File ID: 2025-01644 10/7/2025

Award Construction Contract and Supplemental Agreement for the North Sacramento-Hagginwood Library Renovation (NSHLR) Project: (C15000850) [Published for 10-Day Review 09/23/2025]

File ID: 2025-01644

Location: 1124 Del Paso Boulevard, District 2

Recommendation: Pass a **Motion**: 1) authorizing the Interim City Manager or designee to execute a construction contract with John F. Otto Inc., dba Otto Construction in an amount not to exceed $7,076,000 for the construction of the North Sacramento-Hagginwood Library Renovation Project (C15000850); and 2) authorizing the Interim City Manager or designee to execute Supplemental Agreement No. 2 to City Agreement No. 2019-1843 with PBK Architects increasing the not-to-exceed amount by $98,730 for a new not-to-exceed amount of $848,730 for construction administration services.

Contact: Ezra Roati, Senior Architect (916) 808-5877 eroati@cityofsacramento.org; David R. Avila, Supervising Architect (916) 808-7501 dravila@cityofsacramento.org; James Christensen, Facilities Manager (916) 808-5863 jechristensen@cityofsacramento.org, Department of Public Works

Presenter: None

Attachments:
1-Description/Analysis
2-Contract- John F. Otto, Inc., dba Otto Construction
3-Contract Amendment PBK Architects

Description/Analysis
Issue Detail: The North Sacramento-Hagginwood Library (NSHL) was established in 1987 by merging the North Sacramento and Hagginwood branches of the Sacramento Public Library System. Currently, NSHL operates in a leased 4,000 square foot building, which is too small to meet community needs. In September 2021, the City bought a 19,000 square foot building, previously occupied by Sacramento News and Review, to be the new NSHL.

In collaboration with the Sacramento Library Authority, the City secured $7,245,240 from California's Building Forward Grant for the relocation project. Combined with City funds, this grant will cover the

renovation costs.

PBK Architects was hired in August 2022 to create design renderings, complete the Construction Documents, and obtain a building permit. PBK will also oversee Construction Administration until the project's completion.

Policy Considerations: The recommendations contained in this report are consistent with Sacramento City Code Section 3.56 requiring City Council approval for agreements equal to or greater than $250,000.

The Sacramento City Code Section 3.04.20 requiring City Council approval to execute contract amendments that are greater than 10% of the original contract price.

The Sacramento City Code Section 4.04.020 and the City Council Rules of Procedure (Chapter 7, Section E.2.d) which require that unless waived by 2/3 vote of the of the City Council, all labor agreements, and all agreements greater than $1,000,000 shall be made available to the public at least ten (10) days prior to City Council Action. This item was published for 10-day review on September 23, 2025, in compliance with the City Code.

Economic Impacts: The recommended contract is expected to create 52.33 jobs (33.24 direct jobs and 19.09 jobs through indirect and induced activities) and create $6,095,964 in total economic output ($4,426,902 of direct output and another $2,479,061 of output in indirect and induced activities).

The indicated economic impacts are estimates calculated using a calculation tool developed by the Center for Strategic Economic Research (CSER). CSER utilized the IMPLAN input-output model (2009 coefficients) to quantify the economic impacts of a hypothetical $1 million of spending in various construction categories within the City of Sacramento in an average one-year period. Actual impacts could differ significantly from the estimates and neither the City of Sacramento nor CSER shall be held responsible for consequences resulting from such differences.

Environmental Considerations:

California Environmental Quality Act (CEQA): The action is exempt from review under the California Environmental Quality Act (CEQA) pursuant to CEQA Guidelines, Section 15301. The action involves the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, or mechanical equipment, involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination. The exemption covers interior or exterior alterations involving such things as interior partitions, plumbing, and electrical conveyances; and similar facilities; restoration or rehabilitation of deteriorated or damaged structures, facilities, or mechanical equipment to meet current standards of public health and safety, unless it is determined that the damage

was substantial and resulted from an environmental hazard such as earthquake, landslide, or flood. The project qualifies for a Categorical Exemption under Article 19 of CEQA Guidelines Section 15301, existing facilities. No environmental review is necessary.

Sustainability: Not applicable

Commission/Committee Action: Not applicable

Rationale for Recommendation: On April 16, 2025, the Department of Public Works issued Request for Qualifications (RFQ) No. Q25014541001 to pre-qualify Construction firms that have the experience, expertise, and capacity to complete the construction of the North Sacramento-Hagginwood Library Remodel Project. The City received 12 proposals, and a selection committee reviewed the Statement of Qualifications and scored them based on a predetermined list of qualifications. After evaluating responses, and discussion the panel members in collaboration with the Sacramento Library Authority determined the most qualified contractors to move forward on to the second phase. Five Contractors were selected as the most -qualified firms to provide competitive pricing for construction.

On July 18, 2025, the Department of Public Works issued bid documents to the five (5) pre-qualified contractors with a due date of August 26, 2025. City staff received the following four bids:

CONTRACTOR	BID AMOUNT	LBE %
John F. Otto, Inc.	$6,813,000	Yes
Swinerton Builders	$7,001,463	Yes
Unger Construction	$7,218,282	Yes
Whiting-Turner	$8,531,430	Yes

John F. Otto, Inc. was the lowest responsive and responsible bidder with a base bid of $6,813,000. City staff recommend entering into a contract with John F. Otto, Inc. in an amount not to exceed $7,076,000 which includes two additive alternatives. Staff also recommend increasing the contract with PBK Architects by $98,730 for a new not-to-exceed amount of $848,730 for construction administration services.

Financial Considerations: The North Sacramento Library Relocation Project (C15000850) has sufficient funds within General Fund and Matching Grant Fund 3704 to cover the cost of construction and all other project related costs, including project management and construction administration.

Local Business Enterprise (LBE): John F. Otto, Inc. dba Otto Construction is an LBE

AGREEMENT
(Construction Contract Over $25,000)

THIS AGREEMENT, dated for identification _____, 2025, is made and entered into between the CITY OF SACRAMENTO, a municipal corporation ("City"), and **John F. Otto, dba Otto Construction, 1717 2nd Street, SACRAMENTO, CA 95811, ("Contractor") in the amount of SEVEN MILLION SEVENTY-SIX THOUSAND DOLLARS AND ZERO CENTS ($7,076,000.00)**

The City and Contractor hereby mutually agree as follows:

1. CONTRACT DOCUMENTS

The Contract Documents, sometimes also referred to as the "Contract," consist of the following items, which are hereby incorporated by reference as if set forth in full in this Agreement:

Notice to Contractors
Proposal Form submitted by the Contractor
Instructions to Bidders
Subcontractor and Local Business Enterprise Participation Form
Drug-Free Workplace Policy and Affidavit
Construction and Demolition (C&D) Debris Recycling Requirements
Workers' Compensation Insurance Certification
Federal or State funding requirements (if applicable)
Local Business Enterprise (LBE) Requirements
Requirements of the Non-Discrimination in Employee Benefits Code
Ban-The-Box Requirements
Addenda, if any
This Agreement
Standard Specifications
Special Provisions
Plans and Technical Specifications
The drawings and other data and all developments thereof prepared by City pursuant to the Contract
Any modifications of any of the foregoing made or approved by City, including but not limited to duly authorized change orders

Unless specifically noted otherwise, references to the "Standard Specifications" shall mean and refer to the Standard Specifications for Public Construction of the City of Sacramento approved by the Sacramento City Council on November 10, 2020 (Resolution No. 2020-0354), and any subsequent amendments thereto approved by the Sacramento City Council or the Sacramento City Manager. Work called for in any one Contract Document and not mentioned in another is to be performed and executed as if mentioned in all Contract Documents. The table of contents, titles and headings contained in the Contract Documents are provided solely to facilitate reference to various provisions of the Contract Documents and in no way affect or limit the interpretation of the provisions to which they refer.

2. DEFINITIONS

Unless otherwise specifically provided herein, all words and phrases defined in the Standard Specifications shall have the same meaning and intent in this Agreement.

3. AGREEMENT CONTROLS

In the event of a conflict between any of the terms and conditions set forth in this Agreement and the terms and conditions set forth in other Contract Documents, the terms and conditions set forth in this Agreement shall prevail, except that the provisions of any duly authorized change order shall prevail over any conflicting provisions of this Agreement.

4. SCOPE OF CONTRACT

Contractor agrees to furnish all tools, equipment, apparatus, facilities, labor, material, and transportation necessary to perform and complete in a good and workmanlike manner to the satisfaction of City, all the Work called for in the Contract Documents entitled:

North Sacramento-Hagginwood Library Roof Replacement and Remodel
PN: C15000850

Including the Work called for in the following alternative bid items described in the Proposal Form:

Additive Alternative #1 in Remodel Drawings- Cut Openings and (13) Tubular Skylights
Additive Alternative #2 in Remodel Drawings- Demo front Glazing & New Storefront

Contractor agrees to perform such Work in the manner designated in and in strict conformity with the Contract Documents.

5. CONTRACT AMOUNT AND PAYMENTS

City agrees to pay, and Contractor agrees to accept, as complete payment for the above Work, in accordance with the schedule and procedures set forth in the Contract Documents and subject to deductions, withholdings and additions as specified in the Contract Documents, a total sum that shall not exceed the total bid amount set forth in Contractor's Proposal Form. In addition, subject to deductions, withholdings, and additions as specified in the Contract Documents, payment for individual items of the Work shall be computed as follows:

A. For items of the Work for which a lump sum price is specified in Contractor's Proposal Form, Contractor shall be paid the lump sum price(s) specified in Contractor's Proposal Form; and

B. For items of the Work for which a unit price is specified in Contractor's Proposal Form, Contractor shall be paid the sum computed at such unit price, or computed at a different price if such different price is determined by City in accordance with the Standard Specifications, based on the actual amount of each such item performed and/or furnished and incorporated in the Work; provided that in no event shall the total sum for a unit price item exceed the total bid amount set forth for such item in the Contractor's Proposal Form, unless authorized by Change Order.

6. PROGRESS PAYMENTS

Subject to the terms and conditions of the Contract, City shall cause payments to be made upon demand of Contractor as follows:

A. On or about the first of the month, the Engineer shall present to the Contractor a statement showing the amount of labor and materials incorporated in the Work through the twentieth (20) calendar day of the preceding month. After both Contractor and Engineer approve the statement in writing, and the City's labor compliance officer provides written approval, the City shall issue a certificate for ninety-five (95) percent of the amount it shall find to be due, subject to any deductions or withholdings authorized or required under the Contract or any applicable Laws or Regulations.

B. No inaccuracy or error in said monthly estimates shall operate to release Contractor from damages arising from such Work or from enforcement of each and every provision of the Contract Documents, and City shall have the right subsequently to correct any error made in any estimate for payment.

C. Contractor shall not be paid for any defective or improper Work.

D. The remaining five (5) percent of the value of the Work performed under the Contract, if unencumbered and subject to any deductions or withholdings authorized or required under the Contract or any applicable Laws or Regulations, shall be released not later than sixty (60) days after completion and final acceptance of the Work by City. Acceptance by Contractor of the final payment shall constitute a waiver of all claims against the City arising under the Contract Documents, except for disputed claims in stated amounts that the Contractor specifically reserves in writing, but only to the extent that the Contractor has complied with all procedures and requirements applicable to the presentation and processing of such claim(s) under the Contract Documents. Contractor shall be entitled to substitute securities for retention or to direct that payments of retention be made into escrow, as provided in Public Contract Code Section 22300, upon execution of the City's Escrow Agreement for Security Deposits in Lieu of Retention.

E. The parties agree that, for purposes of the timely progress payment requirements specified in Public Contract Code Section 20104.50, the date that the City receives a statement jointly approved by the Contractor and the Engineer as provided above shall be deemed to constitute the date that City receives an undisputed and

properly submitted payment request from the Contractor. Progress payments not made within 30 days after this date may be subject to payment of interest as provided in Public Contract Code Section 20104.50.

F. This Contract is subject to compliance monitoring and enforcement by the California Department of Industrial Relations, as specified in California Labor Code section 1771.4.

7. RETENTION OF SUMS CHARGED AGAINST CONTRACTOR

When, under the provisions of this Contract or any applicable Laws or Regulations, City is authorized or required to withhold, deduct, or charge any sum of money against Contractor, City may deduct and retain the amount of such charge from the amount of the next succeeding progress estimate(s), or from any other moneys due or that may become due Contractor from City. If, on completion or termination of the Contract, sums due Contractor are insufficient to pay City's charges, City shall have the right to recover the balance from Contractor or its Sureties.

8. COMMENCEMENT AND PROSECUTION OF WORK

Contractor shall commence the Work not later than fifteen (15) working days after the date of the written Notice to Proceed from City to Contractor and shall diligently prosecute the Work to final completion. The phase "commence the Work" means to engage in a continuous program on-site including, but not limited to, site clearance, grading, dredging, land filling and the fabrications, erection, or installation of the Work. The Notice to Proceed shall be issued within fifteen (15) calendar days following execution of the Agreement by the City and the filing by Contractor of the required Bonds and proof of insurance, provided that the Engineer may delay issuance of the Notice to Proceed if the Engineer determines in the Engineer's sole discretion that conditions on the site of the Work are unsuitable for commencement of the Work. After the Notice to Proceed is issued, the continuous prosecution of Work by Contractor shall be subject only to Excusable Delays as defined in this Agreement.

9. TIME OF COMPLETION

The entire Work shall be brought to completion in the manner provided for in the Contract Documents on or before **TWO HUNDRED SEVENTY (270) CALENDAR** days from the date of the Notice to Proceed (hereinafter called the "Completion Date") unless extensions of time are granted in accordance with the Contract Documents.

Failure to complete the entire Work by the Completion Date and in the manner provided for in the Contract Documents shall subject Contractor to liquidated damages as provided in this Agreement. Time is and shall be of the essence in the performance of the Contract and the Work.

10. PAYMENTS DO NOT IMPLY ACCEPTANCE OF WORK

The payment of any progress payment, or the acceptance thereof by Contractor, shall not constitute acceptance of the Work or any portion thereof and shall in no way reduce the

liability of Contractor to replace unsatisfactory work or material, whether or not the unsatisfactory character of such work or material was apparent or detected at the time such payment was made.

11. ACCEPTANCE NOT RELEASE

Contractor shall correct immediately any defective or imperfect work or materials that may be discovered before final acceptance of the entire Work, whether or not such defect or imperfection was previously noticed or identified by the City. The inspection of the Work, or any part thereof, shall not relieve Contractor of any of its obligations to perform satisfactory work as herein specified.

Failure or neglect on the part of City or any of its officers, employees or authorized agents to discover, identify, condemn or reject defective or imperfect work or materials shall not be construed to imply an acceptance of such work or materials, if such defect or imperfection becomes evident at any time prior to final acceptance of the entire Work, nor shall such failure or neglect be construed as barring City from enforcing Contractor's warranty(ies) or otherwise recovering damages or such a sum of money as may be required to repair or rebuild the defective or imperfect work or materials whenever City may discover the same, subject only to any statutes of limitation that may apply to any such claim.

12. CITY'S RIGHT TO TAKE POSSESSION OF THE WORK IN WHOLE OR IN PART

The City shall have the right at any time to enter upon the Work and perform work not covered by this Contract, or to occupy and use a portion of the Work, prior to the date of the final acceptance of the Work as a whole, without in any way relieving Contractor of any obligations under this Contract.

13. NO WAIVER OF REMEDIES

Neither the inspection by City, its officers, employees or agents, nor any certificate or other approval for the payment of money, nor any payment for, nor acceptance of the whole or any part of the Work by City, nor any extensions of time, nor any position taken by City, its officers, employees or its agents shall operate as a waiver of any provision of the Contract Documents nor of any power herein reserved to City or any right to damages herein provided, nor shall any waiver of any breach of this Agreement be held to be a waiver of any other or subsequent breach. All remedies provided in the Contract Documents shall be taken and construed as cumulative; in addition to each and every other remedy herein provided, the City shall have any and all equitable and legal remedies that it would in any case have.

14. WARRANTY

Except as otherwise expressly provided in the Contract Documents, and excepting only items of routine maintenance, ordinary wear and tear and unusual abuse or neglect by City, Contractor warrants and guarantees all Work executed and all supplies, materials and devices of whatsoever nature incorporated in or attached to the Work, or otherwise provided as a part of the Work pursuant to the Contract, to be absolutely free of all defects

of workmanship and materials for a period of one year after final acceptance of the entire Work by the City. Contractor shall repair or replace all work or material, together with any other work or material that may be displaced or damaged in so doing, that may prove defective in workmanship or material within this one-year warranty period without expense or charge of any nature whatsoever to City.

In the event that Contractor shall fail to comply with the conditions of the foregoing warranty within ten (10) days after being notified of the defect in writing, City shall have the right, but shall not be obligated, to repair, or obtain the repair of, the defect and Contractor shall pay to City on demand all costs and expense of such repair. Notwithstanding anything herein to the contrary, in the event that any defect in workmanship or material covered by the foregoing warranty results in a condition that constitutes an immediate hazard to public health or safety, or any property interest, or any person, City shall have the right to immediately repair, or cause to be repaired, such defect, and Contractor shall pay to City on demand all costs and expense of such repair. The foregoing statement relating to hazards to health, safety or property shall be deemed to include both temporary and permanent repairs that may be required as determined in the sole discretion and judgment of City.

In addition to the above, the Contractor shall make a written assignment of all manufacturers and other product warranties to the City, prior to completion and final acceptance of the Work by City.

The Contractor's Performance Bond shall secure the performance of the Contractor's obligations under this Section 14, and the Contractor and its Surety shall be jointly and severally liable for these obligations.

15. LIQUIDATED DAMAGES IF WORK NOT COMPLETED ON TIME

A. The actual fact of the occurrence of damages and the actual amount of the damages that City would suffer if the entire Work, and/or any specified portion thereof, were not completed within the time(s) specified herein are dependent upon many circumstances and conditions that could prevail in various combinations, and for this reason, it is impracticable and extremely difficult to fix the actual damages. Damages that City would suffer in the event of such delay include: loss of the use of the project; expenses of prolonged assignment to the project of an architectural and/or engineering staff; prolonged costs of administration, inspection, and supervision; increased operational expenses and/or impaired operation of other facilities dependent upon completion of the project; and the loss and inconvenience suffered by the public within the City of Sacramento by reason of the delay in the completion of the project or portion thereof. Accordingly, the parties agree, and by execution of this Agreement, Contractor acknowledges that it understands and agrees, that the amount(s) set forth herein as liquidated damages reflect the parties' best efforts at the time of entering into the Contract to estimate the damages that may be incurred by City and the public due to the Contractor's delay in completion of the Work and/or any specified portion thereof, and shall be presumed to be the amount of damages

sustained by the failure of Contractor to complete the entire Work and/or any specified portion thereof within the time(s) specified herein.

B. Contractor shall pay liquidated damages to City for failure to complete the entire Work by the Completion Date (as extended in accordance with the Contract Documents, if applicable) in the amount of **$ 3,428.00** a day for each calendar day after the Completion Date (as extended in accordance with the Contract Documents, if applicable), continuing to the time at which the entire Work is completed. Such amount is the actual cash value agreed upon by the City and Contractor as the loss to City and the public resulting from Contractor's default.

The parties agree, and by execution of this Agreement, Contractor acknowledges that it understands and agrees, that the foregoing provisions provide for the imposition of liquidated damages from the Completion Date (as extended in accordance with the Contract Documents, if applicable) until the date of completion of the entire Work as determined by the Engineer in accordance with Section 8-4 of the Standard Specifications, whether or not the Work or any portion thereof is claimed or determined to be substantially complete prior to such date of completion.

C. In the event Contractor shall become liable for liquidated damages, City, in addition to all other remedies provided by law, shall have the right to withhold any and all payments that otherwise would be or become due Contractor until the liability of Contractor under this section is finally determined. City shall have the right to use and apply such payments, in whole or in part, to reimburse City for all liquidated damages due or to become due to City. Any remaining balance of such payments shall be paid to Contractor only after discharge in full of all liability incurred by Contractor under this section or otherwise under any provision of the Contract Documents or any applicable Law or Regulation. If the sum so retained by City is not sufficient to discharge all such liabilities of Contractor, Contractor shall continue to remain liable to City until all such liabilities are satisfied in full. No failure by City to withhold any payment as specified above shall in any manner be construed to constitute a release of any such liabilities nor a waiver of the City's right to withhold payment for such liabilities.

16. INDEMNITY AND HOLD HARMLESS

A. Contractor shall defend, hold harmless and indemnify the City, its officers, employees, and agents, and each and every one of them, from and against any and all actions, damages, costs, liabilities, claims, demands, losses, judgments, penalties, costs and expenses of every type and description, whether arising on or off the site of the Work, including, but not limited to, any fees and/or costs reasonably incurred by City's staff attorneys or outside attorneys and any fees and expenses incurred in enforcing this provision (hereafter collectively referred to as "Liabilities"), including but not limited to Liabilities arising from personal injury or death, damage to personal, real or intellectual property or the environment, contractual or other economic damages, or regulatory penalties, arising out of or in any way connected with performance

of or failure to perform the Work by the Contractor, any subcontractor or agent, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, whether or not (i) such Liabilities are caused in part by a party indemnified hereunder, or (ii) such Liabilities are litigated, settled or reduced to judgment; provided that the foregoing indemnity does not apply to liability for damages for death or bodily injury to persons, injury to property, or other loss, damage or expense to the extent arising from (i) the sole negligence or willful misconduct of, or defects in design furnished by, City, its agents, servants, or independent contractors who are directly responsible to City, or (ii) the active negligence of City.

B. The existence or acceptance by City of any of the insurance policies or coverages described in this Agreement shall not affect or limit any of City's rights under this Section 16, nor shall the limits of such insurance limit the liability of Contractor hereunder. The provisions of this Section 16 shall survive any expiration or termination of the Contract.

17. CONTRACTOR SHALL ASSUME RISKS

Until the completion and final acceptance by City of all Work under this Contract, the Work shall be under Contractor's responsible care and charge, and Contractor, at no cost to City, shall rebuild, repair, restore and make good all injuries, damages, re-erections, and repairs occasioned or rendered necessary by accidental causes of any nature, to all or any portions of the Work.

18. GENERAL LIABILITY OF CONTRACTOR

Except as otherwise herein expressly stipulated, Contractor shall perform all the Work and furnish all the labor, materials, tools, equipment, apparatus, facilities, transportation, power and light, and appliances, necessary or proper for performing and completing the Work herein required in the manner and within the time herein specified. The mention of any specific duty or liability of Contractor shall not be construed as a limitation or restriction of any general liability or duty of Contractor, and any reference to any specific duty or liability shall be construed to be solely for the purpose of explanation.

19. INSURANCE

During the entire term of the Contract, Contractor shall maintain the insurance coverage described in this Section 19.

Full compensation for all premiums that Contractor is required to pay for the insurance coverage described herein shall be included in the compensation specified for the Work performed by Contractor under this Contract. No additional compensation will be provided for Contractor's insurance premiums. Any available insurance proceeds in excess of the specified minimum limits and coverages shall be available to the City.

It is understood and agreed by the Contractor that its liability to the City shall not in

any way be limited to or affected by the amount of insurance coverage required or carried by the Contractor in connection with this Contract.

A. Minimum Scope & Limits of Insurance Coverage

(1) Commercial General Liability Insurance providing coverage at least as broad as ISO CGL Form 00 01 on an occurrence basis for bodily injury, including death, of one or more persons, property damage, and personal injury, arising out of activities performed by or on behalf of Contractor and its subcontractors, products and completed operations of Contractor and its subcontractors, and premises owned, leased, or used by Contractor and its subcontractors, with limits of not less than three million dollars ($3,000,000) per occurrence. The policy shall provide contractual liability and products and completed operations coverage for the term of the policy.

(2) Automobile Liability Insurance providing coverage at least as broad as ISO Form CA 00 01 for bodily injury, including death, of one or more persons, property damage, and personal injury, with limits of not less than one million dollars ($1,000,000) per accident. The policy shall provide coverage for owned, non-owned, and/or hired autos as appropriate to the operations of the Contractor.

No automobile liability insurance shall be required if Contractor completes the following certification:

> "I certify that a motor vehicle will not be used in the performance of any work or services under this agreement." _____ (Contractor initials)

(3) Excess Insurance: The minimum limits of insurance required above may be satisfied by a combination of primary and umbrella or excess insurance coverage; provided that any umbrella or excess insurance shall contain, or be endorsed to contain, a provision that it shall apply on a primary basis for the benefit of the CITY, and any insurance or self-insurance maintained by CITY, its officials, employees, or volunteers shall be in excess of such umbrella or excess coverage and shall not contribute with it.

(4) Workers' Compensation Insurance with statutory limits, and Employers' Liability Insurance with limits of not less than one million dollars ($1,000,000). The Workers' Compensation policy shall include a waiver of subrogation in favor of the City.

No Workers' Compensation insurance shall be required if Contractor completes the following certification:

> "I certify that my business has no employees, and that I do not employ anyone. I am exempt from the legal requirements to provide Workers' Compensation insurance." _____ (Contractor initials)

A. (5) Property Insurance.

(1) CONTRACTOR shall purchase and maintain without interruption, in a company or companies lawfully authorized to do business in California, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the full replacement cost with a $10,000 deductible. Earth movement/Earthquake coverage will not be included, as the CITY has directed this will be self-insured by the CITY based on maximum probable loss of the new improvements. Such property insurance shall be maintained, otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until completion and final acceptance of all Work or until no person or entity other than the CITY has an insurable interest in the property required to be covered, whichever is later. This insurance shall provide for losses to be payable directly to the CITY, CONTRACTOR, or any Subcontractor, as named insureds or loss payees, as their interests may appear. The policy shall have no coinsurance penalty provisions.

(2) This property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of lightning, fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, flood, windstorm, water damage, damage caused by frost and freezing, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for the CONTRACTOR's or architect's services and expenses (including the services and expenses of subcontractors and subconsultants) required as a result of such insured loss. This property insurance shall include comprehensive boiler and machinery coverage including coverage for installation and testing. The policy shall contain flood limits of $ 1,000,000.

(3) This property insurance shall cover portions of the Work stored on and off the Project site, and also portions of the Work in transit. CONTRACTOR shall be responsible for any claim in an amount less than $10,000.

(4) CITY will provide coverage for existing structure and will secure a Waiver of Subrogation in favor of the CONTRACTOR from their insurance carrier. CONTRACTOR and CITY by the nature of the Builder Risk mutually waive subrogation in regard to property coverage for the new work to be installed. Upon CITY's written notification to CONTRACTOR of CITY's election to do so, provided at any time prior to CITY's acceptance of the GMP, CONTRACTOR shall have no obligation to provide property insurance coverage under this subsection G, and any costs incurred by CONTRACTOR to obtain property insurance coverage of any kind with respect to the Work shall be the sole responsibility of CONTRACTOR and shall not be paid by CITY. CONTRACTOR shall provide suitable written evidence of such coverage to CITY not more than 30 days after CITY's acceptance of the GMP. CITY shall be responsible for the deductible for the CITY's property policy, except that CONTRACTOR shall fund the first $10,000 of any claim made against the Builders Risk policy.

(1) Pollution Liability.

a) Prior to, and as a condition of, CITY's acceptance of the GMP, CONTRACTOR shall obtain Pollution Liability insurance. This insurance shall be written in comprehensive form either as a separate policy or as an endorsement to CONTRACTOR's general liability coverage and shall cover liability for bodily injury, property damage, and environmental damage resulting from pollution and related cleanup costs incurred, all arising out of any Work to be performed under the Contract, including liability for and defense of lawsuits and regulatory actions. Coverage shall be provided for both work performed on site, as well as during the transport of hazardous materials. Coverage shall apply to sudden as well as gradual pollution conditions, including without limitation conditions resulting from the escape or release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids, or gases, natural gas, waste materials, or other irritants, contaminants, or pollutants, including asbestos. The liability limits shall be not less than:

1. Combined Single Limit for each occurrence: $1,000,000.
2. General Aggregate: $2,000,000.

b) If the any coverage required is written on a claims-made coverage form:

1. The retroactive date must be shown, and this date must be before the award date of the Contract.
2. Insurance must be maintained, and evidence of insurance must be provided for at least five years after final payment.
3. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a retroactive date prior to the Contract award date, the CONTRACTOR must purchase extended reporting period coverage for a minimum of five years after final payment.
4. A copy of the claims reporting requirements must be submitted to the CITY for review.
5. If the Work involves lead-based paint or asbestos identification/remediation, the CONTRACTOR's Pollution Liability policy shall not contain lead-based paint or asbestos exclusions. If the Work involves mold identification/remediation, the CONTRACTOR's Pollution Liability policy shall not contain a mold exclusion, and the definition of Pollution shall include microbial matter, including mold.

B. Additional Insured Coverage

(1) Commercial General Liability Insurance: The City, its officials, employees, and volunteers shall be covered by policy terms or endorsement as additional insureds as respects general liability arising out of: activities performed by or on behalf of Contractor and its subcontractors; products and completed operations of Contractor and its subcontractors; and premises owned, leased, or used by Contractor and its subcontractors.

(2) Automobile Liability Insurance: The City, its officials, employees, and volunteers shall be covered by policy terms or endorsement as additional insureds as respects auto liability.

C. Other Insurance Provisions

The policies are to contain, or be endorsed to contain, the following provisions:

(1) Contractor's insurance coverage, including excess insurance, shall be primary insurance as respects City, its officials, employees, and volunteers. Any insurance or self-insurance maintained by City, its officials, employees, or volunteers shall be in excess of Contractor's insurance and shall not contribute with it.

(2) Any failure to comply with reporting provisions of the policies shall not affect coverage provided to City, its officials, employees, or volunteers.

(3) Coverage shall state that Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

(4) City will be provided with thirty (30) days written notice of cancellation or material change in the policy language or terms.

D. Acceptability of Insurance

Insurance shall be placed with insurers with a Bests' rating of not less than A:VI. Self-insured retentions, policy terms or other variations that do not comply with the requirements of this Section 3 must be declared to and approved by the City in writing prior to execution of this Contract.

E. Verification of Coverage

(1) Contractor shall furnish City with certificates and required endorsements evidencing the insurance required. Copies of policies shall be delivered to the City on demand. Certificates of insurance shall be signed by an authorized representative of the insurance carrier.

(2) For all insurance policy renewals during the term of this Contract, Contractor shall send insurance certificates reflecting the policy renewals directly to:

City of Sacramento
c/o EXIGIS LLC
P.O. Box 947
Murrieta, CA 92564

Insurance certificates also may be faxed to (888) 355-3599, or e-mailed to:
certificates-sacramento@riskworks.com

(3) The City may withdraw its offer of contract or cancel this Contract if the certificates of insurance and endorsements required have not been provided prior to execution of this Contract. The City may withhold payments to Contractor or cancel the Contract if the insurance is canceled or Contractor otherwise ceases to be insured as required herein.

F. Subcontractors

Contractors shall require and verify that all subcontractors maintain insurance coverage that meets the minimum scope and limits of insurance coverage specified in subsection A, above. However, insurance requirements will only apply to workers' compensation coverage and commercial and automobile liability insurance with policy limits of at least $1,000,000.

20. FAILURE TO MAINTAIN BONDS OR INSURANCE

If, at any time during the performance of this Contract, Contractor fails to maintain any item of the bonds and/or insurance required under the Contract in full force and effect, Contractor shall immediately suspend all work under the Contract and notify City in writing of such failure. After such notice is provided, or if City discovers such failure and notifies Contractor, the City thereafter may withhold all Contract payments due or that become due until notice is received by City that such bonds and/or insurance have been restored in full force and effect and that the premiums therefor have been paid for a period satisfactory to the Division of Risk Management. Contractor shall not resume work until notified by City to do so, and the City shall have no responsibility or liability for any costs incurred by Contractor as a result of such suspension of Work.

In addition to the foregoing, any failure to maintain any item of the required bonds and/or insurance at any time during the performance of this Contract will be sufficient cause for termination of the Contract by City.

The Contractor shall be solely responsible for, and shall defend, indemnify, and hold harmless the City, its officers, employees and agents against and from, any and all damages, claims, losses, actions, costs or other expenses of any kind incurred by any party as a direct or indirect result of any suspension of Work or termination of the Contract under the provisions of this Section.

21. EXCUSABLE DELAYS

For the purpose of these Contract Documents, the term "Excusable Delay" shall mean, and is limited to, delay caused directly by: acts of God; acts of a public enemy; fires; inclement weather as determined by the Engineer; riots; insurrections; epidemics; quarantine restrictions; strikes; lockouts; sitdowns; acts of a governmental agency;

priorities or privileges established for the manufacture, assemble, or allotment of materials necessary in the Work by order, decree or otherwise of the United States or by any department, bureau, commission, committee, agent, or administrator of any legally constituted public authority; changes in the Work ordered by City insofar as they necessarily require additional time in which to complete the Work; the prevention of Contractor from commencing or prosecuting the Work because of the acts of others, excepting Contractor's subcontractors or suppliers; or the prevention of Contractor from commencing or prosecuting the Work because of a Citywide failure of public utility service.

The term "Excusable Delay" shall specifically not include: (i) any delay that could have been avoided by the exercise of care, prudence, foresight and diligence on the part of Contractor; (ii) any delay in the prosecution of any part of the Work that does not constitute a Controlling Operation, whether or not such delay is unavoidable; (iii) any reasonable delay resulting from time required by City for review of any Contractor submittals and for the making of surveys, measurements and inspection; and, (iv) any delay arising from an interruption in the prosecution of the Work on account of reasonable interference by other Contractors employed by City that does not necessarily prevent the completion of the entire Work within the time specified. Excusable Delays, if any, shall operate only to extend the Completion Date (not in excess of the period of such delay as determined by City) and shall not under any circumstances increase the amount City is required to pay Contractor except as otherwise provided in these Contract Documents.

22. CONTRACTOR TO SERVE NOTICE OF DELAYS

Whenever Contractor foresees any delay in the prosecution of the Work, and in any event as soon as possible (not to exceed a period of ten (10) calendar days) after the initial occurrence of any delay that Contractor regards as or may later claim to be an Excusable Delay, the Contractor shall notify the Engineer in writing of such delay and its cause, in order that the Engineer: (i) may take immediate steps to prevent if possible the occurrence or continuance of the delay; or (ii) if this cannot be done, may determine whether the delay is to be considered excusable, how long it continues, and to what extent the prosecution and completion of the Work are delayed thereby. Said written notice shall constitute an application for an extension of time only if the notice requests such an extension and sets forth the Contractor's estimate of the additional time required together with a full description of the cause of the delay relied upon.

After the completion of any part or whole of the Work, the Engineer, in estimating the amount due Contractor, will assume that any and all delays that may have occurred in its prosecution and completion were not Excusable Delays, except for such delays for which the Contractor has provided timely written notice as required herein, and that the Engineer has found to be excusable. Contractor shall not be entitled to claim Excusable Delay for any delay for which the Contractor failed to provide such timely written notice.

23. EXTENSION OF TIME

If the Contractor complies with Section 22, above, and the Engineer finds a delay claimed by the Contractor to be an Excusable Delay, the Contractor shall be allowed an extension

of time to complete the Work that is proportional to the period of Excusable Delay determined by the Engineer, subject to the approval by City of a change order granting such time extension. During a duly authorized extension for an Excusable Delay, City shall not charge liquidated damages against the Contractor for such delay.

If the City extends the time to complete the Work as provided herein, such extension shall in no way release any warranty or guarantee given by Contractor pursuant to the provisions of the Contract Documents, nor shall such extension of time relieve or release the sureties of the Bonds provided pursuant to the Contract Documents. By executing such Bonds, the Sureties shall be deemed to have expressly agreed to any such extension of time. The granting of any extension of time as provided herein shall in no way operate as a waiver on the part of City of its rights under this Contract, excepting only extension of the Completion Date for such period of Excusable Delay as may be determined by the Engineer and approved by a duly authorized change order.

24. NO PAYMENT FOR DELAYS

No damages or compensation of any kind shall be paid to Contractor or any subcontractor because of delays in the progress of the Work whether or not such delays qualify for extension of time under this Agreement; except that this provision shall not preclude the recovery of damages for a delay caused by the City that is unreasonable under the circumstances and that is not within the contemplation of the parties, provided that the Contractor timely submits all such written notice(s) and fully complies with such other procedures as may be specified in the Contract Documents or any Laws or Regulations for Contractor to claim damages for such delay.

25. CHANGES IN THE WORK

Changes in the Work authorized or directed in accordance with the Contract Documents and extensions of time of completion made necessary by reason thereof shall not in any way release any warranty or guarantee given by Contractor pursuant to the provisions of the Contract Documents, nor shall such changes in the Work relieve or release the Sureties on Bonds provided pursuant to the Contract Documents. By executing such Bonds, the Sureties shall be deemed to have expressly agreed to any such change in Work and to any extension of time made by reason thereof.

26. TERMINATION AFTER COMPLETION DATE

In addition to any other rights City may have, if any services or work required under the Contract (including but not limited to punch list items) are not completed as of the Completion Date (as adjusted by any extensions of time for Excusable Delays granted pursuant to the Contract Documents), City may terminate the Contract at any time after the Completion Date (as adjusted by any extensions of time for Excusable Delays granted pursuant to the Contract Documents), by providing a written notice to Contractor specifying the date of termination. Such notice also may specify conditions or requirements that Contractor must meet to avoid termination of the Contract on such date. If Contractor fails to fulfill all such conditions and requirements by such termination date, or, if no such conditions or requirements are specified, Contractor shall cease rendering services and performing work on such termination date and shall not be

entitled to receive any compensation for services rendered or work performed after such termination date. In the event of such termination, Contractor shall remain liable to City for liquidated damages incurred for any period of time prior to the termination date.

In addition to any other charges, withholdings or deductions authorized under the Contract or any Laws or Regulations, if City terminates the Contract pursuant to this section, City may withhold and deduct from any payment and/or retention funds otherwise due Contractor any sum necessary to pay the City's cost of completing or correcting, or contracting for the completion or correction of, any services or work under the Contract that are not completed to the satisfaction of the City or that otherwise are deficient or require correction as of such termination date, including but not limited to incomplete punch list items. Such costs shall include all of the City's direct and indirect costs incurred to complete or correct such services or work, including the City's administrative and overhead costs. If the amount of payment(s) and/or retention funds otherwise due the Contractor are insufficient to pay such costs, City shall have the right to recover the balance of such costs from the Contractor and/or its Surety(ies).

27. TERMINATION FOR CONVENIENCE

Upon written notice to the Contractor, the City may at any time, without cause and without prejudice to any other right or remedy of the City, elect to terminate the Contract for the convenience of City. In such case, the Contractor shall be paid (without duplication of any items, and after deduction and/or withholding of any amounts authorized to be deducted or withheld by the Contract Documents or any Laws or Regulations):

A. For Work executed in accordance with the Contract Documents prior to the effective date of termination and determined to be acceptable by the Engineer, including fair and reasonable sums for overhead and profit on such Work;

B. For reasonable claims, costs, losses, and damages incurred in settlement of terminated contracts with subcontractors, suppliers, and others; and

C. For reasonable expenses directly attributable to termination.

Contractor shall not be paid for any loss of anticipated profits or revenue for any Work not performed prior to termination, nor for any economic loss arising out of or resulting from such termination, except for the payments listed in this section. Contractor's warranty under Section 14 of this Agreement shall apply, and Contractor shall remain responsible for all obligations related to such warranty, with respect to all portions of the Work performed prior to the effective date of the termination for convenience pursuant to this section. The City shall be entitled to have any or all remaining Work performed by other contractors or by any other means at any time after the effective date of a termination for convenience pursuant to this section.

28. TERMINATION FOR BREACH OF CONTRACT

If Contractor abandons the Work under this Contract, or if the Contract or any portion of the Contract is sublet or assigned without the consent of the City, or if the Engineer determines in the Engineer's sole discretion that the conditions of the Contract in respect to the rate of progress of the Work are not being fulfilled or any part thereof is unnecessarily delayed, or if Contractor violates or breaches, or fails to execute in good faith, any of the terms or conditions of the Contract, or if Contractor refuses or fails to supply enough properly skilled labor or materials or refuses or fails to make prompt payment to subcontractors for material or labor, or if Contractor disregards any Laws or Regulations or proper instruction or orders of the Engineer, then, notwithstanding any provision to the contrary herein, the City may give Contractor and its Sureties written notification to immediately correct the situation or the Contract shall be terminated.

In the event that such notice is given, and, in the event such situation is not corrected, or arrangements for correction satisfactory to the City are not made, within ten (10) calendar days from the date of such notice or within such other period of time as may be specified by the City in the notice, the Contract shall upon the expiration of said period cease and terminate. In the event of any such termination, City may take over the Work and prosecute the Work to completion, or otherwise, and the Contractor and its Sureties shall be liable to City for any cost occasioned City thereby, as hereinafter set forth.

In the event City completes the Work, or causes the Work to be completed, no payment of any kind shall be made to Contractor until the Work is complete. The cost of completing the Work, including but not limited to, extra costs of project administration and management incurred by City, both direct or indirect, shall be deducted from any sum then due, or that becomes due, to Contractor from City. If sums due to Contractor from City are less than the cost of completing the Work, Contractor and its Sureties shall pay City a sum equal to this difference on demand. In the event City completes the Work, and there is a sum remaining due to Contractor after City deducts the costs of completing the Work, then City shall pay such sum to Contractor. The Contractor and Contractor's Sureties shall be jointly and severally liable for all obligations imposed on Contractor hereunder.

No act by City before the Work is finally accepted, including, but not limited to, exercise of other rights under the Contract, actions at law or in equity, extensions of time, payments, assessments of liquidated damages, occupation or acceptance of any part of the Work, waiver of any prior breach of the Contract or failure to take action pursuant to this section upon the happening of any prior default or breach of Contractor, shall be construed to be a waiver or estoppel of the City's right to act pursuant to this Section upon any subsequent event, occurrence or failure by Contractor to fulfill the terms and conditions of the Contract. The rights of City to terminate the Contract pursuant to this Section and pursuant to Sections 26 and 27 are cumulative and are in addition to all other rights of City pursuant to the Contract and at law or in equity.

29. CONTRACTOR BANKRUPT

If Contractor should commence any bankruptcy proceeding, or if Contractor is adjudged a bankrupt, or if Contractor makes any assignment for the benefit of creditors, or if a receiver is appointed on account of Contractor's insolvency, then the City may, without

prejudice to any other right or remedy, terminate the Contract and complete the work by giving notice as provided in Section 28 above.

30. SURETIES' OBLIGATIONS UPON TERMINATION

If the City terminates the Contract pursuant to Section 28 or Section 29 above:

A. The Surety under Contractor's performance bond shall be fully responsible for all of the Contractor's remaining obligations of performance under the Contract as if the Surety were a party to the Contract, including without limitation Contractor's obligations, as provided in the Contract Documents, to complete and provide a one-year warranty of the entire Work, pay liquidated damages and indemnify, defend and hold harmless City, up to the full amount of the performance bond.

B. The Surety under Contractor's payment bond shall be fully responsible for the performance of all of the Contractor's remaining payment obligations for work, services, equipment, or materials performed or provided in connection with the Work or any portion thereof, up to the full amount of the payment bond.

31. ACCOUNTING RECORDS OF CONTRACTOR

During performance of the Contract and for a period of three (3) years after completing the entire Work, Contractor shall maintain all accounting and financial records related to the Contract and performance of the Work in accordance with generally accepted accounting practices and shall keep and make such records available for inspection and audit by representatives of the City upon reasonable written notice.

32. USE TAX REQUIREMENTS

During the performance of this Agreement, CONTRACTOR, for itself, its assignees, and successors in interest, agrees as follows:

A. Use Tax Direct Payment Permit: For all leases and purchases of materials, equipment, supplies, or other tangible personal property used to perform the Agreement and shipped from outside California, the Contractor and any subcontractors leasing or purchasing such materials, equipment, supplies or other tangible personal property shall obtain a Use Tax Direct Payment Permit from the California State Board of Equalization ("SBE") in accordance with the applicable SBE criteria and requirements.

B. Sellers Permit: For any construction contract and any construction subcontract in the amount of $5,000,000 or more, Contractor and the subcontractor(s) shall obtain sellers permits from the SBE and shall register the jobsite as the place of business for the purpose of allocating local sales and use tax to the City. Contractor and its subcontractors shall remit the self-accrued use tax to the SBE, and shall provide a copy of each remittance to the City.

C. The above provisions shall apply in all instances unless prohibited by the funding source for the Agreement.

33. NON-DISCRIMINATION IN EMPLOYEE BENEFITS

This Agreement may be subject to the requirements of Sacramento City Code Chapter 3.54, Non-Discrimination in Employee Benefits by City Contractors. The Contract Documents include a summary of the requirements of Sacramento City Code Chapter 3.54, entitled "Requirements of the Non-Discrimination in Employee Benefits Code." By signing this Agreement, Contractor acknowledges and represents that Contractor has read and understands these requirements and agrees to fully comply with all applicable requirements of Sacramento City Code Chapter 3.54. If requested by City, Contractor agrees to promptly provide such documents and information as may be required by City to verify Contractor's compliance. Any violation by Contractor of Sacramento City Code Chapter 3.54 constitutes a material breach of this Agreement, for which the City may terminate the Agreement and pursue all available legal and equitable remedies.

34. CONSIDERING CRIMINAL CONVICTION INFORMATION IN THE EMPLOYMENT APPLICATION PROCESS

This Agreement may be subject to the requirements of Sacramento City Code Chapter 3.62, Procedures for Considering Criminal Conviction Information in the Employment Application Process. The Contract Documents include a summary of the requirements of Sacramento City Code Chapter 3.62, entitled "Ban-The-Box Requirements." By signing this Agreement, Contractor acknowledges and represents

that Contractor has read and understands these requirements and agrees to fully comply with all applicable requirements of Sacramento City Code Chapter 3.62. If requested by City, Contractor agrees to promptly provide such documents and information as may be required by City to verify Contractor's compliance. Any violation by Contractor of Sacramento City Code Chapter 3.62 constitutes a material breach of this Agreement, for which the City may terminate the Agreement and pursue all available legal and equitable remedies. Contractor agrees to require its subcontractors to fully comply with all applicable requirements of Sacramento City Code Chapter 3.62 and include these requirements in all subcontracts covered by Sacramento City Code Chapter 3.62.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement on the date set for opposite their names.

CONTRACTOR

Under penalty of perjury, I certify that the taxpayer identification number and all other information provided here are correct.

DATE September 11, 2025

BY aeismotto
Allison Otto
Print Name
President
Title

BY aeismotto
Allison Otto
Print Name
President
Title
1000005395
DIR Registration #
94-1431805
Federal ID#
129-5804-7
State ID#
151366
City of Sacramento Business Operation Tax Certificate No. (City will not award contract until Certificate Number is obtained)

Type of Business Entity *(check one)*:

____ Individual/Sole Proprietor
____ Partnership
__X__ Corporation
____ Limited Liability Company
____ Other (*please specify:*_____)

CITY OF SACRAMENTO
a municipal corporation

DATE _____

BY _____
For: Leyne Milstein, Interim City Manager

Original Approved As To Form:

_____
City Attorney

Attest:

_____
City Clerk

CONTRACTOR NAME: John F. Otto, Inc. dba Otto Construction

TO THE HONORABLE CITY COUNCIL
SACRAMENTO, CALIFORNIA:

In compliance with the Contract Documents, the undersigned hereby proposes to furnish all required labor, materials, supervision, transportation, equipment, services, taxes, and incidentals required for:

BID PROPOSAL
North Sacramento-Hagginwood Library
Roof Replacement and Remodel
C15000850

in the City and County of Sacramento, California.

The Work is to be done in strict conformity with the Contract Documents now on file in the Office of the City Clerk, for the following sum:

Item No.	Item Description	Estimated Quantity	Unit	Unit Price	Total
	DIVISION 1- GENERAL CONDITIONS				
1	Temporary Fence, Restrooms and Power	1	LS	$ 5,825	$ 5825
2	SWPPP- BMP's	1	LS	$ 18,502	$ 18,502
3	As-Built Plans and Closeout Docs	1	LS	$ 6,354	$ 6,354
4	Oversight- Superintendent	1	LS	$ 197,874	$ 197,874
5	Temp Security Camera and Camera snapshot of interior (Owner to be given access throughout and all files).	1	LS	$ 6,672	$ 6,672
6	General Conditions- Performance and Payment Bonds required. Any Items Not mentioned above.	1	LS	$ 511,478	$ 511,478
	DIVISION 2- DEMOLITION				
7	Selective Structural Demolition- Shoring, Bracing, Etc.	1	LS	$ 68,818	$ 68,818

8	Selective Demolition- Interior Walls, Roof, Etc.	1	LS	$ 86,361	$ 86,361
9	Remediation- Mold (if occurs), Lead, Asbestos. Note: No lead-paint or asbestos has been found.	1	LS	$ 39000	$ 39000
10	Exterior Demolition	1	LS	$ 19,698	$ 19,698
	DIVISION 3- CONCRETE				
11	Concrete Repairs	1	LS	$ 3,769	$ 3,769
12	Concrete Forming, Reinforcement and Cast-in-Place Concrete	1	LS	$ 44,173	$ 44,173
	DIVISION 4- MASONRY				
13	Masonry infill at existing CMU walls. Refer to structural plans and specs for scope.	1	LS	$ 71,610	$ 71,610
	DIVISION 5- METALS				
14	Structural and Miscellaneous Steel	1	LS	$ 48,716	$ 48,716
15	Cold-Formed Metal Framing	1	LS	$ 61,425	$ 61,425
16	Metal Railings	1	LS	$ 4,236	$ 4,236
	DIVISION 6- WOOD, PLASTICS, COMPOSITE				
17	Rough Carpentry- Trusses, GLBs, etc.	1	LS	$ 569,544	$ 569,544
18	Architectural Woodwork	1	LS	$ 22,469	$ 22,469
19	PLAM cabinets, millwork and countertops	1	LS	$ 60,505	$ 60,505
	DIVISION 7- THERMAL AND MOISTURE PROTECTION				
20	Blanket and Batt Insulation	1	LS	$ 38,655	$ 38,655
21	PVC- TPA Roofing. Note: Certified Tremco installer is required as a subcontractor.	1	LS	$ 566,373	$ 566,373

22	Roof Sheetmetal	1	LS	$ 38,077	$ 38,077
23	Sheetmetal Flashing and Trim	1	LS	$ 102,853	$ 102,853
24	Coping System and Roof Accessories	1	LS	$ 34,704	$ 34,704
25	Firestopping and Fireproofing	1	LS	$ 10,591	$ 10,591
26	Sealants	1	LS	$ 10,591	$ 10,591
	DIVISION 8- OPENINGS				
27	HM Doors and Frames and Wood Doors.	1	LS	$ 49,920	$ 49,920
28	Aluminum Doors and Frames	1	LS	$ 6,354	$ 6,354
29	Tubular Skylights	1	LS	$ see alt	$ see alt
30	Door Hardware	1	LS	$ 49,928	$ 49,928
31	Automatic Door Operators	1	LS	$ 22,143	$ 22,143
32	Glazing and Storefront	1	LS	$ 21,466	$ 21,466
	DIVISION 9- FINISHES				
33	Gypsum Board Assemblies (see Division 5 for Metal Studs).	1	LS	$ 114,378	$ 114,378
34	Ceramic Tile.	1	LS	$ 82,735	$ 82,735
35	Acoustical Ceiling Tiles.	1	LS	$ 9,552	$ 9,552
36	LVT Flooring, Carpet Tile and Resilient Base	1	LS	$ 189,322	$ 189,322
37	Polish/Sealer on Concrete	1	LS	$ 21,181	$ 21,181
38	FRP wall panels	1	LS	$ 4046	$ 4,046
39	Fabric-Covered Acoustical Panels	1	LS	$ 11,120	$ 11,120
40	Sound-Absorbing Ceiling Clouds	1	LS	$ 23,045	$ 23,045

41	Painting and Coatings (Interior and Exterior)	1	LS	$ 104,865	$ 106,865
	DIVISION 10- SPECIALTIES				
42	Markerboards and Tackboards	1	LS	$ 12,725	$ 12,725
43	Signage- Including Interior and Exterior and Monument Sign	1	LS	$ 56,955	$ 56,955
44	Toilet Accessories	1	LS	$ 22,314	$ 22,314
45	Fire Protection Specialties	1	LS	$ 5,233	$ 5,233
46	Aluminum Awnings (Note: Requires Contractor to provide separate Submittal and Permit.)	1	LS	$ 47,657	$ 47,657
	DIVISION 11- EQUIPMENT				
47	Fall Protection on Roof	1	LS	$ 202,149	$ 202,149
48	Miscellaneous equipment.	1	LS	$ 42,892	$ 42,892
	DIVISION 12- FURNISHINGS				
49	Roller Shades	1	LS	$ 16,127	$ 16,127
50	Built-In Furniture (Bookshelves, Front Counter, Etc.)	1	LS	$ 238,181	$ 238,181
	DIVISION 21- FIRE PROTECTION				
52	Fire Sprinkler System including riser, heads, signage, etc.	1	LS	$ 123,875	$ 123,875
53	Fire Alarm System including panel, alert devices, etc. See Div. 27 in Specs	1	LS	$ see 68	$ see 68
54	Fire Alarm and Fire Sprinkler integration (Note See Site scope for site components.	1	LS	$ see 68	$ see 68
	DIVISION 22- PLUMBING				
55	Plumbing- Interior Improvements including infrastructure and fixtures.	1	LS	$ 204,622	$ 204,622

56	Plumbing- Exterior Improvements (Roof- Including Roof Add Alt #1)	1	LS	$ 19,744	$ 19,744
	DIVISION 23- HVAC				
57	HVAC- Rooftop Units and Curbs. Include Roof Package Alt #1.	1	LS	$ 264,043	$ 264,043
58	HVAC- Interior Units including ductwork, registers, thermostats, etc.	1	LS	$ 392,351	$ 392,351
	DIVISION 26- ELECTRICAL				
59	Electrical Panels, breakers and main infrastructure. Include Roof (incl. Roof Add Alt #1) and TI scope.	1	LS	$ 77,602	$ 77,602
60	Low voltage electrical for Roof and Interior. Incl. Roof and TI Scope.	1	LS	$ see 64	$ see 64
61	Raceways, J-Boxes, Grounding and Bonding, Conductors, and Wiring Devices.	1	LS	$ 497,314	$ 497,314
62	Interior and Exterior Lights	1	LS	$ 253443	$ 253,443
63	Lighting Controls	1	LS	$ 54,444	$ 54,444
	DIVISION 27- COMMUNICATIONS				
64	Low voltage conduit, conductors and cabling. Structured Cabling System.	1	LS	$ 152,900	$ 152,900
65	Integration with Library Servers.	1	LS	$ 2,436	$ 2,436
	DIVISION 28- ELECTRONIC SAFETY SECURITY				
66	Access Controls. Card Readers and Panels (All Equip. By Contractor).	1	LS	$ 35,224	$ 35,226
67	CCTV Security Cameras and Panels and Intrusion Detection (All Equip. By Contractor).	1	LS	$ 102,924	$ 102,924
68	Local Alarm System infrastructure (Alarm equipment by Others).	1	LS	$ 79,068	$ 79,068

	DIVISION 31- EARTHWORK				
69	Utility Trenching and Backfill.	1	LS	$ 118,085	$ 118,085
70	Finish Grading	1	LS	$ 83,877	$ 83,877
	DIVISION 32- EXT IMPROVEMENTS				
39	Concrete Pavement and Walkways	1	LS	$ 98,025	$ 98,025
39	Asphalt Slurry Seal, Pavement and Markings. Include Site Signage.	1	LS	$ 65,555	$ 65,555
40	Bollard Gates	1	LS	$ 64,470	$ 64,470
41	Irrigation, Planting, O&M	1	LS	$ 75,470	$ 75,470
	DIVISION 33- UTILITIES				
42	Fire Water Service including Encroachment Permit, Street Water Tap, Asphalt Paving in road, conc. sidewalk, Backflow preventer and cage, and water line up to building.	1	LS	$ 5,943	$ 5,943
43	Signage- Building Address on Backflow and "FACP" and "Fire Riser" signs.	1	LS	$ 5,295	$ 5,295
44	Water Line from Street to Building and up to Fire Riser Connection.	1	LS	$ 22,240	$ 22,240
45	Coord. w/ Fire Sprinklers.	1	LS	$ 15,886	$ 15,886

CONTRACTOR NAME: John F. Otto, Inc. dba Otto Construction ***TOTAL*** $ 1,813,000

The determination of the lowest bidder will be for the LUMP SUM BASE BID LISTED IN THE TOTAL COST as outlined above.

The following items will not be included in the analysis of the bids, but may be added to the project scope:
Additive Alternative #1 in Roof Package Drawings- Included in Base Scope above. All HVAC units are to be replaced.
Additive Alternative #1 in Remodel Drawings- Cut Openings and (13) Tubular Skylights-- $ 154,000
Additive Alternative #2 in Remodel Drawings- Demo front Glazing & New Storefront ----- $ 109,000
Deductive Alternative #1 in Remodel Drawings - Eliminate interior "tree" feature ----------$ (62,800)
Deductive Alternative #2 in Remodel Drawings - Eliminate Tackboard ----------$ (7,000)

SCHEDULE
If awarded the Contract, the undersigned agrees to sign said Contract and furnish the necessary surety bonds and insurance certificates within ten (10) days after receipt of the notice of award of the Contract, and to begin work within fifteen (15) days after the issuance of the Notice to Proceed by the City.

It is understood that this Bid Proposal is based upon completion of the Work within a period **of TWO HUNDRED SEVENTY (270) CALENDAR DAYS.** The Contractor shall refer to Section 1.B Completion Time of the Special Provisions for calculation of the completion date.

DETERMINATION OF LOW BIDDER
SPECIAL CONDITION: THE DETERMINATION OF THE LOW BIDDER WILL BE BASED ON THE BASE BID ONLY. HOWEVER, THE CONTRACT AWARD MAY INCLUDE ALL OR SOME OF THE ADDITIVE ALTERNATIVES. THE CITY RESERVES THE RIGHT TO SELECT WHICH ADDITIVE OR DEDUCTIVE ALTERNATIVES, IF ANY, TO INCLUDE IN THE CONTRACT AWARD IN ADDITION TO THE BASE BID WORK.

CORRECTING BID PROPOSAL: In determining the amount bid by each bidder, the City shall disregard mathematical errors in addition, subtraction, multiplication, and division that appear obvious on the face of the Bid Proposal. When such a mathematical error appears on the face of the Bid Proposal, the City shall have the right to correct such error and to compute the total amount bid by said bidder on the basis of the corrected figure or figures.

When an item price is required to be set forth in the Bid Proposal, and the total for the item set forth separately does not agree with a figure which is derived by multiplying the item price times the Engineer's estimate of the quantity of work to be performed for said item, the item price shall prevail over the sum set forth as the total for the item unless, in the sole discretion of the City, such a procedure would be inconsistent with the policy of the bidding procedure. The total paid for each such item of work shall be based upon the item price and not the total price. Should the Bid Proposal contain only total price for the item and the item price is omitted, the City shall determine the item price by dividing the total price for the item by the Engineer's Estimate of the estimated quantities of work to be performed as items of work.

If the Bid Proposal contains neither the item price nor the total price for the item, then it shall be deemed incomplete, and the Bid Proposal shall be disregarded.

BIDDER'S DECLARATION
The undersigned has examined the location of the proposed Work, the local conditions at the place where the Work is to be done, is familiar with the Contract Documents and is familiar and expressly agrees to the liquidated damages provision of the Contract Documents. The undersigned has carefully checked all of the foregoing figures and understands that the City of Sacramento will not be responsible for any errors or omissions on the part of the undersigned in making up this Bid Proposal.

Enclosed is Bid Proposal Guarantee, as required, consisting of a bidder's bond or other acceptable security for not less than ten percent (10%) of the amount Base Bid Proposal.

Facilities and Real Property Management

The undersigned agrees that all addenda received and acknowledged herein shall become a part of and be included in this Bid Proposal. This Bid Proposal includes the following addenda:

Add. #	1	DATE	08.07.2025
Add. #	2	DATE	08.18.2025
Add. #		DATE	

NOTE: State whether your concern is a corporation, a co-partnership, private individual, or individuals doing business under a firm name. If the Bidder is a corporation, the Bid Proposal must be executed in the name of the corporation and must be signed by a duly authorized officer of the corporation. If the Bidder is a partnership, the Bid Proposal must be executed in the name of the partnership and one of the partners must subscribe their signature thereto as the authorized representative of the partnership.

FOR CITY USE ONLY

BID BOND SECURITY
- ☐ *Properly Signed*
- ☐ *Improperly Signed*
- ☐ *Not Included*
- ☐ *Not Required*

TYPE OF DEPOSIT
- ☐ *Bid Bond*
- ☐ *Cashier/Certified Check*
- ☐ *Other* _____

Initial: _____

CONTRACTOR: John F. Otto, Inc. dba Otto Construction

By: _____
(Signature)

Natalie Hayward
(Print or Type)

Title Vice President/Estimating & Preconstruction
Address 1717 2nd Street, Sacramento, California, 95811
Telephone No. (916) 441-6870
Fax No. (916) 441-6138
EMAIL ADDRESS nhayward@ottoconstruction.com
Date 08/21/2025

PLEASE PRINT CLEARLY AS BID RESULTS WILL BE SENT VIA EMAIL

Contractor's License No. 178809 Type (A,B)
Expiration Date 09/30/2026
Tax I.D. Nos.- Fed. 94-1431805 State California
City of Sacramento Business Operation Tax Certificate No. 151366
(City will not award contract if Certificate Number is missing.)
DIR Registration No. 1000005395

LOCAL BUSINESS ENTERPRISE (LBE)

PARTICIPATION PROGRAM

NOTE: Proposers must provide responses to the following items. Failure to provide a response to each of the items in this section may be grounds for rejection of the proposal.

1. LBE FIVE PERCENT (5%) PARTICIPATION

On April 3, 2012, the Sacramento City Council adopted a Local Business Enterprise (LBE) Preference Program to provide enhanced opportunities for the participation of local business enterprises (LBEs) in the City's contracting and procurement activities. On November 19, 2013, City Council increased the LBE preference and authorized City departments to require minimum LBE participation levels in individual contracts. Under City Code section 3.60.270 , when the bid specifications for a City contract establish a minimum participation level for LBEs, no bidder on the contract shall be considered responsive unless its bid meets the minimum LBE participation level required by the bid specifications.

The City has established a minimum 5% participation level for LBEs on this contract. Pursuant to City Code Section 3.60.270, no bidder on this contract shall be considered responsive unless its bid meets or exceeds this minimum participation level. To qualify for this requirement, bidders must either (a) be an LBE, or (b) subcontract with a qualified LBE.

Detailed information about this program can be found at http://www.cityofsacramento.org/Finance/Procurement/Contract-Ordinances

Local Business Enterprise means a business enterprise, including but not limited to, a sole proprietorship, partnership, limited liability company, corporation, or other business entity that has a legitimate business presence in the city or unincorporated county of Sacramento. Evidence of legitimate business presence in the city or unincorporated county of Sacramento shall include:

1. Having a current City of Sacramento Business Operation Tax or County of Sacramento Business License for at least twelve (12) consecutive months prior to submission of bid; and
2. Having either of the following types of offices or workspace operating legally within the city or unincorporated county of Sacramento for at least twelve (12) consecutive months prior to submission of bid:
    a. The LBE's principle business office or workspace; or
    b. The LBE's regional, branch or satellite office with at least one full time employee located in the city or unincorporated county of Sacramento.

A. LOCAL BUSINESS ENTERPRISE (LBE)

Is the firm submitting the bid qualified as a local business enterprise? Check the appropriate box below:

[X] **YES** - the firm submitting the bid is qualified as a local business enterprise.

[ ] **SUBCONTRACTING/SUPPLIERS** - The firm submitting the bid is qualified by utilizing subcontractors and/or suppliers who qualify as local business enterprises.

[ ] **NO** - the firm submitting the bid is not qualified as a local business enterprise.

If the response to the above is YES, provide the City of Sacramento Business Operations Tax Certificate Number and/or County of Sacramento Business License Number:

151366

If the response to the above is YES, provide a current copy of the City of Sacramento Business Operations Tax Certificate and/or County of Sacramento Business License.

If the response to the above is YES, provide business office or workspace address*:

John F. Otto, Inc

1717 2nd Street

Sacramento, CA 95811

* Address must be a physical address for the basis of location, this excludes P.O. Box addresses.

City of SACRAMENTO
Finance Department

BUSINESS OPERATIONS TAX CERTIFICATE

Business Name	**JOHN F. OTTO, INC.**
Business Address	**1717 2ND ST**
Owner	**ALLISON OTTO**
Type of Business	**Contractors - General**
Tax Classification	**Gross Receipts**
Expires	**12/31/2025**
Mailing Address	**JOHN F. OTTO, INC.** **1717 2ND ST** **SACRAMENTO, CA 95811-6298**

151366

CITY OF SACRAMENTO
DEPARTMENT OF FINANCE
MARK OF AUTHENTICATION

MUST BE POSTED IN CONSPICUOUS PLACE

This certificate is not to be construed as a business license or imply that the City of Sacramento has investigated, or approves or recommends, the holder of this certificate. Any representation to the contrary is fraudulent. This certificate must be renewed within 30 days of expiration.

Starting January 1, 2021, Assembly Bill 1607 requires the prevention of gender-based discrimination of business establishments. A full notice is available in English or other languages by going to: https://www.dca.ca.gov/publications/

151366

TOTAL PAID:
$5,004.00

THIS STUB MAY BE FOLDED/DETACHED BEFORE POSTING

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

2

Business Name	PARC Environmental	**Subcontractor or Supplier?** *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	501913	**DIR Registration #** *(10 digits)*	1000002586
Address	P.O. Box 10077	**Does this subcontractor or supplier qualify as an LBE?**	no
City, State, Zip	Fresno, CA 93745	**Estimated dollar value of work, services or materials to be performed of provided**	$ ~~64,481~~ 131,526
Contact Person	Alfredo Segura	**Type of Work, Services, or Materials to be provided to complete contract.**	Demolition
Email Address	asegura@parcenvironmental.com		
Phone	559-233-7156		

3

Business Name		**Subcontractor or Supplier?** *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☐ Subcontractor ☐ Supplier
CSLB/Professional License #		**DIR Registration #** *(10 digits)*	
Address		**Does this subcontractor or supplier qualify as an LBE?**	
City, State, Zip		**Estimated dollar value of work, services or materials to be performed of provided**	$
Contact Person		**Type of Work, Services, or Materials to be provided to complete contract.**	
Email Address		~~Concrete~~	
Phone			

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

Signature (Principal of Firm)	Title	Date	Total Bid Amount (including additive alternates if applicable)
[signature]	Vice President/Estimating & Preconstruction	08/26/2025	$ 7,006,200

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

5

Business Name	Capitol Iron Works	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	223482	DIR Registration # *(10 digits)*	1000035200
Address	7009 Power Inn Rd	Does this subcontractor or supplier qualify as an LBE?	Yes
City, State, Zip	Sacramento, CA 95828	Estimated dollar value of work, services or materials to be performed of provided	$ 50,000
Contact Person	Steve Hartzell	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	steve@capitolironworks.com	Steel	
Phone	916-381-1554		

6

Business Name	RHI	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	457656	DIR Registration # *(10 digits)*	1000002414
Address	1029 Third St	Does this subcontractor or supplier qualify as an LBE?	No
City, State, Zip	Santa Rosa, CA 95112	Estimated dollar value of work, services or materials to be performed of provided	$ 537,785
Contact Person	Isaac Lamar	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	isaac@rhiframing.com	Rough Carpentry	
Phone	707-528-4900		

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

[signature]	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	Title	Date	Total Bid Amount (including additive alternates if applicable)

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

7

Business Name	~~Northwestern~~ Design	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	517128	DIR Registration # *(10 digits)*	~~1000004417~~
Address	605 SE J St	Does this subcontractor or supplier qualify as an LBE?	~~No~~
City, State, Zip	Grants Pass, OR ~~97526~~ 97527	Estimated dollar value of work, services or materials to be performed of provided	$ ~~248,870~~
Contact Person	Tim K.	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	Timk@nwdoregon.com	~~Finish Carpentry~~	
Phone	541-471-0900		

8

Business Name		Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☐ Subcontractor ☐ Supplier
CSLB/Professional License #		DIR Registration # *(10 digits)*	
Address		Does this subcontractor or supplier qualify as an LBE?	
City, State, Zip		Estimated dollar value of work, services or materials to be performed of provided	$
Contact Person		Type of Work, Services, or Materials to be provided to complete contract.	
Email Address		~~Insulation~~	
Phone			

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

Signature (Principal of Firm)	Title	Date	Total Bid Amount (including additive alternates if applicable)
	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

Business Name	~~Kodiak Union Roofing~~	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ ~~Subcontractor~~ ☐ Supplier
CSLB/Professional License #	~~911071~~	DIR Registration # *(10 digits)*	~~1000005850~~
Address	~~8825 Washington Blvd.~~	Does this subcontractor or supplier qualify as an LBE?	~~NO~~
City, State, Zip	~~Roseville, CA 95678~~	Estimated dollar value of work, services or materials to be performed of provided	$ ~~820,475~~
Contact Person	~~Ben Nash~~	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	~~bnash@kodiakroofing.com~~	~~ROOFING~~	90
Phone	916-343-0109		

Business Name	Omni sheet metal	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	853380	DIR Registration # *(10 digits)*	1000021315
Address	1010 olinder CT	Does this subcontractor or supplier qualify as an LBE?	NO
City, State, Zip	San Jose, CA 95122	Estimated dollar value of work, services or materials to be performed of provided	$ 144,036
Contact Person	Nick Liu	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	nliu@omnisheetmetal.com	Sheet Metal	
Phone	408-435-5020		

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

[signature]	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	Title	Date	Total Bid Amount (including additive alternates if applicable)

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

13

Business Name	~~[illegible] Doors & Others~~	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☐ Subcontractor ☐ Supplier
CSLB/Professional License #		DIR Registration # *(10 digits)*	
Address		Does this subcontractor or supplier qualify as an LBE?	
City, State, Zip		Estimated dollar value of work, services or materials to be performed of provided	$
Contact Person		Type of Work, Services, or Materials to be provided to complete contract.	
Email Address		Doors	
Phone			

14

Business Name	~~Royal Glass~~	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	~~543471~~	DIR Registration # *(10 digits)*	2000000148
Address	~~11343 Sunrise Park~~	Does this subcontractor or supplier qualify as an LBE?	~~Yes~~
City, State, Zip	~~Rancho Cordova, CA~~	Estimated dollar value of work, services or materials to be performed of provided	$ ~~119,553~~
Contact Person	~~Phil Gomez~~	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	~~philgomezglassca.com~~	Glass	
Phone	~~(916) 858-8026~~		

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

[signature]	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	Title	Date	Total Bid Amount (including additive alternates if applicable)

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

15

Business Name	~~Slayx Inc.~~	**Subcontractor or Supplier?** *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	~~1055149~~	**DIR Registration #** *(10 digits)*	~~1000045028~~
Address	~~11353 Sunrise Gold Cir., G~~	**Does this subcontractor or supplier qualify as an LBE?**	~~No~~
City, State, Zip	~~Rancho Cordova, CA 95742~~	**Estimated dollar value of work, services or materials to be performed of provided**	$ ~~245,148~~
Contact Person	~~Jeff Silva~~	**Type of Work, Services, or Materials to be provided to complete contract.**	
Email Address	~~jeff@slayxinc.com~~	Drywall	
Phone	~~209-641-3151~~		

16

Business Name	NCTS	**Subcontractor or Supplier?** *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	938930	**DIR Registration #** *(10 digits)*	1000002421
Address	9980 Horn Rd.	**Does this subcontractor or supplier qualify as an LBE?**	Yes
City, State, Zip	Sacramento, CA 95827	**Estimated dollar value of work, services or materials to be performed of provided**	$ 78,122
Contact Person	Christena t.	**Type of Work, Services, or Materials to be provided to complete contract.**	
Email Address	christena@nctscorp.com	Tile	
Phone	916-853-9090		

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	**Title**	**Date**	**Total Bid Amount (including additive alternates if applicable)**

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

17

Business Name	~~Pat Baird~~	**Subcontractor or Supplier?** *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	~~731213~~	**DIR Registration #** *(10 digits)*	1000005712
Address	~~P.O. Box 3370~~	**Does this subcontractor or supplier qualify as an LBE?**	no
City, State, Zip	~~Rocklin, CA 95677~~	**Estimated dollar value of work, services or materials to be performed of provided**	$ 51,000
Contact Person	~~Brittney Steele~~	**Type of Work, Services, or Materials to be provided to complete contract.**	
Email Address	~~brittney@patbairdacoustics.com~~	Acoustical	
Phone	~~916-408-6522~~		

18

Business Name	Universal Flooring	**Subcontractor or Supplier?** *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	813425	**DIR Registration #** *(10 digits)*	1000003729
Address	1060 National, Ste 1	**Does this subcontractor or supplier qualify as an LBE?**	YES
City, State, Zip	Sacramento, CA 95834	**Estimated dollar value of work, services or materials to be performed of provided**	$ 107,700
Contact Person	Danny Murguia	**Type of Work, Services, or Materials to be provided to complete contract.**	
Email Address	dannyeufi2@.com	Flooring	
Phone	530-682-7987		

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

[signature]	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	**Title**	**Date**	**Total Bid Amount (including additive alternates if applicable)**

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

20

Business Name	~~Applied Finishes~~	**Subcontractor or Supplier?** *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ ~~Subcontractor~~ ☐ Supplier
CSLB/Professional License #	~~1072434~~	**DIR Registration #** *(10 digits)*	~~1000016533~~
Address	~~P.O. Box 481~~	**Does this subcontractor or supplier qualify as an LBE?**	~~NO~~
City, State, Zip	~~Chico, CA 95927~~	**Estimated dollar value of work, services or materials to be performed of provided**	$ ~~105,319~~
Contact Person	~~NICK~~	**Type of Work, Services, or Materials to be provided to complete contract.**	
Email Address	~~Nick@AppliedFinishes.net~~	~~Painting~~	
Phone	~~530-906-9754~~		

21

Business Name		**Subcontractor or Supplier?** *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☐ Subcontractor ☐ Supplier
CSLB/Professional License #		**DIR Registration #** *(10 digits)*	
Address		**Does this subcontractor or supplier qualify as an LBE?**	
City, State, Zip		**Estimated dollar value of work, services or materials to be performed of provided**	$
Contact Person		**Type of Work, Services, or Materials to be provided to complete contract.**	
Email Address		~~Marketboards~~	
Phone			

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	**Title**	**Date**	**Total Bid Amount (including additive alternates if applicable)**

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

22

Business Name	Commercial Sign Crafters	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	1096364 / C-45	DIR Registration # *(10 digits)*	1000972975
Address	11387 Pyrites Way, Ste A	Does this subcontractor or supplier qualify as an LBE?	no
City, State, Zip	Rancho Cordova, CA 95678	Estimated dollar value of work, services or materials to be performed of provided	$ 58,779
Contact Person	Cheryl Serrano	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	cheryl@consigncrafters.com	Signage	
Phone	916-852-8584		

23

Business Name		Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☐ Subcontractor ☐ Supplier
CSLB/Professional License #		DIR Registration # *(10 digits)*	
Address		Does this subcontractor or supplier qualify as an LBE?	
City, State, Zip		Estimated dollar value of work, services or materials to be performed of provided	$
Contact Person		Type of Work, Services, or Materials to be provided to complete contract.	
Email Address		~~Toilet Accessories~~	
Phone			

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

[signature]	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	Title	Date	Total Bid Amount (including additive alternates if applicable)

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

26

Business Name		Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☐ Subcontractor ☐ Supplier
CSLB/Professional License #		DIR Registration # *(10 digits)*	
Address		Does this subcontractor or supplier qualify as an LBE?	
City, State, Zip		Estimated dollar value of work, services or materials to be performed of provided	$
Contact Person		Type of Work, Services, or Materials to be provided to complete contract.	
Email Address		~~Roller Shades~~	
Phone			

27

Business Name	Ross McDonald Co.	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	314333	DIR Registration # *(10 digits)*	1000003848
Address	1154 Stealth St	Does this subcontractor or supplier qualify as an LBE?	no
City, State, Zip	Livermore, CA 94551	Estimated dollar value of work, services or materials to be performed of provided	$ 224,900
Contact Person	Garen McDonald	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	gmcdonald@rossmcdonald.com	Furniture	
Phone	925-455-1635		

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

[signature]	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	Title	Date	Total Bid Amount (including additive alternates if applicable)

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

Business Name	ACCO Engineered Systems	**Subcontractor or Supplier?** *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	120696	**DIR Registration #** *(10 digits)*	1000005416
Address	10590 Armstrong Ave	**Does this subcontractor or supplier qualify as an LBE?**	no
26 **City, State, Zip**	Mather, CA 95655	**Estimated dollar value of work, services or materials to be performed of provided**	$ 116,968
Contact Person	aaron shiles	**Type of Work, Services, or Materials to be provided to complete contract.**	
Email Address	ashiles@accoes.com	Fire Sprinkler	
Phone	916-520-2100		

Business Name	Airco	**Subcontractor or Supplier?** *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	311454	**DIR Registration #** *(10 digits)*	1000003442
Address	8210 Demetre Ave	**Does this subcontractor or supplier qualify as an LBE?**	Yes
29 **City, State, Zip**	SAC, CA 95828	**Estimated dollar value of work, services or materials to be performed of provided**	$ 211,855
Contact Person	Jesse	**Type of Work, Services, or Materials to be provided to complete contract.**	
Email Address	bid@airomech.com	Plumbing	
Phone	916-381-4523		

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

[signature]	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	**Title**	**Date**	**Total Bid Amount (including additive alternates if applicable)**

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

30

Business Name	Airco	**Subcontractor or Supplier?** *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	311454	**DIR Registration #** *(10 digits)*	1000003442
Address	8210 Demetre Ave	**Does this subcontractor or supplier qualify as an LBE?**	Yes
City, State, Zip	Sac, CA 95828	**Estimated dollar value of work, services or materials to be performed of provided**	$ 619,793
Contact Person	Jesse	**Type of Work, Services, or Materials to be provided to complete contract.**	
Email Address	bid@aircomech.com	Mechanical (HVAC)	
Phone	916-381-4523		

31

Business Name	Absolut	**Subcontractor or Supplier?** *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☐ Subcontractor ☐ Supplier
CSLB/Professional License #	917514	**DIR Registration #** *(10 digits)*	1000002429
Address	2797 Del Monte Street	**Does this subcontractor or supplier qualify as an LBE?**	NO
City, State, Zip	West Sacramento CA, 95691	**Estimated dollar value of work, services or materials to be performed of provided**	$ 1,185,357
Contact Person		**Type of Work, Services, or Materials to be provided to complete contract.**	
Email Address		Electrical	
Phone			

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	**Title**	**Date**	**Total Bid Amount (including additive alternates if applicable)**

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

32

Business Name		Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☐ Subcontractor ☐ Supplier
CSLB/Professional License #		DIR Registration # *(10 digits)*	
Address		Does this subcontractor or supplier qualify as an LBE?	
City, State, Zip		Estimated dollar value of work, services or materials to be performed of provided	$
Contact Person		Type of Work, Services, or Materials to be provided to complete contract.	
Email Address		~~Low Voltage~~	
Phone			

33

Business Name	Duran & Venables	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	375068	DIR Registration # *(10 digits)*	1000001404
Address	748 South Hillview Dr.	Does this subcontractor or supplier qualify as an LBE?	no
City, State, Zip	Milpitas, CA 95035	Estimated dollar value of work, services or materials to be performed of provided	$ 124,700
Contact Person	Mike Stogner	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	mikes@dvpave.com	Site Work	
Phone	408-934-7300		

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

Signature (Principal of Firm)	Title	Date	Total Bid Amount (including additive alternates if applicable)
	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

34

Business Name		Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☐ Subcontractor ☐ Supplier
CSLB/Professional License #		DIR Registration # *(10 digits)*	
Address		Does this subcontractor or supplier qualify as an LBE?	
City, State, Zip		Estimated dollar value of work, services or materials to be performed of provided	$
Contact Person		Type of Work, Services, or Materials to be provided to complete contract.	
Email Address		~~Site concrete~~	
Phone			

35

Business Name	Marina	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	492862	DIR Registration # *(10 digits)*	1000000079
Address	1683 E. Louise Dr.	Does this subcontractor or supplier qualify as an LBE?	NO
City, State, Zip	Lathrop, CA 95330	Estimated dollar value of work, services or materials to be performed of provided	$ 71,262
Contact Person	Fransisco Trejo	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	estimator@marinaco.com	Landscaping	
Phone	925-719-9135		

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

[signature]	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	Title	Date	Total Bid Amount (including additive alternates if applicable)

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

Business Name	preston pipelines	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	1059395	DIR Registration # *(10 digits)*	1059395
Address	133 Bothelo Ave	Does this subcontractor or supplier qualify as an LBE?	no
City, State, Zip	Milpitas, CA 95035	Estimated dollar value of work, services or materials to be performed of provided	$ 149,000
Contact Person	chad Hutchinson	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	chutchinson@prestonpipelines.com	~~GATES~~ underground utilities	
Phone	408-262-1418		

36

Business Name	~~Preston~~ crusader	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	1056652	DIR Registration # *(10 digits)*	1000449929
Address	3115 Gold Valley Dr.	Does this subcontractor or supplier qualify as an LBE?	no
City, State, Zip	Rancho Cordova, CA 95742	Estimated dollar value of work, services or materials to be performed of provided	$ 60,875
Contact Person	Codi Beck	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	codi@crusaderfence.com	~~underground utilities~~ GATES	
Phone	888-818-9191		

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

[signature]	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	Title	Date	Total Bid Amount (including additive alternates if applicable)

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

Business Name	Pac Shield Roof Svs.	**Subcontractor or Supplier?** *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	1031725	**DIR Registration #** *(10 digits)*	1000692652
Address	5151 Pentecost Drive, A	**Does this subcontractor or supplier qualify as an LBE?**	no
City, State, Zip	Modesto, CA 95356	**Estimated dollar value of work, services or materials to be performed of provided**	$ 761,622
Contact Person	Anthony Lozano	**Type of Work, Services, or Materials to be provided to complete contract.**	
Email Address	alozano@pacshield.com	ROOFING	
Phone	209-688-3451		

Business Name	Mason painting	**Subcontractor or Supplier?** *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☑ Subcontractor ☐ Supplier
CSLB/Professional License #	819987	**DIR Registration #** *(10 digits)*	1000008947
Address	P.O. Box 1115	**Does this subcontractor or supplier qualify as an LBE?**	~~no~~ yes
City, State, Zip	orangevale, CA 95662	**Estimated dollar value of work, services or materials to be performed of provided**	$ 100,906
Contact Person	mason valasques	**Type of Work, Services, or Materials to be provided to complete contract.**	
Email Address	mason@masonpainting.com	Painting	
Phone	916-660-2150		

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	**Title**	**Date**	**Total Bid Amount (including additive alternates if applicable)**

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

Business Name	U-Neal Framing and Drywall	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☐ Subcontractor ☐ Supplier
CSLB/Professional License #	667764	DIR Registration # *(10 digits)*	1000003640
Address	3236 Fitzgerald Rd Suite B	Does this subcontractor or supplier qualify as an LBE?	Yes
City, State, Zip	Rancho Cordova, CA 95742	Estimated dollar value of work, services or materials to be performed of provided	$ 166,000
Contact Person	Mike	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	Mike@U-Neal.com		
Phone	916 220-0994	Drywall	

Business Name	Nor-Cal Glass	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☐ Subcontractor ☐ Supplier
CSLB/Professional License #	868066	DIR Registration # *(10 digits)*	1000004806
Address	246 S. Shepherd St.	Does this subcontractor or supplier qualify as an LBE?	NO
City, State, Zip	Sonora, CA 95370	Estimated dollar value of work, services or materials to be performed of provided	$ 59,185
Contact Person	Jennifer Ketchum	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	Nor-calglass@sbcglobal.Net		
Phone	209 588-9993	Glass	

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

[signature]	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	Title	Date	Total Bid Amount (including additive alternates if applicable)

City of SACRAMENTO

SUBCONTRACTOR AND LOCAL BUSINESS ENTERPRISE PARTICIPATION FORM

FOR PUBLIC PROJECTS OVER 250,000

THIS FORM MUST BE SUBMITTED WITH THE SEALED BID PROPOSAL

To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work, services or materials listed. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

Prime Contractor Name	John F. Otto, Inc. dba Otto Construction
(REQUIRED) Prime Contractor DIR Registration #	1000005395

Business Name	Emerzian Woodworking	Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☐ Subcontractor ☐ Supplier
CSLB/Professional License #	731427	DIR Registration # *(10 digits)*	1000005826
Address	2555 North Argyle Rd	Does this subcontractor or supplier qualify as an LBE?	NO
City, State, Zip	Fresno, Ca 93727	Estimated dollar value of work, services or materials to be performed of provided	$ 78.347
Contact Person	Rodney Vargas	Type of Work, Services, or Materials to be provided to complete contract.	
Email Address	rvargas@ewiwood.com	Finish Carpentry	
Phone			

Business Name		Subcontractor or Supplier? *(Concrete delivery companies, temp fence companies that perform labor of installing or removing fencing and surveyors require DIR Registration)*	☐ Subcontractor ☐ Supplier
CSLB/Professional License #		DIR Registration # *(10 digits)*	
Address		Does this subcontractor or supplier qualify as an LBE?	
City, State, Zip		Estimated dollar value of work, services or materials to be performed of provided	$
Contact Person		Type of Work, Services, or Materials to be provided to complete contract.	
Email Address			
Phone			

I hereby certify that each subcontractor listed on this LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

[signature]	Vice President/Estimating & Preconstruction	08/26/2025	$ See First Page of Subcontractor Listing
Signature (Principal of Firm)	Title	Date	Total Bid Amount (including additive alternates if applicable)

Addendum A

COMMUNITY WORKFORCE AND TRAINING AGREEMENT
CITY OF SACRAMENTO
AGREEMENT TO BE BOUND

The undersigned, as a Contractor or Subcontractor, including construction material trucking company/entity, (CONTRACTOR) on the City of Sacramento Project, (hereinafter PROJECT), for and in consideration of the award to it of a contract to perform work on said PROJECT, and in further consideration of the mutual promises made in this Community Workforce and Training Agreement (hereinafter AGREEMENT), a copy of which was received and is acknowledged, hereby:

(1) Accepts and agrees to be bound by the terms and conditions of the AGREEMENT for this Project, together with any and all amendments and supplements now existing or which are later made thereto.

(2) The CONTRACTOR agrees to be bound by the legally established local trust agreements designated in the applicable Master Agreement as described in Article XI of this AGREEMENT.

(3) The CONTRACTOR authorizes the parties to such local trust agreements to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the CONTRACTOR.

(4) Certifies that it has no commitments or agreements which would preclude its full and complete compliance with the terms and conditions of said AGREEMENT.

(5) Agrees to secure from any CONTRACTOR(S) (as defined in said AGREEMENT) which is or becomes a subcontractor (of any tier) to it, a duly executed Agreement to be Bound in form identical to this document.

(6) This Agreement to be Bound constitutes a subscription agreement to the extent of its terms. However, the undersigned agrees to execute a separate Subscription Agreement(s) or contributing employer agreement for Trust Funds when such Trust Fund(s) requires such document(s).

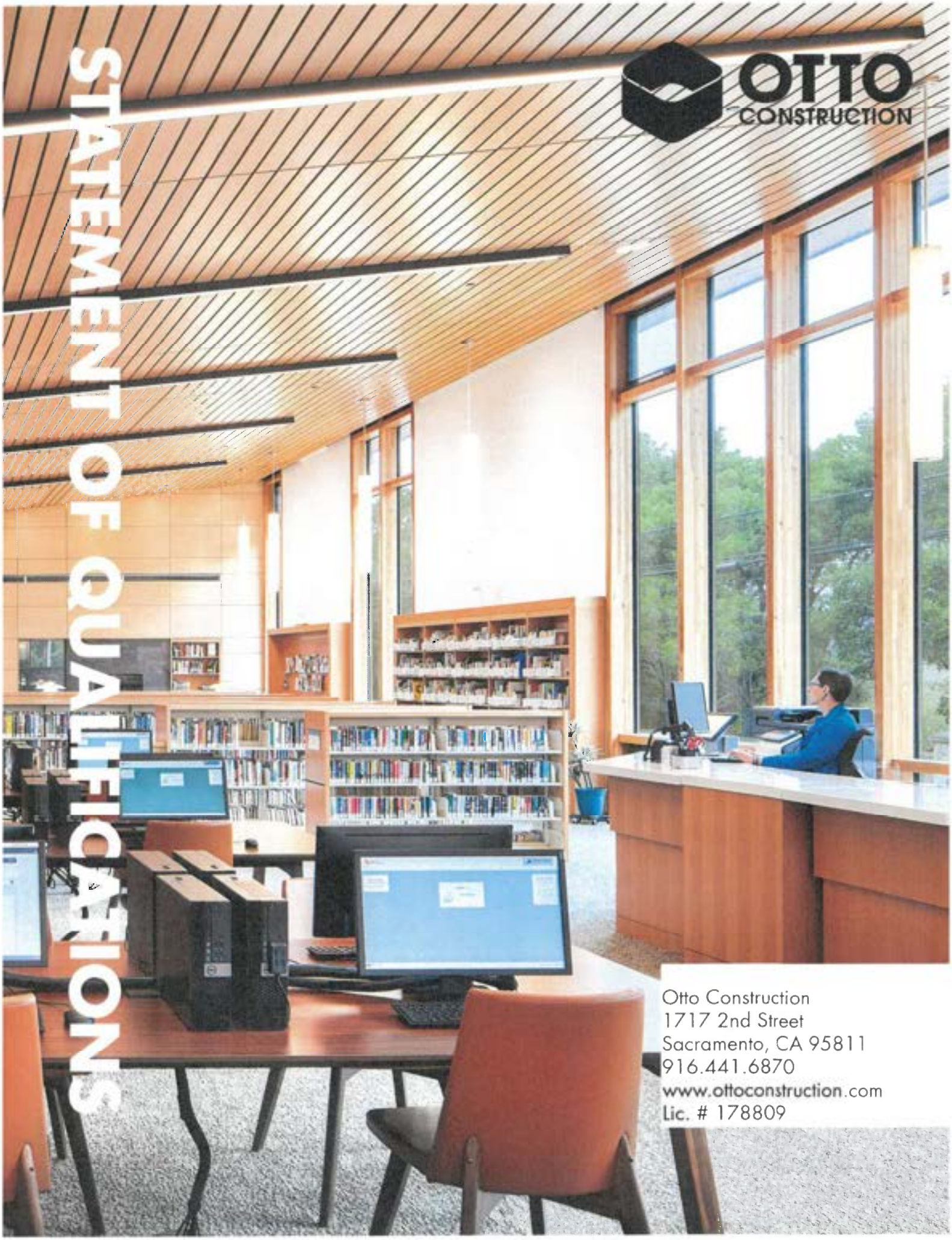
Date: 9/12/2025

John F. Otto, Inc. dba Otto Construction
Name of Contractor

Nicholas Foley -
(Name of Contractor Representative)

Project Manager
(Authorized Officer & Title)

CA LIC #178809
CSLB # or Motor Carrier Permit



Otto Construction
1717 2nd Street
Sacramento, CA 95811
916.441.6870
www.ottoconstruction.com
Lic. # 178809

QUESTIONNAIRE

NOTICE: **For firms that maintain other operating business units, offices, branches and/or subsidiary divisions that will not be involved with the performance of any project work if the firm is awarded the contract, references hereafter to "your firm" shall mean only those operating business units, offices, branches and/or subsidiary divisions that will be involved with the performance of any project work.**

All of the following questions regarding "your firm" refer to the firm (corporation, partnership or sole proprietor) submitting this questionnaire, as well as any firm(s) with which any of your firm's owners, officers, or partners are or have been associated as an owner, officer, partner or similar position within the last five years

The firm submitting this questionnaire shall not be considered a responsible bidder if the answer to any of these questions is "yes", or if the firm submits a questionnaire that is not fully completed or contains false information.

1. **Classification & Expiration Date(s) of California** Contractor's License Number(s) held by firm:
   178809 A & B 9/30/2026, 9/30/2026

2. Has a contractor's license held by your firm and/or any owner, officer or partner of your firm been revoked at anytime in the last five years?

   ☐ Yes ☒ No

3. Within the last five years, has a surety firm completed a contract on your firm's behalf, or paid for completion of a contract to which your firm was a party, because your firm was considered to be in default or was terminated for cause by the project owner?

   ☐ Yes ☒ No

4. At the time of submitting this minimum qualifications questionnaire, is your firm ineligible to bid on or be awarded a public works contract, or perform as a subcontractor on a public works contract, pursuant to either California Labor Code section 1777.1 (prevailing wage violations) or Labor Code section 1777.7 (apprenticeship violations)?

   ☐ Yes ☒ No

5. At any time during the last five years, has your firm, or any of its owners, officers or partners been convicted of a crime involving the awarding of a contract for a government construction project, or the bidding or performance of a government contract?

   ☐ Yes ☒ No

FOR CITY CLERK USE ONLY

RESOLUTION NO.: 2007-574

DATE ADOPTED: July 31, 2007

6. Answer either subsection A or B, as applicable:

A. Your firm has completed three or more government construction contracts in Sacramento County within the last five years: Within those five years, has your firm been assessed liquidated damages on three or more government construction contracts in Sacramento County for failure to complete contract work on time?

NOTE: If there is a pending administrative or court action challenging the assessment of liquidated damages on a government contract within the last five years, you need not include that contract in responding to this question.

☐ Yes ☒ No ☐ Not applicable

OR

B. Your firm has not completed at least three government construction contracts in Sacramento County within the last five years: Within the last three years, has your firm been assessed liquidated damages on three or more government construction contracts for failure to complete contract work on time?

NOTE: If there is a pending administrative or court action challenging an assessment of liquidated damages on a government contract within the last three years, you need not include that contract in responding to this question.

☐ Yes ☒ No ☐ Not applicable

7. In the last three years has your firm been debarred from bidding on, or completing, any government agency or public works construction contract for any reason?

NOTE: If there is a pending administrative or court action challenging a debarment, you need not include that debarment in responding to this question.

☐ Yes ☒ No

8. Has CAL OSHA assessed a total of three or more penalties against your firm for any "serious" or "willful" violation occurring on construction projects performed in Sacramento County at any time within the last three years?

NOTE: If there is a pending administrative or court action appealing a penalty assessment, you need not include that penalty assessment in responding to this question.

☐ Yes ☒ No

FOR CITY CLERK USE ONLY

RESOLUTION NO.: 2007-574

9. Answer either subsection A or B, as preferred:

A. In the last three years has your firm had a three year average Workers' Compensation experience modification rate exceeding 1.1?

☐ Yes ☒ No

OR

B. In the last three years has your firm had a three-year average incident rate for total lost workday cases exceeding 10?

NOTE: Incident rates represent the number of lost workday cases per 100 full-time workers and is to be calculated as: (N/EH) x 200,000, where

N = number of lost workday cases (as defined by the U.S. Dept. of Labor, Bureau of Labor Statistics)
EH = total hours worked by all employees during the calendar year
200,000 = base for 100 equivalent full-time working (working 40 hours per week, 50 weeks per year)

☐ Yes ☒ No

10. In the past three years, has the federal EPA, Region IX or a California Air Quality Management District or Regional Water Quality Control Board assessed penalties three or more times, either against your firm, or against the project owner for a violation resulting in whole or in part from any action or omission by your firm on a project on which your firm was a contractor in Sacramento County?

NOTE: If there is a pending administrative or court action appealing a penalty assessment, you need not include that penalty assessment in responding to this question.

☐ Yes ☒ No

FOR CITY CLERK USE ONLY

RESOLUTION NO.: 2007-574

11. In the past three years, has the federal EPA, Region IX or a California Air Quality Management District or Regional Water Quality Control Board assessed a single penalty of $100,000 or more, either against your firm, or against the project owner for a violation resulting in whole or in part from any action or omission by your firm on a project on which your firm was the contractor in Sacramento County?

NOTE: If there is a pending administrative or court action appealing a penalty assessment, you need not include that penalty assessment in responding to this question.

☐ Yes ☒ No

12. In the past three years, have civil penalties been assessed against your firm pursuant to California Labor Code 1777.7 for violation of California public works apprenticeship requirements, three or more times?

NOTE: If there is a pending administrative or court action appealing a penalty assessment, you need not include that penalty assessment in responding to this question.

☐ Yes ☒ No

13. In the past three years, has a public agency in California withheld contract payments or assessed penalties against your firm for violation of public works prevailing wage requirements, three or more times?

NOTE: If there is a pending administrative or court action appealing a withholding or penalty assessment, you need not include that withholding or penalty assessment in responding to this question.

☐ Yes ☒ No

14. Has your firm been assessed penalties for violation of public works prevailing wage requirements in California, in an aggregate amount for the past three years of $50,000 or more?

NOTE: If there is a pending administrative or court action appealing a penalty assessment, you need not include that penalty assessment in responding to this question.

☐ Yes ☒ No

FOR CITY CLERK USE ONLY

RESOLUTION NO.: 2007-574

DATE ADOPTED: July 31, 2007

VERIFICATION AND SIGNATURE

I, the undersigned, certify and declare that I have read all the foregoing answers to this Minimum Qualifications Questionnaire, and know their contents. The matters stated in these Questionnaire answers are true of my own knowledge and belief, except as to those matters stated on information and belief, and as to those matters I believe them to be true. I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Signed at Sacramento, CA (Location), on 8/21/2025 (Date).

Signature: Allison Otto

Print name: Allison Otto

Title: President/ CEO

NOTE: If two or more entities submit a bid on a contract as a Joint Venture, each entity within the Joint Venture must submit a separate Minimum Qualifications Questionnaire.

FOR CITY CLERK USE ONLY

RESOLUTION NO.: 2007-574

DATE ADOPTED: July 31, 2007

DRUG-FREE WORKPLACE POLICY AND AFFIDAVIT

BID PROPOSAL MAY BE DECLARED NONRESPONSIVE IF THIS FORM (COMPLETED) IS NOT ATTACHED.
Pursuant to City Council Resolution CC90-498 dated 6/26/90 the following is required.

The undersigned contractor certifies that it and all subcontractors performing under this Agreement will provide a drug-free workplace by:

1. Publishing a "Drug-Free Workplace" statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition.

2. Establishing a Drug-Free Awareness Program to inform employees about:

   a. The dangers of drug abuse in the workplace.
   b. The contractor's policy of maintaining a drug-free workplace.
   c. Any available drug counseling, rehabilitation, and employee assistance program.
   d. The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.

3. Notify employees that as a condition of employment under this Agreement, employees will be expected to:

   a. Abide by the terms of the statement.
   b. Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace.

4. Making it a requirement that each employee to be engaged in the performance of the Agreement be given a copy on the "Drug-Free Workplace" statement.

5. Taking one of the following appropriate actions, within thirty (30) days of receiving notice from an employee or otherwise receiving such notice, that said employee has received a drug conviction for a violation occurring in the workplace:

   a. Taking appropriate disciplinary action against such an employee, up to and including termination; or
   b. Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a federal, state, or local health, law enforcement or other appropriate agency.

* I certify that no person employed by this company, corporation, or business has been convicted of any criminal drug statute violation on any job site or project where this company, corporation or business was performing was within three years of the date of my signature below.

EXCEPTION: _____ _____ _____

Date **Violation Type** **Place of Occurrence**

If additional space is required use back of this form.

*** The above statement will also be incorporated as a part of each subcontract agreement for any and all subcontractors selected for performance on this project.**

IN THE EVENT THIS COMPANY, CORPORATION, OR BUSINESS IS AWARDED THIS CONSTRUCTION AGREEMENT, AS A RESULT OF THIS BID; THE CONTRACTOR WITH HIS/HER SIGNATURE REPRESENTS TO THE CITY THAT THE INFORMATION DISCLOSED IN THIS DOCUMENT IS COMPLETE AND ACCURATE. IT IS UNDERSTOOD AND AGREED THAT FALSE CERTIFICATION IS SUBJECT TO IMMEDIATE TERMINATION BY THE CITY.

The Representations Made Herein On This Document Are Made Under Penalty Of Perjury.

CONTRACTOR'S NAME: John F. Otto, Inc. dba Otto Construction

BY: _____ Vice President/Estimating & Preconstruction **Date:** 08/26/2025

Signature **Title**

Effects of violations: **a.** Suspension of payments under the Agreement. **b.** Suspension or termination of the Agreement. **c.** Suspension or debarment of the contractor from receiving any Agreement from the City of Sacramento for a period not to exceed five years.

City of SACRAMENTO

PAYMENT BOND

Bond No.:_____
Premium: _____

WHEREAS, the City of Sacramento, State of California, hereinafter called City, has conditionally awarded to:
John F. Otto, dba Otto Construction, 1717 2nd Street, SACRAMENTO, CA 95811 as principal, hereinafter called Contractor, a contract for construction of:

North Sacramento-Hagginwood Library Roof Replacement and Remodel
PN: C15000850

which contract is by reference incorporated herein and made a part hereof as if the Surety named below were a party to the contract, and is hereinafter referred to as the Contract; and

WHEREAS, under the terms of the Contract and pursuant to Chapter 5 of Title 3 of Part 6 of Division 4 of the California Civil Code (commencing with Civil Code Section 9550), Contractor is required to furnish a good and sufficient payment bond to secure payment of the claims to which reference is made in Civil Code Section 9554.

NOW, THEREFORE, we the Contractor and (*here insert full name and address of Surety*):
_____, a corporation duly authorized and admitted to transact business and issue surety bonds in the State of California, hereinafter called Surety, are held and firmly bound unto the City, and unto all persons or entities entitled to assert a claim against a payment bond under any of the aforesaid Civil Code provisions in the sum of **SEVEN MILLION SEVENTY-SIX THOUSAND DOLLARS AND ZERO CENTS ($7,076,000.00)**, on the condition that if Contractor shall fail to pay for any materials or equipment furnished or used in performance of the Contract, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, or for any amounts required to be deducted, withheld, and paid over to the Franchise Tax Board or the Employment Development Department from the wages of employees of the Contractor and all subcontractors with respect to such work or labor, then the Surety shall pay the same in an amount not exceeding the sum specified above. If suit is brought upon this bond, Surety shall pay, in addition to the above sum, all costs, expenses and fees, including attorney's fees, reasonably incurred by any party in successfully enforcing the obligation secured hereby, all to be taxed as costs and included in any judgment rendered. Should the condition of this bond be fully performed, then this obligation shall become null and void, otherwise it shall be and remain in full force and effect, and shall bind Contractor, Surety, their heirs, executors, administrators, successors, and assigns, jointly and severally.

It is hereby stipulated and agreed that this bond shall inure to the benefit of all persons, companies, corporations, political subdivisions, State agencies and other entities entitled to assert a claim against a payment bond under any of the aforesaid Civil Code provisions, so as to give a right of action to them or their assigns in any suit brought upon this bond. The Surety, for value received, hereby stipulates, and agrees that no change, extension of time, alteration, or addition to the terms of the Contract or to the work to be performed thereunder or to the specifications accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration, or addition.

IN WITNESS WHEREOF, this instrument has been duly executed by authorized representatives of the Contractor and Surety.
SIGNED AND SEALED on _____, 20____.

_____	_____
(Contractor) (Seal)	(Surety) (Seal)
By _____	By_____
Title _____	Title_____
	Agent Name and Address
ORIGINAL APPROVED AS TO FORM:	_____
	_____
	Agent Phone # _____
_____	Surety Phone #_____
City Attorney	California License # _____

City of SACRAMENTO

PERFORMANCE BOND

Bond No.:_____
Premium: _____

WHEREAS, the City of Sacramento, State of California, hereinafter called City, has conditionally awarded to:
John F. Otto, dba Otto Construction, 1717 2nd Street, SACRAMENTO, CA 95811 as principal, hereinafter called Contractor, a contract for construction of:

North Sacramento-Hagginwood Library Roof Replacement and Remodel
PN: C15000850

which contract is by reference incorporated herein and made a part hereof as if the Surety named below were a party to the contract, and is hereinafter referred to as the Contract; and

WHEREAS, under the terms of the Contract, Contractor is required to furnish a bond for the faithful performance of the Contract.

NOW, THEREFORE, we the Contractor and *(here insert full name and address of Surety)*:
_____,
a corporation duly authorized and admitted to transact business and issue surety bonds in the State of California, hereinafter called Surety, are held and firmly bound unto the City, as obligee, in the sum of: **SEVEN MILLION SEVENTY-SIX THOUSAND DOLLARS AND ZERO CENTS ($7,076,000.00)**, for the payment of which sum well and truly to be made, we the Contractor and Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally. The condition of this obligation is such that, if the Contractor, Contractor's heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and fully perform all covenants, conditions and agreements required to be kept and performed by Contractor in the Contract and any changes, additions or alterations made thereto, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meanings, and shall indemnify and save harmless the City, its officers, employees and agents, as therein provided, then the Surety's obligations under the Contract and this bond shall be null and void; otherwise they shall be and remain in full force and effect. This obligation shall remain in full force and effect through the end of the Contract warranty period, which will expire one year after the completion of work date specified in the Notice of Completion filed for the above-named project.

As part of the obligations secured hereby and in addition to the sum specified above, there shall be included all costs, expenses, and fees, including attorney's fees, reasonably incurred by City in successfully enforcing such obligations, all to be taxed as costs and included in any judgment rendered.

The Surety, for value received, hereby stipulates, and agrees that no change, extension of time, alteration, or addition to the terms of the Contract or to the work to be performed thereunder or to the specifications accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration, or addition.

IN WITNESS WHEREOF, this instrument has been duly executed by authorized representatives of the Contractor and Surety.
SIGNED AND SEALED on _____, 20____.

_____	_____
(Contractor) (Seal)	(Surety) (Seal)
By _____	By_____
Title _____	Title_____
	Agent Name and Address
ORIGINAL APPROVED AS TO FORM:	_____
	_____
	Agent Phone # _____
_____	Surety Phone #_____
City Attorney	California License # _____

PROJECT MANUAL

FOR

NORTH SACRAMENTO-HAGGINWOOD LIBRARY
TENANT IMPROVEMENT

1124 Del Paso Blvd., Sacramento, CA 95815

OWNER

CITY OF SACRAMENTO
5730 24th Street, Building 4,
Sacramento, CA 95822

ARCHITECT

PBK ARCHITECTS
1110 Iron Point Road, SUITE 200
Folsom, CA 95630
(916) 355-9922

PROJECT 220389
DECEMBER 2024

TABLE OF CONTENTS
SPECIFICATIONS GROUP

NORTH SACRAMENTO-HAGGINWOOD LIBRARY TENANT IMPROVEMENT

SPECIFICATIONS GROUP
GENERAL REQUIREMENTS SUBGROUP

DIVISION 01 GENERAL REQUIREMENTS

01 10 00 Summary
01 25 00 Substitution Procedures
01 26 00 Contract Modification Procedures
01 29 00 Payment Procedures
01 31 00 Project Management and Coordination
01 32 00 Construction Progress Documentation
01 32 33 Photographic Documentation
01 33 00 Submittal Procedures
01 40 00 Quality Requirements
01 42 00 References
01 50 00 Temporary Facilities and Controls
01 60 00 Product Requirements
01 73 00 Execution
01 74 19 Construction Waste Management and Disposal
01 77 00 Closeout Procedures
01 78 23 Operation and Maintenance Data
01 78 39 Project Record Documents
01 79 00 Demonstration and Training

DIVISION 02 EXISTING CONDITIONS

02 41 16 Structure Demolition
02 41 19 Selective Demolition
02 87 13 Mold Remediation

DIVISION 03 CONCRETE

03 01 00 Concrete Spall Repair and Crack Injection
03 10 00 Concrete Forming and Accessories
03 20 00 Concrete Reinforcing
03 30 00 Cast-In-Place Concrete

DIVISION 04 MASONRY

04 20 00 Concrete Unit Masonry

DIVISION 05 METALS

05 11 00 Structural and Miscellaneous Steel
05 40 00 Cold-Formed Metal Framing
05 52 00 Metal Railings and Handrails

DIVISION 06 WOOD, PLASTICS, AND COMPOSITES

06 10 00 Rough Carpentry
06 40 00 Architectural Woodwork
06 41 16 Plastic-Laminate-Clad Architectural Cabinets

DIVISION 07 THERMAL AND MOISTURE PROTECTION

07 21 16 Blanket Insulation
07 54 19 Polyvinyl-Chloride (PVC, TPA) Roofing
07 62 00 Roof Related Sheet Metal
07 62 00.01 Sheet Metal Flashing and Trim
07 62 01 Coping System
07 72 00 Roof Accessories
07 81 00 Applied Fireproofing
07 84 00 Firestopping
07 92 00 Joint Sealants

DIVISION 08 OPENINGS

08 11 13 Hollow Metal Doors and Frames
08 11 16 Aluminum Doors and Frames
08 14 00 Wood Doors
08 62 23 Tubular Slylights
08 71 00 Door Hardware
08 71 13 Automatic Door Operators
08 80 00 Glazing

DIVISION 09 FINISHES

09 21 16 Gypsum Board Assemblies
09 22 16 Metal Stud Framing
09 30 12 Ceramic Tile Wall Finishing
09 51 00 Acoustical Ceiling Tile
09 65 13.13 Resilient Base
09 65 16 Resilient Vinyl Sheet Flooring
09 65 23 Luxury Vinyl Tile Flooring
09 68 13 Tile Carpeting
09 77 33 Fiber Reinforced Plastic Panels
09 84 13 Fabric Covered Sound-Absorbing Panels
09 84 36 Sound Absorbing Ceiling Units
09 90 00 Painting and Coating

DIVISION 10 SPECIALTIES

10 11 19 Markerboards and Tackboards
10 14 00 Signage
10 28 13 Toilet Accessories
10 44 00 Fire Protection Specialties
10 73 00 Aluminum Awning

DIVISION 11 EQUIPMENT

11 90 00 Miscellaneous Equipment
11 24 29.01 Facility Fall protection, Non-Penetrating

DIVISION 12 FURNISHINGS

12 24 13 Roller Shades - Manual

DIVISION 13 SPECIAL CONSTRUCTION

NOT USED

DIVISION 14 CONVEYING EQUIPMENT

NOT USED

DIVISION 15 TO 19 RESERVED

NOT USED

SPECIFICATIONS GROUP
FACILITY SERVICES SUBGROUP

DIVISION 20 RESERVED

NOT USED

DIVISION 21 FIRE SUPPRESSION

21 00 00 Fire Suppression Sprinkler System
21 00 01 Common Work Results for Fire Suppression
21 00 02 Identification for Fire Suppression Piping and Equipment

DIVISION 22 PLUMBING

22 00 00 General Plumbing Provisions
22 00 01 Plumbing
22 00 02 Plumbing (Roof Assessment & Repair)

DIVISION 23 HEATING, VENTILATING, AND AIR CONDITIONING

23 00 00 General Mechanical Provisions
23 00 01 Heating, Ventilation and Air Conditioning
23 00 02 Heating, Ventilation and Air Conditioning (Roof Assessment & Repair)
23 90 00 Direct Digital Control and Energy Management System

DIVISION 24 RESERVED

NOT USED

DIVISION 25 INTEGRATED AUTOMATION

NOT USED

DIVISION 26 ELECTRICAL

26 05 00 Common Work Results for Electrical
26 05 01 Common Work Results for Electrical (Roof Assessment & Repair)
26 05 19 Low-Voltage Electrical Power Conductors and Cables
26 05 20 Low-Voltage Electrical Power Conductors and Cables (Roof Assessment & Repair)
26 05 26 Grounding and Bonding for Electrical Systems
26 05 29 Hangers and Supports for Electrical Systems
26 05 33 Raceways and Boxes for Electrical Systems
26 05 34 Raceways and Boxes for Electrical Systems (Roof Assessment & Repair)
26 05 53 Identification of Electrical Systems
26 09 23 Lighting Control Devices
26 24 16 Panelboards
26 27 26 Wiring Devices
26 27 27 Wiring Devices (Roof Assessment & Repair)
26 28 16 Enclosed Switches and Circuit Breakers
26 51 00 Interior Lighting
26 56 00 Exterior Lighting

DIVISION 27 COMMUNICATIONS

27 00 00 Basic Materials and Methods
27 10 00 Structural Cabling System (SCS)
27 51 23.80 Local Sound Reinforcement Systems

DIVISION 28 ELECTRONIC SAFETY AND SECURITY

28 05 00 General Electronic Safety Systems Requirements
28 13 00 Access Control System
28 16 00 Intrusion Detection System
28 23 00 Local Video Management System
28 23 01 IP Video Surveillance Cameras
28 31 00 Fire Detection and Alarm

DIVISION 31- DIVISION 33- SITE AND INFRASTRUCTURE

31 21 00 Utility Trench and Backfill
31 22 19 Finish Grading
32 13 13 Concrete Placement
32 13 18 Cement and Concrete for Exterior
32 14 00 Slurry Seal
32 17 23 Pavement Markings
32 31 13 Gates
32 84 00 Irrigation
32 90 00 Planting
32 98 00 Operation and Maintenance
33 10 00 Water System

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work by Owner.
5. Work under separate contracts.
6. Future work.
7. Owner-furnished products.
8. Access to site.
9. Coordination with occupants.
10. Work restrictions.
11. Specification and Drawing conventions.
12. Miscellaneous provisions.

B. Related Requirements:

1. Section 013100 “Project Management and Coordination” for requirements on using web-based Project software.

1.3 PROJECT INFORMATION

A. Project Identification: North Sacramento-Hagginwood Library Tenant Improvement

1. Project Location: 1124 Del Paso Blvd., Sacramento, CA 95815

B. Owner: City of Sacramento, 915 I St. Sacramento, CA 95814.

1. Owner's Representative: Ezra Roati, Senior Architect Facilities and Real Property Management, Department of Public Works, 5730 24th Street, Sacramento, CA 95822, (916) 808-5877.

C. Consultants: Owner has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. PBK Architects, refer to contract documents for contact information.

D. Construction Inspector:

1. Construction Inspector has been engaged for this Project to serve as an advisor to Owner and to provide assistance in administering the Contract for construction between Owner and Contractor.

E. Web-Based Project Software: Project software administered by Contractor will be used for purposes of managing communication and documents during the construction stage.

1. See Section 013100 "Project Management and Coordination." for requirements for using web-based Project software.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Remodel of existing building, to convert to Public Library space. Site work includes parking lot upgrades; revisions to public parking ADA stalls and path of travel into the main front entrance to the Library; Exterior facade improvements; Added public amenities such as outdoor gathering spaces, bike racks/lockers. Interior work includes general demolition of exiting walls and construction of new walls to accommodate new space needs;Structural improvements as needed; ADA upgrades to restroom facilities; upgrades to existing mechanical, electrical, plumbing, and technologies to meet new library needs; new automatic fire sprinkler and fire alarm system.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with any work performed by Owner.

1.6 ACCESS TO SITE

A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

1.7 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption with Owner.

1. Notify Owner not less than two days in advance of proposed disruptive operations.
2. Obtain Owner's written permission before proceeding with disruptive operations.

C. Restricted Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

D. Employee Identification: Owner will provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.9 MISCELLANEOUS PROVISIONS

A. Security Conditions at the Construction Site: Owner is aware of conditions in the immediate vicinity of the construction site that may impact contractor’s performance of

the work. These conditions include a high population of unsheltered homeless persons, camping by unsheltered homeless persons, accumulations of trash, clothing, food containers, biohazards, cast-off personal possessions and camping equipment, abandoned bikes, animals, stray animals, panhandling activities, persons seeking assistance, medical emergencies, and fire and police activity.

B. Responsibility for Site Security: Contractor shall retain responsibility for site security, site maintenance, site clean-up, protection of materials and equipment including stored, staged and installed materials and equipment, according to contract documents. Contractor's responsibility shall continue 24-hours, 7-days-per-week during the performance of the Work, and as such may require security performed with staff and/or electronic surveillance.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions and Value Engineering.

B. Related Requirements:

1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience / Equal: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use electronic (PDF) copy of form provided in Project Manual.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication, or installation method cannot be provided, if applicable.

b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
i. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
j. Cost information, including a proposal of change, if any, in the Contract Sum.
k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Architect will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 10 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience / Equal:

1. Architect will consider requests for substitution if received no later than 10 days prior to Bid Date.

2. All Substitutions for Convenience / Equal must be pre-approved prior to Bid Date.

3. All requests for pre-approval of Substitutions for Convenience / Equal must be in writing.

4. All items, materials or processes that are to be considered for pre-approval must be submitted in the manner described in the individual Specification Sections in which they appear, and must include all required and necessary support information, certificates, and product information needed for evaluation. Responsibility for assembling and providing adequate review material is solely that of the pre-approval application. Adequacy of the material submitted will be determined solely by the Architect, whose decision shall be final.

5. Inadequate applications will not be reviewed. Neither the Architect nor the Owner has an obligation to notify applicants of inadequate applications prior to the established cut-off dates for review.

6. Neither the Architect nor the Owner has an obligation to review proposed equals prior to Bidding unless pre-approval of a particular material, method or item of equipment is expressly required in the Specifications.

7. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

    a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
    b. Requested substitution does not require extensive revisions to the Contract Documents.
    c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    d. Substitution request is fully documented and properly submitted.
    e. Requested substitution will not adversely affect Contractor's construction schedule.
    f. Requested substitution has received necessary approvals of authorities having jurisdiction.
    g. Requested substitution is compatible with other portions of the Work.
    h. Requested substitution has been coordinated with other portions of the Work.
    i. Requested substitution provides specified warranty.
    j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

END OF SECTION 0125000
(SUBSTITUTION FORM TO FOLLOW)

FORM FOR USE WITH SUBSTITUTION REQUESTS / EQUALS

TO:

PROJECT:

SPECIFIED ITEM: _____

SECTION:_____ PAGE: _____ PARAGRAPH: _____ DESCRIPTION: _____

The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION:

Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of the requests; applicable portions of the data are clearly identified. Attached data also includes description of changes to Contract Documents that proposed substitution will require for its proper installation.

The undersigned states that the following paragraphs, unless modified on attachments, are correct:

1. The proposed substitution does not affect dimensions shown on Drawings.
2. The undersigned will pay for changes to the building design, including engineering, design, detailing and construction costs caused by the requested substitution.
3. The proposed substitution will have no adverse effect on other trades, the construction schedule or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.

The undersigned further states that the function, appearance and quality of the proposed substitution are equivalent or superior to the specified item.

Submitted by: _____ Title: _____

Signature:_____ Date: _____

Firm:_____ Phone: _____

Address: _____

Attachments:

* *

Accepted: City_____ Architect_____ Rejected: City_____ Architect_____

By:_____Date:_____(City)

By:_____Date:_____(Architect)

END FORM FOR USE WITH SUBSTITUTION REQUESTS / EQUALS

(This page intentionally left blank)

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Owner will issue through Construction Manager supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time,

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Construction Manager will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Construction Manager are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.

d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
e. Quotation Form: Use EZ-PCO form provided by Owner. Sample copy is included at the end of this section.
f. Markups, including percentages of mark-up, shall be allowed only as described within the EZ-PCO Change Order Proposal and Change Order Proposal Summary. No mark-up is allowed for intermediate sub-contractors.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Construction Manager.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use EZ-PCO form provided by Owner. Sample copy is included at the end of this section.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Change Proposal Request, Construction Manager will issue a Change Order for signatures of Owner and Contractor.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Construction Manager may issue a Construction Change Directive on form included in Project Manual. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00 (SAMPLE FORMS TO FOLLOW)

Change Order Proposal - EZ-PCO

General Contractor or Sub-Contractor Direct Costs

1. Labor..... $ _____ .
2. Materials ..... $ _____ .
3. Equipment ..... $ _____ .
4. Sub-Total for Labor, Materials & Equipment **$ _____ .** **$ _____ .**

Summary of Sub-Contractor Cost

a. _____ $ _____ .
b. _____ $ _____ .
c. _____ $ _____ .
d. _____ $ _____ .
e. _____ $ _____ .

5. Sub-Total for Sub-Contractors Above **$ _____ .** **$ _____ .**

6. Mark-Up on Direct Cost Labor, Materials & Equipment ..... **$ _____ .**
   If Line 4 above is greater than zero ("0"), enter 15% x Line 4; or
   If Line 4 above is less than zero ("0") enter 5% x Line 4 as a credit.

7. Mark-Up on Sub-Contractor Cost (Prime Contractor Only) **$ _____ .**
   If Sub-Contractor Summary enter zero ("0").
   If Line 5 above is greater than zero ("0"), enter 5% x Line 5; or
   If Line 5 above is less than zero ("0") enter zero ("0").

8. Total Proposal (Line 4 + Line 5 + Line 6 + Line 7) ..... **$ _____ .**

9. Proposed Time Extension (Prime Contractor Only, Calendar Days) ..... _____ Days
   (Requires written schedule analysis and justified impact to critical path schedule or enter zero "0").

Project Number: _____ **Date:** _____

Agreement Number: _____

Company: _____ **PCO #:** _____

Summary for: **Contractor** ❑ **Sub-Contractor** ❑

Attach supporting documentation with detailed cost breakdowns. Attach this form to each sub-contractor proposal.

Refer to instructions for detail on completing this form.

SAMPLE

Change Order Proposal Summary - EZ-PCO

Contractor shall complete and attach this form as a coversheet for each price proposal for the prime contractor and as separate coversheets for each separate sub-contractor proposal at any tier forming a part of the prime proposal.

Lines 1, 2 & 3 represent authorized allowable labor, materials and equipment by the firm performing the work and proposing the costs, whether prime or sub-contractor. Include only costs directly and solely attributable to work described in the PCO. Do not include the types of costs listed as "Indirect and Overhead Costs" below.

Line 5 – Represents authorized allowable costs proposed by sub-contractors at the next lower tier.

Line 6 – For added scope, markup shall not exceed 15% for self-performed work. A credit of 5% for mark-up is applied to net credit costs at the prime contractor tier or sub-contractor tier at which the cost is incurred.

Line 7 – The mark-ups made over a sub-contractor tier shall not exceed 5%. A credit mark-up of 0% if the work was performed by a sub. The aggregate mark-up shall not exceed 25% (i.e. 15% sub + 5% prime sub + 5% GC).

Indirect and Overhead Costs

Do NOT include indirect and overhead costs in lines 1 through 4. The following list is not inclusive and serves only to present examples of the types of costs which are already included in allowable mark-ups.

Salaries and Benefits
Principal Officer, Project Manager, Superintendent, General Foreman, Quality Control Representative, Estimator, Negotiator, Office Manager, Clerical, Receptionist, etc.

Facilities
Office rental/depreciation, storage trailer, warehouse, shops, toilets, washrooms, yard, temporary electrical panel and circuits, temporary lighting, temporary plumbing and drainage, transportation, connection, setup, installation, and removal charges, costs of facilities capital, etc.

Utility Expense
Electricity, gas, water, telephone, janitorial, trash removal, dump fees and sanitary pump-out, etc.

Office Equipment & Vehicles
Personnel transport vehicle (car, pick-up), general delivery vehicle, company car, yard equipment and machinery, depreciation, fuel, oil, filters, tires, maintenance, repairs, storage bins, dumpsters, computers, fax machines, refrigerator, coffee machine, audio and video recorders, cameras, shoring, etc,

Office Furnishings
Desks, tables, chairs, lamps, file cabinets, credenzas, bookcases, carpeting, draperies, dividers, etc.

Small Tools
Shovels, pry bars, hammers, nail gun, screwgun, Hilti, skillsaw, cutoff saw, hacksaw, pliers, snips, torches, hand drills, come-alongs, wrenches, caulk guns, tape measures, levels, chalk lines, conduit benders, fish tape, water hose, etc.

Consumables
Paper, pens, pencils, office supplies, reusable lumber, form materials, tarpaulins, drinking cups, toilet paper, etc.

Safety Equipment
Ear protection, goggles, respirators, safety belts, first aid supplies, fire extinguishers, etc.

Material Delivery, Off-Loading and Handling Expenses

General Office Expenses
Bid preparation, payment and performance bonds, estimating, planning, marketing, public relations, entertainment, safety and security, professional, business and contractors licenses and fees, employee recruitment, termination, transportation and relocation. Professional service fees, legal fees, court costs, litigation, arbitration, idle facilities and capacity, losses on contracts, security, transportation costs, contributions and donations, general coverage, liability insurance, project general insurance, corporate income taxes, stock and bond dividends, debt principal and interest payments, job-site close-up, mobilization and demobilization, etc.

Change Order Administrative Expenses
Takeoff & estimate, proposal preparation & transmittal, negotiations, distribution, general supervision, billing, quality control, schedule update, as-built update, bond and insurance adjustment, etc.

SAMPLE

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Spec. Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

2. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values (SOV): A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES (SOV)

A. Coordination: Coordinate the SOV with Contractor's construction schedule.

1. Coordinate line items in the SOV with items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the SOV to Owner at earliest possible date, but no later than 14 days before the date scheduled for submittal of initial Application for Payment.

3. Sub-schedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide sub-schedules showing values coordinated with each element.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the SOV. Provide at least one line-item for each Specification Section.

1. Identification: Include the following Project identification on the SOV:

   a. Project name and location.
   b. City's Project number.
   c. Contractor's name, address and phone number.
   d. Date of submittal.

2. Use City provided Schedule of Values form.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent (5% min.) of the Contract Sum.

4. Provide a separate line item in the SOV for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

   a. Differentiate between items stored on-site and items stored off-site.

5. Overhead Costs: Include total cost, overhead and profit for each line item.

6. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling equal or greater than five percent of the Contract Sum and subcontract amount.

7. Schedule of Values Revisions: Revise the SOV when Change Orders (CO) or Construction Change Directives (CCD) result in a change in the Contract Sum. Include at least one separate line item for each CO and CCD.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by City's Project Manager and paid for by Owner.

B. Payment Application Times: The date (20th of each month) for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

1. Submit draft copy of Application for Payment ten days prior to due date for review by City Labor Compliance, Inspector, Project & Construction Manager.

C. Application for Payment Forms: Use City provided form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Execute by a person authorized to sign legal documents on behalf of Contractor. City will return incomplete applications without action.

1. Entries shall match data on the SOV and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide address of warehouse facility, certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit one signed original copy of each Application for Payment to Project Manager by an electronic method ensuring receipt. Include waivers of lien and similar attachments as required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Liens: With each Application for Payment, submit waivers of lien from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.

4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of Values (SOV).
3. Contractor's construction schedule (preliminary if not final).
4. Products list (preliminary if not final).
5. Sustainable design action plans, including preliminary project materials cost data.
6. Schedule of unit prices.
7. Submittal schedule (preliminary if not final).
8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of building permits.
11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
12. Initial progress report.
13. Report of preconstruction conference.

I. Application for Payment at Substantial Completion: After City issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. Evidence that claims have been settled.
5. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
6. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Spec. Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. RFIs.
4. Digital project management procedures.
5. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor. However, General Contractor shall coordinate and be responsible for the entire project.

C. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 5 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, in web-based Project software directory, and in prominent location in each built facility. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its own operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Preinstallation conferences.
6. Project closeout activities.
7. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

   a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
   b. Coordinate the addition of trade-specific information to coordination drawings in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
   c. Indicate functional and spatial relationships of components of architectural, structural, mechanical, and electrical systems.
   d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
   e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
   f. Indicate required installation sequences.
   g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Owner indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, fire-protection, fire-alarm, and electrical Work. Show

locations of visible ceiling-mounted devices. Supplement plan drawings with section drawings where required to adequately represent the Work.

2. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
3. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
4. Mechanical and Plumbing Work: Show the following:

    a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    c. Fire-rated enclosures around ductwork.

5. Electrical Work: Show the following:

    a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
    b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
    d. Location of pull boxes and junction boxes, dimensioned from column center lines.

6. Fire-Protection System: Show the following:

    a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

7. Review: Owner will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Owner determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Owner will so inform Contractor, who shall make suitable modifications and resubmit.
8. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
2. File Submittal Format: Submit or post coordination drawing files in PDF format.
3. Owner will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.

a. Owner makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
b. Digital Data Software Program: Drawings are available in AutoCAD 2015 Version in Microsoft Windows operating system.
c. Contractor shall execute a data licensing agreement in the form of the Agreement included in this Project Manual.

1.7 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Owner will return without response those RFIs submitted to Owner by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect and Owner
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Form bound in Project Manual or Software-generated form with substantially the same content as indicated above, acceptable to Owner.

1. Attachments shall be electronic files in PDF format.

D. Owner's Action: Owner will review each RFI, determine action required, and respond. Allow five working days for Owner's response for each RFI. RFIs received by Owner after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Owner's action may include a request for additional information, in which case Owner's time for response will date from time of receipt by Owner of additional information.
3. Owner's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Owner in writing within 5 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Software log with not less than the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Owner's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

F. On receipt of Owner's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Owner within five days if Contractor disagrees with response.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Use of Owner's Digital Data Files: Digital data files of Owner's drawings will be provided by Owner for Contractor's use during construction.

1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
2. Owner makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Digital Drawing Software Program: Contract Drawings are available in PDF.

4. Contractor shall execute a data licensing agreement in the form of Agreement included in Project Manual.

    a. Subcontractors, and other parties granted access by Contractor to Owner's digital data files shall execute a data licensing agreement in the form of Agreement included in this Project Manual.

5. The following digital data files will be furnished for each appropriate discipline:

    a. Site plans.
    b. Floor plans.
    c. Reflected ceiling plans.

B. Web-Based Project Software: Provide, administer, and use web-based Project software site for purposes of hosting and managing Project communication and documentation until Final Completion.

1. Web-based Project software site includes, at a minimum, the following features:

    a. Compilation of Project data, including Contractor, subcontractors, Architect, architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
    b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
    c. Document workflow planning, allowing customization of workflow between project entities.
    d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
    e. Track status of each Project communication in real time, and log time and date when responses are provided.
    f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
    g. Processing and tracking of payment applications.
    h. Processing and tracking of contract modifications.
    i. Creating and distributing meeting minutes.
    j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
    k. Management of construction progress photographs.
    l. Mobile device compatibility, including smartphones and tablets.

2. Provide up to seven web-based Project software user licenses for use of Owner, Architect, and Architect's consultants. Upon request, provide four hours of software training at Owner's office for web-based Project software users.
3. At completion of Project, provide digital archive in format that is readable by Microsoft Windows applications. Provide data in locked/flattened format.
4. Provide one of the following web-based Project software packages under their current published licensing agreements:

a. Autodesk Plangrid;
b. Corecon Technologies, Inc.
c. Meridian Systems; Prolog.
d. Newforma, Inc.
e. Procore Technologies, Inc.
f. Viewpoint, Inc.; Viewpoint for Project Collaboration.

C. PDF Document Preparation: Where PDFs are required to be submitted to Owner, prepare as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, within three days of the meeting.

B. Preconstruction Conference: Owner will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

a. Responsibilities and personnel assignments.
b. Tentative construction schedule.
c. Phasing.

d. Critical work sequencing and long lead items.
e. Designation of key personnel and their duties.
f. Lines of communications.
g. Use of web-based Project software.
h. Procedures for processing field decisions and Change Orders.
i. Procedures for RFIs.
j. Procedures for testing and inspecting.
k. Procedures for processing Applications for Payment.
l. Distribution of the Contract Documents.
m. Submittal procedures.
n. Preparation of Record Documents.
o. Use of the premises.
p. Work restrictions.
q. Working hours.
r. Procedures for moisture and mold control.
s. Construction waste management and recycling.
t. Parking availability.
u. Office, work, and storage areas.
v. Equipment deliveries and priorities.
w. First aid.
x. Security.
y. Progress cleaning.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Owner of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Possible conflicts.
i. Compatibility requirements.
j. Time schedules.
k. Weather limitations.
l. Manufacturer's written instructions.
m. Warranty requirements.
n. Compatibility of materials.

o. Regulations of authorities having jurisdiction.
p. Testing and inspecting requirements.
q. Installation procedures.
r. Protection of adjacent work.
s. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner, but no later than 30 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

a. Preparation of Record Documents.
b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
c. Procedures for completing and archiving web-based Project software site data files.
d. Submittal of written warranties.
e. Requirements for preparing operations and maintenance data.
f. Requirements for delivery of material samples, attic stock, and spare parts.
g. Requirements for demonstration and training.
h. Preparation of Contractor's punch list.
i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
j. Submittal procedures.
k. Owner's partial occupancy requirements.
l. Installation of Owner's fixtures, and equipment.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at regular intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning,

coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

        1) Review schedule for next period.

    b. Review present and future needs of each entity present, including the following:

        1) Interface requirements.
        2) Sequence of operations.
        3) Status of submittals.
        4) Deliveries.
        5) Off-site fabrication.
        6) Access.
        7) Site use.
        8) Quality and work standards.
        9) Status of correction of deficient items.
        10) Field observations.
        11) Status of RFIs.
        12) Status of Proposal Requests.
        13) Pending changes.
        14) Status of Change Orders.
        15) Pending claims and disputes.
        16) Documentation of information for payment requests.

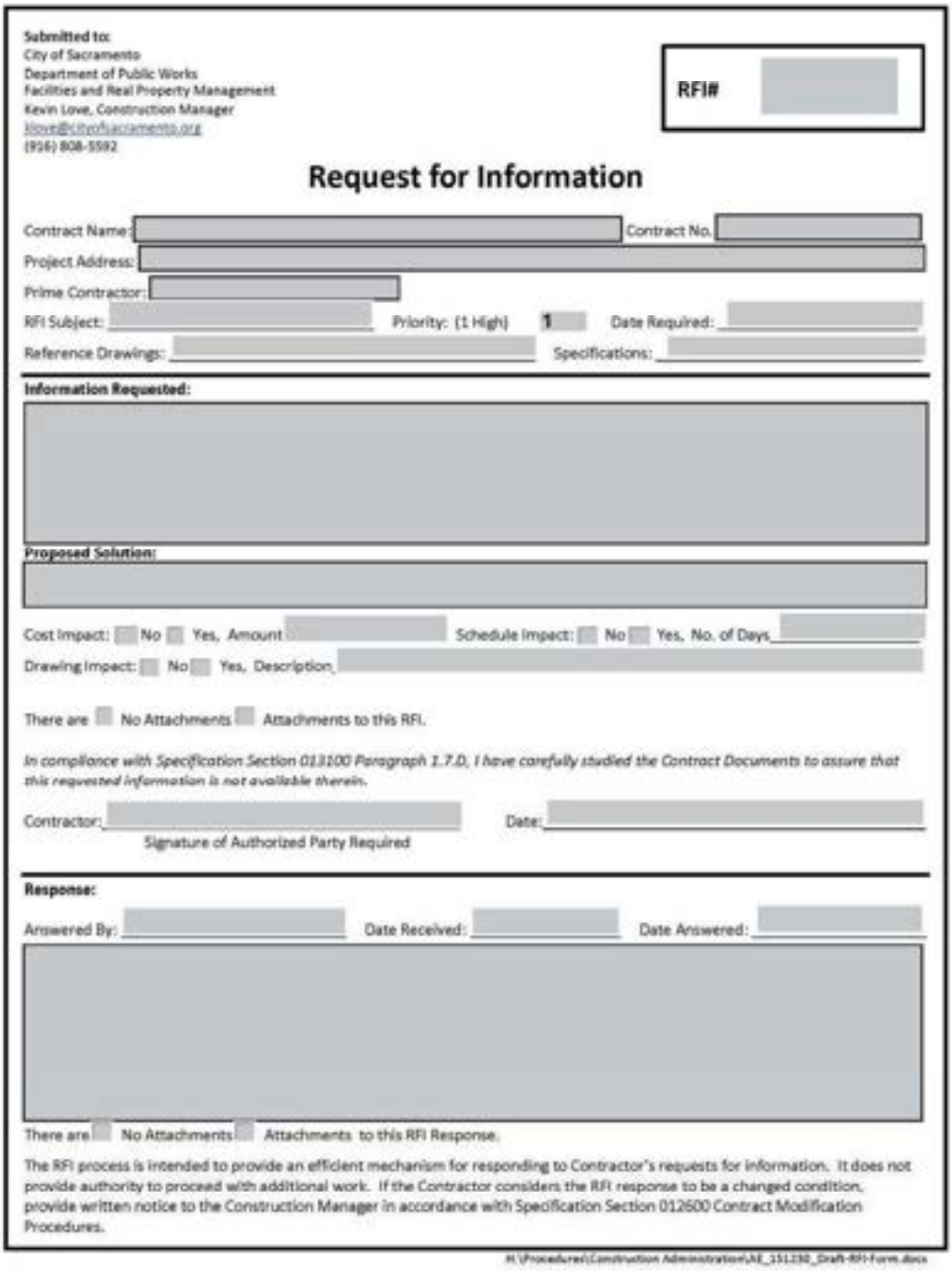
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

    a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule with the report of each meeting.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

END OF SECTION 013100 (SAMPLE FORM TO FOLLOW)

SAMPLE FORM TO BE USED WITH PROJECT MANAGEMENT AND COORDINATION PROCEDURES



Submitted to:
City of Sacramento
Department of Public Works
Facilities and Real Property Management
Kevin Love, Construction Manager
klove@cityofsacramento.org
(916) 808-5592

RFI#

Request for Information

Contract Name: _____ Contract No. _____

Project Address: _____

Prime Contractor: _____

RFI Subject: _____ Priority: (1 High) 1 Date Required: _____

Reference Drawings: _____ Specifications: _____

Information Requested:

Proposed Solution:

Cost Impact: ☐ No ☐ Yes, Amount _____ Schedule Impact: ☐ No ☐ Yes, No. of Days _____

Drawing Impact: ☐ No ☐ Yes, Description _____

There are ☐ No Attachments ☐ Attachments to this RFI.

In compliance with Specification Section 013100 Paragraph 1.7.D, I have carefully studied the Contract Documents to assure that this requested information is not available therein.

Contractor: _____ Date: _____

Signature of Authorized Party Required

Response:

Answered By: _____ Date Received: _____ Date Answered: _____

There are ☐ No Attachments ☐ Attachments to this RFI Response.

The RFI process is intended to provide an efficient mechanism for responding to Contractor's requests for information. It does not provide authority to proceed with additional work. If the Contractor considers the RFI response to be a changed condition, provide written notice to the Construction Manager in accordance with Specification Section 012600 Contract Modification Procedures.

H:\Procedures\Construction Administration\AE_151230_Draft-RFI-Form.docx

END SAMPLE FORM TO BE USED WITH PROJECT MANAGEMENT AND COORDINATION PROCEDURES

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's Construction Schedule.
2. Site condition reports.
3. Unusual event reports.

B. Related Requirements:

1. Section 011000 “Summary” for concurrent work by Owner under separate contracts.

2. Section 012900 "Payment Procedures” for requirements to prepare and process Applications for Payment.

3. Section 013100 "Project Management and Coordination" for construction coordination provisions.

4. Section 013300 “Submittal Procedures” for submittal schedule requirements and procedural requirements for submittals.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values (SOV) for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration (no float).

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF file emailed to Owner's Project Manager.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

C. Construction Schedule Updating Reports: Submit with Applications for Payment.

D. Site Condition Reports: Submit at time of discovery of differing conditions.

E. Unusual Event Reports: Submit at time of unusual event.

1.5 QUALITY ASSURANCE

A. Scheduling Qualifications: Experienced specialist in CPM scheduling and reporting, with capability of producing reports/ diagrams within 24 hours of Owner's request.

1.6 COORDINATION

A. Coordinate Contractor's Construction Schedule with SOV, list of subcontracts, submittal schedule, progress reports, payment requests, and required documents.

1. Time commitments for critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.7 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Computer Scheduling Software: Prepare schedules using current version of software specifically to manage construction schedules.

1. Use Scheduling component of Project software specified in Section 013100 "Project Management and Coordination."

B. Time Frame: Extend schedule from date established for commencement of the Work to date of Substantial Completion.

1. Contract completion date shall not be changed by submission of a schedule, unless specifically authorized by Change Order.

C. Activities: Treat area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Owner.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to: submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Owner’s administrative procedures necessary for certification of Substantial Completion.
5. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how Work sequence is affected.

1. Products Ordered in Advance: Include a separate activity for each product. Delivery dates indicated stipulate the earliest possible delivery date.
2. Work Restrictions: Show the effect of the following items on the schedule:

a. Coordination with existing construction.

3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

    a. Submittals.
    b. Purchases.
    c. Fabrication.
    d. Deliveries.
    e. Installation.
    f. Adjusting.
    g. Curing.

4. Construction Areas: Identify area of construction for each portion of the Work. Indicate where each construction activity within an area must be sequenced or integrated with other construction activities to provide for the following:

    a. Permanent space enclosure.
    b. Completion of mechanical installation.
    c. Completion of electrical installation.
    d. Substantial Completion.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, Notice to Proceed, Substantial Completion, and final completion:

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and the Contract Time.

G. Distribution: Distribute copies of approved schedule to Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.8 GANTT-CHART SCHEDULE REQUIREMENTS

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for commencement of the Work.

1. Base schedule on the startup construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1.9 CPM SCHEDULE REQUIREMENTS

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. CPM Schedule: Prepare Contractor's Construction Schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date of Notice to Proceed.

a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.

2. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.

C. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

a. Preparation and processing of submittals.
b. Mobilization and demobilization.
c. Purchase of materials.
d. Delivery.
e. Fabrication.
f. Installation.
g. Testing and inspection.
h. Punch list and final completion.
i. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

D. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.

E. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "start-total float." Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Start dates.
6. Finish dates.
7. Activity duration in workdays.
8. Total float or slack time.

1.10 REPORTS

A. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

B. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

1. Submit unusual event reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 32 00

SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Periodic construction photographs.
3. Final completion construction photographs.

B. Related Requirements:

1. Section 017700 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
2. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.
3. Section 024116 "Structure Demolition" for photographic documentation before building demolition operations commence.
4. Section 024119 "Selective Demolition" for photographic documentation before selective demolition operations commence.
5. Section 311000 "Site Clearing" for photographic documentation before site clearing operations commence.

1.3 INFORMATIONAL SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

B. Digital Photographs: Submit image files within five days of taking photographs.

1. Submit photos on USB thumb-drive or by uploading to web-based project software site. Include digital copy of key plan indicating each photograph's location and direction.
2. Identification: Provide the following information with each image description in file metadata tag or in web-based project software site:

a. Name of Project.
b. Date photograph was taken.

c. Description of location, vantage point, and direction.
d. Unique sequential identifier keyed to accompanying key plan.

1.4 QUALITY ASSURANCE

A. Photographer Qualifications: An individual who has been regularly engaged on construction projects for not less than three years.

1.5 FORMATS AND MEDIA

A. Digital Photographs: Provide color images in JPG format, produced by a digital camera and at an image resolution of not less than 3200 by 2400 pixels. Use flash in low light levels or backlit conditions.

B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

C. Metadata: Record accurate date and time and GPS location data from camera.

D. File Names: Name media files with date and Project Name and sequential numbering.

1.6 CONSTRUCTION PHOTOGRAPHS

A. Photographer: Engage a qualified person to take construction photographs.

B. General: Take photographs with maximum depth of field and in focus.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

C. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Owner.

1. Flag construction limits before taking construction photographs.
2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
3. Take 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
4. Take additional photographs as required to record adjacent structures, pavements, and improvements.

D. Periodic Construction Photographs: Take 50 photographs coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

E. Final Completion Construction Photographs: Take 50 photographs after date of Substantial Completion for submission as Project Record Documents. Owner will inform photographer of desired vantage points.

F. Additional Photographs: Owner may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.
   1. In emergency situations, take additional photographs within 24 hours of request.
   2. Circumstances that could require additional photographs include, but are not limited to, the following:

      a. Special events planned at Project site.
      b. Immediate follow-up when on-site events result in construction damage or losses.
      c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
      d. Substantial Completion of a major phase or component of the Work.
      e. Extra record photographs at time of final acceptance.
      f. Owner's request for special publicity photographs.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013233

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Spec. Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
5. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
6. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
7. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Owner's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Owner's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Owner and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal Category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Owner's final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled date of fabrication.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Owner's Project Manager.
5. Name of Contractor.
6. Name of firm or entity that prepared submittal.
7. Names of subcontractor, manufacturer, and supplier.
8. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
9. Category and type of submittal.

10. Submittal purpose and description.
11. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
12. Drawing number and detail references, as appropriate.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

B. Options: Identify options requiring selection by Owner.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Owner on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.6 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Email: Prepare submittals as a 0PDF and transmit to Owner via email. Include PDF transmittal form. Identify submittal type in email subject line.

    a. Owner will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently. Partial submittals are prohibited. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
3. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Owner reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Owner's receipt of submittal. No extension

of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Owner will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by consultants, Owner, or other parties is indicated, allow 21 days for initial submittal review.

D. Resubmittals: Make resubmittals in same form and number of copies as initial.

1. Note date and content of previous submittal.
2. Note date and content in label or title block and clearly indicate revision extent.
3. Resubmit submittals until they are marked with approval notation from Owner's action stamp.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Owner's stamp.

1.7 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit Shop Drawings, not Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams that show factory-installed wiring.

b. Printed performance curves.
c. Operational range diagrams.

5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data. Submittal based on Architect's digital data drawing files is permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

C. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.

D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Owner, and other information specified.

E. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

F. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience.

4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

1.8 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Owner.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp or indication in web-based Project software. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Owner will not review submittals received from Contractor that do not have Contractor's review and approval.

1.9 OWNER'S REVIEW

A. Action Submittals: Owner will review each submittal, indicate corrections or revisions required, and return it.

1. PDF Submittals: Owner will indicate, via markup on each submittal:

a. No Exceptions Taken
b. Make Corrections Noted
c. Revise and Resubmit
d. Rejected

B. Informational Submittals: Owner will review each submittal and will not return it or will return it if it does not comply with requirements. Owner will forward each submittal to appropriate party.

C. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

D. Owner will only return with review submittals received from the Contractor.

E. Submittals not required in the Contract Documents: returned by Owner with no action.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used

END OF SECTION 013300

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Spec. Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. Specified inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Specific inspection requirements are not specified in this Section.

1.3 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests: Inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

D. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

E. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

F. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

G. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect or Construction Manager.

1.4 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Owner for direction before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 ACTION SUBMITTALS

A. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Reports: Prepare and submit certified written reports and documents as specified.

D. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to commencement of work. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's Construction Schedule.

B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

1.8 REPORTS AND DOCUMENTS

A. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.9 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification

requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

F. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.10 QUALITY CONTROL

A. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate inspection.

1. Schedule times for inspections and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Inspection Log: Prepare a record of inspections. Including:

1. Date inspection was conducted.
2. Description of the Work inspected.
3. Date inspection results were transmitted to Architect.
4. Identification of inspector conducting inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, and Construction Manager's reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

A. General: On completion of inspection and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

(THIS PAGE INTENTIONALLY LEFT BLANK)

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Spec. Sections, apply to this Section.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the U.S."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ABMA - American Boiler Manufacturers Association; www.abma.com.
8. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org
9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
11. AF&PA - American Forest & Paper Association; www.afandpa.org.
12. AGA - American Gas Association; www.aga.org.
13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
15. AI - Asphalt Institute; www.asphaltinstitute.org.
16. AIA - American Institute of Architects (The); www.aia.org.
17. AISC - American Institute of Steel Construction; www.aisc.org.
18. AISI - American Iron and Steel Institute; www.steel.org.
19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.

21. ANSI - American National Standards Institute; www.ansi.org.
22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
23. APA - APA - The Engineered Wood Association; www.apawood.org.
24. APA - Architectural Precast Association; www.archprecast.org.
25. API - American Petroleum Institute; www.api.org.
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. CDA - Copper Development Association; www.copper.org.
49. CE - Conformite Europeenne; http://ec.europa.eu/growth/single-market/ce-marking/
50. CEA - Canadian Electricity Association; www.electricity.ca.
51. CEA - Consumer Electronics Association; www.ce.org.
52. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
54. CGA - Compressed Gas Association; www.cganet.com.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
56. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
57. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
59. CPA - Composite Panel Association; www.pbmdf.com.
60. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
61. CRRC - Cool Roof Rating Council; www.coolroofs.org.
62. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
63. CSA - CSA Group; www.csa.ca.

64. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
65. CSI - Construction Specifications Institute (The); www.csinet.org.
66. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHI - Door and Hardware Institute; www.dhi.org.
71. ECA - Electronic Components Association; (See ECIA).
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
73. ECIA - Electronic Components Industry Association; www.eciaonline.org.
74. EIA - Electronic Industries Alliance; (See TIA).
75. EIMA - EIFS Industry Members Association; www.eima.com.
76. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
77. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org .
78. ESTA - Entertainment Services and Technology Association; (See PLASA).
79. ETL - Intertek (See Intertek); www.intertek.com.
80. EVO - Efficiency Valuation Organization; www.evo-world.org.
81. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
82. FM Approvals - FM Approvals LLC; www.fmglobal.com.
83. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
84. FSA - Fluid Sealing Association; www.fluidsealing.com.
85. FSC - Forest Stewardship Council U.S.; www.fscus.org.
86. GA - Gypsum Association; www.gypsum.org.
87. GANA - Glass Association of North America; www.glasswebsite.com.
88. GS - Green Seal; www.greenseal.org.
89. HI - Hydraulic Institute; www.pumps.org.
90. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
91. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
92. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
93. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
94. IAPSC- International Association of Professional Security Consultants; www.iapsc.org.
95. IAS - International Accreditation Service; www.iasonline.org.
96. IAS - International Approval Services; (See CSA).
97. ICBO - International Conference of Building Officials; (See ICC).
98. ICC - International Code Council; www.iccsafe.org.
99. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
100. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
101. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
102. IEC - International Electrotechnical Commission; www.iec.ch.
103. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
104. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
105. IESNA - Illuminating Engineering Society of North America; (See IES).
106. IEST - Institute of Environmental Sciences and Technology; www.iest.org.

107. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
108. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
109. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
110. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
111. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
112. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
113. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
114. ISO - International Organization for Standardization; www.iso.org.
115. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
116. ITU - International Telecommunication Union; www.itu.int/home.
117. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
118. LMA - Laminating Materials Association; (See CPA).
119. LPI - Lightning Protection Institute; www.lightning.org.
120. MBMA - Metal Building Manufacturers Association; www.mbma.com.
121. MCA - Metal Construction Association; www.metalconstruction.org.
122. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
123. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
124. MHIA - Material Handling Industry of America; www.mhia.org.
125. MIA - Marble Institute of America; www.marble-institute.com.
126. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
127. MPI - Master Painters Institute; www.paintinfo.com.
128. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
129. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
130. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
131. NADCA - National Air Duct Cleaners Association; www.nadca.com.
132. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
133. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
134. NBI - New Buildings Institute; www.newbuildings.org.
135. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
136. NCMA - National Concrete Masonry Association; www.ncma.org.
137. NEBB - National Environmental Balancing Bureau; www.nebb.org.
138. NECA - National Electrical Contractors Association; www.necanet.org.
139. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
140. NEMA - National Electrical Manufacturers Association; www.nema.org.
141. NETA - InterNational Electrical Testing Association; www.netaworld.org.
142. NFPA - National Fire Protection Association; www.nfpa.org.
143. NFPA - NFPA International; (See NFPA).
144. NFRC - National Fenestration Rating Council; www.nfrc.org.
145. NHLA - National Hardwood Lumber Association; www.nhla.com.
146. NLGA - National Lumber Grades Authority; www.nlga.org.
147. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
148. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.

149. NRCA - National Roofing Contractors Association; www.nrca.net.
150. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
151. NSF - NSF International; www.nsf.org.
152. NSPE - National Society of Professional Engineers; www.nspe.org.
153. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
154. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
155. NWFA - National Wood Flooring Association; www.nwfa.org.
156. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
157. PDI - Plumbing & Drainage Institute; www.pdionline.org.
158. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); http://www.plasa.org.
159. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
160. RFCI - Resilient Floor Covering Institute; www.rfci.com.
161. RIS - Redwood Inspection Service; www.redwoodinspection.com.
162. SAE - SAE International; www.sae.org.
163. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
164. SDI - Steel Deck Institute; www.sdi.org.
165. SDI - Steel Door Institute; www.steeldoor.org.
166. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
167. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
168. SIA - Security Industry Association; www.siaonline.org.
169. SJI - Steel Joist Institute; www.steeljoist.org.
170. SMA - Screen Manufacturers Association; www.smainfo.org.
171. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
172. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
173. SPIB - Southern Pine Inspection Bureau; www.spib.org.
174. SPRI - Single Ply Roofing Industry; www.spri.org.
175. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
176. SSINA - Specialty Steel Industry of North America; www.ssina.com.
177. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
178. STI - Steel Tank Institute; www.steeltank.com.
179. SWI - Steel Window Institute; www.steelwindows.com.
180. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
181. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
182. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
183. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
184. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
185. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
186. TMS - The Masonry Society; www.masonrysociety.org.
187. TPI - Truss Plate Institute; www.tpinst.org.
188. TPI - Turfgrass Producers International; www.turfgrasssod.org.
189. TRI - Tile Roofing Institute; www.tileroofing.org.
190. UL - Underwriters Laboratories Inc.; http://www.ul.com.
191. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.

192. USGBC - U.S. Green Building Council; www.usgbc.org.
193. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
194. WA - Wallcoverings Association; www.wallcoverings.org
195. WASTEC - Waste Equipment Technology Association; www.wastec.org.
196. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
197. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
198. WDMA - Window & Door Manufacturers Association; www.wdma.com.
199. WI - Woodwork Institute; www.wicnet.org.
200. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
201. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
1. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
2. ICC - International Code Council; www.iccsafe.org.
3. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.

6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
6. SMAQMD; Sacramento Metro Air Quality Management District; www.airquality.org.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
2. Section 011200 "Multiple Contract Summary" for responsibilities for temporary facilities and controls for projects utilizing multiple contracts.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Sewer Service: **Owner will pay** sewer-service use charges for sewer usage by all entities for construction operations.

C. Water Service: **Owner will pay** water-service use charges for water used by all entities for construction operations.

D. Electric Power Service (Temporary): If temporary power is needed, Contractor shall pay for all temporary power needs including generators or temporary electrical service.

E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges.

Provide connections and extensions of services as required for construction operations.

G. Sewer, Water, and Electric Power Service: Use charges are specified in Section 011200 "Multiple Contract Summary."

1.4 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.

C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

E. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.

F. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:

1. Locations of dust-control partitions at each phase of work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air-filtration system discharge.
4. Waste-handling procedures.
5. Other dust-control measures.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top rails.

B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top and bottom rails. Provide galvanized-steel bases for supporting posts.

C. Fencing Windscreen Privacy Screen: Polyester fabric scrim with grommets for attachment to chain link fence, sized to height of fence, in color selected by Architect from manufacturer's standard colors.

D. Wood Enclosure Fence: Plywood, 8 feet high, framed with four 2-by-4-inch rails, with preservative-treated wood posts spaced not more than 8 feet apart.

E. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

F. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats minimum 36 by 60 inches.

G. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, Construction Manager, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot-square tack and marker boards.
3. Drinking water and private toilet.
4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
5. Lighting fixtures capable of maintaining average illumination of 20 fcat desk height.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction, and clean HVAC system as required in Section 017700 "Closeout Procedures."

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

E. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

1. Toilets: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

F. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

G. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.

a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.

2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

H. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

I. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service underground unless otherwise indicated.
2. Connect temporary service to Owner's existing power source, as directed by Owner.

J. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.4 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after

Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

C. Parking: **Use designated areas of Owner's existing** parking areas for construction personnel.

D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove water as required to minimize accumulations.

E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

    a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touch up signs so they are legible at all times.

F. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

G. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

H. Temporary Elevator Use: Use of elevators is not permitted.

I. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.

1. Do not load elevators beyond their rated weight capacity.
2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be

refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.

J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

K. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

L. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 011000 "Summary."

C. Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Section 311000 "Site Clearing."

D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to **requirements of CA Department of Water Resources Stormwater Quality Program Construction General Permit or authorities having jurisdiction, whichever is more stringent.**

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

F. Tree and Plant Protection: Comply with requirements specified in Section 015639 "Temporary Tree and Plant Protection."

G. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

H. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

I. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

J. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

K. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

L. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction and requirements indicated on Drawings.

1. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
2. Paint and maintain appearance of walkway for duration of the Work.

M. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

N. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise.

1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.

    a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.

3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
4. Insulate partitions to control noise transmission to occupied areas.
5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
6. Protect air-handling equipment.
7. Provide walk-off mats at each entrance through temporary partition.

O. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48hours are considered defective and require replacing.
b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Spec. Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for requests for substitutions.
2. Section 014200 "References" for applicable industry standards for products specified.
3. Section 017700 “Closeout Procedures” for information on submittal times.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product. Any comparable product must be approved through the Substitution Procedure.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special

features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.4 ACTION SUBMITTALS

A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor through Construction Manager of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Form of Architect's Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of

products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

    a. Name of product and manufacturer.
    b. Model and serial number.
    c. Capacity.
    d. Speed.
    e. Ratings.

3. See individual identification sections in Divisions 15 and 16 for additional identification requirements.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will select.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.

    a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: …"

2. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.

    a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: …"

3. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.

    a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: …"

4. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.

    a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: …"

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

    a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
2. Evidence that proposed product provides specified warranty.
3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
4. Samples, if requested.

B. Submittal Requirements: Approval of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.

B. Related Requirements:

1. Section 011000 "Summary" for limits on use of Project site.
2. Section 013300 "Submittal Procedures" for submitting surveys.
3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 PREINSTALLATION MEETINGS

A. Cutting and Patching Conference: Conduct conference at Project site.

1. Prior to submitting cutting and patching plan, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result

from cutting and patching work. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:

a. Contractor's superintendent.
b. Trade supervisor responsible for cutting operations.
c. Trade supervisor(s) responsible for patching of each type of substrate.
d. Mechanical and electrical subcontractors' supervisors, to the extent each trade is affecting by cutting and patching operations.

2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer.

B. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.

C. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

D. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

E. Certified Surveys: Submit two copies signed by land surveyor.

F. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.6 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:

    a. Primary operational systems and equipment.
    b. Fire-suppression systems.
    c. Plumbing piping systems.
    d. Mechanical systems piping and ducts.
    e. Communication systems.
    f. Fire-detection and -alarm systems.
    g. Electrical wiring systems.
    h. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

    a. Water, moisture, or vapor barriers.
    b. Membranes and flashings.
    c. Equipment supports.
    d. Piping, ductwork, vessels, and equipment.
    e. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and Construction Manager promptly.

B. General: Engage a professional engineer to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Architect and Construction Manager when deviations from required lines and levels exceed allowable tolerances.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.5 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
3. Mechanical and Electrical Services: Cut off conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of conduit to prevent entrance of moisture or other foreign matter after cutting.
4. Proceed with patching after construction operations requiring cutting are complete.

F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

G. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

F. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

G. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

H. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

I. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

(THIS PAGE INTENTIONALLY LEFT BLANK)

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:

1. Section 013100 “Project Management and Coordination” for information on Waste Management Conferences.

1.3 DEFINITIONS

A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner’s property.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 7 days of date established for the Notice to Proceed. Waste Management Plan is available on the City website.

B. Waste Log: Submit the required Waste Log within 20 days after final inspection.

1.6 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Construction and Demolition Waste Log available on the City website.

B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.7 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management

coordination of projects with similar requirements. Superintendent may serve as Waste Management Coordinator.

B. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

C. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of each contractor and waste management coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to requirements set forth by City of Sacramento Solid Waste Services. Plan shall consist of waste identification, compliant debris recycling goals, and material management plan, including accompanying Waste Log. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

PART 2 - PRODUCTS

2.1 RECYCLING RECEIVERS AND PROCESSORS

A. Subject to compliance with requirements, available recycling receivers and processors include, but are not limited to, the following:

1. Kiefer Landfill, 127601 Kiefer Blvd. Sloughouse, CA 95683.

2. Florin Perkins Disposal Site, 4201 Florin Perkins Rd, Sacramento, CA 95826

2.2 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of 50 percent by weight of total nonhazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.

3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

D. Procedures: Process recyclable waste according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.3 RECYCLING DEMOLITION WASTE

A. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Pulverize concrete to maximum 1-1/2-inch size.
2. Crush concrete and screen to comply with requirements in Civil Specifications Section 14 "Earthwork, Excavation, Embankment, and Subgrade" for use as satisfactory soil for fill or subbase.

3.4 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

D. Paint: Seal containers and store by type.

3.5 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner's property.

C. Burning: Do not burn waste materials.

END OF SECTION 01 74 19

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Spec. Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for final Application for Payment.
2. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
3. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.
B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
C. Certified List of Incomplete Items: Final submittal at final completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.
B. Certificate of Insurance: For continuing coverage.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance materials in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner. Label with manufacturer's name and model number.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.

5. Submit testing, adjusting, and balancing records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Complete final cleaning requirements.
6. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Owner will either proceed with inspection or notify Contractor of

unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Owner, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection are the requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Owner. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.
5. Submit final completion photographic documentation.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Owner will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.

c. Name of Architect and Owner
d. Name of Contractor.
e. Page number.

4. Submit list of incomplete items in the following format:

a. MS Excel electronic file. Owner will return annotated file.
b. PDF electronic file. Owner will return annotated file.
c. Web-based project software upload (punch list).
d. Electronic PDF copies. Owner will return annotated PDF file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Owner for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the Project Manual.

D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1. Submit on digital media acceptable to Owner via weblink by email.

E. Provide PDF's of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site in areas disturbed by construction activities of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Remove tools, construction equipment, machinery, and surplus material from Project site.
d. Sweep concrete floors broom clean in unoccupied spaces.
e. Remove labels that are not permanent.
f. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
g. Clean luminaires, lamps, globes, and reflectors to fully function.
h. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair.

a. Do not paint over "UL" and other required labels and identification, including mechanical & electrical. Remove paint applied to labels. Do not paint over fire-rated plywood labels.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs dimmed by use, and defective and noisy fixtures to comply with requirements.

END OF SECTION 01 77 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory manuals.
2. Systems and equipment operation manuals.
3. Systems and equipment maintenance manuals.
4. Product maintenance manuals.

B. Related Requirements:

1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Owner will comment on whether content of operation and maintenance submittals is acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

1. Submit PDF documents via email to Owner. Enable reviewer comments on draft submittals.

2. Submit PDF documents on a USB flash drive and deliver to owner's representative.

C. Initial Manual Submittal: Submit draft copy of each manual at least thirty [30] days before commencing demonstration and training. Owner will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least fifteen [15] days before commencing demonstration and training. Owner will return copy with comments in a digital format.

1. Correct or revise each manual to comply with Owner's comments. Submit digital copies of each corrected manual within fifteen [15] days of receipt of Owner's comments and prior to commencing demonstration and training.

E. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required. Provide a USB flash drive with all files sorted by O&M manual sections and renamed appropriately.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

1.6 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Construction Manager.
7. Name and contact information for Owner.
8. Name and contact information for Architect.
9. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a digital file.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.7 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:

1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in a separate list.
3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Wiring diagrams.
6. Precautions against improper use.
7. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Routine and normal operating instructions.
3. Normal shutdown instructions.

1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of

a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data includes more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

    a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of maintenance manuals.

1.10 PRODUCT MAINTENANCE MANUALS

A. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Repair instructions.

B. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

C. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 78 23

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:

1. Section 013100 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
2. Section 017300 "Execution" for final property survey.
3. Section 017700 "Closeout Procedures" for general closeout procedures.
4. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set of marked-up record prints.
2. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal:
   1) Submit PDF electronic files of scanned record prints and one set of file prints.
   2) Owner will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:
   1) Submit PDF electronic files of scanned record prints and one set of prints.

2) Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Submit scans of marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

E. Reports: Submit written report monthly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.4 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Revisions to routing of piping and conduits.
d. Revisions to electrical circuitry.
e. Actual equipment locations.
f. Duct size and routing.
g. Locations of concealed internal utilities.
h. Changes made by Change Order or Construction Change Directive (CCD).

i. Changes made following Owner's written orders.
j. Details not on the original Contract Drawings.
k. Field records for variable and concealed conditions.
l. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Owner. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
2. Format: DWG Version 2015 or previous, Microsoft Windows operating system.
3. Format: Annotated PDF electronic file with comment function enabled.
4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
5. Refer instances of uncertainty to Owner for resolution.
6. Owner will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.

    a. See Section 013100 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
    b. Architect/Owner will provide data file layer information. Record markups in separate layers.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Architect and Owner.

e. Name of Contractor.

5. Record Drawings must be submitted for each subcontractor, General Contractor for all scope of work performed on-site and submitted prior to release of final payment.

1.5 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Specifications.

1.6 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

C. Format: Submit record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.7 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.8 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Owner's reference during normal working hours.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 01 78 39

(THIS PAGE INTENTIONALLY LEFT BLANK)

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.

B. Allowances: Furnish demonstration and training instruction time under the demonstration and training allowance as specified in Section 012100 "Allowances."

C. Unit Price for Instruction Time: Length of instruction time will be measured by actual time spent performing demonstration and training in required location. No payment will be made for time spent assembling educational materials, setting up, or cleaning up. See requirements in Section 012200 "Unit Prices."

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training for systems, equipment, and products.

B. Qualification Data: For facilitator and/or instructor.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.
2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.6 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Systems and equipment operation manuals.
    c. Systems and equipment maintenance manuals.
    d. Product maintenance manuals.
    e. Project Record Documents.
    f. Identification systems.
    g. Warranties and bonds.
    h. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.
    f. Safety procedures.
    g. Instructions on stopping.
    h. Normal shutdown instructions.
    i. Operating procedures for emergencies.
    j. Operating procedures for system, subsystem, or equipment failure.
    k. Seasonal and weekend operating instructions.
    l. Required sequences for electric or electronic systems.
    m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning.
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

1.7 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.8 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
2. Owner will furnish an instructor to describe Owner's operational philosophy.

3. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, through Construction Manager, with at least seven days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

PART 2 - EXECUTION

END OF SECTION 01 79 00

(THIS PAGE INTENTIONALLY LEFT BLANK)

SECTION 02 41 16 STRUCTURE DEMOLITION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Demolition and removal of existing building elements as indicated on Drawings.
   2. Disconnect, cap or seal, and abandoning in-place all site utilities to an area designated on Drawings.
   3. Salvaging items for reuse by Owner.

B. Related Sections:
   1. Section 01 74 19: Construction Waste Management and Disposal.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse or store. Include fasteners or brackets needed for reattachment elsewhere.

1.4 SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Proposed Protection Measures:
   1. Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control, and for noise control. Indicate proposed locations and construction of barriers:
      a. Adjacent buildings: Detail special measures proposed to protect adjacent buildings to remain including means of egress from those buildings.

C. Schedule of Building Demolition Activities:
   1. Indicate the following:
      a. Detailed sequence of demolition work, with starting and ending dates for each activity.
      b. Temporary interruption of utility services.
      c. Shutoff and capping or re-routing of utility services.

D. Pre-Demolition Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces, which might be misconstrued as damage caused by demolition operations. Comply with Section 01 32 33: Photographic Documentation. Submit before the Work begins.

E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that

recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

F. Inventory: Submit a list of items that have been removed and salvaged. Refer to Section 01 74 19: Construction Waste Management and Disposal.

1.5 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

1.6 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

B. Pre-demolition conference to be conducted at Project site:
1. Inspect and discuss condition of construction to be demolished.
2. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review and finalize protection requirements.
4. Review procedures for noise control and dust control.
5. Review procedures for protection of adjacent buildings.
6. Review items to be salvaged and returned to Owner.

C. Arrange demolition schedule so as not to interfere with Owner's onsite operations or operations of adjacent occupied buildings.

D. Arrange demolition schedule so as not to interfere with work performed by other contractors onsite. Coordinate work for equipment used to not deter or stop work by others.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner:
1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

C. Onsite storage or sale of removed items or materials is not permitted.

PART 2 NOT USED

PART 3 EXECUTION

3.1 FIELD CONDITIONS

A. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted:
1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent

occupied buildings:
a. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings:
1) Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical:
1. Before building demolition, Owner will remove the following items:

C. Hazardous Materials:
1. It is not expected that hazardous materials will be encountered in the Work:
a. Hazardous materials will be removed by Owner before start of the Work.
b. If elements suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

3.2 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting demolition operations.

B. Review Project record documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project record documents.

C. Engage a professional Engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.

D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

E. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations. Comply with Section 01 32 33: Photographic Documentation.

3.3 PREPARATION

A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

B. Salvaged Items:
1. Clean salvaged items of dirt and demolition debris.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to storage area.
5. Protect items from damage during transport and storage.

3.4 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Utilities to be Disconnected:
1. Locate, identify, disconnect, and seal or cap off utilities serving buildings and structures

to be demolished:

a. Owner will arrange to shut off utilities when requested by Contractor.
b. Arrange to shut off utilities with utility companies.
c. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
d. Cut off pipe or conduit a minimum of 24 inches (610 mm) below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
e. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.5 PROTECTION

A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.

B. Temporary Shoring:
1. Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished:
   a. Strengthen or add new supports when required during progress of demolition.

C. Existing Utilities to Remain:
1. Maintain utility services to remain and protect from damage during demolition operations:
   a. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
   b. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction:
      1) Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.

D. Temporary Protection:
1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 01 50 00: Temporary Facilities and Controls:
   a. Protect adjacent buildings and facilities from damage due to demolition activities.
   b. Protect existing site improvements, appurtenances, and landscaping to remain.
   c. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
   d. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   e. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
   f. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
   g. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.

E. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.6 DEMOLITION, GENERAL

A. Demolish indicated buildings and site elements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
   2. Maintain fire watch during and for at least two (2) hours after flame-cutting operations.
   3. Maintain adequate ventilation when using cutting torches.
   4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

B. Site Access and Temporary Controls:
   1. Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities:
      a. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
      b. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

3.7 DEMOLITION BY EXPLOSIVES

A. **No explosives** are to be used on this Project.

3.8 DEMOLITION BY MECHANICAL MEANS

A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above floor or tier before disturbing supporting members on the next lower level.

B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent:
   1. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.

C. Salvage:

3.9 REPAIRS

A. Promptly repair damage to adjacent buildings caused by demolition operations.

B. Promptly repair damaged sidewalks, roadways, fencing, or retaining walls to nearest expansion joint. Replace in-kind or as designated by Architect.

3.10 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction and recycle or dispose of them according to Section 01 74 19: Construction Waste Management and Disposal:
   1. Do not allow demolished materials to accumulate onsite.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Do not burn demolished materials.

3.11 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began. Clean roadways of debris caused by debris transport.

END OF SECTION 02 41 16

SECTION 02 41 19

SELECTIVE DEMOLITION

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal of designated building equipment and fixtures.

B. Removal of designated construction.

C. Disposal of materials.

D. Storage of salvaged materials.

E. Cap and identify utilities.

F. Temporary partitions to allow building occupancy.

G. Temporary fire protection.

H. Schedule of materials and equipment.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or recycled.

B. Disposal: Removal off-site of demolition waste and subsequently deposit in landfill acceptable to authorities having jurisdiction.

C. Salvage: Recovery of demolition waste for subsequent reuse.

D. Recycle: Recovery of demolition waste for subsequent processing.

E. Existing to Remain: Items of construction that are not to be removed and that are not indicated to be removed salvaged, or recycled.

1.3 MATERIALS OWNERSHIP

A. Historic items, relics, cornerstones, commemorative plaques, tablets and similar objects encountered during demolition are to remain the Owner's property.

B. Carefully remove each item in a manner to prevent damage and deliver to Owner.

1.4 SUBMITTALS

A. Predemolition Photographs: Show conditions of exiting adjacent construction and site improvements that might be misconstrued as damaged by demolition operations. Submit before work begins.

B. Record Documents: Submit under provisions of Section 01 77 00. Accurately record locations of utilities and subsurface obstructions.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable codes for demolition work, safety of structure, electrical disconnection and reconnection dust control and disposal of materials.

B. Comply with California Fire Code (CFC), California Code of Regulations, (CCR) Title 24, Part 9, Chapter 5 - Fire Service Features and Chapter 33 - Fire Safety During Construction and Demolition.

C. Obtain required permits from authorities.

D. Notify affected utility companies before starting work and comply with their requirements.

E. Do not close or obstruct egress width to exits.

F. Do not disable or disrupt building fire or life safety systems without 7 days prior written notice to the Owner.

1.6 EXISTING CONDITIONS

A. Areas of buildings to be demolished will be evacuated and their use discontinued before start of work.

B. Owner will occupy building(s) adjacent to demolition area. Conduct demolition so owner's operation will not be disrupted.

C. Provide at least 72 hour notice to Owner of activities that will affect Owner's operation.

D. Maintain access to existing walkways, exits and other adjacent occupied facilities.

E. Owner assumes no responsibility for areas of buildings to be demolished.

F. Hazardous Materials: It is not anticipated that hazardous materials will be encountered in the work.

1. If materials suspected of containing hazardous materials are encountered, do not disturb. Notify Architect.

2. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.

1.7 SEQUENCING

A. Sequence work under the provisions of City of Sacramento.

B. Owner will conduct salvage operations before demolition begins to remove materials and equipment that the Owner chooses to retain.

1.8 SCHEDULING

A. Schedule work under provisions of City of Sacramento.

B. Schedule Work to coincide with owner occupancy.

C. Perform work during normal hours of operation.

D. Notify Owner in writing 5 days in advance of any required work to be performed on a weekend or holiday.

E. Coordinate utility and building service interruptions with Owner.

F. Schedule tie-ins to existing systems to minimize disruption.

G. Coordinate Work to ensure fire sprinklers, fire alarms, smoke detectors, emergency lighting, exit signs and other life safety systems remain in full operation in occupied areas.

1.9 PROJECT CONDITIONS

A. Conduct demolition to minimize interference with adjacent and occupied building areas.

B. Cease operations immediately if structure appears to be in danger and notify Architect. Do not resume operations until directed.

2. PART 2 PRODUCTS

Not Used.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Correlate existing conditions with requirements indicated.

B. Inventory and record condition of items to be removed and salvaged.

C. Execute predemolition photographs.

D. Verify that hazardous waste remediation is complete.

3.2 PREPARATION

A. Existing Utilities: Locate, identify, disconnect and seal or cap off indicated utilities serving areas to be demolished.

B. Salvaged Items: Clean, pack and identify items for delivery to Owner .

C. Protect existing items which are not indicated to be salvaged, removed, or altered.

D. Erect and maintain weatherproof closures for exterior openings.

E. Erect and maintain temporary partitions to prevent spread of dust, fumes, noise, and smoke to provide for Owner occupancy as specified in Section 01 11 00.

3.3 DEMOLITION

A. Conduct demolition to minimize interference with adjacent and occupied building areas.

B. Cease operations immediately if structure appears to be in danger. Notify Architect. Do not resume operations until directed.

C. Maintain protected egress and access to the Work.

D. Maintain fire safety during demolition in accordance with CFC, Chapter 33.

E. Demolish in an orderly and careful manner. Protect existing supporting structural members.

3.4 SALVAGING OF DEMOLITION MATERIALS

A. Salvage materials under the provisions of Section 01 74 19.

A. Clean salvaged items.

B. Pack or crate items after cleaning. Identify contents.

C. Store items in secure area until delivery to Owner, if required.

D. Protect items from damage.

E. Install salvaged items to comply with requirements for new materials and equipment.

3.5 RECYCLING OF DEMOLITION MATERIALS

A. Recycle demolition waste under the provisions of Section 01 74 19.

A. Separate recycled demolition materials from other demolished materials.

B. Stockpile processed materials on-site without intermixing with other materials.

C. Do not store materials within drip line of trees.

D. Transport recyclable materials that are not indicated to be reused off Owner's property to recycling receiver or processor.

E. Recycled incentives received for building demolition materials shall be equally shared between Contractor and Owner.

F. Wood Materials: Sort and stack members according to size, type and length. Separate dimensional and engineered lumber, panel products, and treated wood materials.

G. Metals: Separate by metal type. Remove nuts, bolts and rough hardware. Sort structural steel by type and size.

H. Roofing: Separate organic and fiberglass shingles and felts. Remove nails, staples and accessories.

I. Doors and Hardware: Brace open end of door frames. Leave hardware attached to doors.

J. Carpet and Pad: Store clean dry carpet and pad in a closed container or trailer.

K. Gypsum Board: Stack large clean pieces on pallets. Remove edge trim and sort with metals. Remove and dispose of fasteners.

L. Acoustical Ceiling Materials: Stack panels and tiles on pallets. Separate suspension system and sort with metals.

M. Equipment: Drain tanks, piping and fixtures. Seal openings with caps or plugs.

N. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves and other components.

O. Lighting Fixtures: Remove lamps and separate by type.

P. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

Q. Conduit: Reduce conduit to straight lengths and store by type and size.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Except for items to be recycled, salvaged, reinstalled, or otherwise indicated to remain, remove demolished materials from Project site and legally dispose of them in an EPA – approved landfill.

B. Do not burn or bury materials on site.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt and debris caused by demolition.

B. Remove temporary construction.

C. Return adjacent areas to condition existing before demolition operations began.

D. Leave site in a clean condition.

3.8 SCHEDULES

A. Salvage, store, and protect the following equipment for reinstallation:

1. Refrigerators in Maker Space.

2. Salvage viable door slabs and door hardware.

3. See plans for additional equipment not indicated here.

B. Owner will salvage and keep the following material and equipment:

1. Water Heater.

C. See plans for indication of materials and equipment that shall remain.

END OF SECTION

SECTION 02 87 13 MOLD REMEDIATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This specification covers the removal and disposal of mold. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Related Sections:
1. Section 02 41 13: Selective Demolition.

C. References:
1. U.S. EPA “Mold Remediation in Schools and Commercial Buildings” 2. U.S. EPA “A Brief Guide to Mold, Moisture, and Your Home.”

1.3 DEFINITIONS

A. Experienced: When used with an entity or individual, experienced means having successfully completed a minimum of five (5) years’ documented experience with projects similar in nature, size, and extent; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality Control Testing: Tests and inspections performed onsite for work scheduled to be performed and upon completed Work.

C. Installer/Applicator/Erector:
1. Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform particular services, including installation, erection, application, and similar operations for replacement or modifications:
   a. Use of trade specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

1.4 SUBMITTALS

A. List of all personnel to be involved in the work with their training and certifications.
1. List of all products and procedures proposed for use in performance of the work.
2. Test reports.
3. Certificates.
4. Preliminary Visual Assessment Reports.
   a. Photos.
   b. Maps of areas needing remediation.
   c. Approximate Square footage of each area needing remediation.
5. Submit Product Data and Safety Data Sheets for all materials brought on the site to be used.

B. Proposed Schedule
   1. Provide documentation for proposed schedule of work, include inspection and reasonable amount of time for settlement of materials and equipment.

1.5 QUALITY ASSURANCE

A. Conform to all Federal, State, and Local regulations which govern the handling and disposal of mold materials.

B. For areas requiring containment, Contractor to provide bilingual warning signage outside remediation areas. Including yellow caution tape and signage with large black letters:
   1. Signage to read: "Warning DO NOT ENTER remediation work in progress".

PART 2 PRODUCT - (NOT USED)

PART 3 EXECUTION

A. Environmental Assessment:
   1. The presence of mold, water damage, or musty odors shall be addressed immediately. In all instances, any source(s) of water must be stopped and the extent of water damaged determined.
   2. Water damaged materials shall be dried and repaired.
   3. Mold damaged materials shall be remediated in accordance with this document.
      a. Visual Inspection: A visual inspection is the most important initial step in identifying a possible contamination problem. The extent of any water damage and mold growth shall be visually assessed. This assessment is important in determining remedial strategies.
      b. Ventilation systems shall also be visually checked, particularly for damp filters but also for damp conditions elsewhere in the system and overall cleanliness.
      c. Ceiling tiles, gypsum wallboard (sheetrock), cardboard, paper, and other cellulosic surfaces shall be given careful attention during a visual inspection.
   4. The use of equipment such as a boroscope, to view spaces in ductwork or behind walls, or a moisture meter, to detect moisture in building materials, may be helpful in identifying hidden sources of fungal growth and the extent of water damage.
   5. Bulk/Surface Sampling:
      a. Bulk or surface sampling is not required to undertake a remediation. Remediation of visually identified fungal contamination shall proceed without further evaluation.
      b. Bulk or surface samples may need to be collected to identify specific fungal contaminants as part of a medical evaluation if occupants are experiencing symptoms which may be related to fungal exposure or to identify the presence or absence of mold if a visual inspection is equivocal (e.g., discoloration, and staining).
      c. An individual trained in appropriate sampling methodology shall perform bulk or surface sampling.
         1) Bulk samples shall be collected from visibly moldy surfaces by scraping or cutting materials with a clean tool into a clean plastic bag.
         2) Surface samples shall be collected by wiping a measured area with a sterile swab or by stripping the suspect surface

B. Existing Conditions
   1. Surface sampling is less destructive than bulk sampling. Other sampling methods may also be available. A laboratory specializing in mycology shall be consulted for specific sampling and delivery instructions.
   2. Air Monitoring:
      a. Air sampling for fungi shall not be part of a routine assessment. This is because

decisions about appropriate remediation strategies can usually be made on the basis of a visual inspection. In addition, air-sampling methods for some fungi are prone to false negative results and therefore cannot be used to definitively rule out contamination.

b. Air monitoring may be necessary if an individual(s) has been diagnosed with a disease that is or may be associated with a fungal exposure (e.g., pulmonary hemorrhage/hemosiderosis, and aspergillosis).

c. Air monitoring may be necessary if there is evidence from a visual inspection or bulk sampling that ventilation systems may be contaminated. The purpose of such air monitoring is to assess the extent of contamination throughout a building. It is preferable to conduct sampling while ventilation systems are operating.

d. Air monitoring may be necessary if the presence of mold is suspected (e.g., musty odors) but cannot be identified by a visual inspection or bulk sampling (e.g., mold growth behind walls).

   1) The purpose of such air monitoring is to determine the location and/or extent of contamination. e. If air monitoring is performed, for comparative purposes, outdoor air samples shall be collected concurrently at an air intake, if possible, and at a location representative of outdoor air. For additional information on air sampling, refer to the American Conference of Governmental Industrial Hygienists' document, "Bioaerosols: Assessment and Control."

e. Personnel conducting the sampling shall be trained in proper air sampling methods for microbial contaminants. A laboratory specializing in mycology shall be consulted for specific sampling and shipping instructions.

f. Analysis of Environmental Samples:

   1) Microscopic identification of the spores/colonies requires considerable expertise. These services are not routinely available from commercial laboratories. Documented quality control in the laboratories used for analysis of the bulk/surface and air samples is necessary. The American Industrial Hygiene Association (AIHA) offers accreditation to microbial laboratories (Environmental Microbiology Laboratory Accreditation Program (EMLAP)). Accredited laboratories must participate in quarterly proficiency testing (Environmental Microbiology Proficiency Analytical Testing Program (EMPAT)).

g. Evaluation of bulk/surface and air sampling data shall be performed by an experienced health professional. The presence of few or trace amounts of fungal spores in bulk/surface sampling shall be considered background. Amounts greater than this or the presence of fungal fragments (e.g., hyphae, and conidiophores) may suggest fungal colonization, growth, and/or accumulation at or near the sampled location. Air samples shall be evaluated by means of comparison (i.e., indoors to outdoors) and by fungal type (e.g., genera, and species). In general, the levels and types of fungi found should be similar indoors (in non-problem buildings) as compared to the outdoor air. Differences in the levels or types of fungi found in air samples may indicate that moisture sources and resultant fungal growth may be problematic.

C. Remediation General:

1. In all situations, the underlying cause of water accumulation must be rectified or fungal growth will recur. Any initial water infiltration shall be stopped and cleaned immediately. An immediate response (within 24 to 48 hours) and thorough clean up, drying, and/or removal of water damaged materials will prevent or limit mold growth.
2. If the source of water is elevated humidity, relative humidity shall be maintained at levels below 60% to inhibit mold growth.
3. Emphasis shall be on ensuring proper repairs of the building infrastructure, so that water damage and moisture buildup does not recur.
4. Five different levels of abatement are described in this section (Below).

5. The size of the area impacted by fungal contamination primarily determines the type of remediation. The sizing levels below are based on professional judgment and practicality; currently there is not adequate data to relate the extent of contamination to frequency or severity of health effects. The goal of remediation is to remove or clean contaminated materials in a way that prevents the emission of fungi and dust contaminated with fungi from leaving a work area and entering an occupied or non-abatement area, while protecting the health of workers performing the abatement. The listed remediation methods were designed to achieve this goal, however, due to the general nature of these methods it is the responsibility of the people conducting remediation to ensure the methods enacted are adequate. The listed remediation methods are not meant to exclude other similarly effective methods. Any changes to the remediation methods listed in these guidelines, however, shall be carefully considered prior to implementation.
6. Non-porous (e.g., metals, glass, and hard plastics) and semi-porous (e.g., wood, and concrete) materials that are structurally sound and are visibly moldy can be cleaned and reused. Cleaning shall be done using a detergent solution. Porous materials such as ceiling tiles and insulation, and wallboards with more than a small area of contamination shall be removed and discarded. Porous materials (e.g., wallboard, and fabrics) that can be cleaned, can be reused, but should be discarded if possible. A professional restoration consultant shall be contacted when restoring porous materials with more than a small area of fungal contamination. All materials to be reused shall be dry and visibly free from mold. Routine inspections shall be conducted to confirm the effectiveness of remediation work.
7. The use of gaseous, vapor-phase, or aerosolized biocides for remedial purposes is not recommended. The use of biocides in this manner can pose health concerns for people in occupied spaces of the building and for people returning to the treated space if used improperly. Furthermore, the effectiveness of these treatments is unproven and does not address the possible health concerns from the presence of the remaining non-viable mold. For additional information on the use of biocides for remedial purposes, refer to the American Conference of Governmental Industrial Hygienists' document, "Bioaerosols: Assessment and Control."

D. **Level I:** Small Isolated Areas (10 sq. ft or less) - e.g., ceiling tiles, small areas on walls.
1. Remediation can be conducted by regular building maintenance staff. Such persons shall receive training on proper clean up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).
2. Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection shall be worn.
3. The work area shall be unoccupied. Vacating people from spaces adjacent to the work area is not necessary but is recommended in the presence of infants (less than 12 months old), persons recovering from recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity, pneumonitis, and severe allergies).
4. Containment of the work area is not necessary. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.
5. Contaminated materials that cannot be cleaned shall be removed from the building in a sealed plastic bag. There are no special requirements for the disposal of moldy materials.
6. The work area and areas used by remedial workers for egress shall be cleaned with a damp cloth and/or mop and a detergent solution. g. All areas shall be left dry and visibly free from contamination and debris.

E. **Level II:** Mid-Sized Isolated Areas (10 - 30 sq. ft.) - e.g., individual wallboard panels.
1. Remediation can be conducted by regular building maintenance staff. Such persons

shall receive training on proper clean up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

2. Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection shall be worn.
3. The work area shall be unoccupied. Vacating people from spaces adjacent to the work area is not necessary but is recommended in the presence of infants (less than 12 months old), persons having undergone recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity, pneumonitis, and severe allergies).
4. The work area shall be covered with a plastic sheet(s) and sealed with tape before remediation, to contain dust/debris.
5. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.
6. Contaminated materials that cannot be cleaned shall be removed from the building in sealed plastic bags. There are no special requirements for the disposal of moldy materials
7. The work area and areas used by remedial workers for egress shall be HEPA vacuumed (a vacuum equipped with a High-Efficiency Particulate Air filter) and cleaned with a damp cloth and/or mop and a detergent solution.
8. All areas shall be left dry and visibly free from contamination and debris.

F. **Level III:** Large Isolated Areas (30 - 100 square feet) - e.g., several wallboard panels.
1. A health and safety professional with experience performing microbial investigations shall be consulted prior to remediation activities to provide oversight for the project.
2. The following procedures at a minimum are recommended:
   a. Personnel trained in the handling of hazardous materials and equipped with respiratory protection, (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection shall be worn.
   b. The work area and areas directly adjacent shall be covered with a plastic sheet(s) and taped before remediation, to contain dust/debris.
   c. Seal ventilation ducts/grills in the work area and areas directly adjacent with plastic sheeting.
   d. The work area and areas directly adjacent shall be unoccupied. Further vacating of people from spaces near the work area is recommended in the presence of infants (less than 12 months old), persons having undergone recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity, pneumonitis, and severe allergies).
   e. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.
   f. Contaminated materials that cannot be cleaned shall be removed from the building in sealed plastic bags. There are no special requirements for the disposal of moldy materials.
   g. The work area and surrounding areas shall be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution.
   h. All areas shall be left dry and visibly free from contamination and debris.
3. If abatement procedures are expected to generate a lot of dust (e.g., abrasive cleaning of contaminated surfaces, demolition of plaster walls) or the visible concentration of the fungi is heavy (blanket coverage as opposed to patchy), then it is recommended that the remediation procedures for Level IV are followed.

G. **Level IV:** Extensive Contamination (greater than 100 contiguous square feet in an area)
1. A health and safety professional with experience performing microbial investigations shall be consulted prior to remediation activities to provide oversight for the project.

The following procedures are recommended:

a. Personnel trained in the handling of hazardous materials equipped with:
   1) Full-face respirators with high efficiency particulate air (HEPA) cartridges.
   2) Disposable protective clothing covering both head and shoes.
   3) Gloves.
b. Containment of the affected area:
   1) Complete isolation of work area from occupied spaces using plastic sheeting sealed with duct tape (including ventilation ducts/grills, fixtures, and any other openings).
   2) The use of an exhaust fan with a HEPA filter to generate negative pressurization.
   3) Airlocks and decontamination room.
c. Vacating people from spaces adjacent to the work area is not necessary but is recommended in the presence of infants (less than 12 months old), persons having undergone recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity, pneumonitis, and severe allergies).
d. Contaminated materials that cannot be cleaned shall be removed from the building in sealed plastic bags. The outside of the bags shall be cleaned with a damp cloth and a detergent solution or HEPA vacuumed in the decontamination chamber prior to their transport to uncontaminated areas of the building. There are no special requirements for the disposal of moldy materials.
e. The contained area and decontamination room shall be HEPA vacuumed and cleaned with a damp cloth and/or mop with a detergent solution and be visibly clean prior to the removal of isolation barriers.
f. Air monitoring shall be conducted prior to occupancy to determine if the area is fit to reoccupy.

H. **Level V:** Remediation of HVAC Systems.

1. A Small Isolated Area of Contamination (<10 square feet) in the HVAC System 1) Remediation can be conducted by regular building maintenance staff. Such persons shall receive training on proper clean up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).
   a. Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection shall be worn.
   b. The HVAC system shall be shut down prior to any remedial activities. 4) The work area shall be covered with a plastic sheet(s) and sealed with tape before remediation, to contain dust/debris.
   c. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.
   d. Growth supporting materials that are contaminated, such as the paper on the insulation of interior lined ducts and filters, shall be removed. Other contaminated materials that cannot be cleaned shall be removed in sealed plastic bags. There are no special requirements for the disposal of moldy materials.
   e. The work area and areas immediately surrounding the work area shall be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution.
   f. All areas shall be left dry and visibly free from contamination and debris.
   g. A variety of biocides are recommended by HVAC manufacturers for use with HVAC components, such as, cooling coils and condensation pans. HVAC manufacturers shall be consulted for the products they recommend for use in their systems.
2. Areas of Contamination (>10 square feet) in the HVAC System: A health and safety professional with experience performing microbial investigations shall be consulted prior to remediation activities to provide oversight for remediation projects involving

more than a small isolated area in an HVAC system. The following procedures are recommended:

a. Personnel trained in the handling of hazardous materials equipped with:
    1) Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended.
    2) Gloves and eye protection
    3) Full-face respirators with HEPA cartridges and disposable protective clothing covering both head and shoes shall be worn if contamination is greater than 30 square feet. 2)
b. The HVAC system shall be shut down prior to any remedial activities.
c. Containment of the affected area:
    1) Complete isolation of work area from the other areas of the HVAC system using plastic sheeting sealed with duct tape.
    2) The use of an exhaust fan with a HEPA filter to generate negative pressurization.
    3) Airlocks and decontamination room if contamination is greater than 30 square feet.
d. Growth supporting materials that are contaminated, such as the paper on the insulation of interior lined ducts and filters, shall be removed. Other contaminated materials that cannot be cleaned should be removed in sealed plastic bags. When a decontamination chamber is present, the outside of the bags shall be cleaned with a damp cloth and a detergent solution or HEPA vacuumed prior to their transport to uncontaminated areas of the building. There are no special requirements for the disposal of moldy materials.
e. The contained area and decontamination room shall be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution prior to the removal of isolation barriers.
f. All areas shall be left dry and visibly free from contamination and debris.
g. Air monitoring shall be conducted prior to re-occupancy with the HVAC system in operation to determine if the area(s) served by the system are fit to reoccupy.
h. A variety of biocides are recommended by HVAC manufacturers for use with HVAC components, such as, cooling coils and condensation pans. HVAC manufacturers shall be consulted for the products they recommend for use in their systems.

3. Hazard Communication: When fungal growth requiring large-scale remediation is found, the building owner, management, and/or employer shall notify occupants in the affected area(s) of its presence. Notification shall include a description of the remedial measures to be taken and a timetable for completion. Group meetings held before and after remediation with full disclosure of plans and results can be an effective communication mechanism. Individuals with persistent health problems that appear to be related to bioaerosol exposure should see their physicians for a referral to practitioners who are trained in occupational/environmental medicine or related specialties and are knowledgeable about these types of exposures. Individuals seeking medical attention shall be provided with a copy of all inspection results and interpretation to give to their medical practitioners.

3.2 CLOSEOUT DOCUMENTATION

A. Documents required at closeout of project:
1. Daily logs.
    a. Brief description of work activities.
    b. Number of personnel on site.
    c. Type of equipment used.
    d. Type of Products Used.
    e. List of any non-compliance noted, emergencies, stop work orders(with detailed

explanations)

f. Photographic logs.

g. Report certifying remediation is complete.

END OF SECTION 02 87 13

SECTION 03 01 00

CONCRETE SPALL REPAIR AND CRACK INJECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide all labor, materials, formwork, equipment and services to complete removal of damaged concrete and repair/patching of concrete to be reconstructed.

1.2 REFERENCES

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 19 Concrete.

B. American Concrete Institute (ACI) PRC-224.1 "Causes, Evaluation, and Repair of Cracks in Concrete Structures".

C. ACI RAP Bulletin 1 "Field Guide to Concrete Repair Application Procedures – Structural Crack Repair by Epoxy Injection".

1.3 SUBMITTALS

A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. The General Contractor shall review and approve submittals prior to submittal to the Architect/Engineer. Submittals that do not meet these requirements will be returned for correction without review. Submit for review prior to installation.

B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents.

C. Product Data: Submit manufacturers' data on manufactured products and other concrete related materials. Demonstrate compliance with specified characteristics. Provide samples of items upon request.

D. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction for concrete accessories.

1.4 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI RAP Bulletin 1.

B. Perform tests specified below in article FIELD QUALITY CONTROL.

C. Contractor shall bear the entire cost of remediation, removal, and/or replacement of concrete repairs determined defective or non-conforming, including Architect/Engineer fees for redesign.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Materials specified by brand name shall be delivered in undamaged packages bearing manufacturer's label and shall be brand specified or a previously submitted and approved equal.

B. Delivery, handling and storage of other materials shall conform to the applicable sections of the current editions of the various reference standards listed in this Section.

C. Protect materials from weather, temperature variations, or other damage. Sort to prevent inclusion of foreign materials.

1.6 MOCK-UP

A. Perform spall repair and/or crack injection on an inconspicuous location for review prior to commencing work

B. Provide 2 inch diameter concrete core at injected location to ensure adequate penetration and bond of epoxy. Notify Engineer for location of core. Patch core with repair mortar.

C. If determined to be acceptable mock-up may remain as part of the Work.

1.7 SCHEDULING AND SEQUENCING

A. Perform Work in existing facilities during such hours and by methods as are approved by Owner. Owner reserves the right to modify proposed schedules to eliminate conflicts and ensure use of existing facilities during the Work. Follow exactly the schedule as finally approved by Owner.

B. Organize the work and employ shop and field crew(s) of sufficient size to minimize impact on the Owner/Tenant.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete Bonding Agent: Sika “Sikadur 32 Hi-Mod”, Simpson Strong-Tie “RPS-752”.

B. Steel Corrosion Inhibitor: Sika “Armatec 110 EpoCem”, Simpson Strong-Tie “RPS-406”.

C. Crack Injection:

1. Epoxy Surface Seal Compound: When required furnish Sika “Sikadur 31 High Mod Gel”, Simpson Strong-Tie “CIP-F” paste-over. The surface seal material shall have adequate strength to hold injection fittings firmly in place and to resist injection pressures adequately to prevent leakage during injection.

2. Injection ports: per epoxy manufacturer’s recommendations.

3. Pressure Injected Epoxy:

a. For installations above 60 degrees Fahrenheit: Sika “Sikadur 35 Hi-Mod LV” adhesive, Simpson Strong-Tie “CI-LV”. The epoxy resin adhesive

shall conform to ASTM C881, Type I and IV, Grade 1, Class C, with a minimum 14-day bond strength per ASTM C882 of 2,750 psi.

b. For cold weather installations (40 to 60 degrees Fahrenheit): Sika "Sikadur 35 Hi-Mod LV" adhesive, Simpson Strong-Tie "CI-LV FS". The epoxy resin adhesive shall conform to ASTM C881, Type I and IV, Grade 1, Class B, with a minimum 14-day bond strength per ASTM C882 of 2,750 psi.

D. Spall Repairs:

1. Horizontal or formed surfaces: Sika "Sikacrete 211 SCC", Simpson Strong-Tie "RPS-Rapid Setting Mortar".

2. Vertical or overhead surfaces: Sika "SikaQuick VOH", Simpson Strong-Tie "RPS-263".

PART 3 - EXECUTION

3.1 GENERAL CONCRETE WORK

A. Work must be performed by a contractor having not less than 5 years successful experience with comparable concrete repair projects employing personnel skilled in the restoration process and operations indicated

B. Protect finished surfaces not to be repaired from work to be done in this section.

C. Provide formwork, shoring, and bracing as required to complete work.

3.2 CRACK INJECTION WITH EPOXY

A. Equipment for Injection: Provide the type of equipment necessary to meter and mix the two injection adhesive components and inject the mixed adhesive into the crack. Follow manufacturer's recommendations.

B. Surface Preparation: The cracks and surface adjacent to cracks or other areas of application shall be cleaned of dirt, dust, grease, oil, efflorescence or other foreign matter detrimental to bond of epoxy injection surface seal system. Use wire brushing, sandblasting, high pressure water blasting, etc per manufacturer's instructions. Acid and other corrosives shall not be permitted. Repair area must be dry prior to product application. Manufacturer's recommended minimum application and minimum/maximum curing temperature for substrate shall be verified.

C. Epoxy Application or Injection: In accordance with accepted procedures overseen by an experienced contractor, inject or apply epoxy compounds in strict accordance with the manufacturer's specifications and recommendations for each intended type of use. Entry ports shall be provided along the crack at intervals no greater than the thickness of the concrete (8 inch maximum spacing). Do not proceed until injected or pasted over material has gained adequate strength to continue with injection process. Perform epoxy adhesive injection continuously until all pressure-injected cracks are completely filled. The epoxy injection process should not, under any circumstances, result in any damage to the steel in the concrete.

D. Finishing and Cleaning: Excess materials, gel sealants and pastes, and plastic ports shall be removed after epoxy resin has cured. Exposed surfaces to be restored to original condition.

3.3 SPALL REPAIR OF CONCRETE

A. Remove loose/damaged concrete, sawcut straight edges with a minimum of 1/4" depth, chip and/or sand blast to assure competent concrete surfaces, expose clean aggregate surface to 1/4" minimum amplitude (ICRI CSP 9 or higher), and clean/remove rust from existing reinforcing. Remove concrete to minimum ¾ inch clear all around exposed reinforcing bars.

B. Notify Engineer for review of cleaned reinforcing.

C. If existing reinforcing steel is deemed acceptable by Engineer, coat prepared reinforcing steel with corrosion inhibitor per manufacturer's requirements. Coat prepared concrete surfaces with bonding agent per manufacturer's requirements.

D. Set formwork as required.

E. Mix and place grout per manufacturer's recommendations. Surfaces to be saturated surface dry (SSD) with no standing water unless noted otherwise. Scrub mortar into substrate, filling all pores and voids. Force grout against edge of repair, working toward the center.

F. Finishes: All finishes to match original finishes. Float, hand trowel, and edge (as for slab on grade). Remove formed edges if used (when grout has achieved sufficient set), float and hand trowel. Provide light broom, hand trowel, or other finish as required to match existing surfaces.

G. Apply curing compound or cover with water retaining materials and keep wet for 4 days minimum. Use of curing compound is limited to locations and/or conditions for which discoloration due to cure is acceptable and locations where other finishes will not be affected.

3.4 FIELD QUALITY CONTROL

A. A 2 inch diameter concrete core shall be taken for every 50 feet of injected crack (minimum 2 cores total) to verify adequate penetration and bond. Notify Engineer for location of cores. Patch core holes with repair mortar.

3.5 CLEANING

A. Remove all debris created by the work of this section.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: All labor, materials and equipment and all operations required to complete all formwork as indicated on the drawings; to produce shapes and configurations as shown, as required; and as specified herein, including:
   1. Forms, shores, bracing, removal and other operations as necessary for all cast-in-place concrete and masonry placed.
   2. Setting and securing anchor bolts and other metal items embedded in concrete into formwork, using materials and layouts furnished and delivered to jobsite as specified under other sections.

B. Related Sections:
   1. Pertinent Sections of Division 03 specifying concrete construction.
   2. Pertinent Sections of other Divisions specifying work to be embedded in concrete or work penetrating concrete foundations and formwork.

1.2 REFERENCES

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 19 Concrete.

B. American Concrete Institute (ACI) PRC-347 "Guide to Formwork for Concrete".

C. American Plywood Association (APA) “Concrete Forming Guide”.

D. West Coast Lumberman Inspection Bureau (WCLIB) “Standard Grading Rules for West Coast Lumber”.

E. ACI MNL-066 “ACI Detailing Manual”.

F. ACI SPEC-301 “Specifications for Concrete Construction”.

G. Concrete Reinforcing Steel Institute (CRSI) “Manual of Standard Practice”.

1.3 DESIGN REQUIREMENTS

A. Design, engineer, and construct formwork, shoring and bracing to conform to design and code requirements, resist imposed loads; resultant concrete to conform to required shape, line and dimension.

1.4 SUBMITTALS

A. Limitation of review: Structural Engineer's review will be required only where specifically requested for general architectural applications and features only. Contractor is responsible for structural stability, load-resisting characteristics and sufficiency of form work design.

1.5 QUALITY ASSURANCE

A. General: All form materials shall be new at start of work. Produce high quality concrete construction. Minimize defects due to joints, deflection of forms, roughness of forms, nonconforming materials, concrete or workmanship.

B. Reuse of Forms: Plywood forms may be reused, if thoroughly cleaned of all dirt, mortar, and foreign materials, and undamaged at edges and contact face. Reuse shall be subject to permission from the Architect without exception, and issued in writing. Reuse of any panel which will produce a blemish on exposed concrete, will not be permitted.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Form Materials:

1. Non-Exposed Surface Formwork Facing: Forms for concrete which is not exposed to view, may be of plywood as specified for exposed surfaces, or square edge 1x nominal Douglas Fir, Construction Grade, S4S.
2. Exposed Surface Formwork Facing:
   a. Forms for all exterior and interior concrete flat surfaces unless otherwise specified as board formed shall be new Douglas Fir Plywood (APA) ply, 5/8-inch, B-B Plyform, Class 1, Exterior Type, oiled and edged and edge-sealed conforming to U.S. Product Standard PS 1 in large sheet sizes to achieve joint patterns shown.
   b. All exposed concrete edges shall be chamfered 3/4" minimum or as noted on the drawings.
3. Exposed Surface Formwork - Special Pattern Form Liner:
   a. Forms for all exterior and interior concrete flat surfaces indicated shall be as designated by Architect.

B. Earth Forms: Allowed, subject to soil standing in excavations without ravel or caving.

C. Form Release Agent: Spray-on compound, not affecting color, bond or subsequent treatment of concrete surfaces. Maximum VOC content shall comply with local requirements and California Green Building Code.

D. Accessories: Types recommended by manufacturers or referenced standards to suit conditions indicated;

1. Anchors, spacers, void in-fill materials: sized to resist imposed loads.
2. Form Ties: Prefabricated rod, flat band, or wire snap ties with 1" break-back or threaded internal disconnecting type with external holding devices of adequate bearing area. Ties shall permit tightening and spreading of forms and leave no metal closer than 1" to surface.

E. Corner Chamfers and Rustications: Filleted, wood strip or foam type; sizes and shapes as detailed, or 3/4 x 3/4 inch size minimum if not detailed; maximum possible lengths.

F. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

G. Foam Block Formwork: For use only where specified on drawings to create void space under or within concrete. ASTM D6817.

Use Case	InsulFoam Geofoam (or equivalent)	Maximum Density (pcf)	Compressive Resistance at 1% Deformation (psi)	Compressive Resistance at 5% Deformation (psi)	Compressive Resistance at 10% Deformation (psi)
1) Void formwork	EPS-15	0.90	3.6	8.0	10.2
2) Planters	EPS-19	1.14	5.8	13.1	16.0
3) Pedestrian Loads (<=100psf)	EPS-22	1.35	7.3	16.7	19.6
4) Vehicular Loads and Sidewalks (<= 250psf)	EPS-39	2.40	15.0	35.0	40.0

PART 3 – EXECUTION

3.1 EXAMINATION

A. Inspect the substrate and the conditions under which concrete formwork is to be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected. Commencement of work indicates acceptance of substrates and conditions.

B. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

A. If natural soil or compacted fill can be accurately cut and maintained, foundations and grade beams may be poured against earth without forming. Provide positive protection of trench top corners.

B. Maintain earth forms free of water and foreign materials.

3.3 ERECTION – FORMWORK

A. General: Construct formwork in accordance with calculations, and recommendations of ACI PRC-347. Construct forms to the sizes, shapes, lines and dimensions shown, and as required to obtain accurate alignment, location, grades, level and plumb work in finished structure. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required. Use selected materials to obtain required finishes.

1. Construct cambers specified in concrete members and slabs in the formwork.
2. Schedule the work and notify other trades in ample time so that provisions for their work in the formwork can be made without delaying progress of the project. Install all sleeves, pipes, etc. for building services systems, or other work. Secure information about and provide for all openings, offsets, recessed nailing blocks, channel chases, anchors, ties, inserts, etc. in the formwork before concrete placement.

3. Deflection: Formwork and concrete with excessive deflection after concrete placement will be rejected. Excessive deflection is that which will produce visible and noticeable waves in the finished concrete.
4. Measure formwork for elevated structural slabs, columns, wall elevations points of maximum camber and submit in writing to the Architect/Engineer prior to placing concrete.

B. Formwork Construction: Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI SPEC-301. Uniform, substantial and sufficiently tight to prevent leakage of concrete paste, readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials. Tie, brace, shore, and support to insure stability against pressures from any source, without failure of any component part and without excessive deflection. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins.

C. Provide all openings, offsets, inserts, anchorages, blocking, and other features of the work as shown or required. See INSERTS, EMBEDDED PARTS, AND OPENINGS for detailed requirements.

D. Warped, checked, or scuffed forms will be rejected.

E. Maintain membranes, reinforcing and other work free of damage; protect with plywood runway boards or other positive, durable means.

F. Align joints and make watertight. Keep form joints to a minimum.

G. Provide fillet and chamfer strips on external corners of exposed locations and as indicated to form patterns in finished work. Extend patterns around corners and into alcoves, on backs of columns and similar locations not otherwise shown.

1. Produce beveled, smooth, solid, unbroken lines, except as otherwise indicated to conform to patterns.
2. Form corners and chamfers with 3/4 inch x 3/4 inch strips, unless otherwise indicated, accurately formed and surfaced to produce uniformly straight lines and tight edge joints. Extend terminal edges to required limit and miter chamfer at changes in direction.

H. Unexposed corners may be formed either square or chamfered.

I. Ties and Spreaders: Arrange in a pattern acceptable to the Architect when exposed. Snap-ties may be used except at joints between pours where threaded internal disconnecting type shall be used.

J. Coordinate this section with other sections of work that require attachment of components to formwork.

K. Reglets and Rebates: Accurately locate, size, and form all reglets and rebates required to receive work of other trades, including flashing, frames, and equipment.

3.4 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not allow excess form coating material to accumulate in the forms or to come into contact with reinforcement or surfaces which will be bonded to fresh concrete.

D. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork will be rejected.

E. Leave no residue or stain on the face of the concrete, nor affect bonding of subsequent finishes or work specified in other sections.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

1. Provide openings in concrete formwork to accommodate work of other sections including those under separate contracts (if any). Size and location of openings, recesses and chases shall be in accordance with the section requiring such items. Accurately place and securely support items to be built into forms.

B. Construction Joints: Construct and locate generally as indicated on Drawings and only at locations approved by Structural Engineer, so as not to impair the strength of the structure. Form keys in all cold joints shown or required.

C. Locate and set in place items that will be cast directly into concrete.

D. Rough Hardware and Miscellaneous Metal: Set inserts, sleeves, bolts, anchors, angles, and other items to be embedded in concrete. Set embedded bolts and sleeves for equipment to template and approved shop drawings prepared by trades supplying equipment.

E. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

F. Wood Inserts and Nailers: Provide approved preservative-treated lumber. Set all required nailing blocks, grounds, and other inserts as required to produce results shown. Wood plugs shall not be used.

G. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

H. Piping: Do not embed piping in structural concrete unless locations specifically approved by Structural Engineer.

I. Conduit: Place conduit below slabs-on-grade and only as specifically detailed on structural drawings. Minimum clear distance between conduits shall be 3 diameters. Location shall be subject to Engineer's written approval and shall not impair the strength of the structure.

J. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

1. Provide openings for the introduction of vibrators at intervals necessary for proper placement.

2. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

K. Install Form Liner inserts in accordance with manufacturer's recommendations, to produce patterns and textures indicated.

L. Install waterstops in accordance with manufacturer's recommendations to provide continuous waterproof barrier.

3.6 FORM CLEANING

A. Clean forms as erection proceeds, remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

1. Remove all dirt, chips, sawdust, rubbish, water and foreign materials detrimental to concrete.
2. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

3.7 FOOTINGS

A. Verify elevations and provide final excavation required for footings prior to placing of concrete.

3.8 EQUIPMENT BASES

A. Form concrete bases for all mechanical and electrical equipment in accordance with approved shop details furnished by other sections.

B. Sizes and locations as indicated and as required to produce results shown.

C. Provide coved base for all equipment bases placed on concrete slabs.

3.9 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI SPEC-301.

3.10 FOAM BLOCK FORMWORK

A. Blocks shall be placed on prepared leveling course for level bearing. Place adjacent blocks in tight contact together. Where placed in multiple layers, orient long axis of upper layer at 90° to lower layer, and so forth for subsequent layers. Anchor blocks as required to prevent movement prior to and during concrete placement. Do not expose to hydrocarbons, solvents, or coal tar.

3.11 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

B. Do not reuse wood formwork more than 2 times for concrete surfaces to be exposed to view. Do not patch formwork.

C. Clean and repair surfaces to be re-used in the work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. Apply new form coating compound material to concrete contact surfaces as specified for new formwork.

D. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close all joints. Align and secure joints to avoid offsets.

3.12 FORM REMOVAL

A. Do not loosen or remove forms before minimum curing period has elapsed without employment of appropriate alternate curing methods, approved by the Architect in writing.

B. Remove forms without damage to the concrete using means to ensure complete safety of the structure and without damage to exposed beams, columns, wall edges, chamfers and inserts. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Do not remove forms until the concrete has hardened sufficiently to permit safe removal and the concrete has attained sufficient strength to safely support imposed loads. The minimum elapsed time for removal of forms after concrete has been placed shall be as follows:

1. Columns and Walls: 7 days, provided members are not subjected to overhead loads.
2. Retaining Walls: 21 days minimum.
3. Footings: 7 days minimum. If backfilled immediately, side forms may be removed 24 hours after concrete is placed.
4. Beams, elevated slab, and similar overhead conditions: 28 days unless adequate shoring is provided.

D. Durations listed above are minimums and are subject to extension at the sole judgment of the Architect/Engineer.

E. Reshoring: Reshore members where and if required by Formwork Design Engineer.

F. Do not subject concrete to superimposed loads (structure or construction) until it has attained full specified design strength, nor for a period of at least 14 days after placing.

G. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

3.13 CLEANING

A. Remove excess material and debris associated with this work from the job site.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Reinforcing steel work for all concrete and masonry work as indicated on the drawings and specified herein.
2. Coordinate this work with other work affected by these operations, such as forms, electrical work, mechanical work, structural steel, masonry and concrete.

B. Related Sections:

1. Pertinent Sections of Division 01 specifying Quality Control and Testing Laboratory services.
2. Pertinent Sections of Divisions 03 specifying concrete construction.
3. Pertinent Sections of Divisions 04 specifying masonry construction.
4. Pertinent Sections of other Divisions specifying work to be embedded in concrete or work penetrating concrete work.

1.2 REFERENCE STANDARDS

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC) Chapter 19 Concrete.

B. American Concrete Institute (ACI) SPEC-301 “Specifications for Concrete Construction”.

C. ACI CODE-318 “Building Code Requirements for Structural Concrete and Commentary”.

D. ACI MNL-066 “ACI Detailing Manual”.

E. ASTM International (ASTM) A1064 “Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete”.

F. ASTM A615 “Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement”.

G. ASTM A706 “Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement”.

H. American Welding Society (AWS) D1.4 – “Structural Welding Code - Steel Reinforcing Bars”.

I. Concrete Reinforcing Steel Institute (CRSI) - “Manual of Standard Practice”.

J. CRSI - “Placing Reinforcing Bars”.

1.3 SUBMITTALS

A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. Submit for review prior to fabrication.

B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer.

C. Shop Drawings: Show complete fabrication and placing details of all reinforcing steel. Comply with requirements of ACI MNL-66. Include:

1. Bar sizes and schedules;
2. Shapes of bent bars, layout and spacing of bars, location of splices.
3. Stirrup spacing, arrangements and assemblies,
4. References to Contract Document detail numbers and designations.
5. Wall elevations corresponding to elevations shown in Contract Documents.

D. Product Data: Submit manufacturer's product data, specifications, location and installation instructions for proprietary materials and reinforcement accessories. Provide samples of these items upon request.

E. Certificates: Submit all certifications of physical and chemical properties of steel for each heat number as manufactured, including location of material in structure as specified below in Article titled QUALITY ASSURANCE. All materials supplied shall be tagged with heat numbers matching submitted Mill Test Report analyses.

F. Samples: Provide to the Owner's Testing laboratory as specified in Article SOURCE QUALITY CONTROL.

1.4 QUALITY ASSURANCE

A. Perform work of this Section in accordance with the CRSI “Manual of Standard Practice”, CRSI “Placing Reinforcing Bars”, ACI SPEC-301, and ACI CODE-318.

B. Requirements of Regulatory Agencies, refer to pertinent Sections of Division 01 and CBC.

C. Certification and Identification of Materials and Uses: Provide Owner's Testing Agency with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection and all material identification/test information listed below.

1. Provide manufacturer's Mill Test Reports for all materials. Include chemical and physical properties of the material for each heat number manufactured. Tag all fabricated materials with heat number.
2. Provide letter certifying all materials supplied are from heat numbers covered by supplied mill certificates. Include in letter the physical location of each grade of reinforcing and/or heat number in the project (i.e. foundations, walls, etc.).
3. Unidentified Material Tests: Where identification of materials by heat number to mill tests cannot be made, Owner's Testing Agency shall test unidentified materials as described below.

D. Testing and Inspection: Tests and Inspections required by Independent Testing Agency are specified below in Articles SOURCE QUALITY CONTROL and FIELD QUALITY CONTROL. Duties and limitations of Independent Testing Agency, test costs and test reports in conformance with pertinent Sections of Division 01.

1.5 DELIVERY, STORAGE AND HANDLING

A. Comply with pertinent requirements of Division 01.

B. Deliver reinforcement to project site in bundles marked with durable tags indicating heat number, mill, bar size and length, proposed location in the structure and other information corresponding with markings shown on placement diagrams.

C. Handle and store materials above ground to prevent damage, contamination or accumulation of dirt or rust.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Reinforcing Steel: Deformed billet steel bars, ASTM A706 Grade 60 or ASTM A615 Grade 60.

1. Welded reinforcement shall be ASTM A706, or A615 meeting carbon requirements of AWS D1.4. Welding shall conform with AWS D1.4.
2. All reinforcement to be unfinished.
3. ASTM A615 reinforcement at special structural concrete walls, concrete coupling beams, and special concrete moment frames shall have maximum yield stress of 78,000 psi and the tensile strength shall be greater than 125% of the actual yield strength. Test ASTM A615 reinforcement for conformance to these criteria prior to fabrication and/or installation.

B. Welded Wire Reinforcement: ASTM A1064.

C. Tie Wire: No. 16 AWG or heavier, black annealed.

D. Concrete Blocks: On-grade conditions only, as required to support reinforcing bars in position.

E. Reinforcing Supports: Plastic or galvanized steel chairs, bolsters, bar supports, or spacers sized and shaped for adequate support of reinforcement and construction loads imposed during concrete placement, meeting ACI and CRSI standards.

1. For use over formwork: Galvanized wire bar type supports complying with CRSI recommendations. Provide plastic tips where exposed to view or weather after removal of formwork. Do not use wood, brick, or other unacceptable materials.

F. Reinforcement Splice Couplers: For use only where specified on drawings. Submit other locations proposed for use to Engineer for review. "L-Series Bar Lock" Coupler Systems for Splicing Reinforcement Bars, UES ER-0319, by Dayton-Superior Corporation.

2.2 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4), unless specifically shown otherwise. Details not specifically shown or indicated shall conform to SP-066 and specified codes and standards.

1. Accurately shop-fabricate to shapes, bends, sizes, gauges and lengths indicated or otherwise required.
2. Bend bars once only. Discard bars improperly bent due to fabricating or other errors and provide new material; do not re-bend or straighten unless specifically indicated. Rebending of reinforcement in the field is not allowed.
3. Do not bend reinforcement in a manner that will injure or weaken the material or the embedding concrete.
4. Do not heat reinforcement for bending. Heat-bent materials will be rejected.

B. Unacceptable materials: Reinforcement with any of the following defects will not be permitted in the work.

1. Bar lengths, depths and bends exceeding specified fabrication tolerances.
2. Bends or kinks not indicated on Drawings or final shop drawings.
3. Bars with reduced cross-section due to rusting or other cause.

C. Tag reinforcement with durable identification to facilitate sorting and placing.

D. Shop Fusion Welded Stirrup/Tie/Spiral Cages

1. Shop fusion welding of stirrup/tie/spiral cages is permitted to aid in fabrication and handling. The following requirements shall be met.
2. All reinforcing bars receiving weld shall be ASTM A706.
3. Longitudinal holding wires shall be ASTM A1064.
4. Shop welding shall be performed by machines under a continuous, controlled process.
5. Quality control tests shall be performed on shop-welded specimens and the test results shall be available, upon request, to the Architect/Engineer.
6. Tack welding of reinforcing steel is not permitted.
7. Welding of any type shall not occur at 90°, 135°, or 180° bends. Circular ties and spirals may be shop fusion welded outside of areas with 90°, 135°, or 180° hook bends.
8. Longitudinal bars shall not be welded to stirrups/ties/spirals.

2.3 SOURCE QUALITY CONTROL

A. The Testing Agency, as specified in the Article QUALITY ASSURANCE, will perform the following:

1. Material Testing:
   a. Identified Steel: When samples are taken from bundled steel identified by heat number, matched with accompanying mill analyses as delivered from the mill, supplemental testing of reinforcing steel is not required.
   b. Unidentified Steel: When identification of materials by heat number matched to accompanying mill analyses cannot be made, perform one tensile test and one bend test per each two and one-half tons or fraction thereof for each required size of reinforcing steel. Tests of unidentified steel shall be performed by the Owner's Testing Agency and costs for these tests shall be paid by the Contractor by deductive change order.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Inspect the conditions under which concrete reinforcement is to be placed. Do not proceed with the work until unsatisfactory conditions have been corrected.

B. Coordinate with work of other sections to avoid conflicts or interference. Bring conflicts between reinforcement and other elements to Architect's attention. Resolve conflicts before concrete is placed.

C. Notify Architect, Structural Engineer, and Authority Having Jurisdiction for review of steel placement not less than 48 hours before placing concrete.

3.2 PLACEMENT

A. General: Comply with the specified codes and standards, and Concrete Reinforcing Steel Institute recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean bars free of substances which are detrimental to bonding. Maintain reinforcement clean until embedded in concrete.

C. Place reinforcement to obtain the minimum coverages for concrete protection. Do not deviate from required position. Maintain required distance, spacing and clearance between bars, forms, and ground.

D. Location and Support: Provide metal chairs, runners, bolsters, spacers and hangers, as required.

E. Provide additional steel reinforcement as necessary or as directed, to act as spreaders or separators to maintain proper positioning.

F. Tying and Attachment: Securely tie at all intersections and supports with wire. Prevent dislocation or movement during placement of concrete. Direct twisted ends of wire ties away from exposed concrete surfaces.

G. Separate reinforcing from pipes or conduits with approved non-metallic separators. Do not use wood or steel form stakes or reinforcement used as stakes as support for reinforcement.

H. Accommodate placement of formed openings required by other sections.

I. Obstructions:

1. Where obstructions, block-outs, or penetrations (conduits, raceways, ductwork) prevent continuous placement of reinforcement as indicated, provide additional reinforcing as detailed and as directed by the Structural Engineer to supplement the indicated reinforcement around the obstruction.
2. Place additional trim bars, ties, stirrups, or other elements as detailed and as directed at all opening, sleeves, pipes or other penetrations through structural elements.

J. Welded Wire Reinforcement: Reinforce slabs with 6"x 6"-W1.4 x W1.4 welded wire reinforcement reinforcing, unless otherwise noted on drawings.

1. Provide flat sheets only, no rolls. Straighten, cut to required size, and lay out flat in place.
2. Securely wire-tie reinforcement to other reinforcement at frequent intervals.
3. Extend reinforcement over supporting beams and walls, and to within 1 inch of edge of slabs, construction joints, and expansion joints.
4. Support reinforcement in mid-depth of slab.
5. Lift reinforcement at intervals as slab concrete is placed, ensure proper embedment.

3.3 REINFORCING SPACING AND COVERAGE

A. Spacing: Do not space bars closer than four (4) diameters of the largest of two adjacent bars, except at bar laps, which shall be placed such that a minimum of 2 bar diameters is clear between bars.

B. Where reinforcing in members is placed in two layers, the distance between layers shall not be less than four bar diameters of the largest bar and the bars in the upper layers shall be placed directly above those in the bottom layer, unless otherwise detailed or dimensioned.

C. Coverage of bars (including stirrups and columns ties) shall be as follows, unless otherwise shown:

1. Concrete cast against earth or grade: 3 inches.
2. Concrete exposed to weather or formed and exposed to earth:
   a. #5 & smaller: 1-1/2 inches.
   b. #6 & larger: 2 inches.
3. Concrete not exposed to earth or weather:
   a. #5 & smaller: 1 inch.
   b. #6 & larger: 1-1/2 inches.

3.4 DOWELS, SPLICES, OFFSETS AND BENDS

A. Provide standard reinforcement splices at splices, corners, and intersections by lapping ends, placing bars in contact, and tightly tying with wire at each end. Comply with details shown on structural drawings and requirements of ACI CODE-318.

B. Provide minimum 1-1/2 inch clearance between sets of splices. Stagger splices in horizontal bars so that adjacent splices will be 4 feet apart.

C. Laps of welded wire reinforcement shall be at least two times the spacing of the members in the direction lapped but not less than twelve inches.

D. Splices of reinforcement shall not be made at points of maximum stress. Provide splice lengths as noted on the structural drawings, with sufficient lap to transfer the stress between bars by bond and shear.

E. Spacing:

1. Space bars minimum distance specified and all lapped bars 2 bar diameters (minimum) clear of the next bar.
2. Stagger splices of adjacent bars where possible and where required to maintain bar clearance.

3. Beam or slab top bars shall be spliced mid-span of column support and bottom bars spliced at column supports.
4. Request Architect/Engineer review prior to placement for all splices not shown on the drawings.

F. Reinforcement Couplers: Install at all locations indicated. Install couplers in accordance with manufacturer's recommendations.

3.5 WELDING

A. No reinforcing shall be welded unless specifically indicated. No reinforcing shall be welded without prior approval of the Structural Engineer and the Authority Having Jurisdiction.

B. Only when so approved for use as noted above, all welding shall conform to AWS D1.4, ACI CODE-318, and the following;

1. All welding performed by certified welders.
2. All reinforcement requires preheat prior to welding. All preheat and welding shall be continuously inspected by the Testing Agency.

3.6 MISPLACED REINFORCEMENT

A. Notify Architect/Engineer immediately if reinforcing bars are known to be misplaced after concrete has been placed.

B. Perform no correction or cutting without specific direction. Do not bend or kink misplaced bars.

C. Correct misplaced reinforcing only as directed in writing by the Architect/Engineer. Bear all costs of redesign, new, or additional reinforcing required because of misplaced bars at Contractor's expense.

3.7 FIELD QUALITY CONTROL

A. The Testing Agency as specified in the Article QUALITY ASSURANCE, will inspect the work for conformance to contract documents before concrete placement.

1. Inspection: Provide inspection and verification of installed reinforcement. Confirm that the surface of the rebar is free of form release oil or other coatings.
2. Inspect all preheat and welding activities for steel reinforcement, when these occur.
3. Exception: Shallow foundations & non-structural slabs-on-grade supporting buildings of no greater than three stories and either of concrete design strength 2500psi (or greater) or supporting light-frame construction do not require special inspection. Non-structural patios, driveways, and sidewalks do not require special inspection.

3.8 CLEANING

A. Remove excess material and debris associated with this work from the job site.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: Provide all labor, materials, equipment and services to complete all concrete work required, including, but not limited to, the following:

1. Foundations, beams, columns, elevated slabs, slabs-on-ground, walls, and retaining walls.
2. Installation of all bolts, inserts, sleeves, connections, etc. in the concrete.
3. Joint devices associated with concrete work.
4. Miscellaneous concrete elements, including, but not limited to: equipment pads, light pole bases, flagpole bases, thrust blocks, and manholes.
5. Concrete curing.
6. Coordination with other sections:
   a. Make all preparations and do all work necessary to receive or adjoin other work. Install all bolts and anchors, including those furnished by other sections, into formwork and provide all required blocking.
   b. Install all accessories embedded in the concrete and provide all holes, blockouts and similar provisions necessary for the work of other sections. Provide all patching or cutting made necessary by failure or delay in complying with this requirement at the Contractor's expense.
   c. Coordinate with other sections for the accurate location of embedded accessories.

B. Related Sections:

1. Pertinent Sections of Division 01 specifying Quality Control and Testing Laboratory services.
2. Pertinent Sections of Division 03 specifying concrete construction.
3. Pertinent Sections of other Divisions specifying work to be embedded in concrete or work penetrating concrete.
4. Pertinent sections of other Divisions specifying floor finishes and sealants applied to concrete substrates.

1.2 REFERENCES

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC) Chapter 19 Concrete.

B. American Concrete Institute (ACI) PRC-211.1 “Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete”

C. ACI PRC-213 “Guide for Structural Lightweight-Aggregate Concrete”.

D. ACI SPEC-301 “Specifications for Concrete Construction”.

E. ACI PRC-302.1 “Guide for Concrete Floor and Slab Construction”.

F. ACI PRC-304 “Guide for Measuring, Mixing, Transporting, and Placing Concrete”.

G. ACI SPEC-305.1 “Specification for Hot Weather Concreting”.

H. ACI SPEC-306.1 “Standard Specification for Cold Weather Concreting”.

I. ACI SPEC-308.1 “Specification for Curing Concrete”.

J. ACI CODE-318 “Building Code Requirements for Structural Concrete and Commentary”.

1.3 SUBMITTALS

A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer. Submittals that do not meet these requirements will be returned for correction without review. Submit for review prior to fabrication.

B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents.

C. Product Data: Submit manufacturers' data on manufactured products and other concrete related materials such as bond breakers, cure/sealer, admixtures, etc. Demonstrate compliance with specified characteristics. Provide samples of items upon request.

D. Mix Designs: Submit Mix Designs for each structural concrete type required for work per requirements of articles CONCRETE MIXES and QUALITY ASSURANCE. Resubmit revised designs for review if original designs are adjusted or changed for any reason. Non-Structural mixes need not be submitted for review by Structural Engineer.

E. Shop Drawings: Proposed location of construction and cold joints. Proposed location of all slab construction/dowel joints, control joints, and blockouts.

F. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction for concrete accessories.

G. Batch Plant Ticket: Include with delivery of each load of concrete. Provide ticket to the Testing Agency and the Architect/Engineer as separate submittals. Concrete delivered to the site without such ticket shall be rejected and returned to the plant. Each ticket shall include all information specified in Article SOURCE QUALITY CONTROL below.

H. Engineering Analysis: Prepared by a California-licensed Civil or Structural Engineer, justifying construction-imposed loads on slabs, beams, and walls which exceed those allowed by CBC for the specified use.

1. 2000 lbs maximum allowable construction load without analysis.
2. 10,000 lbs maximum allowable construction load with analysis.

I. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.4 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI SPEC-301 and ACI CODE-318.

B. Concrete construction verification and inspection to conform to CBC 1705.3.

C. Common Sourcing: Provide each of the following materials from consistent sources for entire project.

1. Cement.
2. Fly ash.
3. Aggregate.
4. Slag Cement.

D. Follow requirements of ACI SPEC-305.1 when concreting during hot weather. Follow requirements of ACI SPEC-306.1 when concreting during cold weather.

E. Services by the Independent Testing Agency (includes "Special" Inspections) as specified in this Section and as follows:

1. Perform tests and inspections specified below in articles SOURCE QUALITY CONTROL and FIELD QUALITY CONTROL. Duties and limitations of Independent Testing Agency, test costs and reports to be in conformance with pertinent Sections of Division 01.

F. Contractor shall bear the entire cost of remediation, removal, and/or replacement of concrete determined defective or non-conforming, including Architect/Engineer fees for redesign.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Materials specified by brand name shall be delivered in unbroken packages bearing manufacturer's label and shall be brand specified or an approved equal.

B. Delivery, Handling and Storage of other materials shall conform to the applicable sections of the current editions of the various reference standards listed in this Section.

C. Protect materials from weather or other damage. Sort to prevent inclusion of foreign materials.

D. Specific Requirements:

1. Cement: Protect against dampness, contamination, and warehouse set. Store in weather tight enclosures.
2. Aggregates: Prevent excessive segregation, or contamination with other materials or other sizes of aggregates. Use only one supply source for each aggregate stock pile.
3. Admixtures:
   a. Store to prevent contamination, evaporation, or damage.
   b. Protect liquid admixtures from freezing and extreme temperature ranges.
   c. Agitate emulsions prior to use.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather (Freezing or near-freezing temperatures) per ACI SPEC-306.1:

1. Heat concrete materials before mixing, as necessary to deposit concrete at a temperature of at least 50°F but not more than 90°F.

2. Do not place concrete during freezing, near-freezing weather, snow, rain or sleet unless protection from moisture and/or cold is provided.
3. Protect from freezing and maintain at a temperature of at least 50°F for not less than seven days after placing. Take special precautions to protect transit-mixed concrete.
4. No salts, chemical protection or admixture are permitted without written approval of Architect/Engineer.
5. Contractor shall maintain an air temperature log for the first 7 days after placement with entry intervals not to exceed 8 hours.

B. Hot Weather per ACI SPEC-305.1:

1. Cool concrete materials before mixing, or add ice in lieu of mix water as necessary to deposit concrete at a temperature below 85°F.
2. Do not place concrete in hot/windy weather without Architect/ Engineer review of procedures.
3. Provide sunshades and/or wind breakers to protect concrete during finishing and immediate curing operations. Do not place slab concrete at air temperature exceeding 90°F.
4. Provide modified mix designs, adding retarders to improve initial set times and applying evaporation reducers during hot/windy weather for review by Independent Testing Agency prior to use.

1.7 MOCK-UP

A. Construct and erect mock-up panel for architectural concrete surfaces indicated to receive special treatment or finish, as result of formwork.

1. Panel Size: Sufficient to illustrate full range of treatment.
2. Number of Panels: 2.
3. Locate as indicated on drawings.

B. If requested by Architect / Engineer, cast concrete against mock-up panel. Obtain acceptance of resulting surface finish prior to erecting formwork.

C. Accepted mock-up panel is considered basis of quality for the finished work. Keep mock-up exposed to view for duration of concrete work.

D. Mock-up may remain as part of the Work.

1.8 SCHEDULING AND SEQUENCING

A. Organize the work and employ shop and field crew(s) of sufficient size to minimize inspections by the Testing Agency.

B. Provide schedule and sequence information to Testing Agency in writing upon request. Update information as work progresses.

PART 2 – PRODUCTS

2.1 FORMWORK

A. Comply with requirements of Section 03 1000.

2.2 REINFORCEMENT

A. Comply with requirements of Section 03 2000.

2.3 MATERIALS

A. General Requirements: All materials shall be new and best of their class or kind. All materials found defective, unsuitable, or not as specified, will be condemned and promptly removed from the premises.

B. Cementitious Materials:

1. Portland Cement: ASTM C150, Type II, low alkali conforming to CBC 1903.1.
2. Fly Ash (Pozzolan): ASTM C618, Class F.
3. Slag Cement: ASTM C989, Grade 100 or 120.

C. Concrete Aggregates:

1. Coarse and Fine Aggregates: ASTM C33; Stone aggregate and sand. Specific source aggregate and/or sand or shrinkage characteristics as required for class of concrete specified.
2. Lightweight aggregate: ASTM C330 and C332.
3. Source shall remain constant throughout the duration of the job. The exact portions of the fine aggregates and coarse aggregates to be used in the mix shall be determined by the mix design.
4. Recycled concrete products: Returned plastic concrete may not be used in a mix. Recycled Concrete Aggregate (RCA) is not permitted. Reclaimed coarse aggregate is permitted and shall comply with ASTM C33. Reclaimed fine aggregate is not permitted.

D. Water: ASTM C1602. Potable, clean, from domestic source.

E. Admixtures: All admixtures shall be used in strict accordance with the manufacturer's recommendations. Admixtures containing calcium chlorides or other accelerators shall not be used without the approval of the Architect/Engineer and the Owner's Testing Laboratory.

1. Normal or Mid Range Water Reducing Admixtures: ASTM C494 Type A, “MasterPozzolith” series or "MasterPolyheed" series by Master Builders Solutions, "WRDA" series by W.R. Grace, or equal.
2. Water Reducing Admixture and Retarder: ASTM C494 Type B or D, "MasterSet R” series or “MasterSet DELVO” series by Master Builders Solutions, "Plastiflow-R" by Nox-crete, or equal.
3. High Range Water-Reducing Admixtures: ASTM C494 Type F, "MasterRheoBuild 1000" or “MasterGlenium” series by Master Builders Solutions or equal.
4. Air Entraining Admixtures: ASTM C260, “MasterAir” series by Master Builders Solutions or equal.
5. Viscosity Modifiers: ASTM C494 Type S, “MasterMatrix VMA” series by Master Builders Solutions or equal..

F. Slurry: Same proportion of cement to fine aggregates used in the regular concrete mix (i.e. only coarse aggregate omitted); well mixed with water to produce a thick consistency.

G. High Strength Grout: See section 05 1200 or 05 1100 for requirements.

H. Dry Pack: Dry pack (used only for cosmetic concrete repairs) shall consist of:

1. One part cement to 2-1/2 parts fine aggregate (screen out all materials retained on No.4 sieve), mixed with a minimum amount of water, added in small amounts.
2. Mix to consistency such that a ball of the mixture compressed in the hand will retain its shape, showing finger marks, but without showing any surface water.

2.4 ACCESSORIES

A. Bonding Agent: ASTM C881, Type II Grade 2 Class B or C. Do not allow epoxy to set before placing fresh concrete.

1. "MasterEmaco ADH 326" by Master Builders Solutions;
2. "Rezi-Weld 1000" by W.R. Meadows.

B. Chemical Hardener: Fluorosilicate solution designed for densification of cured concrete slabs. "MasterKure HD 300 WB" by Master Builders Solutions, "LIQUI-HARD" W.R. Meadows Co, or equal.

C. Moisture-Retaining Cover: ASTM C171, type 1, one of the following;

1. Regular Curing Paper, Type I, reinforced waterproof: Fortifiber Corporation "Orange Label Sisalkraft", "Pabcotite" paper, or equal.
2. Polyethylene Film: ASTM D 2103, 4 mil thick, clear or white color.
3. White-burlap-polyethylene sheet, weighing not less than 10 oz/per linear yd.

D. Liquid Curing Compound: ASTM C 309, Type 1, Class B, clear or translucent, 25% minimum solids, water base acrylic cure/sealer which will not discolor concrete and compatible with bonding of finishes specified in related sections. W.R. Meadows Co. "Vocomp 25" or equal. Maximum VOC content shall comply with local requirements and California Green Building Code.

E. Under Slab Water Vapor Retarder: Vapor retarder sheet to be ASTM E1745 Class A; 15 mil, single ply extruded polyolefin; permeance no greater than 0.01 U.S. Perms per ASTM E154, ASTM E96 procedure B or ASTM F1249.

1. "Stego Wrap Vapor Barrier (15mil)" by Stego Industries LLC.
2. "Vaporguard" by Reef Industries.
3. Approved Equal.

F. Evaporation Reducer: "MasterKure ER 50", by Master Builders Solutions.

G. Permeability Reducer: Use only where specifically referred to.

1. ASTMC494 Type S.
2. Admixture Type: Xypex Chemical Corporation "XYPEX Admix C-500", Master Builders Solutions "MasterLife 300" series. Dosage: per manufacturer.
3. Surface-Applied Type: Xypex Chemical Corporation "XYPEX Concentrate. Brush application: 1.25-1.50lb/sq. yd., 5 parts powder to 2 parts water. Master Builders Solutions "MasterSeal 500". Slurry coat: one part water to 2.25-2.5 parts powder by volume.
4. Approved equal.

2.5 JOINT DEVICES AND MATERIALS

A. Waterstops: Resilient type, meeting Corps of Engineers CRD-C 572. Consult manufacturer for appropriate product for specific use. Submit for review. Install per manufacturers recommendation. Provide W. R. Meadows “Seal Tight” PVC waterstop, Sika “Greenstreak” PVC waterstop, or approved equal.

B. Expansion Joint Filler: ASTM D1751, Nonextruding, resilient asphalt impregnated fiberboard or felt, 3/8 inch thick and 4 inches deep; tongue and groove profile.

1. Products: "Serviced Products", W.R. Meadows, Inc., "National Expansion Joint Company", "Celotex Corporation", or equal.

C. Joint Filler: ASTM D944, Compressible asphalt mastic with felt facers, 1/4 inch thick and 4 inches deep.

D. Sealant and Primer: As specified in Section 07 9000.

E. Slab Joint Sealant: Compatible with floor finishes specified in related sections.

2.6 CONCRETE MIXES

A. General requirements for mix design and submittal of structural class concrete:

1. Provide Contractor submittals to Architect/Engineer not less than 15 days before placing concrete.
2. Contractor shall review mix designs and proposed placing requirements prior to submittal for compatibility to ensure that the concrete as designed can be placed in accordance with the drawings and specifications.
3. Changes or revisions require re-submittal: All variations to approved mix designs, including changing type and/or quantity of admixtures shall be resubmitted to the Architect/Engineer for review prior to use.
4. Mix design(s) for all structural classes of concrete to be prepared by qualified person experienced in mix design. Allow for time necessary to do trial batch testing when required.
5. Preparer to provide backup data and certify in writing that mix design meets:
   a. Requirements of the specifications for concrete durability and quality;
   b. Requirements of the California Building Code and ACI CODE-318, including break histories, trial batching test results, and/or a mix designed by a California Registered Civil Engineer per ACI CODE-318 and bearing the Engineer’s seal & signature.
6. Clearly note on mix designs with specified maximum W/CM if design permits addition of water on site, or clearly identify in the mix design that no water is to be added on site.
7. Deviations: Clearly indicate proposed deviations, and provide written explanation explaining how the deviating mix design(s) will provide equivalent or better concrete product(s) than those specified.
8. Include adjustments to reviewed mix designs to account for weather conditions and similar factors.

B. Proportioning - General: The following provisions apply to all mix designs:

1. Proportion concrete mixes to produce concrete of required average strength (as defined by ACI CODE-318). Select slump, aggregate sizes, shrinkage, and consistency that will allow thorough compaction without excessive puddling, spading, or vibration, and without permitting the materials to segregate, or allow free water to collect on the surface.
2. Select aggregate size and type to produce dense, uniform concrete with low to moderate shrinkage, free from rock pockets, honeycomb and other irregularities.
3. Mix designs may include water reducing and retarding admixtures to meet or exceed minimum set times (time required to place and finish) and to minimize Water-Cementitious Materials (W/CM). Minimum and maximum criteria presented in this section are guidelines and do not represent a specific mix design.
4. Cement Content: Minimum cement content indicates minimum sacks of cementitious material. Increasing cement content to increase early strengths or to achieve specified W/CM while maintaining water content is discouraged in order to minimize effects of shrinkage.
    a. Substitution of fly ash for Portland cement on an equivalent weight basis up to 25% replacement is permitted, except at high early strength concrete. Replacement in excess of 25% is not permitted unless part of a specified mix design that has been submitted for review.
    b. Substitution of slag cement for Portland cement on an equivalent weight basis up to 45% replacement is permitted, except at high early strength concrete. Replacement in excess of 45% is not permitted unless part of a specified mix design that has been submitted for review.
    c. Such substitution requests may be denied by the Engineer.
5. Water Content: Mix designs with a specified maximum W/CM may be designed with a lower WCR than specified in order to allow addition of water at the site.
6. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI SPEC-301 and this section.
    a. For trial mixtures method, employ independent testing agency acceptable to Architect/Engineer for preparing and reporting proposed mix designs.
7. Placement Options: Mix designs may, at the Contractor's option, be designed for either pump or conventional placement with aggregate size, slumps, etc. to be maintained as specified in this section.

C. Proportioning Normal Weight Concrete: Comply with ACI PRC-211.1 recommendations and this section.

D. Proportioning Structural Light Weight Concrete: Comply with ACI PRC-213 recommendations and this section. Maximum cured weight of light weight concrete shall be 120 pounds per cubic feet. General Contractor is responsible for coordinating and providing light weight concrete density to meet the required fire assembly rating of the Construction Documents at the concrete depths provided in the structural drawings. General Contractor to notify the Structural Engineer for review if light weight concrete of the required density for the specified fire assembly rating cannot be sourced.

E. Special mix design requirements for interior concrete floor slabs-on-ground:

1. Proportion concrete mixes per this specification, ACI PRC-211.1, and the requirements below:

2. Fly Ash, shall be substituted for cement on a 1 lb. per 1 lb. basis, with a minimum replacement of 25% and a maximum of 35%. Alternatively, slag cement, shall be substituted for cement on a 1 lb. per 1 lb. basis, with a minimum replacement of 30% and a maximum of 45%.
3. 200 lbs. of 3/8(-) aggregate shall be added to reduce total sand.
4. Reduce total sand to minimum practical.
5. Admixture dosage shall be per manufacturer's recommendations. Dosage may be increased for workability as long as set times are not excessive for placement and finishing.

Concrete Class	Coarse Aggregate Size (Inches) & Fine Aggregate[3]	Maximum W/CM or Maximum Nominal Slump & Tolerance (Inches)[1,2]	Minimum 28-Day Design Strength	Minimum Cement Sacks/per yd[4]
STRUCTURAL				
1) Interior Slab on Ground[5]	1" x #4	W/CM = .45	3,000	6.1

6. The tolerance is the maximum deviation allowable without rejection. The mix design shall be based on the nominal value specified and is without water reducing mixtures. Slump to be measured at the end of the hose.
7. The maximum W/CM is limited at time of placement as noted. No water is to be added on site such that the specified W/CM or maximum slump is exceeded without approval of the testing laboratory and the Architect/Engineer. Workability is to be achieved utilizing an acceptable mid range to high range water reducing admixture.
8. Gradation of aggregate is per ACI CODE-318 and ASTM C33.
9. Minimum cement content includes all cementitious materials.
10. See Article 2.6E for additional requirements at interior slabs on ground.

2.7 MIXING CONCRETE

A. Batch final proportions in accordance with approved mix designs. All adjustments to approved proportions, for whatever reason, shall be reviewed by the Architect/Engineer prior to use.

B. Batch and mix concrete in accordance with ASTM C94, at an established plant. Site mixed concrete will be rejected.

C. Provide batch and transit equipment adequate for the work. Operate as necessary to provide concrete complying with specified requirements.

D. Place mixed concrete in forms within 1-1/2 hours from the time of introduction of cement and water into mixer or 300 revolutions of the drum whichever comes first. Use of, re-mixing, and/or tempering mixed concrete older than 1 hour will not be permitted.

E. Do not add water at the site to concrete mixes with a maximum specified W/CM unless the water content at batch time provides for a W/CM less than specified and this provision, including the quantity of water which may be added at the site, is specifically noted on the mix design and certification by the mix preparer. See ASTM C94 for additional requirements.

2.8 SOURCE QUALITY CONTROL

A. Services by independent Testing Agency:

1. Batch Plant Certificates: Obtain the weighmaster's Batch Plant Certificate at arrival of truck at the site. If no batch plant certificate is provided, recommend to the General Contractor that the truckload of concrete be rejected. So note in daily log, along with the location of the load of concrete in the structure if the load is not rejected.
   a. Laboratory's inspector shall obtain for each transit mixer Batch Plant Certificates to verify mix design quantities and condition upon delivery to the site.
   b. Certificates to include: Date, time, ingredient quantities, water added at plant and on job, total mixer revolutions at time of placement, and time of departure.
   c. Concrete with specified water cement ratio: Add no water on site unless mix design and batch records each show additional water may be added. See ASTM C94 for additional requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

B. Verify work of other sections is complete and tested as required before proceeding.

3.2 PREPARATION

A. Observation, Inspection and Testing:

1. Architect/Engineer: Notify not less than 2 working days before each concrete placement, for observation and review of reinforcing, forms, and other work prior to placement of concrete.
2. Testing Agency: Notify not less than 24 hours before each placement for inspection and testing.

B. Placement Records: Contractor shall maintain records of time, temperature and date of concrete placement including mix design and location in the structure. Retain records until completion of the contract. Make available for review by Testing Agency and Architect/Engineer.

C. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

D. Verify location, position and inclusion of all embedded and concealed items.

E. Verify installation of vapor retarder under interior slabs on ground, as specified in related section, is complete.

F. Cleaning and Preparation:

1. Remove loose dirt, mud, standing water, and foreign matter from excavations and cavities.
2. Close cleanout and inspection ports securely.

3. Thoroughly clean reinforcement and other embedded items free from loose rust and foreign matter. Maintain reinforcing securely in place. Do not place concrete on hot reinforcing.
4. At cold joints, remove laitance from previously placed concrete surface.
5. Dampen form materials and substrates on which concrete is to be placed at least 1 hour in advance of placing concrete; repeat wetting as necessary to keep surfaces damp. Do not saturate. Do not place concrete on saturated material.
   a. Thoroughly wet wood forms (except coated plywood), bottom and sides of trenches, adjacent concrete or masonry and reinforcement.
   b. Concrete slabs on base rock, dampen rock.
   c. Concrete slabs on vapor retarder, do not wet vapor retarder.
6. Verify that metal forms are clean and free of rust before applying release agent.
7. Thoroughly clean metal decking. Do not place concrete on wet deck surface.
8. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

G. Drill holes in existing concrete at locations where new concrete is doweled to existing work. Insert steel dowels and prepare connections as detailed.

H. Do not overcut at existing concrete work to remain. Contractor is responsible for repair/replacement of overcut concrete to the Owner's satisfaction.

3.3 PIPES AND CONDUITS IN CONCRETE

A. Slabs-on-Ground:

1. No pipe or conduit exceeding 1 inch outside diameter shall be embedded within the specified slab thickness except as specifically detailed.
2. Do not stack or abut pipes, maintain 3 inches minimum clearance.

B. Sleeving and Wrapping:

1. Foundations: Sleeve or wrap all individual pipe penetrations, minimum 1-1/2 inches clear to reinforcing all around.
   a. Sleeves: PVC. Provide 1 inch minimum clear all around O.D. pipe to I.D sleeve, UNO at ends, fill void space with mastic or plastic bituminous cement.
   b. Wrapped Vertical Pipes: Provide 1/8 inch nominal sheet foam with three wraps minimum, UNO.
   c. Wrapped Horizontal Pipes: Provide 1/8 inch nominal sheet foam with eight wraps minimum, UNO.
   d. Underground Fire Lines 4" and Larger: At sleeves provide 2 inch minimum clear all around O.D. pipe to I.D sleeve. At wrapped pipes, provide 1/8 inch nominal sheet foam with sixteen wraps minimum.
2. Slabs or Curbs: Wrap pipes as described above.

C. Space groups of pipes/conduits at least 3 sleeve diameters apart, do not interrupt specified concrete and reinforcement.

1. Provide block-outs as detailed when grouping of pipes/conduits in foundation or other structural member prevents spacing as described. Notify Architect/Engineer for review of any conditions not conforming to details.
2. Center pipe/conduit penetrations in the depth and/or thickness of foundations.
3. Maximum size of pipe/conduit penetrations shall not exceed the least dimension of concrete divided by 3.

D. Do not embed pipes/conduits in concrete slabs on metal deck.

E. Provide the following at pipes/conduits detailed to be embedded in a concrete beam, wall or column:

1. Place as near as possible to center of member with reinforcing as specified on each side.
2. Where reinforcing is located near or at center of member, place pipe or conduit 1 inch minimum clear from reinforcing and provide #3 at 12 inches on center perpendicular to the pipe/conduit. Reinforcing to extend 12 inches minimum past pipe/conduit each side.
3. Maintain ¾ inch clear minimum from added reinforcing to face of concrete where not exposed to weather and 1-1/2 inches clear where exposed to weather.
4. Space embedded items (groups of pipe/conduit, junction boxes or other elements) minimum 3 inches apart.
5. Provide reinforcing in walls, beams, columns as detailed for groups of pipe/conduit. Provide minimum replacement reinforcement of same size and number for interrupted or displaced reinforcement for the full height, length, width of the wall, beam, and/or column on each side of the "effective opening."

3.4 CONCRETE PLACEMENT

A. Transporting:

1. Provide clean, well-maintained equipment of sufficient quantity and capacity to execute the work and produce concrete of quality specified.
2. Handle and transport concrete from mixer to final deposit location as rapidly as practicable. Prevent separation or loss of ingredients.

B. Perform concrete placement by methods which will not puncture, damage or disturb vapor retarder membrane. Repair all damage to vapor retarder membrane before covering.

C. Placement - General: Placement, once started, shall be carried on as a continuous operation until section of approved size and shape is completed. Provide construction joints as detailed on the drawings. Engineer's written approval required for all deviations.

1. Deposition:
   a. Deposit concrete to maintain an approximately horizontal plastic surface until the completion of the unit placement.
   b. Deposit as neatly as practicable in final position, minimize re-handling or flow.
   c. Do not drop concrete freely where reinforcing bars, embeds, or obstructions occur that may cause segregation. Provide spouts, elephant trunks, or other means to prevent segregation during placement.
2. Depth: Layered placement in columns and walls shall not exceed ten feet vertical depth.
   a. Place concrete in minimum 32 inch horizontal lifts.
   b. Schedule placement to ensure that concrete will not take initial set before placement of next lift.
   c. No horizontal cold joints are allowed in columns or walls.
3. Progress Cleaning: Remove all concrete spilled on forms or reinforcing steel in portions of structure not immediately concreted. Remove completely before concrete sets.

4. Interruptions: Shut down placement operations and dispose of all remaining mixed concrete and concrete in hoppers or mixers following all interruption in placement longer than 60 minutes.
    a. If such interruption occurs, provide new or relocate existing construction joints as directed by Engineer.
    b. Cut concrete back to the designated line, cleaning forms and reinforcing as herein specified.
    c. Prepare for resumption of placement as for new unit when reason for interruption is resolved.

D. Placement - Elevated Structural Systems: Place as noted for "General" above and as follows:

1. Metal Decking and Structural Steel Beam Systems that are not to be shored: Locate screed lines on primary structural members. Review proposed screed line locations and expected structural deflections with the Architect/Engineer prior to placement of concrete.
2. Place screed lines to match camber of primary girders made of material other than concrete. Locate screeds to provide the minimum specified thickness of concrete at all locations.
3. Compensate for deflection of intermediate structural members and decking by placement of additional concrete.
4. Adjust embedded items to compensate for camber and deflection. Maintain locations within specified tolerances.

E. Consolidation:

1. Consolidate all concrete thoroughly during placement with high-speed mechanical vibrators and other suitable tools. Perform manual spading and tamping to work around reinforcement, embedded fixtures, and into corners of formwork as required to obtain thorough compaction.
    a. Provide vibrators with sufficient amplitude for adequate consolidation.
    b. Use mechanical vibrators at each point of concrete placement.
    c. Keep additional spare vibrators, in addition to those required for use, at the site for standby service in case of equipment failure.
2. Consolidate each layer of concrete as placed.
    a. Insert vibrators vertically at points 18 to 30 inches apart; work into top area of previously placed layer to reconsolidate, slowly withdraw vibrator to surface.
    b. Avoid contact of vibrator heads with formwork surfaces.
    c. Systematically double back and reconsolidate wherever possible. Consolidate as required to provide concrete of maximum density with minimized honeycomb.

F. Unacceptable Materials:

1. Do not place concrete that has started to set or stiffen. Dispose of these materials.
2. Do not add water on site to concrete except as specified in the approved mix design, see PART 2 above.

G. Protection of installed work:

1. Do not introduce any foreign material into any specified drainage, piping or duct systems.

2. Contractor shall bear all costs of work required to repair or clean affected work as a result of failure to comply with this requirement.

3.5 CONCRETE JOINTS

A. Structural Joints (Construction/Cold Joints):

1. Locate joints only where shown, or as approved.
2. Review Required: Joints not indicated on the plans shall be located to meet the minimum requirements below, shall not impair the strength of the structure and shall be submitted to Architect/Engineer for review prior to placement of concrete.
   a. Indicate proposed location(s) of construction/cold/expansion joints on shop drawing submittals for review prior to placing concrete.
3. Clean and roughen all surfaces of previously placed concrete at construction joints by washing and sandblasting to expose aggregate to 1/4 inch amplitude.
4. Slabs-On-Ground: Maximum Length of continuous placement shall not exceed 60 feet without special review by the Architect/Engineer. Alternate or stagger placement sections.
5. Foundations, Beams, Elevated Slabs and Joists: Maximum Length of continuous placement shall not exceed 200 foot increments. Provide "keyed" shut-off locations made up with form boards. Extend reinforcing one lap length or more through shut-off.
   a. All reinforcement shall be continuous through construction/cold joint, lapping to adjacent reinforcing in future placement.
   b. Construction Joints in Elevated Slabs: Review all proposed locations with Architect/Engineer.
   c. Construction Joints in Slabs on Metal Decking: Review all proposed locations with Architect/Engineer. Do not locate closer than 48 inches of centerline of beam.
6. Retaining and Basement Walls: Maximum Length of continuous placement shall not exceed 100 foot increments. Provide "keyed" shut-off locations made up with form boards to limit the length of continuous placement and at abrupt changes in wall thickness. Extend reinforcing one lap length or more through shut-off.
   a. Review all proposed locations with Architect/Engineer
   b. Horizontal construction joints are not allowed unless approved by the Engineer
7. Horizontal Construction Joints: Place 2 inch slurry (specified concrete mix less coarse aggregate) at beginning of pour at the bottom of walls unless a prior review of a mock-up section demonstrates that segregation of aggregate will not occur.

B. Expansion/Construction Joints (Dowel Joints and Control Joints):

1. Interior and Exterior Slabs-on-Ground:
   a. Expansion/Construction Joints: Provide dowel joints or control joints at a maximum dimension (in feet) of three times the slab thickness (in inches) in each direction unless noted otherwise (15'-0" maximum). Install joints to match slab level and in straight lines. Locate joints at all reentrant corners including blockouts.
   b. Proportions: Install joints to divide slab into rectangular areas with long dimensions less than 1.5 times short dimension.
2. Exterior Concrete Slabs-on-Ground (walkways, patios):

a. Expansion/ construction joints: Provide a 2 inch deep troweled groove or asphalt impregnated joint material embedded 50 percent of the slab depth at 12 feet on center, maximum.
b. Proportions: Place no section with a length larger than two times width. Additionally, place joints at all inside corners and at all intersections with other work.

3. Elevated Structural Slabs: Locate construction joints as specifically indicated on the drawings. All additional proposed locations shall be reviewed by the Architect/Engineer prior to placement.
4. Retaining and Basement Walls:
a. Contraction Joints: Provide ¾ inch wide beveled wood strips attached to inside face of formwork on each side of the wall. Wood strips shall extend 1/8 times the wall thickness into the wall. Cut 50% of the horizontal reinforcing bars at contraction joint locations
b. Proportions: Place joints at 2 times the height of the wall on center max, but not less than 10'-0". Joints shall not exceed 25'-0" on center.
c. Review all proposed locations with Architect/Engineer

C. Joint Types:

1. Dowel Joint: A keyed joint with smooth dowels passing through to allow unrestricted movement due to contraction and expansion. Joints are as specified on the drawings.
2. Control Joint(s): Shrinkage crack control joints may be of the following types when shown on the drawings. Install joints in a straight line between end points with edges finished appropriate to type. Depth shall be 25% of the slab thickness, unless noted otherwise. Fill joints with sealant as shown on the drawings or as required by related sections.
a. 1/4 inch wide troweled joint.
b. Keyed joint: Only at locations where concealed by other finishes.
c. Masonite Strip, 1/8 inch: Only at locations where concealed by other finishes.
d. Saw Cut, 1/8 inch: Must be performed within eight hours of completion of finishing. Do not make saw cuts if aggregate separates from cement paste during cutting operation. Prevent marring of surface finish. Fill with flexible sealant.

3.6 VAPOR RETARDER

A. Vapor Retarder Installation: Install as specified in PART 2, ASTM E1643, and per manufacturer's recommendations including taping and lapping of seams, sealing of penetrations, and repair of damage. Do not extend vapor retarder below footings.

3.7 FLATWORK

A. General Requirements for All Concrete Formed & Finished Flat:

1. Edge Forms and Screeds: Set accurately to produce indicated design elevations and contours in the finished surface, edge forms sufficiently strong to support screed type proposed.
2. Jointing: Located and detailed as indicated.
3. Consolidation: Concrete in slabs shall be thoroughly consolidated.

B. Flatwork Schedule:

1. Exterior Slabs-On- Ground: Place concrete directly over sub-base as indicated.
   a. Sub-Base: Clean free-draining, crushed base rock, 4 inch minimum thickness, thoroughly compacted.
2. Interior Concrete Slabs-On- Ground:
   a. Sub-Base: Clean free-draining, crushed base rock, 4 inch minimum thickness, thoroughly compacted.
   b. Vapor Retarder: Install over sub-base.

3.8 FORMED SURFACES

A. Form all concrete members level and plumb, except as specifically indicated. Comply with tolerances specified in ACI CODE-318, ACI SPEC-301, and this specification, except that maximum permissible deviation is 1/4 inch end-to-end for any single member.

B. Cambers: Provide all cambers indicated in the formwork construction. Set screeds to produce specified cambers in the finished concrete.

3.9 CONCRETE FINISHES

A. Flatwork Finishing:

1. Perform with experienced operators.
2. Finish surfaces monolithically. Establish uniform slopes or level grades as indicated. Maintain full design thickness.
3. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains as indicated on drawings.
4. Flatwork Finish Types:
   a. Wood Float Finish: Surfaces to receive quarry tile, ceramic tile, or cementitious terrazzo with full bed setting system, or wood frame for raised finished floors.
   b. Steel Trowel Finish: Surfaces to receive carpeting, resilient flooring, seamless flooring, thin set terrazzo, thin set tile or similar finishes specified in related sections. Trowel twice, minimum.
   c. Broom Texture Finish: Exterior surfaces as indicated or for which no other finish is indicated. Finish as for steel trowel finish, except immediately following first troweling, (depending on conditions of concrete and nature of finish required) provide uniform surfaces texture using a medium or coarse fiber broom.

B. Other Concrete: Provide as required to achieve appearance indicated on structural and architectural drawings and related sections.

1. Repair surface defects, including tie holes, immediately after removing formwork.
2. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
3. Exposed Form Finish: Finish concrete to match forms. Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   a. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
   b. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.

c. Cork Floated Finish: Immediately after form removal, apply grout with trowel or firm rubber float; compress grout with low-speed grinder, and apply final texture with cork float.

4. Intermediate joint and score marks and edges: Tool smooth and flush unless otherwise indicated or as directed by the Architect.

5. Use steel tools of standard patterns and as required to achieve details shown or specified. All exposed corners not specified to be chamfered shall have radiused edges.

3.10 TOLERANCES

A. Minimum Flatwork Tolerances: Measure flatness of slabs with in 48 hours after slab installation in accordance with ACI PRC-302.1 and ASTM E1155 and to achieve the following FF and FL tolerances:

1. Exterior surfaces: 1/8 inch minimum per foot where sloped to drain. Level otherwise. FF20 and FL15.
2. Interior surfaces not otherwise shown or required: Level throughout. FF25 and FL20
3. Interior surfaces required to be sloped for drainage: 1/8 inch in 10 ft.
4. Finish concrete to achieve the following tolerances:
   a. Under Glazed Tile on Setting Bed: FF30 and FL20.
   b. Under Resilient Finishes: FF35 and FL25.
   c. Flooring manufactureer and pertainent section of Division 9.

B. Formed Surface Tolerances:

1. Permanently Exposed Joints and Surfaces: Provide maximum differential height within two feet of, and across construction joints of 1/16 inch.
2. Vertical Elevations: Elevation of surfaces shall be as shown or approved.

3.11 SEPARATE FLOOR TOPPINGS

A. Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.

B. Place required dividers, edge strips, reinforcing, and other items to be cast in.

C. Apply bonding agent to substrate in accordance with manufacturer's instructions.

D. Apply sand and cement slurry coat on base course, immediately prior to placing toppings.

E. Place concrete floor toppings to required lines and levels. Place topping in checkerboard panels not to exceed 20 feet in either direction.

F. Screed toppings level, maintaining surface tolerances per above.

3.12 CONCRETE CURING

A. Curing - General: Cure in accordance with ACI SPEC-308.1. Maintain concrete water content for proper hydration and minimize temperature variations. Begin curing immediately following finishing.

B. Protection During Curing: Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. The General Contractor is responsible for the protection of the finished slab from damage.

1. Avoid foot traffic on concrete for minimum of 24-hours after placement.
2. Protect concrete from sun and rain.
3. Maintain concrete temperature at or above 50 degrees F. during the first 7 days after placement. See Article ENVIRONMENTAL REQUIREMENTS.
4. Do not subject concrete to design loads until concrete is completely cured, and until concrete has attained its full specified 28-day compressive strength or until 21 days after placement, whichever is longer.
5. Protect concrete during and after curing from damage during subsequent building construction operations. See Article PROTECTION.

C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

1. Normal concrete: Not less than 7 days.
2. High early strength concrete: Not less than 4 days.

D. Begin curing immediately following finishing.

E. Surfaces Not in Contact with Forms:

1. Start initial curing as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than 3 days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
2. Begin final curing after initial curing but before surface is dry.
   a. Moisture-retaining cover: Seal in place with waterproof tape or adhesive.
   b. Curing compound: Apply in two coats at right angles, using application rate recommended by manufacturer.
3. In addition, see specific conditions noted below.

F. Slabs on Ground: Cure by one of the following methods:

1. Water Cure (Ponding): Maintain 100 percent coverage of water over floor slab areas, continuously for minimum 7 calendar days.
2. Spraying: Spray water over floor slab areas and maintain wet for 7 days.
3. Moisture-Retaining Film or Paper: Lap strips not less than 6 inches and seal with waterproof tape or adhesive; extend beyond slab or paving perimeters minimum 6 inches and secure at edges; maintain in place for minimum 7 days.
4. Absorptive Moisture-Retaining Covering: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides and extend beyond slab or paving perimeters 6 inches minimum; maintain in place for minimum 7 days.
5. Liquid Membrane-forming Curing Compound: Provide only when subsequent concrete treatments or finish flooring specified in related sections will not be affected by cure/sealer. Apply curing compound in accordance with manufacturer's instructions at the maximum recommended application rate in two coats, with second coat applied at right angles to first.

G. Elevated Slabs: Cure by one of the following methods.

1. Moisture-Retaining Sheet: As specified for Slab on Ground above.
2. Water Cure: As specified above for minimum 14 days.

3. Apply Membrane Curing Compound as specified above after initial curing period.

H. Concrete on Metal Decking: Moisture-Retaining Sheet method as specified above.

I. Formed Concrete Members: Cure by moist curing with forms in place for full curing period.

1. Protect free-standing elements from temperature extremes.
2. Maintain forms tight for minimum 7 days. Maintain exposed surfaces continuously damp and completely covered by sheet materials thereafter.
3. Maintain all shoring in place. Refer to related sections specifying formwork.
4. Membrane Curing Compound: Apply compound in accordance with manufacturer's instructions in one coat.

J. Foundations: Apply curing compound immediately after floating.

3.13 CONCRETE HARDENER

A. Apply hardener to all floor slabs not receiving other finishes after 30 days minimum curing. Clean slabs of non-compatible cure/sealers or other foreign material(s) and apply in strict accordance with the manufacturer's directions.

3.14 GROUTING AND DRY PACK

A. Set steel plates on concrete or masonry with high strength grout bed, completely fill all voids; thoroughly compact in place. See Section 05 1200 or 05 1100.

B. Bolts or inserts dry packed or grouted in place shall cure for minimum 7 days before tensioning.

3.15 FIELD QUALITY CONTROL

A. Testing and Inspections by Independent Testing Agency: Provided verification and inspection of concrete per CBC Table 1705.3. Provide written reports for to Engineer, Architect, Contractor and Building Official for the following tests and inspections:

B. Testing & Inspection: Provide periodic inspection of reinforcing steel. Provide continuous inspection during placement of structural class concrete, 3000 psi or more. Non-structural class concrete with a design strength of 2500 psi or less to have periodic inspection on a 150 cubic yard basis as required to assure conformance.

1. Provide periodic inspection of bolts in concrete prior to and during placement where so noted on the construction documents.
2. Structural Concrete Cylinder Tests: Form in accordance with ASTM C31.
   a. Take four standard 6 inch x 12 inch (or five 4 inch x 8 inch) cylinder specimens on the site, of each class of concrete as specified in PART 2, not less than once a day or for each 150 cubic yards or 5000 sq ft or fraction thereof placed each day.
   b. Record the location of each concrete batch in the building in a log and also note on each specimen.
   c. Perform standard compression test of cylinders in accordance with ASTM C39, one at 7 days and two (three for 4x8 cylinders) at 28 days.
   d. Hold fourth (fifth) cylinder untested until specified concrete strengths are attained.

3. Structural Concrete Slump Test and Air Tests: Perform slump in accordance with ASTM C143 and air content in accordance with C231 or C173 at the time of taking test cylinders, and/or at one-hour intervals during concrete placing.
4. Measure and record concrete temperature in accordance with ASTM C1064 upon arrival of transit mixers and when taking specimens. Note weather conditions and temperature.
5. Determine concrete density in accordance with ASTM C138 at the time of forming test cylinders.
6. Propose adjustments to reviewed mix designs for Architect / Engineer review to account for variations in site or weather conditions, or other factors as appropriate.
7. Water Vapor Transmission Tests: Floors receiving floor finishes specified in related sections will be tested prior to installation of flooring systems. Refer to sections specifying floor finishes for related requirements.

C. Services by Contractor:

1. Rejection of Concrete Materials: Do not use the following without prior written approval of the Architect/Engineer;
   a. Materials without batch plant certificates.
   b. Materials not conforming to the requirements of these specifications.

3.16 ADJUSTING

A. Inspect all concrete surfaces immediately upon formwork removal. Notify Architect/Engineer of identified minor defects. Repair all minor defects as directed.

B. Surface and Finish Defects: Repair as directed by the Architect/Engineer, at no added expense to the Owner. Repairs include all necessary materials; reinforcement grouts, dry pack, admixtures, epoxy and aggregates to perform required repair.

1. Repair minor defective surface defects by use of drypack and surface grinding. Specific written approval of Architect/Engineer is required. Submit proposed patching mixture and methods for approval prior to commencing work.
2. Slabs-on- Ground, Elevated Slabs and on Slabs on Metal Deck: Review for "curled" slab edges and shrinkage cracks prior to installation of other floor finishes. Grind curled edges flush, fill cracks of 1/16 inch and greater with cementitious grout.
3. Grind high spots, fins or protrusions caused by formwork; Fill-in pour joints, voids, rock pockets, tie holes and other void not impairing structural strength. Provide surfaces flush with surrounding concrete.

3.17 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required compressive strength, lines, details, dimensions, tolerances, finishes or specified requirements; as determined by the Architect/Engineer.

B. Repair or replacement of defective concrete will be determined by the Architect/Engineer who may order additional testing and inspection at his option. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

C. Specific Defects:

1. "Low-Strength"; Concrete Not Meeting Specified Compressive Strength after 28 days:
   a. Concrete with less than 25% Fly Ash or 35% Slag as cementitious material: Test remaining cylinder(s) at 56 days. If strength requirements are met, concrete strength is acceptable.
   b. Concrete with 25% or more Fly Ash or 35% or more Slag as cementitious material: Test remaining cylinder(s) at 70 days. If strength requirements are met, concrete strength is acceptable.
2. Excessive Shrinkage, Cracking, Crazing or Curling; Defective Finish: Remove and replace if repair to acceptable condition is not feasible.
3. Lines, Details, Dimensions, Tolerances: Remove and replace if repair to acceptable condition is not feasible.
4. Slab sections not meeting specified tolerances for trueness/flatness or lines/levels: Remove and replace unless otherwise directed by the Architect/Engineer. Minimum area for removal: Fifteen square feet area unless directed otherwise by the Architect/Engineer.
5. Defective work affecting the strength of the structure or the appearance: Complete removal and replacement of defective concrete, as directed by the Architect/Engineer.

3.18 CLEANING

A. Maintain site free of debris and rubbish. Remove all materials and apparatus from the premises and streets at completion of work. Remove all drippings; leave the entire work clean and free of debris.

B. Slabs to Receive Floor Finishes Specified in other sections: Remove non-compatible cure/sealers or other foreign material(s) which may affect bonding of subsequent finishes. Leave in condition to receive work of related sections.

3.19 PROTECTION

A. Protect completed work from damage until project is complete and accepted by Owner.

B. Construction Loads: Submit engineering analysis for equipment loads (including all carried loads) specified in article submittals.

C. Keep finished areas free from all equipment traffic for a minimum of 4 additional days following attainment of design strength and completion of curing.

D. Protection of Drainage Systems:

1. Care shall be taken not to introduce any foreign material into any specified drainage, piping or duct system.
2. Cost of work to repair or clean drainage system as a result of failure to comply with this requirement will be back charged to the contractor.

E. Cover traffic areas with plywood sheets or other protective devices; maintain protection in place and in good repair for as long as necessary to protect against damage by subsequent construction operations.

END OF SECTION

SECTION 04 20 00

CONCRETE UNIT MASONRY

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: All labor, material and equipment and perform all operations required to complete all masonry work as indicated on the drawings and specified.

B. Additional work included in this section: Provision of concrete grout and installation of items provided by other trades that are embedded in and/or attached to masonry work; providing forms at block-outs and formed concrete grout.

C. Related Sections:

1. Pertinent Sections of Division 01 specifying Quality Control and Testing Agency services.
2. Pertinent sections of other Divisions specifying formwork, reinforcement, concrete, masonry, steel, and rough carpentry.
3. Pertinent Sections of other Divisions specifying work to be embedded in concrete or work penetrating concrete work.

1.2 REFERENCES AND STANDARDS

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 19 Concrete, Chapter 21 Masonry

B. TMS 402 / ACI 530 / ASCE 5 “Building Code Requirements for Masonry Structures”.

C. TMS 602 / ACI 530.1 / ASCE 6 “Specification for Masonry Structures”.

D. ASTM A615 “Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement”.

E. ASTM C90 “Load-Bearing Concrete Masonry Units”.

F. ASTM C144 “Aggregate for Masonry Mortar”.

G. ASTM C270 “Mortar for Unit Masonry”.

H. ASTM C404 “Aggregates for Masonry Grout”.

I. ASTM C476 “Grout for Masonry”.

1.3 SUBMITTALS

A. Submit in accordance with Division 01 specifying submittal procedures. The General Contractor shall review and approve submittals prior to submittal to the Architect/Engineer. Submittals that do not meet these requirements will be returned for correction without review.

B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents.

C. Product Data: Submit manufacturer's product data, specifications, location and installation instructions for proprietary materials and reinforcement accessories. Provide samples of these items upon request.

D. Contractor Submittals:

1. Mix design for all grout and mortar, prepared by a qualified testing laboratory, per TMS 602 section 1.5. Show conformance of mix to proportion specification of ASTM C270 for mortar and ASTM C476 for grout. Alternatively, provide test results and show conformance of mix to property specification of ASTM C270 for mortar and ASTM C476 for grout. Mix shall conform to all requirements herein.
2. Material certificates for all materials used in mixes.
3. Submit shop drawings for all shapes and sizes of concrete unit masonry shown and scheduled on the drawings. Submit shop drawings detailing and locating all masonry reinforcement.
4. Certificate of compliance and test data by concrete unit masonry supplier showing conformance to specified material strengths and properties.
5. Samples: Laid up sections of masonry walls for the Architect's approval of size, texture and color of block, mortar and joint pattern.
6. Layout of vertical control joints in masonry walls coordinated with structural and architectural drawings.
7. Submit cold and/or hot weather construction procedures when ambient temperature is below 40°F or above 90°F. See PART 3.

1.4 QUALITY ASSURANCE

A. For requirements of the Authority Having Jurisdiction, refer to pertinent sections of Division 01 and CBC Chapter 17.

B. All tests shall be performed by an approved Testing Agency as specified in pertinent sections of Division 01.

C. Testing and Inspection: Tests and inspections performed by approved Testing Agency are specified below in Articles SOURCE QUALITY CONTROL and FIELD QUALITY CONTROL and the Testing & Inspection Form. Duties and limitations of approved Testing Agency, test costs and test reports in conformance with pertinent sections of Division 01.

D. General: Provide reports to Architect/Engineer and Authorities Having Jurisdiction (AHJ) indicating results of tests and inspections.

E. Concrete Unit Masonry

1. All testing of concrete unit masonry by the approved Testing Agency shall comply with the requirements of CBC Chapters 17 and 21.
2. Approved Testing Agency shall provide Level 2 Quality Assurance Program per TMS 602 and CBC Chapter 17 by an approved inspector of masonry construction.

F. Contractor shall provide adequate materials for sampling and shall patch core holes made by the approved Testing Agency using non-shrink, high- strength grout.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver and store packaged material in original containers with seals unbroken and labels intact until time of use.

B. Unload masonry units carefully and store on raised platform protected from weather.

C. Protect cementitious materials against exposure to moisture. Use of cementitious or other materials that have become caked and hardened from absorption of moisture will not be permitted.

1.6 JOB CONDITIONS

A. Environmental Conditions: Do not place concrete unit masonry when temperature is below 40 degrees Fahrenheit or above 90 degrees Fahrenheit unless the Contractor provides means for preventing damage due to freezing or high-temperatures before and after placement and the Architect/Engineer approves. See Section PART 3.

B. Protection: Protect surrounding work as required against damage from masonry work. Clean satisfactorily or otherwise correct damage to surrounding work resulting from masonry work. See PART 3.

1.7 SCHEDULING AND SEQUENCING

A. Organize the work and employ shop and field crew(s) of sufficient size to minimize inspections by the approved Testing Agency.

B. Provide schedule and sequence information to approved Testing Agency in writing upon request. Update information as work progresses.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Hollow Load-Bearing Concrete Masonry Units:

1. General: All concrete masonry units shall be double open end wherever possible (single open end otherwise).
2. Concrete masonry units shall be medium or light weight and shall conform to ASTM C90. Minimum compressive strength shall be 2000psi.
3. Concrete masonry units exposed to view shall be 8x8x16 unless otherwise noted on the construction drawings. Concrete masonry caps shall be 2x8x16 (nominal) standard grey unless otherwise noted on the construction drawings.

B. Portland Cement: ASTM C150, Type II, low alkali

C. Aggregates

1. For Mortar: ASTM C144.
2. For Grout: ASTM C404.

D. Hydrated Lime: ASTM C207, Type S

E. Quick Lime: ASTM C5, high calcium

F. Reinforcing Steel: ASTM A615 (or A706) grade 60.

G. Water: Clean and potable, free from impurities detrimental to mortar and grout.

H. Grout Aid: "Grout Aid" by Sika Corporation.

I. High Strength Grout: Conform to CRD-C621 and ASTM C1107. Non-shrink, non-ferrous, minimum compressive strength at 28 days to be 7000 psi (when placed in a fluid state). Meet or exceed BASF "Master Flow 928".

J. Pre-molded Control Joint: ASTM D2000 M2AA-805 rubber shear keys with a minimum durometer hardness of 80 or ASTM D2287 Type PVC 654-4 PVC shear keys with a minimum durometer hardness of 85.

K. Flexible Sealant: ASTM C920.

L. Mortar Color: Submit to Architect for approval.

2.2 FABRICATION

A. Reinforcement: Conform to requirements of Section 03 2000, Concrete Reinforcing.

2.3 MIXES AND MIXING

A. General Mixing Requirements:

1. Measure materials accurately. Shovel measurements will not be permitted.
2. Use mechanical mixer of at least one sack capacity.
3. Mix for minimum of three minutes and in no case less than time required for securing uniform mass and workable consistency.
4. Completely empty drum before charging succeeding batch of materials.
5. Exercise extreme care in measuring ingredients for partial batches.

B. Mortar

1. Type M or S per ASTM C270. Minimum compressive strength at 28 days: 1800 psi (Type S), 2500 psi (Type M). Admixtures not allowed. Otherwise conform to CBC Section 2103.2.1.
2. Use and place mortar in final position within 2-1/2 hours after mixing. Mortars that have stiffened due to evaporation of water may be retempered with water as frequently as required to restore required consistency during this time period.
3. Provide integrally colored mortar to match block. Colors to be submitted to Architect for approval. Add mortar colors in accordance with manufacturer's recommendations. Ensure uniformity of mix and coloration.

C. Concrete Grout

1. General:
   a. Six sacks (94 pounds per sack) of cement per cubic yard minimum. Concrete masonry grout compressive strength to attain 2000 psi minimum after 28 days
   b. One pound "Sika Grout Aid" per sack of cement (6 pounds maximum per cubic yard).
   c. Slump: 8 to 11 inches.
   d. "Coarse" type per TMS.
2. Otherwise conform to CBC Section 2103.3.

2.4 SOURCE QUALITY CONTROL

A. An approved Testing Agency will perform source quality control tests and submit reports, as specified in pertinent section of Division 01 and CBC Chapter 17 and 21.

B. Test materials per CBC Chapter 17 and TMS 602 Section 1.4B unit strength method or prism test method.

PART 3 – EXECUTION

3.1 INSPECTION BY CONTRACTOR

A. Examine areas to receive masonry and verify following per TMS 602:

1. Foundation surface is level to permit bed joint within range of 1/4 to 3/4-inch.
2. Edge is true to line to permit projection of masonry to less than 1/4-inch.
3. Projecting dowels are free from loose scale, dirt, concrete or other bond-inhibiting substances and properly located.
4. Built-in items are properly sized and located.

B. Do not begin work before unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean concrete surfaces to receive masonry. Remove laitance or other foreign material lodged in surface by sandblasting or other means as required. Roughen foundation bed to expose aggregate; remove loose particles and saturate before laying units.

B. Ensure masonry units are clean and free from dust, dirt or other foreign materials before laying.

3.3 REINFORCEMENT

A. Place bars where noted in accordance with drawings and SP-66 "ACI Detailing Manual". Do not disturb after start of masonry placement.

B. Splice bars with dowels cast in concrete; lap bars per drawings. Bars shall not be "stabbed" after grout placement. All reinforcing shall be tied in place with wire prior to grout placement. The use of approved bar spacers is acceptable.

3.4 PLACEMENT

A. General Requirements

1. Masonry construction shall conform with TMS 602.
2. Ensure masonry units are sound, clean and free of cracking at time of placement.
3. Accurately cut and fit units as required using masonry saws to accommodate work of other sections.
4. Lay masonry units plumb, true to line with level courses accurately placed. Maximum tolerance 1/4" in 8'-0".
5. Adjust unit to final position while mortar is soft and plastic.
6. Align vertical cells accurately.
7. Remove units disturbed after stiffening of mortar, clean joints and relay unit with fresh mortar.
8. Do not attach construction supports to walls.
9. Install anchor bolts and other embedded items accurately as work progresses. Use templates as necessary to meet required tolerance of other's work.
10. Brace walls adequately until supporting structure is complete.
11. Do not place conduit, pipes, wire, etc. in cells containing reinforcing steel.

B. Joints:

1. Fill joints; ensure full coverage of face shells in both horizontal and vertical joints and on webs.
2. Tool (concave) and finish joints as specified to achieve solid, smooth, watertight compacted joint.
3. Immediately fill holes made by line pin with mortar when pin is withdrawn.
4. Remove surplus mortar from joints.
5. Provide vertical control joints at 1.5 times the wall height (but not greater than 25'-0") and as detailed on the structural drawings.

C. Cold Weather Requirements

1. When ambient temperature is below 40 degrees Fahrenheit, submit cold weather protection plan per TMS 602 Section 1.8C. Ensure reinforcing, masonry units, etc. contacting mortar and grout are free of frost.

D. Hot Weather Requirements

1. When ambient temperature exceeds 90 degrees, submit hot weather protection plan per TMS 602 Section 1.8D.

E. Protection

1. Protect face materials against staining.
2. Remove misplaced grout or mortar immediately.
3. Protect sills, ledges, off-sets and similar items from mortar drippings or other damage during construction.
4. Cover top of unfinished work to protect it from weather and debris.

F. Concrete Masonry Units

1. Bond: Running bond unless specifically noted otherwise.
2. Joint Thickness: 3/8-inch both vertically and horizontally.
3. Joint Treatment:

a. Typical exterior and interior walls; tool joint for weather tightness.
b. Construction joints to be sealed with joint sealant or high strength grout as noted on the drawings.

4. Use proper units to provide for doors, bond beams lintels, etc. in order to minimize cutting.
5. Do not wet units.
6. Align vertical cells to provide continuous, unobstructed opening for grouting.
7. Corners: Provide standard masonry bond by overlapping units.
8. Provide mechanical cleanout methods as needed. To facilitate cleanout were pour height exceeds 5 feet 4 inches, provide inverted bond beam units at the bottom of each pour and provide cleanouts in these courses as necessary, not exceeding 32 inches on center. Locate cleanouts to minimize visual impact. Verify with Architect/Engineer.

3.5 GROUTING

A. General Requirements

1. Conform to requirements of TMS 602.
2. A pour is defined as the height of grout to be placed in one day. The height of masonry unit placement at the time of grouting shall not exceed the pour height. Masonry shall have cured minimum 4 hours before grout placement. Maximum pour height is 24 feet, or less, as determined by the contractor. Maximum individual lift height is 5 feet 4 inches, or less, as determined by the contractor. Allow time between lifts for initial water loss of grout to occur. Do not allow grout to cure between lifts. Contractor is responsible for adequate cleaning and prevention of blowouts.
3. Grout void between wythes and cells of concrete block.
4. Ensure grout flows into voids and completely surrounds reinforcing steel.
5. Stop grout approximately one and a half inches below top of last course except at top course without a concrete cap.
6. Grout from a non-exposed face of masonry wherever possible.
7. Where necessary to stop longitudinal run, provide suitable dam to retain grout in place.
8. Clean all cells of pour space prior to grouting. Remove all loose mortar, etc.
9. Consolidate grout with a mechanical vibrator with a 3/4" head.
10. Slushing with mortar will not be permitted.
11. Use grout pump, hopper or bucket to place grout.
12. Do not wet down grout spaces prior to grouting.
13. Do not subject masonry to design loads until masonry is completely cured, and until masonry has attained its full specified 28-day compressive strength or until 21 days after placement, whichever is longer.

3.6 FIELD QUALITY CONTROL

A. The approved Testing Agency will perform field quality control tests, as specified in pertinent sections of Division 01 and CBC Chapters 17 and 21.

B. The approved Testing Agency will provide inspections per the requirements of CBC Section 1705.4.

C. Concrete masonry shall have an assumed 28 day prism strength of 2000psi.

3.7 POINTING AND CLEANING

A. Point holes or defective mortar joints upon completion of work; where necessary, cut out and repoint defective joints.

B. At end of workday, fiber brush new surfaces to remove mortar splotches, clean with mild detergent or enzymes, and rinse with clean water.

C. When ordinary methods are not adequate, employ sandblasting, chipping or other special methods.

D. Do not use acid solution to remove green stain or efflorescence resulting from vanadium salts. Follow recommendations of manufacturer for removal of such stains.

E. Clean all surfaces upon completion of erection, leave free of grime and dirt. Remove unused materials, tools, equipment and debris from the premises and leave surfaces broomed clean.

F. Protect work from damage by subsequent operations.

3.8 ADJUSTING

A. Replace all defective work at Contractor's expense.

B. Replace defective or damaged work with conforming work.

C. Architect/Engineer shall review all proposals for the repair or replacement of damaged, defective, or missing work.

D. Contractor to pay expenses incurred by Owner for Architect/Engineer's costs for (re-) design and obtaining approvals of Authorities Having Jurisdiction necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work, as specified in pertinent sections of Division 01.

E. Pay expenses due to re-testing and re-inspection necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work, as specified in pertinent sections of Division 01.

END OF SECTION

SECTION 05 11 00

STRUCTURAL AND MISCELLANEOUS STEEL

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: All labor, materials, equipment and operations required to complete structural and miscellaneous metals in shapes and configurations indicated; including:

1. Structural steel columns, beams, bracing, base plates, bolts, joist hangers, and stud bolts welded to structural steel.
2. Miscellaneous structural steel and connections; fabricated connectors and hangers installed by related sections.
3. Anchor bolts and steel inserts embedded in concrete or masonry, installed by related sections.
4. Fabricated steel items embedded in concrete or masonry installed by related sections.
5. Supervision of anchor bolt setting, leveling and elevations to ensure required fit of steel work.
6. Shop priming and field touch-up, galvanizing.
7. Bracing, Shoring, Fabrication and Erection.

B. Related Sections:

1. Pertinent sections of Division 01 specifying Quality Control and Testing Agency services.
2. Pertinent Sections of other Divisions specifying concrete reinforcement, formwork, concrete, structural and miscellaneous metal fabrications, steel joists, metal decking, cold-formed metal framing, rough carpentry.

1.2 REFERENCES

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 22 Steel.

B. American Institute of Steel Construction (AISC) 303 “Code of Standard Practice for Steel Buildings and Bridges”.

C. AISC 360 “Specification for Structural Steel Buildings”.

D. American Welding Society (AWS) D1.1 “Structural Welding Code - Steel”.

E. Underwriters Laboratories (UL) FRD “Fire Resistance Directory”.

1.3 SUBMITTALS

A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer. Submittals that do not meet these requirements will be returned for correction without review.

B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents.

C. Product Data: Submit manufacturer's product data, specifications, location and installation instructions for proprietary materials and reinforcement accessories. Provide samples of these items upon request.

D. Shop drawings: Submit each building as a complete unit. Do not mix components from multiple buildings or units of work in a submittal. Include all of the following;

1. Profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
2. Fabrication tolerances for all steel.
3. Connections: All, including type and location of shop and field connections.
4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths, type, size, and sequence. Designate demand critical welds.
5. Cross-reference all shop drawing detail references to contract document detail references.
6. Secure all field measurements as necessary to complete this work prior to submitting shop drawings for review.
7. Provide holes, welded studs, etc. as necessary to secure work of other sections.
8. Provide the following as separate submittals for each building or unit of work:
   a. Bolt and anchor setting plans.
   b. Layout, fabrication and erection drawings.

E. Certifications:

1. Steel Materials: Submit the following for identified materials.
   a. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
   b. Mill Test Reports: Indicate structural strength, destructive test analysis, and non-destructive test analysis.
   c. Contractor's affidavit certifying that all identified steel materials provided are of the grades specified and match the certificates supplied.
2. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification per AWS D1.1.

F. Samples: Provide samples to the Testing Agency as specified in Article SOURCE QUALITY CONTROL, at no additional costs.

1.4 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies, refer to pertinent sections of Division 01 and CBC Chapter 17.

B. All tests shall be performed by a recognized testing agency as specified in pertinent sections of Division 01.

C. Certification and Identification of Materials and Uses: Provide Testing Agency with access to fabrication plant to facilitate inspection of steel. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection and all material identification/test information listed below.

1. Test all steel as required by ASTM A6.

2. Provide manufacturer's Mill Test Reports for all materials. Include chemical and physical properties of the material for each heat number manufactured. Tag all fabricated materials with heat number.
3. Provide letter certifying all materials supplied are from heat numbers covered by supplied mill certificates. Include in letter the physical location of each material type and/or heat number in the project (i.e. walls, braced frames etc.).
4. Unidentified Material Tests: Where identification of materials by heat number or mill tests cannot be made, Owner's Testing Agency shall test unidentified materials.
5. Provide all certification, verifications, and other test data required to substantiate specified material properties at no additional cost to the Owner.

D. Testing and Inspection: Tests and Inspections performed by Independent Testing Agency are specified below in Articles SOURCE QUALITY CONTROL and FIELD QUALITY CONTROL. Duties and limitations of Independent Testing Agency, test costs and test reports in conformance with pertinent sections of Division 01.

E. The following standards are the minimum level of quality required. Provide higher quality work as specifically indicated in the Contract Documents.

1. Workmanship and details of structural steel work shall conform to the CBC and AISC 360.
2. The quality of materials and the fabrication of all welded connections shall conform to AWS D1.1.
3. Comply with Section 10 of AISC 303 for architecturally exposed structural steel.

F. The Testing Agency will review all submittals and testing of materials.

G. All re-inspections made necessary by non-conforming work shall be at the Contractor's expense.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to project site in bundles marked with durable tags indicating heat number, mill, member size and length, proposed location in the structure and other information corresponding with markings shown on placement diagrams.

B. Handle and store materials above ground to prevent damage, contamination or accumulation of dirt or rust.

1.6 SCHEDULING AND SEQUENCING

A. Organize the work and employ shop and field crew(s) of sufficient size to minimize inspections by the Testing Agency.

B. Provide schedule and sequence information to Testing Agency in writing upon request. Update information as work progresses.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural Steel W Shapes: ASTM A992 Gr. 50 or ASTM A572 Gr. 50.

B. Structural Steel Plates: ASTM A36 or ASTM A572 Gr. 50 or ASTM A529 Gr. 50

C. Structural Steel Channels, Angles: ASTM A36 or ASTM A572 Gr. 50.

D. HSS (Hollow Structural Sections):

1. Round: ASTM A500, Gr. C.
2. Rectangular or Square: ASTM A500, Gr. C.

E. Pipe: ASTM A53, Grade B.

F. Bolts, Nuts, and Washers: ASTM A307 Grade A machine bolts with ASTM A563 Grade A nuts and ASTM F844 washers to match. See FINISHES section for galvanization, where required.

G. Anchor Bolts/Rods, Nuts, and Washers: ASTM F1554 Gr. 36 or 55 with ASTM A563 Grade A nuts and ASTM F436 Type 1 washers. Grade DH nuts where Grade 105 rod is specified. No upset thread allowed.

H. Arc-Welding Electrodes: AWS Standards E70 or equivalent, except no E70T-4 allowed.

I. Other Welding Materials: AWS D1.1; type required for materials being welded.

J. Welded Headed/Threaded Studs: AWS D1.1 Type B.

K. Deformed Bar Anchors: ASTM A1064.

2.2 ACCESSORIES

A. High Strength Grout: ASTM C1107, non-shrink, premixed compound consisting of aggregate, cement, and water reducing plasticizing agents. Minimum compressive strength f'c = 7000 psi at 28 days, placed in a "fluid" state. Non-metallic where exposed to view. BASF "MasterFlow 928" or equivalent.

B. Building Structural Steel Primers: Comply with local VOC limitations of authorities having jurisdiction and the California Green Building Code. Verify compatibility with finish coats specified in other sections. Follow manufacturers printed instructions. Apply one coat unless otherwise directed.

1. Type A: Self-Crosslinking Hydrophobic Acrylic passing 2000 hours ASTM D4585 and 7000 hours ASTM D5894. "Series 115 Uni-Bond DF" by Tnemec (2.0 to 4.0 mils DFT).
2. Type B: Organic Zinc-Rich Urethane passing 50,000 hours ASTM B117 and 15000 hours ASTM G85. "Series 90-97 Tneme-Zinc" by Tnemec (2.5 to 3.5 mils DFT) or "Series 94-H20 Hydro-Zinc" by Tnemec (2.5 to 3.5 mils DFT).
3. Type C: MIO-Zinc Filled Urethane passing 10,000 hours ASTM B117 and 5000 hours ASTM D4585. "Series 394 PerimePrime" by Tnemec (2.5 to 3.5 mils DFT).

C. Galvanizing: ASTM A153 and A123.

D. Touch-Up Primer for Galvanized Surfaces: Type B primer.

2.3 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Continuously seal built up members by continuous welds where exposed to weather.

C. Fabricate connections for bolt, nut, and washer connectors.

D. Protect all materials, before and after fabrication, from rust, corrosion, dirt, grease, and other foreign matter.

E. Fabricate framing members free from twists or bends. Form holes, cut and sheared edges neatly without kinks, burrs, or warped edges.

F. Exposed Steel: Straight, smooth, free of nicks, scars or dents.

G. Gas Cutting: Gas cutting of holes in a member shall not be permitted.

H. Splicing of members: Members requiring splicing due to length requirements may be spliced using full penetration butt welds when such welds and procedures are inspected and certified by the Testing Agency, in conformance with AWS and AISC standards. The location of splices shall be approved by the Architect/Engineer in writing prior to fabrication.

I. Welding: Welding of structural steel connections shall be performed by qualified welders in accordance with AWS Standards. All weld sizes shall match those shown on the drawings.

1. Preparation: Clean all surfaces free of rust, paint and all foreign matter. Remove paint or scale by brushing, chipping or hammering as required. Chip clean and wire brush burned or flame cut edges before welding. Space and alternate welds, clamping as necessary to prevent warp or misalignment.
2. Sequence Welding: When welds enclose, or partially enclose, the perimeter or portion of the surface of a member, make weld bead in sequence, or staggered. Minimize internal stresses. Weld groups of members occurring in a single line in staggered sequence to minimize distortion of the structural frame.
3. Faulty and Defective Welding: Welds failing to meet AWS standards and the Contract Documents shall be rejected and remade at Contractor expense. All welds showing cracks, slag inclusion, lack of fusion, bad undercut or other defects, ascertained by visual or other means of inspection shall be removed and replaced with conforming work.
4. Minimum Weld Strengths: All welds shall match the minimum weld sizes recommended by AISC. Details of fabrication not specifically shown shall match similar details which are specifically shown. All bevel and groove welds shall be full penetration unless size is noted otherwise.
5. Threaded studs, headed studs, and deformed bar anchors shall be full-fusion welded conforming to ASW D1.1.

J. Camber: Fabricate all beams cambered as indicated on the drawings.

1. Fabricate beams without camber for installation with any "natural" crown up.
2. Exception: Fabricate cantilever beams with "crown" down.

K. Grinding: Grind smooth the following structural steel and connections;

1. Exposed cut ends of structural and fabricated shapes.
2. All welds exposed to view.
3. Mitered and fit-up corners and intersections.

L. Back-Up Bars: Required for all complete penetration welds.

M. Bolt Holes: Edge, end distances and spacing shall conform to dimensions shown on the drawings, and as follows;

1. Round: Size indicated and 1/16 inch maximum oversize, except 1 inch and larger bolts may have 1/8 inch maximum oversize.
2. Slotted: At locations specifically noted on the drawings, provide size indicated and 1/16 inch by 1/4 inch oversize slotted in direction perpendicular to applied loads.
3. Holes in base plates for anchor bolts may be 1/8 inch oversize.

N. Comply with Section 10 of AISC 303 for architecturally exposed structural steel (AESS). See architectural & structural drawings for locations of AESS.

2.4 FINISHES

A. Steel exposed to inclement atmospheric conditions or weather (such as coastal moisture or seasonal rain) shall be sufficiently primed or otherwise protected against corrosion. If condition of steel is suspect due to weathering/corrosion, Contractor shall bear cost of inspection to determine if excessive corrosion is present and if steel member(s) requires repair or replacement. Contractor shall bear cost of repair or replacement.

B. Prepare and finish structural and miscellaneous steel component surfaces as follows, unless a higher standard-of-care is determined necessary per item A:

1. Unpainted, interior, dry exposure surfaces need not be primed.
2. Finished painted, interior, dry exposure surfaces:
   a. Surface Preparation: SSPC-SP2 Hand-Tool and/or SP3 Power-Tool Cleaning. Apply Primer Type A. Field touchup with same primer.
   b. Where jobsite exposure is expected to exceed 6 months, SSPC-SP6 / NACE No. 3 Commercial Blast-Cleaning is required. Apply Primer Type B or C. Field touchup with same primer.
3. Finish painted surfaces with exterior exposure, interior exposure subject to wet conditions or fumes, or surfaces to receive high performance finish coatings (for example epoxy or urethane coatings.
   a. Surface Preparation: SSPC-SP6 / NACE No. 3 Commercial Blast-Cleaning to create a dense, uniform angular surface profile of 2.0 mils minimum. For severe (immersion) exposure, SSPC-SP10 / NACE No. 2 Near-White Blast-Cleaning is required.
   b. Apply Primer Type B. Field touchup with same primer.
4. Surfaces to be fire proofed need not be primed unless required by the fireproofing manufacturer or if jobsite exposure is expected to be inclement per item A. Where unprimed steel is to receive fireproofing, prepare steel surface as required by fireproofing manufacturer. If fireproofed surfaces are to be primed, provide primer as follows:
   a. Surface Preparation: SSPC-SP3 Power-Tool Cleaning.
   b. Apply Primer Type C. Field touchup with same primer.
5. Exterior exposed (unpainted) surfaces and as otherwise indicated to receive galvanizing:
   a. Galvanize per ASTM A123 Class 55 minimum. Passivation agents are

not permitted on galvanized metal that is to be painted. Provide vent holes per ASTM A385 at closed sections (such as HSS). Submit proposed location of vent holes for review by Engineer.

b. Connection hardware shall be hot-dip galvanized per ASTM A153 or F2329. Mating bolts and nuts shall receive the same zinc-coating process.

c. Repair all uncoated, damaged, or altered galvanized surfaces per ASTM A780.

C. Do not prime the following surfaces unless otherwise indicated:

1. Connections to be field welded.
2. Steel in contact with concrete.
3. Surfaces to receive welded metal decking.

D. Do not cover up work with finish materials until inspection is complete and work is approved by the Testing Agency.

2.5 SOURCE QUALITY CONTROL

A. An independent Testing Agency will perform source quality control tests and submit reports, as specified in pertinent sections of Division 01.

B. Steel Materials Testing:

1. No testing is required for materials identified in accordance with CBC 2202.1 (heat number, grade stencil, etc.).
2. Unidentified steel- General: Test all structural shapes. In addition, test to verify Fy and Fu values when engineering requirements exceed Fy = 25 ksi for design.

C. Shop Welding Inspection:

1. Testing Agency shall inspect and certify all structural welds, unless the fabricating shop has been accredited in conformance with CBC requirements. Submit certification to the Architect/Engineer for review and the Building Official for approval.
2. Welder Qualifications: Welding inspector shall verify that all the welders are properly qualified prior to steel fabrication and state the qualifications of each welder in the welding inspection report.
3. Welding Inspection: Continuous inspection required unless otherwise noted below. Comply with requirements of AWS D1.1.
   a. Welding Inspector shall check all welds, materials, equipment and procedures.
   b. Welding Inspector shall provide reports certifying the welding is as required and has been done in conformity with the plans, specifications and codes.
   c. Welding Inspector shall use radiographic, ultrasonic, magnetic particle, or any other necessary aid to visual inspection to assure adequacy of welds.
4. Periodic Inspection Acceptable:
   a. Single pass fillet welds not exceeding 5/16 inch.

D. Bolts, Nuts, and Washers: Provide samples to Testing Agency for required testing, at no additional cost.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.2 ERECTION

A. Erect structural steel in compliance with AISC 303.

B. Framing:

1. Erect all structural steel true and plumb.
2. Verify proper final alignment prior to making final connections.

C. Field Connections:

1. Workmanship of field bolted and welded connections shall conform in all respects to methods and tolerances specified for fabrication.
2. Field weld components indicated on shop drawings. Sequence field welds to minimize built-up stress and distortion of the structural frame. Verify sequence with Engineer. Coordinate field welding schedule with Testing Laboratory.
3. Welded Studs: Install in accordance with manufacturer's instructions and structural welding code AWS D1.1.

D. Templates: Provide bolt setting templates for all anchor bolts. Provide instructions for the setting of anchors and bearing plates, verify these items are set correctly as work progresses.

E. Column base plates: Set level to correct elevations, support temporarily on steel wedges, shims, or leveling nuts where shown, until the supported members are plumbed and base plate is grouted.

1. Grout solid the full bearing area under base plates prior to installation of floor and/or roof decks.
2. Comply with manufacturer's instructions for high strength grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees, or form edges vertical 1in-2in away from base plate edges. Top of grout outside of base plate footprint shall not extend higher than bottom of base plate.

F. Bolting:

1. Inspect mating surfaces to ensure that bolt head and nut will have full bearing and that metal plies will mate flush between bolts.
2. Install bolts in matching holes. Do not distort metal or enlarge holes by drifting during assembly. Remake mismatched components to achieve tolerances indicated.
3. Holes mismatched in excess of 1/8 inch will be rejected.
4. Holes mismatched less than 1/8 inch may be reamed to the next larger size bolt.
5. Do not enlarge holes by flame cutting or air/arc (“plasma“) cutting.
6. Provide flat washer(s) at over-size holes.
7. Provide washer at bolt head and nut where connected part is less than ¼ inch thick.
8. Provide ASTM F436 beveled washers when the slope of the surfaces of parts in

contact with the bolt head or nut is greater than 1:20.
9. Do not install bolts with damaged threads.
10. Threads shall commence outside of the shear plane.
11. Machine Bolts (MB): Install and tighten to a snug condition (ST) such that laminated surfaces bear fully on one another, using an impact wrench or "full effort" of an installer using a standard spud wrench.

G. Supports, Shoring and Bracing: Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing. Conform to requirements of all applicable laws and governing safety regulations. Resist imposed loads, including those of stored materials and equipment.

1. Provide all temporary supports, shoring and bracing necessary to achieve work of tolerances indicated.
2. Provide all necessary temporary flooring, planking and scaffolding required for erection of steel, and support of erection machinery.
3. Construction Loading: Do not overload the structure or temporary supports with stored materials, equipment or other loads.
4. Maintain temporary bracing and shoring until work is complete, and longer as required to ensure stability and safety of structure.

H. Do not make final connections until structure is aligned to meet specified tolerances.

3.3 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

A. The independent Testing Agency will perform field quality control tests, as specified in pertinent sections of Division 01.

B. Field Welding Inspection: Conform to all requirements of section SOURCE QUALITY CONTROL.

1. Inspect mating surfaces.
2. Test all materials prior to use. Use only materials meeting specified requirements.

3.5 ADJUSTING

A. Touch-up damaged finishes with compatible specified primer.

B. Replace defective or damaged work with conforming work. Replace all defective work at Contractor's expense.

C. Straighten materials by means that will not injure the materials.

D. Replace defective or damaged work which cannot be corrected in the field with new work, or return defective items to the shop for repair.

E. Architect/Engineer shall review all proposals for the repair or replacement of damaged,

defective, or missing work.

F. Pay expenses incurred by Owner for Architect/Engineer's costs for (re-)design and obtaining approvals of Authorities Having Jurisdiction (AHJ) necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work, as specified in pertinent sections of Division 01.

G. Pay expenses due to re-testing and re-inspection necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work, as specified in pertinent sections of Division 01.

3.6 CLEANING AND PROTECTION

A. Clean all surfaces upon completion of erection; leave free of grime and dirt. Remove unused materials, tools, equipment and debris from the premises and leave surfaces broomed clean.

B. Protect work from damage by subsequent operations.

END OF SECTION

SECTION 05 40 00

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. All design and other services, material, labor and equipment as necessary for the fabrication, erection and completion of all cold formed metal framing including all bracing and shoring required for erection, miscellaneous metal, and related work.

B. Related Sections:

1. Pertinent Sections of Division 01 Specifying Quality Control and Testing Agency Sections
2. Pertinent Sections of Division 05 Specifying Structural Steel.

1.2 REFERENCE STANDARDS

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 22 Steel.

B. American Iron and Steel Institute (AISI) S100 "North American Specification for the Design of Cold-Formed Steel Structural Members".

C. AISI S200 "North American Standard for Cold-Formed Steel Framing – General Provisions".

D. AISI D100 "Cold-Formed Steel Design Manual.

E. American Welding Society (AWS) D1.3 "Structural Welding Code – Sheet Steel"

F. American Society for Testing and Materials (ASTM):

1. ASTM A307 "Stand Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength".
2. ASTM A606 "Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance".
3. ASTM A653 "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process".
4. ASTM A780 "Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings".
5. ASTM A1003 "Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members".
6. ASTM A1008 "Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable".

7. ASTM A1011 “Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength”.
8. ASTM C645 “Standard Specification for Nonstructural Steel Framing Members”.
9. ASTM C754 “Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products”.
10. ASTM C955 “Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases”.
11. ASTM C1007 “Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories”.
12. ASTM C1513 “Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections”.

G. The Society for Protective Coatings (SSPC) SSPC-Paint20 “Zinc-Rich Coating (Inorganic or Organic)”.

H. National Institute of Standards and Technology (NIST) / Engineered Wood Association (APA) “PS 1 - Voluntary Product Standard for Structural Plywood”.

I. NIST / APA “PS 2 - Performance Standard for Wood-Based Structural-Use Panels”.

1.3 SUBMITTALS

A. Manufacturer's Literature:

1. Descriptive data illustrating cold-formed framing system components including framing members, fasteners, and accessories, including ICC-ES reports.
2. Erection instructions containing sequence of operations.

B. Samples: Provide adequate samples of unidentified material to the Owner's Testing Laboratory for testing purposes.

1.4 QUALITY ASSURANCE

A. Erector Qualifications:

1. Minimum of three years successful experience on comparable cold-formed metal framing projects.
2. Welders qualified in accordance AWS D1.3.

B. Cold form carbon and low alloy steel used for structural purposes shall be identified per CBC Section 2202.1.

C. Welding inspections shall conform to AWS D1.3 and CBC 1705.2.

D. Wood product quality standards:
1. All wood products to comply with article REFERENCES.
2. Factory-mark each piece of sheathing with type, grade, mill, and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.
3. Sheathing panels to be marked by APA (The Engineered Wood Association).

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent requirements of Division 01.

B. Delivery: Time delivery and installation of carpentry products to avoid delaying other trades whose work is dependent on or affected by this section and to comply with moisture content, protection and storage requirements.

C. Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and sheathing panels to prevent deformation and provide air circulation within stacks.
   1. Store materials for which a maximum moisture content is specified only in areas where relative humidity has been reduced to a level where specified moisture content can be maintained.
   2. Handle and store materials above ground to prevent damage, contamination, or accumulation of dirt or foreign materials.

D. Provide special protection for horizontal sheathing panels. Deformation of panels due to moisture is not acceptable.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel Framing System:

   1. All stud and/or joist framing members shall be of the type & size as shown on the plans and reviewed shop drawings. Framing member section properties (thickness, dimensions, area, section modulus, and moment of inertia) shall match those per AISI D100 unless noted otherwise on drawings.
   2. All runner and end tracks, bridging, and non-load bearing studs shall be of the type & size shown on the plans.
   3. All studs, joists, and tracks 54 mils or greater in thickness shall be formed from steel that corresponds to the requirements of ASTM A1003 (Grade ST50H or ST50L) with a minimum yield of 50,000 psi.
   4. All studs, joists, track, bridging, U-channel, (hat) furring (F) channels, and accessories 43 mils or thinner in thickness shall be formed from steel that corresponds to the requirements of ASTM A1003 (Grade ST33H or ST33L) with a minimum yield of 33,000 psi.
   5. All stud and joist components shall be formed from steel having a minimum G-60 galvanized coating (equivalent coatings such as “G60e” are not acceptable), unless noted otherwise, or shall be primed with paint meeting the performance requirements SSPC-Paint20, where noted.
   6. Welding Electrodes: Shall conform to AWS D1.3. E60 or E70. Touch up all welds with zinc-rich paint in compliance with ASTM A780.
   7. Primer: SSPC-Paint20.

B. Screws shall be per ASTM C1513.

C. Machine bolts shall be per ASTM A307.

D. Power Actuated Fasteners (PAF): Hilti X-U, ICC ESR-2269. For use only where specified by the drawings.

E. Accessories: Cold-formed metal framing manufacturer's standard.

F. Structural Sheathing Panels:

1. Plywood: Structural sheathing shall conform to product standard PS-1 or PS-2. All panels shall have a minimum bond classification of “Exposure 1” and bear the trademark of the Engineered Wood Association (APA) or other qualified agency. Grades shall be “Rated Sheathing” or “Structural 1” as required on the drawings.

G. Oriented Strand Board (OSB): All structural OSB shall be grade marked by a qualified agency for conformance with Product Standard PS-2 and shall be fabricated with exterior glue. Grades shall be as required on the drawings.

2.2 FABRICATION

A. Form members to manufacturer's standard shapes meeting design criteria.

B. Cut right angle connections of framing components to fit squarely against abutting members.

C. Prime un-galvanized steel to 1.5 mil (0.038) minimum dry film thickness.

PART 3 - EXECUTION

3.1 ERECTION

A. Clean surfaces that will be in contact after assembly.

B. Position members plumb, square and true to line.

C. Seat studs squarely in track with stud web and flange abutting track web with maximum 1/8 inch gap.

D. Connect members together by welding and/or fasteners in accordance with the drawings.

E. Do not splice studs. Provide "headers" and "trim studs" at openings as required. Studs shall be securely attached to tracks at all exterior walls except as noted below.

F. Provide for expansion and contraction between floors at solid wall sections of two stories or more by providing a slip joint between stud and track at one end. This connection shall be capable of transmitting lateral loads to the structure.

G. Provide and install bridging, fire blocking, etc. per manufacturer's recommendations, the plans, and code requirements.

H. Perform welding in accordance with AWS D1.3

I. Remove erection bolts and screws used in welded construction.

J. Do not use gas cutting for field correction of fabrication without concurrence of Architect/Engineer.

K. Touch-up field connections and breaks in shop coating with same primer used for shop priming.

3.2 STRUCTURAL SHEATHING

A. General:

1. Sheathing screwing shall be as required on the drawings. Do not overdrive (Do not break skin of sheathing face sheet). Over driving will be cause for rejection.

B. Roof and Floor Sheathing: lay with face grain perpendicular to roof rafters, roof trusses or floor joists. Stagger sheets. Block all unsupported sheet edges with 54 mils material unless noted otherwise.

C. Wall Sheathing: Lay with face grain either parallel or perpendicular to studs. Exposed bottom edges shall be sealed as recommended by manufacturer. Block all unsupported sheet edges with 54 mils materials unless noted otherwise.

3.3 DEFECTIVE WORK AND MATERIALS

A. Work found to be defective, missing or damaged shall be immediately replaced with proper work. Such replaced work and the inspection for same shall be at the expense of the Contractor.

B. Straightening of any materials, if necessary, shall be done by a process and in a manner that will not injure the materials, and which is approved by the Architect. Sharp kinks or bends shall be cause for rejection. Heating will not be allowed.

C. If defects or damaged work cannot be corrected in the field, the material shall be returned to the shop or new parts furnished, as the Architect directs; the Contractor shall replace all work at his own expense.

3.4 CLEANING

A. After erection, all surfaces shall be cleaned and left free of all grime and dirt. Remove unused materials, tools, equipment and debris from the premises and leave broom clean.

END OF SECTION

SECTION 05 52 00

METAL RAILINGS AND HANDRAILS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Stainless steel tube handrails, balusters, and fittings.

1.2 REFERENCES

A. 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design.

B. ASTM A36 - Specifications for Structural Steel.

C. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

D. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

E. ASTM A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

F. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.

G. ASTM B429 - Aluminum-Alloy Extruded Structural Pipe and Tube.

H. ASTM E985 - Permanent Metal Railing Systems and Rails for Buildings.

I. AWS D1.1 - Structural Welding Code - Steel.

J. AWS D1.2 - Structural Welding Code - Aluminum.

K. AWS D1.6 - Structural Welding Code - Stainless Steel.

L. NAAMM - Metal Finishes Manual.

M. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.

N. SSPC - The Society for Protective Coatings.

1.3 DESIGN REQUIREMENTS

A. Design, engineer, fabricate and install railing assembly, wall rails, and attachments to resist force of 200 lbs applied in any direction at any point on the rail without damage or permanent set.

B. Conform to CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 2 and the 2010 ADA Standards for Accessible Design for accessibility requirements.

C. Fabricate railing assembly, wall rails, and attachments to ASTM E985 requirements.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

1.5 REGULATORY REQUIREMENTS

A. Railings and Handrails: CBC Section 11B-505

1. Top of gripping surfaces of handrails shall be 34" minimum and 38" maximum vertically above walking surfaces, stair nosings, and ramp surfaces. Handrails shall be at a consistent height above such surfaces.

2. Clearance between handrail gripping surfaces and adjacent surfaces shall be 1 1/2" minimum. Handrail may be located in a recess if the recess is 3" maximum deep and 18" minimum clear above the top of the handrail.

3. Handrail gripping surfaces shall be continuous along their length and shall not be obstructed along their tops or sides. The bottoms of handrail gripping surfaces shall not be obstructed for more than 20% of their length. Where provided, horizontal projections shall occur 1 1/2" minimum below the bottom of the handrail gripping surfaces.

4. Handrail gripping surfaces with a circular cross section shall have an outside diameter of 1 1/4" minimum and 2" maximum.

5. Handrail gripping surfaces with a non-circular cross section shall have an outside dimension of 4" minimum and 6 1/4" maximum, and a cross-sectional dimension of 2 1/4" maximum.

6. Handrail gripping surfaces and any surfaces adjacent to them shall be free of sharp or abrasive elements and shall have rounded edges.

7. Handrails shall not rotate within their fittings.

8. Handrail gripping surfaces shall extend beyond and in the same direction of stair flights and ramp runs in accordance with CBC Section 11B-505.10. Such extensions are not required for continuous handrails at the inside turn of switchback or dogleg stairs and ramps.

9. The orientation of at least one handrail shall be in the direction of the stair run, perpendicular to the direction of the stair nosing, and shall not reduce the minimum required width of the stair. CBC Section 11B-505.2.1.

10. A 2" minimum high curb or barrier shall be provided to prevent the passage of a 4" diameter sphere rolling off the edges on a ramp or landing surface. Such a curb or barrier shall be continuous and uninterrupted along the length of a ramp. CBC Section 11B-405.9.2.

1.6 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on Drawings.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Craneveyor Corp., www.craneveyor.com.

B. HDI, Inc., www.hdirailings.com.

C. Julius Blum & Co., Inc., www.juliusblum.com

D. P & P Artec, www.artec-rail.com.

E, Tubular Specialties Mfg. Inc., www.calltsm.com.

F. Substitutions: Under provisions of Section 01 25 00.

2.2 STEEL HANDRAILS

A. Handrails: ASTM A500, Grade B, 1-1/2" diameter steel rails, continuous or welded smooth joints, with steel brackets for wall mounting.

B. See drawings for locations and configuration. Conform to CBC handrail requirements.

2.3 STEEL RAILING SYSTEM

A. Rails and Posts: ASTM A500, Grade B, 1-1/2 inch diameter steel tubing, 3/16 inch wall thickness, welded joints with steel brackets for embedding into existing wall.

B. Structural Plates, Shapes, and Bars: ASTM A36.

C. Fittings: Elbows, T-shapes, flanges, escutcheons; machined steel.

D. Wall Brackets: Julius Blum No. 1378, www.juliusblum.com.

E. Splice Connectors: Steel welding collars.

F. Welding Materials: AWS D1.1.

2.4 FABRICATION

A. Fit and shop assemble components in largest practical sizes, for delivery to site.

B. Fabricate components with joints tightly fitted and secured.

C. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

E. Continuously seal joined pieces by continuous welds in accordance with AWS requirements.

F. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

G. Accurately form components to suit stairs and landings, to each other and to building structure.

2.5 FINISHES

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Do not prime surfaces in direct contact with concrete or where field welding is required.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of installation means erector accepts existing conditions.

3.2 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete and embedded in masonry with setting templates, to appropriate Sections.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install components plumb and level, accurately fitted, free from distortion or defects.

C. Provide anchors required for connecting railings to structure. Anchor railing to structure.

D. Field weld anchors as indicated on Drawings. Grind welds smooth. Touch-up welds with primer.

E. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

F. Install wall mounted handrail brackets to bottom of handrail.

G. Install wall mounted handrails with a 1-1/2 inch space between wall and inside face of handrail.

H. Extend handrail at top of stairs a minimum of 1'-0" past face of riser. Extend handrail at bottom of stairs a minimum distance of 1'-0" plus depth of one stair tread. The 1'-0" handrail extensions to be level and parallel with the landing surface.

I. Extend handrails at top and bottom of ramps a minimum of 1'-0". The 1'-0" handrail extensions to be level and parallel with the landing surface.

END OF SECTION

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: All labor, materials and equipment and all operations required to complete all rough carpentry and structural framing as indicated on the drawings; to produce shapes and configurations as shown, as required; and as specified herein, including:

1. Structural floor, wall, and roof framing.
2. Floor, wall, and roof sheathing.
3. Rough hardware, framing connectors and fasteners.
4. Treatment of wood.
5. Concealed wood blocking for support of toilet and bath accessories, wall cabinets, wood trim, and other work requiring supporting blocking.
6. Miscellaneous wood nailers and furring strips, including roof applications, other wood framing, furring, shims or blocking as required to complete the work.

B. Related Sections:

1. Pertinent sections of Division 01 specifying Quality Control and Testing Agency services.
2. Pertinent sections of Division 01 specifying Structural Product Requirements: Structural Product Options, Substitution procedures and limitations, transportation, handling and storage.
3. Pertinent sections of Division 03 specifying wood formwork construction and/or setting anchors in concrete.
4. Pertinent section of Division 06 specifying wood construction and materials.
5. Pertinent sections of other divisions specifying steel or concrete construction.

1.2 REFERENCES

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 23 Wood.

B. American National Standards Institute (ANSI) / American Wood Council (AWC) "NDS - National Design Specification for Wood Construction".

C. National Institute of Standards and Technology (NIST) / Engineered Wood Association (APA) "PS 1 - Voluntary Product Standard for Structural Plywood".

D. NIST / APA "PS 2 - Performance Standard for Wood-Based Structural-Use Panels".

E. NIST "PS 20 - American Softwood Lumber Standard".

F. Redwood Inspection Bureau (RIS) "Standard Specifications for Grades of California Redwood Lumber".

G. West Coast Lumber Inspection Bureau (WCLIB) "Standard Grading Rules for West Coast Lumber No. 17".

H. Western Wood Products Association (WWPA) "Western Lumber Grading Rules".

I. American Wood Preservers Association (AWPA) "Book of Standards".

1.3 SUBMITTALS

A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. Submit for review prior to fabrication. Submittals that do not meet these requirements will be returned for correction without review.

1. Substitutions for products specified require conformance to substitution requirements in Division 01.
2. Review of materials and hardware for substitution to products specified is at the additional expense of the Contractor.

B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer.

C. Product Data:

1. Submit manufacturer's product data, specifications, and installation instructions for & location of framing connectors, wood preservative materials, application instructions, and fasteners. Include complete, accurate equivalence data when submitting alternate products to those specified. Provide samples of these items upon request.
2. Submit product data and current ICC-ES report for machine-driven nails, fasteners, and equipment, including dimensions of all fasteners, including head, shank diameter and length.

D. Shop drawings: For manufactured wood products, submit each building as a complete unit. Do not mix components from multiple buildings or units of work in a submittal. Include all of the following;

1. Indicate profiles, sizes, and spacing locations of structural members.
2. Cross-reference all shop drawing detail references to contract document detail references.
3. Secure all field measurements as necessary to complete this work.

E. Manufacturer's Certificate: Submit all certifications of physical and chemical properties of materials as specified below in Article titled QUALITY ASSURANCE.

1. Certify that wood products supplied for rough carpentry meet or exceed specified requirements, including specified moisture content.

1.4 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies, refer to pertinent sections of Division 01 and CBC Chapter 17.

B. All tests shall be performed by a recognized testing agency as specified in pertinent sections of Division 01.

C. Inspection of fabricators is required per CBC 1704.2.5 unless fabricator is registered and approved by the building official. Wood product quality standards:

1. All wood products to comply with article REFERENCES.
2. Factory-mark each piece of lumber and sheathing with type, grade, mill, and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.
3. Sheathing panels to be marked by APA (The Engineered Wood Association).

D. End-Jointed lumber shall not be used.

E. Hardware and engineered wood products shall have current ICC ES Evaluation/research reports that are equivalent to products specified.

F. Employ competent workers experienced in work of the types specified and required.

1.5 DELIVERY, STORAGE AND HANDLING

A. Comply with pertinent requirements of Division 01.

B. Delivery: Time delivery and installation of carpentry products to avoid delaying other trades whose work is dependent on or affected by this section and to comply with moisture content, protection and storage requirements.

C. Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and sheathing panels to prevent deformation and provide air circulation within stacks.

1. Store materials for which a maximum moisture content is specified only in areas where relative humidity has been reduced to a level where specified moisture content can be maintained.
2. Handle and store materials above ground to prevent damage, contamination, or accumulation of dirt or foreign materials.
3. Provide special protection for horizontal sheathing panels. Deformation of panels due to moisture is not acceptable.

1.6 PROJECT/SITE CONDITIONS

A. Verify all conditions at project site affecting the work; work to field dimensions as required. Coordinate carpentry installation with size, location, and installation of service utilities.

B. Sequence rough carpentry installation activities to allow sufficient time for:

1. Review of all submittals.
2. Indicate submittal review, procurement, and testing activities in the project schedule prior to the start of installation. Installation durations shall be based on hand-nailed installation methods specified.
3. Attainment of specified maximum lumber moisture content.

PART 2 - PRODUCTS

2.1 DIMENSIONED LUMBER

A. General

1. Size per industry standards for nominal sizes shown; S4S (sanded four sides).
2. Warped/twisted and excessively checked members shall not be used regardless of grade marks.
3. At the Contractor's option, engineered lumber of equivalent size and material properties may be substituted for solid sawn lumber where material is difficult to source due to length, availability, etc. Submit proposed substitution to Engineer for review prior to purchasing materials.

B. Moisture content of framing:

1. All lumber to be maximum 19% at time of fastener installation. All lumber to be maximum 19% at time of close-in, unless noted otherwise.
2. The Owner's Testing Laboratory will test for moisture content prior to commencement of close-in.
3. The Contractor shall recognize that excessive shrinkage of lumber results from excess moisture content at the time of installation. The Contractor will compensate for use of such lumber by waiting for acceptable moisture content before close in and/or by replacing/repairing lumber that has sagged, twisted, or warped prior to close in.
4. Deviation from this specification would require structural redesign of connections and fasteners.

C. Sills/ledgers on concrete or masonry: No. 2 pressure treated Douglas Fir and as called for on the drawings.

D. Interior structural framing shall be Douglas Fir (D.F.) with grades as noted below, unless otherwise specified on the drawings. All grades are per WCLIB standard grading rules.

1. All permanently exposed (interior or protected from weather) framing shall be select structural grade with no box heart.
2. Except per 1 above, unless noted otherwise, minimum grades are:
   a. Floor/roof joists/rafters (2x) and 2x8 & larger studs: D.F. No. 2
   b. 2x4 and 2x6 studs and plates: D.F. No. 2
   c. 4x and larger: D.F. No. 1
   d. Blocking: D.F. No. 2
   e. 6x8 and larger posts and beams may be SGL/CGL per below unless noted otherwise on the drawings.

E. Exterior structural framing (exposed to weather) shall be redwood select structural grade or pressure treated D.F. No. 1, unless noted otherwise.

F. Structural decking shall be D.F. select decking or White Pine select where not exposed to moisture. Where directly exposed to moisture or high humidity for prolonged periods of time, decking shall be Alaskan Yellow Cedar or Port Orford Cedar. Moisture content at time of installation to be less than 12%.

G. Framing not otherwise shown or specified: Douglas Fir construction grade per WCLIB paragraphs applicable to uses and sizes required.

2.2 MANUFACTURED LUMBER

A. Structural (Certified) Glued Lumber (SGL): SGL shall be manufactured following the American Lumber Standards Committee (ALSC) "Glued Lumber Policy" and meet the requirements of Voluntary Product Standard PS 20 "American Softwood Lumber Standard". Grading shall be per the West Coast Lumber Inspection Bureau (WCLIB) or Western Wood Products Association (WWPA). SGL shall be manufactured with waterproof adhesive. "Stud use only" SGL is not permitted.

1. Acceptable products:
   a. "RMT" by Rosboro.
   b. Approved equal.
2. Where specified for use on plan, SGL shall be entirely Douglas Fir lumber. SGL shall be grademarked to match the grade as would be specified for solid sawn lumber in the same location/use.
3. At the contractor's option, SGL may be substituted for solid sawn lumber. SGL species and grade shall match that for the solid sawn member. SGL shall not be substituted for glued-laminated (glulam) members.

B. Laminated Veneer Lumber (LVL): for use as joists, beams, blocking, or studs when so noted on the drawings. Conform to ICC AC 47. Minimum F_b = 2,600 PSI. Minimum E=2,000,000 PSI. Acceptable products:

1. "Microllam LVL" by Trus Joist, ICC ESR-1387
2. "Redlam LVL" by RedBuilt, ICC ESR-2993
3. Approved equal

C. Laminated Strand Lumber (LSL): for use as blocking (flat or vertical) or rim joist when used with I-joist or LVL, when so noted on the drawings. Conform to ICC AC 124. Minimum F_b = 1,700 PSI. Minimum E=1,300,000 PSI. Acceptable products:

1. "Timberstrand LSL" by Trus Joist, ICC ESR-1387
2. "Redlam LSL" by Redbuilt, ICC ESR-1387
3. Approved equal

D. Parallel Strand Lumber (PSL): for use as beams and posts when so noted on the drawings. Conform to ICC AC 47. Minimum material properties for beams: E = 2,200,000 psi; F_b = 2,900 psi; F_c = 2,900 psi (parallel); F_v = 290 psi. Minimum material properties for posts: E = 1,800,000 psi; F_b = 2,400 psi; F_c = 2,500 psi (parallel); F_v = 190 psi. Acceptable products:

1. "Parallam PSL" by Trus Joist, ICC ESR-1387
2. Approved equal

2.3 STRUCTURAL SHEATHING PANELS

A. Plywood: Structural sheathing shall conform to product standard PS-1 or PS-2. All panels shall have a minimum bond classification of "Exposure 1" and bear the trademark of the Engineered Wood Association (APA) or other qualified agency. Grades shall be "Rated Sheathing" or "Structural 1" as required on the drawings.

B. Oriented Strand Board (OSB): All structural OSB shall be grade marked by a qualified agency for conformance with Product Standard PS-2 and shall be fabricated with exterior glue. Grades shall be as required on the drawings.

2.4 TREATED WOOD:

A. Treated Lumber and Plywood: Comply with requirements of AWPA Standard U1. See Standard U1 for "Use Category" designations. Do not provide higher Use Category lumber than that specified. Maximum moisture content shall be the same as required for "dimensioned lumber" as specified above.

B. Preservative Treated Lumber

1. General
   a. Preservatives shall be waterborne. Preservative retention rate shall be as required per AWPA Standards U1 & T1. Lumber shall be Douglas Fir No. 2 (or better). Cut faces of treated wood shall be brush treated (two complete applications) prior to installation.
   b. Lumber less than 8 inches above grade and lumber less than 6 inches above exterior hard-surface flatwork shall be treated.
   c. Each piece of wood shall be stamped by the wood preservative applicator to identify its treatment and preservative retention.
2. Lumber at interior, non-weather exposed locations installed adjacent to concrete or masonry shall be Use Category UC2. Examples include sill plates & ledgers and lumber in contact with roofing, flashing, or water proofing. Borate treated lumber meeting AWPA UC2 is acceptable in this application.
3. Lumber at exterior locations, not in contact with soil/ground, shall be Use Category UC3B. Examples include Douglas Fir decking and deck framing.
4. Lumber in contact with soil/ground shall be Use Category UC4A. Examples include timber retaining walls.
5. Poles, posts, and sheathing panels shall be treated as recommended by AWPA Standard U1 per use and exposure.
6. Maximum Volatile Organic Compound (VOC) content of field-applied preservative shall meet local air quality standards and the California Green Building Code. Provide either of the following:
   a. Copper Azole (CA-B) per ICC-ES AC326.
   b. Alkaline/Copper/Quaternary (ACQ).

C. Fire Retardant Treatment: Product and application process must be recommended by manufacturer of treatment as being suitable for painting. Application shall be by a California State Fire Marshal approved licensed contractor.

1. Exterior Type: Use Category UCFB, chemically treated, and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
   a. Treat exposed exterior rough carpentry items, including stairways, balconies, and covered walkways.
   b. Do not use treated wood in direct contact with the ground.

2. Interior Type: Use Category UCFA, low temperature (low hygroscopic) type, chemically treated, and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
   a. Treat rough carpentry items as indicated.
   b. Do not use treated wood in applications exposed to weather or where the wood may become wet.

2.5 FASTENERS AND ACCESSORIES

A. General requirements for fasteners:

1. Fasteners shall be of adequate size, spacing, and number to resist design loads under intended use, and types shall be appropriate for the materials or conditions for which used.
2. Provide washers, pre-drilling, etc. as required for proper installation and to prevent damage to framing.
3. Fasteners shall be hot-dip galvanized (ASTM A153), mechanically galvanized (ASTM B695 class 55 minimum), stainless steel (type 303, 304, 305, or 316), silicon bronze, or copper by approved methods for the following applications:
   a. Exterior, exposed use.
   b. In contact with preservative or fire-retardant treated wood.
   c. Nails in contact with preservative treated wood containing ammonia shall be stainless steel.
4. Fasteners in moist corrosive atmosphere to be of stainless steel (type 303, 304, 305, or 316).
5. Where the retention level of ACQ or MCQ preservative is greater than 0.40 pcf, CBA-A preservative is greater than 0.41 pcf, or CA-B preservative is greater than 0.21 pcf, provide stainless steel fasteners (type 303, 304, 305, or 316).
6. All fasteners specified by manufacturer shall be installed in framing hardware, unless noted otherwise.
7. At borate treated lumber a clear zinc coating per ASTM F1941 is acceptable.

B. Nails and nailing not otherwise shown or specified:

1. Comply with requirements of governing building code.
2. For securing materials to hardened concrete or masonry provide hardened steel masonry nails or Simpson Strong-Tie “Titen” screws.
3. For framing and general woodwork: Common bright wire nails (not box nails) with centered full-round heads per ASTM F1667 including Supplement S1. 16d cement coated sinker nails may be used in lieu of common nails for framing, where noted on the drawings. Unless otherwise noted on drawings, nail sizes shall be as follows
   a. 8d Common: 0.131”ø x 2-1/2” long with 0.281”ø head.
   b. 10d Common: 0.148”ø x 3” long with 0.312”ø head.
   c. 16d Common: 0.162”ø x 3-1/2” long with 0.344”ø head.
4. Nails for sheathing panels shall be of common wire with full round heads and shall be of sufficient length to fully develop the nails.
5. Machine-driven nails of all types must comply with the requirements of this section. All proposed nails shall match diameter and penetration of specified nails.

6. Staples shall conform to length and gauges specified and shall be installed to match specified patterns and spacing.
7. Power Actuated Fasteners (PAF): Use only as approved by the Architect/Engineer; operators shall be qualified.

C. Bolts: Malleable iron washers or steel plate washers, unless otherwise shown, shall be provided under all bolt heads and nuts.

1. Machine Bolts: ASTM A307 and ANSI/ASME B18.2.1, standard semi-finished machine bolts as shown or required. Nuts shall be standard size unless noted otherwise and shall be per ASTM A563.
2. Anchor bolts or threaded rod anchors shall conform to ASTM F1554, ASTM A307, or ASTM A36. Anchor bolts shall be headed or end in two nuts tightened against one another, unless noted otherwise. Provide embedded plate washer as indicated on drawings. No upset threads allowed. No L or J bolts allowed.

D. Lag screws: Standard hex lag screws per ANSI/ASME B18.2.1.

E. Wood screws: Standard wood screws per ANSI/ASME B18.6.1.

F. Power Actuated Fasteners (PAF): Hilti X-CP72, ICC ESR-2379; Simpson PDPAWL-300 MG, ICC ESR-2138.

G. Framing hardware: Fabricated sheet metal timber framing connectors shall be manufactured from painted or galvanized G90 steel by Simpson Strong-Tie (connectors specified on drawings are per Simpson Strong Tie, or approved equivalent. Connectors shall be at least 16 gauge material, (1/8 inch plate materials where welded), unless otherwise noted, punched for nailing. All heavy hardware to be fabricated from A36 steel per Division 05, Metals. All hardware intended for exterior exposed use shall be galvanized per G185 ASTM A653 or stainless steel.

1. For contact with preservative or fire-retardant treated wood, provide minimum G185 galvanizing per ASTM A653.
2. Nails and nailing shall conform to the manufacturer's instructions with a nail provided for each punched hole. Nails to be used with framing accessories are subject to the requirements specified in this Section for fasteners and anchors.

H. Subfloor Glue: Water proof, water base, air cure type, cartridge dispensed conforming to APA Standard AFG-01 or ASTM D3498. Maximum Volatile Organic Compound (VOC) shall meet local air quality standards and the California Green Building Code.

2.6 SOURCE QUALITY CONTROL

A. The Testing Agency, as specified in the Article QUALITY ASSURANCE, will perform testing for moisture content of all lumber at time of fastener installation.

B. The Testing Agency will submit reports as specified in Division 01.

PART 3 - EXECUTION

3.1 REQUIREMENTS FOR STRUCTURAL FRAMING

A. General

1. Refer to drawings for layouts, notes and details, provide framing as required; comply with governing building code requirements.
2. Provide framing to achieve true alignments as surfaces receiving finish materials.
3. It shall be the responsibility of the Contractor to provide and install all wood blocking, furring strips, or grounds detailed or required to provide anchorage for all finishes, accessories, fixtures, etc. as required to complete all work. All blocking and/or backing shall be securely bolted or otherwise anchored in place.
4. Contractor shall be responsible for layout of anchor bolts, and other hardware embedded in concrete when placed by other trades.
5. Provide and install all structural framing, blocking, fasteners, brackets, clips, etc. as required to complete work specified in the Construction Documents.

B. Framing

1. Sill Plates and Ledgers:
   a. Sill plates and ledgers on concrete shall be anchored with bolts, unless noted otherwise, shall have full bearing on concrete, and shall be placed for sheathing panel nailing as indicated. All bolt nuts shall be provided with a cut plate steel washer for bearing on wood.
   b. Provide a minimum of two sill anchor bolts per sill piece with a bolt no less than 4 ½" and no more than 12" from the end of the sill. Bolts to be 5/8" diameter x 12" (18" at curb) long at 48" on centers, unless otherwise shown or noted. Provide additional anchor bolts each side of a notch or hole, as per a typical plate splice, where notch or hole is in excess of 1/3 the plate width. At shear walls, provide a plate washer 3" x 3" x 0.229" minimum between the sill and nut at anchor bolts. Plate washer to extend within ½ inch of the structural wall sheathing. Offset and/or stagger anchor bolts, or provide larger plate washer as required.
   c. Anchor bolt holes in sill plates or ledgers shall be 1/16" maximum larger than anchor bolt.
2. Stud Walls and Framing:
   a. Cut studs and posts with square ends, unless otherwise shown or noted. All posts and beams shall be "cut to bear" unless otherwise detailed.
   b. All studs in walls shall be placed with the shortest dimension parallel to the run of the wall. Bearing studs shall extend full height to be the supporting framing as shown; non-bearing studs shall extend to the supporting framing.
   c. Provide double studs on each side of all openings, unless shown or noted otherwise.
   d. All openings in stud walls and partitions shall be framed with headers across the top, as shown, with a minimum size (6" nominal depth x stud width) resting on short cripple studs, and as shown on the drawings.
   e. All stud partitions and walls shall have horizontal solid blocking not less than 2x and of the same width as the stud, fitted and nailed into the studs at mid-height of stud, for studs over 8 feet in height, except as otherwise shown or specified. This blocking shall be so spaced that there shall be no concealed air spaces greater than eight feet in any dimension.

f. Stud partitions containing plumbing, heating or other pipes shall be so framed as to give proper clearance for piping. Plumbing, heating and vent pipes exceeding 1-1/2" in inside diameter shall not be placed in partitions used as bearing or shear walls unless completely furred clear of the wall. No notching shall be allowed. Pipes shall be placed in the center of the plate using a neat bored hole and the plates shall be strapped on each side with 3" x 36" x 14 gauge steel punched for 10d nails 3" on center, staggered, or as shown on the drawings.

3. Top Plates
   a. Top plates shall be double, set single. Corners where stud wall or partitions meet shall be framed with studs on all surfaces and blocking to form a "rigid" corner with nailing for all corners. Double top plates shall be lapped at corners. Lap splices and nailing per the drawings.
4. Floor, Roof and Ceiling Framing
   a. Joists and beams shall be accurately aligned and the position and spacing of all joists and beams shall be as shown and be coordinated with other framing and to other trades prior to actual construction.
   b. Place all joists and beams with crown up. Cantilevered joists and beams shall be placed with the crown down.
   c. Cutting of wood girders, beams or joists for electrical and mechanical lines shall be limited to cuts and bored holes not deeper than 1/5 of the beam depth from the top and located not farther from the support than three times the beam depth and not less than the beam depth. Cuts in excess of this, or single bored holes with a diameter of more than 1" are not permitted without special provisions for framing the beams. Location of all cuts in framing shall receive the prior review of the Architect/Engineer.
   d. Provide vent holes in rafters and/or blocking as shown and/or directed by the Architect.

3.2 STRUCTURAL SHEATHING

A. General

1. Sheathing nailing shall be as required on the drawings. Do not overdrive (Do not break skin of sheathing face sheet). Over driving will be cause for rejection.
2. Form sheathing may be re-used for concealed sheathing provided the lumber at the time of re-use is approved by the Architect, meets with the framing grade requirements specified herein, is in good condition, and is thoroughly cleaned with all nails removed.
3. Pneumatic nailing devices shall be adjustable so that nail heads do not penetrate skin of sheathing. Contractor shall submit equipment and nails for review prior to use. Refer to PART 2 for other nailing requirements.

B. Roof and Floor Sheathing: Except "Panelized Roofs", lay with face grain perpendicular to roof rafters, roof trusses or floor joists. Stagger sheets. Block all unsupported sheet edges with 2x material unless noted otherwise.

C. Wall Sheathing: Lay with face grain either parallel or perpendicular to studs. Exposed bottom edges shall be sealed as recommended by manufacturer. Block all unsupported sheet edges with 2x materials unless noted otherwise.

D. Panelized Roofs: Where sheathing is set @ 8'-0 1/8" spacing, cut every fourth sheet short by 1/2" to re-align structural framing that has been specified to be spaced at even units of 2, 4 or 8 feet.

3.3 ROUGH HARDWARE

A. General: Nails, spikes, screws, fabricated sheet metal anchors, ties, hangers and any other materials shown or required for the attachment of wood to concrete and wood to steel and wood to wood shall be furnished and installed as part of this work.

B. Framing Nailing: All framing nailing shall conform to minimum requirements of the Building Code, and with details shown on the drawing.

C. Bolts, Lag Screws and Washers:

1. Bolts in wood shall be machine bolts unless otherwise noted and shall be of such length that the bearing length of the threads does not exceed ¼ of the full bearing length in the member holding the threads. Bolt holes in wood shall be 1/32" oversized. Bolt holes for sill plates may be 1/16" maximum oversize. Holes in steel shall be 1/16" oversize. See Section 3.1 for anchor bolts at sill plates and ledgers.
2. Provide square plate or malleable iron washer and nut at head where bearing is against wood; cut washer under nut where it is against steel. Washer will not be required under head of carriage bolts. Provide malleable iron washers where exposed.
3. All nuts shall be tightened when placed and retightened at completion of the job or immediately before closing with final construction.
4. Lag screws shall be screwed (not driven) into place. Drill pilot hole to 70% of shank diameter. Drill clearance hole to full shank diameter and depth of unthreaded screw length.

D. Wood Screws: Minimum penetration is 10 diameters unless noted otherwise. Where fastening hardwood timber species or where wood tends to split, provide pilot hole 70% of screw shank diameter.

E. Proprietary Fasteners and Hardware: Install per manufacturer's published installation instructions (MPII) and code approval report (e.g. ICC ESR, IAPMO ER, etc). Provide MAX quantity, size, and length of fastener at hardware (i.e. joist hangers, framing, clips, etc) unless otherwise noted per plan.

3.4 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD

A. Coordinate installation of wood decking, metal-web wood joists, glued-laminated wood construction, shop-fabricated wood trusses, and wood I- joists.

B. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members. Fasten curbs corner-to-corner and to rafters with framing connectors configured for this application.

C. Blocking:

1. Provide fire blocking at locations and spacing's as required by CBC Chapter 7. Locate other blocking, supplementary framing, backing plates and bracing to

facilitate installation of finish materials, fixtures, equipment, services, accessories, and trim requiring attachment and support.

2. Solid block joists and rafters over all supports with blocking of the same size and material as the joist or rafter.

D. Furring:

1. Nominal 1 inch x 3 inch minimum, continuous and spaced at 16 inches on center, maximum.
2. Install plumb, rigid, and level. Shim where necessary to provide a true, even plane suitable to receive the finish required.
3. Attach to concrete and masonry as shown in the contract drawings.

E. Bridging: Use 2 inch solid cross bridging. Nail bottom ends of bridging only after sheathing has been nailed.

F. Stair Framing: Provide with 3 stair stringers for each set of stairs, unless otherwise shown. Cut notches to receive exact size of treads and risers (if any) shown, with no change in dimensions between landings. Provide stringers of size shown, or if not shown, of a size to allow not less than 3-1/2 inch of effective depth, measured perpendicular to the rake of the stringer, after notching.

G. Install miscellaneous metal angles, bolts, and other items; secure into formwork where embedded in concrete.

H. Install accessory items not otherwise set under other sections; after completion of painting and other finishing work; in locations shown or directed by the Architect. Set items plumb, level, and secure using appropriate fastening as applicable.

3.5 FIELD APPLIED WOOD TREATMENT

A. Field treat all end cuts and holes in preservative treated materials per PART 2.

B. Apply two brush coats; or full-immersion dip not less than 15 minutes; or as required to thoroughly saturate all surfaces after cutting.

C. Air dry 2-hours minimum before installation.

3.6 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

C. Variation from Plane (Other than Floors): 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum. Provide framed substrates meeting requirements for application of finishes specified in other sections.

D. Exposed surfaces shall be free from dents and tool marks, unsanded rough or torn faces and corners, and other defects.

3.7 FIELD QUALITY CONTROL

A. The Testing Agency, as specified in the Article QUALITY ASSURANCE, will perform the following tests and submit reports as specified in Division 01:

1. Moisture content of all lumber at time of close-in.
2. Periodic special inspection of nailing, bolting, and other fastening within the seismic-force-resisting system including shear walls, wood diaphragms, etc. per CBC Section 1705.13.2, excluding systems with sheathing nailing spacing greater than 4" on center.
3. Special inspection of high load diaphragms per CBC Section 1705.5.1 where designated on documents.

3.8 ADJUSTING

A. Replace all defective work at Contractor's expense.

B. Replace defective or damaged work with conforming work.

C. Correct defects using means that will not injure the materials.

D. Replace defective or damaged work which cannot be corrected in the field with new work, or return defective items to the shop for repair.

E. Repair or replace framing lumber sagged, twisted or warped due to shrinkage from excessive moisture content at time of installation, or from other causes.

F. Adjust to meet specified tolerances.

G. Architect/Engineer shall review all proposals for the repair or replacement of damaged, defective, or missing work.

H. Pay expenses incurred by Owner for Architect/Engineer's costs for (re-)design and obtaining approvals of Authorities Having Jurisdiction (AHJ) necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work.

I. Pay expenses due to re-testing and re-inspection necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work.

3.9 CLEANING AND PROTECTION

A. Clean all surfaces upon completion of erection, leave free of grime and dirt. Remove unused materials, tools, equipment, and debris from the premises and leave surfaces broomed clean.

B. Waste Disposal: Comply with the requirements of pertinent sections of Division 01 specifying cleaning and disposal.

1. Comply with applicable regulations.
2. Do not burn scrap on project site.
3. Do not burn scraps that have been pressure treated.
4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.

C. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

D. Prevent sawdust and wood shavings from entering the storm drainage system.

E. Protect work from damage by subsequent operations.

END OF SECTION

SECTION 06 40 00

ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements including but not limited to:
   1. Plastic laminate cabinets.
   2. Plastic laminate and solid surface countertops.
   3. Plastic laminate panels.
   4. Standing and running trim.
   5. Closet and utility shelving.
   6. Shop finishing.
   7. Accessories necessary for a complete installation.

B. Related Sections:
   1. Section 06 10 00: Rough Carpentry.
   2. Section 06 41 16: Plastic-Laminate-Clad architectural Cabinets

1.3 DEFINITIONS

A. Architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

1.4 SUBMITTALS

A. Product Data:
   1. Technical data for each type of product indicated including cabinet hardware and accessories:
      a. Include data for fire retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings:
   1. Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components:
      a. Show details full size.
      b. Show locations and sizes of furring, blocking, and hanging strips including concealed blocking and reinforcement specified in other Sections.
      c. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, and other items installed in architectural woodwork.

C. Samples:
   1. Lumber with or for transparent finish, not less than five inches (125 mm) wide by 24 inches (600 mm) long, for each species and cut, finished on one (1) side and one (1) edge.
   2. Veneer faced panel products with or for transparent finish, eight inches by ten inches

(200 by 250 mm), for each species and cut. Include at least one (1) face veneer seam and finish as specified.

3. Lumber and panel products with shop applied finish, 50 square inches (300 sq. cm) for lumber and eight inches by ten inches (200 mm by 250 mm) for panels, for each finish system and color, with 1/2 of exposed surface finished.
4. Plastic laminates, eight inches by ten inches (200 mm by 250 mm), for each type, color, pattern, and surface finish and specified edge material applied to one (1) edge.
5. Quartz surfacing materials, six inches (6") square.
6. Corner pieces:
   a. Cabinet front frame joints between stiles and rails, as well as exposed end pieces, 18 inches (450 mm) high by 18 inches (450 mm) wide by six inches (150 mm) deep.
7. Exposed cabinet hardware and accessories, one (1) unit for each type and finish.

D. Qualification Data: For fabricator/installer.

E. Woodwork Quality Standard Compliance Certificates: Woodwork Institute (WI) Quality Certification Program certificates (CCP).

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:
1. Building code: Comply with applicable requirements of CBC Chapter 8 for Interior Finishes.
2. Accessibility:
   a. 2022 California Building Code; Section 11B-309 for Casework, Section 11B-404 Doors and Hardware and Section 11B-703 for Signage (where applicable).
   b. ADA Accessibility Guidelines (ADAAG) for Buildings and Facilities; final guidelines and revisions.
3. Quality standard: Unless otherwise indicated, comply with WI for premium grade architectural woodwork indicated for construction, finishes, installation, and requirements. Provide certified compliance labels and certificates indicating that woodwork, including installation, complies with requirements of grades specified.
4. Fire test response characteristics: Where fire retardant materials or products are indicated, provide materials and products with specified fire test response characteristics determined by testing identical products per test method indicated by UL. Identify with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.

B. Fabricator Qualifications: Shop having minimum five (5) years' documented experience who employs skilled workers who custom fabricate products similar to those required and who is a participating member of WI.

C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork with sequence matched wood veneers and transparent finished wood doors that are required to be of same species as woodwork.

D. Quality Standard: Unless otherwise indicated, comply with North American Architectural Woodwork Standards, meeting or exceeding ANSI A161.1, for grades of architectural woodwork indicated for construction, finishes, installation, and requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork

is completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide materials that comply with requirements of WI quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Products:
   1. Hardboard: AHA A135.4.
   2. Medium density fiberboard:
      a. ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde; minimum 48 pcf density except that minimum for screw holding capacity on face shall be 300 pounds; minimum 3/4 inches (19 mm) thick, edged and faced as specified:
         1) Arauco; Trupan MDF, VESTA Technology.
         2) Roseburg Forest Products, Inc.; Roseburg MDF products.
         3) Approved equal.
   3. Particleboard: Unless otherwise noted by District, particleboard is not to be used.
   4. Softwood plywood: DOC PS 1, medium density overlay.

C. Lumber:
   1. Comply with applicable provisions for grading and workmanship of WI Quality Standards, and requirements specified. Provide lumber surfaced 4 sides (S4S) and fabricated to profiles shown. Kiln dry lumber to 19 percent moisture content:
      a. Furring, blocking, and shims: No. 1 Common; Southern Pine.
      b. Solid hardwood for opaque finish: Plain sawn Yellow Poplar, free from checks, splits, and sound knots.

D. Drawer Locks
   1. Compx National Security Products

E. Thermoset Decorative Panels:
   1. Particleboard or medium density fiberboard finished with thermally fused, melamine impregnated decorative paper complying with LMA SAT-1:
      a. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semi-exposed edges.

F. High Pressure Decorative Laminate - NEMA LD 3, grade indicated or as required by woodwork quality standard:
   1. Manufacturer is subject to compliance with requirements; provide high pressure decorative laminates by one of the following:
      a. Abet Laminati, Inc.
      b. Formica Corporation.
      c. Panolam Surface Systems by Panolam Industries International Incorporated.
      d. Wilsonart LLC.

2.2 FIRE RETARDANT TREATED MATERIALS

A. Where fire retardant treated materials are indicated, use materials complying with requirements acceptable to authorities having jurisdiction, and with fire test response characteristics specified:

1. Do not use treated materials that do not comply with requirements of referenced woodworking standard or that are warped, discolored, or defective.
2. Use fire retardant treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
3. Identify fire retardant treated materials with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.

B. Fire Retardant Particleboard:
1. Panels complying with requirements, made from softwood particles and fire retardant chemicals mixed together at time of panel manufacture to achieve flame spread index of 25 or less and smoke developed index of 50 or less per ASTM E84:
   a. For panels 3/4 inch (19 mm) thick and less, comply with ANSI A208.1 for Grade M-2 except for the following minimum properties: Modulus of rupture, 1,600 psi 11 MPa; modulus of elasticity, 300,000 psi 2,070 MPa; internal bond, 80 psi 550 kPa; and screw-holding capacity on face and edge, 250 and 225 lbf 1,100 and 1,000 N, respectively.
   b. For panels 13/16 inch to 1-1/4 inches (20 to 32 mm) thick, comply with ANSI A208.1 for Grade M-1 except for the following minimum properties: Modulus of rupture, 1,300 psi 9 MPa; modulus of elasticity, 250,000 psi 1,720 MPa; linear expansion, 0.50 percent; and screw-holding capacity on face and edge, 250 and 175 lbf 1,100 and 780 N, respectively.
   c. Product: Subject to compliance with requirements, provide Duraflake FR by Arauco.

C. Fire Retardant Fiberboard: Medium density fiberboard panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire retardant chemicals mixed together at time of panel manufacture to achieve flame spread index of 25 or less and smoke developed index of 200 or less in accordance with ASTM E84.

2.3 CABINET HARDWARE AND ACCESSORIES

A. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers of items referenced to this standard. Provide cabinet hardware and accessory materials associated with architectural cabinets.

B. Frameless Concealed Hinges (European Type) - BHMA A156.9, B01602, Self-Closing:
1. Provide 170-degree minimum opening capabilities. For end doors perpendicular to walls, provide 90-degree type.
2. For doors 32 inches high or less, provide two (2) pairs of hinges, add 1/2 pair for every additional 20 inches.
3. Products are subject to compliance with requirements; provide from one of the following:
   a. Hafele North America Co.
   b. Julius Blum, Inc.
   c. Mepla-Alfit, Inc.

C. Wire Pulls: Back mounted, solid metal, five inches (127 mm) long, 2-1/2 inches (63.5 mm) deep, and 5/16 inch (8 mm) in diameter.

D. Catches - Magnetic, Complying with BHMA A156.9 and B03161:
1. Rockwood 901 by Assa Abloy.
2. Comparable product.

E. Cabinet Shelf Rests - Nickel plated, 7 mm diameter shelf support pegs in brass sockets,

complying with BHMA A156.9, B04013:
1. Hafele 282.01.701 x 282.50.704 or comparable product.

F. Closet Rods and Flanges: 1-1/2-inch diameter, satin finished chrome plated steel or satin finished stainless steel with matching end flanges.

G. Adjustable Shelf Standards and Brackets for Wall Hung Open Shelving - BHMA A156.9, B04071; With Shelf Rests, B04081:
1. Standards: Model No. 87ANO Super Duty 87/186/187 Steel Series; lengths as indicated, by Knape & Vogt or comparable product.
2. Brackets: Model No. 187 LL ANO 12 to 24 for 12-inch to 24-inch (300 mm to 600 mm) deep shelves by Knape & Vogt or comparable product.
3. Shelf rests: Model No. 210 ANO End Rest and Model No. 211 ANO Center Rest with Model No. 129 RUB Rubber Cushions or comparable product.

H. Shelf Rests: BHMA A156.9, B04013; metal, two pin type with shelf hold down clip.

I. Silencers:
1. Provide rubber silencers on jamb and/or head and sill strike areas of all cabinet doors and drawers, two (2) for paired doors, and three (3) for single doors:
   a. Size: Approximately 1/4-inch (6.4 mm) diameter.
   b. Color: Compatible with adjacent finish.

J. Drawer Slides - BHMA A156.9, B05091:
1. Provide positive stop, self-closing side mounted, full extension, zinc plated steel drawer slides with steel ball bearings:
   a. Pencil drawer slides: Grade 1; for drawers not more than three inches (75 mm) high and 24 inches (600 mm) wide; Accuride 2006 having 3/4 extension carburized steel ball bearing, side mounting, 45-pound capacity medium duty load rating, cold rolled steel slide members and ball retainers, bright electro zinc plate finish.
   b. Box drawers (less than eight inches [8"] deep): Grade 1HD-100; for drawers not more than six inches (150 mm) high and 24 inches (600 mm) wide. Provide Accuride 4034; up to 24 inches wide, full extension carburized steel ball bearing, side mounting, 150-pound capacity medium duty load rating, cold rolled steel slide members and ball retainers, cushioned in and out stops, detent-in, progressive action, positive stop, clear zinc finish.
   c. Pedestal drawers (greater than eight inches [8"] deep): Accuride 4032; up to 24 inches wide, full extension carburized steel ball bearing, rail mounting, minimum 150-pound capacity heavy duty load rating, cold rolled steel slide members and ball retainers, cushioned in and out stops, detent-in, progressive action, positive stop, bright electro zinc plate finish.
   d. Lateral file drawer slides: For drawers more than six inches (150 mm) high or 24 inches (600 mm) wide; heavy-duty, up to 42 inches wide, 3640A by Accuride.
   e. Keyboard slide: Model No. 2109, color black, by Accuride, Inc.
   f. Refuse cabinets: Accuride C3600-201D, full extension carburized steel ball bearing, bracket mounting, heavy-duty, cold rolled steel slide members and ball retainers, cushioned in and out stops, progressive action, positive stop, clear zinc plate finish.

K. Door and Drawer Locks:
1. Provide locks for each cabinet door and drawer as indicated on Drawings. Finish exposed portions of locks to match cabinet pull finish. Furnish two (2) keys with each lock and key locks inside one room alike and provide master key for locks in Project. Selections to meet BHMA A156.11 and E07041 (for drawers) or E07121 (for doors):
   a. Cam lock similar to Hafele 235.20.20x, chrome plated, with offset cam 219.13.9xx, sized to fit opening.

b. Cam lock similar to Hafele 235.20.20x, chrome plated, with surface mounted strike 251.60.703.
c. Pairs of doors:
1) Inactive leaf: Furniture bolt similar to Hafele 252.02.644, polished chrome, with strike 251.60.703.
2) Active leaf: Single door lock assembly.

L. Grommets for Cable Passage through Countertops:
1. Two-inch (51 mm), black, molded plastic grommets and matching plastic caps with slot for wire passage:
a. Product: Subject to compliance with requirements, provide TG series by Doug Mockett & Company, Inc.

M. Trash Grommet Through Countertop: TM1B, six-inch by two-inch (6" x 2") polished stainless-steel grommet by Doug Mockett and Co., Inc.

N. Exposed Hardware Finishes:
1. For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated:
a. Satin chromium plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.

O. Concealed Hardware: Provide finish complying with product class requirements in BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Fire retardant treated softwood lumber, kiln dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous metal or hot dip galvanized anchors and inserts on inside face of exterior walls and as required for corrosion resistance. Provide toothed steel or lead expansion sleeves for drilled in place anchors.

C. Hanging (Zee Clip) Strips: Extruded aluminum zee type interlocking clips; type, size and quantity for the condition of use.

D. Screws: Select material, type, size, and finish required for each use. Comply with FS FF-S-111 for applicable requirements.

E. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.

F. Blind Splines: Specialty devices, as required for tight butt joining, types and size as recommended by woodwork fabricator.

G. Covercaps: Where mortises of fastener heads or drawdowns are exposed (blind holes) in finished work, provide black plastic covercaps.

H. Adhesive for Bonding Plastic Laminate:
1. Resorcinol:
a. Adhesive for bonding edges: Hot melt adhesive.

I. Stone Seam Adhesive:

1. Two-part, epoxy resin stone adhesive with an initial set time of not more than two (2) hours at 70 degrees F (21 degrees C), and with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    a. Color: Clear.
    b. Products: Subject to compliance with requirements, provide Bonstone Materials Corporation - Duproxi or Akemi North America - Akepox.

J. Stone Sealer:
1. Colorless, nonstaining, single component, neutral curing silicone sealant that does not affect color or physical properties of stone surfaces, recommended by stone producer for application indicated. Subject to compliance with requirements, provide products by one of the following:
    a. Bostik, Inc.
    b. Custom Building Products.
    c. Hillyard, Inc.

K. Stone Cleaner: Cleaner specifically formulated for stone types, finishes, and applications indicated, recommended by stone producer and by sealer manufacturer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.

2.5 FABRICATION

A. Woodwork Grade:
1. WI Custom Grade woodwork complying with referenced quality standard:
    a. Complete fabrication, including assembly, finishing, and hardware application, before shipment to site to the maximum extent possible. Disassemble components as necessary for shipment and installation. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting. The width of scribe and filler panels shall not exceed 1/2 inch or 1/2-inch clear dimension from adjacent wall to outside face of cabinet door in a 90-degree position, whichever is greater.
    b. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify various parts fit as intended and check measurements of assemblies against field measurements indicated on shop drawings before disassembling for shipment.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

C. Sand fire retardant treated wood lightly to remove raised grain on exposed surfaces before fabrication.

D. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
1. Corners of cabinets and edges of solid wood (lumber) members 3/4 inch (19 mm) thick or less: 1/16 inch (1.5 mm).
2. Corners of cabinets and edges of solid wood (lumber) members 3/4 inch (19 mm) thick or less: 1-1/2 inch (38 mm).
3. Corners of cabinets and edges of solid wood (lumber) members and rails: 1/16 inch (1.5 mm).

E. Shop cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs:

1. Seal edges of openings in countertops with a coat of varnish.

F. Plastic Laminate Faced Wood Paneling - WS Premium Grade:
   1. Plastic laminate - high pressure decorative laminate complying with NEMA LD 3:
      a. Faces: Grade SGF.
      b. Backs: Grade BKH.
      c. Exposed edges: Same as faces.
   2. Colors, patterns, and finishes:
      a. Wood grains, matte finish:
         1) Grain direction: Vertical.
   3. Panel core - particleboard or medium density fiberboard:
      a. Thickness: 3/4 inch (19 mm).
   4. Exposed panel edges:
      a. Applied solid wood banding 11/16 inch (18 mm) thick by depth of panels.
   5. Adhesive for bonding edges: Hot melt adhesive or adhesive for faces.
   6. Assemble panels by gluing and concealed fastening.

G. Plastic Laminate Cabinets - WS Premium Grade:
   1. WI type of cabinet construction: Flush overlay.
   2. Materials:
      a. Laminate cladding for exposed surfaces - high pressure decorative laminate:
         1) Horizontal surfaces other than tops: Grade HGS.
         2) Post formed surfaces: Grade HGP.
         3) Vertical surfaces: Grade VGS.
         4) Edges: Grade HGS.
      b. Semi-exposed surfaces:
         1) Surfaces other than drawer bodies - thermoset decorative panels:
            a) Edges of plastic laminate shelves: Grade HGS, matching laminate in color, pattern, and finish.
            b) For semi-exposed backs of panels with exposed plastic laminate surfaces, provide surface of high pressure decorative laminate, Grade VGS.
         2) Drawer sides and backs: Solid hardwood lumber.
         3) Drawer bottoms: Hardwood plywood.
      c. Concealed backs of panels with exposed plastic laminate surfaces: High pressure decorative laminate, Grade BKL.
   3. Colors, patterns, and finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces indicated in Finish Schedule.
   4. Provide dust panels of 1/4 inch (6.4 mm) plywood or tempered hardboard above compartments and drawers, unless located directly under tops.
   5. Fabrication:
      a. Join case body members using concealed dado or dowel methods utilizing glue and pressure. Reinforce dado method with nailing or screws. Mechanical fasteners are not permitted:
         1) Base cabinet bottoms and subtops: Bottoms, 3/4-inch particleboard with low pressure laminate finish on interior side and phenolic backing sheet on concealed side. Subtops, 3/4-inch particleboard with phenolic backing sheet both sides. Fabricate all base cabinets with subtops.
         2) Wall cabinet tops and bottoms: Tops, one-inch (1") particleboard with low pressure laminate finish on interior side and phenolic backing sheet on concealed side. Bottoms, one-inch (1") particleboard with manufacturer's low pressure laminate finish both sides.
         3) Cabinet ends: 3/4-inch particleboard with low pressure laminate finish on interior side and phenolic backing sheet on concealed side. Install high pressure plastic laminate on exposed sides of cabinet ends.
         4) Cabinet backs - 1/4-inch hardboard with low pressure laminate finish for

standard unexposed backs:
a) Fabricate with continuous hot melt glue joint between sides, tops, bottoms, and back on concealed side.
b) Exposed backs: 3/4-inch particleboard with low pressure laminate finish on interior side and high pressure plastic laminate on exterior, exposed side.

5) Cabinet shelves (adjustable, semi-concealed): 3/4-inch particleboard with low pressure laminate finish on both sides. Provide one-inch (1") particleboard for shelves for unsupported spans over 36 inches.
6) Cabinet doors: 3/4-inch particleboard with high pressure plastic laminate on exterior side and heavy gauge balancing sheet on interior side.
7) Drawer fronts: 3/4-inch particleboard with high pressure plastic laminate on exterior side and heavy gauge balancing sheet on interior side.
8) Drawer construction - 1/2-inch solid hardwood back, sides, and subfront; tongued and dadoed into back and subfront, joints glued and pinned; 1/4-inch hardboard bottom tongued and dadoed in all four sides, back, and subfront. Provide additional support with continuous hot melt glue joint on underside of drawers between sides, back, subfront, and bottom:
a) Reinforce drawer bottoms as required with spreaders.
b) Apply drawer front to subfront in accordance with manufacturer's standard procedures.
c) Dividers: 3/4-inch particleboard with manufacturer's low pressure laminate finish on both sides. Secure to inside of cabinet with manufacturer's standard plastic clips.
d) Dust panels: Provide dust panels of 1/4-inch plywood or tempered hardboard above compartments and drawers except where located directly under tops.
e) Finish exterior exposed surfaces with high pressure plastic laminate. Laminate plastic to particleboard core with balancing sheet using urea resin formaldehyde glue. Fabricate using cold press method with regulated pressure for minimum eight hours at minimum 70 degrees F.

H. Countertops - WI Premium Grade:
1. Solid surface:
a. Solid surfacing material thickness: 3/4 inch (19 mm).
b. Colors, patterns, and finishes: Provide materials and products resulting in colors of solid surfacing material indicated on Drawings.
2. Quartz countertops:
a. Seams:
1) Fabricate countertops without seams to the extent possible. When seams are necessary, fabricate countertops in sections indicated for joining in field, with sealant filled seams 1/16 inch (1.5 mm) in width.
b. Fittings: Drill countertops in shop for fittings and similar items.
c. Fabricate with four-inch (4") backsplashes. Sand minor scratches and stains with #400 then #600 sandpaper.
3. Fabrication:
a. Fabricate tops in one piece, unless otherwise indicated. Comply with solid surfacing material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing:
1) Fabricate tops with shop applied edges of materials and configuration indicated.
2) Fabricate tops with loose backsplashes for field application.
b. Drill holes in countertops for plumbing fittings and soap dispensers in shop.
4. Countertop construction tolerances:
a. Variation from plumb: For vertical lines and surfaces, do not exceed 1/16 inch in 48 inches (1.5 mm in 1,200 mm).

b. Variation from level: Do not exceed 1/8 inch in 96 inches (3 mm in 2,400 mm), 1/4 inch (6 mm) maximum.
c. Variation in joint width: Do not vary joint thickness more than 1/4 of nominal joint width.
d. Variation in plane at joints (lipping): Do not exceed 1/64-inch (0.4 mm) difference between planes of adjacent units.
e. Variation in line of edge at joints (lipping): Do not exceed 1/64-inch (0.4-mm) difference between edges of adjacent units, where edge line continues across joint.

2.6 SHELVING

A. Closet and Utility Shelving:
1. Grade: WI Custom.
2. Shelf material: 3/4 inch (19 mm) medium density fiberboard with solid lumber edge.
3. Cleats: 3/4-inch (19 mm) solid lumber.

2.7 SHOP FINISHING

A. Grade: WI Premium grade.

B. Shop finish architectural woodwork at fabrication shop. Defer final touchup, cleaning, and polishing until installation.

C. Produce finish architectural woodwork at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.

D. Preparations for Finishing:
1. Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work:
a. Back priming: Apply one (1) coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two (2) coats to back of paneling and to end grain surfaces. Concealed surfaces of plastic laminate clad woodwork do not require back priming when surfaced with plastic laminate, backing paper, or thermoset decorative overlay.

E. Exposed Surfaces - WI Premium Grade:
1. Plastic laminate finish: Use hot plate method for gluing of plastic laminate surfacing materials; glued surfaces shall be in close contact throughout. Glue stains are not permitted.
2. Solid surfacing finish: As scheduled.

F. Unexposed Wood Finish: Water based alkyd type primer/sealer.

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements:
1. Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on

shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work:

a. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on shop drawings.
b. Established dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

3.2 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork will be supported and installed as indicated.

3.3 PREPARATION

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas. Before installing architectural woodwork, examine shop fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.4 INSTALLATION

A. Grade: Install woodwork to comply with requirements for grade specified for fabrication of type of woodwork involved.

B. Assemble woodwork and complete fabrication at site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches (3 mm in 2,400 mm). Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

C. Fire Retardant Treated Wood: Handle, store, and install fire retardant treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails (or finishing screws) for exposed fastening, countersunk, and filled flush with woodwork and matching final finish if transparent finish is indicated.

E. Plastic Laminate Paneling:

1. Install paneling to comply with same grade as paneling to be installed:
    a. Install paneling level, plumb, true, and straight with no distortions. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2,400 mm). Install with no more than 1/16 inch in 96 inches (1.6 mm in 2,400 mm) vertical cup or bow and 1/8 inch in 96 inches (3 mm in 2,400 mm) horizontal variation from a true plane.
    b. Anchor paneling to supporting substrate with blind nailing. Do not use face fastening unless covered by trim.

F. Cabinets:

1. Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated:
    a. Install cabinets with no more than 1/8 inch in 96 inches (3 mm in 2,400 mm) sag, bow, or variation from a straight line.
    b. Maintain veneer sequence matching of cabinets with transparent finish.
    c. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches (400 mm) o.c. with No. 10 wafer head screws sized for 1 inch (25 mm) penetration into wood framing, blocking, or hanging strips or toggle bolts through metal backing or metal framing behind walls.

G. Countertops:
1. Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop:
    a. Install countertops with no more than 1/8 inch in 96 inches (93 mm in 2,400 mm) sag, bow, or variation from a straight line.
    b. Secure backsplashes to tops with concealed metal brackets at 16 inches (400 mm) o.c. and to walls with adhesive.
    c. Caulk space between backsplash and wall with silicone sealant.

H. Solid Surface and Stone Countertop:
1. Install components plumb and level scribed to adjacent finishes. Fabricate with backsplashes. Sand minor scratches and stain:
    a. Align adjacent stone and solid surfacing material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
    b. Do not cut in field unless otherwise indicated. If countertops or splashes require additional fabrication not specified to be performed at site, return to fabrication shop for adjustment.
    c. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.
    d. Set stone and solid surface materials to comply with requirements indicated on Drawings and shop drawings. Shim and adjust to locations indicated, with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances. Install anchors and attachments indicated or necessary to secure countertops in place.
    e. Where backsplash is indicated, install backsplash and end splash by adhering to wall with water-cleanable epoxy adhesive and to countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
    f. Adhesive top mount sinks/bowls to countertops using manufacturer's recommended adhesives and color matched silicone sealants.
    g. Keep components clean during installation. Remove adhesives, sealants, and stains. Replace stained components.
    h. Apply sealant to joints and gaps; comply with Section 07 92 00: Joint Sealants. Remove temporary shims before applying sealant.
    i. Make plumbing connections to sinks in accordance with plumbing requirements.
    j. Protect surfaces from damage. Repair work or replace damaged work that cannot be repaired to Architect's satisfaction.

I. Closet and Utility Shelving:
1. Cut shelf cleats at ends of shelves about 1/2 inch (13 mm) less than width of shelves and sand exposed ends smooth:
    a. Install shelf cleats by fastening to framing or backing with finish nails or trim screws, set below face and filled. Space fasteners maximum 16 inches (400 mm)

o.c.

b. Install shelf brackets according to manufacturer's written instructions, spaced maximum 36 inches (900 mm) o.c. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.
c. Install standards for adjustable shelf supports according to manufacturer's written instructions. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors. Space fasteners maximum 12 inches (300 mm) o.c.
d. Install standards for adjustable shelf brackets according to manufacturer's written instructions, spaced maximum 36 inches (900 mm) o.c. and within six inches (150 mm) of end of shelves. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.
e. Cut shelves to neatly fit openings with only enough gap to allow shelves to be removed and reinstalled. Install shelves, fully seated on cleats, brackets, and supports:
    1) Fasten shelves to cleats with finish nails or trim screws, set flush.
    2) Fasten shelves to brackets to comply with bracket manufacturer's written instructions.

J. Touch up finishing work. Fill nail holes with matching filler where exposed.

K. Construction Tolerances:
1. Variation from plumb: For vertical lines and surfaces, do not exceed 1/16 inch in 48 inches (1.5 mm in 1,200 mm).
2. Variation from level: Do not exceed 1/8 inch in 96 inches (3 mm in 2,400 mm), 1/4-inch (6 mm) maximum.
3. Variation in joint width: Do not vary joint thickness more than 1/4 of nominal joint width.
4. Variation in plane at joints (lipping): Do not exceed 1/64-inch (0.4 mm) difference between planes of adjacent units.
5. Variation in line of edge at joints (lipping): Do not exceed 1/64-inch (0.4 mm) difference between edges of adjacent units, where edge line continues across joint.

3.5 SITE ENVIRONMENTAL PROCEDURES

A. Indoor Air Quality: Provide temporary ventilation during work.

B. Waste Management:
1. Comply with requirements of Section 01 74 19: Construction Waste Management and Disposal:
    a. Select wood sizes to minimize waste; reuse scrap to the greatest extent possible. Clearly separate scrap for use on site as accessory components, including shims, bracing, and blocking.
    b. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
    c. Prevent saw dust and wood shavings from entering the storm drainage system.
    d. Do not burn scrap lumber that has been pressure treated.
    e. Do not send lumber treated with pentachlorophenol, CCA, or ACA to cogeneration facilities or waste to energy facilities.

3.6 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop applied finishes to restore damaged or soiled areas.

D. Countertops:
   1. Clean countertops as work progresses. Remove adhesive, grout, mortar, and sealant smears immediately:
      a. In-progress cleaning: Clean countertops as work progresses. Remove adhesive, grout, mortar, and sealant smears immediately.
      b. Remove and replace countertops that are:
         1) Broken, chipped, stained, or otherwise damaged. Stone may be repaired if methods and results are approved by Architect. Repair solid surface in accordance with manufacturer recommendations when approved by Architect.
         2) Defective countertops.
         3) Defective joints, including misaligned joints.
      c. Replace complying with requirements and showing no evidence of replacement.

E. Stone: Clean stone countertops not less than six (6) days after completion of sealant installation, using clean water and soft rags. Do not use wire brushes, acid type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage stone.

F. Stone Sealer Application: Apply stone sealer to comply with stone producer's and sealer manufacturer's written instructions.

3.7 PROTECTION

A. Provide final protection and maintain conditions, acceptable to manufacturer and installer, ensuring woodwork is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 06 41 16

PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Special fabricated cabinet units.

B. Countertops.

C. Preparation for utilities (i.e. electrical or data pulls).

D. Cabinet hardware.

E. Restoration/Alteration of existing cabinetry.

1.2 REFERENCES

A. WI - Woodwork Institute of California: North American Architectural Woodwork Standards 3.1. (NAAWS)

B. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

C. ASTM A653 - Steel Sheet, Zinc Coated, (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

D. ASTM A924 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

E. ASTM C615 – Standard Specification for Granite Dimension Stone.

F. ASTM E84 – Test Method for Surface Burning Characteristics of Building Materials.

G. CBC – California Building Code, (CCR) California Code of Regulations, Title 24, Part 2.

H. FSC – Forest Stewardship Council.

1.3 REGULATORY REQUIREMENTS

A. Conform to CBC requirements for flame spread classification in accordance with CBC Section 803 and Table 803.11.

B. Conform to Flame Spread Classifications for Interior Millwork for flame spread ratings as tested according to ASTM E84.

C. Materials of this section shall meet the requirements for formaldehyde as specified in the California Air Resources Board's Air Toxics Control Measure (ATCM) for Composite Wood (17CCR 93120 et seq.).

D. Operable parts for all accessible casework shall comply with CBC Section 11B-309.

1.4 MOCKUP

A. Prepare mockup under provisions of Section 01 43 00.

B. Provide full size base cabinet and upper cabinet of each type indicated, in specified finish with hardware installed.

C. Units will be examined to ascertain quality and conformity to WI standards.

D. Units will establish a minimum standard of quality for this work.

E. Approved units may be used as part of the Work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and protect products to site under provisions of Section 01 61 00.

B. Conform to Section 2 of the North American Architectural Woodwork Standards for a climate controlled application.

C. Delivery of casework shall be made only when the area of installation is enclosed, all plaster and concrete work is dry, the area is broom clean and environmental conditions are as specified.

1.6 ENVIRONMENTAL CONDITIONS

A. Area of casework installation shall be fully enclosed, well ventilated, and protected from direct sunlight, excessive heat, rain and moisture.

B. Relative humidity of the area of casework installation shall be maintained between 25 percent and 55 percent with a temperature range of between 60 degrees F to 90 degrees F.

C. Casework shall be acclimated to the area of installation for a minimum of 72 hours prior to installation.

1.7 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 33 00.

B. Include materials, component profiles, fastening methods, assembly methods, joint details, accessory listings, schedule of finishes and keying plan.

C. Provide WI Certified Compliance Label for the Certified Seismic Installation Program on the first page of shop drawings.

D. Provide WI Certified Compliance label on first page of shop drawings. Include WI inspector's signature.

E. Provide WI certificates of compliance and inspection reports.

1.8 WARRANTY

A. Provide manufacturer's 10 year warranty for solid surface countertops and sinks under provisions of Section 01 77 00.

B. Warranty to provide for repair or replacement of countertop material and sinks if material fails due to manufacturing defect.

2. PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Active member of the Woodwork Institute licensed by WI to provide WI Certified Compliance Certificates and Labels for the products and materials specified in this section www.woodworkinstitute.com.

B. Substitutions: Under provisions of Section 01 25 00.

2.2 MATERIALS

A. Material shall conform to standards of the North American Architectural Woodwork Standards as follows: Section 3, Section 4, Section 10, and Section 11.

2.3 CABINET DESIGN

A. Individual cabinets are indicated on the drawings by the WI Cabinet Design Series (CDS) numbering system, Design Ideas.

2.4 MODULAR CASEWORK - LAMINATED PLASTIC COVERED

A. Fabricate in accordance with Section 10 of the North American Architectural Woodwork Standards.

1.	WI Grade:	Custom
2.	Core Material:	Combination Core, PureBond Classic Core, www.columbiaforestproducts.com or Pro-Core, www.timberproducts.com.
3.	Construction:	Style - Frameless
4.	Joinery:	Doweled Joints.
5.	Cabinet Backs:	Blind Dadoed.
6.	Cabinet Door Type:	Reveal overlay
7.	Base:	Moisture resistant.
8.	Shelves:	1-M-2 particle board, with HPDL two sides, 1 inch thick, MOE of 710,000, capable of supporting 50 lb/sq ft load with deflection of L/144.
9.	Shelf Edge Bands	1mm PVC in color to match shelf. All 4 edges of adjustable shelves to receive banding.
10.	Door and Drawer Edge Bands:	3mm PVC radiused 1/8 inch at edge. Solid color as selected by Architect.
11.	Exposed Surfaces (Including shelves and interior of open front cabinets):	0.028 inch high pressure plastic laminate, color and pattern as selected by Architect. A maximum of 5 colors and patterns to be selected. A minimum of 3 color combinations per room may be selected.
12.	Semi-Exposed Surfaces (Behind doors and inside drawers):	Low pressure decorative polyester or melamine laminate 0.020 inch thick in complimentary color to exposed surfaces as selected.
13.	Substitutions:	Under the provisions of Section 01 25 00.

2.5 LAMINATED PLASTIC COUNTERTOPS

A. Fabricate in accordance with Section 11 of the North American Architectural Woodwork Standards.

1.	WI Grade:	Premium.
2.	Core Thickness:	0.75 inch minimum.
3.	Laminate Thickness:	0.050 inch or .042 inch for postformed use.
4.	Front Edge Covering:	Self-edged with drip groove
5.	Backsplash at Top:	Integral Coved. 4 inch height.
6.	Top of Back Splash:	Square with scribe.
7.	Construction Type:	Assembly 2, deck mount, manufacturer assembled.
8.	Plastic Colors and Pattern:	To be selected from standard patterns, satin finish, solid colors, woodgrain pattern, or textured finish.

2.6 JANITOR ROOMS

A. Provide economy grade casework in accordance with Section 10 of the North American Architectural Woodwork Standards.

2.7 HARDWARE

A. Finish: Satin Aluminum.

B. Shelf Supports: Metal or molded polycarbonate clips set in drilled holes spaced 32 mm on center. Clips to have vertical locating pin for retention of shelf.

C. Drawer and Door Pulls: Epco MC-402-4 U-shaped wire pull.

D. Cabinet Locks: Olympus 500/600 or CompXNational.

E. Drawer Slides for Drawers 24 inch Wide or Less: Accuride 7432.

F. Drawer Slides for Drawers over 24 inch Wide: Accuride 3640.

G. Drawer slides for File Drawers: Accuride 4034.

H. Hinges: Hafele, Aximat hinge. Hinges per leaf: 3'-0" high doors - 2 hinges, 3'-0" to 5'-0" high doors - 3 hinges, 5'-0" to 7'-4" high doors - 4 hinges, 7'-0" to 8'-0" - 5 hinges.

I. Magnetic Door Catch: Epco 591/592.

J. Sliding Door Track Assemblies: Grant 2023N sheaves and Grant 2011 track.

K. Hanger Rods: 1-1/16 inch diameter tubing, stainless steel.

L. Countertop Support Bracket: 24 inch x 24 inch x 1/8 inch thick pre-manufactured angled steel bracket, black paint finish, minimum 1,000 lb. load support capability, with 7 predrilled anchor holes per bracket leg. Manufactured by A & M Hardware, Inc. www.aandmhardware.com

M. Remainder of hardware required shall meet requirements of ANSI/BHMA Grade 1.

N. Plumbing and electrical service fixtures as indicated in Division 22 and Division 26.

O. Substitutions: Under the provisions of Section 01 25 00.

2.8 FABRICATION

A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.

B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

C. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal contact surfaces of cut edges.

D. Before installation, seal unfinished material installed for backs, bases, self-edge backing, stripping and other concealed portions with a water-repellant sealer.

E. Install plastic grommets in the field in plastic laminate casework and Owner furnished furniture as directed by the Owner's Representative and/or Architect.

F. Install one adjustable shelf for each 1'-0" of height for all wall mounted cabinets.

G. Provide stretcher at top face of all door and drawer fronts.

H. Provide locks as indicated at location shown on drawings for both doors and drawers.

I. Verify keying requirements with Owner.

2.9 RESTORATION AND SURFACE PREPARATION OF EXISTING CABINETS

A. Only skilled workers who are experienced in cabinetry repairs and restoration, have the skills required for the work of this section, and are familiar with the materials and methods required for laminate-clad wood cabinet restoration work shall be used.

B. In the acceptance or rejection of the restoration work, no allowance will be made for lack of skill on the part of the workers or their lack of experience.

C. Coordinate restoration of existing surfaces so that they are exposed for a minimal amount of time prior to refinishing to avoid further damage to bare wood.

D. Protect all adjacent surfaces from damage or deterioration resulting from restoration work.

E. Protect restoration work in progress to prevent further deterioration of exposed surfaces.

F. Remove and relocate existing cabinetry to new locations as indicated. Provide additional scribe strips as needed for adjacent cabinetry or abutting walls.

G. Adjust height of toe space as required to conform to designated height of countertop.

H. Remove all decayed laminate-clad cabinetry to a clean, sound unaffected substrate.

I. Remove plastic laminate cladding on face frames and end panels of cabinetry.

J. All peeling and loose plastic laminate shall be removed.

K. Wash all surfaces with recommended neutralizing agents to remove any foreign particles and chemical residue.

L. Remove existing hardware and fill all holes with repair compound. Sand surface even and smooth.

M. Relaminate face frames and end panels with plastic laminate.

N. Install new hardware. Installation to include hinges, pulls, locks, and drawer slides. Adjust for proper operation.

3. PART 3 EXECUTION

3.1 INSPECTION

A. Verify adequacy of backing and support framing.

3.2 INSTALLATION

A. Set and secure casework in place rigid, plumb, and level.

B. Install casework in accordance with Section 10 of the North American Architectural Woodwork Standards.

C. Install casework items in accordance with the Woodwork Institute's Certified Seismic Installation Program (CSIP)

D. Install countertops in accordance with Section 11 of the North American Architectural Woodwork Standards.

3.3 ADJUSTING AND CLEANING

A. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly and correctly.

B. Clean casework, counters, shelves, hardware, fittings and fixtures.

END OF SECTION

SECTION 07 21 16

BLANKET INSULATION

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Batt insulation and vapor barrier in exterior wall construction.

B. Batt sound insulation in interior walls and partitions and above ceiling.

1.2 REFERENCES

A. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

B. ASTM C1320 - Installation of Mineral Fiber Batt and Thermal Insulation for Light Frame Construction.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. CBC - California Building Code, (CCR) California Code of Regulations , Title 24, Part 6.

E. Business and Professions Code.

1.3 PERFORMANCE REQUIREMENTS

A. Materials of this Section shall provide continuity of thermal and moisture barrier at building enclosure elements.

B. Materials of this Section shall provide continuity of sound control where indicated or scheduled.

1.4 REGULATORY REQUIREMENTS

A. Installation of insulation may only commence if insulation meets mandatory manufacturer certification to the California Energy Commission required by Title 24, Part 6, Section 110.8 of the CBC - California Building Code, (CCR) California Code of Regulations that insulation complies with Title 24, Part 12, Chapter 12-13, Article 3 of the California Quality Standards for Insulating Materials.

B. Insulation products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Insulation materials to be certified in compliance with Business and Professions Code Section 19165.

D. Insulation manufacturer to be licensed by the California Department of Consumer Affairs, Bureau of Home Furnishing and Thermal Insulation according to Business and Professions Code, Section 19059.7.

1.5 SUBMITTALS

A. Submit manufacturer's certificates under provisions of Section 01 33 00 that materials meet or exceed specified regulatory requirements.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS - INSULATION MATERIALS

A. Certain Teed Corp., www.certainteed.com.

B. Johns Manville Corp., www.jm.com.

C. Knauf Insulation, www.knaufinsulation.us.

D. Owens-Corning Fiberglass Corporation, www.owenscorning.com.

E. Substitutions: Under provisions of Section 01 25 00.

2.2 MATERIALS

A. Thermal Batt Insulation, Concealed Wall and Roof: ASTM C665 Preformed fiber glass batt, Type II Kraft Faced, Class C, Category 1 "SmartBatt", with stapling flange for attachment to applicable construction. Equivalent continuous roll membrane facing of "MemBrain" Continuous Air Barrier and Smart Vapor Retarder may be utilized in lieu of individual glass fiber batts. Provide R19 at walls.

B. Thermal Batt Insulation, Exposed at underside of roof: Replace existing damaged or missing insulation at underside of roof with new preformed glass fiber batts to match existing.ASTM C665 Preformed fiber glass batt, Type II Kraft Faced, Class C, Category 1, "SmartBatt", with stapling flange for attachment to existing roof framing.

C. Acoustical Batt Sound Insulation, Concealed Wall and Ceiling: ASTM C665 preformed glass fiber batt, Type I unfaced, with flame spread of 25 or less, and a smoke density of 450 or less when tested in accordance with ASTM E84. Provide 6 inch thickness.

D. Spindle Fasteners: Steel impale spindle and clip on flat metal base, spot self adhering backing, length to suit insulation thickness, capable of securely and rigidly fastening insulation in place.

E. Scrim-sheet: Provide continuous "black" scrim sheet at underside roof insulation at all exposed ceiling areas. Attach to existing wood roof framing under roof roof decking.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation are dry and ready to receive insulation.

B. Verify that enclosed spaces are ventilated to dissipate humidity.

C. Maximum relative humidity level of less than 50 percent shall be maintained during installation of insulation.

3.2 INSTALLATION

A. Install insulation in accordance with insulation manufacturer's instructions and ASTM C1320.

B. Fill any small spaces around door frames, window frames, skylight frames, and other wall or roof openings with insulation.

C. Fill hollow space of steel door frame, steel window frame and other wall or roof frame with insulation.

D. Fill hollow space created by wall or roof framed headers and jamb spaces with insulation.

E. Install batt sound insulation in interior walls full height of wall.

F. Install batt sound insulation above ceilings in areas as indicated. Extend a minimum of 4'-0" beyond face of vertical dividing partitions of space to be insulated where partition terminates at ceiling.

G. Install batt sound insulation at underside of floor decking between adjacent floor levels.

H. Trim insulation neatly to fit spaces.

I. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation. Leave no gaps or voids.

J. Install with factory applied membrane facing warm side of building spaces.

K. Lap ends and side flanges of vapor barrier membrane over face of framing members.

L. Extend vapor barrier on to any adjacent construction and tape seal edge of vapor barrier.

M. Seal butt ends, lapped flanges, and tears or cuts in membrane with tape or another layer of membrane.

N. Seal joints in vapor barrier caused by pipes, conduits, electrical boxes, and similar items penetrating vapor barrier.

O. Tape stapling flange over flange of adjacent blanket to flange of metal stud.

P. Friction fit sound insulation between studs and fill as required to completely fill space between the wall finishes.

Q. Where wall finish does not occur, lace 16 gauge support wire through studs at not-to-exceed 16 inches oc vertically at metal studs.]

R. Retain unsupported roof insulation to metal or concrete substrate with spindle fasteners at 24 inches on center.

END OF SECTION

SECTION 07 54 19 - POLYVINYL-CHLORIDE (PVC/TPA) ROOFING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Mechanically-fastened thermoplastic PVC roofing system on wood deck, including:
   2. Roof insulation cover board.
   3. Walkway material.

1.2 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and glossary in applicable edition of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" for definition of terms related to roofing work in this Section.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.
   1. Meet with Owner, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
   2. Review specifications.
   3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
   4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   5. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
   6. Review structural loading limitations of roof deck during and after roofing.
   7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
   8. Review governing regulations and requirements for insurance and certificates if applicable.
   9. Review temporary protection requirements for roofing system during and after installation.
   10. Review roof observation and repair procedures after roofing installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. SDS: For each type of product indicated.

C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
   1. Tapered insulation, including slopes and crickets.

1.5 CLOSEOUT SUBMITTALS

A. Executed copies of warranties.

B. Maintenance Data: To include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.

B. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be the following:
   1. An authorized full-time technical employee of the manufacturer.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site access to manufacturer's written recommendations and instructions for installation of products.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
   1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT / FIELD CONDITIONS

A. Retain, revise, or delete paragraphs and subparagraphs in this article to suit Project.

B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
   1. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
   2. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.
   3. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.

4. Remove temporary plugs from roof drains at end of each day.
5. Remove and discard temporary seals before beginning work on adjoining roofing.

1.9 WARRANTY

A. Manufacturer's Warranty: Roof System Manufacturer's standard form in which Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period, as follows.
   1. Form of Warranty: Manufacturer's standard warranty form.
   2. Scope of Warranty: Work of this Section and including sheet metal details and termination details installed by the roof system Installer and approved by the Roof System Manufacturer.
   3. Warranty Period: 20 years from date of completion.

B. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.
   1. Inspections to occur in following years: 2, 5, 10, 15 following completion.

C. Installer Warranty: Installer's warranty signed by Installer, as follows.
   1. Form of Warranty: Form acceptable to Roofing Manufacturer and Owner.
   2. Scope of Warranty: Work of this Section.
   3. Warranty Period: 2 years from date of completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: The roof system specified in this Section is based upon products of Tremco, Inc., Beachwood, OH, (800) 562-2728, www.tremcoroofing.com that are named in other Part 2 articles. Provide specified products or equal.

C. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
   1. Accelerated Weathering: Roofing system shall withstand 10,000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
   2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746/D3746M, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

B. Exterior Fire-Test Exposure: ASTM E108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

C. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E1980, based on testing identical products by a qualified testing agency.

2.3 MATERIALS, GENERAL

A. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

2.4 THERMOPLASTIC MEMBRANE MATERIALS

A. PVC Roof Membrane:
   1. Thermoplastic PVC/TPA sheet, internally fabric reinforced, Energy Star qualified, CRRC listed, and California Title 24 Energy Code compliant, ASTM D4434 Type IV.
      a. Basis of design product: Tremco, TPA Single Ply Roof Membrane.
      b. Tensile Strength at 0 deg. F (-18 deg. C), minimum, ASTM D751: 300 lbf/in (1330 N).
      c. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D751: 100 lbf (440 N).
      d. Elongation at 0 deg. F (-18 deg. C), minimum at fabric break, ASTM D751: 25 percent machine direction, 25 percent cross-machine direction.
      e. Minimum Thickness, nominal, ASTM D751: 0.060 in (1.5 mm).
      f. Color: White.
      g. Solar Reflectance Index (SRI), ASTM E1980: 108 (White, initial) 84 (White, 3-year aged).
      h. Recycled Content, minimum: 25 percent pre-consumer.

B. Membrane Flashing: Manufacturer's standard, smooth-backed, sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.

2.5 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
   1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Flashing Membrane Adhesive:
   1. Bonding adhesive, contact-type solvent-based low VOC, for bonding TPA non-fleece-backed single ply membranes and flashings to substrates.
      a. Basis of design product: Tremco, TPA LV Single Ply Bonding Adhesive.
      b. VOC, maximum, ASTM D3960: 200 g/L.

C. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 mm by 3 mm) thick; with anchors.

D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to membrane roofing system manufacturer.

E. Joint Sealant: Elastomeric joint sealant compatible with roofing materials, with movement capability appropriate for application.
   1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.
      a. Basis of design product: Tremco, TremSEAL Pro.
      b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.
      c. Hardness, Shore A, ASTM C661: 40.
      d. Adhesion to Concrete, ASTM C794: 35 pli.
      e. Tensile Strength, ASTM D412: 350 psi (2410 kPa).
      f. Color: White.

F. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

G. Gutters: 22 gauge, Kynar coated 5" x 5" x 5" box gutters.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.6 ROOF INSULATION MATERIALS

A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from insulation manufacturer's standard sizes, suitable for application, and of thicknesses indicated.
   1. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes at the high side of the penthouse and curbs.. Fabricate to slopes indicated, not less than two times the roof slope.

2.7 ROOF INSULATION ACCESSORIES

A. Cover Board:
   1. Gypsum panel, glass-mat-faced, ASTM C1177/C1177M.
      a. Basis of design product: Tremco/GP Gypsum DensDeck.
      b. Thickness: 1/4 inch (6 mm).

B. Insulation Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

2.8 WALKWAY MATERIALS

A. Walkway Material:
   1. Walkway roll, reinforced PVC/TPA membrane roll with serrated slip-resistant surface, fabricated for heat welding to compatible PVC/TPA membrane surface.
      a. Basis of design product: Tremco, TPA Walkway Roll.
      b. Roll Size: 36 inches by 60 foot (914 mm by 18.3 m).
      c. Thickness / Color: Gray, 0.072 inch (2 mm).
      d. Tensile, Grab ASTM D751: 200 lbf (890 N).
      e. Tear Strength, Tongue : 45 lbf (200N).
      f. Low Temp Flex: -40 deg F. (-40 deg C.).

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
   1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
   2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
   3. Existing Prepared Roof Substrate: Verify that existing insulation and substrate is sound and dry. Refer to requirements of Division 07 Section "Preparation for Re-Roofing."
   4. Wood Roof Deck: Verify that deck is sound and dry and securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.

5. Verify that existing substrate is sound and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Remove the existing roofing system, fasteners and underlayment and dispose.

C. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

D. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 INSTALLATION, GENERAL

A. Install roofing system in accordance with manufacturer's written instructions and approved details.

3.4 INSULATION INSTALLATION

A. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.

B. Tapered Insulation and Crickets: Install tapered insulation at the high side of the penthouse and roof curbs.
   1. Where crickets are indicated or required to provide positive slope to drain, make slope of crickets minimum of two times the roof slope.

C. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

D. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
   1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

E. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

F. Cover Boards: Install cover boards over crickets and plywood decking with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together.
   1. Mechanically fasten cover boards.

3.5 MECHANICALLY FASTENED MEMBRANE ROOFING INSTALLATION

A. Mechanically fasten membrane roofing over area to receive roofing and install according to roofing system manufacturer's written instructions.
   1. For in-splice attachment, install membranes roofing with long dimension perpendicular to steel roof deck flutes.

B. Start installation of membrane roofing in presence of roofing system manufacturer's technical personnel.

C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Mechanically fasten or adhere membrane roofing securely at terminations, penetrations, and perimeter of roofing.

E. Apply membrane roofing with side laps shingled with slope of roof deck where possible.

G. In-Seam Attachment: Secure one edge of membrane sheet using fastening plates or metal battens centered within membrane seam and mechanically fasten membrane sheet to roof deck.

H. Welded Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
   1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
   2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
   3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

3.6 GUTTER INSTALLATION

A. Remove existing gutters and gutter guards is dispose.

B. Install new vertical sheet metal flashing to cover the expose wood nailer (where the flashing is missing) at the top of the alley facing wall.

C. Install new box gutters and secure to the edge of the roof deck.

D. Install gutter straps every 2.5'.

E. Install gutter drops and tie into the existing downspouts.

3.7 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Seal top termination of base flashing with a metal termination bar and a continuous bead of joint sealant.

F. Remove copings where they intersect roofing, install roofing membrane up and over the walls and reinstall copings.

G. Cut and skirt the counter flashings at the plaster walls.

H. Skirt curbs with new sheet metal flashings. This is not necessary at skylights.

3.8 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in front of mechanical unit service doors and at penthouse man door. Heat weld to substrate.

3.9 FIELD QUALITY CONTROL

A. Roofing Inspector: Manufacturer to provide employee to visit the project 2-3 times per week during the installation and provide written reports to the project stakeholders..

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.10 PROTECTING AND CLEANING

A. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

B. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 54 19

SECTION 07 62 00 - ROOF RELATED SHEET METAL

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.1 SECTION INCLUDES

A. It is the intent of this Section that the Work shall:
   1. Conform to all applicable building code requirements and of authorities having jurisdiction;
   2. Include all shop and field formed sheet metal work shown on drawings, specified or required, including, but not limited to:
      a. Roof penetration sleeves and hood and umbrella counterflashing
      b. Metal counterflashing
      c. Roof drains
      d. Scuppers
      e. Metal perimeter edge
      f. Gutters and downspouts
      g. One-way roof moisture relief vents
      h. Metal gravity vents
      i. Metal heat exhaust vents
      j. Sanitary vent pipes
      k. Pipe box
      l. Copings, trim and miscellaneous sheet metal accessories.
   3. be part of the Work of Section 07 52 50, Modified Bitumen Membrane Roofing System; and be performed by a single source contractor.

B. Related Sections:
   1. Section 07 54 19: Polyvinyl-Chloride/TPA Roofing
   2. Section 07 72 00: Roof Accessories.
   3. All Sections of Work relating to or affecting the roofing system, including mechanical, plumbing and electrical items.

C. References
   1. ASTM International (ASTM)
      a. A525, Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
      b. A526, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality
      c. A527, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock-Forming Quality
      d. A167, Standard Specification for Galvanized and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
      e. B32, Standard Specification for Solder Metal
      f. C1107, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
   2. FM Global (FM)
      a. Loss Prevention Data Sheets: I-49, Perimeter Flashing
   3. National Association of Architectural Metal Manufacturers (NAAMM)
   4. National Roofing Contractors Association (NRCA)
      a. Roofing and Waterproofing Manual – Latest Edition

5. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
   a. Architectural Sheet Metal Manual – Latest Edition
6. ANSI / SPRI ES-1: Fabricate and install sheet metal edge flashings and copings to comply with requirements of ANSI / SPRI ES-1 for 115 MPH wind speed zone and wind resistance loads.

1.2 SUBMITTALS

A. Product Data:
   1. Manufacturer's specifications and other data needed to prove compliance with specified requirements.
   2. Manufacturer's installation instructions.

B. Shop Drawings: Indicating sizes, configurations, details of attachment to related and adjacent work, materials, and finishes.

C. Samples:
   1. Full range of finish colors for Architect's selection.
   2. 12 inch long sample of each specified item with approved finish.
   3. Provide full size mockup of all shop built assemblies.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Fabricator and installer of roof-related flashing and accessories shall be the same as the membrane roof installer.

B. Comply with governing codes and regulations of authorities having jurisdiction.

1.4 INSTALLATION CONFERENCE

A. Installation conference to be conducted on site.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver, handle and store materials in accordance with manufacturer's instructions.

B. Handle and store materials and equipment in such a manner as to avoid damage.

C. No storage of materials shall be permitted on roof areas other than those materials that are to be installed the same day. Any exception must be in written form. Do not place materials or equipment in such a manner as to overload structure.

1.6 WARRANTIES

A. Manufacturer's Product Warranty:
   1. Manufacturer's standard 20 year Kynar 500 or Hylar 5000 Finish warranty signed by the manufacturer, with guarantee covering any failure of the fluoropolymer finish during the warranty period.
   2. Failure is defined to include, but not be limited to:
      a. Deterioration of finish, such as fading, discoloring, peeling, cracking, corroding, etc.
   3. Correction may include repair or replacement of failed product.

B. Roofing Contractor's Warranty:

1. Contractor shall warrant the sheet metal work and related work to be free from defects in workmanship and materials, and that the metal flashings will be and remain watertight, for a period of five (5) years from date of Substantial Completion.
2. Defects shall include, but not be limited to:
   a. Leaking water or bitumen within building or construction.
   b. Becoming loose from substrate.
   c. Loose or missing parts.
   d. Finish failure as defined above.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Manufacturers named within specification are approved for use on the Project providing:
   1. their products meet or exceed the specifications;
   2. company has a minimum of five (5) years experience manufacturing products of the type specified;
   3. products have been tested in conjunction with roofing membrane system as an assembly and as such has obtained the same approval and rating as the roofing membrane system; and
   4. products are approved for use by the roofing membrane manufacturer.

B. Substitutions shall be in accordance with Division 1 requirements regarding substitutions.

2.2 SHEET METAL MATERIALS

A. General Requirements: Roofing sheet metal system shall have been tested in conjunction with roofing membrane system as an assembly and have the same approval and rating as the roofing membrane system.

B. Galvanized Sheet Steel:
   1. Commercial quality ASTM A527 G-90 hot-dip galvanized coating designation.
   2. Thickness: Except as otherwise indicated, minimum 24 gauge. SMACNA recommendations shall govern.
   3. Finish:
      i. Surface Preparation: Acid etch galvanized surfaces that have not weathered at least six (6) months prior to beginning painting operations.
      ii. Finish: One coat Macropoxy 646 (B58-600), two (2) coats HS Polyurethane, Sherwin Williams, or equal.
      iii. Color: White.

C. Sheet Lead:
   1. Comply with FS QQ-L-201, Grade B
      a. Four (4) pound minimum for use at roof drains and soil stacks.

D. Galvanized Steel: ASTM A527 with G-90 hot-dip galvanized coating designation. Minimum thickness 24 gauge, except as otherwise noted.

E. Stainless Steel: ASTM A167, Type 302/304 Soft Temper, No. 2D finish. Minimum thickness 24 gauge, except as otherwise noted.

2.3 FASTENERS

A. Same metal as flashing/sheet metal or other non-corrosive metal or as noted below.

B. Exposed fasteners shall be self-sealing and gasketed for weathertight installation. (ZAC type)

C. Match finish of exposed heads with material being fastened.

D. Mechanical Fasteners:
   1. Nails: Ring shank, minimum 1-1/2 inches in length with 1/2 inch diameter head.
   2. Washers: Steel washers with bonded rubber sealing gasket.
   3. Screws: Self-tapping/Self-piercing sheet metal type of galvanized steel or compatible with material being fastened, with integral EPDM washers.
   4. Rivets: Stainless steel and cadmium plated material, closed end type of sizes recommended by sheet metal manufacturer to suit application.

E. Clips:
   1. Continuous Cleat (coping/fascia): Minimum 22 gauge, G-90 galvanized finish or galvanized steel. Match material of coping/fascia and provide one (1) gauge heavier.

2.4 RELATED MATERIALS

A. Solder: ASTM B32, alloy grade 58, 50 percent tin, 50 percent lead.

B. Flux:
   1. Phosphoric acid type, manufacturer's standard.
      a. For Use with Steel or Copper: Rosin flux
      b. For Use with Galvanized Steel: Acid-chloride type flux, except use rosin flux over tinned surfaces.

C. High-Temperature Sheet 40 mil thick SBS modified bituminous product of self-adhering type with polyethylene-film surface conforming to "Lastobond Shield HT" manufactured by Soprema, Inc., or approved equal.

D. Adhesives: Type recommended by flashing sheet manufacturer seaming and adhesive application of flashing sheet to ensure adhesion and watertightness.

E. Metal Accessories: Sheet metal clips, straps, anchoring devices, clamps and similar accessories required for the complete installation of work, matching or compatible with material being installed, non-corrosive, size and gauge recommended by installer to suit application and performance.

F. Sealant:
   1. Type A:
      a. Type: One-part, non-sag, moisture-curing polyurethane sealant.
      b. Approved Products/Manufacturers:
         1. "Chem-Calk 900" manufactured by Bostik Construction Products Division,
         2. "Vulkem 921" manufactured by Mameco International, Inc.,
         3. "Dynatrol I" manufactured by Pecora Corporation,
         4. "NP 1" manufactured by Sonneborn Building Products, or
         5. Approved equal.
   2. Type B:
      a. Type: One-part, neutral-curing, medium-modulus silicone sealant for sealing metal to metal surfaces, i.e. metal edge, cover plates, etc.

b. Approved Products/Manufacturers:
   1. "Chem-Calk 1200" manufactured by Bostik Construction Products Division,
   2. "795 Silicone Building Sealant" manufactured by Dow Corning Corporation,
   3. "895 Silicone" manufactured by Pecora Corporation,
   4. "Omniseal" manufactured by Sonneborn Building Products,
   5. "Spectrem 2" manufactured by Tremco Incorporated, or
   6. Approved equal.

G. Liquid Applied Penetration Flashing System:
   1. Polyurethane bituminous PMMA resin with polyester fleece reinforcement specifically formulated for liquid applied flashing or roof penetrations to be utilized at following locations:
      a. Flashing drains, penetrations, protrusions, electrical penetrations, low curb details, I-beams and other similar or unconventional conditions.
      b. Approved Product/Manufacturer:
         1. Soprema Product: Alsan Flashing; Polyfleece
         2. Siplast Product: ParaPro Flashing Resin; Pro Fleece
         3. Firestone Product: UltraFlash Liquid Flashing; UltraFlash Fabric

H. Termination Bar:
   1. Material: Extruded aluminum bar with flat profile.
   2. Size: 1/8 inch thick by one (1) inch wide with factory punched 1/4 inch x 3/8 inch oval holes spaced six (6) inches on center.
   3. Approved Product/Manufacturer: "TB 125" manufactured by TruFast Corp., or approved equal.

I. Pipe Hangers and Supports: Refer to Section 07 72 00, Roof Accessories.

2.5 FABRICATION

A. Except as otherwise indicated, fabricate work in accordance with SMACNA Architectural Sheet Metal Manual and other recognized industry practices and reviewed shop drawings. Form all flashings, receivers and counterflashings in accordance with standards set forth in the NRCA roofing manual *and* SMACNA.

B. Comply with manufacturer's installation instructions and recommendations.

C. Unless noted otherwise, fabricate perimeter edge/fascia, scuppers, gutters, downspouts, copings, and trim from pre-finished galvanized sheet.

D. Shop fabricate work to greatest extent possible. Fabricate inside and outside corners for metal edges, counterflashing, and coping caps of equal length – minimum 2 foot lengths

E. Fabricate items to size and dimensions as indicated on the drawings. Limit single-piece lengths to ten (10) feet.

F. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work sufficient to permanently prevent leakage, damage or deterioration of the work.

G. Integrate flashing in a manner consistent with detailing. Form work to fit substrates.

H. Make angle bends and folds for interlocking metal with full regard for expansion and contraction to avoid buckling or fullness in metal after installation.

I. Fabricate items with straight lines, sharp angles, smooth curves, and true levels. Avoid tool marks, buckling, and oil canning.

J. Fold back edges on concealed side of exposed edge to form hem.

K. Unless noted otherwise, lap joints minimum one (1) inch. Rivet and solder joints on parts that are to be permanently and rigidly assembled.

L. Seams:
1. Wherever possible, fabricate non-moving seams in sheet metal with flat-lock seams and end joints.
2. Pre-finished Galvanized Steel: Seal pre-finished metal seams with rivets and silicone sealant.
3. Metal Other than Aluminum: Tin edges to be seamed, form seams, and solder..

M. Backpaint all concealed metal surfaces with bituminous paint where expected to be in contact with cementitious materials or dissimilar metals.

N. Expansion Provisions: Where lapped or bayonet type expansion provisions in work cannot be used or would not be sufficiently waterproof or weatherproof, form expansion joints of intermeshing hooked flanges, not less than one (1) inch deep filled with mastic sealant concealed within joints.

2.6 FABRICATED ITEMS

A. Metal Flashings: (Minimum ten (10') foot lengths)
1. Through wall Receiver Tray: Minimum 24 gauge stainless steel, through wall receivers shall not extend past the face of the exterior veneer more than ¾".
2. Counterflashing: Minimum 24 gauge pre-finished galvanized metal.

B. Wind Clips: Minimum 24 gauge to match material of counterflashing, one (1) inch wide by length to engage counterflashing a minimum of 1/2 inch.

C. Metal Edge:
1. Minimum 24 gauge pre-finished galvanized metal formed in maximum ten (10) foot lengths, with six (6) inch wide cover plates of same profile, four (4) inch flange, maximum seven (7) inch fascia, including a 3/4 inch gravel stop. For fascias over (7) inches a two (2) piece fascia with separate cleat will be required.
2. Provide expansion slip joints at maximum 20 feet on center.
3. Shop fabricate all interior and exterior corners. Fabricate exterior corners with 18 inch minimum to four (4) foot maximum legs. Lap, rivet, and seal prior to delivery to jobsite.
4. Fabricate to sizes and dimensions as indicated on drawings with a minimum one (1) inch coverage past top of wall. Refer to SMACNA Fig. 2-5A.
5. Provide mock-up for Architect's approval prior to fabrication.

D. Continuous Cleats: Continuous strips, same material and profile, minimum one gauge heavier of item which cleats attach.

E. Vent Hoods, Sleeves, Penetration Flashings, and Accessories: Minimum 24 gauge stainless steel, or as shown or directed otherwise.

F. Angle Termination Bar: One (1) inch x one (1) inch 24 gauge galvanized steel.

G. Roof Drain Flashing: Four (4) pound lead, minimum 36 inches by 36 inches.

H. Coping:
1. Refer to section 07 62 01 – COPING SYSTEM.

I. Gutters, Downspouts and Collector Heads:
1. Gutters and Downspouts:
a. 24 gauge pre-primed galvanized metal formed in maximum ten (10) foot lengths, with six (6) inch wide cover plates.
b. Minimum five (5) inch x six (6) inch box gutter (verify size meets rainfall data per SMACNA).
c. Downspout: ASTM A53, schedule 10 galvanized pipe, standard weight, one piece without joints.
d. Finishes: Field-applied coating schedule:
1. Primer: One (1) coat Pro-Cryl Pro Industrial Primer (B66W310) Sherman Williams. Or equal
2. Finish: Two (2) coats Sher-Cryl HPA High Performance Acrylic (B66W300) Sherman Williams, or equal.
3. Finish Color: White
2. Gutter/Downspout Straps:
a. Minimum 24 gauge pre-finished (match color of gutter) galvanized metal. Hem both sides.
3. Gutter Supports:
a. 24 gauge pre-finished galvanized steel. Hemmed around 1/8 inch galvanized bent steel bracket.
4. Gutter Screen:
a. Galvanized steel ¼" diamond wire screen enclosed in a pre-finished steel frame.
5. Collector Head:
a. 24 gauge pre-finished galvanized metal.
b. As outlined in SMACNA;
c. Refer to Figure 1-25F and Figure 1-28 with alternate Section A-A.
6. Base Metal:
a. Steel conforming to:
1. ASTM A924/A792 (Formerly ASTM A792) minimum yield 40,000 psi
2. [For primers thicker than 0. 5 mil] Steel conforming to ASTM A65 3 (formerly ASTM A446), G-90 Galvanized, minimum yield 43,500 psi
3. 24 gauge.

J. Pipe Box Cover: 24 ga. stainless steel.

K. Heat Exhaust Curbs and Hoods: 22 gauge stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrates are smooth and clean to extent required to perform sheet metal work.

B. Verify roof openings, curbs, pipes, sleeves, ducts or vents through roof are solidly set in place.

C. Verify that reglets, nailers, cants, and blocking to receive sheet metal are in place and free of concrete and soil.

D. Do not start work until conditions are satisfactory.

3.2 PREPARATION

A. Field measure site conditions prior to fabrication work.

B. Install starter and edge strips and cleats before starting installation.

3.3 INSTALLATION

A. Install sheet metal with lines, arises, and angles sharp and true, and plane surfaces free from objectionable wave, warp, or buckle. Exposed edges of sheet metal shall be folded back to form 1/4 inch hem on concealed side from view. Finished work shall be free from water retention and leakage under all weather conditions. Pre-fabricated corners or transitions are required at changes in direction, elevation, or plane and at intersections. Locate field joints not less than 12 inches, nor more than three (3) feet from actual corner. Laps shall be one (1) inch, riveted and soldered at following locations:
1. Pre-fabricated corners;
2. transitions;
3. changes in direction, elevation, and plane; and
4. at intersections.

B. Anchor units of work securely in place to prevent damage or distortion from wind or buckling. Provide for thermal expansion of metal units; conceal fasteners wherever possible; and set units true to line and level as indicated. Install work with laps, joints, and seams which are permanently watertight and weatherproof.

C. Install fabricated sheet metal items in accordance with manufacturer's installation instructions and recommendations and with SMACNA Architectural Sheet Metal Manual.

D. Separations: Provide for separation of metal from dissimilar metal or corrosive substrates by coating concealed surfaces with zinc chromate, bituminous coating, or other permanent separation at locations of contact as recommended by manufacturer or fabricator. Do not use materials which are incompatible with roofing system.

E. Continuous Cleat: At exposed edges of perimeter edge, fascias, cap flashings, and where required, attach continuous cleat at six (6) inches on center with appropriate fasteners.

F. Gravel Guard/Fascia:
1. Install with expansion joints 10 feet o.c., 1/2 inch expansion leeway, with cover plate.
2. Set in asphalt mastic and fasten into nailer at 3 inches o.c. staggered.
3. Buff sand Kynar surface of flange and prime.
4. Strip in flange with specified stripping plies set in hot bitumen extending 3 inches from outer edge of flange to at least 3 inches inward towards gravel stop. Provide finish stripping ply of modified bitumen base ply in hot bitumen extending 6 inches from the outer edge of the flange and butt base of gravel stop.

G. Counterflashing:
1. Do not use surface mount counterflashing

2. Set in through wall with receiver and spring lock counterflashing, as detailed in drawings and to NRCA roofing manual, SMACNA standards.
3. Coordinate installation of through-wall flashing with the veneer contractor.
4. Seal through-wall in conjunction with substrate wall waterproofing.
5. Install wind clips 30 inches o.c. at all counterflashing over five (5) feet in length.

H. Liquid Applied Penetration Flashing System: (Sanitary Vent Stacks)
1. Precut fleece for wrapping pipe, ensure the fleece extends 4" up the pipe and the fingers extend a minimum of 2" onto the field. The fingers of the fleece should be approximately 1-2" wide. Ensure when wrapping the pipe, the fleece overlaps 1".
2. Precut fleece for field, ensure the fleece extends 8" from the pipe in all directions. Using two pieces of fleece with overlap of 2" and cut out an opening for the pipe allowing a "snug" fit.
3. Dry fit all of the fleece for proper fit. Tape off 1" past the fleece in the field and on the pipe for clean application. Label fleece pieces (1,2,3) and mark on tape to ensure proper order of placement.
4. Buff sand penetration to create a rough surface.
5. Stir liquid flashing to ensure no separation.
6. Apply liquid flashing to the penetration at a rate of 2 gallons per square, ensuring there is no drips, dry spots and that the coverage is uniform.
7. Apply fleece to wet liquid flashing using the brush to ensure fingers spread correctly and lay flat. Apply liquid flashing in fleece 1" overlap to ensure fleece remains in place then apply liquid flashing to fleece on pipe and onto fingers. Apply in the direction of the fleece wrap to prevent voids, fish mouths, and/or creases in the fleece.
8. Apply liquid flashing to 1/2 of the field area at a rate of 2 gallons per square, look for similar coverage as the first application to the pipe and no dry spots.
9. Apply fleece into wet liquid flashing. Do not apply full coating on top just ensure it is set in place with light pressure.
10. Apply liquid flashing to the other 1/2 of the field area and in the area that will be overlapped by the second piece of field fleece.
11. Apply fleece into wet liquid flashing and coat the full field area with liquid flashing at a rate of 2 gallons per square. Ensure that the fleece is completely saturated and there are no voids or dry areas.
12. Remove tape around penetration and field and let dry 24 to 48 hours (curing time may vary with temperature and humidity)
13. Apply second coat of liquid flashing to pipe and field after first coat cures approximately 1-1/2" past the previous application at a rate of 2 gallons per square.
14. Broadcast granules into liquid flashing until refusal. Wait for coat to dry and then brush off remaining granules.

I. Roof Drains:
1. After membrane installation, prime bottom of lead flashing sheet and set in uniform bed of plastic roof cement at specified locations.
2. Extend lead flashing into drain bowl or pipe a minimum of two (2) inches and over top of piping/bowl connection, if possible. Apply a continuous bead of specified Type A sealant, at intersection of pipe and drain bowl.
3. If drain bowl and pipe connection is contaminated with bituminous material, strip-in area with three (3) coursing of plastic roof cement and fabric.
4. Prime top of lead flashing sheet to receive strip-in membrane.

J. Gutters / Downspouts:
1. Install gutters as detailed.
2. Install downspouts plumb and level, attached to columns or wall with straps located at top and bottom of downspout and maximum ten (10) feet on center.

3. End Caps, Downspout Outlets, Gutter and Downspout Straps, Support Brackets and joint fasteners to be manufactured to suit profile and dimension of gutter and downspout.
4. Install all anchoring devices as outlined in SMACNA.
5. Expansion Joints: Lap or Butt type per SMACNA, locate every 50 linear feet.

K. Coping:
1. Install wood nailers as shown on drawings.
2. Install metal cleats with appropriate fasteners spaced six (6) inches on center.
3. Install underlayment over the wood substrate. Lap ends minimum of six (6) inches and secure membrane in place. Seal laps with appropriate adhesive.
4. Install metal coping allowing 1/2 inch spaces between segments. Lock coping onto cleat and install appropriate fasteners through the interior fascia spaced 24 inches on center in enlarged holes.
5. Install cover plate centered over coping joint in continuous beads of specified Type B sealant, placed approximately one (1) inch from cover edges. Refer to SMACNA for alternate joints as required by length.
6. Install appropriate fastener through neoprene washer and cover plate between coping segments.
7. Accommodate building wall expansion joints by terminating coping joints and cleats either side of expansion joint. Do not run coping or cleats continuous across joints. Install coping cover plate to span across joint and lap coping on each side of joint a minimum of four (4) inches. Fasten cover plate on one (1) side of joint only. (Provide wall flashing membrane up and over parapet wall in accordance with manufacturer's detail.)

3.4 CLEANING AND PROTECTION

A. Remove flux and residual acid immediately by neutralizing with baking soda and washing with clean water. Leave work clean of stains.

B. Remove scraps and debris and leave work area clean.

C. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes. Paint areas where finish is damaged on pre-finished metal by painting with a compatible paint in color to match undamaged finish.

D. Prime soldered area of phosphatized metal after cleaning to prevent rusting.

E. Paint metal flashings that have been soiled with bitumen with aluminized paint.

F. Clean other work damaged or soiled by Work of this Section.

G. Protect finished work from damage.

END OF SECTION 07 62 00

SECTION 07 62 00.01

SHEET METAL FLASHING AND TRIM

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fascias.

B. Counter flashing at piping penetrations, vent pipes, and conduits.

C. Counterflashings over bituminous base flashings.

D. Counterflashings at roof mounted equipment, curbs and supports.

E. Counterflashings for skylights.

1.2 REFERENCES

A. ANSI / SPRI ES-1 Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

B. ASTM A653 - Steel Sheet, Zinc-Coated, (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM A755 - Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.

D. ASTM A792 – Steel Sheet, Aluminum-Zinc Alloy. Coated by the Hot-Dip Process, General Requirements.

E. ASTM A924 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

F. ASTM B32 - Solder Metal.

G. ASTM B101 - Standard Specifications for Lead-Coated Copper Sheet and Strip for Building Construction.

H. ASTM D4586 - Asphalt Roof Cement, Asbestos Free.

I. SMACNA - Architectural Sheet Metal Manual.

1.3 SYSTEM DESCRIPTION

A. Work of this Section is to physically protect base flashings, from damage that would permit water leakage to building interior.

1.4 QUALITY ASSURANCE

A. Applicator: Company specializing in sheet metal flashing work with five years minimum experience.

B. Perform work in accordance with SMACNA standard details and requirements.

C. Copings and roof edge flashings shall conform to SPRI ES-1 testing and shall be in compliance with SMACNA Technical Resource Bulletin #5-09.

D. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings capable of resisting an ultimate design wind speed of 115 miles per hour.

1.5 SUBMITTALS

A. Submit shop drawings, product data, and samples under provisions of Section 01 33 00.

B. Submit shop drawings of sheet metal items indicating profiles, jointing, terminations and installation details. Indicate type and spacing of fasteners.

C. Submittal of specific plates from the SMACNA Architectural Sheet Metal Manual constitutes acceptable documentation of installation details.

D. Submit product data for pre-coated galvanized steel.

E. Submit two samples, 4 x 4 inch in size illustrating metal finish color for pre-coated steel.

F. Submit product data for flashing accessories.

G. Submit warranty for water tightness.

H. Submit warranty for metal finish.

1.6 STORAGE AND HANDLING

A. Store products under provisions of Section 01 61 00.

B. Stack preformed material to prevent twisting, bending, or abrasion, and to provide ventilation.

C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

1.7 WARRANTY

A. Provide warranty under provisions of Section 01 77 00.

B. Provide 2-year warranty coverage for degradation of water tightness and integrity of seals.

C. Provide 20-year warranty coverage for metal finish from all defects.

2. PART 2 PRODUCTS

2.1 SHEET MATERIALS

A. Pre-Coated Galvanized Steel: ASTM A755 on zinc-coated galvanized substrate, ASTM A653, Grade 33, G90 zinc coating in accordance with ASTM A924 or ASTM A792, Grade 50, AZ55 aluminum zinc coating; 0.0299 inch thick core steel.

2.2 ACCESSORIES

A. Lead-Coated Copper: ASTM B101, Temper H00 and H01, cold-rolled copper sheet, coated both sides with lead weighing not less than 12 lb/100 sq. ft. or more than 15 lb./100 sq. ft. total weight of copper sheet with lead applied to both sides.

B. Fastener: Galvanized steel or stainless steel with soft neoprene washers at exposed fasteners. Finish exposed fasteners same as pre-coated metal.

C. Underlayment: Spunbound reinforced polypropylene coated fabric sheet.

1. Premium Grade Feltex as manufactured by SystemComponents Corp., www.systemcomponents.net.

2. Premium Summit Synthetic Underlayment as manufactured by Atlas Roofing Corp., www.atlasroofing.com.

3. Roof Top Guard II Underlayment as manufactured by Underlayment Specialties Plus, www.uspunderlayment.com.

4. Substitutions: Under provisions of Section 01 25 00.

D. Metal Primer: As specified in Section 09 90 00.

E. Protective Backing Paint: Zinc chromate alkyd.

F. Slip Sheet: 0.05 lb./sq. ft., rosin sized building paper.

G. Sealant: Type specified in Section 07 92 00.

H. Bedding Compound: Rubber-asphalt type.

I. Plastic Cement: ASTM D4586, Type I.

J. Metal Flashing System: Two piece pre-coated galvanized steel similar to Springlok Flashing System, manufactured by Fry Reglet, www.fryreglet.com, type as indicated. Include fabricated end closures and mitered corners.

K. Solder for Lead-Coated Copper: ASTM B32, Grade SN 60 percent tin, 40 percent lead.

L. Solder for Zinc: ASTM B32; 50/50 tin/lead type, with rosin flux.

2.3 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate concealed cleats of galvanized steel, ASTM A653, Grade 33, G90 zinc coating, 0.0478 inch thickness, interlockable with sheet.

C. Fabricate exposed cleats and coverplates of same material as sheet, interlockable with sheet.

D. Form pieces in longest practical lengths.

E. Hem exposed edges on underside 1/2 inch. Miter and seam corners.

F. Form material with flat lock seam.

G. Solder and seal metal joints. After soldering, remove flux. Wipe and wash solder joints clean.

H. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

I. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

J. Fabricate vent pipe and roof penetration flashings of lead-coated copper with clamping ring.

2.4 FINISH

A. Site paint exposed to view metal surfaces under provisions of Section 09 90 00.

C. Kynar 500 or Hylar 5000 shop pre-coated finish with 0.2 mil baked on primer and 0.8 mil baked on topcoat for a 1.0 mil dry film thickness. Color to be selected by Architect from manufacturer's entire range of standard colors.

3. PART 3 EXECUTION

3.1 INSPECTION

A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets are in place, and nailing strips located.

B. Verify membrane termination and base flashings are in place, sealed, and secure.

C. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

A. Field measure site conditions prior to fabricating work.

B. Install starter and edge strips, and cleats before starting installation.

C. Install surface mounted reglets true to line and level. Seal top with sealant.

D. Install underlayment with protective slip sheet over parapets, caps, copings, gravel stops and curbs.

3.3 INSTALLATION

A. Conform to indicated details on the drawings and the recommendations included in the SMACNA Architectural Sheet Metal Manual.

B. Provide for thermal expansion of exposed sheet metal work. Space movement joints at 10 feet - 0 inches o.c. maximum with no joints within 2 feet - 0 inches of corners.

C. Form expansion joints of intermeshing hooked flanges filled with sealant.

D. Insert flashings into reglets to form tight fit. Secure in place with lead wedges at maximum 12 inches on center. Pack remaining spaces with lead wool. Seal flashings into reglets with sealant.

E. Secure flashings in place using concealed fasteners. Use exposed fasteners only where indicated.

F. Lap, lock, seam and seal all joints.

G. Apply plastic cement compound between metal flashings and felt flashings. Apply bituminous coating between dissimilar metals where occurs.

H. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

I. Roof-Penetration, Vent Pipe Flashing: Turn lead flashing down inside vent piping. Clamp flashing to other pipes penetrating roof except for vent piping. Seal with elastomeric sealant.

J. Seal metal joints watertight.

3.4 FIELD QUALITY CONTROL

A. Conform to SMACNA Architectural Sheet Metal Manual.

B. Field observation will involve surveillance of Work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 07 62 01 COPING SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Provide all labor, equipment, and materials to and install the specified pre-manufactured coping system as specified: Coping cap at parapets.

B. Reference Standards:
   1. American Society for Testing and Materials (ASTM):
      a. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (galvanized) or Zinc-Iron Alloy-Coated (galvannealed) by the Hot-Dip Process.
      b. ASTM A792 Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy Coated by the Hot-Dip Process.
      c. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
      d. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
      e. ASTM D692 Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures.
   2. American National Standards Institute/Single Ply Roofing Industry (ANSI/SPRI).
   3. Warnock Hersey International, Inc., Middleton, WI (WH).
   4. Factory Mutual Research Corporation (FMRC).
   5. Underwriters Laboratories (UL).
   6. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Latest Edition Architectural Sheet Metal Manual.
   7. National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual.
   8. American Society of Civil Engineers (ASCE):
      a. ASCE 7 Minimum Design Loads for Buildings and Other Structures.

1.3 SUBMITTALS

A. Product Data:
   1. Provide manufacturer's specification data sheets for each product.
   2. Metal material characteristics and installation recommendations.
   3. Submit color chart prior to material ordering and/or fabrication so that equivalent colors to those specified can be approved.

B. Samples: Submit two (2) samples, illustrating typical metal edge, coping, gutters, and fascia extenders for material and finish.

C. Shop Drawings:
   1. For manufactured and ANSI/SPRI approved shop fabricated gravel stops, fascia, scuppers, and all other sheet metal fabrications.
   2. Indicate material profile, jointing pattern, jointing details, fastening methods, flashing, terminations, and installation details.
   3. Indicate type, gauge, and finish of metal.

D. Specimen Warranty: Provide an unexecuted copy of the warranty specified for this Project, identifying the terms and conditions required of the manufacturer and the Owner.

E. Design Loads: Any material submitted as equal to the specified material must be accompanied by a report signed and sealed by a professional engineer licensed in the State of California. This report shall show that the submitted equal meets the wind uplift and perimeter attachment requirements according to ASCE 7. Substitution requests submitted without licensed engineer approval will be rejected for nonconformance.

F. Factory Mutual Research Corporation's (FMRC) wind uplift resistance classification: The roof perimeter flashing shall conform to the requirements as defined by the FMRC Loss Prevention Data Sheet 1-49.

G. A letter from an officer of the manufacturing company certifying that the materials furnished for this Project are the same as represented in tests and supporting data.

H. Mill production reports certifying that the steel thicknesses are within allowable tolerances of the nominal or minimum thickness or gauge specified.

I. Certification of work progress inspection. Refer to Quality Assurance article below.

J. Certifications:
1. Submit roof manufacturer's certification that metal fasteners furnished are acceptable to roof manufacturer.
2. Submit roof manufacturer's certification that metal furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.

K. Closeout Submittals:
1. Special project warranty: Provide specified warranty for the Project, executed by the authorized agent of the manufacturer.
2. Roofing maintenance instructions: Provide a manual of manufacturer's recommendations for maintenance of installed roofing systems.
3. Insurance certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.4 PERFORMANCE REQUIREMENTS

A. Thermal Expansion and Contraction: Completed metal edge flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors, or fasteners, or reducing performance ability.

1.5 QUALITY ASSURANCE

A. Engage an experienced roofing contractor specializing in sheet metal flashing work with a minimum of five (5) years' experience.

B. Maintain a full-time supervisor/foreman who is on the jobsite at all times during installation. Foreman must have a minimum of five (5) years' experience with the installation of similar system to that specified.

C. Source Limitation: Obtain components from a single manufacturer. Secondary products that cannot be supplied by the specified manufacturer shall be approved in writing by the primary

manufacturer prior to bidding.

D. Upon request, fabricator/installer shall submit work experience and evidence of financial responsibility. The Owner's representative reserves the right to inspect fabrication facilities in determining qualifications.

1.6 WARRANTY

A. Owner shall receive one (1) warranty from manufacturer of roofing materials covering all of the following criteria. Multiple warranties are not acceptable:
   1. Pre-finished metal material shall require a written twenty (20) year non-prorated warranty covering fade, chalking, and film integrity. The material shall not show a color change greater than five (5) NBS color units per ASTM D2244 or chalking excess of eight (8) units per ASTM D659. If either occurs, material shall be replaced per warranty at no cost to the Owner.
   2. Changes: Changes or alterations in the edge metal system without prior written consent from the manufacturer shall render the system unacceptable for a warranty.
   3. Warranty shall commence on date of Substantial Completion or final payment, whichever is agreed by contract.
   4. The Contractor shall provide the Owner with a notarized written warranty assuring that all sheet metal work including caulking and fasteners to be watertight and secure for a period of three (3) years from the date of final acceptance of the building. Warranty shall include all materials and workmanship required to repair any leaks that develop, and make good any damage to other work or equipment caused by such leaks or the repairs thereof.
   5. Installing roofing contractor shall be responsible for the installation of the edge metal system in general accordance with the membrane manufacturer's recommendations.
   6. Installing contractor shall certify that the edge metal system has been installed per the manufacturer's printed details and specifications.
   7. One manufacturer shall provide a single warranty for all accessory metal for flashings, metal edges, and copings, along with the warranty for metal roof areas, membrane roof areas, and any transitions between two different material types.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.

B. Stack pre-formed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials that may cause discoloration or staining.

PART 2 PRODUCTS

2.1 PRODUCTS, GENERAL

A. Basis of Design: Materials, manufacturer's product designations, and/or manufacturer's names specified herein shall be regarded as the minimum standard of quality required for work of this Section. Comply with all manufacturer and Contractor/fabricator quality and performance criteria specified in Part 1.

B. Substitutions:
   1. Products proposed as equal to the products specified in this Section shall be submitted in accordance with Bidding Requirements and Division 01 provisions:

a. Proposals shall be accompanied by a copy of the manufacturer's standard specification section. That specification section shall be signed and sealed by a professional engineer licensed in the State of California. Substitution requests containing specifications without licensed engineer certification shall be rejected for nonconformance.
b. Include a list of three (3) projects of similar type and extent, located within a 100-mile radius from the location of the Project. In addition, the three (3) projects must be at least five (5) years old and be available for inspection by the Architect, Owner, or Owner's representative.
c. Equivalency of performance criteria, warranty terms, submittal procedures, and contractual terms will constitute the basis of acceptance.
d. The Owner's decision regarding substitutions will be considered final. Unauthorized substitutions will be rejected.

2.2 ACCEPTABLE MANUFACTURERS

A. The design is based upon roofing systems engineered and manufactured by:
1. The Garland Company
3800 East 91st Street
Cleveland, Ohio 44105
Telephone: 559-647-1196
Website: www.garlandco.com
Local representative: Rich Jones

2.3 MATERIALS

A. General: Product designations for the materials used in this Section shall be based on performance characteristics of the R-MER Edge System manufactured by the Garland Company, Cleveland, OH, and shall form the basis of the Contract Documents.

B. R-Mer Edge Coping:
1. Minimum gauge of steel or thickness of aluminum to be specified in accordance with Architectural Sheet Metal Manual, Sheet Metal and Air Conditioning Contractor's National Association, Inc. recommendations. 22 gauge, Zinc-coated (galvanized) steel sheet, as per ASTM A653: G90 (Z275) coating designation; structural quality, grade 40 ksi (275 MPa).

C. R-Mer Edge Coping Chairs:
1. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 0.0635 nom./ 16 gauge, 36 inches to 48 inches by coil length, chemically treated, commercial or lock-forming quality.

D. Finishes:
1. Exposed surfaces for coated panels:
a. Steel finishes: exterior factory finish shall be pre-primed only.
b. Field-applied coating schedule:
1. Primer: One (1) coat Pro-Cryl Pro Industrial Universal Primer (B66W310) Sherwin Williams, or equal.
2. Finish: Two (2) coats Sher-Cryl HPA High Performance Acrylic (B66W300) Sherwin Williams, or equal.
3. Finish Color: White.
c. Exposed and unexposed surfaces for anodized aluminum flashing, fascia, and coping cap, shall be as shipped from mill.

2.4 RELATED MATERIALS AND ACCESSORIES

A. Metal Primer: Zinc chromate type.

B. Plastic Cement: ASTM D4586.

C. Sealant: Tuff Stuff Urethane Caulking.

D. Underlayment: Aqua Block 60.

E. Slip Sheet: Rosin sized building paper.

F. Fasteners:
   1. Corrosion resistant screw fastener as recommended by metal manufacturer. Finish exposed fasteners same as flashing metal.
   2. Fastening shall conform to Factory Mutual requirements or as stated on section details, whichever is more stringent.

G. Gutter and Downspout Anchorage Devices: Material as specified for system.

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

A. Determine that work of other trades will not hamper or conflict with necessary fabrication and storage requirements for pre-formed metal edge system.

3.2 PROTECTION

A. Isolate metal products from dissimilar metals, masonry, or concrete with bituminous paint, tape, or slip sheet. Use gasketed fasteners where required to prevent corrosive reactions.

3.3 GENERAL

A. Secure fascia to wood nailers at the bottom edge with a continuous cleat.

B. Fastening of metal to walls and wood blocking shall comply with building code standards.

C. All accessories or other items essential to the completeness of sheet metal installation, whether specifically indicated or not, shall be provided and of the same material as item to which applied.

D. Allow sufficient clearances for expansion and contraction of linear metal components. Secure metal using fasteners as required by the system. Exposed face fastening will be rejected.

3.4 INSPECTION

A. Verify that curbs are solidly set and nailing strips located.

B. Perform field measurements prior to fabrication.

C. Coordinate work with work of other trades.

D. Verify that substrate is dry, clean, and free of foreign matter.

E. Commencement of installation shall be considered acceptance of existing conditions.

3.5 MANUFACTURED SHEET METAL SYSTEMS

A. Furnish and install manufactured fascia and coping cap systems in strict accordance with manufacturer's printed instructions.

B. Provide factory-fabricated accessories including, but not limited to, fascia extenders, miters, scuppers, joint covers, etc. Refer to source limitation provision in Part 1.

3.6 SHOP-FABRICATED SHEET METAL

A. Metal work shall be shop fabricated to configurations and forms in accordance with recognized sheet metal practices.

B. Hem exposed edges.

C. Angle bottom edges of exposed vertical surfaces to form drip.

D. Lap corners with adjoining pieces fastened and set in sealant.

E. Form joints for gravel stop fascia system, coping cap with a 3/8-inch opening between sections. Back the opening with an internal drainage plate formed to the profile of fascia piece.

F. Install sheet metal to comply with referenced ANSI/SPRI, SMACNA, and NRCA standards.

3.7 FLASHING MEMBRANE INSTALLATION

A. Snap-On Coping Cap Detail:
   1. Install miters first.
   2. Position base flashing of the built-up and/or modified roofing membrane over the wall edge covering nailers completely, fastening eight inches (8”) on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
   3. Install minimum 16-gauge, 16-inch long by specified width anchor chair, spaced per manufacturer’s recommendations.
   4. Install six-inch (6”) wide splice plate by centering over 16-inch long by specified width anchor chair. Apply two (2) beads of sealant to either side of the splice plate's center, approximately two inches (2”) from the coping cap joint. Install coping cap by hooking outside hem of coping on outside face of anchor chair. Press downward on inside edge of coping until "snap" occurs and hem is engaged on the entire chair.

3.8 CLEANING

A. Clean installed work in accordance with the manufacturer's instructions.

B. Replace damaged work than cannot be restored by normal cleaning methods.

3.9 CONSTRUCTION WASTE MANAGEMENT

A. Remove and properly dispose of waste products generated. Comply with requirements of authorities having jurisdiction.

3.10 FINAL INSPECTION

A. At completion of installation and associated work, meet with Contractor, Architect, installer, installer of associated work, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.

B. Inspect work and flashing of roof penetrations, walls, curbs, and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.

C. Repair or replace deteriorated or defective work found at time of above inspection as required to produce an installation that is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

D. Notify the Owner upon completion of corrections.

E. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

F. Immediately correct roof leakage during construction. If the Contractor does not respond within 24 hours, the Owner will exercise rights to correct the work under the terms of the conditions of the contract.

3.11 DEMONSTRATION AND TRAINING

A. At a time and date agreed to by the Owner, instruct the Owner's facility manager, or other representative designated by the Owner, on the following procedures:
   1. Troubleshooting procedures.
   2. Notification procedures for reporting leaks or other apparent roofing problems.
   3. Maintenance.
   4. The Owner's obligations for maintaining the warranty in effect and force.
   5. The manufacturer's obligations for maintaining the warranty in effect and force.

END OF SECTION 07 62 01

SECTION 07 72 00 ROOF ACCESSORIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Roof curbs.
   2. Equipment supports.

B. Related Sections:
   1. Section 07 62 00: Roof Related Sheet Metal

1.3 SUBMITTALS

A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details for roof accessories. Show layouts of roof accessories including plans and elevations. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other work.

C. Coordination Drawings:
   1. Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
      a. Size and location of roof accessories specified in this Section.
      b. Method of attaching roof accessories to roof or building structure.
      c. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.

D. Warranty: Provide manufacturer's standard warranty.

1.4 QUALITY ASSURANCE

A. Sheet Metal Standard: Comply with SMACNA's Architectural Sheet Metal Manual details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

B. Mockups: Refer to Section 07 62 00: Roof Related Sheet Metal

C. All work must conform to California Building Code.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers listed in other Part 2 articles.

2.2 METAL MATERIALS

A. Galvanized Steel Sheet: ASTM A653/A653M, G90 (Z275) coated.

B. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, AZ50 (AZM150) coated.

C. Aluminum Sheet: ASTM B209, alloy and temper recommended by manufacturer for type of use and mill finish.

D. Aluminum Extrusions and Tubes: ASTM B221, alloy and temper recommended by manufacturer for type of use, mill finished.

E. Stainless-Steel Shapes or Sheet: ASTM A240/A240M or ASTM A666, Type 304 or Type 316, No. 2D finish.

F. Steel Shapes: ASTM A36/A36M, hot-dip galvanized to comply with ASTM A123/A123M, unless otherwise indicated.

G. Steel Tube: ASTM A500, round tube, baked-enamel finished.

H. Galvanized Steel Tube: ASTM A500, round tube, hot-dip galvanized to comply with ASTM A123/A123M.

I. Galvanized Steel Pipe: ASTM A53/A53M.

2.3 MISCELLANEOUS MATERIALS

A. Glass-Fiber Board Insulation: ASTM C726, one inch (25 mm) thick.

B. Polyisocyanurate Board Insulation: ASTM C1289, one inch (25 mm) thick.

C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, not less than 1-1/2 inch (38 mm) thick.

D. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15 mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

E. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.

F. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.

G. Elastomeric Sealant: ASTM C920, polyurethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

H. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant,

polyisobutylene plasticized, and heavy bodied for hooked-type expansion joints with limited movement.

I. Roofing Cement: ASTM D4586, non-asbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.4 ROOF CURBS

A. Roof Curbs:
1. Provide metal roof curbs, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Fabricate with welded or sealed mechanical corner joints, with an integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or shop drawings of equipment to be supported:
   a. Manufacturers (Butler IF Curb):
      1) Colony Custom Curbs.
      2) Commodity Products Company, Inc.
      3) Conn-Fab Sales, Inc.
      4) Curbs Plus Inc.
      5) Custom Curb, Inc.
      6) LM Curbs.
      7) Loren Cook Company.
      8) Metallic Products Corporation.
      9) Pate Company (The).
      10) Roof Products & Systems Corporation.
      11) Roof Products, Inc.
      12) Thaler Metal Industries Ltd.
      13) ThyCurb; Div. of Thybar Corporation.
      14) Uni-Curb, Inc.
      15) Vent Products Company, Inc.
   b. Material: Galvanized or aluminum-zinc alloy-coated steel sheet, 0.052 inch (1.32 mm) thick.
   c. Liner: Same material as curb, of manufacturer's standard thickness and finish.
   d. Factory install wood nailers at tops of curbs.
   e. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
   f. Factory insulate curbs with manufacturer's standard rigid or semi-rigid insulation:
      1) Curb height may be determined by adding thickness of roof insulation and minimum base flashing height recommended by roofing membrane manufacturer. Fabricate units to minimum height of 16 inches (400 mm), unless otherwise indicated.
      2) Sloping roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

2.5 EQUIPMENT SUPPORTS

A. Equipment Supports:
1. Provide metal equipment supports, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported. Fabricate with welded or sealed mechanical corner joints, with an integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or shop drawings of equipment to be supported:
   a. Manufacturers:
      1) Colony Custom Curbs.
      2) Commodity Products Company, Inc.

3) Conn-Fab Sales, Inc.
4) Curbs Plus Inc.
5) Custom Curb, Inc.
6) LM Curbs.
7) Loren Cook Company.
8) Metallic Products Corporation.
9) Pate Company (The).
10) Roof Products & Systems Corporation.
11) Roof Products, Inc.
12) Thaler Metal Industries Ltd.
13) ThyCurb; Div. of Thybar Corporation.
14) Uni-Curb, Inc.
15) Vent Products Company, Inc.

b. Indicate load requirements on Drawings or insert below.
c. Material: Galvanized or aluminum-zinc alloy-coated steel sheet, 0.052 inch (1.32 mm) thick.
d. Factory install continuous wood nailers 3-1/2 inches (90 mm) wide at tops of equipment supports.
e. Metal counterflashing: Manufacturer's standard removable counterflashing, fabricated of same metal and finish as equipment support.
f. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
g. Equipment support height may be determined by adding thickness of roof insulation and minimum base flashing height recommended by roofing membrane manufacturer.
h. Fabricate units to minimum height of 12 inches (300 mm), unless otherwise indicated.
i. Sloping roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

A. Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication and indicate measurements on shop drawings.

3.2 COORDINATION

A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

3.3 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, to verify actual locations, dimensions, and other conditions affecting performance of work:
1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, is securely anchored, and is ready to receive roof accessories.
2. Verify dimensions of roof openings for roof accessories.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.4 INSTALLATION

A. General: Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Install roof accessories to fit substrates and to result in watertight performance.

C. Metal Protection:
   1. Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer:
      a. Coat concealed side of uncoated aluminum and stainless steel roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
      b. Underlayment: Where installing exposed-to-view components of roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.
      c. Bed flanges in thick coat of asphalt roofing cement where required by roof accessory manufacturers for waterproof performance.

D. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.

E. Roof Curb Installation: Set roof curb so top surface of roof curb is level.

F. Equipment Support Installation: Set equipment support so top surface of equipment support is level.

G. Seal joints with elastomeric sealant as required by manufacturer of roof accessories.

3.5 TOUCH UP

A. Touch up factory-primed surfaces with compatible primer ready for field painting in accordance with Section 09 90 00: Painting and Coating.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

3.6 CLEANING

A. Clean exposed surfaces according to manufacturer's written instructions.

END OF SECTION 07 72 00

SECTION 07 81 00

APPLIED FIREPROOFING

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fireproofing, spray applied.

1.2 REFERENCES

A. ASTM E84 - Surface Burning Characteristics of Building Materials.

B. ASTM E119 - Fire Tests of Building Construction and Materials.

C. ASTM E605 - Thickness and Density of Sprayed Fire-Resistive Materials Applied to Structural Members.

D. ASTM E736 - Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.

E. ASTM E759 - Deflection of Sprayed Fire-Resistive Materials Applied to Structural Members.

F. ASTM E760 - Effect of Impact on Bonding of Sprayed Fire-Resistive Materials Applied to Structural Members.

G. ASTM E761 - Compressive Strength of Sprayed Fire-Resistive Materials Applied to Structural Members.

H. ASTM E859 - Air Erosion of Sprayed Fire-Resistive Materials Applied to Structural Members.

I. ASTM E937 - Corrosion of Steel by Sprayed Fire-Resistive Material Applied to Structural Members.

J. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

K. CBC - California Building Code, Title 24 Part 2 of the California Code of Regulations (CCR).

L. ICC ES - International Code Council/Evaluation Service, Inc.

M. UL - Underwriters Laboratories: Fire Hazard Classifications.

N. 40 CFR Part 763, Subpart F(7-1-90 Edition) - Asbestos Hazardous Emergency Response Act, Friable Asbestos-Containing Materials in Schools.

1.3 SUBMITTALS

A. Submit product data under provisions of Section 01 33 00.

B. Manufacturer's Data: Submit manufacturer's specifications and include certification from materials manufacturer to show material compliance with Contract Documents. Include certification from manufacturer, signed by an officer of the firm, stating that the proposed material is free of all forms of asbestos, including actionlite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.

C. Test Data: Submit laboratory test results for sprayed fireproofing for the following:

1. Deflection per ASTM E759.

2. Bond Impact per ASTM E760.

3. Compressive Strength per ASTM E761.

4. Bond Strength per ASTM E736.

5. Air Erosion per ASTM E859.

6. Surface Burning Characteristics per ASTM E84.

7. Corrosion Resistance per ASTM E937.

8. Mold Resistance per ASTM G21.

D. Submit laboratory test reports in accordance with ASTM E119, indicating fire resistance as required to satisfy codes. Submit extracts of classified listings of tests performed by Underwriters Laboratories, Inc.

1.4 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five years documented experience.

B. Applicator: Company specializing in applying the Work of this Section with minimum three years documented experience, approved by manufacturer.

C. Provide fireproofing products containing no detectable asbestos as determined according to the method specified in 40 CFR, Part 763, Subpart F, Appendix A, Section 1.

D. Products, execution, and fireproofing thicknesses shall conform to CBC and UL requirements for the required fire-resistance ratings.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable codes for fire resistance ratings.

B. Submit certification of acceptability of fireproofing materials to authority having jurisdiction.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not apply fireproofing when temperature of substrate material and surrounding air is below 40 degrees F.

B. Provide ventilation to allow proper drying of the sprayed fire-proofing during and subsequent to its application.

C. Maintain non-toxic, unpolluted working area. Provide temporary enclosure to prevent spray from contaminating air.

1.7 SEQUENCING AND SCHEDULING

A. Sequence Work in conjunction with placement of ceiling hanger tabs, mechanical component hangers, and other related sections.

1.8 DELIVERY, STORAGE AND PROTECTION

A. Deliver, store and protect products under provisions of Section 01 61 00.

1.9 WARRANTY

A. Provide warranty that fireproofing will remain free from cracking, checking, dusting, flaking, spalling, separation, and blistering. Reinstall or repair such defects or failures.

2. PART 2 PRODUCTS

2.1 FIREPROOFING WITHIN CONDITIONED SPACES

A. Manufacturers

1. GCP Applied Technologies, ICC ES No. ESR-1186, Monokote Type MK-6, www.gcpat.com.

2. Isolatek International, BlazeShield II, UL ER 13348-01', www.cafco.com.

3. Southwest Fireproofing, Type 5GP, www.southwestfireproofing.com.

4. Substitutions: Under provisions of Section 01 25 00.

B. Materials

1. Fireproofing: Factory mixed, asbestos free, material blended for uniform texture conforming to the following requirements:

(a) Bond Strength: ASTM E736, 200 lb./sq.ft. when set and dry.

(b) Bond Impact: ASTM E760, no cracking, flaking, or delamination.

(c) Dry Density: ASTM E605, minimum average density of 15 lb./cu. ft.

(d) Compressive Strength: ASTM E761, Minimum 500 lb./sq.ft.

(e) Surface Burning Characteristics: In accordance with ASTM E84:

Flame Spread 0

Smoke Developed 0

(f) Air Erosion: Maximum allowable weight loss of the fireproofing material shall be 0.025 grams per square foot when tested in accordance with ASTM E859.

(g) Corrosion Resistance: Tested in accordance with ASTM E937 and shall not promote corrosion of steel.

(h) Resistance to Mold: Formulated at time of manufacturing with mold inhibitor. Tested in accordance with ASTM G21 and shall show resistance to mold growth when inoculated with aspergillus niger.

2.2 ACCESSORIES

A. Provide accessories to comply with manufacturer's recommendations and to meet fire resistance design requirements.

B. Accessories include, but are not limited to, any required or optional items such as bonding agents, mechanical attachments, application aids such as metal lath, scrim or netting and accelerators.

C. Bond seal coating for all exposed to view fireproofing that is to receive a subsequent field applied painted finish under the provisions of Section 09 90 00.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive Work.

B. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.

C. Verify that ducts, piping, equipment, or other items which would interfere with application of fireproofing are not positioned until fireproofing work is complete.

D. Verify that voids and cracks in substrate are filled and projections are removed where fireproofing is exposed to view as a finish material.

E. Do not apply fire-resistive material to metal roof deck substrates until concrete topping, if any, has been applied.

F. For metal roof decks without concrete topping, do not apply fire-resistive material to metal deck substrates until roofing has been completed. Prohibit roof traffic during application and drying of fire-resistive material.

G. Do not apply fire-resistive material to metal floor deck substrates until concrete topping has been completed.

H. Beginning of installation means installer accepts existing surfaces.

3.2 PREPARATION

A. Clean substrate of dirt, dust, grease, oil, loose material, paints, primers, or other matter which may affect bond of fireproofing.

B. Remove incompatible materials which affect bond by scraping, brushing, scrubbing, or sandblasting.

3.3 PROTECTION

A. Protect workmen and public, as required under the regulations of the U.S. Occupational Safety and Health Act (OSHA) and applicable local ordinances and/or code regulations.

B. Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting.

3.4 APPLICATION

A. Equipment and application procedure shall conform to the material manufacturer's application instructions.

3.5 FIELD QUALITY CONTROL

A. Field Inspection and testing will be performed under provisions of Section 01 45 29.

B. Random sampling to verify thickness and density of fireproofing will be conducted in accordance with provisions of ASTM E605 or CBC, Section 1705.14.

C. Reinspect the installed fireproofing for integrity of fire protection, prior to concealment of work.

D. Correct unacceptable work and provide further inspection to verify compliance with requirements.

E. Trade responsible for any damage to fireproofing shall be held responsible for its replacement and/or repair.

3.6 CLEANING

A. Clean work under provisions of 01 77 00.

B. Remove excess material, overspray, droppings, and debris.

C. Remove fireproofing from materials and surfaces not specifically required to be fireproofed.

3.7 SCHEDULE

A. Fire-Resistance Rating, unrestrained, (time in hours) shall be per code analysis floor plan.

END OF SECTION

SECTION 07 84 00

FIRESTOPPING

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.

B. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.

C. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.

D. Sealant joints in fire-resistance-rated construction.

E. Fireproof firestopping and firesafing materials and accessories.

1.2 REFERENCES

A. ASTM C920 - Elastomeric Joint Sealants.

B. ASTM C1193 - Use of Joint Sealants.

C. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

D. ASTM E119 - Method for Fire Tests of Building Construction and Materials.

E. UL - Fire Hazard Classifications.

F. UL 1479 - Fire Tests of Through-Penetration Firestops.

G. 40 CFR Part 763, Subpart F (7-1-90 Edition) - Asbestos Hazardous Emergency Response Act, Friable Asbestos - Containing Materials in Schools.

1.3 DEFINITION

A. Firestopping (Firesafing): A sealing or stuffing material or assembly placed in spaces between building materials to arrest the movement of smoke, heat, gases, or fire through wall or floor openings.

1.4 SYSTEM DESCRIPTION

A. F-Rated Through Penetration Firestop Systems: F-ratings as required according to UL 1479, but not less than that equaling or exceeding fire resistance rating of assembly penetrated where the following conditions exist:

1. Penetrations larger than 4 inch nominal pipe size or 16 square inches in overall cross-sectional area.

B. T-Rated Through Penetration Firestop Systems: T-ratings, in addition to F-ratings, as required according to UL 1479, where the following conditions exist:

1. Through penetrations of fire rated walls above corridor ceilings which are not part of a fire-resistive assembly.

2. Through penetrations of fire rated walls below any ceiling.

3. Penetrations larger than 4 inch nominal pipe size or 16 square inches in overall cross-sectional area.

C. Penetrations not larger than 4 inch nominal pipe size or 16 square inches in overall cross-sectional area shall have the annular space between the penetrating item and the wall/floor assembly filled with a material which will prevent passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E119 under a minimum positive pressure differential of 0.01 inch water column for the time period at least equal to the fire resistance rating of the wall/floor assembly.

D. Surface Burning: ASTM E84 with a flame spread/smoke developed rating of 25/450.

E. Firestop all interruptions and terminations of fire rated assemblies.

F. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

G. For floor penetrations with annular spaces exceeding 4 inches or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means.

H. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Provide data on product characteristics, performance and limitation criteria.

C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

D. Certification: Submit firestopping manufacturer's certificate that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.

1.6 QUALITY ASSURANCE

A. Through penetration firestop systems to correspond to those penetration firestop system designations listed by UL in their Fire Resistance Directory.

1.7 REGULATORY REQUIREMENTS

A. Conform to CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 2 and UL requirements for fire resistance ratings and surface burning characteristics.

B. Firestopping products shall contain no detectable asbestos as determined by 40 CFR, Part 763, Subpart F, Appendix A, Section 1, Polarized Light Microscopy.

1.8 SEQUENCING AND SCHEDULING

A. Coordinate Work under provisions of Section 01 31 00.

B. Coordinate construction of openings and penetrating items to ensure that through penetration firestop systems are installed per manufacturer's instructions and regulatory requirements.

C. Do not cover up installations that will become concealed behind other construction until authorities having jurisdiction, if required, have examined each installation.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when temperature of substrate material and ambient air is below 60 degrees F.

B. Maintain this minimum temperature before, during, and for 3 days after installation of materials.

C. Provide ventilation in areas to receive solvent cured materials.

2. PART 2 PRODUCTS

2.1 FIRESTOPPING, GENERAL

A. Provide firestopping components that are compatible with each other, substrates of openings, and items penetrating firestopping.

B. Provide accessories for each firestopping system that are needed to comply with designated fire-resistance-rated systems specified by firestopping manufacturer.

2.2 ACCEPTABLE MANUFACTURERS

A. AD Fire Protection Systems, Inc., www.adfire.com.

B. Hilti Construction Chemicals, Inc., www.us.hilti.com.

C. Minnesota Mining and Mfg. Co., www.3m.com/firestop.

D. Rector Seal Corporation, www.rectorseal.com.

E. Specified Technologies, Inc., www.stifirestop.com.

F. Tremco, www.tremcosealants.com.

G. United States Gypsum Co., www.usg.com.

H. Substitutions: Under provisions of Section 01 25 13.

2.3 FILL MATERIALS

A. Intumescent Wrap: Single-component, elastomeric sheet.

B. Vinyl Compound: Vinyl-based powder product mixed on site with water to produce a paintable compound with flame-spread and smoke-developed rating of 0 per ASTM E84.

C. Silicone Foam: Two-component, silicone based liquid elastomer that, when mixed, expands and cures in place to produce a flexible nonshrinking foam.

D. Silicone Sealant: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealant either in a self-leveling or non-sag grade for opening condition.

E. Fiber Stuffing: Mineral fiber stuffing with a minimum density of 3.5 lbs./cu. ft.

2.4 JOINT SEALANTS

A. Manufacturer's standard chemically curing elastomeric sealant that complies with ASTM C920.

B. Provide selections from manufacturer's full range of colors.

C. Single-Component, Neutral Curing Silicone Sealant: Type S; Grade NS; Class 25; exposure-related use NT; and joint substrate related uses M, G, A, and O, as applicable to substrate assembly condition.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions under provisions of Section 01 31 00.

B. Verify openings are ready to receive the work of this Section.

3.2 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.

B. Remove laitance and form release agents from concrete.

C. Remove incompatible materials which may affect bond.

D. Install backing materials to arrest liquid material leakage.

3.3 APPLICATION OF THROUGH-PENETRATION FIRESTOPS

A. Install material at walls or partition openings which contain penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.

B. Comply with through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications required.

C. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce shapes and depths required to achieve fire ratings.

D. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop system.

E. Apply primer and materials in accordance with manufacturer's instructions.

F. Apply firestopping material in sufficient thickness to achieve rating.

3.4 APPLICATION OF FIRE-RESISTIVE JOINT SEALANT

A. Comply with ASTM C1193 and manufacturer's installation instructions and drawings pertaining to products and applications required.

B. Install joint fillers to provide support and at a position required to produce depth to joint widths that allow development of fire-resistance rating required.

C. Install sealant to completely fill recesses provided. Install sealant at same time as joint filler.

D. Tool non-sag sealants after application to form smooth uniform bead to configuration required to produce fire-resistance rating.

3.5 FIELD QUALITY CONTROL

A. Do not cover up installations that will become concealed behind other construction until authorities having jurisdiction if required have examined each installation.

B. Where deficiencies are found, repair or replace firestopping to required condition.

3.6 CLEANING

A. Clean Work under provisions of Section 01 77 00.

B. Clean adjacent surfaces of firestopping materials.

3.7 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01 61 00.

B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Preparing sealant substrate surfaces.

B. Sealant and backing.

1.2 SUMMARY OF SEALANT LOCATIONS

A. Joints in horizontal surfaces.

1. Expansion and isolation joints in cast-in-place concrete slabs.
2. Control and expansion joints in ceramic and quarry tile.
3. Control and expansion joints in soffits, ceilings and overhead surfaces.
4. Perimeter joints in exterior openings.
5. Joints between ceiling surfaces and frames for doors and windows.
6. Joints in flashing and sheet metal.
7. Perimeter joints of plumbing fixtures.
8. Acoustical isolation joints between head and sill of walls and floor and ceiling surfaces.
9. Joints between countertops and wall surfaces.
10. Joints in skylights and framing.
11. Joints between thresholds and floors.
12. Isolation joints in plaster soffits and ceilings.
13. Joints between dissimilar materials and those listed above.
14. Other joints as indicated.

B. Joints in vertical surfaces:

1. Expansion and isolation joints in cast-in-place concrete.
2. Control and expansion joints in ceramic and quarry tile.
3. Perimeter joints in exterior openings.
4. Joints in flashing and sheet metal.
5. Perimeter joints of plumbing fixtures.
6. Acoustical isolation joints of walls.
7. Joints between cabinets and walls.
8. Joints between wall surfaces and door and window frames.

9. Joints in skylights and framing.

10. Isolation joints in plaster walls.

11. Joints between dissimilar materials and those listed above.

12. Other joints as indicated.

1.3 REFERENCES

A. ASTM C834 - Latex Sealing Compounds.

B. ASTM C919 - Practices for Use of Sealants in Acoustical Applications.

C. ASTM C920 - Elastomeric Joint Sealants.

D. ASTM C1193 - Standard Guide for Use of Joint Sealants.

E. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.

F. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type.

G. SWRI - (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

A. Submit product data under provisions of Section 01 33 00.

B. Submit product data indicating sealant chemical characteristics, performance criteria, limitations, and color availability.

1.5 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five years documented experience.

B. Applicator: Company specializing in applying the Work of this Section with minimum three years documented experience, approved by sealant manufacturer.

C. Conform to Sealant, Waterproofing, and Restoration Institute (SWRI) requirements for materials and installation.

D. Perform Work in accordance with ASTM C1193.

E. Perform acoustical sealant application work to provide maximum STC values in accordance with ASTM C919.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not install solvent curing sealants in enclosed building spaces.

B. Do not install sealant when temperature is less than 40 degrees F.

C. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit maintenance data under the provisions of Section 01 77 00.

B. Submit recommended inspection intervals for sealant joints.

C. Submit instructions for repairing and replacing failed sealant joints.

1.8 WARRANTY

A. Provide 5 year warranty under provisions of Section 01 77 00.

B. Include coverage for installed sealants and accessories which fail to achieve air and water seal and exhibit loss of adhesion or cohesion or do not cure.

2. PART 2 PRODUCTS

2.1 MATERIALS

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content limits when calculated according to South Coast Air Quality Management District (SCAQMD) Rule 1168, and must meet or exceed the requirements for the Bay Area Quality Management District Regulation 8, Rule 5.

1. Sealants: 250 g/L.

2. Sealant Primers for Nonporous Substrates: 250 g/L.

3. Sealant Primers for Porous Substrates: 775 g/L.

2.2 MANUFACTURERS

A. Manufacturers and their products are listed for each type of sealant. Acceptable manufacturers include the following:

1. Dow Consumer Solutions, www.consumer.dow.com.

2. General Electric Co., www.gesealants.com.

3. Pecora Corp., www.pecora.com.

4. Sika Corp., www.sikausa.com.

5. Sonneborn/ChemRex, www.chemrex.com.

6. Tremco, Inc., www.tremcosealants.com.

7. United States Gypsum Co., www.usg.com.

8. W.R. Meadows, Inc., www.wrmeadows.com.

B. Substitutions: Under provisions of Section 01 25 00.

2.3 SEALANTS

A. Type A - Acrylic Latex: One-part, non-sag, mildew resistant acrylic emulsion compound complying with ASTM C834, Type S, Grade NS, formulated to be paintable.

1. Tremco, Inc., Acrylic Latex Caulk.

2. Pecora Corporation, AC-20.

3. Sonneborn, Chemrex, Sonolac.

B. Type B - Butyl Sealant: One-part, non-sag solvent-release-curing sealant complying with FS TT-S-001657 for Type 1 and formulated with a minimum of 75 percent solids.

1. Tremco, Inc., Tremco Butyl Sealant.

2. Pecora Corporation, BC-158.

3. Sonneborn, Chemrex, Multi-Purpose Sealant.

C. Type D - Non-Sag Polyurethane Sealant: Single component sealant complying with ASTM C920, Type S, Grade NS, Class 25:

1. Pecora Corp., Dynatrol I-XL.

2. Tremco, Inc., Vulkem 921.

3. Sika Corp., Sikaflex 1a.

4. Sonneborn/ChemRex, Sonolastic NP-1.

D. Type E - Neutral-Curing Silicone Sealant: One part medium modulus neutral-curing silicone sealant complying with ASTM C920, Type S, Grade NS, Class 25.

1. Dow Consumer Solutions, Dowsil 795.

2. General Electric Co., Ultraglaze 4000.

3. Tremco, Inc., Spectrum 3.

4. Pecora Corp., 895.

E. Type F - One-Part Mildew-Resistant Silicone Sealant: Complying with ASTM C920, Type S, Grade NS, Class 25.

1. Dow Consumer Solutions, Dowsil 786.

2. General Electric Co., Sanitary 1700.

3. Tremco, Inc., Tremsil 200.

4. Pecora Corp., 863 or 898 White.

F. Type G - Multi-Part Pourable Sealant: Complying with ASTM C920, Type M, Grade P, Class 25. Shore A hardness +40.

1. Tremco, Inc., THC900/901.

2. Pecora Corp., Dynatred or Urexpan NR-200.

3. Sika Corporation, Sikaflex 2c NS TG.

4. W.R. Meadows, Pourthane NS/SL.

G. Type H - Acoustical Sealant: Nondrying, nonhardening permanently flexible conforming to ASTM C834.

1. Pecora Corp., AIS-919 Acoustical Sealant.

2. Tremco, Inc., Tremco Acoustical Sealant.

3. United States Gypsum Co., Sheetrock Acoustical Sealant.

2.4 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: ASTM D1056; round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that joint openings are ready to receive Work and field measurements are as shown on Drawings and recommended by the manufacturer.

B. Beginning of installation means installer accepts existing substrate.

3.2 PREPARATION

A. Clean and prime joints in accordance with manufacturer's instructions. Prime if recommended by manufacturer.

B. Remove loose materials and foreign matter which might impair adhesion of sealant.

C. Verify that joint backing and release tapes are compatible with sealant.

D. Perform preparation in accordance with ASTM C1193.

E. Protect elements surrounding the Work of this Section from damage or disfiguration.

3.3 INSTALLATION

A. Install sealant in accordance with manufacturer's instructions.

B. Measure joint dimensions and size materials to achieve required width/depth ratios.

C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.

D. Install bond breaker where joint backing is not used.

E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Tool joints concave unless otherwise detailed.

3.4 CLEANING AND REPAIRING

A. Clean work under provisions of Section 01 77 00.

B. Clean adjacent soiled surfaces.

C. Repair or replace defaced or disfigured finishes caused by Work of this Section.

3.5 PROTECTION OF FINISHED WORK

A. Protect sealants until cured.

B. Sprinkler fine silica sand on sealant of exterior concrete paving joints to reduce tracking of sealant.

3.6 SCHEDULE

Type	Location	Color
A. Type A - Acrylic Latex Cure	All interior joints not otherwise scheduled	To match adjacent surfaces
B. Type B - Butyl	Under thresholds	Black
C. Type D - Non-Sag Polyurethane Sealant	Exterior door, entrance and window frames. Exterior and Interior vertical joints in painted concrete and masonry.	To match adjacent surface.
D. Type E - Neutral-Curing Silicone	Joints within skylight framing system aluminum entrance system glass and glazing.	Translucent
E. Type F - Mildew-Resistant Silicone	Interior joints in ceramic tile and at plumbing fixtures.	White
F. Type G - Multi-part Pourable Urethane	Exterior and interior joints in horizontal surfaces of concrete.	To match adjacent material
G. Type H - Acoustical Sealant	Interior walls between stud track/runner and adjacent construction. Between outlet boxes and gypsum board.	White

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

1. PART 1 GENERAL

1.1 WORK INCLUDED

A. Non-rated and fire rated rolled steel doors, and frames.

B. Interior light frames.

C. Louvers.

1.2 REFERENCES

A. ANSI A250.8 - Recommended Specification for Standard Steel Doors and Frames.

B. ANSI A250.3 - Test Procedure and Acceptance Criteria for Factory-Applied Finish Painted Steel Surfaces for Steel Doors and Frames.

C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

D. ASTM A653 - Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation.

F. ASTM A924 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

G. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace.

H. CEC - California Energy Commission.

I. NFPA 80 - Fire Doors and Windows.

J. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.

K. DHI - Door and Hardware Institute.

L. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2 and Part 6.

M. UL 9 - Fire Tests of Window Assemblies.

N. UL 10C - Fire Tests of Door Assemblies.

1.3 QUALITY ASSURANCE

A. Conform to requirements of ANSI A250.8.

B. Fire rated door and frame construction to conform to UL 9 and UL 10C.

C. Installed frame and door assembly to conform to NFPA 80 for fire rated class indicated on Drawings.

D. Installed exterior frame and door assembly to be weather tight.

E. Manufacturer shall have both fabrication and assembly plant located within the continental United States or Canada. Products that are either fabricated or assembled outside the continental United States or Canada are not acceptable.

1.4 PERFORMANCE REQUIREMENTS

A. Thermal Performance: Glazed exterior borrowed lite, sidelite and transom lite frames shall have an overall minimum U-value of 0.71 as rated in accordance with the default table method approved by the California Energy Commission (CEC). Provide Certificate NRCC-ENV-05-E, from the Nonresidential Compliance Manual documenting compliance with the CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 6, Section 110, Table 110.6-A.

B. Solar Heat Gain Coefficient: Glazed exterior borrowed lite, sidelite and transom lite frames shall have an overall maximum solar heat gain coefficient of 0.73 as rated in accordance with default table method approved by the California Energy Commission (CEC). Provide Certificate NRCC-ENV-05-E, from the Nonresidential Compliance Manual documenting compliance with the CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 6, Section 110, Table 110.6-B.

1.5 REGULATORY REQUIREMENTS

A. Conform to CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 2 for fire rated frames and doors.

B. Conform to CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 6, for U-value and solar heat gain coefficient.

1.6 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 33 00.

B. Indicate frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, and finish.

C. Indicate door elevations, internal reinforcement, and closure method.

D. Submit two samples of exterior frame profile at mullion intersection.

E. Submit Certificate NRCC-ENV-05-E, from the Nonresidential Compliance Manual documenting compliance with the CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 6, Section 110, Table 110.6-A and 110.6-B.

1.7 DELIVERY, STORAGE AND PROTECTION

A. Deliver, store, protect, and handle products under provisions of Section 01 61 00.

B. Store products on site under cover.

C. Place products on at least 4 inch wood sills to prevent rust and damage.

D. Protect doors and frames with resilient packaging.

1.8 SEQUENCING AND SCHEDULING

A. Sequence Work under the provisions of Section 01 11 00.

B. Schedule Work under the provisions of The City of Sacramento.

C. Schedule delivery of all doors and frames so as not to delay progress of other trades.

2. PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Curries Mfg., Inc., www.curries.com.

B. DCI Hollow Metal, www.dcihollowmetal.com.

C. Fleming, www.flemingdoor.com.

D. Krieger Steel Products Company, www.kriegersteel.com.

E. Republic Builders Products Corporation, www.republicdoor.com.

F. Security Metal Products, www.secmet.com.

G. Steelcraft, www.steelcraft.com.

H. Stiles Custom Metal, Inc., www.hollowmetal.com.

I. Titan Metal Products, Inc., www.titanmetalinc.com.

J. Substitutions: Under provisions of Section 01 25 00.

2.2 DOORS AND FRAMES

A. Steel: Commercial quality cold rolled steel conforming to ASTM A653 galvanized to A60 or G60 coating class or Type B, A40 (ZF120) according to ASTM A924 with minimized spangle, mill phosphatized.

B. Exterior Doors: ANSI A250.8, Level 3, extra heavy-duty, Model 2, continuous welded seam, beveled edges, minimum 0.053 inch thick faces.

C. Interior Doors: ANSI A250.8, Level 2 heavy duty, Model 1, beveled edges, minimum 0.042 inch thick faces.

D. Exterior Frames: ANSI A250.8, Level 3, 0.067 inch thick material, core thickness.

E. Interior Frames: ANSI A250.8, Level 2, 0.053 inch thick material, core thickness.

2.3 DOOR CORE

A. Exterior Core: Polystyrene insulation.

B. Interior Door Core: Impregnated cardboard honeycomb.

2.4 ACCESSORIES

A. Louvers: Roll formed steel, prime coated, inverted 'Y' blade, sightproof, with countersink, tamperproof fasteners.

B. Rubber Silencers: Resilient rubber as supplied by Section 08 71 00.

C. Glazing Stops: Rolled steel channel shape, mitered corners; prepared for countersink style tamperproof screws at door installations, square butt at light frames.

D. Mineral-Fiber Insulation: ASTM C665, Type 1, without membrane facing; slag or rock wool fibers; with maximum flame spread and smoke developed indexes of 25 and 50; passing ASTM E136 for combustion characteristics.

2.5 FRAME ANCHORS

A. Masonry Anchors: Adjustable T-strap, 0.053 inch thick steel, corrugated, 2 inch x 10 inch size. Fire rated frames to have UL listed perforated strap anchor permanently anchored to frame.

B. Metal Stud Anchor: Z type anchor, welded to frame, 0.053 inch thick steel, UL listed as required for fire rating.

C. Wood Stud Anchor: U-shaped anchor, welded to frame, 1 inch wide, 0.053 inch thick steel, with 2 pre-punched holes in nailing flange. UL listed as required for fire rating.

D. Existing Wall Anchor: 0.053 inch thick pipe spacer with 2 inch x 0.053 inch thick steel plate sized to accommodate a 3/8 diameter countersunk flathead expansion anchor. UL listed as required for fire rating.

E. Floor Clip: Angle anchor, full width of frame, 0.067 inch thick steel.

2.6 PROTECTIVE COATINGS

A. Primer: Clean and treat with three stage iron phosphate process. Provide baked-on shop coat of EPA compliant gray synthetic rust - inhibitive enamel primer meeting acceptance criteria of ANSI 250.10.

B. The frame underneath the glazing stops and the inside of the glazing stop area shall be treated for maximum paint adhesion and prime painted with a rust inhibitive primer prior to installation of the frame.

2.7 HARDWARE REINFORCEMENT

A. Fabricate frames and doors with hardware reinforcement plates welded in place.

B. Hinge reinforcing shall be full width of frame profile.

C. Provide spacers for all thru-bolted hardware.

D. Reinforcement components shall be the following minimum thickness:

1.	Hinge (door and frame)	3/16 inch
2.	Mortise Lock or Deadbolt	0.093 inch
3.	Bored Lock or Deadbolt	0.093 inch
4.	Flush Bolt Front	0.093 inch
5.	Surface Bolt	0.093 inch
6.	Surface Applied Closer	0.093 inch
7.	Hold Open Arm	0.093 inch
8.	Pull Plates and Bars	0.067 inch
9.	Surface Exit Device	0.093 inch
10.	Floor Checking Hinge	0.167 inch
11.	Pivot Hinge	0.167 inch

2.8 FABRICATION

A. When shipping limitations so dictate, frames for large openings shall be fabricated in sections designed for splicing.

B. All spliced joints shall occur on the interior side of exterior frames.

C. Fabricate frames as full profile welded units.

D. All face, rabbet and soffit joints between abutting members shall be continuously welded and finished smooth when exposed to exterior.

E. Corner joints shall have all contact edges closed tight, with faces mitered and continuously welded.

F. Frames with multiple openings shall have mullion members fabricated with no visible seams or joints. All face, rabbet and soffit joints between abutted members shall be continuously welded and finished smooth when exposed to exterior.

G. Provide 3/8 inch back bend return on frames where gypsum board wall material occurs whether on one or both sides.

H. Dust cover boxes or mortar guards of 0.016 inch thick steel shall be provided at all hardware mortises on frames.

I. Reinforce frames wider than 48 inches with roll formed, 0.093 inch thick steel channels fitted tightly and welded into frame head, inverted U-shape profile.

J. Prepare frame for silencers except for frames which receive weatherstripping. Provide three single rubber silencers for single doors on strike side, and two single silencers on frame head at double doors without mullions.

K. Provide steel spreader temporarily attached to feet of both jambs as a brace during shipping and handling. Spreader is not to be used for installation purposes.

L. Attach fire rated label to each frame and door unit.

M. Close top edge of exterior door flush with inverted steel channel closure. Weld all joints watertight.

2.9 MANUFACTURING TOLERANCE

A. Manufacturing tolerance shall be maintained within the following limits:

1.	Frame width	+1/16 inch -1/32 inch
2.	Frame height	+-3/64 inch
3.	Frame face	+-1/32 inch
4.	Frame stop	+-1/32 inch
5.	Frame rabbet	+-1/64 inch
6.	Frame depth	+-1/32 inch
7.	Frame throat	+-1/16 inch
8.	Door width and height	+-3/64 inch
9.	Door thickness	+-1/16 inch
10.	Hardware location	+-1/32 inch
11.	Door flatness	+-1/16 inch

2.10 FINISH

A. Primer: Baked on rust-inhibitive enamel.

B. Finish: Site paint under provisions of Section 09 90 00.

C. Coat inside of frame profile [for frames installed in masonry construction] with rubberized undercoating to a thickness of 1/16 inch. Coating may be factory or site applied. Do not apply coating to fire rated frames.

3. PART 3 EXECUTION

3.1 INSTALLATION

A. Install frames in accordance with ANSI/SDI A250.11.

B. Install doors in accordance with DHI.

C. Install fire doors and frames in accordance with NFPA 80.

D. Installation of exterior doors and frames to be weathertight and waterproof.

E. Seal penetration of all surface applied screws on exterior face of frames at glass stops and hardware attachments.

F. Coordinate installation with electrically controlled locks.

G. Coordinate with wall construction and details for anchor placement. Provide anchors as follows:

1. Frames up to 7'-6" height - 4 anchors each jamb.

2. Frames 7'-6" to 8'-0" height - 5 anchors each jamb. Plus an additional anchor for each 2' or fraction thereof over 8'-0".

3. Frames for Double Doors: Minimum of 2 anchors in head approximately 12 inches from each jamb.

4. Borrowed Lite Frames: 2 anchors each jamb plus 1 for each 18 inches or fraction thereof over 3'-0". Minimum 2 anchors in head and sill approximately 12 inches from each jamb plus 1 for each 30 inches of length or fraction thereof.

5. Floor anchors - 1 anchor each jamb for interior doors. At exterior doors set frames 2 inches into blocked out recess and grout flush with floor.

6. Existing wall anchors shall be welded to provide non-removable condition. Welded bolt head to be ground, dressed and finished smooth.

H. Frames installed in masonry walls to be fully grouted with masonry grout.

I. Exposed field welds to be finished smooth and touched up.

J. Primed or painted surfaces which are scratched or marred shall be touched up.

K. Hardware to be applied in accordance with hardware manufacturer's templates and instructions.

L. Coordinate installation of glass and glazing.

M. Install door louvers.

N. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.

O. Solidly pack mineral-fiber insulation into frames installed in exterior walls that are not solid grouted. For vertical and horizontal frame mullions that are inaccessible after frame assembly place insulation into frame before joining members together.

3.2 INSTALLATION TOLERANCES

A. Edge clearance for swinging doors shall not exceed the following:

1.	Between door and frame at head and jamb	1/8 inch
2.	Between edge of pair of doors	1/8 inch
3.	At door sill with threshold (From bottom of door to top of threshold)	3/8 inch
4.	At door sill with no threshold	1/2 inch
5.	At door bottom and rigid floor covering per NFPA 80	1/2 inch
6.	At door bottom and nominal floor covering per NFPA 80	5/8 inch

B. Frame installation tolerance shall not exceed the following:

1.	Squareness	+-1/16 inch
2.	Alignment	+-1/16 inch
3.	Plumbness	+-1/16 inch
4.	Diagonal Distortion	+-1/32 inch

END OF SECTION

SECTION 08 11 16

ALUMINUM DOORS AND FRAMES

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aluminum door frames for interior use. Non-rated.

B. Aluminum doors for interior use, non-rated.

C. Aluminum light frames for interior use, non-rated.

D. Anchors, brackets and attachments.

1.2 REFERENCES

A. 2010 Americans with Disabilities Act (ADA) Standards for Accessibility Design.

B. AAMA 603.8 - Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.

C. AAMA 607.1 - Guide Specification and Inspection Methods for Clear Anodized Finishes for Architectural Aluminum.

D. AAMA 608.1 - Guide Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum.

E. AAMA 609 & 610-02 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum.

F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

G. NAAMM - Metal Finishes Manual for Architectural Metal Products.

H. CBC - California Building Code, (CCR) California Code of Regulations , Title 24, Part 2.

I. NFPA 80: Standard for Fire Doors and Fire Windows.

J. NFPA 252: Standard Methods of Fire Tests of Door Assemblies.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 00.

1. Submit shop drawings showing frame layouts, profiles, anchor types and spacings and product components.

2. Indicate door elevations, internal reinforcing, closure method.

3. Submit 1 sample of framing for finish, color and texture.

4. Technical Information: Submit product data providing description, technical data and installation instructions.

1.4 OPERATION AND MAINTENANCE DATA

A. Submit maintenance data under provisions of Section 01 77 00.

B. Include recommended repair and replacement procedures for trim and finishes.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver store and protect products under provisions of Section 01 61 00.

B. Ordering: Order products and materials in sufficient time to avoid construction delays.

C. Delivery: Deliver materials in manufacturer's packaging, undamaged, complete with installation instructions.

D. Storage and Protection:

1. Store off ground, under cover, protected from weather, direct sunlight, and construction activities.

2. Frame units must be separated by nonabrasive pads such as cloth or cork.

3. Place frames upright, no less than 6 degrees from vertical. Do not store horizontally.

4. Repair damage to finish of frames as recommended by manufacturer.

E. Handling: Protect materials and finish during handling and installation to prevent damage.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual measurements for openings by field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

B. Coordinate work of this section with others affected including but not limited to: Door hardware provided by Section 08 71 00 and Glazing provided under Section 08 80 00.

1.7 QUALIFICATIONS

A. Manufacturer: A firm with a minimum of 5 years' experience manufacturing interior aluminum framing and doors.

B. Installer: A firm with a minimum of 5 years' experience with the installation of aluminum doors and frames similar to those specified in this section.

1.8 REGULATORY REQUIREMENTS

A. Conform to the accessibility requirements of the CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, and the 2010 ADA Standards for Accessible Design.

1.9 WARRANTY

A. Provide one year manufacturer's standard warranty for doors and framing under provisions of Section 01 77 00.

2. PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis of Design: Western Integrated Materials www.aluminumdoorframes.com.

B. Substitutions: Under provisions of Section 01 25 00.

2.2 MATERIALS

A. Extruded Aluminum: ASTM B221 alloy of 6063-T5.

2.3 ALUMINUM FRAMING

A. Western Integrated Material Series 300 framing system.

B. Rectilinear design.

C. 1-1/2 inch face profile with 1-1/2 inch x 5/16 inch trim.

2.4 ALUMINUM DOORS

A. 1-3/4-inch-thick doors of types and design indicated.

B. Aluminum stile and rail swinging doors.

C. Stiles: Wide stile, 5 inch wide.

D. Rails: 10-inch-high bottom rail with smooth surface.

E. Aluminum glazing channels with wrap around black PVC glazing beads.

2.5 GLAZING

A. Interior Glazing: As specified in Section 08 80 00 - Glazing and as indicated on drawings.

2.6 HARDWARE

A. Interior Hardware: As specified in Section 08 71 00 - Door Hardware.

2.7 FABRICATION

A. Factory pre-engineered and pre-cut components to the greatest extent possible.

B. Conceal corner reinforcements and alignment clips.

C. Prepare for hardware. Include cutouts, reinforcement, mortising, drilling and tapping.

D. Fabricate all components without exposed fasteners.

E. Provide internal reinforcement for all door frame / sidelight jamb configurations.

2.8 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying designated finishes.

B. Finish framing after assembly and before shipping.

C. Protect finishes on exposed surfaces from damage by applying a removable, temporary protective cladding before shipping.

D. Appearance of Finished Work: Minor variations in appearance of adjacent frame sections are acceptable. Noticeable variations in the same piece are not acceptable.

E. Clear Anodic Finish: Finish system complying with AAMA 607.1. Commercial, AA-M12-C22-A21 clear anodic coating, 0.1 mil minimum thickness.

2.9 ACCESSORIES

A. Fasteners: Aluminum, non-magnetic, stainless-steel compatible with frames.

B. Silencers: Manufacturer's standard wool pile seals.

C. Glazing Gaskets: Manufacturer's standard extruded plastic.

2.10 SEALANT MATERIALS

A. Sealant and Backing Materials: Types as specified in Section 07 92 00- Joint Sealants.

3. PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine area to receive framing and door system. Openings shall be plumb, square and within allowable tolerances.

B. Notify Architect of conditions that would adversely affect installation or subsequent use.

C. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Attach frame around the perimeter using #10 screws x appropriate length to achieve 3 threads past face of steel framing through factory prepared access holes in aluminum frame.

B. Install hardware using templates provided. Refer to Section 08 71 00 for installation requirements.

C. Install glass in accordance with Section 08 80 00, using interior dry method.

D. Install reveal trim.

E. Seal perimeter of framing system with sealant materials as specified in Section 07 92 00.

3.3 TOLERANCES

A. Not more than 1/8 inch at jambs and heads, ¼ inch between pairs of doors. and not more than ¾ inch at threshold of door.

3.4 ADJUSTING

A. Adjust operating hardware and check each door to ensure proper operation. Replace units that cannot be adjusted to operate freely.

B. Instruct Owner's personnel in proper maintenance of hardware and finishes.

3.5 CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent work areas.

B. Glass and frame should be cleaned using soft clean cloth, chamois leathers, sponges or soft paper. Use clean warm water with a mild detergent. Do not use detergent that contains either alkaline, acids or fluoride. Clean prior to date of Substantial Completion.

C. Remove construction debris from project site and legally dispose of debris.

3.6 REPAIR AND TOUCH UP

A. Limited to minor repair of small scratches. Use only manufacturer's recommended products.

1. Repairs shall match original finish for quality of material.

2. Repair and touch-up scratches when visible from a distance of 5 feet.

END OF SECTION

SECTION 08 14 00

WOOD DOORS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flush faced wood doors and panels, fire rated and non-rated.

B. Light frames.

C. Door louvers.

1.2 REFERENCES

A. ANSI/WDMA - Wood Door Manufacturers Association I.S. 1-A-04-Architectural Wood Flush Doors.

B. CBC - California Building Code, (CCR) California Code of Regulations , Title 24, Part 2.

C. NFPA 80 - Fire Doors and Windows.

D. NWWDA I.S.1 - Industry Standard For Wood Flush Doors (Includes Standards I.S.1.1 through I.S.1.7).

E. FSC - Forest Stewardship Council.

F. UL 10C - Fire Tests of Door Assemblies.

G. WI - Woodwork Institute North American Architectural Woodwork Standards 3.0.

1.3 QUALITY ASSURANCE

A. Conform to requirements of The WI North American Architectural Woodwork Standards, Section 9 Custom Grade except where otherwise indicated.

B. All wood doors and the installation of wood doors shall be monitored for compliance under the scope of the WI Certified Compliance Program (CCP).

C. Issue a WI Certified Compliance Certificate prior to delivery of doors certifying that doors meet all requirements of WI Grade specified.

D. After completion issue a WI Certified Compliance Certificate for Installation.

1.4 REGULATORY REQUIREMENTS

A. Conform to CBC - California Building Code, for fire rated doors.

B. Fire Door Construction: Conform to UL 10C, Category A.

C. Installed Doors: Conform to NFPA 80 for fire rated class indicated.

1.5 SUBMITTALS

A. Submit shop drawings under provisions of Section 01 33 00. Shop drawings shall bear the WI Certified Compliance Label on the first page of each set.

B. Indicate door elevations, stile and rail reinforcement, internal blocking for hardware attachment, and cutouts for glazing and louvers.

C. Submit samples under provisions of Section 01 33 00.

D. Submit two samples 12 x 12 inch in size illustrating each species and finish.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Protect products under provisions of Section 01 61 00.

B. Package, deliver, and store doors in accordance with WI requirements as set forth in Section 2 of The WI North American Architectural Woodwork Standards.

1.7 WARRANTY

A. Provide manufacturer's standard lifetime warranty for interior doors under provisions of Section 01 77 00 for solid core doors.

2. PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS, FLUSH FACED DOORS

A. Algoma Hardwoods, www.algomahardwoods.com.

B. Door America-American Building Supply, Inc., www.dooramerican.com.

C. Eggers Industries, www.eggersindustries.com.

D. Haley Architectural Doors, www.haleybros.com.

E. Oshkosh Door Co., www.oshkoshdoor.com.

F. Marshfield Door Systems, Inc., www.marshfielddoors.com.

G. V.T. Industries, www.vtindustries.com.

H. Substitutions: Under provisions of Section 01 25 13.

2.2 ACCEPTABLE MANUFACTURERS, STILE AND RAIL DOORS

A. Algoma Hardwoods, www.algomahardwoods.com.

B. Door America-American Building Supply, Inc., www.dooramerican.com.

C. Eggers Industries, www.eggersindustries.com.

D. Pinecrest, www.pinecrestinc.com.

E. Simpson Door Co., www.simpsondoor.com.

F. Sun-Dor-Co., www.sundorco.com.

G. The Maiman Co., www.maiman.com.

H. Marshfield Door Systems, Inc., www.marshfielddoors.com.

I. Substitutions: Under provisions of Section 01 25 13.

2.3 DOOR CONSTRUCTION

A. Solid Non-rated Core: Solid wood block, framed block glued, or solid particleboard.

B. Solid, Special Function Core: Labeled fire performance type, UL 10C, Category A. Intumescent seals concealed by outer stile in matching veneer.

C. Construction: WI, Custom grade, ANSI/WDMA extra heavy duty, 5 ply, manufactured as an edge bonded, sanded core assembly, laminated in a one-step, hot pressed operation. Cold-press method is not acceptable.

D. Flush Interior Door Veneer:

1. Species and grain to match existing wood doors; for transparent stain finish. Satin sheen. Factory finish.

2.4 ADHESIVES

A. Interior Doors: WI Type I.

2.5 ACCESSORIES

A. Louvers: Roll formed 20 gage galvanized steel; factory primed; inverted 'Y' blade; sightproof.

B. Glass Stops: Wood to match face veneer.

2.6 FABRICATION

A. Fabricate non-rated wood doors to requirements of The WI North American Architectural Woodwork Standards, Section 9, in the WI Grade specified.

B. Fabricate fire rated doors per manufacturer's standard construction, and labeling agency requirements.

C. Premachine doors for finish hardware.

D. For fire rated doors with mineral cores, provide solid wood blocks for hardware reinforcement at lock edge and at top of door for closer.

E. For fire rated doors with mineral cores, provide solid wood blocking for thru-bolted hardware.

3. PART 3 EXECUTION

3.1 INSTALLATION

A. Install doors in accordance with The WI North American Architectural Woodwork Standards Section 9.

B. Conform to WI and NFPA requirements for fit tolerances.

C. Coordinate installation of glass and glazing.

D. Install door louvers.

E. Adjust doors for smooth and balanced movements.

F. Install fire doors in accordance with NFPA 80.

3.2 INSTALLATION TOLERANCES

A. Edge clearance for swinging doors shall not exceed the following as required by WI and NFPA 80:

1.	Between door and frame at head and jamb	1/8 inch
2.	Between edge of pair of doors	1/8 inch
3.	Diagonal distortion	1/8 inch
4.	At door sill with threshold. (From bottom of door to top of threshold)	3/8 inch
5.	At door sill with no threshold	1/2 inch
6.	At door bottom and rigid floor covering per NFPA 80	1/2 inch
7.	At door bottom and nominal floor covering per NFPA 80	5/8 inch

END OF SECTION

SECTION 08 62 23

TUBULAR SKYLIGHTS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Tubular skylights consisting of skylight dome, reflective tube, and diffuser assembly.

B. Accessories

1.2 REFERENCES

A. ASTM A463 - Standard Specification for Steel Sheet, Aluminum Coated, by the Hot Dip Process.

B. ASTM A653 - Standard Specification for Steel Sheet, Zinc Coated (Galvanized), by the Hot Dip Process.

C. ASTM A641 - Zinc-Coated (Galvanized) Carbon Steel Wire.

D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

E. ASTM D635 - Test Method for Rate of Burning and/or Extent of Time of Burning of Self-Supporting Plastics in a Horizontal Position.

F. ASTM D1929 - Test Method for Ignition Properties of Plastics.

G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

H. ASTM E108 - Standard Test method for Fire Tests of Roof Covering

I. ASTM E283 - Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

J. ASTM E308 - Standard Practice for Computing the Colors of Objects by Using the CIE System

K. ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls and Doors.

L. ASTM E547 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Cyclic Air Pressure Difference.

M. UL - Underwriters Laboratory - UL 181 - Factory Made Air Ducts and Air Connectors.

N. UL - Underwriters Laboratory - UL 790 - Standard for Tests for Fire Resistance of Roof Covering Materials.

O. ICC - International Code Council - AC-16 - Acceptance Criteria for Plastic Skylights.

1.3 PERFORMANCE REQUIREMENTS

A. Completed skylight assemblies shall be capable of meeting the following performance requirements:

1. Air Infiltration Test: Maximum 0.30 cfm/sf aperture at 1.57 psf pressure differential when tested in accordance with ASTM E283.

2. Water Resistance Test: No water leakage at 10.7 psf pressure differential with water rate of 5 gallons/hours/sf when tested in accordance with ASTM E547.

3. Uniform Load Test: No breakage, permanent damage or permanent deflection of any section at either a maximum positive load of 150 psi or negative load of 70 psf. All units shall be tested with a safety factor of three for positive pressure and two for negative pressure, acting normal to plane of roof in accordance with ASTM E330.

4. Fire Testing:

   (a) Burning Brand: Class 'B' Burning Brand Test per ASTM E 108 and UL 790.

   (b) Self-Ignition Temperature: Greater than 650 degrees F per ASTM D1929.

   (c) Smoke Density Rating: No greater than 450 per ASTM E 84 in way intended for use.

   (d) Rate of Burn: Maximum Burning Rate of 2.5 inches/min for Classification CC-2 material per ASTM D635.

   (e) Rate of Burn Extent: Maximum Burn Extent of 1 inch for Classification CC-1 material per ASTM D635.

B. ICC Compliance: Comply with ICC AC-16 Acceptance Criteria for Plastic Skylights.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

C. Shop Drawings : Indicate layout, detail of construction and identification of materials.

D. Wiring Diagrams: Diagrams for power and control wiring.

E. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in the manufacture of tubular skylights for a minimum of 10 years.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and protect products to site under provisions of Section 01 61 00

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions for temperature, humidity, and ventilation within limits recommended by manufacturer for optimum results.

B. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Provide warranty under provisions per City of Sacramento.

B. Skylights: Manufacturer's standard 10 year warranty.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Solatube International, Inc., Solatube Model 750 DS - O Open Ceiling, 21 inch daylighting system, ICC ESR-2253, www.solatube.com.

B. Substitutions: Under provisions of Section 01 25 00.

2.2 TUBULAR SKYLIGHTS

A. Transparent roof-mounted skylight dome and self-flashing curb, reflective tube with ceiling level diffuser assembly. All components made and assembled by one manufacturer.

B. Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube in conformance with the following:

1. Outer Roof Dome Assembly: 0.125 inch minimum thick injection molded acrylic classified as CC2 material.

2. Inner Dome Assembly: 0.115 inch thick injection modeled acrylic classified as CC1 material.

3. Low-Angled Sun Reflector: Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight.

4. Roof Flashing Base: Sheet steel, one piece, seamless, leak-proof flashing functioning as base support for dome and top of tube conforming to ASTM A 653.

(a) Base Style: Type F11, self mounted, 11 inches high.

(b) Membrane Counter Flashing: Type MCF, one piece, seamless spun aluminum alloy 1100. Corrosion resistant conforming to ASTM B209, 0.59 inch thick.

(c) Base Style: Type FC, curb cap, with inside dimensions of 27 inches x 27 inches to cover curb. Curb specified under Section 06 10 00.

(d) Flashing Insulator: Type F1, thermal isolation material for use under flashing.

5. Tube Ring: 0.090 inch nominal thickness injection molded high impact PVC.

6. Dome Seal: Adhesive backed weather-strip 0.63 inch tall by 0.28 inch wide.

7. Reflective Tube: Aluminum sheet, 0.018 inch thickness.

(a) Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface; specular reflectance of greater than 99 percent for visible spectrum, less than 93 percent for total solar spectrum.

(b) Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.

(c) Tube Diameter: Approximately 21 inches.

(d) Top Tube Angle Adapter, Type TA: Reflective 45 degree adjustable top tube angle adapter, 16 inches long.

(e) Bottom Tube Angle Adapter, Type BA: Reflective 45 degree adjustable bottom tube angle adapter, 16 inches long.

(f) Top Tube Angle Adapter and Bottom Top Tube Angle Adapter Kit, Type AK: Reflective 45 degree adjustable top and bottom angle adapters, 16 inches long.

(g) Extension Tube: Reflective extension tube, Type EXX, notched for open ceiling diffuser attachment, 24 inches long.

(h) Reflective 90 Degree Adjustable Tube: Manufacturer's standard adapters for applications.

8. Diffuser Assemblies for Tubes not Penetrating Ceilings (Open Ceiling): Solatube Model 750 DS-O. 21 inch diameter diffuser attached directly to bottom of tube.

9. Diffuser Assemblies for Tubes Penetrating Ceilings: Solatube Model 750 DS-C ceiling mounted box transitioning from round tube to square ceiling assembly, supporting light transmitting surface at bottom termination of tube, with compression seal to minimize condensation and bug or dirt infiltration; 23.8 by 23.8 inches square frame to fit standard suspended ceiling grids. Transition Box: Opaque polymeric material, classified as CC2, 0.110 inch thick.

10. Lens: Type L1, Opti View Fresnel lens design to maximize light output and diffusion with extruded aluminum frame. Visible Light Transmission shall be 90 percent at 0.022 inches thick, Class CC2 material.

11. Seal: Open cell foam, acrylic adhesive backed, 0.75 inch wide by 0.125 inch thick.

12. Thermal Insulation Panel: Two climate control discs paired with polycarbonate ring.

2.3 ACCESSORIES

A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.

B. Sealant: Polyurethane based elastomeric sealant as recommended by manufacturer.

C. Security Bar: Type B, 0.375 inch thick stainless steel bar, across flashing diameter opening.

D. Suspension Wire: Steel, annealed, ASTM A641, Class 1 coating (galvanized), soft temper, No.12 gage size for suspension and bracing requirement.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's printed instructions and as indicated in ICC ES Report ESR-2253.

B. During installation do not leave tubes or domes in contact with combustible materials.

C. Remove protective film from tubular skylight assembly only after all parts have been installed.

D. After installation of first unit, field test to determine adequacy of installation. Conduct water test in presence of Architect or Owner's Inspector. Correct if needed before proceeding with installation of subsequent units.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hardware for doors.

B. Thresholds.

C. Gasketting.

D. Keying.

1.2 REFERENCES

A. ADA - Americans with Disabilities Act Standards for Accessible Design.

B. ANSI - American National Standards Institute.

C. BHMA - Builders' Hardware Manufacturers Association.

D. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.

E. DHI - Door and Hardware Institute.

F. NFPA 80 - Fire Doors and Windows.

G. UL - Underwriters Laboratories.

1.3 COORDINATION

A. Coordinate work of this Section with other directly affected Sections involving manufacturer of any internal reinforcement for door hardware.

1.4 QUALITY ASSURANCE

A. Manufacturers: Companies specializing in manufacturing door hardware with minimum five years experience. Obtain each kind of hardware from only one manufacturer.

B. Hardware Supplier: Company specializing in supplying commercial door hardware with five years documented experience.

C. Hardware Installer: Company specializing in the installation of commercial door hardware with five years documented experience.

D. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this Section.

1.5 REGULATORY REQUIREMENTS

A. Fire-Rated Openings: Comply with CBC Section 716 and NFPA Standard No. 80. Provide only hardware tested and listed by UL for the type and size of each door required, which complies with the requirements of the door and frame labels.

1. Where exit devices are required on fire-rated doors, provide supplementary marking on door UL label indicating "Fire Door to be Equipped with Fire Exit Hardware", and provide UL Label on exit device indicating "Fire Exit Hardware".

2. Exit device touchpad shall be compliant with State Fire Marshall Standard 12-10-3, Section 12-10-302.

B. Conform to applicable requirements of the Americans with Disabilities Act Standards for Accessible Design regarding accessibility requirements for door and entrance hardware.

C. Doors and doorways that are part of an accessible route shall comply with CBC Sections 11B-404.

D. The clear opening width for a door shall be 32 inches minimum. For a swinging door it shall be measured between the face of the door and the stop, with the door open 90 degrees. There shall be no projections into the opening below 34 inches and 4 inches maximum projections into the opening between 34 inches and 80 inches above the finish floor or ground. Door closers and stops shall be permitted to be 78 inches minimum above the finish floor or ground. CBC Section 11B-404.2.3.

E. Handles, pulls, latches, locks, and other operable parts on accessible doors shall comply with CBC Section 11B-309.4 and shall be operable with one hand and not require tight grasping, pinching, or twisting of the wrist. Operable parts of such hardware shall be 34 inches minimum and 44 inches maximum above the finish floor or ground. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides. CBC Section 11B-404.2.7.

F. The force for pushing or pulling open a door shall be as follows: CBC Section 11B-404.2.9.

1. Interior hinged doors, sliding or folding doors, and exterior hinged doors: 5 lbs. (22.2N) maximum.

2. Required fire doors: the minimum opening force allowable by the Authority having Jurisdiction, not to exceed 15 lbs. (66.7N). These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position.

3. The force required for activating any operable parts, such as lever hardware, or disengaging other devices shall be 5 lbs. (22.2N) maximum to comply with CBC Section 11B-309.4.

G. Door closing speeds shall be as follows: CBC Section 11B-404.2.8.

1. Closer shall be adjusted so that the required time to move a door from an open position of 90 degrees to a position of 12 degrees from the latch is 5 seconds minimum.

2. Spring hinges shall be adjusted so that the required time to move a door from an open position of 70 degrees to the closed position is 1.5 seconds minimum.

H. Thresholds shall comply with CBC Section 11B-404.2.5.

I. Pair of doors: Limit swing of one leaf to 90 degrees so that a clear floor space is provided beyond the arc of the swing for the wall-mounted tactile sign. CBC Section 11B-703.4.2.1.

1.6 SUBMITTALS

A. Submit schedule under provisions of Section 01 33 00.

B. Submit schedule at earliest possible date along with essential product data where acceptance of hardware schedule must precede fabrication of other work.

C. Organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following:

1. Type, style, function, size and finish of each hardware item. Use BHMA finish codes as per ANSI A156.18.

2. Name and manufacturer of each item.

3. Fastenings and other pertinent information.

4. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.

5. Explanation of all abbreviations, symbols, codes, etc., contained in schedule.

6. Mounting locations for hardware.

7. Door and frame sizes and materials.

D. Provide product data on specified hardware.

E. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

F. Furnish hardware templates to each fabricator of doors, frames, and other work to be factory-prepared for the installation of hardware.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 01 77 00.

B. Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site and to other Sections under provisions of Section 01 61 00.

B. Store and protect products under provisions of Section 01 61 00.

C. Package hardware items individually; label and identify package with door opening code to match hardware schedule.

D. Deliver keys to Owner by security shipment direct from hardware supplier.

1.9 WARRANTY

A. Provide five year warranty for closers, two year warranty for all other hardware under provisions of Section 01 77 00.

1.10 MAINTENANCE MATERIALS

A. Provide special wrenches and tools applicable to each different or special hardware component.

B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

2. PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

Item		Manufacturer
A.	Butt Hinges	Ives
B.	Locksets	Schlage
C.	Cylinders	Schlage

Item		Manufacturer
D.	Exit Devices	Von Duprin
E.	Surface Closers	LCN
F.	Cylinder Guards	Schlage
G.	Protection Plates	Trimco
H.	Stops and Holders	Trimco
I.	Overhead Stops	Glynn Johnson
J.	Thresholds/Sweeps/Seals	Pemko

2.2 MATERIALS

A. Locksets: Mortise and cylindrical type. 16 gage curved steel, bronze or brass strikes with 2 inch deep box construction, with curved lips of sufficient length to clear trim and protect clothing.

1. Comply with requirements of local security ordinances.

2. Locks shall be of such construction that when locked, the door may be opened from within by using lever and without the use of a key or special knowledge.

3. Lock series and design: Schlage ALX Series; passage lockset.

B. Butt Hinges: Outswinging exterior doors shall have non-removable (NRP) pin. Hinge open widths shall be minimum, but of sufficient size to permit door to swing 180 degrees. Furnish hinges with stainless steel pins and ball bearings.

1. Furnish 3 hinges per leaf to 7'-5" height. Add one for each additional 2 foot height.

2. Provide 5 inch heavy weight hinges on doors over 3'-4" width.

C. Panic Hardware: Furnish exit devices with sex bolts at wood doors. Lever handle trim shall match locksets. Device shall bear UL label for fire and or panic as may be required.

1. Provide glass bead kits of proper thickness where the rail assembly of the exit device crosses a lite.

D. Surface Door Closers: Full rack and pinion type with removable non-ferrous case. Provide closers with sex bolts and grommets at wood doors. Place closers inside building, stairs, rooms, etc. Closers shall be non-handed, non-sized and adjustable. Closers shall be installed to permit door to swing 180 degrees.

1. Flush transom offset brackets shall be used where parallel arm closers are listed for doors with fixed panels over.

2. Provide drop brackets, shoe supports, and blade stop spacers as required at narrow top rails.

E. Protection Plates: Fabricate either kick, armor, or mop plates with four beveled edges, height called for in schedule by width of door less 2 inches. Furnish with machine or wood screws of bronze or stainless steel to match other hardware.

F. Floor Stops: Floor mounted door stops are prohibited where located in the path of travel. Where provided, install maximum 4 inches from wall surface.

G. Seals: Solid neoprene to be MIL Spec. R6855-CL III, Grade 40. Sponge neoprene to be MIL Spec. R6130, Type II, Group C. UL label shall be applied on all rated doors.

H. Silencers: Furnish silencers for interior hollow metal frames, 3 for single doors, 2 for pairs of doors. Omit where sound or light seals occur, or for fire-resistive-rated door assemblies.

I. Thresholds: Change in level between 1/4 inch and 1/2 inch shall be beveled with a slope no greater that 1 unit vertical to 2 units horizontal (50 percent slope). The floor or landing shall not be more that 1/2 inch lower than the threshold of the doorway.

2.3 KEYING

A. Contact the Facilities Department with the City of Fairfield for keying requirements. Keying system shall be coordinated with the Owner and approved by Owner's representative in writing. Furnish construction key system in accordance with lock manufacturers' standard. Where interchangeable core systems are used, provide temporary cores for construction keying.

B. Key system shall be Schlage; Mortise lock.

C. For protection of the Owner, cylinders shall be keyed at the factory of the cylinder manufacturer where permanent records are maintained. Permanently inscribe each key cylinder with number that identifies cylinder manufacturer key symbol, and notation "DO NOT DUPLICATE".

D. Deliver permanent keys and cylinders directly to Owner by registered security shipment direct from hardware manufacturer. Hardware supplier shall not cut keys.

2.4 LOCK BOX

A. Model No. 3200 lock box manufactured by the Knox Company, www.knoxbox.com..

B. Surface or recess mounted as required.

C. Polyester powder coated finish in black color.

D. UL listed tamper switch.

2.5 FINISHES

A. Generally to be BHMA 626 Satin Chromium.

B. Areas using BHMA 626 shall have push, pulls and kick plates of BHMA 630, Satin Stainless Steel, unless otherwise noted.

C. Factory paint door closers to match other hardware, unless otherwise noted.

D. Aluminum items to be finished AL unless otherwise noted.

2.6 FASTENERS

A. Screws for strikes, face plates and similar items shall be flathead, countersunk type; provide machine screws for metal and standard wood screws for wood.

B. Screws for butt hinges shall be flathead, countersunk, full-thread type.

C. Fastening of closer bases or closer shoes to doors shall be by means of sex bolts and spray painted to match closer finish.

D. Provide expansion anchors for attaching hardware items to concrete or masonry.

E. All exposed fasteners shall have a phillips head.

F. Finish of exposed screws to match surface finish of hardware or other adjacent work.

2.7 OTHER MATERIAL

A. All other materials not specifically described, but required for a complete and proper finish hardware installation shall be selected by Architect as required at no additional cost.

3. PART 3 EXECUTION

3.1 INSPECTION

A. Verify that doors and frames are ready to receive work and dimensions are as instructed by the manufacturer.

B. Verify that power supply is available to power operated devices.

C. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

A. Pre-Installation Meetings: Initiate and conduct with supplier, installer, and related trades, coordinate materials and techniques, and sequence complex hardware items and systems installation. Include manufacturers' representatives of locks, panic hardware, and door closers in the meetings. Convene at least one week prior to commencement of related work.

B. Install hardware in accordance with manufacturer's instructions and requirements of DHI.

C. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protection with finishing work specified in Division 9. Do not install surface-mounted items until finishes have been completed on the substrate.

D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

F. Set exterior door thresholds with full-width bead of elastomeric sealant on each point of contact with floor, providing a continuous weather seal. Anchor thresholds with stainless steel countersunk screws.

G. If handle of door is changed during construction, make necessary changes in hardware at no additional cost.

H. Mount lock box in accordance with manufacturers' instructions. Connect to building security system. Mount at 4'-0" from finished grade to center of box.

3.3 ADJUST AND CLEAN

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Clean adjacent surfaces soiled by hardware installation.

C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware finishes, during the final adjustment of hardware.

E. Continued Maintenance Service: Approximately six months after the completion of the project, the Contractor, accompanied by the Finish Hardware Installer, shall return to the project and re-adjust every item of hardware to

restore proper function of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

3.4 HARDWARE LOCATIONS

A. Lockset: 34 to 44 inches above finished floor. Verify manufacturers' template with door design.

B. Panic Device: 36 to 44 inches above finished floor. Verify manufacturers' template with door design.

C. Floor Stop: 4 inches maximum distance from any adjacent wall surface.

D. Conform to CBC, CCR, Title 24, Part 2, and ADA regarding positioning requirements for accessibility.

3.5 FIELD QUALITY CONTROL

A. Architectural Hardware Consultant (AHC) to inspect installation and certify that hardware and its installation have been furnished and installed in accordance with manufacturer's instructions and as specified herein.

3.6 SCHEDULE

A. Legend of listed manufacturers. The last column in the Schedule of Door Hardware refers to the manufacturer listed in the following schedule:

SCH	Schlage
GLY	Glynn Johnson
HAG	Hager
LCN	LCN
ALL	Allegion
PEM	Pemko
TRM	Trimco
VON	Von Duprin

B. The items listed in the following schedule shall conform to the requirements of the foregoing specification.

C. The Door Schedule on the Drawings indicates which hardware set is used with each door.

D. Schedule of Door Hardware

HINGE	5BB1-4.5X4.5	626	IVES
LOCKSET	L9010-RHO	626	SCH
LOCKSET	L9044-RHO-ADA THUMBTURN	626	SCH
KICK PLATE	K0050-10"XB4E	630	TRM
WALL BUMP	1270WV	630	TRM
SURFACE CLOSER	4040XP-H-LONG	652	LCN
OVERHEAD STOP	90H	652	GLY
EXIT DEVICE	AX-LD-98L-NL-3'	626	VON
EXIT DEVICE	2670 Guard-X-3'	626	VON
MOP PLATE	KM50-6"XB4EXCSK	630	TRM
COAT HOOK	3071	626	TRM
ELECTRICAL HINGE	5BB1TW4-4.5X4.5	652	IVES
JUNCTION BOX	430	602	HAGER
ELECTRICAL LOCKSET	ND80EL	626	SCH
AUTOMATIC OPENER	LCN 4640 (Push Side)	628	ALL

HW-1

Doors: 13A, 26A

(3)	HINGE	5BB1-4.5X4.5	652	IVES
1	LOCKSET	L9010-RHO	626	SCH
1	KICK PLATE	K0050-10"XB4E	630	TRM
1	WALL BUMP	1270WV	630	TRM
1	SURFACE CLOSER	4040XP-H-LONG	652	ALL

HW-2
Door: 16A

(3)	HINGE	5BB1-4.5X4.5		626	IVES
1	LOCKSET	L9010-RHO		626	SCH
1	WALL BUMP	1270WV		630	TRM
1	SURFACE CLOSER	4040XP-H-LONG	652	ALL	

HW-3
Door: 27A

(3)	HINGE	5BB1-4.5X4.5	626	IVES
1	LOCKSET	L9010-RHO	626	SCH
1	KICK PLATE	K0050-10"XB4E	630	TRM
1	OVERHEAD STOP	90H	652	GLY

HW-4
Door: 35C

(3)	HINGE	5BB1-4.5X4.5	626	IVES
1	LOCKSET	L9010-RHO	626	SCH
1	KICK PLATE	K0050-10"XB4E	630	TRM
1	SURFACE CLOSER	4040XP-REGARM	652	ALL

HW-6
Door: 00B

(2)	HINGE	5BB1-4.5X4.5	626	IVES
1	EXIT DEVICE	AX-LD-98L-NL-3'	626	VON
1	LOCKSET	L9010-RHO	626	SCH
1	KICK PLATE	K0050-10"XB4E	630	TRM
1	SURFACE CLOSER	4040XP-H-LONG	652	ALL
1	WALL BUMP	1270WV	630	TRM
1	ELECTRICAL HINGE	5BB1TW4-4.BX4.5	652	IVES
1	JUNCTION BOX	430	602	HAGER
1	ELECTRICAL LOCKSET	ND80EL	626	SCH

HW-7
Door: 10A

(3)	HINGE	5BB1-4.5X4.5	626	IVES
1	LOCKSET	L9010-RHO	626	SCH
1	SURFACE CLOSER	4040XP-H-LONG	652	ALL

HW-8
Doors: 9A, 8A, 24A

(3)	HINGE	5BB1-4.5X4.5	626	IVES
1	LOCKSET	L9044-RHO-ADATHUMBTURN	630	SCH
1	SURFACE CLOSER	4040XP-H-LONG	652	ALL
1	KICK PLATE	K0050-10"XB4E	630	TRM
1	MOP PLATE	KM50-6"XB4EXCSK	630	TRM
1	WALL BUMP	1270WV	630	TRM
1	COAT HOOK	3071	626	TRM

HW-9
Door: 14A

(2)	HINGE	5BB1-4.5X4.5	626	IVES
1	ELECTRICAL HINGE	5BB1TW4-4.5X4.5	652	IVES
1	JUNCTION BOX	430	602	HAGER
1	ELECTRICAL LOCKSET	ND80EL	626	SCH
1	KICK PLATE	K0050-10"XB4E	630	TRM
1	WALL BUMP	1270WV	630	TRM
1	SMOKE SEAL	S88 HEAD & JAMB	BLK	PEM
1	SURFACE CLOSER	4040XP-H-LONG	652	ALL

CARD READER BY OTHERS

Note: Access control system, door contacts, power supply, and wiring per Division 26

HW-10

Door: 21A

(3)	HINGE	5BB1-4.5X4.5	626	IVES
1	LOCKSET	L9044-RHO-ADATHUMBTURN	630	SCH
1	SURFACE CLOSER	4040XP-H-LONG	652	ALL
1	KICK PLATE	K0050-10"XB4E	630	TRM
1	MOP PLATE	KM50-6"XB4EXCSK	630	TRM
1	WALL BUMP	1270WV	630	TRM
1	COAT HOOK	3071	626	TRM
1	SMOKE SEAL	S88 HEAD & JAMB	BLK	PEM

HW-11

Door: 19B

(3)	HINGE	5BB1-4.5X4.5	626	IVES
1	LOCKSET	L9010-RHO	626	SCH
1	KICK PLATE	K0050-10"XB4E	630	TRM
1	WALL BUMP	1270WV	630	TRM
1	SURFACE CLOSER	4040XP-H-LONG 652	ALL	
1	SMOKE SEAL	S88 HEAD & JAMB	BLK	PEM

HW-12

Door: 20A

(3)	HINGE	5BB1-4.5X4.5	626	IVES
1	LOCKSET	L9010-RHO	626	SCH
1	WALL BUMP	1270WV	630	TRM

HW-13

Door: 19A

(2)	HINGE	5BB1-4.5X4.5	626	IVES
1	ELECTRICAL HINGE	5BB1TW4-4.5X4.5	652	IVES
1	JUNCTION BOX	430	602	HAGER
1	ELECTRICAL LOCKSET	ND80EL	626	SCH
1	KICK PLATE	K0050-10"XB4E	630	TRM
1	WALL BUMP	1270WV	630	TRM

CARD READER BY OTHERS

Note: Access control system, door contacts, power supply, and wiring per Division 26

HW-14

Doors: E26A, E12A, E29A, E31A

(2)	HINGE	5BB1-4.5X4.5	626	IVES
1	ELECTRICAL HINGE	5BB1TW4-4.5X4.5	652	IVES
1	JUNCTION BOX	430	602	HAGER
1	ELECTRICAL LOCKSET	ND80EL	626	SCH

CARD READER BY OTHERS

Note: Access control system, door contacts, power supply, and wiring per Division 26

HW-15

Doors: E35B, E32A, E33A

1	SURFACE CLOSER	4040XP-H-LONG	652	ALL

HW-16

Doors: E14A

(2)	HINGE	5BB1-4.5X4.5	626	IVES
1	ELECTRICAL HINGE	5BB1TW4-4.5X4.5	652	IVES
1	JUNCTION BOX	430	602	HAGER
1	ELECTRICAL LOCKSET	ND80EL	626	SCH
1	AUTOMATIC OPENER	LCN 4640 (Push Side)	628	ALL

CARD READERS BY OTHERS

Note: Access control system, door contacts, power supply, and wiring per Division 26

HW-17
Doors: E35B, E1B

1	LOCKSET	L9025	626	SCH

HW-18
Doors: 1A, E35A, E26A
PER DOOR

(2) HINGE	5BB1-4.5X4.5	626	IVES
(1) ELECTRICAL HINGE	5BB1TW4-4.5X4.5	652	IVES
(1)KICK PLATE	K0050-10"XB4E	630	TRM
(1) SURFACE CLOSER	4040XP-H-LONG	652	LCN
(1) JUNCTION BOX	430	602	HAGER
(1) ELECTRICAL LOCKSET	ND80EL	626	SCH

END OF SECTION

SECTION 08 71 13

AUTOMATIC DOOR OPERATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes
   1. Electromechanical low-energy powered door operators, opening force not exceeding 5 lb-force (38 N).

B. Related Requirements
   1. Section 08 11 13 “Hollow Metal Doors and Frames”.
   2. Section 08 14 00 “Wood Doors”.
   3. Division 26 – Electrical: 120 VAC (20 amp circuit breaker, one per unit) single-phase.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 REFERENCES

A. ANSI/BHMA A156.19 – American National Standard for Power Assist & Low-Energy Power Operated Doors.

B. UL 325 – Standard for Door, Drapery, Gate, Louver and Window Operators and Systems.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00 “Submittal Procedures”.

B. Product Data: Manufacturer’s catalog data, detail sheets and specifications.

C. Shop Drawings: Prepared specifically for this project; show dimensions of operators and interface with other products.

D. Operating and Maintenance Data: Operating and maintenance instructions, parts lists and wiring diagrams.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Factory-trained with minimum 3 years’ experience.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Specifications are based on products of manufacturers named as the Basis of Design. Manufacturers listed whose products meet or exceed the specifications are approved for use on the Project. Other manufacturers must have a minimum of five (5) years’ experience

manufacturing products meeting or exceeding the specifications and comply with Division 01 requirements regarding substitutions to be considered.

1. dormakaba.
2. LCN, an Allegion company.
3. Substitution: Under provisions of Section 01 25 00

2.2 BASIS OF DESIGN

A. Products as manufactured by LCN, an Allegion company.

2.3 OPERATORS

A. Operation: Push button, push plate, switch-activated, manual or field-programmable manual/electric power assisted Push N' Go opening; comply with ANSI A156.19 and UL 325.
   1. Manual opening force: 5 lb-force (38 N) maximum.
   2. Closing force: 5 lb-force (22 N).
   3. Manual "Off/Auto/Hold-Open" switch.
   4. Fail safe: In event of power failure, make door operate manually with controlled spring close as though equipped with a #3 manual door closer, without damage to operator components.
   5. Provide adjustment by microprocessor control in a self-contained housing for:
      a. Opening speed
      b. Backcheck speed
      c. Hold-open, from 1 to 30 seconds
      d. Closing speed
      e. Door will safely stop and reverse if an object is encountered in the opening cycle
      f. Delayed activation to provide 1 second delay between reception of the activation signal and actual opening of the door
      g. Adjustable latching from 0 to 23 degrees from fully closed position
      h. Alternate Action single activation to keep door open until that time activation occurs again
      i. Logic terminal for interface with accessories, mats, and sensors

B. Equipment: Completely electromechanical; comply with ANSI A156.19 and UL 325.
   1. Control Box and Motor / Gear Box: Contained in aluminum housing; precision-machined gears and bearing seats and all-weather lubricant, mounted on vibration isolators. No exposed gears.
   2. Enclosure: Extruded header concealing all operating parts except arms and manual control switches.
      a. 4-1/2 inch x 5-3/4 inch aluminum housing that allows for bottom loading.
      b. Design for overhead concealed application.
      c. Design for interior application.
   3. Gears: Manufactured by operator manufacturer specifically for operators.
      a. Gears enclosed in gearbox.
   4. Motor: DC permanent magnet motor with shielded ball bearings. Stop motor when door stops or is fully open and when breakaway is operated.
   5. Door Operating Arm: Forged steel, attached at natural pivot point of door.
      a. Exposed arms: Factory-painted and finished to match operator enclosure.
      b. Overhead concealed butt hung. Provide concealing arm channel.
   6. "Off/Auto/Hold-Open" switch: Three-position rocker or key type and slide arm for top of door.
   7. Control Circuits for Actuators and Safeties: Low-voltage, NEC Class II.
   8. Service Conditions: Satisfactory operation between -30 degrees F (-34 degrees C) and 160 degrees F (71 degrees C).
   9. Power Supply Required: 120 VAC (20 amp circuit breaker, one per unit).
   10. Microprocessor Control: 120 VAC. Do not use micro-switches.

11. Concealed Overhead Mounting: In ceiling or frame header, accessed through cutout; conceal door arm when door is closed.

2.4 ACTIVATORS

A. Push Button Switch: Two per door.

B. LCN 8310-836TW Low profile 36" x 6" push plate
   1. Material: Stainless Steel
   2. Marking: Wheelchair Logo

C. Card Reader: By Others

2.5 MARKINGS

A. Decals: Visible from either side, instructing the user as to the operation and function of the door.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that door openings and doors are properly installed and ready for installation of door operators.

B. Verify that electrical service is available, properly located and of proper type.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions; comply with ANSI A156.19.

B. Verify that electrical connections are made correctly and with dedicated grounding.

3.3 ADJUST

A. Adjust door operators for proper operation, without binding or scraping and without excessive noise.

B. Supply Owner/Contractor with keys if required.

END OF SECTION

SECTION 08 80 00

GLAZING

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Glass and glazing for windows, storefronts, and doors.

B. Mirror glass.

1.2 REFERENCES

A. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.

B. ASTM C920 - Elastomeric Joint Sealants.

C. ASTM C1036 - Flat Glass.

D. ASTM C1048 - Heat-Treated Flat Glass.

E. ASTM C1172 - Specification for Laminated Architectural Flat Glass.

F. ASTM C1651 - Measurement of Roll Wave Optical Distortion in Heat-Treated Flat Glass.

G. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.

H. CBC - California Building Code, (CCR) California Code of Regulations , Title 24, Part 2.

I. CPSC - Consumer Product Safety Council.

J. GANA - Glazing Manual.

K. UL - Underwriters' Laboratories, Inc., Building Materials Directory.

1.3 QUALITY ASSURANCE

A. Conform to The Glass Association of North America (GANA) Glazing Manual and Sealant Manual for glazing installation methods.

1.4 REGULATORY REQUIREMENTS

A. Conform to all glass labeling requirements of the CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, Section 2403.

1.5 SUBMITTALS

A. Submit product data under provisions of Section 01 33 00.

B. Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Provide data on glazing sealant. Identify colors available.

D. Submit samples under provisions of Section 01 33 00.

E. Submit two samples, 12 x 12 inches in size, illustrating each glass coloration.

F. Submit 12 inch long bead of glazing sealant in color selected.

G. Submit sealed glass unit manufacturer's certificate under provisions of Section 01 33 00 indicating units meet or exceed specified requirements.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Deliver, store and protect products under provisions of Section 01 61 00.

1.7 WARRANTY

A. Provide ten year manufacturer's warranty under provisions of City of Sacramento.

B. Warranty: Include coverage of sealed insulating glass units from seal failure, interpane dusting or misting, and replacement of same.

C. Warranty: Include coverage for reflective coating on mirrors and replacement of same.

D. Warranty: Include coverage for delamination of laminated glass and replacement of same.

2. PART 2 PRODUCTS

2.1 ACCEPTABLE GLASS MANUFACTURERS

A. Clear and Tinted Float Glass:

1. AGC Industries, Inc., www.agc.com.
2. Guardian Industries Corp., www.guardianglass.com.
3. Pilkington Glass HA, www.pilkington.com.
4. Vitro Architectural Glass, www.vitroglazings.com.
5. Oldcastle Glass, www.obe.com.
6. Zeledyne Versalux Architectural Glass, www.hartung-glass.com.
7. Viracon, Inc., www.viracon.com.

B. Tempered Glass:

1. AGC Industries, Inc., www.agc.com.
2. Guardian Industries Corp., www.guardianglass.com.
3. Oldcastle Glass Co., www.obe.com.
4. Interpane, www.interpane.com.
5. Pilkington Glass NA, www.pilkington.com.
6. Vitro Architectural Glass, www.vitroglazings.com.
7. Zeledyne Versalux Architectural Glass, www.hartung-glass.com.
8. Viracon, Inc., www.viracon.com.

C. Laminated Glass:

1. AGC Industries, Inc., www.agc.com.
2. Guardian Industries Corp., www.guardianglass.com.

3. Interpane, www.interpane.com.

4. Oldcastle Glass Co., www.obe.com.

5. Pilkington Glass HA, www.pilkington.com.

6. Vitro Architectural Glass, www.vitroglazings.com.

7. Zeledyne Versalux Architectural Glass, www.hartung-glass.com.

8. Viracon, Inc., www.viracon.com.

D. Sealed Insulating Glass:

1. AGC Industries, Inc., www.agc.com.

2. Guardian Industries Corp., www.guardianglass.com.

3. Interpane, www.interpane.com.

4. Oldcastle Glass Co., www.obe.com.

5. Pilkington Glass NA, www.pilkington.com.

6. Vitro Architectural Glass, www.vitroglazings.com.

7. Zeledyne Versalux Architectural Glass, www.hartung-glass.com.

8. Viracon, Inc., www.viracon.com.

E. G-6 Acoustic Glazing: Glass unit consisting of 1/4 inch (6 mm) tempered glass laminated to 3/8 inch (9 mm) clear float glass comprised of two 3/16 inch (4.5 mm) clear float glass lites laminated to each other with clear 0.060 inch thick polyvinyl butyral (PVB) interlayer.

F. Glass Film Overlay: Translucent, dimensionally stable, cast PVC film, 2 mil (0.05 mm) minimum thickness, with pressure sensitive, clear adhesive back for adhering to glass and releasable protective backing.

G. Substitutions: Under provisions of Section 01 25 00.

2.2 GLASS MATERIALS, GENERAL

A. Primary Glass Standard: Comply with ASTM C1036 requirements, including reference to type, class, quality, and, if applicable, form, finish, and pattern.

B. Tempered Glass Standard: Comply with ASTM C1048 requirements, including those indicated by reference to kind, condition, type, quality, class, and, if applicable, form, finish, and pattern.

C. Laminated Glass Standard: Comply with ASTM C1172 requirements including reference to type, class, quality, and if applicable, form, finish and pattern.

D. Sizes: Fabricate glass to sizes required for glazing openings, with edge clearances and tolerances complying with recommendations of glass manufacturer and GANA.

E. Provide thicknesses indicated or, if not indicated, as recommended by glass manufacturer for application indicated.

F. Roller wave distortion shall not exceed 0.003 inch as measured peak to valley at the center of the glass, and 0.008 inch at the leading and trailing edge of the lite of glas s as measured by ASTM C1651.

2.3 PRIMARY GLASS PRODUCTS

A. Mirror Glass: ASTM C1036, Type I Transparent Glass, Flat; Class 1, Clear; q1 mirror select; 1/4 inch thick with pressure-sensitive adhesive coated scrim-impregnated film tape safety backing.

2.4 TEMPERED GLASS PRODUCTS

A. Manufacturing Process: Horizontal (roller hearth) process with roll wave distortion parallel with bottom edge of glass as installed.

B. Clear Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type 1 (transparent glass, flat) Class 1 (clear), Quality q3 (glazing select); conforming to ANSI Z97.1 and CPSC 16 CFR 1201, Category II.

2.5 LAMINATED GLASS PRODUCTS

A. Laminated Safety Glass: Two plies of float glass of indicated thickness, ASTM C1172, Type II, Kind HS (heat-strengthened), laminated with 0.030 inch thick plastic interlayer; conforming to ANSI Z97.1, and CPSC 16 CFR 1201, Category II. Unit to have the following characteristics:

1. Glass: Class 1 - clear for both plies.

2. Glass Thickness:

(a) Combination for each pane of the following plies:

1. Interior: 1/8 + 1/8 inch.

3. Color of Plastic Interlayer: Clear

B. Plastic Interlayer:

1. Saflex (Solutia); Monsanto Co., www.saflex.com.

2. Butacite; E.I. DuPont DeNemours & Co., Inc., www.dupont.com.

3. Eastman Chemical Company, Vanceva, www.vanceva.com.

4. Kuraray America, Inc., www.trosifol com.

2.6 SEALED INSULATING GLASS UNITS

A. Comply with ASTM E2190, for double glazed, air filled units.

B. Nominal Thickness of Exterior Pane: 1/4 inch.

C. Nominal Thickness of Interior Pane: 1/4 inch.

D. Air Space Thickness: 1/2 inch.

E. Exterior Pane: Laminated safety glass.

F. Interior Pane: Laminated safety glass.

G. Spacer Material: Stainless steel warm edge spacer.

H. Dessicant: Molecular sieve or silica gel or blend of both.

2.7 GLAZING SEALANTS AND PREFORMED GLAZING TABS

A. General: Comply with ASTM C920, and sealant and glass manufacturers recommendations for suitability and compatibility.

B. One-Part Butyl Glazing Sealant:

1. Chem-Calk 300; Bostik Construction Products Div., www.bostik-findley-us.com.

2. BC 158; Pecora Corp., www.pecora.com.

C. One-Part Acid-Curing Silicone Glazing Sealant: Type S; Grade NS; Class 25:

1. Dowsil 999; Dow Consumer Solutions, www.consumer.dow.com.

2. SCS 1200; General Electric Corp., www.gesealants.com.

3. 863; Pecora Corp., www.pecora.com.

4. Omniglaze; Sonneborn Building Products Div.; ChemRex Products, Inc., www.chemrex.com.

5. Proglaze; Tremco, www.tremcosealants.com.

D. Preformed Butyl-Polyisobutylene Glazing Tape:

1. 3M Glazing Tape, 3M Corporation, www.3m.com.

2. Norseal V990 Tape: Saint-Gobain North America, www.foams.saint-gobain.com.

3. Tremco Polyshim II Tape; Tremco, Inc., www.tremcosealants.com.

4. Sika Glazing Tape, Sika Corporation, www.usa.sika.com.

2.8 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene; EPDM or silicone blocks, 80-90 Shore A durometer hardness.

B. Spacer Shims: Neoprene; EPDM or silicone blocks, Shore A durometer hardness; self adhesive one face.

C. Glazing Gasket: Resilient polyvinylchloride extruded shape to suit glazing channel retaining slot with prefabricated molded corners. Color to be selected from manufacturer's full range of colors.

D. Glazing Clips: Manufacturer's standard type.

E. Mirror Attachment Accessories: Stainless steel clips.

3. PART 3 EXECUTION

3.1 INSPECTION

A. Verify surfaces of glazing channels or recesses are clean, free of obstructions, and ready for work of this Section.

B. Beginning of installation means acceptance of substrate.

3.2 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses.

C. Prime surfaces scheduled to receive sealant.

3.3 EXTERIOR DRY METHOD (PREFORMED GLAZING)

A. Cut glazing tape to length; install on glass pane. Seal corners by butting tape and dabbing with butyl sealant.

B. Place setting blocks at 1/4 inch points with edge block no more than 6 inches from corners.

C. Rest glass on setting blocks and push against fixed stop with sufficient pressure to attain full contact at perimeter of pane.

D. Install removable stops without displacement of glazing gasket. Exert pressure for full continuous contact.

E. Trim protruding tape edge.

F. Use for all aluminum windows and aluminum framed storefronts.

3.4 INTERIOR - DRY METHOD (TAPE AND TAPE)

A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

D. Place glazing tape on free perimeter of glazing in same manner described above.

E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

F. Knife trim protruding tape.

G. Use for all interior steel frames.

3.5 INSTALLATION - MIRRORS

A. Set mirrors with clips. Anchor rigidly to wall construction.

A. Place plumb and level.

3.6 CLEANING

A. After installation, mark pane with an "X" by using plastic tape or removable paste.

B. Remove glazing materials from finish surfaces.

C. Remove labels after Work is completed.

END OF SECTION

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

1. PART 1 GENERAL

1.1 WORK INCLUDED

A. Gypsum board.

B. Glass mat gypsum sheathing.

C. Shaft wall coreboard.

D. Gypsum soffit board.

E. Impact resistant gypsum board.

F. Acoustically enhanced gypsum board.

G. Taped and sanded joint treatment.

H. Surface primer.

I. Texture finish.

J. Resilient furring channels.

K. Metal channel ceiling framing.

1.2 REFERENCES

A. ASTM A641 - Zinc-Coated (Galvanized) Carbon Steel Wire.

B. ASTM C11 - Standard Terminology Relating to Gypsum and Related Building Materials and Systems.

C. ASTM C79 - Standard Specification for Treated Core and Nontreated Core Gypsum Sheathing Board.

D. ASTM C475 - Joint Treatment Materials for Gypsum Wallboard Construction.

E. ASTM C514 - Nails for the Application of Gypsum Wallboard.

F. ASTM C557 - Adhesives for Fastening Gypsum Wallboard to Wood Framing.

G. ASTM C645 - Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.

H. ASTM C754 - Installation of Steel Framing Members to Receive Screw Attached Gypsum Wallboard, Backing Board, or Water Resistant Backing Board.

I. ASTM C840 - Application and Finishing of Gypsum Board.

J. ASTM C919 - Use of Sealants in Acoustical Applications.

K. ASTM C1002 - Steel Drill Screws for the Application of Gypsum Board.

L. ASTM C1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

M. ASTM C1396 - Standard Specification for Gypsum Board.

N. ASTM C1629 - Standard Specification for the Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.

O. ASTM D226 - Asphalt-Saturated Felt Used in Roofing and Waterproofing.

P. ASTM D1037 - Test Methods for Evaluating Properties of Wood-Based Fiber and Particle Panel Materials.

Q. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

R. ASTM D3274 - Standard Test Method for Evaluating Degree of Surface Disfiguration of Paint Films in Fungal or Algal Growth, or Soil and Dirt Acumulation.

S. ASTM D4977 - Standard Test Method for Granular Adhesion to Mineral Surfaced Roofing by abrasion (modified).

T. ASTM D5420 - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact).

U. ASTM E90 - Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.

V. ASTM E695 - Standard Method of Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact Loading.

W. CBC - California Building Code, (CCR) California Code of Regulations , Title 24, Part 2.

X. GA 201 - Using Gypsum Board for Walls and Ceilings.

Y. GA 214 - Levels of Gypsum Board Finish.

Z. GA 216 - Application and Finishing of Gypsum Board.

AA. GA 253 - Application of Gypsum Sheathing.

BB. GA 600 - Fire Resistance Design Manual.

CC. ISO 14040 - Environmental Management - Life cycle assessment - Principals and Framework.

DD. UL - Underwriters Laboratories.

1.3 QUALITY ASSURANCE

A. Applicator: Company specializing in gypsum board systems work with five years documented experience.

1.4 REGULATORY REQUIREMENTS

A. Conform to CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, Chapter 7, and UL and GA requirements for fire rated assemblies as indicated on the drawings

B. Conform to UL No. 2079 for cyclical design at head of fire rated walls.

1.5 ACOUSTICAL PERFORMANCE

A. Acoustical Attenuation for Identified Interior Partitions: STC in accordance with ASTM E90.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Maintain uniform temperature of minimum 60 degrees F and humidity of 30 to 50 percent prior to, during, and after installation of the Work of this Section.

1.7 DEFINITIONS

A. Refer to ASTM C11 for definitions of terms related to gypsum board assemblies.

2. PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - GYPSUM BOARD SYSTEM

A. American Gypsum Corp., www.americangypsum.com.

B. Certainteed, www.certainteed.com.

C. Georgia Pacific Corp., www.gp.com.

D. National Gypsum Co., www.nationalgypsum.com.

E. PABCO Gypsum, www.pabcogypsum.com.

F. United States Gypsum Co., www.usg.com.

G. Substitutions: Under provisions of Section 01 25 00.

2.2 FRAMING MATERIALS

A. Metal Furring: ASTM C645, hat-shaped, 7/8 inch deep, 0.0329 inch thick.

B. Resilient Furring Channel: Manufacturer's standard product designed to reduce sound transmission, complying with ASTM C645 for material, finish and widths of face and fastening flange; 1/2 inch deep x 0.0179 inch thick asymmetric-shaped channel with face connected to single flange by slotted leg (web).

C. Furring Channel: ASTM C754, 1-1/2 inch x 0.475 lb./ft. channel.

D. Fasteners: ASTM C1002.

E. Hanger Wire: ASTM A641, Class 1 coating (galvanized) soft temper, 9 gauge.

F. Tie Wire: ASTM A641, Class 1 coating (galvanized) soft temper, 16 and 18 gauge.

G. Adhesive: ASTM C557.

2.3 GYPSUM BOARD MATERIALS

A. Standard Gypsum Board: ASTM C1396; 5/8 inch thick unless otherwise indicated, maximum permissible length; ends square cut, tapered and beveled edges. Similar to Sheetrock Brand EcoSmart Panels manufactured by United States Gypsum Company.

B. Fire Rated Gypsum Board: ASTM C1396; fire resistive type, UL rated; 5/8 inch thick unless otherwise indicated, maximum permissible length; ends square cut, tapered and beveled edges. Similar to Sheetrock Brand EcoSmart Panels manufactured by United States Gypsum Company

C. Mold and Mildew Resistant Gypsum Board: ASTM C1396; 5/8 inches thick unless otherwise indicated, maximum length; ends square cut, tapered and beveled edges. Mold and mildew resistant core and paper facing, meeting ASTM D3273, with a score of 10 as rated according to ASTM D3274. Similar to Sheetrock Brand EcoSmart Mold Tough Panels manufactured by United States Gypsum Company.

D. Fire Rated Mold and Mildew Resistant Gypsum Board: ASTM C1396; fire resistive type, UL rated 5/8 inches thick unless otherwise indicated, maximum length; ends square cut, tapered and beveled edges. Mold and mildew resistant core and paper facing, meeting ASTM D3273, with a score of 10 as rated according to ASTM D3274. Similar to Sheetrock Brand EcoSmart Mold Tough Firecode X Panels manufactured by United States Gypsum Company.

E. Moisture Resistant Gypsum Board: ASTM C1396 with a score of 10 as rated according to ASTM D3274; 5/8 inch thick unless otherwise indicated, water resistant core; water resistant paper on front, back, and long edges; maximum permissible length; ends square cut, tapered and beveled edges.

F. Fire Rated Moisture Resistant Gypsum Board: ASTM C1396; fire resistive type, UL rated; 5/8inch thick unless otherwise indicated; water resistant core; water resistant paper on front, back and long edges; maximum permissible length; ends square cut, tapered and beveled edges.

G. Backing Board: ANSI/TCNA A118.9; High density, cementitious, glass fiber reinforced, 5/8 inch thick to match adjacent wallboard, 2 inch wide coated glass fiber tape for joints and corners; manufacture licensed by TCNA.

1. Location: Install at all Restrooms behind ceramic tile.

H. Acoustically Enhanced Gypsum Board: ASTM C1396, 5/8 inch thick multilayer product constructed of two layers of gypsum board sandwiching a viscoelastic sound-absorbing polymer core; maximum permissible length; ends square cut, tapered and beveled edges, similar to Sound Break as manufactured by National Gypsum Company.

I. Fire Rated Acoustically Enhanced Gypsum Board: ASTM C1396: fire resistive type, UL rated; 5/8 inch thick multilayer product constructed of two layers of gypsum board sandwiching a viscoelastic sound-absorbing polymer core; maximum permissible length; ends square cut, tapered and beveled edges, similar to Sound Break as manufactured by National Gypsum Company.

J. Exterior Gypsum Soffit Board: ASTM C1396; fire resistive type, UL rated; 5/8 inch thick unless otherwise noted, maximum permissible lengths; enhanced sag resistant core; water resistant paper on front, back and long edges; beveled tongue and groove edges.

K. Glass-Mat Gypsum Sheathing Board: ASTM C1177; 1/2 inch thick, similar to Dens-Glass Gold manufactured by Georgia Pacific Corp.

2.4 ACCESSORIES

A. Acoustical Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board: As specified in Section 07 92 00.

B. Fire Rated Sealant and Fiber Stuffing: As specified in Section 07 84 00.

C. Corner Beads: Metal, hot dip galvanized.

D. Edge Trim: GA 201 and GA 216; Type LC bead, unless otherwise indicated.

E. Control Joints: Roll-formed zinc, Type USG No. 093.

F. Curved-Edge Cornerbead: Vinyl type with notched or flexible flanges.

G. Spot Grout: ASTM C475, setting-type joint compound.

H. Joint Materials Interior: ASTM C475; reinforcing tape, joint compound, adhesive, water, and fasteners. Use tapes and compound recommended by gypsum board manufacturer for the use intended. Use ready mixed, drying type compounds. Use taping compound for embedding tape and first coat over fasteners and flanges of corner beads and trim. Use topping compound for fill and finish coats.

I. Joint Materials, Exterior:

1. Gypsum Soffit Board: Setting-type taping and setting-type, sandable topping compound.

2. Glass-Mat Gypsum Sheathing: 2 inch wide 10 x 10 self-adhering fiberglass joint tape recommended by manufacturer.

J. Primer: Flat latex basecoat paint equivalent to First Coat manufactured by United States Gypsum Company.

K. Primer-Surfacer: Vinyl acrylic latex-based primer and surfacer equivalent to Tuff-Hide manufactured by United States Gypsum Company.

L. Spray Texture Finish: Equivalent to USG Spray Texture Finish, spatter texture, manufactured by United States Gypsum Company.

M. Membrane: ASTM D226; No. 15 asphalt saturated roofing felt.

3. PART 3 EXECUTION

3.1 INSPECTION

A. Verify that site conditions are ready to receive Work.

B. Beginning of installation means acceptance of substrate.

3.2 WALL FURRING INSTALLATION

A. Erect wall furring for direct attachment to masonry or concrete walls.

B. Erect metal furring vertically at 16 inches o.c. Secure in place on alternate channel flanges at maximum 24 inches o.c.

3.3 ACOUSTICAL ACCESSORIES INSTALLATION

A. Space resilient furring channels horizontally at maximum 16 inches o.c., not more than 2 inches from floor and ceiling lines.

B. Locate nested joints over framing members.

C. Install acoustical sealant within partitions in accordance with manufacturer's instructions and ASTM C919.

D. Seal perimeter, joints, openings and penetrations on each face of partition.

3.4 CEILING FRAMING INSTALLATION

A. Install in accordance with ASTM C754 and CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, Chapter 25.

B. Coordinate locations of hangers with other Work.

C. Install ceiling framing independent of walls and columns.

D. Space 9 gauge hanger wires 3'-0" o.c. along 1-1/2 inch furring channels and within 6 inches of end of furring channel.

E. Install 1-1/2 inch furring channels at 4'-0" o.c. and within 6 inches of parallel walls. Provide 1 inch clearance between end of channels and abutting walls.

F. Position furring channels for proper ceiling height, level, and secure with hanger wire saddle-tied along channel.

G. At channel splices, interlock flanges, overlap ends 12 inches and secure each end with double-strand of 16 gauge tie wire.

H. Erect metal furring at right angles to 1-1/2 inch furring channels. Space metal furring 16 inches o.c.

I. Install metal furring within 6 inches of parallel walls. Provide 1 inch clearance between end of furring and abutting wall.

J. Secure metal furring to furring channel with clips or saddle tie with double strand of 18 gauge tie wire.

K. At splices of metal furring nest furring at least 8 inches and securely wire-tie each end with double strand of 16 gauge tie-wire.

L. Reinforce openings in ceiling suspension system which interrupt main furring channels or metal furring with lateral channel bracing. Extend bracing minimum 24 inches past each end of openings.

3.5 GYPSUM BOARD INSTALLATION

A. Install gypsum board in accordance with ASTM C840 and manufacturer's instructions.

B. Erect single layer standard gypsum board in most economical direction, with ends and edges occurring over firm bearing except those ends and edges which are perpendicular to framing.

C. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing except those ends and edges which are perpendicular to framing members. Comply with required UL, CBC, or GA fire rated assembly.

D. Erect double layer gypsum board with standard gypsum board for first layer placed in most economical direction with second layer placed parallel to face layer with adhesive and supplementary fasteners. Off-set joints of second layer from joints of first layer by at least 12 inches.

E. Erect double layer fire rated gypsum board in accordance with required UL, CBC, or GA fire rated assembly.

F. Use screws when fastening gypsum board to metal furring.

G. Use screws when fastening gypsum board to wood furring or framing except where nails are required for UL or UBC fire rated assembly.

H. Install fire stop sealant and fiber stuffing at wall penetrations and terminations in accordance with required UL, CBC, or GA fire rated assembly in accordance with Section 07 84 00.

I. Install acoustical sealant at wall penetrations and terminations as specified in this section and in accordance with Section 07 92 00.

J. Isolate perimeter of gypsum board applied to non-load bearing partitions at structural abutments. Provide ½ inch wide space and trim with metal edge. Seal joint between metal edge and structural surface with acoustical sealant.

K. Where partitions intersect structural members projecting below underside of floor / roof slabs and decks, cut gypsum panels to fit profile formed by structural member. Allow ½ inch wide space and install acoustical sealant.

L. Treat cut edges and holes in moisture resistant gypsum board with sealant.

M. Install gypsum board with mold and mildew-resistant core and paper facing at exterior locations on the interior face of all exterior walls.

N. Place control joints not to exceed 30 feet maximum in either direction for partitions and ceilings. Provide adequate seal or safing insulation behind control joints to maintain sound or fire ratings.

O. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

P. Spot grout metal door frames. Apply spot grout at each jamb anchor clip just before inserting board into frame.

Q. Locations: Verify specific board location consistent with what is shown on drawings, UNO.

3.6 CURVED PARTITIONS

A. Install panels horizontally and unbroken across curved surface.

B. Wet gypsum panels on surface that will become compressed.

C. On convex side of partition, begin installation at one end of curved surface and fasten panels to studs as they are wrapped around curve.

D. On concave side of partition, start fastening panels at center of curve and work outward to panel ends.

E. Allow wetted panels to dry before applying joint treatment.

3.7 EXTERIOR SOFFIT AND CEILING INSTALLATION

A. Apply gypsum soffit board panels perpendicular to supports with end joints staggered and located over supports.

B. Install panels with 1/4 inch open space where panels abut other construction or penetrations.

C. Fasten with corrosion-resistant screws.

3.8 GLASS MAT GYPSUM SHEATHING INSTALLATION

A. Install glass mat gypsum sheathing in accordance with manufacturer's instructions and in accordance with GA-253.

B. Install glass mat gypsum sheathing with gold side out.

C. Install glass mat gypsum parapet sheathing with blue low-perm side out.

D. Install glass mat gypsum sheathing with long dimension parallel to framing members.

E. Fasten with corrosion-resistant screws.

F. Install fire rated glass mat gypsum sheathing in accordance with listed assembly indicated from UL, CBC or GA.

3.9 SHAFT WALL ASSEMBLY INSTALLATION

A. Shaft wall assemblies shall be installed to comply with requirements of fire-resistance-rated assemblies indicated from UL, CBC or GA.

B. Do not bridge building expansion joints with shaft-wall assemblies. Frame both sides of joint with furring and other supports.

C. At penetrations in shaft wall, maintain fire-resistive rating by installing supplemental fire protection behind boxes, elevator call buttons, elevator floor indicators and similar items.

D. Isolate gypsum finish panels from building structure to prevent cracking while maintaining continuity of fire-rated construction.

E. Seal gypsum board shaft walls with fire rated sealant at perimeter of assembly where it abuts other work and at joints and penetrations.

F. Where shaft wall assemblies cannot be positioned within 2 inches of the shaft wall face of structural beams, floor edges and similar projections into shaft, install 5/8 inch thick gypsum board cants covering tops of projections.

G. Install multiple layers of gypsum board materials as specified for double layer installation.

3.10 JOINT TREATMENT

A. Tape, fill, and sand joints, edges, and corners in accordance with GA-214.

B. Feather successive coats a minimum of 2 inches onto adjoining surfaces for each coat.

C. Where fire resistance rating is required, detail of joint treatment shall meet fire rating requirement.

D. Level 1 Treatment:

1. All joints and angles shall have tape embedded in joint compound.

2. Surface shall be free of excess joint compound.

3. Tool marks and ridges are acceptable.

4. Use for plenum areas above ceiling, in areas that are generally concealed and other areas not normally open to view.

E. Level 2 Treatment:

1. All joints and angles shall have tape embedded in joint compound and one separate coat of joint compound shall be applied over all fastener heads and accessories.

2. Surface shall be free of excess joint compound.

3. Tool marks and ridges are acceptable.

4. Use where surface is substrate to ceramic tile, acoustic tile, or tackable wallboard system.

F. Level 3 Treatment:

1. All joints and angles shall have tape embedded in joint compound and two separate coats of joint compound shall be applied over all joints, angels, fastener heads and accessories.

2. Apply a skim coat of topping compound over entire surface.

3. All compound shall be smooth and free of tool marks and ridges.

4. Use for all surfaces that are scheduled to receive a texture and painted finish over impact resistant gypsum board.

G. Level 4 Treatment:

1. All joints and angles shall have tape embedded in joint compound with three separate coats of topping compound applied over all joints, angles, fasteners, and accessories.

2. All compound shall be smooth and free of tool marks and ridges.

3. Sand lightly between coats, taking care not to roughen face paper.

4. Use for all surfaces that are scheduled to receive a textured and painted finish, except areas of food service and preparation, or a surface applied wallcovering.

H. Level 5 Treatment:

1. All joints and angles shall have tape embedded in joint compound with three separate coats of topping compound applied over all joints, fasteners, and accessories.

2. Apply two thin skim coats of topping compound over entire surface.

2. All compound shall be smooth and free of tool marks and ridges.

3. Sand lightly between coats.

4. Use for all surfaces that are scheduled to receive a painted finish in all vertical and horizontal surfaces of restrooms and at impact resistant gypsum board indicated with no texture.

I. Glass-Mat Gypsum Sheathing Board: Apply self-adhering fiberglass joint tape over joints and embed in bead of acrylic latex sealant applied into board joint.

J. Gypsum Board Soffit Board: Apply joint tape over joints and embed in setting type joint compound. Skim joint surface with setting type joint compound for smooth finish.

3.11 FINISHING

A. Roller apply surface primer to all gypsum board surfaces scheduled to receive a painted and textured finish prior to application of paint or texture finish.

B. Spray apply textured finish to all surfaces scheduled to receive a paint finish except surfaces of food service and preparation areas.

C. Remove any overspray of texture finish from door frames, windows, and other adjoining construction.

3.12 TOLERANCES

A. Maximum Variation from True Flatness: 1/8 inch in 10 feet in any direction.

3.13 PROTECTION

A. Protect adjacent surfaces from joint compound. Promptly remove from floors and other surfaces. Repair stained and marred surfaces damaged during gypsum board application.

B. Protect work of this section from weather, condensation, direct sunlight, and other detrimental causes during the construction period.

C. Remove and replace gypsum panels that become wet, moisture damaged and mold damaged.

END OF SECTION

SECTION 09 22 16

METAL STUD FRAMING

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Formed metal stud framing.

B. Shaft wall framing.

C. Furring channels.

D. Framing accessories.

1.2 REFERENCES

A. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. ASTM A924 - General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

C. ASTM C645 -Standard Specification for Nonstructural Steel Framing Members.

D. ASTM C754 - Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water-Resistant Backing Board.

E. ASTM C1002 - Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.

F. CBC - California Building Code (CCR) California Code of Regulations, Title 24, Part 2.

G. NFPA 80 - Fire Doors and Windows.

H. GA600 - Fire Resistance Design Manual.

I. SFIA - Steel Framing Industry Association.

J. SSMA - Steel Stud Manufacturer's Association.

K. SSPC - The Society for Protective Coatings.

L. UL - Underwriters Laboratories.

1.3 SUBMITTALS

A. Submit product data under provisions of Section 01 33 00.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with ASTM C754 and the recommendations of the SSMA and SFIA.

B. Maintain one copy of each document on site.

1.5 REGULATORY REQUIREMENTS

A. Conform to CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, Chapter 7, and UL and GA requirements for fire rated assemblies.

B. Conform to UL No. 2079 for cyclical design at head of fire rated walls.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate Work under the provisions of Section 01 31 00.

B. Coordinate installation of head of wall track with spray applied fireproofing in Section 07 81 00.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS

A. California Expanded Metal Products Co., www.cemcosteel.com.

B. Consolidated Fabricators Corp., www.confabbpd.com.

C. ClarkDietrich Building Systems, www.clarkdietrich.com.

D. Frametek Steel Products, www.frameteksteel.com.

E. Steel Stud Manufacturing Co., www.scafco.com.

F. United Metal Products, Inc.., www.unitedmetalproducts/info.

G. Substitutions: Under provisions of Section 01 25 00.

2.2 STUD FRAMING MATERIALS

A. Framing System Components: ASTM C645. Depth as scheduled.

B. Studs: ASTM A653, Grade 33 for steel 0.0428 inch thick and below, Grade 50 for steel 0.0538 inch thick and above, galvanized to G60 coating class in compliance with ASTM A924, non-load bearing rolled steel, channel shaped, punched for utility access as shown on the drawings.

C. Runners: Of same material and finish as studs, unpunched. Minimum thickness one size greater than wall stud.

D. Ceiling Runners: Of same material, finish and thickness as studs. Minimum thickness one size greater than wall stud.

E. Deflection Track: Top runner track designed to allow for deflection of structure to interior partition fabricated of same material, finish and thickness as studs and of the following configuration:

1. Top runner track with slotted flanges, 2-1/2 inch deep with vertical slots 1 inch on center.

2. Products: Subject to compliance with requirements, provide one of the following:

(a) BST, as manufactured by BlazeFrame Industries, www.blazeframe.com.

(b) CST, SLP-TRK, as manufactured by CEMCO, www.cemcosteel.com

(c) Max Trax as manufactured by ClarkDietrich Building Systems, www.clarkdietrich.com.

(d) The System, Slotted Angle System, as manufactured by Metal-Lite, Inc. www.metal-lite.net.

(e) SLT standard slotted track as manufactured by Steel Stud Manufacturing C., www.scafco.com.

F. Firestop Track: Top runner track designed to allow for deflection of structure to interior partition fabricated of same material, finish and thickness as studs and capable of maintaining a fire rated joint system as determined by UL 2079 using intumescent tape applied to face of track. Of the following configuration:

1. Top runner track with slotted flanges, 2-1/2 inches deep with vertical slots 1 inch on center.

2. Intumescent tape to be applied to face of track in length and thickness required to maintain designated fire rating of wall.

3. Products: Subject to compliance with requirements, provide one of the following:

(a) Blaze Frame DSL, as manufactured by BlazeFrame Industries, www.blazeframe.com.

(b) FAS Track as manufactured by CEMCO, www.cemcosteel.com

(c) Blaze Frame DSL, as manufactured by ClarkDietrich Building Systems, www.clarkdietrich.com.

G. Hat Shaped, Rigid Furring Channels: ASTM C645, 7/8 inch deep, 0.0329 inch thick.

H. Resilient Furring Channels: ASTM C645, 1/2 inch deep, 0.0179 inch thick, asymmetric-shaped channel designed to reduce noise transmission with face attached by slotted flange.

I. Z-Shaped Furring: Non slotted web, face flange of 1-1/4 inch, wall attachment flange of 3/4 inch, minimum thickness of 0.0329 inch thick.

J. Furring and Bracing Members: Of same material and finish as studs, thickness to suit purpose.

K. Radiused Track and Runners: ASTM A653, galvanized to G60 coating class, 0.0329 inch thick steel Flex – C Trac as manufactured by Flex-Ability Concepts, www.flexc.com, or standard unpunched track and runner of same material, finish and thickness as studs.

2.3 ACCESSORIES

A. Fasteners: ASTM C1002, self-drilling, self-tapping screws.

B. Metal Backing: 0.0538 inch thick galvanized steel.

C. Anchorage Devices: Powder actuated and drilled expansion bolts.

D. Primer: SSPC 20.

E. Beam Clips: 0.0179 inch thick x 2-3/8 inch long galvanized steel clip as manufactured by Claw International, www.clawinternational.com.

F. Flute Cover: FAS Strap as manufactured by CEMCO, www.cemco.com, or FC Flute Closure as manufactured by ClarkDietrich, www.clarkdietrich.com. Width to match flute opening in metal deck. Intumescent tape applied for fire rated head of wall conditions.

G. Spray Applied Fireproofing: As specified in Section 07 81 00.

H. Fiber Stuffing: Mineral fiber as specified in Section 07 84 00.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that conditions are ready to receive Work.

B. Verify field measurements are as shown on Drawings.

C. Verify that rough-in utilities are in proper location.

D. Beginning of installation means installer accepts existing conditions.

3.2 ERECTION

A. Install components in accordance with ASTM C754 requirements; manufacturer's instructions; details indicated on drawings; and as specified herein.

B. Coordinate installation of sealant specified in Sections 07 92 00 and 09 21 16.

C. Coordinate installation of spray applied fireproofing specified in Section 07 81 00.

D. Coordinate installation of fiber stuffing as specified in Section 07 84 00.

E. Align and secure top and bottom runners at 24 inches o.c.

F. Fit runners under and above openings; secure intermediate studs at spacing of wall studs.

G. Install studs vertically at 16 inches o.c. horizontal spacing.

H. Connect studs to tracks using fastener method.

I. Stud splicing not permissible.

J. Construct corners using minimum three studs.

K. Double studs of 0.0329 inch thickness at wall openings, door and window jambs, and each side of other openings that are 4'-0" or less in width.

L. Double studs of 0.0428 inch thickness at wall openings, door and window jambs, and at each side of other openings that are more than 4'-0" in width.

M. Frame door and window openings with details indicated; with GA-600 and NFPA 80.

N. Install framing below sills of openings to match framing above head of opening.

O. Coordinate erection of studs with requirements of door and window frame supports and attachments.

P. Brace stud framing system and make rigid.

Q. Construct toilet and plumbing chase walls of 0.0428 inch thick studs braced horizontally at midpoint and quarter point of wall but not less than 48 inches o.c. vertically with 2-1/2 inch wide cross studs.

R. Erect minimum 0.0329 inch thick studs behind all cementitious backing board and ceramic tile installations.

S. Erect minimum 0.0538 inch thick studs behind all casework and wall mounted cabinets.

T. Align stud web openings and point stud flanges in the same directions.

U. Secure stud ends to bottom tracks on both faces.

V. Coordinate installation of bucks, anchors, and backing with electrical and mechanical work to be placed in or behind stud framing.

W. Backing: Secure steel backing to studs. Install backing for support of toilet partitions, wall cabinets, toilet accessories, hardware, and all other wall mounted items.

X. Extend partition framing full height to structural support or substrates above suspended ceilings, except where partitions are indicated to terminate at ceiling. Install deflection track, anchor to structure.

Y. For sound and fire resistance rated partitions extend framing to underside of floor/roof or other continuous solid surface to obtain rating. Install fire-rated deflection track, anchor to structure.

Z. Continue partition framing over door and window openings and frame around ducts penetrating partitions above ceiling.

AA. Maintain clearance under structural building members to avoid deflection transfer to studs. Provide deflection track top runner to attain lateral support and avoid axial loading.

BB. Coordinate placement of insulation in multiple stud spaces made inaccessible after stud framing erection.

CC. Maintain clearance under structural building members at fire-resistance rated assemblies. Provide firestop track top runner.

DD. Install beam clips on beam flanges spaced at 2'-0" on center.

3.3 RADIUSED PARTITION ERECTION

A. Cut top and bottom runners through leg and web at 2 inch intervals for arc length or use manufacturer's standard flexible runner track.

B. Allow for uncut straight lengths of not less than 12 inches at ends of arcs.

C. Bend runners to uniform curve of radius indicated and locate straight lengths so they are tangent to arcs.

D. Support outside (cut) leg of runners by clinching a 1 inch high x 0.0329 inch thick steel sheet strip to inside of cut legs using metal lock fasteners.

E. Attach runners to structural elements at floor and ceiling with fasteners located 2 inches from ends and spaced 24 inches on center.

3.4 ERECTION TOLERANCES

A. Maximum variation from true position: 1/2 inch.

B. Maximum variation of any member from plane: 1/8 inch in 10 feet.

C. Maximum variation from plumb: 1/8 inch in 10 feet.

3.5 RECYCLING CONSTRUCTION WASTE

A. Recycle excess materials waste under the provisions of Section 01 74 19.

END OF SECTION

SECTION 09 30 12

CERAMIC TILE WALL FINISHING

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Ceramic tile wall and wainscot finish using the thinset application method.

B. Ceramic tile base.

C. Cementitious backing board.

1.2 REFERENCES

A. ANSI/TCNA A108.5 - Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.

B. ANSI/TCNA A108.11 - Interior Installation of Cementitious Backer Units.

C. ANSI/TCNA A118.1 - American National Standard Specification for Dry-Set Cement Mortar.

D. ANSI/TCNA A118.4 - American National Standard Specification for Modified Dry-Set Cement Mortar.

E. ANSI/TCNA A118.7 - American National Standard Specification for High Performance Cement Grouts for Tile Installation.

F. ANSI/TCNA A118.9 - American National Standard Specification for Test Methods and Specifications for Cementitious Backer Units.

G. ANSI/TCNA A137.1 - Specifications for Ceramic Tile.

H. ASTM C847 - Standard Specifications for Metal Lath.

I. ASTM D226 - Asphalt-Saturated Felt Used in Roofing and Waterproofing.

J. TCNA (Tile Council of North America) - Handbook for Ceramic, Glass, and Stone Tile Installation.

1.3 SUBMITTALS

A. Submit shop drawings under provisions of Section 01 33 00.

B. Submit shop drawings indicating tile layout, patterns, color arrangement, perimeter conditions, and junctions with dissimilar materials.

C. Submit samples under provisions of Section 01 33 00.

D. Mount tile and apply grout on two 24 x 24 inch plywood panels, representative of pattern, color variations, and grout joint size variations.

E. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

F. Submit maintenance data under provisions of Section 01 77 00.

G. Include recommended cleaning and stain removal methods, and cleaning materials.

1.4 QUALITY ASSURANCE

A. Conform to ANSI/TCNA A137.1 for tile material.

B. Conform to ANSI/TCNA Standards and TCNA Handbook for tile installation.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum five years documented experience.

B. Installer: Company specializing in applying the Work of this Section with minimum five years documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Maintain 50 degrees F during installation of mortar materials.

1.7 EXTRA MATERIALS

A. Provide extra quantity of full size tile and trim shape units to Owner under provisions of Section 01 77 00.

B. Attic Stock - Provide 10% attic stock for all tile products for future repairs.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS - TILE

A. American Olean Tile Co., Inc., www.aotile.com.

B. Ceramic Tile International, www.ceramictileintl.com.

C. Crossville Ceramics, www.crossvilleinc.com.

D. DSA (Buchtal), www.dsa-ceramics.com.

E. Dal-Tile Corp., www.daltile.com.

F. Florida Tile Industries, Inc., www.floridatile.com.

G. Interceramic, www.interceramic.com.

H. Shaw Commercial, www.shawinc.com.

I. Summitville Tiles, Inc., www.summitville.com.

J. United States Ceramic Tile Co., www.usctco.com.

K. Substitutions: Under provisions of Section 01 25 00.

2.2 TILE MATERIAL

A. Ceramic Wall Tile: ANSI/TCNA A137.1, conforming to the following:

Moisture Absorption:	0.5 to 3.0 percent
Manufacturer and Product:	Equivalent to Daltile
Field Pattern:	Pattern No. DalTile Color Match
Wainscot Cap Pattern:	Pattern No. DalTile Color Match
Size:	4" x 8" inch

Edge:	Cushioned
Surface Finish:	Unglazed
Color:	As selected

B. Wainscot Cap: Match wall tile for moisture absorption, surface finish, and color, tile size 8 inch long x 4 inch high, bullnosed top edge. Color to be selected by Architect.

2.3 MANUFACTURERS - MORTAR AND GROUT

A. American Olean Tile Co., Inc., www.aotile.com.

B. C-Cure, www.c-cure.com.

C. Custom Building Products, www.custombuildingproducts.com.

D. Dal-Tile Corp., www.daltile.com

E. H.B. Fuller Company, www.hbfuller.com.

F. Hydromet, www.bostikfindley-usa.com.

G. Laticrete International, Inc., www.laticrete.com.

H. MAPEI, www.mapei.com.

I. W.R. Bonsal Company, www.bonsal.com.

J. Substitutions: Under provisions of Section 01 25 00.

2.4 MORTAR MATERIALS

A. Portland Cement Mortar Materials: ANSI/TCNA A118.1.

B. Latex-Portland Cement Mortar: ANSI/TCNA A118.4 and the following:

1. Acrylic resin latex additive.

2. Dry mortar mix supplied by latex manufacturer.

2.5 GROUT MATERIALS

A. Portland Cement Grout Materials: ANSI/TCNA A118.7.

B. Latex-Portland Cement Grout: ANSI/TCNA A118.7 of color selected and the following:

1. Acrylic resin latex additive.

2. Microban antimicrobial additive, www.microban.com.

3. Dry mortar mix supplied by latex manufacturer.

2.6 ACCESSORIES

A. Reinforcing Mesh: ASTM C847; 3.4 lb./sq.yd. expanded metal, galvanized, self-furring type.

B. Backing Board: ANSI/TCNA A118.9; High density, cementitious, glass fiber reinforced, 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners; manufacture licensed by TCNA.

C. Sealant: Type specified in Section 07 92 00.

2.7 MORTAR MIX AND GROUT MIX

A. Mix and proportion pre-mix setting bed and grout materials in accordance with manufacturer's instructions and referenced standards.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means installer accepts condition of existing surfaces.

3.2 PREPARATION

A. Protect surrounding work from damage or disfiguration.

B. Vacuum clean existing surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

3.3 INSTALLATION - THINSET METHOD

A. Install mortar, tile, and grout in accordance with ANSI/TCNA 108.5 and applicable tile installation standards of the TCNA Handbook.

B. Lay tile to pattern indicated. If not indicated, request from Architect. Do not interrupt tile pattern around openings.

C. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly. Align wall, base, and floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar or excess grout.

E. Form internal angles coved and external angles bullnosed.

F. Sound tile after setting. Replace hollow sounding units.

G. Keep control joints free of mortar or grout. Apply sealant to joints.

H. Allow tile to set for a minimum of 48 hours prior to grouting.

I. Grout tile joints.

J. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.4 CLEANING

A. Clean work under provisions of 01 77 00.

B. Clean tile surfaces.

END OF SECTION

SECTION 09 51 00

ACOUSTICAL CEILING PANELS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements including but not limited to:
   1. Acoustical panels.
   2. Concealed and exposed suspension systems for ceilings.
   3. Ceiling panel for food service area.
   4. Accessories necessary for a complete installation.

1.3 SUBMITTALS

A. Product Data: Technical data for each product including installation instructions.

B. Samples:
   1. Acoustic Panel: Set of 6-inch (150 mm) square samples of each type, color, pattern, and texture.
   2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch (300 mm) long samples of each type, finish, and color.

C. Coordination Drawings:
   1. Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
      a. Suspended ceiling components.
      b. Structural members to which suspension systems will be attached.
      c. Size and location of initial access modules for acoustical panels.
      d. Items penetrating finished ceiling including but not limited to the following:
         1) Lighting fixtures.
         2) Air outlets and inlets.
         3) Speakers.
         4) Sprinklers.
         5) Access panels.
      e. Perimeter moldings.

D. Maintenance Data: Manufacturer data for finishes for inclusion in maintenance manuals.

E. Submit one copy of ICC-ES Reports.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Building Code:
      a. Comply with applicable requirements of the CBC for interior finishes:
         1) DSA Interpretation of Regulations – IR 25-2.13 Metal Suspension Systems for Lay-in Panel Ceilings.

2) California Building Code (CBC).
3) Chapter 19, California Building Code.
4) Chapter 23, California Building Code.
5) Acoustical Panel Standard: ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance:
   a) Mounting Method for Measuring NRC: Plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface according to ASTM E795.

2. Surface Burning Characteristics:
   a. Ceiling panels with surface burning characteristics complying with CBC and ASTM E1264 for Class A materials determined by testing identical products in accordance with ASTM E84:
      1) Flame Spread Index: 25 or less.
      2) Smoke Developed Index: 450 or less.
3. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE 7.
4. Fire Resistance Ratings: Comply with ASTM E119; testing by qualified testing agency. Identify products with appropriate markings of applicable testing agency. Indicate design designations from UL Fire Resistance Directory or from the listings of another qualified testing agency.

B. Source Limitations:
   1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
   2. Suspension System: Obtain each type through one source from a single manufacturer.

C. Comply with applicable regulations regarding toxic and hazardous materials:
   1. Coating Based Antimicrobial Treatment: Provide acoustical panels with face and back surfaces coated with antimicrobial treatment; and showing no mold or mildew growth when tested in accordance with ASTM D3273.
   2. Panel Based Antimicrobial Treatment: Provide acoustical panels manufactured with antimicrobial treatment in the panels.

D. Pre-installation Conference: Conduct conference at site.

1.5 WARRANTY

A. Standard Ceiling Panels: Warrant ceiling panels to be free from sagging, warping, shrinking, buckling, or delaminating as a result of manufacturing defects for a period of one (1) year from the date of Substantial Completion.

B. Sag Resistant Ceiling Panels: warrant products to be free from sagging, warping, shrinking, buckling, or delaminating as a result of manufacturing defects for a period of ten (10) years from the date of Substantial Completion.

C. Standard Suspension System: Suspension systems shall be warranted to be free from defects in material or factory workmanship and shall not incur 50 percent red rust as defined by ASTM B117 test procedures for a period of ten (10) years from the date of Substantial Completion.

D. Suspension system / ceiling panels: Provide manufacturers standard 15 year warranty for suspension systems when used in combination with same manufacturers sag resistant ceiling panels. Ceiling panels to be free from sagging, warping, shrinking, buckling, or delaminating as a result of manufacturing defects. Suspension systems shall not incur 50 percent red rust as defined by ASTM B117 test during the period of the warranty, extra materials.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension system components, and accessories to site in original, unopened packages and store in a fully enclosed, conditioned space protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, allow panels to attain room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

PART 2 PRODUCTS

2.1 MATERIALS

A. Manufacturers are subject to compliance with requirements; provide ceiling panels and grid systems by one of the following:
   1. Concealed and Exposed Suspension Grid:
      a. Armstrong World Industries, Inc.
      b. CertainTeed Corporation.
      c. Chicago Metallic; Rockfon (Roxul Inc.).
      d. Hunter Douglas.
      e. USG Interiors.
   2. Acoustical Ceiling Panel:
      a. Armstrong World Industries, Inc.
      b. CertainTeed Corporation.
      c. Rockfon (Roxul Inc.).
      d. Tectum Inc.
      e. USG Interiors.
   3. Molding and Edge Trim:
      a. Armstrong World Industries, Inc.
      b. CertainTeed Corp.
      c. Chicago Metallic Corporation.
      d. Fry Reglet Corporation.
      e. Gordon, Inc.
      f. USG Interiors, Inc.; Subsidiary of USG Corporation.
   4. Acoustical Sealant for Exposed and Concealed Joints:
      a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
      b. USG Corporation; SHEETROCK Acoustical Sealant.
   5. Acoustical Sealant for Concealed Joints:
      a. Henkel Corporation; OSI Pro-Series SC-175 Acoustical Sound Sealant.
      b. Pecora Corporation; AIS-919.

B. Acoustical Panel Colors and Patterns:
   1. Match appearance characteristics indicated for each product type:
      a. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E1264 and not manufacturers' proprietary product designations, provide products selected by Architect that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.2 METAL SUSPENSION SYSTEM

A. Metal Suspension System:

1. Direct hung metal suspension systems of types, structural classifications, and finishes indicated complying with applicable requirements in ASTM C635/C635M:
   a. High Humidity Finish:
      1) Comply with ASTM C635/C635M requirements for Coating Classification for Severe Environment Performance where high humidity finishes are indicated.
   b. Attachment Devices - Size for five times the design load indicated in ASTM C635/C635M, Table 1 Direct Hung, unless otherwise indicated. Comply with seismic design requirements:
      1) Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E488 or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency:
         a) Type: Cast in place, postinstalled expansion or postinstalled bonded anchors.
         b) Corrosion Protection: Carbon steel components zinc plated to comply with ASTM B633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
         c) Corrosion Protection: Stainless steel components complying with ASTM F593 and ASTM F594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchor.
         d) Corrosion Protection: Components fabricated from nickel copper alloy rods complying with ASTM B164 for UNS No. N04400 alloy.
      2) Power Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E1190, conducted by a qualified testing and inspecting agency.
2. Wire Hangers, Braces, and Ties:
   a. Zinc Coated, Carbon Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
   b. Stainless Steel Wire: ASTM A580/A580M, Type 304, nonmagnetic.
   c. Nickel Copper Alloy Wire: ASTM B164, nickel copper alloy UNS No. N04400.
   d. Size: Select wire diameter so its stress at three times hanger design load (ASTM C635/C635M, Table 1 Direct Hung) will be less than yield stress of wire, but provide not less than 0.106 inch (2.69 mm) diameter wire.
3. Hanger Rods and Flat Hangers: Mild steel, zinc coated or protected with rust inhibitive paint.
4. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04 inch (1 mm) thick, galvanized steel sheet complying with ASTM A653/A653M, G90 (Z275) coating designation; with bolted connections and 5/16 inch (8 mm) diameter bolts.
5. Hold Down Clips: Provide hold down clips spaced 24 inches (610 mm) o.c. on all cross tees in areas with exterior opening larger than 48" x 96".
6. Impact Clips: Provide impact clip system designed to absorb impact forces against acoustical panels in Gymnasiums.
7. Aluminum cap for use over steel grid in kitchen areas or where shown on drawings or required.

B. Metal Suspension Systems:
   1. Wide Face, Steel Capped, Double Web, Steel Suspension System:
      a. Main and cross runners roll formed from cold rolled steel sheet; prepainted, electrolytically zinc coated, or hot dip galvanized according to ASTM A653/A653M, not less than G30 (Z90) coating designation; with prefinished 15/16 inch (24 mm)

wide metal caps on flanges:
1) Structural Classification: Heavy duty system.
2) Face Design: Flat, flush.
3) Cap Finish: Color selected by Architect.

2.3 ACOUSTICAL PANELS

A. Acoustic Panel Type **ACT-1.**
1. Basis of Design Product: Fine Fissured No added formaldehyde as manufactured by Armstrong World Industries
2. Color: White
3. Pattern: 6"X48" Linear Plank.
4. LR: Not less than 0.85
5. NRC: Not less than 0.65
6. CAC: Not less than 35
7. Edge Profile: 15/16" Beveled Tegular for interface with Prelude XL 15/16" Exposed Tee grid
8. Thickness: 3/4 inch (19 mm).
9. Module Size: 24 by 48 inch
10. Classification – A - Provide panels complying with ASTM E1264 for type, form, and pattern. Type III, Form 1, Pattern E I K , Fire Class A
11. Ceiling Panels with BioBlock - Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273 and evaluated according to ASTM D3274 or ASTM G21.
12. Location: As shown on Drawings.
13. For information regarding this product contact Catarina Silva, (408) 857-3955, Cfsilva@armstrongceilings.com.

2.4 MOLDING, TRIM AND ACCESSORIES

A. Light Fixture Protection:
1. Manufacturer: Thermafiber Light Protection Kit by Owens Corning or Type 5/8 or 3/4 P(S) by Armstrong World Industries.
2. Fire Resistance Rating: Same as ceiling assembly rating.
3. Locations: At fixtures reinstalled in fire rated ceiling assemblies.

B. Roll Formed, Sheet Metal Edge Moldings and Trim:
1. Type and profile for standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color used for exposed flanges of suspension system runners:
   a. Provide edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
   b. For lay in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
   c. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

C. Acoustical Sealant:
1. Comply with ASTM C834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90:
   a. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.

b. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic rubber sealant.

D. Acoustical Suspension System:
1. Armstrong Prelude XL Selection
   a. Composition: Hot-dipped Galvanized Steel
   b. Color: White
   c. Profile Height: 1-11/16 in
   d. Profile: PeakForm with SuperLock Main runner clip and XL² stake on end detail on Cross-tee
   e. Flange: 15/16”
   f. Acceptable Product: Prelude XL 15/16" Exposed Tee System as manufactured by Armstrong World Industries.
   g. For information regarding this product contact Catarina Silva, (408) 857-3955, Cfsilva@armstrongceilings.com
2. Suprafine XM for DesignFlex Selection
   a. Composition: Hot-dipped Galvanized Steel
   b. Color: White
   c. Profile Height: 1-11/16 in
   d. Profile: PeakForm with SuperLock Main runner clip and XL² stake on end detail on Cross-tee
   e. Flange: 9/16”
   f. Brackets: 75AB45D - Suprafine 45º Double Angle Bracket
   g. Acceptable Product: Suprafine XM 9/16" Exposed Tee System as manufactured by Armstrong World Industries.
   h. For information regarding this product contact Catarina Silva, (408) 857-3955, Cfsilva@armstrongceilings.com.

E. Edge Moldings and Trim:
1. 7800 – 12’ Wall Molding – color to match the grid as manufactured by Armstrong World Industries.
2. Accessories:
   a. BERC2 clip – 2” Beam End Retaining Clip as manufactured by Armstrong World Industries.

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

A. Environmental Limitations:
1. Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use:
   a. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

3.2 EXTRA MATERIALS

A. Furnish extra materials matching products installed and packaged with protective covering for storage and identified with labels describing contents:
1. Acoustical Ceiling Panels: Full size panels equal to 10 percent of quantity installed.
2. Suspension System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
3. Hold Down Clips: Equal to 2 percent of quantity installed.

4. Impact Clips: Equal to 2 percent of quantity installed.

3.3 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut for compliance with requirements specified that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation after correcting unsatisfactory conditions.

3.4 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less than half width panels at borders, and comply with layout shown on reflected ceiling plans.

3.5 INSTALLATION

A. Install acoustical panel ceilings to comply with ASTM C636/C636M and seismic design requirements indicated, according to manufacturer's written instructions and *CISCA Ceiling Systems Handbook*:
   1. Fire Rated Assembly: Install fire-rated ceiling systems according to tested fire rated design.

B. Suspend ceiling hangers from building's structural members and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   2. Splay hangers where required and, if permitted with fire resistance rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
   3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
   4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
   5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
   6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast in place hanger inserts, postinstalled mechanical or adhesive anchors, or power actuated fasteners that extend through forms into concrete.
   7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
   8. Do not attach hangers to steel deck tabs.
   9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
   10. Space hangers not more than 48 inches (1200 mm) o.c. along each member

supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.

11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast in place or postinstalled anchors.

D. Panel Accessibility: Install panels downward accessible by disengaging hinge support rail on one side of panel from the T Bar Flange or optional A Mount rail flange without the use of tools, for access without removal of panel from the ceiling.

E. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels:

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

F. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

G. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit:

1. Arrange directionally patterned acoustical panels with pattern running in one direction parallel to long axis of space.
2. For square edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
3. For reveal edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
4. For reveal edged panels on suspension system members with box shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.
5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
6. Install hold-down clips in areas indicated, in areas with exterior opening larger than 48” x 96”, where required by authorities having jurisdiction, and for fire resistance ratings; space as recommended by panel manufacturer's written instructions unless otherwise indicated.
7. Install clean room gasket system in areas indicated, sealing each panel and fixture as recommended by panel manufacturer's written instructions.
8. Protect lighting fixtures and air ducts to comply with requirements indicated for fire resistance rated assembly.

3.6 FIRE RATING SCHEDULE

A. Refer to UL Assemblies Drawings for Fire Rating requirements of ceiling materials at rated floor and roof assemblies.

3.7 FIELD QUALITY CONTROL

A. Special Inspections:
   1. Engage a qualified special inspector to perform the following special inspections:
      a. Compliance of seismic design.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.

C. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations show compliance with requirements:
   1. Extent of Each Test Area:
      a. When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed:
         1) Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf (890 N) of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf (1957 N) of tension.
         2) When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

D. Acoustical panel ceiling hangers and anchors and fasteners will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.8 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 00

SECTION 09 65 13.13

RESILIENT BASE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements including but not limited to:
   1. Rubber base.
   2. Accessories necessary for a complete installation.

1.3 SUBMITTALS

A. Product Data: Technical data for each type of product including manufacturer's installation instructions.

B. Samples: Sample of Base Selected or Color Chart if none selected.

C. Maintenance Data: Submit for inclusion in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Entity having minimum 5 years documented experience who employs workers competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store base and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 degrees F (10 degrees C) or more than 85 degrees F (29 degrees C). Store floor tiles on flat surfaces.

PART 2 PRODUCTS

2.1 MATERIALS

A. Basis of Design Product:
   1. Manufacturers and tile series, pattern, and color selections are indicated in the Finish Schedule and are a basis of design. Subject to compliance with requirements, provide product indicated in Finish Schedule or comparable product by one of the following:
      a. Flexco Floors.
      b. Johnsite, a division of Tarkett Group.
      c. Mannington Commercial.
      d. Roppe.

B. Rubber Base - ASTM F1861:
   1. Material: Rubber, vulcanized, Type TS, Group I, Styles A and B.

2. Manufacturing Method: Group I (solid, homogeneous).
3. Style: Topset cove; minimum 100 foot coil, cut to length required.
4. Minimum Thickness: 0.125 inch (3.2 mm).
5. Color: Charcoal
6. Height: 4 inches, unless otherwise indicated on drawings.
7. Outside Corners: Job formed.
8. Inside Corners: Job formed.

C. Adhesives: Water resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

PART 3 EXECUTION

3.1 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F (21 degrees C) or more than 85 degrees F (29 degrees C), in spaces to receive floor tile during the following time periods:
1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees F (13 degrees C) or more than 95 degrees F (35 degrees C).

C. Close spaces to traffic for 48 hours after installation.

3.2 EXAMINATION

A. Examine substrates for compliance with requirements for maximum moisture content and other conditions affecting performance of the work:
1. Verify that finishes of substrates comply with tolerances and other requirements specified for other work and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation after correcting unsatisfactory conditions. Installation of resilient flooring and accessories indicates acceptance of surfaces and conditions.

3.3 PREPARATION

A. Immediately before installation, sweep clean substrates to be covered by resilient base.

3.4 INSTALLATION

A. Comply with manufacturer's written instructions for installing flooring. Scribe and cut flooring to butt neatly and tightly to vertical surfaces, permanent fixtures, and built in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Extend flooring into toe spaces, door reveals, closets, and similar openings.

B. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on flooring as marked on substrates. Use chalk or other nonpermanent marking device.

C. Resilient Base:

1. Comply with manufacturer's written instructions for installing resilient base. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required:
   a. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
   b. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
   c. Do not stretch resilient base during installation.
   d. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
   e. Preformed Corners: Install preformed corners before installing straight pieces.
   f. Job Formed Corners:
      1) Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
      2) Form without producing discoloration (whitening) at bends.
      3) Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length:
         a) Miter or cope corners to minimize open joints.

END OF SECTION

SECTION 09 65 16

RESILIENT VINYL SHEET FLOORING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Requirements including but not limited to:
   1. Resilient Homogeneous Vinyl Sheet Flooring, With PUR
   2. Trowelable Leveling and Patching Compound.
   3. Adhesives.

B. Related Sections:
   1. Section 03 30 00: Cast-in-Place Concrete.

1.3 DEFINITIONS

A. Comparable Product: Product demonstrated and approved through submittal process, or where indicated as a produce substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Homogeneous: Composed of parts or elements that are all of the same kind.

1.4 SUBMITTALS

A. Product Data: Technical data including installation recommendations for each type of substrate as indicated on Drawings.

B. Samples for Initial Selection: For each product and for each color and texture listed. Label each Sample with manufacturer's name, material description, color, pattern, and designation as indicated on Drawings.

C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size samples of each resilient product color, texture, and pattern required.

D. Product Schedule: For resilient products. Use same designations indicated on Drawings.

E. Product Test Reports for Each products listed.

F. Submit shop drawings, seaming plan, coving details, and manufacturer's technical data, installation and maintenance instructions.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Building Code: Comply with applicable requirements for the CBC for interior finishes.
   2. Fire Test Response Characteristics: Provide products with the critical radiant flux classification determined by testing identical products in accordance with ASTM E 648.

Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

3. Accessibility Requirements - Comply with applicable requirements:
   a. Americans with Disabilities Act of 1990, as amended:
      1) ADA Title II Regulations & the 2010 ADA Standards for Accessible Design
      2) 2010 ADA regulations.
   b. CBC 2022 California Building Code (CCR Title 24, Part 2, as adopted and amended by DSA):
      1) CBC Chapter 11B, Access to Public Buildings, Public Accommodations, Commercial Buildings and Public Housing.

B. Installation Qualification: Contractors for floor covering installation should be experienced in managing commercial flooring projects and provide professional installers, qualified to install the various flooring materials specified.
   1. An installer is "qualified" if trained, or a certified by Tarkett or a certified INSTALL (International Standards & Training Alliance) resilient floor covering installer.

C. Mockups: Provide resilient products with mockups specified in other Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by Tarkett, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).

PART 2 PRODUCTS

2.1 RESILIENT SHEET FLOORING

A. Manufacturers:
   1. Tarkett North America, 30000 Aurora Road, Solon, Ohio 44139 Phone: 800-899-8916 www.tarkettna.com

B. Homogenous Vinyl Sheet Flooring
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Tarkett Iconk-Catera
   2. Sheet Standard: ASTM F1913, Standard Specification for Vinyl Sheet Floor Covering Without Backing.
   3. Thickness/Wearlayer: TBD
   4. For size specify: TBD
   5. Integral 6" cove base turn up wall.
   6. Colors and Patterns: Middle Gray
      a. Test data:
         1) Flexibilty (ASTM F137): Passes
         2) Chemical Resistance (ASTM F925): Passes
         3) Static Load Limit (ASTM F970): Passes 250 psi
         4) Resistance to Heat (ASTM F1514): $\Delta E \leq 8$
         5) Resistance to Light (ASTM F1515): $\Delta E \leq 8$
         6) Residual Indentation (ASTM F1914): Passes
         7) Static Coefficient of Friction (ASTM D 2047): ≥ 0.5 SCOF
         8) Flamability (ASTM E648, Critical Radiant Flux): Class 1 (≥ 0.45 W/cm^2)
         9) Limited Commercial Warranty: 20 years

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PROJECT CONDITIONS

A. Install resilient products after other finishing operations, including painting, have been completed.

B. Maintain ambient temperatures within range recommended by Tarkett, but not less than 65 deg F (18 deg C) or more than 85 deg F (29 deg C) in spaces to receive resilient products during the following time periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

C. Maintain the ambient relative humidity between 40% and 60% during installation.

D. Until Substantial Completion, maintain ambient temperatures within range recommended by Tarkett, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).

3.3 PREPARATION

A. Prepare substrates according to Tarkett written instructions to ensure proper adhesion of Resilient Flooring.
   1. Prepare concrete substrates in accordance with ASTM F 710.
      a. Concrete floors must be free of dust, solvent, paint, wax, oil, grease, residual adhesive, adhesive removers, film-forming curing compounds, silicate penetrating curing compounds, sealing, hardening or parting compounds, alkaline salts, excessive carbonation or laitence, mold, mildew, and other foreign materials that may affect dissipation rate of moisture from the concrete, discoloration or adhesive bonding.
      b. Mechanically remove contamination on the substrate that may cause damage to the resilient flooring material. Permanent and non-permanent markers, pens, crayons, paint, etc., must not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and stain the flooring material.
      c. Perform moisture testing as recommended by manufacturer. Proceed with installation only after substrates have been tested and meet the minimum requirements from the manufacturer in accordance with ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride or ASTM F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
      d. A pH test for alkalinity must be conducted on the concrete floor prior to installation with results between 7 and 9. If the test results are not within the acceptable range, then installation must not proceed until the problem has been corrected.

e. Wood subfloors must have a minimum 18" (45.7 cm) of cross-ventilated space beneath the bottom of the joist.

2. The floor must be rigid, free of movement.
   a. Single wood and tongue and groove subfloors should be covered with ¼" (6.4 mm) or ½" (12.7 mm) APA approved underlayment plywood.
   b. Use ¼" (6.4 mm) thick underlayment panels for boards with a face width of 3" (76 mm) or less.
   c. Use ½" (12.7 mm) thick underlayment panels for boards with a face width wider than 3" (76 mm).
3. Do not install over OSB (Oriented Strand Board), particle board, chipboard, lauan or composite type underlayments.

B. Fill cracks, holes, depressions and irregularities in the substrate with good quality Portland cement-based underlayment leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

C. Floor covering shall not be installed over expansion joints.

D. Do not install resilient products until they are same temperature as the space where they are to be installed.

E. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

F. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic-cement-based formulation.

B. Adhesives: As recommended by Tarkett to meet site conditions
1. Tarkett 975 Two-Part Urethane Adhesive
2. Tarkett 996 Two-Part EpoxyAdhesive

3.5 RESILIENT SHEET FLOORING INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient sheet flooring.

B. Resilient Sheet Flooring:
1. Install with Tarkett adhesive specified for the site conditions and follow adhesive label for proper use.
2. Install rolls in sequential order following roll numbers on the labels.
3. Reverse non-pattern sheets as referenced in the Tarket Installation Instructions.
4. Roll the flooring in both directions using a 100 pound three-section roller.
5. Vinyl sheet flooring must be welded.
   a. Note: It is recommended to heat weld seams to provide a more sterile and water tight seam.
6. Tarkett Resilient Sheet Flooring may be flash coved.
   a. Use Johnsonite CFS-00-A Cove Filler Strip.
   b. Net fit flooring material into the appropriate Johnsonite cove cap.
7. Adhesive Application:See adhesive chart below and follow adhesive label instructions for proper use.
8. Sheet Installation Procedure:

a. Install rolls in sequential order following roll numbers on the labels.
b. Reverse sheets.
c. Cut pieces to length allowing approximately 3" (76 mm) excess for trimming.
d. Cut the first piece to fit by freehand knife, direct scribing or pattern scribing method.
e. Trim 1/2" (13 mm) off opposite seam edge using an edge trimmer or straight edge and knife.
f. Position all remaining sheets so that the top sheet overlaps the previous sheet by 3/4" (19 mm).
g. Trim 1/2" (13 mm) off opposite seam edge using an edge trimmer or straight edge and knife.
h. Fold back the sheets and apply the adhesive to the substrate and allow proper open time.
i. Open and working times are dependent on the ambient temperature, humidity, substrate porosity and temperature, and air movement.
j. It is the installer's responsibility to modify the open and working time for jobsite conditions.
k. When using 975 Two-Part Urethane or 996 Two-Part Epoxy Adhesive the installer MUST work off the flooring or use kneeling boards.
l. Periodically, lift a corner of the sheet to ensure proper transfer of adhesive.
m. Roll the flooring in both directions using a 100 pound three-section roller. (Stay approximately 3" (76 mm) from the seams.).
n. Recess-scribe the seam to achieve a proper fit.
o. Inspect the floor surface, especially seams, and remove any adhesive on the surface.
p. Vinyl sheet flooring must be welded using the Heat Weld or Cold Weld methods listed below.

9. Seams:
   a. Heat Weld Seam:
      1) NOTE: It is recommended to heat weld seams to provide a sterile and watertight seam.
   b. Recess scribe the seam with a slight gap not to exceed 1/64" (0.4mm) to help guide the router.
   c. Insert a scrap piece of material under the scribe mark to protect the seam edge of the first piece.
   d. Use a sharp knife to cut the seam following the scribe mark. Cut must be perpendicular, do not angle the knife blade.
   e. Remove the scrap material and seam trimmings before rolling the seam with a small hand roller.
   f. Roll the seam area with a 100 pound three-section roller.
   g. Wait a minimum 24 hours after installation before heat welding the seams.
   h. Rout approximately 2/3 of the thickness of the material, or as recommended by manufacturer.
   i. Use Tarkett vinyl weld rod.

3.6 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:

C. Remove adhesive and other blemishes from exposed surfaces.

D. Sweep and vacuum surfaces thoroughly.

E. Damp-mop surfaces to remove marks and soil.

F. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
   1. No traffic for 24 hours after installation.
   2. No heavy traffic, rolling loads, or furniture placement for 72 hours after installation.
   3. Wait 72 hours after installation before performing initial cleaning.

G. A regular maintenance program must be started after the initial cleaning.

END OF SECTION

SECTION 09 65 23

LUXURY VINYL TILE FLOORING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes requirements limited to:
   1. Luxury vinyl floor tile.
   2. Accessories necessary for a complete installation.

B. Related Sections:
   1. Section 03 30 00: Cast-In-Place Concrete.
   2. Section 09 65 13.13: Resilient Base.

1.3 SUBMITTALS

A. Product Data: Technical data for each type of product including manufacturer's installation instructions.

B. Shop Drawings - For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built in furniture, cabinets, and cutouts:
   1. Show details of special patterns.

C. Samples - Full size units of each color and pattern of floor tile required:
   1. Luxury Vinyl Tile (LVT) flooring: 18 inch by 18 inch (460 mm by 460 mm) tile in each color selected and 12 inch long piece of base material in each color selected for approval.

D. Product Schedule: Submit for floor tile using same designations indicated on Drawings.

E. Maintenance Data: Submit for inclusion in maintenance manuals.

F. Reports: Certified Moisture Testing Results.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Fire Test Response Characteristics - For resilient tile flooring, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency:
      a. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
      b. Smoke Density: Maximum specific optical density of 450 per ASTM E662.
   2. Accessibility Requirements - Comply with applicable requirements:
      a. U.S. Architectural and Transportation Barriers Compliance Board Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG).
      b. 2010 ADA regulations.
      c. 2022 California Building Code (CBC) Section 11B-302.1.

B. Installer Qualifications: Entity having minimum 5 years documented experience who employs workers competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

C. Contractor is required to achieve the specified concrete moisture content prior to installation of all flooring materials or use a flooring manufacture approved moisture barrier prior to installation of all flooring products. Contractor shall provide certified moisture testing results per ASTM F2170 (*Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes*) to Architect and Owner prior to floor installation. Acceptable moisture content of concrete sub floor shall be within approved manufacture limits or lower prior to installation.

D. Source Limitations:
   1. Tile: Obtain floor products of same type and color or finish from one source or producer. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
   2. Setting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

1.5 WARRANTY

A. Warrant the Work specified herein for ten (10) years against becoming unserviceable or causing an objectionable appearance resulting from either defective, or nonconforming materials and workmanship.

B. Defects shall include, but not be limited to, the following:
   1. Damaged tile, including broken or chipped edges.
   2. Loose or missing tile.
   3. Noticeable deterioration or discoloring of tile or grout.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 degrees F (10 degrees C) or more than 85 degrees F (29 degrees C). Store floor tiles on flat surfaces.

PART 2 PRODUCTS

2.1 MATERIALS

A. Basis of Design Product:
   1. Manufacturers and tile series, pattern, and color selections are indicated in the Finish Schedule and are a basis of design. Subject to compliance with requirements, provide product indicated in Finish Schedule or comparable product by one of the following:
      a. Luxury Vinyl Tile (LVT):
         1) Basis of Design: **ADAPTT by Tandus Centiva**
         2) Alternates include:
            a) Karndean.
            b) Aspecta.
            c) Armstrong.
            d) Patcraft.
            e) Tandus Centiva.
            f) Other comparable product.

B. Luxury Solid Vinyl Tile (LVT-1) - ASTM F1700:
   1. Class III, monolithic vinyl tile:
      a. Type B: Embossed surface.
   2. Thickness: 0.177 inch (4.5 mm).
   3. Size: 7.25" x 48"
   4. Construction: Heterogeneous Resilient Flooring with .030" (30 mil) high density wear layer.
   5. Colors: As selected by Architect from manufacturer's available colors.
   6. Patterns: Factory mounted patterns as selected by Architect.

C. Trowelable Leveling and Patching Compounds: Latex modified, portland cement based formulation provided or approved by floor tile manufacturer for applications indicated.

D. Adhesives: Water resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

E. Floor Polish: Provide protective, liquid floor polish products recommended by floor tile manufacturer.

PART 3 EXECUTION

3.1 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F (21 degrees C) or more than 85 degrees F (29 degrees C), in spaces to receive floor tile during the following time periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees F (13 degrees C) or more than 95 degrees F (35 degrees C).

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Where demountable partitions, cabinets, and similar items are indicated for installation on top of resilient tile flooring, install tile before these items are installed.

F. Do not install flooring over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive, as determined by flooring manufacturer's recommended bond and moisture test.

G. Install flooring after other finishing operations, including painting, have been completed.

3.2 EXTRA STOCK

A. Furnish extra materials matching products installed and packaged with protective covering for storage and identified with labels describing contents:
   1. LVT Flooring: 10 percent of amount installed.

3.3 EXAMINATION

A. Examine substrates for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work:
   1. Verify that finishes of substrates comply with tolerances and other requirements specified for other Work and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation after correcting unsatisfactory conditions. Installation of resilient flooring and accessories indicates acceptance of surfaces and conditions.

3.4 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates - Prepare according to ASTM F710:
   1. Verify substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
   3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
   4. Moisture Testing - Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:
      a. Perform anhydrous calcium chloride test according to ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
      b. Perform relative humidity test using in situ probes according to ASTM F2170. Proceed with installation only after substrates have a maximum **95** percent relative humidity level.
   5. Bond Test: Bond 3' x 3' panels spaced 50 feet apart throughout subfloor area. After moisture test proves floor acceptably dry, install panels using adhesive. If panels are securely bonded after 72 hours, subfloor is sufficiently clean of foreign materials for satisfactory installation of resilient flooring.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until they are the same temperature as the space where they are to be installed:
   1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.5 INSTALLATION

A. Comply with manufacturer's written instructions for installing flooring. Scribe and cut flooring to butt neatly and tightly to vertical surfaces, permanent fixtures, and built in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Extend flooring into toe

spaces, door reveals, closets, and similar openings.

B. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on flooring as marked on substrates. Use chalk or other nonpermanent marking device.

C. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one/half tile at perimeter:
   1. Lay tiles square with room axis.

D. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles:
   1. Lay tiles with grain running in one direction.

E. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built in furniture, cabinets, pipes, outlets, and door frames.

F. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

H. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

I. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

J. Floor Tile - Comply with manufacturer's written instructions for installing floor tile:
   1. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one/half tile at perimeter:
      a. Lay tiles square with room axis unless pattern indicated for an area.
   2. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles. Lay tiles with grain running in one direction.

K. Resilient Accessories - Comply with manufacturer's written instructions for installing resilient accessories:
   1. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.6 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp mop surfaces to remove marks and soil.

C. Protect floor tile from mars, marks, indentations, and damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish. Apply two coat(s).

E. Sealers and Finish Coats:
1. Remove soil, visible adhesive, and surface blemishes from resilient terrazzo floor tile surfaces before applying liquid cleaners, sealers, and finish products:
   a. Sealer: Apply two base coats of liquid sealer.
   b. Finish: Apply two coats of liquid floor finish.

F. Cover floor tile until Substantial Completion.

G. Clean floor surfaces not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products according to manufacturer's written recommendations:
1. Before cleaning, strip protective floor polish.
2. Reapply polish to floor surfaces to restore protective floor finish according to flooring manufacturer's written recommendations.

END OF SECTION

SECTION 09 68 13

TILE CARPETING

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Modular carpet tile installed by fully adhered method.

B. Accessories.

1.2 REFERENCES

A. ASTM D1335 - Tuft Bind of Pile Floor Coverings.

B. ASTM E648 - Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

C. ASTM E662 - Specific Optical Density of Smoke Generated by Solid Materials.

D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

E. ASTM F2170 - Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probe.

F. CRI 104 - Carpet and Rug Institute Standard for Installation of Commercial Textile Floorcovering Materials.

G. FTC - Federal Trade Commission Guides, Part 260, Guides for Use of Environmental Marketing Claims.

H. NFPA - National Fire Protection Association.

I. NSF / ANSI 140-2007e Sustainable Carpet Assessment.

1.3 SUBMITTALS

A. Submit product data under provisions of Section 01 33 00.

B. Provide product data on specified products, describing physical characteristics; sizes, patterns, colors available, and method of installation.

C. Submit samples under provisions of Section 01 33 00.

D. Submit two samples minimum 18 x 18 inch in size illustrating color and pattern for each carpet material specified.

1.4 RECYCLED CONTENT

A. Carpet must contain a minimum of 40 percent recycled content by weight.

B. Recycled content to be calculated by the following formula:
(Recycled Content Weight) / (Total Product Weight) x 100 = Percent recycled content.

C. Carpet must contain a minimum of 10 percent post-consumer recycled content by weight from post-consumer carpet.

D. Recycled content to be certified by Scientific Certification Systems (SCS) or National Sanitation Foundation International. Product must carry label certifying overall recycled content.

E. Recycled content statements shall comply with FTC Part 260 Guidelines with respect to labeling, product inserts, and catalog representations.

1.5 RECYCLED PROGRAM

A. Manufacturer shall have an existing established collection and recovery system for carpet in operation.

B. Collection and recovery system shall be capable of reclaiming and recycling 100 percent of a vinyl backed carpet.

C. Current recycling program to be in accordance with FTC Guides, Section 260.7(d).

1.6 PRODUCT CERTIFICATION

A. Carpet must be certified with NSF 140-207(e) Sustainable Carpet Assessment Standards. Platinum level of certification.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit maintenance data under provisions of Section 01 77 00.

B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning and shampooing.

1.8 QUALITY ASSURANCE

A. Perform work in accordance with CRI 104.

B. Maintain one copy of document on site.

C. Carpet shall have an average tuft bind of 20 pounds when tested in accordance with ASTM D1335.

D. Carpet shall bear CRI Indoor Air Quality Carpet Testing Program Green Label Plus.

1.9 REGULATORY REQUIREMENTS

A. Floor covering to have an NFPA Class I rating with a minimum radiant flux of 0.45 watt per square centimeter when tested in accordance with ASTM E648.

B. Floor covering to have a smoke developed rating of less than 450 when tested in accordance with ASTM E662.

C. Carpet shall be securely attached and shall have firm cushion, pad, or backing or no cushion or pad. It shall have a level loop, textured loop, level cut pile, or level cut/uncut pile texture. Pile height shall be ½" maximum.

D. Exposed edges shall be fastened to floor surfaces and shall have trim on the entire length. Carpet edges shall comply with CBC Section 11B-303.

1.10 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and protect products to site under provisions of Section 01 61 00.

B. Comply with requirements of CRI 104 Section 4.0.

1.11 PROJECT/SITE CONDITIONS

A. Comply with requirements of CRI 104, Section 7.0.

B. Concrete subfloor to be allowed to cure for a minimum of 90 days to achieve acceptable dryness.

C. Store materials for three days prior to installation in area of installation to achieve temperature stability.

D. Moisture Testing: Perform tests as recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.

1. Subfloor Moisture Conditions: Moisture emission rate of no more than 3 lb/1000 sq. ft./24 hours when tested by the Quantitive Anhydrous Calcium Chloride Test, ASTM F1869, with subfloor temperature not less than 65 degrees F.

2. Subfloor Humidity Conditions: Relative humidity level of no more than 75 percent when tested by in situ drilled probes according to ASTM F2170.

3. Subfloor Alkalinity Conditions: pH range of between 5 to 9 when subfloor is wetted with potable water and pHdrion paper is applied.

1.12 WARRANTY

A. Provide manufacturer's standard lifetime or 20 year non-prorated warranty under provisions of Section 01 77 00.

B. Performance Warranty: Manufacturer's warranty covering delamination of secondary backing, edge ravel and tuft bind of carpet under both wet and dry conditions.

C. Wear Warranty: Manufacturer's warranty that carpet will lose no more than 10 percent by weight of face yarn.

1.13 EXTRA MATERIALS

A. Provide full modular tiles equal to 10 percent of amount installed under the provisions of Section 01 77 00.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Jhane Barnes, Style: TextureMap, www.jahnebarnes.com..

B. Substitutions: Under provisions of Section 01 25 00.

2.2 MATERIALS

A. Carpet shall conform to published specification characteristics of named manufacturer as modified by requirements specified in this section.

B. Size: 9 inches x 36 inches.

C. Color: Nocturnal

D. Fiber Type: Invista Antron Legacy, Antron Lumena or Universal Nylon Type 6, 6.

E. Pile Height: Maximum 1/2 inch.

F. Backing: Synthetic, non-woven, 100 percent recycled content. No latex backing to be used.

G. Soil-Resistance Treatment: Manufacturer's standard integral stain resistant treatment.

2.3 ACCESSORIES

A. Sub-Floor Filler: White premix portland cement and latex; type as recommended by carpet manufacturer.

B. Primers and Adhesives: Waterproof; releasable type recommended by carpet manufacturer. Shall meet Sacramento Metro Air Quality Management.

C. Edge Strips: Metal type, color as selected. Strip shall be beveled with a slope no greater than 1 inch unit vertical to 2 units horizontal (50 percent slope).

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Examine subfloors and conditions for compliance with requirements for moisture content, humidity levels, alkalinity range and other conditions affecting performance of carpet.

B. Verify that subfloor surfaces are smooth and flat and are ready to receive work.

C. Beginning of installation means acceptance of subfloor and site conditions.

3.2 PREPARATION

A. Remove subfloor coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone.

B. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.

C. Apply, trowel, and float filler to leave smooth, flat, hard surface.

D. Prohibit traffic until filler is cured.

E. Apply subfloor primer compatible with adhesive where recommended by carpet manufacturer.

F. Vacuum floor surface.

3.3 INSTALLATION

A. Apply carpet and adhesive in accordance with manufacturer's instructions and CRI 104, Section 10.2.

B. Fully adhere carpet tile to substrate.

C. Lay carpet on floors with tiles laid in straight pattern.

D. Install pattern parallel to walls.

E. At doorways, center seams under door in closed position.

F. Fit seams straight, not crowded or peaked, free of gaps.

G. Extend carpet into toe spaces, door reveals, open-bottomed obstructions, alcoves and similar openings.

H. Cut and fit carpet around interruptions.

I. Fit carpet tight to intersection with vertical surfaces without gaps.

3.4 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Vacuum carpet surfaces.

3.5 PROTECTION

A. Comply with requirements of CRI 104, Section 13.7.

B. Prohibit traffic from carpet areas for 24 hours after installation.

END OF SECTION

SECTION 09 77 33

FIBER REINFORCED PLASTIC PANELS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fiberglass reinforced plastic (FRP) panels.

B. Panel moldings.

1.2 REFERENCES

A. ASTM E84 - Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

A. Submit product data under provisions of Section 01 33 00.

B. Submit product data for panels and accessories.

C. Submit samples under provisions of Section 01 33 00.

D. Submit two samples 4 x 4 inches in size illustrating panel pattern and color. Submit two 12 inch long samples of panel moldings.

E. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.4 OPERATION AND MAINTENANCE DATA

A. Submit maintenance data under provisions of Section 01 77 00.

B. Include data for cleaning and stain removal.

C. Include manufacturer's recommendations for cleaning materials, polishes, and waxes.

1.5 REGULATORY REQUIREMENTS

A. Conform to flame/smoke developed rating of 25/450 when tested in accordance with ASTM E84.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and protect products to site under provisions of Section 01 61 00.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not install fiberglass reinforced plastic panels when temperatures are below 60 degrees F or above 90 degrees F.

B. Maintain temperature range for 24 hours before, during, and 72 hours after installation of panels.

1.8 WARRANTY

A. Provide one year warranty under provisions of Section 01 77 00.

B. Include coverage for surface staining and finish deterioration.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Crane Composites, Inc., www.cranecomposites.com.

B. Glasteel Inc., www.glasteel.com.

C. Lasco Products, www.lascoboard.com.

D. Marlite, www.marlilte.com.

E. Nudo Products, Inc., www.nudo.com.

F. Panolam Industries, www.panolam.com.

G. Substitutions: Under provisions of Section 01 25 00.

2.2 MATERIALS

A. Fiberglass reinforced plastic panels of 0.090 inch thickness in 4 x 8 foot sheet sizes.

B. Panels to have smooth flat surface finish in color selected by Architect.

C. Basis of Design for panel texture and color are shown on Finish Legend on drawings.

D. Panels to have a flame/smoke rating of 25/450 for a Class A finish when tested according to ASTM E84.

2.3 ACCESSORIES

A. Moldings: Extruded aluminum or plastic panel accessories in maximum practical lengths. Finish to match panels.

B. Adhesive: Latex based non-flammable construction adhesive.

C. Sealant: Silicone sealant specified in Section 07 92 00.

D. Substitutions: Under provisions of Section 01 25 00.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and openings are ready to receive work.

B. Verity that field measurements and tolerances are as instructed by manufacturer.

C. Verify that required utilities are available, in proper location, and ready for use.

D. Beginning of installation constitutes acceptance of existing substrate surface conditions by installer.

3.2 PREPARATION

A. Clean substrate surfaces.

B. Protect elements of work adjacent to work of this Section from damage or disfiguration.

3.3 INSTALLATION

A. Install panels and accessories in accordance with manufacturer's instructions.

B. Coordinate location of panel joints to minimize interference with fixtures and accessories.

C. Apply panel adhesive at 6 inches on center over entire field of panel.

D. Set panel ends and edges in moldings.

E. Seal moldings and panel joints with sealant.

3.4 FIELD QUALITY CONTROL

A. Panels shall lay flush with substrate, without air pockets or warpage.

B. Remove and replace panels not conforming to manufacturer's installation guidelines.

3.5 CLEANING

A. Clean work under provisions of Section 01 77 00.

3.6 PROTECTION

A. Protect finished installation under provisions of Section 01 61 00.

END OF SECTION

SECTION 09 84 13

FABRIC COVERED SOUND-ABSORBING PANELS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fabric covered acoustic panels.

B. Fiberglass insulation.

C. Attachments and accessories.

1.2 REFERENCES

A. ASTM C423: Standard Test Method for Sound Absorption and Sound Coefficients by the Reverberation Room Method.

B. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.

C. ASTM E1264: Standard Classification for Acoustical Ceiling Products.

1.3 PERFORMANCE REQUIREMENTS

A. Meet the requirements of ASTM E84 for flame spread of 25 or less and smoke developed of less than 450.

B. Meet the requirements of ASTM C423 for NRC value listed.

1.4 SUBMITTALS

A. Submit shop drawings under provisions of Section 01 33 00.

B. Submit shop drawings indicating layout of panels and attachment methods.

C. Submit product data under provisions of Section 01 33 00.

D. Submit product data for panels and fabric surfaces.

E. Submit samples under provisions of Section 01 33 00.

F. Submit four samples 12 x 12 inches in size illustrating panel composition, edge banding, support method, and finish fabric.

G. Submit test reports under provisions of Section 01 33 00.

H. Submit test report indicating flame spread and sound absorption.

I. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.5 OPERATION AND MAINTENANCE DATA

A. Submit maintenance data under provisions of Section 01 77 00.

B. Include cleaning and replacement of damaged fabrics.

C. Include cleaning and stain removal methods and recommended cleaning materials.

1.6 QUALITY ASSURANCE

A. Install in accordance with manufacturer's instructions.

B. Maintain one copy of document on site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and protect products to site under provisions of Section 1 61 00.

B. Store and protect products under provisions of Section 01 61 00.

C. Accept packaged panel assemblies on-site. Verify damage.

D. Protect all material from weather by storing indoors in properly ventilated area.

1.8 EXTRA MATERIALS

A. Submit maintenance materials under provisions of Section 01 77 00.

B. Provide three extra panels of each panel type and size indicated under provisions of Section 01 77 00.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Armstrong World Industries, Inc. Product: Soundsoak 85, www.armstrong.com.

B. Substitutions: Under provisions of Section 01 25 00.

2.2 MANUFACTURED UNITS

A. Interior Wall Panel

1. Core Material: Fiberglass insulation.
2. Thickness: 1 inch
3. Edge: Fabric wrapped edges.
4. Width: 24 inches.
5. Length: as indicated.
6. Panel Size: as indicated on drawings.
7. Finish: FR-701 (FR) fabric in color as selected by Architect.
8. Mounting Style: A.
9. NRC Rating: 0.85.

2.3 ACCESSORIES

A. Metal Brackets: Manufacturer's standard "Z" clip.

B. Screws: Bolts, screws and washers as indicated, galvanized.

C. Adhesive: Manufacturer's recommended panel adhesive.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate is ready to receive work.

B. Verify field measurements are as shown on shop drawings.

C. Verify that required electrical and other utilities are in place, in proper locations, and ready for use.

D. Verify that all painting and other surface treatment has been satisfactorily completed prior to beginning installation.

E. Verify that all supporting material is in proper locations as shown on shop drawings.

F. Beginning of installation means installer accepts existing substrate conditions.

3.2 PREPARATION

A. Clean surfaces to be covered.

B. Protect elements surrounding the work of this Section from damage or disfiguration.

3.3 INSTALLATION

A. Install in accordance with manufacturer's recommendations and instructions.

B. Interlock long edge of adjacent panels into “H” spline.

C. Adhere panels to wall substrate with adhesive and “Z” panel clips.

D. Secure panels to wall substrate in pattern as indicated.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Coordinate with installation of finish electrical work and other work that impacts the panel installation.

3.5 TOLERANCES

A. Maximum Variation From Level: 1/8 inch in 4 feet.

B. Maximum Offset From True Alignment: 1/4 inch.

3.6 CLEANING

A. Clean work under provisions of Section 01 77 00.

B. Clean fabric surfaces.

3.7 PROTECTION

A. Protect finished installation under provisions of Section 01 61 00.

B. Provide poly-wrap or other protective means.

C. Do not permit traffic in contact with surfaces and protect as necessary.

END OF SECTION

SECTION 09 84 36

SOUND ABSORBING CEILING UNITS

PART 1 - GENERAL

1.1. SECTION INCLUDES

A. Profile Clouds

1.2. REFERENCES

A. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

B. ASTM E 84/CAN/ULC S102 Standard Test Method for Surface Burning Characteristics of Building Materials.

C. NFPA 701 (2010; Small Scale Test) Standard Methods of Fire Tests for Flame Resistant Textiles and Films.

D. NFPA 705 Recommended Practice for a Field Flame Test for Textiles and Films.

E. SIN 722-06 Flammability Requirements for Fire Retardant Trees and Plants.

F. Title 19 California State Fire Marshal minimum requirements for flame resistance products identified in Section 13115, California Health and Safety Code.

G. NF X 70-100 (1986, Tube Furnace Method) Fire Test for Analysis of Pyrolysis and Combustion Gasses. Evaluation of Toxic Fumes.

1.3. SUBMITTALS

A. Product Data: Submit Data sheet or Manufacturer Documentation for each product showing dimensions, materials, and colors.

B. Shop Drawings: Submit shop drawings of site plans showing details of construction, product configuration, and related construction.

C. Verification Samples: Submit samples of each chosen material and color.

1.4. QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical components andinstallation components by a single manufacturer.

B. Coordination of Work: Coordinate acoustical component work with installers of related work including, but not limited to light fixtures, mechanical systems, electrical systems, and sprinklers.

1.5. DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical components to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing, allow acoustic components to gradually reach room temperature

and a stabilized moisture content.

C. Handle acoustic components carefully to avoid damage.

1.6. PROJECT CONDITIONS

A. Space Enclosure:

1. Acoustical Components: All wet work must be complete and dry prior to installation. Installation shall be carried out where the temperature is between 60 degrees F and 100 degrees F. These temperature conditions must be maintained for optimal component lifespan.

1.7. WARRANTY

A. Acoustic Room Component: Submit a written manufacturer warranty, agreeing to repair or replace acoustical components that fail within the warranty period. Failures include, but are not limited to:

1. Acoustical Room Component: Manufacturer's defects

B. Warranty Period:

1. Acoustical Room Component: Refer to manufacturer's standard warranty.

PART 2 - PRODUCTS

2.1. MANUFACTURER

A. Accepted Manufacturer: CSI Creative.

1. Location: 9901 W 74th St, Eden Prairie, MN 55344

2. Sales Representative: Steven Leung 3.

Phone: 213-667-0135

4. Email: steven@csicreative.com

5. Web Address: www.csicreative.com

2.2. B. Substitutions: Per Section 01 25 00

SOUND ABSORBING CLOUDS

A. Basis-of-Design:

1. Profile Clouds 008 by CSI Creative www.csicreative.com

2. Materials

a. Felt: PoshFelt® 100 percent wool 3mm design felt, 100 percent biodegradable.

b. Acoustic Substrate: Soundcore® 100 percent recyclable 12mm PET, 60 percent recycled content.

1) NFPA 701: Pass
2) NFPA 705: Pass

3) SIN 722-06: Pass

4) California Title 19: Pass

5) NF X 70-100: Pass

c. Contains no formaldehyde, chemical irritants, or harmful substances.

d. VOC info: VOC Free, Berkeley Analytical Certificate ID 190313-01

3. Panel Thickness: [12-48mm]

4. Panel Size: 48”

5. Felt Color: See Finish Schedule on plans

6. Edge: Covered Edge

7. Attachment Method: Individual Suspension; see details on plans.

8. Properties:

a. Acoustic Performance: NRC (ASTM C423): 0.45 - 1.55 varies by design.

b. Burning Characteristics: ASTM E-84 Class A

PART 3 - EXECUTION

3.1. EXAMINATION

A. Proceed with installation only when all wet work is completed, and unsatisfactory site conditions have been corrected.

3.2. INSTALLATION

A. Clean substrates and attachment points of dirt, oils, and other substances that could cause issues during installation.

B. Install units in accordance with manufacturer's instructions and approved submittals.

3.3. ADJUSTING AND CLEANING

A. Replace damaged or broken components.

B. Adjust units for proper position, uniform appearance and operation.

C. Clean exposed and semi-exposed surfaces using materials acceptable to the manufacturer.

D. Maintenance of components should consist of:

1. Blot spills from material quickly. Wipe with a damp cloth. If stain persists, apply small quantities of carpet or upholstery shampoo solution with a damp cloth (test on inconspicuous location first). Blot well with a clean cloth after each application. Avoid excessive amounts of water. Ensure adequate ventilation if the product is subject to excessive moisture.

3.4. WASTE MANAGEMENT

A. Waste Management

1. Coordinate recycling of waste materials with Section [01 74 19 - Construction Waste Management and Disposal].

2. Collect recyclable waste and dispose of or recycle field generated construction waste created during demolition, construction or final cleaning.

3. Remove recycling containers and bins from site.

3.5. PROTECTION

A. Protect finished installation from dust and damage from subsequent and ongoing construction activity.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements including but not limited to:
1. Surface preparation and field painting of exposed items and surfaces.
2. Field preparation and painting of factory primed metal products and fabrications.
3. Accessories necessary for a complete installation.

B. Related Sections (Including but not limited to):
1. Section 05 52 00: Metal Railings.
2. Section 06 10 00: Rough Carpentry.
3. Section 08 11 13: Hollow Metal Doors and Frames.
4. Section 09 21 16: Gypsum Board Assemblies.

1.3 DEFINITIONS

A. Standard coating terms defined in ASTM D16 apply:
1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
3. Satin refers to a slightly higher sheen than eggshell and more reflective and durable finish and is less lustrous than semi-gloss.
4. Semigloss refers to medium sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
5. Full gloss refers to high sheen finish with a gloss range more than 70 when measured at a 60-degree meter

1.4 SUBMITTALS

A. Product Data:
1. Submit technical data and information for block fillers, primers, paints, and coatings, including label analysis and instructions for handling, storing, and applying each coating material proposed for use:
a. Indicate manufacturer's instructions for special surface preparation procedures, substrate conditions requiring special attention.
b. Material List: Provide inclusive list of required coating materials. Indicate each material and cross reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number, series, and general classification.

B. Samples:
1. Submit for each type of paint system and in each color and gloss of topcoat:
a. Provide stepped samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.
b. Provide list of material and application for each coat of each sample. Label each sample as to location and application.
c. Submit samples on following substrates for review of color and texture only:
1) Concrete: Provide two 4-inch square samples for each color and finish.

2) Concrete Masonry: Provide two 4" x 8" samples of masonry, with mortar joint in the center, for each finish and color.
3) Painted Wood: Provide two 12-inch square samples of each color and material on hardboard.
4) Ferrous and Nonferrous Metals: Provide two 4-inch square samples of flat metal and two 8-inch-long samples of solid metal for each color and finish.

C. Product List: Submit product list of each paint system, color, and location of application. Use same product and location designations indicated in Finish Schedule.

D. Coating **Maintenance Manual**: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as **Sherwin-Williams "Custodian Project Color and Product Information"** report or equal. Manual shall include an Area Summary with Finish Schedule, Area Detail designating where each product/color/finish was used, including product data pages, Manual Safety Data sheets, care and cleaning instructions, touchup procedures, and color samples of each color and finish used.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:
1. Comply with Federal and local toxicity and air quality regulations and with Federal requirements on content of for heavy metals, including but not limited to, lead and mercury. Do not use solvents in paint products that contribute to air pollution.
2. Comply with CARB suggested control measures using the Method 24 analysis.
3. Performance and Durability:
a. ASTM D16 – "Standard Test Method for Load Testing Refractory Shapes at High Temperatures."
b. ASTM D2486 – "Standard Test Method for Scrub Resistance of Interior Wall Paint."
c. ASTM D2805 – "Standard Test Method for Hiding Power of Paints by Reflectometry."
d. ASTM D4828 – "Standard Test Method for Practical Washability of Organic Coatings."
e. ASTM D3363 – "Standard Test Method for Film Hardness by Pencil Test."

B. Applicator Qualifications: A firm or individual having minimum 5 years documented experience in applying paints and coatings similar in material, design, and extent to those indicated.

C. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

1.6 WARRANTY

A. Written warranty signed by the manufacturer and the installer in which the manufacturer and installer agree to repair or replace paint and primers that fail within specified warranty period:
1. Failures include, but are not limited to, the following:
a. Flaking or delamination of paint with the substrate.
b. Rust, scale, similar imperfections due to improper surface preparation.
c. Thinning or watering of paint beyond that considered acceptable of paint manufacturer.
d. Failure to achieve dry film thickness (DFT) recommended by manufacturer for each coat in a paint system.
e. Deterioration or loss of color of paint beyond normal weathering.
2. Warranty Period: One year from date of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F (7 degrees C):
1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

PART 2 PRODUCTS

2.1 MATERIALS

A. Basis of Specifications: **Sherwin Williams Company**: For product inquiries contact: Richard.condie@sherwin.com 916.267.3232
1. Subject to compliance with requirements, provide first quality, 100% acrylic, commercial or industrial products of one of the specified manufacturers. Residential products are not permitted:

Substituted products must be equal to or better in quality than the Sherwin Williams products listed in Part 4.

a. Proprietary Names:
1) Paint Schedule is based on a single manufacturer for convenience with exception to the paint used in specific areas where specialized coatings are required (Refer to Drawings).
2) Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that named products are required to the exclusion of comparable products of specified manufacturers.
3) Furnish product technical data, including per cent solids by weight and volume: (Method 24 analysis)
a) VOC content limits and emissions data.
b) Certificates of performance for comparable paint products of specified manufacturer.
4) Use MPI index to coordinate performance based
b. Paint Products:
5) Sherwin-Williams Co.
6) PPG Industries, Inc.
7) Dulux; Theater Black (Where applicable, see Drawings)

B. Material Compatibility: Provide each paint system including block fillers, primers, and finish coats, that are compatible with one another and with substrates indicated under conditions of service and application, demonstrated by manufacturer based on testing and field experience.

C. Material Quality: Provide manufacturer's best quality commercial paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint material containers not displaying manufacturer's product identification will not be acceptable. Residential quality paint products are not permitted.

D. Chemical Components of Interior Paints and Coatings:
1. Provide products complying with limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
a. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
b. Restricted Components: Paints and coatings shall not contain components restricted by the EPA.

E. Accessories: Materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

F. Patching Materials: Latex filler compatible with paint systems.

G. Fastener Head Cover Materials: Latex filler.

H. Theater Black: No Exceptions or alternates.

2.2 SOURCE QUALITY CONTROL

A. Testing of Paint Materials:

1. Owner reserves the right to invoke to engage the services of a qualified testing agency to sample paint materials:
   a. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to site, samples may be taken at the site. Samples will be identified, sealed, and certified by testing agency.
   b. Testing agency will perform tests for compliance with product requirements.
   c. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 EXECUTION

3.1 FIELD CONDITIONS

A. Apply waterborne paints when temperatures of surfaces to be painted and surrounding air are between 50 degrees F and 90 degrees F.

B. Do not thin or add water to waterbased paints, including waterbased alkyds.

C. Weather Conditions:
   1. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
   2. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 degrees F (3 degrees C) above dew point; or to damp or wet surfaces.
   3. Minimum Application Temperatures for Water based Paints: Between 50 degrees F (10 degrees C) and 90 degrees F (32 degrees C).

D. Apply solvent thinned paints when temperatures of surfaces to be painted and surrounding air are between 45 degrees F and 95 degrees F:
   1. Minimum Application Temperature for Varnish Finishes: 65 degrees F (18 degrees C) for interior or exterior, unless required otherwise by manufacturer's instructions.
   2. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by the manufacturer during application and drying periods.

E. Provide lighting level of 80-foot candles (860lx) measured midheight at substrate surface.

F. Labels: Do not paint over Underwriters Laboratories, Factory Mutual, other code required labels, or equipment name, identification, performance rating, or nomenclature plates.

3.2 EXTRA MATERIALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents:
   1. Paint: 2 percent, but not less than 1 gallon (3.8 L) of each material and color applied.

3.3 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for maximum moisture content and conditions affecting performance of the work.

B. Test substrates after repairing and cleaning substrates but prior to application of paint and coatings:
   1. Maximum moisture content of substrates, when measured with an electronic moisture meter as follows:
      a. Concrete: 12 percent.
      b. Fiber Cement Board: 12 percent.

c. Masonry (Clay and CMUs): 12 percent.
d. Wood: 15 percent.
e. Gypsum Board: 12 percent.
f. Plaster: 12 percent.

2. Test cementitious and plaster cement/stucco for alkalinity (pH).

C. Gypsum Board Substrates: Verify joints are taped and finishing compound is sanded smooth.

D. Plaster Substrates: Verify plaster has fully cured. Verify existing plaster is in good condition and can receive new paint coating.

E. Spray Textured Ceiling Substrates: Verify surfaces are dry.

F. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers:
1. Verify previously painted surfaces can be stripped to bare substrate, repaired if necessary, and prepared to receive new paint system consisting of primer and two top coats at a minimum:
a. Note: If previously painted surfaces have failed to accept new paint systems, determine cause of failure and take corrective measures to ensure each surface accepts new paint system. Failure of new paint system is not permitted.

G. Commence paint and coating application after correcting unsatisfactory conditions and surfaces are dry. Application of coating indicates applicator's acceptance of surfaces and conditions.

3.4 ITEMS TO RECEIVE PAINT

A. Generally, all new items that are normally painted in any typical building, including but not limited to the following list:
1. All ferrous metal
2. All exterior galvanized metal
3. All exterior wood
4. All interior wood
5. All prime coated hardware
6. All exposed pipe, plumbing, ductwork, conduit, outlet boxes and electrical cabinets, excluding those located in mechanical rooms.
7. All metal grilles, except aluminum, unless otherwise indicated.
8. All exposed gypsum board surfaces, including all mechanical rooms.
9. Miscellaneous other items which normally require painting or are scheduled to be painted.
10. Consult plans, finish schedule, details, and specifications for other trades, as all items usually field painted or finished will be considered as part of the Contract.
11. All exposed mechanical equipment and electrical equipment.
12. Traffic lanes and parking spaces including fire lanes and crosswalks.
13. Rolling doors.
14. Bollards.
15. Loose lintels.
16. Refer to MEP specifications for additional items to receive paint.

B. All work where a coat of material has been applied must be inspected and approved by Architect before application of succeeding specified coat, otherwise no credit for coat applied will be given. Notify Architect when a particular coat has been completed for inspection and approval. Apply coats of material in strict accordance with manufacturer's specifications except where requirements of these specifications are in excess of manufacturer's requirements. Paint all sight exposed pipe and plumbing only after all mechanical work and tests have been completed.

3.5 PREPARATION

A. Coordination of Work:
1. Review work in which primers are provided to ensure compatibility of the total system for various substrates. Notify Architect of anticipated problems when using materials specified over substrates primed by others:
a. Preprimed Substrates: Inspect existing conditions in which primers are factory applied to

ensure compatibility of the total system for each substrate. Notify Architect of anticipated problems when using the materials specified over factory primed or preprimed substrates.

b. Existing Painted Surfaces: Inspect previously painted surfaces to ensure compatibility of the existing paints with new paint system for each substrate. Notify Architect of anticipated problems.
c. Correct defects and clean surfaces affecting bond with paint system. Remove existing paints exhibiting loose surface defects showing signs of rust, scale, or delamination.
d. Seal marks which may bleed through surface finishes.

B. Surface Preparation:
1. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified. Provide barrier coats over incompatible primers or remove and reprime. If removal is impractical or impossible because of size or weight of item, provide surface applied protection before surface preparation and painting:
a. Remove hardware and hardware accessories, plates, lighting fixtures, and similar items that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface applied protection before surface preparation and painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
b. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface applied protection if any.
c. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
d. Clean and prepare surfaces to receive paint according to manufacturer's written instructions for each substrate condition and as specified. Provide barrier coats over incompatible primers, existing paint or coating, or remove and reprime.
e. Correct defects and clean surfaces affecting bond with paint or coating system. Remove existing coatings exhibiting loose surface defects. Seal marks which may bleed through surface finishes.

C. Cleaning:
1. Before applying paint or surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning. Schedule cleaning and painting so dust and contaminants from the cleaning process will not fall on wet, newly painted surfaces:
a. Remove incompatible primers, including factory applied primers, and reprime substrate with compatible primers or apply barrier coat as necessary to produce paint systems indicated.
b. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
c. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
d. Galvanized Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
e. Aluminum Substrates: Remove surface oxidation.
2. Power Washing:
a. Loxon Self cleaning Acrylic:
1) 1 Coat Loxon LX02 Masonry Primer
2) 2 coats Loxon Self Cleaning Acrylic LX13-50

D. Mildew and Mold Removal: Remove mildew and mold by high power washing (pressure range of 1500 to 4000 psi) with solution of trisodium phosphate and bleach. If substrate is too soft for high power washing, scrub substrate with solution. Rinse with clean water and allow surface to dry.

E. Protective Coverings: Provide protections for duration of the work, including covering furnishings and decorative items. Protect and mask adjacent finishes and components against damage, marking, overpainting, and injury. Clean and repair or replace damage caused by painting.

F. Renovated Surfaces:
1. Clean surface free of loose dirt and dust. Except at gypsum board surfaces, remove existing

paint and coatings to bare substrate and prepare substrates to receive new paint system. Test substrate to verify it will bond with primer and receive new paint system without failure. If test fails, clean surface to base substrate and apply barrier coat. Retest to verify surface will accept new paint system:

a. Remove surface film preventing proper adhesion and bond.
b. Wash glossy paint with a solution of sal soda and rinse thoroughly.
c. Remove loose, blistered, and defective paint and varnish; smooth edges with sandpaper.
d. Clean corroded iron and steel surfaces.
e. Repair and blend into portland cement plaster.
f. Prime bare surfaces.
g. Tone varnished surfaces with stain bringing to uniform color.
h. If existing surfaces cannot be put in acceptable condition for finishing by customary cleaning, sanding, and puttying operations, notify Owner and do not proceed until correcting unsatisfactory conditions.

G. Cementitious Substrates:
1. Prepare concrete surfaces to receive paint. Remove efflorescence, chalk, dust, dirt, grease, oils, release agents, mold, mildew, and existing paint. Roughen as necessary to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation:
   a. Use abrasive blast cleaning methods if recommended by paint manufacturer.
   b. Do not paint surfaces if moisture content or alkalinity of surfaces exceeds that permitted in manufacturer's written instructions:
      1) Determine alkalinity and moisture content of surfaces by performing appropriate pH testing. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct condition prior to application of paint.
      2) Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m).
      3) Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation after substrates have obtained percent relative humidity level recommended by paint manufacturer.
      4) Perform additional moisture tests when recommended by manufacturer. Proceed with installation when moisture content complies with that permitted in manufacturer's written instructions.
      5) Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to thoroughly dry.
2. Clean concrete floors to receive paint or coating with a 5 percent solution of muriatic acid or etching cleaner. Flush floors with clean water to remove acid; neutralize with ammonia, rinse, allow to dry; vacuum before painting.

H. Ferrous Metals:
1. Clean ungalvanized ferrous metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC recommendations:
   a. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3.
   b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
   c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.

I. Galvanized Ferrous Metal Substrates: Clean galvanized surfaces with nonpetroleum based solvents leaving surface free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

J. Shop Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop primed surfaces.

K. Aluminum Substrates: Clean surfaces to remove oil, grease, surface oxidation, and contaminants in accordance with SSPC SP-1 Solvent Cleaning. Lightly abrade surface with a nonmetallic pad.

L. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

M. Plaster/Stucco Substrates:
1. Remove contaminants, release agents, curing compounds, efflorescence, chalk, mold, mildew, and similar deterrents. Spot patch existing plaster to eliminate blisters, buckles, excessive crazing, and to check cracking, dryouts, efflorescence, sweat outs, and similar deflects the prevent plaster from bonding with paint or coatings. Sand or texture repair or patch to match adjacent finish and to remove trowel marks and arises:
   a. Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
   b. Deep Cracks: Clean out and fill deep cracks with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
   c. Do not paint surfaces if moisture content or alkalinity of surfaces exceeds that permitted in manufacturer's written instructions. Test for alkali using litmus paper.
   d. Allow patching and repair compounds to set and cure before painting.

N. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.

O. Wood Substrates:
1. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
2. Sand surfaces that will be exposed to view and dust off.
3. Prime, stain, or seal wood to be painted. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.
4. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
5. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

P. Pipe Covering and Insulation: Clean to remove loose, foreign, and objectionable material before applying sealing coat.

Q. Preparation of Substrates for Wallcovering:
1. Prime and seal substrate with release coat in accordance with wallcovering manufacturer's recommendations for substrate:
   a. Assure compatibility with product of wall covering manufacturer.
   b. Fill indentations in substrate and prime with opaque white primer before applying release coat.
   c. Apply release coat in accordance with manufacturer's recommendations.

R. Barrier Coat: Provide barrier coats over incompatible primers or remove and reprime. Notify Owner in writing of anticipated problems using specified finish coat material over previously coated substrates.

S. Material Preparation:
1. Mix and prepare paint materials according to manufacturer's written instructions:
   a. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
   b. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
   c. Do not use thinners for water-based paints.
   d. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.6 APPLICATION

A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated:
   1. The term exposed surfaces includes areas visible when permanent or built in fixtures, grilles, convector covers, covers for finned tube radiation, and similar components are in place. Extend coatings in these areas to maintain system integrity and provide desired protection.
   2. Use applicators and techniques suited for paint and substrate indicated.
   3. Provide finish coats compatible with primers.
   4. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
   5. Paint exposed surfaces. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces:
      a. Field painting of exposed surfaces include bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory applied final finish.
      b. Areas visible when permanent or built in fixtures, grilles, convector covers, covers for finned tube radiation, and similar components are in place.
      c. Extend coatings in areas, as required, to maintain system integrity and provide desired protection.
   6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
   7. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
   8. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   9. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   10. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or surface imperfections. Cut in sharp lines and color breaks.
   11. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
   12. Provide finish coats compatible with primers used.
   13. Sand lightly between each succeeding enamel or varnish coat.

B. Items not to Receive Paint: Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

C. Applicators:
   1. Apply paints and coatings by brush, roller, spray, or applicators recommended by manufacturer:
      a. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
      b. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool recommended by manufacturer for material and texture required.
      c. Spray Equipment: Use airless spray equipment with orifice size recommended by manufacturer for material and texture required.

D. Minimum Coating Thickness:
   1. Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer:
      a. Measure film thickness on magnetic surfaces by use of Elcometer thickness gauge and on nonmagnetic surfaces by pit gauge or Tooke Gauge.

E. Application:
   1. Apply first coat to surfaces that have been cleaned, pretreated, or prepared for painting as soon as practicable after preparation and before subsequent surface deterioration:
      a. The number of coats and film thickness required are the same regardless of application

method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.

b. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished after removing rust and scale and priming or touching up surface sand if acceptable to topcoat manufacturers.

c. If undercoats, stains, or conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive dry film thickness equivalent to that of flat surfaces.

d. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried and cured to where it feels firm and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

F. Mechanical and Electrical Work:

1. Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces:
   a. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
   b. Prime and paint uninsulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, heat exchangers, tanks, ductwork, conduit, switchgear, and paintable insulation except where items are prefinished.
   c. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
   d. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
   e. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.
   f. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
   g. Concealed Members: Wherever steel and metal parts to receive paint are built into and concealed by construction, paint as specified for exposed parts so finish painting is complete before members are concealed.

G. Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Painting is limited to items exposed in equipment rooms and occupied spaces:
   a. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
   b. Prime and paint uninsulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, heat exchangers, tanks, ductwork, conduit, switchgear, and paintable insulation except where items are prefinished.
   c. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
   d. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
   e. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.
   f. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

H. Electrostatic Spray Painting:

1. Apply coating electrostatically to finished surfaces, free from runs, sags, visible overlaps, holidays, craters, pinholes and other defects detrimental to protective and decorative qualities of coating:
   a. Thickness of Coatings: 1.5 to 2.0 mils dry film thickness. Measure dry film thickness with magnetic gauge.
   b. Use application techniques, equipment, materials, and preparation procedures

recommended by manufacturer.

I. Block Fillers: Apply block fillers to concrete masonry block at rate to ensure complete coverage with pores filled.

J. Prime Coats: Before applying finish coats, apply prime coat, recommended by manufacturer, to material required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or defects due to insufficient sealing.

K. Finish Coats:
1. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance without bleed through:
   a. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or surface imperfections is not acceptable.
   b. Transparent (Clear) Finishes: Use multiple coats to produce glass smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections. Provide satin finish for final coats.

L. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

M. Touch Up:
1. Touch up marred, scraped, and blemished areas of surfaces which were factory primed or previously coated:
   a. Prepare and touch up scratches, abrasions, and blemishes and remove foreign matter before proceeding with succeeding coats.
   b. Touch up marred, scraped, and blemished areas of factory primed or previously coated surfaces.
   c. Feather touch up coating overlapping minimum 2 inches onto adjacent unblemished areas producing smooth, uniform surface.
   d. As soon after erection and installation as possible, touch up fasteners, welded surfaces and surroundings, field connections, and areas on which shop coat has been abraded or damaged with specified primer before corrosion and other damage occurs from exposure.

3.7 FIELD QUALITY CONTROL

A. Dry Film Thickness (DFT) Testing:
1. Tests for dry film thickness may be determined by using a Tooke Scale and microgroover, an electronic scanner, or the Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness:
   a. Contractor shall touch up and restore painted surfaces damaged by testing.
   b. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.8 CLEANING AND PROTECTION

A. It is of the upmost importance to the AISD that the site remains in a safe, clean, and well-maintained condition. At the end of each day, leave the site ready to use by staff and students. Protect staff and students and the learning environment throughout the work.

B. Cleanup: At the end of each day, remove empty cans, rags, rubbish, and discarded paint materials from site. After completion of painting work, clean glass and paint spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. Provide Wet Paint signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work. After related work is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

E. At completion of painting activities, touch up and restore damaged or defaced painted surfaces.

F. Waste Management: Legally dispose of unused paint and paint containers in accordance with manufacturer's recommendations and environmental regulations.

PART 4 SCHEDULE

A. The following is a schedule of typical painted items and does not specifically include every item that is to receive paint but should establish type and quality of finish for all items normally included in a complete paint job.

B. Exterior Surfaces:
1. Galvanized Metal:
   a. Surface Preparation: Acid etch galvanized surfaces that have not weathered at least six (6) months prior to beginning painting operations.
   b. Primer: One (1) coat Pro-Cryl Pro Industrial Universal Primer (B66W310)
   c. Finish: Two (2) coats Sher-Cryl HPA High Performance Acrylic (B66W300)
2. Un-galvanized Metal:
   a. Primer: One (1) coat Pro-Cryl Pro Industrial Universal Primer (B66W310).
   b. Finish: Two (2) coats Sher-Cryl HPA High Performance Acrylic (B66W300).
3. Concrete and CMU:
   a. Primer/Finish: (2) coats Loxon XP Exterior Waterproofing System, 14-18 mils wet, 6.4 – 8.3 mils dry per coat.
4. Wood (Includes plywood siding and wooden trim):
   a. Primer: One (1) coat PrepRight ProBock Primer B28.
   b. Finish: Two (2) coats A-100 Acrylic Gloss (A8 ser.).
5. Fiber-Cement Materials & Brick Veneers:
   a. Primer: One (1) coat Loxon Masonry Primer (LXO2).
   b. Finish: Two (2) coats A-100 Acrylic Gloss (A8 Series).
6. Parking Line and Driveway Paint: Sherwin Williams Setfast Waterborne Yellow (TM225) (meets Federal Specification (FS) TTP-1952-B).
7. All piping in mechanical rooms shall be painted in their entirety, in the following colors:
   a. Gas lines: Orange
   b. Domestic cold water: White
   c. Domestic hot water: Pink
   d. Heating hot water: Red
   e. Condenser water: Green
   f. Chilled water: Blue

C. Interior Surfaces:
1. Galvanized Metal:
   a. Primer: One (1) coat Pro-Cryl Pro Industrial Universal Primer (B66W310).
   b. Finish: Two (2) coats Pro Industrial 0 VOC Acrylic Semi-Gloss B66 Series.
2. Ferrous Metals (Use for metal doors and frames and miscellaneous metal items):
   a. Shop coat (spot prime as needed)
   b. One (1) coat over Steel and Aluminum, Pro Industrial Pro-Cryl Universal Primer (B66W610).
   c. Two (2) coats Pro Industrial Acrylic Semi-Gloss, B66 Series.
3. Gypsum Wallboard:
   a. Primer: One (1) coat ProMar 200 Zero VOC Latex Primer (B28W2600).
   b. Finish: Two (2) coats ProMar 200 Zero VOC Latex Eg-Shel (B20W2651 Series).
   c. Alternate (high traffic areas):

1) Primer: One (1) coat ProMar 200 Zero VOC Latex Primer (B28W2600).
2) Finish: SW Scuff Tuff Waterbased Enamel S23 Series

4. Concrete and CMU (Enamel):
   a. One (1) coat ProMar Block Filler (AB25W25).
   b. Finish: Two (2) coats Solo Semi-Gloss A76 (B31W2651 Series).
5. Wood (Painted):
   a. Primer: Premium Wall and Wood Primer (B25W8111).
   b. Finish: ProClassic Waterborne Semi-Gloss (B31 Series).
6. Wood (Stained):
   a. Stain: Minwax stain.
   b. Finish (First Coat): Wood Classics Polyurethane Varnish (A67 Series).
   c. Finish (Second Coat): Wood Classics Polyurethane Varnish (A67 Series).
7. Gypsum Wallboard (Epoxy) – Kitchens, bathrooms, laboratories, etc.:
   a. Primer: One (1) coat ProMar 200 Zero VOC Latex Primer (B28W2600).
   b. Finish: Two (2) coats Pro Industrial Pre-Catalyzed, Semi-Gloss (K45 Series):
      1) Location: Corridors & Stairwells.
8. CMU (Epoxy) - Kitchens, bathrooms, laboratories, etc.:
   a. Primer: Two (2) coats Heavy Duty Block Filler (B42W46).
   b. Finish: Two (2) coats Macropoxy Epoxy, Semi-Gloss (646 Series).
9. Pipe and fittings, including but not limited to copper and brass, at kitchen areas (but excluding aluminum, stainless steel, nickel and chrome plated pipe and fittings):
   a. Primer: One (1) coat; product recommended for the substrate by the finish coat manufacturer.
   b. Finish: Two (2) coats bright aluminum paint, S-W BondPlex Aluminum (B71S200).

END OF SECTION

SECTION 10 11 19

MARKERBOARDS AND TACKBOARDS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Markerboards.

B. Tackboards.

C. Trim, marker tray and accessories.

1.2 REFERENCES

A. ANSI A208.1 - Mat Formed Wood Particleboard.

B. ASTM B221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.

C. ASTM A424 - Steel Sheets for Porcelain Enameling.

D. ASTM C208 - Insulation Board (Cellulose Fiber).

E. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

F. CFFA-W-101-A - Chemical Fabrics and Film Association Quality Standard for Vinyl Coated Fabric Wallcovering.

G. FS CCC-W-408 A and B - Wall Covering, Vinyl-Coated.

H. Porcelain Enamel Institute - Performance Specifications for Porcelain Enamel Chalkboards.

I. UL - Underwriters Laboratories, Inc.

1.3 REGULATORY REQUIREMENTS

A. Conform to flame/fuel/smoke rating of 25/0/25 for vinyl fabric covered tackboards when tested in accordance with ASTM E84 by UL.

1.4 SUBMITTALS

A. Submit product data under provisions of Section 01 33 00.

B. Indicate on shop drawings, wall elevations, dimensions, joint locations.

C. Provide product data on markerboards, tackboards, [tackboard surface covering, trim and accessories.

D. Submit samples under provisions of Section 01 33 00.

E. Submittwo samples 3" x 3" inch in size illustrating materials and finish, color, and texture of tackboard surfacing.

F. Horizontal Sliding Panel System: Submit 18 x 24 inch sample panel illustrating materials and construction.

1.5 MAINTENANCE DATA

A. Submit maintenance data under provisions of Section 01 77 00.

B. Include maintenance information on regular cleaning and stain removal.

1.6 WARRANTY

A. Provide 11 year lifetime warranty under provisions of Section 01 77 00.

B. Warranty: Include coverage for discoloration of surfaces due to cleaning, crazing or cracking and staining.

2. PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. AARCO Products, Inc., www.aarco.com.

B. Claridge Products and Equipment, Inc., www.claridgeproducts.com.

C. Lemco, www.adplemco.com.

D. Nelson Adams, www.nelsonadamsnaco.com

E. Platinum Visual Systems, www.pvsusa.com.

F. Tri-Best Visual Display Products, www.tri-best.com.

G. Substitutions: Under provisions of Section 01 25 13.

2.2 MATERIALS

A. Steel Sheet: ASTM A424, Type I, commercial quality.

B. Aluminum Extrusions: ASTM B221, 6063 alloy, T5 temper.

C. Cork: Fine grain natural cork, homogeneous composition.

D. Particle Board: ANSI A208.1; wood shavings set with waterproof resin binder, sanded faces.

E. Fiberboard: Industrial insulation board, ironed and prime coated, ASTM C208, cellulosic, 3/8 inch thick, 4 foot wide x required length, made with binder containing no urea formaldehyde.

F. Foil Backing: Aluminum foil sheet.

G. Honeycomb: Honeycell/Honeycomb.

H. Tackboard Covering: Koroseal Wallcoverings, www.koroseal.com conforming to FS CCC-W-408 A and B and CFFA W-101-B, Type II and the following:

1. Total Weight: 20 oz/lin yd
2. Roll Width: 54 inches
3. Pattern: To be selected by Architect
4. Color: As selected

I. Adhesives: Type recommended by manufacturer.

2.3 ACCESSORIES

A. Map Rail Accessories: Formed aluminum display hooks, map roller brackets, and flag holder. Sliding type to fit map rail. One pair of display hooks and map roller brackets for every two feet of map rail. One flag holder per map rail.

B. Protective Cover: Sheet polyethylene, 8 mil thick.

C. Blocking Pads: Manufacturer's standard padding designed to prevent deflection.

D. Metal Mounting Clips: Steel angle clips, 2 inches long x 16 gage thick.

2.4 FABRICATION - MARKERBOARDS

A. Outer Face Sheet: Steel, 24 gage thick. Equivalent to Claridge LCS.

B. Core: Particle Board, 3/8 inch thick

C. Backing Surface: Aluminum foil, 0.005 inch thick.

D. Units up to 16 feet in length to be one piece construction, no joints.

2.5 FABRICATION - TACKBOARDS

A. Outer Facing: Tackboard covering.

B. Underlayment: Cork, 1/8 inch thick.

C. Core: Fiberboard, 3/8 inch thick.

D. Units up to 16 feet in length to be one piece construction, no joints.

2.6 FRAME AND TRIM

A. Frame: Extruded aluminum, equivalent to Claridge Series 5 profile; concealed fasteners; map rail with 1/4 inch thick cork insert over markerboard surfaces.

B. Marker Tray: Extruded aluminum, equivalent to Claridge 992 profile; one piece, full length of markerboard; concealed fasteners.

2.7 HORIZONTAL SLIDING PANEL ASSEMBLY

A. Single Sided panel - Markerboard:

1. Surface: Porcelain markerboard.

2. Core: 7/8 inch thick honeycomb.

3. Subframe: PVCO SF-78, 2 inch x 7/8 inch aluminum tube, 4 sides.

4. Moisture Barrier: .012 inch thick aluminum sheet.

B. Single Sided Panel - Tackboard

1. Surface: Tackboard covering.

2. Underlayment: Cork, 1/4 inch thick.

3. Core: 5/8 inch thick honeycomb.

4. Subframe: PVCO SF-58, 2 inch x 5/8 inch aluminum tube, 4 sides.

5. Moisture Barrier: .012 inch thick aluminum sheet.

C. Frame, Hardware, and Accessories

1. Trim: PVCO C-12 extruded aluminum with punched and wrapped safety corner.

2. Top Track: PVCO C-1 extruded aluminum guide.

3. Bottom Track: PVCO BT-1 extruded aluminum track.

4. Filler Strip: PVCO BT-1F extruded aluminum series.

5. Rollers: PVCO HB Series, Model MAL-33 bottom rollers.

6. Sheaves: PVCO 1607 adjustable brass ball bearing sheaves. Two wheels per sheave and two sheaves per panel.

7. Pulls: PVCO 230.B.26.D chrome retractable edge pulls, two per panel, fully recessed.

8. Locks: PVCO JK-39 locking mechanism, one per panel.

9. Chalkrail: PVCO CRA-4D modified as indicated with rounded corner.

10. Maprail: PVCO MR-3 with vinyl backed cork and end caps.

11. Maprail Accessories: Formed aluminum display hooks, map roller brackets and flag holder. Sliding type to fit map rail. One pair of display hooks and map roller brackets for every two feet of map rail.

D. Markerboard and tackboard configuration as indicated on drawings.

2.8 FINISHES

A. Porcelain Enamel: Glass fibered enamel, baked to vitreous surfaces; Porcelain Enamel Institute Type A; low gloss; color as selected from manufacturer's standard range.

B. Tackboard Surface: Vinyl of as selected from manufacturer's standard range.

C. Aluminum Frame and Accessories: Clear satin.

3. PART 3 EXECUTION

3.1 INSPECTION

A. Verify that surfaces and internal wall blocking are ready to receive work, and dimensions are as indicated on shop drawings.

B. Beginning of installation means acceptance of substrate construction.

3.2 INSTALLATION

A. Install markerboards and tackboards in accordance with manufacturer's instructions and as indicated on drawings.

B. Install blocking pads behind markerboards and tackboards at 16 inches on center both vertically and horizontally.

C. Install metal clips at 16 inches on center at sides and bottom of boards.

D. Secure units level and plumb.

E. Butt markerboard panels tight with concealed spline to hairline joint.

3.3 CLEANING

A. Clean markerboard and tackboard surfaces in accordance with manufacturer's instructions.

B. Cover markerboard surfaces with protective cover, taped to frame.

C. Remove protective cover at Date of Substantial Completion.

END OF SECTION

SECTION 10 14 00

SIGNAGE

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Plastic/acrylic signs.

B. Metal signs.

C. Letters and numbers.

D. Cast metal plaques.

E. Fire wall barrier identification signs.

F. Precast Concrete Monument Sign.

1.2 REFERENCES

A. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2.

B. 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design.

1.3 SUBMITTALS

A. Submit shop drawings under provisions of Section 01 33 00.

B. Submit shop drawings listing sign styles, lettering and locations, spacing and installation method.

C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

D. Include installation templates and hardware.

1.4 REGULATORY REQUIREMENTS

A. Conform to CBC - California Building Code, (CCR), Title 24, Part 2 and the 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design for accessibility requirements.

B. Raised characters shall comply with CBC Section 11B-703.2:

1. Depth: Raised characters shall be 1/32-inch (0.8 mm) minimum above their background and shall be sans-serif uppercase and be duplicated in Braille.

2. Height: Raised character height shall be 5/8-inch (15.9 mm) minimum and 2 inches (51 mm) maximum based on the height of the uppercase letter “I”. CBC Section 11B-703.2.5.

3. Finish and Contrast: Characters and their background shall have a non-glare finish. Character shall contrast with their background with either light characters on a dark background or dark characters on a light background. CBC Section 11B-703.5.1.

4. Proportions: Raised character proportions shall be selected from fonts where the width of the uppercase letter “O” is 60% minimum and 110% maximum of the height of the uppercase letter “I”. Stroke thickness of the uppercase letter “I” shall be 15% maximum of the height of the character. CBC Section 11B-703.2.4 and 11B-703.2.6.

5. Character Spacing: Spacing between individual raised characters shall comply with CBC Section 11B-703.2.7.

6. Line Spacing: Spacing between individual raised characters shall comply with CBC Section 11B-703.2.8.

7. Format: Text shall be in a horizontal format. CBC Section 11B-703.2.9.

8. Braille: Braille shall be contracted (Grade 2) and shall comply with CBC Sections 11B-703.3 and 11B-703.4. Braille dots shall have a domed or rounded shape and shall comply with CBC Figure 11B-703.3.1.

9. Mounting Height: Tactile characters on signs shall be located 48" minimum to the baseline of the lowest Braille cells and 60" maximum to the baseline of the highest line of raised characters above the finish floor or ground surface. CBC Section and Figure 11B-703.4.1.

10. Mounting Location: A tactile sign shall be located per CBC Section and Figure 11B-703.4.2 as follows:

    (a) alongside a single door at the latch side.

    (b) on the inactive leaf at double doors with one active leaf.

    (c) to the right of right hand at double doors with two active leafs.

    (d) on the nearest adjacent wall when there is no wall space at the latch side of a single door.

    (e) at the right side of double doors with two active leaf's.

    (For all cases, a clear floor space of 18" x 18" minimum, centered on the tactile characters, shall be provided beyond the arc of any door swing between the closed position and 45-degree open position.)

C. Visual characters shall comply with CBC Section 11B-703.5 and shall be 40" minimum above finish floor or ground. Visual character stroke thickness of the uppercase letter "I" shall be 10% minimum and 20% maximum of the height of the character. CBC Section 11B-703.5.7.

1. Line Spacing between the baselines of separate lines of characters within a message shall be 135% min. and 170% max. of the character height per CBC Section 11B-703.5.9.

2. Character Spacing between individual adjacent characters shall be 10% min. and 35% max. of character height per CBC Section 11B-703.5.8.

D. Pictograms shall comply with CBC Section 11B-703.6.

E. Symbols of accessibility shall comply with CBC Section 11B-703.7.

F. Variable message signs shall comply with CBC Section 11B-703.8.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and protect products to site under provisions of Section 01 61 00.

B. Package signs, labeled in name groups.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not install adhesive mounted signs when ambient temperature is below 70 degrees F. Maintain this minimum during and after installation of signs.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acrylic Signs:

1. Architectural Sign Identity, www.architecturalsignidentity.com.
2. ASI - Sign Systems, www.asisignage.com.
3. Best Manufacturing, www.bestsigns.com.
4. Bravo Sign and Design, www.bravosign.com.
5. CA Signs, www.casigns.com.
6. Mohawk Sign Systems, www.mohawksign.com.
7. Neiman and Company, www.neimanandco.com.
8. Signs and Lucite Products, Inc., www.adasignscalifornia.com
9. Signtec, www.signtec.com.
10. Southwell Company, www.southwellco.com.
11. Vomar Products, Inc., www.vomarproducts.com.
12. Substitutions: Under provisions of Section 01 25 00.

B. Letters and Numbers:

1. ARK Ramos, www.arkramos.com.
2. ASI - Sign Systems, www.signage.com.
3. Bravo Sign and Design, www.bravosign.com.
4. Gemini, www.gemini.signproducts.com
5. Matthews, www.matthewssigns.com.
6. Nelson-Harkins Ind., www.nelson-harkins.com.
7. Neiman and Company, www.neimanandco.com.
8. Southwell Company, www.southwellco.com.
9. Signs and Lucite Products, Inc., www.adasignscalifornia.com.
10. Signtec, www.signtec.com.
11. Vomar Products, Inc., www.vomarproducts.com.
12. Substitutions: Under provisions of Section 01 25 00.

C. Cast Metal Plaques:

1. ARK Ramos, www.arkramos.com.
2. Bravo Sign and Design, www.bravosign.com.

3. Gemini, www.geminisignproducts.com.

4. Matthews, www.matthewsbronze.net.

5. Signs and Lucite Products, Inc., www.adasignscalifornia.com

6. Signtec, www.signtec.com.

7. Southwell Company, www.southwellco.com.

8. Substitutions: Under provisions of Section 01 25 00.

D. Metal and Traffic Signs:

1. Four S Company, (877) 597-1288. No URL available.

2. Signs and Lucite Products, Inc., www.adasignscalifornia.com

3. Signtec, www.signtec.com.

4. Traffic Management Inc., www.trafficmanagement.com.

5. Substitutions: Under provisions of Section 01 25 00.

E. Precast Concrete Monument Sign.

1. Quickcrete Products Corp., www.quickcrete.com.

2. Wausau Tile, www.wausautile.com

3. Substitutions: Under provisions of Section 01 25 00.

F. Fire Wall Barrier Identification Sign:

1. Fire Wall Signs, Inc., www.firewallsigns.com.

2. Fire Safety Signs, www.mysafetysign.com.

3. Substitutions: Under provisions of Section 01 25 00.

2.2 MANUFACTURED UNITS

A. Room Control Signage: Mohawk Sign Systems, Series 200A, Format D Sand Carved Process, with 1/32 inch raised border and letters with integral California round top contracted Grade 2 braille dots with dot spacing in compliance with CBC Table 11B-703.3.1 raised a minimum of 1/ 40 inch. Material shall be 1/8 inch thick x 6 inch high MP plastic plate of length required with 1 inch high helvetica medium lettering; adhesive and mechanical mounting with copy centered on plate. Provide one sign for each door shown on the drawings. Allow for twelve letters and three numerals for each sign. Signage to be in compliance with the requirements of Article 703 of the 2010 ADA Standards for Accessible Design and CBC, California Building Code (CCR), Title 24, Part 2, Section 11B-703.

B. Tactile Exit Signage: Mohawk Sign Systems, Series 200A, Format D Sand Carved Process, with 1/32 inch raised border and letters with integral California round top contracted Grade 2 braille dots with dot spacing in compliance with CBC Table 11B-703.3.1 raised a minimum of 1/ 40 inch. Material shall be 1/8 inch thick x 6 inch high MP plastic plate of length required with 1 inch high helvetica medium lettering; adhesive and mechanical mounting with copy centered on plate. Provide signs at locations shown on the drawings. Signage to be in compliance with the requirements of Article 703 of the 2010 ADA Standards for Accessible Design and CBC, California Building Code (CCR), Title 24, Part 2, Section 1011.4 and 11B-703.

C. Pictorial Symbol Signage: Mohawk Sign Systems, Series 200A, Format D Sand Carved Process, with 1/32 inch raised border and letters with integral California round top contracted Grade 2 braille dots with dot spacing in compliance with CBC Table 11B-703.3.1 raised a minimum of 1/ 40 inch. Material shall be

1/8 inch thick MP plastic plate of size indicated with lettering and symbols as indicated; adhesive and mechanical mounting with copy centered on plate. Provide sign in locations shown on the drawings. Signage to be in compliance with the requirements of Article 703 of the 2010 ADA Standards for Accessible Design and CBC, California Building Code (CCR), Title 24, Part 2, Section 11B-703.

D. Entrance and Restroom Signage:

1. Restroom Doors: Acrylic plastic signs equivalent to that as detailed on the drawings; 12 inch circle and triangle with international symbol of accessibility in accordance with CBC, California Building Code, (CCR), Title 24, Part 2, Section 11B-216.8 and 11B-703.7.2.6.

2. Building Entrance: Equivalent to 5 inch square, reflective decal accessible sign in accordance with CBC, California Building Code (CCR), Title 24, Part 2, Section 11B-216.6 and 11B-703.7.2.1.

E. Exterior Directional Signage: 0.080 inch thick aluminum sheet sign of size indicated. Paint with reflectorized paint. Graphics and text to be as indicated. Mount sign to wall with four countersunk vandal resistant screws or on free standing 2-inch diameter standard weight galvanized steel pipe post as indicated. Signs shall be in conformance with CBC, California Building Code (CCR), Title 24, Part 2, Section 11B-216.9.2 and 11B-703.5.

F. Accessible Gate Signage: 0.080 inch thick aluminum sheet sign of size indicated. Paint with reflectorized paint. Graphics and text to be as indicated. Attach sign to adjacent fence with 12 gage wire ties at each corner. Mount sign at 5'-0" from grade to center of sign. Sign shall be in conformance with CBC, California Building Code (CCR), Title 24, Part 2, Section 11B-206.4.7 and 11B-404.1.1.

G. Fire Wall Barrier Identification Sign: 11 x 15 inch adhesive backed vinyl sign with minimum 3 inch high letters identifying wall as a fire and or smoke barrier; listing hourly rating of fire wall; with specific language stating that all openings in wall are to be protected. Sign shall be in conformance with CBC, California Building Code (CCR), Title 24, Part 2, Section 703.7.

H. Safe Dispersal Area Sign: 0.080 inch thick aluminum sheet sign in size indicated. Paint with reflectorized paint. Text to be as indicated. Mount and attach sign to adjacent fence fabric, post, or wall as indicated on drawings. Sign shall be in conformance with CBC, California Building Code (CCR), Title 24, Part 2, Section 1028.5.

I. Storage Room Sign: Mohawk Sign Systems, Series 200A, Format A, Sand Carved Process. Material shall be 1/8 inch thick MP plastic plate of size indicated with lettering indicated, mechanical and adhesive mounting with copy centered on plate. Provide signs in locations as shown on drawings. Signage shall be in conformance with CBC, California Building Code, (CCR), Title 24, Part 2, Section 3005.4. 1. 6.

J. Traffic Signage:

1. Van Parking Stall: 12 inch x 18 inch 0.080 inch thick aluminum accessible sign in accordance with CBC, California Building Code, (CCR), Title 24, Part 2, Section 11B-502.6 and 11B-703.7.2.1 with separate 12 inch wide x 4 inch high sign with "Van-Accessible" wording and additional language below symbol of accessibility that states "Minimum Fine $250.00." Mount on 2 inch diameter standard weight galvanized steel pipe post.

2. Auto Parking Stall: 12 inch x 18 inch 0.080 inch thick aluminum accessible sign in accordance with CBC, California Building Code, (CCR), Title 24, Part 2, Section 11B-502.6 and 11B-703.7.2.1 with additional language below symbol of accessiblity that states "Minimum Fine $250.00." Mount on 2 inch diameter standard weight galvanized steel pipe post

3. Drive Approach: 18 inch x 24 inch 0.080 inch thick aluminum tow-away sign with local address and police phone number in accordance with CBC, California Building Code, (CCR), Title 24, Part 2, Section 11B-502.8.1. Mount on 2 inch diameter standard weight galvanized steel pipe post.

4. Passenger Loading Zone: 12 inch x 18 inch 0.080 inch thick aluminum sign as detailed on drawings. Mount on 2 inch diameter standard weight galvanized steel pipe post.

K. Occupant Load Signage:

1. Provide maximum occupant load signs where indicated on drawings. Locate near main exit of space.

2. Material: 1/8 inch thick x 6 inch high MP plastic plate of length required with 3/4 and 1/2 inch high helvetica medium lettering: adhesive and mechanical mounting with copy centered on plate.

3. Signage to conform to the requirements of the CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, Section 1004.3.

L. Accessories: Provide all anchors, adhesives, and accessories for a complete installation.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means installer accepts existing surfaces.

3.2 INSTALLATION - GENERAL

A. Install in accordance with manufacturer's instructions.

B. Install true, plumb, level and adequately secured to substrate.

C. Clean and polish.

3.3 INSTALLATION - FIRE BARRIER

A. Install fire wall barrier identification signs on fire walls in accessible concealed floor, floor-ceiling or attic space above accessible ceilings.

B. Install at intervals not exceeding a 30' - 0" horizontal spacing.

C. Install at maximum 15' - 0" from end of wall.

END OF SECTION

SECTION 10 28 13

TOILET ACCESSORIES

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Toilet and washroom accessories.

B. Framed mirror units.

C. Concealed anchor devices and backing plate reinforcements furnished to other Sections.

D. Attachment hardware.

1.2 REFERENCES

A. 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design.

B. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.

C. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strips.

D. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

E. ASTM A366 - Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.

F. ASTM A386 - Zinc Coating (Hot-Dip) on Assembled Steel Products.

G. ASTM B456 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

H. ASTM A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

1.3 SUBMITTALS

A. Submit product data under provisions of Section 01 33 00.

B. Provide product data on accessories describing size, finish, details of function, attachment methods.

C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.4 KEYING

A. Supply two keys for each accessory to Owner.

B. Master key all accessories.

1.5 REGULATORY REQUIREMENTS

A. Conform to CBC, California Building Code, (CCR) Title 24, Part 2, the 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design and for accessibility requirements.

B. Structural strength of grab bars, shower seats, fasteners and mounting devices shall conform to requirements of the CBC, California Building Code, (CCR) Title 24, Part 2, Section 11B-609, 11B-610 and shall withstand the application of a 250 lb. point load.

C. Elements of Sanitary facilities shall be mounted at locations in compliance with CBC Sections 11B-602 through 11B-612.

D. Grab bars in toilet facilities and bathing facilities shall comply with CBC Section 11B-609. Grab bars and any wall or other surfaces adjacent to grab bars shall be free of sharp or abrasive elements and shall have rounded edges. The space around the grab bars shall be as follows:

1. 1 ½" between the grab bar and the wall.

2. 1 ½" minimum between the grab bar and projecting objects below and at the ends.

3. 12" minimum between the grab bar and projecting objects above.

1.6 COORDINATION

A. Coordinate the work of this Section under provisions of Section 01 31 00.

B. Coordinate the work of this Section with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Bobrick Washroom Equipment, Inc., www.bobrick.com.

B. American Specialties, Inc. (ASI), www.americanspecialties.com.

C. Bradley Corporation, www.bradleycorp.com.

D. Substitutions: Under provisions of Section 01 25 13.

2.2 MATERIALS

A. Sheet Steel: ASTM A366.

B. Stainless Steel Sheet: ASTM A167, Type 304.

C. Tubing: ASTM A269, stainless steel, Type 304.

2.3 ACCESSORIES

A. Adhesive: Two component epoxy type waterproof.

B. Fasteners, Screws, and Bolts: Hot dip galvanized, tamperproof.

C. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

D. Existing Grab Bar Wall Anchor: Wingit Model GBW40, www.wingits.com. Fastener capable of withstanding an applied load of 250 lbs.

2.4 FABRICATION

A. Weld and grind smooth joints of fabricated components.

B. Form exposed surfaces from single sheet of stock, free of joints.

C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

D. Back paint components where contact is made with building finishes to prevent electrolysis.

E. Shop assemble components and package complete with anchors and fittings.

F. Provide steel anchor plates, adapters, and anchor components for installation.

G. Hot dip galvanize exposed and painted ferrous metal and fastening devices.

H. Toilet tissue dispensers located in accessible toilet rooms or stalls shall not have their flow restricted and shall be capable of continuous flow.

2.5 FACTORY FINISHING

A. Galvanizing: ASTM A123 to 1.25 oz/sq yd.

B. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

C. Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats electrostatic baked enamel.

D. Chrome/Nickel Plating: ASTM B456, Type SC 2 satin finish.

E. Stainless Steel: No. 4 satin luster finish.

F. Mirror Glass: FS DD-G-451 Type I, Class 1, Quality of 2, 1/4 inch thick with silver coating, copper protective coating and non metallic paint coating complying with FS DD-M-411.

G. Stainless Steel Mirror: Type 430, 20 gage, bright annealed stainless steel.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that site conditions are ready to receive work and dimensions are as instructed by the manufacturer.

B. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

A. Deliver inserts and rough-in frames to site at appropriate time for building-in.

B. Provide templates and rough-in measurements as required.

C. Verify exact location of accessories for installation.

3.3 INSTALLATION

A. Install fixtures, accessories and items in accordance with manufacturers' instructions.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Accessories required to be accessible shall be mounted at heights according to CBC Section 11B-603.5 and as indicated on the drawings.

D. Toilet paper dispensers and feminine napkin dispensers located on the grab bar side of an accessible toilet room or stall shall not project more than 3 inches from the finished surface of the wall nor be located closer than 1-1/2 inches clear of the tangent point of the grab bar.

3.4 SCHEDULE

A. See plans as indicated.

END OF SECTION

SECTION 10 44 00

FIRE PROTECTION SPECIALTIES

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fire extinguishers.

B. Non-rated and fire rated cabinets.

C. Accessories and signage.

1.2 REFERENCES

A. ASTM E814 - Fire Tests of Through-Penetration Fire Stops.

B. NFPA 10 - Portable Fire Extinguishers.

C. CFC - California Fire Code, (CCR) California Code of Regulations, Title 24, Part 9.

D. Title 19, State Fire Marshal Regulations.

1.3 QUALITY ASSURANCE

A. Conform to NFPA 10 requirements.

1.4 REGULATORY REQUIREMENTS

A. Conform to requirements of the CFC, Section 906, and Title 19 - State Fire Marshal Regulations, Chapter 3.

B. Fire Extinguisher Cabinets must comply with CBC Sections 11B-307, 11B-308, 11B-309, and 11B-403.

1.5 SUBMITTALS

A. Submit product data under provisions of Section 01 33 00.

B. Include physical dimensions, operational features, color and finish, mounting and anchorage details, rough-in measurements, location, and details.

C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.6 OPERATION AND MAINTENANCE DATA

A. Submit manufacturer's operation and maintenance data under provisions of Section 01 77 00.

B. Include test, refill or recharge schedules, procedures, and re-certification requirements.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not install extinguishers when ambient temperatures may cause freezing.

2. PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Amerex Corporation, www.amerex-fire.com.

B. J. L. Industries, www.jlindustries.com.

C. Larsen's Mfg. Co., www.larsensmfg.com.

D. Potter-Roemer, Inc., www.potterroemer.com.

E. Substitutions: Under provisions of Section 01 25 00.

2.2 EXTINGUISHERS

A. Dry Chemical Type: Equivalent to J.L. Industries Cosmic Model 10E, UL 4A:80B:C nominal capacity with multi-purpose chemical agent and inert material in enameled-steel container, with pressure-indicating gage.

2.3 CABINETS

A. Non-rated cabinets equivalent to J.L. Industries Ambassador Model No. 1017G10 and SAF-T-LOK keyed cylinder lock.

B. Fire rated cabinets, equivalent to J.L. Industries Ambassador Model No. 10 17 FX with semi-recessed and steel doors with vertical duo glazing. Cabinet to be fabricated according to ASTM E814 and be listed and labeled by Warnock-Hersey for one and two hour fire rated wall systems.

2.4 FABRICATION

A. Form body of cabinet with tight inside corners and seams.

B. Fabricate body of fire rated cabinet of double wall construction filled with a 5/8 inch thick layer of protective fire barrier insulation.

C. Predrill holes for anchorage.

D. Form perimeter trim by welding, filling, and grinding smooth.

E. Hinge doors for 180 degree opening with continuous piano hinge. Provide nylon catch with pull handle.

F. Glaze doors with resilient channel gasket glazing.

2.5 FINISHES

A. Extinguisher: Red enamel.

B. Cabinet Trim and Door: Type 304 stainless steel with No. 4 finish.

3. PART 3 EXECUTION

3.1 INSPECTION

A. Verify rough openings for cabinet are correctly sized and located.

B. Beginning of installation means acceptance of existing conditions.

C. Contractor to obatain current FE tags at Substantial Completion.

3.2 INSTALLATION

A. Install cabinets plumb and level in wall openings.

B. Secure rigidly in place in accordance with manufacturer's instructions.

C. Install fire rated cabinets in strict conformance with manufacturer's instructions and listing requirements of Warnock-Hersey.

D. Attach steel cable theft device to each extinguisher. Locate inside cabinet.

END OF SECTION

SECTION 10 73 00

ALUMINUM AWNING

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Work in this section includes furnishing and installation of extruded and/or formed aluminum overhead canopies.

B. Related Items and considerations
1. Determine wall construction, make-up, and thickness.
2. Ensure adequate wall construction to carry canopy loads as required.
3. Consider water drainage out of and away from canopy, with front located gutter drained via scupper, or rear located gutter drained via downspout.
4. Engineering to be submitted to AHJ for deferred approval. Items should not be fabricated until deferred approval is received from AHJ. Manufacturer to provide drawings and calculations designed in accordance with the CBC, be prepared and designed by a California licensed structural engineer.

1.2 QUALITY ASSURANCE

A. Products specified herein meet the established standard of quality required, as manufactured by Awnex Inc., Ball Ground, GA, 770-704-7140.

1.3 FIELD MEASUREMENT

A. Confirm dimension prior to shop drawings when possible or necessary.

B. If requested, supply manufacturer's standard literature and specifications for canopies.

C. Submit shop drawings showing structural component locations/positions, material dimensions, and details of construction and assembly.

1.4 PERFORMANCE REQUIREMENTS

A. Canopy must conform to local building codes.

B. Determine if specific load requirements have been established for canopies and if stamped calculations and drawings are required for location in which canopy is to be installed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store all canopy components in protected areas until ready for installation.

1.6 REFERENCES

A. American Architectural Manufacturers Association (AAMA)
1. 2603 Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Architectural Extrusions and Panels.

B. American Society of Civil Engineers (ASCE) 7 – Minimum Design Loads for Buildings and

Other Structures.

C. ASTM International (ASTM)
1. B-221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
2. B429 – Standard Specification for Aluminum-Alloy Extruded Pipe and Tube.

PART 2 PRODUCTS

2.1 MANUFACTURER:

A. **Basis of Design**: Awnex Inc.
www.Awnexinc.com
Colorado and Pheonix System

B. Substitutions: Under provisions of Section 01 25 00.

2.2 MATERIALS

A. Rain pans shall be brake-formed sheets at 1/16" thickness (width varies), attached via #10 x 3/4" H.H. self-drilling screws.

B. Rear channel, at standard sizes of 8" shall be extruded aluminum alloy 6063-T5, at a nominal thickness of 1/8". If face size deviates from the standard sizes, rear channel, side and face pieces shall be brake-formed sheet at 1/8" thickness.

C. Gutter members shall be brake-formed aluminum sheets at 1/8" thickness, or extruded aluminum, alloy 6063-T6 at a nominal thickness of 1/8".

D. Intermediate framing members (compression bars) shall be extruded aluminum, alloy 6005A-T5, at a nominal thickness of 1/8".

E. Soffit support tubes shall be extruded aluminum, alloy 6036-T52, at a nominal thickness of 1/8".

F. Soffit trim angle shall be extruded aluminum, alloy 6063-T52, at a nominal thickness of 1/8".

G. Soffit shall be brake-formed aluminum sheets at 1/16" thickness.

H. Tie-back rods and exposed attachment brackets and hardware (as required) shall be powder coated.

I. Internal outriggers shall consist of minimum of 2" x 3" x 1/4" THK. carbon steel tube, welded to minimum 1/4" thickness steel plate.

J. End and face members for 8" flat, shall be snap channel of extruded aluminum, alloy 6063-T5, at a nominal thickness of 1/8".

K. All aluminum sheet shall be alloy 3003-H14

2.3 FASCIA SHALL BE STANDARD 8" FLAT FACE EXTRUDED ALUMINUM, ALLOY 6063-T5 AT A NOMINAL THICKNESS OF 1/8". DEVIATION FROM THESE FACES WILL REQUIRE BRAKE-FORMED OR EXTRUDED ALUMINUM PIECES TO BE ATTACHED MECHANICALLY TO THE CANOPY FRAME.

2.4 FINISHES

A. Standard powder-coat finish shall conform with AAMA 2603 specifications. Color charts and samples are available upon request.

B. Optional finishes include standard and custom two-coat Kynar colors, wood-look "sublimated" finish, and wet paint.

2.5 FABRICATION

A. All connections shall be mechanically assembled, utilizing 410 stainless steel #10 and #14 size fasteners with a minimum shear stress of 350 lb.

B. Concealed drainage. Water shall drain from covered surfaces into formed gutter located at the front for front drainage via scuppers, or the rear for ground level discharge via one or more designated downspouts (as specified).

PART 3 EXECUTION

3.1 INSPECTION

A. Confirm that surrounding area is ready for the canopy installation.

B. Installer shall confirm dimensions and elevations to be as shown on drawings provided by manufacturer.

C. Erection shall be performed by a qualified installer of similar products and scheduled after all concrete, Masonry, and roofing in the area is completed.

3.2 INSTALLATION

A. Installation shall be performed in strict accordance with manufacturer's shop drawings. Particular attention should be given to protecting the finish during handling and installation.

B. After installation, entire system shall be cleaned, inspected, sealed, and left in a clean condition.

END OF SECTION

SECTION 11 24 29.01 FACILITY FALL PROTECTION, NON-PENETRATING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-penetrating fall protection systems, including:
   1. Roof edge rail systems.

1.2 REFERENCES

A. General: Applicable edition of references cited in this Section is current edition published on date of issue of Project specifications, unless otherwise required by building code in force.

B. American National Standards Institute (ANSI), www.ansi.org.
   1. A21.1 - Safety Requirements for Floor and Wall Openings, Railings and Toe Boards.
   2. A58.1 - Minimum Design Loads in Buildings and Other Structures.
   3. A117.1 - Accessible and Usable Buildings and Facilities.

C. Code of Federal Regulations (CFR): OSHA standards.
   1. 29 CFR 1910.28 - Duty to have fall protection and falling object protection.
   2. 29 CFR 1910.29 - Fall protection systems and falling object protection - criteria and practices.

1.3 COORDINATION

A. Coordinate selection of fall protection and fall restraint devices and attachment provisions with Owner's safety program and Owner-provided personal protection equipment.

B. B. Coordinate layout and location of facility fall protection with Architect.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of fall protection specified.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

1.7 PRODUCT DELIVERY AND STORAGE

A. Deliver manufactured materials in original, unbroken pallets, packages, containers, or bundles bearing the label of the manufacturer.

B. Store and handle materials carefully to prevent abrasion, cracking, chipping, twisting, other deformations, and other types of damage.

C. Adhesives, resins and their catalysts and hardeners shall be crated or boxed separately and

noted as such to facilitate their movement to a dry indoor storage facility.

1. Store adhesives, resins and their catalysts in dry indoor storage facilities, between 70- and 85- degrees F (20- and 29 degrees C) until they are required for use.

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard form in which Manufacturer agrees to repair or replace components of fiberglass reinforced plastic (FRP) guard railings that fail in materials or workmanship within warranty period, as follows.
   1. Form of Warranty: Manufacturer's standard "FRP Safety Material Warranty".
   2. Warranty Period: Twenty (20) years from date of completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer/Products: Subject to compliance with requirements, provide listed products of Fibergrate Composite Structures, Dallas TX, (800) 527-4043. Provide specified products.

B. Single Source: Provide fall protection components from a single manufacturer through a single source, unless otherwise indicated.

2.2 PERFORMANCE REQUIREMENTS

A. Occupational Safety and Health Standards: Provide fall protection components complying with requirements of 29 CFR 1910.28 and 29 CFR 1910.29, including structural performance.

B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Handrails and Top Rails of Guards:
      a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
      b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.

2.3 ROOF GUARDRAIL SYSTEMS

A. Roof Edge Guardrail Systems: Fall protection safety railing components including pipe or tubing, fittings, and accessories complying with requirements of authorities having jurisdiction.
   1. Application: Guardrail system for low slope roofs up to 5 deg. slope, including:
      a. Roof edge guardrail.
   2. Basis of Design Product: Fibergrate, Dynaround RG Slimline Fiberglass Roof Guardrail System.
   3. System Description: Non-penetrating roof guardrail system having a minimum finished height of 42 inches (1067 mm) with a mid-rail installed at 21 inches (533 mm) above the walking surface; including posts, rails, fittings, and counterweights; and having the following characteristics:
      a. Fiberglass Reinforcement: Continuous roving, continuous strand mat, and surfacing veil.
      b. Resin: Fire retardant vinyl ester.
      c. Flexural Strength (Full Section): 70,000 psi (482 MPa).
      d. Flame Spread: ASTM E84; 25 or less.

e. Color: Gray, with UV resistant coating.

4. Post Base and Roof Ballasts: Galvanized cast iron, supplied with a rubber anti-skid surface on surface to be in contact with roof.
   a. Dynaround Slimline Base: Circular base with a diameter of 24.5 inches (622 mm), with four sockets for the installation of posts and slots for the installation of lock pins; 90 degrees of rotational adjustment for the posts.
5. Miscellaneous Fittings: Galvanized cast iron with 9/16 inch (14 mm) diameter socket head set screws for clamping to the FRP round tube pipes, posts, rails and outriggers.

2.4 MISCELLANEOUS MATERIALS

A. Hardware: Manufacturer's standard hardware as required for a complete installation; corrosion resistant, and identical to hardware utilized in tested assemblies meeting performance requirements.

B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC Paint 20 and compatible with paints specified to be used over it.

2.5 FABRICATION

A. Cut and drill FRP and metal shapes cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.

B. Form work true to line and level with accurate angles and surfaces.

C. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

D. Form changes in direction by inserting prefabricated elbow fittings.

E. Close exposed ends of railing members with prefabricated end fittings.

F. Brackets, Flanges, Fittings, and Anchors: Provide brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

G. Toe Boards: Provide toe boards at railings around openings and at edge of open-sided roofs and platforms.

2.6 STEEL AND IRON FINISHES

A. Comply with ASTM A153/A153M for hot-dip railings and galvanized hardware.

B. Powder-Coat Finish: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Verify that roof assembly is sound, dry, smooth, clean, sloped for drainage, securely anchored and ready for placement of fall protection.

C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install fall protection in accordance with manufacturer's written instructions.

B. Set fall protection components accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
   1. Do not weld, cut, or abrade surfaces of components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
   2. Set components plumb within a tolerance of 1/8 inch in 3 feet (4 mm in 1 m).
   3. Align horizontal members so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (6 mm in 3.5 m).

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

D. Coordinate review of installation by Owner's safety director or designated representative prior to turnover to Owner.

3.4 FIELD QUALITY CONTROL

A. Remove and replace railings where test results indicate that they do not comply with specified requirements unless they can be repaired in a manner satisfactory to and comply with specified requirements.

B. Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional work with specified requirements.

3.5 REPAIR AND CLEANING

A. Protect installed products until completion of project.

B. Clean exposed surfaces according to manufacturer's written instructions.

C. Touch-up, repair or replace damaged products before Substantial Completion.
   1. Touchup Painting: Immediately after erection, clean bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.
   2. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A780/A780M.
   3. Replace components that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 11 24 29.01

SECTION 11 90 00

MISCELLANEOUS EQUIPMENT

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Library bookdrop.

B. Bicycle racks.

C. Refrigerator.

D. Microwave ovens.

E. Clock.

1.2 REFERENCES

A. 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design.

B. CBC - California Building Code, (CCR) California Code of Regulations , Title 24, Part 2.

1.3 SUBMITTALS

A. Submit product data and manufacturer's installation instructions for each item under provisions of Section 01 33 00.

1.4 REGULATORY REQUIREMENTS

A. Conform to CBC, California Building Code, (CCR), Title 24, Part 2 and the 2010 ADA Standards for Accessible Design for accessibility.

1.5 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 01 77 00.

2. PART 2 PRODUCTS

2.1 PRODUCTS

A. Bicycle Rack: Rolling Rack, Model No. RR4H-87 inch-9 Bikes manufactured by American Bicycle Security Company, www.ameribike.com. ASTM A53, 2 inch schedule 40 pipe, galvanized Surface mounted.

B. Refrigerator: EnergyStar Compact Top Freezer Refrigerator, Model No. LG LT13C2000V, https://www.lg.com/ca_en/refrigerators/top-freezer/lt13c2000v/.

C. Book drop: Kingsley KwikDrop ThruWall Return System manufactured by demco, https://www.demco.com/kingsley-reg-kwikdrop-trade-thruwall-return-system.

D. Projector: Ultra Short Throw Projector, Model No. NP-UM361X manufactured by NEC, https://www.sharpnecdisplays.us/products/projectors/np-um361x

E. Microwave: GE Countertop Microwave; Model # GCST11N1WSS

F. Substitutions: Under provisions of Section 01 25 00

3. PART 3 EXECUTION

3.1 INSTALLATION

A. Install equipment in accordance with manufacturer's printed instructions and as indicated on the drawings.

B. Furnish all necessary hardware, anchors, inserts, connections, and embedded items necessary for proper installation. Coordinate with work of other sections.

END OF SECTION

SECTION 12 24 13

ROLLER SHADES

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fabric roller shades.

B. Manual operation.

C. Accessories and attachment hardware.

1.2 REFERENCES

A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. CEC – California Electrical Code.

C. NFPA 701 - Fire Tests for Flame-Resistant Textiles and Films.

D. UL325 – Listed Solution covering all controls, electrical accessories and motors.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Provide manufacturer's data sheets on each product used.

C. Shop Drawings: Provide plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.

D. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.

E. Samples: Provide 4 sets of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.

F. Maintenance Data: Provide methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company with a minimum of ten years experience and a minimum of five projects of similar scope and size to those specified in this section.

B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of five years experience in installing products comparable to those specified in this section.

1.5 REGULATORY REQUIREMENTS

A. Fire-Test-Response Characteristics: Shall pass NFPA 701, small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

B. Electrical Components: CEC listed and labeled by UL and tested as a system. Individual testing of components will not be acceptable in lieu of system testing.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Anti-Microbial Characteristics: ASTM G 21, 'No Growth' results for fungi ATCC9642, ATCC 9644, ATCC9645.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and protect products to site under provisions of Section 01 61 00.

B. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Verify dimensions by field measurements before fabrication.

1.9 WARRANTY

A. Provide warranties under provisions of Section 01 77 00.

B. Roller Shade Hardware and Standard Shadecloth: Manufacturer's non-depreciating twenty-five-year limited warranty.

C. Roller Shade Installation: One year from date of Substantial Completion.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis-of -Design Product: Subject to compliance with requirement, provide products manufactured by Mecho, www.mecho.shade.com.

B. Comparable products manufactured by one of the following manufacturers are acceptable, with prior written approval through the Submittal process:

1. Draper Inc., www.draperinc.com.

2. Hunter Douglas/Nysan Shading Systems Ltd., www.hunterdouglascontract.com.

3. Lutron Electronics Co., Inc. www.lutron.com.

4. Skyco Shading Systems, Inc., www.skycoshade.com.

5. Spring Window Fashions, www.swfcontract.com.

C. Substitutions: Under provisions of Section 01 25 00.

2.2 APPLICATION

A. Roller Shade Schedule:

1. Shade Type 1: Manual operating, chain drive, sunscreen roller shades in exterior windows of rooms and spaces indicated on the Drawings.

2. Shade Type 2: Manual operating, chain drive, acoustical shade at exterior windows as indicated on the Drawings.

2.3 OPERATION

A. Manual Operated Shades:

1. Universal, regular and offset drive capacity. Allow drive chain to fall at front, rear or non-offset for drive end brackets.

2. Hardware to be minimum of 1/8 inch thick plated steel capable of supporting 150 percent of weight of each shade.

3. Installation to be designed for a removable fascia for both regular and reverse roll. Fascia to be installed with no exposed fasteners.

4. Fascia to be mounted continuously across two or more shade bands.

5. System to allow operation of multiple shade bands by single chain operator.

6. Shade roller tube to have positive mechanical engagement for drive mechanism.

7. Drive Bracket / Brake Assembly: Mecho Model M/5.

8. Drive Chain: No. 10 stainless steel chain rated at a minimum of 90 lb. breaking strength.

2.4 SHADE CLOTH

A. Visually Transparent Single-Fabric Shadecloth: MechoShade Systems, Inc., ThermoVeil group, single thickness non-raveling 0.035-inch thick vinyl fabric, woven from 0.018-inch diameter extruded vinyl yarn comprised of 25 percent polyester and 75 percent reinforced vinyl:

1. Dense Linear Weave: "1000 Series", 3 percent open, dense linear-weave pattern.

2. Color: Selected from manufacturer's standard colors.

B. Acoustical Shade Cloth: Mecho AcoustiVeil " 0890 ", Dimout, 0-1 percent open, fabric, sound-absorbing, with noise reduction coefficient (NRC) of 0.575, 100 percent Polyester, PVC-Free with a Declare Label. Thickness .020 inches translucent material and weighing 0.478 lbs. per square yard:

1. Color: selected from manufacturer's standard colors.

2.5 SHADE BAND

A. Shade Bands: Includes fabric, enclosed hem weight, shade roller tube, and attachment of shade band to roller tube. Sewn hems and open hem pockets are not acceptable.

1. Concealed Hembar: Continuous extruded aluminum for entire width of shade band heat sealed on all sides.

2. Shade Band and Shade Roller Attachment:

(a) Extruded aluminum shade roller tube of diameter and wall thickness required to support shade fabric without deflection.

(b) Positive mechanical attachment of shade band to roller tube; shade band to be removable / replaceable with a "snap-on" "snap-off" spline mounting, without having to remove shade roller from shade brackets.

(c) Mounting spline shall not require use of adhesives, adhesive tapes, staples, or rivets.

2.6 SHADE FABRICATION

A. Shadecloth to hang flat without buckling or distortion.

B. Heat-sealed trimmed edges to hang straight without curling or raveling.

C. Unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch in either direction per 8 feet of shade height due to warp distortion or weave design.

D. Fabricate hem as follows:

1. Concealed hemtube.

E. Provide battens in standard shades to assure proper tracking and uniform rolling of the shadebands. Battens shall be roll-formed stainless steel or tempered steel.

F. Battens shall be concealed in an integrally-colored fabric to match the inside and outside colors of the shadeband.

G. Provide battens for railroaded shades when width-to-height ratios meet or exceed manufacturer's standards.

2.7 COMPONENTS

A. Access and Material Requirements:

1. Provide shade hardware that allows the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.

2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.

3. Use only Delran engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester shall not be used.

2.8 ACCESSORIES

A. Fascia for Shade Type 1 and 2 :

1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets with no exposed fasteners.

2. Install across two or more shade bands in one piece.

3. Fully conceal brackets, shade roller and fabric on the tube.

4. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.

5. Do not notch fascia for manual chain.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Verify field measurements are as shown on shop drawings.

C. Notify Architect of unsatisfactory preparation before proceeding.

D. Beginning of installation means installer accepts existing conditions.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces as recommended by the manufacturer.

3.3 INSTALLATION

A. Install roller shades in accordance with manufacturer's instructions and in compliance with Section 01 73 00.

B. Install roller shades level, plumb, square, and true.

C. Locate shade band no closer than 2 inches to interior face of glass.

D. Allow proper clearances for window operation hardware.

3.4 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.5 CLEANING

A. Clean roller shade surfaces after installation according to manufacturer's written instructions.

3.6 DEMONSTRATION

A. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.7 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 21 00 00

FIRE SUPPRESSION SPRINKLER SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wet-Pipe Fire Sprinkler System.

B. System Design, Installation and Certification.

1.2 RELATED REQUIREMENTS

A. The Drawings and General Provisions of the Contract, including the General Conditions, Special Conditions and Division 01 - General Requirements apply to this section.

B. Section 28 46 00 – Fire Detection and Alarm.

C. Section 21 00 01 - Common Work Results for Fire Suppression: Pipe, fittings, and valves.

D. Section 21 00 02 - Identification for Fire Suppression Piping and Equipment: Piping Identification.

E. Divisions 22 / 23 – Plumbing / Heating, Ventilation, and Air Conditioning (HVAC)

F. Division 26 – Electrical.

G. Division 27 / 28 – Communications / Electronic Safety and Security

1.3 REFERENCE STANDARDS

A. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.

B. NFPA 13 - Standard for the Installation of Sprinkler Systems; National Fire Protection Association 2022.

C. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories, Inc.; current edition.

D. ASTM A234 - Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.

E. ASTM B75 - Seamless Copper Tube.

F. ASTM B88 - Seamless Copper Water Tube.

G. ASTM B251 - General Requirements for Wrought Seamless Copper and Copper Alloy Tube.

H. AWS D10.9 - Specifications for Qualification of Welding Procedures and Welders for Piping and Tubing.

1.4 SUBMITTALS

A. See Division 01 for Administrative Requirements, for Submittal Procedures.

B. Product Data: Provide data on sprinklers, valves, and specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.

C. Shop Drawings: Fire sprinkler system design is not a deferred submittal. The overall system design is approved by DSA. The overall system design is a directive for the installation of the system.
   1. Examine Contract Documents prior to bidding of Work and report discrepancies in writing to LEAF Engineers.
   2. Drawings showing location of equipment and materials are diagrammatic and job conditions will not always permit installation in location shown. The fire protection Drawings show general arrangement of equipment and materials, etc., and shall be followed as closely as existing conditions, actual building construction, and work of other trades permit.
   3. Architectural and structural Drawings are part of the Work. These Drawings furnish Contractor with information relating to design and construction of the Project. Architectural Drawings take precedence over fire protection Drawings.
   4. Investigate structural and finish conditions affecting the Work and arrange Work accordingly. Provide offsets, fittings, and accessories required to meet conditions. Inform Architect immediately when job conditions do not permit installation of equipment and materials in locations shown. Obtain LEAF Engineers' approval prior to relocation of equipment and materials.
   5. Submit preliminary layout of finished ceiling areas indicating only sprinkler locations coordinated with ceiling installation.
   6. Indicate hydraulic calculations, detailed pipe layout, hangers and supports, sprinklers, seismic details and calculations, components, and accessories. Indicate system controls.
   7. Submit shop drawings to LEAF Engineers for approval prior to fabrication or installation.
   8. Installation is to conform to the DSA approved fire sprinkler plans.
   9. Approved documents do not relieve the contractor of field coordination. It is the fire sprinkler contractors' responsibility to coordinate piping locations with the work of other trades.
   10. Preparation of installation and fabrication drawings is the responsibility of the fire sprinkler contractor.

D. Material Data: DSA Approved material data is a guideline. The fire sprinkler system design parameters must be strictly adhered to. Alternate manufacturers may be submitted to LEAF Engineers for review of project compliance. DSA approval must be obtained prior to installation. A copy of the approved material data must be on the project site for the Project Inspector prior to the commencement of installation.

E. Substitutions:
   1. It is the responsibility of Contractor to assume costs incurred because of additional work and or changes required to incorporate proposed substitute into the Project.
   2. Substitutions will be interpreted to be manufacturers other than those specifically listed in Contract Documents by brand name, model, or catalog number.
   3. Only one request for substitution will be considered for each item of equipment or material.
   4. Substitution requests shall include the following:
      a. Reason for substitution request.
      b. Complete submittal information.

F. Project Record Documents: Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and test locations.

G. Manufacturer's Certificate: Certify that system has been tested and meets or exceeds specified requirements and code requirements.

H. Operation and Maintenance Data: Include components of system, servicing requirements, record drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.

I. Maintenance Materials: Furnish the following for the Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Sprinklers: Type and size matching those installed, in quantity required by referenced NFPA design and installation standard.
   3. Sprinkler Wrenches: For each sprinkler type.

J. Section 01 91 13 – General Commissioning Requirements

1.5 QUALITY ASSURANCE

A. Maintain one copy of referenced design and installation standard on site.

B. Conform to UL and FM requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

D. Fabrication shop must provide welding certifications and copy of weld stamp. Weld stamp to be provided on all pipe at welds.

E. Installer Qualifications: Company specializing in performing the work of this section with minimum five years' experience. Installing company must have a valid State of California contractors' license with a C-16 classification.

F. Equipment and Components: Provide products that bear UL and FM label or marking.

G. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

1.6 STRUCTURAL DESIGN REQUIREMENTS AND SEISMIC RESTRAINTS

A. Fire protection systems and equipment shall be anchored and seismically braced in accordance with all applicable codes and industry standards.

B. Contractor shall design seismic bracing for all fire protection equipment and systems to comply with the 2022 California Building Code (CBC) and the latest edition of the Mason Industries "Seismic Restraint Guidelines".
   1. Contractor shall submit details and calculations prepared and signed by a licensed professional structural engineer registered in the state in which the Work is performed demonstrating compliance with the above and all applicable codes.
   2. Drawings, details, and calculations shall be submitted to the Architect for review. Compliance documents shall be approved by the Architect prior to installation.

C. Fire protection systems and equipment shall include, but are not limited to, all piping, valve assemblies, fire pumps, electrical and control panels, conduits, and other components.

D. Supports, anchorage and restraints, including attachments to building structure, for all piping for standard installation details that comply details shown on the fire sprinkler plans and structural plans.

1.7 DELIVERY, STORAGE AND HANDLING

A. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

PART 2 PRODUCTS - ALL PRODUCTS SHALL CONFORM TO CONTRACT DOCUMENTS INCLUDING APPROVED MATERIAL DATA.

2.1 SPRINKLER SYSTEM

A. Sprinkler System: Provide coverage for building areas noted on Drawings, including all areas, rooms, spaces above and below ceilings, entry ways, overhangs (if applicable), etc. and all other areas requiring sprinklers in accordance with NFPA 13.

B. Occupancy: Administration: Light Hazard, Student Union: Light Hazard, Library: Light Hazard, Classroom: Light Hazard, Restroom: Light Hazard. Comply with NFPA 13, 2022. All storage rooms to have sprinklers spaced for ordinary hazard.

C. Interface system with building fire and smoke alarm system.

D. Provide fire department connections where indicated.

E. Storage Cabinet for Spare Sprinklers and Tools: Steel, located adjacent to fire sprinkler riser. Supply no less than two (2) spare sprinklers of each type and temperature rating used on project. Storage cabinet to include a wrench(s) applicable to sprinkler types.

2.2 SPRINKLERS

A. Exposed Area Type: Upright.
   1. Response Type: Quick.
   2. Coverage Type: Standard.
   3. Finish: Brass.
   4. Fusible Link: Glass bulb type temperature rated for specific area hazard.
   5. Application: Areas with exposed construction and all spaces above ceiling.

B. Finished Gypsum Board Ceilings and Suspended Ceilings: Semi-Recessed Pendent.
   1. Response Type: Quick.
   2. Coverage Type: Standard.
   3. Finish: Chrome sprinkler with White escutcheon.
   4. Fusible Link: Glass bulb type temperature rated for specific area hazard.

2.3 PIPING SPECIALTIES

A. Zone Control Valves:
   1. Outside screw and yoke or butterfly, U.L. listed.
   2. Valves shall be sealed open using approved seal.
   3. Provide weatherproof actuator housing with two single pole double throw switches.

B. Electric Alarm: Electrically operated chrome plated gong with pressure alarm switch.

C. Water Flow Switch: Vane type switch for mounting horizontal or vertical, with two contacts; rated 10 amp at 125 volt AC and 2.5 amp at 24 volt DC.

D. Fire Department Connections:
1. Type: Free Standing with brass finish.
2. Outlets: Two way with thread size to suit fire department hardware; threaded dust cap and chain of matching material and finish.
3. Drain: 3/4 inch automatic drip, outside.
4. Label: "Sprinkler - Fire Department Connection".

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with referenced NFPA design and installation standards, DSA requirements and DSA approved plans.

B. Approved documents do not relieve the fire sprinkler contractor of field coordination. It is the fire sprinkler contractors' responsibility to coordinate piping locations with the work of other disciplines.

C. Strict adherence to the contract design documents is required. Any deviation from the contract documents requiring additional plan review, hydraulic calculations, structural review or calculations, or seismic calculations, shall be submitted to LEAF Engineers for review prior to making changes.

D. Install equipment in accordance with manufacturer's instructions.

E. Locate fire department connection with sufficient clearance from walls, obstructions, or adjacent siamese connectors to allow full swing of fire department wrench handle.

F. Preparation of installation and fabrication drawings is the responsibility of the fire sprinkler contractor.

G. Locate outside alarm gong on building wall as indicated on Fire Sprinkler Shop Drawings.

H. Place pipe runs to minimize obstruction to other work.

I. Place piping in concealed spaces above finished ceilings.

J. Center sprinklers in two ft. direction in ceiling tile and provide piping offsets as required. Flex drops are not permitted.

K. All pendent or horizontal sidewall sprinklers are to be installed on return bends

L. Apply masking tape or paper cover to ensure concealed sprinklers, cover plates, and sprinkler escutcheons do not receive field paint finish. Remove after painting. Replace painted sprinklers.

M. Flush entire piping system of foreign matter.

N. Install guards on sprinklers where subject to damage as in attic space where mechanical equipment is located and in mechanical room.

O. Hydrostatically test entire system.

P. Required test to be witnessed by IOR.

Q. Verification of weld inspection required prior to installation of fire sprinkler system.

3.2 INTERFACE WITH OTHER PRODUCTS

A. Ensure required devices are installed and connected as required to fire alarm system.

END OF SECTION

SECTION 21 00 01

COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe, fittings, valves, and connections for sprinkler systems.

1.2 RELATED REQUIREMENTS

A. The Drawings and General Provisions of the Contract, including the General Conditions, Special Conditions and Division 01 - General Requirements apply to this section.

B. Section 21 00 00 – Fire Suppression Sprinkler Systems: Sprinkler systems design.

C. Section 21 00 02 - Identification for Fire Suppression Piping and Equipment: Piping Identification.

D. Divisions 22 / 23 – Plumbing / Heating, Ventilation and Air Conditioning (HVAC)

E. Division 26 – Electrical

F. Division 27 / 28 – Communications / Electronic Safety and Security.

1.3 REFERENCE STANDARDS

A. ASME (BPV IX) - Boiler and Pressure Vessel Code, Section IX - Welding and Brazing Qualifications; The American Society of Mechanical Engineers.

B. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250; The American Society of Mechanical Engineers.

C. ASME B16.3 - Malleable Iron Threaded Fittings; The American Society of Mechanical Engineers.

D. ASME B16.4 - Gray Iron Threaded Fittings; The American Society of Mechanical Engineers.

E. ASME B16.9 - Factory-made Wrought Steel Buttwelding Fittings; The American Society of Mechanical Engineers.

F. ASTM A 47/ A 47M - Standard Specification for Ferritic Malleable Iron Castings.

G. ASTM A 53/ A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

H. ASTM A 795/ A 795M - Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.

I. AWWA C110/ A21.10 - American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (75 mm Through 1200 mm), for Water and Other Liquids; American Water Works Association.

J. AWWA C111/ A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; American Water Works Association (ANSI/ AWWA C111/ A21.11).

K. AWWA C151/ A21.51 - Ductile-Iron Pipe, Centrifugally Cast, for Water; American Water Works Association (ANSI/ AWWA C151/ A21.51).

L. NFPA 13 - Standard for the Installation of Sprinkler Systems; National Fire Protection Association; 2022.

M. NFPA 14 - Standpipe and Hose Systems.

N. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories, Inc.; current edition.

O. UL 262 - Gate Valves for Fire-Protection Service; Underwriters Laboratories, Inc.; Current Edition, Including All Revisions.

P. UL 312 - Check Valves for Fire-Protection Service; Underwriters Laboratories, Inc.; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Provide manufacturers catalogue information. Indicate valve data and ratings.

C. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, seismic restraints and calculations, and piping connections.
   1. Examine Contract Documents prior to bidding of Work and report discrepancies in writing to Architect.
   2. Drawings showing location of equipment and materials are diagrammatic and job conditions will not always permit installation in location shown. The fire protection Drawings show general arrangement of equipment and materials, etc., and shall be followed as closely as existing conditions, actual building construction, and work of other trades permit.
   3. Architectural and structural Drawings are part of the Work. These Drawings furnish Contractor with information relating to design and construction of the Project. Architectural Drawings take precedence over fire protection Drawings.
   4. Investigate structural and finish conditions affecting the Work and arrange Work accordingly. Provide offsets, fittings, and accessories required to meet conditions. Inform Architect immediately when job conditions do not permit installation of equipment and materials in locations shown. Obtain Architects' approval prior to relocation of equipment and materials.
   5. Relocate equipment and materials installed without prior approval of Architect. Remove and relocate equipment and materials at Contactors' expense upon Architects' direction.
   6. Minor changes in locations of equipment, piping, ducts, etc., from locations shown shall be made when directed by the Architect at no additional cost to the Owner providing such change is ordered before such items of work or work directly connected to same are installed and providing no additional material is required.

D. Project Record Documents: Record actual locations of components and tag numbering.

E. Operation and Maintenance Data: Include installation instructions and spare parts lists.

F. Section 01 91 13 – General Commissioning Requirements

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Fabrication shop must provide welding certifications and copy of weld stamp. Weld stamp to be provided on all pipe at welds.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years' experience.

D. Conform to UL and FM requirements.

E. Valves: Bear UL and FM label or marking. Provide manufacturer's name and pressure rating marked on valve body.

F. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store valves in shipping containers, with labeling in place.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

PART 2 PRODUCTS

2.1 FIRE PROTECTION SYSTEMS

A. Sprinkler Systems: Conform work to NFPA 13 and DSA requirements.

B. Welding Materials and Procedures: Conform to ASME Code.

2.2 ABOVE GROUND PIPING

A. Steel Pipe: ASTM A 795 Schedule 10 or ASTM A 53 Schedule 40, black, or as approved by DSA:
   1. Steel Fittings: ASME B16.9, wrought steel, buttwelded.
      a. Schedule 10 Pipe: Shall be U.L. approved with U.L. approved grooved fittings and couplings for pipe sizes 2-1/2" and larger only. Schedule 10 pipe shall not be used for pipe sizes less than 2-1/2". Threaded fittings shall not be used for any Schedule 10 pipe.
   2. Cast Iron Fittings: ASME B16.1, flanges, and flanged fittings and ASME B16.4, threaded fittings.
   3. Malleable Iron Fittings: ASME B16.3, threaded fittings, and ASTM A 47/ A 47M.
   4. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.

5. Mechanical formed fittings, including, but not limited to, tees, saddle fittings, bushings and mechanical sprinkler head fittings shall not be used.

B. Cast Iron Pipe: AWWA C151/ A21.51.
   1. Fittings: AWWA C110/ A21.10, standard thickness.
   2. Joints: AWWA C111, rubber gasket.
   3. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped composition sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.

2.3 PIPE HANGERS AND SUPPORTS

A. Hangers for Pipe Sizes 1/2 inch and Over: Carbon steel, adjustable, split ring, galvanized.

B. Vertical Support: Steel riser clamp.

C. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

2.4 GATE VALVES

A. Up to and including 2 inches:
   1. Bronze body, bronze trim, rising stem, handwheel, solid wedge or disc, threaded ends.

B. Over 2 inches:
   1. Iron body, bronze trim, rising stem pre-grooved for mounting tamper switch, handwheel, OS&Y, solid bronze or cast iron wedge, flanged ends.

C. Over 4 inches:
   1. Iron body, bronze trim, non-rising stem with bolted bonnet, solid bronze wedge, flanged ends, iron body indicator post assembly.

2.5 GLOBE OR ANGLE VALVES

A. Up to and including 2 inches:
   1. Bronze body, bronze trim, rising stem and handwheel, inside screw, renewable rubber disc, threaded ends, with backseating capacity repackable under pressure.

B. Over 2 inches:
   1. Iron body, bronze trim, rising stem, handwheel, OS&Y, plug-type disc, flanged ends, renewable seat, and disc.

2.6 BALL VALVES

A. Up to and including 2 inches:
   1. Bronze two piece body, brass, chrome plated bronze, or stainless steel ball, teflon seats and stuffing box ring, lever handle and balancing stops, threaded ends with union.

2.7 BUTTERFLY VALVES

A. Cast or Ductile Iron Body:
   1. Cast or ductile iron, chrome or nickel plated ductile iron or aluminum bronze disc, resilient replaceable EPDM seat, wafer, lug, or grooved ends, extended neck, handwheel and gear drive and integral indicating device, and internal tamper switch

rated 10 amp at 115 volt AC.

2.8 CHECK VALVES

A. Up to and including 2 inches:
   1. Bronze body and swing disc, rubber seat, threaded ends.

B. Over 2 inches and less than 4 inches:
   1. Iron body, bronze trim, swing check with rubber disc, renewable disc and seat, flanged ends with automatic ball check.

C. 4 inches and Over:
   1. Iron body, bronze disc, stainless steel spring, resilient seal, threaded, wafer, or flanged ends.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and foreign material, from inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

A. Install sprinkler system and service main piping, hangers, and supports in accordance with NFPA 13.

B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.

C. Install piping to conserve building space, to not interfere with use of space and other work.

D. Group piping whenever practical at common elevations.

E. Sleeve pipes passing through partitions, walls, and floors.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Pipe Hangers and Supports:
   1. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   2. Place hangers within 12 inches of each horizontal elbow.
   3. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   4. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.

H. Slope piping and arrange systems to drain at low points.

I. Prepare pipe, fittings, supports, and accessories for finish painting.

J. Do not penetrate building structural members unless indicated.

K. Provide sleeves when penetrating footings, floors, and walls. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required.

L. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

M. Install valves with stems upright or horizontal, not inverted. Remove protective coatings prior to installation.

N. Provide gate valves for shut-off or isolating service.

O. Provide drain valves at main shut-off valves, low points of piping and apparatus.

END OF SECTION

SECTION 21 00 02

IDENTIFICATION FOR FIRE SUPPRESSION PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Nameplates.

B. Tags.

C. Pipe Markers.

1.2 RELATED REQUIREMENTS

A. The Drawings and General Provisions of the Contract, including the General Conditions, Special Conditions and Division 01 General Requirements apply to this section.

B. Section 09 90 00 – Painting and Coating.

1.3 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems; The American Society of Mechanical Engineers.

1.4 SUBMITTALS

A. See Section 01 33 00 – Submittals Procedures.

B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.

C. Product Data: Provide manufacturers catalog literature for each product required.

D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

E. Project Record Documents: Record actual locations of tagged valves.

F. Section 01 91 13 – General Commissioning Requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Brady Corporation: www.bradycorp.com.

B. Champion America, Inc.: www.Champion-America.com.

C. Seton Identification Products: www.seton.com/aec.

2.2 NAMEPLATES

A. Description: Laminated three-layer plastic with engraved letters.
   1. Letter Color: White.
   2. Letter Height: Equipment, control panels, 1 inch.
   3. Letter Height: Controls and small components, 1/4 inch.
   4. Background Color: Black.

2.3 TAGS

A. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

2.4 PIPE MARKERS

A. Color: Conform to ASME A13.1.

B. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings. Secure to pipe using two (2) bands of adhesive tape with flow arrows supplied by the manufacturer. Install securing bands completely around pipe and overlapped.

D. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic pipe markers in accordance with manufacturer's instructions.

D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

E. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.

F. Identify valves in main and branch piping with tags.

G. Identify piping, concealed or exposed, with plastic pipe markers or plastic tape pipe markers. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION 21 00 02

SECTION 22 00 00

GENERAL PLUMBING PROVISIONS

PART 1 GENERAL

1.1 GENERAL CONDITIONS

A. The foregoing General and Special Conditions shall form a part of this Division with the same force and effect as though repeated herein. The provisions of this Section shall apply to all the Sections of Division 22.

1.2 CODES AND REGULATIONS

A. All work and materials shall be in full accordance with current rules and regulations of applicable codes and all California Amendments. Nothing in these drawings or specifications is to be construed to permit work not conforming to these codes. Should the drawings or specifications call for material or methods of construction of a higher quality or standard than required by these codes, the specifications shall govern. Applicable codes and regulations are:

1. California Code of Regulations – CCR:
   a. Title 8, Industrial Relations.
   b. Title 24, Building Standards.
2. California Building Code – CBC.
3. California Mechanical Code – CMC.
4. California Plumbing Code – CPC.
5. California Fire Code – CFC.
6. California Green Building Code.
7. American Gas Association – AGA.
8. American National Standards Institute – ANSI.
9. American Society of Heating, Refrigerating and Air Conditioning Engineers – ASHRAE.
10. American Society of Mechanical Engineers – ASME.
11. American Society for Testing and Materials – ASTM.
12. American Water Works Association – AWWA.
13. Cast Iron Soil Pipe Institute – CISPI.
14. California Electrical Code – CEC.
15. National Electrical Manufacturers Association – NEMA.
16. National Fire Protection Association – NFPA.
17. National Sanitation Foundation – NSF.
18. Plumbing and Drainage Institute – PDI.
19. Sheet Metal and Air Conditioning Contractors National Association – SMACNA.
20. Underwriters' Laboratory – UL.
21. Occupational Safety and Health Act - OSHA.
22. California Assembly Bill 1953 (AB1953).
23. ASCE 7-16, Chapter 13.

1.3 PERMITS AND FEES

A. The Contractor shall take out all permits and arrange for all tests in connection with his work as required by local ordinances. All charges are to be included in the work. Permits for equipment connected to a particular system are to be considered as a part of the work included under each system; for example, permits for electric motor connection are part of electrical work, permits for domestic water or gas connections are part of plumbing work. All charges for service connections, meters, etc. by utility companies or districts shall be

included in the work.

1.4 COORDINATION OF WORK

A. Layout of materials, equipment and systems is generally diagrammatic unless specifically dimensioned. The actual locations of all materials, piping, fixtures, equipment, supports, etc. shall be carefully planned, prior to installation of any work, to avoid all interferences with each other, or with structural, electrical or architectural elements. Verify the proper voltage and phase of all equipment with the electrical plans. All conflicts shall be called to the attention of the Engineer prior to the installation of any work or the ordering of any equipment.

1.5 GUARANTEE

A. Guarantee shall be in accordance with the General Conditions. These specifications may extend the period of the guarantee for certain items. Where such extensions are called for, or where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the Certificate of Guarantee shall be furnished to the Owner through the Engineer.

1.6 EXAMINATION OF SITE

A. The Contractor shall examine the site, compare it with plans and specifications, and shall have satisfied himself as to the conditions under which the work is to be performed. No allowance shall subsequently be made in his behalf for any extra expense to which he may be put due to failure or neglect on his part to make such an examination.

1.7 SUBMITTALS

A. Submit shop drawings in accordance with Division 01.

B. Shop Drawings: Within 30 days of contract award, the Contractor shall submit six copies of shop drawings for all materials, equipment, etc. proposed for use on this project. Material and equipment shall not be ordered or installed until written review is processed by the Engineer. Any item omitted from the submittal shall be provided as specified without substitution. All shop drawings must comply with the following:

1. Shop drawings are required for all material and equipment items and shall include manufacturer's name and catalog numbers, dimensions, capacities, performance curves, and all other characteristics and accessories as listed in the specifications or on the drawings. Descriptive literature shall be current factory brochures and submittal sheets. Capacities shall be certified by the factory.
2. All shop drawings shall be submitted at one time in a neat and orderly fashion in a suitable binder with title sheet including Project, Engineer and Contractor; Table of Contents; and indexed tabs dividing each group of materials or item of equipment. All items shall be marked with the specification paragraph number for which they are proposed. All equipment shall also be identified by the mark number as indicated on the drawings.
3. All capacities, characteristics, and accessories called for in the specifications or on the drawings shall be highlighted, circled, or underlined on the shop drawings. Calculations and other detailed data indicating how the item was selected shall be included for items that are not scheduled. Data must be complete enough to permit detailed comparison of every significant characteristic which is specified, scheduled, or detailed.

C. Substitutions: Manufacturers and model numbers listed in the specifications or on the

drawings represent the standard of quality and the features desired. Unless otherwise noted, alternate manufacturers may be submitted for review by the Engineer. Calculations and other detailed data indicating how the item was selected shall be included. The Contractor shall assume full responsibility that substituted items or procedures will meet the specifications and job requirements and shall be responsible for the cost of redesign and modifications to the work caused by these items.

D. Review: Submittals will be reviewed for general conformance with the design concept, but this review does not guarantee quantity shown, nor does it supersede the responsibility of the Contractor to provide all materials, equipment, and installation in accordance with the drawings and specifications. The Contractor shall agree that shop drawing submittals processed by the Engineer are not Change Orders; that the purpose of shop drawing submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept; that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use. The Contractor shall agree that if deviations, discrepancies or conflicts between shop drawings and design drawings and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed.

1.8 OPERATION AND MAINTENANCE INSTRUCTIONS

A. Submit one electronic pdf copy for review and after approved submit three hard copies of the Operation and Maintenance Instructions and Wiring Diagrams for all equipment and parts lists for all equipment, etc. shall be submitted to the Engineer. All instructions shall be clearly identified by marking them with the same designation as the equipment item to which they apply (e.g. WH-1). All wiring diagrams shall agree with revised shop drawings and indicate the exact field installation. All instructions shall be submitted at the same time and shall be bound in a suitable binder with tabs dividing each type of equipment (e.g. Water Heaters, Pumps, Motors, etc.). Each binder shall be labeled indicating "Operating and Maintenance Instructions, Project Title, Contractor, Date" and shall have a Table of Contents listing all items included. **(These submittals shall be submitted with regular submittals at start of job so Commissioning Contractor can start on the commissioning check list for Title 24 Requirements)**

B. Verbal: The Contractor shall verbally instruct the Owner's maintenance staff in the operation and maintenance of all equipment and systems. The controls contractor shall present that portion of the instruction that applies to the control system. The Engineer's office shall be notified 96 hours prior to this meeting.

C. Acknowledgment: The Contractor shall prepare a letter indicating that all operation and maintenance instructions (printed, verbal and posted) have been given to the Owner, to the Owner's satisfaction. This letter shall be acknowledged (signed) by the Owner and submitted to the Engineer.

1.9 RECORD DRAWINGS

A. The Contractor shall maintain a set of prints for the project as a record of all construction changes made. As the Work progresses, the Contractor shall maintain a record of all deviations in the Work from that indicated on the drawings. Final location of all underground work shall be recorded by depth from finished grade and by offset distance from permanent surface structures, i.e. buildings, curbs and walks. In addition, the water, gas, sewer, etc. within the building shall be recorded by offset distances from building walls. The original drawings will be made available to the Contractor from which he shall have a set of reproducible drawings made. The Contractor shall then transfer the changes, notations, etc. from the marked-up prints to the reproducible drawings. The record drawings (marked-up

prints and reproducibles) shall be submitted to the Engineer for review (as an alternative, the marked-up prints may be photocopied full size on reproducible stock).

PART 2 PRODUCTS

2.1 PROTECTIVE COATING FOR UNDERGROUND PIPING

A. All ferrous pipe below grade (except cast iron) shall have a factory applied protective coating of extruded high density polyethylene, 35 to 70 mils total thickness, X-Tru Coat, Scotchkote. All fittings and areas of damaged coating shall be covered with two layer double wrap of 10 mil polyvinyl tape to total thickness of 40 mils. Manville Corporation. Protective coating shall be extended 6" above surrounding grade.

2.2 CONCRETE ANCHORS

A. Concrete Anchors shall comply with CBC 1901A.3. Steel stud with expansion anchor requiring a drilled hole; powder driven anchors are not acceptable. Minimum concrete embedment shall be 4-1/2 diameters. Minimum spacing shall be 10 diameters center-to-center and 5 diameters from center to edge of concrete. Maximum allowable stresses for tension and shear shall be 80% of the test report values "with special inspection". Anchors shall be Hilti, Philips - or Approved equal.

2.3 SEISMIC RESTRAINTS

A. All plumbing systems (all equipment, piping, etc.) shall be provided with seismic restraints in accordance with "Seismic Restraint Systems Guidelines" OPM-0052-13 by Eaton/ Tolco.

2.4 SYSTEM IDENTIFICATION

A. Above Grade Piping: Provide markers on piping which is either exposed or concealed in accessible spaces. For piping systems, other than drain and vent lines, indicate the fluid conveyed or its abbreviation, either by preprinted markers or stenciled marking, and include arrows to show the direction of flow. Comply with ANSI A13.1 for colors. Locate markers at ends of lines, near major branches and other interruptions including equipment in the line, where lines pass through floor, walls or ceilings or otherwise pass into inaccessible spaces, and at 50' maximum intervals along exposed portion of lines. Marking of short branches and repetitive branches for equipment connections is not required.

B. Equipment: All equipment shall be identified with a plastic laminated, engraved nameplate which bears the unit mark number as indicated on the drawings (e.g. WH-1). Provide 1/2" high lettering, white on black background. Nameplates shall be permanently secured to the unit.

C. Valves: Provide valve tags on all valves of each piping system, excluding check valves, valves within equipment, faucets, stops and shut-off valves at fixtures and other repetitive terminal units. Provide brass tags or plastic laminate tags. Prepare and submit a tagged valve schedule, listing each valve by tag number, location, and piping service. Mount in glazed frame where directed.

2.5 EQUIPMENT SUPPORT FRAMES

A. Unless specifically noted otherwise, it shall be the responsibility of Plumbing Contractor to furnish and install all support frames for its equipment.

PART 3 EXECUTION

3.1 SCHEDULING OF WORK

A. All work shall be scheduled subject to the approval of the Engineer and Owner. No work shall interfere with the operation of the existing facilities on or adjacent to the site.

3.2 CONDUCT OF WORK

A. The Contractor shall have at all times, as conditions permit, a sufficient force of workmen and quantity of materials to install the work contracted for as rapidly as possible consistent with good work and shall cause no delay to other Divisions engaged upon this project or to the Owner.

B. Plumbing Contractor shall arrange for all cutting necessary for the proper installation of its work, providing all sleeves and chases necessary. Cutting shall not be done in such a manner to impair the strength of the structure. Any damage resulting from work shall be repaired by the Contractor at his expense to the satisfaction of the Engineer.

C. Progressively, daily at the completion of each day's work, and at completion of the job, the Contractor shall thoroughly clean all of his work, removing all debris, stain and marks resulting from his work.

3.3 EXCAVATION AND BACKFILL

A. Excavation: Trenches are to be excavated to grade and depth established by drawings. Unless otherwise noted, minimum earth cover above top of pipe shall be 24", not including base and paving in paved areas. Width of trenches at top of pipe shall be a minimum of 16" plus the outside diameter of the pipe. Provide all shoring required by site conditions. Barrel of pipe shall have uniform support on trench bottom, hand excavate additional depth at bells, hubs, and fittings. Where over-excavation occurs, provide compacted selected backfill to pipe bottom. Where ground water is encountered, remove to keep excavation dry, using well points and pumps as required.

B. Backfill:
1. Around Pipe and to One Foot Above Pipe: Material shall be river run sand or native granular free flowing material, free of clay lumps, silt or vegetable matter and shall have 100% passing through the No. 4 sieve and a maximum of 3% passing through the No. 200 sieve. Place carefully around and on top of pipe, taking care not to disturb piping. Consolidate with vibrator.
2. One Foot Above Pipe to Grade: Material to be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed, to proper moisture and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to approval by the Engineer.
3. Remove all water sensitive settlement from trench backfill regardless of location and compaction requirements.

C. Compaction: Compact to a density of 95% within building and 90% outside building. Demonstrate proper compaction by testing at one-half of the trench depth. Perform three tests per 100' of trench.

3.4 OPENINGS, CUTTING AND PATCHING

A. The locations and dimensions for openings through walls, floors, ceilings, foundations,

footings, etc. required to accomplish the work under this Specification Division shall be provided under this Division. The actual openings and the required cutting and patching shall be provided. Coring through existing concrete or masonry walls, floors, ceilings, foundations, footings, etc., and saw cutting of concrete floors or asphaltic concrete required to accomplish the work under this Specification Division shall be provided under this Division. Patching of these surfaces shall also be provided. Cutting and coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor's expense to the satisfaction of the Engineer.

3.5 MANUFACTURER'S RECOMMENDATIONS

A. All material, equipment, devices, etc., shall be installed in accordance with the recommendations of the manufacturer of a particular item. The Contractor shall be responsible for all installations contrary to the manufacturer's recommendations. The Contractor shall make all necessary changes and revisions to achieve such compliance. Manufacturer's installation instructions shall be delivered to and maintained at the job site through the construction of the project.

3.6 QUIETNESS

A. Piping and equipment shall be arranged and supported so that vibration is a minimum and is not carried to the building structure or spaces.

3.7 DAMAGES BY LEAKS

A. The Contractor shall be responsible for damages to other work caused by leaks in the temporary or permanent piping systems prior to completion of work and during the period of the guarantee, and for damages to other work caused by disconnected pipes or fittings, and the overflow of equipment prior to completion of the work.

3.8 CLEANING

A. Progressively and at completion of the job, the Contractor shall thoroughly clean all of his work, removing all debris, stain and marks resulting from his work.

END OF SECTION

SECTION 22 00 01

PLUMBING

PART 1 GENERAL

1.1 GENERAL CONDITIONS

A. The foregoing Section 22 00 00, General Plumbing Provisions shall form a part of this specification.

1.2 SCOPE

A. Included: Perform all work necessary and required to complete construction as indicated. Such work includes the furnishings of all labor, materials, and services necessary for a complete, lawful, and operating plumbing system with all equipment as shown or noted on the drawings or as specified herein. The work includes, but is not necessarily limited to, the following:
   1. Sanitary sewer system.
   2. Domestic water system.
   3. Plumbing fixtures.
   4. Plumbing equipment.
   5. Condensate drains.
   6. Storm drain system.
   7. Gas piping.

B. Work Specified Elsewhere:
   1. Line voltage power wiring (60 volts or greater), motor starters in motor control centers, and disconnect switches are included in the Electrical Division, unless otherwise noted.
   2. Access doors.
   3. Concrete and reinforcing steel.
   4. 23 00 01, Heating, Ventilating and Air Conditioning.

1.3 CODES AND STANDARDS

A. All pipe, pipe or plumbing fittings or fixture, solder, or flux shall be lead free that provides water for human consumption per California Assembly Bill 1953 (AB1953).

B. See Section 22 00 00 for additional requirements.

1.4 SUBMITTALS

A. Provide product data for all materials per Division 01.

PART 2 MATERIALS

2.1 PIPING MATERIALS

A. Sanitary Sewer:
   1. Soil, Waste and Vent Piping:
      a. Inside Building and Within Five Feet of Building Walls: Standard weight coated cast iron pipe and fittings. Plain end with neoprene gasket and stainless steel retaining sleeve, CISPI 301, ASTM A888 hubless cast-iron, or hub end with rubber gasket,

ASTM A74, ASTM C564. Size 2" and smaller above grade may be standard weight galvanized steel, ASTM A53, with coated cast iron recessed drainage fittings, ANSI B16.12. All cast iron pipe and couplings shall be American made and tested, no imported pipe or coupling is acceptable. Use heavy-duty (4-Band) couplings for all soil and waste piping. Use standard (2-Band) couplings for all vent piping. Tyler Pipe, AB & I Foundry or Charlotte Pipe. Couplings shall be Tyler, Anaco or Husky.

2. Cleanouts: Floor cleanouts: Smith 4020 with nickel bronze top in finished areas; Smith 4220 in utility areas. Wall cleanouts: Smith 4530 with stainless steel cover and screw. Comparable models of Josam, Wade, Zurn or equal.
3. Cleanout Box: Precast reinforced concrete. Cast iron lid marked for service. Christy or equal; F22 in foot traffic area; G5 in roadways.

B. Water:
   1. Hot and Cold Water:
      a. Inside Building: Type L hard temper seamless copper, ASTM B88. Wrought copper fittings ANSI B16.22. Vacuum pipe shall have long sweeping elbow fittings. 95/5 tin-silver soldered joints. Brazesafe, Silcan or equal brazing material.

C. Condensate Drain Piping: Same as cold water piping.

D. Valves and Specialties:
   1. Valves:
      a. General: Manufacturer's model numbers are listed to complete description. Milwaukee, Kitz, Apollo, Nibco, Stockham or equal. All valves shall be full size of upstream piping. **Ball valves shall be substituted for gate valves 2" and smaller. Butterfly valves shall be substituted for gate valves 2-1/2" and larger. C_V factors for ball valves shall not be less than equal size gate valves.**
      b. Check Valve: 2" and smaller: All bronze swing check, regrinding. 200 psi WOG. Milwaukee No. 509, 1509 or equal. 2-1/2" and larger: Non-slam type, 125 psi iron body wafer type with renewable seats and stainless steel spring. Milwaukee 1400 series or equal.
      c. Ball Valves: Two or three piece construction, forged bronze body, chrome plated brass ball, threaded ends, teflon seats, PTFE or reinforced teflon stem seals, lever handle. Underground valves shall have "T" handle. Provide one operating "T" extension handle for all underground valves. Milwaukee BA100/150, BA300/350, Nibco or equal.
      d. Valve Box: Precast reinforced concrete. Cast iron lid marked for service. Christy or equal; F22 in foot traffic areas: G5 in roadways.
   2. Miscellaneous Specialties:
      a. Temperature and Pressure Relief Valve: ASME rated fully automatic, reseating combination temperature and pressure relief valve sized in accordance with energy input. Sensing element immersed within upper 6" of tank. Watts.
      b. Union: 2" and Smaller: AAR malleable iron, bronze to iron ground seat. 300 psi.
      c. Dielectric Coupling: Insulating coupling rated for 250 psig. EPCO or equal.
      d. Shock Absorbers: Sioux Chief "Hydra-Rester", Zurn "Shoktrol", PPP "SC Series" or equal.

E. Miscellaneous Piping Items:
   1. Pipe Support:
      a. Pipe Hanger: Adjustable split ring, swivel hanger and rod. Black malleable iron. Size and maximum load per manufacturer's recommendation. Felt lined, B-Line B3690F, Unistrut or equal.
      b. Construction Channel: 12 gage 1-5/8" x 1-5/8" steel channel. Single or multiple section. Self-locking nuts and fittings. B-Line, Unistrut, Superstrut or equal.

2. Pipe Sleeves: 24 gage galvanized steel. Adjus-to-Crete #10 with #99 thimble for floors. #100 for walls.
3. Flashing: Vent flashing and flashing for piping through roof shall be prefabricated 24 gauge galvanized steel roof jacks with 8" square flange around pipe sealed with weatherproofing mastic.

2.2 PIPING INSULATION MATERIALS

A. General: All piping insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.

B. Pipe Insulation: Elastomeric type, ASTM C534, with a thermal conductivity of 0.27 at 75°F when measured in accordance with ASTM C177 or ASTM C518.
1. Wall thickness: 3/4 in.
2. Adhesive: Conform to Manufacturer's recommendations.

C. Pre-molded Fiberglass: Heavy density sectional pre-molded fiberglass with vapor barrier laminated all-service jacket and pressure sealing vapor barrier lap. Thermal conductivity shall not exceed 0.25 Btu-in/hr-sq. ft-degrees F, at a mean temperature of 50 degrees F. Perm rating 0.02, ASTM E96. Puncture rating 50 Beach units, ASTM D781. Provide 3" (min.) wide tape of same material as lap for butt joints. For hot water piping, thickness shall be 1" for pipe sizes less than 2", 1-1/2" thickness for pipe sizes 2" and larger. CSG Insulation Corp., Manville, Owens-Corning or equal.

D. Fiberglass Blanket: Unfaced. Thermal conductivity shall not exceed 0.25 Btu-in/hr sq. ft-degrees F, at a mean temperature of 50 degrees F. 1-1/2" thickness. Manville, Owens-Corning or equal.

E. PVC Jacket (for exposed pipes and fittings): Pre-molded polyvinyl chloride (PVC) jackets. Size to match application. Provide PVC vapor barrier, pressure-sealing tape by same manufacturer. Zeston or equal.

2.3 FIXTURES

A. General: This Division shall rough-in for and install all plumbing fixtures shown on drawings. All trim not concealed shall be brass with polished chromium plate finish unless otherwise noted. All enameled fixtures shall be acid resisting. Standard color is white unless otherwise noted.

B. Schedule: Refer to Plumbing Fixture Schedule on the drawings for list of fixtures. Manufacturer's model numbers are listed to complete description. Water consumption quantities listed on schedule are maximum. Equivalent models of American Standard, Crane, Haws, Kohler, Eljer, Zurn or equal. For drainage fixtures, equivalent models of Josam, Smith, Wade, Zurn or equal.

C. Stops and P-traps: All fixtures shall be provided with stops and p-traps as applicable.
1. Stops: All hot and cold water supplies shall be 1/2" angle stops with IPS inlets and compression outlets, stuffing box, screwdriver lock shield, and 1/2" flexible brass tubing riser. Speedway. Wall mounted trim shall have concealed loose key wall stop. Chicago 1771 or equal.
2. P-traps: Brass, ground joint. 17 gage. American Standard, California Tubuler or equal.
   a. Trap primers shall be provided with ball valve and cylinder key-lock access panel for all floor drains and floor sinks. PPP, Inc. or equal.

2.4 EQUIPMENT

A. General Requirements:
   1. General: These equipment specifications are to supplement the drawings. Refer to schedules on drawings for the specific equipment to be provided. Capacities shall be in accordance with the schedules shown on the drawings. Capacities are to be considered minimum.
   2. Dimensions: Equipment must conform to space requirements and limitations as indicated on the drawings and as required for operation and maintenance. Equipment will not be accepted that does not readily conform to space conditions.
   3. Ratings: Electrical equipment shall be in accordance with NEMA Standards and UL listed where applicable standards have been established.
   4. Basis of Design: Manufacturers and model numbers listed in schedules as the basis of design are intended to represent the standard of quality and the features desired.
   5. Piping: Each item or assembly of items shall be furnished completely piped for connection to services. Control valves and devices shall be provided. Equipment requiring domestic water for non-potable use shall be provided with backflow preventer acceptable for intended use by local governing authorities.
   6. Electrical:
      b. General: Each item or assembly of items shall be furnished completely wired to individual terminal blocks for connection to single branch electrical circuit. All electrical accessories and controls required by equipment shall be furnished. Provide terminal blocks for controls not included in equipment package. Manual and magnetic starters shall have ambient compensating running over-current protection in all ungrounded conductors. Magnetic starters shall be manual reset. Controllers and other devices shall be in NEMA 3 or 12 enclosures as applicable.
      c. Wiring: Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each ungrounded conductor, all accessible on operating side of equipment. Switches, contacts, and other devices shall be in ungrounded conductors.
      d. Motors: Shall be rated, constructed, and applied in accordance with NEMA and ANSI Standards without using service factor. Single-phase motor shall be of type to suit application. Three-phase motors shall be open drip-proof, NEMA B design on pumps and fans, NEMA C on reciprocating equipment, sealed ball bearing, three-phase induction. Design shall limit starting inrush current and running current to values shown on drawings.
      e. Starters: Motor starters shall be provided for all equipment except where starter is in a motor control center as designated on the electrical drawings.
      f. Control Voltage: Equipment connected to greater than 240 volts shall be provided with 120 volt transformer if separate source is not indicated on plans. 240 volt control is acceptable if confined within control panel.
      g. Submittals: Included in shop drawings shall be internal wiring diagrams and manufacturer's recommended external wiring.

B. Electric Drinking Fountain: Wall hung, Dual height with Bottle Filler. Provide steel mounting brackets. Stainless steel basin. Removable grid drain. Chrome plated brass bubbler with automatic flow regulator and self-closing valve. Nonferrous evaporator. Hermetic compressor with automatic reset overload protection. Air cooled condenser. Adjustable thermostat. UL listed. ARI certified. Oasis, Sunroc.

C. Water Heater, Instantaneous Gas: 150 psi working pressure. Automatic temperature control. High limit control. Direct vent sealed combustion with category III stainless steel venting. Coated copper heat exchanger. Provide with remote control panel. AGA and CEC approved. Extended warranty period of 5 years minimum. Nortiz, Rheem, Takagi or equal.

D. Water Heater, Electric: Glass lined tank. 150 psi working pressure. Fully insulated. Automatic temperature control. High limit control. Provide ASME rated temperature and pressure relief valve sized in accordance with energy input, dielectric couplings and drain cock. UL listed and CEC approved. Extended warranty for a period of 3 years minimum. State, A.O. Smith, National, Rheem or equal.

E. Circulation Pump: Bronze pump with stainless steel or non-metallic impeller. Shaft shall be stainless steel or ceramic with carbon bearings with EPDM O-ring and gaskets. Replaceable cartridge type circulators shall have stainless steel cartridge. Connections shall be sweat, threaded, or flanged. Taco, Bell & Gossett, Grundfos, Armstrong or equal.

PART 3 EXECUTION

3.1 PIPING INSTALLATION

A. General:
1. Piping Layout: Piping shall be concealed in walls, above ceilings, or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location to be approved by Owner's Representative. No structural member shall be cut, notched, bored, or otherwise altered unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. All piping shall be installed in a manner to ensure unrestricted flow, eliminate air pockets, prevent any unusual noise, and permit complete drainage of the system. All piping shall be installed to permit expansion and contraction without strain on piping or equipment. Expansion joints shall be installed as required. Vertical lines shall be installed to allow for building settlement without damage to piping. All exposed piping to be primed and painted, see painting section.
2. Joints:
   a. Threaded: Pipe shall be cut square and reamed to full size. Threads shall be in accordance with ANSI B2.1. Joint compound or tape suitable for conveyed fluid shall be applied to male thread only. Joints shall be made with three threads exposed.
   b. Welded or Brazed: Filler rod shall be of the same suitable alloy as pipe. Welding or brazing shall be performed in accordance with requirements of recognized published standards of practice and by licensed or otherwise certified contractors. Welder or Brazer shall be a person who specialized in welding or brazing of pipes and holds a recognized certificate of competency from a recognized testing laboratory, based on the requirements of the ASME Boiler and Pressure Vessels Code, Section 9.
   c. Other: Joints other than threaded or welded shall be installed in accordance with manufacturer's recommendations.
   d. Open Ends: Open ends of piping shall be capped during progress of work to preclude foreign matter.
   e. Electrical Equipment: Joints shall be avoided, where possible, over electrical equipment.
   f. Copper pipe 1-1/2" or less may be soldered. Above 1-1/2" and all below grade shall be brazed.
3. Fittings:
   a. Standard Fittings: All joints and changes in direction shall be made with standard fittings. Close nipples shall not be used.
   b. Reducers: Pipe size reduction shall be made with bell reducer fittings. Bushings shall not be used.
   c. Unions: A union shall be installed on the leaving side of each valve, at equipment connections, and elsewhere as necessary for assembly or disassembly of piping.
   d. Valves: All valves shall be full line size. At equipment connections, valves shall be

full size of upstream piping.

4. Pipe Support:
   a. General: Hangers shall be placed to support piping without strain on joints or fittings. Maximum spacing between supports shall be as specified below. Actual spacing requirements will depend on structural system. Refer to drawings for additional requirements and attachment to structure. Vertical piping shall be supported at floor and ceiling. Support pipe within 12" of all changes in direction. Support individual pipes with pipe hanger. All pressure piping, drainage piping above grade and metallic piping of dissimilar metal from hangers shall have isolating shield, or felted hangers.
      1) Screwed Pipe:

Pipe Size Between Supports*	Max. Spacing
(in)	(ft)
½	6
¾	8
1	8
1-1/4 & larger	10

      * Based on straight lengths of pipe with couplings only. Provide additional supports for equipment, valves, or other fittings.
      2) Copper Tubing: Copper tubing shall be supported at approximately six (6) foot intervals for piping one and one-half (1-1/2) inches and smaller in diameter and ten (10) foot intervals for piping two (2) inches and larger in diameter.
      3) Gravity Drainpipe: Piping shall be supported at each length of pipe or fitting, but in no case at greater spacing than indicated above for pressure pipe.
   b. Trapeze: Trapeze hangers of construction channel and pipe clamps may be used. Submit design to Engineer for approval.
5. Excavation and Backfill: Minimum cover on all piping shall be as follows unless otherwise noted:
   a. Up to 2-1/2" pipe - 24" cover.
   b. 3" and larger pipe - 30".
6. Miscellaneous:
   a. Escutcheons: Provide chromium plated escutcheons where piping penetrates walls, ceilings, or floors in finished areas.
   b. Pipe Sleeves: All piping passing through concrete shall be provided with pipe sleeves. Allow 1" clearance between sleeve and pipe or pipe insulation.
   c. Dielectric Couplings: Dielectric couplings shall be installed wherever piping of dissimilar metals are joined.
   d. Shock Absorbers: Install per manufacturers recommendations.

B. Sanitary Sewer Piping:
1. General: Where inverts are not indicated, sanitary sewer piping shall be installed at 1/4" per foot pitch. Piping 4" and larger may be installed at 1/8" per foot pitch where structural or other limitations prevent installation at a greater pitch.
2. Cleanouts: Install cleanouts at ends of lines, at changes of direction greater than 45 degrees, and at not greater than 100 foot intervals. Locate interior cleanouts in accessible locations and bring flush to finished surface. Cleanouts at urinals shall be installed above urinal.
3. Vents: Vents shall terminate not less than 6" above the roof nor less than 12" from any vertical surface nor within 10 feet of any outside air intake. Install horizontal vent lines at 1/4" per foot pitch. Offset vents 2 feet minimum from gutters, parapets, ridges, and roof flashing.

C. Water Piping: Connections to branches shall be made from the top side of the main. Supply header in fixture battery shall be full size to last fixture, reducing in size only on individual

connections to each fixture in battery. Provide ball valve shutoff for each building and at each connection to equipment and trap primers. Shock absorbers shall be installed in a vertical position at end of branch runs as specified in this section whether specifically shown or not on drawings. Connections to equipment shall be made with flexible connectors. Non-metallic pipe shall have 18 AWG copper tracer wire laid on top of pipe and taped in place at 15-foot spacing, terminate 4" above grade at ends of pipe runs.

D. Condensate Drain Piping: Install with constant pitch to receptacle, 1/4" per foot where possible, otherwise 1/8" per foot minimum. Provide trap at each air handling unit to prevent air leakage. Connections to equipment shall be made with flexible connection unless connection is internally isolated.

3.2 PIPING INSULATION INSTALLATION

A. Domestic Tempered Water Supply:
   1. General: All domestic tempered water supply piping, except for exposed connections to fixtures, shall be insulated. Do not insulate unions or valves less than 2", unless exposed to weather.
   2. Install elastomeric pipe insulation by slipping over end of pipe. Where not feasible, slit insulation longitudinally, snap over piping and seal with adhesive. Insulate fittings with larger diameter sleeves or insulation, lapping pipe insulation a minimum of 2 in.
   3. Butt sections of insulation tightly together and seal with adhesive to provide a continuous vapor and thermal barrier.
   4. Pipe: Apply pre-molded fiberglass sections to pipe using integral pressure sealing lap adhesive in accordance with manufacturer's recommendations. Stagger longitudinal joints. Seal butt joints with factory supplied sealing tape.
   5. Fittings and Valves:
      a. Wrap fitting with pre-cut fiberglass blanket to thickness matching adjoining insulation. Cover blanket with PVC jacket in accordance with manufacturer's recommendations. Seal all joints with factory supplied pressure sealing vapor barrier tape with 2" (min.) overlap on both sides of joint. Insulate valves to stem.
      b. For miscellaneous fittings for which PVC jackets are not available or where proximity of fittings precludes a neat-appearing installation, the contractor may cover the fiberglass blanket with stretchable glass fabric and at least two coats of vapor barrier coating. All exposed ends of insulation shall be adequately sealed.

B. ADA Compliant Fixtures:
   1. At lavatories which are to be ADA Compliant the P-Trap and angle stop assemblies & water heater shall be covered with Truebro Lav-Shield, or equivalent. Abrasion resistant exterior cover shall be smooth. Fasteners shall be tamper resistant.

3.3 FIXTURE INSTALLATION

A. Fixture Height: Shall be standard height except those specified as ADA Compliant. Such fixtures shall be mounted in accordance with CBC, Section 11B, Division 6 and drawing details.

B. Wall Hung Fixtures: Shall be provided with proper backing and hanger plates secured to wall. Fixtures mounted on carriers shall bear against stop nuts, clear of wall surface. Caulk fixtures against walls with white G.E. “Sanitary SCS1700” silicone sealant. Caulking shall be smooth and flush with fixture surface (not concave).

C. Floor Drains or Floor Sinks: Shall be placed parallel to room surfaces, set level, flush with floor, and adjusted at proper height to drain and easily accessible for inspection and cleaning. Cover openings during construction to keep all foreign matter out of drain line.

D. Other Connections: Rough-in and connection for trim or fixtures supplied by others shall be included in this specification section.

E. Floor Mounted Fixtures: Shall be provided with proper support plates. Caulk fixtures against floors with white G.E. "Sanitary SCS1700" silicone sealant. Caulking shall be smooth and flush with fixture surface (not concave).

3.4 EQUIPMENT INSTALLATION

A. General: It shall be the responsibility of the equipment installer to ensure that no work done under other specification sections shall in any way block, or otherwise hinder the equipment.

B. Connections to Equipment: Where size reductions are required for connections to equipment, they shall be made immediately adjacent to the equipment and, if possible, inside the equipment cabinet.

3.5 TESTS AND ADJUSTMENTS

A. General: Unless otherwise directed, tests shall be witnessed by the Owner's Representative. Work to be concealed shall not be enclosed until prescribed tests are made. Should any work be enclosed before such tests, the Contractor shall, at his expense, uncover, test, and repair his work, and that of other contractors, to original conditions. Leaks and defects shown by tests shall be repaired and entire work retested. Tests may be made in sections. However, all connections between sections previously tested and new section shall be included in the new test. New sections shall be isolated from existing sections for testing purposes. There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made. Test the new sections or branches of piping only.

B. Gravity System:
1. Sanitary Sewer: All ends of the new sections of sewer system shall be capped and lines filled with water to the top of the highest vent, 10 feet above grade minimum. This test shall be made before any fixtures are installed. Test shall be maintained until all joints have been inspected, but no less than 2 hours.
2. Condensate Piping: Maintain 15 psig water pressure for a duration of 4 hours.

C. Pressure Systems:
1. General: There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made. Test the new sections or branches of piping only.
2. Domestic Tempered, Cold & DI Water Piping: Maintain 60 psig water pressure for a minimum duration of 2 hours.

D. Accessible Lavatories:
1. Faucet controls and operating mechanisms shall be installed and tested to comply per CBC Section 11B-606.4.

3.6 DISINFECTION

A. Disinfect all domestic hot and cold water piping systems in accordance with California Plumbing Code Sections 609.9.1 through 609.9.4. The method to be followed shall be that prescribed by the Health Authority or, in case no method is prescribed by it, the following:
1. The pipe system shall be flushed with clean, potable water until potable water appears

at the points of outlet.

2. The system or parts thereof shall be filled with a water-chlorine solution containing not less than 50 parts per million of chlorine, and the system or part thereof shall be valved-off and allowed to stand for 24 hours; or the system or part thereof shall be filled with a water-chlorine solution containing not less than 200 parts per million of chlorine and allowed to stand for 3 hours.
3. Following the allowed standing time, the system shall be flushed with clean, potable water until the chlorine residual in the water coming from the system does not exceed the chlorine residual in the flushing water.
4. The procedure shall be repeated where it is shown by bacteriological examination made by an approved agency that contamination persists in the system.

B. Disinfection process shall be performed by certified testing agency or in cooperation with health department having jurisdiction and witnessed by a representative of the Architect. During procedure, signs shall be posted at each water outlet stating, "Chlorination - Do Not Drink". After disinfection, water samples shall be collected by certified testing agency or by health department for bacteriological analysis. Certificate of Bacteriological Purity shall be obtained and delivered to the Owner through the Owner's Representative.

END OF SECTION

SECTION 22 00 02 PLUMBING

PART 1 GENERAL

1.1 GENERAL CONDITIONS

A. The foregoing Section 22 00 00, General Plumbing Provisions shall form a part of this specification.

1.2 SCOPE

A. Included: Perform all work necessary and required to complete construction as indicated. Such work includes the furnishings of all labor, materials, and services necessary for a complete, lawful, and operating plumbing system with all equipment as shown or noted on the drawings or as specified herein. The work includes, but is not necessarily limited to, the following:
   1. Domestic water system.
   2. Plumbing fixtures.
   3. Plumbing equipment.
   4. Condensate drains.
   5. Gas piping.

B. Work Specified Elsewhere:
   1. Access doors.
   2. 23 00 01, Heating, Ventilating and Air Conditioning.

1.3 CODES AND STANDARDS

A. All pipe, pipe or plumbing fittings or fixture, solder, or flux shall be lead free that provides water for human consumption per California Assembly Bill 1953 (AB1953).

B. See Section 22 00 00 for additional requirements.

1.4 SUBMITTALS

A. Provide product data for all materials per Division 01.

PART 2 MATERIALS

2.1 PIPING MATERIALS

A. Sanitary Sewer:
   1. Soil, Waste and Vent Piping:
      a. Inside Building and Within Five Feet of Building Walls: Standard weight coated cast iron pipe and fittings. Plain end with neoprene gasket and stainless steel retaining sleeve, CISPI 301, ASTM A888 hubless cast-iron, or hub end with rubber gasket, ASTM A74, ASTM C564. Size 2" and smaller above grade may be standard weight galvanized steel, ASTM A53, with coated cast iron recessed drainage fittings, ANSI B16.12. All cast iron pipe and couplings shall be American made and tested, no imported pipe or coupling is acceptable. Use heavy-duty (4-Band) couplings for all soil and waste piping. Use standard (2-Band) couplings for all vent piping. Tyler Pipe, AB & I Foundry or Charlotte Pipe. Couplings shall be Tyler, Anaco or Husky.

2. Cleanouts: Floor cleanouts: Smith 4020 with nickel bronze top in finished areas; Smith 4220 in utility areas. Wall cleanouts: Smith 4530 with stainless steel cover and screw. Comparable models of Josam, Wade, Zurn or equal.
3. Cleanout Box: Precast reinforced concrete. Cast iron lid marked for service. Christy or equal; F22 in foot traffic area; G5 in roadways.

B. Water, Vacuum, Air and Gas:
1. Hot and Cold Water, Vacuum & Air Piping:
   a. Inside Building: Type L hard temper seamless copper, ASTM B88. Wrought copper fittings ANSI B16.22. Vacuum pipe shall have long sweeping elbow fittings. 95/5 tin-silver soldered joints. Brazesafe, Silcan or equal brazing material.
   b. Outside Building Below Grade: Same as Inside Building with protective coating on ferrous pipe or Schedule 40 PVC pipe thru 2", Class 315 2" thru 4".
2. Gas Piping:
   a. Above Grade: Schedule 40 black steel pipe, ASTM A120. 150 psi black malleable iron screwed fittings, ANSI B16.3, ANSI B31.8. Galvanized pipe and fittings will not be allowed. Flexible connections shall be convoluted brass with dielectric couplings, AGA approved. Outside building flexible connections shall be convoluted stainless steel with dielectric couplings, AGA approved. Prime and paint all piping.
   b. Outside Building – Below Grade: Same as Inside Building – Above Grade, with protective coating of ferrous pipe or medium density polyethylene (MDPE) PE2708 or PE2406 pipe manufactured in accordance with ASTM D2513 and IAPMO Standards.

C. Condensate Drain Piping: Same as cold water piping.

D. Valves and Specialties:
1. Valves:
   a. General: Manufacturer's model numbers are listed to complete description. Milwaukee, Kitz, Apollo, Nibco, Stockham or equal. All valves shall be full size of upstream piping. Ball valves shall be substituted for gate valves 2" and smaller. Butterfly valves shall be substituted for gate valves 2-1/2" and larger. Cv factors for ball valves shall not be less than equal size gate valves.
   b. Gate Valve: 2" and smaller: All bronze, rising stem, union bonnet, wedge disk, 200 psi WOG. Milwaukee No. 1152. The material of the valve stem shall be limited to a maximum of six (6) percent zinc content. 2-1/2" and larger: Iron body, bronze mounted. Non-rising stem. Wedge disk. 200 psi WOG. Flanged or AWWA hub as applicable. Open/ closed indicator. Milwaukee No. F2882. Underground valves shall have square operating nut.
   c. Plug Valve: Eccentric bronze plug. Nickel chromium alloy iron body. Bronze bushings. Buna-N O-rings. UL approved for gas distribution. 175 psi WOG. DeZurick Series 400 or equal.
   d. Gas Valves: 2" and smaller, Milwaukee BB2-100; 2-1/2" and larger, Rockwell #142 or equal.
   e. Valve Box: Precast reinforced concrete. Cast iron lid marked for service. Christy or equal; F22 in foot traffic areas: G5 in roadways.
   f. Butterfly Valve: Iron Body, Aluminum bronze disk (connection to shaft shall not be by pins, screws, or bolts). Ductile body PPS coated with EPPM coated ductile disc. O-ring seals. Resilient removable seat. 416 stainless steel two piece shaft. 6" and smaller valves shall have multi-position lever handle. Underground valves shall have square operating nut. Provide one operating "T" handle for underground valves. Provide 2" extension neck at insulated pipes. Milwaukee "C" series, Kitz or equal.

2. Miscellaneous Specialties:
   a. Union: 2" and Smaller: AAR malleable iron, bronze to iron ground seat. 300 psi.
   b. Dielectric Coupling: Insulating coupling rated for 250 psig. EPCO or equal.
   c. Shock Absorbers: Sioux Chief "Hydra-Rester", Zurn "Shoktrol", PPP "SC Series" or equal.

E. Miscellaneous Piping Items:
1. Pipe Support:
   a. Pipe Hanger: Adjustable split ring, swivel hanger and rod. Black malleable iron. Size and maximum load per manufacturer's recommendation. Felt lined, B-Line B3690F, Unistrut or equal.
   b. Construction Channel: 12 gage 1-5/8" x 1-5/8" steel channel. Single or multiple section. Self-locking nuts and fittings. B-Line, Unistrut, Superstrut or equal.
2. Pipe Sleeves: 24 gage galvanized steel. Adjus-to-Crete #10 with #99 thimble for floors. #100 for walls.
3. Flashing: Vent flashing and flashing for piping through roof shall be prefabricated 24 gauge galvanized steel roof jacks with 8" square flange around pipe. For tile or other roofing systems where pliable flashing is required, flashing shall be lead. Seal with weatherproofing mastic.

2.2 PIPING INSULATION MATERIALS

A. General: All piping insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.

B. Pipe Insulation: Elastomeric type, ASTM C534, with a thermal conductivity of 0.27 at 75°F when measured in accordance with ASTM C177 or ASTM C518.
1. Wall thickness: 3/4 in.
2. Adhesive: Conform to Manufacturer's recommendations.

C. Pre-molded Fiberglass: Heavy density sectional pre-molded fiberglass with vapor barrier laminated all-service jacket and pressure sealing vapor barrier lap. Thermal conductivity shall not exceed 0.25 Btu-in/hr-sq. ft-degrees F, at a mean temperature of 50 degrees F. Perm rating 0.02, ASTM E96. Puncture rating 50 Beach units, ASTM D781. Provide 3" (min.) wide tape of same material as lap for butt joints. For hot water piping, thickness shall be 1" for pipe sizes less than 2", 1-1/2" thickness for pipe sizes 2" and larger. CSG Insulation Corp., Manville, Owens-Corning or equal.

D. Fiberglass Blanket: Unfaced. Thermal conductivity shall not exceed 0.25 Btu-in/hr sq. ft-degrees F, at a mean temperature of 50 degrees F. 1-1/2" thickness. Manville, Owens-Corning or equal.

E. PVC Jacket (for exposed pipes and fittings): Pre-molded polyvinyl chloride (PVC) jackets. Size to match application. Provide PVC vapor barrier, pressure-sealing tape by same manufacturer. Zeston or equal.

2.3 FIXTURES

A. General: This Division shall rough-in for and install all plumbing fixtures shown on drawings. All trim not concealed shall be brass with polished chromium plate finish unless otherwise noted. All enameled fixtures shall be acid resisting. Standard color is white unless otherwise noted.

B. Schedule: Refer to Plumbing Fixture Schedule on the drawings for list of fixtures.

Manufacturer's model numbers are listed to complete description. Water consumption quantities listed on schedule are maximum. Equivalent models of American Standard, Crane, Haws, Kohler, Eljer, Zurn or equal. For drainage fixtures, equivalent models of Josam, Smith, Wade, Zurn or equal.

C. Stops and P-traps: All fixtures shall be provided with stops and p-traps as applicable.
   1. Stops: All hot and cold water supplies shall be 1/2" angle stops with IPS inlets and compression outlets, stuffing box, screwdriver lock shield, and 1/2" flexible brass tubing riser. Speedway. Wall mounted trim shall have concealed loose key wall stop. Chicago 1771 or equal.
   2. P-traps: Brass, ground joint. 17 gage. American Standard, California Tubuler or equal.
      a. Trap primers shall be provided with ball valve and cylinder key-lock access panel for all floor drains and floor sinks. PPP, Inc. or equal.

2.4 EQUIPMENT

A. General Requirements:
   1. General: These equipment specifications are to supplement the drawings. Refer to schedules on drawings for the specific equipment to be provided. Capacities shall be in accordance with the schedules shown on the drawings. Capacities are to be considered minimum.
   2. Dimensions: Equipment must conform to space requirements and limitations as indicated on the drawings and as required for operation and maintenance. Equipment will not be accepted that does not readily conform to space conditions.
   3. Ratings: Electrical equipment shall be in accordance with NEMA Standards and UL listed where applicable standards have been established.
   4. Basis of Design: Manufacturers and model numbers listed in schedules as the basis of design are intended to represent the standard of quality and the features desired.
   5. Piping: Each item or assembly of items shall be furnished completely piped for connection to services. Control valves and devices shall be provided. Equipment requiring domestic water for non-potable use shall be provided with backflow preventer acceptable for intended use by local governing authorities.
   6. Electrical:
      a. General: Each item or assembly of items shall be furnished completely wired to individual terminal blocks for connection to single branch electrical circuit. All electrical accessories and controls required by equipment shall be furnished. Provide terminal blocks for controls not included in equipment package. Manual and magnetic starters shall have ambient compensating running over-current protection in all ungrounded conductors. Magnetic starters shall be manual reset. Controllers and other devices shall be in NEMA 3 or 12 enclosures as applicable.
      b. Wiring: Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each ungrounded conductor, all accessible on operating side of equipment. Switches, contacts, and other devices shall be in ungrounded conductors.
      c. Motors: Shall be rated, constructed, and applied in accordance with NEMA and ANSI Standards without using service factor. Single-phase motor shall be of type to suit application. Three-phase motors shall be open drip-proof, NEMA B design on pumps and fans, NEMA C on reciprocating equipment, sealed ball bearing, three-phase induction. Design shall limit starting inrush current and running current to values shown on drawings.
      d. Starters: Motor starters shall be provided for all equipment except where starter is in a motor control center as designated on the electrical drawings.
      e. Control Voltage: Equipment connected to greater than 240 volts shall be provided with 120 volt transformer if separate source is not indicated on plans. 240 volt

control is acceptable if confined within control panel.

f. Submittals: Included in shop drawings shall be internal wiring diagrams and manufacturer's recommended external wiring.

PART 3 EXECUTION

3.1 PIPING INSTALLATION

A. General:

1. Piping Layout: Piping shall be concealed in walls, above ceilings, or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location to be approved by Owner's Representative. No structural member shall be cut, notched, bored, or otherwise altered unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. All piping shall be installed in a manner to ensure unrestricted flow, eliminate air pockets, prevent any unusual noise, and permit complete drainage of the system. All piping shall be installed to permit expansion and contraction without strain on piping or equipment. Expansion joints shall be installed as required. Vertical lines shall be installed to allow for building settlement without damage to piping. All exposed piping to be primed and painted, see painting section.
2. Joints:
   a. Threaded: Pipe shall be cut square and reamed to full size. Threads shall be in accordance with ANSI B2.1. Joint compound or tape suitable for conveyed fluid shall be applied to male thread only. Joints shall be made with three threads exposed.
   b. Other: Joints other than threaded or welded shall be installed in accordance with manufacturer's recommendations.
   c. Open Ends: Open ends of piping shall be capped during progress of work to preclude foreign matter.
   d. Electrical Equipment: Joints shall be avoided, where possible, over electrical equipment.
   e. Copper pipe 1-1/2" or less may be soldered. Above 1-1/2" and all below grade shall be brazed.
3. Fittings:
   a. Standard Fittings: All joints and changes in direction shall be made with standard fittings. Close nipples shall not be used.
   b. Reducers: Pipe size reduction shall be made with bell reducer fittings. Bushings shall not be used.
   c. Unions: A union shall be installed on the leaving side of each valve, at equipment connections, and elsewhere as necessary for assembly or disassembly of piping.
   d. Valves: All valves shall be full line size. At equipment connections, valves shall be full size of upstream piping.
4. Pipe Support:
   a. General: Hangers shall be placed to support piping without strain on joints or fittings. Maximum spacing between supports shall be as specified below. Actual spacing requirements will depend on structural system. Refer to drawings for additional requirements and attachment to structure. Vertical piping shall be supported at floor and ceiling. Support pipe within 12" of all changes in direction. Support individual pipes with pipe hanger. All pressure piping, drainage piping above grade and metallic piping of dissimilar metal from hangers shall have isolating shield, or felted hangers.
      1) Screwed Pipe:

PIPE SIZE BETWEEN SUPPORTS*	MAX. SPACING
(IN)	(FT)
½	6
¾	8
1	8
1-1/4 & LARGER	10

* Based on straight lengths of pipe with couplings only. Provide additional supports for equipment, valves, or other fittings.

2) Copper Tubing: Copper tubing shall be supported at approximately six (6) foot intervals for piping one and one-half (1-1/2) inches and smaller in diameter and ten (10) foot intervals for piping two (2) inches and larger in diameter.
3) Gravity Drainpipe: Piping shall be supported at each length of pipe or fitting, but in no case at greater spacing than indicated above for pressure pipe.

b. Trapeze: Trapeze hangers of construction channel and pipe clamps may be used. Submit design to Engineer for approval.

5. Miscellaneous:
   a. Escutcheons: Provide chromium plated escutcheons where piping penetrates walls, ceilings, or floors in finished areas.
   b. Pipe Sleeves: All piping passing through concrete shall be provided with pipe sleeves. Allow 1" clearance between sleeve and pipe or pipe insulation.
   c. Dielectric Couplings: Dielectric couplings shall be installed wherever piping of dissimilar metals are joined.
   d. Shock Absorbers: Install per manufacturers recommendations.

B. Water Piping: Connections to branches shall be made from the top side of the main. Supply header in fixture battery shall be full size to last fixture, reducing in size only on individual connections to each fixture in battery. Provide ball valve shutoff for each building and at each connection to equipment and trap primers. Shock absorbers shall be installed in a vertical position at end of branch runs as specified in this section whether specifically shown or not on drawings. Connections to equipment shall be made with flexible connectors. Non-metallic pipe shall have 18 AWG copper tracer wire laid on top of pipe and taped in place at 15-foot spacing, terminate 4" above grade at ends of pipe runs.

C. Gas Piping: Shall be pitched to drain to drip legs at each piece of equipment. No unions shall be installed except at connections to equipment. Provide shutoff at each equipment connection. Connections to equipment shall be made with flexible connectors. Under floor piping shall be sleeved, sealed, and vented. Polyethylene or polyvinyl chloride pipe and fittings shall be joined in accordance with manufacturer's recommendation. Metal-to-plastic transition fittings shall be installed at all transitions. Non-metallic pipe shall have 18 AWG copper tracer wire laid on top of pipe and taped in place at 15-foot spacing, terminate 4" above grade at ends of pipe runs. All gas below grade shall have continuous caution tape installed 12” above gas line. All exposed gas piping shall be primed and painted, see

painting section.

D. Condensate Drain Piping: Install with constant pitch to receptacle, 1/4" per foot where possible, otherwise 1/8" per foot minimum. Provide trap at each air handling unit to prevent air leakage. Connections to equipment shall be made with flexible connection unless connection is internally isolated.

3.2 PIPING INSULATION INSTALLATION

A. Domestic Tempered Water Supply:
   1. General: All domestic tempered water supply piping, except for exposed connections to fixtures, shall be insulated. Do not insulate unions or valves less than 2", unless exposed to weather.
   2. Install elastomeric pipe insulation by slipping over end of pipe. Where not feasible, slit insulation longitudinally, snap over piping and seal with adhesive. Insulate fittings with larger diameter sleeves or insulation, lapping pipe insulation a minimum of 2 in.
   3. Butt sections of insulation tightly together and seal with adhesive to provide a continuous vapor and thermal barrier.
   4. Pipe: Apply pre-molded fiberglass sections to pipe using integral pressure sealing lap adhesive in accordance with manufacturer's recommendations. Stagger longitudinal joints. Seal butt joints with factory supplied sealing tape.
   5. Fittings and Valves:
      a. Wrap fitting with pre-cut fiberglass blanket to thickness matching adjoining insulation. Cover blanket with PVC jacket in accordance with manufacturer's recommendations. Seal all joints with factory supplied pressure sealing vapor barrier tape with 2" (min.) overlap on both sides of joint. Insulate valves to stem.
      b. For miscellaneous fittings for which PVC jackets are not available or where proximity of fittings precludes a neat-appearing installation, the contractor may cover the fiberglass blanket with stretchable glass fabric and at least two coats of vapor barrier coating. All exposed ends of insulation shall be adequately sealed.

3.3 FIXTURE INSTALLATION

A. Fixture Height: Shall be standard height except those specified as ADA Compliant. Such fixtures shall be mounted in accordance with CBC, Section 11B, Division 6 and drawing details.

B. Other Connections: Rough-in and connection for trim or fixtures supplied by others shall be included in this specification section.

C. Floor Mounted Fixtures: Shall be provided with proper support plates. Caulk fixtures against floors with white G.E. “Sanitary SCS1700” silicone sealant. Caulking shall be smooth and flush with fixture surface (not concave).

3.4 EQUIPMENT INSTALLATION

A. General: It shall be the responsibility of the equipment installer to ensure that no work done under other specification sections shall in any way block, or otherwise hinder the equipment.

B. Connections to Equipment: Where size reductions are required for connections to equipment, they shall be made immediately adjacent to the equipment and, if possible, inside the equipment cabinet.

3.5 TESTS AND ADJUSTMENTS

A. General: Unless otherwise directed, tests shall be witnessed by the Owner's Rep02 sentative. Work to be concealed shall not be enclosed until prescribed tests are ma Should any work be enclosed before such tests, the Contractor shall, at his expense, uncover, test, and repair his work, and that of other contractors, to original conditions. Leaks and defects shown by tests shall be repaired and entire work retested. Tests may be made in sections. However, all connections between sections previously tested and new section shall be included in the new test. New sections shall be isolated from existing sections for testing purposes. There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made. Test the new sections or branches of piping only.

B. Gravity System:
   1. Sanitary Sewer: All ends of the new sections of sewer system shall be capped and lines filled with water to the top of the highest vent, 10 feet above grade minimum. This test shall be made before any fixtures are installed. Test shall be maintained until all joints have been inspected, but no less than 2 hours.
   2. Condensate Piping: Maintain 15 psig water pressure for a duration of 4 hours.

C. Pressure Systems:
   1. General: There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made. Test the new sections or branches of piping only.
   2. Domestic Tempered, Cold & DI Water Piping: Maintain 60 psig water pressure for a minimum duration of 2 hours.
   3. Gas, Vacuum and Air Piping: Maintain 60 psig air pressure for a minimum duration of 2 hours.

3.6 DISINFECTION

A. Disinfect all domestic hot and cold water piping systems in accordance with California Plumbing Code Sections 609.9.1 through 609.9.4. The method to be followed shall be that prescribed by the Health Authority or, in case no method is prescribed by it, the following:
   1. The pipe system shall be flushed with clean, potable water until potable water appears at the points of outlet.
   2. The system or parts thereof shall be filled with a water-chlorine solution containing not less than 50 parts per million of chlorine, and the system or part thereof shall be valved-off and allowed to stand for 24 hours; or the system or part thereof shall be filled with a water-chlorine solution containing not less than 200 parts per million of chlorine and allowed to stand for 3 hours.
   3. Following the allowed standing time, the system shall be flushed with clean, potable water until the chlorine residual in the water coming from the system does not exceed the chlorine residual in the flushing water.
   4. The procedure shall be repeated where it is shown by bacteriological examination made by an approved agency that contamination persists in the system.

B. Disinfection process shall be performed by certified testing agency or in cooperation with health department having jurisdiction and witnessed by a representative of the Architect. During procedure, signs shall be posted at each water outlet stating, "Chlorination - Do Not Drink". After disinfection, water samples shall be collected by certified testing agency or by health department for bacteriological analysis. Certificate of Bacteriological Purity shall be obtained and delivered to the Owner through the Owner's Representative.

END OF SECTION 22 00 02

SECTION 23 00 00

GENERAL MECHANICAL PROVISIONS

PART 1 GENERAL

1.1 GENERAL CONDITIONS

A. The foregoing General and Special Conditions shall form a part of this Division with the same force and effect as though repeated herein. The provisions of this Section shall apply to all the Sections of Division 23.

1.2 CODES AND REGULATIONS

A. All work and materials shall be in full accordance with current rules and regulations of applicable codes and all California Amendments. Nothing in these drawings or specifications is to be construed to permit work not conforming to these codes. Should the drawings or specifications call for material or methods of construction of a higher quality or standard than required by these codes, the specifications shall govern. Applicable codes and regulations are:

1. California Code of Regulations – CCR:
   a. Title 8, Industrial Relations.
   b. Title 24, Building Standards.
2. California Building Code – CBC.
3. California Mechanical Code – CMC.
4. California Plumbing Code – CPC.
5. California Fire Code – CFC.
6. California Green Building Code.
7. Air Diffusion Council – ADC.
8. American Gas Association – AGA.
9. Air Moving and Conditioning Association – AMCA.
10. American National Standards Institute – ANSI.
11. Air Conditioning and Refrigeration Institute – ARI.
12. American Society of Heating, Refrigerating and Air Conditioning Engineers – ASHRAE.
13. American Society of Mechanical Engineers – ASME.
14. American Society for Testing and Materials – ASTM.
15. American Water Works Association – AWWA.
16. California Electrical Code – CEC.
17. National Electrical Manufacturers Association – NEMA.
18. National Fire Protection Association – NFPA.
19. Sheet Metal and Air Conditioning Contractors National Association – SMACNA.
20. Underwriters' Laboratory – UL.
21. Occupational Safety and Health Act - OSHA.
22. ASCE 7-16, Chapter 13.

1.3 PERMITS AND FEES

A. The Contractor shall take out all permits and arrange for all tests in connection with his work as required by local ordinances. All charges are to be included in the work. Permits for equipment connected to a particular system are to be considered as a part of the work included under each system; for example, permits for electric motor connection are part of electrical work, permits for domestic water or gas connections are part of plumbing work. All charges for service connections, meters, etc. by utility companies or districts shall be included in the work.

1.4 COORDINATION OF WORK

A. Layout of materials, equipment and systems is generally diagrammatic unless specifically dimensioned. The actual locations of all materials, piping, ductwork, equipment, supports, etc. shall be carefully planned, prior to installation of any work, to avoid all interferences with each other, or with structural, electrical, or architectural elements. Verify the proper voltage and phase of all equipment with the electrical plans. All conflicts shall be called to the attention of the Engineer prior to the installation of any work or the ordering of any equipment.

1.5 GUARANTEE

A. Guarantee shall be in accordance with the General Conditions. These specifications may extend the period of the guarantee for certain items. Where such extensions are called for, or where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the Certificate of Guarantee shall be furnished to the Owner through the Engineer.

1.6 EXAMINATION OF SITE

A. The Contractor shall examine the site, compare it with plans and specifications, and shall have satisfied himself as to the conditions under which the work is to be performed. No allowance shall subsequently be made in his behalf for any extra expense to which he may be put due to failure or neglect on his part to make such an examination.

1.7 SUBMITTALS

A. Submit shop drawings in accordance with Division 01.

B. Shop Drawings: Within 30 days of contract award, the Contractor shall submit six copies of shop drawings for all materials, equipment, etc. proposed for use on this project. Material and equipment shall not be ordered or installed until written review is processed by the Engineer. Any item omitted from the submittal shall be provided as specified without substitution. All shop drawings must comply with the following:

1. Shop drawings are required for all material and equipment items and shall include manufacturer's name and catalog numbers, dimensions, capacities, performance curves, and all other characteristics and accessories as listed in the specifications or on the drawings. Descriptive literature shall be current factory brochures and submittal sheets. Capacities shall be certified by the factory.
2. All shop drawings shall be submitted at one time in a neat and orderly fashion in a suitable binder with title sheet including Project, Engineer, and Contractor; Table of Contents; and indexed tabs dividing each group of materials or item of equipment. All items shall be marked with the specification paragraph number for which they are proposed. All equipment shall also be identified by the mark number as indicated on the drawings.
3. All capacities, characteristics, and accessories called for in the specifications or on the drawings shall be highlighted, circled, or underlined on the shop drawings. Calculations and other detailed data indicating how the item was selected shall be included for items that are not scheduled. Data must be complete enough to permit detailed comparison of every significant characteristic which is specified, scheduled, or detailed.

C. Substitutions: Manufacturers and model numbers listed in the specifications or on the drawings represent the standard of quality and the features desired. Unless otherwise noted, alternate manufacturers may be submitted for review by the Engineer. Calculations

and other detailed data indicating how the item was selected shall be included. The Contractor shall assume full responsibility that substituted items or procedures will meet the specifications and job requirements and shall be responsible for the cost of redesign and modifications to the work caused by these items.

D. Review: Submittals will be reviewed for general conformance with the design concept, but this review does not guarantee quantity shown, nor does it supersede the responsibility of the Contractor to provide all materials, equipment, and installation in accordance with the drawings and specifications. The Contractor shall agree that shop drawing submittals processed by the Engineer are not Change Orders; that the purpose of shop drawing submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept; that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use. The Contractor shall agree that if deviations, discrepancies or conflicts between shop drawings and design drawings and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed.

1.8 OPERATION AND MAINTENANCE INSTRUCTIONS

A. Submit one electronic pdf copy for review and after approved submit three hard copies of the Operation and Maintenance Instructions and Wiring Diagrams for all equipment and parts lists for all equipment, etc. shall be submitted to the Engineer. All instructions shall be clearly identified by marking them with the same designation as the equipment item to which they apply (e.g. AC-1). All wiring diagrams shall agree with revised shop drawings and indicate the exact field installation. All instructions shall be submitted at the same time and shall be bound in a suitable binder with tabs dividing each type of equipment (e.g. Fans, Motors, etc.). Each binder shall be labeled indicating "Operating and Maintenance Instructions, Project Title, Contractor, Date" and shall have a Table of Contents listing all items included. (These submittals shall be submitted with regular submittals at start of job so Commissioning Contractor can start on the commissioning check list for Title 24 Requirements)

B. Verbal: The Contractor shall verbally instruct the Owner's maintenance staff in the operation and maintenance of all equipment and systems. The controls contractor shall present that portion of the instruction that applies to the control system. The Engineer's office shall be notified 96 hours prior to this meeting.

C. Posted: The Contractor shall prepare operation instructions for all systems which shall be typewritten, reviewed by the Engineer, and mounted under glass adjacent to the appropriate temperature control panel. These instructions shall include applicable temperature control diagrams.

D. Acknowledgment: The Contractor shall prepare a letter indicating that all operation and maintenance instructions (printed, verbal and posted) have been given to the Owner, to the Owner's satisfaction. This letter shall be acknowledged (signed) by the Owner and submitted to the Engineer.

1.9 RECORD DRAWINGS

A. The Contractor shall maintain a set of prints for the project as a record of all construction changes made. As the Work progresses, the Contractor shall maintain a record of all deviations in the Work from that indicated on the drawings. Final location of all underground work shall be recorded by depth from finished grade and by offset distance from permanent surface structures, i.e. buildings, curbs and walks. In addition, the water, gas, under-floor ducts, etc. within the building shall be recorded by offset distances from building walls. The

original drawings will be made available to the Contractor from which he shall have a set of reproducible drawings made. The Contractor shall then transfer the changes, notations, etc. from the marked-up prints to the reproducible drawings. The record drawings (marked-up prints and reproducibles) shall be submitted to the Engineer for review (as an alternative, the marked-up prints may be photocopied full size on reproducible stock).

PART 2 PRODUCTS

2.1 PROTECTIVE COATING FOR UNDERGROUND PIPING

A. All ferrous pipe below grade (except cast iron) shall have a factory applied protective coating of extruded high density polyethylene, 35 to 70 mils total thickness, X-Tru Coat, Scotchkote. All fittings and areas of damaged coating shall be covered with two layer double wrap of 10 mil polyvinyl tape to total thickness of 40 mils. Manville Corporation. Protective coating shall be extended 6" above surrounding grade.

2.2 CONCRETE ANCHORS

A. Concrete Anchors shall comply with CBC 1901A.3. Steel stud with expansion anchor requiring a drilled hole; powder driven anchors are not acceptable. Minimum concrete embedment shall be 4-1/2 diameters. Minimum spacing shall be 10 diameters center-to-center and 5 diameters from center to edge of concrete. Maximum allowable stresses for tension and shear shall be 80% of the test report values "with special inspection". Anchors shall be Hilti, Philips - or Approved equal.

2.3 SEISMIC RESTRAINTS

A. All mechanical systems (all equipment, piping, etc.) shall be provided with seismic restraints in accordance with details on the drawings.

2.4 SYSTEM IDENTIFICATION

A. Above Grade Piping: Provide markers on piping which is either exposed or concealed in accessible spaces. For piping systems, other than drain and vent lines, indicate the fluid conveyed or its abbreviation, either by preprinted markers or stenciled marking, and include arrows to show the direction of flow. Comply with ANSI A13.1 for colors. Locate markers at ends of lines, near major branches and other interruptions including equipment in the line, where lines pass through floor, walls or ceilings or otherwise pass into inaccessible spaces, and at 50' maximum intervals along exposed portion of lines. Marking of short branches and repetitive branches for equipment connections is not required.

B. Equipment: All equipment shall be identified with a plastic laminated, engraved nameplate which bears the unit mark number as indicated on the drawings (e.g. AC-1). Provide 1/2" high lettering, white on black background. Nameplates shall be permanently secured to the unit.

C. Valves: Provide valve tags on all valves of each piping system, excluding check valves, valves within equipment, shut-off valves at equipment and other repetitive terminal units. Provide brass tags or plastic laminate tags. Prepare and submit a tagged valve schedule, listing each valve by tag number, location, and piping service. Mount in glazed frame where directed.

D. Controls: Label all panels, thermostats and by-pass timers with plastic laminated, engraved nameplate which bears the unit mark number as indicated on the drawings (e.g. AC-1). Provide 1/4" high lettering, white on black background. Nameplates shall be permanently

secured to the unit.

2.5 EQUIPMENT SUPPORT FRAMES

A. Unless specifically noted otherwise, it shall be the responsibility of Mechanical Contractor to furnish and install all support frames for its equipment.

PART 3 EXECUTION

3.1 SCHEDULING OF WORK

A. All work shall be scheduled subject to the approval of the Engineer and Owner. No work shall interfere with the operation of the existing facilities on or adjacent to the site.

3.2 CONDUCT OF WORK

A. The Contractor shall have at all times, as conditions permit, a sufficient force of workmen and quantity of materials to install the work contracted for as rapidly as possible consistent with good work and shall cause no delay to other Divisions engaged upon this project or to the Owner.

B. Mechanical Contractor shall arrange for all cutting necessary for the proper installation of its work, providing all sleeves and chases necessary. Cutting shall not be done in such a manner to impair the strength of the structure. Any damage resulting from work shall be repaired by the Contractor at his expense to the satisfaction of the Engineer.

C. Progressively, daily at the completion of each day's work, and at completion of the job, the Contractor shall thoroughly clean all of his work, removing all debris, stain and marks resulting from his work.

D. IAQ Management plan will be in effect for Cal Green Certification, including the sealing of duct ends before and during rough-in, specific requirements for the use of HVAC equipment during construction (if used at all), building flush-out, etc. Adhesives and mastic must comply with low VOC requirements and documentation (MSDS, etc.) shall be provided with submittals.

3.3 EXCAVATION AND BACKFILL

A. Excavation: Trenches are to be excavated to grade and depth established by drawings. Unless otherwise noted, minimum earth cover above top of pipe shall be 24", not including base and paving in paved areas. Width of trenches at top of pipe shall be a minimum of 16" plus the outside diameter of the pipe. Provide all shoring required by site conditions. Barrel of pipe shall have uniform support on trench bottom, hand excavate additional depth at bells, hubs, and fittings. Where over-excavation occurs, provide compacted selected backfill to pipe bottom. Where ground water is encountered, remove to keep excavation dry, using well points and pumps as required.

B. Backfill:
   1. Around Pipe and to One Foot Above Pipe: Material shall be river run sand or native granular free flowing material, free of clay lumps, silt or vegetable matter and shall have 100% passing through the No. 4 sieve and a maximum of 3% passing through the No. 200 sieve. Place carefully around and on top of pipe, taking care not to disturb piping. Consolidate with vibrator.
   2. One Foot Above Pipe to Grade: Material to be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed, to proper moisture and compacted to required density. If

backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to approval by the Engineer.

3. Remove all water sensitive settlement from trench backfill regardless of location and compaction requirements.

C. Compaction: Compact to a density of 95% within building and 90% outside building. Demonstrate proper compaction by testing at one-half of the trench depth. Perform three tests per 100' of trench.

3.4 OPENINGS, CUTTING AND PATCHING

A. The locations and dimensions for openings through walls, floors, ceilings, foundations, footings, etc. required to accomplish the work under this Specification Division shall be provided under this Division. The actual openings and the required cutting and patching shall be provided. Coring through existing concrete or masonry walls, floors, ceilings, foundations, footings, etc., and saw cutting of concrete floors or asphaltic concrete required to accomplish the work under this Specification Division shall be provided under this Division. Patching of these surfaces shall also be provided. Cutting and coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor's expense to the satisfaction of the Engineer.

3.5 MANUFACTURER'S RECOMMENDATIONS

A. All material, equipment, devices, etc., shall be installed in accordance with the recommendations of the manufacturer of a particular item. The Contractor shall be responsible for all installations contrary to the manufacturer's recommendations. The Contractor shall make all necessary changes and revisions to achieve such compliance. Manufacturer's installation instructions shall be delivered to and maintained at the job site through the construction of the project.

3.6 QUIETNESS

A. Piping, ductwork, and equipment shall be arranged and supported so that vibration is a minimum and is not carried to the building structure or spaces.

3.7 DAMAGES BY LEAKS

A. The Contractor shall be responsible for damages to other work caused by leaks in the temporary or permanent piping systems prior to completion of work and during the period of the guarantee, and for damages to other work caused by disconnected pipes or fittings, and the overflow of equipment prior to completion of the work.

3.8 CLEANING

A. Progressively and at completion of the job, the Contractor shall thoroughly clean all of his work, removing all debris, stain and marks resulting from his work.

END OF SECTION

SECTION 23 00 01

HEATING, VENTILATING AND AIR CONDITIONING

PART 1 GENERAL

1.1 GENERAL CONDITIONS

A. The foregoing Section 23 00 00, General Mechanical Provisions, shall form a part of this specification.

1.2 SCOPE

A. Included: Perform all work necessary and required to complete construction as indicated. Such work includes the furnishing of all labor, materials, and services necessary for a complete, lawful, and operating air conditioning, heating, ventilating system with all equipment as shown or noted on the drawings or as specified herein. The work includes, but is not necessarily limited to, the following:
   1. Heating, ventilating and air conditioning equipment.
   2. Air distribution system (Ductwork, Air Terminals, etc.).
   3. Piping systems.
   4. System insulation.

B. Work Specified Elsewhere:
   1. Line voltage power wiring (60 volts or greater), motor starters in motor control centers and disconnect switches are included in the Electrical Section.
   2. Connection of condensate drains to equipment.
   3. Access doors.
   4. Controls, control wiring, and conduit for control wiring.

PART 2 MATERIALS

2.1 DUCTWORK MATERIALS

A. General: All ductwork materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL-723 not exceeding a flame spread of 25 and smoke developed of 50. All ductwork shall be per Chapter 6 of the CMC.

B. Low Velocity Metal Ductwork: Metal ductwork shall be galvanized sheet steel, ASTM A653.

C. Low Velocity Flexible Ductwork: Insulated flexible ductwork. Continuous internal liner bonded to galvanized steel wire helix. One pound per cubic foot glass fiber insulation, R-8. Thermal conductivity shall not exceed 0.13 Btu./ hr. sq. ft.-degrees F at a mean temperature of 75°F. Seamless vapor barrier jacket. Each length shall have a factory installed metal sleeve at each end. Duct shall be capable of continuous operation at 1.5" of water static pressure and 4000 ft./ min. air velocity. Maximum length 5 ft., single piece at runouts to air terminals. Genflex, Lamborn or equal.

D. Kitchen Hood Exhaust Duct: Ductwork shall be galvanized steel all welded construction, ASTM A240. United McGill Corp.

E. Spiral Duct: Ductwork shall be galvanized steel with uni-seal spiral seamlock and uni-seal fittings, ASTM A653. United McGill Corp. All exposed spiral duct shall be painted, color selected by Owner.

F. Bonding Adhesive: Durodyne WBG, Scotchgrip Adhesive 4230, United McGill Uni-Tack.

G. Duct Mastic: Minnesota Mining and Manufacturing Duct Sealer 800, Tuff-Bond No. 12, Glencoat Seal-Flex, United Duct Sealer.

H. Fiber Tape: Mineral impregnated fiber tape and plastic activator - adhesive, Hardcast, Inc., United McGill Uni-Cast or equal.

I. Duct Joints:
   1. As an option to joints and seams designated by SMACNA or shown on Drawings, the following systems may be used:
      a. Ducts with sides 24 inches to 48 inches, transverse duct joint system by Ductmate Jr., Nexus or equal (SMACNA "E" Type connection).
      b. Ducts 48 inches and larger, Ductmate Regular, Nexus or equal (SMACNA "J" Type connection).

2.2 AIR TERMINALS AND DUCT FITTINGS

A. Grilles: (Grilles, Registers and Diffusers)
   1. Information on Drawings: Refer to the Air Distribution Schedule on the drawings for the list of grilles. Manufacturer's model numbers are listed to complete the description. Equivalent models of Anemostat, J & J, Krueger, Barber-Colman, Price, Environmental Air Products, Titus or equal. Refer to the floor plans for neck size, CFM, air diffusion pattern, and fire damper, if required.
   2. Performance: If, according to the certified data of the manufacturer of the proposed units, the sizes indicated on the drawings will not perform satisfactorily, the units shall be reselected by the Contractor for the proper diffusion, spread, drop, and throw.
   3. Frame Accessories: All supply, return, and exhaust grilles shall be provided with cushion heads and attachments to structure, unless otherwise noted. All surface mounted grilles shall have a perimeter gasket and flanged edge. All grilles shall have frames suitable for mounting in the surfaces designated by the architectural drawing, coordinate prior to ordering.
   4. Finish: All ceilings and wall grilles shall have a paintable white finish unless otherwise noted. Interior components shall be flat black.
   5. Gyms: Provide 12 Ga. wire safety cables for all overhead grilles in Gym.

B. Turning Vanes: Double wall, hollow metal, air-foil shape. Spacing in accordance with manufacturer's recommendations. Aero Dyne, HEP, or equal.

C. Flexible Connection: UL listed neoprene coated 30-ounce fiberglass cloth. 3" metal, 6" fabric, 3" metal. Ventglas or equal.

2.3 DUCTWORK INSULATION MATERIALS

A. General: All ductwork insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.

B. Acoustic Lining: Glass fiber. One side coated to prevent fiber erosion up to 6000 ft./ min. Average noise reduction coefficient of 0.90. 0.13 Btu/ hr. – sq. ft. – degrees F conductivity at a mean temperature of 75 degrees F, R-8. CSG Insulation Corp., Schuller, Owens-Corning, Knauf or equal. Duct dimensions shown on drawings for lined duct are clear (net) opening inside of lining.

C. Fiber Glass Blanket: Foil faced,0.13 Btu/ hr. – sq. ft. – degrees F conductivity at a mean

temperature of 75 degrees F, R-8. CSG Insulation Corp., Schuller, Owens-Corning, Knauf or equal.

D. Bonding Adhesive: Benjamin Foster 85-15 or equal.

2.4 PIPING MATERIALS

A. Refrigerant Piping:
   1. Piping: Type L hard temper seamless copper, ASTM B88. Wrought copper fittings ANSI B16.22. 95/ 5 tin-silver brazed joints. Provide schedule 40 PVC sleeve pipe for all below grade refrigerant piping. All piping shall be sized per equipment manufacturer requirements.
   2. Valves and Specialties:
      a. Line Valves: Bronze body, ball type, TFE locked in seals. Back seated valve stem. Contromatics C-11.
      b. Filter-Drier: Replaceable core. Capacity in accordance with ARI Standard 710. Sporlan "Catch-All".
      c. Moisture Indicator-Sight Glass: Double port. Henry, Sporlan.
      d. Vibration Isolating Connection: Seamless flexible bronze tubing, braid covered. Suitable for system pressure. American, Flexonics.

2.5 PIPING INSULATION MATERIALS

A. General: All piping insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.

B. Pre-Molded Fiberglass: Heavy density sectional pre-molded fiberglass with vapor barrier laminated all-service jacket and pressure sealing vapor barrier lap. Thermal conductivity shall not exceed 0.25 Btu-in/ hr.-sq. ft-degrees F. at a mean temperature of 50°F. Perm rating 0.02, ASTM E96. Puncture rating 50 Beach units, ASTM D781. Provide 3" (min.) wide tape of same material as lap for butt joints. For chilled and hot water piping, thickness shall be 1" for pipe sizes less than 2", 1-1/2" thickness for pipe sizes 2" and larger. CSG Insulation Corp., Manville, and Owens-Corning.

C. Fiber Glass Blanket: Unfaced. Thermal conductivity shall not exceed 0.25 Btu-in/ hr. sq. ft-degrees F. at a mean temperature of 50°F. 1-1/2" thickness. Manville, Owens-Corning.

D. PVC Jacket (for fittings and valves): Pre-molded polyvinyl chloride (PVC) jackets. Size to match application. Provide PVC vapor barrier, pressure-sealing tape by same manufacturer. Zeston.

E. Aluminum Jacketing: Aluminum pipe and fitting jacketing, 0.016" thickness for straight pipe, 0.024" thickness for fittings. Integral moisture barrier. Provide pre-fabricated aluminum strapping and seals by same manufacturer. Childers, Pabco.

F. Refrigerant Piping: Rubber based elastomeric preformed pipe insulation. Thermal conductivity shall not exceed 0.25 Btu-in/ hr.-sf-°F. at mean temperature of 75°F., 3/4" thickness. Provide aluminum pipe and fitting jacketing. 0.016" thickness for straight pipe, 0.024" thickness for fittings with integral moisture barrier, pre-fabricated strapping and seals for piping exposed to weather, Childers, Pabco or equal.
   1. Insulation shall be provided on both refrigerant lines for ductless split systems.

2.6 EQUIPMENT

A. General Requirements:

1. Capacity: Capacities shall be in accordance with schedules shown on drawings. Capacities are to be considered minimum.
2. Dimensions: Equipment must conform to space requirements and limitations as indicated on drawings and as required for operation and maintenance. Where Architectural screening is indicated, equipment shall not extend above or beyond screening. Equipment will not be accepted that does not readily conform to space conditions. Prepare and submit layout drawings for all proposed equipment (different than scheduled units) showing actual job conditions, required clearances for proper operation, maintenance, etc.
3. Ratings:
   e. Electrical: Electrical equipment shall be in accordance with NEMA Standards and UL or ETL listed where applicable standards have been established.
4. Electrical:
   a. General: Each item or assembly of items shall be furnished completely wired to individual terminal blocks for connection to single branch electrical circuit. All electrical accessories and controls required by equipment shall be furnished. Provide terminal blocks for controls and interlocks not included in equipment package. Manual and magnetic starters shall have ambient compensating running overcurrent protection in all ungrounded conductors. Magnetic starters shall be manual reset, shall have H-O-A switches and auxiliary contacts. Controllers and other devices shall be in NEMA 1 or 3R enclosures as applicable.
   b. Wiring: Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each ungrounded conductor, all accessible on operating side of equipment. Switches, contacts, and other devices shall be in ungrounded conductors.
   c. Motors: Shall be rated, constructed, and applied in accordance with NEMA and ANSI Standards without using service factor. Single-phase motor shall be of type to suit application. Three-phase motors shall be open drip proof, NEMA B design on pumps and fans, NEMA C on reciprocating equipment, sealed ball bearing, three-phase induction unless otherwise noted. Design shall limit starting inrush current and running current to values shown on drawings. Motors 1 horsepower and larger shall be the premium efficiency type, tested according to IEEE Standard 112, Method B. Motors exposed to weather shall be TEFC. Motors in a fan air stream shall be TEFC or TEAO. Vertical motors outdoors shall be ODP or TEFC and shall have rain caps.
   d. Starters: Motor starters shall be furnished for all equipment except where starter is in a motor control center as designated on the electrical drawings. Deliver starter to Electrical Contractor for installation and wiring.
   e. Control Voltage: Equipment connected to greater than 240 volts shall be provided with 120 volt control circuit from integral protected transformer if separate source is not indicated on plans. 240 volt control is acceptable if confined within control panel.
   f. Submittals: Included in shop drawings shall be internal wiring diagrams and manufacturer's recommend external wiring.
5. Fan Selection:
   a. Fan Curves: Performance curves shall be submitted for all units of 3000 CFM or greater. Operating point for forward curved fans shall be from point of maximum efficiency towards increased CFM limited by horsepower scheduled. Operating point for backward inclined fans shall be selected near point of maximum efficiency. Curves shall plot CFM verses static pressure with constant brake horsepower, RPM, and efficiency lines.
   b. Static Pressure: Unless otherwise noted, pressure scheduled as external static pressure (ESP) includes all ductwork and accessory losses external to the unit housing. Unless otherwise noted, pressure scheduled as total static pressure

includes all ductwork, filter, coil, cabinet, damper, and other accessory losses. Unless otherwise noted, pressure scheduled as duct static pressure includes all supply and return ductwork and accessory losses external to the unit housing and plenum (as applicable). The allowance for filter losses is 0.3" WC, unless otherwise noted. Submit itemized static pressure losses for all components.

6. Filters:
   a. General: Tested and rated in accordance with ASHRAE Standard 52.2 and Title 24, C.C.R. Furnish and install one complete change of all filters after air balance in completed and prior to acceptance. Provide pressure differential gage across all filter banks.
   b. Filter Media: 2" media. MERV-13. Clean filter resistance 0.25" water at 500 fpm. Throw-away frame. Class 2. Camfil Farr AP or equal.
   c. Pressure Differential Gage: Diaphragm actuated. 4" dial. Zero adjustment. Accuracy +/- 2% of full scale. Range as required. Provide static pressure sensors, tubing, and mounting brackets. Dwyer Series 2000. Mark gage to indicate filter replacement pressure, coordinate point with filter and equipment manufacturers.
7. Mixing Dampers: Opposed blade, 16-gage. Six-inch maximum blade width, 48" maximum length. Nylon or oil impregnated bronze bearings. One-half inch diameter pin shaft. 16-gage channel frame. One percent maximum leakage at 4" WC in accordance with AMCA 500 for outside air dampers. Actuating rod out of air stream. Arrow.
8. Sound Ratings: Shall be in accordance with ASHRAE 36-72. Sound ratings shall not exceed scheduled values.
9. Drives: Unless noted as direct connected, drives shall be V-belt, rated at 150% of motor horsepower. Multiple drive belts shall be matched set. Drive sheaves shall be dynamically balanced, adjustable, range +/- 10%, selected at mid-range. Adjustable relative movement shall be lockable to shaft. Belts shall be aligned within 1-1/2 degrees at all times. Open drives shall be provided with OSHA approved open mesh belt guards. Belt guards exposed to weather shall be weatherproof enclosure with louvered face for adequate ventilation. Driving motor shall be mounted on adjustable rails. T.B. Woods, Browning. Submit RPM range of driven machine with drive selection.

B. Air Conditioning Unit (thru 15 tons):
1. General: Self-contained heating/ cooling unit designed for outdoor installation. Factory assembled and tested. Provide all starters and relays required for operation. 24 volt control circuit from integral transformer. Weatherproof cabinet, galvanized steel with enamel finish. Drain pan. Multivane-centrifugal supply fan. ARI certified. Gas equipment AGA certified. BDP, Carrier, York, Trane, Lennox, and Daikin.
2. Refrigeration: Sealed Hermetic compressor with internal vibration isolating mount. Crank case heater, high/ low pressure switch, anti-recycle timer. Air-cooled condenser with propeller fan. Non-ferrous finned coil. Low ambient control to 25°F, unless otherwise noted.
3. Heat: Gas fired. Aluminized or ceramic-coated welded steel heat exchanger. Electric ignition. Automatic gas valve, 100% safety shutoff.
4. Automatic Shutoff: For units or zones providing air in excess of 2000 cfm, provide smoke detectors in supply air stream to automatically shut off all power to air moving equipment and alert fire alarm system when smoke is detected in accordance with 2019 CMC Section 608.

OR

5. Economizer with Power Exhaust (where shown on drawings): Economizer shall be a modulating power exhaust type where the unit will exhaust at the minimum outside air setpoint and exhaust 100% during economizer mode. Economizer with power exhaust is shipped separately and shall be field installed and wired under this section.
   a. Provide plastic air sampling tube to sense pressure in room for control of power

exhaust. Tube shall be placed thru ceiling with escutcheon plate in room that unit serves.

b. Modulating Economizer Sequence of Operation: The economizer system initially responds to a signal from the cooling thermostat and functions as a true first stage for cooling, while providing maximum fuel economy. The economizer is automatically locked out during the heating mode and holds the outdoor air damper at the minimum position settings. During the occupied period, the discharge sensor provides a signal to the actuator during free cooling or economizer mode. The signal opens the economizer damper until the discharge temperature drops below 50 degrees F. At this time the signal causes the motor to drive the damper back to minimum position. As the discharge temperature climbs to 60 degrees F the motor will drive back open. During the occupied period, the actuator will not close past the minimum position. **(The setpoints maybe changed by Commissioning Contractor to optimize controls for LEED Certification or Title 24 Requirements.)** If the fully open actuator cannot satisfy the space demand, mechanical cooling is sequenced on. During the unoccupied period, the actuator will override minimum position setting and drive fully closed. On a loss of power, the actuator will spring return fully closed. When in heating operation, or when outdoor air temperature or enthalpy conditions are high, economizer operation is locked out, and actuator is held at minimum position. The staging relay is used when the first stage compressors must provide mechanical cooling when assisting the economizer. The staging relay can be omitted when the second stage compressors can be used to assist the economizer with mechanical cooling.

c. CO2 Sensor Economizer Integration: When a CO2 sensor is used in conjunction with an economizer, the minimum position jumper between P and P1 on the logic is removed, and the sensor connected. When the Co2 sensor gets a reading higher than the setpoint, the sensor will signal the logic to modulate the outside air dampers open. The HVAC unit functions as if there is no economizer during the CO2 call for fresh air. When the CO2 level falls below the setpoint, the damper modulates back to the minimum position.

d. Modulating Power Exhaust Sequence of Operation: The MicroMetl version of the Lenze i510 Variable Frequency Drive (VFD) is enabled when circuit 24V and DI1 is closed. This can be done by installing a jumper between the two, or via a remote contact. This contact can be the Exhaust Option on the Economizer Logic marked EF and EF1 on the electromechanical W7212, the EXF 2-pin connector on the unit controller – see Economizer Instructions for Sequence of Operation, the Auxiliary Switch option on the Actuator Motor, or a relay. See wire Diagram Options for details. A Pressure Transducer is utilized to monitor the building pressure. The Transducer provides a 0-10VDC signal to terminals AI2 and GND, or a 4-20mA signal at terminals AI1 and GND on the VFD to control the motor speed. On a scale of 0" to .10" WG and 0-10Vdc, for example, the transducer will output ~ 3.0 VDC (8.5mA) @ .03" WG and ~ 5.0 VDC (11.5mA) @ .05" WG If a jumper between 24V and DI1 is used to enable the VFD the motor is commanded on and will run at minimum speed (15Hz) for a minimum of 2.5 minutes or 5 minutes, depending on the program, if the building pressure stays below the PI Setpoint (typically .03" to .05" w.c.). When the building pressure rises above Setpoint the frequency output to the motor will be increased for increased motor speed. If the pressure stays above Setpoint, the motor will continue to increase in speed until it achieves a maximum speed of 60Hz, or the building pressure decreases to below Setpoint. If the building pressure stays below or drops below the predetermined Setpoint for longer than 2.5 or 5 minutes mentioned earlier, the motor is commanded OFF and the display will show SLP. This feature is called the Sleep Mode. If the pressure rises above the Setpoint the motor will be commanded back on and the Sleep Timer will be reset. Assuming a Setpoint of .03" the transducer will output a VDC or mA signal in relation to the building pressure. Once the signal rises above the Setpoint the motor will begin to increase in speed. The PI Protocol of the VFD controls the response

time, however. So, if the increase is only a spike the VFD may not respond right away, or possibly, not at all. Additionally, if the increase is minor and the pressure fails to decrease with the increase in motor speed, the VFD will continue to increase the frequency output to increase the motor speed. This is because the goal of the VFD is to try to maintain Setpoint. Because of this, the frequency output of the VFD does not always correspond with the Transducer VDC output.

OR

6. Economizer: Economizer shall be a modulating gear driven type where the outside air will modulate from closed to minimum outside air setpoint and 100% during economizer mode. Economizer is shipped separately and shall be field installed and wired under this section.
7. Guarantee: Provide 5 year extended warranty on the condenser coil and compressor.
8. Provide Herosite coating on condenser coils.

C. Heat Pump, Packaged:
   1. General: Self-contained heating/ cooling unit designed for outdoor installation. Factory assembled and tested. Provide all starters and relays required for operation. 24 volt control circuit from integral transformer. Weatherproof cabinet, galvanized steel with enamel finish. Drain pan. Multivane-centrifugal supply fan. ARI certified. BDP, Carrier, Lennox. York, and Trane.
   2. Refrigeration: Sealed Hermetic compressor with internal vibration isolating mount. Reversing valve, hard start components, crankcase heater, high/ low pressure switch, anti-recycle timer. Air-cooled condenser with propeller fan. Non-ferrous finned coil. Low ambient control to 25°F, unless otherwise noted.
   3. Heat: Reverse cycle with supplemental electrical heater.
   4. Guarantee: Provide 5 year extended warranty on the condenser coil and compressor.
   5. Thermostat: Thermostats shall comply with Title 24 Energy Conservation Standards. Thermostat shall provide automatic changeover from heating to cooling with continuous fan operation. Provide 2 stage heating and "OFF-HEAT-AUTO-COOL" and "AUTO-ON" switches.

D. Split System Air Conditioning:
   1. Condensing Unit:
      a. General: Self-contained unit designated for outdoor installation. Factory assembled and tested. Provide all starters and relays required for operation. 24 volt control circuit from integral transformer. Weatherproof cabinet, galvanized steel with enamel finish. Drain pan. ARI certified. Daikin, Quietside, Carrier, York, Trane, and Mitsubishi.
      b. Refrigeration: Sealed Hermetic compressor with internal vibration isolating mount. Crank case heater, high/ low pressure switch, anti-recycle timer. Air-cooled condenser with propeller fan. Non-ferrous finned coil. Low ambient control to 25°F, unless otherwise noted.
      c. Guarantee: Provide 5 year extended warranty on the condenser coil and compressor.
   2. Indoor Unit: Multi-speed direct drive blower on vibration mountings, filters, capacity as scheduled on plans. Daikin, Quietside, Carrier, York, Trane, and Mitsubishi.
   3. Coil Section: Encased coil. Casing shall be galvanized steel finished with baked enamel and shall be insulated. Direct expansion evaporation coils suitable for use with upflow furnace complete with distribution piping, expansion valve, drain pan, and drain connection. Daikin, Quietside, Carrier, York, Trane, and Mitsubishi.

E. Exhaust Fans:
   1. General: All exhaust fans shall be tested and rated in accordance with AMCA

Standard 210. Fans exposed to the weather shall have ventilated weatherproof housing over motor and drive assembly.

2. Ceiling Fan: Ceiling mounted direct drive centrifugal exhaust fan with exhaust grille. Motor mounted in rubber-in-shear isolators. Motor and fan removable through grille. Acoustically lined housing. Backdraft damper. UL listed. Penn, Cook, ACME, Greenheck or equal.
3. Roof Fan: Multivane centrifugal fan. Ball bearings. Vibration isolation mount. All aluminum curb base. Weatherproof disconnect switch. Down blast type UL listed. Cook, Greenheck, Penn, ACME or equal.

PART 3 EXECUTION

3.1 DUCTWORK INSTALLATION:

A. General:
1. Standards: Unless otherwise noted, all ductwork shall be constructed and installed in accordance with current SMACNA "HVAC Duct Construction Standards." Ductwork and accessories shall be installed in a manner to prevent vibration and rattling.
2. Seismic Bracing: All ducts shall be braced and supported per details on the drawings.
3. Duct Access Doors: Provide access doors as required to adjust equipment and dampers.
4. Flexible Connections: Connections of ductwork to all equipment shall be with 6" (min.) flexible connection. Install with ample slack and uniform gap after deflection of vibration isolators. There shall be no metal to metal contact across flexible connection. Protect outdoor connections with weatherproof metal shroud on top and sides, no metal-to-metal contact. Provide at all seismic joints.
5. Open ends of ductwork shall be covered during construction to keep inside clean.

B. Low Velocity-Low Pressure (up to 2000 ft./ min.; up to 2.0 in. water):
1. Sheet Metal Ductwork:
   a. Ells: Ells with less than standard radius and square ells shall be fitted with turning vanes.
   b. Tees: Tees shall be straight tap-in with extractor or 45 degree takeoff, as shown on drawings.
   c. Duct Joints: Seal duct joints airtight with fibre tape and adhesive per manufacturer's printed instructions. Ducts in weather shall be sealed air and watertight with duct mastic before closing and taping.
      1) Where Ductmate type of joints are used the manufacturer's, designated procedure shall be followed. Ductmate joints on roof shall have continuous cleat on top duct flange to prevent water from collecting on gasket.
   d. Dampers: Install volume control damper and damper regulator in all branch ducts whether specifically shown on drawings or not.
   e. Duct dimensions shown on drawings for lined ducts are clear net openings inside of lining.
   f. Top of ducts exposed to weather shall be cross broken and sloped slightly to each side to allow rainwater to run off. Ducts that do not drain off top will be rejected and need to be replaced at contractors' expense.
2. Flexible Glass Fiber Ductwork: Hangers shall be 2" wide metal straps spaced to prevent sagging, 3 feet spacing maximum. Insert 6" wide fiberglass pad between duct and hanging strap. All joints and fittings shall be sheet metal and shall be installed with metal bands or 3 (min.) self-tapping screws and fiber tape. Maximum length of flexible duct shall be 5 ft., single piece minimum length shall be 3 ft. Minimum turn radius shall be in accordance with SMACNA Standards (turn radius to duct centerline not less than 1.5 times the duct diameter).

3.2 AIR TERMINALS AND DUCT FITTINGS INSTALLATION

A. General: Unless otherwise noted, all air terminals and duct fittings shall be installed in accordance with current SMACNA "HVAC Duct Construction Standards", details on drawings and manufacturer's instructions. Terminals and fittings shall be installed in a manner to prevent vibration and rattling.

3.3 DUCTWORK INSULATION INSTALLATION

A. General: All supply and return sheet metal ductwork shall be insulated.

B. Concealed Ductwork: Wrap ductwork with fiberglass blanket lapped 2" minimum. Secure with foil tape at all joints for a complete vapor barrier.

C. Acoustic Lining: All ductwork in equipment rooms, where exposed to weather, and elsewhere as indicated on drawings, shall have acoustic lining (except downstream of final filters). Increase each sheet metal dimension to accommodate lining and maintain clear inside duct dimensions shown on drawings. Apply lining with bonding adhesive in accordance with manufacturer's recommendations and also secure with mechanical fasteners in accordance with SMACNA Standards. Seal exposed edges of lining with bonding adhesive.

3.4 EQUIPMENT INSTALLATION

A. General: It shall be the responsibility of the contractor to ensure that no work done under other specification sections shall in any way block, or otherwise hinder access panels or diminish the effectiveness of equipment vibration isolation.

B. Connections to Equipment: Where size reductions are required for connections to equipment, they shall be made immediately adjacent to the equipment and, if possible, inside the equipment cabinet. Connections made to equipment mounted on vibration isolators shall be with flexible connectors, installed adjacent to equipment.

C. Start Up: Engage manufacturer or factory-authorized service representative to perform start up supervision. Manufacturer shall provide on-site start up and commissioning assistance through job completion. Complete installation and start up checks according to manufacturer's written instructions.

3.5 TEMPERATURE CONTROL SYSTEM

A. Thermostat shall have the capability of terminating all heating at a temperature of no more than 70°F or terminating all cooling at a temperature of no less than 78°F, and to provide a temperature range of up to 10°F between full heating and full cooling. Thermostats shall be 7 day programmable, Honeywell or equal with sub-base capable of battery backup or capacitor to retain program in the event of a power outage. All control wiring, regardless of voltage, shall be installed in conduit.

1. Exhaust fans will be energized by the program systems(s), including any one of the bypass timers.

B. Unless noted otherwise, all products shall be of a single manufacturer. The standard of design and quality shall be products as manufactured by Johnson Controls or Owner/Engineer approved alternate.

C. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional requirements of the specified product. A request for Architect/Engineer's approval must be submitted with complete technical data to allow for proper evaluation. All materials for evaluation must be received by Project Manager at least 10 days prior to bid due date.

3.6 TESTS AND ADJUSTMENTS

A. General: Unless otherwise directed, tests shall be witnessed by a representative of the Architect. Work to be concealed shall not be enclosed until prescribed tests are made. Should any work be enclosed before such tests, the Contractor shall, at his expense, uncover, test, and repair his work and that of other contractors to original conditions. Leaks and defects shown by tests shall be repaired and entire work retested.

3.7 SYSTEM ENERGY BALANCE

A. Scope: Provide the services of a qualified independent test and balance agency certified by the Associated Air Balance Council (AABC) or The National Environmental Balancing Bureau (NEBB) to test, adjust and balance, retest, and record performance of the system to obtain design quantities as specified. Balancing contractor must also be TABB certified and have a C-20 license.

B. Qualifications: Prior to commencing work, the agency shall be approved by the Owner's Representative.

C. Instruments: All instruments shall be accurately calibrated; calibration histories shall be available for examination. Application of instrumentation shall be in accordance with AABC standards.

D. Procedure: General: Balanced quantities shall be plus 5%, minus 5% of design quantities. All name-plate data, manufacturer, model, and serial numbers shall be recorded for each item tested. All outside air flow listed in minimum.

E. Extended Warranty: The test and balance agency shall include an extended warranty of 90 days after completion of test and balance work, during which time the Owner's Representative at his discretion may request a recheck or resetting of any item or items in test report. The agency shall provide technicians to assist the Owner's Representative in making any tests he may require during this period of time.

F. Air Balance Procedure (For Each Air Handling System):
1. All air filters shall be clean when air balance is performed.
2. Provide a sketch of the equipment showing exactly where all pressure readings were taken.
3. Adjust blower RPM to design requirements.
4. Record motor full load amperes.
5. Make pitot tube traverse of main supply and return ducts and obtain design CFM at fans.
6. Record system static pressures, inlet, and discharge.
7. Record filter quantity, size(s) and pressure drop across filter(s) at each filter bank.
8. Adjust system for design CFM recirculated air.
9. Adjust system for design CFM outside air minimum settings.
10. Record entering air temperatures. (DB heating, DB and WB cooling.)
11. Record leaving air temperatures. (DB heating, DB and WB cooling.)
12. Adjust all main supply and return air ducts to design CFM.
13. Adjust all zones to design CFM, supply, and return.

14. Adjust all diffusers, grilles, and registers to plus 10%, minus 0% of design requirements.
15. Adjust CFM at all exhaust fans, make-up units, etc. (high and low speed, where applicable). Record applicable data from items 1 through 11 above.
16. Each grille, diffuser and register shall be identified as to location.
17. Verify proper diffusion pattern for all ceiling grilles and that all sidewall grilles are set for 5 degrees downward deflection unless otherwise noted. Make a notation of any that are not set properly.
18. Size, type and manufacturer of diffusers, grilles, registers, and all tested items shall be identified and listed. Manufacturer's ratings shall be used to make required calculations on all items.
19. Readings and tests of diffusers, grilles, and registers shall include required FPM velocity and test resultant velocity, required CFM and test resultant CFM after adjustments.
20. In cooperation with the control manufacturer's representative, set adjustments of automatically operated dampers to operate as specified. Testing agency shall check all controls for proper calibrations and list all controls requiring adjustment by control installers.
21. All diffusers, grilles and registers shall be adjusted for required air patterns and to minimize drafts.
22. As a part of the work of this contract, THE AIR CONDITIONING CONTRACTOR shall make any changes in pulleys, belts, dampers, or the addition of dampers cleaning of insect screens and replacement of filters required for correct balance as recommended by air balance agency, at no additional cost to Owner.
23. Set, test, and adjust packaged heating/ cooling unit economizer operation in cooperation with controls contractor. Record minimum and maximum outside and exhaust airflows.

END OF SECTION

SECTION 23 00 02 HEATING, VENTILATING AND AIR CONDITIONING

PART 1 GENERAL

1.1 GENERAL CONDITIONS

A. The foregoing Section 23 00 00, General Mechanical Provisions shall form a part of this specification.

1.2 SCOPE

A. Included: Perform all work necessary and required to complete construction as indicated. Such work includes the furnishings of all labor, materials, and services necessary for a complete, lawful, and operating air conditioning, heating, ventilating system with all equipment as shown or noted on the drawings or as specified herein. The work includes, but is not necessarily limited to, the following:
   1. Heating, ventilating and air conditioning equipment.
   2. Air distribution system (Ductwork, Air Terminals, etc.).
   3. System insulation.
   4. Controls and control wiring and conduit for control wiring.

B. Work Specified Elsewhere:
   1. Line voltage power wiring (60 volts or greater), motor starters in motor control centers, and disconnect switches are included in the electrical section.
   2. Connection of gas and condensate drains to equipment.
   3. Access doors.

PART 2 - MATERIALS

2.1 DUCTWORK MATERIALS

A. General: All ductwork materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL-181 not exceeding a flame spread of 25 and smoke developed of 50. All ductwork shall be per Chapter 6 of the CMC.

B. Low Velocity Metal Ductwork: Metal ductwork shall be galvanized sheet steel, ASTM A653.

C. Low Velocity Flexible Ductwork: Insulated flexible ductwork. Continuous internal liner bonded to galvanized steel wire helix. One pound per cubic foot glass fiber insulation, R-8. Thermal conductivity shall not exceed 0.13 Btu/hr. sq. ft.- degrees F at a mean temperature of 75°F. Seamless vapor barrier jacket. Each length shall have a factory installed metal sleeve at each end. Duct shall be capable of continuous operation at 1.5" of water static pressure and 4000 ft./ min. air velocity. Maximum length 5 ft., single piece at runouts to air terminals. Genflex, Lamborn or equal.

D. Spiral Duct: Ductwork shall be galvanized steel with uni-seal spiral seamlock and uni-seal fittings, ASTM A653. United McGill Corp or equal. All exposed spiral duct shall be painted, color selected by Owner.

E. Bonding Adhesive: Durodyne WBG, Scotchgrip Adhesive 4230 or equal.

F. Duct Mastic: Minnesota Mining and Manufacturing Duct Sealer 800, Tuff-Bond No. 12, Glencoat Seal-Flex or equal.

G. Duct Joints:
   1. As an option to joints and seams designated by SMACNA or shown on Drawings, the following systems may be used:
      a. Ducts with sides 24 inches to 48 inches, transverse duct joint system by Ductmate Jr., Nexus or equal (SMACNA "E" Type connection).
      b. Ducts 48 inches and larger, Ductmate Regular, Nexus (SMACNA "J" Type connection) or equal.

H. Fiber Tape: Mineral impregnated fiber tape and plastic activator-adhesive. Hardcast, Inc., United McGill Uni-Cast or equal.

2.2 AIR TERMINALS AND DUCT FITTINGS

A. Grilles: (Grilles, Registers and Diffusers)
   1. Information on Drawings: Refer to the Air Distribution Schedule on the drawings for the list of grilles. Manufacturer's model numbers are listed to complete the description. Equivalent models of J & J, Krueger, Barber-Colman, Anemostat, Price, Titus or equal. Refer to the floor plans for neck size, CFM, air diffusion pattern, and fire damper, if required.
   2. Performance: If, according to the certified data of the manufacturer of the proposed units, the sizes indicated on the drawings will not perform satisfactorily, the units shall be re-selected by the Contractor for the proper diffusion, spread, drop, and throw.
   3. Frame and Accessories: All supply, return, and exhaust grilles shall be provided with cushion heads and attachments to structure, unless otherwise noted. All surface mounted grilles shall have a perimeter gasket and flanged edge. All grilles shall have frames suitable for mounting in the surfaces designated by the architectural drawing, coordinate prior to ordering.
   4. Finish: All ceilings and wall grilles shall have a paintable white finish unless otherwise noted. Interior components shall be flat black.
   5. Gyms: Provide 12 Ga. wire safety cables for all overhead grilles in Gym.

B. Turning Vanes: Double wall, hollow metal, air-foil shape. Spacing in accordance with manufacturer's recommendations. Aero Dyne, HEP or equal.

C. Flexible Connection: UL listed neoprene coated 30-ounce fiberglass cloth. 3" metal, 6" fabric, 3" metal. Ventglas or equal.

D. Branch Duct Volume Damper: Volume control damper (VCD) in rectangular ducts shall be as follows: Opposed blade, 6" maximum blade width, 16-gage blade, 48" maximum length, nylon or oil impregnated bronze bearings, ½" diameter pin shaft, 16-gage channel frame, actuating rod and linkage out of air stream. VCD in round duct shall be as follows: Damper blade full height of branch and 1" less than branch width. All branch dampers shall have regulator with stamped steel handle, spring loaded shaft nut, cast body, and serrated self-locking die cast core. Regulator for horizontal ducts overhead shall be mounted on sides or bottom of ducts. Secure a 12" length of brightly colored plastic ribbon to handle for ease of location. Where rectangular or round ductwork is insulated, slit insulation to allow handle to protrude. Ventlok 641 (with 607 end bearing for round ducts).

E.

F. Louvers: Refer to the Air Distribution Schedule on the drawings. Manufacturer's model numbers are listed to complete the description. Equivalent models of Ruskin, Greenheck, Dayton or approved equal. Contractor shall fabricate and provide 16 GA. galvanized perforated panel (50% Free Area) over exterior of all louvers and have field painted to match exterior wall. Refer to the floor plans for all sizes.

2.3 DUCTWORK INSULATION MATERIALS

A. General: All ductwork insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL-181 not exceeding a flame spread of 25 and smoke developed of 50.

B. Acoustic Lining: Glass fiber. One side coated to prevent fiber erosion up to 6000 ft./ min. Average noise reduction coefficient of 0.90. 0.13 Btu/ hr – sq. ft. – degrees F conductivity at a mean temperature of 75 degrees F, R-8. CSG Insulation Corp., Schuller, Owens-Corning, Knauf or equal. Duct dimensions shown on drawings for lined duct are clear (net) opening inside of lining.

C. Fiber Glass Blanket: Foil faced, 0.13 Btu/ hr – sq. ft. – degrees F conductivity at a mean temperature of 75 degrees F, R-8. CSG Insulation Corp., Schuller, Owens-Corning, Knauf or equal.

D. Bonding Adhesive: Benjamin Foster 85-15 or equal.

2.4 PIPING MATERIALS

A. Miscellaneous Piping Items:
   1. Pipe Support:
      a. Pipe Hanger: Adjustable split ring, swivel hanger and rod. Black malleable iron. Size and maximum loads per manufacturer's recommendation. Felt Lined, Kin-Line 450 F.
      b. Construction Channel: 12 gage 1-5/8" x 1-5/8" steel channel. Single or multiple sections. Self-locking nuts and fittings. Kin-Line, Unistrut.
   2. Pipe Sleeves: 24 gage galvanized steel. Adjus-to-Crete #10 with #99 thimble for floors. #100 for walls.

B. Flashing: Flashing for piping through roof shall be prefabricated 24 gage galvanized steel roof jacks with 8" square flange around pipe. Seal with weatherproofing mastic.

2.5 PIPING INSULATION MATERIALS

A. General: All piping insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.

2.6 EQUIPMENT

A. General Requirements:
   1. Capacity: Capacities shall be in accordance with schedules shown on drawings. Capacities are to be considered minimum.
   2. Dimensions: Equipment must conform to space requirements and limitations as indicated on drawings and as required for operation and maintenance. Where Architectural screening is indicated, equipment shall not extend above or beyond screening. Equipment will not be accepted that does not readily conform to space conditions. Prepare and submit layout drawings for all proposed equipment (different than scheduled units) showing actual job conditions, required clearances for proper operation, maintenance, etc.
   3. Ratings:
      a. Electrical: Electrical equipment shall be in accordance with NEMA Standards and UL or ETL listed where applicable standards have been established.
   4. Piping: Each item or assembly of items shall be furnished completely piped for

connection to services. Control valves and devices shall be provided. Equipment requiring domestic water for non-potable use shall be provided with backflow preventer acceptable for intended use by local governing authorities.

5. Electrical:
   a. General: Each item or assembly of items shall be furnished completely wired to individual terminal blocks for connection to single branch electrical circuit. All electrical accessories and controls required by equipment shall be furnished. Provide terminal blocks for controls and interlocks not included in equipment package. Manual and magnetic starters shall have ambient compensating running overcurrent protection in all ungrounded conductors. Magnetic starters shall be manual reset, shall have H-O-A switches and auxiliary contacts. Controllers and other devices shall be in NEMA 1 or 3R enclosures as applicable.
   b. Wiring: Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each ungrounded conductor, all accessible on operating side of equipment. Switches, contacts, and other devices shall be in ungrounded conductors.
   c. Motors: Shall be rated, constructed, and applied in accordance with NEMA and ANSI Standards without using service factor. Single-phase motor shall be of type to suit application. Three-phase motors shall be open drip proof, NEMA B design on pumps and fans, NEMA C on reciprocating equipment, sealed ball bearing, three-phase induction unless otherwise noted. Design shall limit starting inrush current and running current to values shown on drawings. Motors 1 horsepower and larger shall be the premium efficiency type, tested according to IEEE Standard 112, Method B. Motors exposed to weather shall be TEFC. Motors in a fan air stream shall be TEFC or TEAO. Vertical motors outdoors shall be ODP or TEFC and shall have rain caps.
   d. Starters: Motor starters shall be furnished for all equipment except where starter is in a motor control center as designated on the electrical drawings. Deliver starter to Electrical Contractor for installation and wiring.
   e. Control Voltage: Equipment connected to greater than 240 volts shall be provided with 120 volt control circuit from integral protected transformer if separate source is not indicated on plans. 240 volt control is acceptable if confined within control panel.
   f. Submittals: Included in shop drawings shall be internal wiring diagrams and manufacturer's recommend external wiring.
6. Fan Selection:
   a. Fan Curves: Performance curves shall be submitted for all units of 3000 CFM or greater. Operating point for forward curved fans shall be from point of maximum efficiency towards increased CFM limited by horsepower scheduled. Operating point for backward inclined fans shall be selected near point of maximum efficiency. Curves shall plot CFM verses static pressure with constant brake horsepower, RPM, and efficiency lines.
   b. Static Pressure: Unless otherwise noted, pressure scheduled as external static pressure (ESP) includes all ductwork and accessory losses external to the unit housing. Unless otherwise noted, pressure scheduled as total static pressure includes all ductwork, filter, coil, cabinet, damper, and other accessory losses. Unless otherwise noted, pressure scheduled as duct static pressure includes all supply and return ductwork and accessory losses external to the unit housing and plenum (as applicable). The allowance for filter losses is 0.3" WC, unless otherwise noted. Submit itemized static pressure losses for all components.
7. Filters:
   a. General: Tested and rated in accordance with ASHRAE Standard 52.2 and Title 24, C.C.R. Furnish and install one complete change of all filters after air balance in completed and prior to acceptance. Provide pressure differential gage across all filter banks.

b. Filter Media: 2" media. MERV 13. Clean filter resistance 0.25" water at 500 fpm. Throw-away frame. Class 2. Camfil Farr AP.
c. Pressure Differential Gage: Diaphragm actuated. 4" dial. Zero adjustment. Accuracy +/ - 2% of full scale. Range as required. Provide static pressure sensors, tubing, and mounting brackets. Dwyer Series 2000. Mark gage to indicate filter replacement pressure, coordinate point with filter and equipment manufacturers.

8. Mixing Dampers: Opposed blade, 16-gage. Six-inch maximum blade width, 48" maximum length. Nylon or oil impregnated bronze bearings. One-half inch diameter pin shaft. 16-gage channel frame. One percent maximum leakage at 4" WC in accordance with AMCA 500 for outside air dampers. Actuating rod out of air stream. Arrow.
9. Sound Ratings: Shall be in accordance with ASHRAE 36-72. Sound ratings shall not exceed scheduled values.
10. Drives: Unless noted as direct connected, drives shall be V-belt, rated at 150% of motor horsepower. Multiple drive belts shall be matched set. Drive sheaves shall be dynamically balanced, adjustable, range +/ - 10%, selected at mid-range. Adjustable relative movement shall be lockable to shaft. Belts shall be aligned within 1-1/2 degrees at all times. Open drives shall be provided with OSHA approved open mesh belt guards. Belt guards exposed to weather shall be weatherproof enclosure with louvered face for adequate ventilation. Driving motor shall be mounted on adjustable rails. T.B. Woods, Browning. Submit RPM range of driven machine with drive selection.

B. Packaged Heat Pump Unit (thru 15 tons): (ADDITIVE ALTERNATE #1)

1. General: Self-contained heating/cooling unit designed for outdoor installation. Factory assembled and tested. Provide all starters and relays required for operation. 24 volt control circuit from integral transformer. Weatherproof cabinet, galvanized steel with enamel finish. Drain pan. Multi-vane, centrifugal supply fan. ARI Certified. Basis of Design: Trane. Owner approved alternate.
2. Refrigeration: Sealed Hermetic compressor with internal vibration isolating mount. Reversing valve, hard-start components, crankcase heater, high/low pressure switch, anti-recycle timer. Air-cooled condenser with propellor fa. Non-ferrous finned coil. Low ambient control to 25 F. unless otherwise noted.
3. Heat: Reverse cycle with supplemental electrical heater.
4. Thermostat: Thermostats shall comply with Title 24 Energy Conservation Standards. Thermostat shall provide automatic changeover from heating to cooling with continuous fan operation. Provide 2 stage heating and "OFF-HEAT-AUTO-COOL" and "AUTO-ON" switches.
5. Economizer with Power Exhaust: Economizer shall be a modulating power exhaust type where the unit will exhaust at the minimum outside air setpoint and exhaust 100% during economizer mode. Economizer with power exhaust is shipped separately and shall be field installed and wired under this section.
   a. Provide plastic air sampling tube to sense pressure in room for control of power exhaust. Tube shall be placed thru ceiling with escutcheon plate in room that unit serves.
   b. Modulating Economizer Sequence of Operation: The economizer system initially responds to a signal from the cooling thermostat and functions as a true first stage for cooling, while providing maximum fuel economy. The economizer is automatically locked out during the heating mode and holds the outdoor air damper at the minimum position settings. During the occupied period, the discharge sensor provides a signal to the actuator during free cooling or economizer mode. The signal opens the economizer damper until the discharge temperature drops below 50 degrees F. At this time, the signal causes the motor to drive the damper back to minimum position. As the discharge temperature climbs to 60 degrees F the motor will drive back open. During the occupied period, the actuator will not close past the minimum position. (The setpoints maybe changed by Commissioning

Contractor to optimize controls for LEED Certification or Title 24 Requirements.) If the fully open actuator cannot satisfy the space demand, mechanical cooling is sequenced on. During the unoccupied period, the actuator will override minimum position setting and drive fully closed. On a loss of power, the actuator will spring return fully closed. When in heating operation, or when outdoor air temperature or enthalpy conditions are high, economizer operation is locked out, and actuator is held at minimum position. The staging relay is used when the first stage compressors must provide mechanical cooling when assisting the economizer. The staging relay can be omitted when the second stage compressors can be used to assist the economizer with mechanical cooling.

c. CO2 Sensor Economizer Integration: When a CO2 sensor is used in conjunction with an economizer, the minimum position jumper between P and P1 on the logic is removed, and the sensor connected. When the CO2 sensor gets a reading higher than the setpoint, the sensor will signal the logic to modulate the o/a dampers open. The HVAC unit functions as if there is no economizer during the CO2 call for fresh air. When the CO2 level falls below the setpoint, the damper modulates back to the minimum position.

d. Modulating Power Exhaust Sequence of Operation: When the outside air damper on an economizer starts to open, extra air is introduced the system. As this happens, a mercury switch mounted on the economizer closes. This causes a switch to close on the variable speed controller, allowing high voltage power to be sent to an exhaust motor and blower. The mercury switch is adjusted to close at the 1% outside air damper position. The power exhaust is a centrifugal blower power exhaust. The power exhaust uses an adjustable transducer (0-10 VDC) to accurately compare the space pressure to atmospheric pressure and adjust the amount of exhaust air accordingly. The exhaust volume adjustment is accomplished using a variable frequency drive with a built-in PID control to maintain a field adjustable pressure set point.

6. Economizer: Economizer shall be a modulating gear driven type where the outside air will modulate from closed to minimum outside air setpoint and 100% during economizer mode. Economizer is shipped separately and shall be field installed and wired under this section.
7. Guarantee: Provide 5 year extended parts warranty on the condenser coil and compressor.

C. Exhaust Fans:
1. General: All exhaust fans shall be tested and rated in accordance with AMCA Standard 210. Fans exposed to the weather shall have ventilated weatherproof housing over motor and drive assembly.
2. Ceiling Fan: Ceiling mounted direct drive centrifugal exhaust fan with exhaust grille. Motor mounted on rubber-in-shear isolators. Motor and fan removable through grille. Acoustically lined housing. Backdraft damper. UL listed. Penn, Cook, ACME, Greenheck or equal.
3. Roof Fan: Multi-vane centrifugal fan. Ball bearings. Vibration isolation mount. All aluminum curb base. Weatherproof disconnect switch. Down blast type UL listed. Cook, Greenheck, Penn, ACME or equal.

D. Range Hood:
1. General: Self-contained stainless steel residential style unit designed for indoor installation and UL listed. Factory assembled and tested. Provide with washable aluminum filters, integral controls for multi-speed fan and two (50 watt max.) halogen flood lights. Verify color or stainless steel with Architect/ Owner prior to ordering. Broan or equal.

PART 3 EXECUTION

3.1 DUCTWORK INSTALLATION

A. General:
1. Standards: Unless otherwise noted, all ductwork shall be constructed and installed in accordance with current SMACNA "HVAC Duct Construction Standards". Ductwork and accessories shall be installed in a manner to prevent vibration and rattling.
2. Seismic Bracing: All ducts shall be braced and supported per details on the drawings.
3. Duct Access Doors: Provide access doors as required to adjust equipment and dampers.
4. Flexible Connections: Connections of ductwork to all equipment shall be with 6" (min.) flexible connection. Install with ample slack and uniform gap after deflection of vibration isolators. There shall be no metal to metal contact across flexible connection. Protect outdoor connections with weatherproof metal shroud on top and sides, no metal-to-metal contact. Provide at all seismic joints.
5. Ducted Returns: All air handling that is not directly located in the space that it serves shall have ducted returns.
6. Open ends of ductwork shall be covered during construction to keep inside clean.

B. Low Velocity-Low Pressure (up to 2000 ft/ min; up to 2.0 in. water):
1. Sheet Metal Ductwork:
   a. Ells: Ells with less than standard radius and square ells shall be fitted with turning vanes.
   b. Tees: Tees shall be straight tap-in with extractor or 45 degree takeoff, as shown on drawings.
   c. Duct Joints: Seal duct joints airtight with fiber tape and adhesive per manufacturer's printed instruction. Ducts in weather shall be sealed air and watertight with duct mastic before closing and taping.
      1) Where Ductmate type joints are used, the manufacturer's designated procedure shall be followed. Ductmate joints on roof shall have continuous cleat on top duct flange to prevent water from collecting on gasket.
   d. Dampers: Install volume control damper and damper regulator in all branch ducts.
   e. Duct dimensions shown on drawings for lined ducts, are clear net openings inside of lining.
   f. Top of ducts exposed to weather shall be cross broken and sloped slightly to each side to allow rainwater to run off. Ducts that do not drain off top will be rejected and need to be replaced at contractors' expense.
2. Flexible Glass Fiber Ductwork: Hangers shall be 2" wide metal straps spaced to prevent sagging, 3 feet spacing maximum. Insert 6" wide fiberglass pad between duct and hanging strap. All joints and fittings shall be sheet metal and shall be installed with metal bands or 3 (min) self-tapping screws and fiber tape. Maximum length of flexible duct shall be 5 ft. Single piece minimum length shall be 3 ft. Minimum turn radius shall be in accordance with SMACNA Standards (turn radius to duct centerline not less than 1.5 times the duct diameter).

3.2 AIR TERMINALS AND DUCT FITTINGS INSTALLATION

A. General: Unless otherwise noted, all air terminals and duct fittings shall be installed in accordance with current SMACNA "HVAC Duct Construction Standards", details on drawings and manufacturer's instructions. Terminals and fittings shall be installed in a manner to prevent vibration and rattling.

B. Fire Smoke Damper: Fire smoke dampers shall be installed in accordance with their State Fire Marshal approval and the manufacturer's recommendations.

C. Gym: Attach safety cable to inside of duct and to grille neck with #10 sheet metal screws.

3.3 DUCTWORK INSULATION INSTALLATION

A. General: All supply and return sheet metal ductwork shall be insulated.

B. Concealed Ductwork: Wrap ductwork with fiberglass blanket lapped 2" minimum. Secure with foil tape at all joints for a complete vapor barrier.

C. Acoustic Lining: All ductwork in equipment rooms, where exposed to weather, and elsewhere as indicated on drawings, shall have acoustic lining. Increase each sheet metal dimension to accommodate lining and maintain clear inside duct dimensions shown on drawings. Apply lining with bonding adhesive in accordance with manufacturer's recommendations and secure with mechanical fasteners in accordance with SMACNA Standards. Seal exposed edges of lining with bonding adhesive.

3.4 PIPING INSTALLATION

A. General:
   1. Piping Layout: Piping shall be concealed in walls, above the ceilings, or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location to be approved by Architect. No structural member shall be weakened by cutting, notching, boring or otherwise unless specifically allowed by structural drawings and/ or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. All piping shall be installed in a manner to ensure unrestricted flow, eliminate air pockets, prevent any unusual noise, and permit complete drainage of the system. All piping shall be installed to permit expansion and contraction without strain on piping or equipment. Expansion joints and/or flexible connectors shall be installed as required. Vertical lines shall be installed to allow for building settlement without damage to piping. Lines shall be adequately braced against vertical and lateral movement.
   2. Pipe Support:
      a. General: Hangers shall be placed to support piping without strain on joints or fittings. Maximum spacing between supports shall be as specified below. Actual spacing requirements will depend on structural system. Refer to drawings for additional requirements and attachment to structure. Vertical piping shall be supported at floor and ceiling. Support pipe within 12" of all changes in direction. No perforated straphanger shall be used in any work.
      b. Refrigerant Piping: Pipe shall be cut square. Joint surfaces shall be thoroughly cleaned, fitted, and erected before brazing. Install specified accessories. After installation, evacuate to 29 inches of mercury, ambient temperature during evacuation shall not be less than 70 degrees F. After evacuation, fill with dry nitrogen to 250 psi and maintain for two-hour period without additional charge. After nitrogen test, purge with refrigerant charged through dryer and maintain holding charge in system and equipment. Refrigerant piping below grade shall be run in 4” (min.) PVC conduit with long radius ells. Seal ends of conduit watertight.
      c. PVC Piping: Shall be cut square and assembled prior to solvent weld. Apply primer per manufacturer’s recommendations. Coat male joint fully with solvent, make joint before solvent dries and wipe exterior clean.

3.5 PIPING INSULATION INSTALLATION

A. Refrigerant Piping: Cover suction piping with foamed plastic insulation. Longitudinal and end seams shall be thoroughly cemented with adhesive in accordance with manufacturer's recommendation. Cover all fittings, unions, valves, and connections. Piping exposed to weather shall be covered with aluminum jacketing, seal all joints and seams with grey outdoor mastic or silver silicone sealant. Piping exposed in room shall be covered with piping chase painted to match wall.

3.6 EQUIPMENT INSTALLATION

A. General: It shall be the responsibility of the contractor to ensure that no work done under other specification sections shall in any way block, or otherwise hinder access panels or diminish the effectiveness of equipment vibration isolation.

B. Connections to Equipment: Where size reductions are required for connections to equipment, they shall be made immediately adjacent to the equipment and, if possible, inside the equipment cabinet. Connections made to equipment mounted on vibration isolators shall be with flexible connectors, installed adjacent to equipment.

C. Start Up: Engage manufacturer or factory-authorized service representative to perform start up supervision. Manufacturer shall provide on-site start up and commissioning assistance through job completion. Complete installation and start up checks according to manufacturer's written instructions.

3.7 TEMPERATURE CONTROL SYSTEM

A. Thermostats shall have the capability of terminating all heating at a temperature of no more than 70 degrees F or terminating all cooling at a temperature of no less than 78 degrees F, and to provide a temperature range of up to 10 degrees F between full heating and full cooling. Thermostats shall be 7 day programmable, Carrier, Robertshaw or equal with sub-base capable of battery backup or capacitor to retain program in the event of a power outage. All control wiring, regardless of voltage, shall be installed in conduit.

3.8 HVAC DUCT CLEANING (ADDITIVE ALTERNATE 1)

A. General: Duct cleaning procedures shall be done per National Air Duct Cleaners Association (NADCA), ACR 2006 Guidelines. Contractor shall thoroughly clean all existing ductwork and grilles to remain shown on drawings with a brush and vacuum system. All workers who may potentially breathe duct contaminants or biocides should wear suitable protective breathing apparatus. Also, workers should look for other types of problems, such as holes or gaps in the ducts. After duct cleaning, a video inspection shall be done for owner review. Inspector to be present during video inspection. The video shall be performed on all ductwork runs with adequate lighting at the camera and adequate reference point, grilles, etc.

B. Work Schedule: All work shall be performed in accordance with the time provisions of the contract. Contractor shall perform work according to a pre-approved schedule with General Contractor, and to complete the work on schedule.

C. Power Vacuum Equipment: Vacuum shall be equipped with final High efficiency Particulate Efficiency (HEPA) filtration to protect surrounding environment from recontamination by disbursement of contaminants removed from air ducts. As an option, contractor may use a collection unit outside of the building. It shall be the contractor's responsibility to remove and dispose of all contaminants from jobsite at contractor's expense.

D. Supervision: All work shall be supervised by an on-site skilled foreman with thorough knowledge and experience in the cleaning of heating, ventilating and air conditioning systems. Supervisor shall have a minimum of 5 years' experience in duct cleaning.

E. Cleaning Process: All ducts shall be cleaned and inspected as work proceeds. Ductwork shall be cleaned by attachment of HEPA power vacuum hose to isolated section of air duct and by combining brushes and reverse air nozzles, to remove all contaminants from the surface of air duct interior. As the brushes and reverse air nozzle are being operated, all

contaminants shall be drawn into the HEPA vacuum unit (minimum 5,000 CFM HEPA vacuum to maintain velocity necessary to keep particulate airborne – 3500 FPM). All foreign materials such as dust, mold, soot, lint, bacteria, and other air residues shall be removed from air ducts. Fan powered high efficiency dust and particulate collection units shall be connected to the supply outlets. The collection systems shall be a self-contained unit, with appropriate components to adequately prevent dirt and debris, loosened from upstream ducts during cleaning operations, from entering the conditioned spaces by capturing this debris within the collection device.

1. Special care and attention shall be given to air ducts having interior lining and a light vacuum process shall be used to prevent damage to air side surfaces. All loose fibrous materials shall be removed by a combination of controlled air pressure and power vacuum.
2. Any major repairs not included in contract shall be brought to the owner's attention.
3. The air handling unit should not be used during the cleaning process. Also, after duct cleaning has been completed, the air handler should be run one (1) hour to allow at least 8 air changes in the area cleaned before being occupied.
4. When gaining access to sheet metal ducts for cleaning use existing duct systems openings where possible. However, where holes need to be cut for access it is essential to seal the access hole properly in order to maintain the integrity of the HVAC system.

F. Clean Up: Contractor shall, at the end of each shift, remove all waste, dirt, and debris, resulting from work performed. Such materials shall be removed from the property and disposed of at the expense of the contractor.

G. Place filter media in all supply diffusers to ensure no contaminants are emitted into areas during cleaning.

H. Cut access panels where necessary by use of sheet metal cutting devise. Access into supply side, then cover with 24 gauge metal gasket seal. Apply sheet metal screws for an airtight seal. Where necessary in concealed attic spaces Contractor will install ceiling access points. Provide gasketed removable access panels at the following locations:

1. Adjacent to turning vanes.
2. Adjacent to dampers (balancing, fire, control, back-draft, splitter, etc.).
3. Upstream of VAV boxes.
4. Next to duct transitions, offsets, and changes of direction.
5. Adjacent to all other in-duct mechanical components and sensors.

I. At any time when ducts are large enough Contractor will enter the ductwork to clean by hand.

J. Wherever the grilles and/ or diffusers are removable, they shall be removed, vacuum cleaned, washed, dried, and then replaced at the original setting. Welded grilles may be cleaned in place.

K. Sanitizing the air distribution network shall be performed as required. Using a suitable atomizing spray wand inserted through the access points, coat all interior surfaces of the ductwork with a fine mist of an EPA registered sanitizing fluid: Oxine or equal.

L. Where necessary place plastic covers on all office furnishings and equipment to protect it from dirt and debris.

M. Supply color codes on blueprints to indicate work performed during the last shift.

N. Supply progress report to the Engineer on work completed and work to be performed on a

shift by shift basis.

O. Supply M.S.D.S. sheets on all cleaners that are used in the cleaning process.

3.9 SYSTEM AIR BALANCE

A. Scope: Provide the services of a qualified independent test and balance agency certified by the Associated Air Balance Council (AABC) or The National Environmental Balancing Bureau (NEBB) to test, adjust and balance, retest, and record performance of the system to obtain design quantities as specified. Balancing contractor must also be TABB certified and have a C-20 license.

B. Qualifications: Prior to commencing work, the agency shall be approved by the Owner's Representative.

C. Instruments: All instruments shall be accurately calibrated; calibration histories shall be available for examination. Application of instrumentation shall be in accordance with AABC standards.

D. Procedure: General: Balanced quantities shall be plus 5%, minus 5% of design quantities. All name-plate data, manufacturer, model, and serial numbers shall be recorded for each item tested.

E. Extended Warranty: The test and balance agency shall include an extended warranty of 90 days after completion of test and balance work, during which time the Owner's Representative at his discretion may request a recheck or resetting of any item or items in test report. The agency shall provide technicians to assist the Owner's Representative in making any tests he may require during this period of time.

F. Air Balance Procedure (for each Air Handling System):
1. All air filters shall be clean when air balance is performed.
2. Provide a sketch of the equipment showing exactly where all pressure readings were taken.
3. Adjust blower RPM to design requirements.
4. Record motor full load amperes.
5. Make pitot tube traverse of main supply and return ducts and obtain design CFM at fans.
6. Record system static pressures, inlet, and discharge.
7. Record filter quantity, size(s) and pressure drop across filter(s) at each filter bank.
8. Adjust system for design CFM recirculated air.
9. Adjust system for design CFM outside air.
10. Record entering air temperatures. (DB heating, DB and WB cooling.)
11. Record leaving air temperatures. (DB heating, DB and WB cooling.)
12. Adjust all main supply and return air ducts to design CFM.
13. Adjust all zones to design CFM, supply, and return.
14. Adjust all diffusers, grilles, and registers to plus 10%, minus 0% of design requirements.
15. Adjust CFM at all exhaust fans, make-up units, etc. (high and low speed, where applicable). Record applicable data from items 1 through 11 above.
16. Each grille, diffuser and register shall be identified as to location.
17. Verify proper diffusion pattern for all ceiling grilles and that all sidewall grilles are set for 5 degrees downward deflection unless otherwise noted. Make a notation of any that are not set properly.
18. Size, type and manufacturer of diffusers, grilles, registers, and all tested items shall be identified and listed. Manufacturer's ratings shall be used to make required calculations on all items.

19. Readings and tests of diffusers, grilles, and registers shall include required FPM velocity and test resultant velocity, required CFM and test resultant CFM after adjustments.
20. In cooperation with the control manufacturer's representative, set adjustments of automatically operated dampers to operate as specified. Testing agency shall check all controls for proper calibrations and list all controls requiring adjustment by control installers.
21. All diffusers, grilles and registers shall be adjusted for required air patterns and to minimize drafts.
22. As a part of the work of this contract, THE AIR CONDITIONING CONTRACTOR shall make any changes in pulleys, belts, dampers, or the addition of dampers cleaning of insect screens and replacement of filters required for correct balance as recommended by air balance agency, at no additional cost to Owner.
23. Set, test, and adjust packaged heating/ cooling unit economizer operation in cooperation with controls contractor. Record minimum and maximum outside and exhaust airflows.

END OF SECTION 23 00 02

SECTION 23 90 00

DIRECT DIGITAL CONTROL AND ENERGY MANAGEMENT SYSTEM

PART 1 GENERAL

1.1 GENERAL MECHANICAL PROVISIONS

A. The General Mechanical Provisions of Section 23 90 00 shall form a part of this Section with the same force and effect as though repeated here.

1.2 SCOPE:

A. General: The direct digital control and energy management system (DDC/EMS) includes control panels, control devices, valves, actuators, all line and low voltage control and interlock wiring (including wiring to controllers, switches, timers, relays, etc.) and conduit and related equipment, as required for proper operation of all equipment. Provide all equipment, programming, labor, materials, and services necessary for a complete, lawful, and operating DDC/EMS as shown or noted on the drawings and as specified herein. All control wiring, line and low voltage shall be installed in conduit. Power wiring, power to DDC/EMS control panels and disconnect switches are included in the Electrical Specifications, except that power wiring for control devices such as controllers, valves, etc., is included in the control system. Electrical work shall be in accordance with Electrical Specifications. The system shall be direct digital control/electric. **The control system shall be Johnson Controls Metasys.** The system shall communicate over the Local Ethernet LAN/WAN and shall include the latest upgrading (software and firmware) during the warranty period. The data wiring shall have an Ethernet connection at the DDC/EMS panel. A Graphical User Interface (GUI) shall be provided. Coordinate with Section 23 00 01, Heating, Ventilating and Air Conditioning and with Division 26. Comply with ASHRAE 55 and Title 24.

1. All work described in this section shall be installed, wired, circuit tested and calibrated by factory certified technicians qualified for this work.

B. Contractor Qualifications: All controls shall be furnished and installed by a Johnson Controls ASI (Authorized Systems Integrator) who is licensed, N4 certified and approved by the controls manufacturer for design, installation, start-up and service of their product. The Contractor must also have a written agreement with the local factory authorized distributor who can in addition to the contractor, supply training and support to the owner directly. Distributor must maintain $100,000 of locally stocked inventory of like product installed at this site. The Contractor must have sufficient personnel to respond to a trouble call at the site within four hours. The Contractor's local manager shall have a minimum of five years' experience in the design, installation, start-up and service of similar systems. The Contractor shall submit a list of at least five projects which are similar in size, scope and contract value to this project. This list shall include the Owner's contact person, phone number and controls contract value.

C. Submittals: Within 60 days of contract award, submit eight (8) copies of shop drawings showing the following aspects of the DDC/EMS system (CAD file with DXF format if required of floor and site plans can be secured from the Architect).

1. All termination points, terminal cabinets, and cabling.
2. Schedule of input and output points.
3. Locations of all visible DDC/EMS system components (i.e. interior and exterior sensors, terminal strips, panels, trench and pull boxes, etc.), identifying specifically any exposed conduit.

4. Descriptive literature for all material and equipment items shall include manufacturer's name and catalog numbers, dimensions, capacities, and all other characteristics and accessories as listed in the specifications or on the drawings.
5. Submit copies of forms to be used for testing and verification showing all data which is to be recorded. Three copies of complete report shall be submitted for review.
6. Complete written sequence of operation for all controlled equipment.

D. Installation and Operation Manuals: Furnish Installation and Operating Manuals for all components. These manuals shall contain full documentation which shall include, without being limited to, the following:
1. General description and specifications.
2. Installation and initial checkout procedures.
3. Complete alignment and calibration procedures for all components.
4. Detailed schematics and assembly drawings and communication trunk diagram with control unit addresses.
5. BACNet architecture diagrams.
6. Sequence of Operations.
7. Commissioning Sheets on every controller installed.
8. Controller points lists.

1.3 SYSTEM ARCHITECTURE:

A. DDC/EMS Equipment: The main controller shall contain the network communications and information management programs providing integrated global control, trend logging, local and remote alarming and fully menu driven user interface. The local network controller must be an intelligent, stand-alone microprocessor based controller which can have a variety of configurations based on their application.

B. Data Transfer System: The DDC/EMS shop drawings shall indicate where all equipment items are to be located for input and output to complete the system. The conduit/cabling system shall inter-tie these points as required to complete one system to meet the design criteria herein. Conduit shall be used for all EMS wiring whenever access is limited (hard-lid, walls, etc). When EMS wiring is installed in/above accessible areas (such as T-bar ceilings), free-air with J-hooks and wire-ties is acceptable. Use cable tray in open ceilings. However, EMS wiring cannot be intermixed or bundled with any other cabling/wiring (Fire Alarm, internet, etc). Cables are to be continuous with no splices. If one cable is found to be discontinuous, the whole project shall be re-cabled. System high speed communication shall be hardwired using a Belden shielded cable as recommended by DDC manufacturer.

C. User Interface Communication: The user may communicate with the DDC/EMS system with a workstation located at the City of Sacramento Main Office over the WAN, with a remote workstation, with an On-Site Operator Workstation, or with a Lap-Top computer (Service Tool).

D. Standard Network Support: All Master Controllers, Workstation(s) and File Server shall be capable of residing directly on the owner's Ethernet TCP/IP LAN/WAN. Furthermore, the Master Controllers, Workstation(s) and File Server shall be capable of using standard, commercially available, off-the-shelf Ethernet infrastructure components such as routers, switches and hubs. With this design the owner may utilize the investment of an existing or new enterprise network or structured cabling system. This also allows the option of the maintenance of the LAN/WAN to be performed by the owner's Information Technology Department as all devices utilize standard TCP/IP components. If the DDC/EMS contractor needs an additional data port that is not already provided, its installation must be coordinated with the City of Sacramento IT department (and IT infrastructure contractor if applicable) and shall be installed at the DDC/EMS contractor's expense. As a result, the DDC/EMS contractor shall ensure any additional data port locations are clearly indicated

and that the existing EMS data ports they intend to utilize are addressed/identified prior to construction so they are not damaged or removed. This coordination shall occur between the City of Sacramento Construction Office, IT department, DDC/EMS operator, IT infrastructure contractor (if applicable), and the project's general construction contractor manager.

PART 2 PRODUCTS

2.1 GENERAL:

A. General Requirements: The Electronic Microprocessor Based Direct Digital Control and Energy Management System (DDC/EMS) shall monitor the data environment and perform control functions in relation to a programmed strategy and the status of the data environment. The system shall use solid state computer based digital and analog technology. The system shall be standard with the manufacturer to ensure on-going parts availability and trained technical support. The DDC/EMS shall be of the user programmable type requiring no special computer education for operation. All necessary instruction manuals and user orientation training shall be supplied by the manufacturer or agent thereof. The DDC/EMS shall be UL listed as a Direct Digital Control and Energy Management System. The programmable control requirements of the DDC/EMS shall include, but not be limited to:

1. OPTIMUM START/STOP (BASED ON HISTORICAL DATA)
2. TIME OF DAY ROUTINES
3. SCHEDULED OCCUPANCY ROUTINES INCLUDING HOLIDAYS
4. CUSTOM TAILORED REPORTING
5. ACCUMULATING RUN TIME
6. CRITICAL CONDITION ALARMING
7. FLUID FLOW SWITCH AND CONTROL ALARMING
8. PID CONTROL ON ANALOG OUTPUTS
9. HOT WATER RESET
10. DAY/NIGHT SETBACK
11. ECONOMIZER/PURGE
12. CUSTOM TAILORED REPORTING
13. POINT OVERRIDE ABILITY FOR EVERY DIGITAL AND ANALOG OUTPUT
14. SEPARATE MODES AS REQUIRED BY CONTROL SEQUENCE
15. ALL EXTERIOR LIGHTING CIRCUITS CONTROLLED BY SYSTEM

B. Environment: The DDC/EMS shall operate in an environment of 40 120 degrees F and 10 95% relative humidity. Sensors and control elements shall operate under the temperature, pressure, humidity, and vibration conditions normally encountered in the installed location. The DDC/EMS shall maintain accuracy as follows:

1. +/ 0.5 F for the space temperatures in the 0 F 130 F range.
2. +/ 0.5 F for duct temperatures in the 40 F 130 F range.
3. +/ 1.0 F for outside air temperatures in the 30 230 F range.
4. +/ 1.0 F for water temperature in the 30 230 F range.
5. KWH and KW monitoring within 1.0%.

C. MicroSD Backup: The system shall be tolerant of power failure and automatically save database to on-board MicroSD chip. On power restoration, the system shall automatically and without operator intervention of execution of manual restart procedures:

1. Come On Line.
2. Update all monitored functions.
3. Resume operation based on current time and status.
4. Implement special building start up strategies as required.
5. Log time of power outages and start-ups.

D. Program Storage: All hardware licenses and certificates shall be stored on local MicroSD memory chip employing encrypted “safe boot” technology.

E. Protocol: Protocol shall be BACnet. The Main Controller shall be enabled to support and shall be licensed with the following Open protocol drivers (client and server) by default
   1. BACnet
   2. Lon
   3. Modbus
   4. SNMP
   5. KNX

F. The Main Controller shall provide the following hardware features as a minimum:
   1. Two 10/100 Mbps Ethernet ports.
   2. Two Isolated RS-485 ports with biasing switches.
   3. 1 GB RAM.
   4. 4 GB Flash Total Storage / 2 GB User Storage.
   5. Wi-Fi (Client or WAP).
   6. USB Flash Drive.
   7. High Speed Field Bus Expansion.
   8. -20-60°C Ambient Operating Temperature.
   9. Integrated 24 VAC/DC Global Power Supply.
   10. MicroSD Memory Card Employing Encrypted Safe Boot Technology.

G. The Controller shall be provided with a 1 Year (SMA) Software Maintenance Agreement. Labor to implement not included.

H. The controller shall be licensed for 100 devices minimum. If the amount of controllers on the complete project exceeds 100, the controller shall be licensed to support all of the devices plus an additional 10 for future expansion.

2.2 SYSTEMS DESCRIPTION:

A. Modular Design/Expandability: The DDC/EMS shall be of a modular design providing distributed processing capability and allowing future expansion of both input/output points and processing/control functions. The modular DDC/EMS shall be configured on the main/local concept. The main controller shall have the capability of adding local controllers and the local controllers shall be capable of adding I/O modules.

B. Main (Master) Description: The master shall function as the overall system coordinator, accept control programs, perform automated energy management functions, control peripheral devices and perform all necessary mathematical calculations. The master shall be a microcomputer of modular design. The word size shall be 16 bits or larger, with a memory cycle time less than 1 microsecond. All chips shall be second sourced. The master shall have the following:
   1. Protected Access: Key lock protected access to output override switches and internal circuitry.
   2. Memory: The master shall have memory required for systems operation and diagnostics or MCP software.
   3. Real Time Clock: The master shall have a battery backed uninterruptable "Real Time Clock". The accuracy shall be within ten seconds per day. The RTC shall provide the following information: Time of Day, Day, Month, Year, and Day of Week. The system shall be programmed to automatically correct the clock for day light savings time and leap years and Time Sync.
   4. Power: The master shall operate from 120 VAC +/- 20%, 60 Hz. Line voltages below the operating range of the system shall be considered outages. The master shall have over voltage surge protection and require no additional AC power signal conditioning.

5. Parallel Processing: The master shall be capable of parallel processing, executing separate control programs simultaneously. Any control program may affect control of another program if desired. Each program shall have full access to all I/0 facilities of the processors.
6. Communications Processor: Each master shall provide communication to the City of Sacramento Workstation(s) (LAN) and the field buses. In addition, each master must have communications ports that support portable service tool and connection to third party controllers such as a chiller control panel or Variable Frequency Drives.
7. Uninterruptable Functions: Control functions shall not be interrupted due to program entry or other user communications.

C. Local Controller Units: The local units function as a stand-alone controller and as an Input/Output interface of the DDC/EMS and the Data Environment.
1. HVAC units must be fully controlled by a controller connected to the DDC/EMS that can be fully programmed by the DDC/EMS contractor.
2. Monitoring: Local units shall be used to connect the data environment to the system and contain all necessary Input/Output functions to read field sensors and operate controlled equipment based on internal instructions or instructions from the Master. The units shall be fully supervised to detect failures. The units shall report the status of all points in its data environment at the rate of at least once every second. Local units shall connect directly to the Master with a twisted pair shielded RS-485 interface.al unit failure.
3. Unit Failure: Upon failure of the unit (including transmission failure), the unit shall automatically fail off or to a predetermined state for three-way valves. All local units must run independently in the event of a central unit failure (including transmission failure) in bypass mode via the thermostat.
4. Power: The unit shall operate from 120 VAC, +/-20%, 60 Hz, 220 VAC, +/-20%, 50 Hz or 24 VAC +/- 20%, 50/60 Hz power. For voltages below the operating threshold the unit shall totally shutdown and de energize its outputs.
5. LAN and/or Field Bus: Each unit shall communicate with any unit through the RS-485 interface LAN and/or field bus.
6. Auxiliary Port: Each unit shall be equipped with an auxiliary port to allow local interrogation of input and output values, and keyboard override of outputs through laptop.

2.3 INPUT/ OUTPUT CAPABILITY:

A. Inputs: The DDC/EMS shall accept information in the form of a temperature, voltage, digital signal (on off) or pulse counter.
1. Analog Inputs: The Analog Input (AI) function shall monitor each analog input, perform A/D conversion, and hold the digital value in a buffer for interrogation. The A/D conversion shall have a minimum resolution of 10 bits. Input ranges shall be within the range of 0-10 VDC.
2. Digital Inputs: The Digital Input (DI) function shall accept dry contact closures and voltage level or resistance level (5VDC reference voltage) transitions. A voltage level below 1 volt or a resistance below 500 ohms shall be read as ON (closed), a voltage level above 3 volts or a resistance above 1400 ohms shall be read as OFF (open).
3. Pulse Accumulator Inputs: The pulse accumulator function shall have the same characteristics as the DI, except that, in addition, a buffer shall be included to totalize pulses between interrogations. Each input shall accept pulses at a minimum of 2 per second.
4. Temperature Inputs: Temperature inputs originating from a thermistor, shall be monitored and buffered as an AI, except that, automatic conversion to degrees F shall occur without any additional signal conditioning.
5. Input Wiring: All analog inputs shall be two wire devices, with shielded wire for accurate operation.

B. Outputs:
   1. Master and local controllers - Form C relay outputs rated at 5 amp, 24 VAC/DC or 2 amp, 30 VAC for on/off or Pulse Width Modulation for maintained operation of field devices. Output pulse width shall be selectable between 0.1 and 3200 seconds with a minimum resolution of 0.1 seconds. Isolation and protection against voltage surges shall be provided. Central plant controllers shall be equipped with an ON/OFF/AUTO switch to manually obtain either output state or able to be overridden from GUI. Manual overrides shall be reported to the master at each update. An LED shall be provided to indicate the state of each digital output.
   2. All digital and analog output points on every controller must have an override (highest priority) input point in the controller's point list in the controller. This override point must be clearly labeled and identifiable. For example, "DO1ovrd" would be the point to override Digital Output 1.

2.4 SOFTWARE:

A. User Software: HTML5 based. Provide software (required upgrades) for Laptop Computer (Service Tool) and Facilities office workstation, as required.

B. Software Features:
   1. Mathematical Requirements: The DDC/EMS shall have a math package capable of addition, subtraction, multiplication, division, square root, greater than and less than functions, minimum and maximum selection functions, and up to five levels of parenthesis for computation of variables. Control commands may be executed based on these calculated variables which are available to the program on a global basis. Math expressions may be used in action and exit commands of control program. The mathematical software shall be capable of mixed mode arithmetic, utilizing Boolean logic statements in combination with basic arithmetic to provide conditional mathematical computations.
   2. Passwords: The DDC/EMS shall have multiple levels of user programmable passwords in addition to a master password, for programming security. Separate passwords may be user programmed. Level of password will define user's access level and ability to change system.
   3. Trend Logging: The DDC/EMS shall trend log variables. Any system variable (inputs, outputs, numerals, can be trend logged.
   4. Messages: The DDC/EMS shall provide alarming, preventative maintenance and status reporting messages.
   5. Documentation Format: The programming language of the DDC/EMS shall be plain English based such that a printout of the control program shall serve as the primary documentation for the system.
   6. Micro Processor Integrity Checking: Each DDC/EMS microprocessor shall continuously monitor and check itself and produce error messages in the event of a malfunction.
   7. Data Plotting: The DDC/EMS shall provide plots of values of system variables on a graph. Graphs may consist of combinations of up to 3 system variables at a time from the history logs.

C. Color Graphics Requirements Provide HTML5 based color graphics which allow user to access and change (based on user access level) all schedules and setpoints (including damper or control valve positions) directly through the user graphics. Real time data shall continuously be updated. Navigation between the screens (forward and backwards) shall be accomplished with the use of a mouse. The minimum graphic screens shall include the following:
   1. Site lay-out locations of all equipment being controlled, control component locations, and spaces served. Provide multiple screens-minimum of 1 screen per building plus site and others as needed for clarity. By "clicking" mouse on the desired equipment area a flow diagram will be displayed for the related equipment (as described below -

Item 2). By "clicking" the mouse on a conditioned space, a graphic display of the zone conditions (as described below - Item 3) will be displayed.

2. Each building must have a graphical summary page of all the zones in that building that displays zone temperature, set point, discharge air temperature, and fan command.
3. Zone & HVAC Equipment Description on GUI: Each item of HVAC equipment must be clearly identified by what area it serves and its unit number. For example, if HC-2A serves Classroom 4, the GUI should list it as "Classroom 4, HC-2A." It should NOT be listed as only "HC-2A" or "Classroom 4."
4. Flow diagrams shall be provided for each HVAC system, such as air-handling system, chilled water system, hot water system, condenser water system, package unit system, brine system with all inputs and outputs dynamically displayed.
5. Each temperature control zone shall have a screen providing set points, temperatures, and related HVAC system status data.
6. Scheduling screens allowing On/Off times to be set.

D. Software Manual: The software manual shall describe programming and testing, starting with a system overview and proceeding to a detailed description of each software feature. The manual shall instruct the user on programming or reprogramming any portion of the system. This shall include all control programs, variables, set points, time periods, messages, passwords and other information necessary to load, alter, test and execute the system. The manual shall include commands, editing and writing control programs, printouts and logs, mathematical calculations, and instructions on modifying any control point, verifying error status, changing passwords, and initiating or disabling control programs.

E. Software Licenses: The owner shall be named the license holder of all software associated with any and all incremental work on the project(s). All Niagara 4 software licenses shall have the "accept.station.in=*"; "accept.station.out=*"; "accept.wb.in=*"; and "accept.we.out=*" section of the software licenses. The intent is to ensure that the installed Niagara 4 products may be completely open for integrations. Owner shall be free to direct the modification of the software license, regardless of supplier. In addition, the Owner shall receive ownership of all job-specific software configuration documentation, data files, and application-level software developed for this project. This shall include all custom, job-specific software code and documentation for all configuration and programming that is generated for a given project and/or configured for use within Niagara Framework (Niagara 4) based controllers and/or servers and any related LAN/WAN/Intranet and Internet connected routers and devices. Any and all required IDs and passwords for access to any component or software program shall be provided to the Owner.

2.5 USER INTERFACE:

A. LAN Connections: If an additional LAN connection is needed, the conduit and cable from LAN rack is to be installed by electrical contractor. The planned location of all LAN connections (new and existing) to EMS equipment must be coordinated with the City of Sacramento networking staff and EMS staff as early as possible. Final connections shall be made by DDC/EMS Contractor.

B. Direct Computer Communication: The DDC/EMS shall have a computer compatible communication mode for communication with other intelligent devices, which performs data integrity checking, with automatic retransmission of data when errors are detected.

C. Controller software must include all applications to make all folders viewable and accessible.

2.6 SYSTEM COMPONENTS:

A. Control Components:
   1. Wall Switches: Plates for all wall switches and timers shall match those specified in Division 26.
   2. Labels: All labels, signs, etc. shall be engraved, laminated plastic, white on black background, 1/8" high lettering, minimum.
   3. Temperature Sensors:
      a. Sensor Type: All temperature sensors shall be made of a highly stable, precision thermistor material accurate to within ±0.36 Degrees F. Identify each temperature sensor with a "Lamicoid" label keyed to the control system as-built drawings.
      b. Room Sensor: Room temperature sensor shall have Executive Decorator housing with programmable visible temperature indication. Housing shall include an occupancy override, temperature setpoint adjustment and a service tool jack.
      c. Vandal Resistant Room Sensor: Where noted, shall be a blank stainless steel wall plate with the sensing element bonded to the back side. The plate back shall be insulated to reduce wall temperature influence.
      d. Duct Sensor: Duct temperature sensor shall be a probe type element with 9 inch insertion length. Element shall be installed where air mixture provides a true temperature indication. Where adequate mixing is not practical, the duct temperature sensor shall have an averaging type thermistor element, installed across the entire cross section of the duct.
      e. Outdoor Air Sensor: Outdoor air temperature sensor shall be a probe type element mounted in a ventilated, treated white PVC sun shield to minimize radiant energy effects. The sensor and sun shield shall be mounted on a weatherproof outlet box for outdoor installation.
      f. Low Differential Air Pressure Applications (0" to 5" W.C.): The differential pressure transmitter shall be of industrial quality and transmit a linear, 4 to 20 mA output in response to variation of differential pressure or air pressure sensing points. Non-interactive zero and span adjustments, adjustable from the outside cover. (0.00 - 1.00" to 5.00") W.C. input differential pressure ranges. 4-20 mA output. Maintain accuracy up to 20 to 1 ratio turndown. Reference Accuracy: +0.2% of full span.
      g. CO2 Sensor: The sensor shall have a five year recommended calibration interval. In addition, the sensor shall be provided with a five-year calibration guarantee, providing for free factory replacement if the sensor is found to be out of calibration within five years of the purchase date. The sensor shall have accuracy of ±50 ppm and repeatability of ±20 ppm. All adjustments to the sensor including output scaling, elevation adjustment, relay set point, relay dead-band, linear or exponential output, and single point calibration shall be made via on-board push buttons and LCD display. The LCD display must be covered by a solid door and only viewable when the door is opened for adjustments.
   4. Temperature Control Panels: Each panel and each control device or readout on the front of the panel shall be identified with a laminated plastic label with 1/4" high engraved lettering, white on black background. Pilot lights shall be the push to test type.
   5. Smoke Detectors: Furnished by Division 23 and installed by Division 26. Power and fire alarm wiring by Division 28. Control wiring by Division 23. Coordinate with Division 26.
   6. Status Sensor: Current sensing status sensor (with sensitivity adjustment for belt loss detection).
   7. Electric Actuators:
      a. General: Fully modulating, UL listed. Visual position indicator, manual override and clear weather shield where exposed to weather. 24 volt. Belimo.
      b. Valve Actuators: Provide with factory mounting brackets and linkage to the control valve. Capable of shutting off against a 50 psi differential.
      c. Damper Actuators: Positive position feed back and spring return. OSA dampers shall be spring return closed. Actuators shall be direct mounted onto the damper control shaft without linkage. Damper actuators shall be sized to provide a

minimum of 5 in-lbs torque per square foot of damper face area.

8. VFD: Provide VFD drives for equipment as scheduled on drawings. Microprocessor-based, sensorless vector drives to provide adjustable speed control for three-phase motors. Include standard features that can be programmed to customize the drive's performance to suit a wide variety of applications, a digital display and operating and programming keys on a removable keypad and a SA Communication card as standard. JCI or equal.

B. Lighting Contactors: Lighting contactor with metal enclosure will be furnished, installed, and wired to the lighting panel by the electrical contractor. See electrical contract documents for location. The DDC/EMS Contractor shall provide low voltage relay(s) required at the contactor panel and wire to the contactors to complete the DDC/EMS side of the lighting control. DDC/EMS Contractor shall provide required photo cells. Relays shall be suitable for up to 277 volts.

C. Lightning Arrestor and Surge Suppressors: Shall be provided as approved and/or manufactured by the DDC/EMS equipment manufacturer.

D. Conduit: Conduit to be a minimum 1" diameter, and to have at least 25% spare capacity, except drops to room sensors may be run in ½" conduit. Conduit shall be run in electrical or mechanical trenches wherever possible. Site conduit (building to building) will be installed (and terminated inside the building) by Division 26.

E. Wiring: Use yellow colored, 4-wire communication cables. Communication cables between buildings must be underground rated.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION:

A. General: Schedule a pre-installation conference. All electrical work shall be in accordance with the California Electrical Code and the Electrical Specification Sections. City of Sacramento preference is for Head-End or "Jace" equipment controllers to be located in climate-controlled rooms. Use mechanical rooms, or recessed cabinets in wall, mounted between 7'-6" and 10'-0" AFF. Roof mounted controllers and cabinets are not allowed. Photocell and outside air sensor location need to be located to minimize solar effect-in shade, on north side, over landscaping areas; (Radiated heat from concrete is a problem). All electric/electronic systems shall be hardwired in conduit, except as specifically allowed by 1.03, B. Wiring shall be concealed in walls, above the ceilings, or below grade unless otherwise noted. Exposed wiring shall run parallel to room surfaces; location shall be approved by the Architect. No structural member shall be weakened by cutting, notching, boring or otherwise. Provide a 120 volt circuit for each device requiring external power. Dedicated circuits shall be provided where required. Any devices or wiring exposed to the weather shall be protected in weatherproof enclosures such as NEMA 3R and weatherproof conduit.

B. Labeling of System: DDC/EMS Contractor shall provide complete labeling of all terminals at all panels or equipment terminal strips and wiring. Equal to Brady marking on wires and number on terminals in sequence corresponding to control diagram.

C. Programming:

1. Control scheme strategy is to schedule occupied and unoccupied times, monitored temperatures, equipment status and control exterior lighting. Set points are determined by City of Sacramento. Set the default to "occupied" setting; default on always. Set the points to the City of Sacramento defaults and use inside air

temperature only. The Sequence of Operations (SOO) shall be simple, and not overly complex. The equipment can have its own layer of SOO that retains manufacturer warranties. The Direct Digital Control and Energy Management System (DDC/EMS) operational program shall be provided by the DDC/EMS Contractor. The DDC/EMS Contractor shall be responsible for programming the system and shall coordinate the scheduling (on/off times) with the Owner. Control system programming should reside in each controller so as to remain operational in event of lost connection with front-end. The proper system function is supposed to be programmed and schedules are entered either at City of Sacramento Control Center or at site head-end Jace and copied to the various controllers. Prior to start-up, the DDC/EMS Contractor shall provide any testing program he feels necessary to fully test the operation of the various components.

2. The DDC/EMS Contractor shall load the operational program into the DDC/EMS controller from his office via the City of Sacramento network (via VPN) or at the job site via a direct connect cable. Prior to starting up the system, the DDC/EMS Contractor shall:
   a. Confirm that the control system has been connected to the City of Sacramento LAN/WAN and that the LAN/Wan is working.
   b. Confirm the functionality of the DDC/EMS controllers and all input points by reading the input values, and comparing them with a measured temperature, pressure, voltage, current, or resistance as appropriate. Calibrate all transducers as required.
   c. Confirm the functionality of all digital output points by manual operational of the relay contacts. Use proper discretion in starting and stopping equipment.
   d. Confirm the functionality of all analog output points by manually imposing an adjustable voltage on the appropriate circuit to check proper operation of the controlled device. Calibrate all transducers as required.
   e. The DDC/EMS Contractor shall notify the General Contractor (one week in advance of) when the system will be ready for loading and testing the operational program. The DDC/EMS Contractor's start-up technician shall be present while the program is being loaded and shall communicate with the programmer prior and after program loading to confirm proper operation.

D. Training: Prior to final acceptance, the DDC/EMS Contractor shall provide operational training to the Owner's personnel. The training sessions shall include a complete demonstration of the system. Dates and times of the training sessions shall be coordinated through the Owner not less than one week prior to session. A total of 40 hours of instruction shall be provided. The DDC/EMS Contractor shall maintain a log of training sessions including dates, times and names/titles of those attending. The DDC/EMS Contractor shall submit a copy of this log on request. Contractor shall provide 1 week factory certified training schedule and class at owners' discretion.

E. Testing and Acceptance: The DDC/EMS Contractor shall furnish a complete and operating system. The DDC/EMS Contractor shall also verify, in the presence of the Owner, the system accuracy and proper function of each controlled device and sensor. The following items shall be successfully demonstrated prior to acceptance by the Owner:
   1. All system outputs including controllers, relays, and other control devices shall be addressed and start/stop functions demonstrated.
   2. All inputs shall be displayed and all event-initiated functions shall be demonstrated.
   3. Demonstrate program integrity and power restore sequence during and after a power failure and restoration.
   4. Deliver all Record Drawings, wiring diagrams, equipment specifications, installation and Operation Manuals and other documentation as required to describe the system.
   5. Complete operator training in the use, programming, and operation of the system.

F. Start-up of the System:

1. The start-up period starts when the following conditions are met:
   a. The DDC/EMS system and all involved HVAC equipment have been installed, connected to the DDC/EMS system and are ready to operate.
   b. A start-up meeting has been conducted with representative of the General Contractor, Architect/Engineer, Maintenance Staff, and the DDC/EMS Contractor.
   c. Consensus is reached, by the representatives at the above referenced meeting that it is appropriate for the start-up process to start.
2. The alarm pagers called by the control system during the start-up period shall be the pagers carried by the Mechanical Contractor and/or DDC/EMS Contractor as appropriate. The Mechanical Contractor and DDC/EMS Contractor shall respond to all pages from the control system and work cooperatively to ensure that the building environmental standards are maintained.
3. The start-up process shall be completed and the warranty period shall start when the following conditions are met.
   a. All training to be provided as part of the project has been completed.
   b. No "alarm" or "condition reports" are being generated by the DDC/EMS system for seven (7) calendar days (168 hours) due to incomplete or inaccurate installation or programming.
   c. All adjustments and "fine tuning" of the system have been completed.

G. Verification: A written testing and start-up report must be submitted for approval before acceptance. In addition to the DDC/EMS Contractor's testing and start-up report, the Owner may independently verify the test results. The report on test results shall include setpoints and operating ranges of all components.

END OF SECTION

SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

CONDITIONS OF THE CONTRACT AND DIVISION 01, as applicable, apply to this Section.

PART 1 GENERAL

1.1 SUMMARY

A. Provide all work for electrical systems required in the project to be properly installed, tested, and performing their intended function.

1.2 QUALITY ASSURANCE

A. Perform all work in accordance with the latest edition of the California Electrical Code, and local codes.

B. All electrical materials and distribution, and utilization equipment shall be UL Listed.

C. All equipment and materials shall be new and unused and of United States Domestic manufacture unless approved otherwise by engineer or owner.

D. Eliminate any abnormal sources of noise that are considered by the architect not to be an inherent part of the electrical systems as designed.

1.3 COORDINATION WITH OTHER TRADES

A. Coordinate the work of this division with all other divisions to ensure that all components of the electrical system will be installed at the proper time and fit the available space.

B. Locate and size all openings in work of other trades required for the proper installation of the electrical system components.

C. Make all electrical connections to all equipment furnished by this division and any other division.

D. Make all electrical connections from all 120 volt and greater dampers and switches to associated exhaust fan(s) furnished by any other division.

1.4 DRAWINGS

A. The drawings are schematic in nature but show the various components of the systems approximately to scale and attempt to indicate how they are to be integrated with other parts of the building. Determine exact locations by review of equipment manufacturer's data, by job site measurements, by checking the requirements of other trades, and by reviewing all Contract Documents. The size of the electrical equipment indicated on the Drawings may be based on the dimensions of a particular manufacturer. While other listed manufacturers will be acceptable, it is the responsibility of the Contractor to determine if the equipment that Contractor proposes to furnish will fit in the space. The drawings are not intended to show exact locations of conduit and wire, or to indicate all wire terminators, connectors, conduit fittings, boxes or supports, but rather to indicate distribution, circuitry, and control.

B. The Electrical Drawings are necessarily diagrammatic in character and cannot show every connection in detail or conduit in its exact location. These details are subject to the requirements of ordinances and also structural and architectural conditions. The Contractor shall carefully investigate structural and finish conditions and shall coordinate the separate trades in order to avoid interference between the various phases of work. Work shall be laid out so that it will be concealed in furred chases and suspended ceilings, etc., in finished portions of the building, unless specifically noted to be exposed. Work shall be installed to avoid crippling of structural members. All exposed work shall be installed parallel or perpendicular to the lines of the building unless otherwise noted.

C. When the mechanical and electrical Drawings do not give exact details as to the elevation of pipe, conduit, and ducts, physically arrange the systems to fit in the space available at the elevations intended with the proper grades for the functioning of the system involved. Exposed conduit is generally intended to be installed true and square to the building construction and located as high as possible against the structure in a neat and workmanlike manner. The Drawings do not show all required offsets and their location details. Work shall be concealed in all finished areas.

1.5 SUBMITTALS

A. Specification Review:
   1. Include a paragraph-by-paragraph written specification review for each product listed requiring a submittal. Denote any proposed deviations from specifications.

1.6 EXISTING CONDITIONS

A. Do all work required to maintain electrical services to the Owner occupied portions of the building during construction.

B. No connection to existing services or utilities shall be made without Owner's knowledge and permission. All such connections shall be planned and scheduled to minimize the length of service interruption required. Request for shutdown shall be made to Owner at least two (2) weeks in advance and shall be accompanied by detailed written schedule of activities during shutdown and list of materials required for connection and renewal of service. It shall be understood that all such service interruptions shall be made at the Owner's convenience, not the Contractor's. No increase in contract amount will be allowed for reasons of premium time, inefficiency of operations or other considerations not calculated in original bid.

C. All items removed shall be stored on-site. Schedule a review of the items with the Owner. Remove from site all items the Owner does not choose to keep. Deliver Owner designated items to Owner's storage facility.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

B. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

C. Do not deliver items to project before time of installation. Limit shipment of bulk and multiple-use materials to quantities needed for immediate installation.

PART 2 EXECUTION

2.1 EXISTING WORK

A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

B. Provide temporary wiring and connections to maintain existing systems in service during construction.

C. When performing work on energized equipment or circuits, use personnel experienced and trained in similar operations.

D. Remove, relocate, and extend existing installations to accommodate new construction.

E. Repair adjacent construction and finishes damaged during demolition and extension work.

2.2 OWNER INSTRUCTION

A. Provide on-site Owner training for all new equipment.

B. Use Operation and Maintenance manuals and actual equipment installed as basis for instruction.

C. At conclusion of on-site training program have Owner personnel sign written certification they have completed training and understand equipment operation. Include copy of training certificates in final Operation and Maintenance manual submission.

D. Supply record drawings to the Owner in PDF and the latest version of AutoCAD.

END OF SECTION

SECTION 26 05 01 COMMON WORK RESULTS FOR ELECTRICAL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
1. Materials and equipment shall be furnished and installed in support of electrical work described in these plans and specifications including but not limited to, raceways, boxes, enclosures, feeders, branch circuiting, supports, terminal cabinets, sleeves, gutters, panels, transformers, switchgear, lighting fixtures, controls, relays, contactors, in order to complete and make fully functional the systems described.
2. Complete fire alarm and annunciation system as shown and/or required by the (local jurisdiction having authority, California State Fire Marshal) including monitoring equipment and wiring for central station connection.
3. Lighting systems, both interior and exterior as shown on the plans and as specified herein, including controls, occupancy sensors, lumen sensors, photocell controls, LED'S supports, fasteners, straps, and miscellaneous mounting hardware and support structures for such equipment.
4. HVAC and plumbing electrical: Conduit, conductors and terminations for all line voltage power, line voltage controls and fusible and/or non-fusible safety disconnect switches for HVAC equipment, including but not limited to air conditioners, furnaces, fans, heat pumps, system pumps, condensing units. Provide protective equipment unless otherwise noted, etc. including protective devices.
5. Power and Lighting Distribution: Furnish and install power and lighting distribution systems including but not limited to panels, feeders, transformers, branch circuits, devices, fixtures, disconnect switches, contactors, controls, etc. for a complete working system.
6. Data systems infrastructure including all boxes, raceways, cable tray, wire basket tray, dedicated branch circuits, sleeves and penetrations, etc. as described and as shown in plans, risers, specifications and/or required for a complete and operating system.
7. Allocation of time to adequately train the Owner on the use and operation of all systems installed within the facility or on the property.

B. System Description:
1. The electrical plans indicate the general layout and arrangement; the architectural drawings and field conditions shall determine exact locations. Field verify all conditions and modify as required to satisfy design requirements as well as code minimums. Maintain all required working clearances as described in CEC Article 110 as well as other applicable articles.
2. Discrepancies shall be brought immediately to the attention of the Architect for clarification. The Architect shall approve any changes. Prior to rough-in, refer to architectural plans that shall take precedence over electrical plans with respect to locations.

C. Related Work Under Other Sections:
1. Mechanical Wiring: Control circuit wiring, energy management controls and interlocks for mechanical equipment shall be installed by Mechanical Contractor.
2. HVAC Control Raceway: Raceways, boxes, and control wiring for thermostats, temperature sensors and control components specified within the mechanical

specifications, shall be furnished and installed as required, and installed in accordance with the minimum wiring methods allowed for branch circuit wiring in Division 26.

3. Smoke Fire Dampers: Coordination with Mechanical plans for exact locations and points of connection for power and fire alarm system connections (power and fire alarm connection shall be by Electrical Contractor).
4. Duct mounted smoke detectors: Coordination with Mechanical plans for exact locations and points of connection for power and fire alarm system connections (power and fire alarm connection shall be by Electrical Contractor).

1.3 SUBMITTALS

A. Before construction, submit in accordance with the General Conditions of this Specification.

B. Manufacturers' specifications, catalog cuts and shop drawings as required to demonstrate compliance with the specifications. Identify specific intended use for each component where submittal may be ambiguous. Submit entire bound submittal at one time; partial submittals will not be accepted. At a minimum, submittals will be required for the following:

1. Distribution equipment including transformers, distribution panels and breakers, motor controls, distribution and branch circuit panels, grounding, surge protection device, etc.
2. Electrical equipment including disconnects, fuses, raceways, straps and racks, fittings, conductors, boxes, gutters, devices, plates, etc.
3. Lighting equipment including fixtures, LED's, mounting accessories, color charts (where required), etc.
4. Lighting control equipment including low voltage switching system, dimmer switchbank / accessories, occupancy sensing equipment, time clocks, contactors, photocells, lumen sensors, etc.
5. Complete system component submittals for:
   a. Voice Public Address System / Intercom / Clock.
   b. Fire Alarm System.
   c. Communication Systems including but not limited to; cable, fiber, terminations, cable management, cable tray, patch panels, equipment racks, cabinets, jacks, plates, cable labeling.
6. Conduit including all fittings, etc.
7. Wiring and cable, etc.
8. Fire rating penetration materials, etc.

C. The intent of these specifications is to establish a standard of quality for materials and equipment. Therefore, some items are identified by manufacturer or trade name designation. Substitutions shall be subject to the Architect's approval. Where the substitution will affect other trades, coordinate all changes with those trades concerned and pay any additional costs incurred by them as a result of this substitution. Approval of substitutions shall not relieve the Contractor from providing an operational system in accordance with all applicable codes and ordinances.

1.4 WARRANTY

A. Equipment and labor shall be guaranteed and warranted free of defects, unless otherwise stated to be more restrictive, for a period of one year from the date of final acceptance by the Owner. A written warranty shall be presented to the Architect at the time of completion prior to final acceptance. Equipment deemed to be damaged, broken or failed should be repaired or replaced at no additional cost to the Owner. Materials or system requiring longer than a one-year warranty as described herein shall be separately warranted in separate letters of guarantee stating the duration of warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage of equipment for the job is the responsibility of the Electrical Contractor and shall be scheduled for delivery to the site, as the equipment is required. Damage to the equipment delivered to the site or in transport to the job shall be the responsibility of the Electrical Contractor.

PART 2 PRODUCTS

2.1 MATERIALS

A. Materials shall be new and bear the label of or be listed by a nationally recognized testing laboratory. The quality and suitability of all materials shall conform to the standards and practices of this trade.

B. Supplied materials shall be of a current manufactured product line. Discontinued products are not acceptable. Where products are identified on the contract documents by part number, EC may supply the current product model or series which meets the specification and intended use of the specified component.

PART 3 EXECUTION

3.1 INSTALLATION

A. Professionalism and appearance of installations shall be in accordance with accepted practices of this trade. Installation methods shall conform to manufacturers' specifications and recommendations. The Contractor shall man the job with qualified journeymen and helpers in this trade for the duration of the job. It is the Contractor's responsibility to communicate with and keep the job superintendent appraised of changes or clarifications, etc.

B. Employment of any person on any job in the capacity of an electrician is not permitted unless such person has qualified for and holds a valid Journeyman Electrician Pocket Card or General Journeyman Electrician Certificate issued by the State of California Division of Apprenticeship Standards except, Contractor may employ electrical helpers or apprentices on any job of electrical construction, new or existing, when the work of such helpers or apprentices is performed under the direct and constant personal supervision of a journeyman electrician holding a valid Pocket Card accepted by the State of California Division of Apprenticeship Standards:

1. Each Pocket Card carrying journeyman electrician will be permitted to be responsible for the quality of workmanship for a maximum of one helper or apprentice during any same time period, provided the nature of work is such that good supervision can be maintained and the quality of workmanship is the best, as expected by Owner and implied by the latest edition of the National Electrical Code.

C. Materials shall be installed in accordance with the manufacturers' specification and recommendations. They must conform to the approval AHJ adopted codes and standards, but not less than the 2019 CEC and all applicable codes and standards, including but not necessarily limited to California Code of Regulations Title 24, NFPA, National Electrical Manufacturers Association, ANSI, CBC, and any other adopted ordinances of applicable agencies having jurisdiction.

D. Electrical Contractor shall lay work out in advance in order to avoid unnecessary cutting, chasing, and drilling of floors, walls, ceilings and other surfaces. Work of this nature shall be carefully done so as not to damage work already performed by other trades. Such alterations shall not depreciate the integrity of the structure. Approval for cuts or

penetrations in structural members shall be by the Architect.

E. Supporting Devices:
   1. Verify mounting height of all luminaires or items prior to installation when heights are not detailed.
   2. Install vertical support members for equipment and luminaires, straight and parallel to building walls.
   3. Support conduits within 18" of outlets, boxes, panels, cabinets and deflections. Maximum distance between supports not to exceed spacing per CEC.
   4. Securely suspend all junction boxes, pull boxes or other conduit terminating housings located above suspended ceiling from the floor above or roof structure to prevent sagging and swaying.
   5. Provide seismic bracing per UBC requirements for this building location.
   6. Supporting Devices: Safety factor of 4 required for every fastening device or support for electrical equipment installed. Support to withstand four times weight of equipment it supports. Bracing to comply with seismic design category as per Structural Engineer.

F. Coordinate work with other trades as required to eliminate any delays during construction. Coordinate changes with other prime contractors to avoid construction conflicts.

G. Engineer's Field Observation: Site visits during construction for field observations and reports will be conducted by electrical engineer when directed by the Architect. A list of items that need to be addressed will be submitted to the Architect for forwarding to the Contractor.

H. Drawings of Record: Provide a full and accurate set of field record drawings marked up in a neat and understandable manner submitted to the Owner Representative, Construction Manager, or Architect upon completion of the work and prior to issuance of a certificate of completion. The drawings shall dimension all electrical facilities including but not limited to underground conduit, vaults, boxes as well as conduit routing scaled to within 12" of actual field conditions and shall be kept up to date reflecting changes or deviations. Electrical facilities shall be accurately drawn on the plan to scale. Refer to the general conditions of these specifications for additional requirements. Record drawings shall be required to identify both horizontal and vertical dimensions to visible and fixed points such as concrete, asphalt, buildings, sidewalks, etc.

I. Identification: Provide engraved laminated plastic nameplates for all switchboards, panelboards, fire alarm terminal cabinets, telephone and cable television backboards, main devices, control panels, time clocks, contactors and safety disconnect switches accurately identifying each device. Labels shall be attached to the equipment by means of screws or rivets. Self-adhering labels will not be acceptable.

J. Safety: The Electrical Contractor is responsible to maintain equipment in a safe and responsible manner. Keep dead front equipment in place while equipment is energized. Conduct construction operations in a safe manner for employees as well as other work persons or anyone visiting the job site. Provide barriers, trench plates, flags, tape, etc.

K. Operating and Installation Manuals: Provide two copies each of manuals, operating and installation instructions for equipment indicated in submittal packages. Instruct the Owner's representative as to the operation and location of equipment necessary to allow them to operate the facility upon final acceptance. This instruction period shall be prearranged with the Owner's representative prior to occupancy of the facility and the weeks prior to training scheduled.

END OF SECTION 26 05 00

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section

1.2 SUMMARY

A. Section includes:
   1. Wires and cables rated for 600 volts or less.
   2. Connectors, splices, and terminations rated for 600 volts or less.
   3. Lugs and pads rated for 600 volts or less.

B. System Description:
   1. Provide wires, cables, connectors, lugs, strain reliefs, racking insulators for a complete and operational electrical system.

C. Reference Standards:
   1. California Electrical Code (CEC) based on NFPA 70 (NEC). California Code of Regulations, Title 24, Part 3.
   2. National Electrical Manufacturers Association (NEMA):
      a. WC 70 Power Cables Rated 2,000 V or Less for the Distribution of Electrical Energy.
   3. National Electrical Testing Association (NETA):
      a. ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
   4. Underwriters Laboratories, Inc. (UL):
      a. 83 UL Standard for Safety Thermoplastic-Insulated Wires and Cables.
      b. 486 Standard for Wire Connectors.
   5. American Society for Testing and Materials (ASTM):
      a. B1 Standard Specification for Hard-Drawn Copper Wire.
      b. B3 Standard Specification for Soft or Annealed Copper Wire.
      c. B8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

1.3 SUBMITTALS

A. Provide product data for the following equipment:
   1. Wires.
   2. Cables.
   3. Connectors.
   4. Lugs.
   5. Splice Kits.

B. Provide the insulation cable testing report in the project closeout documentation, refer to Closeout Requirements in the General Conditions portion of this specification.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Confirm to requirements of the CEC, latest adopted version with amendments by local Authority Having Jurisdiction (AHJ).
   2. Furnish products listed by UL or other testing firm acceptable to AHJ.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Wires and Cables:
   1. Southwire Company
   2. Encore Wire Corporation
   3. Cerro Wire and Cable Co.
   4. General Cable Corp.; a brand of Prysmian Group
   5. Okonite Co.
   6. Alan Wire
   7. LS Cable and System USA
   8. American Wire and Cable

B. Connectors:
   1. FCI Burndy Corp.
   2. Cooper Crouse Hinds.
   3. O.Z./ Gedney Co.
   4. Thomas & Betts Co.
   5. 3-M Co.
   6. Ideal Industries Co.
   7. Polaris Electrical Connectors
   8. ILSCO

C. Wire connectors shall be minimum 75 degree centigrade rated and properly sized for the number of conductors being connected, terminated, spliced etc. All above grade connectors shall be solderless lug or plastic wire nut type, screw on, pressure cable type (wire nut or spring nut type), 600 Volt, 105-degree C, with skirt to cover all portions of stripped wires. Connector shall be U.L. rated for number and size of conductors being joined together as a splice.

D. Splices:
   1. Branch Circuit Splices: Ideal, Scotch-Lock, 3M, or approved.
   2. Feeder Splices: Compression barrel splice with two layers Scotch 23 and four layers of Scotch 33+ as vapor barrier.
   3. Screw Terminal Lugs.
   4. Kearney Split Bolt.

2.2 WIRES AND CABLES FOR LINE VOLTAGE SYSTEM AND CONTROLS.

A. Wire and Cable Shall Be:
   1. Copper, 600 volt rated throughout. Conductors 12AWG to 10AWG, solid or stranded. Conductors 8AWG and larger, stranded.
   2. Phase color to be consistent at all feeder terminations; A-B-C, top to bottom, left to right, front to back. Phasing tape shall be permitted on sizes #6 and larger.

B. Each phase wire shall be uniquely color-coded as indicated below:
   1. 120/ 240 Volts
      Phase A – Black
      Phase B – Red

Neutral – White
Ground – Green

2. 120/ 208 Volts
   Phase A – Black
   Phase B – Red
   Phase C – Blue
   Neutral – White
   Ground – Green
3. 277/ 480 Volts
   Phase A – Brown
   Phase B – Orange
   Phase C – Yellow
   Neutral – White or Natural Gray
   Ground – Green
4. Isolated Grounds: Green with Yellow Stripes

C. All conductors shall be copper unless otherwise noted. Minimum size for individual conductors shall be #12 AWG unless otherwise noted. Sizes #8 AWG and larger shall be stranded conductor. Individual conductors shall be insulated with type, XHHW, THW, THHN/ THWN 600- volt insulation unless otherwise noted. Control, signal, communication conductors shall be as dictated by the vendor of that equipment or as specified here-in. Proper insulation type shall be used for the proper environmental application (i.e., waterproof, wet location, plenum, temperature rated). If a condition exists where the application is uncertain, contact the Engineer for direction. Contractor is responsible to follow specific cabling requirements described in other sections of this specification relative to various communications and controls systems as well as the respective riser diagrams shown on plans. If a discrepancy occurs, communicate such discrepancy to the Architect and Engineer immediately for resolution.

D. Insulation types THWN, THHN or XHHW. Minimum insulation rating of 90C for branch circuits.

E. Refer to signal and communications specification sections for cable requirements.

2.3 CONNECTORS

A. Copper Pads: Drilled and tapped for multiple conductor terminals.

B. Lugs: Indent/ compression type for use with stranded branch circuit or control conductors.

C. Solid Conductor Branch Circuits: Spring connectors, wire nuts, for conductors 12 through 8AWG.

2.4 LUGS AND PADS

A. Ampacity: Cross-sectional area of pad for multiple conductor terminations to match ampere rating of panelboard bus or equipment line terminals.

PART 3 EXECUTION

3.1 INSTALLATION

A. Installation: Conductors shall not be installed until after conduit systems are permanently in place. Use an approved non-hardening type wire pulling lubricant if lubricant is to be used. Maintain all conduits and wire pulls free from foreign material. If due to field conditions, more

than a total of 300 degrees of bend are required; a pull box shall be furnished and installed for ease of installation. Said pull boxes must be sized and rated for the appropriate application and must remain easily accessible upon completion of the project (approval of the location shall be obtained from the Architect prior to installation). Show these pullboxes on the field record drawings. Conductors installed in underground raceways on site shall be duct sealed and taped where they exit the raceway to prevent the entrance of foreign material and moisture after the conductors are installed. Proper drainage shall be provided for underground pull and splice boxes.

B. Insulation: Use proper insulation types where temperature and environment are a factor.

C. Labeling: All conductors in panels, switchboards, terminal cabinets, vaults, pull boxes, and junction boxes shall be labeled with tape number markers indicating circuit number and identifying system. All labeling shall be permanent. See Section 26 05 53: Identification of Electrical Systems.

D. All conductors, wiring, cable where installed below floor, slab or underground shall be considered wet locations, and shall be rated accordingly. Non-waterproof cabling is not allowed in any below grade or wet application.

E. Cables routed together in cable tray shall be stacked, organized and tie wrapped together in a neat and workman like manner. Random cable routing is not acceptable.

F. Cable and conductors routed through pull boxes and vaults shall be properly supported. Bend radius of cable or conductor shall not be less than six times the overall cable diameter.

G. Wires and Cables:
   1. Conductor Installation:
      a. Install conductors in raceways having adequate, code size cross-sectional area for wires indicated.
      b. Install conductors with care to avoid damage to insulation.
      c. Do not apply greater tension on conductors than recommended by manufacturer during installation.
      d. Use of pulling compounds is permitted. Clean residue from exposed conductors and raceway entrances after conductor installation.
   2. Conductor Size and Quantity:
      a. Install no conductors smaller than 12AWG unless otherwise shown (e.g. – Fire alarm and communications systems, as defined in their respective specifications sections and/ or drawings).
      b. Provide all required conductors for a fully operable system.
   3. Provide dedicated neutrals (one neutral conductor for each phase conductor). Exceptions may only be granted with Electrical Engineer approval.
   4. Conductors in Cabinets:
      a. Cable and train all wires in panels and cabinets for power and control neatly and uniformly. Use plastic ties in panels and cabinets.
      b. Tie and bundle feeder conductors in wireways of panelboards.
      c. Hold conductors away from sharp metal edges.

3.2 FIELD QUALITY CONTROL

A. Field inspection and test shall be performed under provisions of NETA ATS section 7.3 (2) - Low Voltage Cables, 600-Volt Maximum as follows:
   1. Visual and Mechanical Inspection:
      a. Compare cable data with drawings and specifications.
      b. Inspect exposed sections of cable for physical damage and correct connection in accordance with single-line diagram.

c. Inspect all bolted electrical connections for high resistance using one of the following methods:
    1) Use of low-resistance ohm-meter in accordance with NETA section 7.3.2.2 (Electrical Tests).
    2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data from NETA ATS Table 10.12.
d. Inspect compression-applied connectors for correct cable match and indentation.
e. Verify cable color coding with applicable specifications and CEC.

2. Electrical Tests
    a. Perform insulation-resistance test on each conductor with respect to ground and adjacent conductors. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute.
    b. Perform resistance measurements through all bolted connections with low-resistance ohmmeter, if applicable, in accordance with Section 7.3.2.1 (Visual and Mechanical Inspection).
    c. Perform continuity test to insure correct cable connection.
    d. Correct malfunctions and/ or deficiencies immediately as detected at no additional cost to the Owner, including additional verification testing.
    e. Subsequent to final wire and cable terminations, energize all circuitry and demonstrate functional adequacy in accordance with system requirements.
3. Test Values
    a. Compare bolted connection resistance to values of similar connections.
    b. Bolt-torque levels should be in accordance with NETA ATS Table 10.12 unless otherwise specified by the manufacturer.
    c. Micro-ohm or milli-volt drop values shall not exceed the high levels of the normal range as indicated in the manufacturer's published data. If manufacturer's data is not available, investigate any values which deviate from similar connections by more than 50 percent of the lowest value.
    d. Minimum insulation-resistance values should not be less than 50 meg-ohms.
    e. Investigate deviations between adjacent phases.

END OF SECTION

SECTION 26 05 20 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.

1.2 SUMMARY

A. Section includes:
   1. Wires and cables.
   2. Connectors.
   3. Lugs and pads.

B. System Description:
   1. Provide wires, cables, connectors, lugs, strain reliefs, racking insulators for a complete and operational electrical system.

1.3 SUBMITTALS

A. Provide product data for the following equipment:
   1. Wires.
   2. Cables.
   3. Connectors.
   4. Lugs.
   5. Splice Kits.

B. Provide the insulation cable testing report in the project closeout documentation, refer to Closeout Requirements in the General Conditions portion of this specification.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Confirm to requirements of the CEC, latest adopted version with amendments by local Authority Having Jurisdiction (AHJ).
   2. Furnish products listed by UL or other testing firm acceptable to AHJ.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Wires and Cables: General Cable, Okonite, Southwire, or approved equal.

B. Connectors: Burndy, Ilsco, Thomas & Betts, or approved equal.

C. Wire connectors shall be minimum 75 degree centigrade rated and properly sized for the number of conductors being connected, terminated, spliced etc. All above grade connectors shall be solderless lug or plastic wire nut type, screw on, pressure cable type (wire nut or spring nut type), 600 Volt, 105-degree C, with skirt to cover all portions of stripped wires. Connector shall be U.L. rated for number and size of conductors being joined together as a splice.

D. Splices:
   1. Branch Circuit Splices: Ideal, Scotch-Lock, 3M, or approved.
   2. Feeder Splices: Compression barrel splice with two layers Scotch 23 and four layers of Scotch 33+ as vapor barrier.
   3. Screw Terminal Lugs.
   4. Kearney Split Bolt.

2.2 WIRES AND CABLES FOR LINE VOLTAGE SYSTEM AND CONTROLS.

A. Wire and Cable Shall Be:
   1. Copper, 600 volt rated throughout. Conductors 12AWG to 10AWG, solid or stranded. Conductors 8AWG and larger, stranded.
   2. Phase color to be consistent at all feeder terminations; A-B-C, top to bottom, left to right, front to back. Phasing tape shall be permitted on sizes #6 and larger.
   3. Color Code Conductors as Follows:

PHASE	208 VOLT	240 VOLT DELTA	480 VOLT
A	Black	Black	Brown
B.	Red	Orange (High Leg)	Orange
C.	Blue	Blue	Yellow
Neutral	White	White	White w/colored
Ground	Green	Green	Green
Isolated Ground	Green w/yellow trace	Green w/yellow trace	N/A

   4. All conductors shall be copper unless otherwise noted. Minimum size for individual conductors shall be #12 AWG unless otherwise noted. Sizes #8 AWG and larger shall be stranded conductor. Individual conductors shall be insulated with type, XHHW, THW, THHN/THWN 600- volt insulation unless otherwise noted. Control, signal, communication conductors shall be as dictated by the vendor of that equipment or as specified here-in. Proper insulation type shall be used for the proper environmental application (i.e., waterproof, wet location, plenum, temperature rated). If a condition exists where the application is uncertain, contact the Engineer for direction. Contractor is responsible to follow specific cabling requirements described in other sections of this specification relative to various communications and controls systems as well as the respective riser diagrams shown on plans. If a discrepancy occurs, communicate such discrepancy to the Architect and Engineer immediately for resolution.
   5. Insulation types THWN, THHN or XHHW. Minimum insulation rating of 90C for branch circuits.
   6. Refer to signal and communications specification sections for cable requirements.

2.3 CONNECTORS

A. Copper Pads: Drilled and tapped for multiple conductor terminals.

B. Lugs: Indent/compression type for use with stranded branch circuit or control conductors.

C. Solid Conductor Branch Circuits: Spring connectors, wire nuts, for conductors 12 through 8AWG.

2.4 LUGS AND PADS

A. Ampacity: Cross-sectional area of pad for multiple conductor terminations to match ampere rating of panelboard bus or equipment line terminals.

PART 3 EXECUTION

3.1 INSTALLATION

A. Installation: Conductors shall not be installed until after conduit systems are permanently in place. Use an approved non-hardening type wire pulling lubricant if lubricant is to be used. Maintain all conduits and wire pulls free from foreign material. If due to field conditions, more than a total of 300 degrees of bend are required; a pull box shall be furnished and installed for ease of installation. Said pull boxes must be sized and rated for the appropriate application and must remain easily accessible upon completion of the project (approval of the location shall be obtained from the Architect prior to installation). Show these pullboxes on the field record drawings. Conductors installed in underground raceways on site shall be duct sealed and taped where they exit the raceway to prevent the entrance of foreign material and moisture after the conductors are installed. Proper drainage shall be provided for underground pull and splice boxes.

B. Insulation: Use proper insulation types where temperature and environment are a factor.

C. Labeling: All conductors in panels, switchboards, terminal cabinets, vaults, pull boxes, and junction boxes shall be labeled with tape number markers indicating circuit number and identifying system. All labeling shall be permanent. See Section 26 05 53: Identification of Electrical Systems.

D. All conductors, wiring, cable where installed below floor, slab or underground shall be considered wet locations, and shall be rated accordingly. Non-waterproof cabling is not allowed in any below grade or wet application.

E. Cables routed together in cable tray shall be stacked, organized and tie wrapped together in a neat and workman like manner. Random cable routing is not acceptable.

F. Cable and conductors routed through pull boxes and vaults shall be properly supported. Bend radius of cable or conductor shall not be less than six times the overall cable diameter.

G. Wires and Cables:
   1. Conductor Installation:
      a. Install conductors in raceways having adequate, code size cross-sectional area for wires indicated.
      b. Install conductors with care to avoid damage to insulation.
      c. Do not apply greater tension on conductors than recommended by manufacturer during installation.
      d. Use of pulling compounds is permitted. Clean residue from exposed conductors and raceway entrances after conductor installation.
   2. Conductor Size and Quantity:
      a. Install no conductors smaller than 12AWG unless otherwise shown (e.g. – Fire alarm and communications systems, as defined in their respective specifications sections and/or drawings).
      b. Provide all required conductors for a fully operable system.
   3. Provide dedicated neutrals (one neutral conductor for each phase conductor). Exceptions may only be granted with Electrical Engineer approval.
   4. Conductors in Cabinets:
      a. Cable and train all wires in panels and cabinets for power and control neatly and uniformly. Use plastic ties in panels and cabinets.
      b. Tie and bundle feeder conductors in wireways of panelboards.
      c. Hold conductors away from sharp metal edges.

3.2 FIELD QUALITY CONTROL

A. Tests:

1. Test conductor insulation on feeders of 400 amp and greater for conformity with 1000 volt megohmmeter. Use Insulated Cable Engineers Association testing procedures. Minimum insulation resistance acceptable is 1 megohm for systems 600 volts and below.
2. Test Report: Prepare a typed tabular report indicating the testing instrument, the feeder tested, amperage rating of the feeder, insulation type, voltage, the approximate length of the feeder, conduit type, and the measured resistance of the megohmmeter test. Submit report with operating and maintenance manual.

END OF SECTION 26 05 20

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
   1. Grounding and bonding requirements of electrical installations for personnel safety and to provide a low impedance path for possible ground fault currents as described in CEC Article 250.
   2. "Grounding electrode system" refers to all electrodes required by CEC, as well as including made, supplementary, lightning protection system and telecommunications system grounding electrodes.
   3. The terms "connect" and "bond" are used interchangeably in this specification and have the same meaning.

B. Related Sections:
   1. Section 26 05 00: Common Work Results for Electrical.
   2. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.

C. Reference Standards:
   1. California Electrical Code (CEC) based on NFPA 70. California Code of Regulations, Title 24, Part 3.
   2. Institute of Electrical and Electronics Engineers (IEEE):
      a. 81 IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System.
      b. 142 Recommended Practice for Grounding of Industrial and Commercial Power Systems.
      c. 1100 Recommended Practice for Powering and Grounding Electronic Equipment
   3. National Electrical Testing Association (NETA):
      a. ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems
   4. Underwriters Laboratories, Inc. (UL):
      a. 83 UL Standard for Safety Thermoplastic-Insulated Wires and Cables.
      b. 467 Grounding and Bonding Equipment.
   5. American Society for Testing and Materials (ASTM):
      a. B1 Standard Specification for Hard-Drawn Copper Wire.
      b. B3 Standard Specification for Soft or Annealed Copper Wire.
      c. B8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING CONDUCTORS

A. Equipment grounding conductors shall be UL 83 insulated stranded copper, except that sizes No. 10 AWG and smaller shall be solid copper. Insulation color shall be continuous

green for all equipment grounding conductors, except that wire sizes No. 4 AWG and larger shall be permitted to be identified per CEC.

B. Bonding conductors shall be ASTM B8 bare stranded copper, except that sizes No. 10 AWG and smaller shall be ASTM B1 solid bare copper wire.

C. Conductor sizes shall not be less than what is shown on the drawings and not less than required by the CEC, whichever is greater.

2.2 SPLICES AND TERMINATION COMPONENTS

A. Components shall meet or exceed UL 467 and be clearly marked with the manufacturer, catalog number, and permitted conductor size(s).

PART 3 EXECUTION

3.1 GENERAL

A. Ground in accordance with the CEC, as shown on drawings, and as hereinafter specified.

B. System Grounding:
1. Secondary service neutrals: Ground at the supply side of the secondary disconnecting means and at the related transformers.
2. Separately derived systems (transformers downstream from the service entrance): Ground the secondary neutral.

C. Equipment Grounding: Metallic structures (including ductwork and building steel), enclosures, fire sprinklers, plumbing piping, raceways, junction boxes, outlet boxes, cabinets, machine frames, and other conductive items in close proximity with electrical circuits shall be bonded and grounded.

3.2 INACCESSIBLE GROUNDING CONNECTIONS

A. Make grounding connections which are buried or otherwise normally inaccessible (except connections for which periodic testing access is required) by exothermic weld.

3.3 SECONDARY EQUIPMENT AND CIRCUITS

A. Main Bonding Jumper: Bond the secondary service neutral to the ground bus in the service equipment.

B. Metallic Piping, Building Steel, and Supplemental Electrode(s):
1. Provide a grounding electrode conductor sized per CEC between the service equipment ground bus and all metallic water and gas pipe systems, building steel, and supplemental or made electrodes. Jumper insulating joints in the metallic piping. All connections to electrodes shall be made with fittings that conform to UL 467.
2. Provide a supplemental ground electrode and bond to the grounding electrode system.

C. Service Disconnect: Provide a ground bar bolted to the enclosure with lugs for connecting the various grounding conductors.

D. Switchgear, Switchboards, and Motor Control Centers:
1. Connect the various feeder equipment grounding conductors to the ground bus in the enclosure with suitable pressure connectors.
2. For service entrance equipment, connect the grounding electrode conductor to the

ground bus.

3. Connect metallic conduits, which terminate without mechanical connection to the housing, by grounding bushings and grounding conductor to the equipment ground bus.

E. Transformers:
   1. Exterior: Exterior transformers supplying interior service equipment shall have the neutral grounded at the transformer secondary. Provide a grounding electrode at the transformer.
   2. Separately derived systems (transformers downstream from service equipment): Ground the secondary neutral at the transformer. Provide a grounding electrode conductor from bar at the service equipment.

F. Conduit Systems:
   1. Ground all metallic conduit systems. All metallic conduit systems shall contain an equipment grounding conductor sized per CEC.
   2. Nonmetallic conduit systems shall contain an equipment grounding conductor, except that non-metallic feeder conduits which carry a grounded conductor from exterior transformers to interior or building-mounted service entrance equipment need not contain an equipment grounding conductor.
   3. Metal conduit containing only a grounding conductor, and which is provided for mechanical protection of the conductor, shall be bonded to that conductor at the entrance and exit from the conduit.

G. Feeders and Branch Circuits: Install equipment grounding conductors with all feeders, power, and lighting branch circuits.

H. Boxes, Cabinets, Enclosures, and Panelboards:
   1. Bond the equipment grounding conductor to each pullbox, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes.
   2. Provide lugs in each box and enclosure for equipment grounding conductor termination.
   3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs to terminate the equipment grounding conductors.

I. Motors and Starters: Provide lugs in motor terminal box and starter housing or motor control center compartment to terminate equipment grounding conductors.

J. Receptacles shall not be grounded through their mounting screws. Ground with a jumper from the receptacle green ground terminal to the device box ground screw and the branch circuit equipment grounding conductor.

K. Ground lighting fixtures to the equipment grounding conductor of the wiring system when the green ground is provided; otherwise, ground the fixtures through the conduit systems. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.

L. Fixed electrical appliances and equipment shall be provided with a ground lug for termination of the equipment grounding conductor.

3.4 CONDUCTIVE PIPING

A. Bond all conductive piping systems, interior and exterior, to the building to the grounding electrode system. Bonding connections shall be made as close as practical to the equipment ground bus.

3.5 TELECOMMUNICATIONS SYSTEM

A. Bond telecommunications system grounding equipment to the electrical grounding electrode system. Refer to communications backbone cabling specification section.

3.6 GROUND RESISTANCE

A. Grounding system resistance to ground shall not exceed 15 ohms. Make necessary modifications or additions to the grounding electrode system for compliance without additional cost to the Owner. Final tests shall assure that this requirement is met, and test results shall be submitted to the Owner with final close out documents.

B. Resistance of the grounding electrode system shall be measured using a four-terminal fall-of- potential method as defined in IEEE Standard 81. Ground resistance measurements shall be made before the electrical distribution system is energized and shall be made in normally dry conditions not less than 48 hours after the last rainfall. Resistance measurements of separate grounding electrode systems shall be made before the systems are bonded together below grade. The combined resistance of separate systems may be used to meet the required resistance, but the specified number of electrodes must still be provided.

C. Below-grade connections shall be visually inspected by the Inspector of Record (IOR) prior to backfilling. The Contractor shall notify the IOR 24 hours before the connections are ready for inspection.

D. Furnish a copy of tests to Owner at completion of project.

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

CONDITIONS OF THE CONTRACT AND DIVISION 01, as applicable, apply to this Section.

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Conduit supports.
2. Formed steel channel.
3. Spring steel clips.
4. Sleeves.
5. Mechanical sleeve seals.
6. Firestopping relating to electrical work.
7. Firestopping accessories.
8. Equipment bases and supports.

1.2 REFERENCES

A. Underwriters Laboratories Inc.:
1. UL 263 - Fire Tests of Building Construction and Materials.
2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
3. UL 1479 - Fire Tests of Through-Penetration Firestops.
4. UL - Fire Resistance Directory.

1.3 DEFINITIONS

A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.4 PERFORMANCE REQUIREMENTS

A. Firestopping: Conform to Building Code and UL for fire resistance ratings and surface burning characteristics.

1.5 SUBMITTALS

A. Product Data:
1. Hangers and Supports: Submit manufacturers catalog data including load capacity.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with the Building Code.

PART 2 PRODUCTS

2.1 CONDUIT SUPPORTS

A. Manufacturers:

1. Allied Tube & Conduit Corp.
2. Electroline Manufacturing Company.
3. O-Z Gedney Co.
4. Appleton.

B. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.

C. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.

D. Conduit clamps for trapeze hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.

E. Conduit clamps - general purpose: One hole malleable iron for surface mounted conduits.

F. Cable Ties: High strength nylon temperature rated to 185 degrees F. Self-locking. With Stainless tooth.

2.2 FORMED STEEL CHANNEL

A. Manufacturers:
1. Allied Tube & Conduit Corp.
2. B-Line Systems.
3. Midland Ross Corporation, Electrical Products Division.
4. Unistrut Corp.

B. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

2.3 SLEEVES

A. Sleeves for raceway Through Non-fire Rated Floors: 18 gage galvanized steel.

B. Sleeves for raceway Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage galvanized steel.

C. Sleeves for raceway Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL Listed.

D. Fire-stopping Insulation: Glass fiber type, non-combustible.

2.4 SPRING STEEL CLIPS

A. Product Description: Mounting clamp, and screw.

2.5 MECHANICAL SLEEVE SEALS

A. Manufacturers:
1. Thunderline Link-Seal, Inc.
2. NMP Corporation.

B. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.6 FIRESTOPPING

A. Manufacturers:
   1. Dow Corning Corp.
   2. Fire Trak Corp.
   3. Hilti Corp.
   4. International Protective Coating Corp.
   5. 3M fire Protection Products.
   6. Specified Technology, Inc.

B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
   1. Silicone Firestopping Elastomeric Firestopping: Multiple component silicone elastomeric compound and compatible silicone sealant.
   2. Foam Firestopping Compounds: Multiple component foam compound.
   3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
   4. Fiber Stuffing and Sealant Firestopping: Composite of mineral or ceramic fiber stuffing insulation with silicone elastomer for smoke stopping.
   5. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
   6. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
   7. Firestop Pillows: Formed mineral fiber pillows.

2.7 FIRESTOPPING ACCESSORIES

A. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

B. General:
   1. Furnish UL Listed products.
   2. Select products with rating not less than rating of wall or floor being penetrated.

C. Non-Rated Surfaces:
   1. Stamped steel, chrome plated, hinged, split ring escutcheons or floor plates or ceiling plates for covering openings in occupied areas where conduit is exposed.
   2. For exterior wall openings below grade, furnish modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill annular space between conduit and cored opening or water-stop type wall sleeve.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify openings are ready to receive sleeves.

B. Verify openings are ready to receive firestopping.

3.2 INSTALLATION - HANGERS AND SUPPORTS

A. Anchors and Fasteners:
   1. Concrete Structural Elements: Provide precast inserts, expansion anchors, powder

actuated anchors or preset inserts as required.
2. Steel Structural Elements: Provide beam clamps, spring steel clips, steel ramset fasteners or welded fasteners as required.
3. Concrete Surfaces: Provide self-drilling anchors and expansion anchors as required.
4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts or hollow wall fasteners as required.
5. Solid Masonry Walls: Provide expansion anchors or preset inserts as required.
6. Sheet Metal: Provide sheet metal screws.
7. Wood Elements: Provide wood screws.

B. Inserts:
1. Install inserts for placement in concrete forms.
2. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over four (4) inches.
4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

C. Install conduit and raceway support and spacing in accordance with CEC.

D. Do not fasten supports to suspended ceiling support system, pipes, ducts, mechanical equipment, or conduit.

E. Install multiple conduit runs on common hangers.

F. Supports:
1. Fabricate supports from structural steel or formed steel channel. Install hexagon head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts.
2. Install surface mounted cabinets and panelboards with minimum of four anchors.
3. In wet and damp locations install steel channel supports to stand cabinets and panelboards one (1) inch off wall.
4. Support vertical conduit at every floor.

3.3 INSTALLATION - FIRESTOPPING

A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit, and other items, requiring firestopping.

B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.

C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating.

D. Compress fibered material to maximum 40 percent of its uncompressed size.

E. Place intumescent coating in sufficient coats to achieve rating required.

F. Remove dam material after firestopping material has cured.

G. Fire Rated Surface:
1. Seal opening at all rated floors and walls as follows:
a. Install sleeve through opening and extending beyond minimum of one (1) inch on

both sides of building element.
   b. Size sleeve allowing minimum of one (1) inch void between sleeve and building element.
   c. Pack void with backing material.
   d. Seal ends of sleeve with UL Listed fire resistive silicone compound to meet fire rating of structure penetrated.
2. Where cable tray, bus, or conduit, penetrates fire rated surface, install firestopping product ins accordance with manufacturer's instructions.

H. Non-Rated Surfaces:
1. Seal opening through non-fire rated floors and walls as follows:
   a. Install sleeve through opening and extending beyond minimum of one (1) inch on both sides of building element.
   b. Size sleeve allowing minimum of one (1) inch void between sleeve and building element.
   c. Install type of firestopping material recommended by manufacturer.
2. Install escutcheons where conduit, penetrates non-fire rated surfaces in occupied spaces. Occupied spaces include rooms with finished ceilings and where penetration occurs below finished ceiling.
3. Exterior wall openings below grade: Assemble rubber links of mechanical seal to size of conduit and tighten in place, in accordance with manufacturer's instructions.

3.4 INSTALLATION - SLEEVES

A. Exterior watertight entries: Provide mechanical sleeve seals.

B. Interior conduit penetrations not required to be watertight: Sleeve and fill with silicon foam.

C. Set sleeves in position in forms. Provide reinforcing around sleeves.

D. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

E. Extend sleeves through floors and walls one (1) inch above finished floor level. Caulk sleeves.

END OF SECTION

SECTION 26 05 33

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Conduit and fittings.
2. Outlet boxes.
3. Weatherproof outlet boxes.
4. Junction and pull boxes.
5. Floor boxes.
6. Cabinets, termination cabinets.
7. Gutters.

1.3 SUBMITTALS

A. Provide Product Data for the Following Equipment:
1. Conduit and fittings.
2. Outlet boxes.
3. Weatherproof outlet boxes.
4. Junction and pull boxes.
5. Floor boxes.
6. Cabinets, termination cabinets.
7. Gutters.
8. Putty pads.
9. Raceways

B. Submit detailed conduit routing plan, for review and approval, prior to installation as follows:
1. Exposed and/ or concealed in building walls for conduits larger than 2-inch outside diameter.
2. All underground conduits (3/4-inch and larger) in duct bank; concealed in floor slabs, equipment pads and concrete slabs.

1.4 SUBMITTALS

A. Minimum acceptable conduit sizes are summarized in the following table:

	Minimum Size
Underground, site wiring	1”
Underground • Building Wiring Aboveground • Equipment or panel feeders • Telecommunications	3/4"
Aboveground • Lighting or branch circuit wiring	1/2”

• Fire alarm • Security	
Other	3/4”

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Conform to requirements of the CEC, latest adopted version with amendments bylocal AHJs.
   2. Furnish products listed by UL or other independent and nationally recognized testing firm.

1.6 DELIVERY, STORAGE AND HANDLING

A. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

B. Protect PVC and PVC-coated metallic conduit from sunlight.

C. Protection of and cleanliness of pathways and raceways must be assured during the construction process in order to eliminate the possibility of debris entering the conduit, duct, pathway resulting in decreased wire capacity and potential damage to installed conductors and cables.

PART 2 PRODUCTS

2.1 MATERIALS

A. Polyvinyl Chloride (PVC) coated galvanized rigid steel conduit and intermediate metal conduit shall be in accordance with NEMA RN 1. Coating shall be applied under controlled factory conditions. Prior to coating, conduit shall meet requirements of ANSI C80.1 and UL 6 or ANSI C80.6 and UL 1242 as appropriate. PVC coated conduits shall have ultra-violet (UV) inhibitor in the coating material.

B. Intermediate Metal Conduit (IMC). Raceway shall be hot dipped galvanized mild steel in accordance with ANSI C80.6 and UL 1242 and shall bear the UL label. Conduit shall have same characteristics of rigid steel except for thinner wall.

C. Galvanized Rigid Steel Conduit (GRSC or RGS), couplings and elbows shall be hot dip galvanized, rigid mild steel in accordance with ANSI C80.1 and UL 6. The conduit interior and exterior surfaces shall have a continuous zinc coating with a transparent overcoat of enamel, lacquer, or zinc chromate. Conduit shall be formed with continuous welded seams with a uniform wall thickness, in minimum 10-foot lengths, with threaded ends.

D. Electrical Metallic Tubing (EMT). Electrical metallic tubing, including elbows and bends, shall be zinc coated, mild steel in accordance with the requirements of ANSI C80.3 and UL 797. The interior and exterior surfaces of the tubing shall have a continuous zinc coating. Conduit shall be formed with a continuous welded seam, with a uniform wall thickness, in minimum 10-foot lengths.

E. Non-Metallic Conduit shall be as follows:
   1. Schedule 40: Conduit shall be 90 degree Celsius, polyvinyl chloride in conformance with NEMA TC-2 and UL 651 requirements.
   2. Spacers used in duct bank installations shall be high impact plastic, interlocking bases,

and intermediate type spacers. Place spacers between 6 and 10 feet apart.

F. Flexible Metal Conduit shall be galvanized steel meeting the requirements of UL 1. Flexible aluminum conduit is not permitted.

G. Liquid-Tight Flexible Metal Conduit shall be plastic jacketed, galvanized steel, "Sealtite" Type EF for general service areas or Type HC for high temperature when used under raised floor or in air plenums. Conduit shall be UL listed.

H. Manufacturers:
1. Outlet Boxes: Bowers, Raco, Orbit, Steel City or equal.
2. Weatherproof Outlet Boxes: Bell, Red Dot, Carlon or equal.
3. Floor Boxes: Wiremold/ Walker, Hubbell, Steel City, or equal.
4. Junction and Pull Boxes: Circle AW, Hoffman, Wireguard or equal.
5. Box Extension Adapter: Bell, Red Dot, Carlon or equal.
6. Conduit Fittings: O-Z Gedney, Thomas & Betts, Raco, Crouse Hinds, or equal.
7. Putty pads: 3M, Hilti, or equal.
8. Heavy wall rigid non-metallic conduit, Carlon, Certainteed, R&G Sloane or equal.
9. Extra heavy wall non-metallic conduit, Carlon, Certainteed, R&G Sloane or equal.
10. Flexible Metal Conduit (FMC), Alflex, American Flexible Conduit or equal.
11. Liquid tight flexible metal conduit, Anacanda (type UA), Electri-flex Liquatite or equal.
12. Floor Boxes, Single Gang, Walker/ Wiremold 880 CS Series or approved equal.
13. Floor Boxes, Multiple Gang, Walker/ Wiremold RFB Series or Walker Omnibox multi-service floor box with carpet plates, and/ or water resistant device covers.
14. Masonry Boxes, outlets in concrete, Raco Series 690 or equal.

I. Listed products for termination, coupling, extending, benching supports of raceways shall be used.

2.2 OUTLET BOXES

A. NEMA 1 gutter, junction and pull boxes shall be fabricated from code gage steel finished in grey enamel with screw cover fronts and concentric knockouts in all sides.

B. NEMA 3R gutter, junction and pull boxes shall be fabricated from code gage galvanized steel with screw cover fronts and concentric knockouts in the bottom only. Any penetrations to the side, top or back shall be weatherproofed in an approved manner such as “MYERS” gasketed type hub or equal.

C. Steel outlet boxes and plaster rings shall be galvanized rigid assemblies, either one piece pressed or factory welded construction containing the size and number of knockouts required. Steel outlet boxes shall be manufactured, sized and installed in accordance with CEC Article 314. Device Outlet: Installation of one or two devices at common location, minimum 4” square, minimum 1-1/2" deep. Single or 2 gang flush device plaster ring. Raco or equal.

D. Luminaire Outlet: minimum 4” square with correct plaster ring depth, minimum 1-1/2” deep with 3/8” luminaire stud if required. Provide proper depth plaster ring on bracket outlets and on ceiling outlets.

E. Construction: Provide galvanized steel interior outlet wiring boxes, of the type, shape and size, including depth of box, to suit each respective location and installation; constructed with stamped knockouts in back and sides, and with threaded holes with screws for securing box covers or wiring devices. Boxes shall be properly secured to the structure such that they are flush with the finish surface. Boxes shall be made structurally secure by means of the

proper fastening devices.

F. Accessories: Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, plaster rings, luminaire studs, cable clamps and metal straps for supporting outlet boxes, compatible with outlet boxes being used and meeting requirements of individual wiring situations.

2.3 JUNCTION AND PULL BOXES

A. Construction: Provide galvanized sheet steel junction and pull boxes, with screw-on covers; of the type shape and size, to suit each respective location and installation; with welded seams and equipped with steel nuts, bolts, screws and washers.

B. Location:
1. Install junction boxes above accessible ceilings for drops into walls for receptacle outlets from overhead.
2. Install junction boxes and pull boxes as required to facilitate the installation of conductors and limiting the accumulated angular sum of bends between boxes, cabinets and appliances to 300 degrees.
3. Locations: Junction boxes shall be located only where necessary and only in equipment rooms, closets, and accessible attic and underfloor spaces. A horizontal distance of 24" shall separate outlet boxes on opposite sides of occupancy separation walls, fire-rated walls or partitions.
4. Labeling: Junction box covers shall be marked with indelible ink indicated the circuit numbers passing through the box.

2.4 CONDUIT FITTINGS

A. Requirements: Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and plastic conduit bushings of the type and size to suit each respective use and installation.

B. Steel boxes may allow for field knock-out modifications, but shall in all other ways conform to code requirements.

2.5 FLOOR BOXES - SINGLE GANG

A. Construction: Deep cast iron fully adjustable before and after concrete pour with all required components for complete activation. Verify required components for application of service fittings, covers, monuments, and the like, attached to floor boxes.

B. Activations:
1. Flush: Provide brass duplex or single signal cover, hinged with set screw lock. Carpet or tile finish ring.
2. Monuments: Provide stainless steel monuments with power receptacle or data grommet as noted.
3. Coordinate specific application of systems as noted on Drawings.

2.6 FLOOR BOXES - MULTIPLE GANG

A. Construction: Deep cast iron, fully adjustable before and after pour. Equal to Walker/ Wiremold RFB Series or Walker Omnibox multi-service floor box with carpet plates, and/ or water resistant device covers. Verify color. Partition for different power or signal applications. Provide required power receptacle devices and signal grommets or receptacles as noted. Flange type shall be compatible with floor covering for either carpet or

vinyl as required and shall be brass type not polycarbonate.

B. Floor mounted boxes shall be water tight and cast iron when installed in grade level concrete slab floor, fully adjustable with interior and exterior leveling screws. Receptacle flange shall be brass with a duplex lift lid. Flange type shall be compatible with floor type. Before installation, coordinate exact location with Architect.

2.7 PUTTY PADS

A. Intumescent moldable firestop putty designed to protect electrical outlet boxes.

B. Provide putty pads of proper type around outlet boxes and/ or as detailed on plan to meet sound transmission restrictions and fire ratings of walls

PART 3 EXECUTION

3.1 INSTALLATION

A. Conduit systems listed below are for use in installations where they are permitted to be used by CEC and/ or other occupancy restrictions. The below installation methods do not intend to suggest that these materials be installed in conflict with any applicable code. Special attention to applications shall be made in building types such as wet location, hazardous locations, assembly occupancy and multi-story, but not limited to these. Requirements which are more restrictive than the CEC may be called for by the drawings and/ or these specifications. These requirements must be adhered to. The Electrical Contractor shall be responsible to use the proper conduit system for the application. Exposed conduit is not allowed below ceilings or above slab of floor, without prior approval from Electrical Engineer. All conduits shall be concealed except in electrical and telecommunication rooms or where shown to be surface mounted. Exposed conduit (where allowed) shall be run square and plumb with building lines in an approved manner. Support roof mount conduits, where allowed, with minimum 12" wide approved rooftop supports (B-Line Durablok or approved equal) unless otherwise detailed in roof requirements or as specified in roofing specification. Strap conduits to blocks with proper sized conduit straps. Spacing of support shall be a minimum as provided for in the CEC. All exposed conduit mounted below 8' above finished grade shall be strapped at a minimum of 5' spacing.

B. Non-Metallic Rigid Conduit shall be used in concrete slabs, below concrete slabs on grade, or underground outside of a building slab or foundation. Maintain minimum depth requirements and cover with appropriate fill material. Conduit shall be heavy wall Schedule 40 or 80, rigid PVC only. Rigid utility P&C duct shall not be used in any application. Properly sized grounding conductors shall be installed per CEC article 250, in all non-metallic conduit branch circuit and feeder runs. PVC conduit shall be formed or field bent only with the use of properly approved bending tools such as to not decrease the internal bore of the conduit. All conduits shall be cut square and reamed of burrs. Approved and compatible glue shall be used on all PVC fittings to attain watertight joints.

C. Galvanized Rigid Steel (GRS) conduit shall be used where exposed less than 8'–0" above finished grade to 18" below finished grade and where subject to physical damage. Conduits shall be cut square and reamed to remove burrs and sharp edges. Strap conduit below 8' above grade at 5' intervals. Unless otherwise noted, threadless setscrew and threadless weathertight fittings may be used in lieu of threaded fittings. All threaded ends entering a junction box of any type shall require one locknut on the inside and one on the outside of the enclosure and be provided with a plastic bushing or grounding bushing where necessary for proper grounding. Where exposed to moisture, a watertight hub or other approved method shall be required. All conduits shall be stubbed up straight and uniform into junction boxes,

panels, cabinets, etc., and shall be (GRS) properly supported and strapped. All GRS conduit located below grade, shall be tape wrapped.

D. Electrical Metallic Tubing (EMT) shall be used as allowed by code and as permitted by this specification. It shall not be in contact with soil or the concrete slab on the ground floor of any structure. Connectors and couplings shall be steel insulated set screw type where installed in indoor dry locations not subject to moisture. Where the potential for moisture is present, compression type weathertight fittings are required. One hole conduit straps are permitted from 1/2" to 1" and two hole conduit straps are required for size 1-1/4" and larger. EMT shall not be allowed in areas subject to severe physical damage. Install copper ground wire sized per CEC 250-122 in all EMT conduits.

E. Flexible conduit may be used where concealed in building construction or above dropped ceilings, but shall meet the following criteria: No individual circuit path from distribution panel to last device shall exceed a cumulative length of 6' of flexible conduit from start to end. Flexible conduit shall not exceed a total directional change of 270 bending degrees in any one run between conduit terminations. Squeeze type or Jake type steel flex fittings of a grounding type are required. Flexible conduit must be supported in accordance with CEC. Where exposed to the weather, moisture, or spray down flexible conduit shall be of the liquidtight type. Fittings shall be manufactured for use with liquidtight flexible conduit. All motor connections shall be made with liquidtight flex. Flexible conduit may not be used where exposed except for last 2' of equipment connection and unless otherwise noted or approved. A copper ground wire sized per CEC 250-122 shall be installed in all flexible conduit runs. Flexible conduit may not be used exposed. Weatherproof liquid tight conduit shall not be used at roof level for equipment connections with lengths exceeding 24" nor shall it be used to circumvent a rigid conduit systemin a horizontal direction. Connect recessed lighting fixtures to conduit runs with a maximum of 6' of flexible metal conduit extending from junction box to fixture.

F. Underground conduits and transition to above grade/ slab shall be as follows:
1. PVC elbows 2" and smaller are allowed, or if top of elbow is minimum 18" BFG or below top of slab, otherwise GRS elbows are required.
2. GRS risers are required from elbow below grade to equipment (device, outlet, panel, cabinet, etc.) above grade.
3. GRS elbows/risers to be PVC coated or 10 MIL tape wrapped (1/2" lapped) to 3" above finish grade or top of slab.

G. Conduit Supports: Conduit runs may be supported by one-hole and two-hole straps or supports as manufactured by Unistrut, Minerallac, Caddy or equals. Supports may be fastened by means of anchors, shields, beam clamps, toggle bolts, or other approved methods appropriate for the application and size of conduit. Pipe nailers (J-hooks) may only be used for 1" conduit and smaller and only in wood frame construction. Conduit support methods are subject to review by the engineer and authority having jurisdiction for adequacy. Installations deemed inadequate shall be corrected by the contractor at no cost to the Owner.

H. Bends and offsets shall be made with approved tools for the type of conduit being utilized. Bends shall be made without kinking or destroying the smooth bore of the conduit. Parallel conduits shall be run straight and true with bends uniform and symmetrical. Minimum radii shall be per CEC 344-24.

I. Conduit Stub-outs below grade shall be capped with plastic cap, and identified by placing a pull box marked with correctly identified utility such as "Elec", "Tel", etc. Dimension for exact location on field record drawings. Provide lids for proper field application (i.e. traffic, incidental, pedestrian).

J. Conduit Seals - Where below grade conduits enter structure through slab or retaining wall of building or basement, seal the inside of each conduit as follows:
   1. Provide damming material around conductors 3" into conduit. Polywater or equal.
   2. Fill 3" of conduit with 3M #2123 sealing compound.
   3. Wrap conductors where they exit the conduit with 3M #2229 "Scotch Seal" mastic tape. Lap tape to approximate diameter of the raceway and wrap outside of conduit opening with (minimum) one turn.
   4. Use conduit sealing bushings type CSB (O-Z/ Gedney) or equal.
   5. Empty conduits shall be sealed with standard non-hardening duct seal compound and then capped to prevent entrance of moisture and gases and to meet fire resistance requirements.
   6. Provide cable drip loop minimum 12" high.

K. Marker tape: Place marker tape at 12" below finish grade along and above buried conduits. Label tape "CAUTION: ELECTRICAL LINES BELOW" or similar wording.

L. Electrical and communications systems raceways routed underground shall not occupy the same trench as plumbing utilities such as sewer, water, storm drain, gas or other wet or dry gaseous utility system. A minimum of 12" of undisturbed earth is required. Where utilities must cross in closer proximity to each other due to physical constraints, 6" minimum crossing distances are allowed.

M. Conduits, routed below footings, slabs, grade beams, columns, and other structural elements shall be installed in strict compliance with structural details and criteria shown on structural plans. Clearances below structural elements and sleeves through structural elements must be carefully planned to avoid conflict and must be approved by the structural engineer if conflict arises.

N. All conduit or raceways passing through fire rated walls, floors, or ceilings shall be installed with a listed penetration method which protects the opening to the same rating as the assembly and is non hardening.

O. Location: Locate boxes and conduit bodies so as to ensure accessibility of electrical wiring.

P. Anchoring: Secure boxes rigidly to the substrate upon which they are being mounted, or solidly embed boxes in concrete or masonry.

Q. Special Application: Provide weatherproof outlets for locations exposed to weather or moisture.

R. Knockout Closures: Provide knockout closures to cap unused knockout holes where blanks have been removed.

S. Mount outlet boxes, unless otherwise required by ADA, or noted on drawings, the following distances above the finished floor:
   1. Receptacles, Telephone, TV & Data outlets. (measured to bottom of outlet box): +15".
   2. Outlet above counter (measured to top of outlet box): +46".
   3. Control (light) Switches. (measured to top of outlet box): +48".
   4. Fire Alarm Manual Pull Stations, T-stats. (measured to top of outlet box): +48".
   5. Fire Alarm Visuals: the lower of +80" to bottom of lens, or 6" below ceiling.
   6. Other Outlets: As indicated in other sections of specifications or as detailed on drawings.

T. Coordinate all electrical device locations with the architectural floor plan and interior and exterior elevations to prevent mounting devices within elements that they may conflict such

as cabinetry, mirrors, planters, etc.

U. Size outlet and junction boxes to minimum wire fill space requirements. Upsize box as required to allow ease of wire installation and device installation.

V. Outlet and junction boxes in fire rated walls shall be gauged and spaced so as not to exceed the maximum penetration allowed by the assembly without compromising the fire rating. If a conflict arises relative to a specific condition, the contractor shall follow the requirements of the fire authority and ask for guidance from the design team. At no time should a larger box be installed prior to resolution of conflict.

END OF SECTION

SECTION 26 05 34 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Conduit and fittings.
2. Outlet boxes.
3. Weatherproof outlet boxes.
4. Junction and pull boxes.
5. Floor boxes.
6. Cabinets, termination cabinets.
7. Gutters.

B. Related Work:
1. Installation of all wire, cable, conductor, boxes/gutters, pull ropes, fiber optic cable raceway, conduit, innerduct, cable sleeve and duct as described on the plans and/or as specified here-in. This scope shall include pathways to be installed underground onsite and offsite, underslab, above grade, both concealed and exposed, overhead concealed and exposed as appropriately applied. Raceways/boxes shall be installed in accordance with their intended and allowed uses and as specified here-in whichever is more restrictive. Size and capacity of all raceway/boxes shall be as specified here-in or as depicted on the drawings, but shall not be less than that required by code. Larger raceway sizes may be specified than code would permit. The specifications shall govern.
2. Listed products for termination, coupling, extending, benching supports of raceways shall be used.
3. Raceways/boxes described by this section shall include, but not be limited to, power for site utilities and lighting, site and building communications, controls, fire alarm, data system, power distribution, lighting, lighting controls, video, intercom, and other building low voltage/communications systems controls as may be required.
4. Protection of and cleanliness of pathways and raceways must be assured during the construction process in order to eliminate the possibility of debris entering the conduit, duct, pathway resulting in decreased wire capacity and potential damage to installed conductors and cables.
5. Pathways are shown in a diagrammatic way and are generally accurate as to routing, however, it is the Contractor's responsibility as a means and methods process to coordinate with all other trades that require space within a building. The Contractor shall obtain approval for installation of raceways routing through structural footings, retaining walls, columns, beams, purlins, grade beams, etc.
6. It is the Contractor's responsibility to ensure that all raceway and boxes systems penetrate fire assemblies and sound rated assemblies in an approved manner using the appropriate and listed products for the purpose.
7. Minimum conduit size shall be 1/2" except if plan shows or code requires larger size. Exception: Use minimum 3/4" for underslab and below grade applications outside of building exterior walls.
8. All electrical systems shall be installed in an approved conduit system. This shall include but not be limited to all systems described in Section B.3 above.
9. All line voltage wiring above-grade within the building shall be installed in metallic

conduit.

10. Empty or future conduits shall be properly plugged with plastic caps or inserts with a 3/8" polyethylene pull rope. Plastic or "duct" tape will not be acceptable.
11. All low voltage systems including data, voice, intercom, fire alarm, public address, etc. shall be in raceways separated from line voltage cabling. It shall be the contractor's responsibility to provide raceway down walls to outlet boxes and to provide sleeves across inaccessible ceiling spaces.
12. Underground conduits entering building shall have the open end of conduit within building above the elevation of the conduit outside the building such that water cannot enter building through conduit. If such a condition exists, a pull box outside of building footprint shall be installed in conduit route before conduit enters building whereby top of pull box is below finish floor of building and moisture may exit box before entering building.
13. No single conduit run of any type shall exceed 300 degrees of radius bend from termination box to termination box.
14. Separate Raceway System - Provide a separate raceway system for each of the following systems installed. Do not combine different systems into a raceway or cable tray system, unless otherwise noted or allowed. Mechanical controls and raceway shall be provided by others in separate raceway from the below systems:
    a. Fire Alarm.
    b. Line Voltage.
    c. All other low voltage systems provided by electrical contractor.
15. Spare, Future Conduits: Conduits labeled conduit only, spare, or for future use, shall be provided with a pullrope, capped at each end, labeled as spare with destination marked, and turned over to the Owner in an unused state. Contractor shall not utilize these conduits for the installation of cabling or conductors as part of this scope of work. Contractor to verify and install at no additional cost to the Owner, additional conduits as required for the installation of the systems being installed.
16. Outlet System: Provide electrical boxes and fittings as required for a complete installation. Including but not limited to outlet boxes, junction boxes, pull boxes, bushings, locknuts, covers and all other necessary components.
17. Code Compliance: Comply with CEC as applicable to construction and installation of electrical boxes and fittings and size boxes according to CEC 312, 314 and 366 except as noted otherwise.
18. Outlets to be flush mounted: Maintain integrity of insulation and vapor barrier. Unless otherwise noted, flush mount all outlet boxes.
19. Provide putty pads of proper type around outlet boxes and/or as detailed on plan to meet sound transmission restrictions and fire ratings of walls.

1.3 SUBMITTALS

A. Provide Product Data for the Following Equipment:
    1. Conduit and fittings.
    2. Outlet boxes.
    3. Weatherproof outlet boxes.
    4. Junction and pull boxes.
    5. Floor boxes.
    6. Cabinets, termination cabinets.
    7. Gutters.
    8. Putty pads.
    9. Raceways

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:
    1. Conform to requirements of the CEC, latest adopted version with amendments by local

AHJs.

2. Furnish products listed by UL or other independent and nationally recognized testing firm.

PART 2 PRODUCTS

2.1 MATERIALS

A. Heavy wall Rigid Non-Metallic Conduit shall be PVC schedule 40 manufactured in accordance with NEMA Standard TC 2 and UL 651.

B. Extra heavy wall non-metallic conduit shall be PVC schedule 80 manufactured in accordance with NEMA Standard TC 2 and UL 651.

C. Galvanized Rigid Steel (GRS) conduit shall be hot dipped galvanized, zinc coated and shall comply with Underwriters Laboratories UL 6 and ANSI C80.1.

D. Electrical Metallic Tubing (EMT) shall be zinc coated, with a protective coating applied to the inside surface and shall comply with Underwriter Laboratories UL 797 and ANSI C80.3.

E. Electrical Non-Metallic Tubing (ENT), shall be listed to requirements of UL 1653, in accordance with CEC Article 362. ENT shall be rated for 90 degrees C conductors and shall be recognized for use in 2-hour fire resistance non-load bearing and load bearing wall assemblies. ENT shall be recognized for through-penetration firestop systems as classified to meet UL and ICC building codes. ENT shall only be allowed for data cabling systems and will not be permitted for Fire Alarm or line-voltage systems.

F. Flexible Metal Conduit (FMC) shall be continuous wound reduced wall galvanized steel produced to UL standards.

G. Liquid tight flexible metal conduit shall have a thermoplastic cover over a galvanized steel core containing an integral copper ground in sizes to 1 1/4" and shall be in compliance with UL standards and CEC Article 350.

H. Wire basket tray shall be 12" wide with 4" side rails minimum unless otherwise noted. It shall be U.L. listed and use listed connectors, elbows, tees, etc. and be cut and installed using listed equipment. Material shall be zinc electroplated steel.

I. Cable runway tray shall be 12" wide with 4" side rails minimum unless otherwise noted. It shall be U.L. listed and use listed connectors, elbows, tees, etc. Material shall be hollow steel with gray painted finish.

J. Manufacturers:
   1. Outlet Boxes: Bowers, Raco, Orbit, Steel City or equal.
   2. Weatherproof Outlet Boxes: Bell, Red Dot, Carlon or equal.
   3. Floor Boxes: Wiremold/Walker, Hubbell, Steel City, or equal.
   4. Junction and Pull Boxes: Circle AW, Hoffman, Wireguard or equal.
   5. Box Extension Adapter: Bell, Red Dot, Carlon or equal.
   6. Conduit Fittings: O-Z Gedney, Thomas & Betts, Raco, Crouse Hinds, or equal.
   7. Putty pads: 3M, Hilti, or equal.
   8. Heavy wall rigid non-metallic conduit, Carlon, Certainteed, R&G Sloane or equal.
   9. Extra heavy wall non-metallic conduit, Carlon, Certainteed, R&G Sloane or equal.
   10. Flexible Metal Conduit (FMC), Alflex, American Flexible Conduit or equal.
   11. Liquid tight flexible metal conduit, Anacanda (type UA), Electri-flex Liquatite or equal.
   12. Floor Boxes, Single Gang, Walker/Wiremold 880 CS Series or approved equal.

13. Floor Boxes, Multiple Gang, Walker/Wiremold RFB Series or Walker Omnibox multi-service floor box with carpet plates, and/or water resistant device covers.
14. Masonry Boxes, outlets in concrete, Raco Series 690 or equal.
15. Wire basket tray, B-line, GS Metals, Cablofil, Chatsworth, FlexTray or equal.
16. Cable runway tray, B-line, CPI, Homaco, Chatsworth, FlexTray or equal.

2.2 OUTLET BOXES

A. NEMA 1 gutter, junction and pull boxes shall be fabricated from code gage steel finished in grey enamel with screw cover fronts and concentric knockouts in all sides.

B. NEMA 3R gutter, junction and pull boxes shall be fabricated from code gage galvanized steel with screw cover fronts and concentric knockouts in the bottom only. Any penetrations to the side, top or back shall be weatherproofed in an approved manner such as "MYERS" gasketed type hub or equal.

C. Steel outlet boxes and plaster rings shall be galvanized rigid assemblies, either one piece pressed or factory welded construction containing the size and number of knockouts required. Steel outlet boxes shall be manufactured, sized and installed in accordance with CEC Article 314. Device Outlet: Installation of one or two devices at common location, minimum 4" square, minimum 1 1/2" deep. Single or 2 gang flush device plaster ring. Raco or equal.

D. Luminaire Outlet: minimum 4" square with correct plaster ring depth, minimum 1 1/2" deep with 3/8" luminaire stud if required. Provide proper depth plaster ring on bracket outlets and on ceiling outlets.

E. Construction: Provide galvanized steel interior outlet wiring boxes, of the type, shape and size, including depth of box, to suit each respective location and installation; constructed with stamped knockouts in back and sides, and with threaded holes with screws for securing box covers or wiring devices. Boxes shall be properly secured to the structure such that they are flush with the finish surface. Boxes shall be made structurally secure by means of the proper fastening devices.

F. Accessories: Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, plaster rings, luminaire studs, cable clamps and metal straps for supporting outlet boxes, compatible with outlet boxes being used and meeting requirements of individual wiring situations.

2.3 JUNCTION AND PULL BOXES

A. Construction: Provide galvanized sheet steel junction and pull boxes, with screw-on covers; of the type shape and size, to suit each respective location and installation; with welded seams and equipped with steel nuts, bolts, screws and washers.

B. Location:
1. Install junction boxes above accessible ceilings for drops into walls for receptacle outlets from overhead.
2. Install junction boxes and pull boxes as required to facilitate the installation of conductors and limiting the accumulated angular sum of bends between boxes, cabinets and appliances to 300 degrees.
3. Locations: Junction boxes shall be located only where necessary and only in equipment rooms, closets, and accessible attic and underfloor spaces. A horizontal distance of 24" shall separate outlet boxes on opposite sides of occupancy separation walls, fire-rated walls or partitions.

4. Labeling: Junction box covers shall be marked with indelible ink indicated the circuit numbers passing through the box.

2.4 CONDUIT FITTINGS

A. Requirements: Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and plastic conduit bushings of the type and size to suit each respective use and installation.

B. Steel boxes may allow for field knock-out modifications, but shall in all other ways conform to code requirements.

2.5 FLOOR BOXES - SINGLE GANG

A. Construction: Deep cast iron fully adjustable before and after concrete pour with all required components for complete activation. Verify required components for application of service fittings, covers, monuments, and the like, attached to floor boxes.

B. Activations:
1. Flush: Provide brass duplex or single signal cover, hinged with set screw lock. Carpet or tile finish ring.
2. Monuments: Provide stainless steel monuments with power receptacle or data grommet as noted.
3. Coordinate specific application of systems as noted on Drawings.

2.6 FLOOR BOXES - MULTIPLE GANG

A. Construction: Deep cast iron, fully adjustable before and after pour. Equal to Walker/Wiremold RFB Series or Walker Omnibox multi-service floor box with carpet plates, and/or water resistant device covers. Verify color. Partition for different power or signal applications. Provide required power receptacle devices and signal grommets or receptacles as noted. Flange types shall be compatible with floor covering for either carpet or vinyl as required and shall be brass type not polycarbonate.

B. Floor mounted boxes shall be water tight and cast iron when installed in grade level concrete slab floor, fully adjustable with interior and exterior leveling screws. Receptacle flange shall be brass with a duplex lift lid. Flange type shall be compatible with floor type. Before installation, coordinate exact location with Architect.

2.7 PUTTY PADS

A. Intumescent moldable firestop putty designed to protect electrical outlet boxes.

PART 3 EXECUTION

3.1 INSTALLATION

A. Conduit systems listed below are for use in installations where they are permitted to be used by CEC and/or other occupancy restrictions. The below installation methods do not intend to suggest that these materials be installed in conflict with any applicable code. Special attention to applications shall be made in building types such as wet location, hazardous locations, assembly occupancy and multi-story, but not limited to these. Requirements which are more restrictive than the CEC may be called for by the drawings and / or these specifications. These requirements must be adhered to. The Electrical Contractor shall be responsible to use the proper conduit system for the application. Exposed conduit is not

allowed below ceilings or above slab of floor, without prior approval from Electrical Engineer. All conduits shall be concealed except in electrical and telecommunication rooms or where shown to be surface mounted. Exposed conduit (where allowed) shall be run square and plumb with building lines in an approved manner. Support roofmount conduits, where allowed, with minimum 12" wide approved rooftop supports (B-Line Durablok, or approved equal) unless otherwise detailed in roof requirements or as specified in roofing specification. Strap conduits to blocks with proper sized conduit straps. Spacing of support shall be a minimum as provided for in the CEC. All exposed conduit mounted below 8' above finished grade shall be strapped at a minimum of 5' spacing.

B. Electrical Non-Metallic Tubing (ENT) shall be installed in accordance with its listed application. Only listed cement shall be used for connectors, coupling, fittings requiring cement. Unless otherwise noted, ENT systems shall be color coded: Blue for branch and/or feeder power wiring, yellow for communications systems, and red for fire alarm and emergency power systems. Use only approved and listed accessories:
   1. Electrical Nonmetallic Tubing (ENT) is designed to replace EMT, flexible metal conduit or other raceway or cable systems, for installation in accordance with Article 362 of the National Electrical Code, Section 12-1500 of the CEC, other applicable sections of the Code, and local codes.
   2. Any ENT used shall be listed to the requirements of UL 1653 in accordance with Article 362 of the NEC and Section 12-1500 of the CEC.
   3. Any ENT used shall meet the requirements of UL1653 and shall be Listed/Certified in accordance to the Electrical Codes.
   4. Carlon's ENT shall be installed per the technical assessment prepared by fire cause analysis for use in 1hour and 2-hour rated construction.
   5. Penetration of fire rated walls, floors or ceilings shall use Classified Through-Penetration Firestop Systems described in the current Underwriters Laboratories Fire Resistance Directory.
   6. Fittings and outlet boxes shall be designed for use with ENT shall be listed. All fittings, boxes and accessories shall be from one manufacturer.
   7. Only Carlon ENT Blue cement recommended specifically for use with ENT and rigid nonmetallic fittings shall be used.
   8. Unless indicated differently on drawings, ENT systems shall be color coded: BLUE for branch and feeder circuit wiring, YELLOW for communications, and RED for fire alarm and emergency systems, or colors can designate different voltages.
   9. ENT, fittings, and accessories shall be manufactured by Carlon.
   10. ENT shall not be used or allowed in any application where not allowed by CEC Article 362.

C. Non-Metallic Rigid Conduit shall be used in concrete slabs, below concrete slabs on grade, or underground outside of a building slab or foundation. Maintain minimum depth requirements and cover with appropriate fill material. Conduit shall be heavy wall Schedule 40 or 80, rigid PVC only. Rigid utility P&C duct shall not be used in any application. Properly sized grounding conductors shall be installed per CEC article 250, in all non-metallic conduit branch circuit and feeder runs. PVC conduit shall be formed or field bent only with the use of properly approved bending tools such as to not decrease the internal bore of the conduit. All conduits shall be cut square and reamed of burrs. Approved and compatible glue shall be used on all PVC fittings to attain watertight joints.

D. Galvanized Rigid Steel (GRS) conduit shall be used where exposed less than 8'–0" above finished grade to 18" below finished grade and where subject to physical damage. Conduits shall be cut square and reamed to remove burrs and sharp edges. Strap conduit below 8' above grade at 5' intervals. Unless otherwise noted, threadless setscrew and threadless weathertight fittings may be used in lieu of threaded fittings. All threaded ends entering a junction box of any type shall require one locknut on the inside and one on the outside of the enclosure and be provided with a plastic bushing or grounding bushing where necessary for

proper grounding. Where exposed to moisture, a watertight hub or other approved method shall be required. All conduits shall be stubbed up straight and uniform into junction boxes, panels, cabinets, etc., and shall be (GRS) properly supported and strapped. All GRS conduit located below grade, shall be tape wrapped.

E. Electrical Metallic Tubing (EMT) shall be used as allowed by code and as permitted by this specification. It shall not be in contact with soil or the concrete slab on the ground floor of any structure. Connectors and couplings shall be steel insulated set screw type where installed in indoor dry locations not subject to moisture. Where the potential for moisture is present, compression type weathertight fittings are required. One hole conduit straps are permitted from 1/2" to 1" and two hole conduit straps are required for size 1 1/4" and larger. EMT shall not be allowed in areas subject to severe physical damage. Install copper ground wire sized per CEC 250-122 in all EMT conduits.

F. Flexible conduit may be used where concealed in building construction or above dropped ceilings, but shall meet the following criteria: No individual circuit path from distribution panel to last device shall exceed a cumulative length of 6' of flexible conduit from start to end. Flexible conduit shall not exceed a total directional change of 270 bending degrees in any one run between conduit terminations. Squeeze type or Jake type steel flex fittings of a grounding type are required. Flexible conduit must be supported in accordance with CEC. Where exposed to the weather, moisture, or spray down flexible conduit shall be of the liquidtight type. Fittings shall be manufactured for use with liquidtight flexible conduit. All motor connections shall be made with liquidtight flex. Flexible conduit may not be used where exposed except for last 2' of equipment connection and unless otherwise noted or approved. A copper ground wire sized per CEC 250-122 shall be installed in all flexible conduit runs. Flexible conduit may not be used exposed. Weatherproof liquid tight conduit shall not be used at roof level for equipment connections with lengths exceeding 24" nor shall it be used to circumvent a rigid conduit systemin a horizontal direction. Connect recessed lighting fixtures to conduit runs with a maximum of 6' of flexible metal conduit extending from junction box to fixture.

G. Underground conduits and transition to above grade/slab shall be as follows:
1. PVC elbows 2" and smaller are allowed, or if top of elbow is minimum 18" BFG or below top of slab, otherwise GRS elbows are required.
2. GRS risers are required from elbow below grade to equipment (device, outlet, panel, cabinet, etc.) above grade.
3. GRS elbows/risers to be PVC coated or 10 MIL tape wrapped (1/2" lapped) to 3" above finish grade or top of slab.

H. Conduit Supports: Conduit runs may be supported by one-hole and two-hole straps or supports as manufactured by Unistrut, Minerallac, Caddy or equals. Supports may be fastened by means of anchors, shields, beam clamps, toggle bolts, or other approved methods appropriate for the application and size of conduit. Pipe nailers (J-hooks) may only be used for 1" conduit and smaller and only in wood frame construction. Conduit support methods are subject to review by the engineer and authority having jurisdiction for adequacy. Installations deemed inadequate shall be corrected by the contractor at no cost to the Owner.

I. Bends and offsets shall be made with approved tools for the type of conduit being utilized. Bends shall be made without kinking or destroying the smooth bore of the conduit. Parallel conduits shall be run straight and true with bends uniform and symmetrical. Minimum radii shall be per CEC 344-24.

J. Conduit Stub-outs below grade shall be capped with plastic cap, and identified by placing a pull box marked with correctly identified utility such as "Elec", "Tel", etc. Dimension for exact location on field record drawings. Provide lids for proper field application (i.e. traffic,

incidental, pedestrian).

K. Conduit Seals - Where below grade conduits enter structure through slab or retaining wall of building or basement, seal the inside of each conduit as follows:
   1. Provide damming material around conductors 3" into conduit. Polywater or equal.
   2. Fill 3" of conduit with 3M #2123 sealing compound.
   3. Wrap conductors where they exit the conduit with 3M #2229 "Scotch Seal" mastic tape. Lap tape to approximate diameter of the raceway and wrap outside of conduit opening with (minimum) one turn.
   4. Use conduit sealing bushings type CSB (O-Z/Gedney) or equal.
   5. Empty conduits shall be sealed with standard non-hardening duct seal compound and then capped to prevent entrance of moisture and gases and to meet fire resistance requirements.
   6. Provide cable drip loop minimum 12" high.

L. Marker tape: Place marker tape at 12" below finish grade along and above buried conduits. Label tape "CAUTION: ELECTRICAL LINES BELOW" or similar wording.

M. Electrical and communications systems raceways routed underground shall not occupy the same trench as plumbing utilities such as sewer, water, storm drain, gas or other wet or dry gaseous utility system. A minimum of 12" of undisturbed earth is required. Where utilities must cross in closer proximity to each other due to physical constraints, 6" minimum crossing distances are allowed.

N. Conduits, routed below footings, slabs, grade beams, columns, and other structural elements shall be installed in strict compliance with structural details and criteria shown on structural plans. Clearances below structural elements and sleeves through structural elements must be carefully planned to avoid conflict and must be approved by the structural engineer if conflict arises.

O. All conduit or raceways passing through fire rated walls, floors, or ceilings shall be installed with a listed penetration method which protects the opening to the same rating as the assembly and is non hardening.

P. Cable runway shall be used in equipment rooms where shown on the plans. Ladder tray installations shall conform to the requirements of CEC Article 318. The contractor shall provide all mounting hardware, connectors and bracing as required and as recommended by the manufacturer for a complete system installation.

Q. Wire basket tray shall be used in all concealed spaces (above ceiling spaces, under buildings in access tunnels, below raised floors, etc.) unless otherwise noted. Wire basket tray installations shall conform to the requirements of CEC Article 318. The contractor shall provide all mounting hardware, connectors and bracing as required and as recommended by the manufacturer for a complete system installation. All cutting and bending of wire basket tray shall be per the manufacturer's recommendation using tools designed for that purpose. Cable loading shall not exceed the listing of the system and its support.

R. Location: Locate boxes and conduit bodies so as to ensure accessibility of electrical wiring.

S. Anchoring: Secure boxes rigidly to the substrate upon which they are being mounted, or solidly embed boxes in concrete or masonry.

T. Special Application: Provide weatherproof outlets for locations exposed to weather or moisture.

U. Knockout Closures: Provide knockout closures to cap unused knockout holes where blanks have been removed.

V. Mount outlet boxes, unless otherwise required by ADA, or noted on drawings, the following distances above the finished floor:
1. Receptacles, Telephone, TV & Data outlets. (measured to bottom of outlet box): +15".
2. Outlet above counter (measured to top of outlet box): +46".
3. Control (light) Switches. (measured to top of outlet box): +48".
4. Fire Alarm Manual Pull Stations, T-stats. (measured to top of outlet box): +48".
5. Fire Alarm Visuals: the lower of +80" to bottom of lens, or 6" below ceiling.
6. Other Outlets: As indicated in other sections of specifications or as detailed on drawings.

W. Coordinate all electrical device locations with the architectural floor plan and interior and exterior elevations to prevent mounting devices within elements that they may conflict such as cabinetry, mirrors, planters, etc.

X. Size outlet and junction boxes to minimum wire fill space requirements. Upsize box as required to allow ease of wire installation and device installation.

Y. Outlet and junction boxes in fire rated walls shall be gauged and spaced so as not to exceed the maximum penetration allowed by the assembly without compromising the fire rating. If a conflict arises relative to a specific condition, the contractor shall follow the requirements of the fire authority and ask for guidance from the design team. At no time should a larger box be installed prior to resolution of conflict.

END OF SECTION 26 05 34

SECTION 26 05 53

IDENTIFICATION OF ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
   1. Nameplates and warning signs where specified herein and as shown on contract documents including the following:
      a. Nameplates and warning signs permanently installed on all electrical equipment and devices including, but not limited to, the following items:
         1) Enclosures for transformers, switchboards, motor control, panels, pullboxes, cabinets, motors, generators, transfer switches.
         2) Enclosures for all separately enclosed devices including, but not limited to, disconnect switches, circuit breakers, contactors, time switches, control stations and relays, fire alarm panels and lighting control panel.
         3) Wall switches not within sight of outlet controlled.
         4) Special systems such as, but not limited to, telephone, fire alarm, warning, and signal systems. Identification shall be at each equipment rack, terminal cabinet, control panel, annunciator and pullbox.
         5) Devices mounted within and part of equipment including circuit breakers, switches, control devices, control transformers, relays, indication devices and instruments.
   2. Conductor and Cable Identification.

B. Related Sections:
   1. Section 26 05 00: Common Work Results for Electrical.
   2. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.
   3. Section 26 24 16: Panelboards.
   4. Section 26 28 16: Enclosed Switches and Circuit Breakers.

C. Reference Standards:
   1. California Electrical Code (CEC) based on NFPA 70 (NEC). California Code of Regulations, Title 24, Part 3.
   2. National Fire Protection Agency (NFPA):
      a. 70E Standard for Electrical Safety in the Workplace.
   3. American National Standards Institute (ANSI):
      a. A13.1 Pipe Markers.
      b. Z535 Standards for Safety Signs and Labels.
   4. Underwriters Laboratories, Inc. (UL):
      a. 969 Standard for Marking and Labeling Systems.
   5. Code of Federal Regulations, Title 29, Part 1910:
      a. 144 Safety color code for marking physical hazards.
      b. 145 Specifications for accident prevention signs and tags.

PART 2 PRODUCTS

2.1 EQUIPMENT LABEL DESIGNATIONS

A. Equipment labels indicating equipment designations both emergency and normal. Designation per drawings or to be supplied with shop drawings approval.

B. Panelboard labels showing panel designation, voltage, phase, and source.

C. Distribution panels, transformers, safety switches, transfer equipment, etc. Labels shall be per ANSI Z535.4 guidelines.

2.2 MATERIALS

A. For Labels: Three layer laminated plastic or micarta with engraved white letters over black background.

B. For Emergency Equipment: Use engraved white letters over red background.

C. For Warning Signs: Minimum 18 gauge steel with red lettering on white porcelain enamel finish.

D. Arc flash labels shall be provided as required by CEC Article 70E.

E. Conductor tape number markers: TayMac MX4280 Series non-fading permanent adhesive.

PART 3 EXECUTION

3.1 MOUNTING

A. Equipment labels shall be mounted by self-tapping, threaded screws, and bolts, or by rivets. Adhesive types are not acceptable unless specifically noted in this section.

B. Conductor tape markers shall be consistently placed for ready conductor identification.

3.2 HEIGHTS ON LABELS

A. Panelboards, Switchboards and Motor Control Centers and Special Systems Enclosures: 1/4" identify equipment designation; 1/8" identify voltage rating and source.

B. Individual Circuit Breakers, Switches, and Motor Starters in Panelboards, Switchboards, and Motor Control Centers: 3/16" identify circuit and load served, including location of equipment.

C. Enclosed Circuit Breakers, Enclosed Switches, and Motor Starters: 3/16" identify load served.

D. Transformers: 3/16" identify equipment designation; 1/8" identify primary and secondary voltages, primary source, and secondary load. Include location of primary source or secondary load if remote from transformer.

3.3 WARNING SIGNS

A. Warning signs shall be permanently mounted with cadmium plated steel screws or nickel-plated brass bolts.

B. Warning signs to read "DANGER - HIGH VOLTAGE", with letters 1-1/2" high, 3/16" stroke minimum.

C. Provide warning sign on all doors or immediately next to door for equipment rooms, enclosures or closets containing equipment energized above 150 volts to ground as per CEC, and/ or as directed by the Architect. For interior finish spaces and interior doors, signage shall be coordinated and approved with the Architect in advance of installation.

END OF SECTION

SECTION 26 09 23

LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section Includes:
   1. Enclosed contactors for lighting and general purposes. Provide complete systems using contactors, relays, photocells, time clocks, or digital time switches, where required, all properly mounted in enclosures.

1.3 SUBMITTALS:

A. Product Data: Submit dimensions, size, voltage ratings and current ratings.

B. Short circuit current rating (SCCR) of equipment.

C. U.L. Label.

D. Electrical characteristics of equipment.

E. Enclosure metal gauge and finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Occupancy Sensors, Power Packs:
      a. Specifications below are based on WattStopper system of products. A different system can be substituted given equal functionality.

2.2 OCCUPANCY SENSORS:

A. Ceiling Sensors: Require power packs:
   1. W-2000- Low voltage ultrasonic ceiling mounted with 2000 square foot coverage. Typical for large restroom.
   2. DT-300- Low Voltage dual technology ceiling mounted with isolated contact. Typical for classrooms.
   3. WT-2250/ 2255- Typical corridor sensor- Low voltage ultrasonic ceiling mounted with 10' by 90' coverage pattern.

B. Wall Switch Sensors:
   1. PW-100 Line voltage PIR wall switch sensor for 1 circuit- Typical for small office or single person restroom.

PW-100-24 Low Voltage PIR wall switch sensor. Requires power pack.
PW-200- Line voltage PIR wall switch sensor for 2 circuits,
UW-100- Line Voltage ultrasonic wall switch sensor for 1 circuit.
DW-100- Line voltage dual technology wall switch sensor for 1 circuit. Typical for large office or conference room.
DW-100-24- Low voltage dual technology wall switch sensor. Requires Power Pack.
DW-200- Line voltage dual technology wall switch sensor for 2 circuits.

2. Wall switch sensors shall be capable of detection of occupancy at desktop level up to 300 square feet, and gross motion up to 1000 square feet.
3. Wall switch sensors shall accommodate loads from 0 to 800 watts at 120 volts; 0 to 1200 watts at 277 volts and shall have 180° coverage capability.
4. Wall switch products shall utilize Zero Crossing Circuitry which increases relay life protects from the effects of inrush current and increases sensor's longevity.
5. Wall switch sensors shall have no leakage current to load, in manual or in Auto/ Off mode for safety purposes and shall have voltage drop protection.
6. Where specified, wall switch sensors shall provide a field selectable option to convert sensor operation from automatic-ON to manual-ON.
7. Where specified, vandal resistant wall switch sensors shall utilize a hard lens with a minimum 1.0mm thickness. Products utilizing a soft lens will not be considered.

C. Power and Auxiliary Packs:
1. BZ-50- Standard power pack for use with low voltage sensors. 225ma.
2. BZ-150- Power pack for use with low voltage sensors when using a manual on function. 225ma.
3. S120/ 277- Slave relay pack. For controlling more than 1 circuit from a low voltage sensor. Standard BZ-50 can also be used.

D. High Ceiling Applications:
1. HB-350B*LENS Low Voltage PIR sensor.
2. L1 Lens- 20' x 60' coverage pattern when mounted at 40'.
3. L3 Lens- 40' diameter coverage pattern when mounted at 40'.
4. L4 Lens- 60' diameter coverage pattern when mounted at 60'.

E. Passive infrared sensors:
1. Passive infrared sensors shall utilize Pulse Count Processing and Detection Signature Processing to respond only to those signals caused by human motion.
2. Passive infrared sensors shall provide high immunity to false triggering from RFI (hand-held radios) and EMI (electrical noise on the line).
3. Passive infrared sensors shall have a multiple segmented Fresnel lens, in a multiple-tier configuration, with grooves-in to eliminate dust and residue build-up.
4. Where specified, passive infrared ultrasonic and dual technology sensors shall offer daylighting footcandle adjustment control and be able to accommodate dual level lighting.

F. Dual technology sensors:
1. Dual technology sensors shall be wall mounted, corner mounted, or ceiling mounted in such a way as to minimize coverage in unwanted areas.
2. Dual technology sensors shall consist of passive infrared and ultrasonic technologies for occupancy detection. Products that react to noise or ambient sound shall not be considered.

G. Ultrasonic sensors.
1. Ultrasonic sensors shall utilize Advanced Signal Processing to adjust the detection threshold dynamically to compensate for constantly changing levels of activity and air flow throughout controlled space.
2. Ultrasonic operating frequency shall be crystal controlled at 25 kHz within ± 0.005%

tolerance, 32 kHz within ± 0.002% tolerance, or 40 kHz ± 0.002% tolerance to assure reliable performance and eliminate sensor cross-talk. Sensors using multiple frequencies are not acceptable.

H. All sensors shall be capable of operating normally with electronic ballasts, PL lamp systems and rated motor loads.

I. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.

J. When specified, sensors shall utilize SmartSet™ technology for automatically adjustable time delay and sensitivity settings.

K. All sensors shall have readily accessible, user adjustable settings for time delay and sensitivity. Settings shall be located on the sensor (not the control unit) and shall be recessed to limit tampering.

L. In the event of failure, a bypass manual override shall be provided on each sensor. When bypass is utilized, lighting shall remain on constantly or control shall divert to a wall switch until sensor is replaced. This control shall be recessed to prevent tampering.

M. All sensors shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.

N. Where specified, sensor shall have an internal additional isolated relay with Normally Open, Normally Closed and Common outputs for use with HVAC control, Data Logging, and other control options. Sensors utilizing separate components or specially modified units to achieve this function are not acceptable.

O. All sensors shall have UL rated, 94V-0 plastic enclosures.

P. All occupancy sensors shall be set to maximum 30 minute time delay.

Q. Provide minimum 5% spare sensors for owner stock of each type of occupancy sensor.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install enclosed contactors (as indicated on Drawings), in accordance with NECA "Standard of Installation."

B. Install engraved nameplates. Refer to Section 26 05 53 for requirements.

C. Install contactor and relays in Electrical/ Mechanical Rooms unless otherwise noted.

END OF SECTION

SECTION 26 24 16 PANELBOARDS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
   1. Panelboards.

B. Related Sections:
   1. Section 26 05 00: Common Work Results for Electrical.
   2. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.
   3. Section 26 05 33: Raceway and Boxes for Electrical Systems.

C. Reference Standards:
   1. 2019 California Electrical Code (CEC).
   2. Underwriters Laboratories, Inc. (UL):
      a. No. 50 Enclosures for Electrical Equipment.
      b. No. 67 Panelboards.
      c. No. 489 Molded Case Circuit Breakers and Circuit Breaker enclosures.
   3. National Fire Protection Association (NFPA):
      a. No. 70.
   4. National Electrical Manufacturers Association (NEMA):
      a. No. PB 1 Panelboards.
      b. No. AB 3 Molded Case Circuit Breakers and their Application.

PART 2 PRODUCTS

2.1 PANELBOARDS

A. Panelboards shall be in accordance with UL, NEMA, NEC, CEC and as shown on the drawings. Approved manufacturers are Eaton, Square D, General Electric.

B. Panelboards shall be standard manufactured products. All components of the panelboards shall be the product and assembly of the same manufacturer. All similar units of all panelboards to be of the same manufacturer.

C. All panelboards shall be dead front safety type. Arrange sections for easy removal without disturbing other sections.

D. All panelboards shall be completely factory assembled with molded case circuit breakers. All factory wiring shall be checked for correct tightness and visually inspected to insure that bussing and terminations have not become loose in transit to job site.

E. Panelboards shall have main breaker or main lugs, bus size, voltage, phase, top or bottom feed, and flush or surface mounting as scheduled on the drawings. Refer to single line diagram and panel schedules on drawings. Terminals shall be minimum 75 degree rated. Back fed main circuit breakers are not allowed.

F. Panelboards shall have the following features:
   1. Nonreduced size copper bus bars, and connection straps bolted together and rigidly supported on molded insulators. Bus bar taps for panels with single pole branches shall be arranged for sequence phasing of branch circuit devices.
   2. Full size neutral bar, mounted on insulated supports.
   3. Ground bar and isolation ground bar (where called for in panel schedule) with sufficient terminals for all grounding wires. Buses braced for the available short circuit current.
   4. All breakers and phase bus connections shall be arranged so that it will be possible to substitute a 2-pole breaker for two single pole breakers, and a 3-pole breaker for three single pole breakers, when trip is 30 amps or less and frame size is 100 amperes or less, without having to drill and tap the main bus bars at bus straps. Where used for heating and air conditioning, and refrigeration equipment, use only HACR type UL listed circuit breakers.
   5. Design interior so that protective devices can be replaced without removing adjacent units, main bus connectors, and without drilling or tapping.
   6. Where designated on panel schedule as "space", include all necessary bussing, device support and connections. Provide blank cover for each space.
   7. Series rated panelboards are not permitted.
   8. Recessed panel space conduit: Provide (1) ¾ inch spare conduit stubbed to accessible ceiling space and/or interstitial space below floor for every (3) spaces and spares indicated on panel schedules.

G. Panelboards serving as building mains shall be “service entrance rated” and UL Listed as “service equipment”.

2.2 CABINETS AND TRIMS

A. Cabinets:
   1. Provide galvanized steel cabinets to house panelboards. Cabinets for outdoor panels shall be factory primed and suitably treated with a corrosion-resisting paint finish meeting UL standard for outdoor applications.
   2. All ventilated openings in panelboards and switchboards, shall be furnished with dust filters to prevent entrance of dust and debris.
   3. Cabinets for panelboards may be of one piece formed steel or of formed sheet steel with end and side panels welded, riveted, or bolted as required.
   4. Provide necessary hardware for "in" and "out" adjustment of panel interior.
   5. Cabinets for two section panelboards shall be arranged side by side, and shall be the same height. Flush mounted cabinets should be 1 1/2" apart and coupled by conduit nipple if necessary.
   6. Gutter size in panel boxes, on all sides, shall be in accordance with the CEC. Penetrations through gutter to live area of the panelboard shall incorporate approved non-metallic-grommet type of insulation to protect wire passing through.

B. Trims:
   1. Fabricate trim of sheet steel consisting of frame with door attached by concealed hinges. Provide flush or surface trim as shown on the drawings.
   2. Flush trims shall overlap the box by at least 3/4" all around.
   3. Surface trim shall have the same width and height as the box.
   4. Flush or surface trims shall not have ventilating openings.
   5. Secure trims to back boxes by indicating trim clamps.
   6. Provide a welded angle on rear of trim to support and align trim to cabinet.
   7. Provide separate trims for each section of multiple section panelboards. Trims and doors of sections shall be of the same height.

C. Doors:
   1. Provide doors with flush type latch and manufacturer's standard lock. Doors over 48

inches in height shall have a vault handle and a three-point catch, arranged to fasten door at top, bottom, and center.
2. In making switching devices accessible, doors shall not uncover any live parts.
3. Provide concealed hinges welded to the doors and trims.
4. For lighting or power contactors incorporated in panelboards, provide separate doors for the contactors.
5. Provide keyed alike system for all panelboards.
6. Provide a directory card, metal holder, and transparent cover. Permanently mount holders on inside of doors.

D. Painting:
1. Thoroughly clean and paint trims and doors at the factory with primer and manufacturer's standard finish.

2.3 MOLDED CASE CIRCUIT BREAKERS FOR PANELBOARDS

A. Breakers shall be UL listed and labeled, in accordance with the CEC, as shown on the drawings, and as specified.

B. Circuit breakers in panelboards shall be bolt on type on phase bus bar or branch circuit bar:
1. Molded case circuit breakers for lighting and appliance branch circuit panelboards shall have minimum interrupting rating as indicated.
2. Molded case circuit breakers shall have automatic, trip free, non-adjustable, inverse time, and instantaneous magnetic trips for 100 ampere frame or less. Magnetic trip shall be adjustable from 3 times to 10 times for breakers with 600 ampere frames and higher. Factory setting shall be HI, unless otherwise noted.

C. Breaker features shall be as follows:
1. Integral housing of molded insulating material.
2. Silver alloy contacts.
3. Arc quenchers and phase barriers for each pole.
4. Quick-make, quick-break, operating mechanisms.
5. A trip element for each pole, thermal magnetic type with long time delay and instantaneous characteristics, a common trip bar for all poles and a single operator.
6. Electrically and mechanically trip free.
7. An operating handle which indicates ON, TRIPPED, and OFF positions:
   a. Line connections shall be bolted.
   b. Interrupting rating shall not be less than the maximum short circuit current available at the line terminals as indicated on the drawings. The interrupting rating shall not be less than the minimum identified requirement.
8. An overload on one pole of a multipole breaker shall automatically cause all the poles of the breaker to open.

PART 3 EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with CEC, as shown on the drawings, and as specified.

B. Locate panelboards so that the present and future conduits can be conveniently connected. Coordinate the sizes and layout of cabinets within the designated spaces. All equipment must be dimensioned in order to physically fit in the spaces provided and to comply with all code required clearances.

C. Install a typewritten schedule of circuits in each panelboard. Include the room numbers (as

finally described by the Owner) and items served on the cards. Obtain final room numbers from Architect prior to creating schedule.

D. Mount the panelboard so that maximum height of the top circuit breaker above finished floor shall not exceed 78 inches.

E. For panelboards located in areas accessible to the public, paint the exposed surfaces of the trims, doors, and boxes with finishes to match surrounding surfaces after the panelboards have been installed.

F. Circuit numbers shall correspond to the approved panel schedule. Provide as-built drawings showing the actual circuit numbers being used for each device on each branch circuit if changes are required.

G. Verify depth of all flushmounted enclosures in walls to be certain wall depth will accommodate panel depth prior to installation.

H. All openings in switchgear and panelboards that are unused shall be sealed with bolts and washers. Use caulking where holes or openings cannot be sealed by way of a washer, or bolts or conduit seals.

I. Contractor shall include the services of an independent testing company to test GFI circuit breakers in distribution and main panelboards.

END OF SECTION 26 24 16

SECTION 26 27 26

WIRING DEVICES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
   1. Wiring devices.

B. Related Sections:
   1. Section 26 05 00: Common Work Results for Electrical.
   2. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.
   3. Section 26 05 26: Grounding and Bonding for Electrical Systems.
   4. Section 26 05 33: Raceway and Boxes for Electrical Systems.

C. Reference Standards:
   1. California Electrical Code (CEC) based on NFPA 70 (NEC). California Code of Regulations, Title 24, Part 3.
   2. National Electrical Manufacturers Association (NEMA):
      a. WD 1 General Color Requirements for Wiring Devices.
      b. WD 6 Wiring Devices - Dimensional Specifications.
   3. National Electrical Manufacturers Association (NECA):
      a. 1 Good Workmanship in Electrical Construction.
   4. National Electrical Testing Association (NETA):
      a. ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
   5. Underwriters Laboratories, Inc. (UL):
      a. 20 Safety General-Use Snap Switches.
      b. 231 Standard for Power Outlets.
      c. 498 Attachment Plugs and Receptacles.
      d. 943 Ground-Fault Circuit-Interrupters.
      e. 1436 Standard for Outlet Circuit Testers and Similar Indicating Devices.
      f. 1472 Solid-State Dimming Controls.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Receptacles, Switches, Wall Plates:
   1. Cooper Wiring Devices; Division of Cooper Industries, Inc.
   2. Hubbell Incorporated; Wiring Device-Kellems.
   3. Leviton Mfg. Company, Inc.
   4. Pass & Seymour/ Legrand.

2.2 RECEPTACLES

A. General for all receptacles:

1. Device shall be listed by UL
2. Mounting straps shall be plated steel, with break-off plaster ears and shall include a self- grounding feature (this feature does not substitute for a grounding conductor terminated on grounding strap of device). Terminal screws shall be brass, brass plated or a copper alloy metal.
3. Receptacles shall be of a screw terminal type, "pressure type quick wire" terminations are not allowed.

B. Duplex receptacles shall be premium specification grade single phase, 20 ampere, 120 volts, 2-pole, 3-wire, and conform to the NEMA 5-20R configuration in NEMA WD 6. The duplex type shall have bussing break-off feature for two-circuit operation. The ungrounded pole of each receptacle shall be provided with a separate terminal:
1. Wiring device color shall be standard white. Contractor to verify device color with Architect prior to procurement.
2. Ground Fault Interrupter Duplex Receptacles - Shall be an integral unit suitable for mounting in a standard outlet box:
   a. Ground fault interrupter shall be commercial grade and consist of a differential current transformer, solid state sensing circuitry and a circuit interrupter switch. It shall be rated for operation on a 60 Hz, 120 volt, 20-ampere branch circuit. Device shall meet CEC requirements. Device shall have a minimum nominal tripping time of 1/30th of a second. Devices shall meet UL 943.

C. Receptacles; 20, 30 and 50 ampere, 250 volts: Shall be complete and match with appropriate cord grip plug. Devices shall meet UL 231.

D. Weatherproof Receptacles: Shall consist of a listed weather resistant duplex receptacle, mounted in box with a gasketed, while in use weatherproof, cast metal cover plate and cap receptacle opening. The cap shall be permanently attached to the cover plate by a spring-hinged flap.

2.3 SWITCHES

A. Toggle switches shall be totally enclosed tumbler type with bodies of phenolic compound. Toggle handles color to match receptacle device color unless otherwise specified:
1. Shall be single unit toggle, butt contact, quiet AC type, heavy-duty general-purpose use with an integral self-grounding mounting strap with break-off plasters ears and be of a screw terminal type.
2. Shall be color coded for current rating, listed by UL, and meet the requirements of NEMA WD 1, Heavy-Duty and UL 20.
3. Ratings:
   a. 120 volt circuits: 20 amperes at 120-277 volts AC.
   b. 277 volt circuits: 20 amperes at 277 volts AC.
4. The switches shall be mounted on the strike plate side of doors.
5. Incorporate barriers between switches with multi-gang outlet boxes where required by the CEC.
6. All toggle switches shall be of the same manufacturer.

2.4 WALL PLATES

A. Wall plates for switches and receptacles shall be type 302 stainless steel.

B. Standard NEMA design, so that products of different manufacturers will be interchangeable. Dimensions for openings in wall plates shall be accordance with NEMA WD1.

C. For receptacles or switches ganged together, wall plates shall be a single ganged plate.

D. Wall plates for data, telephone or other communication outlets shall be as specified in the associated specification.

E. Surface mounted boxes, NEMA1, shall be industrial grade raised galvanized steel covers. In shop areas, all receptacles shall be dust proof and or waterproof where applicable.

F. Waterproof device covers shall be cast iron, 4-corner screw type, for FS and FD type mounting. Device covers shall be zinc galvanized finish. Weatherproof covers shall be lockable.

PART 3 EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with the CEC, NECA "Standard of Installation", and as shown as on the drawings.

B. Ground terminal of each receptacle shall be bonded to the outlet box with an approved green bonding jumper, and also be connected to the green equipment grounding conductor.

C. General: Devices shall be of the type specified herein. All devices shall be installed with "pigtailed" leads from the outlet box. No device shall be used in the "feed through" application. Screw terminals shall be used to connect all devices to the circuit and shall be grounded by means of a ground wire where grounding terminals are provided in the device.

D. Installation: Devices and plates shall be installed in a "plumb" condition and must be flush with the finish surface of the wall where boxes are recessed.

E. Mounting heights: All control and convenience devices shall comply with California Code of Regulations Title 24 and ADA with respect to accessibility requirements. Mounting heights indicated on plans shall have precedence.

F. Install switches with the off position down.

G. Clean debris from outlet boxes.

H. Provide extension rings as required to bring outlet boxes flush with finished surface or casework.

I. Test each receptacle device for proper polarity.

END OF SECTION

SECTION 26 27 27 WIRING DEVICES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
   1. Wiring devices.

B. Related Sections:
   1. Section 26 05 00: Common Work Results for Electrical.
   2. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.
   3. Section 26 05 33: Raceway and Boxes for Electrical Systems.

PART 2 PRODUCTS

2.1 RECEPTACLES

A. General - All receptacles shall be listed by Underwriters Laboratories, Inc.:
   1. Mounting straps shall be plated steel, with break-off plaster ears and shall include a self- grounding feature (this feature does not substitute for a grounding conductor terminated on grounding strap of device). Terminal screws shall be brass, brass plated or a copper alloy metal.
   2. Receptacles shall be of a screw terminal type, "pressure type quick wire" terminations are not allowed.

B. Duplex receptacles shall be premium specification grade single phase, 20 ampere, 120 volts, 2-pole, 3-wire, and conform to the NEMA 5-20R configuration in NEMA WD 6. The duplex type shall have bussing break-off feature for two-circuit operation. The ungrounded pole of each receptacle shall be provided with a separate terminal:
   1. Wiring device color shall be standard white. Contractor to verify device color with Architect prior to procurement.
   2. Ground Fault Interrupter Duplex Receptacles - Shall be an integral unit suitable for mounting in a standard outlet box:
      a. Ground fault interrupter shall be commercial grade and consist of a differential current transformer, solid state sensing circuitry and a circuit interrupter switch. It shall be rated for operation on a 60 Hz, 120 volt, 20-ampere branch circuit. Device shall meet CEC requirements. Device shall have a minimum nominal tripping time of 1/30th of a second. Devices shall meet UL 943.

C. Receptacles; 20, 30 and 50 ampere, 250 volts: Shall be complete and match with appropriate cord grip plug. Devices shall meet UL 231.

D. Weatherproof Receptacles: Shall consist of a listed weather resistant duplex receptacle, mounted in box with a gasketed, while in use weatherproof, cast metal cover plate and cap receptacle opening. The cap shall be permanently attached to the cover plate by a spring-hinged flap. Approved manufacturers: Intermatic WP10 Series, Thomas & Betts/Red Dot 2CK Series, or engineer approved equal.

E. Approved receptacles are Hubbell HBL5352 Series, and Hubbell GF20, GFCI Series.

2.2 SWITCHES

A. Toggle switches shall be totally enclosed tumbler type with bodies of phenolic compound. Toggle handles color to match receptacle device color unless otherwise specified. Approved toggle switch is Hubbell SB120:
   1. Shall be single unit toggle, butt contact, quiet AC type, heavy-duty general-purpose use with an integral self-grounding mounting strap with break-off plasters ears and be of a screw terminal type.
   2. Shall be color coded for current rating, listed by Underwriters Laboratories, Inc., and meet the requirements of NEMA WD 1, Heavy-Duty and UL 20.
   3. Ratings:
      a. 120-volt circuits: 20 amperes at 120-277 volts AC.
      b. 277-volt circuits: 20 amperes at 277 volts AC.
   4. The switches shall be mounted on the strike plate side of doors.
   5. Incorporate barriers between switches with multi-gang outlet boxes where required by the CEC.
   6. All toggle switches shall be of the same manufacturer.
   7. Key lockable switches shall be Hubbell HBL122 Series.

2.3 WALL PLATES

A. Wall plates for switches and receptacles shall be type 302 stainless steel.

B. Standard NEMA design, so that products of different manufacturers will be interchangeable. Dimensions for openings in wall plates shall be accordance with NEMA WD1.

C. For receptacles or switches ganged together, wall plates shall be a single ganged plate.

D. Wall plates for data, telephone or other communication outlets shall be as specified in the associated specification.

E. Surface mounted boxes, NEMA1, shall be industrial grade raised galvanized steel covers. In shop areas, all receptacles shall be dust proof and or waterproof where applicable.

F. Waterproof device covers shall be cast iron, 4-corner screw type, for FS and FD type mounting. Device covers shall be zinc galvanized finish. Weatherproof covers shall be lockable.

PART 3 EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with the CEC, NECA “Standard of Installation”, and as shown as on the drawings.

B. Ground terminal of each receptacle shall be bonded to the outlet box with an approved green bonding jumper, and also be connected to the green equipment grounding conductor.

C. General: Devices shall be of the type specified herein. All devices shall be installed with “pigtailed” leads from the outlet box. No device shall be used in the “feed through” application. Screw terminals shall be used to connect all devices to the circuit and shall be grounded by means of a ground wire where grounding terminals are provided in the device.

D. Installation: Devices and plates shall be installed in a “plumb” condition and must be flush with the finish surface of the wall where boxes are recessed.

E. Mounting heights: All control and convenience devices shall comply with California Code of Regulations Title 24 and ADA with respect to accessibility requirements. Mounting heights indicated on plans shall have precedence.

F. Install switches with the off position down.

G. Clean debris from outlet boxes.

H. Provide extension rings as required to bring outlet boxes flush with finished surface or casework.

I. Test each receptacle device for proper polarity.

END OF SECTION 26 27 27

SECTION 26 28 16

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.

1.2 SUMMARY

A. This section includes:
   1. Disconnect and safety switches where shown on the contract drawings and specified herein.

B. Related Sections:
   1. Section 26 05 53: Identification of Electrical Systems.

C. Reference Standards:
   1. California Electrical Code (CEC) based on NFPA 70 (NEC). California Code of Regulations, Title 24, Part 3.
   2. National Electrical Manufacturers Association (NEMA):
      a. KS 1 Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum).
      b. AB 3 Molded Case Circuit Breakers and their Application.
      c. FU 1 Low Cartridge Fuses.
      d. 250 Enclosures for Electrical Equipment (1000 Volts Maximum).
   3. Underwriters Laboratories, Inc. (UL):
      a. 98 Enclosed and Dead-Front Switches.
      b. 489 Molded Case Circuit Breakers and Circuit Breaker enclosures.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Fusible Switches, non-fusible switches, and molded case circuit breakers:
   1. Eaton Electrical, Inc.; Cutler-Hammer Business Unit.
   2. Square D; a brand of Schneider Electric
   3. General Electric Company; GE Consumer & Industrial – Electric Distribution
   4. Siemens Energy & Automation, Inc.

2.2 GENERAL

A. Disconnect Switches: Provide with devices enabling the switch to be locked in the open or closed positions.

B. Manual Motor Switches: Tumbler type rated 3HP, 240 Volts with or without overload heaters as required to protect equipment served.

C. Externally Operable Safety Switches: To have quick-make, quick-break mechanism, capable of switching 10 times switch rating, with cover interlock to prevent opening with switch in ON position and defeat mechanism for maintenance.

D. Switches: Shall be general duty (GD) for 240 volt and below and heavy duty (HD) for 277/480 volt type unless otherwise indicated. Provide NEMA 1 enclosures for interior locations and NEMA 3R enclosures for exterior or wet locations. Provide with number of poles, ampacity, voltage, and HP rating, fusible or non-fusible as indicated. Copper blades shall be visible in off position.

E. Fusible Switches: Equip them with rejection clips for UL Class R fuses. Switches having a dual rating when used with dual element fuses shall have a rating so indicated and shall be confirmed by equipment vendor being connected.

F. 600 Amperes or Less Fuses: UL Class RKI with a minimum interrupting rating of 200,000 Amperes, Bussmann "Low-Peak Type" or equal.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION

A. Locations: Install switches, disconnects and safety where indicated on the Contract Drawings or as required by CEC.

B. Fastenings: Securely fasten switches to structural members or Unistrut support as directed by the manufacturer.

C. Label all disconnect switches in accordance with Section 26 05 53: Identification of Electrical Systems.

D. Fuse: All fuses shall be as indicated on the plan or as required by the equipment. Verify fuse size with equipment manufacturer requirements, prior to installation. Use current limiting fuses as indicated on plan.

E. Terminals shall be minimum 75 degree rated.

END OF SECTION

SECTION 26 51 00

INTERIOR LIGHTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
   1. Interior lighting systems, including luminaires, LED's, and emergency lighting equipment.

B. Related Sections:
   1. Section 26 05 00: Common Work Results for Electrical.
   2. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.
   3. Section 26 05 26: Grounding and Bonding for Electrical Systems.
   4. Section 26 05 33: Raceway and Boxes for Electrical Systems.

C. Reference Standards:
   1. California Electrical Code (CEC) based on NFPA 70 (NEC). California Code of Regulations, Title 24, Part 3.
   2. California Energy Code. California Code of Regulations, Title 24, Part 6.
   3. National Electrical Manufacturers Association (NEMA).
      a. 50 Enclosures for Electrical Equipment.
      b. 67 Panelboards.
      c. 489 Molded Case Circuit Breakers and Circuit Breaker enclosures.
   4. Underwriters Laboratories, Inc. (UL).
      a. 50 Enclosures for Electrical Equipment.
      b. 67 Panelboards.
      c. 489 Molded Case Circuit Breakers and Circuit Breaker enclosures.
   5. Aluminum Association Inc. (AA).
   6. Illuminating Engineering Society of North America (IESNA or IES).

1.3 SUBMITTALS

A. Submit in accordance with Section 26 05 00: Common Work Results for Electrical.

B. Shop Drawings:
   1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
   2. Include electrical ratings, dimensions, mounting, details, materials, terminations, wiring and connection diagrams, photometric data, ballasts, luminaires, lamps, and controls.

1.4 DEFINITIONS

A. Lighting terminology used herein is defined in IES.

B. Exception: The term "driver" is used herein to cover both drivers and power supplies, where applicable.

C. Clarification: The term “LED light source(s)” is used herein per IES to cover LED package(s), module(s), and array(s).

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Materials and equipment shall be in accordance with CEC, UL, ANSI, and as shown on the drawings and specified.

2.2 LIGHTING FIXTURES (LUMINAIRES)

A. Shall be in accordance with CEC, UL 1598 and shall be as shown on drawings and as specified. All luminaires shall have been certified to the California Energy Commission by its manufacturer to comply with the efficiency standards as per California Code of Regulations Title 24, Part 6, Section 111 referencing the Appliance Efficiency Regulations in Title 20. Post certification with building permit.

B. Sheet Metal:
1. Shall be formed to prevent warping and sagging. Housing, trim, and lens frame shall be true, straight (unless intentionally curved) and parallel to each other as designed.
2. Wireways and fittings shall be free of burrs and sharp edges and shall accommodate internal and branch circuit wiring without damage to the wiring.
3. When installed, any exposed fixture housing surface, trim frame, door frame and lens frame shall be free of light leaks; lens doors shall close in a light tight manner:
   a. Hinged door closure frames shall operate smoothly without binding when the fixture is in the installed position, and latches shall function easily by finger action without the use of tools.

C. Recessed fixtures shall be of the type approved for the ceiling and insulation conditions and appropriate for the installation location. Insulation must be held back from the fixture to provide manufacturers' recommended clearances for proper operation. Thermal tripping shall be the installer's responsibility to correct. Where installed in fire rated ceilings, coordinate installation of fire rated enclosures around the ceiling penetrations. Fixtures shall contain the proper through wiring capacity for that which is shown on the plans.

D. Recessed fixtures shall be provided with the appropriate trims and hardware compatible with the ceiling type shown. Plaster frames are required where plaster or gypsum board ceilings are encountered.

E. Fixtures with louvers or light transmitting panels shall have hinges, latches, and safety catches to facilitate safe, convenient cleaning and relamping.

F. Mechanical Safety: Lighting fixture closures (lens doors, trim frame, hinged housings, etc.) shall be retained in a secure manner by captive screws, chains, captive hinges, or fasteners such that they cannot be accidentally dislodged during normal operation or routine maintenance.

G. Metal Finishes:
1. The manufacturer shall apply standard finish (unless otherwise specified) over a corrosion resistant primer, after cleaning to free the metal surfaces of rust, grease, dirt, and other deposits. Edges of pre-finished sheet metal exposed during forming, stamping, or shearing processes shall be finished in a similar corrosion resistant manner to match the adjacent surface(s). Fixture finish shall be free of stains or evidence of rusting, blistering, or flaking.

2. Interior light reflecting finishes shall be white with not less than 85 percent reflectance's, except where otherwise specified on the drawing.
3. Exterior finishes shall be as shown on the drawings.

H. Provide all lighting fixtures with a specific means for grounding metallic wireways and housings to an equipment grounding conductor.

I. Light Transmitting Components for Fixtures:
1. Shall be 100 percent virgin acrylic plastic or water white, annealed, crystal glass.
2. Flat lens panels shall have not less than 1/8 inch of average thickness. The average thickness shall be determined by adding the maximum thickness to the minimum unpenetrated thickness and dividing the sum by 2.
3. Unless otherwise specified, lenses, diffusers and louvers shall be retained firmly in a metal frame by clips or clamping ring in such a manner as to allow expansion and contraction of the lens without distortion or cracking.

J. Recessed compact LED fixtures shall be manufactured specifically for LED lamps with drivers integral to the fixture. Assemblies designed to retrofit fixtures are prohibited except when described in this fashion.

2.3 LED LUMINAIRE REQUIREMENTS

A. General Requirements:
1. Luminaire shall have an external label per ANSI C136.15.
2. Luminaire shall have an internal label per ANSI C136.22.
3. Luminaires shall start and operate in -20°C to +40°C ambient.
4. LED light source(s) and driver(s) shall be RoHS compliant.

2.4 EMERGENCY FIXTURE POWER SUPPLY

A. Self-contained battery-operated power supply for operating specified fixture for a minimum output of 90 minutes.

B. The power supply shall be installed within the luminaire ballast compartment or wireway. Provide with test switch and charge indicator installed integral to the luminaire. The test switch and charge indictor may be installed in a remote ceiling mounted flush J-box for recessed downlights which cannot accept integral components.

C. Performance: Emergency operation lumen output for specified fixtures shall be a minimum of 600 lumens.

2.5 LED DRIVER

A. Driver:
1. Rated case temperature shall be suitable for operation in the luminaire operating in the ambient temperatures as indicated.
2. Shall accept the voltage or voltage range indicated and shall operate normally for input voltage fluctuations of plus or minus 10 percent. Consistent with NEMA SSL 1.
3. Shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.

B. Electromagnetic interference:
1. Shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.
2. Shall comply with FCC 47 CFR part 15 non-consumer RFI/ EMI standards.

C. The following shall be in accordance with corresponding sections of ANSI C136.37:
   1. Wiring and grounding.
   2. All internal components shall be assembled and pre-wired using modular electrical connections.
   3. Mounting provisions.
   4. Terminal blocks for incoming AC lines.
   5. Latching and hinging.
   6. Ingress protection.

2.6 LAMPS

A. Led Light Source:
   1. Minimum Color Rendering Index (CRI): 60.
   2. Correlated Color Temperature (CCT):
      a. CCT shall be as listed in Table 1 below:

Table 1. Allowable CCT

Manufacturer-Rated Nominal CCT (K)	Allowable LM-79 Chromaticity Values Measured CCT (K)
2700	2580 to 2870
3000	2870 to 3220
3500	3220 to 3710
4000	3710 to 4260
4500	4260 to 4746
5000	4745 to 5311
5700	5310 to 6020
6500	6020 to 7040

PART 3 EXECUTION

3.1 INSTALLATION

A. Installation and furnishing of lighting fixtures shall be in accordance with the CEC, manufacturer's instructions and as shown on the drawings or specified. Fixtures damaged in transit and storage prior to completion shall be replaced at Contractor's expense.

B. Align, mount and level the lighting fixtures uniformly.

C. Avoid interference with and provide clearance for equipment. Where the indicated locations for the lighting fixtures conflict with the locations for equipment, change the locations for the lighting fixtures by the minimum distances necessary as approved by the Architect. The Architectural reflected ceiling plan will take precedence over electrical plans.

D. For suspended lighting fixtures, the mounting heights shall provide the clearances between the bottoms of the fixtures and the finished floors as shown on the drawings.

E. Lighting Fixture Supports:

1. Contractor shall provide support for all of the fixtures independent of suspended ceilings. Supports may be anchored to channels of the ceiling construction, to the structural slab or to structural members within a partition, or above a suspended ceiling.
2. Shall maintain the fixture positions after cleaning and re-lamping.
3. Shall support the lighting fixtures without causing the ceiling or partition to deflect.
4. Hardware for recessed fluorescent fixtures:
5. Fixtures shall be supported as detailed on drawings and as required by DSA standards.
6. Installation: Fixtures shall be securely mounted on ceilings and walls with appropriate fastening devices. "Drop-in" type T-bar fixtures shall be secured with #12 gauge safety "earthquake wires" as described by California Code of Regulations Title 24 Part 2, Chapter 47. "Tek Screws" will be required for fastening to the T-bar system in addition to safety wire. Surface mounted fluorescent fixtures shall be solidly screwed or clipped into framing above drywall with 4-#10 sheet metal screws into each fixture. Provide blocking for screw supports behind all surface mounted lighting fixtures weighing more than 15 lbs.
7. Surface mounted lighting fixtures:
    a. Fixtures shall be bolted against the ceiling independent of the outlet box at four points spaced near the corners of each unit. The bolts shall be minimum 1/4-20 bolt, secured to structural ceiling. Non-turning studs may be attached to the building structure by 12 gauge safety hangers.
8. Fixtures mounted in open construction shall be secured directly to the building structure with approved bolting and clamping devices.
9. Single or double pendent mounted lighting fixtures:
    a. Each stem shall be supported by an approved outlet box, mounted swivel joint and canopy which holds the stem captive and provides spring load (or approved equivalent) dampening of fixture oscillations. Outlet box shall be supported vertically from the building structure and be allowed to swing to a 45 degree angle.
10. Outlet boxes for support of lighting fixtures (where permitted) shall be secured directly to the building structure with approved devices or supported vertically in a hung ceiling from the building structure with a nine gauge wire hanger and be secured by an approved device to a main ceiling runner or cross runner to prevent any horizontal movement relative to the ceiling.

F. Coordinate between the electrical and ceiling trades to ascertain that approved lighting fixtures are furnished in the proper sizes and installed with the proper devices (hangers, clips, trim frames, flanges), to match the ceiling system being installed.

G. Bond lighting fixtures and metal accessories to the grounding system as specified in Section 26 05 26: Grounding and Bonding for Electrical Systems.

H. Provide unswitched leg of interior lighting branch circuit to integral emergency battery pack light fixtures, exit signs and night lights as applicable per lighting plans.

I. Wallmount fixtures in walkway areas shall not project more than 4 inches from wall when projection occurs lower than 80 inches.

END OF SECTION

SECTION 26 56 00

EXTERIOR LIGHTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section specifies the furnishing, installation, and connection of exterior luminaires, controls, poles and supports.

B. Related Sections:
1. Section 26 05 00: Common Work Results for Electrical.
2. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.
3. Section 26 05 26: Grounding and Bonding for Electrical Systems.
4. Section 26 05 33: Raceway and Boxes for Electrical Systems.
5. Section 26 51 00: Interior Lighting.

C. Reference Standards:
1. American Society for Testing and Materials (ASTM).
2. American Concrete Institute (ACI).
3. American National Standards Institute (ANSI).
4. Aluminum Association Inc. (AA).
5. Illuminating Engineering Society of North America (IESNA).
6. National Electrical Manufacturers Association (NEMA).
7. National Fire Protection Association (NFPA).
8. Underwriters Laboratories, Inc. (UL).

1.3 SUBMITTALS

A. Submit in accordance with Section 26 05 00: Common Work Results for Electrical.

B. Shop Drawings:
1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include electrical ratings, dimensions, mounting, details, materials, required clearances, terminations, wiring and connection diagrams, photometric data, ballasts, poles, luminaires, effective projected area (EPA), lamps and controls.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Materials and equipment shall be in accordance with CEC, UL, ANSI, as shown on the drawings and as specified.

2.2 LUMINAIRES

A. UL 1598 and ANSI C136.17. Luminaries shall be weatherproof, heavy duty, outdoor types designed for efficient light utilization, adequate dissipation of lamp and ballast heat and safe cleaning and relamping.

B. Light emitting diode (LED)-based solid state lighting (SSL) products shall be factory tested in accordance to the International Engineering Society (IES) LM-79 recommendations and meet ANSI C78.377-2008 standards.

C. LED light sources shall be factory tested in accordance to IES LM-80 recommendations.

D. LED-based SSL product shall incorporate an external heat sink, integral to the luminaire.

E. IESNA HB-9 and RP-8 light distribution pattern types shall be as indicated on the drawings.

F. Lenses shall be frame-mounted heat-resistant, borosilicate glass, prismatic refractors. Attach the frame to the luminaire housing by hinges or chain.

G. Pre-wire internal components to terminal strips at the factory.

H. Bracket mounted luminaries shall have leveling provisions and clamp type adjustable slip-fitters with locking screws.

I. Materials shall be rustproof. Latches and fittings shall be non-ferrous metal.

J. LED-based SSL luminaires shall be manufactured specifically for LED lamps with drivers integral to the luminaire housing.

2.3 LED-BASED SOLID STATE DRIVERS

A. Shall be listed by either U.L. or equal listing agency and comply with IEEE C.62.41-1991, Class A operation.

B. Provide a minimum power factor of 0.9.

C. Minimum operating temperature appropriate for outdoor environments.

D. Shall operate at a frequency greater than or equal to 120Hz.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install lighting in accordance with the CEC, as shown on the drawings, and in accordance with manufacturer's recommendations.

3.2 GROUNDING

A. Ground noncurrent-carrying parts of equipment including metal poles, luminaries, mounting arms, brackets, and metallic enclosures as specified in Section 26 05 26: Grounding and Bonding for Electrical Systems. Where copper grounding conductor is connected to a metal other than copper, provide specially treated or alloyed connectors suitable and listed for this purpose.

END OF SECTION

SECTION 27 00 00

BASIC MATERIALS AND METHODS

PART 1 – GENERAL

1.01 RELATED WORK

A. The entire drawing and specification package apply to the work specified in the telecommunications sections of the specifications and shall be complied with in every respect. The Contract Documents are comprised of the drawings and specifications. The Contractor shall examine these Contract Documents, and coordinate required work indicated in each.

1.02 SCOPE OF WORK

A. The work covered by the specifications includes furnishing materials, labor, transportation, tools, permits, fees, utilities, and incidentals necessary for the complete installation of work required in the Contract Drawings.

B. It is the intent of the Contract Documents to provide an extension of the existing installed systems interfaced with new systems, complete in every respect.

C. The Contractor shall be responsible for coordination and proper relation of his work to the building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with the existing site conditions, details of the work and the working conditions, and verify dimensions in the field. The Contractor shall advise the Engineer of any discrepancy prior to bidding. The submission of bids shall be deemed evidence of the Contractor's site visit; coordination of existing conditions and include consideration for existing conditions.

D. Provide line-by-line specification review for each Division 27 section annotated to certify compliance or deviation.

1.03 DRAWINGS AND SPECIFICATIONS

A. The drawings and these specifications are complementary to each other, and what is required by one shall be as binding as if required by both.

B. If variations or departures from the drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore shall be submitted to the Engineer for review. No departures shall be made without prior written acceptance of the Engineer.

C. Should the drawings or specifications disagree in themselves or with their counterpart, the better quality or greater quantity of work or materials shall be estimated upon, and unless otherwise directed by the Engineer in writing, shall be performed or furnished. In case the specifications should not fully agree with the Schedules, the latter shall govern. Figures indicated on drawings govern scale measurements and large scale details govern small scale drawings.

D. Items specifically mentioned in the specifications but not shown on the drawings and/or items shown on the drawings but not specifically mentioned in the specifications shall be installed by the Contractor under the appropriate section of work as if they were both specified and shown.

1.04 CODES AND STANDARDS

A. All work shall comply with the applicable articles of the National Electrical Code, the National Electrical Safety Code, the National Fire Codes (published by National Fire Protection Association), and City Codes and Ordinances, as well as any other authorities that may have lawful jurisdiction pertaining to the work specified. None of the terms or provisions of this specification shall be construed as waiving any of the rules, regulations, or requirements of these authorities.

B. Contractor is responsible for knowledge and application of current versions of all applicable standards and codes. In cases where listed standards and codes have been updated, Contractor shall adhere to the most recent revisions, including all relevant changes or addenda at the time of installation.

C. ANSI/TIA:

1. ANSI/TIA-526-7-A (July 2015) Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
2. TIA-526.2-A (July 2015) Effective Transmitter Output Power Coupled into Single-Mode Fiber Optic Cable - Adoption of IEC 61280-1-1 ed. 2 Part 1-1: Test Procedures for General Communication Subsystems – Transmitter Output Optical Power Measurement for Single-Mode Optical Fiber Cable
3. ANSI/TIA-4994 (March 2015) Standard for Sustainable Information Communications Technology
4. ANSI/TIA-526-14-C (April 2015) Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
5. ANSI/TIA-568.0-D (September 2015) Generic B (supersedes TIA-568-C.0 and TIA-568-C-1)
6. ANSI/TIA-568.1-D (September 2015) Commercial Building Telecommunications Infrastructure Standard (supersedes ANSI/TIA-C.1)ANSI/TIA-568.2-D (September 2018) Balanced Twisted-Pair Telecommunications Cabling and Components Standard
7. ANSI/TIA-568.3-D (June 2016) Optical Fiber Cabling Components Standard
8. ANSI/TIA-568.4-D (August 2020) Broadband Coaxial Cabling Components Standard
9. ANSI/TIA-569-E (May 2019) Telecommunications Pathways and Spaces
10. ANSI/TIA-598-D (July 2014) Optical Fiber Cable Color Coding
11. ANSI/TIA-570-C (August 2012) Residential Telecommunications Infrastructure Standard
12. ANSI/TIA-606-C (June 2017) Administration Standard for Telecommunications Infrastructure
13. ANSI/TIA-607-D (July 2019) Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
14. ANSI/TIA-758-B (March 2012) Customer-Owned Outside Plant Telecommunication Infrastructure Standard
15. ANSI/TIA-862-B (February 2016) Structured Cabling Infrastructure Standard for Intelligent Building Systems
16. ANSI/TIA-942-B (July 2017) Telecommunications Infrastructure Standard for Data Centers
17. ANSI/TIA-1005-A (May 2012) Telecommunications Infrastructure Standard for Industrial Premises
18. ANSI/TIA-1005-A-1 (January 2015) Telecommunications Infrastructure Standard for Industrial Premises, Addendum 1- M12-8 X-Coding Connector - Addendum to TIA-1005-A
19. ANSI/TIA-1183 (August 2012) Measurement Methods and Test Fixtures for Balun-Less Measurements of Balanced Components and Systems
20. ANSI/TIA-1183-1 (January 2016) Measurement Methods and Test Fixtures for Balun-Less Measurements of Balanced Components and Systems, Extending Frequency

Capabilities to 2 GHz - Addendum to TIA-1183

21. TIA-1152 (November 2016) Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
22. TIA-1179-A (September 2017) Healthcare Facility Telecommunications Infrastructure Standard
23. ANSI/TIA-4966 (May 2014) Telecommunications Infrastructure Standard for Educational Facilities
24. TIA-455-104-B (February 2016) FOTP 104- Fiber Optic Cable Cyclic Flexing Test (supersedes TIA-455-104-A)
25. TIA/EIA-455-25-D (February 2016) FOTP-25 Impact Testing of Optical Fiber Cables
26. TIA-604-18 (November 2015) FOCIS 18 Fiber Optic Connector Intermateability Standard – Type MPO-16
27. TIA-604-5-E (November 2015) FOCIS 5 Fiber Optic Connector Intermateability Standard-Type MPO
28. TIA-5017 (March 2016) Telecommunications Physical Network Security Standard
29. TIA-TSB-155-A (Reaffirmed 10-6-2014) Guidelines for the Assessment and Mitigation of Installed Category 6 Cabling to Support 10GBASE-T
30. TSB-184 (July 2009) Guidelines for Supporting Power Delivery Over Balanced Twisted-Pair Cabling
31. TSB-4979 (August 2013) Practical Considerations for Implementation of Multimode Launch Conditions in the Field
32. TSB-190 (June 2011) Guidelines on Shared Pathways and Shared Sheaths
33. TIA-TSB-162-A (November 2013) Telecommunications Cabling Guidelines for Wireless Access Points
34. TSB-5018 (July 2016) Structured Cabling Infrastructure Guidelines to support Distributed Antenna Systems
35. TIA-492AAAE (June 2016) Detail Specification for 50-µm Core Diameter/125-µm Cladding Diameter Class 1a Graded-Index Multimode Optical Fibers with Laser-Optimized Bandwidth Characteristics Specified for Wavelength Division Multiplexing
36. TIA-492AAAB-A (November 2009) Detail specification for 50-µm core diameter/125-µm cladding diameter class Ia graded-index multimode optical fibers
37. TIA-455-243 (March 2010) FOTP-243 Polarization-mode Dispersion Measurement for Installed Single-mode Optical Fibers by Wavelength-scanning OTDR and States-of-Polarization Analysis
38. TSB-172-A (February 2013) Higher Data Rate Multimode Fiber Transmission Techniques

D. ISO/IEC:

1. ISO/IEC TR 11801-99-01 Information technology – Generic cabling for customer premises: Guidance for balanced cabling in support of at least 40 GBit/s data transmission: Parts 1 and 2
2. ISO/IEC TR 29106 AMD 1 Information technology -- Generic cabling -- Introduction to the MICE environmental classification
3. ISO/IEC 24764 AMD 1 Information technology – Generic cabling for data centers
4. ISO/IEC 11801 AMD 1 AMD 2 Information technology – Generic cabling for customer premises
5. ISO/IEC 15018 AMD 1 Information technology – Generic cabling for homes
6. ISO/IEC 24702 AMD 1 Information technology – Generic cabling – Industrial premises
7. ISO/IEC 14763-1 AMD 1 Information technology – Implementation and operation of customer premises cabling – Part 1: Administration
8. ISO/IEC 14763-2 Information technology – Implementation and operation of customer premises cabling – Part 2: Planning and installation
9. ISO/IEC 14763-2-1 Information technology – Implementation and operation of customer premises cabling – Part 2-1: Planning and installation – Identifiers within administration systems
10. ISO/IEC 14763-3 Ed 2.0 Information technology -- Implementation and operation of

customer premises cabling -- Part 3: Testing of optical fiber cabling
11. ISO/IEC TR 24704 Information technology – Customer premises cabling for wireless access points
12. ISO/IEC TR 24750 Information technology – Assessment and mitigation of installed balanced cabling channels in order to support 10GBASE-T
13. ISO/IEC TR 29125 IT Telecommunications cabling requirements for remote powering of terminal equipment

E. BICSI – Building Industry Consultative Services International – Published Standards
1. ANSI/BICSI 001-2009, Information Transport Systems Design Standard for K-12 Educational Institutions
2. ANSI/BICSI 002-2014, Data Center Design and Implementation Best Practices
3. ANSI/BICSI-003-2014 Building Information Modeling (BIM) Practices for Information Technology Systems
4. BICSI 004-2012, Information Technology Division Systems Design and Implementation Best Practices for Healthcare Institutions and Facilities
5. ANSI/BICSI 005-2016, Electronic Safety and Security (ESS) System Design and Implementation Best Practices
6. BICSI 006-2015 Distributed Antenna System (DAS) Design and Implementation Best Practices
7. ANSI/NECA/BICSI 568-2006, Standard for Installing Commercial Building Telecommunications Cabling
8. NECA/BICSI 607-2011, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings
9. BICSI – Building Industry Consultative Services International – Manuals
10. Telecommunications Distribution Methods Manual, 14th Edition (2020)
11. Information Transport Systems Installation Methods Manual (ITSIMM), 6th Edition
12. Outside Plant Design Reference Manual, 5th Edition
13. BICSI's ICT Terminology Handbook, Version 1.0
14. Telecommunications Project Management Manual (TPMM), 1st edition
15. Telecommunications Project Management Reference Document (TPMRD), 2nd Edition
16. BICSI's Special ICT Design Considerations, Version 1.0
17. Essentials of Bonding and Grounding, Version 1.0

F. National Electric Codes
1. National Electrical Safety Code (NESC) (IEEE C2-2012)
2. NFPA 70-2020, National Electrical Code© (NEC©)
3. ANSI/IEEE C2-207, National Electrical Safety Code®
4. National Electrical Code (NEC) (NFPA 70)
5. NFPA 72 National Fire Alarm and Signaling Code

G. ASHRAE
1. ASHRAE Standard 90.4P, Energy Standard for Data Centers and Telecommunications Buildings

H. OSHA Standards and Regulations – all applicable

I. Local Codes and Standards – all applicable

J. Anywhere cabling standards conflict with one another or with electrical or safety codes, Contractor shall defer to the NEC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either.

K. Knowledge and execution of applicable standards and codes is the sole responsibility of the Contractor.

L. Any violations of applicable standards or codes committed by the Contractor shall be remedied at the Contractor's expense.

M. In any instance where these Specifications call for materials for construction of a better quality or larger size than required by the codes, the provisions of these Specifications shall take precedence. The codes shall govern in case of direct conflict between the Codes and the Drawings.

1.05 EXISTING UTILITIES

A. The Contract Documents reflect the general location and routing for all telecommunications services known to exist on this project.

1.06 BUILDING CONSTRUCTION AND LAYOUT OF WORK

A. General: It shall be the responsibility of the Contractor to consult the Engineering Drawings and Details so as to thoroughly familiarize himself with the type and quality of construction to be provided on this project.

B. The drawings are diagrammatic in nature and do not show every connection in detail or every line or conduit in its exact location. These details are subject to the requirements of all codes and ordinances as well as all structural and architectural conditions. The Contractor shall carefully investigate structural and finish conditions and shall coordinate the separate trades in order to avoid interference between the various phases of work. Work shall be laid out so that it will be concealed in furred chases unless specifically noted or indicated to be exposed. Work shall be installed to avoid crippling of structural members; therefore, inserts to accommodate conduit hangers shall be set before concrete is poured, and proper openings through floors, walls, beams, etc. shall be provided as hereinafter specified or as otherwise indicated or required before concrete is poured. All work shall be run parallel or perpendicular to the lines of the building unless otherwise noted.

C. The approximate location of equipment items is indicated on the drawings. Exact locations are to be determined by coordination of dimensions from approved equipment submittals and site-verified field measurements and will in all cases be subject to the approval of the Engineer. The Engineer reserves the right to make any reasonable changes in the indicated locations prior to installation for no additional cost.

D. In areas of existing special ceiling construction the removal and restoration must be carefully planned such that the existing condition of the ceilings is maintained. It may be necessary for the Contractor to procure a Subcontractor familiar with this work to achieve this requirement.

PART 2 – PRODUCTS

2.01 GENERAL MATERIALS AND EQUIPMENT REQUIREMENTS

A. Materials, in general, shall conform to the National Electrical Code requirements and shall be listed, inspected, and approved by the Underwriters Laboratories and shall bear the UL label where labeling service is available. The label or listing of the Underwriters Laboratories, Inc. will be accepted as evidence that the materials or equipment conform to the applicable standards of that agency. In lieu of this listing, the Contractor may submit a statement from a nationally recognized, adequately equipped testing agency, indicating that the items have been tested in accordance with required procedures, and that the materials and equipment comply with all Contract requirements.

2.02 STANDARD PRODUCTS

A. Materials and equipment shall be the standard catalog products of manufacturers regularly engaged in the manufacture of products conforming to these specifications, and shall essentially duplicate materials and equipment that have been in satisfactory use at least two (2) years prior to bid opening. Where custom or special items are required, these shall be fully described using drawings, material lists, etc., which fully describe in detail the item proposed for use on this project.

2.03 MANUFACTURER'S INSTRUCTIONS

A. The Contractor is responsible for furnishing the proper telecommunications equipment and/or material and for seeing it is installed as intended by the manufacturer. The Contractor shall, wherever necessary, request advice and supervisory assistance from equipment manufacturers as required for the proper installation, operation, or start-up. The Contractor shall notify the Engineer in writing of any conflict between the Contract Documents and the manufacturer's recommendations and shall obtain from the Engineer instructions/direction before proceeding with the work. The Contractor shall pay for all costs resulting from deficiencies created by installation not in accordance with the manufacturer's recommendations or the instructions of the Engineer.

2.04 RUST PREVENTION

A. Metallic materials shall be protected against corrosion. Exposed metallic parts of equipment exposed to the elements shall be given a rust inhibiting treatment and standard finish by the manufacturer. Components such as boxes, bodies, fittings, guards, and miscellaneous parts shall be protected in accordance with the ASTM A123 or A153, except where other equivalent protective treatment is specifically approved in writing.

2.05STORAGE AT SITE

A. The Contractor shall not receive material or equipment at the job site until ready for installation or until there is suitable space provided to properly protect equipment from rust, weather, humidity, dust, or physical damage.

2.06 CONDITION OF MATERIALS

A. All materials required for the installation of the telecommunications systems shall be new and unused. Any material or equipment damaged in transit from the factory, during delivery to premises, while in storage on premises, while being erected and installed, or while being tested, until time of final acceptance, shall be replaced by this Contractor without extra cost to Owner.

2.07 NAMEPLATES

A. Factory assembled components and equipment shall be provided with embossed nameplates, securely attached to the equipment with rivets or screws. Nameplates will have information required to specifically identify the equipment in the future such as the manufacturer's name, address, catalog number, serial number, etc. All data on nameplates shall be legible at the time of final inspection.

PART 3 – EXECUTION

3.01 ACCEPTABLE MANUFACTURERS

A. The specifications contain the names of manufacturers which are considered acceptable based on the quality of the product.

B. Where acceptable manufacturers are listed, only products of those manufacturers may be provided. Additionally, the product must meet all the detailed requirements of the specifications.

C. If no manufacturer's name is mentioned, the Contractor shall provide equipment and material which meet the specifications.

D. The drawings represent the manufacturer's equipment scheduled. The listing of acceptable manufacturers in the specifications is not intended to imply that equipment of these other manufacturers will fit in the space provided or have the same electrical, structural or other requirements as the equipment scheduled. The Contractor must ensure that the equipment provided will meet all project requirements prior to submitting data on that equipment.

3.02SPACE AND EQUIPMENT ARRANGEMENT

A. Equipment and components shall be installed in a manner to permit access to parts requiring service. Telecommunications equipment shall be installed in such a manner as to allow removal for service without disassembly of adjacent equipment.

B. Large equipment or apparatus which is to be installed in the building, and which is too large to permit access through stairways, doorways, or shafts shall be brought to the job and placed in the space before the enclosing structure is completed. Following placement in the space, such apparatus shall be thoroughly protected from damage.

C. Equipment shall have working clearances as required by applicable codes and standards.

3.03 SUBMITTAL AND REVIEW OF MATERIALS

A. After the Contract is awarded, but prior to proceeding with the Work, the Contractor shall obtain, check, certify, and submit complete Shop Drawings and Brochures from Manufacturers, Suppliers, Vendors, etc., for all materials and equipment specified herein. Submit Shop Drawings and Brochures in sufficient time so as not to impede the progress of work. Three weeks will be required for the processing of Shop Drawings and Brochures in the Engineer's office, exclusive of transmittal time. This time shall be considered by the Contractor when scheduling submittal data. After the Contract is awarded, the Contractor will advise the Engineer in writing of the schedule for submission of shop drawings and product data and the persons authorized to sign submittal data on behalf of the Company.

B. The Engineer's review of Shop Drawings and Brochures shall not relieve the Contractor of the responsibility for dimensions, errors that may be contained therein, or deviations from Contract Document requirements. It shall be clearly understood that the Engineer's noting some errors but overlooking others does not grant the Contractor permission to proceed in error. Regardless of any information contained in the Shop Drawings, the requirements of the Contract Documents shall govern and are not waived or superseded in any way by the submittal data review.

C. Before submission of Shop Drawings and Brochures, the Contractor shall certify that each Shop Drawing and each item of material or equipment complies with the Contract Documents for this Project. Such certification shall be made by the Owner, a Partner, a Corporate Officer of the Contractor, or by a person duly authorized to sign for the Contractor. Unless so certified, Shop Drawings and/or Brochures will be returned for resubmittal.

Certifications shall be in the form of rubber stamp impressions or typed letter which states:

I hereby certify that this Shop Drawing and/or brochure and the equipment and material shown on this Shop Drawing and/or Brochure complies in all aspects (except as noted*) with the requirements of the Contract Documents for this Project. I further certify that all data shown herein as to performance, dimensions, construction, materials, and other pertinent items are true and correct.

Name of Contractor_____

Signed_____

Position_____

Date_____

*Refer to exception requirements herein.

D. Each Shop Drawing shall indicate in the lower right hand corner and each Brochure shall indicate on the front cover the following: Title of the Sheet or Brochure; name and location of the building; names of the Engineer, Contractor, Manufacturer, Supplier, Vendor, etc., the date of submittal; and the date of each correction and revision. So far as is practical, each Shop Drawing and/or Brochure shall bear a cross-reference note to the sheet number or numbers of the Contract Drawings and Specifications showing the same work. Shop Drawings and Brochures shall be prepared as follows:

1. Shop Drawings: Drawings shall be newly prepared and not reproduced from the Contract Documents, drawn to a scale that can be easily read and shall contain sufficient plans, elevations, sections, and isometrics to describe clearly the items in question. Drawings shall be prepared by a draftsman skilled in this type of work. All equipment layouts and similar Shop Drawings shall be drawn to at least 1/4-inch = 1'-0" scale.

2. All Shop Drawings shall indicate the equipment actually purchased. The elevation, location, support points, load imposed on the structure at support and anchor points, shall be indicated. All beam penetrations and slab penetrations shall be indicated and sized and shall be coordinated. All Design Drawing space allocations shall be maintained, such as ceiling height, chase walls, equipment room size, etc., unless proper written authorization is required from the Engineer to change them. All associated equipment shall be coordinated and clearly shown on the Shop Drawings.

3. Brochures: Brochures submitted to the Engineer shall be published by the Manufacturers and shall contain complete and detailed engineering and dimensional information to show that the equipment will fit into the allotted space.

4. Brochures submitted shall contain only information which is relevant to the particular equipment or materials to be furnished. Do not submit catalogs that describe several different items other than those items to be used unless all irrelevant information is marked out or relevant information is clearly marked.

E. The submittal format shall follow the Specifications format with a submittal required for each required section. The submittal shall be contained in a three-ring hard back binder. Copies of each submittal shall be three-hole punched and arranged (or folded if required) for the Engineer's filing convenience. Provide one copy of updated TABLE OF CONTENTS and progressive-tabbed index sheets also for the Engineer's filing convenience.

F. Submittal data for each section must be complete. Partial submittals will not be reviewed. To the greatest extent possible all sections shall be submitted with the first submission. No more than three additional submissions will be allowed to complete the submittal package.

G. Unless a greater number is indicated within Division One of these specifications, submit six (6) copies of all Brochures for review. Submit one (1) reproducible and one (1) blueprint of shop drawings for review. Comments will be made on the reproducible to facilitate copying.

H. Any submittal that is disapproved must be resubmitted within two (2) weeks following notification of such disapproval. If no satisfactory material is submitted within the two-week period, the Engineer reserves the right to require the Contractor to furnish items exactly as described in the Contract Documents.

I. No allowances will be made for submittals which are not made in a timely fashion or which are turned down because they do not meet the specifications. Should delivery problems arise due to the above, affecting the completion time of the project, the Contractor will furnish and install acceptable alternates until the proper materials arrive and then replace the alternate materials with the approved materials, all at no cost to the Owner. If the Contractor is not able to furnish an acceptable alternate until the proper materials arrive, he will assume all costs for furnishing and installing all alternates as directed by the Engineer and/or will pay a suitable penalty for the inconvenience experienced by the Owner. This penalty will be set by the Owner based on the particular circumstances.

3.04 SUPERVISION

A. A competent certified foreman or superintendent, approved by the Engineer, shall be maintained at the project site to receive instructions and to act for the Contractor. Once this superintendent has been approved, no change shall be made without approval of the Owner or his authorized representative. The Owner and his authorized representative shall have the right to observe the work at any time. The Contractor shall have a representative present when his work is being observed, and he shall give assistance as required.

3.05CUTTING AND PATCHING

A. Where it is necessary to cut through walls, floors, or ceilings to permit installation of work under this section of the Contract, or to repair any defects that may appear, up to the expiration of guarantee period, such cutting shall be done under the supervision of the Engineer. The Contractor shall not be permitted to cut or modify any structural members without the written permission of the Engineer.

B. Patching of all openings and repairing of any damage to the work of other trades occasioned by cutting operations, or occasioned by the failure of any part of work installed under this Contract, shall be performed by the trade whose work is involved, and shall be paid for by the Contractor.

C. Openings cut through exterior walls or roofs shall be provided with suitable covers to protect the property or materials involved. Openings cut through walls below grade shall be properly protected to prevent entrance of water or other foreign elements. Openings cut between fire zones or plenums shall be sealed to maintain the fire integrity of the wall or floor. Conduits and cable tray through plenum wall shall be sealed using materials complying with UL 1479, NEC 300-21, and NEC 800-3(C), and shall be UL classified.

3.06 HOISTING, SCAFFOLDING, AND TRANSPORTATION

A. Provide hoisting and scaffolding facilities as required to set materials and equipment in place.

3.07 CLEANING

A. The Contractor shall at all times keep the premises free from accumulations of waste material or rubbish. Debris shall be removed from the site and from any street or alley adjacent to the site.

B. At completion of the project, the Contractor shall remove all tools, scaffolding, and surplus materials. Contractor shall leave the area "broom clean". Before final acceptance, vacuum all panels, cabinets, racks and other equipment enclosures. Wipe clean all fixture lenses and reflectors, all panelboard and switchboard interior and exterior surfaces, being careful to remove all stray paint, construction materials, dust, and particles. Touch-up all marred surfaces to restore existing conditions to those provided by the manufacturer.

3.08 CONDUIT SLEEVES

A. Where conduits pass through walls or floors not on fill, galvanized sheet metal sleeves shall be provided and shall be sealed to prevent air and noise transmission. In walls, they shall be flush with each finished surface. In pipe chases, they shall extend 1-1/2 inches above floor slab and be cemented in a water tight manner. Size of these sleeves shall be at least 1/2 inch greater than outside diameter of the conduit.

B. For conduits passing through outside walls, provide and install galvanized steel sleeves having an inside diameter at least 4 inches greater than the outside diameter of contained conduit. Where these occur in walls having a waterproof coating applied, the sleeves shall have welded flanges to build into waterproofing. When conduits are installed, the annular space between pipe and sleeve shall be effectively sealed, using shredded lead hammered in place or an approved mastic sealer.

C. Pipe and duct sleeves, pitch pockets, and flashings compatible with the roofing installation shall be provided for roof penetrations.

3.09 GROUNDING

A. Ground buses shall be provided in each Telecommunications room by Division 16 Contractor unless noted on Contract Drawings.

B. Telecommunications grounding system shall be a single point grounding from the building entrance electrical ground to each Telecommunications room. This Grounding system shall be provided by Division 16 Contractor unless notes on Contract Drawings.

C. All Conduit systems, cabinets' racks, cable trays, protector blocks, SCTP patch panels and/or miscellaneous equipment, etc. shall be grounded by being connected to the common telecommunications grounding system. The conductors shall be a # 6awg solid with a green jacket

3.10 RECEDENCE OF WORK

1. This Contract includes many different systems furnished and installed by different trades. All trades shall coordinate their work with that of all other trades so that it may be installed in the most direct and workmanlike manner without hindering or handicapping other trades.

3.11 RECORD DRAWINGS

A. The Contractor shall keep a set of Drawings on the job, noting daily all changes made in these Drawings in connection with the final installation, including exact dimensioned locations of all new and uncovered existing active and inactive utilities outside the building, and shall turn over a clean, neatly marked set of mylar reproducible Drawings showing "as-installed" work to the Engineer for delivery to the Owner. All underground utilities, services, and systems shall be accurately located by the Contractor and dimensioned on the "as-installed" Drawings.

3.12 OPERATING AND MAINTENANCE MANUAL

A. The Contractor shall furnish indexed operating and maintenance manuals with complete technical data for each system, piece of equipment, and material installed under this Contract.

B. Two (2) copies of the manual, bound in hardback binders or an approved equivalent, shall be provided. One copy shall be completed and delivered to the Engineer prior to the time that system and equipment tests are performed. The second copy shall be delivered prior to final acceptance.
1. Provide one (1) operation and Maintenance manual for each building. Provide one (1) as-built floor plan and one CD for each building.

C. The manual shall include the following information
1. Manufacturer's installation instructions.
2. Manufacturer's local representative and/or distributor's name and address.
3. Manufacturer's operating and maintenance instructions.
4. Manufacturer's internal wiring diagrams.
5. Contractor's installation wiring diagrams.
6. Replacement part number listings and descriptions.
7. Framed operating instructions, when required, in individual Specification sections.
8. Warranties and guarantees.
9. Provide an approved submittal at the front of each section.

D. The manuals shall be identified on the cover as "Operating and Maintenance Manual" with additional cover display of the name and location of project, the Owner, the Engineers, the General Contractor, and the Subcontractors installing equipment represented in the brochure.

E. The manual shall have a Table of Contents and shall be grouped in sections according to the sections of Division 27. Each section shall have a copy of the pages of the Specifications covered within the section. Sections shall be organized as follows:
1. Each section in the manual shall identify the grouping of all literature required for the system or equipment included.
2. The contents of each section shall be arranged in the following sequence: First, the approved engineering submittals with complete performance and technical data; second, the manufacturer's installation brochure; third, the manufacturer's operating and maintenance brochure; fourth, the manufacturer's installation wiring diagram; fifth, the Contractor's field wiring diagram, if different; and sixth, the manufacturer's brochure listing replacement part numbers and description.
3. Provide a final section entitled, "Warranties and Guarantees", for all equipment, etc.

3.13 EXISTING FACILITIES

1. The Contractor shall be responsible for loss or damage to the existing facilities and shall be responsible for repairing or replacing such loss or damage. The Contractor shall send proper notices and receive written permission from the Owner to enter existing areas.

Before beginning work in existing areas, the Contractor shall make necessary arrangements and perform other services required for the care, protection, and in-service maintenance of all electrical, communication, plumbing, heating, air condition, and ventilating services for new and existing facilities. The Contractor shall erect temporary barricades with necessary safety devices to protect personnel from injury, removing all such temporary protection upon completion of the work.

2. The Contractor shall provide temporary or new services to existing facilities as required to maintain their proper operation when normal services are disrupted as a result of the work being accomplished under this project.

3. Where existing construction is removed to provide working and extension access to existing utilities, the Contractor shall remove doors, piping, conduit, outlet boxes, wiring, light fixtures, air condition ductwork, and equipment, etc. to provide this access and shall reinstall same upon completion of work.

4. Where partitions, walls, floors, or ceilings of existing construction are indicated to be removed, the Contractor shall remove and reinstall in locations approved by the Engineer all devices required for the operation of the electrical systems installed in the existing construction. This is to include, but is not limited to, temperature control system devices, electrical switches, relays, fixtures, piping, conduit, etc.

3.14 DEMOLITION AND RELOCATION

1. The Contractor shall modify, remove, and relocate all materials and items so indicated on the drawings or required by the installation of new facilities. All removals and/or dismantling shall be conducted in a manner as to produce maximum salvage. Salvage materials shall remain as directed by the Owner. Materials and items scheduled for relocation and which are damaged during dismantling or reassembly operations shall be repaired and restored to the approval of the Owner. The Contractor may substitute new materials and items of like design and quality in lieu of materials and items to be relocated, if approved by the Owner.

2. All items scheduled for relocation and/or reuse shall be inspected by the Contractor and the Owner or his authorized representative. A written report of the condition of each item shall be made and provided to the Engineer. Where items scheduled for relocation and/or reuse are considered unsuitable for reuse, the Contractor shall so notify the Engineer and await reinstallation instructions before proceeding with removal. Items damaged in reinstallation shall be repaired or replaced by the Contractor as directed by the Owner at not additional cost to the Owner or the Engineer.

3. All items which are to be relocated shall be carefully removed in reverse to original assembly or placement and protected until relocated. The Contractor shall clean, repair, and provide all new materials, fittings, and appurtenances required to complete the relocation and to restore the items to good operative order. All relocations shall be performed by workmen skilled in the work ad in accordance with standard practice of the trades involved.

4. Service lines and wiring to items to be removed, salvaged, or relocated shall be removed to points as indicated on the drawings, specified, or acceptable to the Owner. Service lines and wiring not scheduled for reuse shall be removed to the points at which reuse is to be continued or service is to remain. Such services shall be sealed, capped, or otherwise tied off or connections into the existing facilities in such a manner as to result in minimum interruption of services to adjacent occupied areas. Services to existing areas or facilities which must remain in operation during the construction period shall not be interrupted without prior specific written approval of the Engineer.

3.15 OUTAGES

1. Outages of services as required by the project will be permitted, but only at a time approved by the Owner. The Contractor shall notify the Owner in writing two (2) weeks in advance of the requested outage in order to schedule required outages. No outages shall be taken unless written approval has first been received from the Owner. The time allowed for outages will not be during normal working hours unless otherwise approved by the Owner. All costs of outages, including overtime charges, shall be included in the Contract amount.

END OF SECTION

SECTION 27 10 00

STRUCTURED CABLING SYSTEM (SCS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 RELATED WORK

A. 26 05 00 – Grounding and Bonding
B. 26 05 29 – Electrical Hangers and Supports
C. 26 05 33 – Raceway and Boxes

1.3 DESCRIPTION

A. Summary of Work:
   1. Provide a new, complete, and tested Category CAT6A cable distribution system for data interconnections (Local Area Network) in the new campus. The data distribution system shall include fully terminated unshielded twisted pair cables, raceways, conduit, UTP termination devices, data communications outlets, patch panels, patch cables, network racks, and other incidental and miscellaneous premises wiring system hardware as required for a complete and usable system. The installation shall comply with all applicable codes and standards in effect at the job site and as indicated in the Drawings and Specifications.
   2. This project shall be phased. Existing network shall not be interrupted or dismantled until the existing area is no longer in use.
   3. Provide and install building entrance terminals as required.
   4. Provide all Commscope POE extender devices and cabling as required to provide fully functional systems as indicated on drawings and herein.

1.4 QUALITY ASSURANCE

A. Acceptable manufacturers:
   1. The equipment/products described herein and furnished per these specifications shall be the product of one manufacturer. All references to model numbers and other detailed descriptive data is intended to establish standards of design performance, and quality, as required
   2. The approved manufacturers shall provide a complete Category 6A solution with a 25-year performance warranty.
   3. Acceptable product connectivity and cable shall be Uniprise by CommScope. Only the manufacturers listed in this paragraph will be accepted.
   4. All products shall be Category 6A compliant. NO EXCEPTIONS.

B. Installer Qualifications:
   1. The Data Cable System Installer shall be licensed and shall meet all applicable regulations of the State and Department of Labor insofar as they apply to this type of system. The proposer shall be a firm normally employed in the low voltage and data cabling industry and shall provide a reference list of ten (10) similar size, Category 6A, projects and contact names confirming successful Category 6A premises wiring system installations.
   2. The SCS Installer shall be a certified CommScope Uniprise and in good standing

in the Partner Program, local area, integrator and must be able to provide the manufacturer's maximum available warranty on the entire SCS. The contractor's certification must have been obtained and held within 75 miles of the project's location.

3. The installing contractor must have a full-time employed RCDD (Registered Communications Distribution Designer) on staff. Current RCDD certification shall be provided in the product submittals.
4. All individuals installing the SCS must be employees of the certified installer and at least 25% of the installing staff shall have undergone a training class given by the manufacturer. Current certification indicating the successful completion of the training course shall be available upon request at the project and submitted in the contractor's product submittals.
5. The proposing contractor and the installing contractor must be the same company. No subcontractor to the proposing SCS contractor will be allowed for any portion of the SCS scope of work.

C. Pre-Construction Meeting:
1. The successful Contractor shall attend a mandatory pre-construction meeting with the project's consultant and individuals deemed necessary by the Owner's representative prior to the start of the work. No SCS work shall begin prior to this meeting.

D. Acceptance:
1. The Owner's representative reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.

E. Warranty:
1. The selected system installer shall be a CommScope Uniprise, certified contractor and hold current certification. Contractor shall provide an end-to-end performance warranty of not less than twenty (25) years on all products installed. The proposer shall provide current certification documentation. The performance warranty shall be issued by the manufacturer and shall warrant that ALL Category 6A cable links have been tested bi-directionally (end to end) using a Level 2 tester, per TSB-67, and that all test results conform to the most current TIA/EIA-568-C and/or TSB-67 Link values.
2. The warranty will also cover multimode fiber optic cabling. Performance testing shall be conducted in accordance with ANSI/EIA/TIA-526-14 Standard, method B.
3. The warranty will stipulate that all products used in this installation meet the prescribed mechanical and transmission specifications for such products as described in ISO/IEC 11801, ANSI/TIA/EIA-568-A, or EN 50173. Quality and workmanship evaluation shall be solely by the Owner/Designer and designated representatives.

1.5 REGULATORY REQUIREMENTS

A. Standards: All work shall be performed in accordance with the latest revisions of the following standards and codes:
1. Latest Local Codes and Amendments
2. 2014 National Electrical Code

B. Other References:

1.	TIA/EIA-568-C	Commercial Building Telecommunications Wiring Standard
2.	EIA/TIA-569	Commercial Building Standard for Telecommunication Pathways and Spaces.

3.	TIA/EIA-606	The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.
4.	TIA/EIA-607	Commercial Building Grounding and Bonding Requirements for Telecommunications.
5.	EIA/TIA 455-A	Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices and Other Fiber Optic Components.
6.	TIA/EIA TSB 67	Transmission Performance Specification for Field Testing of Unshielded Twisted-Pair Cabling Systems.
7.	TIA/EIA TSB 72	Centralized Optical Fiber Cabling Guidelines
8.	ISO/IEC 11801	Generic Cabling Standard
9.	EN 50173	Generic Cabling Standards for Customer Premises
10.	ANSI/EIA/TIA 526-14	Optical Power Loss Measurements of Installed Multimode Fiber Cable Plan.

C. Governing Codes and Conflicts: If the requirements of these specifications or the Project Drawings exceed those of the governing codes and regulations, then the requirements of these specifications and the Drawings shall govern. However, nothing in the Drawings or Specifications shall be construed to permit work not conforming to all governing codes, regulations, and manufacturer installation requirements.

1.6 ABBREVIATIONS

A. The following abbreviations are used in this document:

DC	Direct Current
IDF	Intermediate Distribution Frame
MDF	Main Distribution Frame
PBX	Private Branch Exchange
UTP	Unshielded Twisted Pair

1.7 SUBMITTALS

A. Project Initiation:

1. Within fourteen (14) days of Notice to Proceed, the data network system installer shall furnish the following in a single consolidated submittal:
   a. Permits: The Contractor shall obtain all required permits and provide copies to the Owner/Architect/Engineer.
   b. Product Literature: Complete manufacturer's product literature for all cable, patch panels, cross-connect blocks, cable supports, cable labels, outlet devices, and other products to be used in the installation. In addition, whenever substitutions for recommended products are made, samples (when requested by the Owner/Designer) and the manufacturer's supporting documentation demonstrating compatibility with other related products shall be included. The submittal shall have some type of distinguishing marker or pointer to indicated what specific product is to be provided
   c. Construction Schedule: A time-scaled Construction Schedule, using PERT/CPM, indicating general project deadlines and specific dates relating to the installation of the cable distribution system.
   d. Testing: Proposed Contractor Category 6A UTP cable test result forms, fiber optic cable test result forms and a list of instrumentation to be used for systems testing.
   e. Specification Compliance: A letter shall be provided stating, by section and subsection, that the SCS installer complies with the ENTIRE

specification section. If the installer intends to deviate from any portion of the specifications, a detailed explanation of reason in which the installer would like to deviate shall be provided in addition to the specification compliance letter. NO DEVIATIONS SHALL BE ACCEPTABLE UNTIL THEY HAVE BEEN ACCEPTED BY THE PROJECT'S TECHNOLOGY CONSULTANT.

f. Certifications: The contractor shall submit all of the following certifications and the certifications must contain dates which are valid from the date of proposal and not expire any sooner than 12 months after substantial completion of the project.
   1) BICSI RCDD Certification: This certification must be held by an on-staff, full-time employee of the SCS installer. The holder must be staffed out of the office that is located within 75 miles of the projected.
   2) Proposed Manufacturer's Strategic Partner Certification: This certification have been obtained by the SCS installer's office that is located within 75 miles of the project and shall be a company certification, not and individual certification.
   3) Proposed Manufacturer's Installer Certification: This certification must be held by at least 25% of the, on-site, staff and be made available at the site if requested by the owner, architect, and/or project's technology consultant.
   4) Fiber Optic Technician Certification: This certification must be held by the on-staff/on-site individual that is supervising the fiber optic installation and performing the fiber optic terminations and testing.

B. Shop Drawings:
   1. Submit the following items, for Owner review and approval, within twenty-eight (28) days of notice to proceed:
      a. Proposed circuit routing and circuit grouping plan prepared by a BICSI certified RCDD (Registered Communications Distribution Designer). The RCDD certification must be current. Identifiable, separate routing shall be shown for both the station cabling and the MDF-to-IDF tie cabling.
      b. In addition to the cable routing, the submitted drawings shall indicate the following, even if the following is expected to be provided by the project's electrical or general contractor:
         1) Location of wall penetrations (all penetrations shall be sleeved and contain protective bushings at both ends)
         2) Location of sleeved wall pass-thru
         3) Size of sleeve at each location installed
         4) Quantity of cable passing through each sleeve
         5) Location of drops in each room (quantity or labeling of drops are not required in the submittal plans. Labeling shall be provided in the closeout plans and quantities shall be as per the contract documents, addendums, and issued changes. Each drop shall be labeled for the type of outlet that it is)
         6) Conduit routing, size, quantity, and stub-up locations for all floor mounted outlets.
      c. Drawing Compliance: A letter shall be provided stating that the SCS installer complies with the ENTIRE project drawing, including all general, keyed, and notes to contractor. If the installer intends to deviate from any portion of the specifications, a detailed explanation of reason in which the installer would like to deviate shall be provided in addition to the specification compliance letter. NO DEVIATIONS SHALL BE ACCEPTABLE UNTIL THEY HAVE BEEN ACCEPTED BY THE

PROJECT'S TECHNOLOGY CONSULTANT.

C. Close-out Procedures:

1. Two (2) copies of the following documents shall be delivered to the building owner's representative at the time of system acceptance. The close out submittals shall include:
   a. Inspection and Test Reports: During the course of the Project, the Contractor shall maintain an adequate inspection system to ensure that the materials supplied and the work performed, conform to contract requirements. The Contractor shall provide written documentation that indicates that materials acceptance testing was conducted as specified. The Contractor shall also provide documentation, which indicates that all cable termination testing was completed and that all irregularities were corrected prior to job completion.
   b. Provide complete test reports for all cabling and devices that comprise system as outlined in this document.
   c. Include the Name, address, and telephone of the authorized factory representative with a 24-hour emergency service number.
   d. The manual shall also include Manufacturer's data sheets and installation manuals/instructions for all equipment installed, a list of recommended spare parts.
   e. Generic or typical owner's instruction and operation manual shall not be acceptable to fulfill this requirement.
   f. An up-to-date record ("as-built") set of approved shop drawing prints that have been revised to show each and every change made to the structure cabling system from the original approved shop drawings. Drawings shall consist of a scaled plan of each building showing the placement of each individual item of the technical cabling system equipment as well as raceway size and routing, junction boxes, and conductor size, quantity, and color in each raceway.
   g. As-built Drawings shall include cable pathways, camera locations with correct labeling and MDF/IDF locations. The as-built drawings shall be prepared using AutoCad 2013 or later. Provide the Owner with electronic versions of the As-Builts on (2) 8GB thumb drives.
   h. All drawings must reflect point to point wiring, device address and programmed characteristics as verified in the presence of the engineer and/or the end user unless device addressing is electronically generated, and automatically graphically self-documented by the system.
   i. A copy of the manufacturer's warranty on the installed system.
   j. Any keys to cabinets and/or equipment and special maintenance tools required to repair, maintain, or service the system.
   k. Operating and Maintenance Instructions for all devices within the system. These instructions shall reflect any changes made during the course of construction, and shall be provided to the Owner, for their use, in a three-ring binder labeled with the project name and description. (4 copies)
   l. Upon completion of the work and at a time designated by the Architect or owner, provide formal training sessions for the Owner's operating personnel to include location, operation, and maintenance of all included systems and equipment. Minimum amount of training time shall be at least 4 hours.
   m. One (1) 30" x 42" laminated floor plan sheets illustrating technology drops and cable designation. Contractor shall provide one complete floor plan sheet for each telecommunications room (MDF or IDF)

PART 2 - PRODUCTS

2.1 GENERAL

A. Installation: The cabling shall be installed per requirements of the manufacturer and the Project Documents utilizing materials meeting all applicable TIA/EIA standards. The Contractor is responsible for providing all incidental and/or miscellaneous hardware not explicitly specified below as required for a complete and operational system.

B. Materials: Materials shall be as listed or shall be approved equivalent products of other manufacturers meeting the intent and quality level of the TIA/EIA specifications. All approved equivalent products will be published by addendum ten days prior to proposal for Architect/Engineer to review.

C. Testing: All installed cabling shall be tested 100% good after installation by the Contractor. All final test results shall be delivered to owner at completion of project. Refer to closeout requirements listed under section 1.5.

D. Ratings: All products shall be new and brought to the job site in the original manufacturer's packaging. Electrical components (including innerduct) shall bear the Underwriter's Laboratories label. All communications cable shall bear flammability testing ratings as follows:
CM Communications Cable
CMP Plenum Rated Communications Cable
CMR Riser-Rated Communications Cable

E. Initial Cable Inspection: The Contractor shall inspect all cable prior to installation to verify that it is identified properly on the reel identification label, that it is of the proper gauge, containing the correct number of pairs, etc. Note any buckling of the jacket that would indicate possible problems. Damaged cable or any other components failing to meet specifications shall not be used in the installation.

F. Cable Lubricants: Lubricants specifically designed for installing communications cable may be used to reduce pulling tension as necessary when pulling cable into conduit.
1. Approved Products
   a. Twisted-pair cable: Dyna-Blue
      American Polywater

G. Fire Wall Sealant: Any penetration through firewalls (including those in sleeves) will be resealed with an Underwriter Laboratories (UL) approved sealant.
1. Approved Products
   a. 3M or
   b. Pre-approved equal

H. All Category 6A cables and data drops on the entire project provided.
1. Areas:
   a. Data Closet Category 6A patch cables (2.2 E.)
   b. Station Wiring (2.5 A.)
   c. Flush Mount Jacks (2.6 A.)
   d. Workstation Category 6A Patch Cables (2.6 C.)

2.2 DATA CLOSET (MDF/IDF) CATEGORY 6A TERMINATION HARDWARE

A. Equipment Racks/Cabinets:

Provide and install equipment racks and/or cabinets in locations indicated on the attached drawings for the following areas.

For all IDF and MDF locations

Contractor shall provide and install new floor mounted rack systems. Refer to floor plan and enlarged MDF/IDF room layouts for number or racks to provide at each location.

1. 2-post Floor mounted racks – Commscope
   a. 760082479 | RK3-45A
2. 4-post Floor mounted racks – Commscope
   a. 720082560 | RK4P45-36A
3. Wall Mounted network cabinet – Chatsworth Products
   a. 11996-X48 - CUBE-iT Wall-Mount Cabinet
   b. Provide the following accessories as required
      i. 40972-001 - Standard Fan and Filter Kit
      ii. 40970-7## - Vertical Cabling Section for CUBE-iT Wall-Mount
      iii. 40971-X48 - Vertical Lashing Bracket
      iv. 25190-000 - Cable Port Brush Kit
      v. 11837-701 - Horizontal Wire Management Bar
      vi. 12787-548 - Equipment Mounting Rail Kit
      vii. 40974-X19 - Rack-Mount Shelf
      viii. 40159-009 - Ground Jumpers
      ix. 12820-706 - Power Strip

B. Distribution Rack/Cabinet Grounding – CommScope

All Racks and/or Cabinets shall be grounded using stranded #6 AWG insulated copper conductor. Connect to service entrance grounding electrode. Provide all required bonding materials and hardware and bond to building grounding electrode subsystem at building electrical service entrance.

1. Grounding Compression Lugs
   a. 245529-10
2. Wall Mount Bus Bar (one per MDF/IDF location)
   a. UGBKIT-0210

C. Fiber Optic Patch Panels – CommScope

The enclosures used shall provide termination panels for SC type connectors and be of sufficient size and capacity to terminate 110% of the fiber count of the inside of outside fiber optic cables. Patch panels must be 19" rack mountable. Provide all termination accessories, fiber patch cords, enclosures, and test for a complete fiber optic distribution system.

1. MDF: 4U Fiber Shelf
   a. 760251048 | EPX-4U-MOD-ENC
2. IDF and Press box MDF: 2U Fiber Shelf
   a. 760251044 | EPX-2U-MOD-ENC
3. Wall Mounted Fiber Enclosure:
   a. 760147496 | WBE-EMT-BK-2P-PNL
4. Contractor shall furnish LC Duplex Cassettes and terminate all fibers in each MDF/IDF
5. Wall Mounted Single Sided Single Door Fiber Enclosure
   a. 760147496-WBE-EMT-BK-2P-PNL
   b. Provide cable grommets AMP #559496-2, or equivalent cable grommet.

D. Category 6A Patch Panels – Cable Matters

The Category 6A data station cable shall be terminated on Category 6A RJ45 patch panels with circuit board construction, T568B terminations. Patch panels shall be 19-inch rack mountable. Workstation patch panels shall terminate all workstation communications

outlets. Furnish units that adhere to the performance requirements TIA/EIA-568A standards.

1. Approved Products:
   a. 24 Port – 180013
   b. 48 Port – 180115
   c. Cat 6A Jacks – CommScope:
      1) UNJ10G Series
   d. Cable support bars at the back of all patch panels to provide additional support at rear of rack and panels

E. Category 6A Rack Patch Cables – CommScope:
1. Network Rack Patch Cables: Cabling Contractor shall provide Owner with (1) – Category 6A patch cable for each data drop on entire project. These cables will provide connectivity from the front of the network patch panels to the network equipment provided by Owner upon move-in. The patch cables are to be terminated properly with RJ-45 connections on each end with the proper pin-out assignments per project configuration.
2. 6' Category 6A Patch Cable
   1) UC1AAA2 Series
3. 6' Category 6A Patch Cable Color Scheme:
   1) BLUE - Data and VOIP
   2) WHITE – Wireless Access Points
   3) ORANGE – Security Cameras, Environmental Sensors, Door Access Systems
   4) GREEN – PA Systems
   5) RED – Fire Alarm
4. Provide the following lengths and percentages of patch cables
   1) 10% 12"
   2) 30% 3'
   3) 30% 5'
   4) 30% 7'

F. Cable Management – CommScope

1. Provide cable management panels as required for vertical cable management. Provide vertical wire management on ends and in between all racks on entire project. All vertical cable managers on the entire project shall be 10" wide management. Horizontal not to be used.
2. Horizontal and Vertical Products
   a. Vertical – 760244781 | VCM-DS-84-10B
   b. Horizontal
      1) 1u – 760072942 | HTK-19-SS-1U
      2) 2u – 760072959 | HTK-19-SS-2U

3. Cable Tray: 760085647 | CR-SLR-10L12W (black) – CommScope:
   a. Accessories (black):
      1) Cable Runway Elevation Kit (CPI) - #10506-706 – per rack
      2) Rack-to-Runway Mounting Plate: 760084053 | CRR2RRMK – per rack
      3) Cable Runway Radius Drop: 760083956 | CRDK-12W
      4) Ladder Rack 90° Horiz. E-Bend Section: 760085530 | CR90FCB-12W
      5) Wall Angle Support Kit: 760084160 | CR12-C24WRSK
      6) End Cap Kit: 760084012 | CRPECK
      7) Junction Splice Kit: 760084046 | CRTJSK.

8) Other required applicable installation accessories

4. Provide Velcro straps for cable dressing in MDF/IDF rooms.

G. Rack/Cabinet Electrical:

1. A power distribution strip shall be installed vertically at the back of each data rack and/or cabinet.
   a. Approved Products
      1) Standard Outlet Chatsworth Products, Inc. (CPI) 12851-706
      2) Twist Lock Outlet Chatsworth Products, Inc. (CPI) 12851-707
2. Provide the following electrical UPS equipment at each location indicated.
   a. At MDF room: (Provide quantity of two (2) each of the following at the MDF)
      1) Smart-UPS 3000VA USB & Serial RM 2U 120V with UPS Network Management Cart with Environmental Monitoring
      2) APC Product Number: SMX3000RM2UNC (black chassis)
      3) 3-year extended warranty
      4) APC Product Number: WBEXTWAR3YR-SP-04
   b. At IDF Room: (Provide quantity of one (1) each of the following at each IDF)
      1) Smart-UPS 1500VA USB & Serial RM 2U 120V with UPS Network Management Cart with Environmental Monitoring
      2) APC Product Number: SMX1500RM2UNC (black chassis)
      3) 3-year extended warranty
      4) APC Product Number: WBEXTWAR3YR-SP-04

2.3 CABLE TRAY

A. Cable tray shall be used to route all cabling in major hallways and corridors. The cable tray shall be a two tiered system with Fiber on the top and all copper cabling on the bottom. Cable tray shall consist of a minimum 2" deep steel wire mesh tray with all necessary cable drop outs, bend radius protection, connectors and all other components to create a fully functional cable tray system that will not threaten the structural integrity of the cable jacket. All threaded rods supporting the tray will be covered with a plastic sleeve to protect the cable jacket.

B. Approved manufacturers:
   1. Panduit
   2. Owner approved manufacturer.

2.4 LADDER RACKS

A. Ladder Racks shall be used in all MDF/IDF rooms. Ladder Rack shall be 12" wide and 2" deep, minimum. Approved manufacturers:
   1. Panduit
   2. CPI
   3. Owner approved manufacturer.

2.5 POE EXTENDERS

A. Provide the following POE extender devices, cabling, connectors and accessories. Quantity as shown on drawings and as required to provide fully functioning systems, to include but not limited to:

1. Commscope Part #: PFU-P-C-O-060-01, PoE Extender, Universal Bracket, Outdoor, 60 Watt, 1-Port.
2. Commscope Part #: CO11152-01F007, PCOSP-6S-BK-7FT, CAT6, F/UTP, Outdoor Rated Patch

Cord, 7ft.

3. Commscope Part #: FAWLCUC01-AXF006, TeraSPEED® OS2 LC to Unconnectorized, Fiber Pigtail, 0.9 mm Tight Buffer, blue jacket, 6 ft, Spliced onto Powered Fiber Cable, fiber 1
4. Commscope Part #: FAWLCUC01-BXF006, TeraSPEED® OS2 LC to Unconnectorized, Fiber Pigtail, 0.9 mm Tight Buffer, orange jacket, 6 ft, Spliced onto Powered Fiber Cable, fiber 2
5. Commscope Part #: 9701008/00, SFS-SLEEVE, Single Fusion Splice Sleeve, 50 Pack
6. Commscope Part #: PFC-S04O12F, Powered Fiber Cable, OS2, 4 Fibers, Outdoor, 12AWG Conductor
7. Transition Networks Part #: TN-GLC-LX-SM, 1000BASE-LX SFP, 1000BASE-LX and 1G Fibre Channel (1GFC) 10km Industrial Temperature Gen 3 SFP Optical Transceiver, one installed at each access point and network switch port.
8. Commscope Part #: 760231456, SD-2U, Standard Density 2U sliding Panel, accepts (6) LGX/1000 style splice cassettes, modules or panels, 2U shelf accepts 6 cassettes, modules, or panels
9. Commscope Part #: 760221747, PNL-CS-12LCW-PT, TeraSPEED® Splicing cassette, 12LC , 900µm, 1 Splice cassette accommodated 6 duplex ports (pt- with pigtails)
10. Commscope Part #: FEWLCLC42-JXF006, TeraSPEED® OS2 LC to LC, Fiber Patch Cord, 1.6 mm Duplex, Riser, yellow jacket, 6 ft, Patch cord connects fiber shelf to network switch for each device pair
11. Commscope Part #: PFP-PX-S1, Power Express Starter Shelf Kit (Shelf and Alarm Module), 1 PE shelf accommodates 4 PE modules (32 total output channels)
12. Commscope Part #: PFP-PX-8M, Power Express 8 port Module, 1 PE module supports 8 x 48VDC output channels
13. Commscope Part #: PFP-PX-SF, Power Express Slot Filler, Used when less than 4 modules installed in PE shelf
14. Commscope Part #: PFP-SPS-S1, Rectifier Shelf, 1 Rectifier Shelf accommodates 3 Rectifier modules
15. Commscope Part #: PFP-SPS-C1, Rectifier Controller with Display, 1 Controller installed in Rectifier Shelf
16. Commscope Part #: PFP-SPS-1600M, 1 Rectifier Module supplies 1200W to distribution shelf (N+1)
17. Commscope Part #: PFP-SPS-SF, Rectifier Slot Filler, Used when less than 3 Rectifier Modules are installed in Rectifier Shelf
18. Altech Corporation Part #: PS-S10048, 48V CLASS2 SELC POWER SUPPLY, or approved equal.

2.6 CABLE ROUTING/PATHWAY

A. Cable Support System: All low voltage cabling shall be installed and supported using a modular cable support system at 48" intervals unless installed in conduit. Do not exceed manufacture recommendation for the quantity of cables supported in an individual support.

B. All cable bundles shall be grouped together using plenum rated Velcro for the entire run above and below the ceilings.

C. Innerduct shall be bright orange and shall be labeled fiber optic cables from fiber patch panel to conduit or plenum entrances. Innerduct installed in plenum rated ceilings shall be plenum rated.

1. Approved products
   a. Carlon
   b. Dura-line

2.7 FIBER OPTIC PRODUCTS

A. Fiber Optic Cable shall be UL listed type OFNP (unless noted otherwise):

1. Single-mode fibers, each with a color-coded PVC tight buffer (unless noted otherwise) shall have a maximum attenuation of 0.65 dB/km / 0.65 dB/km / 0.5 dB/km.
   a. Approved Products:
      1) 24-strand Single-mode, OSP, Armored, Gel-Free cable, shall connect the MDF as specified on Technology Site Plans. Corning Product #024E88-33131-A3
2. Multi-mode fibers, each with a color-coded PVC tight buffer (unless noted otherwise) shall have a maximum attenuation of 2.8 dB/km / 1 dB/km.
   a. Approved Products:
      1) 12-strand Multi-mode, with plenum rated armored jacket shall connect each IDF with the MDF as specified on Technology Riser Plans. Corning Product #012T88-33190-A3

3. Provide (4) CommScope 3-meter patch cords for each backbone fiber installed on the entire project. Coordinate the required connector type, on the equipment end, with the owner prior to procuring the products.

4. All non-armored fiber optic cable shall be installed in 1" innerduct throughout the entire run. Innerduct to be rated for the space in which it is installed in.

5. No fusion or mechanical splices will be allowed at any point in the fiber optic runs.

B. Connectors

Optical Fiber Connectors shall be LC type connectors.

1. Approved Products:

   Corning LC

2.8 STATION WIRING

A. Wire: The data and voice wire provided for all outlets shall be (Category 6A) Plenum-Rated unshielded twisted pair, four-pair, 24 AWG solid copper conductor, meeting the intent and quality level of the TIA/EIA-568-A Commercial Building Wiring Standard. Refer to floor plan and data outlet legend for number of active data ports to specified faceplates.
   1. Approved Products: For all voice and data connections: CommScope CS44P

B. Testing: The Category 6A four-pair UTP cable must be UL Performance Level tested. Each 1000-foot spool must be individually tested with test results affixed to the spool. All cable must be provided on new 1000-foot spools. NO "SHORTS" WILL BE ALLOWED. IF SHORTS ARE DISCOVERED, THE CONTRACTOR WILL BE REQUIRED TO UNINSTALL ALL CABLE ON THE ENTIRE PROJECT AND INSTALL NEW CABLE AT NO ADDITIONAL COST TO THE OWNER.

C. Rating: Cable installed in conduit shall be non-plenum rated. Cable not installed in conduit shall be plenum rated if installed in plenum ceiling space, non plenum rated otherwise.

D. Provide 10 feet service loop at all headend locations properly supported above ceiling. Provide 3' service loop at each workstation outlet properly supported above ceiling. All

workstation service loops shall be made in figure eight configurations, no exceptions.

E. All cable shall be bundled with Velcro from patch panel to outlet. Velcro shall be rated for plenum space.

2.9 STATION HARDWARE

A. Flush Mount Jacks: Flush mount jacks shall be high quality Category 6A RJ45 modular jacks with circuit board construction and IDC style or 110-style wire, T568B terminations. Jacks shall meet EIA/TIA TSB40 recommendations for Category 6A connecting hardware.
   1. Approved Products – Data and Voice Jacks: UNJ10G
   2. All blank inserts shall be Gray.

B. Faceplates: Faceplates shall be a 4-port, flush mounted white CommScope Uniprise solution, for RJ45 outlets at all locations.
   Approved Products:
   1. 2-Port Single Gang, CommScope # 108168469 | M12L-262
   2. 4-Port Single Gang, CommScope # 108168543 | M14L-262
   3. 6-Port Single Gang, CommScope # 108168584 | M16L-262
   4. Provide wall mounted handset faceplates where applicable for wall mounted phone. Refer to floor plan for locations. CommScope # 760100891 | M10WL4SP
   5. Provide Mounting Straps (where applicable)

C. Workstation Patch Cables: Cabling Contractor shall provide district with (1) – 3 Meter Category 6A patch cable for each data drop on entire project. Each cable will be terminated properly with RJ45 connections on each end with appropriate pin-out assignments per project configuration.
   1. Approved Products: CommScope Uniprise, 3 Meter Cat 6A Patch Cable - UC1AAA2

2.7 POLE MOUNTED IP SURVEILLNCE CAMERA FIBER

A. Contractor shall provide (1) 4-strand single-mode poe over fiber cable (Commscope #PFC-S04L12) from nearest idf to light pole where new ip camera shall be installed. Provide the following devices in the nearest idf (to include but not limited to):
   1. 4 qty. Commscope #SFC-LCF-09-8X, fiber QWIK II-LC connector.
   2. 1 qty. Transition networks #TN0SFP-GE-Z, hardened single-mode sfp module - or approved equal.
   3. 1 qty. Altech corporation #PS-S10048 48v class2 SELC power supply - or approved equal.

B. Contractor shall provide the following devices at the light pole (to include but not limited to):
   1. 1 qty. Commscope #PFU-P-C-O-060-02, 2-port poe extender.
   2. 2 qty. Commscope #CO11152-01F006, 6' osp cat6 shielded patch cable.
   3. 4 qty. Commscope #SFC-LCF-09-8X, fiber QWIK II-LC connector.
   4. 1 qty. Commscope #700008360, buffer tubing from fiber, 200' roll.
   5. 1 qty. Transition networks #TN0SFP-GE-Z, hardened single-mode SFP module - or approved equal.

PART 3 - EXECUTION

3.1 GENERAL

A. Fire Wall Penetrations: The contractor shall avoid penetration of fire-rated walls and floors wherever possible. Where penetrations are necessary, they shall be sleeved with

metallic conduit and resealed with an Underwriter Laboratories (UL) approved sealant. Contractor shall also seal all floor, ceiling and wall penetrations in fire or smoke barriers and in the wiring closet.

B. Allowable Cable Bend Radius and Pull Tension: In general, communications cable cannot tolerate sharp bends or excessive pull tension during installation. Refer to the cable manufacturers allowable bend radius and pull tension data for the maximum allowable limits.

C. Cable Lubricants: After installation, exposed cable and other surfaces must be cleaned free of lubricant residue.

D. Pull Strings: Provide pull strings in all new conduits, including all conduits with cable installed as part of this contract. Pull test is not to exceed 200 pounds. Data and video cables can be pulled together with pull strings.

E. Conduit Fill: Conduit fill shall not exceed 40%.

F. Damage:
1. The Contractor shall replace or rework cables showing evidence of improper handling including stretches, kinks, short radius bends, over-tightened bindings, loosely twisted and over-twisted pairs at terminals and cable sheath removed too far (over 1-1/2 inches).
2. The Contractor shall replace any damaged ceiling tiles that are broken during cable installation.

G. Clean Up:
All clean up activity related to work performed will be the responsibility of the Contractor and must be completed daily before leaving the facility.

3.2 DOCUMENTATION

A. LABELING STANDARDS OVERVIEW
1. UNIQUENESS: Each piece of equipment and each cable should have a unique identifier to prevent confusion.
2. CONSISTENCY: Labeling schemes should be consistent within each IDF/MDF and should align with the closet's standard methods.
3. LABEL QUALITY: Use a label maker to ensure clarity, and make sure labels are capable of withstanding environmental factors.

B. LABEL PLACEMENT:
1. General: All network infrastructure components requiring labels should be carefully marked to ensure clear identification of both the origin and destination of drops. When affixing labels, care should be taken to avoid obstructing LEDs, lenses, or any other features critical to the device's functionality or troubleshooting process.
2. Cables: Attach labels to both ends of each cable. Place labels near termination points, making them easily visible and readable.
3. Wall Plates: Distribute labels evenly between the top and bottom wall plate screws and separate entries with commas. Tape labels right below the top screw and right above the bottom screw.
    a. Two Port Plates: Place the label for the first drop below the top wall plate screw and the label for the last drop in above the bottom wall plate screw.
    b. Four Port Plates: Comma-separate labels for the first two drops, starting with the first drop below the top wall plate screw. Do the same for the last two drops, starting with the third drop above the bottom wall

plate screw.

c. Six Port Plates: Comma-separate labels for the first three drops, starting with the first drop below the top wall plate screw. Do the same for the last three drops, starting with the fourth drop above the bottom wall plate screw.

C. INFORMATION ON LABELS: Labels should contain enough details to identify the cable's or equipment's origin, destination, and function.

D. LABEL TYPES: Use self-laminating labels or wrap-around labels. Do not use Flag labels or cable tags.

E. LABEL DIMENSIONS, FONTS, AND MATERIALS:

1. Wall Plate Labels: Use .35" (9mm) laminated black on white label tape. Use 18-point font size for two and four port plates, and 12-point font size for six port wall plates.
2. Access Point (AP) Labels, Camera Labels, and Ceiling Grid Labels: Use .47" (12mm) laminated black on white label tape with a 24-point font size.
3. Ceiling Biscuit Labels: Use .35" (9mm) laminated black on white label tape with an 18-point font size.
4. Wrap Around Cable Labels: Use either .94" (24mm) or .70" (18mm) black on white label tape. Print labels using the Cable Wrap template to ensure the correct font size.
5. Self-Laminating Cable Labels: Use .94" (24mm) black on white label tape with a 12-point font size.
6. Font Style: Use only serif fonts for all labels to ensure readability.

F. Data & Voice Drops

1. Patch Panels Labeled Alphabetically (A, B, C, etc.)
   a. Wall Plate and Drop Cable Label (IDF): Follow the format: [I]-[IDF ID]-[Patch Panel ID]-[Patch Port #]. **Example: I-A-B-24.**
   b. Wall Plate and Drop Cable Label (MDF): Follow the format: [M]-[Patch Panel ID]-[Patch Port #]. **Example: M-B-24.**
   c. Patch Panel Cable Label: Follow the format: [Room ID]-[Patch Panel ID]-[Patch Port #]. **Example: 204-B-24.**
2. Patch Panels Following Number Sequence from Previous Panel
   a. Wall Plate and Drop Cable Label (IDF): Follow the format: [I]-[IDF ID]-[Patch Port #]. Patch Panel IDs are not needed; the port number continues the sequence from the last panel. **Example: I-A-49.**
   b. Wall Plate and Drop Cable Label (MDF): Follow the format: [M]-[Patch Port #]. Patch Panel IDs are not needed; the port number continues the sequence from the last panel. **Example: M-49.**
   c. Patch Panel Cable Label: Follow the format: [Room ID]-[Overall Patch Port #]. **Example: 204-49.**

G. Access Points

1. Label Location: Labels should be placed on the AP in a location that is easily visible during installation or maintenance.
2. Label Format: Use the specific building code (which might be an abbreviation like ADM for Admin, ANX for Annex, WH for Warehouse, or a fixed number for other buildings). Follow this with the Room ID and "R" for room installations. If there are multiple APs in the same room, add the direction (N, S, E, W, NW, NE, SW, SE) after the "R". For APs installed in hallways, use the closest Room ID followed by "H". Finally, append "AP".
3. **Example:**
   a. For Admin building: **ADM-101R-AP**

b. For Annex: **ANX-202H-AP**
c. For Warehouse: **WH-303RW-AP** (if there's another AP in the same room on the west)
d. For building with code 10: **10-404H-AP** (if the AP is in a hallway close to room 404)

H. Access Point Drops
1. Patch Panels Labeled Alphabetically (A, B, C, etc.)
a. Ceiling Grid, Keystone Biscuit, and Drop Cable Label (IDF): Follow the format: [I]-[IDF ID]-[Patch Panel ID]-[Patch Port #]. **Example: I-A-B-24.**
b. Ceiling Grid, Keystone Biscuit, and Drop Cable Label (MDF): Follow the format: [M]-[Patch Panel ID]-[Patch Port #]. **Example: M-B-24.**
c. Patch Panel Cable Label: Follow the format: [Room ID]-[R for Room or H for Hallway][For multi-AP install in room put direction of AP placement(N, S, E, W, NW, NE, SW, SE)]-[AP]-[Patch Panel ID]-[Patch Port #]. **Example: 101R-AP-B-24.**
2. Patch Panels Following Number Sequence from Previous Panel
a. Ceiling Grid, Keystone Biscuit, and Drop Cable Label (IDF): Follow the format: [I]-[IDF ID]-[Patch Port #]. Patch Panel IDs are not needed; the port number continues the sequence from the last panel. **Example: I-A-49.**
b. Ceiling Grid, Keystone Biscuit, and Drop Cable Label (MDF): Follow the format: [M]-[Patch Port #]. Patch Panel IDs are not needed; the port number continues the sequence from the last panel. **Example: M-49.**
c. Patch Panel Cable Label: Follow the format: [Room ID]-[R for Room or H for Hallway][For multi-AP install in room put direction of AP placement(N, S, E, W, NW, NE, SW, SE)]-[AP]-[Overall Patch Port #]. **Example: 101R-AP-49.**
3. Ceiling Grid Label placement and Marking: Mark the ceiling grid with a green sticker to identify the AP drop location. Place the label next to the sticker on the ceiling grid.

I. Security Cameras
1. Label Location: Labels should be placed on the camera in a location that is easily visible during installation or maintenance. Do not obstruct the lens.
2. Label Format: Start with the building abbreviation. Follow this with the Room ID followed by "R" for room installations or "H" for hallway installations, then the direction the camera is facing (N, S, E, W, NW, NE, SW, SE), then the MDF/IDF ID, and finally the last two octets of the camera's IP address.
3. **Example:**
a. For a camera in a room in Admin building: **ADM-101RN-I1-0.70** (camera in room facing North)
b. For a camera in a hallway in Annex: **ANX-202HS-M-1.23** (camera in hallway facing South)
c. For a camera in a room in Warehouse: **WH-303RE-M-1.34** (camera in room facing East)
d. For a camera in a hallway in Alamo building: **Alamo-404HW-M-0.21** (camera in hallway facing West)

J. Security Camera Drops
1. Patch Panels Labeled Alphabetically (A, B, C, etc.)
a. Ceiling Grid, Keystone Biscuit, and Drop Cable Label (IDF): Follow the format: [I]-[IDF ID]-[Patch Panel ID]-[Patch Port #]. **Example: I-A-B-24.**
b. Ceiling Grid, Keystone Biscuit, and Drop Cable Label (MDF): Follow the format: [M]-[Patch Panel ID]-[Patch Port #]. **Example: M-B-24.**
c. Patch Panel Cable Label: Follow the format: [Room ID]-[R for Room or H

for Hallway][direction camera is facing(N, S, E, W, NW, NE, SW, SE)]-[CAM]-[Patch Panel ID]-[Patch Port #]. **Example: 202HS-CAM-B-24.**

2. Patch Panels Following Number Sequence from Previous Panel
    a. Ceiling Grid, Keystone Biscuit, and Drop Cable Label (IDF): Follow the format: [I]-[IDF ID]-[Patch Port #]. Patch Panel IDs are not needed; the port number continues the sequence from the last panel. **Example: I-A-49.**
    b. Ceiling Grid, Keystone Biscuit, and Drop Cable Label (MDF): Follow the format: [M]-[Patch Port #]. Patch Panel IDs are not needed; the port number continues the sequence from the last panel. **Example: M-49.**
    c. Patch Panel Cable Label: Follow the format: [Room ID]-[R for Room or H for Hallway][direction camera is facing(N, S, E, W, NW, NE, SW, SE)]-[CAM]-[Overall Patch Port #]. **Example: 202HS-CAM-49.**
    d. Ceiling Grid Label placement and Marking: Mark the ceiling grid with an orange sticker to identify the camera drop location. Place the label next to the sticker on the ceiling grid.

K. Environmental Sensors
1. Label Location: Labels should be placed on the environmental sensor in a location that is easily visible during installation or maintenance. Do not cover the vents/apertures.
2. Label Format: Start with the building abbreviation. If it is in a multi-story building follow this with the Floor the sensor is installed on, the Room ID followed by "R" for room installations or "H" for hallway installations, then BR if installed in Boy's Restroom or GR for Girl's Restroom, and finally the end with "V".
3. **Example:**
    a. For an environmental sensor in a restroom in the same hallway as room 112 at Central Middle School: **CMS-1-112H-BR-V**
    b. For an environmental sensor in Austin Middle School in a restroom with a room number: **AMS-2-212R-GR-V**

L. Environmental Sensor Drops
1. Patch Panels Labeled Alphabetically (A, B, C, etc.)
    a. Ceiling Grid, Keystone Biscuit, and Drop Cable Label (IDF): Follow the format: [I]-[IDF ID]-[Patch Panel ID]-[Patch Port #]. **Example: I-A-B-24.**
    b. Ceiling Grid, Keystone Biscuit, and Drop Cable Label (MDF): Follow the format: [M]-[Patch Panel ID]-[Patch Port #]. **Example: M-B-24.**
    c. Patch Panel Cable Label: Follow the format: [Room ID]-[R for Room or H for Hallway]-[Restroom]-[V]-[Patch Panel ID]-[Patch Port #]. **Example: 202H-BR-V-B-24.**
2. Patch Panels Following Number Sequence from Previous Panel
    a. Ceiling Grid, Keystone Biscuit, and Drop Cable Label (IDF): Follow the format: [I]-[IDF ID]-[Patch Port #]. Patch Panel IDs are not needed; the port number continues the sequence from the last panel. **Example: I-A-49.**
    b. Ceiling Grid, Keystone Biscuit, and Drop Cable Label (MDF): Follow the format: [M]-[Patch Port #]. Patch Panel IDs are not needed; the port number continues the sequence from the last panel. **Example: M-49.**
    c. Patch Panel Cable Label: Follow the format: [Room ID]-[R for Room or H for Hallway]-[Restroom]-[V]-[Overall Patch Port #]. **Example: 202H-BR-V-49.**

M. Ceiling Grid Label placement and Marking: Mark the ceiling grid with an orange sticker to identify the environmental drop location. Place the label next to the sticker on the ceiling grid and on the environmental sensor.

N. Ceiling Plenum Riser Tubes
   1. Label each tube according to its service direction (N for North, S for South, E for East, and W for West).

O. MDF/IDF Patch Cables

P. Any patch cables exceeding 2 feet in length should be labeled at the patch panel end to indicate the connected switch and port.
   1. Use the format: S_P##
   2. Where: S = Switch Label, P = Switch Port, ## = Switch Port Number
   3. **Examples: 1.12-2_P23 or 1.7_P07**

Q. BUILDING CODES AND ABBREVIATIONS

R. Floor Plan

   1. A floor plan clearly labeled with all outlet jack numbers shall be included in the as-built plans.

   2. Contractor shall label wiring on both ends of cable at workstation and headend locations with machine labels, no exceptions.

3.3 EQUIPMENT RACK CONFIGURATION

A. Equipment Racks: Equipment racks shall be assembled and mounted in locations shown on the Drawings and as detailed. Each rack shall be securely mounted to the floor and braced to the wall with cable tray in accordance with the manufacturer's instructions and recommendations. Racks shall be mounted such that the side rails are plumb with vertical cable management panels. Racks to be located such that future expansion can occur without relocating existing racks. Racks shall be grounded in accordance with NEC requirements.

B. Wire Management Components: Horizontal cable management panels shall be installed directly above and below each patch panel, also 1 per patch panel should be left at site to accommodate the switch gear when they are installed. Vertical cable management panels shall be installed on each side of the rack. In instances where more than one rack is installed in a single location, vertical cable management shall be installed between the racks and on either side.

C. Cable Placement: Cable installation in the Wiring Closet must conform to the Project Drawings. All cabling shall be routed so as to avoid interference with any other service or system, operation, or maintenance location. Avoid crossing area horizontally just above or below any riser conduit. Lay and dress cables to allow other cables to enter the conduit/riser without difficulty at a later time by maintaining a working distance from these openings.

D. Cable Routing: Cable shall be routed as close as possible to the ceiling, floor, or corners to ensure that adequate wall or backboard space is available for current and future equipment. All cable runs within the Wiring Closet shall be horizontal or vertical within the constraints of minimum cable bending radii. Minimum bend radius shall be observed. Cables shall not be tie-wrapped to electrical conduit or other equipment.

E. Installation: All incoming cables shall be routed on the cable tray and neatly dressed down to the patch panels.

F. Hardware: Provide rack and jack panel hardware as required for all data station wiring.

3.4 STATION WIRING INSTALLATION

A. General:
1. Cabling between wiring closet and workstation locations shall be made as individual home runs. No intermediate punch down blocks or splices may be installed or utilized between the wiring closet and the communications outlet at the workstation location.
2. All cable must be handled with care during installation so as not to change performance specifications. Factory twists of each individual pair must be maintained up to the connection points at both ends of the cable. There shall never be more than one and one-half inches of unsheathed enhanced Category 6A UTP cable at either the wiring closet or the workstation termination locations.

B. Exposed Cable:
1. All cabling shall be installed inside walls or ceiling spaces whenever possible. Exposed station cable will only be run where indicated on the Drawings.
2. Additional exposed cable runs will require Owner approval and will only be allowed when no other options exist.

C. Placement: All cabling and associated hardware shall be placed so as to make efficient use of available space. All cabling and associated hardware shall be placed so as not to impair the Owner's efficient use of their full capacity.

D. Cable Routes:
1. All cabling placed in ceiling areas must be in conduit, cable tray or J-Hooks. Cable supports shall be permanently anchored to building structure or substrates. Provide attachment hardware and anchors designed for the structure to which attached and that are suitably sized to carry the weight of the cables to be supported. Do not route cable through webbing of structural steel. Cabling must be supported in dedicated supports intended to support cabling as described in this section.
2. Attaching cable to pipes or other mechanical items is not permitted. Use J-Hooks for up to 15 cables (Chatsworth hooks with appropriate brackets). All runs of sixteen (16) or more cables, provide cable rings on 36-inch maximum centers to hang cable. Communications cable shall be rerouted so as to provide a minimum of 18 inches spacing from light fixtures, sources of heat, power feeder conduits and EMI sources. Cabling shall not be attached to ceiling. Grid support wires. Cable runs shall be parallel or perpendicular to building structure. Multiple cables to be bundled together every 6 feet.

3.5 STATION HARDWARE

A. Flush Mount Jacks: Flush mount jacks shall be mounted in a faceplate with backbox.

B. Placement: Where possible, the communications outlet shall be located so that its centerline is 18 inches above floor level or 12 inches above permanent bench surfaces. Outlets shall not be mounted on temporary, movable, or removable surfaces, doors, or access hatches.

C. RJ-45 Jack Pin Assignments:
1. Pin connections for data station cable outlets and patch panels shall match EIA/TIA 568 modular jack wiring recommendation T568B.
2. Pin connections at data jack panels shall match pin connections at outlets

(straight through wiring).

3.6 CABLE TESTING REQUIREMENTS

A. Notification: The Owner and Engineer shall be notified one week prior to any testing so that the testing may be witnessed.

B. Inspection: Before requesting a final inspection, the Contractor shall perform a series of end-to-end installation performance tests. The Contractor shall submit for approval a proposal describing the test procedures, test result forms and timetable for all copper and fiber optic cabling.

C. Procedures: Trained personnel shall perform all testing. Acceptance of the test procedures discussed below is predicated on the Contractor's use of the recommended products and adherence to the inspection requirements and practices set forth. Acceptance of the completed installation will be evaluated in the context of each of these factors.

D. Errors: When errors are found, the source of each shall be determined, corrected and the cable retested. All defective components shall be replaced and retested. Re-test results must be provided on Owner approved forms and witnessed by Owner.

E. Twisted Pair Cable Testing:
1. At a minimum, the Contractor shall test all station drop cable pairs from Data Closet termination patch panels to outlet device RJ45 jacks. Category 6A products shall be tested for compliance to ANSI/TIA/EIA 568A and ISO/IES 11801 for a Category 6A rated installation. Test equipment used shall meet TIA/EIA TSB-67, Level II accuracy. Further, the contractor shall have a copy of TSB-67 in their possession and be familiar with its contents.
2. Each wire/pair shall be tested at both ends for the following:
   a. Wire map (pin to pin connectivity)
   b. Length (in feet)
   c. Attenuation
   d. Near end cross talk (NEXT)
   e. Power Sum
3. Test equipment shall provide an electronic and printed record of these tests.
4. Test results for each Category 6A four-pair UTP cable must be submitted with identification to match labels on all patch panel ports and RJ45 jacks and must match as-builts associated with that cable.

F. Fiber Optic Cable Testing

1. Testing device for fiber optic cables shall be a high quality OTDR (Optical Time-Domain Reflectometer) equipped with a printer. The printed data shall show, in addition to any summary information, the complete test trace and all relevant scale settings. The OTDR must have the capability to take measurements from bare fiber strands as well as SC connector terminations.

2. All fiber optic cable shall be tested on the reel before installation to insure that it meets the specifications outlined herein.

3. After installation the Contractor shall test each fiber strand in accordance the EIA 455-171 Method D procedures (bi-directional testing) at both 850nm and 1300nm for multimode or 1310nm and 1550nm for singlemode. A form shall be completed for each cable showing data recorded for each strand including length, total segment (end-to-end) loss (dB) and connector losses (dB) at each

end. In addition, the printed data strip for each strand shall be attached to the form. Patch cables shall also be tested.

4. Acceptable fiber optic connector loss shall not exceed .75dB per mated pair. The Contractor is responsible for obtaining minimum loss in fiber connections and polishing per manufacturer specifications.

5. Singlemode:
   a. Singlemode fibers shall have a maximum attenuation of 1.0 dB/km at 1310 nm and 1.0 dB/km at 1550 nm.

6. Multimode:
   a. 50/125um micron multimode fibers shall have a maximum attenuation of 3.5 dB/km at 850 nm and 1.5 dB/km at 1300 nm. Minimum bandwidth shall be 2000 MHz/km at 850 nm and 500 MHz/km at 1300 nm.

7. **OTDR shots shall be provided for each strand of fiber optics completely installed and terminated.**

3.7 INSPECTION

A. Conformance to the installation practices covered above are to be verified when completed. In some cases, the Owner/Designer may inspect before acceptance.
   1. Written Test Report:
      a. Complete test results, including actual values associated with tests.
      b. Show all certifications for telecommunications wiring systems.
      c. Include cable maps showing each cable route and keyed to cable labels. Provide owner with complete floor plans identifying outlet location and cable routing drawing in AutoCad format. Provide electronic copy of drawings to owner in AutoCad version 14 or greater.
      d. Documentation of outlet, cable, and rack labeling system.

B. After performing all tests, tabulate results and bind together in format acceptable to Owner. Installer shall provide written certification in the test report that telecommunications cable is properly installed and test results certify system to all specified standards.

END OF SECTION

SECTION 27 51 23.80

LOCAL SOUND REINFORCING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 GENERAL REQUIREMENTS

A. Provide all materials, equipment, transportation, and labor to achieve complete and fully functional systems as shown or intended on drawings and in bid specifications.

B. All applicable equipment shall bear the UL label. All work shall be executed in accordance with the National Electric Code (NEC), the Occupational Safety and Health Act (OSHA) and all applicable State and Local codes, ordinances, and regulations.

C. The Contractor's installation team shall have at least one member possessing a NICET Level II, CTS-I or C-EST certification; additionally, at least one audio DSP programmer certified in HiQnet Audio Architect, Symetrix, Biamp Tisera, QSC Q-SYS or Dante.

D. Contractor shall have been in the commercial AVL (Audio, Video, Lighting) installation industry for at least five years. Contractor shall have installed at least five systems of this type and comparable scale in educational facilities within the State of Texas. Contractor shall provide a list of successfully completed projects including completion dates within the past two years from the bid date of this project.

E. Should the local sound systems include Crestron or AMX hardware which requires programming, the Contractor shall provide a Certified Crestron Programmer or an AMX Certified Expert (ACE) Programmer to program, upload and debug the third-party control systems.

F. Should the local sound systems include managed network devices, the Contractor shall provide one person on the installation team with valid certification in one of the following: Harman HCNA/P, CompTIA Network+, Cisco CCNA or Cisco CCNP. Provide valid certification credentials in the submittal documentation.

G. Any discrepancy in quantity or part numbers between the drawings and the bid specifications shall be brought to the attention of the Consultant for clarification during the bidding period. No allowance shall be made to the Contractor by reason of failure to have brought said discrepancies to the attention of the Consultant prior to award of contract. Should discrepancies be discovered, the greater in quality and quantity shown shall be provided.

H. Systems to be installed but not limited to in the following areas per Part 2:

1. Library

1.2 REGULATORY REQUIREMENTS

A. Standards: All work shall be performed in accordance with the latest revisions of the following standards and codes:
   1. Latest Local Codes and Amendments
   2. 2015 National Electrical Code

B. Other References:
   1. TIA/EIA-568-A – Commercial Building Telecommunications Wiring Standard
   2. EIA/TIA-569 – Commercial Building Standard for Telecommunication Pathways and Spaces.
   3. TIA/EIA-606 – The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.
   4. TIA/EIA-607 – Commercial Building Grounding and Bonding Requirements for Telecommunications.
   5. EIA/TIA 455-A – Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices and Other Fiber Optic Components.
   6. TIA/EIA TSB 67 – Transmission Performance Specification for Field Testing of Unshielded Twisted-Pair Cabling Systems.
   7. TIA/EIA TSB 72 – Centralized Optical Fiber Cabling Guidelines
   8. ISO/IEC 1180 – Generic Cabling Standard
   9. EN 50173 – Generic Cabling Standards for Customer Premises
   10. ANSI/EIA/TIA 526-14 – Optical Power Loss Measurements of Installed Multimode Fiber Cable Plan.

C. Governing Codes and Conflicts:
   1. If the requirements of these specifications or the Project Drawings exceed those of the governing codes and regulations, then the requirements of these specifications and the Drawings shall govern. However, nothing in the Drawings or Specifications shall be construed to permit work not conforming to all governing codes and regulations.

1.3 ABBREVIATIONS

A. The following abbreviations are used in this document:

1.4 SUBMITTAL DOCUMENTATION

A. Submit shop drawings as specified in pdf format, ARCH E1 (30x42). Contractor shall be responsible for costs associated with producing and submitting all required documentation.

B. Submit a room-by-room list of all equipment to be installed, in pdf format.

C. Submit Manufacturer's product data for all equipment with a table of contents, in pdf format.

D. Submit a line-item compliance statement indicating that the products being submitted comply with the specified equipment and indicate which products deviate from the specifications.

E. Submit detailed drawings of all systems, minimum scale 1/8" = 1', in pdf format.

   1. Table of Contents.
   2. Rigging details. All hardware must meet or exceed a safety factor of 5:1. Detail the product manufacturer, part numbers and load capacity of all hardware to be used. **Contractor shall employ the services of a professional structural engineer licensed to practice in the State of Texas to verify load ratings of hanging components. Provide attachment details on Shop / Submittal**

Drawings reviewed by said engineer. Include stamped report of items reviewed by structural engineer with shop drawings submittal. Report shall include an itemization of items reviewed by the structural engineer and confirmation that proposed methods of suspending equipment as shown on the shop drawings conform with required safety factors.

3. Floor Plans, Reflected Ceiling Plans and Section Elevations displaying loudspeaker locations and orientation, wall plate locations, rack locations, 120vAC receptacle locations and all other related device locations.
4. Comprehensive system schematics displaying detailed connections to all equipment. These shall display wire numbers, terminal block numbers, patch bay assignments and color coding.
5. Proposed construction details for any custom fabricated items; including interface panels, patch panels and wall plates. These shall display dimensions, materials, finishes, I/O connector labels and color selection.
6. Rack elevations displaying the locations of all equipment within each rack.
7. Riser diagrams displaying conduit requirements with pull boxes, outlet boxes, cable layouts, cable type part numbers and quantity of cables with part number in each conduit.
8. Electrical power requirements for the systems. Include diagrams for any remote control of electrical power displaying locations and elevations for all receptacles in detail sufficient to coordinate with the Electrical Contractor.
9. All submittal drawings not meeting the above criteria shall be deemed incomplete, shall not be reviewed and shall be returned for revision.

1.5 OPERATING AND MAINTENANCE MANUALS

A. Provide Operating and Maintenance Manuals as specified in Division 26 and Division One and deliver to the Owner.

B. Include:

1. Product Data.
   a. Manufacturer's data for each type of product conforming to the submission format specified herein. Include manufacturer's serial numbers within the list of product.
   b. For custom circuits or modifications, a description of the purpose, capabilities, and operation of each item.
   c. Each product's Owner Instruction Manual. Provide high quality copies where necessary, with all text legible and illustrations of equal resolution and sharpness as the original manual. Faxed copies or copies with portions of the information missing or smeared are not acceptable.
   d. Manufacturer's maintenance and care instructions.
   e. Separately bound list by manufacturer and model or part number of product incorporated within the systems arranged in alphanumeric order. Manufacturer's warranty statements bound separately where applicable.
2. A complete as-installed (As Built) equipment list, listed by room, identifying manufacturers' names, model numbers, serial numbers, quantities and locations of each item.
3. Complete and correct As Built systems schematics, floor plans, reflected ceiling plans, elevations, rack risers and I/O plate details. Include diagrams or charts displaying final settings of all control knobs in the system (mixers, equalizers, audio amplifiers, etc.).
4. Each individual system's program software / source code (audio, video, lighting and third party control) with final settings and pass codes and As Built AutoCAD files (2013 or newer) shall be saved onto two separate 8GB thumb drives and

included in the close-out documentation. All software programs / source codes are the intellectual property of the Owner.

5. Quick-start Guide for each system written with the assumption that the intended reader is technically inexperienced and unfamiliar with the facility. The Quick-start Guide shall be laminated and affixed to the inside of the front door of the system rack with appropriate mounting hardware. One copy of each individual system schematics printed in ARCH D (24x36) and laminated shall be delivered to the Owner.
6. Two hard copy, paper sets of the as-installed (As Built) drawings in ARCH E1. Drawing sets shall be individually bound.
7. In addition to the hard copy close-out documentation, all close-out documentation shall be included, in pdf format, on the, 8GB thumb drives.
8. Service & Maintenance Manual:
   a. Provide an original manufacturer's copy of the service manual on every piece of equipment for which the manufacturer offers a service manual. On equipment where there is no service manual, provide statement from company indicating manual is not available. Arrange manuals in the same order as the operations manual.
   b. Manufacturer's maintenance and care instructions.
   c. Maintenance Instructions, including maintenance phone numbers and hours; maintenance schedule; description of products recommended or provided for maintenance purposes, and instructions for the proper use of these products.
9. Organize documents into separate bindings containing data relevant to operation, maintenance, and warranty.

1.6 WARRANTY AND SERVICE

A. The Contractor shall warrant all new equipment to be free of defects in materials and workmanship for not less than one year after the Substantial Completion date.

B. The systems are to be free of defects and deficiencies and are to conform to the drawings and specifications as to kind, quality, function, and characteristics. The Contractor shall repair or replace defects which may occur in labor or materials within the warranty period without charge to the Owner.

C. Within the warranty period, respond to requests for service within 24 hours. Service calls to perform warranty work shall be made within 72 hours of request by the Owner. Temporary, equivalent replacement equipment shall be provided at no cost to the Owner when immediate on-site repairs cannot be made.

D. This warranty shall not void or replace individual manufacturer warranties which extend past this warranty period. This warranty shall not void any rights guaranteed the Owner by law.

E. The Contractor shall include in the close-out documentation a certificate of warranty which includes the start and end dates of the warranty and contact information, including name, telephone number and email, of individuals to perform warranty service.

F. This warranty shall not apply to existing Owner Furnished Equipment.

G. Additional warranties may be negotiated between the Contractor and the Owner at the Owner's discretion.

1.7 SUMMARY OF WORK

A. The installation shall comply with all applicable codes and standards in effect at the job site and as indicated in the Drawings and Specifications.

1. Reference project drawings for locations, quantities, and coordination with other trades.

B. All local sound racks shall have cabling installed and routed according to industry standard best practices. Contractor shall employ horizontal lacing rails in the rear of the rack for neat and orderly cable routing. Use Velcro strips for cable bundling. ZIP TIES ARE NOT ACCEPTABLE.

C. Contractor shall perform an RF scan and shall provide results in pdf format with the close-out documentation. Contractor shall provide an RF coordination sheet, documenting all RF frequencies in use in each system, including in the High School buildings, to ensure there is no RF interference between systems. Coordinate with General Contractor and for access to High School building systems.

D. Contractor shall tune each system's DSP to provide a flat frequency response.

1. Tune and set dynamics on all inputs to provide the highest level of gain before feedback while providing intelligibility of all inputs.
2. Contractor shall perform a "rattle test" of all systems: Apply sine wave sweep signal to each loudspeaker system with a two minute sweep from 20Hz to 550Hz, to 10 - 15dB below full system output. Annotate issues discovered during sweep test. Correct issues resulting from the new system equipment and / or rigging hardware.

E. Contractor shall provide all required equipment and programming to provide a fire alarm override. All audio shall mute in all local sound systems during a fire alarm.

F. Contractor shall provide all cabling, connectors, components and equipment required for a complete and functional system.

PART 2 – MATERIALS

A. All equipment shall be new and unused unless otherwise noted.

B. Contractor shall provide all necessary patch cables, riser/plenum cabling and connectors interconnecting all equipment to provide for fully functional systems. In addition, all cabling raceway, support systems, sleeves and any other materials required to properly install and support cabling systems.

C. All equipment quantities shall be as shown on drawings unless otherwise noted.

D. All materials are to be provided as specified. No substitutions shall be accepted without written request from the Contractor and written consent of the Consultant.

2.1 FIRE ALARM OVERRIDE

A. Provide for Fire Alarm Override for each Local Sound system. Contractor shall provide all cabling, relays, mounting hardware and any other devices (Fire Alarm System devices by others) to provide a fully functioning Fire Alarm Override system. When Fire Alarm is active, each Local Sound System shall be muted. When Fire Alarm ceases, each Local Sound System shall automatically revert to normal operation.

2.2 CABLE ROUTING/PATHWAY

A. Cable Support System: All audio-video cabling shall be installed and supported using a cable support system at 4'-0" intervals unless installed in conduit. Do not exceed

manufacture recommendation for the quantity of cables supported in an individual support.

B. All cable bundles shall be grouped together using plenum rated Velcro for the entire run above and below the ceilings.

2.3 AUDIO-VIDEO SYSTEM WIRING AND TERMINATING HARDWARE

A. Cabling:

1. Provide a complete audio/video cabling solution from back of each faceplate to device I/O locations as designated on the contract drawings. Each cable provided shall be installed with a minimum of 10' of excess slack above each outlet location. Contractor shall properly support and label all cabling at each outlet.

2. Contractor shall ensure all cabling requirements are met to provide fully functional A/V systems, specified cabling notwithstanding.

3. Contractor shall provide data, video, usb, audio and fiber patch cables for each system.

   a. Data patch cables – Provide Panduit TX6A-28™ patch cables on a per port basis.
   b. Video patch cables – Provide Extron HDMI Ultra series patch cables for each video field device and rack equipment. Provide Extron HD Pro Plenum Series optical patch cables where applicable.
   c. USB patch cables– Provide Extron USB A-B and C series patch cables for all field devices and rack equipment.
   d. Audio patch cables - Provide Whirlwind MK4 series microphone patch cables for all field devices with microphone inputs/outputs on a per port basis.

2.4 LIBRARY

A. Video Projector
   a. Epson # V11H919520, BrightLink 1485Fi, 1080p 3LCD Interactive Laser Display
   b. Ultra Short-Throw Wall Mount (ELPMB62) V12HA06A05
   c. Finger Touch Module V12H007A23
   d. Touch Module Bracket V12HA05A09

B. Extron Digital Wall Vault System, VoiceLift
   a. Part Number: 42-311-002145, 42-255-03
   b. Contact Extron USA.

C. ASSISTED LISTENING SYSTEM

1. 1 qty. LS-54-216 Assisted Listening System
   a. Install in Extron WallVault enclosure.
   b. Connect Audio Out from Extron PVS 407D to the Audio Input of the ALS transmitter.
2. 1 qty. LA-124 antenna. Install at locations shown on drawings.
3. Provide enough LR-4200-216 Receivers to meet TAS and ADA standards as required by law.
4. Provide with each additional LR-4200-216 Receiver:
   a. 1 qty. LA-401 Ear Speaker.
   b. 1 qty. LA-430 Earphone/Neck Loop Lanyard
5. Provide 1 qty. LA-124 antenna.
6. Coordinate with Architect for installation location of each LA-304 Signage Kit.

D. PLATES AND PANELS - All custom wall plates shall be manufactured by ProCo, RCI or Whirlwind. Anodized aluminum, BLACK with white lettering in 1/8" Sans Serif font.

a. ASSISTED LISTENING ANTENNA PLATE, "H".
    i. ProCo single gang antenna plate with 1 qty. 50 Ohm BNC connector.
    ii. Quantity and locations as shown on drawings.

PART 3 – EXECUTION

3.1 WIRING AND INSTALLATION TECHNIQUES

A. Coordinate all work with all other trades to avoid causing delays in construction schedule. Contractor shall expedite the delivery of materials and provide additional labor as required to meet construction deadline.

B. Coordinate final connection of power and ground wiring to equipment racks by electrical contractor. Power and ground wiring shall terminate inside equipment racks on standard duplex outlets. Mount as to not interfere with internal equipment of the rack. Power shall be a dedicated circuit and not share with any other source. Ground per NEC with third wire (green) to panel ground lug at breaker supply panel.

C. All equipment and enclosures described in this specification section shall be plumb and square. All equipment except portable equipment shall be permanently attached to the structure and held firmly in place. Supports shall be adequate to support their loads with a safety factor of at least five.

D. Wiring and installation under this contract to meet NFPA, NEC, and local code requirements where applicable.

E. The process of equalizing and testing the Audio Sound System may necessitate moving and adjusting certain component parts (e.g., loudspeakers). This shall be done without claim for additional payment.

F. Take such precautions as are necessary to prevent and guard against electromagnetic and electrostatic hum. Separate all low level microphone and auxiliary inputs from speaker output conductors, data or other system wiring.

G. All wiring shall be labeled using vinyl wire labeling tags. Use Brady^{tm} model BMP21 or equal wire labeling printer. Label input, output and wireless wiring. Label electrical power beaker at electrical panel. Label location of room and power panel/breaker at equipment rack. Protect labels with clear heat shrink.

H. Label all mixer inputs with their respective input. Example: mixer input 1 – "Mic-1", etc. Label to reflect name on engraved wall plate.

I. Solder all microphone connections using rosin core solder. Use temperature controlled soldering equipment. Microphone XLR connectors shall use standard wiring code as follows: pin 1 shield/ground, pin 2 positive, pin 3 negative.

J. Paint all back boxes and conduit prior to installation of wiring or connectors. Protect and do not paint any wiring or equipment rack cabinets.

K. Install equipment cabinet in a controlled temperature, dry and accessible area. Provide sufficient space to completely open the front and rear of the cabinet. Equipment not to be in general gym area where it can be damaged.

3.2 CABLING

A. General: Unless otherwise noted, provide the following cable types (or equivalent) for each application:

1. West Penn 454 #22 AWG twisted pair / shielded for Microphone and Line level signals.
2. West Penn C210 #10 AWG twisted pair for subwoofer / low frequency speakers.
3. West Penn 227 #12 AWG twisted pair for conventional, full range sound reinforcement speakers.
4. West Penn 226 #14 AWG twisted pair for 70v sound reinforcement speakers.
5. West Penn 810 RG-8 coax cable for analog RF signal lines.
6. West Penn 4246 CAT6 cable for Local Sound/Video Network and Dante digital audio devices.
7. West Penn 4246F F/UTP CAT6 for digital audio snake devices.
8. West Penn 4246AF F/UTP CAT6A cable for HDBaseT video devices.
9. Crestron CRESNET.
10. Corning 006TSP-T4180D20 multi-mode fiber optic cable for drop face plate connections.
    a. Provide Corning 95-050-99-X LC fiber connectors for multimode terminations.

    Corning 006ESP-T4101D20 single-mode fiber optic cable for network switch interconnections.
    a. Provide Corning 95-200-99 LC fiber connectors for single mode terminations.
11. Provide plenum rated cable where required.

3.3 INSPECTIONS

A. General: Conformance to the installation practices covered above is to be verified when completed. In some cases, the Owner/ Designer may inspect before acceptance.

B. Ensure all systems are installed to provide uniform, balanced audio coverage throughout each intended listening area. Ensure there are no rattles, buzzes, hums, RF interference, electro-static interference, feedback or other audible audio anomalies while the systems are in operation.

C. Contractor shall use white / pink noise generator and audio spectrum analyzer to set overall frequency response and equalization. Ensure gain structure is properly set to prevent clipping on any device and to provide balanced system functionality. Provide proper limiter programming to prevent damage to all audio components. Owner Maintenance personnel to be on site during process.

D. Demonstrate the performance of each system and give instructions of proper operation and maintenance to the Owner. Provide a minimum of eight hours of training and basic system operating instructions for each system in not more than four hour sessions. Include a list of system training attendees in the Close-Out Documentation.

1. Contactor shall record each training session with a 720p, minimum, digital video recording device, with audible audio, in .MOV or .MP4 format and compile sessions onto 128MB thumb drives (as many as required) (SanDisk, Kingston or PNY) and

provide to Owner. Contractor shall title each video file with the room name of the system and date; e.g., "Dining Commons – August 15, 2019."

2. Contractor shall provide an asbuilt QSYS designer file, Dante Controller preset, Shure wireless work bench inventory/RF coordination report and Netgear switch master configuration file supplied on a usb flash drive. In the event when systems are updated during service calls during the warranty period, the contractor shall furnish updated system files to the Owner.

END OF SECTION

SECTION 28 05 00

GENERAL ELECTRONIC SAFETY SYSTEMS REQUIREMENTS

PART 1 – GENERAL

1.1 WORK INCLUDES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1, apply to this Section.

B. Furnishing of all required materials, equipment, tools, scaffolding, labor, and transportation necessary for the complete installation of the Electronic Safety Systems as shown on the drawings and as specified herein.

C. Coordinate wireway, raceway, power, and outlet requirements with the builder and the electrical contractor.

D. Cable pathways, conduit, boxes and cable support systems shall be complete with bushings, de-burred, cleaned, and secure prior to installation of cable.

E. The Electronic Safety Systems Contractor shall provide and install prior to cable installation plastic snap in bushings at each box opening, passage through a metal stud, and at the end of all open conduit stubs or sleeves to protect the cabling from damage.

F. Supply in a timely manner to the electrical contractor special backboxes for installation as required.

G. It is the intent of the Contract Documents to provide complete installations although every item necessary may not be specifically mentioned or shown.

H. It is the intent of the Contract Documents to provide an extension of the existing installed systems interfaced with new systems, complete in every respect.

I. Provide line-by-line specification review for each Division 28 section annotated to certify compliance or deviation.

1.2 WORK TO BE INCLUDED BY THE ELECTRICAL CONTRACTOR IN BASE CONTRACT PROPOSAL

A. Provide utility services conduit as outlined on drawings as required.

B. All required conduit for accessibility to attic space.

C. Furnishing and installation of all required standard back boxes and conduit.

D. Installation of special back boxes supplied by Division 28 contractor(s).

E. Furnishing and installation of all floor boxes, surface raceways, and other wireways which are detailed or specified under Division 26.

F. Provide equipment-mounting boards as outlined on drawings.

G. Provide equipment grounding system, conductors, and bus bars and as outlined in Division 26.

H. Provide 120-volt power and hook-up to equipment provided in Division 28.

I. Coordination of requirements of Division 28 with the Builder.

1.3 WORK NOT INCLUDED

A. Contractors shall make no agreement that obligates the Owner to pay any company providing communications, monitoring, or other services. Contractors shall not make selection, purchase, or installation of interconnect instruments/equipment to be used on this project.

1.4 RELATED SECTIONS

A. The conditions of the Division 0, Division 1, Division 26 requirements, and the contract requirements that include the General Conditions and the Supplementary Conditions apply to work of this division.

B. Section 26 05 34 - Provisions For Communication, Security & Safety Systems.

1.5 CODES, STANDARDS, AND THEIR ABBREVIATIONS

A. General:
   1. Perform all work in strict accordance with the requirements and recommendations stated in the codes and standards except when requirements are exceeded by the contract documents.
   2. In addition to the requirements outlined in other sections of the specifications the following standards are imposed as applicable to the work in each instance:
      a. OSHA Safety and Health Regulations for Construction.
      b. NFPA No. 70 National Electrical Code.
      c. NESC National Electrical Safety Code, ANSI Standard C2.
      d. NEiS National Electrical Installation Standards.
      e. Local Codes and Ordinances.

B. Where local codes or practices exceed or conflict with the NEC, it shall be the Contractor's responsibility to perform the work in accordance with the local code prevailing and local interpretations thereof. Any such additional work shall be performed at no additional cost to the Owner.

C. Materials and components shall be UL listed and labeled by Underwriters Laboratories, Inc. for the intended use under the latest appropriate testing standard.

D. The Contractor shall obtain all permits required to commence work. Upon completion of the Work, the Contractor shall obtain and deliver to the Owner's Representative a Certificate of Inspection and Approval from the State Board of Fire Underwriters and other authorities having jurisdiction. The Contractor shall pay required permit fees.

1.6 LIST OF ASSOCIATIONS AND STANDARDS:

ADA:	Americans with Disabilities Act.
ANSI:	American National Standards Institute, 1430 Broadway; New York, NY 10018.
ASTM:	American Society for Testing and Materials, 1916 Race Street; Philadelphia, PA 19103.
BICSI:	(RCDD5 Standards), 8610 Hidden River Parkway, Tampa, FL 33637
CBM:	Certified Ballast Manufacturers Association, 2116 Keith Building; Cleveland, Ohio 44115.
IEEE:	Institute of Electrical and Electronics Engineers, 345 East 47th Street; New

York, NY 10017.

ICEA: Insulated Cable Engineers Association, P.O. Box P, South Yarmouth, MA 02664.

NEC: National Electrical Code; NFPA No. 70.

NECA: National Electrical Contractors Association, Inc., 7315 Wisconsin Ave.; Washington, DC 20014.

NEMA: National Electrical Manufacturers Association, 155 East 44th Street; New York, NY 10017.

NESC: National Electrical Safety Code, ANSI Standard C2.

NFPA: National Fire Protection Association, 60 Batterymarch Street; Boston, MA 02110.

OSHA: Occupational Safety and Health Administration, US Department of Labor; Washington, DC 20402.

UL: Underwriters Laboratories, Inc., 333 Pfigsten Road; Northbrook, IL 60062.

A. Nothing in the Contract Documents shall be construed to permit work not conforming to these codes.

B. When two or more codes or standards are applicable to the same work, then the stricter code or standard shall govern.

C. The date of the code or standard is that in effect on the date of issue stated on the contract documents, except when a particular publication date is specified.

D. The Contractor shall comply with all State, Federal, NFPA, local codes and ordinances that may alter any part of the plans or specifications. The Contractor shall bear all costs for correcting any deficiencies due to non-compliance.

E. Where local codes and ordinances are not in writing or on record but local precedence have been set, the Owner shall pay for any additional resulting cost.

1.7 DEFINITIONS

A. Approval: It is understood that approval must be obtained from the Architect in writing before proceeding with the proposed work. Approval by the Architect of any changes, submitted by the Contractor, will be considered as general only to aid the Contractor in expediting his work.

B. The Builder: The primary contractor engaged to oversee the construction project. They may be technically described as a Construction Manager, General Contractor, Managing Construction Contractor, et cetera.

C. The Contractor: The Contractor engaged to execute the work included a particular section only, although he may be technically described as a Subcontractor to the Builder. If the Contractor, engaged to execute said work, employs Sub-Contractors to perform various portions of the work included under a particular Section, they shall be held responsible for the execution of this work, in full conformity with Contract Document requirements. The Contractor shall cooperate at all times and shall be responsible for the satisfactory cooperation of his Subcontractors with the other Contractors on the job so that all of the various sections and phases of work may be properly coordinated without unnecessary delays or damage.

D. The Electrical Contractor: The Electrical Contractor shall be engaged to execute the work included Division 26 only.

E. PDF file or .pdf: The filename extension associated with “Portable Document Format” files, which are multi-platform computer files in the ISO 32000-1:2008 open standard format developed and licensed by Adobe Systems. These files are a digital electronic representation of text, documents, images, and technical drawings in a font and color-accurate fixed-layout

format that is platform and display resolution independent. PDF files can be electronically transmitted, viewed, or printed with various free PDF reader application programs, and may allow markups/comments with various PDF editing application programs.

F. Provide: Defined as requiring both the furnishing and installation of the item or facility indicated, complete in all respects and ready for operation unless otherwise specifically noted.

1.8 SCHEDULE OF VALUES, APPLICATION FOR PAYMENT

A. The Contractor shall in accordance with the General Provisions of the Contract, including General and Supplementary Conditions, and Division 1, complete a Schedule of Values and Applications for Payment. When a portion of this work separately funded, including donations or E-Rate, the contractor shall accommodate this in the Schedule of Values and Applications for Payment. For E-Rate eligible portions of this work, the contractor will be required to participate in the E-Rate program, comply with all E-Rate regulations, and provide billing as needed. The contractor shall coordinate with the Owner to file Form 471 or latter edition and/or other forms as may be required.

1.9 WARRANTY

A. The Contractor shall warranty his work against defective materials and workmanship for a period of one year from date of acceptance of the job.

B. Neither the final payment nor any provisions in Contract Documents shall relieve the Contractor of the responsibility for faulty materials or workmanship.

C. He shall remedy any defects due thereto, and pay for any damage to other work resulting there from, which shall appear within a period of one year from date of substantial completion.

D. The Owner shall give notice of observed defects with reasonable promptness.

E. This Warranty shall not be construed to include the normal maintenance of the various components of the system covered by these specifications.

1.10 SITE VISIT

A. Before submitting a proposal, each proposed contractor shall examine all plans and specifications relating to the work, shall visit the site of the project, and become fully informed of the extent and character of the work required, including all required utilities.

B. No consideration will be granted for any alleged misunderstanding of the materials to be furnished or the amount of work to be done, it being fully understood that the tender of a proposal carries with it the agreement to all items and conditions referred to herein, or indicated on the accompanying plans or required by nature of the site of which may be fairly implied as essential to the execution and completion of any and all parts of the work.

1.11 SUBMITTALS

A. Submittal procedures shall be per Division 1 - General Requirements.

B. Provide a complete submittal for each section as specified.

C. Submit complete submittal package within 30 calendar days after award of this work for approval. Equipment is not to be ordered without approval. Partial submittals are not acceptable for review. Each submittal shall include a dated transmittal.

D. A submittal may be electronically transmitted in PDF file format (preferred) or paper copies

may be provided in quantities indicated in Division 1. Paper copies shall be organized including index tabs in a 3-ring black binder of sufficient size.

E. Each Product data submittal shall include:
   1. A cover sheet with the name and location of the project, the name, address, and telephone number of the Contractor, and the name, address, and telephone number of the submitting sub-contractor. Include on or after the cover sheet sufficient space for review stamps.
   2. An indication of any deviations from Contract Document requirements, including variations and limitations. Show any revisions to equipment layout required by use of selected equipment.
   3. A product data index and complete equipment list including for each product submitted for approval the manufactures name and part number, including options and selections.
   4. Cut-sheets or catalog data illustrating the physical appearance, size, function, compatibility, standards compliance, and other relevant characteristics of each product on the equipment list. Indicate by prominent notation (an arrow, circle, or other means) on each sheet the exact product and options being submitted.
   5. Submit design data, when the scope of work requires, including calculations, schematics, risers, sequences, or other data.
   6. When the contract requires extended product warranties, submit a sample of warranty language.
   7. Any resubmittal shall include a complete revised equipment list and any product data that is revised.

F. Submit shop or coordination drawings, when specified or the required for the scope of work, which include information that will allow to the Contractor to coordinate interdisciplinary work and when necessary guide the manufacturer or fabricator in producing the product. Shop or coordination drawings shall be specifically prepared to illustrate the submitted portion of work, this may require diagrams, schedules, details, and accurate to scale equipment and device layouts prepared using a CAD or BIM engineering drawing program.

G. The Engineer's review of submittals is only for confirmation of adherence to design of project and does not relieve the Contractor of final responsibility for furnishing all materials required for a complete working system and in complying with the Contract Documents in all respects.

1.12 PROJECT RECORD DOCUMENTS

A. The Contractor shall keep a set of plans on the job, noting daily all changes made in connection with the final installation including exact dimensioned locations of all new and uncovered existing utility piping outside the building.

B. Upon submitting his request for final payment, he shall turn over to the Architect/Engineer, for subsequent transmittal to the Owner revised plans showing "as installed" work.

C. In addition to the above, the Contractor shall accumulate during the jobs progress the following data in PDF file format (preferred) or paper copies to be turned over to the Architect/Engineer for checking and subsequent delivery to the Owner:
   1. All warranties, guarantees, and manufacturer's directions on equipment and material covered by the Contract.
   2. PDF file or paper copies of all Shop Drawing prints and CAD or BIM engineering drawing program files.
   3. Any software programs, data/programming files, passwords, special interface cables, or keys that may be needed to maintain or access equipment.
   4. Set of operating instructions. Operating instructions shall also include recommended maintenance and seasonal changeover procedures.
   5. Any and all other data and/or plans required during construction.

6. Repair parts lists of all major items and equipment including name, address, and telephone number of local supplier or agent.
7. The first page, or pages, shall have the names, addresses, and telephone numbers of the following:
   a. Builder and all Contractors.
   b. Major Equipment Suppliers
   c. Submit communication systems warranties.

1.13 TRAINING

A. Upon completion of the work and at a time designated by the Architect, provide formal training sessions for the Owner's operating personnel to include location, operation, and maintenance of all Electronic Safety Systems equipment and systems.

B. See other sections for time requirements.

1.14 PLANS AND SPECIFICATIONS

A. The intent of the project drawings is to establish the types of systems and functions, but not to set forth each item essential to the functioning of the system.

B. Electrical drawings are generally diagrammatic and show approximate location and extent of work.

C. Install the work complete including minor details necessary to perform the function indicated. Provide Electronic Safety Systems (including all hook-ups) complete in every respect and ready to operate.

D. If clarification is needed, consult the Architect/Engineer.

E. Review pertinent drawings and adjust the work to conditions shown. Where discrepancies occur between drawings, specifications, and actual field conditions, immediately notify the Architect/Engineer for his interpretation.

F. The Architect/Engineer reserves the right to make any reasonable change in the location of any part of this work without additional cost to the Owner.

1.15 PRODUCT SUBSTITUTIONS:

A. Descriptions and details, acceptable manufacturers' names listed, and specific manufacturer and model number items indicated in the plans and specifications shall establish a standard of quality, function, and design. Manufacturers and model numbers listed "no exceptions" shall not be substituted without specific notice in an addendum. Otherwise, where a specific manufacturer's product is indicated, products of other manufacturers listed as acceptable may be submitted for approval based on the substitute product being, in the opinion of the Engineer, of equivalent or better quality than that of the product specified.

B. Proposed contractors wishing to propose systems which differ in manufacturer, features, functions, or operating characteristics from those outlined in these specifications must do so in writing to the specifying authority at least ten (10) days prior to the proposal opening.

C. For manufacturers equipment or models other than that specified, the proposed contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment. Proposals must include detailed information showing all deviations from the system as specified and include relevant technical and cost data. This shall include a complete description of the proposed substitution, drawings,

catalog cuts, performance data, test data, or any other data or information necessary for evaluation.

D. The Engineer will consider all such submittals and the Architect will issue an addendum listing items that the Engineer considers acceptable. Only such items as specified or approved as acceptable will be installed on this project.

E. Substitute products for which the proposed contractor does not obtain prior approval will not be considered acceptable for this project. Final approval of the alternate system shall be based on the decision of the Owner and Architect. Prior approval to make a proposal for this project does not automatically ensure the system will be an acceptable equivalent.

F. The Contractors' proposal represents that the contract proposal price is based solely upon the materials, equipment, and labor described in the Contract Proposal Documents (including addenda, if any) and that he contemplates no substitutions or extras.

G. The manufacturer of the proposed substitute unit shall provide samples for evaluation, when required, at no charge and non-returnable.

H. Requests for substitution are understood to mean that the Contractor:
   1. Has personally investigated the proposed substitution and determined that it is equivalent or superior in all respects to that specified.
   2. Will provide the same guarantee for the substitution that he would for that specified.
   3. Will, at no cost to the Owner, replace the substitute item with the specified product if the substitute item fails to perform satisfactorily.
   4. After Award of the Contract, substitutions will be considered only under one or more of the following circumstances:
      a. The substitution is required for compliance with subsequent interpretations of code or insurance requirements.
      b. The specified product is unavailable through no fault of the Contractor.
      c. The manufacturer refuses to warranty the specified products as required.
      d. Subsequent information indicates that the specified product is unable to perform properly or to fit in the designated space.
      e. In the Engineer's sole judgment, the substitution would be in the Owner's best interest.
      f. Revisions to the electrical system caused by substitutions shall be under the supervision of the Engineer, at a standard hourly rate charged by the Engineer. Charges from the Engineer, Architect, and Electrical Contractor shall be paid by the Contractor originating the changes.

1.16 FUTURE USE CABLING

A. When cabling is installed for future use, it shall be identified with a tag of sufficient durability to withstand the environment involved.

B. Locations and Existing Conditions:
   1. Location and condition of any existing equipment or services, when shown, have been obtained from substantially reliable sources, are shown as a general guide only, without guarantees as to accuracy.
   2. The Contractor will examine the site, verify all requirements, service points, and availability of all services required to complete this project. No consideration will be granted for any alleged misunderstanding of the materials and labor to be provided as necessitated by nature of the site including those items that may be fairly implied as essential to the execution and completion of any and all parts of this project.

1.17 PROTECTION OF EQUIPMENT AND MATERIALS

A. The Contractor shall take such precautions as may be necessary to protect his apparatus from damage.

B. This shall include the creation of all required temporary shelters to protect any apparatus above the floor of the construction and the covering of apparatus in the completed building with tarpaulins or other protective covering.

C. Failure to comply with the above to the satisfaction of the Owner's inspector will be sufficient cause for the rejection of the equipment in question and its complete replacement by the Contractor.

1.18 FINAL OBSERVATION

A. It shall be the duty of the Contractor to make a careful observation trip of the entire project, assuring themselves that the work on the project is ready for final acceptance before calling upon the Architect/Engineer to make a final observation.

B. To avoid delay of final acceptance of the work, the Contractor shall have all necessary bonds, warranties, receipts, affidavits, et cetera, called for in the various articles of these specifications, prepared and signed in advance, together with a letter of transmittal, listing each paper included, and shall deliver the same to the Architect/Engineer at or before the time of said final observation. The Contractor is cautioned to check over each bond, receipt, et cetera, before preparing for submission to verify that the terms check with the requirements of the specifications.

C. The following and other provision of Division 1 General Conditions will be required at time of final completion:
   1. Final clean up completed.
   2. All systems are fully operational, all material and devices installed.
   3. As built (as installed) drawings and operations manuals.

1.19 PROHIBITED MATERIALS

A. No new asbestos, lead, or materials containing these substances shall be permitted in this project. The Contractor shall consult the Architect concerning these materials if their presence is suspected. All work in or around existing asbestos or lead materials is at the sole risk of the Contractor and his personnel.

1.20 CUTTING AND PATCHING

A. Notify the Builder sufficiently ahead of construction of any floors, walls, ceiling, roof, et cetera, of any openings that will be required for his work.

B. The Contractor shall see that all sleeves required for his work are set at proper times to avoid delay of the job.

C. All necessary cutting of walls, floors, partitions, ceilings, et cetera, as required for the proper installation of the work under this Contract shall be done at the Subcontractor or at the Subcontractor's expense in a neat and workmanlike manner, and as approved by the Architect/Engineer.

D. Patching of openings and/or alterations shall be provided by the Electronic Safety Systems Subcontractor or at the Subcontractor's expense in an approved manner.

E. No joists, beams, girders, or columns shall be cut by any Contractor without first obtaining

written permission of the Architect/Engineer.

F. All openings in firewalls and floors shall be completely sealed after installation for a completely airtight installation. Sealing material shall be non-combustible and UL approved. The installed sealing assembly shall not cause the fire rating of the penetrated structure to be decreased.

G. All openings in exterior walls shall be sealed watertight.

H. Seal voids around conduits penetrating fire-rated assemblies and partitions using fire stopping materials and methods in accordance with NFPA and local codes.

1.21 MANUFACTURERS' INSTRUCTIONS

A. All equipment and devices shall be installed in accordance with the drawings and specifications, manufacturer's instructions, and applicable codes.

B. Where specifications call for installation of a product to be in accordance with manufacturer's instructions and/or where manufacturer's instructions are required for installation of a product, it shall be the contractor's responsibility to obtain the necessary applicable manufacturer's instructions and install the product in accordance with the manufacturer's instructions.

C. It shall be the Contractor's responsibility to install all equipment, materials, and devices shown on the plans and as called out in these specifications even if manufacturer's instructions are absolutely unattainable.

1.22 INSTALLATION

A. Cooperation with trades of adjacent, related or affected materials or operations, and or trades performing continuations of this work under subsequent contracts are considered a part of this work. In order to effect timely and accurate placing of work and to bring together, in the proper and correct sequence, the work of such trades, including work provided under a Division 1 allowance.

B. The Electronic Safety Contractor shall coordinate installation of the systems with the Builder, Electrical, Mechanical, and Plumbing Contractors to ensure a complete working system for the Owner.

C. Where required for accessibility all conduit and boxes for all Electronic Safety Systems shall be provided by the Electrical contractor as specified, including systems in Division 28, any and all allowances shall be included. Normally low voltage wiring shall run open and supported in accessible attic space. All low voltage wiring in exposed areas such as gyms, stages, shops, and field houses shall be enclosed in conduit. Coordinate with, and verify with Division 26 to provide required conduit and boxes at locations and heights as required.

D. Conduit, innerduct, track, or raceway shall conceal and protect wiring in exposed areas, within walls, through in- accessible areas, floors, chases, under slab, crawlspaces, or underground.

E. All conduit, duct, track, and raceway runs shall be spaced apart to allow for maintenance, such as the installation of couplings, without disturbing adjacent pathways.

F. All work must be performed by workers skilled in their trade. The installation must be complete whether the work is concealed or exposed.

G. Provide stainless screw/bolt hardware wherever stainless devices are used and in potentially wet areas.

H. Coordinate the actual locations of devices and outlets and equipment with building features and mechanical equipment as indicated on architectural, structural, and mechanical drawings. Review with the Architect any proposed changes in outlet or equipment location. Relocation of devices, before installation, of up to 3 feet from the position indicated, may be directed without additional cost. Remove and relocate outlets placed in an unsuitable location when so requested by the Architect.

1.23 ADDITIONAL MATERIALS: INCLUDE IN THE BASE CONTRACT PROPOSAL

A. All costs to provide 10 additional fire alarm signals including all cable and devices as directed by the Architect. Conduit and standard back boxes by Division 26 Electrical Contractor.

PART 2 – PRODUCTS

A. Not Applicable

PART 3 – EXECUTION

A. Not Applicable

END OF SECTION

SECTION 28 13 00

ACCESS CONTROL SYSTEM

PART 1- GENERAL

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.1 RELATED WORK

A. Division 26 as it relates to Grounding, Wire Cable and Related Materials, Raceways.

1.2 WORK INCLUDED

A. The Contractor shall furnish and install a complete microprocessor-based access control system as specified herein. The system shall include, but not be limited to, all control equipment, power supplies, power circuits, signal initiating and signaling devices, conduit, wire, fittings, and all other accessories required to provide a complete and operable system. Contractor shall connect all back-up batteries per manufacturer's instructions.

B. Security system devices indicated are for reference and coordination purposes only. The installing contractor shall design and provide a complete system, meeting the requirement of specification. The Contractor shall provide all security system devices required for complete system perimeter coverage acceptable to all governing authorities, Architect and Owner.

C. The system shall include Security Card reader access interfaces at all locations noted.

1. The Control System shall be the product of a single manufacturer.
2. Tag all conductors or cables at each end.
3. Installation of modules and cards.
4. Interconnection to Bosch Intrusion Detection panels.
5. Installation of new security devices.
6. Preconstruction meeting with Owner's personnel, installing technician and project superintendent.
7. Installation of all Card Readers and field devices.

D. The contractor shall connect this location to the district monitoring station as designated by the owner.

E. Prior to construction, contractor shall perform a test of all existing Access Control system devices and cabling. Should any faulty devices or cabling be found, contractor shall provide a list of faulty equipment and provide to the Architect and Owner. Contractor shall provide pricing to repair / replace any faulty device / cabling.

F. Contractor shall integrate the Access Control system with the Intrusion Detection system and the Video Surveillance system. Coordinate with other trades. Provide all licenses required.

G. Contractor shall provide all permits, licenses and system certifications as required by Authority Having Jurisdiction.

H. Contractor shall use a step-bit drill bit to install flush mount door contacts. Do not use a hole-saw.

1.3 CODES AND STANDARDS

The system shall comply with the applicable Codes and Standards as follows:

A. National Fire Protection Association Standards:
   1. NFPA 70 National Electric Code
   2. NFPA 72 National Fire Alarm Code
   3. NFPA 101 Life Safety Code

B. Local & State Building Codes

C. Requirements of Local Authorities having Jurisdiction

D. Underwriters Laboratory Requirements and Listings for use in Security Alarm Systems.

E. Requirements of American Disabilities Act (Public law 101-336).

G. State Fire Marshall.

1.4 QUALITY ASSURANCE

A. Contractor Qualifications:
   1. The installing contractor shall be the authorized representative of the Access Control Manufacturer to sell, install, and service the proposed manufacturer's equipment. The installing contractor shall have represented the security alarm manufacturer's product for at least two years.
   3. The installing contractor shall be licensed by the State as a security services contractor to design, sell, install, and service security alarm systems.
   4. The installing contractor shall provide 24-hour, 365 day per year emergency service with factory trained service technicians.
   5. The installing contractor shall have personnel on their staff that has been actively engaged in the business of designing, selling, installing, and servicing security alarm systems for at least ten (10) years.
   6. All Contractors must submit to the owner prior to starting any work the factory training certificates for all personnel that will be working on the access control system. No person is allowed to work on the system without proper manufacturer's certification.
   7. The proposing contractor for this system and the installing contractor of this system shall be of the same organization. Absolutely no subcontracting of any portion of this system by the proposing contractor will be allowed.
   8. Contractor must be a current integrator of the specified solution in the closet major metropolitan area marketplace, have a permanent office located within 75 miles of the project, and be able to include information on current support staff to be able to service this client.
   9. The contractor must be a Genetec Unified Elite Integrator

1.5 SUBMITTALS

A. The installing contractor and/or equipment supplier shall provide complete and detailed shop drawings and include:
   1. Control panel wiring and interconnection schematics.
   2. Complete point to point wiring diagrams.
   3. Riser diagrams.
   4. Complete floor plan drawings locating all system devices.
   5. Factory data sheets on each piece of equipment proposed.
   6. Detailed system operational description. Any specification differences and

deviations shall be clearly noted and marked.
7. Complete system bill of material.
8. Line by line specification review stating compliance or deviation.

B. All submittal data will be in bound form with Contractor's name, supplier's name, project name, and state security license number adequately identified.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. MonitorCast
Panasonic Security Solutions
800 Gessner Rd #700,
Houston, TX 77024

B. HID

2.2 GENERAL

A. The access control system and security management system shall be deployed through IP network infrastructure with a two- tiered hardware hierarchy. The IP Door Controller shall be capable of running on a TCP/IP network and shall be accessible, configurable, and manageable from a network-connected PC with a browser.

B. Browser access for configuration and administration of the system shall be possible from a PC on the same subnet, through routers and gateways from other subnets, and from the Internet.

C. The top hardware tier shall be the MonitorCast v4 Server based platform. Installed applications on the MonitorCast v4 Server is to be an operating system, a web MonitorCast v4 Server, security application software, and the database of personnel and system activity.

D. The bottom hardware tier shall be the IP Door Controller. The IP Door Controller shall make and manage access control decisions with data provided by the MonitorCast v4 Server, and it shall control the communication between the IP Door Controller and door hardware connected to the IP Door Controller inputs, outputs, and readers. This modular design shall make it possible for the system to continue to manage access control and store system activity logs, even during network downtime. When network connectivity is re-established, the system activity logs shall be automatically re- integrated to the host MonitorCast v4 server.

E. The system shall integrate, within a browser interface; access control and video monitoring. These applications shall be a fully bi-directional integrated software architecture.
1. The database tier shall use Microsoft SQL Server residing on the MonitorCast v4 Server. Microsoft SQL Server on the MonitorCast v4 Server shall be a full featured, high performance database management system. This shall provide a small footprint, low administration, and a high reliability relational database that is embedded without requiring the use of a separate PC MonitorCast v4 Server.
2. The MonitorCast v4 Server tier shall be based on a Microsoft™ MonitorCast v4 Server 2008 R2 or 2012 MonitorCast v4 Server. This application shall provide a graphically rich security management application through a standard web browser.

F. All equipment and materials used shall be standard components, regularly manufactured, and regularly utilized in the manufacturer's system.

G. All systems and components shall have been thoroughly tested and proven in actual use.

H. All systems and components shall be provided with a manufacturer warranty of one year for software and two years for hardware.

2.3 OVERALL SYSTEM CAPABILITY

A. The security management system shall meet the requirements of business and government access control systems. The system shall monitor and control facility access and shall perform alarm monitoring and integration to camera and video monitoring. The system shall also maintain a database of system activity, personnel access control information, and system user passwords and user role permissions. The system shall be controlled from a web browser and require no software installation or client licenses. The system shall provide control and access to users on Local Area Networks (LAN), Wide Area Networks, wireless networks, and the Internet. The system shall provide email and/or text message alerts for all alarm conditions and threats.

B. System Partitioning: The system administrator shall have the ability to divide the system into partitions, allowing subsets of the overall population and/or resources to be managed separately.
   1. From the default Master partition, one or more additional partitions shall be able to be created.
   2. Each partition shall contain some number of administrators, card holders with their credentials, and resources.
   3. When performing administrative functions, the administrator of a partition shall have the ability to create or modify only the cardholders and resources in that partition. However, resources shall be able to be shared across partitions through the mapping of access levels from one partition to another.
   4. System partitioning shall have a precision feature that allows administrators in one or more partitions to view and perform edit functions on person records that belong to another partition.
   5. Administrators shall have the ability to search for person records across all partitions to which they have access. The system administrator shall have the ability to make such cross- partition searches the default for users who have access to multiple partitions.
   6. After finding a personnel group record located in another partition, an administrator shall be able to click a button to switch to that partition directly from the personnel group record—and possibly edit the record, depending on his or her access rights in that partition. Alternatively, an option for making every person record seamlessly visible across all partitions shall be provided.

C. The system shall provide the following Access Control capabilities:
   1. Integrated photo ID creation capability with video verification.
   2. User interface secured access under encrypted password control.
   3. Multiple Site Control.
   4. System-wide timed anti-pass back function.
   5. "First-in-unlock" rule enforcement.
   6. Multiple access levels and cards per person.
   7. Detailed time specifications.
   8. Simultaneous support for multiple card data formats.
   9. Compatibility with various input devices, including biometric readers.
   10. Activation/expiration date/time by person with one-minute resolution.
   11. Access level disable for immediate lockdown.
   12. Multiple holiday schedules.

13. Timed unlock schedules.
14. Dual-reader portal support.
15. Wiegand Reader support.
16. Magnetic-stripe reader support.
17. Wiegand keypad PIN support for 4-digit or 6-digit PINs.

D. The system shall provide the following native or VMS integrated monitoring capabilities:
1. The Home page shall allow users to view a full system summary, including an Activity Log, Auto- Monitor, and dashboard functions.
2. Common alarm panel integration for disarm on access, and arm on egress.
3. Integrated real-time IP-based NVR systems with stored video replay for events.
4. Provides alarms on communication loss.
5. Provides the ability to record video and link to video for alarm events.
6. A monitoring desktop that integrates video, system activity logs, floorplans, ID photos, and alarm notifications.
7. Graphic floorplans with active icons of monitor and access control points.
8. Secure access to the user interface under encrypted password control.
9. Delivery of alerts via VMS Rules Manager or Automation and email.
10. Remote logging of system messages to local host.

E. The system shall provide the following integrated VMS Video Management capabilities:
1. Playback of event-related video.
2. Integrated alarm inputs from the video management system.
3. Digital playback of video events.
4. Linking of video and events based on triggers provided by the system or video system.
5. Support for multiple NVRs.
6. Multiple pre-programmed supported cameras.
7. Monitoring and control through a web browser interface.

F. The system shall provide the following Security Database capabilities:
1. Maintain data of system activity, personnel access control information, system user passwords and custom user role permissions for whole or partial access to system resources and data.
2. LDAP integration for single-user logon authentication.
3. Network-secure API for external application integration.
4. Easy to use custom report generator.
5. Record recall by vehicle tag, name, or card.
6. An API for adding to, deleting from, and modifying the database.
7. Storage of system user passwords and permissions.
8. Storage and recall of ID photos and emergency personal information.
9. Pre-defined reports on system configuration, system activity history, and people.
10. Custom report writer interface that allows the interactive creation of custom reports. Reports may be saved for later reuse. No third-party software (such as Crystal Reports) shall be necessary.
11. Selectable custom report output formats, including PDF & CSV.
12. Custom report repository location. Users shall be able to review, cancel and delete reports from this data storage location.
13. Email and text messaging (SMS) alert notifications.

2.4 HARDWARE REQUIREMENTS

A. The security management system shall employ a modular hardware concept that enables simple system expansion and utilizes a two-tiered hardware hierarchy:
1. At the top tier shall be a MonitorCast v4 Server, which shall contain the database engine, web MonitorCast v4 Server, application software, and configuration data.

It is at this level that System Users, through a browser interface, shall interact with the system, set configurations, monitor activities, run reports, and manage alarms.

2. At the bottom tier shall be the IP Door Controller, an intelligent device with native TCP/IP & PoE support, which shall make and manage access control decisions, a set of inputs, outputs and readers.
3. The network device shall run on existing building TCP/IP PoE networks and shall be configurable for access from separate subnets, through gateways and routers, and from the Internet.

B. A MonitorCast v4 Server shall contain a processor, flash memory, and storage. External battery backup shall be used to provide uninterrupted operation in the event of external power loss. The IP Door Controller shall contain IIS for communication with the IP Door Controllers and a network interface port. A MonitorCast v4 Server shall have the following capabilities:

1.	Door Controller: (Mercury EP/LP boards) (AD-400/AD-300 Wireless locks)	512
2.	Access cards:	No Limit
3.	Card formats:	15 per Controller
4.	Alarm input points:	2,048 per Controller
5.	Control point outputs:	2,048 per Controller
6.	Ethernet ports:	1
7.	Time specifications	512 per Controller
8.	Holidays	255 per Controller
9.	Access levels per person	15 per person (32,000 per Controller)
10.	Cards per person	No Limit
11.	Concurrent system users	Unlimited

C. The IP Door Controller shall make and manage access control decisions with data provided by the MonitorCast v4 Server, and it shall manage the communication between the IP Door Controller connected to the system's inputs, outputs, and readers. The IP Door Controller shall be powered with PoE power input12.95 W (802.3af or 12V DC 900mA power supply) protocol. Each IP Door Controller shall have the following capabilities:

1.	Access control doors	1
2.	Readers	2
3.	Supervised Inputs	2
4.	General Input	2
5.	Relay Outputs	2
6.	Connectivity	10/100 Ethernet
7.	Credential storage	20,000
8.	Activity Log records	27,000

D. The IP Door Sub-Controller single door shall make and manage access control decisions with data provided by the MonitorCast v4 Server through the IP Door Sub-Controller, and it shall manage the communication between the IP Door Sub-Controller connected to the system's inputs, outputs, and readers. The IP Door Controller shall be powered with PoE power input 12.95 W (802.3af or 12V DC 900mA power supply) protocol. Each IP Door Controller shall have the following capabilities:

1.	Access control doors	1
2.	Readers	1
3.	Supervised Input	4
4.	Relay Outputs	2
5.	Connectivity	10/100 Ethernet

E. The Door Sub-Controller single door shall make and manage access control decisions with data provided by the MonitorCast v4 Server through the IP Door Controller, and it shall manage the communication between the IP Door Sub-Controller connected to the system's inputs, outputs, and readers. The IP Door Sub- Controller shall be connected to IP Door Controller using RS-485 protocol. Each IP Door Sub-Controller shall have the following capabilities:

1.	Access control doors	1
2.	Readers	1
3.	General Input	2 (programmable)
4.	Dedicated Input	1
5.	Relay Outputs	2
6.	Connectivity	RS-485

F. The Door Sub-Controller two door shall make and manage access control decisions with data provided by the MonitorCast v4 Server through the IP Door Controller, and it shall manage the communication between the IP Door Sub-Controller connected to the system's inputs, outputs and readers. The IP Door Sub-Controller shall be connected to IP Door Controller using RS-485 protocol. Each IP Door Sub-Controller shall have the following capabilities:

1.	Access control doors	2
2.	Readers	1
3.	General Input	8 (programmable)
4.	Dedicated Input	2
5.	Relay Outputs	6
6.	Connectivity	RS-485

G. The Serial Input Sub-Controller shall make and manage access control decisions with data provided by the MonitorCast v4 Server through the IP Door Controller, and it shall manage the communication between the IP Serial Input Sub-Controller connected to the system's inputs and outputs. The IP Serial Input Sub- Controller shall be connected to IP Door Controller using RS-485 protocol. Each IP Serial Input Sub- Controller shall have the following capabilities:

1.	General Input	16 (programmable)
2.	Dedicated Input	2
3.	Relay Outputs	2
4.	Connectivity	RS-485

H. The Serial Output Sub-Controller shall make and manage access control decisions with data provided by the MonitorCast v4 Server through the IP Door Controller, and it shall manage the communication between the IP Serial Output Sub-Controller connected to the system's inputs & outputs. The IP Serial Output Sub- Controller shall be connected to IP Door Controller using RS- 485 protocol. Each IP Serial Output Sub- Controller shall have the following capabilities:

1.	General Output	16
2.	Dedicated Inputs	2
3.	Connectivity	RS-485

2.5 HARDWARE PACKAGING REQUIREMENTS

A. The security management system shall have various hardware enclosures and configurations available to support different installation requirements. Enclosures shall be available for wall or rack mounting. The wall- mount enclosures shall have a lock requiring a key.

2.6 CERTIFICATIONS

A. UL 294 listed.
B. ISO 9000 listed.
C. CE Compliant.
D. RoHS.

2.7 MONITORCAST v4 ACCESS CONTROL SOFTWARE

A. Operating System and Application Software shall have the following characteristics:
   1. The MonitorCast v4 Server operating system shall Windows Server 2008 R2 or Windows Server 2012 operating system.
   2. The system database shall be SQL Server Express requiring a small footprint and providing high reliability. The MonitorCast v4 Server shall provide users with access and operate the system using a standard web browser.
   3. The system shall support the following web browsers:
   4. For the security management system, the listed browsers shall include Internet Explorer, Firefox, Chrome and Safari.

B. Software Licensing shall have the following characteristics:
   1. Software licensing shall be based upon the number of cameras licenses you have per server and individual lifetime licensing in situations where doors out number cameras at the project site.
   2. Licensing shall be controlled by a Serial Key and an Activation Code. The Serial Key shall contain the licensed system limits. System upgrade licensing to enable more cameras or more doors shall require a Serial Key re-activation. The key shall be locked to the system license number.

C. Software upgrades shall be possible from a browser on any network-connected PC, by uploading a software update to the IP Door Controller. No client software installation shall be necessary.

D. Online Help and Documentation - The system shall be provided with complete online documentation. The online documentation shall include:
   1. Technical Support Notes - These documents shall be in PDF format, shall be printable, and shall be linked to from the Help system table of contents, index, and related topics.
   2. Installation Guides - These documents shall be in PDF format, shall be printable, and shall be linked to from the Help system table of contents, index, and related topics.
   3. Video Integration Guides - These documents shall be in PDF format, shall be printable, and shall be linked to from the Help system table of contents, index, and related topics.
   4. End-User Task Guide - This document shall be in PDF format, shall be printable, and shall be linked to from the Help system table of contents, index, and related topics.

E. Language Support - The system shall be provided with multiple language support. The ability to switch from one language to another shall be accomplished through the user interface. Translation of the user interface, online help and documentation into other languages shall be available. The languages supported shall include:
   1. English

F. Date Formats - The system shall support global date formats as follows:
   1. mm/dd/yyyy
   2. dd/mm/yyyy
   3. yyyy/mm/dd

G. Floor plans - The system shall provide graphic floorplan capability including graphic

display of door status and entry direction. Floor plans shall have the following characteristics:

1. The Network Administrator shall be able to graphically configure device icons onto the floorplan images, and to upload additional floorplan images. JPEG images shall be supported, and the maximum size for a floorplan image shall be 256K.

H. Personnel Data - The system shall maintain person data relating to access control, system user privileges, photo identification, system activity, and contact information.

1. All person data in the system shall be integrated onto one page for viewing, editing, and deletion by system users.
2. A system user holding at least an "Administrator" user role shall be able to create, delete, and modify person records, including access levels, schedules & resource groups.
3. A system user holding at least a "Administrator" user role shall be able to configure the display of person records.

I. Access Control:

1. The system shall be able to make access control decisions, define a variety of access levels and time specifications, write system activity into a log file, maintain a personnel enrollment database, receive signals from input devices such as door switch monitors, card readers and motion detectors, energize devices such as door locks and alarms via outputs.
2. Card Formats - The system shall support the use of readers that use the Wiegand Reader Interface. The system shall also support the use of the Magnetic Stripe ABA track 2 card data formats.
    i. It shall be possible to create new card formats, designate start bits and bit lengths for facility codes and card ID numbers, as well as designate parity bits. The system shall support up to 32 different card formats.
3. Access Levels - The system shall be capable of storing unlimited access levels in each partition.
    i. The definition of an access level shall require the assignment of a reader or reader group, and a time specification.
4. First-in Unlock Rule - The system shall support the use of a First-in unlock rule. It shall be possible to use this rule to control the unlock behavior of portal groups with assigned unlock time specs.
    i. The First-in unlock rule shall require a card read of a specified access level. The portals in the group shall unlock only when the rule is satisfied and the unlock time spec is valid.
5. Holidays - The system shall be capable of storing up to 5 holidays per system. Each holiday shall be assigned a unique alphanumeric name. The definition of a holiday shall require a start date and an end date. Holidays shall have the ability to span several days using only one holiday slot. Holiday definitions shall support the designation of a start time and an end time. If no start time is designated, then the system shall default to 00:00 (start-of-day). If no end time is designated, then the system shall default to 24:00 (end-of-day). Holidays shall require the use of 24-hour time format, e.g. 17:00 is 5:00PM.

J. Reports:

1. The system shall be capable of producing a variety of predefined reports regarding software and security hardware configuration, event history, and the administration of people within the system.
2. The system shall support a graphic interface for interactively building custom reports from either historical or personnel data. These reports shall be savable for later reuse. Parameters shall be inserted into reports to prompt for data input at report runtime. Report results shall be printed, output to a PDF file or put into a

spreadsheet.

3. The system shall be capable of sorting users by various criteria, including email address, and allow for email groups to be selected for auto-distribution.
4. Report generation shall not affect the real-time operation of the system.
5. The specific reports provided shall include the following:
    i. Configuration Reports
        a. Access History - Displays access history based on an entered query. The system user can specify the query using either the keyboard or point-and-click selection.
        b. Custom Report - This provides the capability to create custom reports of historical data.
        c. General Event History - Displays time, type of activity, and activity details for a variety of event types. The system user can select the specific event types for the report.
        d. Audit Trail: Displays an audit trail of system changes and the name of the system user that made the changes. It shall be possible to specify the dates and times covered in the report.
    ii. People Reports
        a. Access Levels - Displays all access levels entered into the system including time specification, reader/reader group, and floor group.
        b. Credential Audit - Lists existing credentials by their current status settings (such as Active, Damaged, Lost, or Not Used). Before running the report, users can filter the data to see only credentials with a particular status setting, or only credentials that were not used with a specific number of days from the date they were issued.
        c. Current Users - Displays a list of all security system users currently logged in to the security system website.
        d. Custom Report - This provides the capability to create custom reports of personnel data. A graphic interface provides the user with the ability to interactively create and save reports for later use. Parameters can be inserted into reports to prompt for data input at report runtime. Custom report configuration shall include page size, orientation, column width and shall automatically notify the user if the selected configuration exceeds the selected page size.

K. Administration - The system shall provide for the performance of system administration tasks from any network-connected computer with a browser. These administrative tasks shall include but not be limited to:
1. Generating reports:
    i. The system shall be capable of producing a variety of predefined reports regarding software and security hardware configuration, event history, and the administration of people within the system.
    ii. Alternatively, the system shall support a graphic interface for interactively building custom reports from either historical or personnel data. These reports shall be savable for later reuse. Parameters can be inserted into reports to prompt for data input at report runtime. Report results can be printed, output to a PDF file or put into a spreadsheet.
    iii. A system user holding “Administrator” permissions shall be able to view and create reports.
2. Database backups:
    i. It shall also be possible for the system users to create such database backups at any time. Any database backups onboard the

MonitorCast v4 Server may also be downloaded to IP Door Controller storage by the system user at any time.

3. System restore:
    i. The system shall be able to restore its database, or the full system data, from a backup. Restoration of the system shall only be possible from a backup copy onboard the MonitorCast v4 Server. It shall, therefore, be possible to upload a copy of a database backup from any network attached storage.
4. Software updates:
    i. Software updates, upgrades and patches shall be provided from time to time. The system shall be able to update its software from these files. Update of the application software shall only be possible from an update file onboard the Server. It shall, therefore, be possible to upload a copy of the software update from any network attached storage or from any PC drive or desktop.
    ii. Software updates may involve the Server only or may include updates for the IP Door Controller also. The monitoring of the security system may be unavailable for several minutes during this process.
5. Enrolling new people - All person data entered into the system shall be held in the system database and shall be available only to system users holding at least the Administer user role. Person data can be added, deleted, and edited by such system users.
6. Configuring network resources:
    i. DNS - The system shall support setting IP addresses for up to two domain name MonitorCast v4 Servers.
    ii. Email settings - The system shall support the use of email notifications of alarm events. The system user must setup the email MonitorCast v4 Server IP address or DNS name and the email address of the Network Controller. A network administrator must setup the network mail MonitorCast v4 Server to relay email for the IP address of the Network Controller.
    iii. Time MonitorCast v4 Servers - The system shall support the use of network time MonitorCast v4 Servers. Up to three MonitorCast v4 Servers can be designated. Use of a network time MonitorCast v4 Server ensures that the Network Controller and its nodes will be regularly synchronized with the exact time used by all other network resources.
    iv. A system user holding “Setup” permissions shall be able to configure network resources.
7. LDAP - It shall be possible to configure an Active Directory MonitorCast v4 Server with the system.
    i. This shall provide single user-login capability.
    ii. Password rules and authentication shall be governed by the LDAP MonitorCast v4 Server.

2.8 MONITORCAST SERVER HARDWARE AND DOOR CONTROLLERS

A. The MonitorCast v4 Server shall be powered by platinum efficiency hot plug redundant 495 W or 750 W power supply.

1.	OS	Windows Server 2008 R2/2012
2.	Storage	200 GB (minimum)
3.	Processor	Intel I5 class processor or higher
4.	RAM	8 GB
5.	Ethernet Ports	1
6.	Warranty	3 Years

B. Each IP Door Controller shall be powered by PoE in accordance with IEEE 802.3af standard. With PoE as the power source the total power available for all external outputs is 12V DC @ 650mA. IP Door Controllers shall have the following characteristics:

1.	TTL reader connectors	2
2.	RS-485 reader connectors	1
3.	Output power	650 milliamps
4.	Input connectors	2
5.	Output connections	2

C. Each IP Door Sub-Controller shall be powered by PoE in accordance with IEEE 802.3af standard. With PoE as the power source the total power available for all external 12V. IP Door Controllers shall have the following characteristics:

1.	TTL reader connectors	1
2.	Power available to readers	150 milliamps
3.	Input connectors	4
4.	Output connections	2

D. Each Single Door Sub-Controller shall be powered by may be supplied with 12-24V DC at 3 amps. With a 12V DC 3A power supply the total power available for all external output shall be 1100mA (13 watts). IP Door Controllers shall have the following characteristics:

1.	TTL reader connectors	1
2.	Power available to readers	150 milliamps
3.	Input connectors	3
4.	Output connections	2
5.	Communication protocol	RS-485

E. Each Two Door Sub-Controller shall be powered by may be supplied with 12-24V DC at 3 amps. With a 12V DC 3A power supply the total power available for all external output shall be 1100mA (13 watts). IP Door Controllers shall have the following characteristics:

1.	TTL reader connectors	2
2.	Power available to readers	150 milliamps
3.	Input connectors	10
4.	Output connections	6
5.	Communication protocol	RS-485

F. Each Serial Input Sub-Controller shall be powered by may be supplied with 12-24V DC at 3 amps. With a 12V DC 3A power supply the total power available for all external output shall be 1100mA (13 watts). IP Door Controllers shall have the following characteristics:

1.	General Input connectors	16
2.	Dedicated Input connectors	2
3.	Output connections	2
4.	Communication protocol	RS-485

G. Each Serial Output Sub-Controller shall be powered by may be supplied with 12-24V DC at 3 amps. With a 12V DC 3A power supply the total power available for all external output shall be 1100mA (13 watts). IP Door Controllers shall have the following characteristics:

1.	General Output connectors	16
2.	Input connections	2
3.	Communication protocol	RS-485

2.9 CREDENTIAL READERS

A. Provide as indicated or approved equivalent.

B. Wall Mounted Applications:
   1. HID SIGNO 40 Card Reader – Contactless, SmartCard Reader, black in color.
   2. Provide card reader backplate, engraved with Owner standard naming convention, black Lexan

C. Mullion Mounted Applications:
   1. HID SIGNO 20 Card Reader – Contactless, SmartCard Reader, black in color.
   2. Provide card reader backplate, engraved with Owner standard naming convention, black Lexan

D. Enrollment Reader:
   1. RF Ideas PCProx Plus Enrollment reader, black, USB. Programmed to work with Owner cards

E. Access Credentials:
   1. Provide two hundred (200) iCLASS® smart card. HID Product 200xiCLAS proximity cards.
   2. Card shall be able to print directly on face of card.

PART 3- EXECUTION

3.1 **INSTALLATION**

A. All wiring shall be in accordance with the National Electrical Code, Local Codes, and article 760 of NFPA Standard 70. All wiring sizes shall conform to recommendations of the equipment manufacturer, and as indicated on the engineered shop drawings.

B. All wire shall be UL Listed CL2 for limited energy (300V) applications and shall be installed in conduit. Limited energy MPP wire may be run open in return air ceiling plenums provided such wire is UL Listed for such applications and is of the low smoke producing fluorocarbon type and complies with NEC Article 760 if so approved by the local authority having jurisdiction.

C. No AC wiring or any other wiring shall be run in the same conduit as security alarm wiring.

D. All wire shall be installed in an approved conduit/raceway system (except where permitted by NEC and the local authority having jurisdiction). Maximum conduit "fill" shall not exceed 40% per NEC.

E. Minimum conduit size shall be 3/4" EMT. Install conduit per engineered shop drawings.

F. Systems utilizing open wiring techniques with low smoke plenum cable shall provide conduit in all inaccessible locations, inside concealed walls, all mechanical/electrical rooms, or other areas where wiring might be exposed or subject to damage.

G. All vertical wiring and all main trunk/riser wiring shall be installed in a complete raceway/conduit system. All riser boxes shall be adequately sized for the number of conductors transversing the respective box as well as the number of terminations required.

H. Network Connection Cable: Provide a 4 pair Category 6 data cable from the Master Control Panel to the MDF network rack. Category 6 cable shall be orange in color.

I. All plenum wiring is to be installed parallel and perpendicular to the building structure. Install wiring tight up against structure for protection. Cable shall be bundled on a maximum of 2'-6"

and secured to the structure at a maximum of 5' on center. Bundling and support shall be with plenum rated cable ties.

J. Contractor is required to provide all mapping and software configuration required to operate system as per manufacturer's recommendations.

2.10 WIRING

A. All Access control wiring shall be orange in color and a minimum of 18 AWG on the entire project.

B. Wire scheme and conductor quantity shall be as required by the manufactures specifications.

C. Contractor to provide and install shielded cable as required.

D. All 120v Power shall be furnished by the Division 26 contractor. In the event that a Division 26000 contractor is not contracted for the project, the system installing contractor shall contract a licensed electrical firm to provide and install all materials required to furnish a complete and operational system.

E. All Security Conduit as required for a complete installation of this system shall be furnished by the Division 26 contractor as part of their scope of work. In the event that a Division 26 contractor is not contracted for the project, the system installing contractor shall provide and install all conduit required.

F. Coordination with the Division 26 contractor is the responsibility of the Security Contractor to ensure all conduit is in place for a complete installation.

G. All systems shall be connected to a dedicated circuit and on an emergency power source if available.

Approved Products:

1. Access control, plenum, composite cable – 18/6 shielded, 18/4, 18/2, Belden, Southwire, General Cable or approved equivalent.

2. All cable shall bear the name of the approved manufacturer. NO PRIVATE LABELED CABLE WILL BE ACCEPTED.

3.2 CABLE INSTALLATION

A. Cable Support:

1. All wire not installed inside conduit or a designated cable tray system shall be installed in a dedicated cable support system for the entire run of each cable. Including, but not limited to service loops.
   a. Approved Cable Support Product:
      PANDUIT® Corporation J-MOD™ modular support system (sized appropriately for the number of wires being installed. Reference the manufacturer's specifications for the suggested maximum cables per support size.
2. The approved cable support system shall be attached directly to the building steel at a serviceable height. In the event that the building steel is not 5' of the finished ceiling, the contractor shall provide a dedicated threaded rod extending within 5' of the finished ceiling and mount the J-MOD™ support hook to the treaded rod.
3. J-MOD™ cable support shall be installed at a maximum of 5' on center.
4. All cable installed shall be attached to the J-MOD™ support system with plenum rated Velcro and a plenum rated Velcro tie shall be installed between each J-MOD™

cable support to keep wires neatly bundled throughout the entire run. Tiewraps will only be allowed to be used inside the control panels as required to manage the wires within each type of panel.

5. ABSOLUTELY NO CABLE, NOT INSTALLED IN CONDUIT, WILL BE ALLOWED TO BE ATTACHED DIRECTLY TO THE BUILDING'S STEEL OR SUPPORTED IN ANY OTHER METHOD THAN THAT STATED ABOVE.
6. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO COORDINATE WITH ALL OTHER TRADES ON THE PROJECT TO INSURE THAT THE PATHWAY OF THIS SYSTEM DOES NOT INTERFERE WITH THE INSTALLATION OF THE OTHER TRADES AND TO PREVENT THE INSTALLED PRODUCT OF OTHER TRADES FROM PUTTING STRAIN ON THE INSTALLED WIRING.

B. Conduit / Raceway:
1. All wire shall be installed in an approved conduit/raceway system (except where permitted by NEC and the local authority having jurisdiction). Maximum conduit "fill" shall not exceed 40% per NEC.
2. Conduit and raceway system shall be installed as specified under the general electrical section of the specifications, and per NEC.
3. Minimum conduit size shall be 3/4" EMT. Install conduit per engineered shop drawings.
4. Systems utilizing open wiring techniques with low smoke plenum cable shall provide conduit in all inaccessible locations, inside concealed walls, all mechanical/electrical rooms, or other areas where wiring might be exposed or subject to damage.
5. All conduit ends shall have a protective bushing to prevent cable damage. BUSHINGS MUST BE INSTALLED PRIOR TO INSTALLING CABLE. CUTTING BUSHING TO INSTALL AROUND INSTALLED CABLES WILL NOT BE ACCEPTED.
6. Provide all conduit required to install cable in non-accessible ceilings. Refer to architectural Reflective Ceiling Plan for locations.

3.3 TESTING

A. Submit a written test report from an authorized representative of the equipment manufacturer that the system has been 100% tested and approved. Final test shall be witnessed by Owner, Engineer, Electrical Contractor and performed by the equipment supplier. Final test report must be received and acknowledged by the Owner prior to substantial completion.

B. Provide instruction as to proper use and operation of system, for the Owner's designated personnel.

3.4 WARRANTY

A. Entire system shall be warranted against defects in materials and workmanship for a period of one (1) year from the date of substantial completion.

3.5 SOFTWARE

A. Provide two electronic copies of the final programming and program software to the Owner's Security Supervisor after final approval.

END OF SECTION

SECTION 28 16 00

INTRUSION DETECTION SYSTEM

CONDITIONS OF THE CONTRACT AND DIVISION 1, as applicable, apply to this Section.

PART 1 - GENERAL

1.1 RELATED WORK

A. All Division 26 at relates to this section.

1.2 WORK INCLUDED

The functional requirements define the field equipment, central monitoring system (CMS) and operational procedures for an integrated audio intrusion system.

Field equipment consists of a UL/ULC Listed field control unit (FCU) with the required audio sensors, glass break detectors, alarm contacts and arming device(s). Sounds of unauthorized entry and alarm loop violations are detected and transmitted to the CMS and monitoring console for operator action.

System control, to the extent of arming and disarming, is under the control of the occupant(s) of the protected facility with restrictions as imposed by the administration and enforced by the central station database and the central station operator.

System control at the protected premise will be accomplished through an intelligent keypad interface and/or access cards via the appropriate reader technology.

The central monitoring system is designed to receive, display, log and annunciate all actions and audible sounds transmitted from the protected premise.

The security system requires that the central processing system, control unit, and detection devices be designed and to be operated as an integrated security system.

1.10.1 The intrusion module (if used) shall be housed in either a standard UL Enclosure or a UL Attack-Rated Enclosure, as required, and shall comply with the limits set for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules. Control Panels and their corresponding Expansion Modules shall satisfy the requirements of the following:

- 1.10.1.1 UL 609; Local Burglary
- 1.10.1.2 UL 365; Police Connected Burglary
- 1.10.1.3 UL 294; Access Control Systems Units
- 1.10.1.4 UL1076; Proprietary Burglar Alarm Units and Systems
- 1.10.1.5 UL 1610; Central station Burglar Alarm Units
- 1.10.1.6 CAN/ULC-S304-06; Signal Receiving Centre and Premise Burglar Alarm Control Units, 2nd Edition
- 1.10.1.7 CAN/ULC-S303-M91; Local Burglar Alarm Units and Systems, 1st
- 1.10.1.8 ULC/ORDC1076-M1986; Proprietary Burglar Alarm Units and Systems, 1st Edition
- 1.10.1.9 CAN/ULC-S319-05; Electronic Access Control Systems, 1st Edition – Level 2

1.10.2 The Access Module shall comply with the limits set for a Class A computing device pursuant to Part 15 of FCC Rules, shall isolate earth ground from

signal ground, and shall be housed in either a standard UL Enclosure or a UL Attack-Rated Enclosure, as required.

1.10.3 The equipment shall comply with Part 68 of the FCC Telephone Requirements Rules.

1.10.4 All circuits and equipment shall be installed and protected according to the National Electric Code and any applicable local requirements.

1.10.5 To ensure data transmission consistency, CAT6 unshielded twisted pair cable or better as specified in EIA/TIA 568 Commercial Building Wiring Standard shall be used.

A. The system shall include intrusion detection at every access point of the buildings, including but not limited to doors, roof hatches, windows, and interior space motion detection. Card reader access interface must also be provided at locations noted.
   1. The Control System shall be the product of a single manufacturer.
   2. The system shall be portioned into multiple zones (two separate buildings, the kitchen area and other areas as directed by the Owner).
   3. Tag all conductors or cables at each end.
   4. Installation of security panels.
   5. Interconnection of security panels.
   6. Installation of new security devices.
   7. Full coverage of all windows, doors, roof hatches.
   8. Preconstruction meeting with Owner's personnel, installing technician and project superintendent.

B. The contractor shall connect this location to the district monitoring station as designated by the owner.

C. Contractor shall integrate the Intrusion Detection system with the Access Control system and the Video Surveillance system. Provide all cabling, connectors and Sonitrol interface devices as required. Coordinate with other trades. Provide all licenses required.

D. Contractor shall connect all back-up batteries per manufacturer's instructions.

E. Contractor shall use a step-bit drill bit to install flush mount door contacts. Do not use a hole saw.

1.3 CODES AND STANDARDS

The system shall comply with the applicable Codes and Standards as follows:

A. National Fire Protection Association Standards:
   1. NFPA 70 National Electric Code
   2. NFPA 72 National Fire Alarm Code
   3. NFPA 101 Life Safety Code

B. Local & State Building Codes

C. Requirements of Local Authorities having Jurisdiction

D. Underwriters Laboratory Requirements and Listings for use in Security Alarm Systems.

E. Requirements of American Disabilities Act (Public law 101-336).

F. State Fire Marshall.

1.4 QUALITY ASSURANCE

A. Contractor Qualifications:
   1. The installing contractor shall be the authorized representative of the Intrusion Detection system to sell, install, and service the proposed manufacturer's equipment. The installing contractor shall have represented the Intrusion Detection system manufacturer's product for at least two years.
   3. The installing contractor shall be licensed by the State of Texas as a security services contractor to design, sell, install, and service security alarm systems and access control system.
   4. The installing contractor shall provide 24-hour, 365 day per year emergency service with factory trained service technicians.
   5. The installing contractor shall have personnel on their staff that has been actively engaged in the business of designing, selling, installing, and servicing security alarm systems for at least ten (10) years.
   6. All Contractors must submit to the owner prior to starting any work the factory training certificates for all personnel that will be working on the Sonitrol System. No person is allowed to work on the Sonitrol system without proper manufacturer's certification.
   7. Contractor shall have at least 5 years of experience installing, servicing, and supporting Sonitrol Systems and have a local office within 75 miles of project site.

1.5 SUBMITTALS

A. The installing contractor and/or equipment supplier shall provide complete and detailed shop drawings and include:
   1. Control panel wiring and interconnection schematics.
   2. Complete point to point wiring diagrams.
   3. Riser diagrams.
   4. Complete floor plan drawings locating all system devices.
   5. Factory data sheets on each piece of equipment proposed.
   6. Detailed system operational description. Any specification differences and deviations shall be clearly noted and marked.
   7. Complete system bill of material.
   8. Line by line specification review stating compliance or deviation.

B. All submittal data will be in bound form with Contractor's name, supplier's name, project name, and state security license number adequately identified.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND INSTALLERS

A. Sonitrol
B. Authorized Sonitrol Distributor Contact:
   John Hessong
   Securitas Technology
   832.322.7167
   john.hessong@securitas.com

2.2 FIELD CONTROL UNIT (FCU)

A. The control communicator shall be Bosch model number B9512G with latest firmware upgrade. The unit shall be UL listed for commercial burglar alarm application and shall be FM approved.

1. The Intrusion Detection system shall be capable of being utilized as a combination Intrusion and Fire system per code. Fully integrated intrusion, access and fire functions allow users to interface with one system instead of three separate systems.
2. Integrated Telephone Line Interface with programmable options for signaling and supervision.
3. Conettix IP based communication option provides high-speed, secure alarm transport and control.
4. 32 programmable areas with perimeter and interior partitioning.
5. 8 on-board, class B hardwired points with expansion capability for a total of 246 wired or wireless points.
6. Compatibility with touch-screen color LCD, vacuum fluorescent, ATM style LCD or LED style Alarm Command Centers.
7. Local or remote programming, test, and diagnostic capability via a computer running the Remote Programming Software (RPS).
8. The system shall support the use of an Apple iOS device for control. Functions to include arming, disarming, control of outputs, lock, unlock, cycle and secure access doors.
9. Integrated real time clock, calendar, test timer and programmable scheduling capability for relay control and automatic execution of system functions based on a time / event.
10. Provide 1.4 amps of power for standby operation and 2 amps of alarm power, both rated at 12 VDC.
11. 2 wet-contact relay outputs and 1 Auxiliary wet-contact relay output with expansion capability for up to an additional 128 dry-contact relay outputs.
12. Integrated battery charger with reverse hook up protection, battery supervision and battery deep discharge protection.
    Supervision of peripheral devices and communications interface(s).

B. Programmable features shall include:
1. Independently control zones through an independent zone control keypad.
2. Two telephone number dial up for primary and secondary remote receivers.
3. Automatic test reports.
4. Selective zone shunting.
5. Custom text on the associated command centers.

C. Zone Expansion - Expanded to 246 individually annunciated points of protection through the addition of a two-wire multiplex zone expansion system (ZONEX). Points of protection are annunciated with custom text at the D1255B Alpha Command Center and they can be reported to a Bosch Connettix D6600 Receiver/Gateway.

D. User Pass Codes – Nine Hundred nighty-nine (999) user pass codes shall be available to identify the user when arming/disarming the system.

E. Protective Circuits shall consist of zones designed for fire and/or panic (holdup, duress, or emergency) and/or burglary and/or supervisory. Each zone represents a protective circuit and shall accommodate normally opened and closed devices with end-of-line resistor supervision. Each of the 246 points are programmable as to whether they are controlled versus 24 hours; interior versus perimeter; instant versus delayed; silent versus audible (and if audible, pulsed, or steady); and local or reporting.
1. Additional programmable parameters for each point include the ability to suppress trouble or restoral reports, designate it as a priority zone (system cannot be armed if this point is off-normal), report two separate telephone numbers and provide for automatic shunting of points from the system in the event that the detection device malfunctions and creates numerous false alarms.
2. Each POPIT shall accommodate normally opened and normally closed devices with end-of-line resistor supervisor.

3. Minimum total points, 248.

F. Entry/exit delays shall be independently programmable from 10 to 150 seconds. A pre-warn audible shall be coincident with the entry delay.

G. Programming of all system functions shall be achievable at system site or remotely via the use of the dial-up telephone network. Minimum programmable functions shall include:
1. User pass codes, entry/exit delay times, master zone personality, day/date/time, telephone numbers, point of protection text labels, and bell time.
2. A programmable system pass code shall be used to prevent unauthorized remote programming attempts.
3. Remote programming capability shall be automatic or require user enabling at the discretion of the user.

H. Remote control via the use of the dial-up telephone and owners local area network shall include:
1. System arming.
2. Reset of audible signals.
3. Activation/deactivation of relay contacts.
4. Interrogation of battery.
5. Zone and armed status.
6. Enable/disable of reporting functions and removing reporting devices for servicing while the remainder of the system is operative.

I. Recognitions shall include UL for central station fire and/or burglary, local burglary and/or fire; FM for fire, California Fire Marshal for fire; and NYBSA for fire.

J. Miscellaneous built-in features shall include:
1. Real-time clock.
2. Interrogator.
3. Auto-answer modem.
4. Phone line monitor.
5. Loop start/ground start telephone interface.
6. Auto bell test.
7. Lug-in terminal strips, and user-controlled zone bypass.

K. Command center (arm/disarm keypad) shall be microprocessor-based, UL listed, with built in: Model B930 ATM Style Alphanumeric Keypad (SDI2)
1. Provide clear, polycarbonate cover at each location.

L. Modules and Accessories
1. ZONEX (Zone Expansion D8125, D8126)
2. D8132 Battery charger module
3. D8103 Universal enclosure
4. D8129 Octo-Relay module - provides eight form "C" dry contact relay outputs for a variety of programmable responses to alarm, trouble, and other system conditions. They shall be automatically operated through schedules.
5. Auxiliary power supplies as required for powering of motion detectors.
6. DX4020 Network Interface module 1ea required.
7. D928 Dual Phone Line switcher.

M. Contractor shall provide the following devices for attic stock for the Intrusion Detection System that is installed. Contractor shall confirm and Coordinate manufacturer and model number of equipment installed:
1. 1 qty. Sonitrol FCU
2. 3 qty. Sonitrol Arm/Disarm Keypad

2.3 FIELD DEVICES

A. Ceiling mounted, 360-degree dual technology, infrared sensors/microwave motion sensors. Model DS9370
   1. Bracket for direct mounting to standard 3-1/2" and 4" electrical backboxes.
   2. All units to have areas of coverage, which would cause false alarm signals to be generated, masked out and adjusted to reduce false signals.
   3. Contractor to provide a dedicated POPIT for each motion detector on the project.

B. Wall mounted, high performance, TriTech PIR/Microwave sensor, Model DS970.
   1. Low Profile Bracket for directional mounting to standard 3-1/2" and 4" electrical backboxes.
   2. All units to have areas of coverage, which would cause false alarm signals to be generated, masked out and adjusted to reduce false signals.
   3. Provide in gymnasiums/cafeteria wall mounted areas. Provide protective wire cover in gymnasium areas.
   4. Contractor to provide a dedicated POPIT for each motion detector on the project.

C. Magnetic Door/Hatch Contacts
   1. Where exposed contacts are used, they shall be heavy duty switches protected by die cast aluminum housing. The contact leads shall be encased in steel armor jacket.
   2. Provide magnetic door contacts on all exterior doors and all roof hatches.
   3. Recessed Steel Door Contacts shall be 1" in diameter, double pole-double throw, white in color. Interlogix Product No. 1076D-N Door Contacts.
   4. Surface Mount Steel Door Contacts shall be Aluminum Housing Armored Cable Contact, DPDT, Wide Gap, 1 1/2" Gap Size, Double Pole-Double Throw. Interlogix Product No. 2507AD-L.
   5. Overhead Door Contacts shall be Sentrol 2300 Series Panel Door magnetic contacts, Single Pole-Double Throw, with 2' stainless steel armored cable. Interlogix Product No. 2317A
   6. Contractor to provide a dedicated POPIT for each motion detector on the project.

D. Glass Break Detector
   1. Bracket for direct mounting to standard 3-1/2" and 4" electrical backboxes.
   2. Protective wire cage as required in areas where damage to detectors is possible such as athletic corridors, gymnasiums, activity centers, kitchens, etc.
   3. GE Solution 2000.

2.4 WIRING

A. All wiring shall be per the manufacture's specifications. All cable shall be shielded as required.

B. All 120v Power shall be furnished by the Division 26 contractor.

C. All Security Conduit as show on the drawings shall be furnished by the Division 26 contractor as part of there scope of work.

D. Coordination with the Division 26 contractor is the responsibility of the Security Contractor to ensure all conduit is in place for a complete installation.

E. All systems shall be connected to an emergency power source as available.

F. Color code of all security intrusion detection system and access control wiring shall be purple in color.

Approved Products:

1. 18/2 unshielded:
   Belden #6300UE 0071000
   Tappan Wire & Cable, Inc. #P40020.122
2. 18/4 unshielded:
   Belden #6302UE 0071000
   Tappan Wire & Cable, Inc. #P41387.28
3. Provide 18/6 cable as required: Belden or Tappan.
4. Other cable types as required by manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All wiring shall be in accordance with the National Electrical Code, Local Codes, and article 760 of NFPA Standard 70. All wiring sizes shall conform to recommendations of the equipment manufacturer, and as indicated on the engineered shop drawings.

B. All wire shall be UL Listed CL2 for limited energy (300V) applications and shall be installed in conduit. Limited energy MPP wire may be run open in return air ceiling plenums provided such wire is UL Listed for such applications and is of the low smoke producing fluorocarbon type and complies with NEC Article 760 if so approved by the local authority having jurisdiction.

C. No AC wiring or any other wiring shall be run in the same conduit as security alarm wiring.

D. All wire shall be installed in an approved conduit/raceway system (except where permitted by NEC and the local authority having jurisdiction). Maximum conduit "fill" shall not exceed 40% per NEC.

E. Minimum conduit size shall be 3/4" EMT. Install conduit per engineered shop drawings.

F. Systems utilizing open wiring techniques with low smoke plenum cable shall provide conduit in all inaccessible locations, inside concealed walls, all mechanical/electrical rooms, or other areas where wiring might be exposed or subject to damage.

G. All vertical wiring and all main trunk/riser wiring shall be installed in a complete raceway/conduit system. All riser boxes shall be adequately sized for the number of conductors transversing the respective box as well as the number of terminations required.

H. Telephone Cable: Provide a 4 pair Category 6 telephone cable from the Master Control Panel to the Telephone Equipment Room.

I. Integrate the security system to the remote monitoring station. Provide all hardware and cabling as required. Coordinate with Owner for approved remote monitoring service.

J. All keypads and sirens shall have dedicated wiring homeruns from each keypad or siren back to panel. Do not daisy chain keypads or sirens.

K. Contractor shall install communication wire from freezer/cooler control panels to burglar alarm panel to notify panel should freezer/cooler encounter high temperature condition. Coordinate programming and final terminations with Owner.

3.2 CABLE PATHWAYS

A. Cable Support:

1. All wire not installed inside conduit or a designated cable tray system shall be installed in a dedicated cable support system for the entire run of each cable. Including, but not limited to service loops.
   a. Approved Cable Support Product:
      PANDUIT® Corporation J-MOD™ modular support system (sized appropriately for the number of wires being installed. Reference the manufacturer's specifications for the suggested maximum cables per support size.()
2. The approved cable support system shall be attached directly to the building steel at a serviceable height. In the event that the building steel is not 5' of the finished ceiling, the contractor shall provide a dedicated threaded rod extending within 5' of the finished ceiling and mount the J-MOD™ support hook to the treaded rod.
3. J-MOD™ cable support shall be installed at a maximum of 5' on center.
4. All cable installed shall be attached to the J-MOD™ support system with plenum rated Velcro and a plenum rated Velcro tie shall be installed between each J-MOD™ cable support to keep wires neatly bundled throughout the entire run. Tie wraps will only be allowed to be used inside the fire alarm panels as required to manage the wires within each type of panel.
5. **ABSOLUTELY NO CABLE, NOT INSTALLED IN CONDUIT, WILL BE ALLOWED TO BE ATTACHED DIRECTLY TO THE BUILDING'S STEEL OR SUPPORTED IN ANY OTHER METHOD THAN THAT STATED ABOVE.**
6. **IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO COORDINATE WITH ALL OTHER TRADES ON THE PROJECT TO INSURE THAT THE PATHWAY OF THIS SYSTEM DOES NOT INTERFERE WITH THE INSTALLATION OF THE OTHER TRADES AND TO PREVENT THE INSTALLED PRODUCT OF OTHER TRADES FROM PUTTING STRAIN ON THE INSTALLED WIRING.**

B. Conduit / Raceway:
1. All wire shall be installed in an approved conduit/raceway system (except where permitted by NEC and the local authority having jurisdiction). Maximum conduit "fill" shall not exceed 40% per NEC.
2. Conduit and raceway system shall be installed as specified under the general electrical section of the specifications, and per NEC.
3. Minimum conduit size shall be 3/4" EMT. Install conduit per engineered shop drawings.
4. Systems utilizing open wiring techniques with low smoke plenum cable shall provide conduit in all inaccessible locations, inside concealed walls, all mechanical/electrical rooms, or other areas where wiring might be exposed or subject to damage.

3.3 SYSTEM OPERATION

A. When an alarm condition is detected by any of the alarm initiating devices, the following functions shall occur:
1. The system keypad's interior audible device shall sound until silenced by using proper security code or after system time out.
2. A custom system alarm message shall be displayed on the LCD display. This display will show the alarm device location in plain English. Location and partition custom messages shall be field programmable.
3. The remote signaling tie connection shall be activated at the Owner's approved central security monitoring location and/or other Owner designated location.
4. Printer shall provide printed copy of events recorded in logger. Install adjacent to security panel.

3.4 SYSTEM ZONING AND PARTITIONING

A. The system shall employ intelligent initiating devices and interface devices capable of being recognized and enunciated at the main system keypad and devices partition keypad.

B. All zoning/device locations shall be field programmable.

3.5 TESTING

A. Submit a written test report from an authorized representative of the equipment manufacturer that the system has been 100% tested and approved. Final test shall be witnessed by Owner, Engineer, Electrical Contractor and performed by the equipment supplier. Final test report must be received and acknowledged by the Owner prior to substantial completion.

3.6 TRAINING

A. Provide a minimum of four hours of instruction as to proper use and operation of system, for the Owner's designated personnel.

3.7 WARRANTY

A. Entire system shall be warranted against defects in materials and workmanship for a period of one (1) year from the date of substantial completion.

3.8 SOFTWARE

A. Provide two electronic copies of the final programming and digital copies of the program software to the Owner's Security Supervisor after final approval.

END OF SECTION

SECTION 28 23 00

LOCAL VIDEO MANAGEMENT SYSTEM

PART1 GENERAL

1.1. SECTION INCLUDES

A. Video Management Systems:
   1. Server application.
   2. Desktop application.

B. Network video recorders.

C. Accessory products.

1.2. RELATED SECTIONS

A. Division 23 – Heating, Ventilating, and Air Conditioning

B. Division 26 – Electrical

C. Division 27 – Communications

1.3. REFERENCES

A. Code of Federal Regulations (CFR).

B. Institute of Electrical and Electronics Engineers (IEEE):
   1. 802.3 Ethernet Standards.

C. International Electrotechnical Commission (IEC).

D. International Organization for Standardization (ISO):
   1. ISO / IEC 10918 - Information technology - Digital compression and coding of continuous-tone still images: Requirements and guidelines; JPEG.
   2. ISO / IEC 14496-10 - Information Technology - Coding Of Audio-Visual Objects - Part 10: Advanced Video Coding; MPEG-4 Part 10 (ITU H.264).
   3. ISO / IEC 23008-2 - High Efficiency Coding And Media Delivery In Heterogeneous Environments - Part 2: High Efficiency Video Coding; MPEG-H Part 2 (ITU H.265, HEVC).

E. European Standard (EN):
   1. EN 50121 - Railway Applications. Electromagnetic Compatibility.
   2. EN 50155 - Railway applications - Rolling stock - Electronic equipment.
   3. EN 50130-4 - Alarm Systems. Electromagnetic Compatibility. Product Family Standard: Immunity Requirements For Components Of Fire, Intruder, Hold Up, CCTV, Access Control And Social Alarm Systems.
   4. CE EN 50581 - Technical Documentation For The Assessment Of Electrical And Electronic Products With Respect To The Restriction Of Hazardous Substances.
   5. EN 55022 Class A - Information Technology Equipment - Radio Disturbance Characteristics - Limits And Methods Of Measurement.
   6. EN 61000-3-2-A2 - Electromagnetic Compatibility (EMC) - Part 3-2: Limits - Limits For Harmonic Current Emissions (Equipment Input Current: 16 A Per Phase).
   7. EN 61000-3-3 - Electromagnetic Compatibility (EMC) - Part 3-3: Limits - Limitation Of Voltage Changes, Voltage Fluctuations And Flicker In Public Low-Voltage Supply Systems, For Equipment With Rated Current less than or equal to 16 A Per Phase And Not Subject To Conditional Connection.

F. European Union Safety Standards (CE).

G. Federal Communications Commission (FCC):
   1. FCC Rules and Regulation of Title 47 of CFR Part 15 Subpart B Class A.

H. Open Network Video Interface Forum (ONVIF):
   1. ONVIF - Profiles G, S, T Specification.

I. Underwriters Laboratories (UL):
   1. UL listed.

J. United States Military Standard (MIL-STD):
   1. MIL-STD-810F - Environmental Engineering Considerations and Laboratory Tests.

K. National Defense Authorization Act (NDAA)

1.4. SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Solution Proposal: System Integrator shall submit the Solution Proposal.

C. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Manufacturer's printed or electronic data sheets.
   2. Manufacturer's installation and operation manuals.
   3. Warranty documentation.

D. Shop Drawings: Include details of construction, interface of equipment, and relationship with adjacent construction.

1.5. QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5-year experience manufacturing similar products.

B. System Integrator shall provide the following as part of the System Solution:
   1. Complete product and technical data specification sheets that include all material and equipment and shall be available freely online.
   2. List of all equipment with part numbers, manufacturer, firmware, and assigned IP addresses.
   3. Locations and details for all components to be installed under this scope of work.
   4. Placement Diagram showing the proposed location of all system hardware devices.
   5. System Calculation of all network bandwidth and storage requirements for System Servers to ensure proper planning of computing and networking infrastructure.

C. Installer Qualifications: Minimum 2-year experience installing similar products. Installers shall be trained and authorized by the Manufacturer to install, integrate, test, and commission the system.

1.6. PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.7. DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handling: Handle materials to avoid damage.

1.8. PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits

recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9. SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.10. WARRANTY

A. The security system VMS software and labor furnished by the System Integrator including wiring, software, hardware and third party products shall be fully warranted for parts, materials and labor for a minimum of 1 year from date of the final acceptance of the Video Surveillance System.

B. Manufacturer shall provide a limited 3-year warranty for the product to be free of defects in material and workmanship.

C. Software Licensing and Warranty:
1. Software licensing should be on a per device basis (e.g. 1 x license per each 1 IP Camera or I/O device) with no base license for additional features or capabilities.
2. The VMS Software should be completely free for live streaming or playback of offline media files (images, videos).
3. Lifetime software upgrades shall be provided by the Manufacturer without cost and without the need for an annual maintenance agreement.

PART2 PRODUCTS

2.1. MANUFACTURERS

A. Acceptable Manufacturer: Hanwha Vision, which is located at: 500 Frank W. Burr Blvd.; Teaneck, NJ 07666; 877-213-1222; Hanwha Vision - Innovative Video Surveillance Systems (hanwhavisionamerica.com)

2.2. VIDEO MANAGEMENT SYSTEMS (VMS)

A. Video Management System (VMS)
1. Software: Wave v5 as manufactured by Hanwha Vision America.
2. System Requirements:
   a. Open video platform designed for use in any video application.
   b. Specified Software: To include, free of charge, any API or SDKs necessary to integrate third party devices and systems.
   c. Specified Video Management Solution's Architecture: To include Desktop, Media Server, Mobile, and Cloud applications.
3. Software Components Characteristics: Four applications working seamlessly together.
   a. Cloud Application: Enables simple remote connectivity, viewing, and management of an unlimited number of systems and users.
   b. Media Server Application: Responsible for discovering, connecting to, and managing system users, devices, and associated data.
   c. Desktop Application: Capable of acting as a stand-alone media player or as a client application for connecting to and managing systems.
   d. Mobile Application: For iOS and Android devices that allows users to connect to, view, search, and control IP cameras over Wifi or Data networks.
4. Built-In Developer and Integration Tools: Accessible from System Server's Web Admin Interface (compatible with all major browsers).
   a. Server API: SUNAPI implementation giving developers the ability to access every system feature available.
   b. API Change Log: List of breaking changes in API from version to version.
   c. Video Source Integration SDK: Integrate virtually any live or recorded video source (IP Cameras, NVRs, DVRs, etc.) into the VMS with methods for discovering, displaying,

analyzing and recording video, as well as integrating device I/O ports and related motion detection information.

d. Metadata SDK – An SDK designed for rapidly integrating object-driven video analytics from 3rd party software or hardware to pull in object coordinates and associated metadata, as well as generate events and context actions in Desktop client UI.

5. System Architecture:
   a. Server Hive Architecture:
      1) System servers are equal synchronizing system databases in real-time.
      2) Users can connect to any system server to see and manage entire system.
      3) Servers support automatic camera failover ensuring limited loss of video recording in event of hardware or network failure.
   b. One-click System Wide Updates:
      1) System Administrators Capabilities:
         a) Upgrade entire system via single button in Desktop Application.
         b) Upgrade on demand to latest release or specific builds with specific functionality or bug fixes.
   c. Use secure technologies for inter-application communication and security.
      1) Email Server: Client (Mobile, Desktop, Web) Communications - HTTPS Email - TLS / SSL - TLS; default option.
      2) Salted/Hashed Passwords: Local credentials protected using a salted MD5 hash, cloud credentials should use a complex multi-level hash.
   d. The VMS will not require any licenses to increase the number of supported devices, users, or servers.

B. VMS Server Application:
   1. Runs on the Following Operating Systems:
      a. Microsoft:
         1) Windows 10 Professional, Windows 10 IOT Enterprise LTSC 2021
         2) Windows Server 2022
         3) Ubuntu 22.04
   2. Minimum Compatible Computing Hardware:
      a. Any hardware able to run a compatible operating system.
      b. Capable of recording 128 dual-streaming IP cameras (256 streams) on a single core of an Intel Core i5 processor.
   3. Performance:
      a. Automatically discover, stream, and record any ONVIF Profile S IP camera located on same subnet as server application.
      b. Manually discover, stream, and record RTSP, HTTP, or UDP (multicast, unicast) streams.
      c. Automatic camera failover without any additional licenses.
      d. Unlimited number of users and custom user roles.
      e. User Login Credential Management: LDAP / Active Directory / Open LDAP integration.
      f. Record and Stream
         1) Video: H.264, H.265, and MJPEG.
         2) Audio: AAC, PCM (Mu-Law, A-law), g726, and MP3.
      g. Transcode Streams on Demand: For delivery to 3rd party system devices.
         1) Codecs: H.265, H.264, MJPEG or WebM.
      h. Pass-through high-res or low-res HLS streams from connected devices.
      i. Support Addressing: IPv4 or IPv6.
      j. Operator ability to change size of reserved disk space for storage drives.
      k. Concurrent recording of all connected cameras / streams to two servers in real-time.
      l. Server-side, CPU-based motion analysis for all connected IP cameras with no perceptible increase, less than 3 percent, in CPU usage.

C. VMS Desktop Application:
   1. Runs on the Following Operating Systems:

a. Microsoft:
    1) Windows 11
    2) Windows 10 IOT Enterprise Solutions LTSC 2021
    3) Windows Server 2022
b. Apple / Mac.
    1) OSX 10.12: Sierra.
    2) OSX 10.13: High Sierra.
    3) OSX 10.14: Mojave.

2. Minimum Compatible Computing Hardware:
    1) Any hardware able to run a compatible operating system with a CPU that supports OpenGL 2.1 and Intel HD Graphics 3000 (or higher).
    b. Will not require any dedicated graphics drive to work at full capacity; 64 streams on a 64-bit OS, 24 streams on a 32-bit OS, and use the CPU for all video decoding and rendering.
3. Performance and Basis Structure:
    a. Navigation Panel: Main menu button, an interactive cloud-login icon, tabbed layouts, minimize and maximize icons, a contextual help icon, and a close application icon.
    b. Resource Panel (Left): Contains all system resources (Servers, Devices, Users, Layouts, Offline files, etc.) with collapsible structure and a keyword search mechanism to allow operators to quickly search for a display live streams / cameras, offline video and image files, or any combination thereof.
    c. Notifications Panel (Right): Shows all system or rules-engine generated notifications which can be clicked on to display relevant resource in the viewing grid.
    d. Timeline Panel (Bottom): Allows for navigation and search of recorded video files.
    e. Viewing Grid (Main Viewing Area): A flexible adaptive grid interface which allows operators to create and share customized layouts of system resources.
    f. Notifications Panel (Right) - shows all system or rules-engine generated notifications which can be clicked on to display the relevant resource in the Viewing Grid as well as Motion Events, Bookmarks, System Alerts, and Detected Objects with the ability to launch an Advanced Object Search dialog.
    g. Advanced Object Search Dialog- the VMS should allow operators to search for detected objects by type and attributes.
4. Operation: Allow operators to do the following.
    a. Scroll to and zoom in on any zone of viewing grid.
    b. Drag and drop to reassign cameras from one server to another server.
    c. Via a flexible timeline, view dates of any and all archived video in the System for a specific camera, or groups of cameras.
    d. Manually Create Bookmarks: With start time, end time, name, description, and tags, for later search. Bookmarks must also be able to be created using the Rules engine.
    e. Execute a Smart Motion Search: By selecting a subset of a live camera stream with results shown in red on the flexible timeline. Smart Motion search should be able to search a year (12 months, 365 days) of archived video in less than one second.
    f. Search video archives by date and time with a responsive, adaptive timeline.
    g. View, Search and Export All system events, System bookmarks, System logs and Audit trail of operator actions and replay related video.
    h. Create and share lockable layouts.
    i. Modify and save a shared layout to affect an instantaneous change to that layout on the VMS Desktop application of any user connected to the system viewing that layout (when the system administrator saves the layout the layout will update in real time for any user viewing that layout).
    j. Support two-way audio between operators and supported devices.
    k. Support audio alerts as an action that can be played on users' computers or connected system devices.
    l. Force open an alarm layout triggered by any system or 3rd party event with one or many associated cameras or resources.
    m. Force users to set the camera's initial password upon enrollment for best cyber security practices.

2.3. NETWORK VIDEO APPLIANCES

A. Selection Guide for Network Video Appliance (Recorder) NVA Storage requirements shall be based on camera counts, resolution of cameras, FPS of cameras, retention period, as defined by End User. Contact manufacturer for assistance for calculating storage minimums for each deployment site location. The following WAVE Servers are approved for deployment.

B. Rackmount NVA – (2RU) Rack Unit
   1. Model: WRR-P-S204W-xxxTB – Windows 10 IOT Enterprise LTSC 2021
   2. General Description:
      a. The Network Video Appliance ("Recording Server") shall be an enterprise class 2RU rack-mount server providing storage scalability up to 240 TB (RAW) with WAVE pre-installed with 4 Professional licenses
      b. Record Video and Audio: 470 Mbps bandwidth
      c. The Manufacturer shall certify that the Recording Server has been designed and built for the purpose of recording surveillance video.
      d. The Recording Server shall provide the capability for remote management, disaster recovery, and critical resource management.
      e. The Recording Server shall have dual dedicated operating system drives to facilitate accelerated boot and application load times.
      f. The Recording Server shall have redundant, hot-swappable, storage drives, cooling fans, and power supplies.
      g. Video Storage
         1) Hard Drive Bays - Number: 12 Front Hot Swappable Front mounted drives size 3.5", Capacity 16 TB and 20TB per drive, Speed: 7200 rpm
      h. Pre-configured with WAVE VMS.
         1) Preloaded with four professional licenses ensuring quick and easy development minimizing setup time.
         2) Remote monitoring environment for video and audio over network using a remote computer.
      i. System:
         1) Processor: Intel® Xeon® Silver 4210 Scalable Processor.
         2) Memory: 16 GB DDR4
         3) Operating Systems: Windows 10 Pro, Server 2016 or Ubuntu 18.04
         4) OS Drive: 2 x 240GB Raid 1 SSD internally mounted.
         5) Dedicated GPU
      j. Network:
         1) Ports 4 x 1GbE RJ45
         2) Remote Management: via dedicated iDRAC port (Front: Micro-AB USB, Rear: RJ45)
         3) Additional Ports - Video output: VGA (1), 2. USB: (2) USB 3.0, Front (2) USB 2.0, Internal (1) USB 3.0
      k. RAID - Levels supported: RAID 0, 1, 5, 6, 10 (RAID 6 configured)
      l. Electrical:
         1) Power:100 to 240 VAC auto ranging
         2) Power Supply: 2 x 800W Redundant.
      m. Mechanical and Environmental:
         1) Keyboard and mouse included
         2) Color: Black / metal.
         3) Front Bezel and lock.
         4) Form Factor 2U Rack Mount Chassis. Sliding rails included.,
         5) Dimensions 19" (482.6mm) x 28.15" (646mm) x 3.4" (86.8mm)
         6) Weight: up to 73 lbs.
         7) Temperature; Operating and Storage: 50F – 95F degrees F
         8) Humidity: 5~90%, RH non-condensing.

C. UPS & ELECTRICAL SURGE PROTECTION

1. All Network Video Recorders & Appliances shall be connected to a properly load sized and configured Pure Sine Wave Power Conditioning UPS to prevent voltage fluctuations (increase or decrease) that can affect operation and cause damage to the equipment.
2. All Network Video Recorders & Appliances shall be connected to an electrical circuit that includes and protects against transient voltage surges.
3. All Network Camera to NVR Connections Shall incorporate an appropriate in line Surge Protection Device between exterior building locations and interior network switch or Network Recorder locations.
4. It is recommended that all UPS systems are sized to provide back-up power for a minimum of 20 minutes or owner stated guidance, with 20% growth capacity, to maintain Video System Operation during brief outages or generator activation and power cut over.

2.4. CLIENT WAVE WORKSTATION

A. Model: WWT-P-5403W WAVE Client Workstation supporting up to Four (4) attached monitors
1. The Workstation shall have a dedicated operating system drive to facilitate accelerated boot and application load times
   a. OS Drive – 1x 256GBSSD internally mounted with Operating System - Microsoft Windows 10 Pro
2. Video Storage - support to add additional 3.5" drive with capacity options for 1 TB, 2 TB, 4 TB, 8 TB, 10 TB, 12 TB, or 14 TB per drive at Speed of 7200 rpm
3. Processor: Qty 1 Intel® 9th Generation Core™ Processor, Intel® Core™ i7-9700, 3.0Ghz to 4.7Ghz (8 Cores, 8 Threads, 12MB) and 16 GB DDR4 RAM memory
4. Graphics Cards - NVIDIA® Quadro® P620 with 4x HDMI adapters
5. Network Controller 1. Ports: 1 x 1GbE RJ45
6. Additional Ports - Video output: Varies with GPU, (1) HDMI 2.0b, (1) DisplayPort 1.4 on motherboard, up to (4) DisplayPort 1.4 , USB: Front: (2) USB 3.1, (2) USB 2.0, Rear: (2) USB 3, (2) USB 2.0
7. Electrical - Power: 100–240 V AC, auto-ranging, Power Supplies: 200W 80 Plus Bronze
8. Mechanical - Dimensions (w x d x h): 3.7" (97mm) x 11.5" (292mm) x 11.4" (290mm)
9. Weight: 11.42 pounds (5.14 kg)
10. Environmental - Operating temperature: 50°F - 95° F (10°C - 35°C)

B. UPS & ELECTRICAL SURGE PROTECTION
1. All Client Workstations shall be connected to a properly sized Pure Sine Wave Power Conditioning UPS or circuit to prevent voltage fluctuations (increase or decrease) that can affect operation and cause damage to the equipment.
2. All Client Workstations shall be installed on an electrical circuit that incudes protection against transient voltage surges.
3. It is recommended that all UPS systems are sized to provide back-up power for a minimum of 20 minutes or owner stated guidance, with 20% growth capacity, to maintain Video System Operation during brief outages or generator activation and power cut over.

2.5. VMS SOFTWARE LICENSES

A. Model: WAVE-PRO-01,-04,-05,-08,-16,-24,-48 as manufactured by Hanwha Vision America
1. Description: WAVE camera license, Enables one IP stream recording per "-0x" license(s) purchased.
   a. Purchase sufficient quantity of WAVE licenses as needed to record the number of camera streams being added to a WAVE System
   b. Note: Cameras that used only for Live Patient Room Monitoring and will NOT be recorded, then WAVE licenses for these specific cameras are not necessary. However, proper sizing of the Recording Server is still required to support the cameras.

B. Model: WAVE-VW-02 as manufactured by Hanwha Vision America.
1. Description: WAVE, Video Wall License, Enables displaying video on up to two (2) additional monitors with remote control of video displayed on those monitors.

C. Model: WAVE-ENC-04 as manufactured by Hanwha Vision America
   1. Description: WAVE, 4 Channel Encoder License

D. Model: WAVE-IO-01 as manufactured by Hanwha Vision America
   1. Description: WAVE, I/O module license, Enables one (1) I/O module

2.6. ACCESSORIES

A. Accessory Products: Provide the following accessories to properly install and mount all cameras as required by the specific camera installation locations, as applicable to the system selected and as scheduled on the Drawings.
   1. Pendant Caps
   2. Corner Mount Brackets
   3. Wall Mount Brackets
   4. Recess Mount Kits
   5. Back box mounts
   6. 2x2 Ceiling Mounts
   7. Sun Shields
   8. Work Boxes
   9. Smoked dome covers.
   10. PTZ/Dome housings.
   11. PTZ/Dome mounts.
   12. HD CCTV accessories.
   13. Network camera POE injectors & accessories.
   14. UTP video devices.
   15. Monitor stands.
   16. Surge Protection
   17. UPS Battery Back Up
   18. UPS Circuits

PART3 EXECUTION

3.1. PREPARATION

A. System Integrator: Confirm the solution proposal planning and design with the installing contractor (if different company from integrator), to be in compliance with End User standards as described in this document, with any exception approved in writing by End User Security Administration.

B. The network design and configuration to be verified for compatibility and performance with the input/output devices.

C. Network Configuration: Tested and qualified by Systems Integrator prior to remote device installation.

D. Equipment to be tested and configured in accordance with instructions provided by the System Integrator prior to installation.

E. All firmware found in products to be the latest and most up-to-date provided by the manufacturer, or of a version as specified by the provider of the Video Management Application (VMA).

F. All equipment requiring users to log on using a password shall be configured with user/site-specific password/passwords. No system/product default passwords shall be allowed.

G. Confirm hardware will be stored in an environment where temperature and humidity are in the range specified by the Manufacturer.

3.2. INSTALLATION

A. Install products per manufacturer's recommendations and approved submittals.

1. Comply with manufacturer's installation and configuration documentation available to the System Integrator to insure all steps have been taken to provide a reliable, easy-to-operate system.
    a. System Integrator shall be a Hanwha Vision STEP Partner in good standing
    b. System Integrator shall provide Technicians that have completed, at minimum, Hanwha WAVE Online Technician Training program.
    c. STEP Partner shall be able to offer extended warranty were applicable.
2. Program and configure all products per the requirements of End User Standards and specific site requirements which shall include, at minimum, the following: (additional requirements may applicable, refer to End User Security Administration).
    a. All cameras and Network Recorders shall be programmed with End User provided IP addresses and password requirements, along with naming guidance as instructed by End User Security Administration.
    b. All Network Camera Recorders shall use the End User NTP (Network Time Protocol) designated server.
    c. All IP Cameras shall have the primary Video Stream programmed to send 15 FPS at 2MP, 5MP, 6MP, 4K (depending on camera model), using the H.265 Codec to stream to the Network Recorder for recording.
    d. All IP Cameras shall have the secondary Video Stream programmed to send 7FPS using H.265 codec to the Network Recorder for client display and non-motion detection recording if motion based alarm recording is implemented.
    e. All IP Cameras shall have a third Video Stream programmed to send 7 FPS at VGA (640x480) using H.264 to the Network Video Recorder for remote access via mobile device as needed.
    f. All indoor cameras shall have video motion detection zones configured and active and walk tested for sensitivity functionality for use during facility closed hours (if applicable to the facility).
    g. All outdoor cameras, if using motion detection, shall have objects such as trees or bushes that can move from the wind, to have motion detection masked off. Outdoor motion detection shall be used carefully for viewing areas considered stable (not plants) such as sidewalks, roads, buildings, doors, and the cameras shall have adequate artificial lighting provided or utilize camera IR light.
    h. All WAVE Client Workstations shall be configured to automatically connect to the designated Network Recorders upon launch of the WAVE Client application.
    i. WAVE Client Setup and Configuration
        1) All WAVE Clients shall be programmed to display cameras in various (End User defines) Pre-Configured and User selectable panes.
        2) All WAVE Clients shall have a designated Video Clip storage location as defined by End User standards.
        3) All WAVE Clients shall have End User designated users entered into the WAVE Client.
    j. Training – WAVE User Training may be required and is to be included if needed. Contact End User Security Administration for guidance,

B. System Integrator personnel must comply with all applicable state and local licensing requirements.

C. Before permanent installation of the system, the System Integrator will test the system in conditions simulating the final installed environment, which shall be witnessed by the Owner or Owner's Representative, and shall adjust the complete system as required until proper operation is achieved.
    1. System Integrator shall email a copy of the final approved Hanwha Device Manager Site Configuration File and Hanwha Device Manager to Security Management as part of the job completion process.

END OF SECTION

SECTION 28 23 01

IP VIDEO SURVEILLANCE CAMERAS

PART1 GENERAL

1.1. SECTION INCLUDES

A. IP security cameras.

B. Accessory products.

1.2. RELATED SECTIONS

A. Division 23 – Heating, Ventilating, and Air Conditioning

B. Division 26 – Electrical

C. Division 27 – Communications

1.3. REFERENCES

A. Code of Federal Regulations (CFR).

B. Institute of Electrical and Electronics Engineers (IEEE):
1. 802.3 Ethernet Standards.

C. International Electrotechnical Commission (IEC).

D. International Organization for Standardization (ISO):
1. ISO / IEC 10918 - Information technology - Digital compression and coding of continuous-tone still images: Requirements and guidelines; JPEG.
2. ISO / IEC 14496-10 - Information Technology - Coding Of Audio-Visual Objects - Part 10: Advanced Video Coding; MPEG-4 Part 10 (ITU H.264).
3. ISO / IEC 23008-2 - High Efficiency Coding And Media Delivery In Heterogeneous Environments - Part 2: High Efficiency Video Coding; MPEG-H Part 2 (ITU H.265, HEVC).

E. European Standard (EN):
1. EN 50121 - Railway Applications. Electromagnetic Compatibility.
2. EN 50155 - Railway applications - Rolling stock - Electronic equipment.
3. EN 50130-4 - Alarm Systems. Electromagnetic Compatibility. Product Family Standard: Immunity Requirements For Components Of Fire, Intruder, Hold Up, CCTV, Access Control And Social Alarm Systems.
4. CE EN 50581 - Technical Documentation For The Assessment Of Electrical And Electronic Products With Respect To The Restriction Of Hazardous Substances.
5. EN 55022 Class A - Information Technology Equipment - Radio Disturbance Characteristics - Limits And Methods Of Measurement.
6. EN 61000-3-2-A2 - Electromagnetic Compatibility (EMC) - Part 3-2: Limits - Limits For Harmonic Current Emissions (Equipment Input Current: 16 A Per Phase).
7. EN 61000-3-3 - Electromagnetic Compatibility (EMC) - Part 3-3: Limits - Limitation Of Voltage Changes, Voltage Fluctuations And Flicker In Public Low-Voltage Supply Systems, For Equipment With Rated Current less than or equal to 16 A Per Phase And Not Subject To Conditional Connection.

F. European Union Safety Standards (CE).

G. Federal Communications Commission (FCC):

1. FCC Rules and Regulation of Title 47 of CFR Part 15 Subpart B Class A.

H. Open Network Video Interface Forum (ONVIF):
1. ONVIF - Profiles G, S, T Specification.

I. Underwriters Laboratories (UL):
1. UL listed.

J. United States Military Standard (MIL-STD):
1. MIL-STD-810F - Environmental Engineering Considerations and Laboratory Tests.

1.4. SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Solution Proposal: System Integrator shall submit the Solution Proposal.

C. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Manufacturer's printed or electronic data sheets.
2. Manufacturer's installation and operation manuals.
3. Warranty documentation.

D. Shop Drawings: Include details of construction, interface of equipment, and relationship with adjacent construction.

1.5. QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5-year experience manufacturing similar products.

B. System Integrator shall provide the following as part of the System Solution:
1. Complete product and technical data specification sheets that include all material and equipment and shall be available freely online.
2. List of all equipment with part numbers, manufacturer, firmware, and assigned IP addresses.
3. Locations and details for all components to be installed under this scope of work.
4. Placement Diagram showing the proposed location of all system hardware devices.
5. System Calculation of all network bandwidth and storage requirements for System Servers to ensure proper planning of computing and networking infrastructure.

C. Installer Qualifications: Minimum 2-year experience installing similar products. Installers shall be trained and authorized by the Manufacturer to install, integrate, test, and commission the system.

1.6. PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.
1. Owner shall provide specific details.

1.7. DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handling: Handle materials to avoid damage.

1.8. PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9. SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.10. WARRANTY

A. Manufacturer shall provide a limited 3-year warranty for the product to be free of defects in material and workmanship.

PART2 PRODUCTS

2.1. MANUFACTURERS

A. Acceptable Manufacturer: Hanwha Vision America, which is located at: 500 Frank W. Burr Blvd.; Teaneck, NJ 07666; 877-213-1222; Hanwha Vision America (hanwhavisionamerica.com)

2.2. IP SECURITY CAMERAS

A. Camera Basis of Design
1. Brand Selection - All cameras provided to the owner shall be Hanwha Vision cameras or pre-approved equal
a. **TYPE I -** XNV-C6083R Powered by WN7
1) Outdoor Network AI IR Vandal Dome Camera, 2MP resolution @ 60FPS, 2.8~12mm(4.3x) (119.5°~27.9°) motorized varifocal lens, Triple codec (H.265/H.264/MJPEG), IR viewable length 40m (131.2ft), USB port for easy installation, Day & Night (ICR), extremeWDR (150dB), DIS with built-in Gyro sensor, Handover, Hard-coated dome bubble, Analytics events based on AI engine: Object detection(Person/Face/Vehicle/License plate), IVA (Virtual line/Area, Enter/Exit, Loitering, direction, intrusion), Analytics events : Defocus detection, Motion detection, Tampering, Fog detection, Audio detection, Sound classification, Shock detection, Appear/Disappear, P66, IP67, NEMA4X, IK10, Operating temperature: -40°C~+55°C(-40°F ~ +131°F), Power: PoE/12VDC, Metal shielded RJ-45

a. **TYPE I -** QNV-C6083R

1) Wisenet Q network outdoor vandal dome camera, 2MP @ 30fps, motorized vari-focal lens 3.2~10.2mm (H: 102.0°~32.2° / V: 54.2°~18.3°), triple codec H.265/H.264/MJPEG with Wisestream III (Based on AI engine), WiseNR II (Based on AI engine), WDR 120dB, IR viewable length 40m (131.23ft), Motion Detection based on AI engine, Classified object type: Person/Vehicle (vehicle type: car/bus/truck/motorcycle/bicycle); IVA events based on AI engine: Virtual line (Crossing/Direction), Virtual area (Loitering/Intrusion/Enter/Exit/(Dis)Appear), *Audio: Selectable(mic in/line in), defocus detection, hallway View, SD card 256GB x 1, video analytics, USB for easy installation, open platform, IP66, IK10, PoE, Operating temperature -40°C~+55°C(-40°F ~ +131°F) white color. * HDMI out supported through an optional cable (SPP-C1900) * Alarm I/O and audio is supported through an optional cable (SPP-C7400)

b. **TYPE II -** PNM-7082RVD
1) Network vandal outdoor 2CH IR dome camera, (2MP X 2 sensors) @ 30fps, 3~6mm(2x) (107°~56.3°) motorized varifocal lens, Triple codec (H.265/H.264/MJPEG), IR viewable length 25m (82ft), USB port for easy installation, Day & Night (ICR), extremeWDR (150dB), DIS, Handover, IVA (Virtual line/Area, Enter/Exit, Loitering, direction, intrusion), Analytics events : Defocus detection, Directional detection, Motion detection, Appear/Disappear, Enter/Exit, Loitering, Tampering, Virtual line, Audio detection, Sound classification, FIPS 140-2, micro SD card 512GB, IP66, NEMA4X, IK10, Operating temperature: -40°C~+55°C(-40°F ~ +131°F), Power: PoE+, Metal shielded RJ-45, Hard-coated dome bubble

c. **TYPE III -** PNM-8082VT –

1) Triple 3x 2MP Camera for T-Hallways (3 views) Powered by WN7, 2MP x 3CH @ 30FPS, multi directional camera, 3~6mm motorized varifocal lens, donut shape bubble, max 321° coverage, Triple codec H.264/265 MJPEG, WiseStream II, extreme WDR 150dB, defocus detection, video analytics, 2x microSD card, PoE+, IP66, IK10, NEMA4X, operating temp -40°C~+55°C

d. **TYPE IV -** PNM-9085RQZ1 –

1) Quad 4x 5MP Camera Wisenet P series network vandal outdoor Multi-sensor Multi-Directional dome camera, 5MP x 4ch multi-directional camera, Motorized PTRZ support, Max. 30fps@5MP(H.265, H.264), 4.13~9.4mm(2.3x) motorized varifocal lens, IR viewable length: 30m, H.265, H.264, MJPEG with WiseStream II technology, 120dB WDR, defocus detection, built in analytics, true D/N, 4x SD card, hallway view, HLC, defog detection, Bi-Directional Audio, Alarm I/O 1/1, IP66, IK10, NEMA4X, -40°C ~ +55°C (-40°F ~ +131°F), White, DIS, HPoE Injector included

e. **TYPE V -** XNV-C8083R

1) Wisenet X powered by Wisenet 7 Outdoor Network AI IR Vandal Dome Camera, 6MP resolution @ 30FPS, 4.4~9.3mm(2.1x) (112.1°~47.5°) motorized varifocal lens, Triple codec (H.265/H.264/MJPEG), IR viewable length 40m (131.2ft), USB port for easy installation, Day & Night (ICR), extremeWDR (120dB), DIS with built-in Gyro sensor, Handover, Hard-coated dome bubble, Analytics events based on AI engine: Object detection(Person/Face/Vehicle/License plate), IVA (Virtual line/Area, Enter/Exit, Loitering, direction, intrusion), Analytics events : Defocus detection, Motion detection, Tampering, Fog detection, Audio detection, Sound classification, Shock detection, Appear/Disappear, P66, IP67, NEMA4X, IK10, Operating temperature: -40°C~+55°C(-40°F ~ +131°F), Power: PoE/12VDC, Metal shielded RJ-45

f. **TYPE VI -** PNM-C16013RVQ

1) Wisenet P series network vandal outdoor Multi-Directional camera 4CH x 4MP @ 30FPS, Fixed 3mm, triple codec H.265/H.264/MJPEG, 120dB WDR; IR viewable length [PoE+] 15m (49ft) / [HPoE] 20m (65ft), USB port for easy installation, Analytics events based on AI engine: Object detection [Person/Vehicle (Car/Bus/Truck/Motorcycle/Bicycle)], IVA (Virtual line/Area, Enter/Exit, Loitering, direction, intrusion), Appear/Disappear, WiseNR Ⅱ (using AI engine), WiseStream Ⅲ (Based on AI engine), I/O Box compatibility; TPM with FIPS 140-2 level2, micro SD card 512GB x2, IP66, IK10, NEMA4X, Operating Temperature: -40°C~+55°C(-40°F~+131°F); PoE+ /HPoE, Hard-coated dome bubble.

B. Minimum Camera Performance Requirements

1. Video Compression and Transmission: Cameras shall have the following properties relating to video signals they produce.
   a. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.
      1) H.265 and H.264: Maximum of 30 fps at all resolutions
      2) MJPEG: Maximum of 30 fps
   b. Video Stream Profiles: Able to configure 6~10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
   c. Video Streams: 10 independent stream types using unicast protocol.
      1) Multicast and unicast video streaming.
   d. DDNS Configurable: At no additional cost by manufacturer.
   e. Smart Codec: Dynamic GOV, and Dynamic FPS to efficiently manage bitrate of video stream.
2. Camera Physical and Performance Properties:
   a. Impact Protection: IK08~IK10 vandal resistance for indoor cameras
   b. IP66 rating minimum for Outdoor Cameras
   c. Resolution and FPS

1) 2MP camera imager sensors shall transmit full 1080P resolution (1920x1080) at a 30FPS using all Codecs (H.265/H.264/MJPEG) with no FPS reduction with the implementation of WDR and / or analytics in the camera.
2) 5MP camera imager sensors shall transmit full 2560x1920 resolution at a 30FPS using all Codecs (H.265/H.264/MJPEG) with no FPS reduction with the implementation of WDR and / or analytics in the camera.

d. Configurable privacy masking regions utilizing a 4-point polygon
e. Camera Models with IR Illumination True day and night operation with removable IR cut filter.
f. Digital Noise Reduction: 2D and 3D technology.
g. Cameras for viewing in darkness shall include Integral IR illumination, providing effective visibility of 65.62 ft (20 m) at 0 Lux when activated in black and White mode.

3. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
   a. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
   b. Logical Events Detection from Camera Video Input:
      1) Tampering (scene change).
      2) Defocus detection.
      3) Motion detection with metadata.
      4) Virtual Area Based Event:
         a) Enter or exit.
      5) Virtual Line Based Event:
         a) Directional detection.
         b) Crossing.
4. Interoperability: ONVIF Profile S, G and T compliant and SUNAPI API
5. Camera Characteristics:
   a. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome, and Safari.
   b. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
   c. Bi-directional audio.
   d. Alarms and Notifications supported:
   e. PoE capable.
6. Multi-Sensor Camera Additional Requirements
   a. Each Video Channel shall support individual enablement of intelligent analytics, WDR, and codec selection independent of the remaining video channels.
   b. Each Channel supports SD card.
   c. One single power supply for all multi-channels

C. UPS & ELECTRICAL SURGE PROTECTION
1. All Network Camera to NVR Connections Shall incorporate an appropriate in line network Surge Protection Device when the Network Camera is located on the exterior of a building and connecting network switch / Network Recorder on interior of building.
2. All Critical Operation Network Cameras shall be on a POE Switch attached to a Pure Sine Wave Power Conditioning UPS or UPS circuit that is sized for the specified required operational time. It is recommended that all UPS systems are sized to provide back-up power for a minimum of 20 minutes or owner stated guidance, with 20% growth capacity, to maintain Video System Operation during brief outages or generator activation and power cut over.

2.3. ACCESSORIES

A. Accessory Products: Provide the following accessories to properly install and mount all cameras as required by the specific camera installation locations, as applicable to the system selected and as scheduled on the Drawings.
1. Pendant Caps

2. Corner Mount Brackets
3. Wall Mount Brackets
4. Recess Mount Kits
5. Pole Mount Brackets
6. Back box mounts
7. 2x2 Ceiling Mounts
8. Sun Shields
9. Work Boxes
10. Smoked dome covers.
11. PTZ/Dome housings.
12. PTZ/Dome mounts.
13. HD CCTV accessories.
14. Network camera POE injectors & accessories.
15. UTP video devices.
16. Monitor stands.
17. Surge Protection
18. UPS Battery Back Up
19. UPS Circuits

PART3 EXECUTION

3.1. PREPARATION

A. System Integrator: Confirm the solution proposal planning and design with the installing contractor (if different company from integrator), to be in compliance with the owner's standards as described in this document, with any exception approved in writing.

B. The network design and configuration to be verified for compatibility and performance with the input/output devices.

C. Network Configuration: Tested and qualified by Systems Integrator prior to remote device installation.

D. Equipment to be tested and configured in accordance with instructions provided by the System Integrator prior to installation.

E. All firmware found in products to be the latest and most up-to-date provided by the manufacturer.

F. All equipment requiring users to log on using a password shall be configured with user/site-specific password/passwords. No system/product default passwords shall be allowed.

G. Confirm hardware will be stored in an environment where temperature and humidity are in the range specified by the Manufacturer.

3.2. INSTALLATION

A. Install products per manufacturer's recommendations and approved submittals.
   1. Comply with manufacturer's installation and configuration documentation available to the System Integrator to ensure all steps have been taken to provide a reliable, easy-to-operate system.
      a. System Integrator shall be a Hanwha Techwin (Silver or higher) STEP Partner in good standing with manufacturer.
      b. System Integrator shall provide Technicians that have completed, at minimum, Hanwha WAVE Online Technician Training program.
      c. STEP Partner shall be able to offer extended warranty were applicable.
   2. Program and configure all products per the requirements of the owner's Standards and specific site requirements which shall include, at minimum, the following: (additional requirements may applicable, refer to ISD/USD Security Administration for details).
      a. All cameras and Network Recorders shall be programmed with the owner's provided

IP addresses and password requirements, along with naming guidance as instructed by the owner.

b. All Network Camera Recorders shall use the owner's NTP (Network Time Protocol) designated server.

c. All IP Cameras shall have the primary Video Stream programmed to send 10 FPS at 2MP, 5MP, (depending on camera model), using the H.264/H.265 Codec to stream to the SKY Cloud Gateway for recording.

d. All indoor cameras shall have video motion detection zones configured and active and walk tested for sensitivity functionality for use during facility closed hours (if applicable to the facility).

e. All outdoor cameras, if using motion detection, shall have objects such as trees or bushes that can move from the wind, to have motion detection masked off. Outdoor motion detection shall be used carefully for viewing areas considered stable (not plants) such as sidewalks, roads, buildings, doors, and the cameras shall have adequate artificial lighting provided or utilize camera IR light.

f. Training – User Training may be required and is to be included as needed. Contact the owner's Security Administration for guidance.

B. System Integrator personnel must comply with all applicable state and local licensing requirements.

C. Prior to acceptance of installed system, the System Integrator will test the system in conditions simulating the final installed environment, which shall be witnessed by the Owner or Owner's Representative and shall adjust the complete system as required until proper operation is achieved.

1. System Integrator shall email a copy of the final approved Wisenet Device Manager Site Configuration File and Wisenet Device Manager Report to End User.

END OF SECTION

SECTION 28 31 00

FIRE DETECTION AND ALARM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:

1. Provide a complete, fully contained fully addressable Manual Fire Alarm System to include automatic detection, notification power supplies, control modules, control relays, input modules and notification appliances (strobe and horn strobe combination). The system shall be connected, tested, verified by AHJ to be acceptable and left in first class operating condition. All equipment herein specified shall be engineer-approved and California State Fire Marshal (CSFM) listed. The entire installation shall conform to the National Fire Protection Association (NFPA) Standard 72, 90A, 101 & CEC Article 760, CFC, CBC and authorities having jurisdiction as applicable. The system specified and depicted on the plan is a complete and approved system. The entire fire alarm system has been submitted and approved by the Authority Having Jurisdiction (AHJ) as a complete submittal. Any routing of the system wiring that is significantly different than shown on the approved drawings shall have the approval of the engineer and must be obtained prior to construction.
2. Provide all work and material as shown and / or required to provide a fully functional and adequate system as described hereon and as required by the California State Fire Marshal.
3. Supervision: The fire alarm system shall monitor the integrity of all alarm initiating and indicating appliance circuits and provide local and remote status of all connected systems. The system shall be provided with automatically charged standby batteries to maintain system operation for 24 HRS in the normal supervisory mode and 5 minutes of alarm. Batteries shall be supervised for connection to the system and low voltage threshold. The automatic battery charger shall be capable of charging fully discharged system batteries to 100% in 8 hours.
4. The system wiring and installation shall be as stated in drawings and as required by the manufacturer. All wiring shall be color coded, tagged and verified to assure that it is free from shorts and grounds and shall be rated for the appropriate environmental conditions such as well locations.
5. Testing: The completed system shall be tested in accordance with NFPA 72.
6. All Fire Alarm wiring shown in drawings shall be in conduit, surface raceway or open run above ceilings, under floors and in walls. Exposed circuits are only permitted when noted as exposed on design documents.
7. System Operation shall include:
   a. Separate zone signaling and device status indication for all initiating devices.
   b. Audible to sound the California uniform fire alarm signal in temporal mode. Devices shall be at least 15dBA above average ambient sound level, but not less than 75dBA at 10' or more than 120dBA.
   c. Visual devices shall not exceed 2 flashes per second and shall not be slower than 1 flash per second. Visual devices shall be synchronized when 3 or more devices are within the same field of view.
   d. Supervision of all circuits to indicate any abnormal wiring condition.
   e. N.O./N.C. integral relays for external device interface or as indicated on drawings.

f. Central station connection capable of indicating (3) distinct separate signals as being tamper, trouble and alarm with point reporting capabilities.

8. All work shall be completed as shown on the plans and or as specified within this specification and shall include the following (but is not limited to):
   a. Life safety fire alarm detection and signaling system.
   b. Furnishing and installation of equipment and devices.
   c. Conductors, connections and interconnections where specified and all in conduit system.
   d. Conduit, wire and connections for control of heating and ventilation motors, smoke dampers and smoke exhaust.
   e. Testing, cleaning and adjusting of completed work.
   f. Wiring diagrams, as-built drawings and three (3) sets of equipment operations and maintenance instructions for Owner.
   g. Complete maintenance for two years.
   h. Proposal for subsequent maintenance contract.
   i. All work and material for complete and operable systems as indicated or specified.
   j. Permits, inspections and fees.
   k. Identification and instruction to Owner Representative. Training shall consist of a minimum or two (2) 6-hour sessions.
9. Coordination with Section 26 05 33: Raceway and Boxes for Electrical Systems.
10. Furnishing of special back boxes where required for installation of fire alarm devices.
11. All conductors to be installed in conduit pursuant to Specification Section 26 05 33: Raceway and Boxes for Electrical Systems. *Where applicable. See section 1.2(6).
12. Qualifications: Contractor shall receive written approval and verified test results which shall be submitted to the owner for system from manufacturers recognized representative prior to completion and acceptance.
13. All initiating devices shall be separately addressed for individual identification at control panel.
14. As-Built Drawings: A complete set of reproducible "as-built" drawings showing installed wiring, color coding, wire tag notations exact locations of all installed equipment, specific interconnections between all equipment and internal wiring of the equipment shall be delivered to the owner upon completion of the system.
15. Maintenance Instructions: Three (3) submittals of maintenance instructions shall be provided and shall be complete, easy to read, understandable and shall provide the following information:
   a. Instructions for replacing any components of the system, including internal parts.
   b. Instructions for periodic cleaning and adjustments of equipment with a schedule of these functions.
   c. A complete list of all equipment and components with information as to the address and telephone number of both the manufacturer and local supplier of each item.
   d. User operating instructions shall be prominently displayed on a separate sheet located next to the control unit in accordance with UL Standard 864. The contractor shall warrant all equipment and wiring free from inherent mechanical and electrical defects for two years from the date of final acceptance.

B. Substitutions
   1. Substitution of system components or manufacturer is not approved at this time. The owner standard equipment is Silent Knight.
   2. Not used.

1.3 SUBMITTALS

A. Comply with applicable provisions of Section 26 05 00: Common Work Results for Electrical.

B. Product Data:

1. A complete list of all supplied equipment including model numbers with catalog data sheets on each component.
2. Data sheets show California State Fire Marshal Listing, U.L. listing, equipment ratings, dimensions and finishes.
3. Highlight actual devices to be used and their amp draw in stand-by and alarm modes.

C. Shop Drawings:
1. Provide schematic layout, floor plan, drawings indicating location of all components and equipment, required size and location of conduit and outlets and type and quantity of system conductors. Include voltage drop calculations and battery calculations based on actual number of devices to be installed.
2. Include riser and wiring diagrams for overall system and components including control panels, annunciators, power supplies, initiating circuits, notification appliances, control devices and FATC. Address numbers shall be noted on all appliances.
3. Include physical and electrical characteristics of equipment to indicate conformance with the Specifications.
4. Describe system characteristics and function as well as device wiring diagrams.
5. Voltage drop and battery calculations for each control panel, power supply, amplifier, and initiating circuits at 24 hour stand-by and 15 mins alarm.
6. System operational matrix.
7. Reproduced copies of the bid set of engineered drawings are not acceptable as shop drawings. Shop drawings must include contractors title block, name, contact information, license numbers and a signed stamp.

D. Operating and Maintenance Instruction Manual:
1. Manual shall include the following tailored to this specific project:
   a. Operational description.
   b. Coded cabling plan.
   c. Two wire circuit diagrams.
   d. Wiring destination schedule.
   e. Schematic component diagrams and PC board layouts.
   f. Maintenance and alignment procedures.
   g. Voltage drop and battery calculations.

1.4 PERFORMANCE REQUIREMENTS

A. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Style 4 (Class B) Signaling Line Circuits (SLC).

B. Device Circuits (IDC) shall be wired Class b (NFPA Style A) as part of an addressable device connected by the SLC Circuit.

C. Notification Appliance Circuits (NAC) shall be wired Class B (NFPA Style Y) as part of an addressable device connected by the SLC Circuit.

D. Alarm signals arriving at the FACP shall not be lost following a primary power failure (or outage) until the alarm signal is processed and recorded.

E. NAC circuits and control equipment shall be arranged such that loss of any one (1) NAC circuit will not cause the loss of any other NAC circuit in the system.

1.5 QUALITY ASSURANCE

A. Loads of Equipment and Components
   a. Follow IEEE Standard where applicable.

b. Provide fuse protection for equipment and spare fuses.
c. Design systems for operation at 120 volts, normal or emergency power as indicated, 60 Hz nominal input.
d. Operating voltage dissipated by resistors shall not exceed 25% of ratings.
e. Operating voltage of capacitors shall not exceed 80% of rated voltage.
f. Operating loads and voltages on transistors and solid-state devices shall not exceed manufacturer's recommendation for normal full load operation.
g. Use electronic components of types and rating commonly available from stock of established commercial distribution.

B. Regulatory Requirements
1. The specifications and standards listed below form a part of this specification. The system shall fully comply with the latest issue of these standards, if applicable.
2. National Fire Protection Association (NFPA) – USA:
a. NFPA 70: California Electrical Code (CEC)
b. NFPA 72: National Fire Alarm Code
c. NFPA 101: Life Safety Code
3. Underwriters Laboratories Inc. (UL):
a. UL 38: Manually Actuated Signaling Boxes
b. UL 268: Smoke Detectors for Fire Protective Signaling Systems
c. UL 464: Audible Signaling Appliances
d. UL 521: Heat Detectors for Fire Protective Signaling Systems
e. UL 864: Control Units for Fire Protective Signaling Systems
f. UL 1480: Speakers for Fire Alarm and Signaling Systems, Including Accessories
g. UL 1481: Power Supplies for Fire Protective Signaling Systems
h. UL 1711: Standard for Amplifiers for Fire Protective Signaling Systems
i. UL 1712: Tests for Ampacity of Insulated Electrical Conductors Installed in Fire Protective System
j. UL 1971: Visual Notification Appliances
k. UL 2572: Mass Notification Systems
4. Local and State Building Code, including but not limited to:
a. California Building Code
b. California Electric Code
c. California Fire Code
5. All requirements of the Authority Having Jurisdiction (AHJ).

1.6 WARRANTY

A. For a period of two years from date of final acceptance, the system shall be under full guarantee for materials and labor at no cost to the Owner. The system shall be under a service contract with a technician authorized by the manufacturer. Replacement parts and labor shall be readily available during normal business hours while the service contract is in effect. A complete system inspection and test shall be performed at five months and again at eleven months after final acceptance. Tests shall include all smoke detector sensitivity settings.

B. Conform to applicable provisions of the General Requirements.

C. Service technicians and replacement components for the system shall be available locally from a service representative of the manufacturer who is able to provide evidence of technical training and authorization by the manufacturer.

D. All component failures shall be remedied to the satisfaction of the Owner.

E. A continuing service contract shall be offered at time of bid to commence at the expiration of warranty included with the system.

PART 2 PRODUCT

2.1 MANUFACTURERS

A. Main Fire Alarm Control Panel, Power Supplies and Amplifiers: Silent Knight

B. Addressable Detectors (smoke, heat and Carbon monoxide): Silent Knight

C. Addressable Manual Pull Stations: Silent Knight

D. Relay, Input and Control Modules: Silent Knight

E. Strobes and Combination Horns and Strobes: System Sensor, Gentex or Wheelock.

2.2 MATERIALS

A. The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, printer, annunciators, and other system-controlled devices.

B. System Devices and components shall be provided as specified on the fire alarm equipment legend and as shown on associated electrical drawing.

PART 3 EXECUTION

3.1 COORDINATION

A. Refer to the drawings and specifications to determine quantities and location of devices and required scope of work. Provide function described under mechanical section Sequence of Control, for fire and/or emergency conditions.

3.2 GENERAL

A. Comply with all applicable paragraphs in this section.

B. Install system(s) in accordance with manufacturer's instructions.

C. Include services of certified technicians to supervise installation, provide adjustments, provide final connections, system testing and system training to Owner Representative

3.3 INSTALLATION

A. Installation shall be in accordance with the CFC, CEC, CMC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.

B. All conduit, junction boxes, conduit supports, and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.

C. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in

unfinished areas.

D. Manual fire alarm boxes shall be suitable for surface mounting or semi-flush mounting as shown on the plans and shall be installed not less than 42 inches (1067 mm), nor more than 48 inches (122 mm) above the finished floor.

3.4 GROUNDING

A. All equipment to be grounded by means of green ground wire to "U" contact of duplex receptacles and bonded to ground provided under 26 05 26: Grounding and Bonding of Electrical Systems.

B. Provide and install transient circuit protection for all fire alarm wiring entering a building.

3.5 INSPECTION

A. Systems to meet all the requirements of the CSFM and IOR and AHJ and shall be approved thereby before installation and prior to final acceptance.

3.6 LOCATION

A. Before installation, verify exact location of control equipment and outlets. The Owner reserves the right to relocate system components within a radius of 10' at no increase in cost before rough-in work is started for the respective component.

3.7 WIRING

A. Furnish all conduit, conductors, equipment, terminal strips, etc., and labor to install a complete and operable system. All cable conductors shall be color coded and numbered for identification at all terminals. Green shall be for grounding conductor only. Use red insulation and or red jacketing on all fire alarm cable unless otherwise approved by the Authority Having Jurisdiction.

3.8 TESTING

A. After all equipment specified herein for each system has been installed and is in operating condition, conduct performance tests to determine if the installation and components comply with these specifications. Furnish competent personnel, all test material and approved test instruments and conduct the tests under supervision of factory personnel, in the presence of the Engineer, the building and fire inspecting agencies:

1. The contractor's job foreman, in the presence of a representative of the manufacturer, a representative of the owner, and the fire department shall operate every installed device to verify proper operation and correct annunciation at the control panel.
2. At least on half of all tests shall be performed on battery standby power.
3. Where application of heat would destroy any detector, it may be manually activated.
4. The signaling line circuits and notification appliance circuits shall be opened in at least two (2) locations to verify the presence of supervision.
5. When the testing has been completed to the satisfaction of the contractor representative IOR, representatives of the manufacturer and owner, a notarized letter co-signed by each attesting to the satisfactory completion of said testing shall be forwarded to the owner and the authority having jurisdiction.
6. The contractor shall leave the fire alarm system in proper working order, and, without additional expense to the owner, shall replace any defective materials or equipment provided by him under this contract within two years from the date of final acceptance by the awarding authority.

7. The local responding fire department must be notified prior to the final test in accordance with local requirements and when requested, participate in system testing and evaluation.

3.9 CLOSE OUT

A. Prepare written report of final test results, signed by witnessing parties. Submit to the Engineer in triplicate for final approval.

B. Provide as built record drawings to the Engineer of Record, owner and local AHJ where applicable.
   1. As built drawings are to include all of the installing contractor's information, to include name, address, contact phone number, email address, license numbers, and signed stamp.
   2. Contractor to provide to the owner, one (1) hard copy of as built drawings to be stored at the fire alarm control panel, one (1) electronic drafting design file (example AutoCAD) and one pdf file on a portable memory device.
   3. Contractor to provide to the owner, one (1) hard copy of the manufacturer's Operation and Maintenance manual and one (1) copy in pdf form on a portable memory device

END OF SECTION

SECTION 31 21 00

UTILITY TRENCHING AND BACKFILL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Excavation, bedding, and backfill for underground storm drain, sanitary sewer, and water piping, underground HVAC piping, electrical conduit, telephone conduit, gas piping, cable TV conduit, etc., and associated structures.
B. Provide labor, material, equipment, and services necessary to complete the backfilling and compacting as necessary for this project. Section includes, but is not limited to:
   1. Select Backfill Material
   2. Aggregate Base
   3. Detectable Tape
   4. Trench Excavation
   5. Pipe Bedding
   6. Trench Backfill
   7. Trench Surfacing
C. This section excludes drainage fill material and placement around subdrains. See Section 33 46 00 – Subdrainage.

1.2 RELATED SECTIONS

A. Section 31 10 00 – Site Clearing
B. Section 31 20 00 – Earthwork Moving
C. Section 31 23 19 - Dewatering
D. Section 33 10 00 – Water System
E. Section 33 30 00 – Sanitary Sewer System
F. Section 33 41 00 – Storm Utility Drainage Piping
G. Section 33 46 00 – Subdrainage

1.3 RELATED DOCUMENTS

A. ASTM
   1. D1557, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
   2. D2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewer and Other Gravity-Flow Applications.
B. California Administrative Code, Title 24, Part 2 - Basic Building Regulations, Chapter 24, Excavations, Foundations, and Retaining Walls.
C. Caltrans Standard Specifications, 2015
   1. Section 19, Earthwork
   2. Section 26, Aggregate Bases
   3. Section 68, Subsurface Drains
   4. Section 96, Geosynthetics
D. CAL/OSHA, Title 8

1.4 DEFINITIONS

A. AC: Asphalt Concrete
B. ASTM: American Society for Testing and Materials
C. Base: The layer placed between the subgrade and surface pavement in a paving system.

D. Bedding: Material from bottom of trench to bottom of pipe
E. CDF: Controlled Density Fill
F. DIP: Ductile Iron Pipe
G. Engineered Fill:
    1. Soil or soil-rock material approved by the Owner and transported to the site by the Contractor in order to raise grades or to backfill excavations.
    2. Contractor shall provide sufficient tests, and a written statement that all materials brought onto the project site comply with specification requirements.
H. Excavation: Consists of the removal of material encountered to subgrade elevations
I. Initial Backfill: Material from bottom of pipe to 12 inches above top of pipe
J. PCC: Portland Cement Concrete
K. RCP: Reinforced Concrete Pipe
L. Relative Compaction: In-place dry density of soil expressed as percentage of maximum dry density of same materials, as determined by laboratory test procedure ASTM D1557.
M. Springline of Pipe: Imaginary line on surface of pipe at a vertical distance of ½ the outside diameter measured from the top or bottom of the pipe.
N. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below base.
O. Subsequent Backfill: Material from 12 inches above top of pipe to subgrade of surface material or subgrade of surface facility or to finish grade.
P. Trench Excavation: Removal of material encountered above subgrade elevations and within horizontal trench dimensions.
    1. Authorized Trench Over-Excavation: Excavation below trench subgrade elevations or beyond indicated horizontal trench dimensions as shown on plans or authorized by the Geotechnical Engineer.
    2. Unauthorized Trench Over-Excavation: Excavation below trench subgrade elevations or beyond indicated horizontal trench dimensions without authorization by the Geotechnical Engineer. Unauthorized excavation shall be without additional compensation.
Q. Utility Structures:
    1. Storm drainage manholes, catch basins, drop inlets, curb inlets, vaults, etc.
    2. Sanitary sewer manholes, vaults, etc.
    3. Water vaults, etc.

1.5 SUBMITTALS

A. Follow submittal procedures outlined in Section 01 10 00 – Supplemental General Requirements.
B. Test Reports: Submit the following report for import material directly to the Owner from the Contractor's testing services:
    1. Compaction test reports for aggregate base.
C. Samples:
    1. If required by the Geotechnical Engineer, provide 20-pound samples of all imported trench bedding and backfill material sealed in airtight containers, tagged with source locations and suppliers of each proposed material. Do not import materials to Project without written approval of the Geotechnical Engineer and the Owner.
    2. Provide materials from same source throughout work. Change of source requires approval of the Geotechnical Engineer and the Owner.

1.6 QUALITY ASSURANCE

A. Conform all work and materials to the recommendations or requirements of the Geotechnical Report and meet the approval of the Geotechnical Engineer.
B. Conform all work to the appropriate portion(s) of the Caltrans Standard Specifications, Section 19, Earthwork.
C. Percentage of compaction specified shall be the minimum acceptable. The percentage

represents the ratio of the dry density of the compacted material to the maximum dry density of the material as determined by the procedure set forth in ASTM D 1557.

D. The Geotechnical Engineer will perform observations and tests required to enable him to form an opinion of the acceptability of the trench backfill. Correct the trench backfill that, in the opinion of the Geotechnical Engineer, does not meet the requirements of these Technical Specifications and the Geotechnical Report.

1.7 PROJECT CONDITIONS

A. Promptly notify the Owner of surface or subsurface conditions differing from those disclosed in the Geotechnical Report. First notify the Owner verbally to permit verification and extent of condition and then in writing. No claim for conditions differing from those anticipated in the Contract Documents and disclosed in the Geotechnical Report will be allowed unless Contractor has notified the Owner in writing of differing conditions prior to contractor starting work on affected items.

B. Barricade open excavations and post with warning lights.
   1. Operate warning lights and barricades as required.
   2. Protect structures, utilities, sidewalks, pavements, and other facilities immediately adjacent to excavations, from damages caused by settlement, lateral movement, undermining, washout, and other hazards.
   3. Protect open, trenches, and utility structure excavations with fences, covers and railings to maintain safe pedestrian and vehicular traffic passage.

C. Stockpile on-site and imported backfill material temporarily in an orderly and safe manner.

D. Provide dust and noise control in conformance with Section 01 10 00 Supplemental General Requirements.

E. Environmental Requirements:
   1. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the Owner.
   2. Protect existing streams, ditches and storm drain inlets during work on this project.

F. Protection of Subgrade: Do not allow equipment to pump or rut subgrade, stripped areas, footing excavations, or other areas prepared for project.

G. Transport all excess soils materials by legally approved methods to disposal areas.
   1. Coordinate with the Engineer.
   2. Any additional fill requirements shall be the responsibility of the Contractor.

1.8 EXISTING UTILITIES

A. Locate existing underground utilities in the areas of work. For utilities that are to remain in place, provide adequate means of protection during excavation operations.
   1. Locating of existing underground utilities shall include but not be limited to pot-holing prior to the start of construction.

B. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult Owner and/or utility agency immediately for directions.
   1. Cooperate with the Owner and public and private utility companies in keeping their respective services and facilities in operation.
   2. Repair damaged utilities to the satisfaction of the agency with jurisdiction.

C. Do not interrupt existing utilities serving facilities occupied and used by the Owner or others, except when permitted in writing by the Owner and then only after acceptable temporary utility services have been provided.

PART 2 PRODUCTS

2.1 GENERAL

A. Import materials will be subject to approval of the Geotechnical Engineer.

B. For approval of imported fill material, notify the Owner at least 7 days in advance of intention to import material.

2.2 PIPE BEDDING AND INITIAL BACKFILL

A. ASTM D2321, Class IA, IB or II.
   1. Clean and free of clay, silt or organic matter.
B. Permeable Material: In accordance with Section 68-2.02F of Caltrans Standard Specifications, Class 1, Type A or Class 2.
C. Class 2 Aggregate Base: In accordance with Section 26 of Caltrans Standard Specifications, ¾ inch maximum.
D. Sand: In accordance with Section 19-3.02F of Caltrans Standard Specifications.

2.3 SELECT BACKFILL

A. Select backfill material shall be gravel, free of clay or organic matter and shall conform to the following gradation:

Sieve Size	Percentage Passing
1 inch	100
¾ inch	90 – 100
No. 4	35 – 60
No. 200	2 - 9

B. For gas pipe and fuel piping select backfill shall be clean, graded building sand conforming to the following gradation:

Sieve Size	Percentage Passing
No. 4	100
No. 200	0 -5

2.4 WARNING TAPE

A. Polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3 inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.
   1. Warning Tape Color Codes
      a. Red: Electric
      b. Yellow: Gas, Oil; Dangerous Materials
      c. Orange: Telephone and Other Communications
      d. Blue: Water Systems
      e. Green: Sewer Systems
      f. White: Steam Systems
      g. Gray: Compressed Air
   2. Warning Tape for Metallic Piping: Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.
   3. Detectable Warning Tape for Non-Metallic Piping: Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when

tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.5 DETECTION WIRE FOR NON-METALLIC PIPING

A. Detection wire shall be insulated single strand, solid copper with a minimum of 12 AWG.

2.6 SUBSEQUENT BACKFILL

A. Conform to on-site or imported structural backfill in Section 31 20 00, Earth Moving.

2.7 CONTROLLED DENSITY FILL (CDF) (IN TRENCHES)

A. Provide non-structural CDF, from bottom of trench to finish subgrade of subbase or base material, that can be excavated by hand and produce unconfined compressive 28-day strengths from 50-psi to a maximum of 150-psi. Provide aggregate no larger than 3/8 inch top size. The 3/8 inch aggregate shall not comprise more than 30% of the total aggregate content.
B. Cement: Conform to the standards as set forth in ASTM C150, Type II Cement.
C. Fly Ash: Conform to the standards as set forth in ASTM C618, for Class F pozzolan. Do not inhibit the entrainment of air with the fly ash.
D. Air Entraining Agent: Conform to the standards as set forth in ASTM C260.
E. Aggregates need not meet the standards as set forth in ASTM C33. Any aggregate, producing performances characteristics described herein will be accepted for consideration. The amount of material passing a #200 sieve shall not exceed 12% and no plastic fines shall be present.
F. Provide CDF that is a mixture of cement, Class F pozzolan, aggregate, air entraining agent and water. CDF shall be batched by a ready mixed concrete plant and delivered to the job site by means of transit mixing trucks.
G. The Contractor shall determine the actual mix proportions of the controlled density fill to meet job site conditions, minimum and maximum strengths, and unit weight. Entrained air content shall be a minimum of 4.0%. The actual entrained air content shall be established for each job with the materials and aggregates to be used to meet the placing and unit weight requirements. Entrained air content may be as high as 20% for fluidity requirements.
H. Mix design shall meet the Geotechnical Engineer's approval.

2.8 CONCRETE STRUCTURE BEDDING AND BACKFILL

A. Precast Structures: Same materials to the same heights as specified for pipe bedding and backfill, or other material approved by the Geotechnical Engineer.
B. Poured-in-Place Structures:
    1. Bedding: Bedding shall meet the approval of the Geotechnical Engineer. In general, bedding is not required, pour bases against undisturbed native earth in cut areas and against engineered fill compacted to 90% relative compaction in embankment areas.
    2. Side Backfill: On-site or imported structural fill meeting the requirements given in Section 31 20 00, Earth Moving.

2.9 GEOSYNTHETICS

A. Filter Fabric:
    1. Filter Fabric: Section 96-1.02 of Caltrans Standard Specifications.
    2. Mirafi 140N, Mirafi Inc., or approved equal.

PART 3 EXECUTION

3.1 GENERAL

A. Comply with the recommendations of the Geotechnical Engineer.
B. Protect existing trees to remain. No grading is permitted under the drip line of protected trees.
C. Excavations for appurtenant structures, such as, but not limited to, manholes, transition structures, junction structure, vaults, valve boxes, catch basins, thrust blocks, and boring pits, shall be deemed to be in the category of trench excavation.
D. Unless otherwise indicated in the Plans, all excavation for pipelines shall be open cut.
E. Prior to commencement of work, become thoroughly familiar with site conditions.
F. In the event discrepancies are found, immediately notify the Owner in writing, indicating the nature and extent of differing conditions.
G. Backfill excavations as promptly as work permits.
H. Do not place engineered fill or backfill until rubbish and deleterious materials have been removed and areas have been approved by the Owner.
I. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.
J. In excavations, use satisfactory excavated or borrow material.
K. Under grassed areas, use satisfactory excavated or borrow material.

3.2 SITE PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, which are to remain, from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
B. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the Owner.

3.3 EXISTING UTILITIES

A. Identity the location of existing utilities.
    1. Prior to trenching, the Contractor shall excavate at locations specifically indicated on the Plans, if any, and where new lines cross other utilities of uncertain depth and determine the elevation of the utility in question to ensure that the new line will clear the potential obstruction.
    2. The Contractor shall contact Underground Service Alert (USA) at 1-800-227-2600 for assistance in locating existing utilities.
    3. If, after the excavation, a crossing utility does present an obstruction, then the line and grade of the new line will be adjusted as directed by the Owner to clear the utility.
B. Protect all existing utilities to remain in operation.
C. Movement of construction machinery and equipment over existing pipes and utilities during construction shall be at Contractor's risk.
D. Excavation made with power-driven equipment is not permitted within 2 feet of any known utility or subsurface structure.
    1. Use hand or light equipment for excavating immediately adjacent to known utilities or for excavations exposing a utility or buried structure.
    2. Start hand or light equipment excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured.
    3. Support uncovered lines or other existing work affected by excavation until approval for backfill is obtained.
    4. Report damage of utility line or subsurface structures immediately to the Owner.
E. Backfill trenches resulting from utility removal in lifts of 8 inches maximum.

3.4 TRENCH EXCAVATION

A. General
   1. Excavation shall include removal of all water and materials that interfere with construction. The Contractor shall remove any water which may be encountered in the trench by pumping or other methods during the pipe laying, bedding and backfill operations. Material shall be sufficiently dry to permit approved jointing.
   2. Excavation shall include the construction and maintenance of bridges required for vehicular and pedestrian traffic, support for adjoining utilities.
   3. The Contractor shall be responsible to safely direct vehicular and pedestrian traffic through or around his/her work area at all times.
   4. The Contractor shall relocate, reconstruct, replace or repair, at his/her own expense, all improvements which are in the line of construction or which may be damaged, removed, disrupted or otherwise disturbed by the Contractor.

B. Existing Paving and Concrete:
   1. Existing pavement over trench shall be sawcut, removed, and hauled away from the job. Existing pavement shall be neatly sawcut along the limits of excavations.
   2. Existing concrete over the trench shall be sawcut to a full depth in straight lines, at a minimum distance of 12 inches beyond the edge of the trench, either parallel to the curb or a right angles to the alignment of the sidewalk.
   3. Boards or other suitable material shall be placed under equipment outrigging to prevent damage to paved surfaces.

C. Trench Width:
   1. The maximum allowable trench widths at the top of the all pipe materials outside diameter of barrel pipe plus 18 inches. shall be as follows:
      h. The maximum trench width shall be inclusive of all shoring.
      i. If the maximum trench width is exceeded, the State's representative may direct the Contractor to encase or cradle the pipe in concrete at no additional charge.
   2. For pipes 3 inch diameter and larger, the free working space on each side of the pipe barrel shall not be less than 6 inches.

D. Excavation Width at Springline of Pipe:
   1. Up to a nominal pipe diameter of 24 inches: Minimum of twice the outside pipe diameter, or as otherwise allowed or required by the Geotechnical Engineer.
   2. Nominal pipe diameter of 30 inches through 36 inches: Minimum of the outside pipe diameter plus 2 feet, or as otherwise allowed or required by the Geotechnical Engineer.
   3. Nominal pipe diameter of 42 inches through 60 inches: Minimum of the outside pipe diameter plus 3 feet, or as otherwise allowed or required by the Geotechnical Engineer.

E. Open Trench:
   1. The maximum length of open trench shall be 300 feet or the distance necessary to accommodate the amount of pipe installed in a single day, whichever is greater. No trench shall be left open at the end of the day.
   2. Provisions for trench crossings and free access shall be made at all street crossings, driveways, water gate valves, and fire hydrants.
   3. Excavate by hand or machine. For gravity systems begin excavation at the outlet end and proceed upstream. Excavate sides of the trench parallel and equal distant from the centerline of the pipe. Hand trim excavation. Remove loose matter.
   4. Excavation Depth for Bedding: Minimum of 6 inches below bottom of pipe or as otherwise allowed or required by the Geotechnical Engineer, except that bedding is not required for nominal pipe diameters of 2 inches or less.
   5. Over-Excavations: Backfill trenches that have been excavated below bedding design subgrade, with approved bedding material.
   6. Where forming is required, excavate only as much material as necessary to permit placing and removal of forms.
   7. Grade bottom of trench to provide uniform thickness of bedding material and to provide uniform bearing and support for pipe along entire length. Remove stones to avoid point bearing.

F. Excavated Material:
   1. All excavated material not required for backfill shall be immediately removed and properly disposed of in a legal manner by the Contractor.
   2. Material excavated in streets and roadways shall be laid alongside the trench no closer than 2 feet from the trench edge and kept trimmed to minimize inconvenience to public traffic.
   3. Provisions shall be made whereby all storm and wastewater can flow uninterrupted in gutters or drainage channels.

3.5 CONTROL OF WATER AND DEWATERING

A. Contractor attention is directed to Section 31 23 19, Dewatering.
B. Be solely responsible for dewatering trenches and excavations and subsequent control of ground and surface water. Provide and maintain such pumps or other equipment as may be necessary to control ground water and seepage to the satisfaction of the Geotechnical Engineer and the Owner until backfilling is completed.
C. Dewater during backfilling operation so that groundwater is maintained a least one foot below level of compaction effort.
D. Obtain the Geotechnical Engineer's approval for proposed control of water and dewatering methods.
E. Reroute surface water runoff away from open trenches and excavations. Do not allow water to accumulate in trenches and excavations.
F. Maintain dewatering system in place until dewatering is no longer required.

3.6 BRACING AND SHORING

A. Conform to California and Federal OSHA requirements.
B. Place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the pipes and appurtenances being constructed; and to prevent damage to adjacent structures or facilities. Remove all bracing and shoring upon completion of the work.
C. Be solely responsible for all bracing and shoring and, if requested by the Owner, submit details and calculations to the Owner. The Owner may forward the submittal to the Geotechnical Engineer, the Consulting Engineer and/or the California Division of Industrial Safety for their review. The Contractor's submittal shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a civil engineer or structural engineer registered in California. No excavations in trench section or around structures shall precede a response to the submittal by the Owner.
D. Be solely responsible for installing and extracting the sheathing in a manner which will not disturb the line, grade, or backfill compaction or operation of the utility being installed or adjacent utilities and facilities.

3.7 PIPE BEDDING

A. Obtain approval of bedding material from the Geotechnical Engineer.
B. Accurately shape bedding material to the line and grade called for on the Plans. Carefully place and compact bedding material to the elevation of the bottom of the pipe in layers not exceeding 8 inches in loose thickness. Compact bedding material at optimum water content to 90% relative compaction unless specified otherwise on the Plans or by the Geotechnical Engineer. Compact by pneumatic tampers or other mechanical means approved by the Geotechnical Engineer. Jetting or ponding of bedding material will not be permitted.
C. Stabilization of Trench Bottom: When the trench bottom is unstable due to wet or spongy foundation, trench bottom shall be stabilized with gravel or crushed rock. The State's inspector will determine the suitability of the trench bottom and the amount of gravel or crushed rock needed to stabilize a soft foundation. Soft material shall be removed and

replaced with gravel or crushed rock as necessary.

D. Placement of Bedding Material: The trench bottom shall be cleaned to remove all loose native material prior to placing select backfill material. Sufficient select backfill material shall be placed in trench and tamped to bring trench bottom up to grade of the bottom of pipe. The relative compaction of tamped material shall be not less than 90 percent. It is the intention of these requirements to provide uniform bearing under the full length of pipe to a minimum width of 60 percent of the external diameter.

3.8 BACKFILLING

A. Initial Backfill:
   1. Obtain approval of backfill material from Geotechnical Engineer.
   2. Bring initial backfill up simultaneously on both sides of the pipe, so as to prevent any displacement of the pipe from its true alignment. Carefully place and compact initial backfill material to an elevation of 12 inches above the top of the pipe in layers not exceeding 8 inches in loose thickness. Compact bedding material at optimum water content to 90% relative compaction unless specified otherwise on the Plans or by the Geotechnical Engineer. Compact by pneumatic tampers or other mechanical means approved by the Geotechnical Engineer. Jetting or ponding of initial backfill material will not be permitted.

B. Pipe Detection: In trenches containing pressurized plastic pipes, tracer wire shall be placed directly above the pipe and shall be connected to all valves, existing exposed tracer wires, and other appurtenances as appropriate.

C. Installation of Tracer Wire:
   1. Install a continuous length of tracer wire for the full length of each run of nonmetallic pipe.
   2. Attach wire to top of pipe in such manner that it will not be displaced during construction operations.
   3. Form a mechanically and electrically continuous line throughout the pipeline, extending to the nearest valve or other pipeline appurtenance. Extend the wire up the outside of the valve box/riser and cut a hole that is 8 inches from the top, extend a 12 inch wire lead to the inside of the box. At other pipeline appurtenances, terminate the 12 inch wire lead inside the enclosure.
   4. Splice wire with a splicing device consisting of and electro-tin plated seamless copper sleeve conductor. Install as recommended by the manufacturer. Wrap splices and damaged insulation with electrician's tape.

D. Installation of Warning Tape
   1. Install tape approximately 1 foot above and along the centerline of the pipe.
   2. Where tape is not continuous lap tape ends a minimum of 2 feet.

E. Subsequent Backfill:
   1. Above the level of initial backfill, the trench shall be backfilled with non-expansive native material from trench excavation or with imported select backfill material (Contractor's option). Subsequent backfill shall be free of vegetable matter, stones or lumps exceeding 3 inches in greatest dimension, and other unsatisfactory material.
   2. Bring subsequent backfill to subgrade or finish grade as indicated. Carefully place and compact subsequent backfill material to the proper elevation in layers not exceeding 8 inches in loose thickness. Compact bedding material at optimum water content to 90% relative compaction, except that the upper 36 inches in areas subject to vehicular traffic shall be compacted to at least 95% relative compaction, unless specified otherwise on the Plans or by the Geotechnical Engineer. Compact by pneumatic tampers or other mechanical means approved by the Geotechnical Engineer. Jetting or ponding of subsequent backfill material will not be permitted.

F. Do not use compaction equipment or methods that produce horizontal or vertical earth pressures that may cause excessive pipe displacement or damage the pipe. Jetting of trench backfill is not permitted.

G. Utility backfill shall be inspected and tested by the Geotechnical Engineer during placement.

Cooperate with the Geotechnical Engineer and provide working space for such tests in operations. Backfill not compacted in accordance with these specifications shall be re-compacted or removed as necessary and replaced to meet the specified requirements, to the satisfaction of the Geotechnical Engineer and the Owner prior to proceeding with the Project.

H. Compaction testing shall be in accordance with California Test Method ASTM D1556 or D1557.

3.9 CLEANUP

A. Upon completion of utility earthwork all lines, manholes catch basins, inlets, water meter boxes and other structures shall be thoroughly cleaned of dirt, rubbish, debris and obstructions of any kind to the satisfaction of the Owner.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 31 22 19

FINISH GRADING

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Provide all labor, materials, services, and equipment indicated on Drawings and/or herein specified to complete all Finish Grading Work.

B. Finish grading shall consist of scarifying and establishing finish grade to conform to the contours, grades, line and shapes as indicated on the Drawings, and ensuring that all landscape areas are uniformly graded to an outlet.

C. Related Sections: Related sections may include but are not limited to:

1. Section 31 20 00 Earthwork
2. Section 32 90 00 Planting

1.2 DEFINITIONS

A. Subgrade: Surfaces upon which additional specified materials are to be placed, prepared, or constructed.

B. Rough grade: The establishment of grades to one-tenth (1/10) foot plus or minus tolerance of grades required to accomplish the Work described in other documents and drawings.

C. Finish grade: The establishment of grades to a plus or minus tolerance of final grades as indicated on Drawings. Tolerances are specified in applicable documents of the specifications (i.e., Planting, Concrete, Decomposed Granite, etc.) Finish Grade elevations in planted areas reference top of soil. Allowance shall be made for installation of mulch, sod, etc. as shown in the drawings.

D. Grading intent: Spot elevations (grades) and contours are indicated based on the best available data. Drawings are referenced to provide additional site grading data. The intent is to maintain constant slopes between spot elevations. If a spot elevation is determined to be in error, or the difference in elevation between points change, contact the City's Representative immediately for field adjustments of spot elevations.

1.3 EXISTING UTILITIES

A. Contractor is responsible to contact Underground Service Alert (USA North) (811) or (800-642-2444) and mark the location of all existing utilities before commencing Work.

B. Refer to the Drawings for information on proposed site utilities and their locations.

C. Retain and protect in operating condition all active utilities traversing the site designated to remain.

D. Where existing utilities not indicated on the Drawings are encountered, support, shore up, protect same and immediately contact the Owner's Representative for continuance and/or relocation of such services.

1.4 PROTECTION OF EXISTING CONDITIONS AND ADJACENT PROPERTIES

A. Use all means necessary to protect existing conditions designated to remain, newly constructed conditions and adjacent properties. Avoid any encroachment on adjacent properties.

B. Prevent damage to existing benchmarks, pavement, and utility lines. In the event of damage or loss, immediately make all repairs and replacements required to the satisfaction of the Owner's Representative and at no additional cost to the Owner.

1.5 QUALITY ASSURANCE

A. Finish grades shall conform to contours, grades, lines, and shapes, as indicated on Drawings, with uniform slopes between finish grades or between finish grades and existing grades.

B. Establish finish landscape grades in a continuous, uniform line, resulting in a uniform surface with positive drainage and without ridges or water pockets.

C. Finish landscape grade tolerance shall be .04 feet plus or minus of final grades indicated on Drawings.

1.6 SUBMITTALS

A. Per Section 31 20 00

PART 2 - PRODUCTS

A. Per Section 31 20 00 and Section 32 90 00

PART 3 - EXECUTION

3.1 PROTECTION

A. Rough grades shall be within plus or minus .10 foot of final finish grades as indicated on plans. If any discrepancies exist, notify the Owner's Representative immediately for direction.

B. Contractor shall be responsible for bringing rough grades into conformity with finish grades as indicated on the plans. Comply with tolerances specified in this document and as specified in applicable documents of the specifications (i.e., concrete, asphalt, planting, etc.).

C. Conduct work in an orderly manner. Dirt shall not be permitted to accumulate on hardscape or be washed into storm drains.

D. Use all means required to prevent the erosion of freshly graded areas during construction and until such time as proposed hard surfaces and landscaping have been constructed.

3.2 LAYOUT

A. Layout of all work under this Section shall be made by a licensed surveyor.

B. Maintain all benchmarks, control monuments and stakes. Protect from damage and dislocation.

C. If any discrepancies are found by the surveyor between the Drawings and actual site conditions, the Owner's Representative reserves the right to make minor adjustment in Work Specified as necessary to accomplish the intent of the Contract Documents without increased cost to the Owner.

3.3 FINISH LANDSCAPE GRADING

A. Scarify or rototill to a 6" depth all planting areas prior to finish grade operations and work until uniform and free from large clods larger than one (1) inch in greatest dimension.

B. Finish grade shall conform, after compaction, to shapes, spot elevations and contours as indicated on Drawings, with uniform levels or slopes between finish elevations or between finish elevations and existing elevations. Landforms shall be naturally formed, with increasing or decreasing slopes as follows:

1. "Round-off" all high points or tops of slopes to finish grade as noted on the drawings in a parabolic fashion, without exceeding maximum or minimum slopes as shown or as required.

2. "Feather" all low points or bottoms of slopes to finish grade as noted on the drawings in a parabolic fashion, without exceeding maximum or minimum slopes as shown or as required.

A. Soil amendment and preparation shall comply with Section 32 90 00 Planting.

B. Spread excess soil material excavated from plant pits to establish subgrades in

surrounding planting areas.

C. Top six (6) inches of all areas to be planted shall be free of stones, stumps, or other deleterious matter one (1) inch in greatest dimension.

D. Compact soil in planting areas to 85% relative compaction in accordance with ASTM D1557-78.

E. Fine grade all planting areas to a smooth, loose, and uniform surface. Eliminate uneven areas, ridges, and depressions.

F. Shrub/ground cover planting areas shall be graded three and one-half (3-1/2) inches below adjacent paved areas, sidewalks, valve boxes, mow bands, drains, etc. in order to receive a three-inch-deep layer of wood chip mulch, establishing final grade one-half (1/2) inches below these surfaces.

G. Turf areas shall be graded 1/2 inch in hydroseed, and 1 inch in sod, below adjacent paved area, sidewalks, valve boxes, mow bands, drains, top of seat walls etc. in order to receive turf, establishing final grade flush with these surfaces.

3.4 OBSERVATION SCHEDULE

A. Normal progress observations shall be requested by the Contractor from the Owner's Representative as per observations listed in Sections: 32 84 00 Planting Irrigation, and 32 90 00 Planting.

3.5 CLEAN UP

A. Remove all trash, excess soil, or rubbish from the property. All scars, ruts or other marks in the ground caused by this work shall be repaired and the ground left in a neat and orderly condition throughout the site.

B. The Contractor shall leave the site area broom-clean and shall wash down all paved areas within the Contract area, leaving the premises in a clean condition acceptable to the Owner's Representative.

END OF SECTION

SECTION 32 13 13

CONCRETE PAVEMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Furnishing, placing, spreading, compacting and shaping portland cement concrete pavement with undoweled transverse weakened plane joints, for vehicular traffic.

B. Form construction and use in placing portland cement concrete pavement.

C. Joints for portland cement concrete pavement.

D. Finishing portland cement concrete pavement.

E. Curing and protecting portland cement concrete pavement.

1.2 RELATED SECTIONS

A. 01 10 00, Supplemental General Requirements

B. 31 20 00, Earth Moving

C. 32 11 00, Pavement Base Course

D. 32 13 18, Cement and Concrete for Exterior Improvements

1.3 RELATED DOCUMENTS

A. AASHTO Standard Specifications
   1. T132: Standard Method of Test for Tensile Strength of Hydraulic Cement Mortars

B. ASTM Standards
   1. D36: Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)
   2. A615: Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
   3. A706: Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.
   4. A775: Standard Specification for Epoxy Coated Steel Reinforcing Bars.
   5. A934: Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.
   6. A996: Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
   7. C94: Standard Specification for Ready-Mixed Concrete
   8. C603: Standard Test Method for Extrusion Rate and Application Life of Elastomeric Sealants
   9. C639: Standard Test Method for Rheological (Flow) Properties of Elastomeric Sealants
   10. C661: Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer
   11. C679: ASTM C679-15 Standard Test Method for Tack-Free Time of Elastomeric Sealants
   12. C719: Standard Test Method for Adhesion and Cohesion of Elastomeric Joint

Sealants Under Cyclic Movement (Hockman Cycle)
13. C793: Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants
14. C881: Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
15. D412: Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
16. D1640: Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings
17. D2628: Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.
18. D2835: Standard Specification for Lubricant for Installation of Preformed Compression Seals in Concrete Pavements.
19. D3963: Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars.
20. D6690: Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.

C. Caltrans Standard Specifications, 2015
1. Section 10, General
2. Section 40, Concrete Pavement
3. Section 52, Reinforcement
4. Section 95, Epoxy

D. Caltrans Standard Plans:
1. Plan P1: Jointed Plan Concrete Pavement – New Construction
2. Plan P10: Concrete Pavement Dowel Bar Details

1.4 DEFINITIONS

A. AASHTO: American Association of State Highway and Transportation Officials

B. ASTM: American Society for Testing and Materials

C. Caltrans: State of California, Department of Transportation

1.5 QUALITY ASSURANCE

A. Testing Agency: Owner's Representative will engage a qualified independent testing agency to perform field inspections and tests and to prepare test reports.
1. Testing agency will conduct and interpret tests and state in each report whether tested work complies with or deviates from specified requirements.

B. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

C. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C94 requirements for production facilities and equipment.

D. Installer Qualification: An experienced installer who has completed pavement work similar in material, design and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

E. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.

1.6 SUBMITTALS

A. Follow submittal procedure outlined in Section 01 10 00, Supplemental General Requirements.

B. Design Mixes: For each concrete pavement mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results or other circumstances warrant adjustments.

C. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements.
1. Cementitious materials and aggregates
2. Steel reinforcement and reinforcement accessories
3. Admixtures
4. Curing compound
5. Applied finish material
6. Bonding agent of adhesive
7. Joint filler
8. Joint Sealant
9. Tie Bars
10. Epoxy
11. Backer Rods

PART 2 PRODUCTS

2.1 PORTLAND CEMENT CONCRETE

A. In accordance with Section 32 13 18, Cement and Concrete for Exterior Improvements.

2.2 BASE MATERIAL

A. In accordance with Section 32 11 00, Pavement Base Course.

2.3 TIE BARS

A. Deformed reinforcing steel bars conforming to the requirements of ASTM Designation A615, Grade 40 or 60

B. Epoxy-coat in accordance with Caltrans Standard Specification Section 52-2.02, Epoxy-Coated Reinforcement, except bars must comply with ASTM A706; ASTM A996; or ASTM A615, Grade 40 or 60.

C. Do not bend tie bars.

2.4 EPOXY

A. Bond tie bars to existing concrete with epoxy resin in accordance with Caltrans Standard Specification Section 95-1.02D, Epoxy Adhesive for Bonding Freshly Mixed Concrete to Hardened Concrete.

2.5 SILICONE JOINT SEALANT

A. Furnish low modulus silicone joint sealant in a one-part silicone formulation. Do not use acid cure sealants. Compound to be compatible with the surface to which it is applied and conform to the following requirements:

Specification	Test Method	Requirement
Tensile stress, 150% elongation, 7-day cure at 77°± 1°F and 45% to 55% Relative Humidity	ASTM D412 (Die C)	45 psi max.
Flow at 77° ± 1°F	ASTM C639[a]	Shall not flow from channel
Extrusion Rate at 77° ± 1°F	ASTM C603[b]	75-250 g per min.
Specific Gravity	ASTM D792 Method A	1.01 to 1.51
Durometer Hardness, at 0°F, Shore A, cured 7 days at 77° ± 1°F	ASTM C661	10 to 25
Ozone and Ultraviolet Resistance, after 5000 hours	ASTM C793	No chalking, cracking or bond loss
Tack free at 77° ± 1°F and 45% to 55% Relative Humidity	ASTM C679	Less than 75 minutes
Elongation, 7 day cure at 77° ± 1°F and 45% to 55% Relative Humidity	ASTM D412 (Die C)	500 percent min.
Set to Touch, at 77° ± 1°F and 45% to 55% Relative Humidity	ASTM D1640	Less than 75 minutes
Shelf Life, from date of shipment	—	6 months min.
Bond, to concrete mortar-concrete briquets, air cured 7 days at 77° ± 1°F	AASHTO T132[c]	50 psi min.
Movement Capability and Adhesion, 100% extension at 0°F after air cured 7 days at 77° ± 1°F, and followed by 7 days in water at 77° ± 1°F	ASTM C719[d]	No adhesive or cohesive failure after 5 cycles

Notes:

1. ASTM Designation: C639 Modified (15 percent slope channel A).
2. ASTM Designation: C603, through $^{1}/_{8}$ inches opening at 50 psi.
3. Mold briquets in conformance with the requirements in AASHTO Designation: T132, sawed in half and bonded with a $^{1}/_{16}$ inches maximum thickness of sealant and tested in conformance with the requirements in AASHTO Designation: T132. Briquets shall be dried to constant mass at 212 ± 10°F.
4. Movement Capability and Adhesion: Prepare 12 inch x 1 inch x 3 inch concrete blocks in conformance with the requirements in ASTM Designation: C719. A sawed face shall be used for bond surface. Seal 2 inch of block leaving ½ inches on each end of specimen unsealed. The depth of sealant shall be $^{3}/_{8}$ inches and the width ½ inches.

B. Formulate the silicon joint sealant to cure rapidly enough to prevent flow after application on grades of up to 15 percent.

C. Furnish to the Owner's Representative a Certificate of Compliance. Accompany certificate with a certified test report of the results of the required tests performed on the sealant material within the previous 12 months prior to proposed use. Provide the certificate and accompanying test report for each lot of silicone joint sealant prior to use on the project.

2.6 ASPHALT RUBBER JOINT SEALANT

A. Conform to the requirements of ASTM Designation: D6690 as modified herein or to the following:
   1. Provide a mixture of paving asphalt and ground rubber. Ground rubber to be vulcanized or a combination of vulcanized and de-vulcanized materials ground so that 100 percent will pass a No. 08 sieve and contain not less than 22 percent ground rubber, by mass. Modifiers may be used to facilitate blending.
   2. The Ring and Ball softening point shall be 135°F minimum, when tested in conformance with the requirements in ASTM D36.

3. Provide asphalt rubber sealant material capable of being melted and applied to cracks and joints at temperatures below 400°F.

B. The penetration requirements of Section 4.2 of ASTM Designation: D6690 do not apply. The required penetration at 77˚F, 5 oz, 5s, shall not exceed 120.

C. The resilience requirements of Section 4.5 of ASTM Designation: D6690 do not apply. The required resilience, when tested at 77°F, shall have a minimum of 50 percent recovery.

D. Accompany each lot of asphalt rubber joint sealant shipped to the job site, whether as specified herein or conforming to the requirements of ASTM Designation D6690, as modified herein, by a Certificate of Compliance, storage and heating instructions and precautionary instructions for use.

E. Heat and place in conformance with the manufacturer's written instructions and the details shown on the Plans. Provide manufacturer's instructions to the Owner's Representative. Do not place when the pavement surface temperature is below 50 ˚F.

2.7 PREFORMED COMPRESSION JOINT SEALANT

A. Material: ASTM Designation: D2628.
   1. Number of cells: 5 or 6.
   2. Lubricant Adhesive: ASTM Designation D2835.
   3. Install compression seals along with lubricant adhesive according to the manufacturer's recommendations. Submit manufacturer's recommendations to the Owner's Representative`.

B. Accompany each lot of compression seal and lubricant adhesive by a Certificate of Compliance, storage instructions and precautionary instructions for use. Also submit the manufacturer's data sheet with installation instructions and recommended model or type of preformed compression seal for the joint size and depth as shown on the Plans. Show evidence that the selected seal is being compressed at level between 20 and 50 percent at all times for the joint width and depth shown on the Plans.

2.8 BACKER RODS

A. Provide backer rods that have a diameter prior to placement at least 25 percent greater than the width of the saw cut after sawing and are expanded, crosslinked, closed-cell polyethylene foam that is compatible with the joint sealant so that no bond, adverse reaction occurs between the rod and sealant. In no case use a hot pour sealant that will melt the backer rod. Submit a manufacturer's data sheet verifying that the backer rod is compatible with the sealant to be used.

2.9 SLIP RESISTIVE AGGREGATE FINISH

A. Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

PART 3 EXECUTION

3.1 WATER SUPPLY

A. Provide water supply in accordance with Caltrans Standard Specification Section 10-6,

Watering.

3.2 SUBGRADE

A. Prepare subgrade in accordance with Caltrans Standard Specification Section 40-1.03F, Placing Concrete.

3.3 SOIL STERILANT

A. Furnish and apply to areas indicated in accordance with Section 31 20 00, Earth Moving.

3.4 PLACING

A. Prepare concrete in accordance with Caltrans Standard Specification Section 40-1.03F, Placing Concrete.

3.5 SPREADING COMPACTING AND SHAPING

A. Contractor to select and conform to one of the following:
   1. Stationary Side Form Construction: In accordance with Caltrans Standard Specification Section 40-1.03F(4), Stationary Side-Form Construction.
   2. Slip Form Construction: In accordance with Caltrans Standard Specification Section 40-1.03F(4), Slip Form Construction.

3.6 INSTALLING TIE BARS

A. Install at longitudinal contact joints, longitudinal weakened plane joints, and transverse contact joints as shown on the Plans. In no case, shall any consecutive width of new portland cement concrete pavement tied together with tie bars exceed 50 feet. In no case shall tie bars be used at a joint where portland cement concrete and asphalt concrete pavements abut.

B. Tie bars shall be installed at longitudinal joints by one of the 3 following methods:
   1. Drilling and bonding in conformance with the details shown on the Plans. Provide a two-component, epoxy-resin, conforming to the requirements of ASTM Designation: C881, Type V. Grade 3 (Non-Sagging), Class shall be as follows:

Temperature of Concrete	Required Class of Epoxy Resin
Lower than 40° F	A
40° F through 60° F	B
Above 60° F	C

   2. Provide, at least 7 days prior to start of work, a Certificate of compliance and a copy of the manufacturer's recommended installation procedure. The drilled holes shall be cleaned in accordance with the epoxy manufacturer's instructions and shall be dry at the time of placing the epoxy and tie bars. Immediately after inserting the tie bars into the epoxy, the tie bars shall be supported as necessary to prevent movement during the curing and shall remain undisturbed until the epoxy has cured a minimum time as specified by the manufacturer. Tie bars that are improperly bonded, as determined by the Owner's Representative, will be rejected. If rejected, adjacent new holes shall be drilled, as directed by the Owner's Representative, and new tie bars shall be placed and securely bonded to the concrete. All work necessary to correct improperly bonded tie bars shall be performed at the Contractor's expense.
   3. Insert the tie bars into the plastic slip-formed concrete before finishing the concrete. Inserted tie bars shall have full contact between the bar and the concrete. When tie

bars are inserted through the pavement surface, the concrete over the tie bars shall be reworked and refinished to such an extent that there is no evidence on the surface of the completed pavement that there has been any insertion performed. Any loose tie bars shall be replaced by drilling and grouting into place with epoxy as described in method 1 above at the Contractor's expense.

4. By using threaded dowel splice couplers fabricated from deformed bar reinforcement material, free of external welding or machining. Threaded dowel splice couplers shall be accompanied by a Certificate of Compliance and installation instructions. Installation of threaded dowel splice couplers shall conform to the requirements of the manufacturer's recommendations.

3.7 JOINTS

A. Construct joints in accordance with Caltrans Standard Specification Section 40-1.03B, Joints, except that tie bars shall be as specified under Part 1, Materials.

1. Construction Joints: In accordance with Caltrans Standard Specification Section 40-1.03B(2), Construction Joints.
   a. Construct a construction joint at the end of each day's work, or where concrete placement is interrupted for more than 30 minutes, to coincide with the next weakened plane joint location.
   b. If sufficient concrete has not been mixed to form a slab to match the next contraction joint, when an interruption occurs, the excess concrete shall be removed and disposed of back to the last preceding joint. The cost of removing and disposing of any excess concrete shall be at the Contractor's expense. Any excess material shall be become the property of the Contractor and shall be properly disposed of.
   c. A metal or wooden bulkhead (header) shall be used to form the joint. The bulkhead shall be designed to accommodate the installation of tie bars.
2. Contraction Joints: In accordance with Caltrans Standard Specification Section 40-1.03B (3), Contraction Joints, except that the insert method of forming joints in pavement shall not be used.

3.8 FINISHING

A. Finish concrete in accordance with Caltrans Standard Specification Section 40-1.03H, Finishing.

B. Slip-Resistive Aggregate Finish: Before final floating, spread slip-resistive aggregate finish on paving surface according to manufacturer's written instructions and as follows:

1. Uniformly spread 40 lb per 100 sq. ft. of dampened, slip-resistive aggregate over paving surface in two applications. Tamp aggregate flush with surface using a steel trowel, but do not force below surface.
2. Uniformly distribute approximately two-thirds of slip-resistive aggregate over paving surface with mechanical spreader, allow to absorb moisture, and embed by power floating. Follow power floating with a second slip-resistive aggregate application, uniformly distributing remainder of material at right angles to first application to ensure uniform coverage, and embed by power floating.

3.9 CURING

A. Cure concrete in accordance with Caltrans Standard Specification Section 40-1.03I, Curing.

3.10 SEALING JOINTS

A. Liquid Joint Sealant Installation.

1. The joint sealant detail for transverse and longitudinal joints, as shown on the Plans, shall apply only to weakened plane joints. Construct weakened plane joints by the sawing method. Should grinding or grooving be required over or adjacent to any joint after sealant has been placed, completely remove the joint material and disposed of, and replace at the Contractor's expense. Recess sealant below the final finished surface as shown on the Plans.
2. At the Contractor's option, transverse weakened plane joints shall be either Type DSC or Type SSC as shown on the Plans. Longitudinal weakened plane joints shall be Type SSC only as shown on the Plans.
3. Seven days after the concrete pavement placement and not more than 4 hours before placing backer rods and joint sealant materials, clean the joint walls by the dry sand blast method and other means as necessary to completely remove from the joint all objectionable material such as soil, asphalt, curing compound, paint and rust. After cleaning the joint, remove all traces of sand, dust and loose material from and near the joint for a distance along the pavement surfaces of at least 2 inch on each side of the joint by the use of a vacuum device. Remove surface moisture at the joints by means of compressed air or moderate hot compressed air or other means approved means. Do not use drying procedures that leave a residue or film on the joint wall. Sandblasting equipment shall have a maximum nozzle diameter size of 1/4 $\pm$ 1/32 inches and a minimum pressure of 90-psi.
4. Install backer rod as shown on the Plans. Provide an expanded, closed-cell polyethylene foam backer rod that is compatible with the joint sealant so that no bond or adverse reaction occurs between the rod and sealant. Install backer rod when the temperature of the portland cement concrete pavement is above the dew point of the air and when the air temperature is 40°F or above. Install backer rod when the joints to be sealed have been properly patched, cleaned and dried. Do not use a method of placing backer rod that leave a residue or film on the joint walls.
5. Immediately after placement of the backer rod, place the joint sealant in the clean, dry, prepared joints as shown on the Plans. Apply the joint sealant by a mechanical device with a nozzle shaped to fit inside the joint to introduce the sealant from inside the joint. Apply adequate pressure to the sealant to ensure that the sealant material is extruded evenly and that full continuous contact is made with the joint walls. After application of the sealant recess the surface of the sealant as shown on the Plans.
6. Any failure of the joint material in either adhesion or cohesion of the material will be cause for rejection of the joint. Conform the finished surface of joint sealant to the dimensions and allowable tolerances shown on the Plans. Rejected joint materials or joint material whose finished surface does not conform to the dimensions shown on the Plans shall be repaired or replaced, at the Contractor's expense, with joint material that conforms to the requirements.
7. After each joint is sealed, remove all surplus joint sealer on the pavement surface. Traffic shall not be permitted over the sealed joints until the sealant is tack free and set sufficiently to prevent embedment of roadway debris into the sealant.

B. Preformed Compression Joint Seal Installation
1. The compression seal alternative joint detail for transverse and longitudinal joints, as shown on the Plans, shall apply only to weakened plane joints. Construct weakened plane joints by the sawing method. Should grinding or grooving be required over or adjacent to any joint after the compression seal has been placed, completely remove the joint materials and disposed of, and replace at the Contractor's expense. Compression seal shall be recessed below the final finished surface as shown on the Plans.
2. At the Contractor's option, transverse weakened plane joints shall be either Type DSC or Type SSC as shown on the Plans. Longitudinal weakened plane joints shall be Type SSC only as shown on the Plans.
3. Seven days after the concrete pavement placement and not more than 4 hours before placing preformed compression joint seals, clean the joint walls by the dry sand blast

method and other means as necessary to completely remove from the joint all objectionable material such as soil, asphalt, curing compound, paint and rust. After cleaning the joint, remove all traces of sand, dust and loose material from and near the joint for a distance along the pavement surfaces of at least 50 mm on each side of the joint by the use of a vacuum device. Remove surface moisture at the joints by means of compressed air or moderate hot compressed air or other means. Do not use drying procedures that leave a residue or film on the joint wall. Sandblasting equipment shall have a maximum nozzle diameter size of 1/4 ± 1/32 inches and a minimum pressure of 90 psi.

3.11 PROTECTING CONCRETE PAVEMENT

A. Protect pavement in accordance with Caltrans Standard Specification Section 40-1.03J Protecting Concrete Pavement.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 32 13 18

CEMENT AND CONCRTETE FOR EXTERIOR IMPROVEMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials for portland cement concrete

B. Aggregate and aggregate grading for portland cement concrete

C. Water for portland cement concrete

D. Admixtures for portland cement concrete

E. Proportioning for portland cement concrete

F. Mixing and transporting portland cement concrete

G. Formwork for cast in place portland cement concrete

H. Embedded materials for portland cement concrete

I. Steel reinforcement for portland cement concrete

J. Placing and finishing portland cement concrete

K. Curing portland cement concrete

L. Protecting portland cement concrete

1.2 RELATED SECTIONS

A. Section 32 12 16, Asphalt Paving

B. Section 32 13 13, Concrete Pavement

1.3 RELATED DOCUMENTS

A. ASTM Standards
   1. A615, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
   2. A1064, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
   3. C94, Standard Specification for Ready-mixed Concrete
   4. C150, Standard Specification for Portland Cement
   5. C260, Standard Specification for Air-Entraining Admixtures for Concrete
   6. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
   7. C494, Standard Specification for Chemical Admixtures for Concrete.
   8. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use in Portland Cement
   9. C1017, Standard Specification for Chemical Admixtures for Use in Producing Flowing

Concrete
10. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
11. D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

B. Caltrans Standard Specifications, 2018
1. Section 51: Concrete Structures
2. Section 73: Concrete Curbs and Sidewalks
3. Section 90: Concrete

1.4 DEFINITIONS

A. ASTM: American Society for Testing and Materials

1.5 SUBMITTALS

A. Concrete Mix Design: Have all concrete mixes designed by a testing laboratory and approved by the Consulting Engineer. Conform all mixes to the applicable building code requirement, regardless of other minimum requirements listed herein or on the Plans. Submit mix designs for review before use. Show proportions and specific gravities of cement, fine and coarse aggregate, and water and gradation of combined aggregates.

B. Reinforcing Steel Shop-Drawings

1.6 QUALITY ASSURANCE

A. Concrete shall be subject to quality assurance in accordance with Section 90 of the Caltrans Standard Specifications.
1. Slump tests: Have available, at job site, equipment required to perform slump tests. Make one slump test for each cylinder sample, from same concrete batch. Allowable maximum slump shall be 4 inches for walls and 3 inches for slabs on grade and other work.

B. Certifications:
1. Provide Owner's Representative at the time of delivery with certificates of compliance signed by both Contractor and Supplier containing the following statements:
   a. Materials contained comply with the requirements of the Contract Documents in all respects.
   b. Proportions and mixing comply with the design mix approved by the Consulting Engineer. Design mix shall have been field tested in accordance with the herein requirements of the Caltrans Standard Specifications and produces the required compressive strength under like conditions.
   c. Statement of type and amount of any admixtures.
2. Provide Owner's Representative, at time of delivery, with certified delivery ticket stating volume of concrete delivered and time of mixing, or time of load-out in case of transit mixers.

1.7 DESIGNATION

A. General: Whenever the 28 day compressive strength is designated herein or on the Plans is 3,600 psi or greater, the concrete shall considered to be designated by compressive strength. The 28 day compressive strength shown herein or on the plans which are less than 3,600 psi are shown for design information only and are not considered a requirement for acceptance of the concrete. Whenever the concrete is designated by class or as minor

concrete herein or on the Plans, the concrete shall contain the cement per cubic yard shown in Section 90-2 of the Caltrans Standard Specifications.

B. Unless specified otherwise herein or on the Plans, portland cement concrete for curbs, gutters, sidewalks and their appurtenances such as island paving, curb ramps and driveways, shall be minor concrete as specified in Section 90-2 of the Caltrans Standard Specifications.

PART 2 PRODUCTS

2.1 PORTLAND CEMENT

A. General: Type II or Type V cement conforming to the requirements of ASTM C150. Contractor may substitute pozzolan for portland cement in amounts up to 15% of the required mix unless high early strength concrete is specified. Pozzolan shall consist of Class F Fly Ash meeting the requirements of ASTM C618.

B. Color: Provide a coloring equivalent to ¼ pound of lampblack per cubic yard. Add to the concrete at the central mixing plant. See landscape architect requirements.

2.2 AGGREGATE AND AGGREGATE GRADATION

A. General: Fine and coarse aggregates shall be ¾ inch maximum size; clean and crushed aggregate free of materials which may cause staining. Aggregates shall conform to the requirements of section 90-1.02C of the Caltrans Standard Specifications.

B. Aggregate Size and Gradation: Conform to the requirements of section 90-1.02C(4)(d) of the Caltrans Standard Specifications for 1 inch maximum combined aggregate.

2.3 WATER

A. General: Water shall be clean, free from injurious amounts of oil, alkali, organic matter, or other deleterious material, and not detrimental to concrete per ASTM C94. Water shall conform to the requirements of section 90-1.02D of the Caltrans Standard Specifications, for mixing and curing portland cement concrete and for washing aggregates.

2.4 CHEMICAL ADMIXTURES

A. Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain no more than 0.1 percent water-soluble chloride ions by mass of cementitious material. Admixtures shall conform to the requirements of section 90-1.02E of the Caltrans Standard Specifications and as noted herein or on the Plans.
1. Air-Entraining Admixture: ASTM C260/C260M
2. Water-Reducing Admixture: ASTM C494/C494M, Type A
3. Retarding Admixture: ASTM C494/C494M, Type B
4. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D
5. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F
6. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type G
7. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II

2.5 CLASSIFICATION OF PORTLAND CEMENT CONCRETE

A. Unless specified otherwise herein or on the Plans, portland cement concrete for the following items shall be designated as follows:
1. Curbs, Gutters, and Sidewalks: Minor concrete.

2. Cast in Place Concrete Pipe: The concrete shall consist of a minimum of 564 pounds of portland cement per cubic yard of concrete.
3. Thrust Blocks: The concrete shall have a minimum compressive strength of 3,000 psi.
4. Sign and Fence Footings: The concrete shall consist of a minimum of 376 pounds of portland cement per cubic yard of concrete.
5. Water, Storm, and Sanitary Structures: The concrete shall consist of a minimum of 564 pounds of portland cement per cubic yard of concrete.

2.6 EXPANSION JOINT MATERIAL

A. Material for expansion joints in portland cement concrete improvements shall be premolded expansion joint fillers conforming to the requirements of ASTM D1751. Expansion joint material shall be shaped to fit the cross section of the concrete prior to being placed. Suppliers certificates showing conformance with this specification shall be delivered with each shipment of materials delivered to the job site. Unless specified otherwise herein or on the Plans, expansion joint thickness shall be as follows:
   1. Concrete Slope Protection, Gutter Lining, Ditch Lining and Channel Lining: ½ inch
   2. Structures: As indicated

2.7 REINFORCEMENT AND DOWELS

A. Bar reinforcement for concrete improvements shall be deformed steel bars of the size or sizes called for on the plans conforming to the requirements of ASTM A615 for Grade 60 bars. Size and shape for bar reinforcement shall conform to the details shown or called for on the Plans. Substitution of wire mesh reinforcement for reinforcing bars will not be allowed.

B. Slip dowels, where noted or called for on the Plans or detail drawings shall be smooth billet-steel bars as designated and conforming to the requirements of ASTM A615 for Grade 60 bars. Ends of bars inserted in new work shall be covered with a cardboard tube sealed with cork; no grease or oil shall be used.

C. Mesh for reinforcement for concrete improvements shall be cold drawn steel wire mesh of the size and spacing called for on the plans conforming to the requirements of ASTM A1064. Size and extent of mesh reinforcement shall conform to the details shown or called for on the plans.

D. Tie wire for reinforcement shall be eighteen (18) gauge or heavier, black, annealed conforming to the requirements of ASTM A1064.

E. Suppliers certificates showing conformance with this specification shall be delivered with each shipment of materials delivered to the job site.

2.8 COLOR AND PATTERN FOR DECORATIVE SURFACES

A. Colors for decorative surfacing shall be CHROMIX admixtures as manufactured by the L. M. Scofield Company, Schedule A-312.05 or approved equal. The specific color shall be as designated or called for on the Plans.

B. Patterns for decorative surfacing shall be standard "Bomanite" patterns as copyrighted by the Bomanite Corporation of Palo Alto, California or equal. The specific pattern shall be as designated or called for on the Plans.

2.9 CURING AND SEALING MATERIALS

A. Curing Compounds:

1. Concrete surface repellent-vertical and/or flatwork: Repello surface treatment, invisible chemical treatment barrier system.
2. Curing and sealing-exterior: Colorcure concrete cureseal manufactured by L.M. Scofield Company or approved equal. Color-matched, water-based curing and sealing compound that complies with ASTM C309.
3. Color Conditioned Decorative Portland Cement Concrete: LITHOCHROME colorwax manufactured by L.M. Scofield Company or approved equal. Color-matched, water-based curing and sealing compound that complies with ASTM C309.

2.10 FORMS

A. Conform to the requirements of Section 73-1.03C and Section 90-1.03B(5) of the Caltrans Standard Specifications.

B. Tolerance: Not to deviate more than ¼ inch in 10 feet in grade and alignment.

2.11 PRECAST CONCRETE STRUCTURES

A. Conform to the following Sections of Caltrans Standard Specifications:
1. 51-7, Minor Structures
2. 70-5.02, Flared End Sections

2.12 CONCRETE VEHICULAR PAVEMENT

A. General: See Section 32 13 13, Concrete Pavement.

PART 3 EXECUTION

3.1 STRUCTURAL EXCAVATION

A. Structural excavation may be either by hand, or by machine and shall be neat to the line and dimension shown or called for on the plans. Excavation shall be sufficient width to provide adequate space for working therein, and comply with CAL-OSHA requirements.

B. Where an excavation has been constructed below the design grade, refill the excavation to the bottom of the excavation grade with approved material and compact in place to 95% of the maximum dry density as determined by ASTM D1557.

C. Remove surplus excavation material remaining upon completion of the work from the job site, or condition it to optimum moisture content and compact it as fill or backfill on the site.

3.2 BRACING AND SHORING

A. Conform to California and Federal OSHA requirements.

B. Place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the facility being constructed; and to prevent damage to adjacent structures or facilities. Remove all bracing and shoring upon completion of the work.

C. Be solely responsible for all bracing and shoring and, if requested by the Owner's Representative, submit details and calculations to the Owner's Representative. The Owner's Representative may forward the submittal to the Consulting Engineer for their review. The Contractor's submittal shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the

materials and methods to be used, and shall be prepared by a civil engineer or structural engineer registered in California. No excavations related to the proposed facility shall precede a response to the submittal by the Owner's Representative.

D. Be solely responsible for installing and extracting the sheathing in a manner which will not disturb the position or operation of the facility being constructed or adjacent utilities and facilities.

3.3 PLACING CONCRETE FORMS

A. Form concrete improvements with a smooth and true upper edge. Side of the form with a smooth finish shall be placed next to concrete. Construct forms rigid enough to withstand the pressure of the fresh concrete to be placed without any distortion.

B. Thoroughly clean all forms prior to placement and coat forms with an approved form oil in sufficient quantity to prevent adherence of concrete prior to placing concrete.

C. Carefully set forms to the alignment and grade established and conform to the required dimensions. Rigidly hold forms in place by stakes set at satisfactory intervals. Provide sufficient clamps, spreaders and braces to insure the rigidity of the forms.

D. Provide forms for back and face of curbs, lip of gutters and edge of walks, valley gutters or other surface slabs that are equal to the full depth of the concrete as shown, noted or called for on the Plans. On curves and curb returns provide composite forms made from benders or thin planks of sufficient ply to ensure rigidity of the form.

3.4 PLACING STEEL REINFORCEMENT

A. Bars shall be free of mortar, oil, dirt, excessive mill scale and scabby rust and other coatings of any character that would destroy or reduce the bond. All bending shall be done cold, to the shapes shown on the plans. The length of lapped splices shall be as follows:
   1. Reinforcing bars No. 8, or smaller, shall be lapped at least 45 bar diameters of the smaller bar joined, and reinforced bars Nos. 9, 10, and 11 shall be lapped at least 60 bar diameters of the smaller bars joined, except when otherwise shown on the plans.
   2. Splice locations shall be made as indicated on the plans.

B. Accurately place reinforcement as shown on the plans and hold firmly and securely in position by wiring at intersections and splices, and by providing precast mortar blocks or ferrous metal chairs, spacers, metal hangers, supporting wires, and other approved devices of sufficient strength to resist crushing under applied loads. Provide supports and ties of such strength and density to permit walking on reinforcing without undue displacement.

C. Place reinforcing to provide the following minimum concrete cover:
   1. Surfaces exposed to water: 4 inches.
   2. Surfaces poured against earth: 3 inches.
   3. Formed surfaces exposed to earth or weather: 2 inches.
   4. Slabs, walls, not exposed to weather or earth: 1 inch.

D. Minimum spacing, center of parallel bars shall be two and one half (2 ½) times the diameter of the larger sized bar. Accurately tie reinforcing securely in place prior to pouring concrete. Placing of dowels or other reinforcing in the wet concrete is not permitted.

3.5 MIXING AND TRANSPORTING PORTLAND CEMENT CONCRETE

A. Transit mix concrete in accordance with the requirements of ASTM Designation C94.

Transit mix for not less than ten (10) minutes total, not less than three (3) minutes of which shall be on the site just prior to pouring. Mix continuous with no interruptions from the time the truck is filled until the time it is emptied. Place concrete within one hour of the time water is first added unless authorized otherwise by the Owner's Representative.

B. Do not hand mix concrete for use in concrete structures.

3.6 PLACING PORTLAND CEMENT CONCRETE

A. Thoroughly wet subgrade when concrete is placed directly on soil. Remove all standing water prior to placing concrete.

B. Do not place concrete until the subgrade and the forms have been approved.

C. Convey concrete from mixer to final location as rapidly as possible by methods that prevent separation of the ingredients. Deposit concrete as nearly as possible in final position to avoid re-handling.

D. Place and solidify concrete in forms without segregation by means of mechanical vibration or by other means as approved by the Owner's Representative. Continue vibration until the material is sufficiently consolidated and absent of all voids without causing segregation of material. The use of vibrators for extensive shifting of fresh concrete will not be permitted.

E. Concrete in certain locations may be pumped into place upon prior approval by the Owner's Representative. When this procedure requires redesign of the mix, such redesign shall be submitted for approval in the same manner as herein specified for approval of design mixes.

3.7 PLACING ACCESSORY MATERIALS

A. Place water stops and other items required to be embedded in of portland cement concrete structures at locations shown or required in accordance with Section 51-2.04 of the Caltrans Standard Specifications unless otherwise specifically noted or called for on the Plans.

B. Curing Compounds:
   1. Regular Portland Cement Concrete: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
   2. Color Conditioned Decorative Portland Cement Concrete: Apply in accordance with the manufacturer's written instructions.

3.8 FORM REMOVAL

A. Remove forms without damage to the concrete. Remove all shores and braces below the ground surface, before backfilling.

B. Do not backfill against concrete until the concrete has developed sufficient strength to prevent damage.

C. Leave forms for cast-in-place walls in place at least 72 hours after pouring.

D. Leave edge forms in place at least 24 hours after pouring.

3.9 DECORATIVE SURFACING CONSTRUCTION

A. Decorative surfacing concrete walks, concrete median islands or other installations shall be formed and placed as a concrete slab conforming to the details shown or noted on the Plans.

3.10 FIELD QUALITY CONTROL

A. Finish subgrade for concrete improvements shall be subject to approval prior to placement of forms.

B. No concrete shall be placed prior to approval of forms.

C. Concrete improvements constructed shall not contain "bird baths" or pond water and shall be smooth and ridge free.

D. Conform the finish grade and cross section of concrete improvements to the design grades and cross sections.

E. Variation of concrete improvements from design grade and cross section as shown or called for on the plans shall not exceed the tolerances ACI 117 and as follows:
   1. Elevation: ¼ inch.
   2. Thickness: Plus 3/8 inch, minus 1/4 inch.
   3. Surface: Gap below 10 foot long, unleveled straightedge not to exceed 1/4 inch.
   4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
   5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
   6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
   7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
   8. Joint Spacing: 3 inches, unless otherwise indicated.
   9. Contraction Joint Depth: Plus 1/4 inch, no minus.
   10. Joint Width: Plus 1/8 inch, no minus.

3.11 RESTORATION OF EXISTING IMPROVEMENTS

A. Replace in kind all pavement or other improvements removed or damaged due to the installation of concrete improvements.

B. Remove, landscaping or plantings damaged or disturbed due to the installation of concrete improvements. Replace in kind.

END OF SECTION

SECTION 32 14 00

SLURRY SEAL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The Contractor shall perform all work associated with Slurry Seal as shown and as specified herein including all labor, materials, equipment supplies, and facilities associated with providing a finished product satisfying all the requirements of the Contract Documents.

1.2 CONTRACTOR SUBMITTALS

A. The Contractor shall submit, at least seven (7) working days before slurry seal placement commences, a laboratory report of test results and proposed mix design covering the specific materials to be used on the project. The percentage of asphaltic emulsion proposed in the mix design shall be within the percentage range specified herein.

1.3 RELATED SECTIONS

A. Section 32 17 23, Pavement Markings

1.4 RELATED DOCUMENTS

A. Caltrans Standard Specifications, 2015
   1. Section 37: Bituminous Seal

PART 2 PRODUCTS

2.1 SLURRY SEAL

A. Slurry seal shall be Type II in accordance with Section 37-3 of the Caltrans Standard Specifications with the exceptions noted in these specifications.

2.2 AGGREGATE

A. Aggregate for Type II slurry seal shall be in accordance with Section 37-3.02A and 37-3.02B of the Caltrans Standard Specifications.

2.3 ASPHALTIC EMULSION

A. Asphaltic emulsion shall be Grade PMCQS1h, complying with Section 37-3B(3) of the Caltrans Standard Specifications.

B. The polymer within the asphalt emulsion shall be Neoprene, SBR, EVA, or SBS or approved equal. Solid polymer such as EVA, SBS, or approved equal shall be adequately blended into the asphalt prior to the asphalt prior to emulsification. If latex such as Neoprene, SBR or similar is used, the latex shall be "co-milled" into the emulsion through the water phase during manufacturing. Each load of polymer asphaltic emulsion shall have a certificate from the asphalt emulsion manufacturing indicating that either asphalt blending or "co-milling" process is used. The certificate shall also state the percentage of the solid rubber polymer added, by weight of the asphalt, as well as the composition of the polymer. The addition of

latex to the emulsion after emulsion manufacturing is prohibited.

2.4 WATER AND ADDITIVE

A. Water shall be of such quality that the asphalt will not separate from the emulsion before the slurry seal is in place in the work. If necessary for workability, a set-control agent that will not adversely affect the slurry seal may be used.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. The application of Type II slurry seal shall conform to Section 37-3.03 of the Caltrans Standard Specifications with the exceptions noted in these Specifications.
   1. The slurry seal shall be placed at a rate to produce 10 to 13 pounds of aggregate per square yard for Type II slurry, as required in these Specifications. The complete mixture shall be such that the slurry seal mixture has proper workability and will permit traffic flow within two (2) hours after placement without the occurrence of bleeding, raveling, polishing, separation, or other distress within 30 days after its placement.
   2. Asphaltic emulsion shall be added at a rate of between 10 to 15 percent by weight of the dry aggregate. The extract rate will be determined by the Engineer. The quantity of asphaltic emulsion to be used in the slurry seal mixture will be determined by the design asphalt binder content, as approved by the Engineer, and the asphalt solid content of the asphaltic emulsion furnished.
   3. The Contractor shall sweep all slurry seal streets seven (7) days after the application of slurry seal with a power sweeper.

3.2 PROPORTIONAL MIXING

A. The proportional mixing of slurry seal shall conform to Section 37-3.03B and 37-3.03C of the Caltrans Standard Specifications.

B. The mixer shall thoroughly blend all materials to form a homogenous mass before leaving the mixer.

3.3 SURFACE PREPARATION

A. All existing striping and pavement markers shall also be removed prior to the application of the slurry seal. The slurry shall be applied within 72 hours after the removal of pavement striping marker.

B. The complete street surface shall be power swept from face of curb to face of curb prior to the application of slurry seal. The Contractor shall provide cleaning method necessary to remove all dirt, vegetation, and loose materials from the pavement.

C. All material gathered shall be properly disposed of by the Contractor. The Contractor shall remove all plant material growing in the street or on the interface of the asphalt surface with the lip of concrete gutter prior to placing slurry.

D. Immediately preceding the slurry seal application, the Contractor shall cover all grates, slotted manholes, and other appurtenances on the pavement that would allow the entry of slurry; cover all manhole covers, water and gas valve box covers, monuments boxes, grates and other exposed facilitates with plastic oil resistant construction paper secured by tape or adhesive. The Contractor prior to the final set of the slurry shall uncover all covered manholes, valves, grates and boxes. All uncovered items shall be clean and meet the

requirement of the Project Inspector.

E. All catch basin grates and hoods adjacent to the work or within 50 feet shall be covered to prevent slurry from entering the catch basin.

3.4 SPREADER BOX

A. The slurry mixture shall be spread by means of a controlled spreader box conforming to Section 37-3.03C of the Caltrans Standard Specifications.

B. The spreader box shall be clean and free of all slurry seal and emulsion at the start of each working shift.

3.5 SAND BLOTTER

A. A sand blotter shall be spread at selected driveways, intersections, and where required by the Engineer to accommodate pedestrian or vehicular traffic until the slurry set.

3.6 APPLICATION OF SLURRY SURFACE

A. The surface shall be fogged with water directly preceding the spreader. The slurry mixture shall be of the desired consistency when deposited on the surface. Total time of mixing shall not exceed four (4) minutes. A sufficient amount of slurry shall be carried in all parts of the spreader at all times so that the complete coverage is obtained. No lumping, balling or unmixed aggregate shall be permitted. No segregation of the emulsion and aggregate fines from the coarse aggregate will be permitted. If coarse aggregate settles to the bottom of the mix, the slurry will be removed from the pavement. No excessive breaking of the emulsion will be allowed in the spread box. No streaks such as those caused by oversize aggregate will be left in the finished pavement.

B. The entire pavement, including the area around curb return shall be covered from gutter lip to gutter lip. The ends of slurry seal streets shall be a clean, straight line created by placing 15 lb felt paper with a 30 in. minimum width to create the line.

C. Longitudinal joints must correspond with lane lines. You may request other longitudinal joint patterns if they do not adversely affect the slurry seal.

D. Spread slurry seal in full lane widths. Do not overlap slurry seal between adjacent lanes more than 3 inches.

E. Use kraft paper at transverse joints and over previously placed slurry seal to prevent double placement. Remove the paper after use. Use hand tools to remove spillage.

F. No excessive buildup, or unsightly appearance shall be permitted on longitudinal or transverse joints. Burlap drags shall be used and changed daily.

G. Approved squeegees shall be used to spread slurry in non-accessible areas to the slurry mixer. Care shall be exercised in leaving no unsightly appearance from handwork.

H. Slurry application will be stopped to allow sufficient time to allow slurry to cure prior to opening streets to traffic. Protect the slurry seal from damage until it has cured.

I. All gutter spills must be cleaned immediately.

3.7 WEATHER LIMITATIONS

A. The slurry seal shall not be applied when either atmospheric or pavement temperature is 55 degrees Fahrenheit and falling but may be applied when either the atmospheric or pavement temperature is above 45 degrees Fahrenheit and rising. The slurry seal shall not be applied during periods of abnormally high relative humidity.

3.8 SLURRY REPAIR

A. In the event that the applied slurry seal surface violates the project requirements or has the following conditions:
   1. Tire or wheel marks
   2. Longitudinal ridges
   3. Picked up or raveled areas
   4. Transverse ridges or bumps
   5. Washboarding or excessively rough sand blotters

B. The slurry seal shall be repaired as follows:
   1. The slurry seal shall be removed by a "PENHALL PROFILER" or equal and a full lane width pass of slurry seal applied in full compliance with these specifications.
   2. The Engineer may omit removal of the affected slurry seal if it would not affect the repair.

3.9 STRIPING

A. Temporary striping and legends shall be placed on the newly slurry sealed streets prior to the release of streets to traffic. These materials must be submitted to the Engineer for approval prior to installation.

B. Permanent striping shall be installed after seven (7) days but no later than ten (10) days after the slurry seal is complete in accordance with Section 32 17 23, Pavement Markings.

END OF SECTION

SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal of existing traffic stripes and pavement markers

B. Removal of existing signs

C. Cleaning and sweeping of streets before application of traffic stripes and pavement markings

D. Materials and application for traffic stripes and pavement markings

E. Materials and application for pavement markers

F. Traffic control signs and street name signs

G. Object markers

H. Survey monuments

1.2 RELATED SECTIONS

A. Section 01 10 00, Supplemental General Requirements

B. Section 32 13 18, Cement and Concrete for Exterior Improvements

1.3 RELATED DOCUMENTS

A. Caltrans Standard Specifications, 2015
   1. Section 78, Incidental Construction
   2. Section 81, Miscellaneous Traffic Control Devices
   3. Section 82, Signs and Markers
   4. Section 84, Markings

B. Caltrans Standard Plans, 2015
   1. Plan A20A through A20D: Pavement Markers and Traffic Lines, Typical Details
   2. Plan A24A and A24B: Pavement Markings Arrows
   3. Plan A24C: Pavement Markings, Symbols and Numerals
   4. Plan A24D: Pavement Markings, Words
   5. Plan A24E: Pavement Markings, Words, Limit and Yield Lines
   6. Plan A24F: Pavement Markings, Crosswalks
   7. Plan A73A: Object Markers
   8. Plan A73B: Markers
   9. Plan A73C: Delineators, Channelizers and Barricades
   10. Plan A74: Survey Monuments
   11. Plan RS1: Roadside Sign, Typical Installation Details No. 1
   12. Plan RS2: Roadside Sign, Wood Post - Typical Installation Details No. 2
   13. Plan RS3: Roadside Sign, Laminated Wood Box Post - Typical Installation Details No. 3
   14. Plan RS4: Roadside Sign, Typical Installation Details No. 4

C. The State of California Traffic Manual, 2014

D. The regulations, standards, and tests of the State of California Department of Transportation Materials and Research Division, edition in effect at time of date on Plans.

E. Professional Land Surveyor's Act, Business and Professions Code §§ 8700 – 8805

1.4 SUBMITTALS

A. Submit product data for each of the following in accordance with Section 01 10 00, Supplemental General Requirements:
   1. Traffic paint
   2. Pavement markers and adhesives
   3. Reflectorized markers and posts

1.5 QUALITY ASSURANCE

A. Deliver certificates showing conformance with this specification to the Owners Representative with each shipment of materials and equipment to the Project site.

B. Provide proper facilities for handling and storage of products to prevent damage. Where necessary, stack products off ground on level platform, fully protected from weather.

1.6 PROJECT CONDITIONS

A. Do not apply traffic striping or pavement markings to the pavement until after approval to proceed has been given by the Owners Representative.

B. Thoroughly cure new asphalt concrete and portland cement concrete before application of stripes, markings or markers.

PART 2 PRODUCTS

2.1 THERMOPLASTIC STRIPES AND MARKING

A. Thermoplastic striping and marking materials shall be in accordance with Caltrans Standard Specifications Sections 84-2.02 and 84-2.02B, unless noted otherwise herein or on the Plans.

B. Glass Beads shall be in accordance with Caltrans Standard Specification Section 84-2.02D, Glass Beads, unless noted otherwise herein or on the Plans.

C. Thermoplastic stripes and markings shall have a minimum skid friction value of BPN 35.

2.2 PAINTED STRIPES AND MARKINGS

A. Painted striping and marking materials shall be in accordance with Caltrans Standard Specifications Sections 84-2.02 and 84-2.02C, unless noted otherwise herein or on the Plans.

B. Glass Beads shall be in accordance with Caltrans Standard Specification Section 84-2.02D, Glass Beads, unless noted otherwise herein or on the Plans.

2.3 PAVEMENT MARKERS

A. Pavement Markers shall be in accordance with Caltrans Standard Specification Section 81-3, Pavement Markers, and as indicated on the Plans.

B. Material
   1. Non-reflective Material shall be in accordance with Caltrans Standard Specification Section 81-3.02B, Non-Reflective Pavement Markers.

PART 3 RETROREFLECTIVE MATERIAL SHALL BE IN ACCORDANCE WITH CALTRANS STANDARD SPECIFICATION SECTION 81-3.02C, RETROREFLECTIVE PAVEMENT MARKERS.

A. Adhesive:
   1. Adhesive Material shall be in accordance with Caltrans Standard Specification Section 81-3.02D, Hot Melt Bituminous Adhesive.

3.2 TRAFFIC CONTROL SIGNS

A. General: Traffic control signs shall be in accordance with Caltrans Standard Specification Section 82-1, Signs and Markers.

B. Sign Panels shall be in accordance with Caltrans Standard Specification Section 82-2, Sign Panels. Conform type (regulatory or warning), size, shape and pattern to the State of California, Department of Transportation, Traffic Manual, edition in effect at the date of the Plans.

C. Posts:
   1. Metal Posts shall be in accordance with Caltrans Standard Specification Section 82-3.02B, Metal Posts.
   2. Wood Posts shall be in accordance with Caltrans Standard Specification Section 82-3.02C, Wood Posts.

D. Mounting Hardware shall be in accordance with Caltrans Standard Specification 82-3.02E, Sign Panel Fastening and Mounting Hardware, unless otherwise specified.

E. Post Foundations: Conform to Caltrans Standard Plans.

3.3 STREET NAME SIGNS

A. Conform to manufacturer, style, size, and shape shown on the Plans.

B. Posts: 2 inch inside diameter steel pipe unless noted otherwise on the Plans. Posts shall be in accordance with Caltrans Standard Specification Section 82-3.02B, Metal Posts.

C. Post Foundations: Portland cement concrete in accordance with Section 32 13 18, Cement and Concrete for Exterior Improvements.

3.4 REFLECTORIZED OBJECT MARKERS

A. Reflectorized Metal Object Markers: In accordance with Caltrans Standard Specification Section 82-5, Markers, for target plates and reflectors, and Caltrans Standard Plans A73A through A73C. Marker type shall be as shown on Plans.

B. Posts: Metal posts shall be in accordance with Caltrans Standard Specification Section 82-5.02C, Metal Posts, and Caltrans Standard Plan A73B.

C. Mounting Hardware: In accordance with Caltrans Standard Specification Section 82-5.02G,

Hardware.

3.5 STREET SURVEY MONUMENTS

A. General: In accordance with Caltrans Standard Specification Section 78-2, Survey Monuments, except that the marker disk will not be furnished. Marker disk shall be 2 inch diameter solid brass with a 2 ¾ inch shaft, "Lietz No. 525" or approved equal.
   1. Portland Cement Concrete: In accordance with Section 32 13 18, Cement and Concrete for Exterior Improvements.

PART 4 EXECUTION

4.1 REMOVAL OF TRAFFIC STRIPES, PAVEMENT MARKINGS AND PAVEMENT MARKERS

A. Where blast cleaning is used for the removal of painted traffic stripes and pavement markings, or for removal of objectionable material, remove the residue, including dust and water, immediately after contact with the surface being treated. Remove by a vacuum attachment operating concurrently with the blast cleaning operation.

B. Where grinding is used for the removal of thermoplastic traffic stripes and pavement markings; remove the residue by means of a vacuum attachment to the grinding machine. Do not allow the residue to flow across or be left on, the pavement.

C. Where markings are to be removed by blast cleaning or by grinding, the removed area shall be approximately rectangular so that no imprint of the removed marking remains on the pavement.

D. Waste from removal of yellow painted traffic stripe may contain lead chromate. Residue produced when yellow paint is removed may contain heavy metals in concentrations that exceed thresholds established by the California Health and Safety Code and may produce toxic fumes when heated. As such, when grinding or other methods approved by the Owner's Representative are used to remove yellow painted traffic stripes, the removed residue, including dust, shall be collected and contained immediately. The Contractor shall submit a written work plan for the removal, storage, and disposal of yellow painted traffic stripe to the Owner's Representative for approval not less than fifteen (15) days prior to the start of the removal operations. Removal operations shall not be started until the Owner's Representative has approved the work plan.

E. Contractor will be responsible for repairing any damage to the pavement during removal of pavement markers. Damage to the pavement, resulting from removal of pavement markers, shall be considered as any depression more than 1/4-inch deep.

4.2 TEMPORARY PAVEMENT MARKERS

A. If permanent pavement markers cannot be installed immediately, and the street or road is to be placed in service, install short term, temporary pavement markers on the new pavement prior to opening the street or road to traffic.

B. Place markers, at a minimum, of 24 feet on centers, or as required by the governmental agency having jurisdiction, in the appropriate colors to delineate centerlines and travel lanes on multi-lane roadways.

4.3 THERMOPLASTIC TRAFFIC STRIPES AND PAVEMENT MARKINGS

A. Apply in conformance with the manufacturer's instructions and the applicable requirements

Caltrans Standard Specification Section 84-2.03, Construction, and Caltrans Standard Plans A20A through A20D, and A24A through A24E.

4.4 PAINTED TRAFFIC STRIPES AND PAVEMENT MARKINGS

A. Apply in conformance with the manufacturer's instructions and the applicable requirements of Caltrans Standard Specification Section 84-3.03, 3.04 and 3.05 and Caltrans Standard Plans A20A through A20D, and A24A through A24F.

4.5 PAVEMENT MARKERS

A. Place in accordance with Caltrans Standard Specification Section 81-3.03, Construction.

B. Pavement recesses are not required. Markers shall be installed accurately to the line established by the Owner's Representative. No markers shall be installed until the surface has been approved by the Owner's Representative.

4.6 TRAFFIC CONTROL SIGNS

A. Install in accordance with Caltrans Standard Specification Sections 82-2.03 and 82-3.03, Caltrans Standard Plan RS1, the applicable requirements of the State of California Department of Transportation Maintenance Manual and the details shown on the Plans. The horizontal locations shown on Caltrans Standard Plan RS1 shall not be applicable, the horizontal location shall be as shown on the Plans.

B. Portland cement concrete for post foundations shall be of the configuration shown on the Plans.

C. After erection, damage to traffic sign faces shall be touched up or the sign replaced.

4.7 STREET NAME SIGNS

A. Install in accordance with the manufacturer's instructions and as shown on the Plans.

B. Horizontal location shall be as shown on the Plans.

C. Portland cement concrete for post foundations shall be of the configuration shown on the Plans.

4.8 REFLECTORIZED OBJECT MARKERS.

A. Install in accordance with Caltrans Standard Specification Section 82-5.03, Construction, except that the metal marker posts shall not be driven in place without prior approval of the Owner's Representative.

B. Install at locations shown on the Plans.

4.9 STREET SURVEY MONUMENTS

A. Install Survey Monuments in accordance with Caltrans Standard Specification Section 78-2.03, Construction and Caltrans Standard Plan A74, except that the marker disk will not be furnished. Exact point in marker to be determined by an accurate survey and placed by a California Licensed Land Surveyors in accordance with the Professional Land Surveyors' Act.

4.10 PROTECTION

A. Protect the newly installed traffic stripes and pavement markings from damage until the material has cured.

B. Replace any traffic stripes or pavement markings or markers broken, misaligned or otherwise disturbed prior to opening roadway to traffic.

4.11 RESTORATION OF EXISTING IMPROVEMENTS

A. Existing signs striping or other markings removed or damaged due to the installation of new facilities shall be replaced in kind.

B. Existing landscaping or planting removed, damaged or disturbed due to the installation of traffic control signs or street name signs shall be replaced in kind.

END OF SECTION

SECTION 32 31 13

GATES

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Swing arm gate.

B. Excavation for post bases.

C. Concrete anchorage for posts and center drop for gates.

D. Manual gates and related hardware.

1.2 REFERENCES

A. ASTM A653 – Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.

B. ASTM F900 - Industrial and Commercial Swing Gates.

C. ASTM A924 – General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

D. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, California State Accessibility and Egress Standards.

1.3 REGULATORY REQUIREMENTS

A. Conform to disabled person access and emergency egress requirements of the CBC California Building Code, (CCR) California Code of Regulations, Title 24, Part 2.

1.4 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 33 00.

B. Include plan layout, grid, spacing of components, accessories, fittings, hardware, anchorages, and schedule of components.

C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

D. Submit project record documents under provisions of Section 01 77 00.

E. Accurately record actual locations of property perimeter posts relative to property lines and easements.

2. PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of design: Barrier gate Bards, Sentinel Manual Double Swing Barrier Gate.

1. Galvanized steel pipe swing gate, up to 15' long gate.

2. Sentinel Swing Barrier Receiver Post with look locking mechanism required at each gate.

B. Substitution : Under provisions of 01 25 00

2.2 CONCRETE MIX

A. Concrete: As specified in Section 03 30 00.

2.3 COMPONENTS

A. Posts per manufacturer.

B. Caps: Cast steel or malleable iron, galvanized; sized to post dimension, set screw retained.

C. Swinging Gates: 3" diameter galvanized steel pipe per manufacturer.

1. Gate Posts: 3" diameter galvanized steel pipe per manufacturer.

2. Gate Hardware: Fork type latch with gravity drop and provision for padlock; center gate stop and drop rod; three 180 degree gate hinges per leaf.

2.4 FINISHES

A. Galvanized: ASTM F1043; 1.8 oz/sq ft coating for schedule 40 pipe. ASTM A90; 1.0 oz/sq ft coating for Class 1A pipe.

B. Accessories: Same finish as framing.

3. PART 3 EXECUTION

3.1 INSTALLATION

A. Consult manufacturer's recommendation.

B. Set terminal, gate and corner posts plumb, in 18 inch diameter concrete footings. Slope top of concrete for water runoff. Footing depth below finish grade: 36 inches for posts.

C. Brace each gate and corner post back to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail, one bay from end and gate posts.

3.2 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 1/4 inch.

B. Maximum Offset from True Position: 1 inch.

C. Components shall not infringe adjacent property lines.

END OF SECTION

SECTION 32 84 00

IRRIGATION

PART 1 - GENERAL

1.1 SUMMARY

A. Scope of Work: Provide complete irrigation system to provide water necessary to sustain planting in healthy condition.

B. Furnish all labor, materials, equipment, facilities, transportation, and services to complete the irrigation system modifications and related work as shown on the Drawings and specified herein.

C. Related Sections:

1. General and Project Conditions of the Bid Documents
2. Section 31 23 33 Utility Trenching, Backfilling and Compacting
3. Section 32 90 00 Planting

1.2 SUBMITTALS

A. Submit the following to the Owner's Representative and Landscape Architect for review and approval prior to the purchase and delivery to the project site:
1. One (1) PDF copy of Materials List of all products specified.
2. One (1) PDF copy of the Product Data or "cut sheets" of all products specified. The Landscape Architect shall permit no substitutions without written acceptance. Cut sheets or manufacturer's technical data sheets to include the manufacturer, model number, and options (if any) for all equipment proposed.
3. One (1) PDF copy of Irrigation equipment layout (if different from the approved drawings). This shall include layout of all automatic controllers, wiring and electrical locations.

B. Submit the following at project close-out to the Owner's Representative and the Landscape Architect:
1. Irrigation plan and hydrozone map: Two (2) sets of these shall be produced (reduced to 11" x 17"), one (1) laminated in 5 mil. clear plastic for placement at or within the irrigation controller cabinet and one (1) for inclusion in the Operational and Maintenance Data Binder (below). Irrigation controller diagrams shall utilize As-Built/Record Drawings as a foundation. Ones shall be identified by number and varying colors. Colors shall not be duplicated on any one sheet.

2. Both sets shall indicate the location of all controls, piping, heads (including type), valves and connection to water service. All as-built information is to be accurately included. Each valve zone lateral line layout shall be color-coded so as to be readily distinguished between adjacent zones. The valve size, station number and gallons per minute shall be legible at each valve and shall match how the controller is wired. Additionally, each valve shall be annotated to describe which type of irrigation it is, i.e.: spray, rotor, bubbler, etc.

3. Irrigation schedules: Two (2) sets shall be produced (reduced to 11" x 17"), one (1) laminated in 5 mil. clear plastic for placement at or within the irrigation controller cabinet and one (1) for inclusion in the Operational and Maintenance Data Binder (below). Irrigation schedule to be created after soil analysis has been perform (post mass-grading) and programmed into controller prior to project close out.

4. Receipts (PDFs) for soil amendments matching soil analysis recommendations confirming delivery to site.

5. Operational and Maintenance Data: Submit one (1) copy of irrigation plan and zone map (see above), approved product cut sheets, and Landscape Certificate of Completion (to be provided by the Landscape Architect upon final acceptance) in a three-ring binder, labeled and indexed.

C. Additional items & equipment to be furnished:

1. Provide the following to the Owner's Representative prior to acceptance:

a. Three sets of any special tools or keys required to access or operate any equipment installed.

b. One quick coupler key and hose swivel for every 10 (or fraction thereof) quick couplers installed.

1.3 QUALITY ASSURANCE

A. Unless otherwise specified, install all materials in accordance with manufacturer's recommendations.

B. All work is to be performed by a single licensed CA Contractor specializing in irrigation system installation.

C. Explanation of Drawings:

1. For design clarity, drawings are generally diagrammatic and not indicative of exact placement or quantities as may be required to complete the work. Any question as to the placement of equipment and line shall be resolved prior to installation.

2. For design clarity, drawings do not indicate all outlets, fittings, sleeves, or other material as may be required to complete the work. Contractor shall review the plans and investigate existing conditions and shall provide all material required to meet existing conditions and install a complete and functional system.

D. Prior to commencing work, Contractor shall:

1. Review the site and resolve all obstructions, conflicts, or discrepancies that may be present.

2. Verify the point of connection and available pressure and flow as indicated on the drawings.

3. Verify the electrical point of connection and coordinate work. (Permanent power connection is required for substantial completion.)

4. Verify sleeves (if indicated as existing).

1.4 COOORDINATION AND SCHEDULING

A. The Contractor shall be responsible for promptly scheduling and progressing the work so as not to delay the project, including:

1. Coordination with other trades as required.

2. Timing of work and coordinating (temporary and permanent) power, water, and other services or requirements.

3. Notifying the Owner's Representative of the following observations, with the advance time indicated:

a. Pressure and flow test at point of connection – 7 days

b. Mainline, control wire, and valve installation and testing – 14 days

c. Lateral line and sprinkler installation – 7 days

d. Coverage test – 7 days

e. Final Inspection – 7 days

1.5 GUARANTY

A. Conform to applicable Division One and Division Two specifications, General Conditions and Special Provisions.

B. Contractor shall provide a written guaranty covering entire system against defects in installation, workmanship and equipment for a period of one (1) year from date of Final Acceptance.

C. Contractor shall make necessary repairs to the system as well as to other work affected by defects in the system during guaranty period. Repairs shall be made at the Contractor's sole expense.

D. After the system is installed and approved, instruct groundskeeper personnel and maintenance staff in the complete operation and maintenance.

PART 2 - PRODUCTS

2.1 GENERAL

A. Use only new materials of brands shown on Drawings, specified herein or as acceptable to the Owner's representative & Landscape Architect.

B. Plastic Pipe: All pipe and hose is free of blisters, internal striations, cracks or any other defects or imperfections. The pipe and hose are continuously and permanently marked with manufacturer's name, material type, size, schedule or class and quality control identifications.

2.2 PIPING MATERIALS

A. Polyvinyl Chloride (PVC) Pipe shall be made from National Sanitation Foundation (NSF) approved Type I, Grade I virgin PVC compound conforming to ASTM resin specification D1785. All PVC pipe shall bear the following marked continuously: Manufacturer's name, nominal pipe size, schedule or class, pressure rating in pounds per square inch (PSI), NSF approval, and date of extrusion.

1. Mainline (constantly pressurized) Pipe

    a. Mainline and sub-mains 3" and large: As specified on Drawings.

    b. Mainline and sub-mains 2 1/2" in diameter and smaller : As specified on Drawings.

    c. Mainline joints shall be minimized to the extent possible within sleeving.

2. Lateral Line Pipe

    a. Lateral lines shall be Class 200 up to 2". PVC Schedule 40 for lateral lines 2-1/2" and above. Fittings shall be PVC schedule 40 solvent weld, NSF approved.

B. Fittings

1. Plastic: Factory-threaded Schedule 80, Type 1, Grade 1 polyvinyl chloride (PVC) pipe, threaded both ends. Pipe shall be in conformance with ASTM D1784 and D1785. Color: Gray.

C. Nipples

1. Plastic: Factory-threaded Schedule 80, Type 1, Grade 1 polyvinyl chloride (PVC) pipe, threaded both ends. Pipe shall be in conformance with ASTM 1784 and D1785. Color: Gray.

D. Joint Restraints:

1. Class 350, AWWA C153 ductile iron joint restraints and/or restraining fittings shall be used for all mainline piping 4" and larger in diameter.

2. Thrust blocks are not allowed in lieu of joint restraints.

E. Copper pipe shall be type 'K', hard tempered seamless conforming to ASTM B88. Soldered joints shall comply with ASME B16.22. Flux shall conform to ASTM B 813, and solder shall conform to B 32. Cast fittings joints shall comply with ASME B16.18.

F. Galvanized Pipe and Fittings shall be schedule 40, threaded and hot dipped galvanized, complying with ASTM A53. Male end of threaded fittings shall be wrapped with three layers of PTFE tape. All Galvanized pipe and fittings installed below grade shall be wrapped with two layers of minimum 10 mil. pipe wrap.

G. Sleeves shall be as specified on the Drawings.

H. Conduit shall be rigid non-metallic PVC schedule 40 bell-end, conforming to ANSI/UL 651 and NEMA TC-2.

1. Elbows shall be long-sweep schedule 40 bell-end, conforming to ANSI/UL 651 and NEMA TC-3

2. Couplings, adapters, and fittings shall conform to UL 514B and NEMA TC-3.

I. Swing Joints: As specified on Drawings.

J. Solvent Cement: Compatible with PVC pipe and of proper consistency.

K. Connecting Compounds:

1. Primer: IPS Corporation Weldon #P70.

2. Cement: Conform to ASTM D2564.

3. IPS Corporation Weldon #705 for Class 200 PVC. Schedule 40 PVC (up to 6 inch diameter) and Schedule 80 PVC (up to 4 inch diameter) pipe IPS Corporation Weldon #711 shall be used for pipe diameters larger than 6 inches.
4. IPS Corporation Weldon #795 for flexible P.V.C. to rigid P.V.C. connections.

2.3 VALVES

A. Isolation (mainline) Valves

1. Valves shall be as specified on the Drawings and same size as the pipe they are installed on. An isolation valve shall be installed downstream of the backflow device, or if none, at the point of connection, whether shown on the plans or not.

B. Quick Coupling Valves (QC) shall be as specified on the Drawings. Valves shall have a brass two-piece body with a minimum working pressure of 125 psi and be operable with a standard quick coupler key.

C. Remote Control Valves (RCV) shall be as specified on the Drawings. Valves have a manual flow adjustment, fully potted solenoid, and include adjustable or pre-set pressure regulation option(s).

2.4 VALVE BOXES

A. Boxes for isolation valves, quick couplers, air release valve, and flow sensor shall be a 10" x 10- 1/4" round box with bolt-down lid. Extension sleeve shall be PVC with a minimum diameter of 6".

B. Boxes for master valve, RCV's, and drip filters shall be 9-1/2" x 16" x 11" rectangular box with bolt-down lid, and extensions as required. Use a separate valve box or jumbo valve box for drip control assemblies if required to allow disassembly and servicing of filter in box.

C. Boxes for drip flush valves and air relief valves shall be 7" or 6" round boxes with push-on lids.

D. Color: Valve boxes and lids shall be green for potable water applications and purple where required for reclaimed water designation.

E. Identification: Remote Control Valve box lids shall be heat-branded with the controller and valve number (e.g.: A13). Quick Coupling Valves shall be branded "QC." Master Valves shall be branded "MV." Isolation Valves shall be branded "IV."

2.5 CONTROL WIRING

A. General: all wire shall be new, with wire and insulation intact and free of nicks and cuts.

B. Splice connectors: Shall be direct bury splice kits pre-filled with epoxy resin. Splice kit shall be designed to encapsulate a one wire connector, stable in applications at elevated temperatures up to 121 degrees C, and with a cure time of 24 hours at 70 degrees F. 3M "DBY" splice connectors or approved equal.

2.6 AUTOMATIC CONTROLLERS

A. Existing controllers to remain.

2.7 OVERHEAD EMITTER ASSEMBLIES

A. All emitters shall be as specified on the drawings, meet ASABE/ICC 802-2014 "Landscape Irrigation Sprinkler and Emitter Standard", and shall have been documented by the manufacturer to achieve a distribution uniformity (low quarter) of 0.65 or higher using the protocol defined in the standard above.

B. All nozzles shall include radius adjustment features, excepting bubblers.

C. Rising-stem bodies shall include a molded wiper seal with UV resistant material and include internal pressure regulation.

D. Bodies with optional factory-installed check valves shall be installed as required to prevent low- head drainage.

E. All bodies shall be installed on swing arms with 360-degree adjustment in three planes, sized to the inlet of the body.

1. Swing shall be constructed of schedule 40 PVC street elbows, and schedule 80 threaded risers, minimum 6" in length. All threaded fittings shall be wrapped with a minimum of 4 wraps of Teflon tape.

F. When specified on pop-up bodies, bubbler nozzles shall fully retract into the body, and shall not require an adapter to thread onto the riser stem.

G. Multi-Stream, Multi-Trajectory Rotating (MSMTR) Nozzles shall include arc adjustment and radius adjustment to a minimum of -25% of catalog throw. As radius and arc are decreased, the volume of water shall proportionally decrease to achieve matched precipitation rates throughout the range of adjustment.

2.8 DRIP IRRIGATION

A. Root Zone Watering System: As specified on Drawings.

PART 3 – EXECUTION

3.1 PREPARATION

A. Contractor shall review the site and confirm that all preceding work has been completed to allow installation of the irrigation system.

B. Verify water and electrical points of connection (services) and ensure they are adequate to serve the work. Notify the Landscape Architect immediately of any discrepancies.

C. Beginning work shall constitute acceptance of the site and suitability of services.

D. Irrigation plans are diagrammatic. Pipelines shown parallel in the Drawings may be placed in a common trench, provided that a minimum horizontal distance of three inches (3") is maintained between buried lines.

3.2 INSTALLATION

A. Trenching: Provide the following minimum depths for all lines:

1. Mainline and control wiring: 24 inches, 30 inches under paving.

2. Lateral lines: 18 inches, 24 inches under paving.

3. Excavate trenches with vertical walls, uniform bottom, free of deleterious materials, and wide enough for pipes to lay side by side, fully supported on bottom. There shall be a minimum three-inch (3") clearance between all pipes.

4. No lines shall be installed parallel to and directly over another line.

5. When lines must cross, the angle shall be forty-five to ninety degrees, and a minimum of three inch (3") vertical clearance shall be maintained.

6. Hydraulic driving methods shall not be used under paved surfaces.

B. Bedding:

1. Mainlines shall have sand bedding, 3" deep.

C. Backfilling:

1. Backfilling shall not occur prior to all required observations and tests. Any lines covered prior to these shall be exposed at the contractor's expense.

2. Initial backfill for mainline shall be 6" of sand.

3. Initial backfill for laterals shall be a fine granular material in a layer 6" deep, or covering the pipe to at least 2" in depth, whichever is greater. Native soil may be used for initial backfill, excepting that rocks, clods, and deleterious material 1/2" in diameter or greater shall be screened out.

4. Backfill shall be compacted to a density at least equal to undisturbed soil in planting areas. Settlement of trenches shall be deemed evidence of insufficient compaction and shall be corrected at the contractor's expense, including adjustment of lines, heads, grades, and replacement of plant material.

D. Backfilling Under Paving:

1. Backfill shall consist of 6" of sand, then screened native material in 6" maximum lifts, compacted to 95% relative compaction. All trenches shall be left flush with the adjoining grade. As a part of irrigation work, contractor shall set in place and cap all sleeving under paving prior to paving work. If piping requires joints under paving, all piping shall be laid, capped, and pressure tested prior to paving work.

2. Piping under existing walks shall be done by jacking or boring. Hydraulic driving shall be permitted only under pedestrian paving not exceeding four feet in length. Where cutting and patching is required, concrete shall be removed to the nearest control joint. New concrete shall match existing finish and color.

3.3 PIPING

A. Installation of all pipes and fittings shall be in strict accordance with the manufacturer's written specifications. Deviations from these specifications shall be permitted only with the written approval of the Owner's Representative.

B. Piping:

1. Install PVC pipe in dry weather when temperature is above 40° F in strict accordance with manufacturer's instructions.

2. Initially fill mainline slowly (maximum velocity 1 foot per second). Vent air from the mainline while filling. Thoroughly flush mainline prior to installing valves.

3. Pipe Clearance: all pipes 4" or greater shall have a minimum clearance of 6" from each other. All pipes 3" or less shall have a minimum clearance of 3" from each other.

4. Deflection for PVC pipe: Do not exceed a longitudinal bending radius of 300 times the pipe outside diameter or the manufacturer's rated deflection, whichever is less, for either solvent welded or gasketed pipe.

5. Mainline shall in all cases be looped or terminated in a thrust-restrained cap with a minimum of 12" offset to upstream fitting(s).

C. Pipe Assemblies:

1. PVC solvent welded joints: follow ASTM D2855, "Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings".

2. Threaded joints: Do not use male inlet pipe thread (MIPT) adapters. All threaded PVC fittings shall be female end with schedule 80 nipples. Wrap nipple with 2 layers of Teflon thread tape prior to assembly. On PVC to metal connections, work metal connections first.

3. Use fittings to change pipe direction without exceeding deflection limits. For elevation changes, multiple 45 or 22.5 degree elbows shall be used. Do not use 90 degree elbows to change elevation.

4. Use minimum number of fittings required. Do not use multiple shorter lengths of pipe in lieu of one continuous piece.
5. Pipe may be assembled and welded on the surface. Snake pipe a minimum of one (1) additional foot per one hundred feet (100') of pipe to allow for expansion and contraction.
6. Connections between plastic pipe and metal valves shall be made using plastic male adapters and applying the recommended threaded joint compound.
7. Cap or plug openings as soon as pipes have been installed to prevent intrusions of debris.
8. Thoroughly flush system prior to installing valves and nozzles.
9. Install all irrigation and/or electrical sleeving as indicated on the Drawings. Contractor shall coordinate the installation of sleeving with the work of other trades

3.4 CONTROL WIRING

A. Wiring shall be installed in the same trench as and adjacent to but not on top of the mainline. Wire shall be bundled together and secured with electrical tape at 10 feet intervals.

B. Wiring shall be laid loosely in the trench and snaked from side to side to allow sufficient length for thermal expansion and contraction. Do not pull, stress, or stretch wires.

C. Provide an expansion curl (pigtail) within 3 feet of each wire connection, the greater of 18" or sufficient length to allow the valve to be raised 12" above the finished surface.

D. Field splices between the controller and the remote control valve shall not be permitted without prior approval of the Owner's Representative.

E. All splices shall be made with dry electrical connectors within valve boxes.

F. Label all wires in the controller enclosure within 18" of the terminal strip with permanent tags wrapped around the wire, indicating the controller, and valve (for master valve/flow sensor wires).

3.10 VALVES

A. Remote Control Valve Assemblies, Quick Couplers, and Isolation Valves

1. Install in approximate locations shown on drawings, but in planter areas instead of turf areas wherever possible, and as shown in the details. Valve boxes shall be perpendicular to adjacent walls, walks, or headers, and shall be parallel to each other.

2. Each valve shall be identified with a minimum 2" x 2-3/4" yellow (or purple, for non-potable applications) polyurethane I.D. tag attached to the control wire of the valve.

3.11 OVERHEAD EMITTERS/SPRINKLER ASSEMBLIES

A. Install as detailed in the drawings. Where adjacent to headers or hard surfaces, locate such that edging equipment can pass between the adjacent edge and emitter without damage to either.

B. In no case shall spacing exceed the manufacturer's listed thrown. Single-stream rotors shall be installed at a spacing of 80% or less of the manufacturer's listed throw.

C. Install plumb with finish grade.

D. Thoroughly flush all lines prior to intsalling nozzles.

3.12 FIELD QUALITY CONTROL

A. The mainline and all piping under paving shall be simultaneously pressure and leak tested. Contractor shall furnish force pump and all necessary equipment. Sufficiently brace piping to prevent movement while testing. If concrete thrust blocking is used, allow blocking to sufficiently cure. Restrain ends of mainlines. Ensure all air is removed from mainline prior to testing.

1. Test with a hydrostatic pressure of 120 psi, or 150% of the operating pressure (sustained mainline pressure), whichever is greater.

2. Observe pressure using a minimum of two gauges, at opposite ends of the mainline. Pressure shall not vary by more than 5 psi during the test.

3. Pressure shall be sustained for a minimum of two hours. If leaks are visible or pressure drops by more than 5 pounds, replace joints and retest.

B. Irrigation system shall be operated in its entirety and shall be adjusted for complete coverage, proper operation, and to reduce or eliminate overspray and water hammer. Adjustments may include:

1. Pressure regulating devices, whether stand-alone or integrated with remote control valves.

2. Manual flow adjustment of each remote control valve.

3. Arc and radius adjustment of each nozzle.

4. Substitution of variable arc nozzles or reduced radius nozzles if required.

C. The irrigation system, including controller, shall be operable prior to planting.

3.13 CLEAN UP

A. All materials and debris accumulated in conjunction with completing this Work, including trash, excess soil, and empty plant containers, shall be legally recycled or disposed of by Contractor off site.

B. All scars, ruts or other marks in the ground caused by this work shall be repaired and the ground left in a neat and orderly condition throughout the site.

C. The Contractor shall leave the site area broom-clean and shall wash down all walkways and other paved areas, leaving the premises in an excessively neat, clean, and safe condition.

D. Promptly remove soil, debris, or marks created by work from paved areas, buildings, site furnishings, and other appurtenances.

E. Clean vehicle tires before leaving site to avoid tracking soils onto paved areas.

END OF SECTION

SECTION 32 90 00

PLANTING

PART 1 - GENERAL

1.1 SUMMARY

A. Scope of Work: Provide landscape planting, complete in place, as shown and specified including: removal of rock, gravel and other construction related material, sub-grade treatment, soil replacement, rough grading, soil amendment and preparation, finish grading, planting, staking, clean-up, and maintenance.

B. Related Sections:

1. General and Project Conditions of the Bid Documents
2. Section 32 84 00 Irrigation
3. Section 32 01 90 Operation and Maintenance of Planting

1.2 SUBMITTALS

A. Submittals shall include but not be limited to the following:

1. Topsoil, Amendments, including fertilizers: Product data including chemical and physical composition, sieve, plasticity, and analytical reports from an approved laboratory source illustrating compliance with industry standards and manufacturer's stated data.
2. Mulch: size, type, and source of material, including data demonstrating compliance with physical and chemical characteristics required herein.
3. Soils fertility testing report(s) (after rough grading). Report(s) to include the following:
   a. percentage of organic matter,
   b. salinity,
   c. pH.
   d. micro and macro mineral nutrients, including concentrations of nitrogen, phosphorus, potassium, calcium, and magnesium,
   e. potential hazards of impediments to plant growth from salinity; sodium, boron, impaired soil structure or drainage,
   f. written recommendations for soil amendment application rates, and
   g. infiltration rates.
   h. Soil Texture
4. Schedule indicating anticipated dates for plant delivery, inspections, reviews, and planting.
   a. Provide documentation at least 60 days before planting certifying that all plant material is available, listing sources of materials.
   b. Contractor is responsible for securing all material in a timely manner so as not to disrupt overall project schedule and allowing for customs and agricultural inspection (if necessary) for materials that may not be locally available.

B. Quality Assurance Submittals:

1. Plants shall be subject to inspection and approval by Owner's Representative at place of growth or upon delivery for conformity to specifications. Such approval shall not impair the right of inspection and rejection during progress of the work. The health and vigor of the plant material is the sole responsibility of Contractor.
2. Owner's Representative may request delivery tags for bulk materials and receipts for other materials.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery

1. Deliver all packaged and/or manufactured products to the site in unopened containers bearing manufacturer's guaranteed chemical analysis.

2. Deliver all plants with legible identification labels.
    a. Label trees, shrubs, bundles of plants, or groundcover plants.
    b. Include correct botanical genus, species, and cultivar indicated on plant list.
    c. Use durable labels with water- and UV- resistant ink which will remain legible for at least sixty days.
3. Transport plants in enclosed or covered conveyances. Protect plant material during delivery and while temporarily stored to prevent damage to root ball and leaves, including, if necessary, application of anti-desiccants.
4. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

B. Storage
1. Store plant material in shade and protect from weather.
2. Maintain and protect plant material not to be planted within 4 hours of delivery in a healthy, vigorous condition.
3. Store seed, mulch, fertilizer, and other products with protection from weather or other conditions that would damage or impair the effectiveness of the product.

C. Handling
1. Contractor is cautioned to exercise care in handling, loading, unloading, and storing of plant materials. Plant materials that have been damaged in any way shall be discarded and shall be replaced with undamaged materials at the Contractor's expense.

1.4 COORDINATION AND SCHEDULING

A. Perform planting only when weather and soil conditions are suitable in accordance with standards of industry.

B. Scheduling: Install trees, shrubs, and liner stock plant material after irrigation system is installed and inspected, after soil amendments have been incorporated and finish grades have been achieved, and before wood mulch is spread.

C. Observation Schedule. Contractor shall notify Owner's Representative in advance for the following site visits, according to the time indicated:
1. Plant material review or tagging at growing site - notify Owner's Representative at least 30 days before planting.
2. Pre-job conference - 7 days.
3. Final grade and soil preparation review - 48 hours.
4. Plant material, plant layout, and planting operation review – 3 days.
5. Pre-maintenance - 7 days.
6. Final acceptance - 7 days.

1.5 SAMPLES AND TESTS

A. Owner's Representative reserves the right to take and analyze samples of materials for conformity to specifications at any time. Contractor shall furnish samples upon request. Rejected materials shall be immediately removed from the site at Contractor's expense. Cost of testing of materials not meeting specifications shall be paid by Contractor.

B. Contractor shall arrange for a soil fertility analysis by a certified soil testing laboratory after rough grading operations are complete. At minimum, provide one test of each source of imported soil, four tests of soil at a depth of 4-6 inches for turf areas, and six tests of soil at a depth of 8-12" for shrub and groundcover areas.

1.6 GUARANTEE AND REPLACEMENT

A. All plants and other materials installed shall be guaranteed against any and material failures, decline, and/or workmanship for the duration of the maintenance period. Any plant found to be dead or not in a satisfactory or healthy condition due to faulty materials, workmanship, natural occurrences, or

improper maintenance shall be replaced immediately by the Contractor at no additional expense to the Owner.

B. The Owner's Representative shall be the sole judge as to the condition of plants and other materials. Material to be replaced within the guarantee period shall be replaced by the Contractor within twenty days of written notification by the Owner. All replacement materials and installation shall comply with the Drawings and Specifications.

PART 2 - PRODUCTS

2.1 GENERAL

A. Specific amendments and fertilizer amounts will be determined after rough grading operations are complete and soil fertility test results are provided by the Contractor and approved by the Owner's Representative. The amounts listed in the Preparation section are considered minimum amounts for the project unless directed otherwise.

2.2 PLANTING SOIL CONDITIONER

A. Gro-Power Plus (no known equal): Humus (bacteria included based fertilizer and soil conditioner with soil penetrant shall consist of the following percentages by weight: 5% nitrogen, 3% phosphoric acid, 1% potash, 50% humus, and 15% humic acids.

2.3 PLANTING ORGANIC AMENDMENT

A. Organic amendment shall be nitrogen stabilized composted wood residual or compost containing 0.56 to 0.84 percent N based on dry weight.

B. Particle Size: 95 - 100 percent passing 6.35 mm standard sieve, 80 - 100 percent passing 2.33 mm standard sieve

C. Iron Content: Minimum 0.08 percent dilute acid soluble Fe on dry weight basis.

D. Ash: 0-6.0 percent (dry weight).

2.4 SOIL AMENDMENTS

A. Soil Sulfur: Agricultural grade sulfur containing a minimum of 99 percent sulfur (expressed as elemental).

B. Iron Sulfate: 20 percent Iron (expressed as metallic iron), derived from ferric and ferrous sulphate, 10 percent sulfur (expressed as elemental).

C. Calcium Carbonate: 95 percent lime as derived from oyster shells.

D. Gypsum: Agricultural grade product containing 98 percent minimum calcium sulphate.

2.5 FERTILIZER

A. General Fertilizer: Pelleted or granular form shall consist of the following percentages by weight and shall be mixed by commercial fertilizer supplier: 16 percent nitrogen, 6 percent phosphoric acid, and 8 percent potash.

2.6 LANDSCAPE TOPSOIL

A. On-site stripped and stockpiled topsoil (if any) shall be considered suitable for planting upon receipt of a soil fertility analysis. Imported soil shall be of a sandy-loam texture, free of refuse, roots or other un-decomposed whole organic material, parasitic nematodes, rocks, clods, clay, or other deleterious material. A minimum of one soil fertility test shall be supplied for each source prior to import.

B. Particle Size:

CLASS	PARTICLE SIZE	MAX. % WT.	MIN. % WT.
Coarse Sand	0.5-2.0 mm	15	0
Silt Plus Clay	< 0.05 mm	50	25
Silt	0.002 - 0.05 mm	30	10
Clay	0 - 0.002 mm	25	10
Gravel	2 - 13 mm	15	
Rock	> 1/2 inch	10% by volume, none > 1 inch	0
Organic Matter		15	0

C. The pH of saturated paste shall be between 5.5 and 7.5 without high qualitative lime content. The sodium absorption ratio (SAR) shall not exceed 6 and the electrical conductivity (ECe) of the saturation extract of this soil shall not exceed 3.0 milliohms per centimeter at 25 degrees centigrade. The boron content shall be no greater than one part per million as measured on the saturation extract.

2.7 PLANT MATERIAL

A. Plants shall be in accordance with the California State Department of Agriculture's regulation for nursery inspections, rules, and rating. All plants shall have a normal habit of growth and shall be sound, healthy, vigorous, and free of insect infestations, weeds, plant diseases, sun scalds, fresh abrasions of the bark, excessive abrasions, or other objectionable disfigurements. Tree trunks shall be sturdy and have well "hardened" systems and vigorous and fibrous root systems that are not root or pot bound.

B. Root conditions of the plants provided by Contractor in containers will be determined by removal of earth from the roots of not less than two plants or more than 2 percent of the total number of plants of each species or variety. Where container-grown plants are from several sources, the roots of not less than 2 plants of each species or variety from each source, will be inspected. In case the sample plants inspected are found to be defective, the City's Representative reserves the right to reject the entire lot or lots of plants represented by the defective samples.

C. The size of the plants shall correspond with that normally expected for species and variety of commercially available nursery stock, conforming to ANSI Z60.1, "American Standard for Nursery Stock," or as shown on the Drawings, whichever is greater. The minimum acceptable size of all plants measured before pruning with the branches in normal position. Plants larger in size than specified may be used without prior approval.

D. All plants not conforming to the requirements herein specified, shall be considered defective and such plants, whether in place or not, shall be marked as rejected and immediately removed from the site of the Work and replaced with new plants at the Contractor's expense.

E. Pruning: At no time shall trees or plant materials be pruned, trimmed or topped prior to delivery and any alteration of their shape shall be conducted only with the approval and when in the presence of the Owner's Representative.

F. Trees specified as multi-trunked shall have at least three primary leaders from the base of the tree. Trees not otherwise specified shall straight, single trunks, with even branching, no split crotches, co-dominate leaders, or closely spaced branches, and shall have a central leader that has not been cut, bent, scared, or broken.

G. Plant material shall be true to botanical and common name and variety as specified in "Annotated Checklist of Woody Ornamental Plants in California, Oregon and Washington," published by the University of California School of Agriculture (1979).

H. Nursery Grown Stock shall be grown under climatic conditions similar to those of the project. Container stock shall be in vigorous, healthy condition, not root-bound or with root system hardened off. Liner or flat plant material shall be well established in removable containers with roots sufficiently developed to hold homogenous soil sections.

2.10 STAKING MATERIALS

A. Tree stakes: round and uniform with chamfered top and conical point, two-inch diameter, 8 or 10 foot length as required for height of tree, Lodgepole Pine or Douglas Fir, treated for resistance to decay with Alkaline Copper Quaternary (ACQ) or Copper Azoles (CA-B). Stakes treated with arsenic or chromium compounds will be rejected.

B. Tree Ties: Vinyl impregnated Nylon or Vinyl, black, 1" wide, UV resistant, waterproof, tensile strength 300 pounds, bursting strength 300 psi. 24" for trees 15 gallons and smaller, 32" length for 36" box to 48" box trees. Tree ties shall be Arthur Enterprises "Super Tree Tie", V.I.T. Enterprises "Cinch Tie", or equal.

C. Tree Guys: 18 gauge, six-strand galvanized steel wire with minimum 2 x 2 x 18" long treated stakes

2.11 WATER

A. Provide or use only from approved water source.

2.12 MULCH

A. Shall be "wood chip mulch" available from green waste recyclers.

B. The mulch shall consist of fibrous, woody mixture of varied size, maximum 3", with the following characteristics:

1. Physical Properties:

Percent Passing Size	Sieve
90-100	1-inch diameter
80-100	1/2-inch diameter
20-60	1/4-inch diameter

2. Chemical Properties:

a. Acidic, maximum pH 5.0
b. Maximum ash 7% based on dry weight
c. Minimum moisture content 30% at time of delivery based on fresh weight.

2.13 TREE ROOT BARRIERS

A. As specified and/or shown on the Drawings.

2.14 SAND

A. Shall be fill sand with 100% passing a #4 screen, 85% passing a #8 Screen and less than 4% passing a #200 screen.

1. Quantities: Sports Fields: 2.5" compacted.

2. Order quantities based on 1.35 tons per cubic yard.

B. Pre- approved suppliers (or equal):

1. West Coast Sand & Gravel: contact JR, 916-386-8177

2. TMT. Contact Matt Moore, 408-432-9040

3. CL Smith, Woodland, California. Contact: Doug 530-662-2633

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that that planting soils have been cleared of all construction debris, including gravel, concrete, concrete washout, paints, asphalt, etc.

B. Verify that final grades have been established to within 1/10 foot prior to commencing planting operations. Provide for inclusion of all amendments, settling, etc. Contractor shall be responsible for finish grading, including shaping all planting areas, including swales and basins, as indicated on Drawings.

C. Lime treated soils shall be considered unsuitable for planting and shall be removed from all planting areas to a depth of 24" or the depth of treatment, whichever is greater, and replaced with topsoil.

D. Prior to planting, inspect trees, shrubs and liner stock plant material for injury, insect infestation and trees and shrubs for improper pruning.

3.2 SOIL PREPARATION

A. Pre-plant Weed Control

1. If live perennial weeds exist on site at the beginning of work, spray with a non-selective systemic contact herbicide, as recommended and applied by an approved licensed landscape pest control advisor and applicator. Leave sprayed plants intact for at least 15 days to allow systemic kill. Clear and remove these existing weeds by mowing or grubbing off all plant parts at least 1/4 inch below the surface of the soil over the entire area to be planted.

2. After irrigation system is operational, apply water for 5 to 10 days as needed to achieve weed germination. Apply contact herbicides and wait as needed before planting. Repeat, if required by Owner's Representative.

B. Soil Amendment

1. After approximate finished grades have been established, hardened or previously unworked areas shall be broken up by ripping, an excavator, or other suitable equipment to a minimum depth of eight inches.

2. Soil amendments shall be uniformly spread and cultivated thoroughly using a mechanical tiller into the top 6 inches of soil. Areas around existing plants to remain shall be cultivated with hand tools.

3. The following amendment rates establish minimum requirements per 1,000 square feet and are listed for bidding purposes. Specific amendments and fertilizer amounts will be determined after rough grading operations are complete and soil samples are tested by the Contractor and approved by the Owner's Representative. The amounts listed below are considered minimum amounts for the project, regardless of soils fertility reports, unless directed otherwise by the Owner's Representative.

   a. Nitrogen stabilized organic amendment – 3 cubic yards
   b. Planting fertilizer - 18 lbs.
   c. Soil Conditioner – 150 lbs.
   d. Gypsum - 200 lbs.
   e. Soil sulfur - 20 lbs.
   f. Iron – 2 lbs.
   g. Calcium carbonate – 2 lbs.
   h. For annual color areas, in addition to the above, incorporate 3 cubic yards organic amendment and 20 cubic feet of Perlite.

C. Final Grades:

1. Remove all rocks, whole organic materials (roots, stumps, etc.), construction debris, or other deleterious materials 1" or greater from the top 6" of soil in planting areas.

2. Fine grades below adjacent paved areas, sidewalks, valve boxes, headers, clean-outs, drains, manholes, etc. shall be as follows: hydroseeded areas, ½ inch; sodded areas, one inch; shrub and groundcover planting areas, 1/2 inch plus the depth of mulch indicated on Drawings below adjacent improvements.

3. Final grading shall ensure proper drainage of the site, with positive surface flow to all catchment inlets, areas, and structures. Surface drainage shall be away from all building foundations.

4. All planting areas shall be compacted and settled by application of heavy irrigation or light roller to a minimum depth of twelve inches.

5. Minor excess soil may be incorporated into planting areas to form minor berms not exceeding slopes of 12:1 without prior approval. Dispose of any unacceptable materials or excess soil legally at an offsite location at no additional expense to the owner.

3.3 PLANT INSTALLATION

A. Only as many plants as can be planted and watered on that same day shall be distributed in a planting area.

B. Layout of Major Plantings: Locations for trees and outlines of areas to be planted shall be marked on the ground by Contractor before any plant pits are dug. All such locations shall be approved by the Owner's Representative. If underground construction or a utility line is encountered during excavation of planting pits, other locations for planting may be selected by the Owner's Representative. Layout shall be accomplished with flagged grade stakes indicating plant names and specified container size on each stake.

C. Planting of Trees and Shrubs:

1. Planting Pit Preparation

   a. Excavation for planting shall include the stripping and stacking of all acceptable topsoil encountered within the areas to be excavated for trenches, tree holes, plant pits and planting beds.

   b. Protect all areas from excessive compaction when trucking plants or other material to the planting site.

   c. All excavated holes shall have vertical sides and shall be of a size that is three times the diameter and 1 and 1/2 times the depth of the root ball for all trees and shrubs. After pits are dug, roughen the sides of the pit, and loosen soil in the bottom of the pit to a depth of 3 inches. Construct foot-tamped mound in the bottom of the pit to support the plant at the proper level.

2. Hardpan Conditions:

   a. Where hardpan exists, whether it is in the form of caliche or other impervious clay, and it is within the top 2 and 1/2 feet of soil, use powered equipment to break through completely at each tree location to allow drainage and root growth. Remove hardpan at least one- and one-half feet greater than the root ball diameter of tree. Backfill with soil mix as specified.

   b. Where hardpan is within the first 12 inches of soil, it shall be completely penetrated for all shrubs and trees.

3. Rock Conditions:

   a. Where rock is encountered, tree planting pits shall be extended in the direction of the underlying rock slope until the bottom of the tree pit is in soil. Tree pits dug in rock shall not be accepted.

4. Percolation Testing and Remediation

   a. Percolation tests are required for all trees. Tree pits shall be filled with water and the drainage rate observed. Percolation rate shall be a minimum of the depth of the tree pit within 24 hours.

   b. If percolation/drainage rate is less, then tree pit drainage shall be installed. Refer to details and plans.

5. Plant Container Removal

   a. Do not handle container plants by the tops, stems or trunks at any time. Lift all plants so that the root ball is supported from the underside. Plants that do not have a satisfactory root system will be rejected. If plants do not have young feeder roots showing at the edge of the container, loosen their roots and score the root ball with a 1/2-inch-deep vertical line to encourage new feeder root development.

   b. Containers: Cut containers on 2 sides with a can cutter designed for the job. Do not injure root ball. Do not cut containers with spade or ax. After removing plant, superficially cut edge roots with knife on 3 sides.

   c. Boxes: Remove bottom of plant boxes before planting. Remove sides of box without damage to root ball after positioning plant and partially backfilling.

6. Planting

    a. Center plant in pit or trench. Root flare shall be approximately 1 inch above finish grade, such that the first lateral root is at or just beneath the surface.

    b. Face plants with fullest growth into prevailing wind.

    c. Set plant plumb and hold rigidly in position until soil has been tamped firmly around ball or roots.

    d. Backfill for trees and shrubs shall consist of amended native soil and granular fertilizer (applied at manufacturer's recommended rates by container size). If native soil is unavailable, unsuitable, or contaminated, use imported topsoil.

    e. For succulent plants, incorporate coarse washed sand as 33%-50% of the total backfill, mixed evenly.

    f. All plants which settle deeper than the surrounding grade shall be raised to the correct level, such that the root flare is above finished grade. After the plant has been placed, place backfill to cover approximately 1/2 of the height of the root ball. Fill the remainder of the hole with water to thoroughly saturate the root ball and adjacent soil.

    g. The remainder of the hole shall then be backfilled, and tamped firm.

    h. After backfilling, an earthen basin shall be constructed around each plant. Each basin shall be of a depth sufficient to hold at least 2 inches of water. The basins shall be constructed of amended topsoil. Remove basin in all turf areas after initial watering.

7. Pruning shall be limited to the minimum necessary to remove injured twigs and branches, and to shape the plant material as directed by the Owner's Representative. Pruning shall not be done prior to delivery of plants.

8. Staking of all trees shall be completed immediately after planting. Remove nursery stakes once tree stakes are in place. All stakes shall be installed plumb and as indicated in the Drawings.

9. Damage to trees and shrubs during installation shall be cause for rejection.

D. Plug and Groundcover Planting:

1. Groundcover plants and plugs shall be grown in flats, liners, or containers as indicated on the Drawings. Flat and liner grown plants shall remain in those flats and liners until transplanting. The flat's soil shall contain sufficient moisture so that it will not fall apart when lifting the plants.

2. Planting shall be in straight rows and evenly spaced, unless otherwise noted, and at intervals called out in the Drawings. Triangular spacing shall be used unless otherwise noted on the Drawings.

3. Each rooted plant shall be planted with its proportionate amount of flat or container soil. Plantings shall be immediately sprinkled with water after planting until the entire area is soaked to the full depth of each hole.

4. Care shall be exercised at all times to protect the plants after planting. Any damage to plants by trampling or other operations shall be repaired immediately.

E. Mulch: All planting areas shall be dressed with a 3 inch layer of mulch. Where slopes are 3:1 or steeper, install jute mesh netting under mulch.

3.4 TREE ROOT BARRIER INSTALLATION

A. Install as shown on the Drawings. Surround application (encircling plants) is not allowed.

3.5 CLEAN UP

A. All materials and debris accumulated in conjunction with completing this Work, including trash, excess soil, and empty plant containers, shall be recycled or legally disposed of by Contractor off site.

B. All scars, ruts or other marks in the ground caused by this work shall be repaired and the ground left in a neat and orderly condition throughout the site.

C. The Contractor shall leave the site area broom-clean and shall wash down all walkways and other paved areas, leaving the premises in an excessively neat, clean, and safe condition.

D. Promptly remove soil, debris, or marks created by work from paved areas, buildings, site furnishings, and other appurtenances.

E. Clean vehicle tires before leaving site to avoid tracking soils onto paved areas.

END OF SECTION

SECTION 32 98 00

OPERATION AND MAINTENACE OF PLANTING

PART 1 - GENERAL

1.1 SUMMARY

A. Maintain all plants in a vigorous growing condition throughout the maintenance period. Furnish all labor, materials, equipment, and services required. Provide selective pruning as required to promote desired structure, form, and long-term health. Apply supplemental materials, including fertilizers as needed. Apply herbicides and pesticides only as required to remedy significant problems that cannot be otherwise controlled through integrated pest management approaches. At all times, protect the health of users. Include trash, debris, and weed removal from the entire site, including sidewalks and gutters.

1.2 QUALITY ASSURANCE

A. Contractor shall be experienced in horticulture and landscape maintenance practice and shall provide sufficient workers and equipment under supervision of qualified foreman at all times.

B. All equipment shall be maintained in optimal condition, including freshly sharpened blades.

C. Sterilize all cutting tools prior to starting work at each site, and between cuts if disease is present or suspected.

1.3 MAINTENANCE PERIOD

A. Maintain the entire project throughout the course of work and during the 90 (ninety) calendar day maintenance period or until project acceptance.

B. Maintenance period shall not begin until all construction activity, including punchlist items, have been completed, including initial grow-in of turf areas. At a minimum, turf areas shall show a competitive, healthy, and even stand of grass, and shall have been mown at least twice.

C. Maintenance period will begin only upon written notice of completion by the Owner's Representative.

D. Any day of improper maintenance, as determined by the Owner's Representative, shall not count toward the completion of the maintenance period.

E. The Owner shall inspect the project, at a minimum, every month throughout the maintenance period. The contractor shall attend a final walkthrough of the project at least one week prior to the scheduled end of the maintenance period, and again at the scheduled end of the maintenance period, as scheduled by the Owner's Representative.

1.4 PROTECTION

A. Protect planting areas and plants against damage until final acceptance. Maintenance includes temporary barriers, fences, and signs as required.

1.5 GUARANTEE AND REPLACEMENT

A. Replace all missing, damaged, or otherwise non-performing materials, including plants, with new materials as specified in the contract documents at no additional cost to the Owner.

B. All repairs and installation of replacement materials shall occur within seven calendar days of notification.

C. The Owner's Representative shall be the sole judge as to the condition of materials.

1.6 FINAL ACCEPTANCE

A. Final acceptance shall occur only after the maintenance period has been completed and following observation by and approval of the Owner's Representative. The maintenance period shall end only upon written notice of final acceptance. Refer to section 01 77 00 – Contract Closeout.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide a monthly record of all chemicals (if any) used on the site.

2.2 FERTILIZER

A. As specified in section 32 90 00 – Planting

2.3 MULCH

A. As specified in section 32 90 00 – Planting.

PART 3 - EXECUTION

3.1 GENERAL

A. All frequencies of work listed in this section shall be considered minimum. Frequency shall be increased as required to ensure a neat and orderly appearance at all times.

B. Nursery stakes and tags shall be removed within the first 15 days of maintenance. Ensure all installed support stakes and ties are securely fastened but allow moderate movement.

3.2 WEEDING

A. All planted areas shall be weeded on a weekly basis. Weeds 3" and larger in any dimension shall be completely removed.

B. Herbicides and pesticides shall only be applied by appropriately licensed operators. Selective herbicide may be used in turf areas to control invasive or noxious weeds. Broad-spectrum herbicides shall only be used in spot applications. No herbicides shall be applied during windy conditions or in a manner that results in overspray or runoff.

3.3 FERTILIZATION

A. A general-purpose fertilizer (16-16-16 or similar formulation) shall be applied to all shrub and groundcover beds at a rate of 5 lbs. per 1,000 square feet, in intervals not less than 30 days and not more than 45 days, including applications at the beginning of the maintenance period and just prior to final acceptance.

B. Apply fertilizer evenly to the entire root zone.

3.4 PRUNING

A. Trees and shrubs shall in all cases be pruned according to ANSI 300 (Part 1)

B. Trees and shrubs shall be pruned to promote sound structure and planting intent, as follows.

1. In no case shall shrubs be balled, boxed, or cut into geometric forms.
2. Shrubs groups (more than one of the same species planted adjacent to each other) shall be allowed to grow together.
3. At maturity, plants shall fully and completely fill planting areas unless clearly shown otherwise on the drawings.
4. Except as noted below, shrubs shall not be sheared. Instead, branches shall be "headed back" prior to the ultimate desired length by removing the terminal bud and adjacent leaf groups if necessary for shape and to promote lateral branching.
    a. Straight rows of small-leaved evergreen shrubs shall be pruned as hedges, forming a solid and dense mass as either a border or background.
    b. Groundcover shall be edged by shearing as required to maintain walkway clearance and keep a neat appearance.
5. Dead or declining leaves of strap-leafed plants shall be removed in their entirety, but in all cases, the overall shape of the plant shall be maintained as a hemisphere rather than a vase, allowing leaves to arch toward the ground. Tip-prune leaves with sharp pruners only if needed for appearance.
6. Pollarding or heading back of trees shall not be allowed.

C. All crossing or rubbing branches shall be removed, in favor of the stronger or best placed branch.

D. Tree pruning to maintain required clearances shall be performed as required to maintain:

1. Pedestrian passage: seven feet of overhead clearance

2. Vehicular passage: fourteen feet of overhead clearance from the travel way.

E. Pruning to frame views or for other aesthetic purposes shall be done only as directed by the City's Representative.

3.5 MULCH

A. Mulch shall be reapplied to shrub and groundcover areas throughout the maintenance period as required to maintain the original depths specified.

B. Mulch shall be topped off just prior to final acceptance.

3.6 DEBRIS

A. All clippings, pruning, and other herbaceous or woody material shall be collected and transported to a green waste recycling center at no additional cost to the Owner.

B. All trash shall be bagged, removed, and legally disposed of off-site.

3.7 IRRIGATION

A. Contractor shall operate, visually inspect, and adjust the system weekly for proper operation and to minimize or eliminate overspray and runoff.

B. Adjust programming as required for optimal plant health, providing deep irrigation without water loss below the root zone, and avoiding overwatering and runoff.

C. Hand watering, if required, shall use a hose-end diffuser, and minimize soil disturbance.

D. Repairs, if necessary, shall be accomplished within twenty-four hours, and at no additional expense to the Owner.

END OF SECTION

SECTION 33 10 00

WATER SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Site water distribution system for domestic and fire protection services up to 5 feet of any on-site building being served.

B. Domestic water and fire protection water transmission or distribution system within a roadway or street right-of-way.

1.2 RELATED SECTIONS

A. Section 31 21 00, Utility Trenching and Backfill

1.3 RELATED DOCUMENTS

A. ASME
1. ASME A112.1.2: Air Gaps in Plumbing Systems (for Plumbing Fixtures and Water Connect Receptors
2. ASME B1.20.1: Pipe Threads, General Purpose, Inch
3. ASME B16.1: Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250
4. ASME B16.18: Cast Copper Alloy Solder Joint Pressure Fittings
5. ASME B16.22: Wrought Copper and Copper Alloy Solder – Joint Pressure fittings
6. ASME B16.26: Cast Copper Alloy Fittings for Flared Copper Tubes

B. ASTM
1. ASTM A536: Standard Specification for Ductile Iron Castings
2. ASTM A674: Standard Practice for Polyethylene Encasement for Ductile Iron Pipe for Water or Other Liquids
3. ASTM B61: Standard Specification for Steam or Valve Bronze Castings
4. ASTM B62: Standard Specification for Composition Bronze or Ounce Metal Castings
5. ASTM B88: Standard Specification for Seamless Copper Water Tube
6. ASTM C94: Standard Specification for Ready-Mixed Concrete
7. ASTM D1785: Standard Specification for Poly Vinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120
8. ASTM D2564: Standard Specification for Solvent Cements for Poly Vinyl Chloride (PVC) Plastic Piping Systems
9. ASTM F1056: Standard Specification for Socket Fusion Tools for Use in Socket Fusion Joining Polyethylene Pipe or Tubing and Fittings

C. AWWA
1. C104: Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
2. C105: Polyethylene Encasement for Ductile-Iron Pipe Systems
3. C110: Ductile-Iron and Gray-Iron Fittings
4. C111: Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
5. C115: Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
6. C116: Protective Fusion-Bonded Epoxy Coatings for the Interior & Exterior Surfaces for Ductile-Iron and Gray-Iron Fittings
7. C150: Thickness Design of Ductile-Iron Pipe
8. C151: Ductile-Iron Pipe, Centrifugally Cast

9. C153: Ductile-Iron Compact Fittings
10. C200: Steel Water Pipe 6 inch and larger
11. C203: Coal-Tar Protective Coatings and Linings for Steel Water Pipe
12. C205: Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 inch and Larger-Shop Applied
13. C207: Steel Pipe Flanges for Waterworks Service-Sizes 4 inch through 144 inch
14. C208: Dimensions for Fabricated Steel Water Pipe Fittings
15. C209: Cold Applied Tape Coatings for Steel Water Pipe, Special Sections, Connections, and Fittings
16. C210: Liquid-Epoxy Coatings and Linings for Steel Water Pipe and Fittings
17. C213: Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings
18. C214: Tape Coatings for Steel Water Pipelines
19. C218: Liquid Coatings for Aboveground Steel Water Pipe and Fittings
20. C219: Bolted, Sleeve-type Couplings for Plain-End Pipe
21. C500: Metal-Seated Gate Valves for Water Supply Service
22. C502: Dry-Barrel Fire Hydrants
23. C503: Wet Barrel Fire Hydrants
24. C504: Rubber Seated Butterfly Valves.
25. C507: Ball Valves, 6 inch through 60 inch.
26. C508: Swing-check Valves for Waterworks Service, 2 inch through 48 inch NPS.
27. C509: Resilient-Seated Gate Valves for Water Supply Service
28. C510: Double Check Valve Backflow Prevention Assembly
29. C511: Reduced-Pressure Principle Backflow Prevention Assembly
30. C512: Air-Release, Air/Vacuum, and Combination Air Valves for Water and Wastewater Service
31. C550: Protective Interior Coatings for Valves and Hydrants
32. C600: Installation of Ductile-Iron Water Mains and Their Appurtenances
33. C606: Grooved and Shouldered Joints
34. C651: Disinfecting Water Mains
35. C800: Underground Service Line Valves and Fittings
36. C900: Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 inch through 60 inch for Water Transmission and Distribution
37. C901: Polyethylene (PE) Pressure Pipe and Tubing, ½ inch through 3 inch for Water Service
38. C905: Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 inch through 48 inch for Water Transmission and Distribution
39. C906: Polyethylene (PE) Pressure Pipe and Fittings, 4 inch through 65 inch, for Waterworks
40. M11: Steel Pipe - A Guide for Design and Installation
41. M23: PVC Pipe – Design and Installation
42. M41: Ductile-Iron Pipe and Fittings

D. Factory Mutual Insurance Company (FM)
1. FM 1530: Fire Department Connections

E. National Fire Protection Association (NFPA)
1. NFPA 24: Installation of Private Fire Service Mains and Their Appurtenances
2. NFPA 70: National Electric Code
3. NFPA 1963: Fire Hose Connection

F. National Sanitation Foundation (NSF)
1. NSF 61: Drinking Water System Components-Health Effects

G. Underwriters Laboratory (UL)
1. UL 262: Safety Gate Valves for Fire-Protection Service
2. UL 405: Safety Fire Department Connection Devices

3. UL 789: Indicator Posts for Fire-Protection Service

1.4 DEFINITIONS

A. AASHTO: American Association of State Highway and Transportation Officials

B. ASTM: American Society for Testing Materials

C. AWWA: American Waterworks Association

D. DI: Ductile iron

E. DIP: Ductile iron pipe

F. FM: Factory Mutual

G. NFPA: National Fire Protection Association

H. NSF: National Sanitation Foundation

I. PCC: Portland cement concrete

J. PE: Polyethylene

K. PVC: Polyvinyl Chloride

L. UL: Underwriters Laboratory

1.5 SYSTEM PERFORMANCE REQUIREMENTS

A. Minimum Working Internal Pressures: As indicated on Plans. [Check if it is indicated on the plans, if not state it here.]

B. External Load: Earth load indicated by depth of cover plus AASHTO H20 live load unless indicated otherwise.

1.6 SUBMITTALS

A. Follow submittal procedure outlined in Section 01 10 00, Supplemental General Requirements.

B. Product Data: Manufacturer's literature and data, including, where applicable, sizes, pressure rating, rated capacity, listing/approval stamps, labels, or other marking on equipment made to the specified standards for materials, and settings of selected models, for the following:
   1. Piping materials and fittings
   2. Gaskets, couplings, sleeves, and assembly bolts and nuts
   3. Flexible pipe fittings
   4. Restrained pipe fittings
   5. Flexible Connectors
   6. Expansion joints
   7. Flexible expansion joints
   8. High deflection fittings/ball joints
   9. Gate valves
   10. Butterfly valves

11. Check valves
12. Ball valves
13. Air release, air/ vacuum and combination air valves
14. Blow-off valves
15. Pressure reducing valves
16. Flow Regulating valves
17. Service connections and water meters
18. Valve boxes, meter boxes, frames and covers
19. Backflow preventers
20. Fire hydrants
21. Post indicator valves
22. Fire department connections
23. Thrust block concrete mix
24. Tapping sleeves and tapping valves
25. Service saddles and corporation stops
26. Identification materials and devices

C. Shop Plans and Calculations: Where an on-site fire water system is required, Contractor shall provide shop plans for Engineer and agency approval prior to construction. Coordinate with the Plans and identify any proposed modifications or deviations. Shop Plans and Calculations shall be stamped and signed by a registered Fire Protection Engineer licensed by the State of California as required.
1. Include the following information:
   a. Design assumptions
   b. Thrust block sizing and calculations
   c. Materials to be used
   d. Available water pressure
   e. Required water pressure
2. The review of fire system components constitutes only a portion of the review and approval required. A copy of the fire system component submittal package shall be forwarded to the local fire marshal for further review and approval.

D. Water Pressure Report: At the conclusion of work, the Contractor shall engage a qualified testing service to conduct a flow test of the existing system (providing flow test data for all mains and at least six (6) hydrants). Provide date and location of test, type and method of test performed, static pressure and residual pressure in psig, observed flow in gpm, and orifice size.

E. Shop drawings: Include plans, elevations, details and attachments.
1. Precast and cast in-place vaults and covers
2. Wiring diagrams for alarm devices

F. Field test reports: Indicate and interpret test results for compliance with the Project requirements.

1.7 QUALITY ASSURANCE

A. Comply with requirements of utility supplying water. Do not operate existing valves or tap existing piping without written permission and/or presence of utility company representative.

B. Comply with the following requirements and standards:
1. NSF 61: "Drinking Water System Components-Health Effects" for materials for potable water.
2. NFPA 24: "Installation of Private Fire Service Mains and Their Appurtenances" for materials, installations, tests, flushing, and valve and hydrant supervision.
3. NFPA 70: "National Electric Code" for electrical connections between wiring and

electrically operated devices.

C. Provide listing/approval stamp, label, or other marking on piping and specialties made to a specified standard.

1.8 MATERIAL DELIVERY, STORAGE AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
   1. Ensure that valves are dry and internally protected against rust and corrosion.
   2. Protect valves against damage to threaded ends and flange faces.
   3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. Deliver piping with factory-applied end-caps. Maintain end-caps through shipping, storage and handling to prevent pipe end damage and to prevent entrance of dirt, debris and moisture.

C. Handling: Use slings to handle valves and fire hydrants whose size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

D. During Storage: Use precautions for valves, including fire hydrants according to the following.
   1. Do not remove end protectors, unless necessary for inspection, then reinstall for storage.
   2. Protection from Weather: Store indoors and maintain temperature higher than ambient dew-point temperature. Store indoors and maintain temperature higher than ambient dew point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

E. Do not store plastic pipe and fittings in direct sunlight.

F. Protect pipe, fittings, flanges, seals and specialties from moisture, dirt and damage.

G. Protect linings and coatings from damage.

H. Handle precast boxes, vaults and other precast structures according to manufacturer's written instructions.

I. Protect imported bedding and backfill material from contamination by other materials.

1.9 COORDINATION

A. Coordinate connection to existing water mains with water utility supplying water.

B. Coordinate piping materials, sizes, entry locations, and pressure requirements with building domestic water distribution piping and fire protection piping.

PART 2 PRODUCTS

2.1 PVC PIPE: SIZES 1/8 INCH THROUGH 3 INCH

A. Pipe and Fittings: ASTM D1785, Schedule 40. [Schedule 80 and 120 are also available. Pressure ratings up to 260 psi are achievable with schedule 40]

B. Joints: Restrain with solvent cement. Do not use threaded pipe.

C. Solvent Cement: ASTM D2564.

2.2 PVC PIPE: SIZES 4 INCH THROUGH 48 INCH

A. Pipe: Pressure Class 200, DR 14, spigot and gasket bell end, conforming to AWWA C900 (4 inch through 12 inch and AWWA C905 (14 inch through 48 inch)

B. Fittings: Ductile iron fittings
   1. Standard: AWWA C110, sizes 4 inch through 48 inch
   2. Compact: AWWA C153, sizes 4 inch through 24 inch
   3. All fittings shall be fusion epoxy coated per AWWA C116

C. Unrestrained Joints: Push-On Bell and Spigot Joint: AWWA C900

D. Restrained Joints:
   1. Push-On Bell and Spigot Joint: Harness assembly as manufactured by EBAA Iron, or approved equal. [Check with the manufacturer for sizes, pressure ratings and corrosion protection coatings that are available.]
   2. Plain End PVC to Ductile Iron Mechanical Joint: EBAA Iron, or approved equal.

E. Steel or Ductile Iron Couplings: [check with manufacturer for sizes and pressure rating available]
   1. Plain End Pipe to Plain End Pipe: Ductile iron or steel bolted couplings, manufacturer's shop coating with low alloy steel bolts and nuts. Steel couplings to conform to AWWA C219. Smith-Blair, Inc., Dresser, or approved equal.
   2. Plain End Pipe to Ductile Iron or Steel Flanged Pipe: Ductile iron or steel bolted flanged coupling adapters, manufacturer's shop coating with low alloy steel bolts and nuts. Steel flanged couplings to conform to AWWA C219. Smith-Blair, Inc, Dresser or approved equal.

F. PVC Couplings: [check with manufacturer for sizes and pressure rating available]
   1. Unrestrained Plain End to Plain End Pipe: AWWA C900, as manufactured by North American Piper approved equal.
   2. Restrained Plain End to Plain End Pipe: AWWA C900, "Fluid-Tite" as manufactured by North American Pipe, or approved equal.

2.3 CEMENT MORTAR LINED AND COATED STEEL PIPE: 6 INCH AND LARGER

A. Pipe: AWWA C200 and AWWA M11

B. Special Sections and Fittings: AWWA C200, C207, C208 and AWWA M11 for all bends, tees, nozzles, closures, etc.

C. Flanges: AWWA C207. Includes blind flanges.

D. Linings and Coatings for Pipe, Special Sections and Fittings: Cement Mortar Lining and Coating: AWWA C205. [Other linings and coatings are available. Consult the following AWWA Standards and pipe manufacturers such, as Ameron, for details.
   1. Liquid Epoxy Lining and Coating: AWWA C210
   2. Fusion Bonded Epoxy Lining and Coating: AWWA C213
   3. Coal-Tar Lining and Coating: AWWA C203
   4. Cold-Applied Tape Coatings, Piping: AWWA C214
   5. Cold-Applied Tape Coatings, Specials, Connection and Fittings: AWWA C209
   6. Cold Applied Petrolatum Tape and Petroleum Wax Tape Coatings for the Exterior of Special Sections, Connections, and Fittings for Buried or Submerged Steel Water

Pipelines
7. Aboveground Pipe Coatings: AWWA C218]

E. Non-Restrained Joints: AWWA M11 - Rubber Gasket: Carnegie-shape rubber gasket as indicated

F. Restrained Joints: AWWA M11. Where a flanged joint, butt strap or coupling are not indicated, either restrained joint a, or b, as follows, is acceptable, but the selected joint shall be used throughout the project.
1. Rubber Gasket: Carnegie-shape rubber gasket with field welded restraint bar as indicated
2. Field Lap Welded Slip Joint: As indicated
3. Field Welded Butt Strap: As indicated
4. Flanged Joint: AWWA C207 with Type 316L stainless steel bolts and nuts as indicated

G. Joint Coating for Cement Mortar Lined and Coated Steel Pipe:
1. Field Joint Encasement: Cement mortar contained in fabric lined with closed cell polyethylene foam as indicated. Attach fabric to pipe with Type 316L stainless steel straps as indicated. Closed cell polyethylene foam encasement shall be by Industrial Specialties or approved equal.

H. Non-Restrained Flexible Couplings: AWWA C219, Smith Blair, Inc., Number 411 or approved equal, with factory applied fusion-bond epoxy coating and Type 316L stainless steel bolts and nuts.

I. Restrained Flexible Couplings: Non-restrained flexible coupling supplemented with a restraining harness as indicated and as follows:
1. Restraining harness design by Contractor's pipe manufacturer using criteria presented in AWWA M11.
2. Space harness-lugs and tie bolts equally around the pipe.
3. Type 316L stainless steel harness tie bolts and nuts.
4. Design and dimensions of harness lugs to be modified from that shown in AWWA M11, as necessary, to provide additional height to clear the coupling.

J. Field Coating of Coupling Assemblies: Apply either of the following flexible tape and mastic or putty coating systems to the all non-restrained or restrained flexible steel couplings.
1. Denso Coating System – Denso North American, Inc.
2. Trenton Coating System – Trenton Corporation

2.4 FLEXIBLE CONNECTORS

A. Flanged Coupling Adapters for plain end pipe at fittings, valves and equipment shall be Dresser Style 127 or 128, similar models by ITT; Baker Coupling Company or approved equal. Nuts, bolts and other hardware shall be Type 304 stainless steel.

B. Mechanical Couplings shall be rated for a minimum working pressure of 150 psi. The barrel shall be a minimum 10 inches long. Couplings shall be cleaned and shop primed with manufacturer's standard rust inhibitive primer. Mechanical couplings shall be Smith-Blair, Romac, JCM, Apac or approved equal, with stainless steel nuts, bolts, and threaded rods.

C. Flexible Coupling for Steel Pipe shall be Dresser Coupling Style 38 with EPDM gaskets, or approved equal.

2.5 EXPANSION JOINT

A. An expansion joint shall be installed at location indicated on the Plans and shall be manufactured of ductile iron conforming to the material properties of AWWA C153.

B. Separation beyond the maximum extension of the expansion joint shall be prevented without the use of external tie rods.

C. The expansion joint shall be pressure tested against its own restraint to a minimum of 250 psi.

D. All pressure containing parts shall be lined with a minimum of 15 mils of fusion bonded epoxy, conforming to the applicable requirements of AWWA C213, and shall be tested with a 1500 volt spark test conforming to stated specification.

E. Mechanical or Flanged Joint: The expansion joint shall be Model Ex-Tend 200, 4 inch through 36 inch, as manufactured by EBAA Iron, Inc., or approved equal.

F. TR Flex Joints: TR Flex Telescoping Sleeve, 4 inch through 64 inch, U. S. Pipe.

2.6 FLEXIBLE EXPANSION JOINTS

A. Flexible expansion joints shall be installed at locations indicated on the Plans and shall be manufactured of ductile iron conforming to the material requirements of ASTM A536 and AWWA C153.

B. Each flexible expansion joint shall be pressure tested prior to shipment against its own restraint to a minimum of 250 psi. A minimum 2:1 safety factor, determined from the published pressure rating, shall apply.

C. Each flexible expansion joint shall consist of an expansion joint designed and cast as an integral part of a ball and socket type flexible joint, having a minimum per ball deflection of 15º, and 6 inches minimum expansion. The flexible expansion fitting shall not expand or exert an axial imparting thrust under internal water pressure. The flexible expansion fitting shall not increase or decrease the internal water volume as the unit expands or contracts.

D. All internal surfaces (wetted parts) shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the applicable requirements of AWWA C213. Sealing gaskets shall be constructed of EPDM. The coating and gaskets shall meet ANSI/NSF-61.

E. Exterior surfaces shall be coated with a minimum of 6 mils of fusion bonded epoxy conforming to the applicable requirements of AWWA C116

F. Polyethylene sleeves, meeting AWWA C105, shall be included for direct buried applications.

G. Flanged or mechanical Joint: Flexible expansion joint shall be Force Balanced FLEX-TEND, sizes 3 inch through 48 inch, as manufactured by EBAA Iron, or approved equal.

H. Flanged Joint: Starflex, Series 5000, Star Pipe Products, or approved equal.

I. Plain End to Plain End Pipe: “Xtra Flex,” sizes 4 inch through 24 inch, U. S. Pipe, or approved equal.

2.7 HIGH DEFLECTION FITTINGS/BALL JOINTS

A. Plain End Pipe: Xtra Flex Restrained Joint High Deflection Fittings, 4 inch through 24 inch, U. S. Pipe, or approved equal.

B. Mechanical or Flanged Joint: Flex 900, 4 inch through 12 inch, EBAA Iron, or approved equal.

2.8 GATE VALVES

A. Provide valves conforming to AWWA C500 or AWWA C509

B. Valves shall be resilient-seated, with non-rising stem, gray or ductile-iron body and bonnet, with bronze or gray or ductile-iron gate, bronze stem and square stem operating nut unless noted otherwise.

C. [Metal seated, AWWA C500, and rubber seated, AWWA C504, are also available.]

D. All bolts, nuts and washers, except operating nut, shall be stainless steel.

E. Stem operating nut to be 2 inches square and open counter-clockwise.

F. Stem extensions shall be installed to bring the stem operating nut to within 2 feet of finish grade where the depth from finish grade to the stem operating nut exceeds 4 feet.

G. Equip valves in pump stations and other interior or vault installations with hand-wheels.

H. Provide protective epoxy interior and exterior coating according to AWWA C550 and manufacturer's recommendations.

I. For the domestic water system, valves shall also conform to NSF 61.

J. Service vine Valves and fittings, 2 inch and smaller shall be in accordance with AWWA C800

K. Where a post indicator is shown, provide valve with an indicator post flange.

L. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the project include, but are not limited to, the following:
   1. Mueller Company
   2. M&H Valve Company
   3. Crane Company, or approved equal

2.9 SWING CHECK VALVES

A. Provide swing-check type valves conforming to AWWA C508.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
   1. Mueller Company
   2. M&H Valve Company
   3. DeZurik/APCO
   4. Watts, or approved equal

2.10 BALL VALVES

A. Provide ball valves (6 inch through 48 inch) per AWWA C507 as manufactured by Crane Company, or approved equal.

B. Provide ball valves (2 inches and smaller) conforming to AWWA C800 as manufactured by Mueller 300 Series, Ford, or approved equal.

C. Valves shall open by counterclockwise rotation of the valve stem.

D. Provide valves with ends as appropriate for the adjoining pipe.

E. Provide valve with lockable operating nut or handle as shown on the Plans.

2.11 AIR RELEASE, AIR/VACUUM AND COMBINATION AIR VALVES

A. Air release and vacuum valves: Provide valve and service size as shown on the Plans. Valve shall have cast-iron single valve body, and shall conform to AWWA C512. A compound lever system shall have a maximum operating pressure of 300 psi. Provide a protective cap for the outlet of the valve. Provide universal air-vacuum type valves, Crispin, DeZurik/APCO or approved equal.

B. Combination air valves: Provide valve and service size as shown on the Plans. Valve shall have cast-iron single valve or double valve body, and shall conform to AWWA C512. A simple or compound lever system shall have a maximum operating pressure of 300 psi. Provide a protective cap for the outlet of the valve.

C. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the project include, but are not limited to, the following:
   1. Crispin
   2. DeZurik/APCO, or approved equal

2.12 BLOW-OFF VALVES

A. Provide valve and service size as shown in the Plans. Provide 2 inch valves at low points of the piping system, and 4 inch valves at dead-ends of the piping system, unless otherwise directed by the Engineer.

B. 2 inch blow-off shall have a 2 inch vertical female iron pipe (FIP) inlet and a 2 inch normal pressure and temperature (NPT) nozzle outlet with cap. Valve shall open by counterclockwise rotation of a top-mounted 9/16 inch square operating nut. All working parts shall be serviceable without excavation. Kupferle/Truflo Model TF550, or approved equal.

C. 4 inch blow-off shall have all brass principal working parts, 4 inch inlet and outlet and is self-draining and non-freezing. Valve shall open by counterclockwise rotation of a top-mounted 2 inch square operating nut. All working parts shall be serviceable without excavation.

D. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:

E. Kupferle/ MainGuard #7600, or approved equal

2.13 PRESSURE-REDUCING VALVES

A. Valve: Automatic, pilot-operated, cast-iron body with interior coating according to AWWA C550. 250 psi working-pressure

B. bronze pressure-reducing pilot valve and tubing, and means for discharge pressure

adjustment.

C. Valves shall have flanged ends. Valves sized 3 inches or smaller may have screwed ends.

D. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
   1. Cla-Val Company
   2. Bermad
   3. Ames Company, or approved equal

2.14 FLOW-REGULATING VALVES

A. Valve: Automatic, pilot-operated, cast-iron body with interior coating according to AWWA C550. 250 psi working-pressure, bronze pressure-reducing pilot valve and tubing, and means for flow adjustment. Details as indicated.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
   1. Cla-Val Company
   2. Bermad
   3. Ames Company, or approved equal

2.15 SERVICE CONNECTIONS AND WATER METERS

A. Service connections and water meter details and boxes as indicated.

2.16 VALVE BOXES, METER BOXES, FRAMES AND COVERS

A. Water Valve Box: Provide pre-cast concrete valve box for each buried valve. Provide box with steel or cast iron traffic cover marked "WATER". Christy Model G5 with G5C cover or approved equal.

B. Valve or Meter Boxes: Contractor shall verify box size required for water system appurtenances as shown in the Construction Documents. Provide a precast concrete utility box for each buried appurtenance. Provide a traffic-rated lid for H20 loading. A non-traffic rated lid may be used for boxes located in landscape areas. Christy, or approved equal.

2.17 BACKFLOW PREVENTER - REDUCED PRESSURE PRINCIPLE ASSEMBLIES (RPPA)

A. Provide RPPA consisting of two independently operating check valves with a pressure differential relief valve located between the two check valves, two shut-off valves and four test cocks. RPPA shall be tamper-proof and conform to AWWA C511. Valve shall have an outside screw (OS) gate valve on inlet and outlet, and strainer on inlet. Include test cocks and pressure-differential relief valve with ASME A112.1.2 air gap fitting located between 2 positive-seating check valves for continuous-pressure application.

B. Body:
   1. 2 inch and Smaller: Bronze with threaded ends
   2. 2 ½ inch and Larger: Bronze, cast iron steel, or stainless steel with flanged ends

C. Interior Lining: AWWA C550, epoxy coating for cast iron or steel bodies

D. Interior Components: Corrosion-resistant materials

E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
   1. Cla-Val Company
   2. Ames Company
   3. Febco, CMB Industries, Inc.
   4. Hersey Products, Inc.
   5. Watts
   6. Zurn/Wilkins, or approved equal

2.18 BACKFLOW PREVENTER - DOUBLE CHECK DETECTOR ASSEMBLY (DCDA)

A. Provide a cast-iron body DCDA consisting of mainline double check assemblies in parallel with a bypass double check and meter assembly, two shut-off valves and four test cocks. DCDA shall be tamper-proof and conform to AWWA C510. FM approved or UL listed, with outside screw and yoke (OS&Y) gate valve on inlet and outlet, and strainer on inlet. Include two positive-seating check valves and test cocks, and bypass with displacement-type water meter, valves, and double-check backflow preventer, for continuous pressure application.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
   1. Cla-Val Company
   2. Ames Company
   3. Febco, CMB Industries, Inc.
   4. Hersey Products, Inc.
   5. Zurn/Wilkins, or approved equal

2.19 POST INDICATOR VALVE

A. General: UL 789, FM approved, vertical-type, cast-iron body with operating wrench extension rod, and adjustable cast-iron barrel of length required for depth of bury of valve.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
   1. Mueller Company
   2. Clow Corporation
   3. American Cast Iron Company

2.20 FIRE DEPARTMENT CONNECTION

A. Exposed, sidewalk or Freestanding Type Fire Department Connection: UL 405, cast brass body with threaded inlets according to NFPA 1963 and matching local fire department hose threads and threaded bottom outlet. Include lugged caps, gaskets and chains; lugged swivel connections and drop clapper for each hose-connection inlet; 18 inch high brass sleeve; and round escutcheon plate. Number of inlets shall be as shown on the Plans. Clapper and spring check inlets shall each have a minimum capacity of 250 gpm, and be furnished with a cap and chain. Outlet shall be sized for simultaneous use of all inlets. Connection shall be branded "Building XX".
   1. 2-Way FDC: Connection shall conform to UL 405 or FM 1530. Elkhart, Croker, or approved equal.
   2. 3-Way FDC: Connection shall be subject to approval by the local water department or fire marshal. Elkhart, Croker, Potter-Roemer or approved equal.
   3. 4-Way FDC: Connection shall conform to UL 405. Potter-Roemer, Croker, or approved equal.

4. 6-Way FDC: Connection shall be subject to approval by the local water department or fire marshal. Croker, Potter-Roemer or approved equal.

2.21 FIRE HYDRANTS

A. Provide two 2 ½ inch and one 4 ½ inch outlets, with a 6 inch nominal inside diameter inlet and break-away type bolts. Hydrant shall have a working pressure of 250 psi and shall conform to AWWA C502 or C503, and be UL listed and FM approved. Provide hydrants of one manufacturer. Clow model 960 series or approved equivalent, subject to approval of the Owner and fire marshal.

2.22 THRUST BLOCKS

A. Use concrete conforming to ASTM C94 having a minimum compressive strength of 2,500 psi at 28 days; or use concrete of a mix not leaner than one part cement, 2 ½ parts sand, and 5 parts gravel, having the same minimum compressive strength.

B. Provide thrust blocks or mechanical pipe restraints at all fittings and changes in angle, alignment or elevation.

C. Where depth or location of existing structures prohibit the use of standard thrust blocks, gravity blocks may be used.

2.23 TAPPING SLEEVES AND TAPPING VALVES

A. Tapping sleeves shall be epoxy coated and furnished with stainless steel washers, nuts and bolts. Mueller H-615 and H-619, Ford, or approved equal.

B. Tapping valves shall have flanged inlet, Class 125, conforming to ASME B16.1 and furnished with stainless steel washers, nuts and bolts. Tapping valves shall be constructed with a mechanical joint outlet. Mueller T-687, T-642, T-681, or approved equal.

2.24 SERVICE SADDLES AND CORPORATION STOPS

A. Service Saddles: Saddles shall conform to AWWA C800 and NSF 61.
   1. For DIP: Provide bronze or stainless steel body, double strap type with a 200 psi, maximum working pressure. Mueller BR2 Series, Ford, or approved equal.
   2. For PVC: Provide bronze body, wide strap type. Mueller H-13000 Series, Ford, or approved equal.
   3. For PE: Per manufacturer's recommendations.

B. Corporation Stops: Provide ground key type; bronze conforming to ASTM B61 or ASTM B62, for a working pressure of 100 psi and suitable for the working pressure of the system.
   1. Ends shall be suitable for adjoining pipe and connections, solder-joint, or flared tube compression type joint.
   2. Threaded ends shall conform to AWWA C800.
   3. Coupling nut for connection to flared copper tubing shall conform to ASME B16.26.
   4. Mueller H-15000 Series with "CC" threads and a copper flare straight connection outlet, Ford, or approved equal.

2.25 IDENTIFICATION MATERIALS AND DEVICES

A. Warning Tape: Provide warning tape consisting of metallic foil bonded to solid blue plastic film not less than 3 inches wide. Film shall be inert polyethylene plastic. Film and foil shall each not be less than 1 mil thick. The tape continuously shall have printed black-letter, not

less than ¾ inch high, message reading "CAUTION: WATER MAIN BELOW".

B. Tracer Wire for Nonmetallic Piping: Provide 12 guage, coated copper or aluminum wire not less than 0.10 inch in diameter, with blue THW, THWN, or THHN rated insulation, in sufficient length to be continuous over each separate run of nonmetallic pipe. Wire shall be tied in at all valves.

PART 3 EXECUTION

3.1 PIPE INSTALLATION

A. Pipe Depth and Trench Configuration: Conform to elevations, profiles and typical trench section(s) shown on the Plans.

B. Excavation, Bedding, Backfill, and Compaction: Section 31 21 00 – Utility Trenching and Backfill.

C. Handling: Carefully handle during loading, hauling, unloading and placing operations to avoid breakage or damage. Use strap type slings for lifting and placing; no chains or hooks will be permitted. Comply with manufacturer's recommendations.

D. Pipe laying and jointing:
1. Provide proper facilities for lowering sections of pipe into trenches.
2. Do not drop or dump pipe, fittings, valves, or any other water line material into trenches.
3. Cut pipe accurately to length established at the site and work into place without springing or forcing. Replace any pipe or fitting that does not allow sufficient space for proper installation of jointing material.
4. Blocking or wedging between bells and spigots will not be permitted. Lay bell-and-spigot pipe with the bell end pointing in the direction of laying.
5. Grade the pipeline in straight lines; avoid the formation of dips and low points.
6. Support pipe at proper elevation and grade.
7. Provide secure firm, uniform support. Wood support blocking will not be permitted.
8. Lay pipe so that the full length of each section of pipe and each fitting rests solidly on the pipe bedding; excavate recesses to accommodate bells, joints, and couplings.
9. Provide anchors and supports where indicated and where necessary for fastening work into place.
10. Make proper provision for expansion and contraction of pipelines.
11. Keep trenches free of water until joints have been properly made.
12. Do not lay pipe when conditions of trench or weather prevent proper installation.
13. All fittings shall be blocked with appropriately sized thrust blocks as shown on the Plans.

E. Installation of Tracer Wire:
1. Install a continuous length of tracer wire for the full length of each run of nonmetallic pipe.
2. Attach wire to top of pipe in such manner that it will not be displaced during construction operations.
3. Form a mechanically and electrically continuous line throughout the pipeline, extending to the nearest valve or other pipeline appurtenance. Extend the wire up the outside of the valve box/riser and cut a hole that is 8 inches from the top, extend a 12 inch wire lead to the inside of the box. At other pipeline appurtenances, terminate the 12 inch wire lead inside the enclosure.
4. Splice wire with a splicing device consisting of and electro-tin plated seamless copper sleeve conductor. Install as recommended by the manufacturer. Wrap splices and

damaged insulation with electrician's tape.

F. Installation of Warning Tape
   1. Install tape approximately 1 foot above and along the centerline of the pipe.
   2. Where tape is not continuous, lap tape ends a minimum of 2 feet.

G. Curved Alignment: When necessary to conform to the alignment specifically indicated, lay pipe on a curved alignment by means of asymmetrical closure of joints or bending of the pipe barrel. If necessary, use shorter than the standard lengths of pipe to achieve curvature specified. Do not exceed the recommendations of the pipe manufacture for deflections at the joints or pipe bending.

H. Connections to Existing Lines:
   1. Make connections to existing water lines after approval is obtained and with a minimum interruption of service on the existing line.
   2. Make connections to existing lines under pressure in accordance with the recommended procedures of a manufacturer of pipe of which the line being tapped is made.

I. Closure: Close open ends of pipes and appurtenance openings at the end of each day's work or when work is not in progress.

3.2 INSTALLATION OF POLYVINYL CHLORIDE PIPING

A. Comply with the recommendations for pipe installation, joint assembly and appurtenance installation in AWWA Manual M23.

B. Comply with the applicable requirements of AWWA C600 for joint assembly, and with the recommendations of Appendix A to AWWA C111.

C. Jointing:
   1. Provide push-on joints with the elastomeric gaskets specified for this type joint, using either elastomeric-gasket bell-end pipe or elastomeric-gasket couplings.
   2. For pipe-to-pipe push-on joint connections, use only pipe with push-on joint ends having factory-made bevel.
   3. For push-on joint connections to metal fittings, valves, and other accessories, cut spigot end of pipe off square and re-bevel pipe end to a bevel approximately the same as that on ductile-iron pipe used for the same type of joint.
   4. Use an approved lubricant recommended by the pipe manufacturer for push-on joints.
   5. Assemble push-on joints for connection to fittings, valves, and other accessories in accordance with the applicable requirements of AWWA C600 for joint assembly.
   6. Make compression-type joints/mechanical-joints with the gaskets, glands, bolts, nuts, and internal stiffeners previously specified for this type joint. Cut off spigot end of pipe for compression-type joint or mechanical-joint connections and do not re-bevel.
   7. Assemble joints made with sleeve-type mechanical couplings in accordance with the recommendations of the coupling manufacturer using internal stiffeners as previously specified for compression-type joints.

D. Pipe Anchorage:
   1. Provide concrete thrust blocks or restrained joints for pipe anchorage, except where metal harness is indicated on the Plans.

3.3 INSTALLATION OF VALVES

A. Gate Valves
   1. Install gate valves conforming to AWWA C500 and UL 262 in accordance with the

requirements of AWWA C600 for valve-and-fitting installation and with the recommendations of the Appendix (Installation, operation, and Maintenance of Gate Valves) to AWWA C509.

2. Install gate valves conforming to AWWA C509 in accordance with the requirements of AWWA C600 for valve-and-fitting installation and with the recommendations of the Appendix (Installation, Operation, and Maintenance of Gate Valves) to AWWA C509.
3. Install gate valves on PVC water mains in addition in accordance with the recommendations for appurtenance installation in AWWA Manual M23.

B. Butterfly Valves: Install butterfly valves in accordance with the applicable requirements of Appendix A of AWWA C504.

C. Check Valves: Install check valves in accordance with the applicable requirements of AWWA C600 for valve-and-fitting installation, except as otherwise indicated.

D. Joints:
1. Valves on DI, PE and PVC Pipe: Mechanical joint valves for buried locations. Flanged-end valves for installation in vaults/pits.
2. Valves on Steel Pipe: As indicated for buried locations. Flanged-end valves for installation in vaults/pits.

3.4 INSTALLATION OF VALVE AND METER BOXES

A. Boxes shall be centered over the appurtenance so as not to transmit shock or stress. Covers shall be set flush with the surface of the finished pavement, or as shown on the Plans. Backfill shall be placed around the boxes and compacted to the specified level in a manner that will not damage or displace the box from proper alignment or grade. Misaligned boxed shall be excavated, plumbed, and backfilled at no additional cost to the Owner.

3.5 INSTALLATION OF FIRE HYDRANTS

A. Install fire hydrants, except for metal harness, plumbed vertical, in accordance with AWWA C600 for hydrant installation and as indicated.

B. Provide and assemble joints as specified for making and assembling the same type joints between pipe and fittings. Hydrants shall be set so that mounting bolts clear the top of finished grade by three inches so bolts may be easily replace if needed.

C. Provide metal harness as specified under pipe anchorage requirements for the respective pipeline material to which hydrant is attached.

3.6 SERVICE LINE CONNECTIONS TO WATER MAINS

A. Connect service lines of size shown on plans to the main with a rigid connection or a corporation stop and gooseneck. Install a gate valve on the service line.

B. Connect service lines to ductile-iron water mains in accordance with AWWA C600 for service taps.

C. Connect service lines to PVC plastic water mains in accordance with the recommendations of AWWA Manual M23.

3.7 INSTALLATION OF BACKFLOW PREVENTERS

A. Backflow devices shall be installed horizontal and level, with three feet minimum clearances

from obstructions.

3.8 ANCHORAGE INSTALLATION

A. Mechanically Restrained Joints: Install where indicated for lengths indicated in accordance with manufacturer's instructions.

B. PCC Thrust Blocks: Install where required and as indicated. Bearing area indicated is to be against undisturbed earth. Allow a minimum of 24 hours curing time before introducing water into the pipeline and allow a minimum of 7 days curing time before pressure testing.

3.9 CONNECTION TO EXISTING

A. Contractor shall submit a work plan delineating the work sequence and duration of each task.

B. The Contractor to submit a contingency plan in case work extends beyond the allowable shutdown duration

C. Contractor to notify Owner 48 hours prior to shutdown.

D. Prior to shutdown the Contractor shall have the following:
   1. Approved submittals for the work to be done
   2. Approved work plan
   3. Approved contingency plan
   4. The material, tools and equipment necessary to do the work, including pumps, generator, lighting, etc.

E. No work shall be done within two weeks from a wet weather event.

F. Contractor to check the weather (NOAA website) and plan work during dry weather period.

3.10 HYDROSTATIC PRESSURE AND LEAKAGE TEST

A. General:
   1. Provide all necessary materials and equipment, including water.
   2. Backfill all trenches sufficient to hold pipe firmly in position.
   3. Allow time for thrust blocks to cure prior to testing.
   4. Flush all pipes prior to testing to remove all foreign material.
   5. Perform pressure and leakage test concurrently.
   6. Apply test pressure by means of a pump connected to the pipe.
   7. Base test pressure on the elevation of the lowest point in the line.
   8. Fill each closed valve section or bulk-headed section slowly. Expel air from section being tested by means of permanent air vents installed at high points or by means of temporary corporation cocks installed at such points. Remove and plug the temporary corporation cocks at the conclusion of the test.
   9. Ensure the release of air from the line during filling, and prevent collapse due to vacuum when dewatering the line.
   10. The pressure test on mortar-lined pipe shall not begin until the pipe has been filled with water for at least 24 hours to allow for absorption in the cement mortar lining.
   11. Allow the system to stabilize at the test pressure before conducting the leakage test.
   12. Do not operate valves in either the opening or closing direction at differential pressures above the valves rated pressure.
   13. Maintain test pressure as specified for type of pipe being tested.
   14. Pressure Test: Examine any exposed pipe, fittings, valves, hydrants and joints during

the test, if no leaks are observed the section of line has passed the pressure test. If leaks are observed, repair any damaged or defective pipe, fittings, valves, or hydrants, and repeat the pressure test.

15. Leakage Test: Perform as specified hereafter for the type of pipe being installed.

B. Preparation for Test
   1. Vents shall be provided at the high points of the system and drains provided where means of venting or draining do not exist.
   2. Remove or block off, all relief valves, rupture discs, alarms, control instruments, etc. that shall not be subjected to the test pressure.
   3. All discs, balls, or pistons from check valves shall be removed if they interfere with filling of the system. Open all valves between inlet and outlet of the section to be tested.
   4. Connect pump and provide temporary closures for all of the external openings in the system. Use caution to insure that the closures are properly designed and strong enough to withstand the test pressure.
   5. A joint previously tested in accordance with this specification may be covered or insulated.
   6. Expansion joints shall be provided with temporary restraint for additional pressure under test or shall be isolated from the test.
   7. Flanged joints, where blanks are inserted to isolate equipment during the test, need not be tested.

C. DIP Leakage Test: Perform in accordance with AWWA C600. Selected requirements of AWWA C600 are repeated as follows:
   1. The pipe shall be subjected to a hydrostatic pressure of 50 percent above the normal operating pressure, or 150 psi, whichever is greater. In no case shall the pressure be allowed to exceed the design pressure for pipe, appurtenances, or thrust restraints.
   2. Maintain the test pressure, +/- 5 psi, for a minimum of four hours.
   3. No piping will be accepted if the leakage is greater than that determined by the following formula:

      $$L = (S \times D \times P^{1/2})/133{,}200$$

      L = Allowable leakage, gallons per hour.
      S = Length of pipe tested, feet.
      D = Nominal diameter of pipe, inches.
      P = Average test pressure during the leakage test, pounds per square inch (gauge).

D. PE Pipe Leakage Test:
   1. The pipe shall be subjected to a hydrostatic pressure of 50 percent above the normal operating pressure, or 150 psi, whichever is greater. In no case shall the pressure be allowed to exceed the design pressure for pipe, appurtenances, or thrust restraints.
   2. Apply the test pressure and allow the pipe to stand, without makeup pressure, for sufficient time to allow for diametric expansion or pipe stretching to stabilize, approximately two to three hours.
   3. After the above stabilization has occurred, return the section being tested to the test pressure. Hold the test pressure for four hours. If the pressure in the test section drops, and it is determined the drop may be the result of expansion resulting from increasing temperature, a limited amount of additional water may be added to bring the pressure back to the test pressure. Allowable amounts of make-up water, to compensate for expansion due to increasing temperature, are as shown in the following table. Make-up water is only allowed during this final test period and not during the initial stabilization described in the previous paragraph. If the additional water added is less than the allowable shown in the table and there are no visual leaks or significant pressure drops, the tested section passes the test.

Nominal Pipe Size (in.)	Allowance for Expansion (U.S. Gals./100 Feet of Pipe)		
	1-Hour Test	2-Hour Test	3-Hour Test
3	0.10	0.15	0.25
4	0.13	0.25	0.40
6	0.30	0.60	0.90
8	0.50	1.0	1.50
10	0.75	1.3	2.1
11	1.0	2.0	3.0
12	1.1	2.3	3.4
14	1.4	2.8	4.2
16	1.7	3.3	5.0
18	2.2	4.3	6.5
20	2.8	5.5	8.0
22	3.5	7.0	10.5
24	4.5	8.9	13.3
28	5.5	11.1	16.8
32	7.0	14.3	21.5
36	9.0	18.0	27.0
40	11.0	22.0	33.0
48	15.0	27.0	43.0

E. PVC Pipe Leakage Test: Perform in accordance with AWWA M23. Selected requirements of AWWA M23 are repeated as follows:
   1. The pipe shall be subjected to a hydrostatic pressure of 50 percent above the normal operating pressure, or 150 psi, whichever is greater. In no case shall the pressure be allowed to exceed the design pressure for pipe, appurtenances, or thrust restraints.
   2. Maintain the test pressure, +/- 5 psi, for a minimum of four hours.
   3. No piping will be accepted if the leakage is greater than that determined by the following formula:

      $L = (N \times D \times P1/2)/7,400$

      L = Allowable leakage, gallons per hour.
      N = Number of joints in the length of the pipeline tested.
      D = Nominal diameter of pipe, inches.
      P = Average test pressure during the leakage test, pounds per square inch (gauge).

F. Cement Mortar Lined and Coated Steel Pipe Leakage Test: Perform in accordance with AWWA M11. Selected requirements of AWWA M11 are repeated as follows:
   1. All pipelines shall be tested by subjecting each section to a pressure, measured at the lowest end of the section, of at least 150 percent of the class rating or design pressure of the pipe under test. In no case shall the pipe be tested at less than 150 psi, nor shall the pressure be allowed to exceed the design pressure for pipe, appurtenances, or thrust restraints.
   2. Maintain the test pressure, +/- 5 psi, for a minimum of four hours.
   3. There shall be no significant leakage for pipe with welded joints or mechanical couplings.
   4. For pipe joined with O-ring rubber gaskets, a leakage of 25 gallons per inch of diameter per mile per 24 hours is allowed.

3.11 CLEANING

A. At the conclusion of the work, thoroughly clean all pipelines by flushing with water or other means to remove all dirt, stones, pieces of wood, or other material which may have entered the pipes during the construction period. Debris cleaned from the lines shall be removed from the low end of the pipeline. If after this cleaning, obstructions remain, they shall be removed. After the pipelines are cleaned and if the groundwater level is above the pipe or following a heavy rain, the Owner will examine the pipes for leaks. If any further defective pipes or joints are discovered, the Contractor shall repair them. Finished paving shall not be installed prior to completion of all cleaning and testing.

3.12 DISINFECTION OF PIPELINES

A. After completion of the hydrostatic test, the mains shall be thoroughly flushed with a minimum pipe velocity of 2.5 fps and chlorinated in accordance with the latest revision of AWWA 651, Standards of Disinfecting Water Mains. Any one of the methods therein described may be used, with the additional requirement of 50 ppm chlorination minimum initial application. At the end of the contact period, the mains shall again be flushed, and bacteriological samples taken.

B. If necessary, the Contractor shall provide, at his expense, outlets from which to take the samples. The location of the chlorination and sampling points will be determined by the Owner in the field. Taps for chlorination and sampling shall be installed. The Contractor shall uncover and backfill the taps as required.

C. Disinfection of tie-ins shall be performed by the Contractor by swabbing with chlorine or by other approved methods. Following a tie-in, the area affected by the tie-in shall be thoroughly flushed and bacteriological samples will be taken as deemed necessary.

D. All treated water flushed from the lines shall be dechlorinated and disposed of by discharging to the locations identified in the Plans, or by other approved means. No discharge of chlorinated water to any storm sewer or natural water course will be allowed, unless properly dechlorinated.

E. The Contractor shall rechlorinate and retest any lines that do not meet the requirements of the above testing. The line shall not be placed in service until the requirements of the State Public Health Department are met.

3.13 BACTERIOLOGICAL TESTING

A. Samples shall be gathered and tests conducted at the expense of the Contractor by a laboratory approved by the Owner.

B. Water samples are to be taken at representative points no less than one test per 500 feet of pipe, plus one test at each end of the pipe; or as required by the Owner.

C. After the samples have passed the bacteriological testing, the Contractor will be notified and arrangements can be made to make tie-ins and connections to house services.

D. Each water sample will have passed the bacteria tests if they show zero total coliform per 100 ml and not more than 50 non-sheen bacteria per 100 ml, and when the turbidity is no greater than the source water.

E. Samples shall be taken no sooner than 24 hours after final flushing.

F. Jumpers and/or plates shall be pulled within 14 days of the notification of a successful test, or new bacteria samples will have to be taken.

G. Follow-up bacteriological testing shall take place after tie-ins have been made, and shall meet the same passing requirements as the initial tests.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

COM-2310004

City of SACRAMENTO
Community Development

300 Richards Blvd., 3rd Floor
Sacramento, CA 95811
Help Line: 916-264-5011
CityofSacramento.org/dsd

Special Inspection Form

2022 CBC Adopted Codes
Effective January 1, 2023

Prior to issuance of a permit, the applicant shall complete Part I of this form. Part II and Part III shall be completed by the project registered design professional (RDP) and the Community Development Department as a part of the plan review process. Before permit issuance, all parties must sign this agreement. Please note that failure to comply with special inspection and testing requirements could be expensive in terms of retrofit design and construction as well as delays in the project.

Part I - Statement of Special Inspection

Project Address: 1124 Del Paso Blvd

Permit Number:

City Approved Testing/ Inspection Agencies (Form CDD-230)

Firm 1: Geocon — Phone: 916-852-9118
Email: guardado@geoconinc.com

Firm 2: Terracon — Phone: 916-283-8417
Email: ryan.king@terracon.com

Instruction to the approved agency/agencies:
1. Provide daily field reports of special inspections to the City's on-site building inspector and to the registered design professional in responsible charge.
2. A copy of all required test reports shall be submitted to the City's on-site building inspector and to the registered design professional in responsible charge.
3. Upon completion of the special inspections and testing work, provide the City's on-site building inspector a final report documenting required special inspections and tests, and correction of any discrepancies noted in the inspections or tests prior to the start of work by the owner or the owner's authorized agent.
4. Special inspection of off site fabricated items is required per CBC §1704.2.5 The City of Sacramento does not have any approved fabricators.

Part II - Special Inspection and Testing Agreement

Where special inspections or tests are required by Section 1705, the registered design professional in responsible charge shall prepare a statement of special inspections in accordance with Section 1704.3, which shall be submitted to the Building Official for approval prior to issuance of the building permit. The approved agency/agencies shall be employed by the owner, or owner's authorized agent, other than the contractor.

The approved agency/agencies named above have been authorized to perform the special inspection and testing services designated in this agreement and in accordance with the California Building Code (CBC) requirements, and to report all activities to the Building Official and other parties as listed. It is understood that special inspections are required in addition to the normal inspections performed by the Building Official (Section 110).

The undersigned hereby affirms, under penalty of law, that the special inspection program is in accordance with the requirements of the CBC and the City of Sacramento. The undersigned has used all reasonable diligence in completing this form and to the best of their knowledge the information contained herein is true and complete. The undersigned hereby certifies under the penalty of perjury under the laws of the State of California that the foregoing is true and correct.

This plan has been developed with the understanding that the Building Official will:

- ***Review and approve the qualifications of the approved agencies who will perform the inspections and tests***
- ***Monitor special inspection activities on the job site to assure that the approved agencies are qualified and are performing their duties as called for in this Statement of Special Inspection.***
- ***Review submitted inspection and test reports.***
- ***Perform inspections as required by CBC 110.3 and the local building code.***

Registered Design Professional (RDP) in Responsible Charge:

Name: Mickey Kellogg License: 5851S

Phone: (916) 924-7024 Email: mickeyk@zfa.com

Signature: Mickey Kellogg Date: 05/08/2023

Owner or Owner's Authorized Agent:

Name: Ezra Roati

Phone: 916-808-5877 Email: eroati@cityofsacramento.org

Signature: Ezra Roati Date: 05/08/2023

Building Official's Acceptance:

Plan Reviewer:

SACRAMENTO Community Development **APPROVED** City of Sacramento Plan Review **STRUCTURAL**
By: *Leticia Valenzuela*
on Sep 27, 2023

SACRAMENTO Community Development **ISSUED BY** Community Development Department
By: *Jason Hone*
on Oct 05, 2023

COMMUNITY DEVELOPMENT DEPARTMENT APPROVED UNDER TITLE 8 &15 & 17 CITY CODE CITY OF SACRAMENTO, CALIF. BUILDING INSPECTION DIVISION

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

Part III - Schedule of Special Inspections

Please refer to Chapter 17 of the California Building Code for detailed tasks for each inspection heading below. Required inspection tasks are to be identified in the left-most column labelled "Req'd". All applicable boxes must be checked for approval.

Notes: "C" denotes continuous special inspection; "P" denotes periodic special inspection. If not identified in the table below the RDP must check the appropriate box for periodic or continuous inspections. Refer to City of Sacramento form CDD-0230 for a list of approved agencies. Approved agency(ies) selected on p. 1 must be approved for inspection and testing services listed in "Agency" column below.

Req'd	Inspection/Testing Item	C	P	Notes	Agency	RDP Notes
§1705.2 Steel Construction						
✓	§1705.2.1 Structural steel welding		✓	*Per AISC 360*	SW	
	§1705.2.1 High-strength bolting			*Per AISC 360*	HSB	
	§1705.2.2 Cold-formed steel deck			*Per SDI QA/QC*	SW	
	§1705.2.3 Open-web steel joists and joist girders		X	*Per Table 1705.2.3*	SW,HSB	
	§1705.2.4 Cold-formed steel trusses spanning 60 feet or greater				SW,HSB	
§1705.3 Concrete Construction (Per Table 1705.3)						
	Reinforcement/Tendons, Verify Placement		X		RC	
	Welding of Reinforcing (§1705.3.1)				SW	
	Cast in place anchors		X		RC	
	Post-installed anchors (sustained tension)	X			RC	
	Post-installed anchors (other than above)		X		RC	
	Verify use of required design mix		X		RC	
	Material tests (§1705.3.2)	X			RC	
	Concrete/shotcrete placement	X			PPC	
	Verify curing temperatures & techniques		X		RC	
	Prestressed concrete	X			PC	
	Precast concrete		X		RC	
	Precast concrete diaphragm connections and reinforcing at joints	X			RC	
	Precast concrete diaphragm joint tolerances		X		RC	
	Post-tensioned concrete strength prior to stressing of tendons		X		PC	
	Formwork		X		RC	
§1705.4 Masonry Construction						
	Level 1			*Per TMS 402/602*	SM	
	Level 2			*Per TMS 402/602*	SM	
	Level 3			*Per TMS 402/602*	SM	
✓	Post-installed anchors in Masonry		✓	*Per TMS 402/602*	SM	
§1705.5 Wood Construction						
	§1705.5.1 High load diaphragms		X		SWC	
	§1705.5.2 Metal-plate-connected wood trusses spanning ≥60ft		X		SWC	
	§1705.5.3 Mass timber construction		X	*Per Table 1705.5.3*	MT	
	a. Adhesive anchors resisting sustained tension loads	X			MT	
	b. Mechanical/Adhesive anchors not defined in item a.		X		MT	

Part III - Schedule of Special Inspections

Req'd	Inspection/Testing Item	C	P	Notes	Agency	RDP Notes
§1705.6 Soils						
	Table 1705.6		X		S	
	Fill Placement (Table 1705.6, item 4)	X			S	
§1705.7 Driven Deep Foundations, §1705.8 Cast-in-place Deep Foundations, §1705.9 Helical Pile Foundations						
	Table 1705.7 Driven Deep Foundations	X			DF	
	Steel Elements (item 5)			*Per AISC 360*	SW, HSB	
	Concrete elements (item 6)			*Per Table 1705.3.1*	RC	
	Table 1705.8 Cast-in-Place Deep Fdtn's	X			DF	
	Concrete elements (item 3)			*Per Table 1705.3.1*	RC	
	§1705.9 Helical Pile Foundations	X			DF	
§1705.13 Special Inspections for Seismic Resistance						
	§1705.13.1 Structural steel				SW, HSB	
	§1705.13.2 Structural wood		X		SW	
	§1705.13.3 Cold-formed steel light-frame construction		X		SW, HSB	
	§1705.13.7 Steel Storage Racks		X	*>8ft in height*	SW, HSB	
	§1705.13.9 Cold-formed steel special bolted moment frames		X		SW, HSB	

Describe the lateral force resisting system(s) and designated lateral systems subject to special inspections per 1705.13 & 1705.14. Include a description for the lateral force resisting system in both orthogonal directions:

§1705.1.1 Others Special Cases, §1704.2.5 Fabricated Items, §1705.15-1705.20 Non-structural Items

List/Describe all special cases, prefabricates items and/or non-structural items requiring special inspections:

Simpson hardware, holdowns, wall-ties, and straps for out-of-plane anchorage.

COM-2310004

ZFA STRUCTURAL ENGINEERS

san francisco
silicon valley
sacramento
santa rosa
napa

North Sacramento Library - ASCE 7/41 Structural Calculations

Sacramento, California
ZFA Project Number: 22689

SACRAMENTO Community Development
ISSUED BY
Community Development Department
By: *Jason Hone*
on Oct 05, 2023

COMMUNITY DEVELOPMENT DEPARTMENT
APPROVED
UNDER
TITLE 8 &15 & 17
CITY CODE
CITY OF
SACRAMENTO, CALIF.
BUILDING INSPECTION DIVISION

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

Permit Submittal

May 2, 2023

REGISTERED PROFESSIONAL ENGINEER
MICKEY C. KELLOGG
STRUCTURAL
No. 5851
STATE OF CALIFORNIA

Prepared For:
PBK
Folsom, California

Prepared By:
Miguel Arismendi-Pardi, Designer
Dudley Mei, PE, Senior Engineer
Mickey Kellogg, SE, Principal-in-Charge
Sacramento, California

SACRAMENTO Community Development
APPROVED
City of Sacramento Plan Review
STRUCTURAL
By: *Leticia Valenzuela*
on Sep 27, 2023

TABLE OF CONTENTS

Description	Page
Structural Narrative	3
ASCE 7 Design Criteria	4
Flat Weights	6
Wall Weights	8
Glulam Retrofit	11
Mechanical Anchorage	77
Truss Analysis	85
ASCE 41 Design Criteria	149
Out-of-Plane Anchorage	152

STRUCTURAL NARRATIVE

The project consist of glulam strengthening with the option of steel or LVL plates underneath the girders, mechanical anchorage, and a truss analysis and strengthening using ASCE 7. The out-of-plane anchorages that would connect the trusses and the ceiling joists to the CMU wall are provided using the ASCE 41.

ZFA STRUCTURAL ENGINEERS

Job #22689
Design Criteria

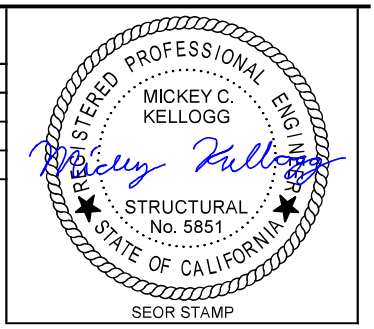
Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

DETAILED DESIGN CRITERIA

BUILDING CODE

Governing Code:	2022 California Building Code
Authority Having Jurisdiction:	City of Sacramento
Local Codes or Amendments:	N/A



SEOR STAMP

BUILDING SYSTEM DESCRIPTION

No. Stories:	1
Footprint:	19800 ft^2
Floor Area:	19800 ft^2
Roof Area:	19800 ft^2
Mean Building Height:	14.5 ft
Roof Pitch:	0 :12

Building Use:	Public Building
Gravity System:	Wood Bearing Walls
Diaphragm System:	Plywood Sheathing

ASCE 7-16 Reference UNO:

SEISMIC DESIGN PARAMETERS

Analysis Procedure Used:	EQ (Equiv. Lat. Force, 12.8)			*Section 12.6*
Latitude:	38.6038 deg	Longitude:	-121.4632 deg	
Risk Category:	II	Public Building		*Table 1.5-1*
I_E =	1.00	Importance Factor, Seismic		*Table 1.5-1*
I_P =	1.00	Importance Factor, Nonstructural Components		*13.1.3*
Soil Site Class =	D (by default)	Per Geotech Report, Site Class D otherwise		*Table 20.3-1*
S_S =	0.541 g	Mapped spectral response acceleration parameter		*USGS*
S_1 =	0.247 g	Mapped spectral response acceleration parameter		*USGS*
F_a =	1.4	Site coefficient		*Table 11.4-1*
F_v =	2.1	Site coefficient		*Table 11.4-2*
S_{DS} =	0.493 g	Design spectral response acceleration parameter		*11.4-3*
S_{D1} =	0.347 g	Design spectral response acceleration parameter		*11.4-4*
Seismic Design Category:	D			*Section 11.6*
Building System, N-S:	A. BEARING WALL SYSTEMS	11. Ordinary plain masonry shear walls		*Table 12.2-1*
Building System, E-W:	A. BEARING WALL SYSTEMS	11. Ordinary plain masonry shear walls		*Table 12.2-1*
Diaphragm=	Flexible Diaphragm	Plywood Sheathing		
$\rho_{(N-S)}$ =	1.0	Redundancy factor, N-S		*12.3.4*
$\rho_{(E-W)}$ =	1.0	Redundancy factor, E-W		*12.3.4*
$R_{(N-S)}$ =	1.50	Response modification coefficient, N-S		*Table 12.2-1*
$R_{(E-W)}$ =	1.50	Response modification coefficient, E-W		*Table 12.2-1*
$\Omega_{o(N-S)}$ =	2.00	Overstrength factor, N-S		*Table 12.2-1*
$\Omega_{o(E-W)}$ =	2.00	Overstrength factor, E-W		*Table 12.2-1*
$C_{d(N-S)}$ =	1.25	Deflection amplification factor, N-S		*Table 12.2-1*
$C_{d(E-W)}$ =	1.25	Deflection amplification factor, E-W		*Table 12.2-1*
$T_{(N-S)}$ =	0.149 sec	Approximate Fundamental Period, N-S		*Section 12.8.2*
$T_{(E-W)}$ =	0.149 sec	Approximate Fundamental Period, E-W		*Section 12.8.2*
T_L =	8 sec	Long Period Transistion Period		*USGS*
$V_{(N-S)}$ (ULT) =	0.329 *W	Base Shear, N-S, LRFD		*Section 12.8 or 12.14*
$V_{(N-S)}$ (ASD) =	0.230 *W	Base Shear, N-S, ASD		*Section 12.8 or 12.14*
$V_{(E-W)}$ (ULT) =	0.329 *W	Base Shear, E-W, LRFD		*Section 12.8 or 12.14*
$V_{(E-W)}$ (ASD) =	0.230 *W	Base Shear,E-W, LRFD		*Section 12.8 or 12.14*
Structural Irregularities	Horizontal:	None		*Table 12.3-1*
	Vertical:	None		*Table 12.3-2*

ZFA STRUCTURAL ENGINEERS
Job #22689
Design Criteria

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

DETAILED DESIGN CRITERIA

WIND DESIGN PARAMETERS

Wind Method Used:	Directional Procedure			*Chapter 27*
Basic Wind Speed =	94 MPH		Ultimate Design Wind Speed (3 second gust)	*Figure 26.5-1A,B or C*
Exposure Category:	B		Urban, Suburban, Wooded	*26.7.3*
K_{zt} =	1.00		Topographic Factor	*26.8*
K_d =	0.85	Buildings	Directionality Factor	*Table 26.6-1*

MATERIAL STRENGTH AND SPECIFICATIONS

STEEL CONNECTORS:

Shear stud connectors, f_u =	65 ksi	ASTM A108
Machine Bolts, f_u =	58 ksi	ASTM A307
High Strength Bolts, f_u =	120 ksi	ASTM A325
Anchor Bolts, f_y =	36 ksi	ASTM F1554, Grade 36 or ASTM A307
Anchor Bolts, f_u =	58 ksi	ASTM F1554, Grade 36 or ASTM A307
Threaded Rods, f_y =	36 ksi	ASTM F1554, Grade 36 or ASTM A307
Threaded Rods, f_u =	58 ksi	ASTM F1554, Grade 36 or ASTM A307
Weld, F_{EXX} =	70 ksi	Weld Strength

MASONRY:

CMU, f'_m =	2000 psi	ASTM C90
Cementitious grout, f'_m =	2000 psi	
Mortar, f'_m =	1800 psi	ASTM C270, Type S
Unit Weight =	135 pcf	ASTM C90, Normal Weight

WOOD CONSTRUCTION:

6x Posts, F_b =	1200 psi	Douglas Fir #1
6x Beam, F_b =	1350 psi	Douglas Fir #1
4x Posts & Beams, F_b =	1000 psi	Douglas Fir #1
2x Joists & Rafters, F_b =	900 psi	Douglas Fir #2
2x Studs, F_b =	900 psi	Douglas Fir #2
Sheathing	PS1 / PS2	
Connections	Simpson Strong-Tie	
Glued-Laminated Beam (GLB), F_b =	2400 psi	24F-V4 (DF/DF) simple span, 24F-V8 (DF/DF) continuous span
Exterior GLB, F_b =	2000 psi	20F-V12 (AC/AC) simple span, 20F-V13 (AC/AC) continuous span
Parallel Strand Lumber (PSL), F_b =	2900 psi	Grade 2.0E
Laminated Veneer Lumber (LVL), F_b =	2600 psi	Grade 1.9E
Laminated Strand Lumber (LSL), F_b =	1700 psi	Grade 1.3E

DEFLECTION & VIBRATION DESIGN CRITERIA

		LIVE		DEAD + LIVE		0.6 WIND	
	Finish	Design	Code Min	Design	Code Min	Design	Code Min
Roof Framing	Ceiling	L/240	L/240	L/180	L/180	L/240	L/240
Floor Framing	-	L/360	L/360	L/240	L/240	-	-
Wall Framing	Flexible	-	-	-	-	L/120	L/120

ZFA STRUCTURAL ENGINEERS

Job #22689
Flat Weights

Engineer: MAAP
4/18/2023

North Sacramento Library - ASCE 7/41

GRAVITY / SEISMIC FLAT WEIGHT TAKEOFF (PSF)

SMALL TRUSS ROOF

CBC Live Load Category: 26. Roof: ordinary [Table 1607.1]
Slope: 0.00:12 Balcony?: No

Material	Thickness (in)	Sloped	Deck	Joists	Girders	Columns	Model	Seismic	Model Seismic
Roofing: TPA Roofing			1.0	1.0	1.0	1.0	1.0	1.0	1.0
Sheathing: 1/2 in. DensDek			2.0	2.0	2.0	2.0	2.0	2.0	2.0
Insulation: "Rigid": Styrofoam t =	4		0.8	0.8	0.8	0.8	0.8	0.8	0.8
Insulation: "Soft": Loose Fill, Blown-In, & Batt t =	6		1.2	1.2	1.2	1.2	1.2	1.2	1.2
Framing:				0.0	0.0	0.0	0.0	0.0	0.0
Framing: GLB					0.5	0.5	0.5	0.5	0.5
Framing: Columns						0.5	0.5	0.5	0.5
						0.0	0.0	0.0	0.0
Ceiling: Metal Suspension System (w/ tile)			0.8	0.8	0.8	0.8	0.8	0.8	0.8
MEP: Typical			2.0	2.0	2.0	2.0	2.0	2.0	2.0
MEP: Sprinkler System (typical)			1.5	1.5	1.5	1.5	1.5	1.5	1.5
Miscellaneous			1.5	1.1	1.1	1.1	1.1	1.1	1.1
Dead Load			10.8	10.4	10.9	11.4	11.4	11.4	11.4
Dead Load - Horiz Projection			10.8	10.4	10.9	11.4	11.4	11.4	11.4
Partitions (Office Buildings)		No	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Live Load			20.0	20.0	20.0	20.0	20.0	0.0	0.0
Live Load - Reduced R_2 = 1.00			20.0	20.0	20.0	20.0	20.0	0.0	0.0
Total Load			30.8	30.4	30.9	31.4	31.4	11.4	11.4

SMALL MEZZANINE FLOOR

CBC Live Load Category: 6. Catwalks [Table 1607.1]
Slope: 0.00:12 Balcony?: No

Material	Thickness (in)	Sloped	Deck	Joists	Girders	Columns	Model	Seismic	Model Seismic
Roofing:			0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sheathing: 5/8 in. OSB			2.0	2.0	2.0	2.0	2.0	2.0	2.0
Insulation: "Soft": Loose Fill, Blown-In, & Batt t =	6		1.2	1.2	1.2	1.2	1.2	1.2	1.2
Framing: DF-L 2x10 @ 24"oc				1.9	1.9	1.9	1.9	1.9	1.9
Framing: GLB					0.5	0.5	0.5	0.5	0.5
Framing:				0.0	0.0	0.0	0.0	0.0	0.0
Framing:					0.0	0.0	0.0	0.0	0.0
Framing:						0.0	0.0	0.0	0.0
MEP:			0.0	0.0	0.0	0.0	0.0	0.0	0.0
MEP: Typical			2.0	2.0	2.0	2.0	2.0	2.0	2.0
MEP: Sprinkler System (typical)			1.5	1.5	1.5	1.5	1.5	1.5	1.5
Miscellaneous			1.5	1.5	1.5	1.5	1.5	1.5	1.5
Dead Load			8.2	10.1	10.6	10.6	10.6	10.6	10.6
Dead Load - Horiz Projection			8.2	10.1	10.6	10.6	10.6	10.6	10.6
Partitions (Office Buildings)		No	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Live Load			40.0	40.0	40.0	40.0	40.0	0.0	0.0
Live Load - Reduced R_2 = 1.00			40.0	40.0	40.0	40.0	40.0	0.0	0.0
Total Load			48.2	50.1	50.6	50.6	50.6	10.6	10.6

ZFA STRUCTURAL ENGINEERS

Job #22689
Flat Weights

Engineer: MAAP
4/18/2023

North Sacramento Library - ASCE 7/41

GRAVITY / SEISMIC FLAT WEIGHT TAKEOFF (PSF)

ROOF

CBC Live Load Category: 26. Roof: ordinary [Table 1607.1]
Slope: 0.00:12 Balcony?: No

Material	Thickness (in)	Sloped	Deck	Joists	Girders	Columns	Model	Seismic	Model Seismic
Roofing: TPA Roofing			1.0	1.0	1.0	1.0	1.0	1.0	1.0
Sheathing: 1/2 in. DensDek			2.0	2.0	2.0	2.0	2.0	2.0	2.0
Insulation: "Rigid": Styrofoam t =	4		0.8	0.8	0.8	0.8	0.8	0.8	0.8
Insulation: "Soft": Loose Fill, Blown-In, & Batt t =	6		1.2	1.2	1.2	1.2	1.2	1.2	1.2
Framing: DF-L 2x10 @ 24"oc				1.9	1.9	1.9	1.9	1.9	1.9
Framing:				0.0	0.0	0.0	0.0	0.0	0.0
Framing: GLB					0.5	0.5	0.5	0.5	0.5
Framing: Columns						0.5	0.5	0.5	0.5
Ceiling: Metal Suspension System (w/ tile)			0.8	0.8	0.8	0.8	0.8	0.8	0.8
MEP: Typical			2.0	2.0	2.0	2.0	2.0	2.0	2.0
MEP: Sprinkler System (typical)			1.5	1.5	1.5	1.5	1.5	1.5	1.5
Miscellaneous			1.5	1.5	1.5	1.5	1.5	1.5	1.5
Dead Load			10.8	12.7	13.2	13.7	13.7	13.7	13.7
Dead Load - Horiz Projection			10.8	12.7	13.2	13.7	13.7	13.7	13.7
Partitions (Office Buildings)		No	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Live Load			20.0	20.0	20.0	20.0	20.0	0.0	0.0
Live Load - Reduced R_2 = 1.00			20.0	20.0	20.0	20.0	20.0	0.0	0.0
Total Load			30.8	32.7	33.2	33.7	33.7	13.7	13.7

ZFA STRUCTURAL ENGINEERS
Job #22689
Wall Weights

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

GRAVITY / SEISMIC WALL WEIGHT TAKEOFF (PSF)

Library Walls

Material	Weight
CMU Wall	125.0
Plaster	0.5
TOTAL	126.0

ASCE 7 Hazards Report

Address:
1124 Del Paso Blvd
Sacramento, California
95815

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Latitude: 38.603779
Longitude: -121.46323
Elevation: 31.59 ft (NAVD 88)





Wind

Results:

Wind Speed	94 Vmph
10-year MRI	65 Vmph
25-year MRI	71 Vmph
50-year MRI	76 Vmph
100-year MRI	80 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Wed Dec 28 2022

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Seismic

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_S :	0.541	S_{D1} :	N/A
S_1 :	0.247	T_L :	12
F_a :	1.367	PGA :	0.227
F_v :	N/A	PGA_M :	0.312
S_{MS} :	0.74	F_{PGA} :	1.373
S_{M1} :	N/A	I_e :	1
S_{DS} :	0.493	C_v :	1.061

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Wed Dec 28 2022

Date Source: USGS Seismic Design Maps

Glulam Retrofit and Joist Analysis

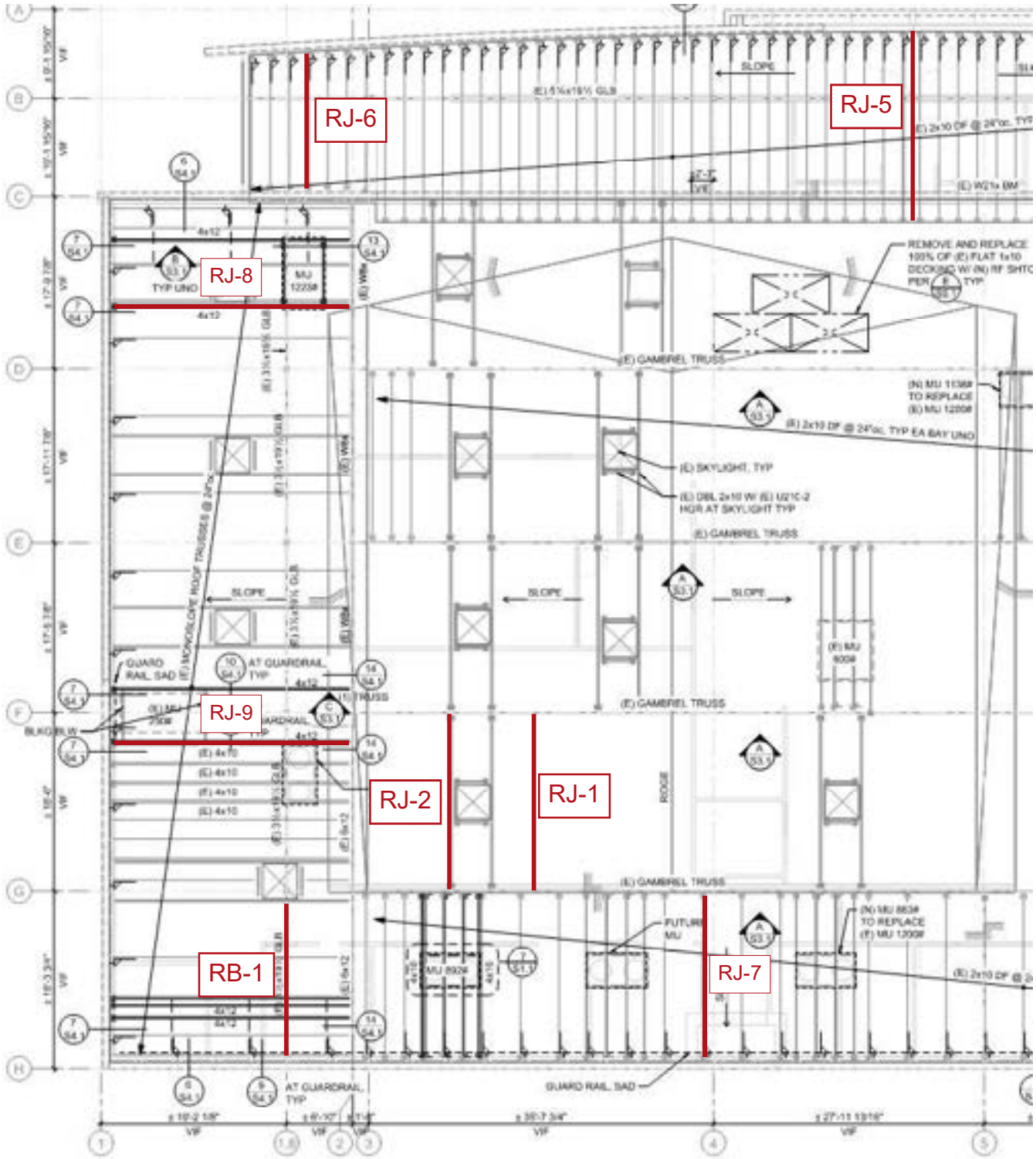
COM-2310004

ZFA STRUCTURAL ENGINEERS

ZFA Job #22689
Joist and Glulam Key Plan

Engineer: MAAP
Date: 03/09/2023

North Sacramento Library



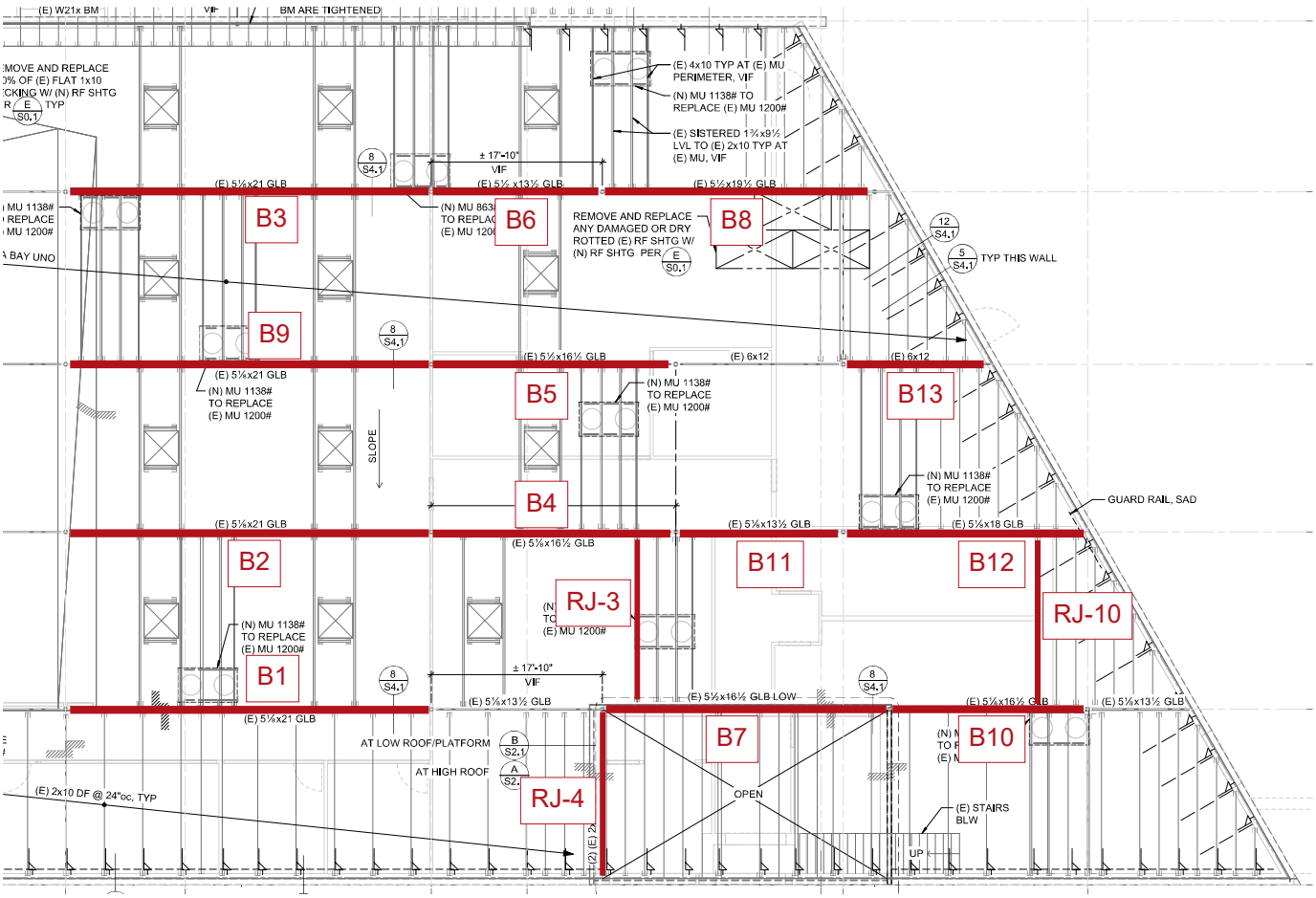
COM-2310004

ZFA STRUCTURAL ENGINEERS

ZFA Job #22689
Joist and Glulam Key Plan

Engineer: MAAP
Date: 03/09/2023

North Sacramento Library



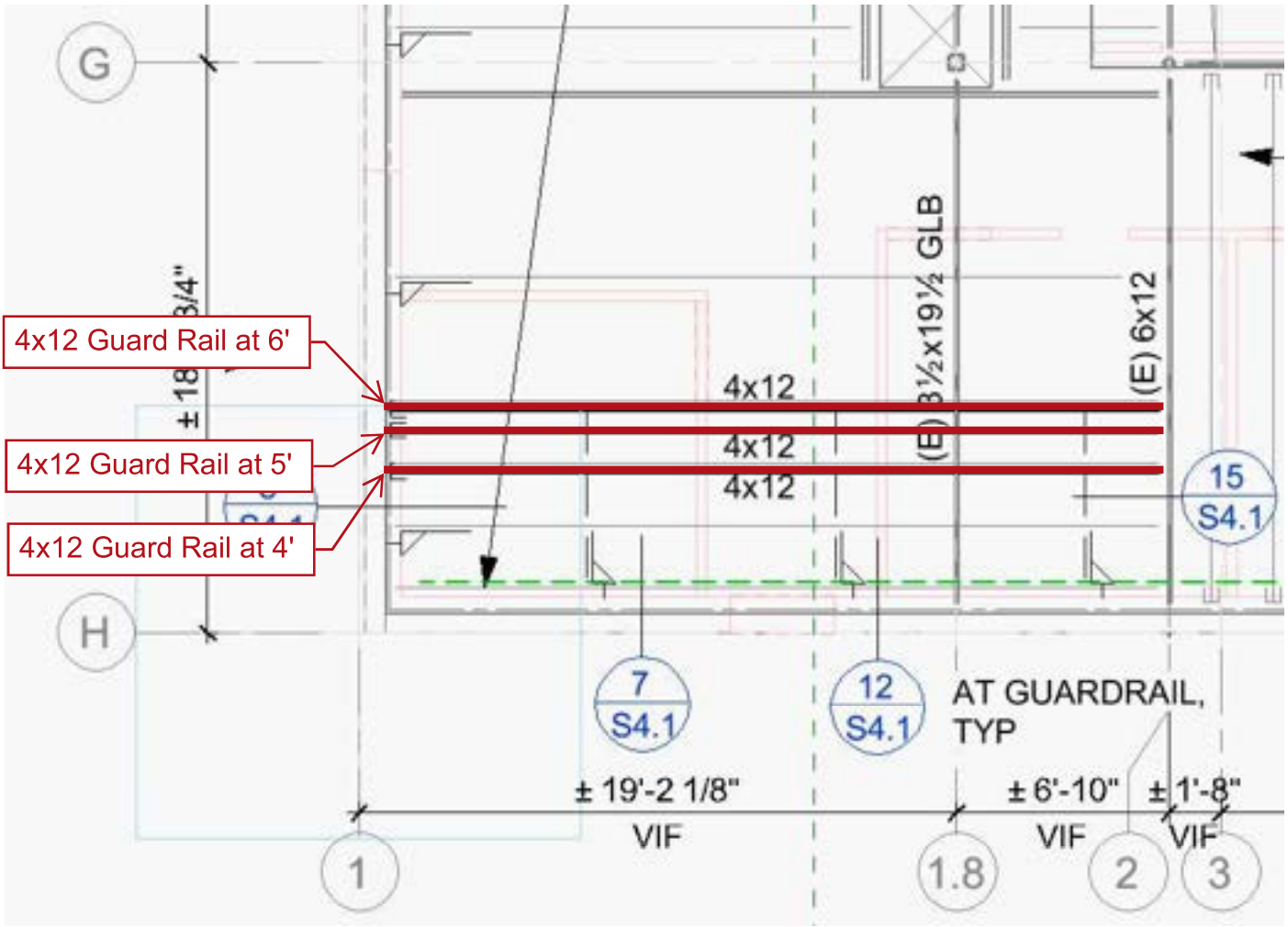
COM-2310004

ZFA STRUCTURAL ENGINEERS

ZFA Job #22689
Joist and Glulam Key Plan

Engineer: MAAP
Date: 03/09/2023

North Sacramento Library



COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: (E) RJ-1

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1000 psi
Fb -	1000 psi
Fc - Prll	1500 psi
Fc - Perp	625 psi
Fv	180 psi
Ft	675 psi

E : Modulus of Elasticity

Ebend- xx	1700 ksi
Eminbend - xx	620 ksi
Density	31.21 pcf

Repetitive Member Stress Increase



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.020, W = 0.0160 ksf, Tributary Width = 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.846 : 1	Maximum Shear Stress Ratio	=	0.246 : 1
Section used for this span		2x10	Section used for this span		2x10
fb: Actual	=	1,337.69 psi	fv: Actual	=	55.34 psi
F'b	=	1,581.25 psi	F'v	=	225.00 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	8.500 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.450 in	Ratio =	453 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	0.791 in	Ratio =	257 >=180	Span: 1 : +D+0.750Lr+0.450W
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.463	0.135	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.94	527.1	1,138.5	0.20	21.8	162.0
+D+Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.846	0.246	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.15	2.38	1,337.7	1,581.3	0.51	55.3	225.0
+D+0.750Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.718	0.209	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.15	2.02	1,135.0	1,581.3	0.43	47.0	225.0
+D+0.60W					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.453	0.132	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	1.63	916.2	2,024.0	0.35	37.9	288.0
+D+0.750Lr+0.450W					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.705	0.205	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	2.54	1,426.9	2,024.0	0.55	59.0	288.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: (E) RJ-1

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.450W					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.405	0.118	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	1.46	818.9	2,024.0	0.31	33.9	288.0
+0.60D+0.60W					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.348	0.101	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	1.26	705.3	2,024.0	0.27	29.2	288.0
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.156	0.045	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.56	316.2	2,024.0	0.12	13.1	288.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750Lr+0.450W	1	0.7913	8.562		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.598	0.598
Max Upward from Load Combinations	0.598	0.598
Max Upward from Load Cases	0.340	0.340
D Only	0.221	0.221
+D+Lr	0.561	0.561
+D+0.750Lr	0.476	0.476
+D+0.60W	0.384	0.384
+D+0.750Lr+0.450W	0.598	0.598
+D+0.450W	0.343	0.343
+0.60D+0.60W	0.296	0.296
+0.60D	0.133	0.133
Lr Only	0.340	0.340
W Only	0.272	0.272

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: (E) RJ-2

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

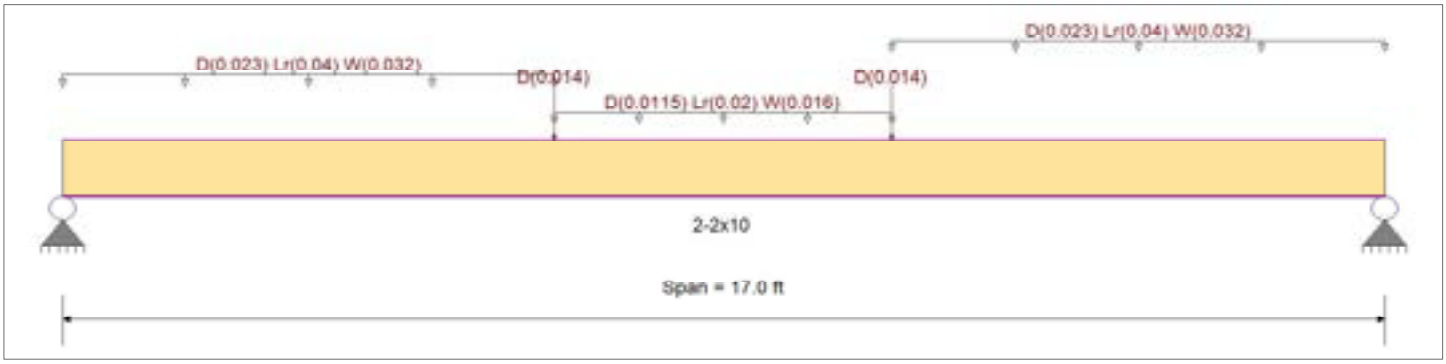
Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1000 psi
Fb -	1000 psi
Fc - Prll	1500 psi
Fc - Perp	625 psi
Fv	180 psi
Ft	675 psi

E : Modulus of Elasticity

Ebend- xx	1700 ksi
Eminbend - xx	620 ksi
Density	31.21 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.01150, Lr = 0.020, W = 0.0160 ksf, Extent = 6.333 -->> 10.667 ft, Tributary Width = 1.0 ft
Uniform Load : D = 0.01150, Lr = 0.020, W = 0.0160 ksf, Extent = 0.0 -->> 6.333 ft, Tributary Width = 2.0 ft
Uniform Load : D = 0.01150, Lr = 0.020, W = 0.0160 ksf, Extent = 10.667 -->> 17.0 ft, Tributary Width = 2.0 ft
Point Load : D = 0.0140 k @ 6.333 ft
Point Load : D = 0.0140 k @ 10.667 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.423 : 1	Maximum Shear Stress Ratio	=	0.116 : 1
Section used for this span		2-2x10	Section used for this span		2-2x10
fb: Actual	=	582.19 psi	fv: Actual	=	26.00 psi
F'b	=	1,375.00 psi	F'v	=	225.00 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	8.500 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.180 in	Ratio =	1131 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	0.351 in	Ratio =	580 >=180	Span: 1 : +D+0.750Lr+0.450W
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.270	0.071	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	0.95	267.0	990.0	0.21	11.6	162.0
+D+Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.423	0.116	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.08	582.2	1,375.0	0.48	26.0	225.0
+D+0.750Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.366	0.100	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.79	503.4	1,375.0	0.41	22.4	225.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: (E) RJ-2

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.60W					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.238	0.064	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.49	418.3	1,760.0	0.34	18.5	288.0
+D+0.750Lr+0.450W					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.350	0.096	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.20	616.9	1,760.0	0.51	27.6	288.0
+D+0.450W					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.216	0.058	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.36	380.5	1,760.0	0.31	16.8	288.0
+0.60D+0.60W					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.177	0.048	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.11	311.5	1,760.0	0.26	13.9	288.0
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.091	0.024	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	0.57	160.2	1,760.0	0.13	6.9	288.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750Lr+0.450W	1	0.3512	8.562		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.565	0.565
Max Upward from Load Combinations	0.565	0.565
Max Upward from Load Cases	0.297	0.297
D Only	0.236	0.236
+D+Lr	0.532	0.532
+D+0.750Lr	0.458	0.458
+D+0.60W	0.378	0.378
+D+0.750Lr+0.450W	0.565	0.565
+D+0.450W	0.342	0.342
+0.60D+0.60W	0.284	0.284
+0.60D	0.141	0.141
Lr Only	0.297	0.297
W Only	0.237	0.237

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: (E) RJ-3

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

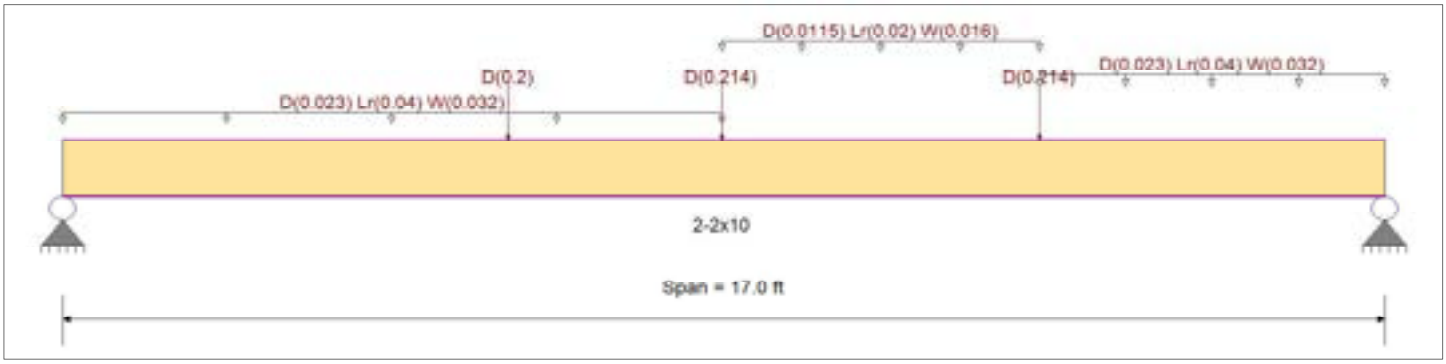
Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1000 psi
Fb -	1000 psi
Fc - Prll	1500 psi
Fc - Perp	625 psi
Fv	180 psi
Ft	675 psi

E : Modulus of Elasticity

Ebend- xx	1700 ksi
Eminbend - xx	620 ksi
Density	31.21 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.01150, Lr = 0.020, W = 0.0160 ksf, Extent = 0.0 -->> 8.479 ft, Tributary Width = 2.0 ft
Point Load : D = 0.20 k @ 5.729 ft
Point Load : D = 0.2140 k @ 8.479 ft
Point Load : D = 0.2140 k @ 12.563 ft
Uniform Load : D = 0.01150, Lr = 0.020, W = 0.0160 ksf, Extent = 12.563 -->> 17.0 ft, Tributary Width = 2.0 ft
Uniform Load : D = 0.01150, Lr = 0.020, W = 0.0160 ksf, Extent = 8.479 -->> 12.563 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.823 : 1	Maximum Shear Stress Ratio	=	0.189 : 1
Section used for this span		2-2x10	Section used for this span		2-2x10
fb: Actual	=	1,131.19 psi	fv: Actual	=	42.59 psi
F'b	=	1,375.00 psi	F'v	=	225.00 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	8.438 ft	Location of maximum on span	=	16.255 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.186 in	Ratio =	1096 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.632 in	Ratio =	323 >=180	Span: 1 : +D+0.750Lr+0.450W
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.808	0.176	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.85	799.7	990.0	0.53	28.6	162.0
+D+Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.823	0.189	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	4.03	1,131.2	1,375.0	0.79	42.6	225.0
+D+0.750Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: (E) RJ-3

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
Length = 17.0 ft	1	0.762	0.174	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.74	1,048.3	1,375.0	0.72	39.1	225.0
+D+0.60W					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.545	0.123	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.42	958.8	1,760.0	0.65	35.3	288.0
+D+0.750Lr+0.450W					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.663	0.153	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	4.16	1,167.7	1,760.0	0.82	44.1	288.0
+D+0.450W					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.522	0.117	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.28	919.0	1,760.0	0.62	33.6	288.0
+0.60D+0.60W					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.363	0.083	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.28	638.9	1,760.0	0.44	23.9	288.0
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.273	0.059	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.71	479.8	1,760.0	0.32	17.1	288.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750Lr+0.450W	1	0.6316	8.500		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.867	0.871
Max Upward from Load Combinations	0.867	0.871
Max Upward from Load Cases	0.524	0.550
D Only	0.524	0.550
+D+Lr	0.833	0.839
+D+0.750Lr	0.756	0.767
+D+0.60W	0.673	0.689
+D+0.750Lr+0.450W	0.867	0.871
+D+0.450W	0.636	0.654
+0.60D+0.60W	0.463	0.469
+0.60D	0.315	0.330
Lr Only	0.309	0.289
W Only	0.247	0.232

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: (E) RJ-4

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1000 psi
Fb -	1000 psi
Fc - Prll	1500 psi
Fc - Perp	625 psi
Fv	180 psi
Ft	675 psi

E : Modulus of Elasticity

Ebend- xx	1700 ksi
Eminbend - xx	620 ksi
Density	31.21 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.00820, Lr = 0.020 , Tributary Width = 1.0 ft
Uniform Load : D = 0.01150, Lr = 0.020, W = 0.0160 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.327 : 1	Maximum Shear Stress Ratio	=	0.089 : 1
Section used for this span		2-2x12	Section used for this span		2-2x12
fb: Actual	=	408.97 psi	fv: Actual	=	20.08 psi
F'b	=	1,250.00 psi	F'v	=	225.00 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	8.500 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.125 in	Ratio =	1632 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.186 in	Ratio =	1093 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.150	0.041	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.71	135.0	900.0	0.15	6.6	162.0
+D+Lr					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.327	0.089	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.16	409.0	1,250.0	0.45	20.1	225.0
+D+0.750Lr					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.272	0.074	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.80	340.5	1,250.0	0.38	16.7	225.0
+D+0.60W					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.125	0.034	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.06	200.7	1,600.0	0.22	9.9	288.0
+D+0.750Lr+0.450W					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: (E) RJ-4

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 17.0 ft	1	0.244	0.066	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.06	389.8	1,600.0	0.43	19.1	288.0
+D+0.450W					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.115	0.031	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.97	184.3	1,600.0	0.20	9.0	288.0
+0.60D+0.60W					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.092	0.025	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.77	146.7	1,600.0	0.16	7.2	288.0
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.0 ft	1	0.051	0.014	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.43	81.0	1,600.0	0.09	4.0	288.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.1865	8.562		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.507	0.507
Max Upward from Load Combinations	0.507	0.507
Max Upward from Load Cases	0.340	0.340
D Only	0.167	0.167
+D+Lr	0.507	0.507
+D+0.750Lr	0.422	0.422
+D+0.60W	0.249	0.249
+D+0.750Lr+0.450W	0.484	0.484
+D+0.450W	0.229	0.229
+0.60D+0.60W	0.182	0.182
+0.60D	0.100	0.100
Lr Only	0.340	0.340
W Only	0.136	0.136

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: (E) RJ-5

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1000 psi
Fb -	1000 psi
Fc - Prll	1500 psi
Fc - Perp	625 psi
Fv	180 psi
Ft	675 psi

E : Modulus of Elasticity

Ebend- xx	1700 ksi
Eminbend - xx	620 ksi
Density	31.21 pcf

Repetitive Member Stress Increase



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.01050, Lr = 0.020, W = 0.0160 ksf, Tributary Width = 2.0 ft
Load for Span Number 2
Uniform Load : D = 0.01050, Lr = 0.020, W = 0.0160 ksf, Tributary Width = 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.795 : 1	Maximum Shear Stress Ratio	=	0.260 : 1
Section used for this span		2x10	Section used for this span		2x10
fb: Actual	=	1,256.31 psi	fv: Actual	=	58.47 psi
F'b	=	1,581.25 psi	F'v	=	225.00 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	8.408 ft	Location of maximum on span	=	16.816 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.453 in	Ratio =	463 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	-0.268 in	Ratio =	328 >=240	Span: 2 : Lr Only
Max Downward Total Deflection	0.775 in	Ratio =	270 >=180	Span: 1 : +D+0.750Lr+0.450W
Max Upward Total Deflection	-0.459 in	Ratio =	190 >=180	Span: 2 : +D+0.750Lr+0.450W

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.414	0.135	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.84	471.2	1,138.5	0.20	21.9	162.0
Length = 3.670 ft	2	0.080	0.135	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.16	90.7	1,138.5	0.07	21.9	162.0
+D+Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.795	0.260	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.15	2.24	1,256.3	1,581.3	0.54	58.5	225.0
Length = 3.670 ft	2	0.153	0.260	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.43	241.8	1,581.3	0.19	58.5	225.0
+D+0.750Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.670	0.219	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.15	1.89	1,060.0	1,581.3	0.46	49.3	225.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: (E) RJ-5

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 3.670 ft	**2**	0.129	0.219	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.36	204.0	1,581.3	0.16	49.3	225.0
+D+0.60W					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 17.50 ft	**1**	0.419	0.137	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	1.51	848.1	2,024.0	0.37	39.5	288.0
Length = 3.670 ft	**2**	0.081	0.137	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.29	163.2	2,024.0	0.13	39.5	288.0
+D+0.750Lr+0.450W					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 17.50 ft	**1**	0.663	0.217	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	2.39	1,342.7	2,024.0	0.58	62.5	288.0
Length = 3.670 ft	**2**	0.128	0.217	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.46	258.4	2,024.0	0.20	62.5	288.0
+D+0.450W					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 17.50 ft	**1**	0.372	0.122	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	1.34	753.8	2,024.0	0.32	35.1	288.0
Length = 3.670 ft	**2**	0.072	0.122	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.26	145.1	2,024.0	0.11	35.1	288.0
+0.60D+0.60W					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 17.50 ft	**1**	0.326	0.107	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	1.18	659.6	2,024.0	0.28	30.7	288.0
Length = 3.670 ft	**2**	0.063	0.107	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.23	127.0	2,024.0	0.10	30.7	288.0
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 17.50 ft	**1**	0.140	0.046	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.50	282.7	2,024.0	0.12	13.2	288.0
Length = 3.670 ft	**2**	0.027	0.046	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.10	54.4	2,024.0	0.04	13.2	288.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750Lr+0.450W	1	0.7750	8.701		0.0000	0.000
	2	0.0000	8.701	+D+0.750Lr+0.450W	-0.4588	3.670

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	0.572	0.876	
Max Upward from Load Combinations	0.572	0.876	
Max Upward from Load Cases	0.335	0.512	
D Only	0.201	0.307	
+D+Lr	0.535	0.820	
+D+0.750Lr	0.452	0.692	
+D+0.60W	0.361	0.553	
+D+0.750Lr+0.450W	0.572	0.876	
+D+0.450W	0.321	0.492	
+0.60D+0.60W	0.281	0.430	
+0.60D	0.120	0.184	
Lr Only	0.335	0.512	
W Only	0.268	0.410	

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: (E) RJ-6

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1000 psi
Fb -	1000 psi
Fc - Prll	1500 psi
Fc - Perp	625 psi
Fv	180 psi
Ft	675 psi

E : Modulus of Elasticity

Ebend- xx	1700 ksi
Eminbend - xx	620 ksi
Density	31.21 pcf

Repetitive Member Stress Increase



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.020, W = 0.0160 ksf, Tributary Width = 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.659 : 1	Maximum Shear Stress Ratio	=	0.214 : 1
Section used for this span		2x10	Section used for this span		2x10
fb: Actual	=	1,041.46 psi	fv: Actual	=	48.05 psi
F'b	=	1,581.25 psi	F'v	=	225.00 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	7.500 ft	Location of maximum on span	=	14.234 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.272 in	Ratio =	660 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.480 in	Ratio =	375 >=180	Span: 1 : +D+0.750Lr+0.450W
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 15.0 ft	1	0.360	0.117	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.73	410.3	1,138.5	0.18	18.9	162.0
+D+Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 15.0 ft	1	0.659	0.214	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.15	1.86	1,041.5	1,581.3	0.44	48.1	225.0
+D+0.750Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 15.0 ft	1	0.559	0.181	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.15	1.58	883.7	1,581.3	0.38	40.8	225.0
+D+0.60W					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 15.0 ft	1	0.352	0.114	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	1.27	713.3	2,024.0	0.30	32.9	288.0
+D+0.750Lr+0.450W					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 15.0 ft	1	0.549	0.178	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	1.98	1,110.9	2,024.0	0.47	51.3	288.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: (E) RJ-6

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.450W					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 15.0 ft	1	0.315	0.102	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	1.14	637.5	2,024.0	0.27	29.4	288.0
+0.60D+0.60W					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 15.0 ft	1	0.271	0.088	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.98	549.1	2,024.0	0.23	25.3	288.0
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.15			0.0	0.00	0.0	0.0
Length = 15.0 ft	1	0.122	0.039	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.15	0.44	246.2	2,024.0	0.11	11.4	288.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750Lr+0.450W	1	0.4796	7.555		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.528	0.528
Max Upward from Load Combinations	0.528	0.528
Max Upward from Load Cases	0.300	0.300
D Only	0.195	0.195
+D+Lr	0.495	0.495
+D+0.750Lr	0.420	0.420
+D+0.60W	0.339	0.339
+D+0.750Lr+0.450W	0.528	0.528
+D+0.450W	0.303	0.303
+0.60D+0.60W	0.261	0.261
+0.60D	0.117	0.117
Lr Only	0.300	0.300
W Only	0.240	0.240

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: RJ-7

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

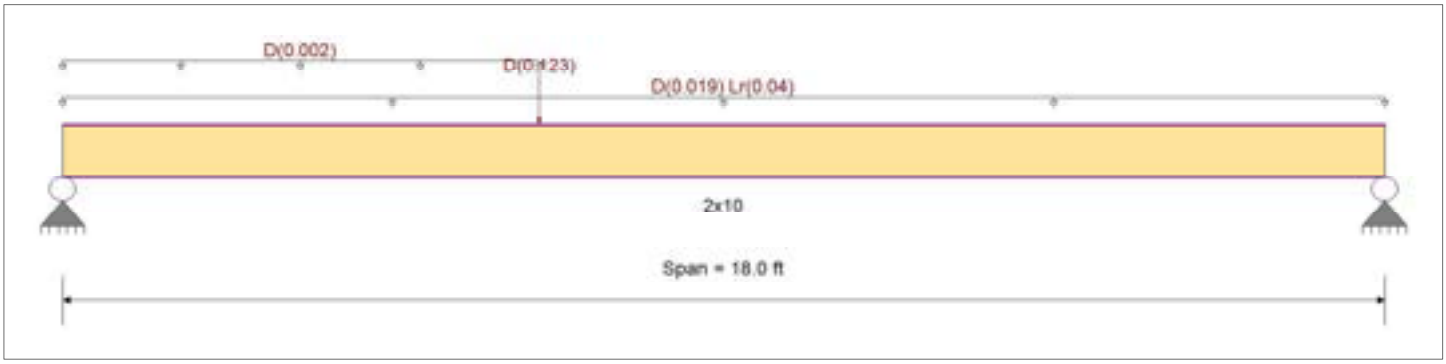
Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,350.0 psi
Fb -	1,350.0 psi
Fc - Prll	925.0 psi
Fc - Perp	625.0 psi
Fv	170.0 psi
Ft	675.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.00950, Lr = 0.020 ksf, Tributary Width = 2.0 ft
Point Load : D = 0.1230 k @ 6.50 ft, (Guard Rail Weight)
Uniform Load : D = 0.0020 k/ft, Extent = 0.0 -->> 6.50 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.891 : 1	Maximum Shear Stress Ratio	=	0.306 : 1
Section used for this span		2x10	Section used for this span		2x10
fb: Actual	=	1,654.80 psi	fv: Actual	=	64.98 psi
F'b	=	1,856.25 psi	F'v	=	212.50 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	8.277 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.600 in	Ratio =	359 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	1.086 in	Ratio =	198 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.572	0.191	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.36	764.0	1,336.5	0.27	29.2	153.0
+D+Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.891	0.306	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.95	1,654.8	1,856.3	0.60	65.0	212.5
+D+0.750Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.770	0.264	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.55	1,429.5	1,856.3	0.52	56.0	212.5
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.193	0.064	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	0.82	458.4	2,376.0	0.16	17.5	272.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: RJ-7

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.0863	8.934		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.647	0.605
Max Upward from Load Combinations	0.647	0.605
Max Upward from Load Cases	0.360	0.360
D Only	0.287	0.245
+D+Lr	0.647	0.605
+D+0.750Lr	0.557	0.515
+0.60D	0.172	0.147
Lr Only	0.360	0.360

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: RJ-8

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

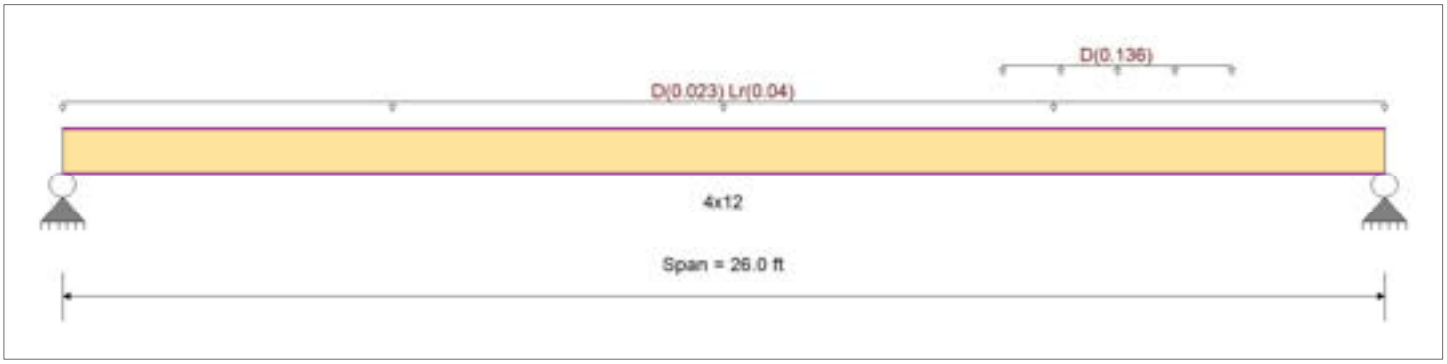
Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,350.0 psi
Fb -	1,350.0 psi
Fc - Prll	925.0 psi
Fc - Perp	625.0 psi
Fv	170.0 psi
Ft	675.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.020 ksf, Tributary Width = 2.0 ft
Uniform Load : D = 0.1360 k/ft, Extent = 18.50 -->> 23.0 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.679 : 1	Maximum Shear Stress Ratio	=	0.243 : 1
Section used for this span		4x12	Section used for this span		4x12
fb: Actual	=	1,260.96 psi	fv: Actual	=	51.71 psi
F'b	=	1,856.25 psi	F'v	=	212.50 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	14.708 ft	Location of maximum on span	=	25.146 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.623 in	Ratio =	501 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	1.447 in	Ratio =	215 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.549	0.217	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	4.51	733.6	1,336.5	0.87	33.2	153.0
+D+Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.679	0.243	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	7.76	1,261.0	1,856.3	1.36	51.7	212.5
+D+0.750Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.607	0.222	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	6.93	1,126.4	1,856.3	1.24	47.1	212.5
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.185	0.073	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.71	440.1	2,376.0	0.52	19.9	272.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: RJ-8

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.4467	13.380		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.054	1.418
Max Upward from Load Combinations	1.054	1.418
Max Upward from Load Cases	0.534	0.898
D Only	0.534	0.898
+D+Lr	1.054	1.418
+D+0.750Lr	0.924	1.288
+0.60D	0.320	0.539
Lr Only	0.520	0.520

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: RJ-9

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,350.0 psi
Fb -	1,350.0 psi
Fc - Prll	925.0 psi
Fc - Perp	625.0 psi
Fv	170.0 psi
Ft	675.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.020 ksf, Tributary Width = 2.0 ft
Uniform Load : D = 0.2290 k/ft, Extent = 17.750 -->> 21.250 ft, Tributary Width = 1.0 ft
Point Load : D = 0.1170 k @ 6.0 ft
Uniform Load : D = 0.008640 k/ft, Extent = 0.0 -->> 6.0 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.812 : 1	Maximum Shear Stress Ratio	=	0.269 : 1
Section used for this span		4x12	Section used for this span		4x12
fb: Actual	=	1,507.41 psi	fv: Actual	=	57.26 psi
F'b	=	1,856.25 psi	F'v	=	212.50 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	15.372 ft	Location of maximum on span	=	25.146 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.623 in	Ratio =	501 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	1.728 in	Ratio =	180 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.746	0.253	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	6.14	997.7	1,336.5	1.02	38.7	153.0
+D+Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.812	0.269	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	9.27	1,507.4	1,856.3	1.50	57.3	212.5
+D+0.750Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.741	0.248	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	8.46	1,375.2	1,856.3	1.38	52.6	212.5
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.252	0.085	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.68	598.6	2,376.0	0.61	23.2	272.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: RJ-9

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.7277	13.380		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.266	1.564
Max Upward from Load Combinations	1.266	1.564
Max Upward from Load Cases	0.746	1.044
D Only	0.746	1.044
+D+Lr	1.266	1.564
+D+0.750Lr	1.136	1.434
+0.60D	0.448	0.626
Lr Only	0.520	0.520

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: RJ-10

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

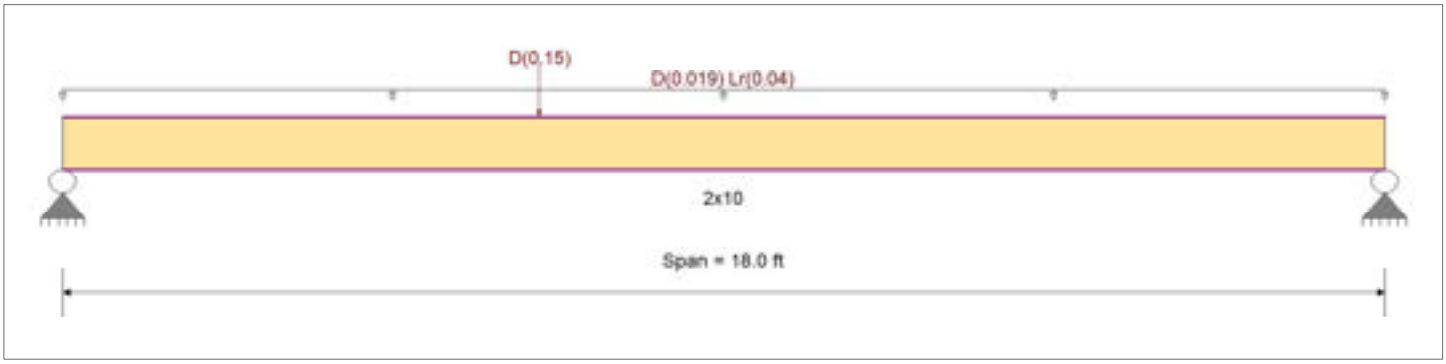
Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,350.0 psi
Fb -	1,350.0 psi
Fc - Prll	925.0 psi
Fc - Perp	625.0 psi
Fv	170.0 psi
Ft	675.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.00950, Lr = 0.020 ksf, Tributary Width = 2.0 ft
Point Load : D = 0.150 k @ 6.50 ft, (Guard Rail Weight)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.913 : 1	Maximum Shear Stress Ratio	=	0.310 : 1
Section used for this span		2x10	Section used for this span		2x10
fb: Actual	=	1,695.57 psi	fv: Actual	=	65.85 psi
F'b	=	1,856.25 psi	F'v	=	212.50 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	8.146 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.600 in	Ratio =	359 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	1.110 in	Ratio =	194 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.607	0.196	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.45	810.9	1,336.5	0.28	30.1	153.0
+D+Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.913	0.310	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.02	1,695.6	1,856.3	0.61	65.8	212.5
+D+0.750Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.792	0.268	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.62	1,470.9	1,856.3	0.53	56.9	212.5
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.205	0.066	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	0.87	486.5	2,376.0	0.17	18.0	272.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: RJ-10

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.1100	8.934		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.654	0.612
Max Upward from Load Combinations	0.654	0.612
Max Upward from Load Cases	0.360	0.360
D Only	0.294	0.252
+D+Lr	0.654	0.612
+D+0.750Lr	0.564	0.522
+0.60D	0.176	0.151
Lr Only	0.360	0.360

ZFA STRUCTURAL ENGINEERS

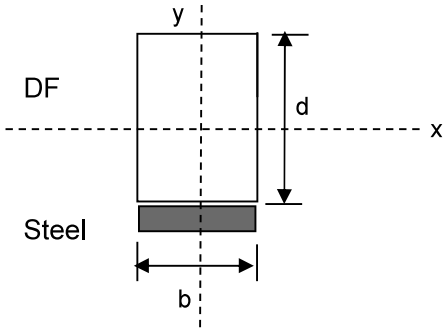
Job #22689
DF Retrofit - RB 1 STL

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

A retrofit for inadequate glulam girder is to attach a steel plate to the bottom of the girder.

54 mil plate:



Existing Wood Properties:

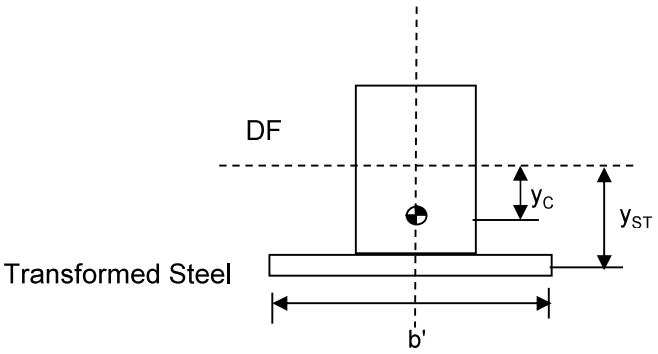
b=	3.5	in	A =	53 in^2
d =	15.25	in	I =	1034.419 in^4
L_{total} =	18.5	ft	E =	1.6E+06 psi
Spacing =	12	ft oc		

STL Plate Properties:

b_{STL}=	3.5	in
d_{STL} =	0.054	in
A =	0.19	in^2
I =	0.000045927	in^4
E =	2.9E+07	psi

Transformed Steel Properties:

n =	18.1	
b' =	63.4	in.
A' =	3.4	in.^{2}
I' =	201	in.^{4}
y_{st} =	7.7	in.
y_c =	0.46	in.



Transformed Section Properties:

I_{DF} =	1046	in.^{4}
I_{ST} =	177	in.^{4}
I_{TR} =	1223	in.^{4}

COM-2310004

ZFA STRUCTURAL ENGINEERS

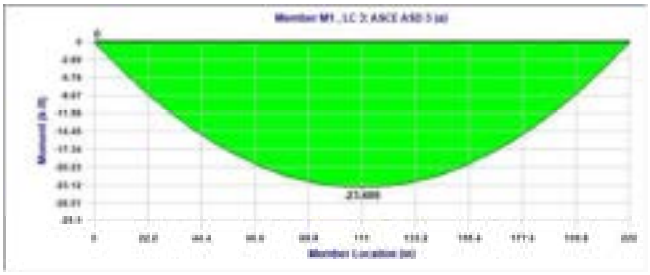
Job #22689
DF Retrofit - RB 1 STL

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

Maximum Stresses:

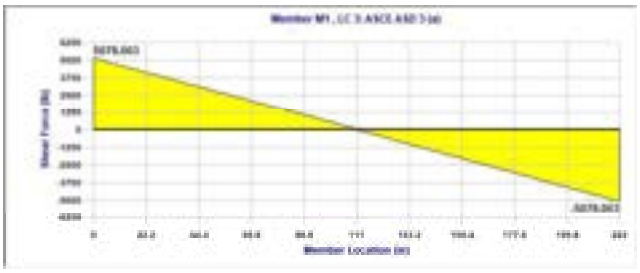
Max Moment =	23.5	k-ft (per Risa)
σ_{DF} =	1864	psi
σ_{STL} =	30148	psi



Allowable Stresses:

$F_{b,\ DF}$ =	2400	psi
C_V =	1.027	
C_D =	1.25	
$F'_{b,\ DF}$ =	3081.624613	psi
F_{STL} =	360000	psi

DCR_{DF} =	0.60	< 1.0, OK
DCR_{ST} =	0.08	< 1.0, OK



Connection Design:

q = VQ/I

V =	5078	lb.
Q =	$A_{st}*y_{st}$	
A_{st} =	3.43	$in.^2$
y_{st} =	7.65	in.
Q =	26.2	$in.^3$
I =	1223	$in.^4$
q =	108.8	lb./in.

Screw Spacing =	6	in oc
Load =	653	lb.
Cd =	1.25	
n =	2	number of screws
va =	420	lb/screw SDS per ESR-2236
Capacity=	1050	lb.
DCR =	0.62	< 1.0, OK

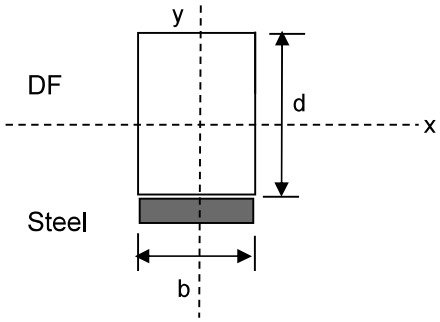
ZFA STRUCTURAL ENGINEERS

Job #22689
DF Retrofit - RB 1 STL Defl

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

A retrofit for inadequate glulam girder is to attach a steel plate to the bottom of the girder.
Try a 54 MIL plate.



Existing Wood Properties:

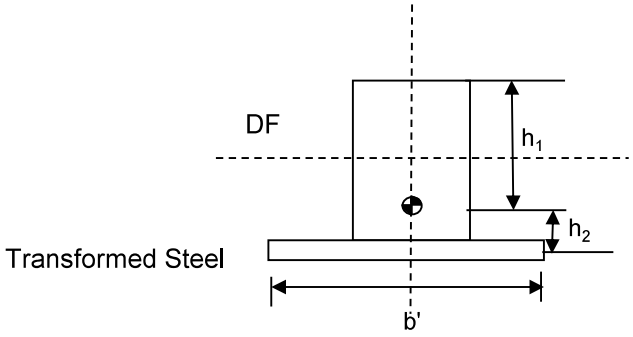
b=	3.5	in	A =	53 in^2
d =	15.25	in	I =	1034.419 in^4
L_{total} =	18.5	ft	E =	1.6E+06 psi
Spacing =	12	ft oc		

STL Plate Properties:

b_{STL}=	3.5	in
d_{STL} =	0.054	in
A =	0.19	in^2
I =	0.000045927	in^4
E =	2.9E+07	psi

Transformed Steel Properties:

n =	18.1	
b' =	63.4	in.
A' =	3.4	in.^{2}



Transformed Section Properties:

h_1 =	8.1	in
h_2 =	7.2	in
I_{DF} =	1046	in.^{4}
I_{ST} =	177	in.^{4}
I_{TR} =	1223	in.^{4}

ZFA STRUCTURAL ENGINEERS

Job #22689
DF Retrofit - RB 1 STL Defl

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

Total Deflection:

w_{DL} =	12.7	psf
w_{LL} =	12	psf
w_{Trib} =	155	in
L =	222	in
I =	1223	in^4
E =	1.60E+06	psi
Δ_{STL} =	0.43	in
P =	542	lbs
a =	141	in
b =	81	in
L =	222	in
I =	1223	in^4
E =	1.60E+06	psi
x =	81	in
Δ_{STL} =	0.06	in
P =	542	lbs
a =	216	in
b =	6	in
L =	222	in
I =	1223	in^4
E =	1.60E+06	psi
x =	6	in
Δ_{STL} =	0.01	in

Total Deflection = L/451 > 180, OK

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B1 - (E) 5 1/8x21 GLB - (2) 5 1/8x1 1/2 LVL

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

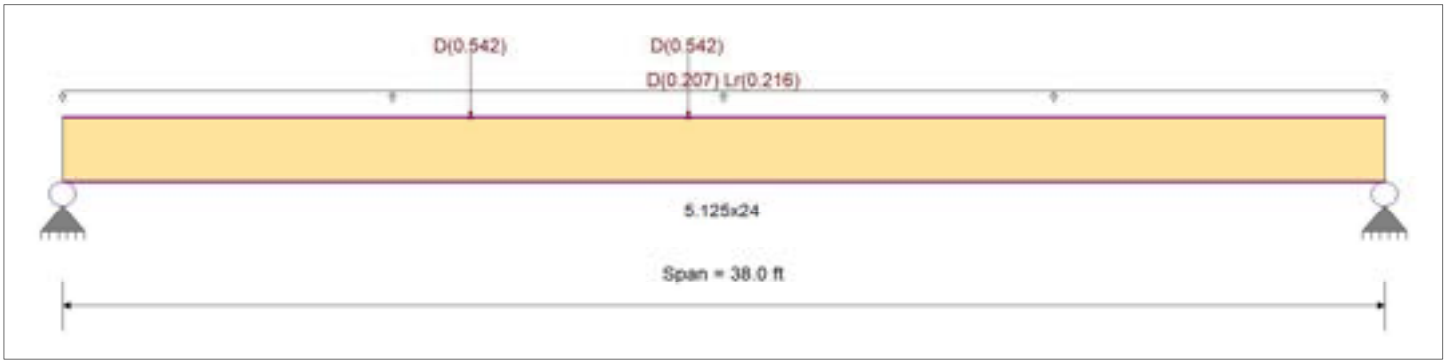
Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.0120 ksf, Tributary Width = 18.0 ft
Point Load : D = 0.5420 k @ 11.750 ft, (Mech Unit)
Point Load : D = 0.5420 k @ 18.0 ft, (Mech Unit)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.827 : 1	Maximum Shear Stress Ratio	=	0.307 : 1
Section used for this span		5.125x24	Section used for this span		5.125x24
fb: Actual	=	2,181.11 psi	fv: Actual	=	101.59 psi
F'b	=	2,637.92 psi	F'v	=	331.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	18.029 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.959 in	Ratio =	475 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	2.180 in	Ratio =	209 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.649	0.238	0.90	1.00	1.00	1.00	0.879	1.00	1.00	1.00	50.54	1,232.7	1,899.3	4.65	56.7	238.5
+D+Lr					1.00	1.00	1.00	0.879	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.827	0.307	1.25	1.00	1.00	1.00	0.879	1.00	1.00	1.00	89.43	2,181.1	2,637.9	8.33	101.6	331.3
+D+0.750Lr					1.00	1.00	1.00	0.879	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.737	0.273	1.25	1.00	1.00	1.00	0.879	1.00	1.00	1.00	79.70	1,944.0	2,637.9	7.41	90.4	331.3
+0.60D					1.00	1.00	1.00	0.879	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.219	0.080	1.60	1.00	1.00	1.00	0.879	1.00	1.00	1.00	30.32	739.6	3,376.5	2.79	34.0	424.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B1 - (E) 5 1/8x21 GLB - (2) 5 1/8x1 1/2 LVL

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	2.1797	19.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	9.203	8.968
Max Upward from Load Combinations	9.203	8.968
Max Upward from Load Cases	5.099	4.864
D Only	5.099	4.864
+D+Lr	9.203	8.968
+D+0.750Lr	8.177	7.942
+0.60D	3.060	2.918
Lr Only	4.104	4.104

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B2 - (E) 5 1/8x21 GLB - (2) 5 1/8x1 1/2 LVL

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

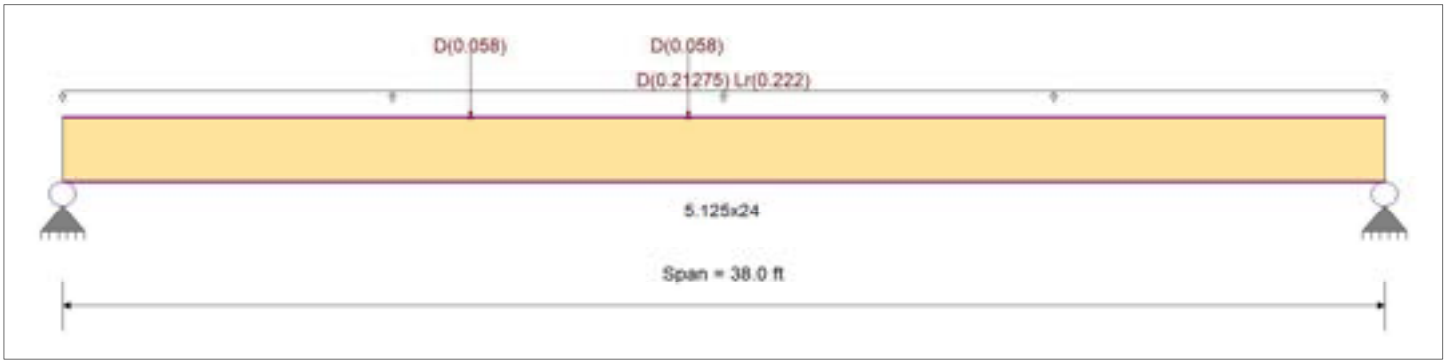
Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.0120 ksf, Tributary Width = 18.50 ft
Point Load : D = 0.0580 k @ 11.750 ft, (Mech Unit)
Point Load : D = 0.0580 k @ 18.0 ft, (Mech Unit)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.778 : 1	Maximum Shear Stress Ratio	=	0.292 : 1
Section used for this span		5.125x24	Section used for this span		5.125x24
fb: Actual	=	2,052.41 psi	fv: Actual	=	96.85 psi
F'b	=	2,637.92 psi	F'v	=	331.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	18.861 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.986 in	Ratio =	462 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	2.068 in	Ratio =	220 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.566	0.212	0.90	1.00	1.00	1.00	0.879	1.00	1.00	1.00	44.08	1,075.1	1,899.3	4.15	50.7	238.5
+D+Lr					1.00	1.00	1.00	0.879	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.778	0.292	1.25	1.00	1.00	1.00	0.879	1.00	1.00	1.00	84.15	2,052.4	2,637.9	7.94	96.8	331.3
+D+0.750Lr					1.00	1.00	1.00	0.879	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.685	0.258	1.25	1.00	1.00	1.00	0.879	1.00	1.00	1.00	74.13	1,808.1	2,637.9	6.99	85.3	331.3
+0.60D					1.00	1.00	1.00	0.879	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.191	0.072	1.60	1.00	1.00	1.00	0.879	1.00	1.00	1.00	26.45	645.1	3,376.5	2.49	30.4	424.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B2 - (E) 5 1/8x21 GLB - (2) 5 1/8x1 1/2 LVL

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	2.0684	19.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	8.837	8.812
Max Upward from Load Combinations	8.837	8.812
Max Upward from Load Cases	4.619	4.594
D Only	4.619	4.594
+D+Lr	8.837	8.812
+D+0.750Lr	7.783	7.758
+0.60D	2.772	2.757
Lr Only	4.218	4.218

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B3 - (E) 5 1/8x21 GLB - (2) 5 1/8x1 1/2 LVL

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

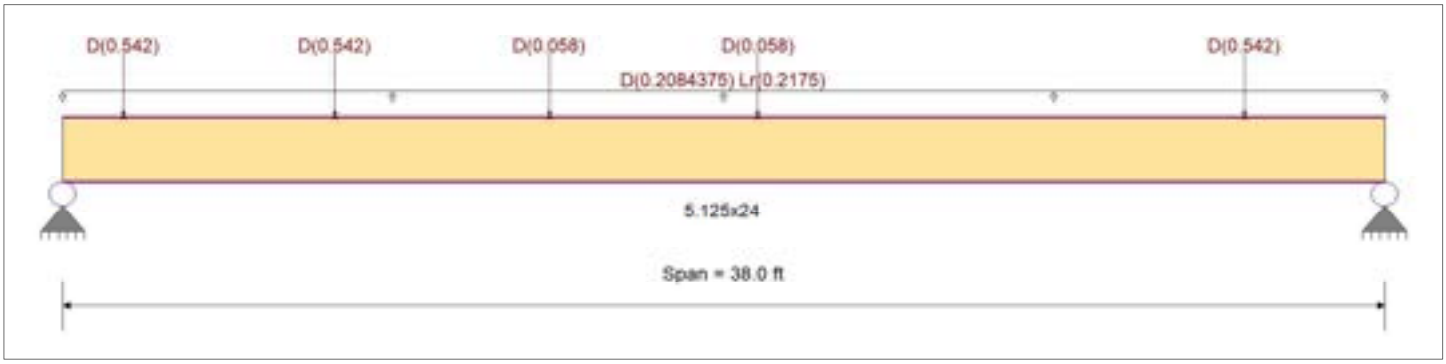
Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.0120 ksf, Tributary Width = 18.125 ft
Point Load : D = 0.5420 k @ 1.750 ft, (Mech Unit)
Point Load : D = 0.5420 k @ 7.830 ft, (Mech Unit)
Point Load : D = 0.0580 k @ 14.0 ft, (Mech Unit)
Point Load : D = 0.0580 k @ 20.0 ft, (Mech Unit)
Point Load : D = 0.5420 k @ 34.0 ft, (Mech Unit)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.798 : 1	Maximum Shear Stress Ratio	=	0.309 : 1
Section used for this span		5.125x24	Section used for this span		5.125x24
fb: Actual	=	2,105.06 psi	fv: Actual	=	102.37 psi
F'b	=	2,637.92 psi	F'v	=	331.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	18.861 ft	Location of maximum on span	=	36.058 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.966 in	Ratio =	472 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	2.135 in	Ratio =	213 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.604	0.239	0.90	1.00	1.00	1.00	0.879	1.00	1.00	1.00	47.05	1,147.7	1,899.3	4.68	57.1	238.5
+D+Lr					1.00	1.00	1.00	0.879	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.798	0.309	1.25	1.00	1.00	1.00	0.879	1.00	1.00	1.00	86.31	2,105.1	2,637.9	8.39	102.4	331.3
+D+0.750Lr					1.00	1.00	1.00	0.879	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.707	0.275	1.25	1.00	1.00	1.00	0.879	1.00	1.00	1.00	76.49	1,865.7	2,637.9	7.47	91.1	331.3

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B3 - (E) 5 1/8x21 GLB - (2) 5 1/8x1 1/2 LVL

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+0.60D					1.00	1.00	1.00	0.879	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.204	0.081	1.60	1.00	1.00	1.00	0.879	1.00	1.00	1.00	28.23	688.6	3,376.5	2.81	34.3	424.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	2.1351	19.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	9.668	9.273
Max Upward from Load Combinations	9.668	9.273
Max Upward from Load Cases	5.535	5.140
D Only	5.535	5.140
+D+Lr	9.668	9.273
+D+0.750Lr	8.635	8.240
+0.60D	3.321	3.084
Lr Only	4.133	4.133

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B4 - (E) 5 1/8x16 1/2 GLB

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

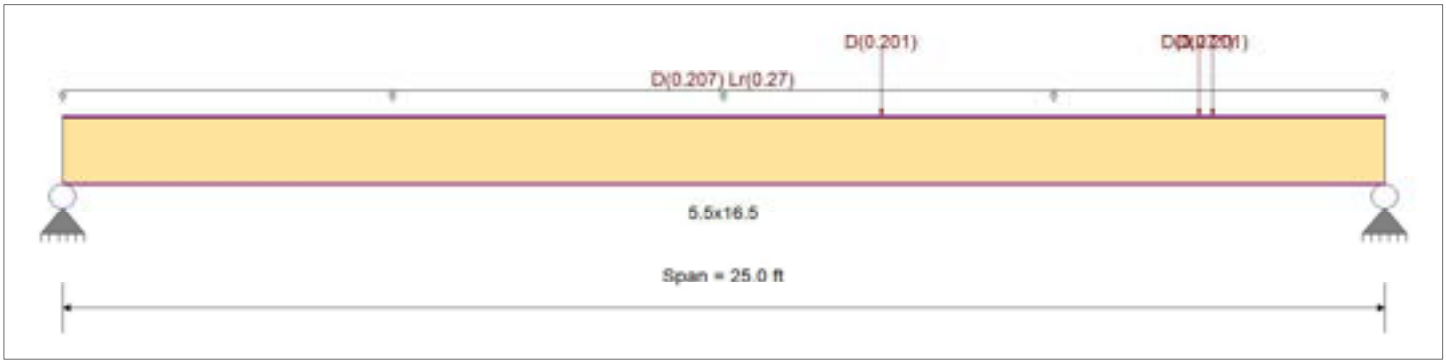
Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.0150 ksf, Tributary Width = 18.0 ft
Point Load : D = 0.2010 k @ 15.50 ft, (Mech Unit)
Point Load : D = 0.2010 k @ 21.750 ft, (Mech Unit)
Point Load : D = 0.2710 k @ 21.50 ft, (Mech Unit)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.688 : 1	Maximum Shear Stress Ratio	=	0.302 : 1
Section used for this span		5.5x16.5	Section used for this span		5.5x16.5
fb: Actual	=	1,951.14 psi	fv: Actual	=	100.18 psi
F'b	=	2,835.65 psi	F'v	=	331.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	12.774 ft	Location of maximum on span	=	23.631 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.644 in	Ratio =	465 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	1.242 in	Ratio =	241 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 25.0 ft	1	0.459	0.212	0.90	1.00	1.00	1.00	0.945	1.00	1.00	1.00	19.51	938.0	2,041.7	3.06	50.5	238.5
+D+Lr					1.00	1.00	1.00	0.945	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 25.0 ft	1	0.688	0.302	1.25	1.00	1.00	1.00	0.945	1.00	1.00	1.00	40.58	1,951.1	2,835.6	6.06	100.2	331.3
+D+0.750Lr					1.00	1.00	1.00	0.945	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 25.0 ft	1	0.599	0.265	1.25	1.00	1.00	1.00	0.945	1.00	1.00	1.00	35.31	1,697.7	2,835.6	5.31	87.8	331.3
+0.60D					1.00	1.00	1.00	0.945	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 25.0 ft	1	0.155	0.071	1.60	1.00	1.00	1.00	0.945	1.00	1.00	1.00	11.70	562.8	3,629.6	1.83	30.3	424.0

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B4 - (E) 5 1/8x16 1/2 GLB

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.2416	12.591		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	6.349	6.741
Max Upward from Load Combinations	6.349	6.741
Max Upward from Load Cases	3.375	3.375
D Only	2.974	3.366
+D+Lr	6.349	6.741
+D+0.750Lr	5.505	5.897
+0.60D	1.784	2.020
Lr Only	3.375	3.375

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B5 - (E) 5 1/8x16 1/2 GLB

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

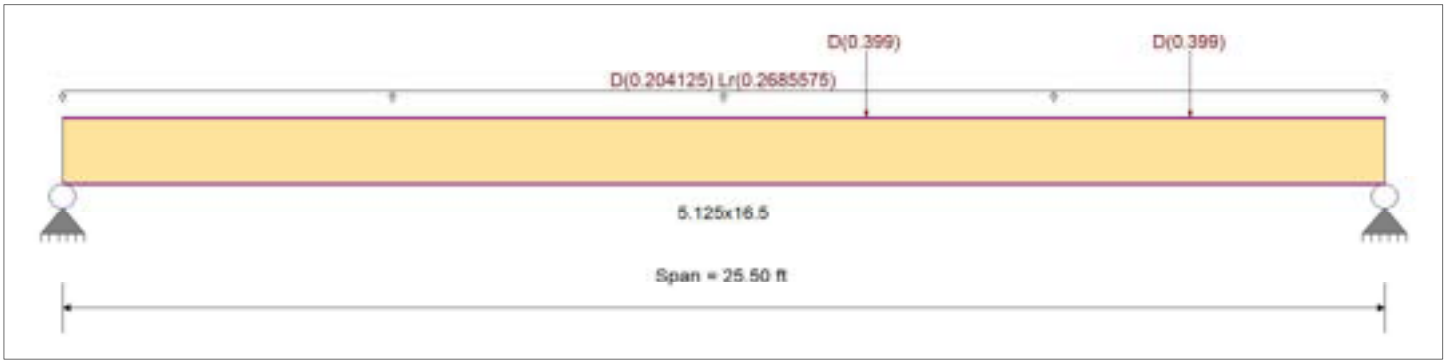
Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.01513 ksf, Tributary Width = 17.750 ft
Point Load : D = 0.3990 k @ 15.50 ft, (Mech Unit)
Point Load : D = 0.3990 k @ 21.750 ft, (Mech Unit)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.773 : 1	Maximum Shear Stress Ratio	=	0.332 : 1
Section used for this span		5.125x16.5	Section used for this span		5.125x16.5
fb: Actual	=	2,203.43 psi	fv: Actual	=	110.04 psi
F'b	=	2,850.09 psi	F'v	=	331.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	13.215 ft	Location of maximum on span	=	24.197 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.744 in	Ratio =	411 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	1.455 in	Ratio =	210 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 25.50 ft	1	0.526	0.233	0.90	1.00	1.00	1.00	0.950	1.00	1.00	1.00	20.93	1,080.0	2,052.1	3.13	55.5	238.5
+D+Lr					1.00	1.00	1.00	0.950	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 25.50 ft	1	0.773	0.332	1.25	1.00	1.00	1.00	0.950	1.00	1.00	1.00	42.70	2,203.4	2,850.1	6.20	110.0	331.3
+D+0.750Lr					1.00	1.00	1.00	0.950	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 25.50 ft	1	0.674	0.291	1.25	1.00	1.00	1.00	0.950	1.00	1.00	1.00	37.25	1,922.2	2,850.1	5.43	96.4	331.3
+0.60D					1.00	1.00	1.00	0.950	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 25.50 ft	1	0.178	0.079	1.60	1.00	1.00	1.00	0.950	1.00	1.00	1.00	12.56	648.0	3,648.1	1.88	33.3	424.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B5 - (E) 5 1/8x16 1/2 GLB

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.4552	12.843		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	6.476	6.843
Max Upward from Load Combinations	6.476	6.843
Max Upward from Load Cases	3.424	3.424
D Only	3.051	3.419
+D+Lr	6.476	6.843
+D+0.750Lr	5.620	5.987
+0.60D	1.831	2.051
Lr Only	3.424	3.424

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B6 - (E) 5 1/8x13 1/2 GLB

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

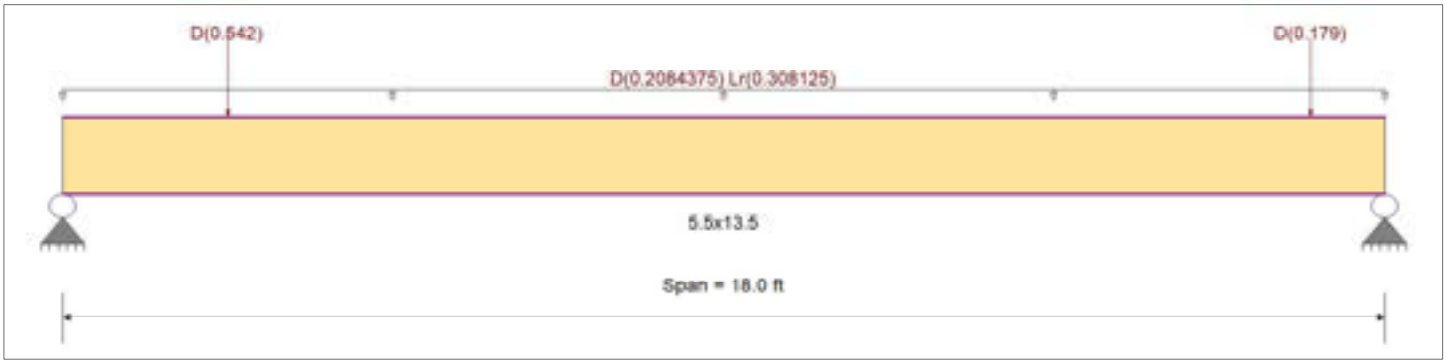
Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.0170 ksf, Tributary Width = 18.125 ft
Point Load : D = 0.5420 k @ 2.250 ft, (Mech Unit)
Point Load : D = 0.1790 k @ 17.0 ft, (Mech Unit)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.535 : 1	Maximum Shear Stress Ratio	=	0.286 : 1
Section used for this span		5.5x13.5	Section used for this span		5.5x13.5
fb: Actual	=	1,599.98 psi	fv: Actual	=	94.61 psi
F'b	=	2,989.74 psi	F'v	=	331.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	8.869 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.361 in	Ratio =	598 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	0.647 in	Ratio =	333 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.327	0.191	0.90	1.00	1.00	1.00	0.997	1.00	1.00	1.00	9.80	703.9	2,152.6	2.25	45.5	238.5
+D+Lr					1.00	1.00	1.00	0.997	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.535	0.286	1.25	1.00	1.00	1.00	0.997	1.00	1.00	1.00	22.27	1,600.0	2,989.7	4.68	94.6	331.3
+D+0.750Lr					1.00	1.00	1.00	0.997	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.460	0.249	1.25	1.00	1.00	1.00	0.997	1.00	1.00	1.00	19.16	1,375.9	2,989.7	4.08	82.3	331.3
+0.60D					1.00	1.00	1.00	0.997	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.110	0.064	1.60	1.00	1.00	1.00	0.997	1.00	1.00	1.00	5.88	422.4	3,826.9	1.35	27.3	424.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B6 - (E) 5 1/8x13 1/2 GLB

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.6473	9.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	5.278	5.031
Max Upward from Load Combinations	5.278	5.031
Max Upward from Load Cases	2.773	2.773
D Only	2.505	2.258
+D+Lr	5.278	5.031
+D+0.750Lr	4.585	4.337
+0.60D	1.503	1.355
Lr Only	2.773	2.773

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B7 - (E) 5 1/8x16 1/2 GLB - (2) 5 1/8x1 1/2 LVL

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

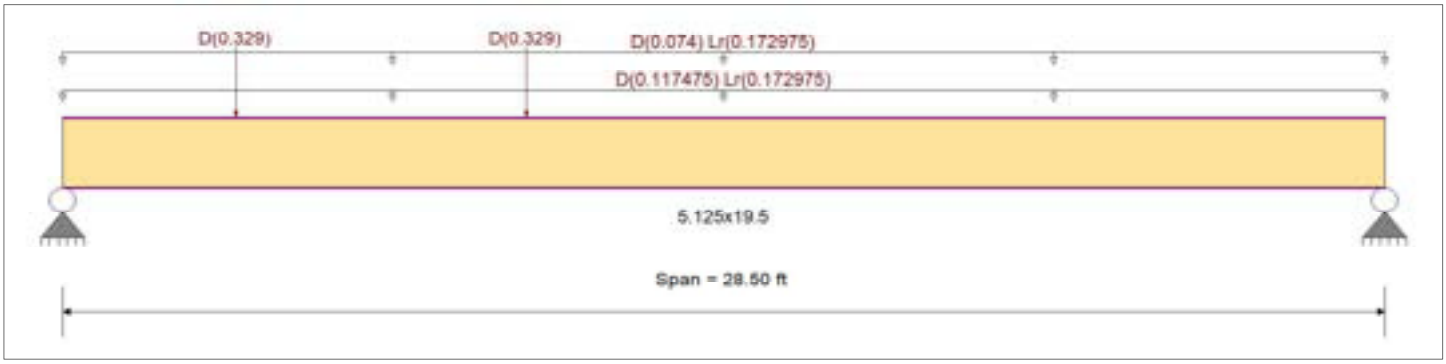
Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,400.0 psi
Fb -	1,850.0 psi
Fc - Prll	1,650.0 psi
Fc - Perp	650.0 psi
Fv	265.0 psi
Ft	1,100.0 psi

E : Modulus of Elasticity

Ebend- xx	1,800.0 ksi
Eminbend - xx	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - yy	850.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01270, Lr = 0.01870 ksf, Tributary Width = 9.250 ft
Uniform Load : D = 0.0080, Lr = 0.01870 ksf, Tributary Width = 9.250 ft
Point Load : D = 0.3290 k @ 3.750 ft, (Mech Unit)
Point Load : D = 0.3290 k @ 10.0 ft, (Mech Unit)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.787 : 1	Maximum Shear Stress Ratio	=	0.344 : 1
Section used for this span		5.125x19.5	Section used for this span		5.125x19.5
fb: Actual	=	2,181.63 psi	fv: Actual	=	113.98 psi
F'b	=	2,771.87 psi	F'v	=	331.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	13.938 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.906 in	Ratio =	377 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	1.526 in	Ratio =	224 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 28.50 ft	1	0.444	0.202	0.90	1.00	1.00	1.00	0.924	1.00	1.00	1.00	23.96	885.3	1,995.7	3.20	48.1	238.5
+D+Lr					1.00	1.00	1.00	0.924	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 28.50 ft	1	0.787	0.344	1.25	1.00	1.00	1.00	0.924	1.00	1.00	1.00	59.05	2,181.6	2,771.9	7.59	114.0	331.3
+D+0.750Lr					1.00	1.00	1.00	0.924	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 28.50 ft	1	0.670	0.294	1.25	1.00	1.00	1.00	0.924	1.00	1.00	1.00	50.27	1,857.4	2,771.9	6.50	97.5	331.3
+0.60D					1.00	1.00	1.00	0.924	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 28.50 ft	1	0.150	0.068	1.60	1.00	1.00	1.00	0.924	1.00	1.00	1.00	14.38	531.2	3,548.0	1.92	28.9	424.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B7 - (E) 5 1/8x16 1/2 GLB - (2) 5 1/8x1 1/2 LVL

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.5258	14.250		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	8.466	8.126
Max Upward from Load Combinations	8.466	8.126
Max Upward from Load Cases	4.930	4.930
D Only	3.536	3.196
+D+Lr	8.466	8.126
+D+0.750Lr	7.234	6.893
+0.60D	2.122	1.918
Lr Only	4.930	4.930

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B8 - (E) 5 1/8x19 1/2 GLB

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.01320 ksf, Tributary Width = 18.50 ft
Point Load : D = 0.1790 k @ 5.10 ft, (Mech Unit)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.715 : 1	Maximum Shear Stress Ratio	=	0.296 : 1
Section used for this span		5.125x19.5	Section used for this span		5.125x19.5
fb: Actual	=	1,973.18 psi	fv: Actual	=	98.16 psi
F'b	=	2,760.00 psi	F'v	=	331.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	14.766 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.759 in	Ratio =	470 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	1.503 in	Ratio =	237 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 29.750 ft	1	0.491	0.206	0.90	1.00	1.00	1.00	0.920	1.00	1.00	1.00	26.39	975.1	1,987.2	3.28	49.2	238.5
+D+Lr					1.00	1.00	1.00	0.920	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 29.750 ft	1	0.715	0.296	1.25	1.00	1.00	1.00	0.920	1.00	1.00	1.00	53.41	1,973.2	2,760.0	6.54	98.2	331.3
+D+0.750Lr					1.00	1.00	1.00	0.920	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 29.750 ft	1	0.625	0.259	1.25	1.00	1.00	1.00	0.920	1.00	1.00	1.00	46.65	1,723.7	2,760.0	5.72	85.9	331.3
+0.60D					1.00	1.00	1.00	0.920	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 29.750 ft	1	0.166	0.070	1.60	1.00	1.00	1.00	0.920	1.00	1.00	1.00	15.84	585.0	3,532.8	1.97	29.5	424.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B8 - (E) 5 1/8x19 1/2 GLB

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.5033	14.875		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	7.268	7.150
Max Upward from Load Combinations	7.268	7.150
Max Upward from Load Cases	3.635	3.632
D Only	3.635	3.518
+D+Lr	7.268	7.150
+D+0.750Lr	6.360	6.242
+0.60D	2.181	2.111
Lr Only	3.632	3.632

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B9 - (E) 5 1/8x21 GLB - (2) 5 1/8x1 1/2 LVL

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

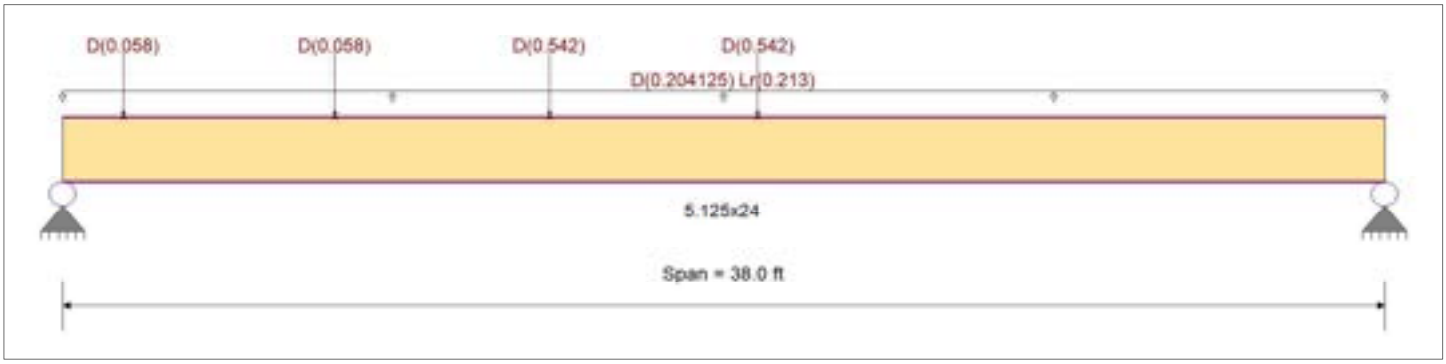
Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.0120 ksf, Tributary Width = 17.750 ft
Point Load : D = 0.0580 k @ 1.750 ft, (Mech Unit)
Point Load : D = 0.0580 k @ 7.830 ft, (Mech Unit)
Point Load : D = 0.5420 k @ 14.0 ft, (Mech Unit)
Point Load : D = 0.5420 k @ 20.0 ft, (Mech Unit)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.823 : 1	Maximum Shear Stress Ratio	=	0.302 : 1
Section used for this span		5.125x24	Section used for this span		5.125x24
fb: Actual	=	2,172.06 psi	fv: Actual	=	100.15 psi
F'b	=	2,637.92 psi	F'v	=	331.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	19.139 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.946 in	Ratio =	482 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	2.171 in	Ratio =	210 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.650	0.234	0.90	1.00	1.00	1.00	0.879	1.00	1.00	1.00	50.61	1,234.4	1,899.3	4.58	55.8	238.5
+D+Lr					1.00	1.00	1.00	0.879	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.823	0.302	1.25	1.00	1.00	1.00	0.879	1.00	1.00	1.00	89.05	2,172.1	2,637.9	8.21	100.2	331.3
+D+0.750Lr					1.00	1.00	1.00	0.879	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 38.0 ft	1	0.735	0.269	1.25	1.00	1.00	1.00	0.879	1.00	1.00	1.00	79.44	1,937.6	2,637.9	7.30	89.1	331.3
+0.60D					1.00	1.00	1.00	0.879	1.00	1.00	1.00			0.0	0.00	0.0	0.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B9 - (E) 5 1/8x21 GLB - (2) 5 1/8x1 1/2 LVL

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
Length = 38.0 ft	1	0.219	0.079	1.60	1.00	1.00	1.00	0.879	1.00	1.00	1.00	30.37	740.6	3,376.5	2.75	33.5	424.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	2.1711	19.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	9.132	8.931
Max Upward from Load Combinations	9.132	8.931
Max Upward from Load Cases	5.085	4.884
D Only	5.085	4.884
+D+Lr	9.132	8.931
+D+0.750Lr	8.121	7.920
+0.60D	3.051	2.931
Lr Only	4.047	4.047

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B10 - (E) 5 1/8x16 1/2 GLB

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.01592 ksf, Tributary Width = 18.375 ft
Point Load : D = 0.5420 k @ 16.0 ft, (Mech Unit)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.593 : 1	Maximum Shear Stress Ratio	=	0.291 : 1
Section used for this span		5.125x16.5	Section used for this span		5.125x16.5
fb: Actual	=	1,715.16 psi	fv: Actual	=	96.24 psi
F'b	=	2,892.48 psi	F'v	=	331.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	11.321 ft	Location of maximum on span	=	20.635 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.449 in	Ratio =	587 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	0.846 in	Ratio =	311 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 22.0 ft	1	0.386	0.194	0.90	1.00	1.00	1.00	0.964	1.00	1.00	1.00	15.57	803.3	2,082.6	2.61	46.2	238.5
+D+Lr					1.00	1.00	1.00	0.964	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.0 ft	1	0.593	0.291	1.25	1.00	1.00	1.00	0.964	1.00	1.00	1.00	33.24	1,715.2	2,892.5	5.43	96.2	331.3
+D+0.750Lr					1.00	1.00	1.00	0.964	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.0 ft	1	0.514	0.253	1.25	1.00	1.00	1.00	0.964	1.00	1.00	1.00	28.82	1,487.0	2,892.5	4.72	83.7	331.3
+0.60D					1.00	1.00	1.00	0.964	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.0 ft	1	0.130	0.065	1.60	1.00	1.00	1.00	0.964	1.00	1.00	1.00	9.34	482.0	3,702.4	1.56	27.7	424.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B10 - (E) 5 1/8x16 1/2 GLB

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.8462	11.080		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	5.892	6.138
Max Upward from Load Combinations	5.892	6.138
Max Upward from Load Cases	3.218	3.218
D Only	2.674	2.920
+D+Lr	5.892	6.138
+D+0.750Lr	5.087	5.334
+0.60D	1.604	1.752
Lr Only	3.218	3.218

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B11 - (E) 5 1/8x13 1/2 GLB

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.01740 ksf, Tributary Width = 18.0 ft
Point Load : D = 0.2710 k @ 2.125 ft, (Mech Unit)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.580 : 1	Maximum Shear Stress Ratio	=	0.298 : 1
Section used for this span		5.125x13.5	Section used for this span		5.125x13.5
fb: Actual	=	1,739.86 psi	fv: Actual	=	98.70 psi
F'b	=	3,000.00 psi	F'v	=	331.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	9.058 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.416 in	Ratio =	526 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	0.721 in	Ratio =	303 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 18.250 ft	1	0.340	0.184	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	9.53	734.8	2,160.0	2.03	44.0	238.5
+D+Lr					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.250 ft	1	0.580	0.298	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	22.57	1,739.9	3,000.0	4.55	98.7	331.3
+D+0.750Lr					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.250 ft	1	0.496	0.257	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	19.31	1,488.6	3,000.0	3.92	85.0	331.3
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.250 ft	1	0.115	0.062	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	5.72	440.9	3,840.0	1.22	26.4	424.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B11 - (E) 5 1/8x13 1/2 GLB

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.7212	9.125		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	5.123	4.915
Max Upward from Load Combinations	5.123	4.915
Max Upward from Load Cases	2.858	2.858
D Only	2.265	2.057
+D+Lr	5.123	4.915
+D+0.750Lr	4.409	4.201
+0.60D	1.359	1.234
Lr Only	2.858	2.858

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B12 - (E) 5 1/8x18 GLB

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

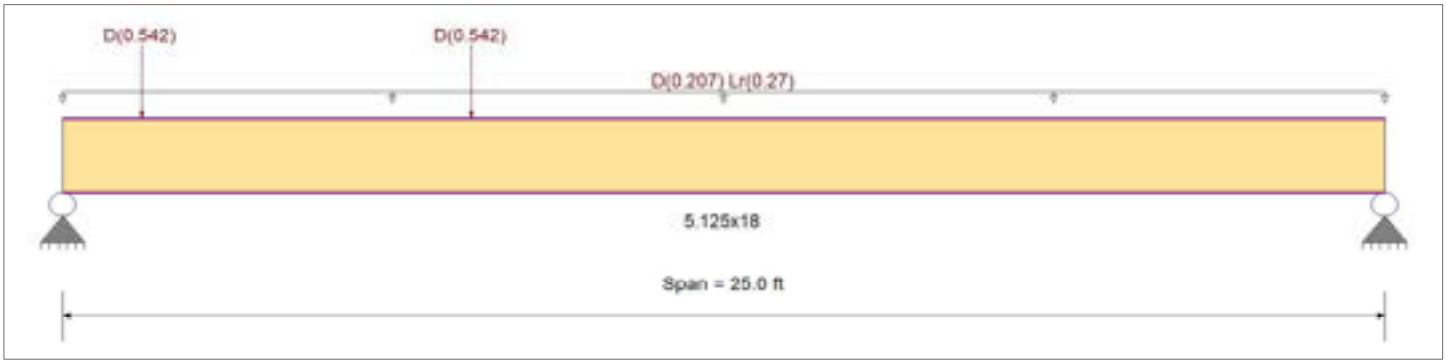
Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.0150 ksf, Tributary Width = 18.0 ft
Point Load : D = 0.5420 k @ 1.50 ft, (Mech Unit)
Point Load : D = 0.5420 k @ 7.750 ft, (Mech Unit)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.634 : 1	Maximum Shear Stress Ratio	=	0.313 : 1
Section used for this span		5.125x18	Section used for this span		5.125x18
fb: Actual	=	1,794.02 psi	fv: Actual	=	103.58 psi
F'b	=	2,831.00 psi	F'v	=	331.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	12.135 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.532 in	Ratio =	563 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	1.048 in	Ratio =	286 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 25.0 ft	1	0.432	0.231	0.90	1.00	1.00	1.00	0.944	1.00	1.00	1.00	20.33	881.5	2,038.3	3.39	55.1	238.5
+D+Lr					1.00	1.00	1.00	0.944	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 25.0 ft	1	0.634	0.313	1.25	1.00	1.00	1.00	0.944	1.00	1.00	1.00	41.37	1,794.0	2,831.0	6.37	103.6	331.3
+D+0.750Lr					1.00	1.00	1.00	0.944	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 25.0 ft	1	0.553	0.276	1.25	1.00	1.00	1.00	0.944	1.00	1.00	1.00	36.11	1,565.6	2,831.0	5.63	91.5	331.3
+0.60D					1.00	1.00	1.00	0.944	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 25.0 ft	1	0.146	0.078	1.60	1.00	1.00	1.00	0.944	1.00	1.00	1.00	12.20	528.9	3,623.7	2.03	33.1	424.0

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B12 - (E) 5 1/8x18 GLB

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.0478	12.500		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	7.096	6.413
Max Upward from Load Combinations	7.096	6.413
Max Upward from Load Cases	3.721	3.375
D Only	3.721	3.038
+D+Lr	7.096	6.413
+D+0.750Lr	6.252	5.569
+0.60D	2.233	1.823
Lr Only	3.375	3.375

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B13 - (E) 5.5x12.75 DF #1

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,350.0 psi
Fb -	1,350.0 psi
Fc - Prll	925.0 psi
Fc - Perp	625.0 psi
Fv	170.0 psi
Ft	675.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.01850 ksf, Tributary Width = 17.750 ft
Point Load : D = 0.0580 k @ 1.50 ft, (Mech Unit)
Point Load : D = 0.0580 k @ 7.750 ft, (Mech Unit)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.722 : 1	Maximum Shear Stress Ratio	=	0.356 : 1
Section used for this span		6x14	Section used for this span		6x14
fb: Actual	=	1,202.65 psi	fv: Actual	=	75.62 psi
F'b	=	1,665.56 psi	F'v	=	212.50 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	7.750 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.238 in	Ratio =	782 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	0.403 in	Ratio =	461 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 15.50 ft	1	0.412	0.205	0.90	1.00	1.00	1.00	0.987	1.00	1.00	1.00	6.88	494.3	1,199.2	1.55	31.3	153.0
+D+Lr					1.00	1.00	1.00	0.987	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 15.50 ft	1	0.722	0.356	1.25	1.00	1.00	1.00	0.987	1.00	1.00	1.00	16.74	1,202.7	1,665.6	3.74	75.6	212.5
+D+0.750Lr					1.00	1.00	1.00	0.987	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 15.50 ft	1	0.616	0.304	1.25	1.00	1.00	1.00	0.987	1.00	1.00	1.00	14.28	1,025.6	1,665.6	3.20	64.6	212.5
+0.60D					1.00	1.00	1.00	0.987	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 15.50 ft	1	0.139	0.069	1.60	1.00	1.00	1.00	0.987	1.00	1.00	1.00	4.13	296.6	2,131.9	0.93	18.8	272.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: B13 - (E) 5.5x12.75 DF #1

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.4028	7.750		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	4.333	4.286
Max Upward from Load Combinations	4.333	4.286
Max Upward from Load Cases	2.545	2.545
D Only	1.788	1.741
+D+Lr	4.333	4.286
+D+0.750Lr	3.697	3.650
+0.60D	1.073	1.045
Lr Only	2.545	2.545

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: 4x12 Guard Rail at 4'

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,350.0 psi
Fb -	1,350.0 psi
Fc - Prll	925.0 psi
Fc - Perp	625.0 psi
Fv	170.0 psi
Ft	675.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.020 ksf, Tributary Width = 2.0 ft
Point Load : D = 0.0780 k @ 5.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.546 : 1	Maximum Shear Stress Ratio	=	0.167 : 1
Section used for this span		4x12	Section used for this span		4x12
fb: Actual	=	1,014.44 psi	fv: Actual	=	35.50 psi
F'b	=	1,856.25 psi	F'v	=	212.50 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	12.810 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.623 in	Ratio =	501 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	1.154 in	Ratio =	270 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.348	0.111	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.86	465.4	1,336.5	0.45	17.0	153.0
+D+Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.546	0.167	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	6.24	1,014.4	1,856.3	0.93	35.5	212.5
+D+0.750Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.473	0.145	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	5.40	877.1	1,856.3	0.81	30.9	212.5
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.118	0.037	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.72	279.2	2,376.0	0.27	10.2	272.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: 4x12 Guard Rail at 4'

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.1545	13.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.993	0.945
Max Upward from Load Combinations	0.993	0.945
Max Upward from Load Cases	0.520	0.520
D Only	0.473	0.425
+D+Lr	0.993	0.945
+D+0.750Lr	0.863	0.815
+0.60D	0.284	0.255
Lr Only	0.520	0.520

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: 4x12 Guard Rail at 5'

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

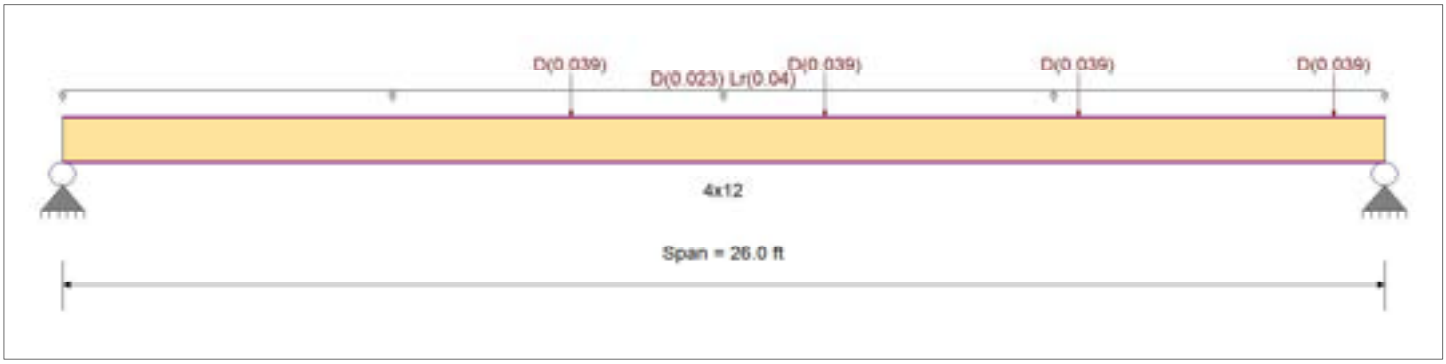
Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,350.0 psi
Fb -	1,350.0 psi
Fc - Prll	925.0 psi
Fc - Perp	625.0 psi
Fv	170.0 psi
Ft	675.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.020 ksf, Tributary Width = 2.0 ft
Point Load : D = 0.0390 k @ 10.0 ft
Point Load : D = 0.0390 k @ 15.0 ft
Point Load : D = 0.0390 k @ 20.0 ft
Point Load : D = 0.0390 k @ 25.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.577 : 1	Maximum Shear Stress Ratio	=	0.175 : 1
Section used for this span		4x12	Section used for this span		4x12
fb: Actual	=	1,071.40 psi	fv: Actual	=	37.10 psi
F'b	=	1,856.25 psi	F'v	=	212.50 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	13.190 ft	Location of maximum on span	=	25.146 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.623 in	Ratio =	501 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	1.212 in	Ratio =	257 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.391	0.122	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.21	522.2	1,336.5	0.49	18.6	153.0
+D+Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.577	0.175	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	6.59	1,071.4	1,856.3	0.97	37.1	212.5
+D+0.750Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.503	0.153	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	5.75	934.1	1,856.3	0.85	32.5	212.5
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: 4x12 Guard Rail at 5'

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
Length = 26.0 ft	1	0.132	0.041	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.93	313.3	2,376.0	0.29	11.2	272.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.2124	13.095		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.981	1.035
Max Upward from Load Combinations	0.981	1.035
Max Upward from Load Cases	0.520	0.520
D Only	0.461	0.515
+D+Lr	0.981	1.035
+D+0.750Lr	0.851	0.905
+0.60D	0.277	0.309
Lr Only	0.520	0.520

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: 4x12 Guard Rail at 6'

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,350.0 psi
Fb -	1,350.0 psi
Fc - Prll	925.0 psi
Fc - Perp	625.0 psi
Fv	170.0 psi
Ft	675.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.01150, Lr = 0.020 ksf, Tributary Width = 2.0 ft
Point Load : D = 0.1170 k @ 1.750 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.538 : 1	Maximum Shear Stress Ratio	=	0.175 : 1
Section used for this span		4x12	Section used for this span		4x12
fb: Actual	=	999.20 psi	fv: Actual	=	37.26 psi
F'b	=	1,856.25 psi	F'v	=	212.50 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	12.905 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.623 in	Ratio =	501 >=240	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	1.136 in	Ratio =	274 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.337	0.123	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.77	449.9	1,336.5	0.49	18.7	153.0
+D+Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.538	0.175	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	6.15	999.2	1,856.3	0.98	37.3	212.5
+D+0.750Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.464	0.154	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	5.30	861.9	1,856.3	0.86	32.6	212.5
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 26.0 ft	1	0.114	0.041	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.66	269.9	2,376.0	0.30	11.2	272.0

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: 4x12 Guard Rail at 6'

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.1360	13.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.039	0.938
Max Upward from Load Combinations	1.039	0.938
Max Upward from Load Cases	0.520	0.520
D Only	0.519	0.418
+D+Lr	1.039	0.938
+D+0.750Lr	0.909	0.808
+0.60D	0.311	0.251
Lr Only	0.520	0.520

COM-2310004

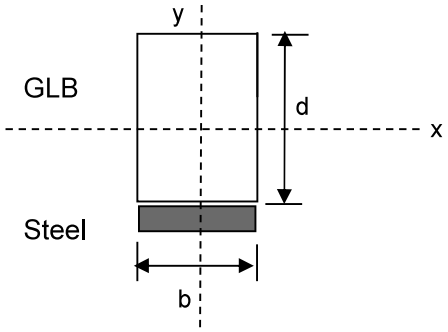
ZFA STRUCTURAL ENGINEERS

Job #22689
Glulam Retrofit - BM 1 STL

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

A retrofit for inadequate glulam girder is to attach a steel plate to the bottom of the girder.
Try a 1/4" plate.



Existing Glulam Properties:

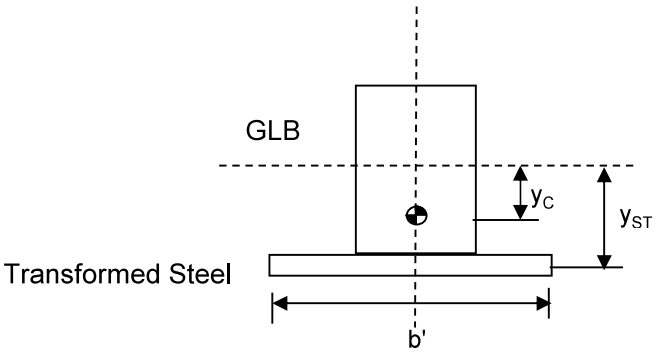
b=	5.125	in	A =	108 in^2
d =	21	in	I =	3955.219 in^4
L_{total} =	38	ft	E =	1.8E+06 psi
Spacing =	18.5	ft oc		

STL Plate Properties:

b_{STL}=	5.5	in
d_{STL} =	0.25	in
A =	1.38	in^2
I =	0.007161458	in^4
E =	2.9E+07	psi

Transformed Steel Properties:

n =	16.1	
b' =	88.6	in.
A' =	22.2	in.^{2}
I' =	2501	in.^{4}
y_{st} =	10.6	in.
y_c =	1.81	in.



Transformed Section Properties:

I_{GLB} =	4309	in.^{4}
I_{ST} =	1720	in.^{4}
I_{TR} =	6029	in.^{4}

ZFA STRUCTURAL ENGINEERS

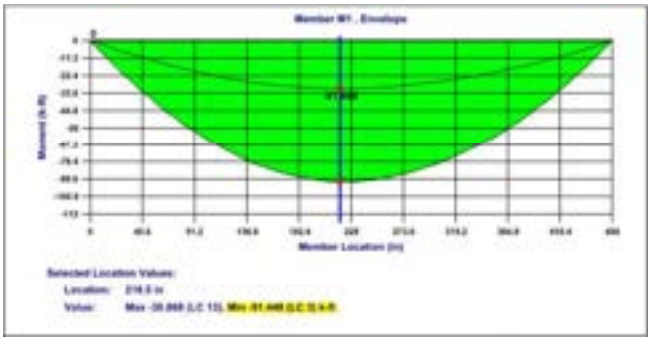
Job #22689
Glulam Retrofit - BM 1 STL

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

Maximum Stresses:

Max Moment =	91.4	k-ft (per Risa)
σ_{GLB} =	2241	psi
σ_{STL} =	26204	psi



Allowable Stresses:

$F_{b,\ GLB}$ =	2400	psi
C_V =	0.891	
C_D =	1.25	
$F'_{b,\ GLB}$ =	2673.382	psi
F_{STL} =	360000	psi



DCR_{GLB} =	0.84	< 1.0, OK
DCR_{ST} =	0.07	< 1.0, OK

Connection Design:

q = VQ/I

V =	9417	lb.
Q =	$A_{st}*y_{st}$	
A_{st} =	22.15	$in.^2$
y_{st} =	10.63	in.
Q =	235.4	$in.^3$
I =	6029	$in.^4$
q =	367.6	lb./in.

Screw Spacing =	2.5	in oc
Load =	919	lb.
Cd =	1.25	
n =	2	number of screws
va =	420	lb/screw SDS per ESR-2236
Capacity=	1050	lb.
DCR =	0.88	< 1.0, OK

COM-2310004

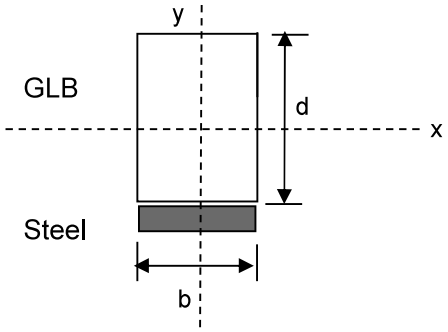
ZFA STRUCTURAL ENGINEERS

Job #22689
Glulam Retrofit - BM 1 STL

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

A retrofit for inadequate glulam girder is to attach a steel plate to the bottom of the girder.
Try a 1/4" plate.



Existing Glulam Properties:

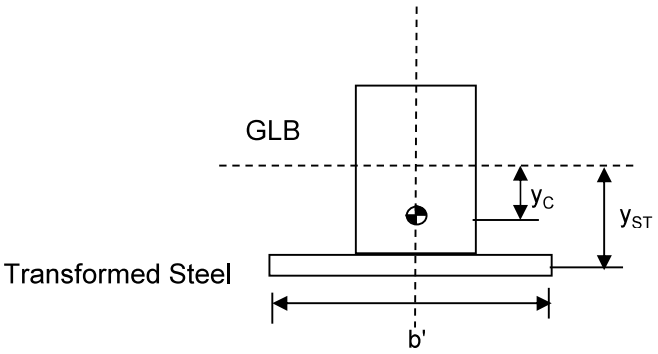
b=	5.125	in	A =	108 in^2
d =	21	in	I =	3955.219 in^4
L_{total} =	38	ft	E =	1.8E+06 psi
Spacing =	18.5	ft oc		

STL Plate Properties:

b_{STL}=	5.5	in
d_{STL} =	0.25	in
A =	1.38	in^2
I =	0.007161458	in^4
E =	2.9E+07	psi

Transformed Steel Properties:

n =	16.1	
b' =	88.6	in.
A' =	22.2	in.^{2}
I' =	2501	in.^{4}
y_{st} =	10.6	in.
y_c =	1.81	in.



Transformed Section Properties:

I_{GLB} =	4309	in.^{4}
I_{ST} =	1720	in.^{4}
I_{TR} =	6029	in.^{4}

COM-2310004

ZFA STRUCTURAL ENGINEERS

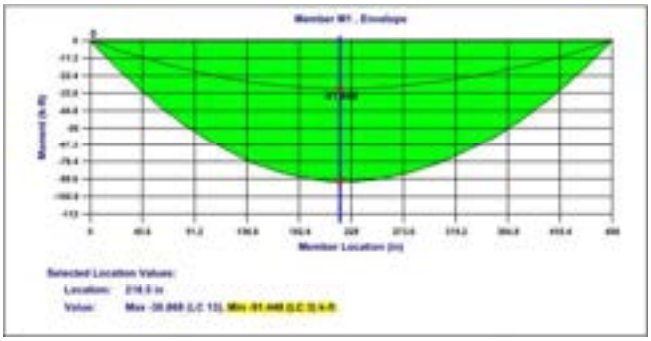
Job #22689
Glulam Retrofit - BM 1 STL

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

Maximum Stresses:

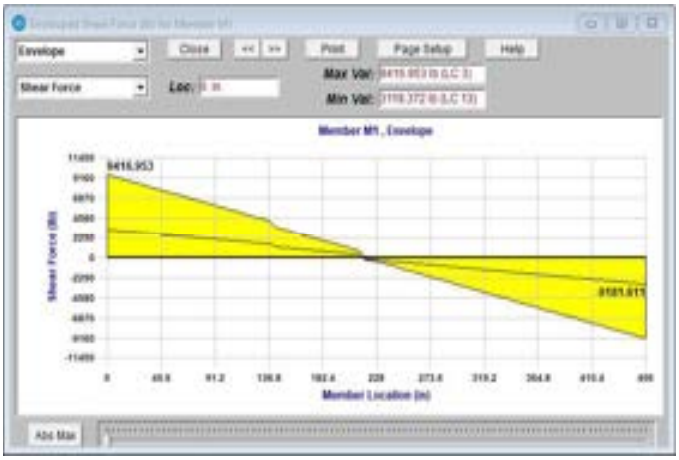
Max Moment =	91.4	k-ft (per Risa)
σ_{GLB} =	2241	psi
σ_{STL} =	26204	psi



Allowable Stresses:

$F_{b,\ GLB}$ =	2400	psi
C_V =	0.891	
C_D =	1.25	
$F'_{b,\ GLB}$ =	2673.382	psi
F_{STL} =	360000	psi

DCR_{GLB} =	0.84	< 1.0, OK
DCR_{ST} =	0.07	< 1.0, OK



Connection Design:

q = VQ/I

V =	4500	lb.
Q =	$A_{st}*y_{st}$	
A_{st} =	22.15	$in.^2$
y_{st} =	10.63	in.
Q =	235.4	$in.^3$
I =	6029	$in.^4$
q =	175.7	lb./in.

Screw Spacing =	6	in oc	This will need to occur 12' from the ends.
Load =	1054	lb.	
Cd =	1.25		
n =	2	number of screws	
va =	420	lb/screw	SDS per ESR-2236
Capacity=	1050	lb.	
DCR =	1.00	>1.0, NO GOOD	

Since it is within 5% of exceedance, it is OK.

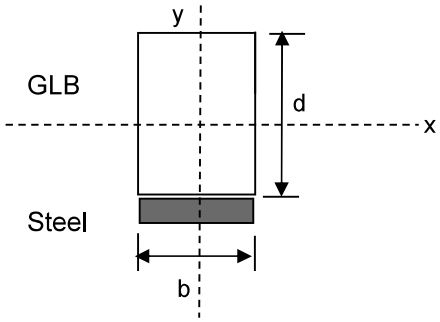
ZFA STRUCTURAL ENGINEERS

Job #22689
Glulam Retrofit - BM 1 STL Defl

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

A retrofit for inadequate glulam girder is to attach a steel plate to the bottom of the girder.



Existing Glulam Properties:

b=	5.125	in	A =	108 in^2
d =	21	in	I =	3955.219 in^4
L_{total} =	38	ft	E =	1.8E+06 psi
Spacing =	18.5	ft oc		

STL Plate Properties:

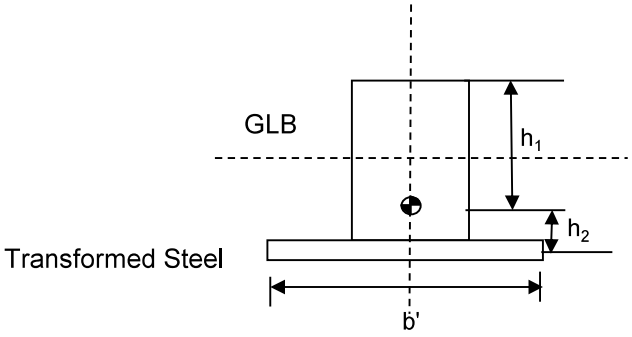
b_{STL}=	5.5	in
d_{STL} =	0.25	in
A =	1.38	in^2
I =	0.007161458	in^4
E =	2.9E+07	psi

Transformed Steel Properties:

n =	16.1	
b' =	88.6	in.
A' =	22.2	in.^{2}

Transformed Section Properties:

h_1 =	12.3	in
h_2 =	8.9	in
I_{GLB} =	4309	in.^{4}
I_{ST} =	1720	in.^{4}
I_{TR} =	6029	in.^{4}



ZFA STRUCTURAL ENGINEERS

Job #22689
Glulam Retrofit - BM 1 STL Defl

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

Total Deflection:

w_{DL} =	12.7	psf
w_{LL} =	12	psf
w_{Trib} =	222	in
L =	456	in
Δ_{TR} =	1.98	in
Deflection =	L/231	

P =	542	lbs
a =	141	in
b =	315	in
L =	456	in
x =	141	in
Δ_{TR} =	0.08	in

P =	542	lbs
a =	216	in
b =	240	in
L =	456	in
x =	216	in
Δ_{TR} =	0.10	in

Total Deflection = L/212 > 180, OK

Mechanical Anchorage

ZFA STRUCTURAL ENGINEERS

Job #22689
Rooftop Equipment Anchorage

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

ROOFTOP EQUIPMENT ANCHORAGE

OSHPD Project = **NO**

SEISMIC DEMAND INPUTS (LRFD)

ASCE 7-16 Chapter 13

$F_p = 0.4 a_p S_{DS} W_p (1+2z/h_r)/(R_p/I_p)$; Horizontal seismic force on unit — *Eq 13.3-1*

$F_{p,max} =$ 0.789 $*W_p$ $= 1.6 S_{DS} I_p W_p$ — *Eq 13.3-2*

$F_{p,min} =$ 0.148 $*W_p$ $= 0.3 S_{DS} I_p W_p$ — *Eq 13.3-3*

$F_v =$ 0.099 $*W_p$ $= 0.2 S_{DS} W_p$; Vertical seismic force on unit (up or down) — *§13.3.1*

$S_{DS} =$ 0.493 ; Short period spectral acceleration

$W_p =$ *See table* ; Unit weight

$W_{p,des} =$ 110% $*W_p$; Design unit weight

$I_p =$ 1.00 ; Component importance factor — *§13.1.3*

$h_r =$ 14.5 ft ; Mean roof height of structure

$a_p =$ *See table* ; Component amplification factor — *T-13.5-1 or T-13.6-1*

$R_p =$ *See table* ; Component response modification factor — *T-13.5-1 or T-13.6-1*

$\Omega_o =$ *See table* ; Component overstrength factor — *T-13.5-1 or T-13.6-1*

$z =$ 14.5 ft ; Height in structure of point of attachment

WIND DEMAND INPUTS

ASCE 7-16 Chapters 29

Use for rooftop equipment on buildings where h < 60ft

$V =$ 94 mph ; Wind speed — *Fig 26.5-1A, B, or C*

Category = B ; Exposure category — *§26.7*

$B =$ 90.0 ft ; Building horiz dimension

$L =$ 120.0 ft ; Building horiz dimension

$q_h = 0.00256 K_z K_{zt} K_d K_e V^2$; Velocity pressure at mean roof height — *Eq 26.10-1*

$K_z = 2.01 (15/z_g)^{2/\alpha}$; z < 15 ft ; Velocity pressure coefficient at mean roof height — *T-26.10-1*

$= 2.01 (z/z_g)^{2/\alpha}$; 15 ft ≤ z < z_g

$K_{zt} =$ 1.00 ; Topographic factor — *§26.8.2*

$K_d =$ *See table* ; Wind directionality factor — *T-26.6-1*

$K_e =$ 1.00 ; Ground elevation factor — *T-26.9-1*

$\alpha =$ 7 ; Terrain exposure constant — *T-26.11-1*

$z_g =$ 1200 ft ; Terrain exposure constant — *T-26.11-1*

$F_h = q_h (GC_r)_h A_f$; Horizontal force on unit due to wind — *Eq 29.4-2*

$(GC_r)_h =$ *See table* 1.9 ; A_f < $(0.1Bh_{roof})$ 1.0 ; (Bh_{roof}) — *§29.4.1*

$A_f =$ max(ℓ, w) * h ; Vertical projected surface area of unit

$F_v = q_h (GC_r)_v A_r$; Vertical uplift force on unit due to wind — *Eq 29.4-3*

$(GC_r)_v =$ *See table* 1.5 ; A_r < (0.1BL) 1.0 ; (BL) — *§29.4.1*

$A_r = ℓ * w$; Horizontal projected surface area of unit

EQUIPMENT DEMANDS

Unit Tag	Model #	UNIT PROPERTIES					SEISMIC DEMANDS							WIND DEMANDS											
		W_p	$W_{p,des}$	Height h	Width w	Length ℓ	a_p	R_p	Ω_o	F_p $*W_p$	$F_{p,gov}$ $*W_p$	F_p	F_v	K_d	K_z	q_h	$A_{f,w}$	$A_{f,ℓ}$	Min A_f/Bh_r	$(GC_r)_h$	$F_{h,w}$	$F_{h,ℓ}$	A_r	A_r/BL	$(GC_r)_v$	F_v
		lbs	*lbs*	*in*	*in*	*in*						*lbs*	*lbs*			*psf*	ft^2	ft^2			*lbs*	*lbs*	ft^2			*lbs*
HP-1,11	WHC092H	1333	1466	47	53	89	2.50	3.00	1.50	0.493	0.493	**723**	**145**	0.90	0.59	12.0	17.3	29.0	0.010	1.90	**395**	**663**	32.8	0.003	1.50	**590**
HP-15	WHC060H	1223	1345	41	53	89	2.50	3.00	1.50	0.493	0.493	**663**	**133**	0.90	0.59	12.0	15.1	25.3	0.009	1.90	**343**	**576**	32.8	0.003	1.50	**588**
HP-5	WHC060H	1138	1252	41	53	89	2.50	3.00	1.50	0.493	0.493	**617**	**123**	0.90	0.59	12.0	15.1	25.3	0.009	1.90	**343**	**576**	32.8	0.003	1.50	**588**
HP-6	WHC048H	1138	1252	41	53	89	2.50	3.00	1.50	0.493	0.493	**617**	**123**	0.90	0.59	12.0	15.1	25.3	0.009	1.90	**343**	**576**	32.8	0.003	1.50	**588**
HP-8	WHC036H	863	949	41	44	70	2.50	3.00	1.50	0.493	0.493	**468**	**94**	0.90	0.59	12.0	12.5	19.9	0.007	1.90	**285**	**453**	21.4	0.002	1.50	**384**
HP-3	WHC036H	892	981	41	44	70	2.50	3.00	1.50	0.493	0.493	**484**	**97**	0.90	0.59	12.0	12.5	19.9	0.007	1.90	**285**	**453**	21.4	0.002	1.50	**384**

All mechanical units include curb weight.

ZFA STRUCTURAL ENGINEERS

Job #22689
Rooftop Equipment Anchorage

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

ROOFTOP EQUIPMENT ANCHORAGE

OSHPD Project = NO

EQUIPMENT OVERTURNING

SEISMIC FORCE EQNS:

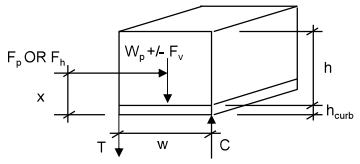
$x = h_{curb}+h/2$; Height to center of gravity
$n_w =$ *See table* ; Number anchors along the unit width
$n_\ell =$ *See table* ; Number anchors along the unit length
$M_{OT,E} = F_p*x$; Overturning moment
$M_{R,w} = (0.9W_p-F_v)*\ell/2$; Resisting moment about the unit width
$M_{R,\ell} = (0.9W_p-F_v)*w/2$; Resisting moment about the unit length
$M_{D,w} = (1.1W_p+F_v)*\ell/2$; Additive gravity moment about the unit width
$M_{D,\ell} = (1.1W_p+F_v)*w/2$; Additive gravity moment about the unit length
$\Omega_0T_w = [(\Omega_0M_{OT,E}-M_{R,w})/\ell]/n_w$; Tension demand on anchors along unit width
$\Omega_0T_\ell = [(\Omega_0M_{OT,E}-M_{R,\ell})/w]/n_\ell$; Tension demand on anchors along unit length
$\Omega_0C_w = [(\Omega_0M_{OT,E}+M_{D,w})/\ell]/n_w$; Compression demand on anchors along unit width
$\Omega_0C_\ell = [(\Omega_0M_{OT,E}+M_{D,\ell})/w]/n_\ell$; Compression demand on anchors along unit length
$\Omega_0T_u = 1.0*\max(\Omega_0T_w,\Omega_0T_\ell) + 0.3*\min(\Omega_0T_w,\Omega_0T_\ell)$; Max anchor tension demand (100%+30%)
$\Omega_0C_u = 1.0*\max(\Omega_0C_w,\Omega_0C_\ell) + 0.3*\min(\Omega_0C_w,\Omega_0C_\ell)$; Max anchor compression demand (100%+30%)
$\Omega_0V_u = 1.3*\Omega_0F_p/(2*n_w+2*n_\ell-4)$; Max anchor shear demand (100%+30%)

WIND FORCE EQNS:

$h_t = (h_{curb}+h)/2$; Height to center of projected area
$M_{OT,W,w} = F_{h,w}*h_t$; Overturning moment about unit width
$M_{OT,W,\ell} = F_{h,\ell}*h_t$; Overturning moment about unit length
$M_{R,w} = (0.9W_p-F_v)*\ell/2$; Resisting moment about the unit width
$M_{R,\ell} = (0.9W_p-F_v)*w/2$; Resisting moment about the unit length
$M_{D,w} = (1.1W_p+F_v)*\ell/2$; Additive gravity moment about the unit width
$M_{D,\ell} = (1.1W_p+F_v)*w/2$; Additive gravity moment about the unit length
$T_w = [(M_{OT,W,w}-M_{R,w})/\ell]/n_w$; Tension demand on anchors along unit width
$T_\ell = [(M_{OT,W,\ell}-M_{R,\ell})/w]/n_\ell$; Tension demand on anchors along unit length
$C_w = [(M_{OT,W,w}+M_{D,w})/\ell]/n_w$; Compression demand on anchors along unit width
$C_\ell = [(M_{OT,W,\ell}+M_{D,\ell})/w]/n_\ell$; Compression demand on anchors along unit length
$V_u = \max(F_{h,w},F_{h,\ell})/(2*n_w+2*n_\ell-4)$; Shear demand on anchors

UNFACTORED FORCE EQNS:

$W_p = W_{p,des}/(w*\ell)$; Distributed area load due to unit weight
$F_{p,OT,w} = (M_{OT,E}/\ell)/w$; Distributed line load along member width due to seismic overturning
$F_{p,OT,\ell} = (M_{OT,E}/w)/\ell$; Distributed line load along member length due to seismic overturning
$F_{h,OT,w} = (M_{OT,W,w}/\ell)/w$; Distributed line load along member width due to wind overturning
$F_{h,OT,\ell} = (M_{OT,W,\ell}/w)/\ell$; Distributed line load along member length due to wind overturning
$F_{v,w} = (F_v/2)/w$; Distributed line load along member width due to wind uplift
$F_{v,\ell} = (F_v/2)/\ell$; Distributed line load along member length due to wind uplift



Unit Tag	Model #	UNIT PROPERTIES $W_{p,des}$ lbs	h_{curb} in	x in	w in	ℓ in	n_w	n_ℓ	SEISMIC F_p lbs	F_v lbs	Ω_0	$M_{OT,E}$ k-in	$M_{R,w}$ k-in	$M_{R,\ell}$ k-in	$M_{D,w}$ k-in	$M_{D,\ell}$ k-in	Ω_0T_w lbs/AB	Ω_0T_ℓ lbs/AB	Ω_0C_w lbs/AB	Ω_0C_ℓ lbs/AB	Ω_0T_u lbs/AB	Ω_0C_u lbs/AB	Ω_0V_u lbs/AB
HP-1,11	WHC092H	1466	10	33.5	53	89	2	3	723	145	1.50	24.2	52.3	31.1	78.2	46.6	0	33	644	521	**33**	**800**	**235**
HP-15	WHC060H	1345	14	34.5	53	89	2	3	663	133	1.50	22.9	48.0	28.6	71.8	42.7	0	36	596	485	**36**	**741**	**216**
HP-5	WHC060H	1252	10	30.5	53	89	2	3	617	123	1.50	18.8	44.6	26.6	66.8	39.8	0	10	534	428	**10**	**662**	**201**
HP-6	WHC048H	1252	10	30.5	53	89	2	3	617	123	1.50	18.8	44.6	26.6	66.8	39.8	0	10	534	428	**10**	**662**	**201**
HP-8	WHC036H	949	10	30.5	44	70	2	3	468	94	1.50	14.3	26.6	16.7	39.8	25.0	0	35	437	352	**35**	**543**	**152**
HP-3	WHC036H	981	14	34.5	44	70	2	3	484	97	1.50	16.7	27.5	17.3	41.2	25.9	0	59	473	386	**59**	**589**	**157**

Unit Tag	Model #	WIND h_t in	$F_{h,w}$ lbs	$F_{h,\ell}$ lbs	F_v lbs	$M_{OT,W,w}$ k-in	$M_{OT,W,\ell}$ k-in	$M_{R,w}$ k-in	$M_{R,\ell}$ k-in	T_w lbs/AB	T_ℓ lbs/AB	C_w lbs/AB	C_ℓ lbs/AB	V_u lbs/AB	GOVERNING $T_{u,max}$ lbs/AB	$C_{u,max}$ lbs/AB	$V_{u,max}$ lbs/AB
HP-1,11	WHC092H	28.5	395	663	590	11.3	18.9	32.5	19.3	**0**	**0**	**246**	**240**	**111**	**33**	**800**	**235**
HP-15	WHC060H	27.5	343	576	588	9.4	15.8	27.7	16.5	**0**	**0**	**209**	**203**	**96**	**36**	**741**	**216**
HP-5	WHC060H	25.5	343	576	588	8.7	14.7	24.0	14.3	**0**	**3**	**184**	**182**	**96**	**10**	**662**	**201**
HP-6	WHC048H	25.5	343	576	588	8.7	14.7	24.0	14.3	**0**	**3**	**184**	**182**	**96**	**10**	**662**	**201**
HP-8	WHC036H	25.5	285	453	384	7.3	11.6	16.5	10.4	**0**	**9**	**170**	**166**	**75**	**35**	**543**	**152**
HP-3	WHC036H	27.5	285	453	384	7.8	12.5	17.5	11.0	**0**	**11**	**181**	**178**	**75**	**59**	**589**	**157**

Max shear used for anchorage DCR.

Unit Tag	Model #	UNFACTORED DESIGN FORCES W_p psf	ALONG UNIT WIDTH $F_{p,OT,w}$ plf	$F_{h,OT,w}$ plf	$F_{v,w}$ plf	ALONG UNIT LENGTH $F_{p,OT,\ell}$ plf	$F_{h,OT,\ell}$ plf	$F_{v,\ell}$ plf
HP-1,11	WHC092H	45	62	29	67	62	48	40
HP-15	WHC060H	41	58	24	67	58	40	40
HP-5	WHC060H	38	48	22	67	48	37	40
HP-6	WHC048H	38	48	22	67	48	37	40

ZFA STRUCTURAL ENGINEERS

Job #22689

Rooftop Equipment Anchorage

Engineer: MAAP

3/8/2023

North Sacramento Library - ASCE 7

ROOFTOP EQUIPMENT ANCHORAGE OSHPD Project = **NO**

HP-8	WHC036H	44	56	28	52	56	45	33
HP-3	WHC036H	46	65	31	52	65	49	33

ZFA STRUCTURAL ENGINEERS

Job #22689
Rooftop Equipment Anchorage

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 7

ROOFTOP EQUIPMENT ANCHORAGE

OSHPD Project = **NO**

SEISMIC DEMAND INPUTS (LRFD)

ASCE 7-16 Chapter 13

$F_p = 0.4a_pS_{DS}W_p(1+2z/h_r)/(R_p/I_p)$; Horizontal seismic force on unit — *Eq 13.3-1*

$F_{p,max}$ = 0.789 $*W_p$ = $1.6S_{DS}I_pW_p$ — *Eq 13.3-2*

$F_{p,min}$ = 0.148 $*W_p$ = $0.3S_{DS}I_pW_p$ — *Eq 13.3-3*

F_v = 0.099 $*W_p$ = $0.2S_{DS}W_p$; Vertical seismic force on unit (up or down) — *§13.3.1*

S_{DS} = 0.493 ; Short period spectral acceleration

W_p = *See table* ; Unit weight

$W_{p,des}$ = 110% $*W_p$; Design unit weight

I_p = 1.00 ; Component importance factor — *§13.1.3*

h_r = 14.5 ft ; Mean roof height of structure

a_p = *See table* ; Component amplification factor — *T-13.5-1 or T-13.6-1*

R_p = *See table* ; Component response modification factor — *T-13.5-1 or T-13.6-1*

Ω_o = *See table* ; Component overstrength factor — *T-13.5-1 or T-13.6-1*

z = 14.5 ft ; Height in structure of point of attachment

WIND DEMAND INPUTS

ASCE 7-16 Chapters 29

Use for rooftop equipment on buildings where h < 60ft

V = 94 mph ; Wind speed — *Fig 26.5-1A, B, or C*

Category = B ; Exposure category — *§26.7*

B = 90.0 ft ; Building horiz dimension

L = 120.0 ft ; Building horiz dimension

$q_h = 0.00256K_zK_{zt}K_dK_eV^2$; Velocity pressure at mean roof height — *Eq 26.10-1*

$K_z = 2.01\ (15/z_g)^{2/\alpha}$; z < 15 ft ; Velocity pressure coefficient at mean roof height — *T-26.10-1*

$= 2.01\ (z/z_g)^{2/\alpha}$; 15 ft ≤ z < z_g

K_{zt} = 1.00 ; Topographic factor — *§26.8.2*

K_d = *See table* ; Wind directionality factor — *T-26.6-1*

K_e = 1.00 ; Ground elevation factor — *T-26.9-1*

α = 7 ; Terrain exposure constant — *T-26.11-1*

z_g = 1200 ft ; Terrain exposure constant — *T-26.11-1*

$F_h = q_h\,(GC_r)_h\,A_f$; Horizontal force on unit due to wind — *Eq 29.4-2*

$(GC_r)_h$ = *See table* 1.9 ; A_f < $(0.1Bh_{roof})$ 1.0 ; (Bh_{roof}) — *§29.4.1*

$A_f = \max(\ell, w) * h$; Vertical projected surface area of unit

$F_v = q_h\,(GC_r)_v\,A_r$; Vertical uplift force on unit due to wind — *Eq 29.4-3*

$(GC_r)_v$ = *See table* 1.5 ; A_r < (0.1BL) 1.0 ; (BL) — *§29.4.1*

$A_r = \ell * w$; Horizontal projected surface area of unit

EQUIPMENT DEMANDS

Unit Tag	Model #	UNIT PROPERTIES					SEISMIC DEMANDS							WIND DEMANDS											
		W_p	$W_{p,des}$	Height h	Width w	Length ℓ	a_p	R_p	Ω_0	F_p $*W_p$	$F_{p,gov}$ $*W_p$	F_p	F_v	K_d	K_z	q_h	$A_{f,w}$	$A_{f,\ell}$	Min A_f/Bh_r	$(GC_r)_h$	$F_{h,w}$	$F_{h,\ell}$	A_r	A_r/BL	$(GC_r)_v$	F_v
		lbs	*lbs*	*in*	*in*	*in*						*lbs*	*lbs*			*psf*	ft^2	ft^2			*lbs*	*lbs*	ft^2			*lbs*
HP-3	WHC048H	1068	1175	41	53	89	2.50	3.00	1.50	0.493	0.493	**579**	**116**	0.90	0.59	12.0	15.1	25.3	0.009	1.90	**343**	**576**	32.8	0.003	1.50	**588**
HP-15	WHC060H	1068	1175	41	53	89	2.50	3.00	1.50	0.493	0.493	**579**	**116**	0.90	0.59	12.0	15.1	25.3	0.009	1.90	**343**	**576**	32.8	0.003	1.50	**588**

All mechanical units include curb weight.

ZFA STRUCTURAL ENGINEERS

Job #22689

Rooftop Equipment Anchorage

Engineer: MAAP

3/8/2023

North Sacramento Library - ASCE 7

ROOFTOP EQUIPMENT ANCHORAGE

OSHPD Project = NO

EQUIPMENT OVERTURNING

SEISMIC FORCE EQNS:

$x = h_{curb}+h/2$; Height to center of gravity

n_w = *See table* ; Number anchors along the unit width

n_ℓ = *See table* ; Number anchors along the unit length

$M_{OT,E} = F_p*x$; Overturning moment

$M_{R,w} = (0.9W_p-F_v)*\ell/2$; Resisting moment about the unit width

$M_{R,\ell} = (0.9W_p-F_v)*w/2$; Resisting moment about the unit length

$M_{D,w} = (1.1W_p+F_v)*\ell/2$; Additive gravity moment about the unit width

$M_{D,\ell} = (1.1W_p+F_v)*w/2$; Additive gravity moment about the unit length

$\Omega_0T_w = [(\Omega_0M_{OT,E}-M_{R,w})/\ell]/n_w$; Tension demand on anchors along unit width

$\Omega_0T_\ell = [(\Omega_0M_{OT,E}-M_{R,\ell})/w]/n_\ell$; Tension demand on anchors along unit length

$\Omega_0C_w = [(\Omega_0M_{OT,E}+M_{D,w})/\ell]/n_w$; Compression demand on anchors along unit width

$\Omega_0C_\ell = [(\Omega_0M_{OT,E}+M_{D,\ell})/w]/n_\ell$; Compression demand on anchors along unit length

$\Omega_0T_u = 1.0*\max(\Omega_0T_w,\Omega_0T_\ell) + 0.3*\min(\Omega_0T_w,\Omega_0T_\ell)$; Max anchor tension demand (100%+30%)

$\Omega_0C_u = 1.0*\max(\Omega_0C_w,\Omega_0C_\ell) + 0.3*\min(\Omega_0C_w,\Omega_0C_\ell)$; Max anchor compression demand (100%+30%)

$\Omega_0V_u = 1.3*\Omega_0F_p/(2*n_w+2*n_\ell-4)$; Max anchor shear demand (100%+30%)

WIND FORCE EQNS:

$h_t = (h_{curb}+h)/2$; Height to center of projected area

$M_{OT,W,w} = F_{h,w}*h_t$; Overturning moment about unit width

$M_{OT,W,\ell} = F_{h,\ell}*h_t$; Overturning moment about unit length

$M_{R,w} = (0.9W_p-F_v)*\ell/2$; Resisting moment about the unit width

$M_{R,\ell} = (0.9W_p-F_v)*w/2$; Resisting moment about the unit length

$M_{D,w} = (1.1W_p+F_v)*\ell/2$; Additive gravity moment about the unit width

$M_{D,\ell} = (1.1W_p+F_v)*w/2$; Additive gravity moment about the unit length

$T_w = [(M_{OT,W,w}-M_{R,w})/\ell]/n_w$; Tension demand on anchors along unit width

$T_\ell = [(M_{OT,W,\ell}-M_{R,\ell})/w]/n_\ell$; Tension demand on anchors along unit length

$C_w = [(M_{OT,W,w}+M_{D,w})/\ell]/n_w$; Compression demand on anchors along unit width

$C_\ell = [(M_{OT,W,\ell}+M_{D,\ell})/w]/n_\ell$; Compression demand on anchors along unit length

$V_u = \max(F_{h,w},F_{h,\ell})/(2*n_w+2*n_\ell-4)$; Shear demand on anchors

UNFACTORED FORCE EQNS:

$W_p = W_{p,des}/(w*\ell)$; Distributed area load due to unit weight

$F_{p,OT,w} = (M_{OT,E}/\ell)/w$; Distributed line load along member width due to seismic overturning

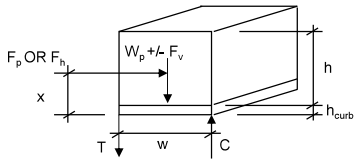
$F_{p,OT,\ell} = (M_{OT,E}/w)/\ell$; Distributed line load along member length due to seismic overturning

$F_{h,OT,w} = (M_{OT,W,w}/\ell)/w$; Distributed line load along member width due to wind overturning

$F_{h,OT,\ell} = (M_{OT,W,\ell}/w)/\ell$; Distributed line load along member length due to wind overturning

$F_{v,w} = (F_v/2)/w$; Distributed line load along member width due to wind uplift

$F_{v,\ell} = (F_v/2)/\ell$; Distributed line load along member length due to wind uplift



		UNIT PROPERTIES							SEISMIC														
Unit Tag	Model #	$W_{p,des}$ lbs	h_{curb} in	x in	w in	ℓ in	n_w	n_ℓ	F_p lbs	F_v lbs	Ω_0	$M_{OT,E}$ k-in	$M_{R,w}$ k-in	$M_{R,\ell}$ k-in	$M_{D,w}$ k-in	$M_{D,\ell}$ k-in	Ω_0T_w lbs/AB	Ω_0T_ℓ lbs/AB	Ω_0C_w lbs/AB	Ω_0C_ℓ lbs/AB	Ω_0T_u lbs/AB	Ω_0C_u lbs/AB	Ω_0V_u lbs/AB
HP-3	WHC048H	1175	14	34.5	53	89	2	3	579	116	1.50	20.0	41.9	24.9	62.7	37.3	0	32	520	423	**32**	**647**	**188**
HP-15	WHC060H	1175	14	34.5	53	89	2	3	579	116	1.50	20.0	41.9	24.9	62.7	37.3	0	32	520	423	**32**	**647**	**188**

		WIND												GOVERNING		
Unit Tag	Model #	h_t in	$F_{h,w}$ lbs	$F_{h,\ell}$ lbs	F_v lbs	$M_{OT,W,w}$ k-in	$M_{OT,W,\ell}$ k-in	$M_{R,w}$ k-in	$M_{R,\ell}$ k-in	T_w lbs/AB	T_ℓ lbs/AB	C_w lbs/AB	C_ℓ lbs/AB	V_u lbs/AB	$T_{u,max}$ lbs/AB	$C_{u,max}$ lbs/AB	$V_{u,max}$ lbs/AB
HP-3	WHC048H	27.5	343	576	588	9.4	15.8	20.9	12.4	**0**	**21**	**170**	**178**	**96**	**32**	**647**	**188**
HP-15	WHC060H	27.5	343	576	588	9.4	15.8	20.9	12.4	**0**	**21**	**170**	**178**	**96**	**32**	**647**	**188**

		UNFACTORED DESIGN FORCES						
			ALONG UNIT WIDTH			ALONG UNIT LENGTH		
Unit Tag	Model #	W_p psf	$F_{p,OT,w}$ plf	$F_{h,OT,w}$ plf	$F_{v,w}$ plf	$F_{p,OT,\ell}$ plf	$F_{h,OT,\ell}$ plf	$F_{v,\ell}$ plf
HP-3	WHC048H	36	51	24	67	51	40	40
HP-15	WHC060H	36	51	24	67	51	40	40

COM-2310004

Design Method	Allowable Stress Design (ASD)
Connection Type	Lateral loading
Fastener Type	Lag Screw
Loading Scenario	Single Shear

Main Member Type	Douglas Fir-Larch
Main Member Thickness	3.5 in.
Main Member: Angle of Load to Grain	0
Side Member Type	Steel
Side Member Thickness	16 gage
Side Member: Angle of Load to Grain	0
Washer Thickness	0 in.
Nominal Diameter	5/16 in.
Length	3 in.
Load Duration Factor	C_D = 1.6
Wet Service Factor	C_M = 1.0
End Grain Factor	C_eg = 1.0
Temperature Factor	C_t = 1.0

Connection Yield Modes

Im	2021 lbs.
Is	487 lbs.
II	818 lbs.
IIIm	849 lbs.
IIIs	304 lbs.
IV	427 lbs.

$$\frac{235 \text{ lbs}}{304 \text{ lbs}} = 77.3\%$$

1/2" ø lag screws are OK by inspection.

Adjusted ASD Capacity	**304 lbs.**

- Lag Screw bending yield strength of 60000 psi is assumed.
- The Adjusted ASD Capacity is only applicable for lag screws with adequate end distance, edge distance and spacing per NDS chapter 11.
- ASTM A36 Steel is assumed for steel side members 1/4 in. thick, and ASTM A653 Grade 33 Steel is assumed for steel side members less than 1/4 in. thick.

While every effort has been made to insure the accuracy of the information presented, and special effort has been made to assure that the information reflects the state-of-the-art, neither the American Wood Council nor its members assume any responsibility for any particular design prepared from this on-line Connection Calculator. Those using this on-line Connection Calculator assume all liability from its use.

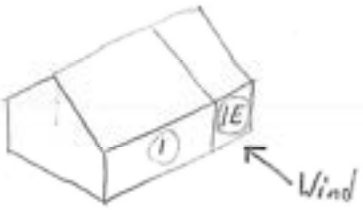
The Connection Calculator was designed and created by Cameron Knudson, Michael Dodson and David Pollock at Washington State University. Support for development of the Connection Calculator was provided by American Wood Council.

COM-2310004

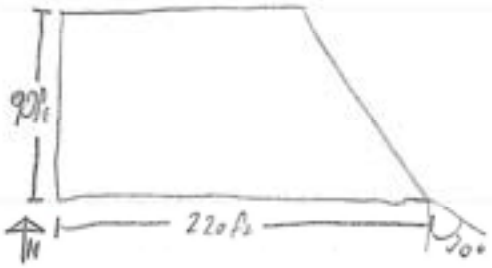
ZFA STRUCTURAL ENGINEERS North San Library
project name

Diaphragm Forces | MAAP | 22689 | 03-03-2023 |
section | engineer | job # | date | page

Load Case A



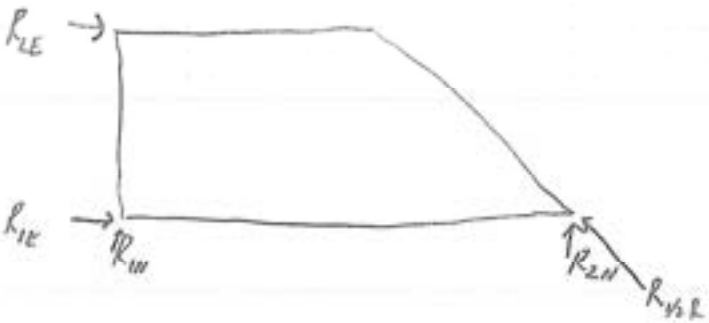
Windward Load ≈ 17psf
Leeward Load ≈ 12psf



Height ≈ 15.5ft

Windward + Leeward $\Rightarrow (17psf + 12psf)\frac{(15.5ft)}{2} \Rightarrow$

$w_{WL} = 225\ plf$

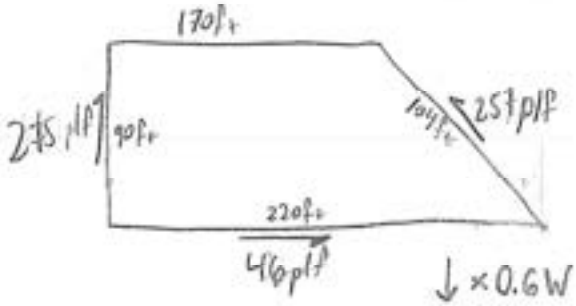


$R_1 = R_2 = \frac{w_{WL}\, l}{2}$

$R_{1E} = R_{2E} = \frac{(225\ plf)(90ft)}{2} = 10125\ Lbs$

$R_{1W} = R_{2W} = \frac{(225\ plf)(220ft)}{2} = 24750\ Lbs$

$R_{1R} = \sqrt{(10125\ Lbs)^2 + (24750\ Lbs)^2} = \approx 26740\ Lbs$



↓ x 0.6W



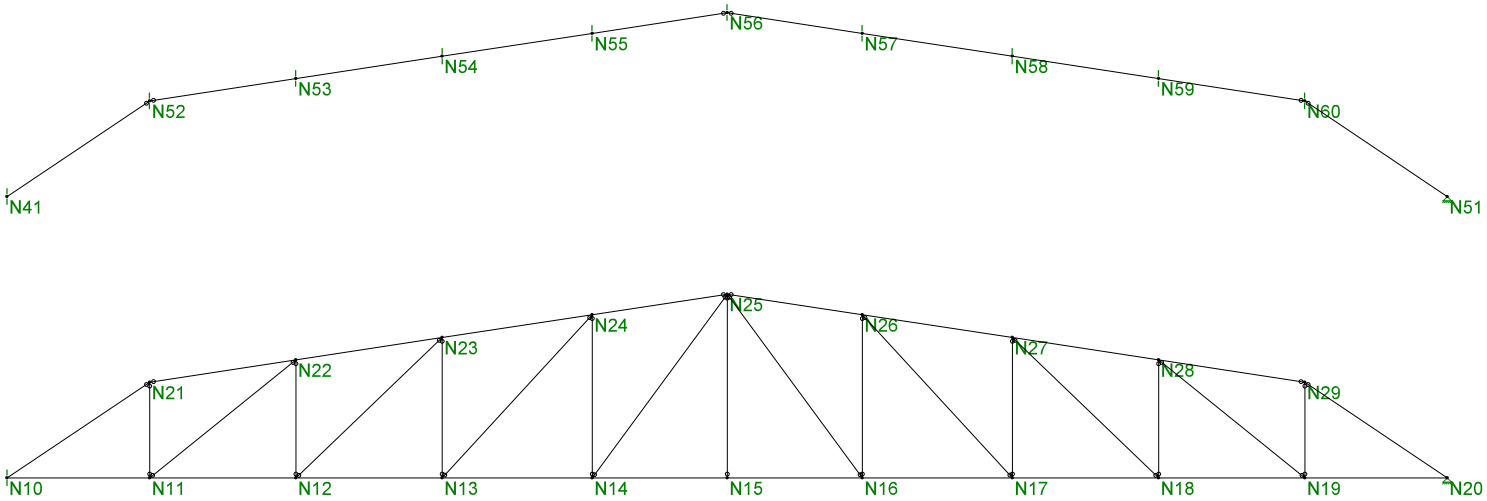
Assuming 23/32 Min. Nominal Panel Thickness,

SDPWS Table 4.2C

$DCR = \frac{165\ Lbs}{300\ Lbs} = \boxed{55\%}$

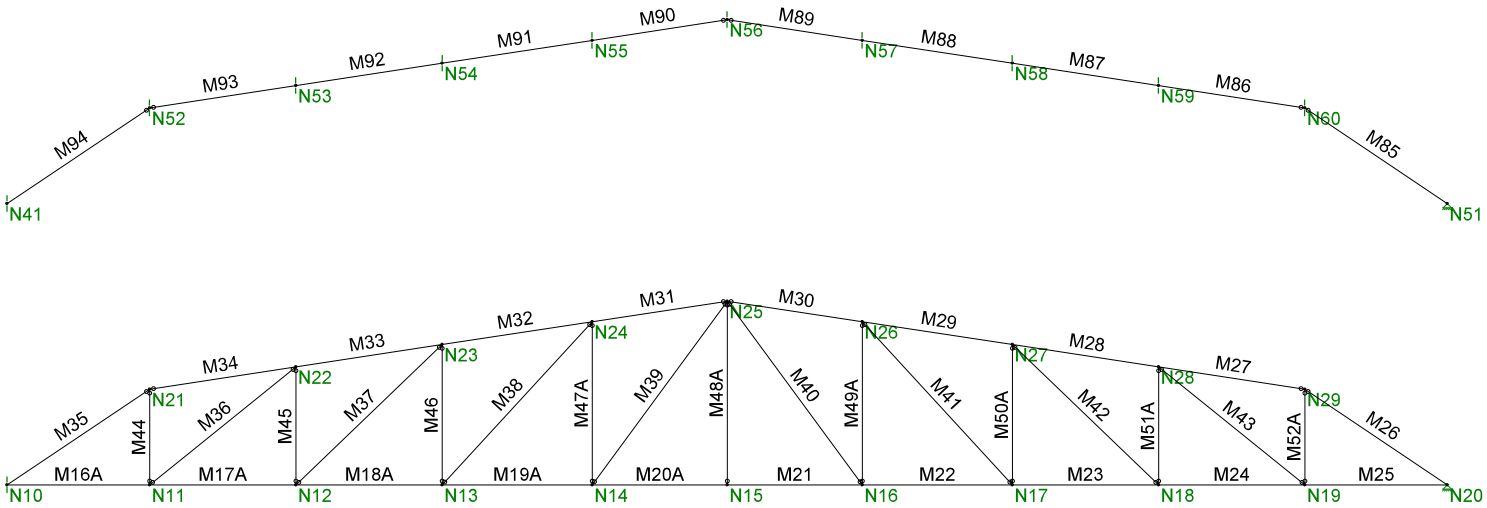
Truss Analysis

This section focuses on the structural analysis of the large gambrel truss and the two small trusses.



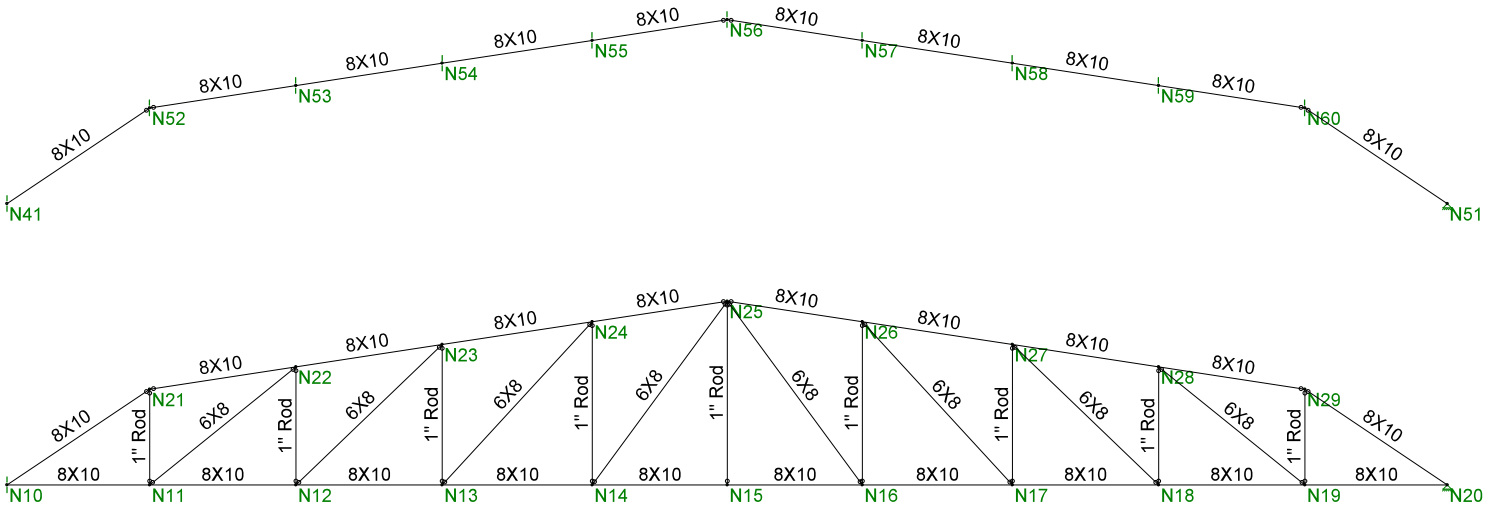
ZFA Structural Engineers	North Sacramento Library	
MAAP		Mar 8, 2023 at 2:20 PM
22689		Large Truss Few Pinned 2.0.r2d

COM-2310004

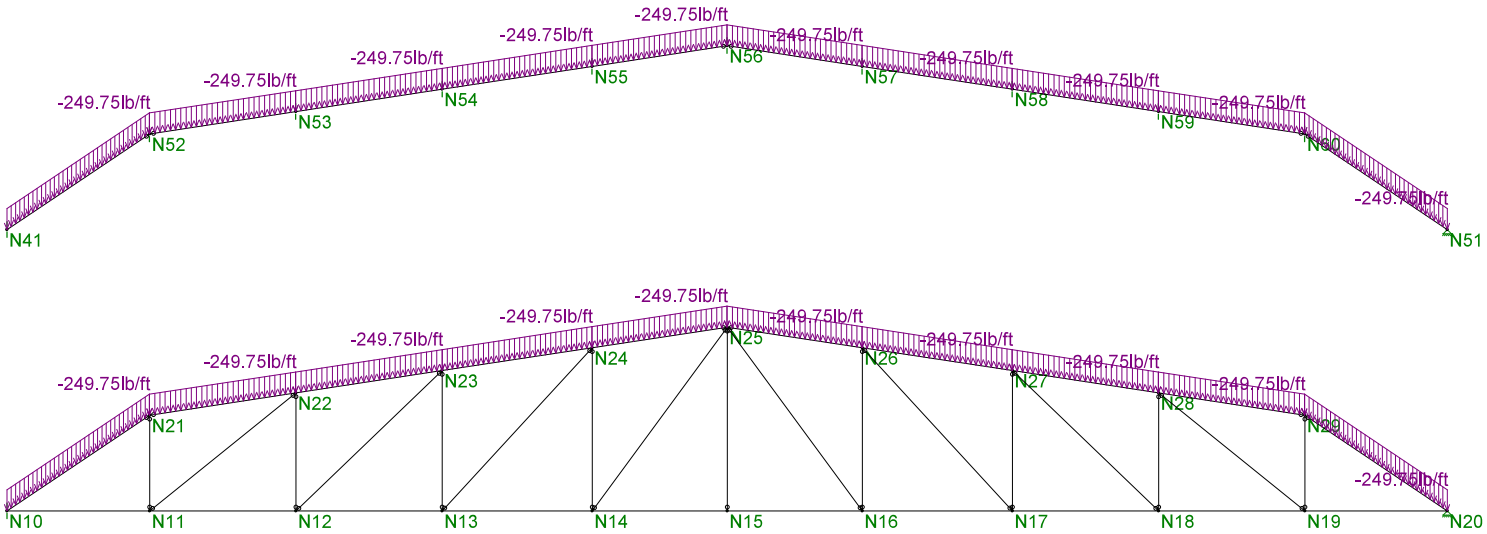


ZFA Structural Engineers	North Sacramento Library	
MAAP		Mar 8, 2023 at 2:20 PM
22689		Large Truss Few Pinned 2.0.r2d

COM-2310004

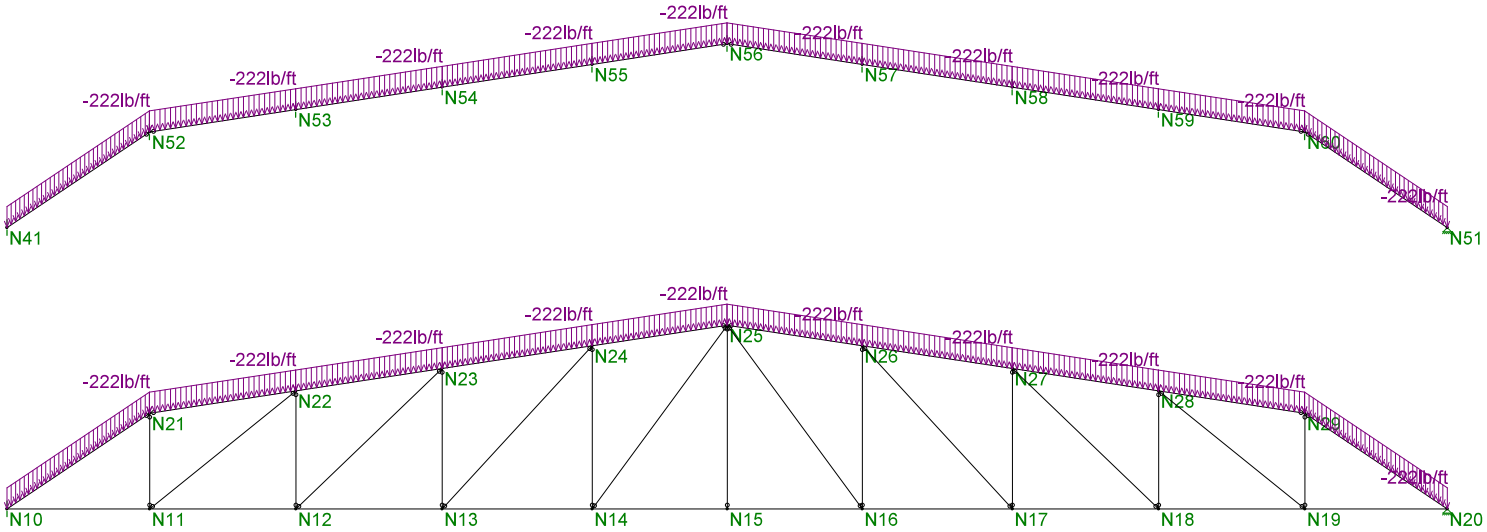


ZFA Structural Engineers	North Sacramento Library	
MAAP		Mar 8, 2023 at 2:21 PM
22689		Large Truss Few Pinned 2.0.r2d



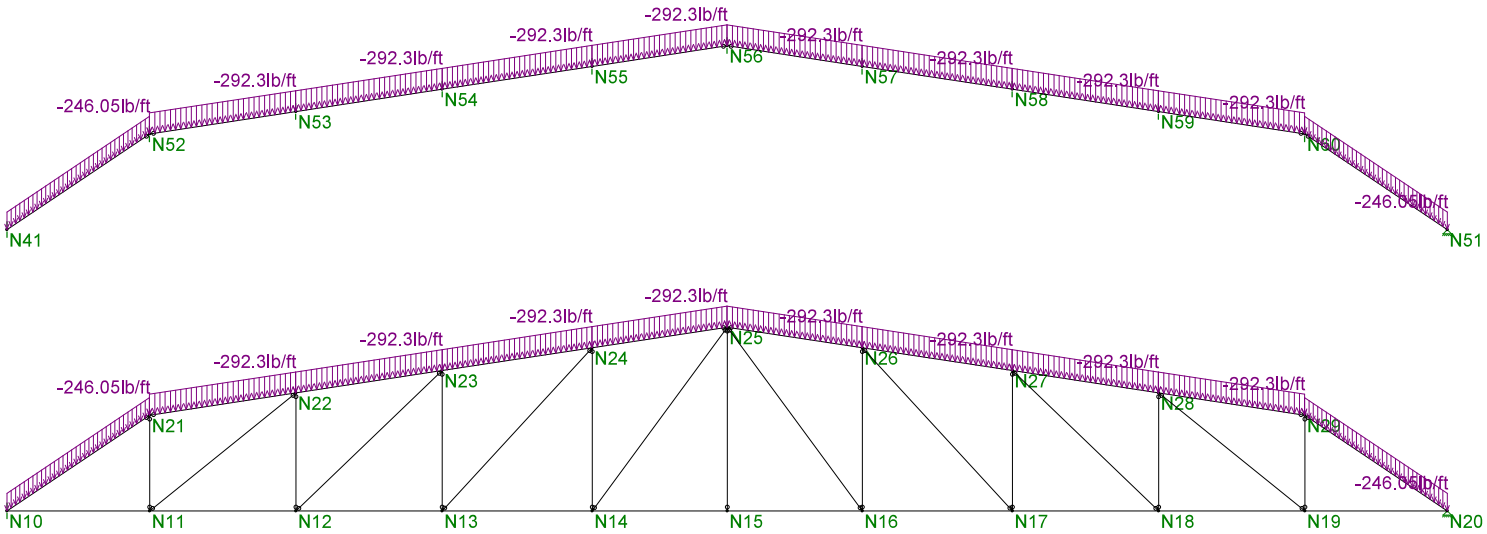
Loads: BLC 1, Roof Dead

ZFA Structural Engineers	North Sacramento Library	
MAAP		Mar 8, 2023 at 2:22 PM
22689		Large Truss Few Pinned 2.0.r2d



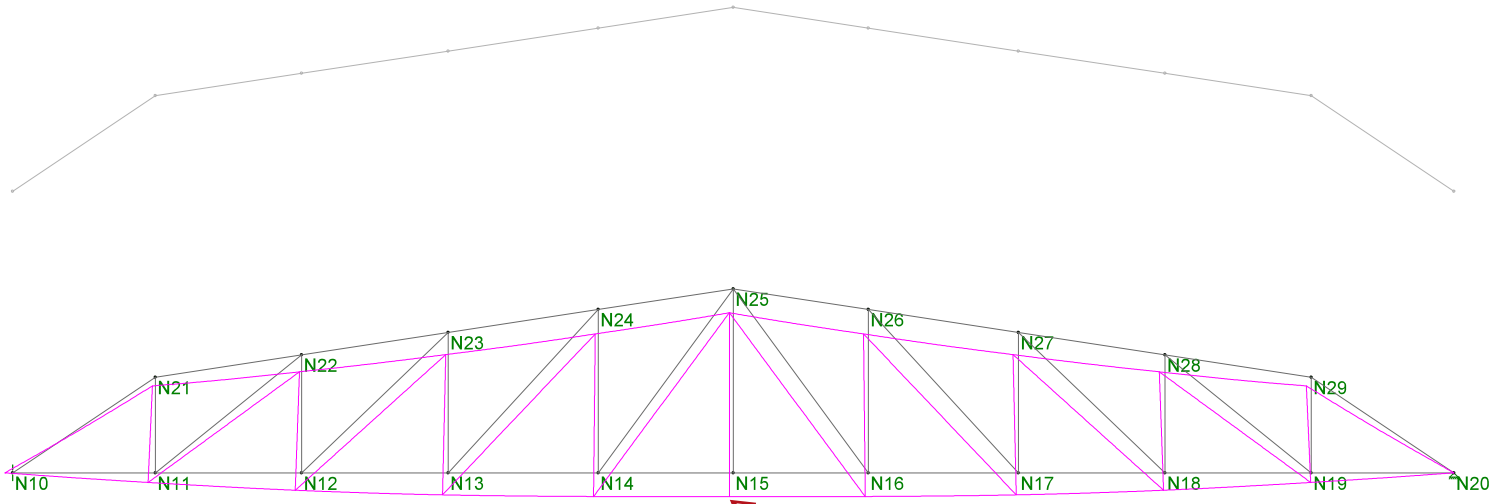
Loads: BLC 3, Roof Live

ZFA Structural Engineers	North Sacramento Library	
MAAP		Mar 8, 2023 at 2:23 PM
22689		Large Truss Few Pinned 2.0.r2d



Loads: BLC 6, Windward

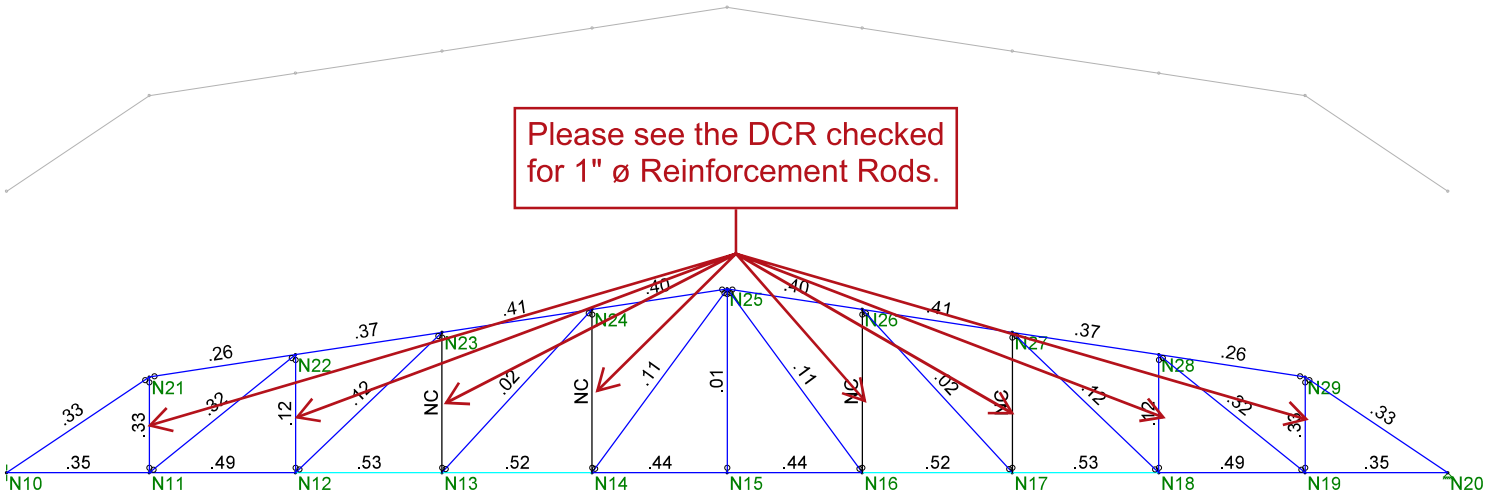
ZFA Structural Engineers	North Sacramento Library	
MAAP		Mar 8, 2023 at 2:33 PM
22689		Large Truss Few Pinned 2.0.r2d



Results for LC 2, ASCE ASD 1

ZFA Structural Engineers	North Sacramento Library	
MAAP		Mar 13, 2023 at 12:19 PM
22689		Large Truss Few Pinned 2.0.r2d

COM-2310004



Member Code Checks Displayed
Results for LC 4, ASCE ASD 3 (a)

ZFA Structural Engineers	North Sacramento Library	
MAAP		Mar 13, 2023 at 12:21 PM
22689		Large Truss Few Pinned 2.0.r2d

Bnl o`mx 9 YE@Rsqt bst q`kDmfhmddqr
Cdr hfimdq 9 L @@O
Ina Mtl adq 9 11578
L ncdkM`l d 9 Mnqsg R`bq`l dmsn Khaq`qx

L`q7+1/12
1925 OL
Bgdbj dc Ax9^^^^^

Wood Section Sets

	K`adk	Rg`od	Sxod	Cdr hfim Khrs	L`sdq`k	Cdr hfim Qt kdr	@Zhm1\	H 8/ +16/ (---	H / +07/ (Zh--
0	V DA A	1W1	UAq`bd	Qdbs`mf t k`q	CE	Sxohb`k	1-14	/ -311	/ -311
1	BGN QC A	1W3	Ad`l	Mnmd	CE	Sxohb`k	4-14	/ -873	4-248
2	BGN QC C	7W0/	Ad`l	Mnmd	CE	Sxohb`k	60-14	222-873	424-748
3	V DA C	5W7	UAq`bd	Qdbs`mf t k`q	CE	Sxohb`k	30-14	0/ 2-873	082-248

Joint Coordinates and Temperatures

	K`adk	WZhm\	X Zhm\	Sdl o ZE\
0	M0/	/	0/ /	/
1	M00	65	0/ /	/
2	M01	043	0/ /	/
3	M02	121	0/ /	/
4	M03	201	0/ /	/
5	M04	273	0/ /	/
6	M05	345	0/ /	/
7	M06	425	0/ /	/
8	M07	503	0/ /	/
0/	M08	581	0/ /	/
00	M1/	657	0/ /	/
01	M10	65	040	/
02	M11	043	051-8/ 1486	/
03	M12	121	063-7/ 4084	/
04	M13	201	076-/ 01876	/
05	M14	273	087	/
06	M15	345	076-/ 01876	/
07	M16	425	063-7/ 4084	/
08	M17	503	051-8/ 1486	/
1/	M18	581	040	/
10	M30	/	14/	/
11	M40	657	14/	/
12	M41	65	2/ 0	/
13	M42	043	201-8/ 1486	/
14	M43	121	213-7/ 4084	/
15	M44	201	226-/ 01876	/
16	M45	273	237	/
17	M46	345	226-/ 01876	/
18	M47	425	213-7/ 4084	/
2/	M48	503	201-8/ 1486	/
20	M5/	581	2/ 0	/

Basic Load Cases

	AKB Cdr bqhoshmm	B`sdf nqx	WF q`uhsx	X F q`uhsx	I nhms	Onhms	Chrsqhat sdc
0	QnneCd`c	CK					1/
2	QnneKhud	QKK					1/
4	Rdhrl hb Kn`c	DK					
5	V hmcv`qc	V K* X					1/
7	Kddv`qc	V K,X					1/
8	Rdke,V dhfigs	CK					

Bnl o`mx 9 YE@Rsqt bst q kDmf lmndqr
Cdr hfimdq 9 L @@D
I na Mtl adq 9 11578
L ncdkM`l d 9 Mnqsg R`bq`l dmsn Kkaq q x

L ` q7+1/12
1925 OL
Bgdbj dc Ax9^^^^

Load Combinations

	Cdr bdqoshmm	Rnk	OC	RQ	AKB	E` bs	AKB	E` bs	AKB	E` bs	AKB	E` bs	AKB	E` bs	AKB	E` bs	AKB	E` bs	AKB	E` bs	AKB	E` bs	AKB	E` bs	AKB	E` bs
0			X																							
1	@RBD@R---	Xdr	X		CK	0																				
2	@RBD@R---	Xdr	X		CK	0	KK	0	KKR	0																
3	@RBD@R---	Xdr	X		CK	0	QKK	0																		
4	@RBD@R---	Xdr	X		CK	0	RK	0	RKM	0																
5	@RBD@R---	Xdr	X		CK	0	QK	0																		
6	@RBD@R---	Xdr	X		CK	0	KK	/ -64	KKR	/ -64	QKK	/ -64														
7	@RBD@R---	Xdr	X		CK	0	KK	/ -64	KKR	/ -64	RK	/ -64	RKM	/ -64												
8	@RBD@R---	Xdr	X		CK	0	KK	/ -64	KKR	/ -64	QK	/ -64														
0/	@RBD@R---	Xdr	X		CK	0	V K	/ -5																		
00	@RBD@R---	Xdr	X		CK	0	V K	/ -34	KK	/ -64	KKR	/ -64	QKK	/ -64												
01	@RBD@R---	Xdr	X		CK	0	V K	/ -34	KK	/ -64	KKR	/ -64	RK	/ -64	RKM	/ -64										
02	@RBD@R---	Xdr	X		CK	0	V K	/ -34	KK	/ -64	KKR	/ -64	QK	/ -64												
03	@RBD@R---	Xdr	X		CK	/ -5	V K	/ -5																		
04	@RBD@R---	Xdr	X		CK	0	DK	/ -6																		
05	@RBD@R---	Xdr	X		CK	0	DK	/ -414	KK	/ -64	KKR	/ -64	RK	/ -64	RKM	/ -64										
06	@RBD@R---	Xdr	X		CK	/ -5	DK	/ -6																		
07	CK NMKX	Xdr	X		0	0																				
08	@RBD@R---	Xdr	X		CK	/ -5	V ---	/ -5																		
1/	@RBD@R---	Xdr	X		CK	/ -5	V ---	/ -5																		
10	QKK NMKX	Xdr	X		QKK	0																				
11	V K* X NM---	Xdr	X		V ---	0																				
12	V K,X NM---		X		V ---	0																				

Load Combination Design

	Cdr bdqoshmm	@RHE	BC	Rdqulbod	Gns Qnkkdc	Bnkc Enql dc	V nnc	Bnmbqdsd	L ` r nmqx	@kl hmil	Rs`hmkdr r
0					Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
1	@RBD@RC 0		/ -8	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
2	@RBD@RC 1			Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
3	@RBD@RC 2 '---		0-14	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
4	@RBD@RC 2 '---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
5	@RBD@RC 2 '---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
6	@RBD@RC 3 '---		0-14	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
7	@RBD@RC 3 '---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
8	@RBD@RC 3 '---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
0/	@RBD@RC 4 '---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
00	@RBD@RC 5 '---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
01	@RBD@RC 5 '---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
02	@RBD@RC 5 '---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
03	@RBD@RC 6		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
04	@RBD@RC 7		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
05	@RBD@RC 8		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
06	@RBD@RC 0/		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
07	CK NMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
08	@RBD@RC *---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
1/	@RBD@RC ,---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
10	QKK NMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
11	V K* X NMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
12	V K,X NMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr

Node Reactions (By Combination)

	KB	Mncd K`adk	WZa\	X Za\	L Y Z, es\
0	1	M0/	/	7278-228	/
1	1	M1/	/	7278-228	/
2	1	M30	/	841-331	/
3	1	M40	/	841-331	/
4	1	M41	/	05/ / -000	KNBJ DC
5	1	M42	/	0750-820	/
6	1	M43	/	0470-8/ 7	/
7	1	M44	/	0700-416	/
8	1	M45	/	0051-73	KNBJ DC
0/	1	M46	/	0700-416	/
00	1	M47	/	0470-8/ 7	/
01	1	M48	/	0750-820	/
02	1	M5/	/	05/ / -000	KNBJ DC
03	1	M18	MB	MB	KNBJ DC
04	1	M14	MB	MB	KNBJ DC
05	1	M10	MB	MB	KNBJ DC
06	1	Sns`kr 9	/	22446-244	
07	1	BNF 'hm(9	W9273	X9127-263	
08	2	M0/	/	7278-228	/
1/	2	M1/	/	7278-228	/
10	2	M30	/	841-331	/
11	2	M40	/	841-331	/
12	2	M41	/	05/ / -000	KNBJ DC
13	2	M42	/	0750-820	/
14	2	M43	/	0470-8/ 7	/
15	2	M44	/	0700-416	/
16	2	M45	/	0051-73	KNBJ DC
17	2	M46	/	0700-416	/
18	2	M47	/	0470-8/ 7	/
2/	2	M48	/	0750-820	/
20	2	M5/	/	05/ / -000	KNBJ DC
21	2	M18	MB	MB	KNBJ DC
22	2	M14	MB	MB	KNBJ DC
23	2	M10	MB	MB	KNBJ DC
24	2	Sns`kr 9	/	22446-244	
25	2	BNF 'hm(9	W9273	X9127-263	
26	3	M0/	/	04735-418	/
27	3	M1/	/	04735-418	/
28	3	M30	/	0688-/ 46	/
3/	3	M40	/	0688-/ 46	/
30	3	M41	/	2/ 11-320	KNBJ DC
31	3	M42	/	2405-870	/
32	3	M43	/	1877-/ 37	/
33	3	M44	/	2310-663	/
34	3	M45	/	1085-365	KNBJ DC
35	3	M46	/	2310-663	/
36	3	M47	/	1877-/ 37	/
37	3	M48	/	2405-870	/
38	3	M5/	/	2/ 11-320	KNBJ DC
4/	3	M18	MB	MB	KNBJ DC
40	3	M14	MB	MB	KNBJ DC

Node Reactions (By Combination) (Continued)

	KB	Mncd K`adk	WZa\	X Za\	L Y Z, es\
41	3	M10	MB	MB	KNBJ DC
42	3	Sns`kr 9	/	52275-005	
43	3	BNF 'hm(9	W9273	X9127-263	
44	4	M0/	/	7278-228	/
45	4	M1/	/	7278-228	/
46	4	M30	/	841-331	/
47	4	M40	/	841-331	/
48	4	M41	/	05/ / -000	KNBJ DC
5/	4	M42	/	0750-820	/
50	4	M43	/	0470-8/ 7	/
51	4	M44	/	0700-416	/
52	4	M45	/	0051-73	KNBJ DC
53	4	M46	/	0700-416	/
54	4	M47	/	0470-8/ 7	/
55	4	M48	/	0750-820	/
56	4	M5/	/	05/ / -000	KNBJ DC
57	4	M18	MB	MB	KNBJ DC
58	4	M14	MB	MB	KNBJ DC
6/	4	M10	MB	MB	KNBJ DC
60	4	Sns`kr 9	/	22446-244	
61	4	BNF 'hm(9	W9273	X9127-263	
62	5	M0/	/	7278-228	/
63	5	M1/	/	7278-228	/
64	5	M30	/	841-331	/
65	5	M40	/	841-331	/
66	5	M41	/	05/ / -000	KNBJ DC
67	5	M42	/	0750-820	/
68	5	M43	/	0470-8/ 7	/
7/	5	M44	/	0700-416	/
70	5	M45	/	0051-73	KNBJ DC
71	5	M46	/	0700-416	/
72	5	M47	/	0470-8/ 7	/
73	5	M48	/	0750-820	/
74	5	M5/	/	05/ / -000	KNBJ DC
75	5	M18	MB	MB	KNBJ DC
76	5	M14	MB	MB	KNBJ DC
77	5	M10	MB	MB	KNBJ DC
78	5	Sns`kr 9	/	22446-244	
8/	5	BNF 'hm(9	W9273	X9127-263	
80	6	M0/	/	02871-120	/
81	6	M1/	/	02871-120	/
82	6	M30	/	0476-3/ 2	/
83	6	M40	/	0476-3/ 2	/
84	6	M41	/	1555-740	KNBJ DC
85	6	M42	/	20/ 2-107	/
86	6	M43	/	1525-402	/
87	6	M44	/	2/ 08-101	/
88	6	M45	/	0827-/ 56	KNBJ DC
0/ /	6	M46	/	2/ 08-101	/
0/ 0	6	M47	/	1525-402	/
0/ 1	6	M48	/	20/ 2-107	/
0/ 2	6	M5/	/	1555-740	KNBJ DC

Node Reactions (By Combination) (Continued)

	KB	Mncd K`adk	WZa\	X Za\	L Y Z, es\
0/3	6	M18	MB	MB	KNBJDC
0/4	6	M14	MB	MB	KNBJDC
0/5	6	M10	MB	MB	KNBJDC
0/6	6	Sns`kr9	/	44817-815	
0/7	6	BNF 'hm(9	W9273	X9127-263	
0/8	7	M0/	/	7278-228	/
00/	7	M1/	/	7278-228	/
000	7	M30	/	841-331	/
001	7	M40	/	841-331	/
002	7	M41	/	05//-000	KNBJDC
003	7	M42	/	0750-820	/
004	7	M43	/	0470-8/7	/
005	7	M44	/	0700-416	/
006	7	M45	/	0051-73	KNBJDC
007	7	M46	/	0700-416	/
008	7	M47	/	0470-8/7	/
01/	7	M48	/	0750-820	/
010	7	M5/	/	05//-000	KNBJDC
011	7	M18	MB	MB	KNBJDC
012	7	M14	MB	MB	KNBJDC
013	7	M10	MB	MB	KNBJDC
014	7	Sns`kr9	/	22446-244	
015	7	BNF 'hm(9	W9273	X9127-263	
016	8	M0/	/	7278-228	/
017	8	M1/	/	7278-228	/
018	8	M30	/	841-331	/
02/	8	M40	/	841-331	/
020	8	M41	/	05//-000	KNBJDC
021	8	M42	/	0750-820	/
022	8	M43	/	0470-8/7	/
023	8	M44	/	0700-416	/
024	8	M45	/	0051-73	KNBJDC
025	8	M46	/	0700-416	/
026	8	M47	/	0470-8/7	/
027	8	M48	/	0750-820	/
028	8	M5/	/	05//-000	KNBJDC
03/	8	M18	MB	MB	KNBJDC
030	8	M14	MB	MB	KNBJDC
031	8	M10	MB	MB	KNBJDC
032	8	Sns`kr9	/	22446-244	
033	8	BNF 'hm(9	W9273	X9127-263	
034	0/	M0/	/	7278-228	/
035	0/	M1/	/	7278-228	/
036	0/	M30	/	841-331	/
037	0/	M40	/	841-331	/
038	0/	M41	/	05//-000	KNBJDC
04/	0/	M42	/	0750-820	/
040	0/	M43	/	0470-8/7	/
041	0/	M44	/	0700-416	/
042	0/	M45	/	0051-73	KNBJDC
043	0/	M46	/	0700-416	/
044	0/	M47	/	0470-8/7	/

Node Reactions (By Combination) (Continued)

	KB	Mncd K`adk	WZa\	X Za\	L Y Z, es\
045	0/	M48	/	0750-820	/
046	0/	M5/	/	05/ / -000	KNBJ DC
047	0/	M18	MB	MB	KNBJ DC
048	0/	M14	MB	MB	KNBJ DC
05/	0/	M10	MB	MB	KNBJ DC
050	0/	Sns`kr 9	/	22446-244	
051	0/	BNF 'hm(9	W9273	X9127-263	
052	00	M0/	/	02871-120	/
053	00	M1/	/	02871-120	/
054	00	M30	/	0476-3/ 2	/
055	00	M40	/	0476-3/ 2	/
056	00	M41	/	1555-740	KNBJ DC
057	00	M42	/	20/ 2-107	/
058	00	M43	/	1525-402	/
06/	00	M44	/	2/ 08-101	/
060	00	M45	/	0827-/ 56	KNBJ DC
061	00	M46	/	2/ 08-101	/
062	00	M47	/	1525-402	/
063	00	M48	/	20/ 2-107	/
064	00	M5/	/	1555-740	KNBJ DC
065	00	M18	MB	MB	KNBJ DC
066	00	M14	MB	MB	KNBJ DC
067	00	M10	MB	MB	KNBJ DC
068	00	Sns`kr 9	/	44817-815	
07/	00	BNF 'hm(9	W9273	X9127-263	
070	01	M0/	/	7278-228	/
071	01	M1/	/	7278-228	/
072	01	M30	/	841-331	/
073	01	M40	/	841-331	/
074	01	M41	/	05/ / -000	KNBJ DC
075	01	M42	/	0750-820	/
076	01	M43	/	0470-8/ 7	/
077	01	M44	/	0700-416	/
078	01	M45	/	0051-73	KNBJ DC
08/	01	M46	/	0700-416	/
080	01	M47	/	0470-8/ 7	/
081	01	M48	/	0750-820	/
082	01	M5/	/	05/ / -000	KNBJ DC
083	01	M18	MB	MB	KNBJ DC
084	01	M14	MB	MB	KNBJ DC
085	01	M10	MB	MB	KNBJ DC
086	01	Sns`kr 9	/	22446-244	
087	01	BNF 'hm(9	W9273	X9127-263	
088	02	M0/	/	7278-228	/
1/ /	02	M1/	/	7278-228	/
1/ 0	02	M30	/	841-331	/
1/ 1	02	M40	/	841-331	/
1/ 2	02	M41	/	05/ / -000	KNBJ DC
1/ 3	02	M42	/	0750-820	/
1/ 4	02	M43	/	0470-8/ 7	/
1/ 5	02	M44	/	0700-416	/
1/ 6	02	M45	/	0051-73	KNBJ DC

Node Reactions (By Combination) (Continued)

	KB	Mncd K`adk	WZa\	X Za\	L Y Z, es\
1/7	02	M46	/	0700-416	/
1/8	02	M47	/	0470-8/7	/
10/	02	M48	/	0750-820	/
100	02	M5/	/	05//-000	KNBJDC
101	02	M18	MB	MB	KNBJDC
102	02	M14	MB	MB	KNBJDC
103	02	M10	MB	MB	KNBJDC
104	02	Sns`kr9	/	22446-244	
105	02	BNF 'hm(9	W9273	X9127-263	
106	03	M0/	/	4/22-5/2	/
107	03	M1/	/	4/22-5/2	/
108	03	M30	/	460-354	/
11/	03	M40	/	460-354	/
110	03	M41	/	85/-/55	KNBJDC
111	03	M42	/	0006-048	/
112	03	M43	/	838-034	/
113	03	M44	/	0/75-805	/
114	03	M45	/	586-6/3	KNBJDC
115	03	M46	/	0/75-805	/
116	03	M47	/	838-034	/
117	03	M48	/	0006-048	/
118	03	M5/	/	85/-/55	KNBJDC
12/	03	M18	MB	MB	KNBJDC
120	03	M14	MB	MB	KNBJDC
121	03	M10	MB	MB	KNBJDC
122	03	Sns`kr9	/	1/023-302	
123	03	BNF 'hm(9	W9273	X9127-263	
124	04	M0/	/	7278-228	/
125	04	M1/	/	7278-228	/
126	04	M30	/	841-331	/
127	04	M40	/	841-331	/
128	04	M41	/	05//-000	KNBJDC
13/	04	M42	/	0750-820	/
130	04	M43	/	0470-8/7	/
131	04	M44	/	0700-416	/
132	04	M45	/	0051-73	KNBJDC
133	04	M46	/	0700-416	/
134	04	M47	/	0470-8/7	/
135	04	M48	/	0750-820	/
136	04	M5/	/	05//-000	KNBJDC
137	04	M18	MB	MB	KNBJDC
138	04	M14	MB	MB	KNBJDC
14/	04	M10	MB	MB	KNBJDC
140	04	Sns`kr9	/	22446-244	
141	04	BNF 'hm(9	W9273	X9127-263	
142	05	M0/	/	7278-228	/
143	05	M1/	/	7278-228	/
144	05	M30	/	841-331	/
145	05	M40	/	841-331	/
146	05	M41	/	05//-000	KNBJDC
147	05	M42	/	0750-820	/
148	05	M43	/	0470-8/7	/

Node Reactions (By Combination) (Continued)

	KB	Mncd K`adk	WZa\	X Za\	L Y Z, es\
15/	05	M44	/	0700-416	/
150	05	M45	/	0051-73	KNBJ DC
151	05	M46	/	0700-416	/
152	05	M47	/	0470-8/7	/
153	05	M48	/	0750-820	/
154	05	M5/	/	05/ / -000	KNBJ DC
155	05	M18	MB	MB	KNBJ DC
156	05	M14	MB	MB	KNBJ DC
157	05	M10	MB	MB	KNBJ DC
158	05	Sns`kr9	/	22446-244	
16/	05	BNF 'hm(9	W9273	X9127-263	
160	06	M0/	/	4/22-5/2	/
161	06	M1/	/	4/22-5/2	/
162	06	M30	/	460-354	/
163	06	M40	/	460-354	/
164	06	M41	/	85/ -/55	KNBJ DC
165	06	M42	/	0006-048	/
166	06	M43	/	838-034	/
167	06	M44	/	0/75-805	/
168	06	M45	/	586-6/3	KNBJ DC
17/	06	M46	/	0/75-805	/
170	06	M47	/	838-034	/
171	06	M48	/	0006-048	/
172	06	M5/	/	85/ -/55	KNBJ DC
173	06	M18	MB	MB	KNBJ DC
174	06	M14	MB	MB	KNBJ DC
175	06	M10	MB	MB	KNBJ DC
176	06	Sns`kr9	/	1/023-302	
177	06	BNF 'hm(9	W9273	X9127-263	
178	07	M0/	/	7278-228	/
18/	07	M1/	/	7278-228	/
180	07	M30	/	841-331	/
181	07	M40	/	841-331	/
182	07	M41	/	05/ / -000	KNBJ DC
183	07	M42	/	0750-820	/
184	07	M43	/	0470-8/7	/
185	07	M44	/	0700-416	/
186	07	M45	/	0051-73	KNBJ DC
187	07	M46	/	0700-416	/
188	07	M47	/	0470-8/7	/
2/ /	07	M48	/	0750-820	/
2/0	07	M5/	/	05/ / -000	KNBJ DC
2/1	07	M18	MB	MB	KNBJ DC
2/2	07	M14	MB	MB	KNBJ DC
2/3	07	M10	MB	MB	KNBJ DC
2/4	07	Sns`kr9	/	22446-244	
2/5	07	BNF 'hm(9	W9273	X9127-263	
2/6	08	M0/	/	0/602-02	/
2/7	08	M1/	/	0/602-02	/
2/8	08	M30	/	0023-353	/
20/	08	M40	/	0023-353	/
200	08	M41	/	0866-762	KNBJ DC

Node Reactions (By Combination) (Continued)

	KB	Mncd K`adk	WZa\	X Za\	L Y Z, es\
201	08	M42	/	1313-537	/
202	08	M43	/	1/48-884	/
203	08	M44	/	1248-/00	/
204	08	M45	/	0403-165	KNBJDC
205	08	M46	/	1248-/00	/
206	08	M47	/	1/48-884	/
207	08	M48	/	1313-537	/
208	08	M5/	/	0866-762	KNBJDC
21/	08	M18	MB	MB	KNBJDC
210	08	M14	MB	MB	KNBJDC
211	08	M10	MB	MB	KNBJDC
212	08	Sns`kr9	/	31741-408	
213	08	BNF 'hm(9	W9273	X9128-011	
214	1/	M0/	/	,636-406	/
215	1/	M1/	/	,636-406	/
216	1/	M30	/	,31-220	/
217	1/	M40	/	,31-220	/
218	1/	M41	/	,0/7-426	KNBJDC
22/	1/	M42	/	,08/-220	/
220	1/	M43	/	,050-6/5	/
221	1/	M44	/	,074-067	/
222	1/	M45	/	,007-757	KNBJDC
223	1/	M46	/	,074-067	/
224	1/	M47	/	,050-6/5	/
225	1/	M48	/	,08/-220	/
226	1/	M5/	/	,0/7-426	KNBJDC
227	1/	M18	MB	MB	KNBJDC
228	1/	M14	MB	MB	KNBJDC
23/	1/	M10	MB	MB	KNBJDC
230	1/	Sns`kr9	/	,188/-/57	
231	1/	BNF 'hm(9	W9273	X9132-84	
232	10	M0/	/	6346-08	/
233	10	M1/	/	6346-08	/
234	10	M30	/	735-504	/
235	10	M40	/	735-504	/
236	10	M41	/	0311-210	KNBJDC
237	10	M42	/	0544-/4	/
238	10	M43	/	03/5-03	/
24/	10	M44	/	050/-135	/
240	10	M45	/	0/22-525	KNBJDC
241	10	M46	/	050/-135	/
242	10	M47	/	03/5-03	/
243	10	M48	/	0544-/4	/
244	10	M5/	/	0311-210	KNBJDC
245	10	M18	MB	MB	KNBJDC
246	10	M14	MB	MB	KNBJDC
247	10	M10	MB	MB	KNBJDC
248	10	Sns`kr9	/	18717-65	
25/	10	BNF 'hm(9	W9273	X9127-263	
250	11	M0/	/	8354-766	/
251	11	M1/	/	8354-766	/
252	11	M30	/	827-221	/

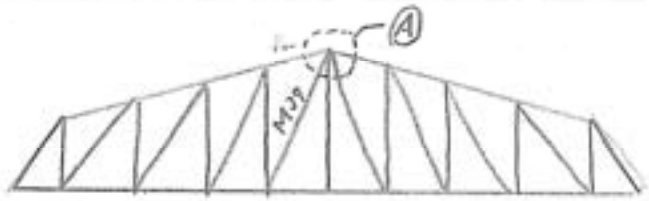
Node Reactions (By Combination) (Continued)

	KB	Mncd K` adk	WZa\	X Za\	L Y Z, es\
253	11	M40	/	827-221	/
254	11	M41	/	0585-233	KNBJ DC
255	11	M42	/	1068-038	/
256	11	M43	/	0740-307	/
257	11	M44	/	101/ -047	/
258	11	M45	/	025/ -843	KNBJ DC
26/	11	M46	/	101/ -047	/
260	11	M47	/	0740-307	/
261	11	M48	/	1068-038	/
262	11	M5/	/	0585-233	KNBJ DC
263	11	M18	MB	MB	KNBJ DC
264	11	M14	MB	MB	KNBJ DC
265	11	M10	MB	MB	KNBJ DC
266	11	Sns` kr 9	/	26752-4/ 8	
267	11	BNF 'hm(9	W9273	X9128-674	

Nodes and Loads in the Y-Axis that were highlighted were used for the 1" ø Rod Reinforcement Calculations.

ZFA STRUCTURAL ENGINEERS North Sacramento Library (project name)

Large Truss Plate Connections	MAAP	22689	03-08-2023	
section	engineer	job #	date	page



M39 Axial Loads

DL: 2922 Lbs

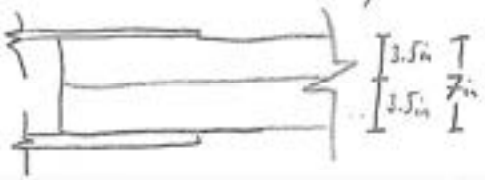
RLL: 2149 Lbs

Load Case = DL + RLL ≈ 5088 Lbs

$\frac{5088\ Lbs}{C_D} = \frac{5088\ Lbs}{1.25} = 4070\ Lbs$

Assume ¼" Plate on (2) 4x10 members

Assume DF and perpendicular connection



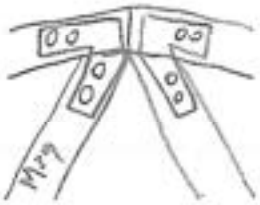


Table 12G from 2018 NDS.

Main Member t = 7½"

Side Member t = ¼"

Bolt Diameter = ¾"

$Z_{||} = 3340\ Lbs/bolt$

(2 bolts)(3340 Lbs/bolt) = 6680 Lbs

$DCR = \frac{Demand}{Capacity} = \frac{4070\ Lbs}{6680\ Lbs} = \boxed{60.9\%}$

(E) Splice / Connection

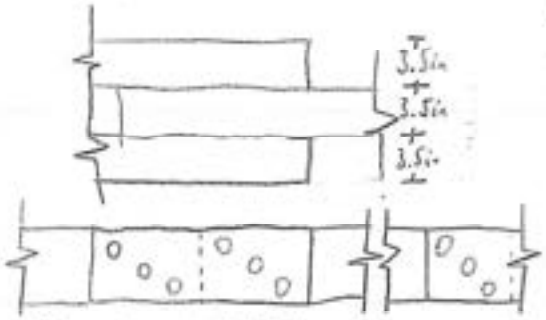


Table 12F from 2018 NDS

Main Member t = 3½"

Side Member t = 3½"

Bolt Diameter = 1"

$Z_{||} = 4900\ Lbs/bolt$

(6 bolts)(4900 Lbs/bolt) = 29,400 Lbs

$Demand = \frac{36,959\ Lbs}{1.25} = 29,567\ Lbs$

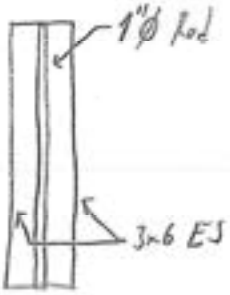
$DCR = \frac{Demand}{Capacity} = \frac{29,567\ Lbs}{29,400\ Lbs} = \boxed{100.6\%}$

M18A

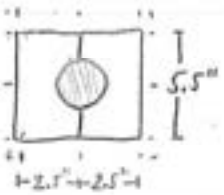
COM-2310004

ZFA STRUCTURAL ENGINEERS North Sacramento Library (project name)

Large Truss 1"Ø Rod Reinforcement (section)	MAAP (engineer)	22689 (job #)	05-08-2023 (date)	(page)



Assume Grade 36 for 1" Ø Rod



$S_{in} = 5.5_{in} = 27.5 in^2$

Wood Member area:

$27.5 in^2 - \pi(\frac{1}{2})^2 = A_w$

$A_w \approx 26.7 in^2$

Max DL Reaction = 1862 Lbs

Max RLL Reaction = 1655 Lbs

Max WL+Y Reaction = 2179 Lbs

Max Load Case:

DL + 0.75RLL + 0.45WL ⇒

1862 Lbs + 0.75(1655 Lbs) + 0.45(2179 Lbs) = 4084 Lbs

For No.2 DF Compression Parallel to Grain;

From NDS Supplement Table 4A, $F_c = 1350 psi$

$C_D = 1.6$, $C_M = 0.8$, $C_F = 1.15$, $C_P = 0.8$

$F_c^* = F_c \times C_D \times C_M \times C_F = (1350 psi)(1.6)(0.8)(1.15) = 1987.2 psi$

$F_c' = F_c^* \times C_P = (1987.2 psi)(0.8) = 1589.8 psi$

Capacity = $1589.8 psi \times 26.7 in^2 = 42,469.8$ Lbs

$DCR = \frac{Demand}{Capacity} = \frac{4084 Lbs}{42,469.8 Lbs} = \boxed{9.62\%}$

COM-2310004

ZFA STRUCTURAL ENGINEERS

Job #22689
1" ø Rod Reinforcement

Engineer: MAAP
3/8/2023

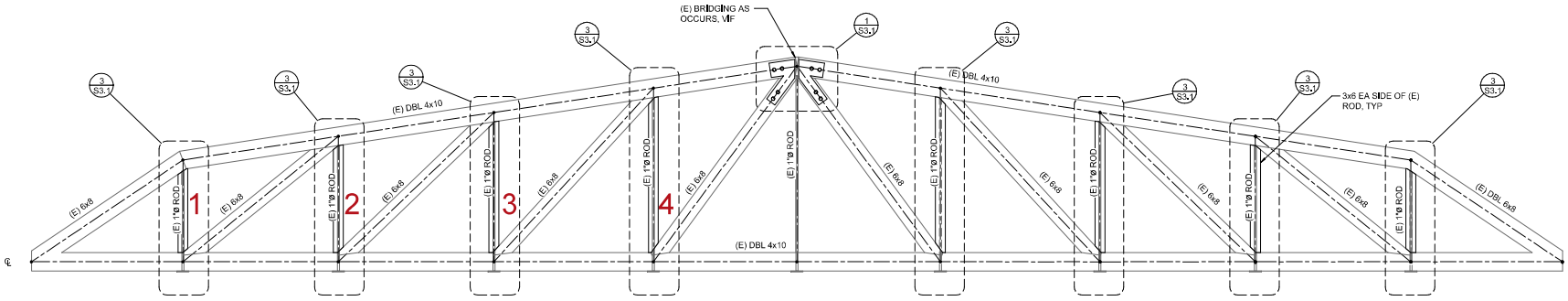
North Sacramento Library - ASCE 7

Desired Spacing	8 in

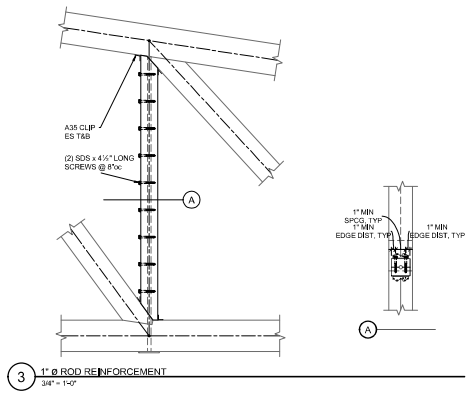
SDS Screw	1/4x4 1/2	
Screw Capacity	368	lbs

230 lbs x C_D =
230 lbs x (1.6) =
368 lbs

Rod	DL	RLL	WL+Y	Load	Length (in)	Linear Load (lbs/in)	Wanted Spacing (in)	# of Screws both sides	Total Screw Strength (lbs)	Min Screw Strength (lbs)	DCR
1	1600	1422	1696	3429.7	51	67.2	8	12	4416	4416	0.78
2	1862	1655	2179	4083.8	62.903	64.9	8	14	5152	4416	0.92
3	1582	1406	1851	3469.45	74.805	46.4	8	18	6624	4416	0.79
4	1812	1610	2120	3973.5	87.013	45.7	8	20	7360	4416	0.90



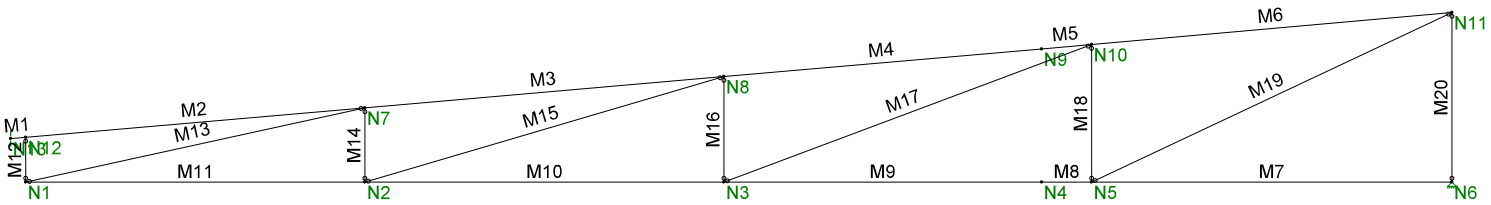
A GAMBREL TRUSS ELEVATION
3/8" = 1'-0"



3 1" Ø ROD REINFORCEMENT
3/4" = 1'-0"

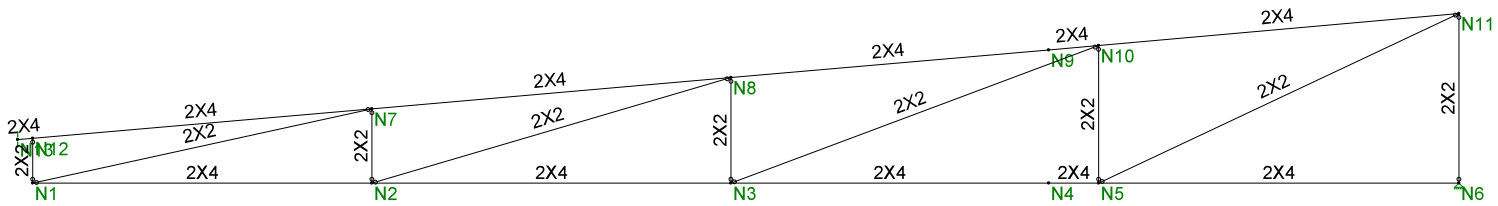
Length (in.)	Model No.	Reference DFL/SP Allowable Shear Loads (lb.) Wood Side Plate Thickness (in.)												
		¾	⅞	1	1	1⅛	1¼	1½	1¾	2½	3	3½	4	4½
2	SDS25200	145	—	—	—	—	—	—	—	—	—	—	—	—
2½	SDS25212	165	165	170	185	—	—	190'	—	—	—	—	—	—
3	SDS25300	165	165	170	185	195	205	280'	—	—	—	—	—	—
3½	SDS25312	165	165	170	185	195	205	340'	340'	—	—	—	—	—
4½	SDS25412	165	165	170	185	195	205	350'	340'	230	200	—	—	—
5	SDS25500	165	165	170	185	195	205	350'	340'	230	230	200	—	—
6	SDS25600	165	165	170	185	195	205	350'	340'	340'	340'	340'	230	200
8	SDS25800	165	165	170	185	195	205	350'	340'	340'	340'	340'	230	230

COM-2310004



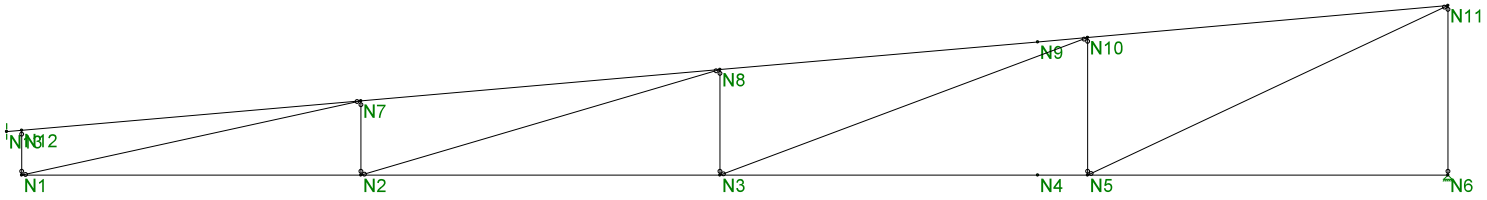
ZFA Structural Engineers	Small Truss	
MAAP		Mar 8, 2023 at 12:23 PM
22689		Small Truss R2.r2d

COM-2310004



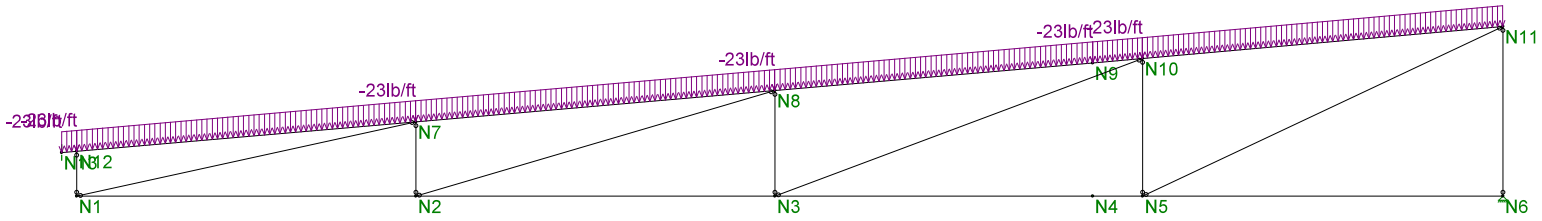
ZFA Structural Engineers	Small Truss	
MAAP		Mar 8, 2023 at 12:25 PM
22689		Small Truss R2.r2d

COM-2310004



ZFA Structural Engineers	Small Truss	
MAAP		Mar 8, 2023 at 12:22 PM
22689		Small Truss R2.r2d

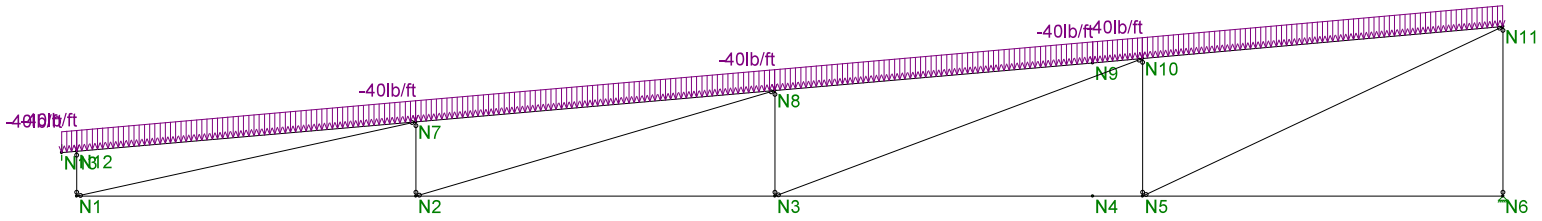
COM-2310004



Loads: BLC 1, Roof Dead Load

ZFA Structural Engineers	Small Truss	
MAAP		Mar 8, 2023 at 12:25 PM
22689		Small Truss R2.r2d

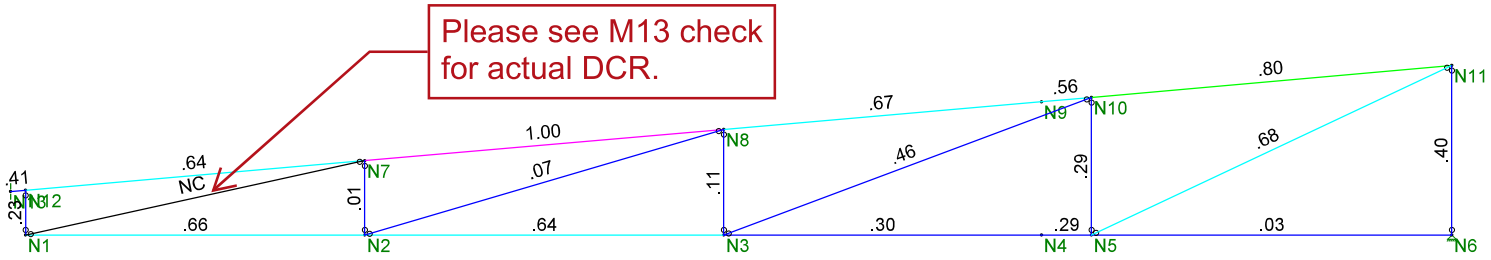
COM-2310004



Loads: BLC 2, Roof Live Load

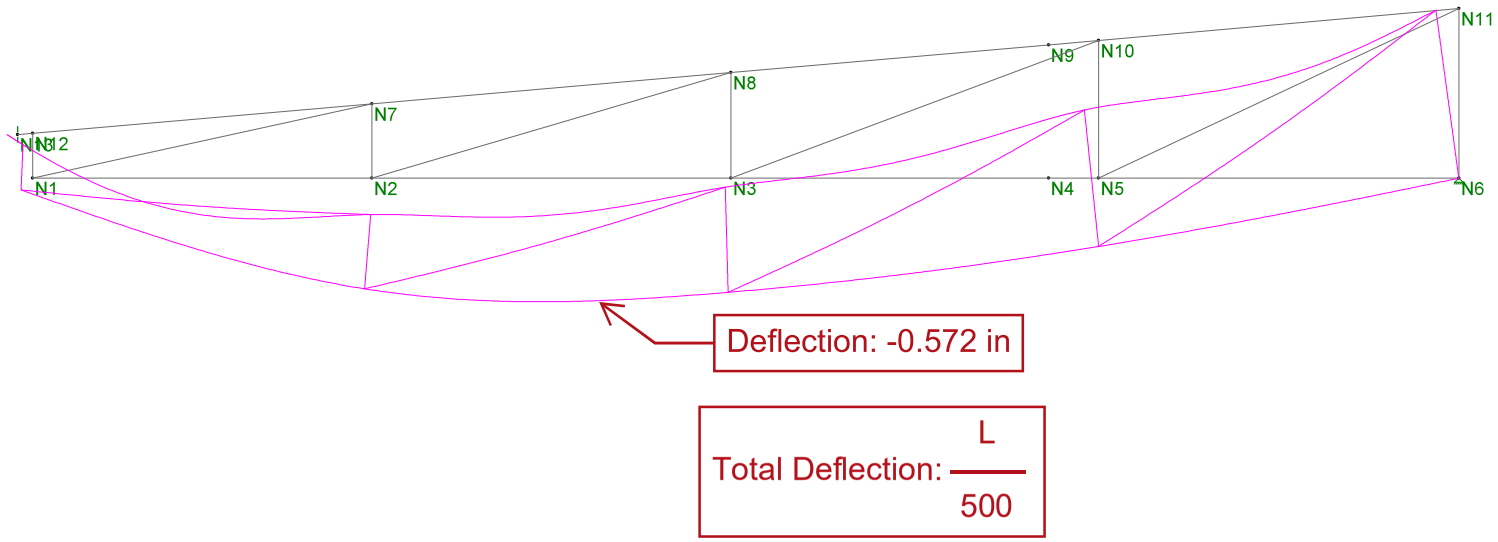
ZFA Structural Engineers	Small Truss	
MAAP		Mar 8, 2023 at 12:26 PM
22689		Small Truss R2.r2d

COM-2310004



Member Code Checks Displayed (Enveloped)
Results for LC 3, ASCE ASD 3 (a)

ZFA Structural Engineers	Small Truss	
MAAP		Mar 13, 2023 at 11:48 AM
22689		Small Truss R2.r2d



Results for LC 3, ASCE ASD 3 (a)

ZFA Structural Engineers	Small Truss	
MAAP		Mar 13, 2023 at 10:42 AM
22689		Small Truss R2.r2d

Bnl o`mx	9 YE@Rsqt bst q`kDmfhmddqr		L`q7+1/12
Cdr hfimdq	9 L @@O		01917 OL
Ina Mtl adq	9 11578		Bgdbj dc Ax9^^^^^
L ncdkM`l d	9 Rl `kkSqt rr		

Wood Section Sets

	K`adk	Rg`od	Sxod	Cdr hfim Khrs	L`sdqh`k	Cdr hfim Qt kdr	@Zhm1\	H 8/+16/(---	H/+07/(Zh--
0	V DA A	1W1	UAq`bd	Qdbs`mf t k`q	CE	Sxohb`k	1-14	/-311	/-311
1	BGN QC A	1W3	Ad`l	Qdbs`mf t k`q	CE	Sxohb`k	4-14	/-873	4-248

Joint Coordinates and Temperatures

	K`adk	WZhm\	X Zhm\	Sdl o ZE\
0	M0	/	/	/
1	M1	57	/	/
2	M2	03/	/	/
3	M3	1/2-64	/	/
4	M4	102-64	/	/
5	M5	175	/	/
6	M6	57	03-803/18	/
7	M7	03/	10-064831	/
8	M8	1/2-64	15-61/234	/
0/	M0/	102-64	16-48//44	/
00	M00	175	23	/
01	M01	/	8	/
02	M02	,2	7-626651	/

Basic Load Cases

	AKB Cdr bqhoshmm	B`sdf nqx	WF q`uhsx	X F q`uhsx	I nhms	Onhms	Chrsqhat sdc
0	QnneCd`c Kn`c	CK					5
1	QnneKhud Kn`c	QKK					5
2	V hmcv`qc Kn`c	V K*X					5
3	Rdhrl hb Kn`c	DK			0		
4	Kddv`qc Kn`c	V K,X					5
5	Rdke,V dhfigs	CK		,0			

Load Combinations

	Cdr bqhoshmm	Rnk--	OC--	RQ--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--
0	@RB D @R---	Xdr			CK	0																		
1	@RB D @R---	Xdr			CK	0	KK	0	KKR	0														
2	@RB D @R---	Xdr			CK	0	QKK	0																
3	@RB D @R---	Xdr			CK	0	RK	0	RKM	0														
4	@RB D @R---	Xdr			CK	0	QK	0																
5	@RB D @R---	Xdr			CK	0	KK	/-64	KKR	/-64	QKK	/-64												
6	@RB D @R---	Xdr			CK	0	KK	/-64	KKR	/-64	RK	/-64	RKM	/-64										
7	@RB D @R---	Xdr			CK	0	KK	/-64	KKR	/-64	QK	/-64												
8	@RB D @R---				CK	0	V ---	/-5																
0/	@RB D @R---				CK	0	V ---	/-5																
00	@RB D @R---				CK	0	V ---	/-34	KK	/-64	KKR	/-64	QKK	/-64										
01	@RB D @R---				CK	0	V ---	/-34	KK	/-64	KKR	/-64	QKK	/-64										
02	@RB D @R---				CK	0	V ---	/-34	KK	/-64	KKR	/-64	RK	/-64	RKM	/-64								
03	@RB D @R---				CK	0	V ---	/-34	KK	/-64	KKR	/-64	RK	/-64	RKM	/-64								
04	@RB D @R---				CK	0	V ---	/-34	KK	/-64	KKR	/-64	QK	/-64										
05	@RB D @R---				CK	0	V ---	/-34	KK	/-64	KKR	/-64	QK	/-64										

Load Combinations (Continued)

	Cdr bdqosmm	Rnk	OC	RQ	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs
06	@RBD@R---				CK	/ -5	V ---	/ -5																		
07	@RBD@R---				CK	/ -5	V ---	/ -5																		
08	@RBD@R---				CK	0	DK	/ -6																		
1/	@RBD@R---				CK	0	DK	/ -414	KK	/ -64	KKR	/ -64	RK	/ -64	RKM	/ -64										
10	@RBD@R---				CK	/ -5	DK	/ -6																		
11	CKNMKX				CK	0																				
12	QKKNMKX				QKK	0																				
13	V K*XNM---				V ---	0																				
14	DKNMKX				DK	0																				

Load Combination Design

	Cdr bdqosmm	@RHE	BC	Rdquhbd	GnsQnkdc	Bnkc Enql dc	V nnc	Bnmbqdsd	L`rnnmqx	@kl hmil	Rs`hmkdrr
0	@RBD@RC 0		/ -8	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
1	@RBD@RC 1			Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
2	@RBD@RC 2'---		0-14	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
3	@RBD@RC 2'---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
4	@RBD@RC 2'---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
5	@RBD@RC 3'---		0-14	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
6	@RBD@RC 3'---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
7	@RBD@RC 3'---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
8	@RBD@RC 4'---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
0/	@RBD@RC 4---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
00	@RBD@RC 5'---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
01	@RBD@RC 5---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
02	@RBD@RC 5'---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
03	@RBD@RC 5---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
04	@RBD@RC 5'---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
05	@RBD@RC 5---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
06	@RBD@RC 6		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
07	@RBD@RC 6@		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
08	@RBD@RC 7		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
1/	@RBD@RC 8		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
10	@RBD@RC 0/		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
11	CKNMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
12	QKKNMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
13	V K*XNMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
14	DKNMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr

Node Reactions (By Combination)

	KB	Mncd K`adk	WZa\	XZa\	LYZ[,e\
0	0	M5	/	208-/33	/
1	0	M02	/	205-820	/
2	0	Sns`kr9	/	524-863	
3	0	BNF'hm(9	W9030-87	X91/-/30	
4	1	M5	/	208-/33	/
5	1	M02	/	205-820	/
6	1	Sns`kr9	/	524-863	
7	1	BNF'hm(9	W9030-87	X91/-/30	
8	2	M5	/	7/1-450	/

Node Reactions (By Combination) (Continued)

	KB	Mncd K`adk	WZa\	X Za\	L Y Z, es\
0/	2	M02	/	7//-31	/
00	2	Sns`kr9	/	05/1-870	
01	2	BNF 'hm(9	W9030-582	X91/-703	
02	3	M5	/	208-/33	/
03	3	M02	/	205-820	/
04	3	Sns`kr9	/	524-863	
05	3	BNF 'hm(9	W9030-87	X91/-/30	
06	4	M5	/	208-/33	/
07	4	M02	/	205-820	/
08	4	Sns`kr9	/	524-863	
1/	4	BNF 'hm(9	W9030-87	X91/-/30	
10	5	M5	/	570-570	/
11	5	M02	/	568-437	/
12	5	Sns`kr9	/	0250-118	
13	5	BNF 'hm(9	W9030-615	X91/-613	
14	6	M5	/	208-/33	/
15	6	M02	/	205-820	/
16	6	Sns`kr9	/	524-863	
17	6	BNF 'hm(9	W9030-87	X91/-/30	
18	7	M5	/	208-/33	/
2/	7	M02	/	205-820	/
20	7	Sns`kr9	/	524-863	
21	7	BNF 'hm(9	W9030-87	X91/-/30	

COM-2310004

ZFA STRUCTURAL ENGINEERS North Sac Library
project name

Small Truss	MAAP	22689	03/13/2023	
section	engineer	job #	date	page

M13

Axial Load : 3000 Lbs => $\frac{3000\ Lbs}{1.6} = 1875\ Lbs$

For a 1x4, Area = $0.75in \times 3.5in = 2.625in^2$

$f_c = \frac{1875\ Lbs}{2.625in^2} \approx 714\ psi$



As stated in Existing Drawings

WOOD:

1) UNLESS OTHERWISE NOTED ON THE DRAWINGS, PROVIDE THE FOLLOWING LUMBER GRADES AND SPECIES AS DEFINED BY WCLIB OR WWPA GRADING RULES:

JOISTS, BEAMS, POSTS, TOP PLATES	¾ DOUGLAS FIR (D.F.)
STUDS	STUD OR ¾ D.F.
HEADERS, BLOCKING	¾ D.F.
SILL PLATES	PRESSURE TREATED ¾ D.F.
ALL OTHER	¾ D.F.

For No.1 DF, $F_c = 1500\ psi$

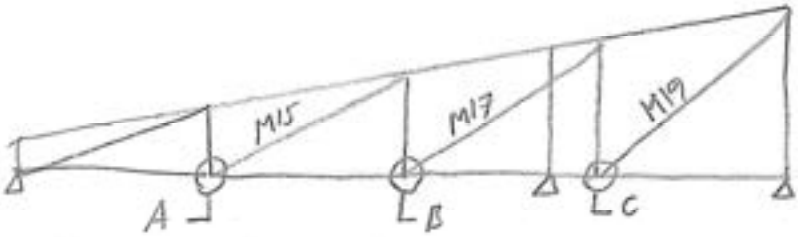
$F'_c = F_c \times C_D = 1500\ psi \times 1.6 = 2400\ psi$

$DCR = \frac{714\ psi}{2400\ psi} = \boxed{29.8\%}$

COM-2310004

ZFA STRUCTURAL ENGINEERS North Sacramento Library (project name)

Small Truss Web to Chord Conn.	MAAP	22689	03-08-2023	
section	engineer	job #	date	page



Use Load Case DL + 0.75RLL + 0.45WL

Tension from M17 = 1270 Lbs ÷ 1.6 = 794 Lbs

Tension from M15 = 945 Lbs ÷ 1.6 = 591 Lbs

Tension from M19 = 497 Lbs ÷ 1.6 = 311 Lbs

Use SDS25300, ¼"x3" Size, Wood Side Plate Thickness of 1½"

SDS Capacity = 280 Lbs/screw

(3 screws)(280 Lbs/screw) = 840 Lbs

DCR for M17 = $\frac{\text{M17 Demand}}{\text{Capacity}} = \frac{794 \text{ Lbs}}{840 \text{ Lbs}} =$ **94.5%**

DCR for M15 = $\frac{\text{M15 Demand}}{\text{Capacity}} = \frac{591 \text{ Lbs}}{840 \text{ Lbs}} =$ **70.4%**

DCR for M19 = $\frac{\text{M19 Demand}}{\text{Capacity}} = \frac{311 \text{ Lbs}}{840 \text{ Lbs}} =$ **37.0%**

Splice calculations done for this truss were applied towards the "Small Truss - 26 in Vert Brace" as seen in detail C/S3.1.

COM-2310004

Design Method	Allowable Stress Design (ASD)
Connection Type	Lateral loading
Fastener Type	Wood Screw
Loading Scenario	Single Shear

Main Member Type	Douglas Fir-Larch
Main Member Thickness	1.5 in.
Main Member: Angle of Load to Grain	0
Side Member Type	Douglas Fir-Larch
Side Member Thickness	0.75 in.
Side Member: Angle of Load to Grain	0
Wood Screw Number	10 (D = 0.19 in.)
Length	2 in.
Load Duration Factor	C_D = 1.6
Wet Service Factor	C_M = 1.0
End Grain Factor	C_eg = 1.0
Temperature Factor	C_t = 1.0

Connection Yield Modes

(5 Screws) x (170 lbs/screw) = 850 lbs

Im	447 lbs.
Is	386 lbs.
II	173 lbs.
IIIm	186 lbs.
IIIs	170 lbs.
IV	187 lbs.

Adjusted ASD Capacity	**170 lbs.**

M17 DCR
794 lbs / 850 lbs = 93.4%

M15 DCR
591 lbs / 850 lbs = 69.5%

M19 lbs
311 lbs / 850 lbs = 36.6%

- Wood Screw bending yield strength of 80000 psi is assumed.
- Dowel bearing strengths for wood screws with nominal diameter greater than 1/4 in. are calculated and rounded to the nearest 50 psi in accordance with NDS Table 11.3.2.
- Length of tapered tip is assumed to be two times the nominal wood screw diameter for calculating dowel bearing length in the main member.

While every effort has been made to insure the accuracy of the information presented, and special effort has been made to assure that the information reflects the state-of-the-art, neither the American Wood Council nor its members assume any responsibility for any particular design prepared from this on-line Connection Calculator. Those using this on-line Connection Calculator assume all liability from its use.

The Connection Calculator was designed and created by Cameron Knudson, Michael Dodson and David Pollock at Washington State University. Support for development of the Connection Calculator was provided by American Wood Council.

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: Option 2 Small Truss

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

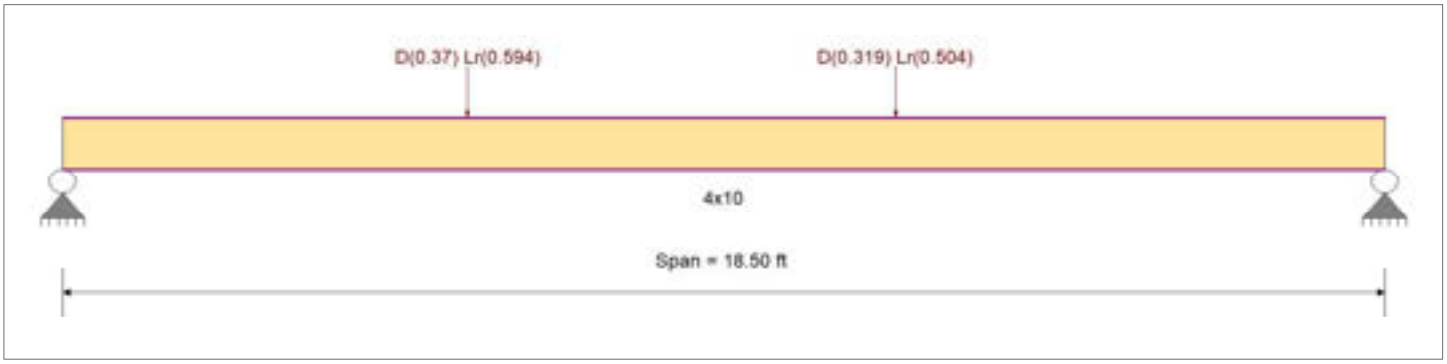
Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,350.0 psi
Fb -	1,350.0 psi
Fc - Prll	925.0 psi
Fc - Perp	625.0 psi
Fv	170.0 psi
Ft	675.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Point Load : D = 0.370, Lr = 0.5940 k @ 5.667 ft
Point Load : D = 0.3190, Lr = 0.5040 k @ 11.667 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.694 : 1	Maximum Shear Stress Ratio	=	0.225 : 1
Section used for this span		4x10	Section used for this span		4x10
fb: Actual	=	1,406.21 psi	fv: Actual	=	47.83 psi
F'b	=	2,025.00 psi	F'v	=	212.50 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	10.465 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.580 in	Ratio =	382 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.995 in	Ratio =	223 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 18.50 ft	1	0.402	0.131	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	2.44	586.6	1,458.0	0.43	20.1	153.0
+D+Lr					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.50 ft	1	0.694	0.225	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	5.85	1,406.2	2,025.0	1.03	47.8	212.5
+D+0.750Lr					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.50 ft	1	0.593	0.192	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	5.00	1,201.3	2,025.0	0.88	40.9	212.5
+0.60D					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.50 ft	1	0.136	0.044	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.46	352.0	2,592.0	0.26	12.1	272.0

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: Option 2 Small Truss

Overall Maximum Deflections

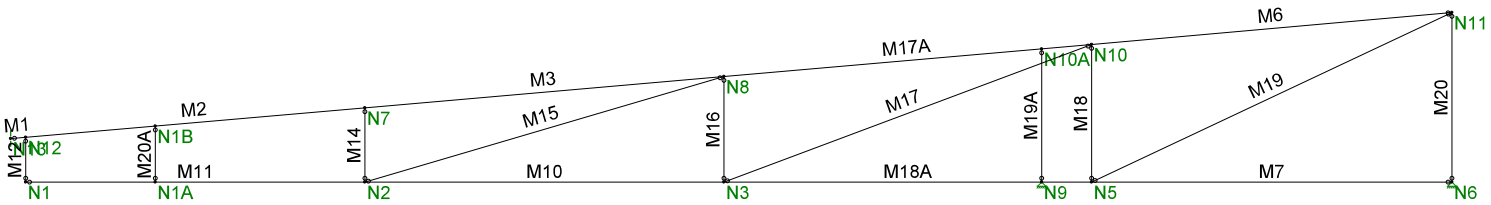
Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.9948	9.182		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

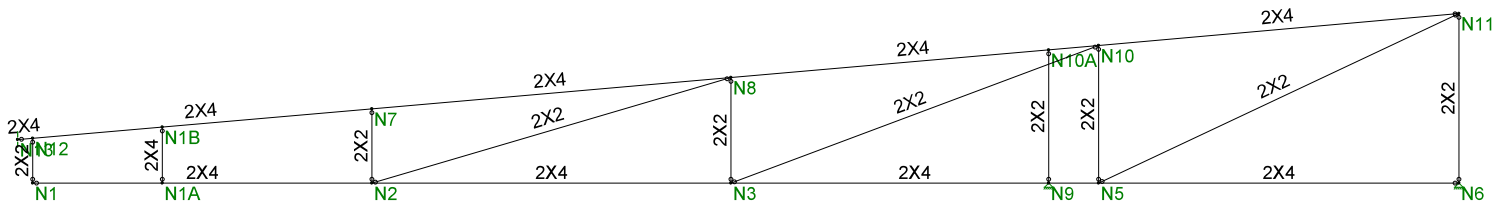
Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.038	0.879
Max Upward from Load Combinations	1.038	0.879
Max Upward from Load Cases	0.598	0.500
D Only	0.439	0.379
+D+Lr	1.038	0.879
+D+0.750Lr	0.888	0.754
+0.60D	0.264	0.228
Lr Only	0.598	0.500

COM-2310004



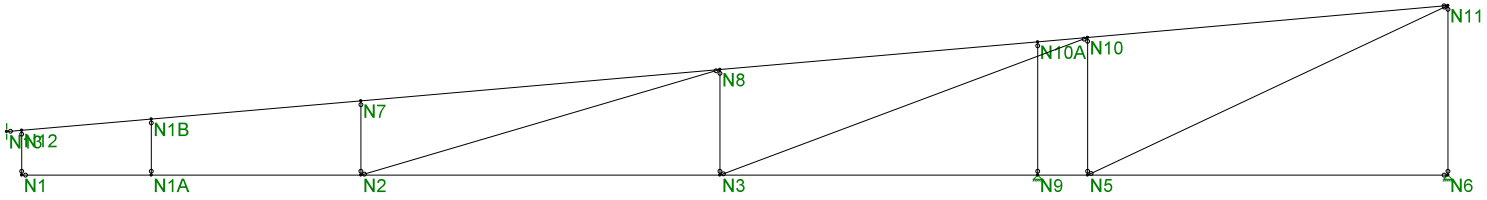
ZFA Structural Engineers	Small Truss	
MAAP		Mar 8, 2023 at 1:34 PM
22689		Small Truss - 26 in Vert Brace.r2d

COM-2310004

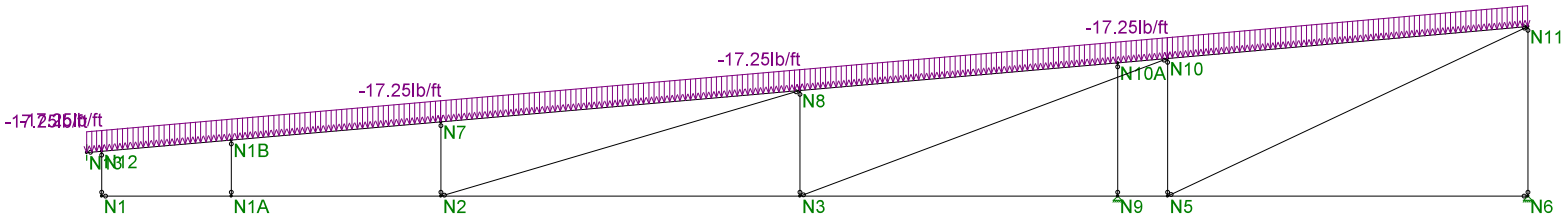


ZFA Structural Engineers	Small Truss	
MAAP		Mar 8, 2023 at 1:36 PM
22689		Small Truss - 26 in Vert Brace.r2d

COM-2310004



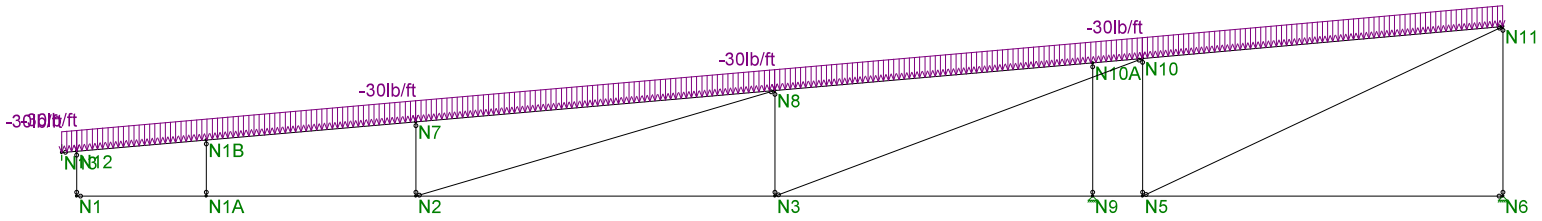
ZFA Structural Engineers	Small Truss	
MAAP		Mar 8, 2023 at 1:31 PM
22689		Small Truss - 26 in Vert Brace.r2d



Loads: BLC 1, Roof Dead Load

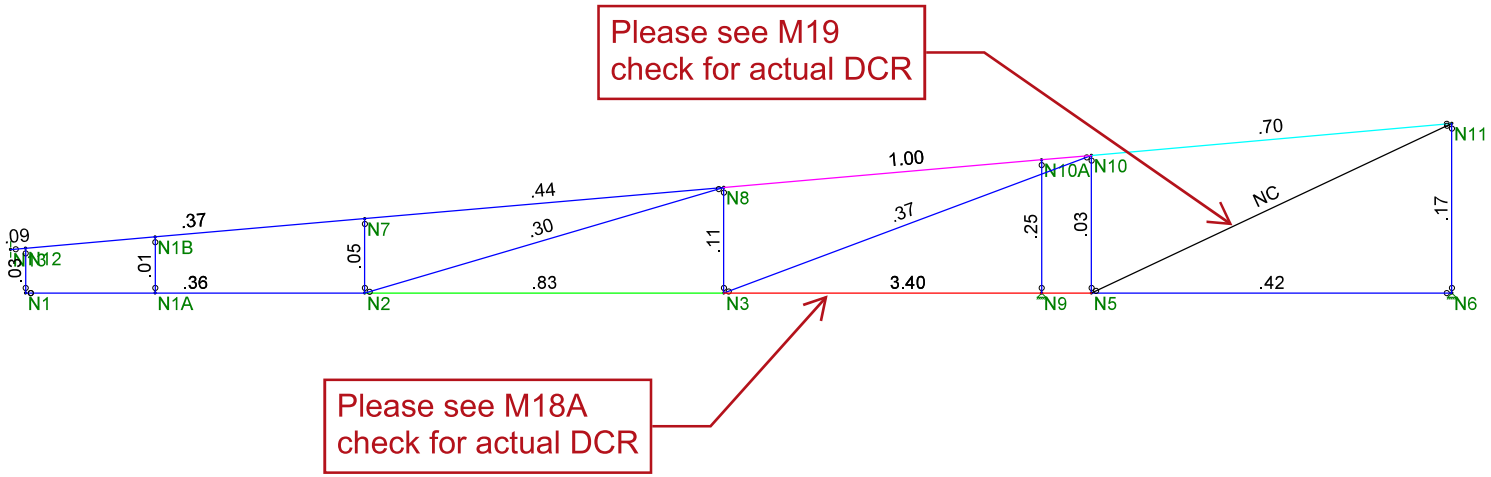
ZFA Structural Engineers	Small Truss	
MAAP		Mar 8, 2023 at 1:36 PM
22689		Small Truss - 26 in Vert Brace.r2d

COM-2310004



Loads: BLC 2, Roof Live Load

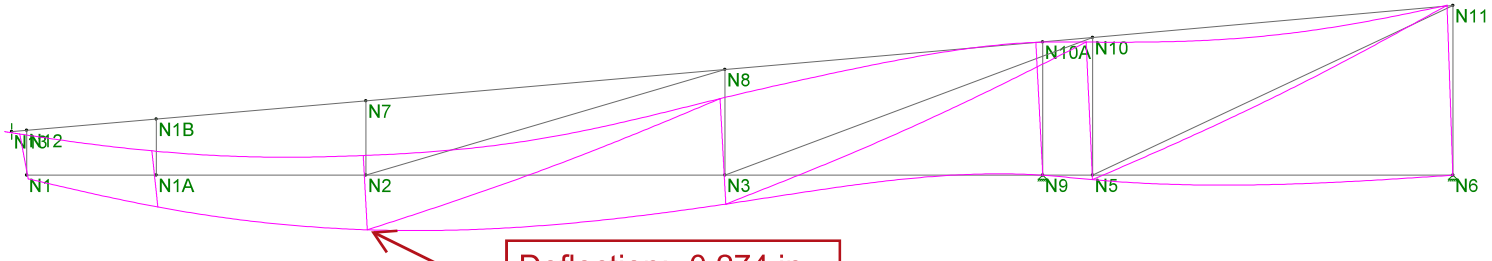
ZFA Structural Engineers	Small Truss	
MAAP		Mar 8, 2023 at 1:37 PM
22689		Small Truss - 26 in Vert Brace.r2d



Member Code Checks Displayed
Results for LC 3, ASCE ASD 3 (a)

ZFA Structural Engineers	Small Truss	
MAAP		Mar 13, 2023 at 11:33 AM
22689		Small Truss - 26 in Vert Brace.r2d

COM-2310004



Total Deflection: $\frac{L}{744}$

Results for LC 1, ASCE ASD 1

ZFA Structural Engineers	Small Truss	
MAAP		Mar 13, 2023 at 10:14 AM
22689		Small Truss - 26 in Vert Brace.r2d

Bnl o`mx	9 YE@Rsqt bst q`kDmfi hmddqr		L`q7+1/12
Cdr hfimdq	9 L @@O		0928 OL
Ina Mtl adq	9 11578		Bgdbj dc Ax9^^^^^
L ncdkM`l d	9 Rl `kkSqt rr		

Wood Section Sets

	K`adk	Rg`od	Sxod	Cdr hfim Khrs	L`sdqh`k	Cdr hfim Qt kdr	@Zhm1\	H 8/ +16/ (---	H / +07/ (Zh--
0	V DA A-1	1W3	UAq`bd	Qdbs`mf t k`q	CE	Sxohb`k	4-14	/ -873	4-248
1	V DA A	1W1	UAq`bd	Qdbs`mf t k`q	CE	Sxohb`k	1-14	/ -311	/ -311
2	BGN QC A	1W3	Ad`l	Qdbs`mf t k`q	CE	Sxohb`k	4-14	/ -873	4-248

Joint Coordinates and Temperatures

	K`adk	WZhm\	X Zhm\	Sdl o ZE\
0	M0A	15	00-150135	/
1	M0@	15	/	/
2	M0	/	/	/
3	M1	57	/	/
4	M2	03/	/	/
5	M4	102-64	/	/
6	M5	175	/	/
7	M6	57	03-803/18	/
8	M7	03/	10-064831	/
0/	M0/@	1/2-64	15-61/2	/
00	M8	1/2-64	/	/
01	M0/	102-64	16-48//44	/
02	M00	175	23	/
03	M01	/	8	/
04	M02	,2	7-626651	/

Basic Load Cases

	AKB Cdr bqhoshmm	B`sdf nqx	WF q`uhsx	X F q`uhsx	I nhms	Onhms	Chrsqhat sdc
0	QnneCd`c Kn`c	CK					4
1	QnneKhud Kn`c	QKK					4
2	V hmcv`qc Kn`c	V K*X					4
3	Rdhrl hb Kn`c	DK			0		
4	Kddv`qc Kn`c	V K,X					4
5	Rdke,V dhfigs	CK		,0			

Load Combinations

	Cdr bqhoshmm	Rnk--	OC--	RQ--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--
0	@RB D @R---	Xdr			CK	0																		
1	@RB D @R---	Xdr			CK	0	KK	0	KKR	0														
2	@RB D @R---	Xdr			CK	0	QKK	0																
3	@RB D @R---	Xdr			CK	0	RK	0	RKM	0														
4	@RB D @R---	Xdr			CK	0	QK	0																
5	@RB D @R---	Xdr			CK	0	KK	/ -64	KKR	/ -64	QKK	/ -64												
6	@RB D @R---	Xdr			CK	0	KK	/ -64	KKR	/ -64	RK	/ -64	RKM	/ -64										
7	@RB D @R---	Xdr			CK	0	KK	/ -64	KKR	/ -64	QK	/ -64												
8	@RB D @R---				CK	0	V ---	/ -5																
0/	@RB D @R---				CK	0	V ---	/ -5																
00	@RB D @R---				CK	0	V ---	/ -34	KK	/ -64	KKR	/ -64	QKK	/ -64										
01	@RB D @R---				CK	0	V ---	/ -34	KK	/ -64	KKR	/ -64	QKK	/ -64										
02	@RB D @R---				CK	0	V ---	/ -34	KK	/ -64	KKR	/ -64	RK	/ -64	RKM	/ -64								

Load Combinations (Continued)

	Cdr bdqosmm	Rnk	OC	RQ	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs	AKB	E`bs
03	@RBD@R---				CK	0	V ---	/ -34	KK	/ -64	KKR	/ -64	RK	/ -64	RKM	/ -64								
04	@RBD@R---				CK	0	V ---	/ -34	KK	/ -64	KKR	/ -64	QK	/ -64										
05	@RBD@R---				CK	0	V ---	/ -34	KK	/ -64	KKR	/ -64	QK	/ -64										
06	@RBD@R---				CK	/ -5	V ---	/ -5																
07	@RBD@R---				CK	/ -5	V ---	/ -5																
08	@RBD@R---				CK	0	DK	/ -6																
1/	@RBD@R---				CK	0	DK	/ -414	KK	/ -64	KKR	/ -64	RK	/ -64	RKM	/ -64								
10	@RBD@R---				CK	/ -5	DK	/ -6																
11	CKNMKX				CK	0																		
12	QKKNMKX				QKK	0																		
13	V K*XNM---				V ---	0																		
14	DKNMKX				DK	0																		

Load Combination Design

	Cdr bdqosmm	@RHE	BC	Rdqulbd	GnsQnkkdc	Bnkc Enql dc	V nnc	Bnmbqdsd	L`rnmqx	@kl hmll	Rs`hmkdrr
0	@RBD@RC 0		/ -8	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
1	@RBD@RC 1			Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
2	@RBD@RC 2'---		0-14	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
3	@RBD@RC 2'---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
4	@RBD@RC 2'---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
5	@RBD@RC 3'---		0-14	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
6	@RBD@RC 3'---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
7	@RBD@RC 3'---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
8	@RBD@RC 4'---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
0/	@RBD@RC 4---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
00	@RBD@RC 5'---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
01	@RBD@RC 5---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
02	@RBD@RC 5'---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
03	@RBD@RC 5---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
04	@RBD@RC 5'---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
05	@RBD@RC 5---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
06	@RBD@RC 6		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
07	@RBD@RC 6@		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
08	@RBD@RC 7		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
1/	@RBD@RC 8		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
10	@RBD@RC 0/		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
11	CKNMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
12	QKKNMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
13	V K*XNMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
14	DKNMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr

Node Reactions

	KB	Mncd K`adk	W Zka\	X Zka\	L Y Z[,es\
0	0	M5	7/ -81	,067-834	KNBJDC
1	0	M02	/	64-282	KNBJDC
2	0	M8	,7/ -81	488-650	/
3	0	M00	MB	MB	KNBJDC
4	0	M0	MB	MB	KNBJDC
5	0	Sns`kr9	/	385-10	

Node Reactions (Continued)

	KB	Mncd K`adk	WZa\	X Za\	L Y Z,es\
6	0	BNF 'hm(9	W9031-565	X908-601	
7	1	M5	7/-81	,067-834	KNBJDC
8	1	M02	/	64-282	KNBJDC
0/	1	M8	,7/-81	488-650	/
00	1	M00	MB	MB	KNBJDC
01	1	M0	MB	MB	KNBJDC
02	1	Sns`kr9	/	385-10	
03	1	BNF 'hm(9	W9031-565	X908-601	
04	2	M5	1//-163	,335-/47	KNBJDC
05	2	M02	/	076-370	KNBJDC
06	2	M8	,1//-163	037/-/31	/
07	2	M00	MB	MB	KNBJDC
08	2	M0	MB	MB	KNBJDC
1/	2	Sns`kr9	/	0110-354	
10	2	BNF 'hm(9	W9030-87	X91/-557	
11	3	M5	7/-81	,067-834	KNBJDC
12	3	M02	/	64-282	KNBJDC
13	3	M8	,7/-81	488-650	/
14	3	M00	MB	MB	KNBJDC
15	3	M0	MB	MB	KNBJDC
16	3	Sns`kr9	/	385-10	
17	3	BNF 'hm(9	W9031-565	X908-601	
18	4	M5	7/-81	,067-834	KNBJDC
2/	4	M02	/	64-282	KNBJDC
20	4	M8	,7/-81	488-650	/
21	4	M00	MB	MB	KNBJDC
22	4	M0	MB	MB	KNBJDC
23	4	Sns`kr9	/	385-10	
24	4	BNF 'hm(9	W9031-565	X908-601	
25	5	M5	06/-324	,268-168	KNBJDC
26	5	M02	/	048-348	KNBJDC
27	5	M8	,06/-324	0148-861	/
28	5	M00	MB	MB	KNBJDC
3/	5	M0	MB	MB	KNBJDC
30	5	Sns`kr9	/	0/3/-040	
31	5	BNF 'hm(9	W9031-/52	X91/-443	
32	6	M5	7/-81	,067-834	KNBJDC
33	6	M02	/	64-282	KNBJDC
34	6	M8	,7/-81	488-650	/
35	6	M00	MB	MB	KNBJDC
36	6	M0	MB	MB	KNBJDC
37	6	Sns`kr9	/	385-10	
38	6	BNF 'hm(9	W9031-565	X908-601	
4/	7	M5	7/-81	,067-834	KNBJDC
40	7	M02	/	64-282	KNBJDC
41	7	M8	,7/-81	488-650	/
42	7	M00	MB	MB	KNBJDC
43	7	M0	MB	MB	KNBJDC
44	7	Sns`kr9	/	385-10	
45	7	BNF 'hm(9	W9031-565	X908-601	

COM-2310004

ZFA STRUCTURAL ENGINEERS North Sacramento Library (project name)

Small Truss - 26 in Vert Brace (section)	MAAP (engineer)	22689 (job #)	03/13/2023 (date)	(page)

M18A with splice as seen in Field.

Axial Load from Risa Model = 1647 Lbs $\Rightarrow \frac{1647 Lbs}{1.6} = 1029 Lbs$

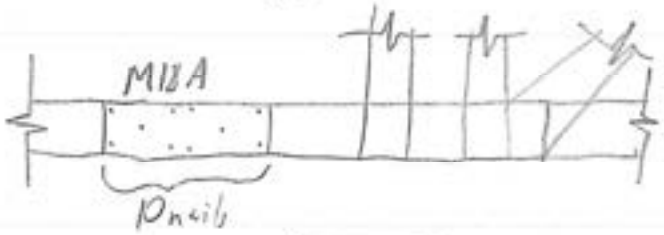
Assuming 16d nails were used.

5 nails on both side

10 nails total.

16d Capacity = 121 Lbs/nail

10 nails $\times \frac{121 Lbs}{nail} = 1210 Lbs$



$DCR = \frac{1029 Lb}{1210 Lbs} = \boxed{85.0\%}$

M19

1x4 Brace

Area = $2.625 in^2$

Axial Load from Risa Model = 1821 Lbs = $\frac{1821 Lbs}{1.6} = 1138 Lbs$

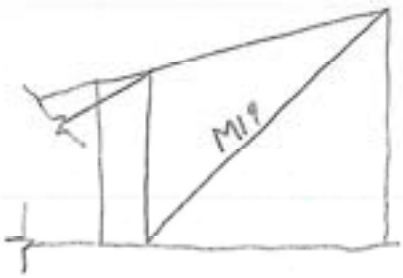
Axial $f_c = \frac{1138 Lbs}{2.625 in^2} \approx 434 psi$

As Stated in Existing Drawings:

WOOD:

U UNLESS OTHERWISE NOTED ON THE DRAWINGS, PROVIDE THE FOLLOWING LUMBER GRADES AND SPECIES AS DEFINED BY WCPA OR WCLIB GRADING RULES:

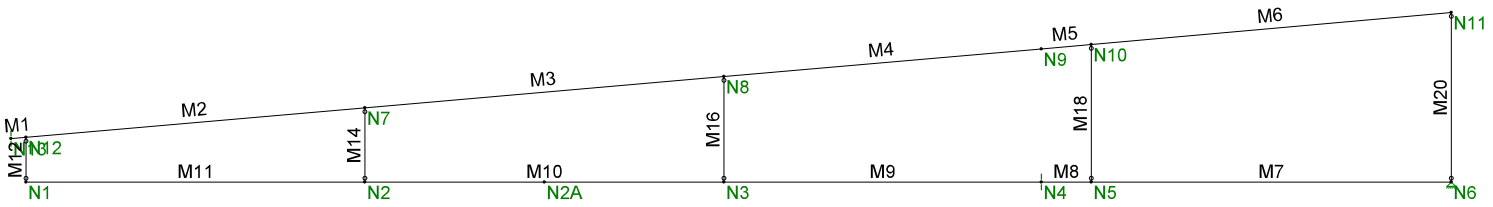
JOISTS, BEAMS, POSTS, TOP PLATES	¶ DOUGLAS FIR (D.F.)
STUDS	STUD OR ¶ D.F.
HEADERS, BLOCKING	¶ D.F.
SILL PLATES	PRESSURE TREATED ¶ D.F.
ALL OTHERS	¶ D.F.



For No. 1 DF, $F_c = 1500 psi$.

$F_c' = F_c \times C_D = 1500 psi (1.6) = 2400 psi$

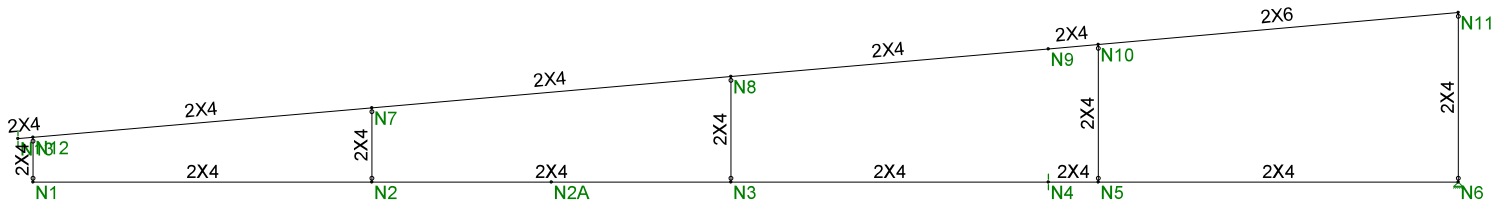
$DCR = \frac{f_c}{F_c'} = \frac{434 psi}{2400 psi} = \boxed{18.1\%}$



Results for LC 3, ASCE ASD 3 (a)
Z-moment Reaction Units are lb and k-ft

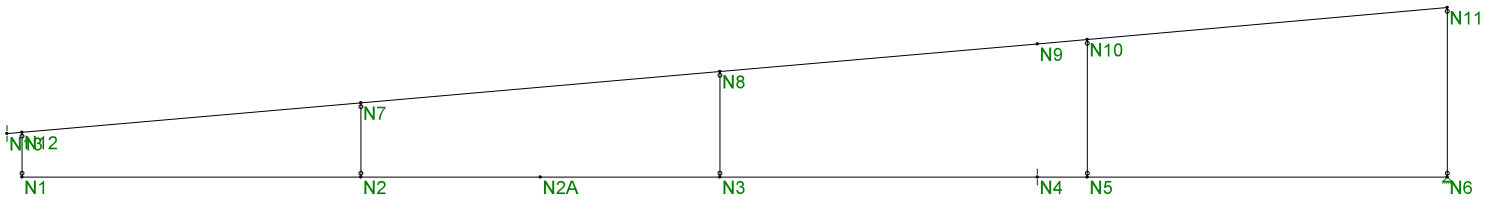
ZFA Structural Engineers	New Small Truss	
MAAP		May 2, 2023 at 2:36 PM
22689		Small Truss New R1.r2d

COM-2310004



Results for LC 3, ASCE ASD 3 (a)
Z-moment Reaction Units are lb and k-ft

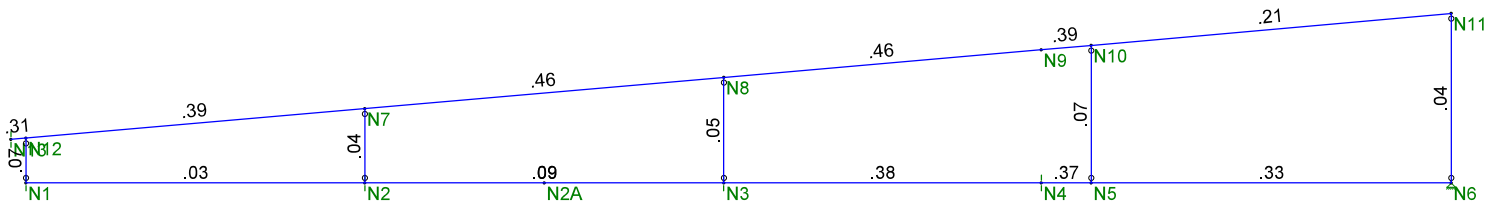
ZFA Structural Engineers	New Small Truss	
MAAP		May 2, 2023 at 2:36 PM
22689		Small Truss New R1.r2d



Results for LC 3, ASCE ASD 3 (a)
Z-moment Reaction Units are lb and k-ft

ZFA Structural Engineers	New Small Truss	
MAAP		May 2, 2023 at 2:44 PM
22689		Small Truss New R1.r2d

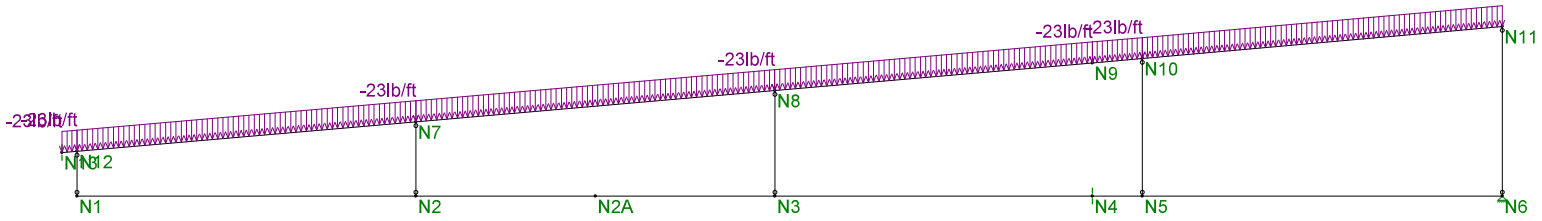
COM-2310004



Member Code Checks Displayed
Results for LC 3, ASCE ASD 3 (a)
Z-moment Reaction Units are lb and k-ft

ZFA Structural Engineers	New Small Truss	
MAAP		May 2, 2023 at 2:42 PM
22689		Small Truss New R1.r2d

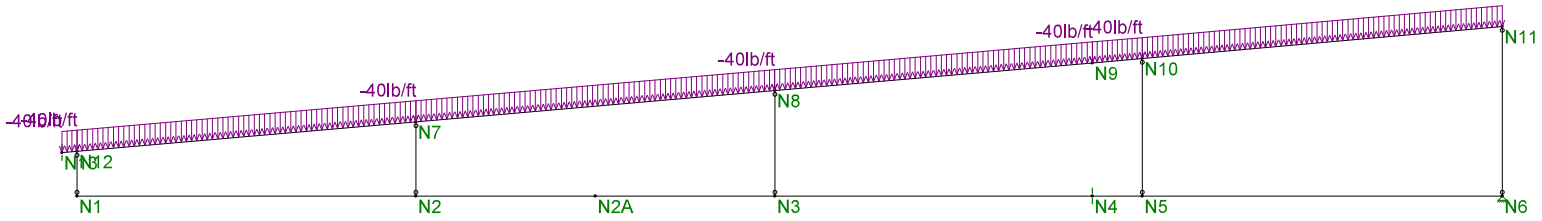
COM-2310004



Loads: BLC 1, Roof Dead Load

ZFA Structural Engineers	New Small Truss	
MAAP		May 2, 2023 at 2:45 PM
22689		Small Truss New R1.r2d

COM-2310004



Because the new truss will have a member underneath to support it, please look at the deflection of "Option 2 Small Truss" to review it's deflection check.

Loads: BLC 2, Roof Live Load

ZFA Structural Engineers	New Small Truss	
MAAP		May 2, 2023 at 2:46 PM
22689		Small Truss New R1.r2d

Wood Section Sets

	K`adk	Rg`od	Sxod	Cdr hfim Khrs	L`sdqh`k	Cdr hfim Qt kdr	@Zhm1\	H 8/ +16/ (---	H / +07/ (Zh--
0	V DA A	1W3	UAq`bd	Qdbs`mf t k`q	CE	Sxohb`k	4-14	/ -873	4-248
1	BGNQC A	1W3	Ad`l	Qdbs`mf t k`q	CE	Sxohb`k	4-14	/ -873	4-248

Wood Design Parameters

	K`adk	Rg`od	Kdmfisg Z--	Kd,nt sZhm\	Kd,hmZhm\	kd,admc sn---	kd,admc an---	J,nt s	J,hm	BU	Bq	Nt srv ---	Hnrv`x
0	L 0	BGNQC A	2-/ 00			Ka nt s							
1	L 1	BGNQC A	57-146	0		Ka nt s							
2	L 2	BGNQC A	61-161	0		Ka nt s							
3	L 3	BGNQC A	52-880	0		Ka nt s							
4	L 4	BGNQC A	0/ -/ 27	0		Ka nt s							
5	L 5	1W5	61-423	0		Ka nt s							
6	L 6	BGNQC A	61-14			Ka nt s							
7	L 7	BGNQC A	0/			Ka nt s							
8	L 8	BGNQC A	52-64			Ka nt s							
0/	L 0/	BGNQC A	61			Ka nt s							
00	L 00	BGNQC A	57			Ka nt s							
01	L 01	V DA A	8										
02	L 03	V DA A	03-803										
03	L 05	V DA A	10-065										
04	L 07	V DA A	16-48										
05	L 1/	V DA A	23										

Joint Coordinates and Temperatures

	K`adk	WZhm\	X Zhm\	Sdl o ZE\
0	M0	/	/	/
1	M1@	0/ 3	/	/
2	M1	57	/	/
3	M2	03/	/	/
4	M3	1/ 2-64	/	/
5	M4	102-64	/	/
6	M5	175	/	/
7	M6	57	03-803/ 18	/
8	M7	03/	10-064831	/
0/	M8	1/ 2-64	15-61/ 234	/
00	M0/	102-64	16-48/ / 44	/
01	M00	175	23	/
02	M01	/	8	/
03	M02	,2	7-626651	/

Basic Load Cases

	AKB Cdr bqhoshmm	B`sdf nqx	WFq`uhsx	X Fq`uhsx	I nhms	Onhms	Chrsqhat sdc
0	QnneCd`c Kn`c	CK					5
1	QnneKhud Kn`c	QKK					5
2	V hmcv`qc Kn`c	V K* X					5
3	Rdhrl hb Kn`c	DK			0		
4	Kddv`qc Kn`c	V K,X					5

Basic Load Cases (Continued)

	AKB Cdr bqtosmm	B`sdf nqx	WFq`uhsx	X Fq`uhsx	I nhms	Onhms	Chrsqhat sdc
5	Rdkq,V dlfi gs	CK		,0			

Load Combinations

	Cdr bqtosmm	Rnk--OC--RQ--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--	AKB	E`bs--
0	@RBD@R---	Xdr	CK	0																						
1	@RBD@R---	Xdr	CK	0	KK	0	KKR	0																		
2	@RBD@R---	Xdr	CK	0	QKK	0																				
3	@RBD@R---	Xdr	CK	0	RK	0	RKM	0																		
4	@RBD@R---	Xdr	CK	0	QK	0																				
5	@RBD@R---	Xdr	CK	0	KK	/ -64	KKR	/ -64	QKK	/ -64																
6	@RBD@R---	Xdr	CK	0	KK	/ -64	KKR	/ -64	RK	/ -64	RKM	/ -64														
7	@RBD@R---	Xdr	CK	0	KK	/ -64	KKR	/ -64	QK	/ -64																
8	@RBD@R---		CK	0	V ---	/ -5																				
0/	@RBD@R---		CK	0	V ---	/ -5																				
00	@RBD@R---		CK	0	V ---	/ -34	KK	/ -64	KKR	/ -64	QKK	/ -64														
01	@RBD@R---		CK	0	V ---	/ -34	KK	/ -64	KKR	/ -64	QKK	/ -64														
02	@RBD@R---		CK	0	V ---	/ -34	KK	/ -64	KKR	/ -64	RK	/ -64	RKM	/ -64												
03	@RBD@R---		CK	0	V ---	/ -34	KK	/ -64	KKR	/ -64	RK	/ -64	RKM	/ -64												
04	@RBD@R---		CK	0	V ---	/ -34	KK	/ -64	KKR	/ -64	QK	/ -64														
05	@RBD@R---		CK	0	V ---	/ -34	KK	/ -64	KKR	/ -64	QK	/ -64														
06	@RBD@R---		CK	/ -5	V ---	/ -5																				
07	@RBD@R---		CK	/ -5	V ---	/ -5																				
08	@RBD@R---		CK	0	DK	/ -6																				
1/	@RBD@R---		CK	0	DK	/ -414	KK	/ -64	KKR	/ -64	RK	/ -64	RKM	/ -64												
10	@RBD@R---		CK	/ -5	DK	/ -6																				
11	CK NMKX	Xdr	CK	0																						
12	QKK NMKX	Xdr	QKK	0																						
13	V K* X NM---		V ---	0																						
14	DK NMKX		DK	0																						

Load Combination Design

	Cdr bqtosmm	@RHE	BC	Rdquhbd	Gns Qnkkdc	Bnkc Enql dc	V nnc	Bnmbqdsd	L`rnmqx	@kl hmil	Rs`hmkdr r
0	@RBD@RC 0		/ -8	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
1	@RBD@RC 1			Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
2	@RBD@RC 2 '---		0-14	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
3	@RBD@RC 2 '---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
4	@RBD@RC 2 '---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
5	@RBD@RC 3 '---		0-14	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
6	@RBD@RC 3 '---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
7	@RBD@RC 3 '---		0-04	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
8	@RBD@RC 4 '---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
0/	@RBD@RC 4---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
00	@RBD@RC 5 '---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
01	@RBD@RC 5---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
02	@RBD@RC 5 '---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
03	@RBD@RC 5---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
04	@RBD@RC 5 '---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
05	@RBD@RC 5---		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
06	@RBD@RC 6		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr

Bnl o`mx 9 YE@Rsqt bst q kDmfi hmdqr
Cdr hfimdq 9 L @@O
Ina Mtl adq 9 11578
L ncdkM`l d 9 Mdv Rl `kkSqt rr

L`x 1+1/ 12
1937 OL
Bgdbj dc Ax9^^^^^

Load Combination Design (Continued)

	Cdr bqhoshmm	@RHE	BC	Rdquhbd	Gns Qnkkdc	Bnkc Enql dc	V nnc	Bnmbqdsd	L`rnmqx	@ktl hmtl	Rs`hmkdr r
07	@RB D @RC 6@		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
08	@RB D @RC 7		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
1/	@RB D @RC 8		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
10	@RB D @RC 0/		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
11	CK NMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
12	QKK NMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
13	V K* X NMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr
14	DK NMKX		0-5	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr	Xdr

Node Reactions (By Combination)

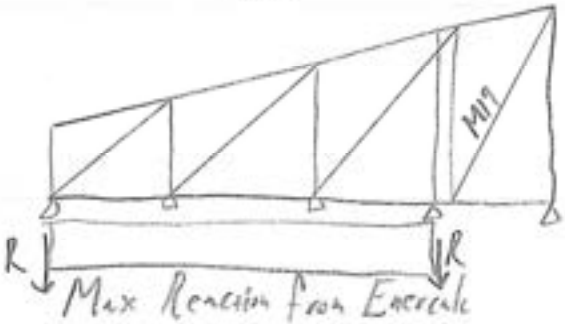
	KB	Mncd K`adk	WZka\	X Zka\	L Y Z, es\
0	0	M5	/	70-271	/
1	0	M3	/	066-325	/
2	0	M02	/	,105-302	/
3	0	M0	/	180-822	/
4	0	M1	/	046-048	/
5	0	M2	/	030-436	/
6	0	M01	KNBJ DC	MB	MB
7	0	Sns`kr 9	/	522-/ 33	
8	0	BNF 'hm(9	W9032-/ 76	X91/ -1/ 5	
0/	1	M5	/	70-271	/
00	1	M3	/	066-325	/
01	1	M02	/	,105-302	/
02	1	M0	/	180-822	/
03	1	M1	/	046-048	/
04	1	M2	/	030-436	/
05	1	M01	KNBJ DC	MB	MB
06	1	Sns`kr 9	/	522-/ 33	
07	1	BNF 'hm(9	W9032-/ 76	X91/ -1/ 5	
08	2	M5	/	088-271	/
1/	2	M3	/	335-30	/
10	2	M02	/	,461-518	/
11	2	M0	/	655-306	/
12	2	M1	/	288-156	/
13	2	M2	/	250-1/ 2	/
14	2	M01	KNBJ DC	MB	MB
15	2	Sns`kr 9	/	05/ / -/ 40	
16	2	BNF 'hm(9	W9031-02	X91/ -770	
17	3	M5	/	70-271	/
18	3	M3	/	066-325	/
2/	3	M02	/	,105-302	/
20	3	M0	/	180-822	/
21	3	M1	/	046-048	/
22	3	M2	/	030-436	/
23	3	M01	KNBJ DC	MB	MB
24	3	Sns`kr 9	/	522-/ 33	
25	3	BNF 'hm(9	W9032-/ 76	X91/ -1/ 5	
26	4	M5	/	70-271	/
27	4	M3	/	066-325	/
28	4	M02	/	,105-302	/

Node Reactions (By Combination) (Continued)

	KB	Mncd K`adk	WZa\	X Za\	L Y Z, es\
3/	4	M0	/	180-822	/
30	4	M1	/	046-048	/
31	4	M2	/	030-436	/
32	4	M01	KNBJ DC	MB	MB
33	4	Sns`kr 9	/	522-/ 33	
34	4	BNF 'hm(9	W9032-/ 76	X91/ -1/ 5	
35	5	M5	/	058-771	/
36	5	M3	/	268-056	/
37	5	M02	/	,372-464	/
38	5	M0	/	536-685	/
4/	5	M1	/	227-63	/
40	5	M2	/	2/ 5-178	/
41	5	M01	KNBJ DC	MB	MB
42	5	Sns`kr 9	/	0247-188	
43	5	BNF 'hm(9	W9031-131	X91/ -7/ 1	
44	6	M5	/	70-271	/
45	6	M3	/	066-325	/
46	6	M02	/	,105-302	/
47	6	M0	/	180-822	/
48	6	M1	/	046-048	/
5/	6	M2	/	030-436	/
50	6	M01	KNBJ DC	MB	MB
51	6	Sns`kr 9	/	522-/ 33	
52	6	BNF 'hm(9	W9032-/ 76	X91/ -1/ 5	
53	7	M5	/	70-271	/
54	7	M3	/	066-325	/
55	7	M02	/	,105-302	/
56	7	M0	/	180-822	/
57	7	M1	/	046-048	/
58	7	M2	/	030-436	/
6/	7	M01	KNBJ DC	MB	MB
60	7	Sns`kr 9	/	522-/ 33	
61	7	BNF 'hm(9	W9032-/ 76	X91/ -1/ 5	
62	11	M5	/	70-271	/
63	11	M3	/	066-325	/
64	11	M02	/	,105-302	/
65	11	M0	/	180-822	/
66	11	M1	/	046-048	/
67	11	M2	/	030-436	/
68	11	M01	KNBJ DC	MB	MB
7/	11	Sns`kr 9	/	522-/ 33	
70	11	BNF 'hm(9	W9032-/ 76	X91/ -1/ 5	
71	12	M5	/	007	/
72	12	M3	/	157-863	/
73	12	M02	/	,245-104	/
74	12	M0	/	363-372	/
75	12	M1	/	131-0/ 8	/
76	12	M2	/	108-545	/
77	12	M01	KNBJ DC	MB	MB
78	12	Sns`kr 9	/	856-/ / 6	
8/	12	BNF 'hm(9	W9030-4/ 3	X910-212	

ZFA STRUCTURAL ENGINEERS North Sacramento Library (project name)

Small Trus, New and Existing	MAAP	22609	04-18-2023	
section	engineer	job #	date	page



R = 630Lbs

Using (3) SDWS22400DB, x 4in Length, 405Lbs/screw x3 screws = 1215Lbs

$DCR = \frac{Demand}{Capacity} = \frac{630 Lbs}{1215 Lbs} =$ **51.9%**

M19 Risa Error

$\frac{l_e}{d} > 50$

$l_{e,M19} = 79.85in$

$d_1 = 3.5in$, $d_2 = 1.5in$

$\frac{l_{e,M19}}{d_1} = \frac{79.85in}{3.5in} \approx 23$ ✓

$\frac{l_{e,M19}}{d_2} = \frac{79.85in}{1.5in} \approx 53$

53 is close enough to 50 to pass slenderness check. **OK**

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: Option 2 Small Truss

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

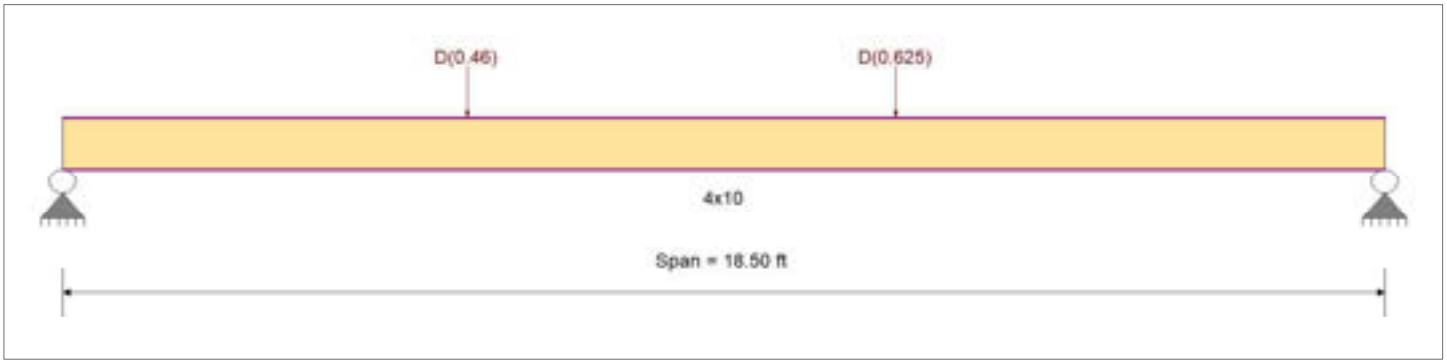
Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,350.0 psi
Fb -	1,350.0 psi
Fc - Prll	925.0 psi
Fc - Perp	625.0 psi
Fv	170.0 psi
Ft	675.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Point Load : D = 0.460 k @ 5.667 ft
Point Load : D = 0.6250 k @ 11.667 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.648 : 1	Maximum Shear Stress Ratio	=	0.185 : 1
Section used for this span		4x10	Section used for this span		4x10
fb: Actual	=	945.34 psi	fv: Actual	=	28.25 psi
F'b	=	1,458.00 psi	F'v	=	153.00 psi
Load Combination		D Only	Load Combination		D Only
Location of maximum on span	=	11.613 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.632 in	Ratio =	351 >=240	Span: 1 : D Only
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 18.50 ft	1	0.648	0.185	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	3.93	945.3	1,458.0	0.61	28.2	153.0
+0.60D					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.50 ft	1	0.219	0.062	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	2.36	567.2	2,592.0	0.37	16.9	272.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
D Only	1	0.6316	9.318		0.0000	0.000

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title: North Sacramento Library
Engineer: MAAP
Project ID: 22689
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.2.14 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2022

DESCRIPTION: Option 2 Small Truss

Vertical Reactions

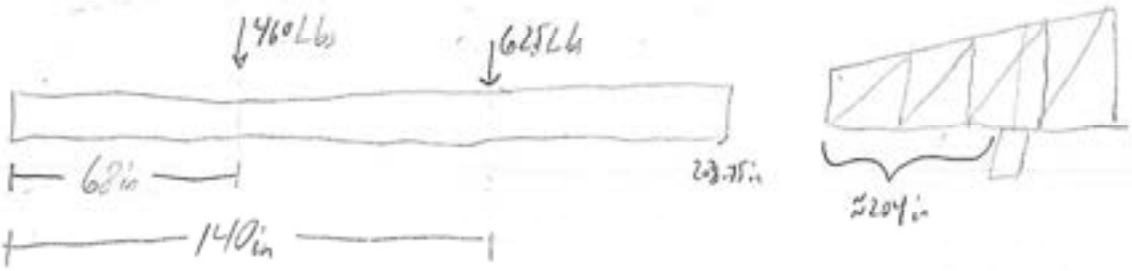
Support notation : Far left is #1 Values in KIPS

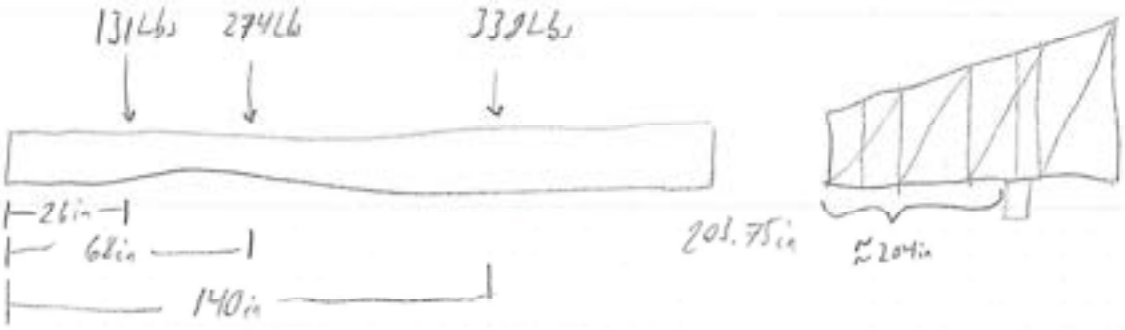
Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.615	0.600
Max Upward from Load Combinations	0.369	0.360
Max Upward from Load Cases	0.615	0.600
D Only	0.615	0.600
+0.60D	0.369	0.360

COM-2310004

ZFA STRUCTURAL ENGINEERS North Sacramento Library (project name)

Option 2 Truss Strengthening	MAAP	22689	03-08-2023	
section	engineer	job #	date	page





Max Reaction

630 Lbs from Enercalc.

LUS48 Capacity = 1060 Lbs

DCR = 630 Lbs / 1060 Lbs = 59.4%

Nailing of Ledger to Wall

SDS25312 Length Screw Capacity: 340 lbs/screw
2 Screws = 680 lbs

DCR = 630 lbs / 680 lbs = 92.6%

ZFA STRUCTURAL ENGINEERS North Sac Library
project name

New Small Truss Axial Loads and (E) Post | MAAP | 22689 | 04-18-2023 |
section | engineer | job # | date | page

Axial Loads

M19: 465 Lbs ÷ 1.25 = 372 Lbs

M17: 1230 Lbs ÷ 1.25 = 984 Lbs

M15: 941 Lbs ÷ 1.25 = 753 Lbs

M13: 1672 Lbs ÷ 1.25 = 1338 Lbs

Number of Screws (6)

$\frac{255 \text{ Lbs}}{\text{screw}} \times 6 \text{ screws} = 1530 \text{ Lbs}$

$DCR = \frac{\text{Max Demand}}{\text{Capacity}} = \frac{1338 \text{ Lbs}}{1530 \text{ Lbs}} \approx \boxed{87.5\%}$

Gusset Plate/Truss Plate Check:

From ESR-2762

AS-20, plate parallel to Load and wood grain:

248 psi

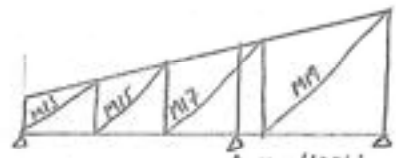
AS256B = $2\frac{1}{2}'' \times 6'' = 15 \text{ in}^2$

$\frac{248 \text{ Lbs}}{\text{in}^2} \times 15 \text{ in}^2 = 3720 \text{ Lbs}$

$DCR = \frac{\text{Max Demand}}{\text{Capacity}} = \frac{1338 \text{ Lbs}}{3720 \text{ Lbs}} = \boxed{36\%}$

Using SDWS 223008B w/ 3 in Length

Capacity 255 Lbs/Screw



DL = 435 Lbs

RLL = 637 Lbs

$\frac{1072 \text{ Lbs}}{2 \text{ ft}} = 536 \text{ plf} \times 18.5 \text{ ft} = 9916 \text{ Lbs}$

On 6x6 existing post, assuming DF No. 1, $F_c' = 1000 \text{ psi} \times 1.25 = 1250 \text{ psi}$

Demand: $\frac{9916 \text{ Lbs}}{(5.5 \text{ in})^2} = 328 \text{ psi}$

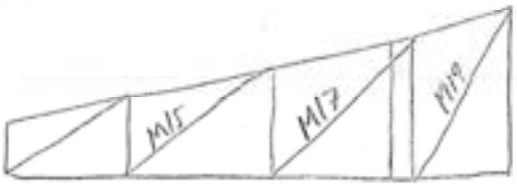
$DCR = \frac{328 \text{ psi}}{1250 \text{ psi}} \approx \boxed{26.2\%}$ OK

COM-2310004

ZFA STRUCTURAL ENGINEERS North Sac Library (project name)

SDWS Axial Check | MAP | 22689 | 04-18-2023 | (page)
section | engineer | job # | date | page

SDWS23300DB x 3'in Length
For 1½" side member, Capacity is 255 Lbs



For all trusses, (E) and (N)

Tension from M17 = 1270 Lbs ÷ 1.6 = 794 Lbs
Tension from M15 = 945 Lbs ÷ 1.6 = 591 Lbs
Tension from M19 = 497 Lbs ÷ 1.6 = 311 Lbs

Length of M17 = 79in Shear of M17 = $\frac{794 Lbs}{79 in}$
Length of M15 = 75in Shear of M15 = $\frac{591 Lbs}{75 in}$
Length of M19 = 80in Shear of M19 = $\frac{311 Lbs}{80 in}$

Spacing for M17 = $\frac{79 in}{794 Lbs} \times 255 Lbs \approx 25$ in
Spacing for M15 = $\frac{75 in}{591 Lbs} \times 255 Lbs \approx 32$ in
Spacing for M19 = $\frac{80 in}{311 Lbs} \times 255 Lbs \approx 66$ in

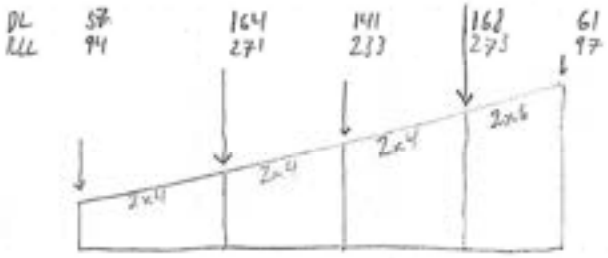
12in spacing for SDWS is OK

For 12" spacing, DCR = $\frac{Demand}{Capacity} = \frac{\frac{794 Lbs}{79 in}}{\frac{255 Lbs}{12 in}} \approx$ 47.3 %

COM-2310004

ZFA STRUCTURAL ENGINEERS North Sacramento Library
project name

Screw Connections for new truss	MAP	22689	05-02-2023	
section	engineer	job #	date	page



2x4 and 2x4 Connection.

Using (4)-#9x3" WD Screws

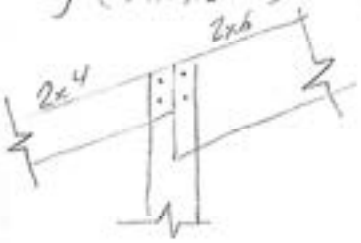
Capacity = $\frac{135 Lbs}{screw} \times 4 screws = 540 Lbs$

Demand: 164+271 = 435 Lbs

DCR = $\frac{435 Lbs}{540 Lbs} \approx$ **80.6%**

2x4 and 2x6 Connection

Using (4)-#9x3" WD Screws



Capacity = $\frac{135 Lbs}{screw} \times 4 screws = 540 Lbs$

Demand = 168+273 = 441 Lbs

DCR = $\frac{441 Lbs}{540 Lbs} \approx$ **81.7%**

ZFA STRUCTURAL ENGINEERS
Job #22689
Design Criteria

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 41

DETAILED DESIGN CRITERIA

BUILDING CODE

Governing Code:	2022 California Building Code
Authority Having Jurisdiction:	City of Sacramento
Local Codes or Amendments:	N/A



SEOR STAMP

BUILDING SYSTEM DESCRIPTION

Date of Construction:	1940
No. Stories:	1
Footprint:	19800 ft^2
Floor Area:	19800 ft^2
Roof Area:	19800 ft^2
Mean Building Height:	14.5 ft
Roof Pitch:	0.00 :12

Building Use:	Public Building
Gravity System:	Wood Bearing Walls
Diaphragm System:	Plywood Sheathing
Foundation System:	Mat Foundation

SEISMIC DESIGN PARAMETERS

				ASCE 41-17 Reference UNO:
DSA Project?	NO			
Latitude:	38.604 deg	Longitude:	-121.463 deg	
Soil Site Class =	D (Default)	Per Geotech Report, Site Class D otherwise		*USGS*
Risk Category:	II			*ASCE 7 Table 1.5-1*
Diaphragm=	Flexible Diaphragm	Plywood Sheathing		
Building System, N-S:	RM1	Reinforced Masonry Bearing Walls w/ Flexible Diaphragms		*Table 3-1*
Building System, E-W:	RM1	Reinforced Masonry Bearing Walls w/ Flexible Diaphragms		*Table 3-1*
$C_{t,\ N-S}$ =	0.02	Approximate Period Parameter, Ct, N-S		*Section 4.4.2.4*
$C_{t,\ E-W}$ =	0.02	Approximate Period Parameter, Ct, E-W		*Section 4.4.2.4*
β_{N-S} =	0.75	Approximate Period Parameter, β, N-S		*Section 4.4.2.4*
β_{E-W} =	0.75	Approximate Period Parameter, β, E-W		*Section 4.4.2.4*
$T_{a,\ N-S}$=	0.149 sec	Approximate Fundamental Period, N-S		*Section 4.4.2.4*
$T_{a,\ E-W}$ =	0.149 sec	Approximate Fundamental Period, E-W		*Section 4.4.2.4*
T_L =	12.000 sec	Long Period Transistion Period		*ASCE 7 Section 11.4.5*
Seismicity:	High			*Table 2-5*

TIER 1 SEISMIC EVALUATION PARAMETERS

Seismic Hazard Level:	BSE-2E	5%/50 years (965 year mean return)	
Performance Objective:	LS	S-3: Life Safety	*Table 2-1 & 2-2*
S_S =	0.404 g	Mapped spectral response acceleration parameter	*USGS*
S_1 =	0.188 g	Mapped spectral response acceleration parameter	*USGS*
S_{XS} =	0.597 g	Mapped spectral response acceleration parameter	*USGS*
S_{X1} =	0.418 g	Mapped spectral response acceleration parameter	*USGS*
$S_{a,\ N-S}$ =	0.597 g	Spectral Response Acceleration, N-S	*Section 4.4.2.3*
$S_{a,\ E-W}$ =	0.597 g	Spectral Response Acceleration, E-W	*Section 4.4.2.3*
C_{N-S} =	1.000	Modification Factor	*Table 4-8*
C_{E-W} =	1.000	Modification Factor	*Table 4-8*
V_{N-S} =	0.597 *W	Pseudo-Seismic Base Shear, N-S	*Section 4.4.2.1*
V_{E-W} =	0.597 *W	Pseudo-Seismic Base Shear, E-W	*Section 4.4.2.1*

DETAILED DESIGN CRITERIA

TIER 2 / 3 SEISMIC EVALUATION PARAMETERS (HAZARD LEVEL A)

Seismic Hazard Level:	BSE-1E	20%/50 years (225 year mean return)	
Performance Objective:	LS	S-3: Life Safety	*Table 2-1 & 2-2*
S_S =	0.223 g	Mapped spectral response acceleration parameter	*USGS*
S_1 =	0.102 g	Mapped spectral response acceleration parameter	*USGS*
S_{XS} =	0.357 g	Mapped spectral response acceleration parameter	*USGS*
S_{X1} =	0.245 g	Mapped spectral response acceleration parameter	*USGS*
$C_{1,\ N\text{-}S}$ =	1.000	Inelastic-to-elastic displacement factor	*Equation 7-22*
$C_{2,\ N\text{-}S}$ =	1.000	Hysteresis shape factor	*Equation 7-23*
Alternate $(C_1C_2)_{N\text{-}S}$ =	1.400	2 ≤ mmax < 6	*Table 7-3*
Use Alternate $(C_1C_2)_{N\text{-}S}$?	Yes		
$(C_1C_2)_{N\text{-}S}$ =	1.400		
$C_{m,\ N\text{-}S}$ =	1.000	Effective mass factor	*Table 7-4*
$C_{1,\ E\text{-}W}$ =	1.000	Inelastic-to-elastic displacement factor	*Equation 7-22*
$C_{2,\ E\text{-}W}$ =	1.000	Hysteresis shape factor	*Equation 7-23*
Alternate $(C_1C_2)_{E\text{-}W}$ =	1.400	2 ≤ mmax < 6	*Table 7-3*
Use Alternate $(C_1C_2)_{E\text{-}W}$?	Yes		
$(C_1C_2)_{E\text{-}W}$ =	1.400		
$C_{m,\ E\text{-}W}$ =	1.000	Effective mass factor	*Table 7-4*
$S_{a,N\text{-}S}$ =	0.356	Spectral Response Acceleration	*Section 2.4.1.7*
$S_{a,E\text{-}W}$ =	0.356	Spectral Response Acceleration	*Section 2.4.1.7*
$V_{N\text{-}S}$ =	0.499 *W	Pseudo-Seismic Base Shear, N-S	*Equation 7-21*
$V_{E\text{-}W}$ =	0.499 *W	Pseudo-Seismic Base Shear, E-W	*Equation 7-21*

TIER 2 / 3 SEISMIC EVALUATION PARAMETERS (HAZARD LEVEL B)

Seismic Hazard Level:	BSE-2E	5%/50 years (965 year mean return)	
Performance Objective:	LS	S-3: Life Safety	*Table 2-1 & 2-2*
S_S =	0.404 g	Mapped spectral response acceleration parameter	*USGS*
S_1 =	0.188 g	Mapped spectral response acceleration parameter	*USGS*
S_{XS} =	0.597 g	Mapped spectral response acceleration parameter	*USGS*
S_{X1} =	0.418 g	Mapped spectral response acceleration parameter	*USGS*
$C_{1,\ N\text{-}S}$ =	1.000	Inelastic-to-elastic displacement factor	*Equation 7-22*
$C_{2,\ N\text{-}S}$ =	1.000	Hysteresis shape factor	*Equation 7-23*
Alternate $(C_1C_2)_{N\text{-}S}$ =	1.400	2 ≤ mmax < 6	*Table 7-3*
Use Alternate $(C_1C_2)_{N\text{-}S}$?	Yes		
$(C_1C_2)_{N\text{-}S}$ =	1.400		
$C_{m,\ N\text{-}S}$ =	1.000	Effective mass factor	*Table 7-4*
$C_{1,\ E\text{-}W}$ =	1.000	Inelastic-to-elastic displacement factor	*Equation 7-22*
$C_{2,\ E\text{-}W}$ =	1.000	Hysteresis shape factor	*Equation 7-23*
Alternate $(C_1C_2)_{E\text{-}W}$ =	1.400	2 ≤ mmax < 6	*Table 7-3*
Use Alternate $(C_1C_2)_{E\text{-}W}$?	Yes		
$(C_1C_2)_{E\text{-}W}$ =	1.400		
$C_{m,\ E\text{-}W}$ =	1.000	Effective mass factor	*Table 7-4*
$S_{a,N\text{-}S}$ =	0.596	Spectral Response Acceleration	*Section 2.4.1.7*
$S_{a,E\text{-}W}$ =	0.596	Spectral Response Acceleration	*Section 2.4.1.7*
$V_{N\text{-}S}$ =	0.834 *W	Pseudo-Seismic Base Shear, N-S	*Equation 7-21*
$V_{E\text{-}W}$ =	0.834 *W	Pseudo-Seismic Base Shear, E-W	*Equation 7-21*

DETAILED DESIGN CRITERIA

STEEL CONNECTORS:

Knowledge factor, κ	0.75	Steel Connectors Knowledge Factor	*Table 6-1*
Shear stud connectors, f_u =	65 ksi	ASTM A108	
Machine Bolts, f_u =	58 ksi	ASTM A307	
High Strength Bolts, f_u =	120 ksi	ASTM A325	
Anchor Bolts, f_y =	36 ksi	ASTM F1554, Grade 36 or ASTM A307	
Anchor Bolts, f_u =	58 ksi	ASTM F1554, Grade 36 or ASTM A307	
Threaded Rods, f_y =	36 ksi	ASTM F1554, Grade 36 or ASTM A307	
Threaded Rods, f_u =	58 ksi	ASTM F1554, Grade 36 or ASTM A307	
Weld F_{EXX} =	70 ksi	Weld Strength	

MASONRY:

Knowledge factor, κ	0.75	Masonry Knowledge Factor	*Table 6-1*
Masonry, f'_m =	600 psi	Solid Units (Unreinforced)	*Table 11-2*
Masonry, f'_{me} =	780 psi	Solid Units (Unreinforced)	*Table 11-1*
Unit Weight =	135 pcf	ASTM C90, Normal Weight	

WOOD CONSTRUCTION:

Knowledge Factor, κ	0.75	Wood Knowledge Factor	*Table 6-1*
6x Posts, F_b =	1200 psi	Douglas Fir #1	
6x Beam, F_b =	1350 psi	Douglas Fir #1	
4x Posts & Beams, F_b =	1000 psi	Douglas Fir #1	
2x Joists & Rafters, F_b =	900 psi	Douglas Fir #2	
2x Studs, F_b =	900 psi	Douglas Fir #2	
Sheathing	PS1 / PS2		
Connections	Simpson Strong		
Glued-Laminated Beam (GLB), F_b =	2400 psi	24F-V4 (DF/DF) simple span, 24F-V8 (DF/DF) continuous s	
Exterior GLB, F_b =	2000 psi	20F-V12 (AC/AC) simple span, 20F-V13 (AC/AC) continuou	
Parallel Strand Lumber (PSL), F_b =	2900 psi	Grade 2.0E	
Laminated Veneer Lumber (LVL), F_b =	2600 psi	Grade 1.9E	
Laminated Strand Lumber (LSL), F_b =	2600 psi	Grade 1.9E	

Out-of-Plane Anchorage

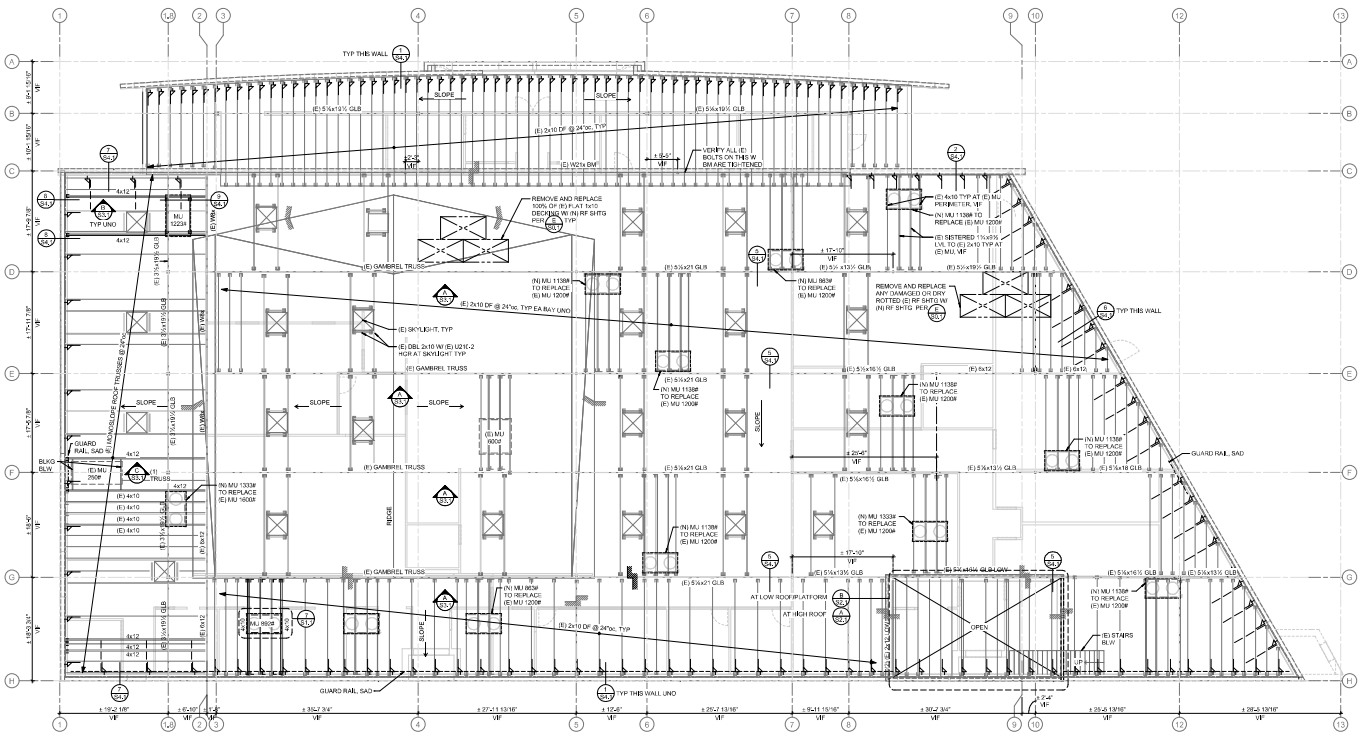
COM-2310004

ZFA STRUCTURAL ENGINEERS

ZFA Job #22689
Hold Down

Engineer: MAAP
Date: 03/08/2023

North Sacramento Library



Model No.	Ga.	Dimensions (in.)					Fasteners (in.)		Minimum Wood Member Size (in.)	Allowable Tension Loads (160)		
		W	H	B	CL	SO	Anchor Bolt Dia. (in.)	Wood Fasteners		DF/SP	SPF/HF	Deflection at Allowable Load (in.)
HDU5-SDS2.5	14	3	13 3/16	3 1/4	1 5/16	1 3/8	5/8	(14) 1/4 x 2 1/2 SDS	3 x 3 1/2	5,645	4,340	0.115

Model No.	Ga.	Dimensions (in.)			SO (in.)	Fasteners (in.)		Minimum Wood Member Size (in.)	Allowable Tension Loads (160)		Deflection at Highest Allowable Load (in.)
		W	L	CL		Anchor Rod Diameter	Wood Fasteners		DF/SP	SPF/HF	
LTTP2	10	2 9/16	14 15/16	1 1/8	7/16	1/2, 5/8, 3/4	(15) 0.148 x 2 1/2	1 1/2 x 3 1/2 (narrow edge)[4,5]	1,845	1,695	0.104
						1/2	(12) 0.148 x 1 1/2	1 1/2 x 3 1/2	1,680[6]	1,545[6]	0.138
						5/8, 3/4			2,135	1,965	0.112
						1/2	(12) #9 x 1 1/2" SD	1 1/2 x 3 1/2	2,320	1,970	0.112
						5/8, 3/4			2,570	2,045	0.136
						1/2, 5/8, 3/4	(12) 0.148 x 2 1/2	3 x 3 1/2	2,275	2,230	0.128
LTTI31	18	3 3/4	31	1 3/8	1/4	5/8	(18) 0.148 x 1 1/2	3 x 3 1/2	1,350	1,160	0.193
HTT4	11	2 1/2	12 3/8	1 5/16	7/16	5/8	(18) 0.148 x 1 1/2	1 1/2 x 3 1/2	3,000	2,580	0.090
							(18) 0.148 x 1 1/2	3 x 3 1/2	3,610	3,105	0.086
							(18) 0.162 x 2 1/2	3 x 3 1/2	4,235	3,640	0.123
							(18) #10 x 1 1/2" SD	1 1/2 x 5 1/2	4,455	3,830	0.112
							(18) #10 x 1 1/2" SD	3 x 3 1/2	4,455	3,830	0.112

ZFA STRUCTURAL ENGINEERS
Job #22689
ASCE 41 Typical Wall OOP Par. 1

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 41

Out-of-Plane Wall Anchorage to Diphragms per ASCE 41 §7.2.11.1

$F_p = 0.4\, S_{XS} k_a k_h X W_p$

$k_h =$ 1.0

$k_a = 1 + L_f/100$

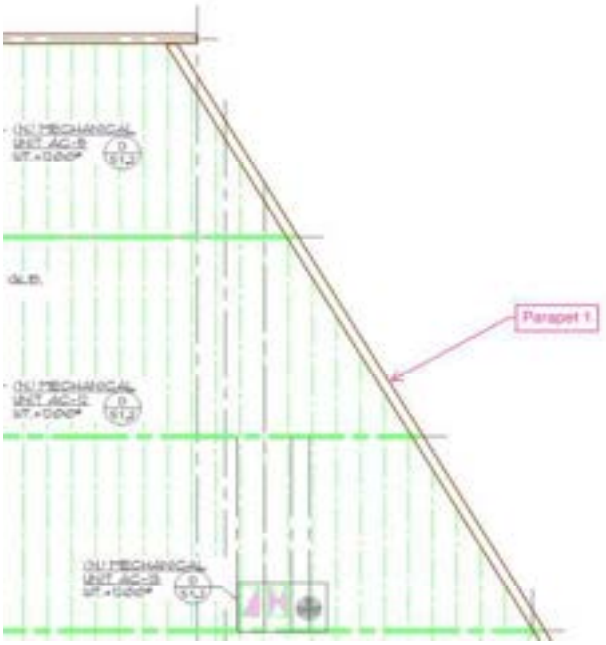
BSE-1 S_{XS} =	0.357	
X_{S-3} =	1.3	ASCE 41 Table 7-1
BSE-1 S_{XS} * X_{S-3} =	0.46	
BSE-2 S_{XS} =	0.597	
X_{S-5} =	0.9	ASCE 41 Table 7-1
BSE-2 S_{XS} * X_{S-5} =	0.54	

BSE-2 governs

F_p =	0.216	$k_a W_p$
H_r =	14.5	ft
H_p =	3.166667	ft
Wall Thickness	7.625	in
Trib Area	6.62	ft^2
CMU Weight	125	pcf
W_p	828	plf
Length of Diaphragm, L_f =	100	ft
k_a =	2	ft
F_p =	0.432	W_p
CMU F_p =	358	plf

Diaphragm Condition: Long Direction

R roof =	369	plf
R base =	152	plf
Max Anchor Spacing	6	ft
F_p Roof =	2214	lbs



Holddown Check

Holddown Type =	HTT4	
Number of Holddowns, n =	1	
Min member	1.5x3.5	
T[Ult] =	3000	lbs
DCR =	**0.74**	

ZFA STRUCTURAL ENGINEERS

Job #22689
ASCE 41 Typical Wall OOP Par. 1

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 41

Epoxy Anchorage Check

Spacing between anchors =	0	in	
Min from edge =	6.5	in	
Bolt type =	HY 200-A V3 + threaded rod 5.8 5/8		
N[se] =	16384	lbs	Steel Strength
N[b] =	2870	lbs	Concrete Breakout
N[a0] =	3634	lbs	Bond Strength
N =	2870	lbs	
DCR =	**0.77**		

ZFA STRUCTURAL ENGINEERS
Job #22689
ASCE 41 Typical Wall OOP Par. 2

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 41

Out-of-Plane Wall Anchorage to Diphragms per ASCE 41 §7.2.11.1

$F_p = 0.4\, S_{XS} k_a k_h X W_p$

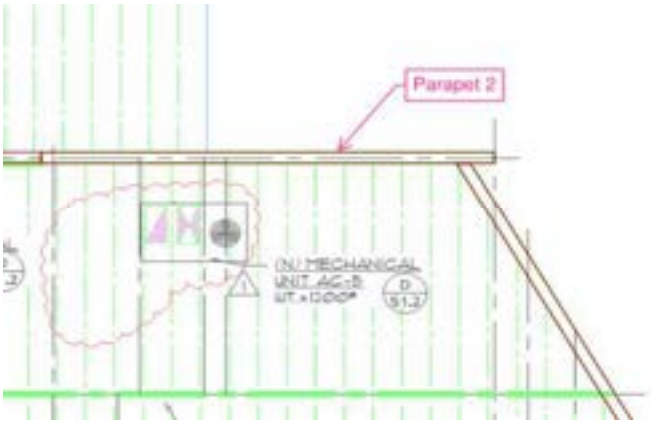
$k_h =$ 1.0

$k_a = 1 + L_f/100$

BSE-1 S_{XS} =	0.357	
X_{S-3} =	1.3	ASCE 41 Table 7-1
BSE-1 S_{XS} * X_{S-3} =	0.46	
BSE-2 S_{XS} =	0.597	
X_{S-5} =	0.9	ASCE 41 Table 7-1
BSE-2 S_{XS} * X_{S-5} =	0.54	

BSE-2 governs

F_p =	0.216	$k_a W_p$
H_r =	14.5	ft
H_p =	11.666667	ft
Wall Thickness	11.625	in
Trib Area	18.33	ft^2
CMU Weight	125	pcf
W_p	2291	plf
Length of Diaphragm, L_f =	100	ft
k_a =	2	ft
F_p =	0.432	W_p
CMU F_p =	990	plf



Diaphragm Condition: Long Direction

R roof =	1235	plf
R base =	14	plf
Max Anchor Spacing	4	ft
F_p Roof =	4940	lbs

Holddown Check

Holddown Type =	HDU5	
Number of Holddowns, n =	1	
Min member	3x3.5	
T[Ult] =	5645	lbs
DCR =	**0.88**	

ZFA STRUCTURAL ENGINEERS

Job #22689
ASCE 41 Typical Wall OOP Par. 2

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 41

Epoxy Anchorage Check

Spacing between anchors =	0	in	
Min from edge =	6.5	in	
Bolt type =	HY 200-A V3 + threaded rod 5.8 5/8		
N[se] =	16384	lbs	Steel Strength
N[b] =	5447	lbs	Concrete Breakout
N[a0] =	9084	lbs	Bond Strength
N =	5447	lbs	
DCR =	**0.91**		

ZFA STRUCTURAL ENGINEERS
Job #22689
ASCE 41 Typical Wall OOP Par. 3

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 41

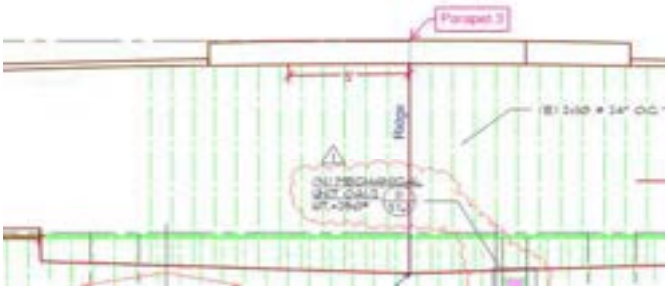
Out-of-Plane Wall Anchorage to Diphragms per ASCE 41 §7.2.11.1

$F_p = 0.4\ S_{XS} k_a k_h X W_p$
$k_h =$ 1.0
$k_a = 1 + L_f/100$

BSE-1 S_{XS} =	0.357	
X_{S-3} =	1.3	ASCE 41 Table 7-1
BSE-1 S_{XS} * X_{S-3} =	0.46	
BSE-2 S_{XS} =	0.597	
X_{S-5} =	0.9	ASCE 41 Table 7-1
BSE-2 S_{XS} * X_{S-5} =	0.54	

BSE-2 governs

F_p =	0.216	$k_a W_p$
H_r =	14.5	ft
H_p =	15	ft
Wall Thickness	7.625	in
Trib Area	14.14	ft^2
CMU Weight	125	pcf
W_p	1768	plf
Length of Diaphragm, L_f =	100	ft
k_a =	2	ft
F_p =	0.432	W_p
CMU F_p =	764	plf



Diaphragm Condition: Long Direction

R roof =	1030	plf
R base =	0	plf
Max Anchor Spacing	4	ft
F_p Roof =	4120	lbs

Holddown Check

Holddown Type =	HDU5	
Number of Holddowns, n =	1	
Min member	1.5x3.5	
T[Ult] =	5654	lbs
DCR =	**0.73**	

ZFA STRUCTURAL ENGINEERS

Job #22689
ASCE 41 Typical Wall OOP Par. 3

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 41

Epoxy Anchorage Check

Spacing between anchors =	0	in	
Min from edge =	6.5	in	
Bolt type =	HY 200-A V3 + threaded rod 5.8 5/8		
N[se] =	16384	lbs	Steel Strength
N[b] =	4201	lbs	Concrete Breakout
N[a0] =	5450	lbs	Bond Strength
N =	4201	lbs	
DCR =	**0.98**		

COM-2310004

ZFA STRUCTURAL ENGINEERS
Job #22689
ASCE 41 Typical Wall OOP Par. 4

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 41

Out-of-Plane Wall Anchorage to Diphragms per ASCE 41 §7.2.11.1

$F_p = 0.4\ S_{XS} k_a k_h X W_p$

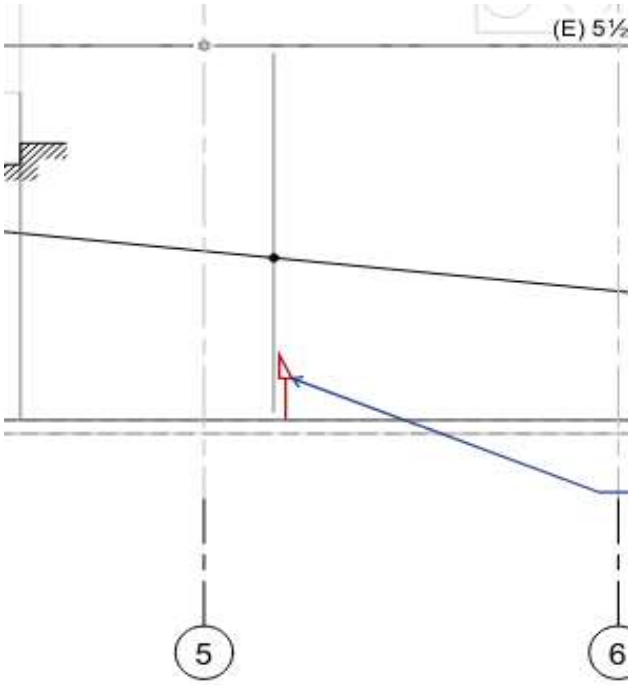
$k_h =$ 1.0

$k_a = 1 + L_f/100$

BSE-1 S_{XS} =	0.357	
X_{S-3} =	1.3	ASCE 41 Table 7-1
BSE-1 S_{XS} * X_{S-3} =	0.46	
BSE-2 S_{XS} =	0.597	
X_{S-5} =	0.9	ASCE 41 Table 7-1
BSE-2 S_{XS} * X_{S-5} =	0.54	

BSE-2 governs

F_p =	0.216	$k_a W_p$
H_r =	14.5	ft
H_p =	0	ft
Wall Thickness	7.625	in
Trib Area	4.61	ft^2
CMU Weight	125	pcf
W_p	576	plf
Length of Diaphragm, L_f =	100	ft
k_a =	2	ft
F_p =	0.432	W_p
CMU F_p =	249	plf
Diaphragm Condition: Long Direction		
R roof =	249	plf
R base =	249	plf
Max Anchor Spacing	4	ft
F_p Roof =	996	lbs



Holddown Check

Holddown Type =	LTTP2	
Number of Holddowns, n =	1	
Min member	1.5x3.5	
T[Ult] =	2570	lbs
DCR =	**0.39**	

ZFA STRUCTURAL ENGINEERS

Job #22689
ASCE 41 Typical Wall OOP Par. 4

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 41

Epoxy Anchorage Check

Spacing between anchors =	0	in	
Min from edge =	6.5	in	
Bolt type =	HY 200-A V3 + threaded rod 5.8 5/8		
N[se] =	16384	lbs	Steel Strength
N[b] =	2870	lbs	Concrete Breakout
N[a0] =	3634	lbs	Bond Strength
N =	2870	lbs	
DCR =	**0.35**		

ZFA STRUCTURAL ENGINEERS
Job #22689
ASCE 41 Typical Wall OOP Par. 5

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 41

Out-of-Plane Wall Anchorage to Diphragms per ASCE 41 §7.2.11.1

$F_p = 0.4\, S_{XS} k_a k_h X W_p$

$k_h = 1.0$

$k_a = 1 + L_f/100$

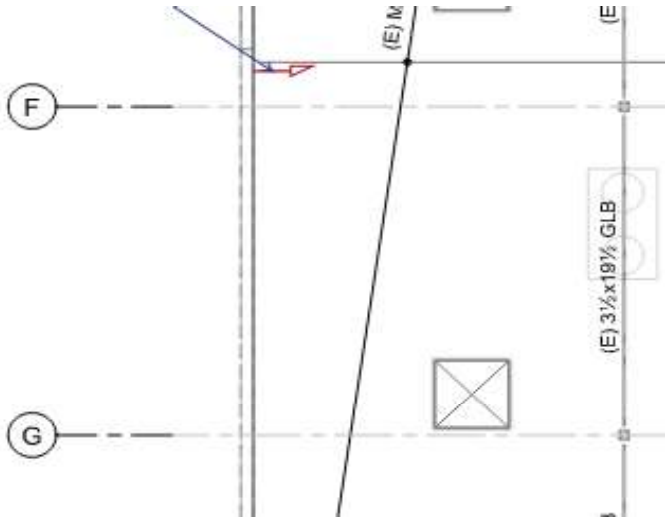
BSE-1 S_{XS} =	0.357	
X_{S-3} =	1.3	ASCE 41 Table 7-1
BSE-1 S_{XS} * X_{S-3} =	0.46	
BSE-2 S_{XS} =	0.597	
X_{S-5} =	0.9	ASCE 41 Table 7-1
BSE-2 S_{XS} * X_{S-5} =	0.54	

BSE-2 governs

F_p =	0.216	$k_a W_p$
H_r =	14.5	ft
H_p =	0.666667	ft
Wall Thickness	7.625	in
Trib Area	5.03	ft^2
CMU Weight	125	pcf
W_p	629	plf
Length of Diaphragm, L_f =	100	ft
k_a =	2	ft
F_p =	0.432	W_p
CMU F_p =	272	plf

Diaphragm Condition: Long Direction

R roof =	272	plf
R base =	226	plf
Max Anchor Spacing	8	ft
F_p Roof =	2176	lbs



Holddown Check

Holddown Type =	LTTP2	
Number of Holddowns, n =	1	
Min member	1.5x3.5	
T[Ult] =	2570	lbs
DCR =	**0.85**	

ZFA STRUCTURAL ENGINEERS

Job #22689
ASCE 41 Typical Wall OOP Par. 5

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 41

Epoxy Anchorage Check

Spacing between anchors =	0	in	
Min from edge =	6.5	in	
Bolt type =	HY 200-A V3 + threaded rod 5.8 5/8		
N[se] =	16384	lbs	Steel Strength
N[b] =	2870	lbs	Concrete Breakout
N[a0] =	3634	lbs	Bond Strength
N =	2870	lbs	
DCR =	**0.76**		

ZFA STRUCTURAL ENGINEERS
Job #22689
ASCE 41 Typical Wall OOP Popout

Engineer: MAAP
3/8/2023

North Sacramento Library - ASCE 41

Out-of-Plane Wall Anchorage to Diphragms per ASCE 41 §7.2.11.1

$F_p = 0.4\, S_{XS} k_a k_h X W_p$

$k_h = 1.0$

$k_a = 1 + L_f/100$

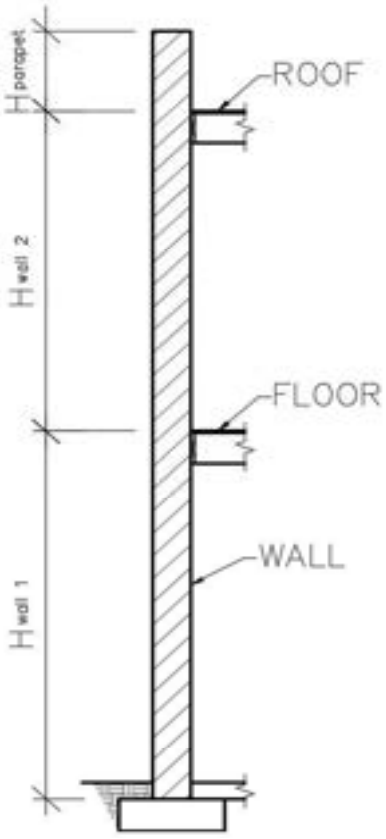
BSE-1 S_{XS} =	0.357	
X_{S-3} =	1.3	ASCE 41 Table 7-1
BSE-1 S_{XS} * X_{S-3} =	0.46	
BSE-2 S_{XS} =	0.597	
X_{S-5} =	0.9	ASCE 41 Table 7-1
BSE-2 S_{XS} * X_{S-5} =	0.54	

BSE-2 governs

F_p =	0.216	$k_a W_p$
$H_{wall\ 1}$ =	14.5	ft
$H_{wall\ 2}$ =	6.5	ft
Wall Thickness	7.625	in
CMU Weight	125	pcf
Length of Diaphragm, L_f =	100	ft
k_a =	2	ft
F_p =	0.432	W_p

Diaphragm Condition: Long Direction

R roof =	7.1	plf
R floor =	511.5	plf
Max Anchor Spacing	4	ft
R floor =	2046	lbs



Holddown Check

Holddown Type =	LTTP2	
Number of Holddowns, n =	1	
Min member	1.5x3.5	
T[Ult] =	2570	lbs
DCR =	**0.80**	

Epoxy Anchorage Check

Spacing between anchors =	0	in	
Min from edge =	6.5	in	
Bolt type =	HY 200-A V3 + threaded rod 5.8 5/8		
N[se] =	16384	lbs	Steel Strength
N[b] =	4705	lbs	Concrete Breakout
N[a0] =	6132	lbs	Bond Strength

ZFA STRUCTURAL ENGINEERS

Job #22689

ASCE 41 Typical Wall OOP Popout

Engineer: MAAP

3/8/2023

North Sacramento Library - ASCE 41

N =	4705	lbs
DCR =	**0.43**	

Hilti PROFIS Engineering 3.0.83

www.hilti.com

Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Masonry - Jan 4, 2023	Date:	2/24/2023
Fastening point:			

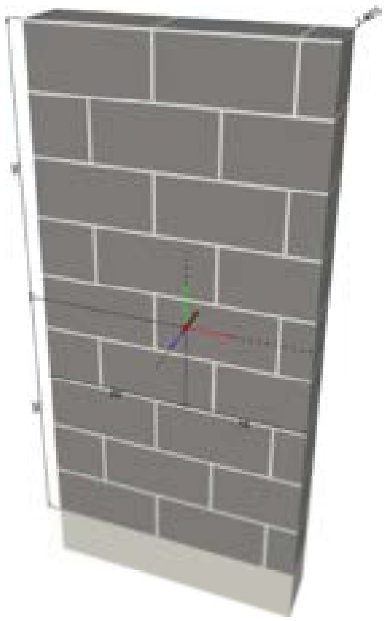
Specifier's comments:

1 Input data



Anchor type and diameter:	**HY 200-A V3 + threaded rod 5.8 5/8**
Item number:	2081381 HAS 5.8 5/8"x6" (element) / 2334276 HIT-HY 200-R V3 (adhesive)
Effective embedment depth:	h_{ef} = 4.000 in.
Material:	5.8
Evaluation Service Report:	ESR-4878
Issued I Valid:	11/1/2022 | 11/1/2023
Proof:	Design Method LRFD (AC58) Masonry + ACI 318-14
Stand-off installation:	
Profile:	
Base material:	cracked Grout-filled CMU, f=1,500 psi L x W x H: 16.000 in. x 8.000 in. x 8.000 in.; Solid Head Joint: no; open ended unit: no
Temp. short/long:	32 °F / 32 °F
	Joints: vertical: 0.375 in.; horizontal: 0.375 in.
Installation:	Face installation, Drill hole: Hammer drilled, Installation condition: Dry
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d))
	Shear load: yes (17.2.3.5.3 (c))

Geometry [in.]



Input data and results must be checked for conformity with the existing conditions and for plausibility!
PROFIS Engineering (c) 2003-2023 Hilti AG, FL-9494 Schaan Hilti is a registered Trademark of Hilti AG, Schaan

3.1 Steel strength

N_{sa} = ESR value — refer to ICC-ES ESR-4878

$\phi\ N_{sa} \geq N_{ua}$ — AC58 Table 3.2 + ACI 318-14 Table 17.3.1.1

$N_{sa,seismic}$ [lb]	ϕ	$\phi_{seismic}$	$\phi\ N_{sa}$ [lb]	N_{ua} [lb]
16,384	0.650	1.000	10,650	4,940

3.2 Bond strength

$N_{ma} = \left(\frac{A_{Na}}{A_{Na0}}\right) \cdot \psi_{ec1,Na} \cdot \psi_{ec2,Na} \cdot \psi_{ed,Na} \cdot N_{ba,m}$ — ACI 318-14 Eq. (17.4.5.1a)

$\phi\ N_{ma} \geq N_{ua}$ — AC58 Table 3.2 + ACI 318-14 Table 17.3.1.1

A_{Na} see ACI 318-14, Section 17.4.5.1, Fig. R 17.4.5.1(b)

$A_{Na0} = (2\ c_{Na})^2$ — ACI 318-14 Eq. (17.4.5.1c)

$c_{Na} = 10\ d_a \sqrt{\frac{\tau_{uncr,m}}{1100}}$ — ACI 318-14 Eq. (17.4.5.1d)

$\psi_{ed,Na} = 0.7 + 0.3 \left(\frac{c_{a,min}}{c_{Na}}\right) \leq 1.00$ — ACI 318-14 Eq. (17.4.5.4b)

$N_{ba,m} = \lambda_a \cdot \tau_{cr,m} \cdot \pi \cdot d_a \cdot h_{ef}$ — ACI 318-14 Eq. (17.4.5.2)

Results

N_{ma} [lb]	ϕ	$\phi_{seismic}$	$\phi\ N_{ma}$ [lb]	$\phi\ N_{ua}$ [lb]
3,634	0.650	0.750	1,771	4,940

3.3 Masonry breakout strength

$N_{mb} = \frac{A_{Nm}}{A_{Nm0}} \cdot \psi_{ed,N,m} \cdot \psi_{c,N,m} \cdot N_{b,m}$ — ACI 318-14 Eq. (17.4.2.1a)

$\phi\ N_{mb} \geq N_{ua}$ — AC58 Table 3.2 + ACI 318-14 Table 17.3.1.1

A_{Nm} see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)

$A_{Nm0} = 9 \cdot h_{ef}^2$ — ACI 318-14 Eq. (17.4.2.1c)

$\psi_{ed,N} = 0.7 + 0.3 \frac{c_{a,min}}{1.5 \cdot h_{ef}} \leq 1.0$ — ACI 318-14 Eq. (17.4.2.5b)

$N_{b,m} = k_m \cdot \lambda_a \cdot \sqrt{f'_m} \cdot h_{ef}^{1.5}$ — ACI 318-14 Eq. (17.4.2.2a)

Results

N_{mb} [lb]	ϕ	$\phi_{seismic}$	$\phi\ N_{mb}$ [lb]	N_{ua} [lb]
2,870	0.650	0.750	1,399	4,940

PROFIS Engineering (c) 2003-2023 Hilti AG, FL-9494 Schaan Hilti is a registered Trademark of Hilti AG, Schaan

Hilti PROFIS Engineering 3.0.84

www.hilti.com

Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Masonry - Jan 4, 2023	Date:	3/10/2023
Fastening point:			

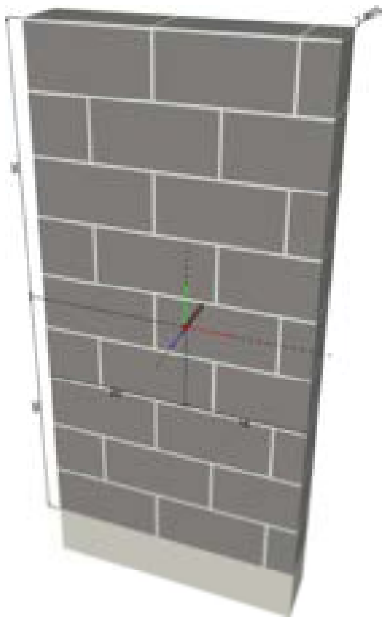
Specifier's comments:

1 Input data



Anchor type and diameter:	**HY 200-A V3 + threaded rod 5.8 5/8**
Item number:	385428 HAS 5.8 5/8"x8" (element) / 2334276 HIT-HY 200-R V3 (adhesive)
Effective embedment depth:	h_{ef} = 6.000 in.
Material:	5.8
Evaluation Service Report:	ESR-4878
Issued I Valid:	11/1/2022 | 11/1/2023
Proof:	Design Method LRFD (AC58) Masonry + ACI 318-14
Stand-off installation:	
Profile:	
Base material:	cracked Grout-filled CMU, f=1500, f = 1,500 psi, L x W x H: 16.000 in. x 8.000 in. x 8.000 in.; Solid Head Joint: no; open ended unit: no
Temp. short/long:	32 °F / 32 °F
	Joints: vertical: 0.375 in.; horizontal: 0.375 in.
Installation:	Face installation, Drill hole: Hammer drilled, Installation condition: Dry
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d))
	Shear load: yes (17.2.3.5.3 (c))

Geometry [in.]



Input data and results must be checked for conformity with the existing conditions and for plausibility!
PROFIS Engineering (c) 2003-2023 Hilti AG, FL-9494 Schaan Hilti is a registered Trademark of Hilti AG, Schaan

3.1 Steel strength

N_{sa} = ESR value — refer to ICC-ES ESR-4878

$\phi\ N_{sa} \geq N_{ua}$ — AC58 Table 3.2 + ACI 318-14 Table 17.3.1.1

$N_{sa,seismic}$ [lb]	ϕ	$\phi_{seismic}$	$\phi\ N_{sa}$ [lb]	N_{ua} [lb]
16,384	0.650	1.000	10,650	4,940

3.2 Bond strength

$N_{ma} = \left(\frac{A_{Na}}{A_{Na0}}\right) \cdot \psi_{ec1,Na} \cdot \psi_{ec2,Na} \cdot \psi_{ed,Na} \cdot N_{ba,m}$ — ACI 318-14 Eq. (17.4.5.1a)

$\phi\ N_{ma} \geq N_{ua}$ — AC58 Table 3.2 + ACI 318-14 Table 17.3.1.1

A_{Na} see ACI 318-14, Section 17.4.5.1, Fig. R 17.4.5.1(b)

$A_{Na0} = (2\ c_{Na})^2$ — ACI 318-14 Eq. (17.4.5.1c)

$c_{Na} = 10\ d_a \sqrt{\frac{\tau_{uncr,m}}{1100}}$ — ACI 318-14 Eq. (17.4.5.1d)

$\psi_{ed,Na} = 0.7 + 0.3 \left(\frac{c_{a,min}}{c_{Na}}\right) \leq 1.00$ — ACI 318-14 Eq. (17.4.5.4b)

$N_{ba,m} = \lambda_a \cdot \tau_{cr,m} \cdot \pi \cdot d_a \cdot h_{ef}$ — ACI 318-14 Eq. (17.4.5.2)

Results

N_{ma} [lb]	ϕ	$\phi_{seismic}$	$\phi\ N_{ma}$ [lb]	$\phi\ N_{ua}$ [lb]
5,450	0.650	0.750	2,657	4,940

3.3 Masonry breakout strength

$N_{mb} = \frac{A_{Nm}}{A_{Nm0}} \cdot \psi_{ed,N,m} \cdot \psi_{c,N,m} \cdot N_{b,m}$ — ACI 318-14 Eq. (17.4.2.1a)

$\phi\ N_{mb} \geq N_{ua}$ — AC58 Table 3.2 + ACI 318-14 Table 17.3.1.1

A_{Nm} see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)

$A_{Nm0} = 9 \cdot h_{ef}^2$ — ACI 318-14 Eq. (17.4.2.1c)

$\psi_{ed,N} = 0.7 + 0.3 \frac{c_{a,min}}{1.5 \cdot h_{ef}} \leq 1.0$ — ACI 318-14 Eq. (17.4.2.5b)

$N_{b,m} = k_m \cdot \lambda_a \cdot \sqrt{f'_m} \cdot h_{ef}^{1.5}$ — ACI 318-14 Eq. (17.4.2.2a)

Results

N_{mb} [lb]	ϕ	$\phi_{seismic}$	$\phi\ N_{mb}$ [lb]	N_{ua} [lb]
4,201	0.650	0.750	2,048	4,940

Input data and results must be checked for conformity with the existing conditions and for plausibility!
PROFIS Engineering (c) 2003-2023 Hilti AG, FL-9494 Schaan Hilti is a registered Trademark of Hilti AG, Schaan

Hilti PROFIS Engineering 3.0.82

www.hilti.com

Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Masonry - Jan 4, 2023	Date:	1/4/2023
Fastening point:			

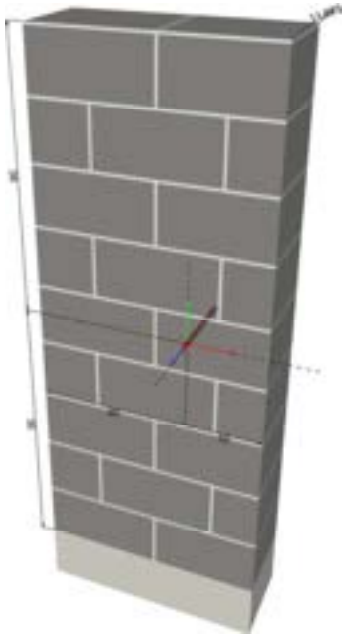
Specifier's comments:

1 Input data



Anchor type and diameter:	**HY 200-A V3 + threaded rod 5.8 5/8**
Item number:	not available (element) / not available (adhesive)
Effective embedment depth:	h_{ef} = 10.000 in.
Material:	5.8
Evaluation Service Report:	ESR-4878
Issued I Valid:	11/1/2022 | 11/1/2023
Proof:	Design Method LRFD (AC58) Masonry + ACI 318-14
Stand-off installation:	
Profile:	
Base material:	cracked Grout-filled CMU, f=1,500 psi L x W x H: 16.000 in. x 12.000 in. x 8.000 in.; Solid Head Joint: no; open ended unit: no
Temp. short/long:	32 °F / 32 °F Joints: vertical: 0.375 in.; horizontal: 0.375 in.
Installation:	Face installation, Drill hole: Hammer drilled, Installation condition: Dry
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

Geometry [in.]



PROFIS Engineering (c) 2003-2023 Hilti AG, FL-9494 Schaan Hilti is a registered Trademark of Hilti AG, Schaan

3.1 Steel strength

N_{sa} = ESR value — refer to ICC-ES ESR-4878

$\phi\ N_{sa} \geq N_{ua}$ — AC58 Table 3.2 + ACI 318-14 Table 17.3.1.1

$N_{sa,seismic}$ [lb]	ϕ	$\phi_{seismic}$	$\phi\ N_{sa}$ [lb]	N_{ua} [lb]
16,384	0.650	1.000	10,650	4,940

3.2 Bond strength

$N_{ma} = \left(\frac{A_{Na}}{A_{Na0}}\right) \cdot \psi_{ec1,Na} \cdot \psi_{ec2,Na} \cdot \psi_{ed,Na} \cdot N_{ba,m}$ — ACI 318-14 Eq. (17.4.5.1a)

$\phi\ N_{ma} \geq N_{ua}$ — AC58 Table 3.2 + ACI 318-14 Table 17.3.1.1

A_{Na} see ACI 318-14, Section 17.4.5.1, Fig. R 17.4.5.1(b)

$A_{Na0} = (2\ c_{Na})^2$ — ACI 318-14 Eq. (17.4.5.1c)

$c_{Na} = 10\ d_a \sqrt{\frac{\tau_{uncr,m}}{1100}}$ — ACI 318-14 Eq. (17.4.5.1d)

$\psi_{ed,Na} = 0.7 + 0.3 \left(\frac{c_{a,min}}{c_{Na}}\right) \leq 1.00$ — ACI 318-14 Eq. (17.4.5.4b)

$N_{ba,m} = \lambda_a \cdot \tau_{cr,m} \cdot \pi \cdot d_a \cdot h_{ef}$ — ACI 318-14 Eq. (17.4.5.2)

Results

N_{ma} [lb]	ϕ	$\phi_{seismic}$	$\phi\ N_{ma}$ [lb]	$\phi\ N_{ua}$ [lb]
9,084	0.650	0.750	4,428	4,940

3.3 Masonry breakout strength

$N_{mb} = \frac{A_{Nm}}{A_{Nm0}} \cdot \psi_{ed,N,m} \cdot \psi_{c,N,m} \cdot N_{b,m}$ — ACI 318-14 Eq. (17.4.2.1a)

$\phi\ N_{mb} \geq N_{ua}$ — AC58 Table 3.2 + ACI 318-14 Table 17.3.1.1

A_{Nm} see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)

$A_{Nm0} = 9 \cdot h_{ef}^2$ — ACI 318-14 Eq. (17.4.2.1c)

$\psi_{ed,N} = 0.7 + 0.3 \frac{c_{a,min}}{1.5 \cdot h_{ef}} \leq 1.0$ — ACI 318-14 Eq. (17.4.2.5b)

$N_{b,m} = k_m \cdot \lambda_a \cdot \sqrt{f'_m} \cdot h_{ef}^{1.5}$ — ACI 318-14 Eq. (17.4.2.2a)

Results

N_{mb} [lb]	ϕ	$\phi_{seismic}$	$\phi\ N_{mb}$ [lb]	N_{ua} [lb]
5,447	0.650	0.750	2,655	4,940

Input data and results must be checked for conformity with the existing conditions and for plausibility!
PROFIS Engineering (c) 2003-2023 Hilti AG, FL-9494 Schaan Hilti is a registered Trademark of Hilti AG, Schaan

Mechanical Systems

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
This document is used to demonstrate compliance for mechanical systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.4, or 141.0(b)2 for alterations.			
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 1 of 12)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

A. GENERAL INFORMATION

01	Project Location (city)	Sacramento	04	Total Conditioned Floor Area	1037
02	Climate Zone	12	05	Total Unconditioned Floor Area	0
03	Occupancy Types Within Project:		06	# of Stories (Habitable Above Grade)	1

● Office ● All Other Occupancies

B. PROJECT SCOPE

This table Includes mechanical systems or components that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.4, 170.2(b) or 141.0(b)2 and 180.2(b)2 for alterations.

01		02		03	
Air System(s)		Wet System Components		Dry System Components	
☒	Heating Air System	☐	Water Economizer	☒	Air Economizer
☒	Cooling Air System	☐	Pumps	☐	Electric Resistance Heat
Mechanical Controls		☐	System Piping	☒	Fan Systems
☒	Mechanical Controls (existing to remain, altered or new)	☐	Cooling Towers	☒	Ductwork (existing to remain, altered or new)
		☐	Chillers	☒	Ventilation
		☐	Boilers	☐	Zonal Systems/ Terminal Boxes

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	Report Page:	(Page 2 of 12)
Project Address:	1122 Delpaso BLVD.	Date Prepared:	3/17/2023

C. COMPLIANCE RESULTS

Table C will indicate if the project data input into the compliance document is compliant with mechanical requirements. This table is not editable by the user. If this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D., or the table indicated as not compliant for guidance.

01		02		03		04		05		06		07		08	09
System Summary 110.1, 110.2, 140.4, 170.2(c)	AND	Pumps 140.4(k), 170.2(c)4I	AND	Fans/ Economizers 140.4(c), 140.4(e), 170.2(c)	AND	System Controls 110.2, 120.2, 140.4(f), 170.2(c)	AND	Ventilation 120.1, 160.2	AND	Terminal Box Controls 140.4(d), 170.2(c)4B	AND	Distribution 120.3, 140.4(l), 160.2, 160.3	AND	Cooling Towers 110.2(e)2	Compliance Results
(See Table F)		(See Table G)		(See Table H)		(See Table I)		(See Table J)		(See Table K)		(See Table L)		(See Table M)	
Yes	AND		AND	Yes	AND	Yes	AND	Yes	AND		AND	Yes	AND		COMPLIES
Mandatory Measures Compliance (See Table Q for Details)										COMPLIES					

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Space Conditioning System Information

01	02	03	04	05	06
System Name	Quantity	System Serving	System Status	Space Type	Utilizing Recovered Heat
HP-3	1	Single zone	New/ Addition		☐
HP-15	1	Single zone	New/ Addition		☐

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	Report Page:	(Page 3 of 12)
Project Address:	1122 Delpaso BLVD.	Date Prepared:	3/17/2023

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Dry System Equipment Sizing (includes air conditioners, condensers, heat pumps, VRF, furnaces and unit heaters and DOAS systems)

01	02	03	04	05	06	07	08	09	10	11
Name or Item Tag	Equipment Category per Tables 110.2, 140.4(a)2 and 170.2(c)3aii	Equipment Type per Tables 110.2 and Title 20	Smallest Size Available[1] 140.4(a) and 170.2(c)1	Equipment Sizing per Mechanical Schedule (kBtu/h) 140.4(a&b), 170.2(c)1 & 170.2(c)2						
				Heating Output[2,3]			Cooling Output[2,3]		Load Calculations[3,4]	
				Per Design (kBtu/h)	Rated (kBtu/h)	Supp. Heating Output (kBtu/h)	Sensible Per Design (kBtu/h)	Rated (kBtu/h)	Total Heating Load (kBtu/h)	Total Sensible Cooling Load (kBtu/h)
HP-3	Unitary Heat Pumps	Air-cooled, pkg (3 phase)	NA: Load Controls	36.86	23.6	20.48	31.79	26.56	38.74	35.23
HP-15	Unitary Heat Pumps	Air-cooled, pkg (3 phase)	NA: Load Controls	50.47	43.22	20.48	50.58	47.11	6.34	66.85

[1]FOOTNOTES: Equipment shall be the smallest size, within the available options of the desired equipment line, necessary to meet the design heating and cooling loads of the building per 140.4(a) and 170.2(c)1. Healthcare facilities are excepted.

[2]It is common practice to show rated output capacity on the equipment schedule. Sensible cooling output comes from specification sheet tables.

[3] If equipment is heating only, leave cooling output and load blank. If equipment is cooling only, leave heating output and load blank.

[4] Authority Having Jurisdiction may ask for load calculations used for compliance per 140.4(b) and 170.2(c).

Dry System Equipment Efficiency (other than Package Terminal Air Conditioners (PTAC) and Package Terminal Heat Pumps (PTHP), DX-DOAS and Dual Fuel Heat Pumps)

01	02	03	04	05	06	07	08	09
Name or Item Tag	Size Category (Btu/h)	Heating Mode				Cooling Mode		
		Rating Condition (°F)	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency
HP-3	<65,000		HSPF	7.7	13.3	SEER	13.0	15.8
HP-15	<65,000		HSPF	7.7	13.3	SEER	13.0	16.4

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 4 of 12)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

G. PUMPS

This section does not apply to this project.

H. FAN SYSTEMS & AIR ECONOMIZERS

This table is used to demonstrate compliance with prescriptive requirements found in 140.4(c), 140.4(e), 140.4(m), 170.2(c)3, and 170.2(c)4A for fan systems. Fan systems serving only process loads are exempt from these requirements and do not need to be included in Table H.

System Name	HP-3	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	1,200	Site Elevation	84	Economizer	Fixed Temperature
01	02	03	04						05	06	07	08	09	10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance		Design		
						Component Allowance	Fan Allowance (watt/cfm)[3]	Design Electrical Input Power Method	Motor Nameplate Horsepower	Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	1,200		278		Manufacturer provided		0.45
			MERV 13-16 Filter upstream of thermal conditioning equipment	1,200		167				
			Hydronic/DX cooling coil or heat pump coil	1,200		167				
			Economizer Return Damper	1,200		55				
				Fan System Allowance (kW)[3]				Fan System Electrical Output (kW)		

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	Report Page:	(Page 5 of 12)
Project Address:	1122 Delpaso BLVD.	Date Prepared:	3/17/2023

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	HP-15	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	2,000	Site Elevation	84	Economizer	Fixed Temperature
01	02	03	04						05	06	07	08	09	10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance		Design		
						Component Allowance	Fan Allowance (watt/cfm) [3]	Design Electrical Input Power Method	Motor Nameplate Horsepower	Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	2,000		464		Manufacturer provided		0.71
			MERV 13-16 Filter upstream of thermal conditioning equipment	2,000		278				
			Hydronic/DX cooling coil or heat pump coil	2,000		278				
			Economizer Return Damper	2,000		92				
				Fan System Allowance (kW)[3]				Fan System Electrical Output (kW)		

[1] *FOOTNOTES: Fans serving spaces with design background noise goals below NC35*

[2] *Low-turndown single-zone VAV fan system must be capable of and configured to reduce airflow to 50 percent of design airflow and use no more than 30 percent of the design wattage at that airflow. No more than 10 percent of the design load served by the equipment shall have fixed loads.*

H. EXHAUST AIR HEAT RECOVERY 140.4(q), 170.2(c)4O

01	02	03	04	05	06	07	08	09	10	11
Fan System Name	Qty	Hours of Operation per Year	Design Supply Airflow Rate	Outdoor Airflow	% Outdoor Air at Full Design Airflow	Exemptions to Exhaust Air Heat Recovery Requirement per 140.4(q) & 170.2(c)4O	Exhaust Air Heat Recovery 140.4(q) & 170.2(c)4O	Type Of Heat Recovery Rating	Required Recovery Ratio	Energy Recovery Bypass

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 6 of 12)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

Fan Energy Index (FEI)

01	02	03
Name or Item Tag	FEI Exception	FEI

I. SYSTEM CONTROLS

This table is used to demonstrate compliance with mandatory controls in 110.2 and 120.2 and prescriptive controls in 140.4(f) and (n), 170.2(c)4D 170.2(c)4L or requirements in 141.0(b)2E 180.2(b)2 for altered space conditioning systems.

01	02	03	04	05	06	07	08	09
System Name	System Zoning	Conditioned Floor Area Being Served (ft^2)	Thermostats 110.2(b) & (c)[1], 120.2(a) 160.3(a)2A or 141.0(b)2E & 180.2(b)2	Shut-Off Controls 120.2(e) & 160.3(a)2D	Isolation Zone Controls 120.2(g) & 160.3(a)2F	Demand Response 110.12 120.2(b) & 160.3(a)2B	Supply Air Temp. Reset 140.4(f) & 170.2(c)4D	Window Interlocks per 140.4(n) & 170.2(c)4D
HP-3	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	4 Hour Timer	EMCS	Included	Provided
HP-15	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	4 Hour Timer	EMCS	Included	Provided

[1]FOOTNOTES: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, non-central electric heaters, fireplaces or decorative gas appliances, wood stoves are not required to have setback thermostats.

J. VENTILATION AND INDOOR AIR QUALITY

This table is used to demonstrate compliance with mandatory ventilation requirements in 120.1 120.2(e)3B 140.4(p) and 140.4(q) for all nonresidential and hotel/motel and d:t24refnolink/]160.2, 160.3(a)3D, 170.2(a)4N, 170.2(a)4O for high-rise residential occupancies. For alterations, only ventilation systems being altered within the scope of the permit application need to be documented in this table. In lieu of this table, the required outdoor ventilation rates and airflows may be shown on the plans or the calculations can be presented in a spreadsheet.

01	☐	Check the box if the project is showing ventilation calculations on the plans, or attaching the calculations instead of completing this table.
02	☒	Check this box if the project included Nonresidential, Hotel/Motel Spaces or Multifamily Common Use Spaces
	☐	
03	☐	Check the box if the project is using natural ventilation in any nonresidential or hotel/motel spaces to meet required ventilation rates per 120.1(c)2.

Nonresidential and Hotel/ Motel Multifamily Common Use Ventilation Systems

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	Report Page:	(Page 7 of 12)
Project Address:	1122 Delpaso BLVD.	Date Prepared:	3/17/2023

J. VENTILATION AND INDOOR AIR QUALITY

04	05			06			07	
System Name	HP-3	System Design OA CFM Airflow[1]	599	System Design Transfer Air CFM	0		Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]	
							Provided	
08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3				Exh. Vent per 120.1(c)4 & 160.2(c)4			DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	
HP-3	Office space	856			128.4	0	0	DCV: NA: Not required per §120.1(d)3
								Occ Sensor: NA: Not required space type
17	Total System Required Min OA CFM				128	18	Ventilation for this System Complies?	Yes

04	05			06			07	
System Name	HP-15	System Design OA CFM Airflow[1]	97	System Design Transfer Air CFM	0		Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]	
							Provided	
08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3				Exh. Vent per 120.1(c)4 & 160.2(c)4			DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	
HP-15	All others	181			0	0	0	DCV: NA: Not required per §120.1(d)3
								Occ Sensor: NA: Not required space type
17	Total System Required Min OA CFM				0	18	Ventilation for this System Complies?	Yes

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 8 of 12)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

J. VENTILATION AND INDOOR AIR QUALITY

[1] FOOTNOTES: System CFM should include both mechanical and natural ventilation for the zone/system

[2] Air filtration requirements apply to the following three system types per 120.1(c)1A: space conditioning systems utilizing ducts to supply air to occupiable space; supply-only ventilation systems providing outside air to occupiable space; supply side of balanced ventilation systems including heat recovery and energy recovery ventilation systems providing outside air to occupiable space.

[3] Uniform Mechanical Code may have more stringent ventilation requirements; the most stringent code requirement takes precedence.

[4] See Standards Tables 120.1-A and 120.1-B.

[5] For lecture halls with fixed seating, the expected number of occupants shall be determined in accordance with the California Building Code.

[6] 120.2(e)3 requires systems serving rooms that are required by 130.1(c) to have lighting occupancy sensing controls to also have occupancy sensing zone controls for ventilation. Examples of spaces which require lighting occupancy sensors include offices 250ft^2 or smaller, multipurpose rooms less than 1,000 ft^2, classrooms, conference rooms, restrooms, aisles and open areas in warehouses, library book stack aisles, corridors, stairwells, parking garages, and loading and unloading zones, unless excepted by 130.1(c).

Multifamily Dwelling Unit Ventilation Systems

☐	Check the box if the system is using continuous ventilation to meet the ventilation requirements per 160.2(b)2Aivb2							
19	20	21	22	23	24	25	26	27
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(b) & 160.2(b)2				Ventilation per Design		Local Exhaust	Air Filtration per 120.1(c) & 160.2(b)1
	Conditioned Floor Area (ft^2)	# of Bedrooms	# of Dwelling Units	Required Min OA CFM[1]	Supply Air CFM	Exhaust CFM		
28	Is this a balanced system[4]				29	Meeting Outside Air Requirements?		

[1] FOOTNOTES: Uniform Mechanical Code may have more stringent ventilation requirements; the most stringent code requirement takes precedence.

[2] Kitchen range hood will be verified per NA7.18.1 to confirm model is rated by HVI or AHAM.

[3] Air filtration requirements apply to the following three system types per 120.1(c)1A: space conditioning systems utilizing ducts to supply air to occupiable space; supply-only ventilation systems providing outside air to occupiable space; supply side of balanced ventilation systems including heat recovery and energy recovery ventilation systems providing outside air to occupiable space.

[4] A balanced ventilation system provides ventilation airflow to each dwelling-unit at a rate equal to or greater than the required minimum rate, but not more than twenty percent.

K. TERMINAL BOX CONTROLS

This section does not apply to this project.

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 9 of 12)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

L. DISTRIBUTION (DUCTWORK and PIPING)

This table is used to show compliance with mandatory pipe insulation requirements found in 120.3 and mandatory requirements found in 120.4(g) for duct sealing.

01	☐	Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather shall be installed with a cover suitable for outdoor service. Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall have a Class I or Class II vapor retarder. All penetrations and joints of which shall be sealed.

Duct Leakage Testing

The answers to the questions below apply to the following duct systems:	HP-3	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	Yes
		Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	Yes
		Duct leakage testing per CMC Section 603.10.1 required for these systems?	No

11	false	
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A
18		All ductwork is an extension of an existing duct system
19		Ductwork serving individual dwelling unit
20		< 25 ft of new or replacement space conditioning ducts installed
21	R-8	Dust Insulation R-value

The answers to the questions below apply to the following duct systems:	HP-15	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	Yes

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 10 of 12)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	Yes
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	false			
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18		All ductwork is an extension of an existing duct system		
19		Ductwork serving individual dwelling unit		
20		< 25 ft of new or replacement space conditioning ducts installed		
21	R-8	Dust Insulation R-value		

M. COOLING TOWERS

This section does not apply to this project.

N. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Form/Title
NRCI-MCH-01-E - Must be submitted for all buildings

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 11 of 12)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

O. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Form/Title	Systems/Spaces To Be Field Verified
NRCA-MCH-02-A - Outdoor Air must be submitted for all newly installed HVAC units. Note: MCH-02-A can be performed in conjunction with MCH-07-A Supply Fan VFD Acceptance (if applicable) since testing activities overlap.	Trane 3 Ton; Trane 5 Ton;
NRCA-MCH-03-A - Constant Volume Single Zone HVAC NOTE: This form does not automatically move to "Yes'. If Constant Volume Single Zone HVAC Systems are included in the scope, permit applicant should move this form to "Yes".	Trane 3 Ton; Trane 5 Ton;
NRCA-MCH-05-A - Air Economizer Controls	Trane 3 Ton; Trane 5 Ton;
NRCA-MCH-11-A Automatic Demand Shed Controls	Trane 3 Ton; Trane 5 Ton;
NRCA-MCH-12-A FDD for Packaged Direct Expansion Units	Trane 5 Ton;
NRCA-MCH-16-A Supply Air Temperature Reset Controls	Trane 3 Ton; Trane 5 Ton;
NRCA-MCH-18-A Energy Management Control Systems	Trane 3 Ton; Trane 5 Ton;

P. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

There are no NRCV forms required for this project.

Q. MANDATORY MEASURES DOCUMENTATION LOCATION

This table is used to indicate where mandatory measures are documented in the plan set or construction documentation.

01		02
Compliance with Mandatory Measures documented through MCH Mandatory Measures Note Block	Yes	Plan sheet or construction document location: M-Sheets

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 12 of 12)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Company: Leaf Engineers	Signature Date: 3/17/23
Address:	CEA/ HERS Certification Identification (if applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: LEAF Egineers	Responsible Designer Signature:
Company: LEAF Engineers	Date Signed: 2023-03-17
Address: 1100 Iron Point Rd, Suite 200	License: M33380
City/State/Zip: Folsom CA 95630	Phone: 916-335-9992

Mechanical Systems

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
This document is used to demonstrate compliance for mechanical systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.4, or 141.0(b)2 for alterations.			
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 1 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

A. GENERAL INFORMATION

01	Project Location (city)	Sacramento	04	Total Conditioned Floor Area	15708
02	Climate Zone	12	05	Total Unconditioned Floor Area	0
03	Occupancy Types Within Project:		06	# of Stories (Habitable Above Grade)	1

● Convention Center ● Library ● Office

B. PROJECT SCOPE

This table Includes mechanical systems or components that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.4, 170.2(b) or 141.0(b)2 and 180.2(b)2 for alterations.

01		02		03	
Air System(s)		Wet System Components		Dry System Components	
☒	Heating Air System	☐	Water Economizer	☒	Air Economizer
☒	Cooling Air System	☐	Pumps	☐	Electric Resistance Heat
Mechanical Controls		☐	System Piping	☒	Fan Systems
☒	Mechanical Controls (existing to remain, altered or new)	☐	Cooling Towers	☒	Ductwork (existing to remain, altered or new)
		☐	Chillers	☒	Ventilation
		☐	Boilers	☐	Zonal Systems/ Terminal Boxes

CERTIFICATE OF COMPLIANCE			**NRCC-MCH-E**
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 2 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

C. COMPLIANCE RESULTS

Table C will indicate if the project data input into the compliance document is compliant with mechanical requirements. This table is not editable by the user. If this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D., or the table indicated as not compliant for guidance.

01		02		03		04		05		06		07		08	09
System Summary 110.1, 110.2, 140.4, 170.2(c)	AND	Pumps 140.4(k), 170.2(c)4I	AND	Fans/ Economizers 140.4(c), 140.4(e), 170.2(c)	AND	System Controls 110.2, 120.2, 140.4(f), 170.2(c)	AND	Ventilation 120.1, 160.2	AND	Terminal Box Controls 140.4(d), 170.2(c)4B	AND	Distribution 120.3, 140.4(l), 160.2, 160.3	AND	Cooling Towers 110.2(e)2	Compliance Results
(See Table F)		(See Table G)		(See Table H)		(See Table I)		(See Table J)		(See Table K)		(See Table L)		(See Table M)	
Yes	AND		AND	Yes	AND	Yes	AND	Yes	AND		AND	Yes	AND		COMPLIES
Mandatory Measures Compliance (See Table Q for Details)										COMPLIES					

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Space Conditioning System Information

01	02	03	04	05	06
System Name	Quantity	System Serving	System Status	Space Type	Utilizing Recovered Heat
HP-1	1	Single zone	New/ Addition		☐
HP-5	1	Single zone	New/ Addition		☐
HP-6	1	Single zone	New/ Addition		☐
HP-7	1	Single zone	New/ Addition		☐

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 3 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Space Conditioning System Information

01	02	03	04	05	06
System Name	Quantity	System Serving	System Status	Space Type	Utilizing Recovered Heat
HP-8	1	Single zone	New/ Addition		☐
HP-9	1	Single zone	New/ Addition		☐
HP-10	1	Single zone	New/ Addition		☐
HP-11	1	Single zone	New/ Addition		☐
HP-12	1	Single zone	New/ Addition		☐
HP-13	1	Single zone	New/ Addition		☐
HP-14	1	Single zone	New/ Addition		☐

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 4 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Dry System Equipment Sizing (includes air conditioners, condensers, heat pumps, VRF, furnaces and unit heaters and DOAS systems)

01	02	03	04	05	06	07	08	09	10	11
Name or Item Tag	Equipment Category per Tables 110.2, 140.4(a)2 and 170.2(c)3aii	Equipment Type per Tables 110.2 and Title 20	Smallest Size Available[1] 140.4(a) and 170.2(c)1	Equipment Sizing per Mechanical Schedule (kBtu/h) 140.4(a&b), 170.2(c)1 & 170.2(c)2						
				Heating Output[2,3]			Cooling Output[2,3]		Load Calculations[3,4]	
				Per Design (kBtu/h)	Rated (kBtu/h)	Supp. Heating Output (kBtu/h)	Sensible Per Design (kBtu/h)	Rated (kBtu/h)	Total Heating Load (kBtu/h)	Total Sensible Cooling Load (kBtu/h)
HP-1	Unitary Heat Pumps	Air-cooled, split (3 phase)	NA: Load Controls	76.61	66.14	30.72	84.45	72.2	76.52	85.3
HP-5	Unitary Heat Pumps	Air-cooled, pkg (3 phase)	NA: Load Controls	50.47	43.22	20.48	53.78	47.11	62.55	55.52
HP-6	Unitary Heat Pumps	Air-cooled, pkg (3 phase)	NA: Load Controls	42.93	32.35	20.48	41.03	35.87	48.37	45.05
HP-7	Unitary Heat Pumps	Air-cooled, pkg (3 phase)	NA: Load Controls	50.47	43.22	20.48	53.41	47.11	58.24	60.64
HP-8	Unitary Heat Pumps	Air-cooled, pkg (3 phase)	NA: Load Controls	36.86	23.6	20.48	31.6	26.56	37.29	32.51
HP-9	Unitary Heat Pumps	Air-cooled, pkg (3 phase)	NA: Load Controls	50.47	43.22	20.48	53.46	47.11	61.34	54.22
HP-10	Unitary Heat Pumps	Air-cooled, pkg (3 phase)	NA: Load Controls	50.47	43.22	20.48	53.37	47.11	62.4	59.12
HP-11	Unitary Heat Pumps	Air-cooled, split (3 phase)	NA: Load Controls	76.61	66.14	30.72	84.74	72.2	80.83	90.61
HP-12	Unitary Heat Pumps	Air-cooled, pkg (3 phase)	NA: Load Controls	50.47	43.22	20.48	53.1	47.11	56.84	63.3
HP-13	Unitary Heat Pumps	Air-cooled, pkg (3 phase)	NA: Load Controls	50.47	43.22	20.48	53.08	47.11	53.67	54.01

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	Report Page:	(Page 5 of 40)
Project Address:	1122 Delpaso BLVD.	Date Prepared:	3/17/2023

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Dry System Equipment Sizing (includes air conditioners, condensers, heat pumps, VRF, furnaces and unit heaters and DOAS systems)

01	02	03	04	05	06	07	08	09	10	11
HP-14	Unitary Heat Pumps	Air-cooled, pkg (3 phase)	NA: Load Controls	50.47	43.22	20.48	52.92	47.11	53.45	59.56

[1]*FOOTNOTES: Equipment shall be the smallest size, within the available options of the desired equipment line, necessary to meet the design heating and cooling loads of the building per 140.4(a) and 170.2(c)1. Healthcare facilities are excepted.*

[2]*It is common practice to show rated output capacity on the equipment schedule. Sensible cooling output comes from specification sheet tables.*

[3] *If equipment is heating only, leave cooling output and load blank. If equipment is cooling only, leave heating output and load blank.*

[4] *Authority Having Jurisdiction may ask for load calculations used for compliance per 140.4(b) and 170.2(c).*

Dry System Equipment Efficiency (other than Package Terminal Air Conditioners (PTAC) and Package Terminal Heat Pumps (PTHP), DX-DOAS and Dual Fuel Heat Pumps)

01	02	03	04	05	06	07	08	09
		Heating Mode				Cooling Mode		
Name or Item Tag	Size Category (Btu/h)	Rating Condition (°F)	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency
HP-1	>=65,000 and <135,000		COP	3.4	4	EER IEER	11 14.1	11.8 15.5
HP-5	<65,000		HSPF	7.7	13.3	SEER	13.0	16.4
HP-6	<65,000		HSPF	7.7	13.3	SEER	13.0	16.5
HP-7	<65,000		HSPF	7.7	13.3	SEER	13.0	16.4
HP-8	<65,000		HSPF	7.7	13.3	SEER	13.0	15.8
HP-9	<65,000		HSPF	7.7	13.3	SEER	13.0	16.4
HP-10	<65,000		HSPF	7.7	13.3	SEER	13.0	16.4
HP-11	>=65,000 and <135,000		COP	3.4	4	EER IEER	11 14.1	11.8 15.5
HP-12	<65,000		HSPF	7.7	13.3	SEER	13.0	16.4
HP-13	<65,000		HSPF	7.7	13.3	SEER	13.0	16.4

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 6 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Dry System Equipment Efficiency (other than Package Terminal Air Conditioners (PTAC) and Package Terminal Heat Pumps (PTHP), DX-DOAS and Dual Fuel Heat Pumps)

01	02	03	04	05	06	07	08	09
Name or Item Tag	Size Category (Btu/h)	Heating Mode				Cooling Mode		
		Rating Condition (°F)	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency
HP-14	<65,000		HSPF	7.7	13.3	SEER	13.0	16.4

G. PUMPS

This section does not apply to this project.

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 7 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

H. FAN SYSTEMS & AIR ECONOMIZERS

This table is used to demonstrate compliance with prescriptive requirements found in 140.4(c), 140.4(e), 140.4(m), 170.2(c)3, and 170.2(c)4A for fan systems. Fan systems serving only process loads are exempt from these requirements and do not need to be included in Table H.

System Name	HP-1	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	3,000	Site Elevation	84	Economizer	Fixed Temperature
01	02	03	04						05	06	07	08	09	10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance		Design		
						Component Allowance	Fan Allowance (watt/cfm)[3]	Design Electrical Input Power Method	Motor Nameplate Horsepower	Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	3,000		696		Manufacturer provided		0.65
			MERV 13-16 Filter upstream of thermal conditioning equipment	3,000		417				
			Hydronic/DX cooling coil or heat pump coil	3,000		417				
			Economizer Return Damper	3,000		138				
				Fan System Allowance (kW)[3]				Fan System Electrical Output (kW)		

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 8 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	HP-5	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	2,000	Site Elevation	84	Economizer	Fixed Temperature
01	02	03	04						05	06	07	08	09	10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance	Allowance: Fan Allowance (watt/cfm)[3]	Design: Design Electrical Input Power Method	Design: Motor Nameplate Horsepower	Design: Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	2,000		464		Manufacturer provided		0.71
			MERV 13-16 Filter upstream of thermal conditioning equipment	2,000		278				
			Hydronic/DX cooling coil or heat pump coil	2,000		278				
			Economizer Return Damper	2,000		92				
				Fan System Allowance (kW)[3]				Fan System Electrical Output (kW)		

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 9 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	HP-6	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	1,600	Site Elevation	84	Economizer	Fixed Temperature
01	02	03	04						05	06	07	08	09	10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance	Allowance: Fan Allowance (watt/cfm)[3]	Design: Design Electrical Input Power Method	Design: Motor Nameplate Horsepower	Design: Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	1,600		371		Manufacturer provided		0.56
			MERV 13-16 Filter upstream of thermal conditioning equipment	1,600		222				
			Hydronic/DX cooling coil or heat pump coil	1,600		222				
			Economizer Return Damper	1,600		74				
				Fan System Allowance (kW)[3]				Fan System Electrical Output (kW)		

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 10 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	HP-7	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	2,000	Site Elevation	84	Economizer	Fixed Temperature
01	02	03	04						05	06	07	08	09	10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance	Allowance: Fan Allowance (watt/cfm)[3]	Design: Design Electrical Input Power Method	Design: Motor Nameplate Horsepower	Design: Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	2,000		464		Manufacturer provided		0.71
			MERV 13-16 Filter upstream of thermal conditioning equipment	2,000		278				
			Hydronic/DX cooling coil or heat pump coil	2,000		278				
			Economizer Return Damper	2,000		92				
				Fan System Allowance (kW)[3]				Fan System Electrical Output (kW)		

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 11 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	HP-8	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	1,200	Site Elevation	84	Economizer	Fixed Temperature
01	02	03	04						05	06	07	08	09	10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance	Allowance: Fan Allowance (watt/cfm)[3]	Design: Design Electrical Input Power Method	Design: Motor Nameplate Horsepower	Design: Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	1,200		278		Manufacturer provided		0.45
			MERV 13-16 Filter upstream of thermal conditioning equipment	1,200		167				
			Hydronic/DX cooling coil or heat pump coil	1,200		167				
			Economizer Return Damper	1,200		55				
				Fan System Allowance (kW)[3]				Fan System Electrical Output (kW)		

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 12 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	HP-9	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	2,000	Site Elevation	84	Economizer	Fixed Temperature
01	02	03	04						05	06	07	08	09	10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance	Allowance: Fan Allowance (watt/cfm)[3]	Design: Design Electrical Input Power Method	Design: Motor Nameplate Horsepower	Design: Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	2,000		464		Manufacturer provided		0.71
			MERV 13-16 Filter upstream of thermal conditioning equipment	2,000		278				
			Hydronic/DX cooling coil or heat pump coil	2,000		278				
			Economizer Return Damper	2,000		92				
				Fan System Allowance (kW)[3]				Fan System Electrical Output (kW)		

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 13 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	HP-10	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	2,000	Site Elevation	84	Economizer	Fixed Temperature
01	02	03	04						05	06	07	08	09	10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance	Allowance: Fan Allowance (watt/cfm)[3]	Design: Design Electrical Input Power Method	Design: Motor Nameplate Horsepower	Design: Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	2,000		464		Manufacturer provided		0.71
			MERV 13-16 Filter upstream of thermal conditioning equipment	2,000		278				
			Hydronic/DX cooling coil or heat pump coil	2,000		278				
			Economizer Return Damper	2,000		92				
				Fan System Allowance (kW)[3]				Fan System Electrical Output (kW)		

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 14 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	HP-11	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	3,000	Site Elevation	84	Economizer	Fixed Temperature
01	02	03	04						05	06	07	08	09	10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance	Allowance: Fan Allowance (watt/cfm)[3]	Design: Design Electrical Input Power Method	Design: Motor Nameplate Horsepower	Design: Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	3,000		696		Manufacturer provided		0.65
			MERV 13-16 Filter upstream of thermal conditioning equipment	3,000		417				
			Hydronic/DX cooling coil or heat pump coil	3,000		417				
			Economizer Return Damper	3,000		138				
				Fan System Allowance (kW)[3]				Fan System Electrical Output (kW)		

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 15 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	HP-12	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	2,000	Site Elevation	84	Economizer	Fixed Temperature
01	02	03	04						05	06	07	08	09	10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance	Allowance: Fan Allowance (watt/cfm)[3]	Design: Design Electrical Input Power Method	Design: Motor Nameplate Horsepower	Design: Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	2,000		464		Manufacturer provided		0.71
			MERV 13-16 Filter upstream of thermal conditioning equipment	2,000		278				
			Hydronic/DX cooling coil or heat pump coil	2,000		278				
			Economizer Return Damper	2,000		92				
				Fan System Allowance (kW)[3]				Fan System Electrical Output (kW)		

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 16 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	HP-13	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	2,000	Site Elevation	84	Economizer	Fixed Temperature
01	02	03	04						05	06	07	08	09	10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance	Allowance: Fan Allowance (watt/cfm)[3]	Design: Design Electrical Input Power Method	Design: Motor Nameplate Horsepower	Design: Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	2,000		464		Manufacturer provided		0.71
			MERV 13-16 Filter upstream of thermal conditioning equipment	2,000		278				
			Hydronic/DX cooling coil or heat pump coil	2,000		278				
			Economizer Return Damper	2,000		92				
				Fan System Allowance (kW)[3]				Fan System Electrical Output (kW)		

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	Report Page:	(Page 17 of 40)
Project Address:	1122 Delpaso BLVD.	Date Prepared:	3/17/2023

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	HP-14	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	2,000	Site Elevation	84	Economizer	Fixed Temperature
01	02	03	04						05	06	07	08	09	10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance		Design		
						Component Allowance	Fan Allowance (watt/cfm)[3]	Design Electrical Input Power Method	Motor Nameplate Horsepower	Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	2,000		464		Manufacturer provided		0.71
			MERV 13-16 Filter upstream of thermal conditioning equipment	2,000		278				
			Hydronic/DX cooling coil or heat pump coil	2,000		278				
			Economizer Return Damper	2,000		92				
				Fan System Allowance (kW)[3]				Fan System Electrical Output (kW)		

[1] *FOOTNOTES: Fans serving spaces with design background noise goals below NC35*

[2] *Low-turndown single-zone VAV fan system must be capable of and configured to reduce airflow to 50 percent of design airflow and use no more than 30 percent of the design wattage at that airflow. No more than 10 percent of the design load served by the equipment shall have fixed loads.*

H. EXHAUST AIR HEAT RECOVERY 140.4(q), 170.2(c)4O

01	02	03	04	05	06	07	08	09	10	11
Fan System Name	Qty	Hours of Operation per Year	Design Supply Airflow Rate	Outdoor Airflow	% Outdoor Air at Full Design Airflow	Exemptions to Exhaust Air Heat Recovery Requirement per 140.4(q) & 170.2(c)4O	Exhaust Air Heat Recovery 140.4(q) & 170.2(c)4O	Type Of Heat Recovery Rating	Required Recovery Ratio	Energy Recovery Bypass

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 18 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

Fan Energy Index (FEI)

01	02	03
Name or Item Tag	FEI Exception	FEI

I. SYSTEM CONTROLS

This table is used to demonstrate compliance with mandatory controls in 110.2 and 120.2 and prescriptive controls in 140.4(f) and (n), 170.2(c)4D 170.2(c)4L or requirements in 141.0(b)2E 180.2(b)2 for altered space conditioning systems.

01	02	03	04	05	06	07	08	09
System Name	System Zoning	Conditioned Floor Area Being Served (ft^2)	Thermostats 110.2(b) & (c)[1], 120.2(a) 160.3(a)2A or 141.0(b)2E & 180.2(b)2	Shut-Off Controls 120.2(e) & 160.3(a)2D	Isolation Zone Controls 120.2(g) & 160.3(a)2F	Demand Response 110.12 120.2(b) & 160.3(a)2B	Supply Air Temp. Reset 140.4(f) & 170.2(c)4D	Window Interlocks per 140.4(n) & 170.2(c)4D
HP-1	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	4 Hour Timer	EMCS	Included	Provided
HP-5	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	4 Hour Timer	EMCS	Included	Provided
HP-6	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	4 Hour Timer	EMCS	Included	Provided
HP-7	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	4 Hour Timer	EMCS	Included	Provided
HP-8	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	4 Hour Timer	EMCS	Included	Provided
HP-9	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	4 Hour Timer	EMCS	Included	Provided
HP-10	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	4 Hour Timer	EMCS	Included	Provided
HP-11	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	4 Hour Timer	EMCS	Included	Provided
HP-12	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	4 Hour Timer	EMCS	Included	Provided

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 19 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

I. SYSTEM CONTROLS

HP-13	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	4 Hour Timer	EMCS	Included	Provided
HP-14	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	4 Hour Timer	EMCS	Included	Provided

[1]*FOOTNOTES: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, non-central electric heaters, fireplaces or decorative gas appliances, wood stoves are not required to have setback thermostats.*

J. VENTILATION AND INDOOR AIR QUALITY

This table is used to demonstrate compliance with mandatory ventilation requirements in 120.1 120.2(e)3B 140.4(p) and 140.4(q) for all nonresidential and hotel/motel and d:t24refnolink/]160.2, 160.3(a)3D, 170.2(a)4N, 170.2(a)4O for high-rise residential occupancies. For alterations, only ventilation systems being altered within the scope of the permit application need to be documented in this table. In lieu of this table, the required outdoor ventilation rates and airflows may be shown on the plans or the calculations can be presented in a spreadsheet.

01	☐	Check the box if the project is showing ventilation calculations on the plans, or attaching the calculations instead of completing this table.
02	☒	Check this box if the project included Nonresidential, Hotel/Motel Spaces or Multifamily Common Use Spaces
	☐	
03	☐	Check the box if the project is using natural ventilation in any nonresidential or hotel/motel spaces to meet required ventilation rates per 120.1(c)2.

Nonresidential and Hotel/ Motel Multifamily Common Use Ventilation Systems

04		05			06			07
System Name	HP-1	System Design OA CFM Airflow[1]		1166	System Design Transfer Air CFM		0	Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]
								Provided
08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	Report Page:	(Page 20 of 40)
Project Address:	1122 Delpaso BLVD.	Date Prepared:	3/17/2023

J. VENTILATION AND INDOOR AIR QUALITY

HP-1	Office space	2186			327.9	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				328	18	Ventilation for this System Complies?		Yes

04	05			06			07
System Name	HP-5	System Design OA CFM Airflow[1]	996	System Design Transfer Air CFM	0		Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]
							Provided

08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	
HP-5	Office space	569			85.4	0	0	DCV: NA: Not required per §120.1(d)3; Occ Sensor: NA: Not required space type
17	Total System Required Min OA CFM				85	18	Ventilation for this System Complies?	Yes

04	05			06			07
System Name	HP-6	System Design OA CFM Airflow[1]	770	System Design Transfer Air CFM	0		Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]
							Provided

08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	Report Page:	(Page 21 of 40)
Project Address:	1122 Delpaso BLVD.	Date Prepared:	3/17/2023

J. VENTILATION AND INDOOR AIR QUALITY

HP-6	Conference/ meeting	440			220	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				220	18	Ventilation for this System Complies?		Yes

04	05			06			07
System Name	HP-7	System Design OA CFM Airflow[1]	887	System Design Transfer Air CFM	0		Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]
							Provided

08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	
HP-7	Library - reading room/ stacks	1664			249.6	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				250	18	Ventilation for this System Complies?		Yes

04	05			06			07
System Name	HP-8	System Design OA CFM Airflow[1]	575	System Design Transfer Air CFM	0		Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]
							Provided

08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	Report Page:	(Page 22 of 40)
Project Address:	1122 Delpaso BLVD.	Date Prepared:	3/17/2023

J. VENTILATION AND INDOOR AIR QUALITY

HP-8	Library - reading room/ stacks	863			129.4	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				129	18	Ventilation for this System Complies?		Yes

04	05			06			07
System Name	HP-9	System Design OA CFM Airflow[1]	954	System Design Transfer Air CFM	0		Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]
							Provided

08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	
HP-9	Library - reading room/ stacks	1193			179	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				179	18	Ventilation for this System Complies?		Yes

04	05			06			07
System Name	HP-10	System Design OA CFM Airflow[1]	951	System Design Transfer Air CFM	0		Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]
							Provided

08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	Report Page:	(Page 23 of 40)
Project Address:	1122 Delpaso BLVD.	Date Prepared:	3/17/2023

J. VENTILATION AND INDOOR AIR QUALITY

HP-10	Library - reading room/ stacks	1783			267.4	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				267	18	Ventilation for this System Complies?		Yes

04	05			06			07
System Name	HP-11	System Design OA CFM Airflow[1]	1207	System Design Transfer Air CFM	0		Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]
							Provided

08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	
HP-11	Office space	3017			452.6	0	0	DCV: NA: Not required per §120.1(d)3
								Occ Sensor: NA: Not required space type
17	Total System Required Min OA CFM				453	18	Ventilation for this System Complies?	Yes

04	05			06			07
System Name	HP-12	System Design OA CFM Airflow[1]	866	System Design Transfer Air CFM	0		Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]
							Provided

08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	Report Page:	(Page 24 of 40)
Project Address:	1122 Delpaso BLVD.	Date Prepared:	3/17/2023

J. VENTILATION AND INDOOR AIR QUALITY

HP-12	Office space	1624			243.6	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				244	18	Ventilation for this System Complies?		Yes

04	05			06			07
System Name	HP-13	System Design OA CFM Airflow[1]	842	System Design Transfer Air CFM	0		Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]
							Provided

08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	
HP-13	Office space	842			126.3	0	0	DCV: NA: Not required per §120.1(d)3; Occ Sensor: NA: Not required space type
17	Total System Required Min OA CFM				126	18	Ventilation for this System Complies?	Yes

04	05			06			07
System Name	HP-14	System Design OA CFM Airflow[1]	814	System Design Transfer Air CFM	0		Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]
							Provided

08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D
	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	Report Page:	(Page 25 of 40)
Project Address:	1122 Delpaso BLVD.	Date Prepared:	3/17/2023

J. VENTILATION AND INDOOR AIR QUALITY

HP-14	Office space	1527			229	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				229	18	Ventilation for this System Complies?		Yes

[1] *FOOTNOTES: System CFM should include both mechanical and natural ventilation for the zone/system*

[2] *Air filtration requirements apply to the following three system types per 120.1(c)1A: space conditioning systems utilizing ducts to supply air to occupiable space; supply-only ventilation systems providing outside air to occupiable space; supply side of balanced ventilation systems including heat recovery and energy recovery ventilation systems providing outside air to occupiable space.*

[3] *Uniform Mechanical Code may have more stringent ventilation requirements; the most stringent code requirement takes precedence.*

[4] *See Standards Tables 120.1-A and 120.1-B.*

[5] *For lecture halls with fixed seating, the expected number of occupants shall be determined in accordance with the California Building Code.*

[6] *120.2(e)3 requires systems serving rooms that are required by 130.1(c) to have lighting occupancy sensing controls to also have occupancy sensing zone controls for ventilation. Examples of spaces which require lighting occupancy sensors include offices 250ft^2 or smaller, multipurpose rooms less than 1,000 ft^2, classrooms, conference rooms, restrooms, aisles and open areas in warehouses, library book stack aisles, corridors, stairwells, parking garages, and loading and unloading zones, unless excepted by 130.1(c).*

Multifamily Dwelling Unit Ventilation Systems

☐ Check the box if the system is using continuous ventilation to meet the ventilation requirements per 160.2(b)2Aivb2

19	20	21	22	23	24	25	26	27
Space Name or Item Tag	Mechanical Ventilation Required per 120.1(b) & 160.2(b)2				Ventilation per Design		Local Exhaust	Air Filtration per 120.1(c) & 160.2(b)1
	Conditioned Floor Area (ft^2)	# of Bedrooms	# of Dwelling Units	Required Min OA CFM[1]	Supply Air CFM	Exhaust CFM		
28	Is this a balanced system[4]				29	Meeting Outside Air Requirements?		

[1] *FOOTNOTES: Uniform Mechanical Code may have more stringent ventilation requirements; the most stringent code requirement takes precedence.*

[2] *Kitchen range hood will be verified per NA7.18.1 to confirm model is rated by HVI or AHAM.*

[3] *Air filtration requirements apply to the following three system types per 120.1(c)1A: space conditioning systems utilizing ducts to supply air to occupiable space; supply-only ventilation systems providing outside air to occupiable space; supply side of balanced ventilation systems including heat recovery and energy recovery ventilation systems providing outside air to occupiable space.*

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 26 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

J. VENTILATION AND INDOOR AIR QUALITY

[4] A balanced ventilation system provides ventilation airflow to each dwelling-unit at a rate equal to or greater than the required minimum rate, but not more than twenty percent.

K. TERMINAL BOX CONTROLS

This section does not apply to this project.

L. DISTRIBUTION (DUCTWORK and PIPING)

This table is used to show compliance with mandatory pipe insulation requirements found in 120.3 and mandatory requirements found in 120.4(g) for duct sealing.

01	☐	Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather shall be installed with a cover suitable for outdoor service. Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall have a Class I or Class II vapor retarder. All penetrations and joints of which shall be sealed.

Duct Leakage Testing

The answers to the questions below apply to the following duct systems:	HP-1	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	Yes

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 27 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	Yes
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	false			
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18		All ductwork is an extension of an existing duct system		
19		Ductwork serving individual dwelling unit		
20		< 25 ft of new or replacement space conditioning ducts installed		
21	R-8	Dust Insulation R-value		
The answers to the questions below apply to the following duct systems:		HP-5	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	Yes

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 28 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	Yes
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	false			
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18		All ductwork is an extension of an existing duct system		
19		Ductwork serving individual dwelling unit		
20		< 25 ft of new or replacement space conditioning ducts installed		
21	R-8	Dust Insulation R-value		
The answers to the questions below apply to the following duct systems:		HP-6	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	Yes

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 29 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	Yes
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	false			
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18		All ductwork is an extension of an existing duct system		
19		Ductwork serving individual dwelling unit		
20		< 25 ft of new or replacement space conditioning ducts installed		
21	R-8	Dust Insulation R-value		
The answers to the questions below apply to the following duct systems:		HP-7	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	Yes

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 30 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	Yes
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	false			
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18		All ductwork is an extension of an existing duct system		
19		Ductwork serving individual dwelling unit		
20		< 25 ft of new or replacement space conditioning ducts installed		
21	R-8	Dust Insulation R-value		
The answers to the questions below apply to the following duct systems:		HP-8	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	Yes

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 31 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	Yes
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	false			
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18		All ductwork is an extension of an existing duct system		
19		Ductwork serving individual dwelling unit		
20		< 25 ft of new or replacement space conditioning ducts installed		
21	R-8	Dust Insulation R-value		
The answers to the questions below apply to the following duct systems:		HP-9	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	Yes

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 32 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	Yes
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	false			
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18		All ductwork is an extension of an existing duct system		
19		Ductwork serving individual dwelling unit		
20		< 25 ft of new or replacement space conditioning ducts installed		
21	R-8	Dust Insulation R-value		
The answers to the questions below apply to the following duct systems:		HP-10	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	Yes

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 33 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	Yes
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	false			
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18		All ductwork is an extension of an existing duct system		
19		Ductwork serving individual dwelling unit		
20		< 25 ft of new or replacement space conditioning ducts installed		
21	R-8	Dust Insulation R-value		
The answers to the questions below apply to the following duct systems:		HP-11	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	Yes

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 34 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	Yes
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	false			
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18		All ductwork is an extension of an existing duct system		
19		Ductwork serving individual dwelling unit		
20		< 25 ft of new or replacement space conditioning ducts installed		
21	R-8	Dust Insulation R-value		
The answers to the questions below apply to the following duct systems:		HP-12	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	Yes

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 35 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	Yes
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	false			
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18		All ductwork is an extension of an existing duct system		
19		Ductwork serving individual dwelling unit		
20		< 25 ft of new or replacement space conditioning ducts installed		
21	R-8	Dust Insulation R-value		
The answers to the questions below apply to the following duct systems:		HP-13	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	Yes

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 36 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	Yes
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	false			
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18		All ductwork is an extension of an existing duct system		
19		Ductwork serving individual dwelling unit		
20		< 25 ft of new or replacement space conditioning ducts installed		
21	R-8	Dust Insulation R-value		
The answers to the questions below apply to the following duct systems:		HP-14	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	Yes

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 37 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	Yes
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	false			
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18		All ductwork is an extension of an existing duct system		
19		Ductwork serving individual dwelling unit		
20		< 25 ft of new or replacement space conditioning ducts installed		
21	R-8	Dust Insulation R-value		

M. COOLING TOWERS

This section does not apply to this project.

N. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Form/Title
NRCI-MCH-01-E - Must be submitted for all buildings

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 38 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

O. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Form/Title	Systems/Spaces To Be Field Verified
NRCA-MCH-02-A - Outdoor Air must be submitted for all newly installed HVAC units. Note: MCH-02-A can be performed in conjunction with MCH-07-A Supply Fan VFD Acceptance (if applicable) since testing activities overlap.	Trane 7.5 Ton; Trane 5 Ton; Trane 4 Ton; Trane 5 Ton; Trane 3 Ton; Trane 5 Ton; Trane 5 Ton; Trane 7.5 Ton; Trane 5 Ton; Trane 5 Ton; Trane 5 Ton;
NRCA-MCH-03-A - Constant Volume Single Zone HVAC NOTE: This form does not automatically move to "Yes'. If Constant Volume Single Zone HVAC Systems are included in the scope, permit applicant should move this form to "Yes".	Trane 7.5 Ton; Trane 5 Ton; Trane 4 Ton; Trane 5 Ton; Trane 3 Ton; Trane 5 Ton; Trane 5 Ton; Trane 7.5 Ton; Trane 5 Ton; Trane 5 Ton; Trane 5 Ton;
NRCA-MCH-05-A - Air Economizer Controls	Trane 7.5 Ton; Trane 5 Ton; Trane 4 Ton; Trane 5 Ton; Trane 3 Ton; Trane 5 Ton; Trane 5 Ton; Trane 7.5 Ton; Trane 5 Ton; Trane 5 Ton; Trane 5 Ton;
NRCA-MCH-11-A Automatic Demand Shed Controls	Trane 7.5 Ton; Trane 5 Ton; Trane 4 Ton; Trane 5 Ton; Trane 3 Ton; Trane 5 Ton; Trane 5 Ton; Trane 7.5 Ton; Trane 5 Ton; Trane 5 Ton; Trane 5 Ton;
NRCA-MCH-12-A FDD for Packaged Direct Expansion Units	Trane 7.5 Ton; Trane 5 Ton; Trane 5 Ton; Trane 5 Ton; Trane 5 Ton; Trane 7.5 Ton; Trane 5 Ton; Trane 5 Ton; Trane 5 Ton;

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 39 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

O. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

NRCA-MCH-16-A Supply Air Temperature Reset Controls	Trane 7.5 Ton; Trane 5 Ton; Trane 4 Ton; Trane 5 Ton; Trane 3 Ton; Trane 5 Ton; Trane 5 Ton; Trane 7.5 Ton; Trane 5 Ton; Trane 5 Ton; Trane 5 Ton;
NRCA-MCH-18-A Energy Management Control Systems	Trane 7.5 Ton; Trane 5 Ton; Trane 4 Ton; Trane 5 Ton; Trane 3 Ton; Trane 5 Ton; Trane 5 Ton; Trane 7.5 Ton; Trane 5 Ton; Trane 5 Ton; Trane 5 Ton;

P. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

There are no NRCV forms required for this project.

Q. MANDATORY MEASURES DOCUMENTATION LOCATION

This table is used to indicate where mandatory measures are documented in the plan set or construction documentation.

01		02
Compliance with Mandatory Measures documented through MCH Mandatory Measures Note Block	Yes	Plan sheet or construction document location: M-Sheets

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	NSHL Roof Assessment and Repair	**Report Page:**	**(Page 40 of 40)**
Project Address:	1122 Delpaso BLVD.	**Date Prepared:**	3/17/2023

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Company: Leaf Engineers	Signature Date: 3/17/23
Address:	CEA/ HERS Certification Identification (if applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: LEAF Egineers	Responsible Designer Signature:
Company: LEAF Engineers	Date Signed: 2023-03-17
Address: 1100 Iron Point Rd, Suite 200	License: M33380
City/State/Zip: Folsom CA 95630	Phone: 916-335-9992

Fibergrate
Composite Structures

Calculations

for

DynaRound Slimline Guardrail System

Checked per the Load Requirements of the International Building Code 2018 and OSHA CFR 1910.29 – Fall Protection Systems and Falling Object Protection



3-6-2020

DynaRound Slimline Guardrail System
Checked per IBC 2018 and OSHA CFR 1910.29
Engineer: E. A. Love, P.E.

Design Criteria

Guardrail Loads:

It is assumed for these calculations that the DynaRound Slimline Guardrail system will be installed on building roofs which are inaccessible to the general public.

- Case 1: From IBC 1607.8.1.1 - Concentrated Load. Handrails and Guards shall be designed to resist a concentrated load of 200 lb (0.89 kN) in accordance with Section 4.5.1.1 of ASCE 7.

- Case 2: From IBC 1607.8.1. Exceptions - …for areas that are not accessible to the general public and that have an occupant load less than 50, the minimum load shall be 20 lb/ft (0.29 kN/m)

From OSHA CFR 1910.29:

- Case 3: From 1910.29(b)(4) When the 200-pound (890-N) test load is applied in a downward direction, the top rail of the guardrail system must not deflect to a height of less than 39 inches (99 cm) above the walking-working surface.

- Case 4: From 1910.29 (b)(5) Midrails, screens, mesh, intermediate vertical members, solid panels, and other equivalent intermediate members are capable of withstanding, without failure, a force of at least 150 pounds (667 N) applied in any downward or outward direction at any point along the intermediate member.

Structural Shapes:

Allowable Stresses:

Bending	45,000 psi	FOS = 2.0
Shear	2,250 psi	FOS = 2.0
Compression	45,000 psi	FOS = 2.0

Mechanical Properties of 1.9 Inch OD x 1.5 Inch ID Tube:

Reference Fibergrate Test Report R1 Dated 10-3-16 (attached):

Ult. Flex Strength	90,000 psi (62 MPa)
Full Section Flex Modulus	5.0×10^6 psi (34.5 GPa)

900 FM 205
Stephenville, Texas 76401 U.S.A.
Phone: 1-800-527-4043
www.fibergrate.com

COM-2310004

Fibergrate
Composite Structures

DATE 1-27-20
W.O. NO.
BY EMhone
PAGE NO ____ OF ____

Dyna Round Slimline

These calculations are for the Dyna Round Slimline guardrail system as detailed in the Product Data Sheet, Attachment (A). It consists of cast iron fittings and 1.9" OD x 1.5" ID FRP Round Tube. Flexural performance of the 1.9" O.D tube is documented in the Sept 30, 2016 Test Report given in Attachment (B). In that report, it was determined that the following properties be used for design:

Flex. Modulus = 5.0×10^6 psi

Flex Strength = 90,000 psi

Guards are checked for the following configurations:

1) 8'-0" post spacing with weighted outrigger.
2) 8'-0" post spacing with 5'-0" (1.52m) guardrail return.

For the purposes of these calculations, it is assumed that a parapet wall is present to

THIS DOCUMENT AND ALL DESIGN INFORMATION IS THE SOLE PROPERTY OF FIBERGRATE COMPOSITE STRUCTURES INC. AND IS NOT TO BE DISCLOSED OR COPIED WITHOUT THE WRITTEN AUTHORIZATION OF FIBERGRATE COMPOSITE STRUCTURES INC.

900 FM 205
Stephenville, Texas 76401 U.S.A.
Phone: 1-800-527-4043
www.fibergrate.com

Fibergrate
Composite Structures

DATE 1-27-20
W.O. NO. —
BY Elmore
PAGE NO ____ OF ____

Dyna Round Slimline

restrain the post bases against sliding

The guardrails are modeled using RISA 3D and are based on four posts spaced at 8'0" O.C. with the end condition specified. Each model is subjected to the code required loads in locations determined to be critical by inspection. The OSHA requirement that infill and intermediate members be capable of resisting a concentrated load of 150 lb downward or outward is OK by comparison to the 200 lb concentrated load cases. This is due to the uniformity of construction of the system, all rails & posts being manufactured from the same 1.9" OD. FRP Tube and all fittings being the same throughout the system

Detailed Analysis - Outrigger Assy at Ends

In this analysis, the ends of the guards are constrained by the weighted "Outrigger" Assy.

THIS DOCUMENT AND ALL DESIGN INFORMATION IS THE SOLE PROPERTY OF FIBERGRATE COMPOSITE STRUCTURES INC. AND IS NOT TO BE DISCLOSED OR COPIED WITHOUT THE WRITTEN AUTHORIZATION OF FIBERGRATE COMPOSITE STRUCTURES INC.

900 FM 205
Stephenville, Texas 76401 U.S.A.
Phone: 1-800-527-4043
www.fibergrate.com

COM-2310004

Fibergrate
Composite Structures

DATE 2-28-20
W.O. NO. ____
BY Steve
PAGE NO ____ OF ____

DynaRound Slimline

shown on the lower left of p. 2 of Attachment (A)

Case (1) 200 lb Load at Extreme End of Rail

Model of Load & Reactions - p. 11

Deflected Shape - p. 12

Detailed analysis of the Outrigger (M1), the closest post (M3) and the top rail (M11) is given on pp 13-15. The max horiz deflection of the top rail is 7.73 inches. The max bending stress occurs in the post and is 18,667 psi < 46,000 psi (ok)

Case (2) 200 lb Load at Interior Post

Model of Loads & Reactions. p. 16

Deflected shape p. 17

Detailed analysis of the top rail (M11) and the loaded post are given on pp 18-19. Max deflection horizontally of the rail is 11.7" with a max bending stress of 10,263 psi < 46 ksi (OK)

THIS DOCUMENT AND ALL DESIGN INFORMATION IS THE SOLE PROPERTY OF FIBERGRATE COMPOSITE STRUCTURES INC. AND IS NOT TO BE DISCLOSED OR COPIED WITHOUT THE WRITTEN AUTHORIZATION OF FIBERGRATE COMPOSITE STRUCTURES INC.

900 FM 205
Stephenville, Texas 76401 U.S.A.
Phone: 1-800-527-4043
www.fibergrate.com

Fibergrate
Composite Structures

DATE 2-28-20
W.O. NO. —
BY [illegible]
PAGE NO ____ OF ____

Dyna Round Slimline

Case (3) Load at Mid Span of Top Rail

Model w/ loads & reactions - p. 20

Deflected Shape - p. 21.

Detailed analysis of one of the interior posts (M4) and the top rail (M11) is given on pp. 22-23. Max horiz deflection of top rail is 13.65" with a max flexural stress of 13,363 psi > 46 ksi (OK)

Case (4) 200 lb Concentrated Load, Vertically Downward

Top rail must deflect less than 3" (to an overall height of 39" per 1910.29(b)(4). Load is applied to one of the end spans.

Model w/ loads & reactions - p. 24

Deflected shape - p. 25

Detailed analysis of the top rail (M11) is given on p. 26. Max vertical deflection = 0.58" < 3" (OK) Bending stress is (OK)

THIS DOCUMENT AND ALL DESIGN INFORMATION IS THE SOLE PROPERTY OF FIBERGRATE COMPOSITE STRUCTURES INC. AND IS NOT TO BE DISCLOSED OR COPIED WITHOUT THE WRITTEN AUTHORIZATION OF FIBERGRATE COMPOSITE STRUCTURES INC.

900 FM 205
Stephenville, Texas 76401 U.S.A.
Phone: 1-800-527-4043
www.fibergrate.com

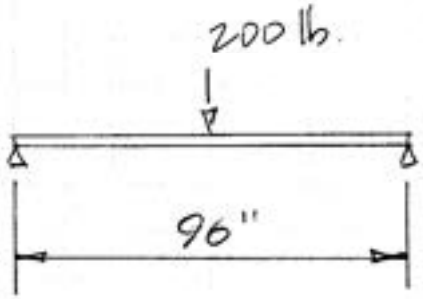
COM-2310004

Fibergrate
Composite Structures

DATE 2-28-20
W.O. NO.
BY
PAGE NO ____ OF ____

Dyna Round Slimline

Check top rail as a simple span as this condition will produce max deflection.



$$\delta = \frac{Pl^3}{48EI}$$

$$= \frac{200(96^3)}{48(5\times10^6)(0.3735\ in^4)}$$

$$= 1.974" < 3" \quad (OK)$$

Bending stress

$$M = \frac{Pl}{4} = \frac{200(96)}{4} = 4800\ lb\text{-}in$$

$$\sigma_f = \frac{4800}{(0.3932)} = 12,208 psi < 46 ksi \quad (OK)$$

∴ Top rail is (OK) for simple span case

Case (5) 20 lb/ft Uniform load

In case (5), an 8' section of rail is loaded at 20 lb/ft horizontally.

Loads & Reactions, see p. 27

Deflected Shape, see p. 28

Detailed analysis of the loaded post (M7) and

THIS DOCUMENT AND ALL DESIGN INFORMATION IS THE SOLE PROPERTY OF FIBERGRATE COMPOSITE STRUCTURES INC. AND IS NOT TO BE DISCLOSED OR COPIED WITHOUT THE WRITTEN AUTHORIZATION OF FIBERGRATE COMPOSITE STRUCTURES INC.

900 FM 205
Stephenville, Texas 76401 U.S.A.
Phone: 1-800-527-4043
www.fibergrate.com

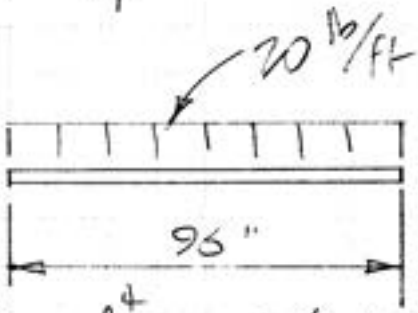
COM-2310004

Fibergrate
Composite Structures

DATE 2-25-25
W.O. NO. —
BY Steve
PAGE NO ____ OF ____

the top rail, (M11), are given on pp 29-30
Max rail deflection = 6.23" w/ bending stress
of 4475psi (OK)

Check top rail as a simple span:



$$\delta = \frac{5wl^4}{384EI} = \frac{5(1.667)(96)^4}{384(5\times10^6)(0.3735)} = 0.99"$$

$$M = \frac{wl^2}{8} = \frac{(1.667)(96)^2}{8} = 1920 \text{ lb-in}$$

$$\sigma_f = \frac{1920}{0.3932} = 4884 \text{ psi} \quad (OK)$$

∴ Top rail (OK) for uniform load on a simple span

Detailed Analysis - 5ft (1.52m) Return at Ends

In this analysis, the ends of the guardrail are constrained by a 5ft return (or kicker) as shown on the lower left of page 2 of Attachment (A)

THIS DOCUMENT AND ALL DESIGN INFORMATION IS THE SOLE PROPERTY OF FIBERGRATE COMPOSITE STRUCTURES INC. AND IS NOT TO BE DISCLOSED OR COPIED WITHOUT THE WRITTEN AUTHORIZATION OF FIBERGRATE COMPOSITE STRUCTURES INC.

900 FM 205
Stephenville, Texas 76401 U.S.A.
Phone: 1-800-527-4043
www.fibergrate.com

COM-2310004

Fibergrate
Composite Structures

DATE 2-23-20
W.O. NO.
BY Ethore
PAGE NO ____ OF ____

Dyna Round Slimline

Case ① 200 lb Load at Extreme End of Rail

Loads & Reactions - see p. 31

Deflected Shape - see p. 32

Detailed analysis of the return post (M3) and the top rail (M11) is given on pp. 33-34. Max deflection at the top rail is 2.83", bending stresses in all members are OK by inspection.

Case ② 200 lb Load at Interior Post

Loads & Reactions, see p. 35

Deflected shape, see p. 36

Detailed analysis of the loaded post (M7) and the top rail (M11) is given on pp. 37-38

Max horiz top rail deflection is 10.6" with a maximum bending stress of 9344 psi OK

Case ③ 200 lb Load at Mid Span of Top Rail

Loads & Reactions, see p. 39

Deflected shape, see p. 40

Detailed analysis of one of the interior posts (M7)

THIS DOCUMENT AND ALL DESIGN INFORMATION IS THE SOLE PROPERTY OF FIBERGRATE COMPOSITE STRUCTURES INC. AND IS NOT TO BE DISCLOSED OR COPIED WITHOUT THE WRITTEN AUTHORIZATION OF FIBERGRATE COMPOSITE STRUCTURES INC.

900 FM 205
Stephenville, Texas 76401 U.S.A.
Phone: 1-800-527-4043
www.fibergrate.com

COM-2310004

Fibergrate
Composite Structures

DATE 1-28-20
W.O. NO.
BY Ethne
PAGE NO ____ OF ____

Dyna Round Stim Line

and the top rail (M11) are given on pp 41-42
Max horiz. defl. at top rail is 12.27" with a max bending stress of 12,765 psi < 46ksi (OK)

Case ④ 200lb Conc. Load Vertically Downward

Loads & Reactions - see p. 43

Deflected Shape - see p. 44

(see page 45)

Detailed analysis of top rail, M11 shows a downward deflection of 0.6" < 3" (OK) Bending stresses are (OK) by inspection. Simple span case is checked above - (OK)

Case ⑤ 20 lb/ft Uniform Load

As above, an 8' section of rail is loaded horizontally with a 20 lb/ft (1.667 lb/in) uniform load. (Simple span case checked above)

Loads & Reactions - p. 46

Deflected Shape - p. 47

Detailed analysis of the loaded post (M7)

THIS DOCUMENT AND ALL DESIGN INFORMATION IS THE SOLE PROPERTY OF FIBERGRATE COMPOSITE STRUCTURES INC. AND IS NOT TO BE DISCLOSED OR COPIED WITHOUT THE WRITTEN AUTHORIZATION OF FIBERGRATE COMPOSITE STRUCTURES INC.

900 FM 205
Stephenville, Texas 76401 U.S.A.
Phone: 1-800-527-4043
www.fibergrate.com

COM-2310004

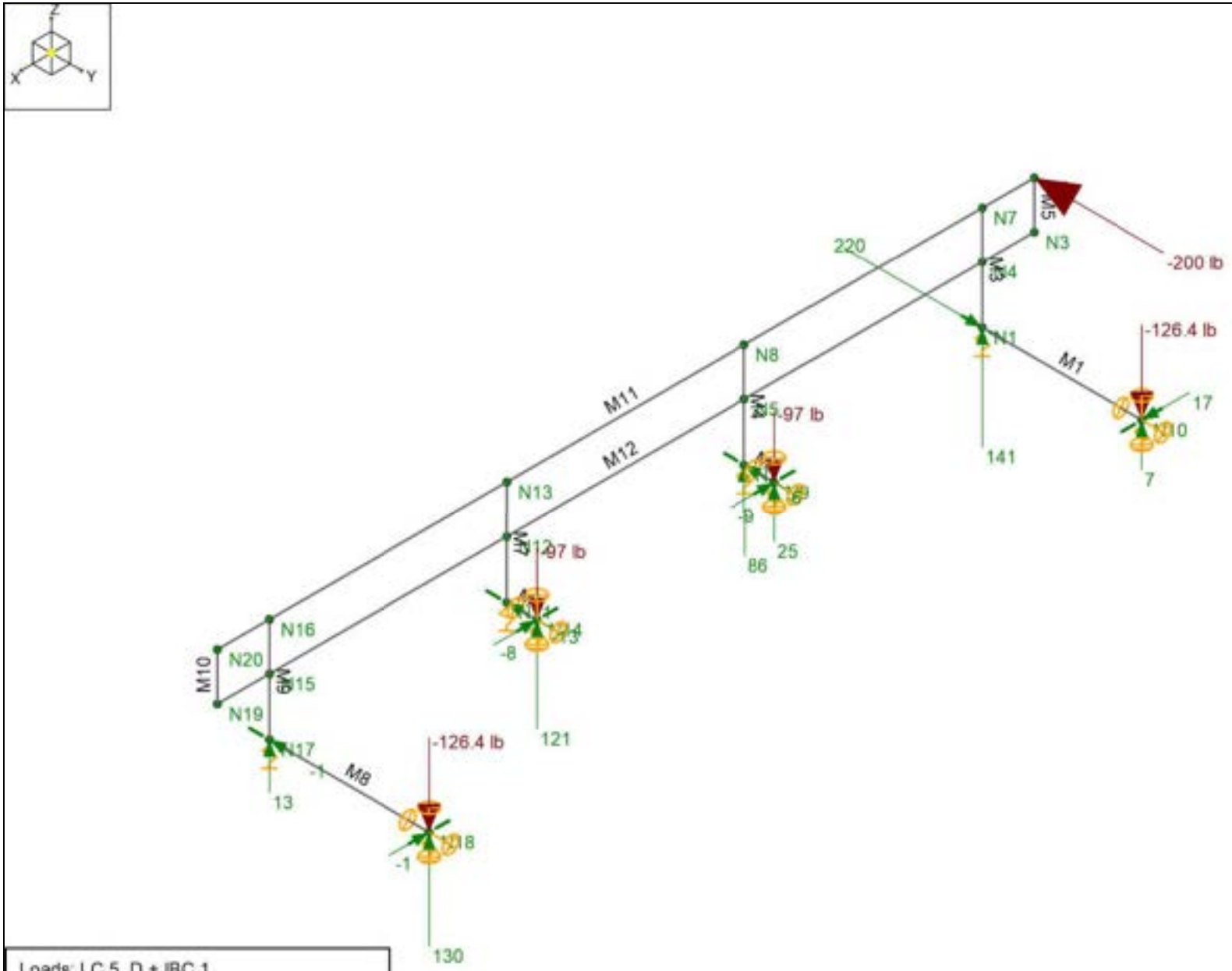
Fibergrate
Composite Structures

DATE 1-28-20
W.O. NO.
BY DMore
PAGE NO ____ OF ____

and the top rail (MII) is given on pp. 48-49
Max horiz. rail deflection = 3.5" with a flexural stress of 2744 psi (OK)

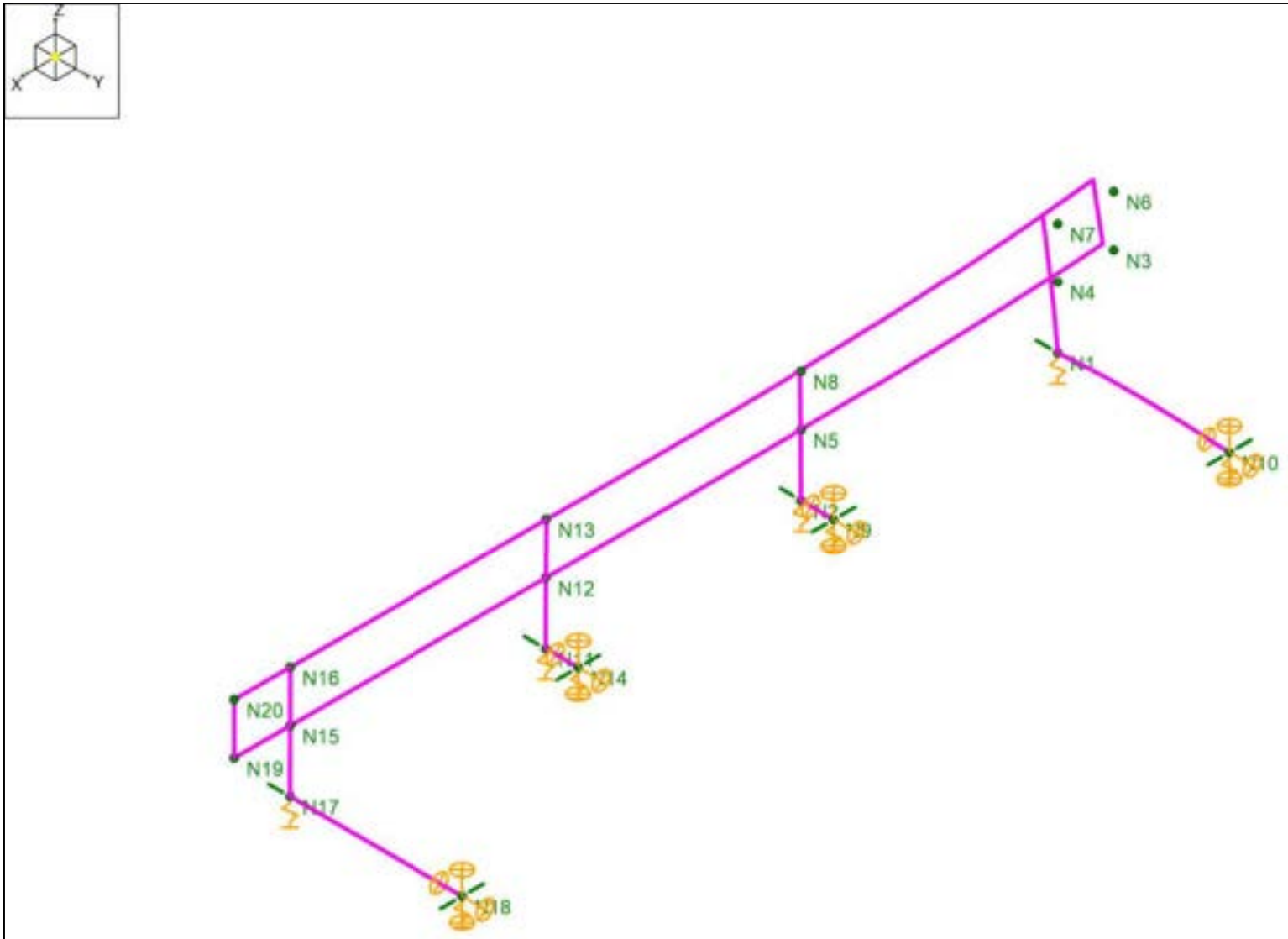
In summary, the above analysis shows that the Dyna Round Slimline system meets the code specified load conditions within the limits placed on the system when installed on roofs in non-public access areas.

THIS DOCUMENT AND ALL DESIGN INFORMATION IS THE SOLE PROPERTY OF FIBERGRATE COMPOSITE STRUCTURES INC. AND IS NOT TO BE DISCLOSED OR COPIED WITHOUT THE WRITTEN AUTHORIZATION OF FIBERGRATE COMPOSITE STRUCTURES INC.



Fibergrate Composite Structures, Inc	DynaRound Slimline - 'A' Outrigger	SK-3
Ethan Love, P.E.		Jan 21, 2020
	Load Case 1 - Loads and Reactions	Slimline 8 FT A Outrigger.r3d

COM-2310004



Results for LC 5, D + IBC 1

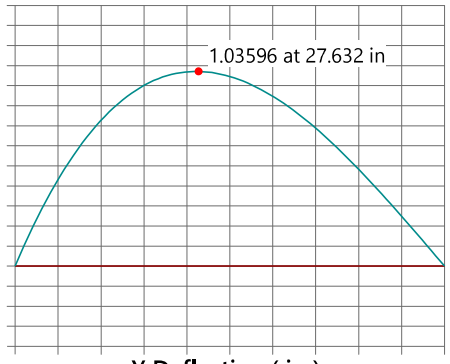
Fibergrate Composite Structures, Inc	DynaRound Slimline - 'A' Outrigger	SK-2
Ethan Love, P.E.		Jan 21, 2020
	Load Case 1 - Deflected Shape x 1	Slimline 8 FT A Outrigger.r3d

COM-2310004

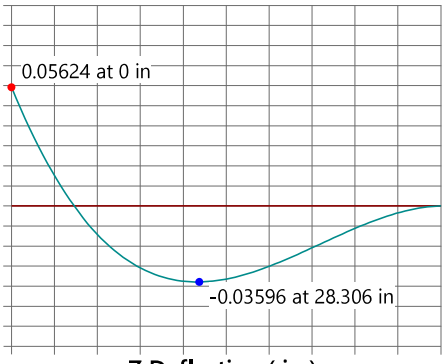
Detail Report: M1

Load Combination: LC 5: D + IBC 1

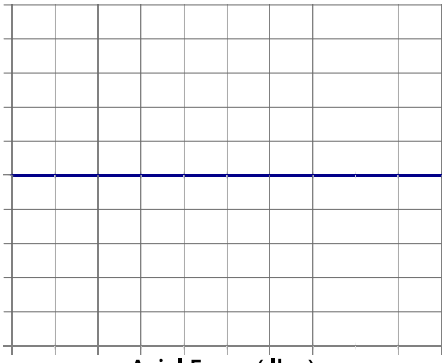
Diagrams:



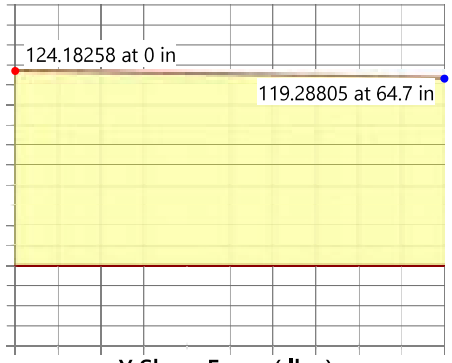
Y Deflection (in)



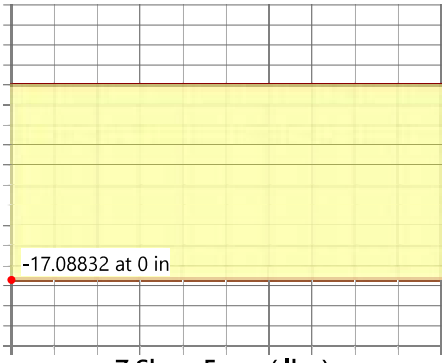
Z Deflection (in)



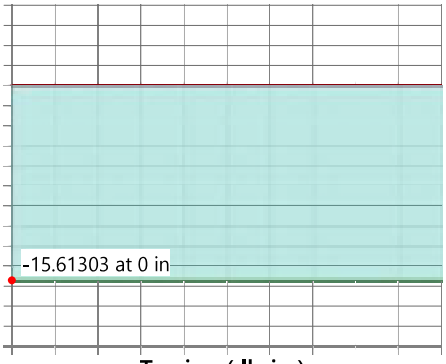
Axial Force (lbs)



Y Shear Force (lbs)



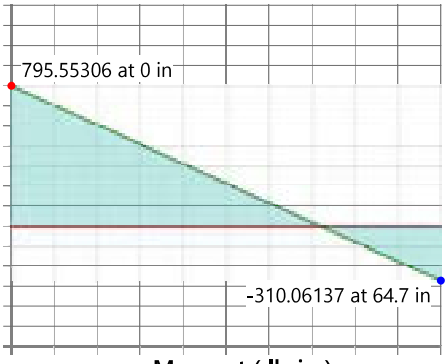
Z Shear Force (lbs)



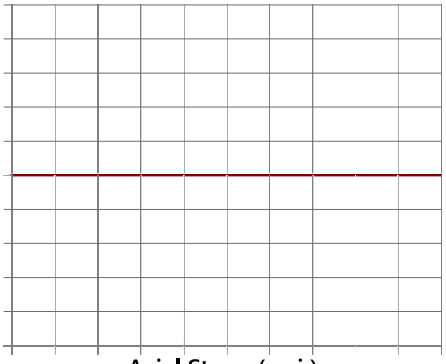
Torsion (lb-in)



z-z Moment (lb-in)



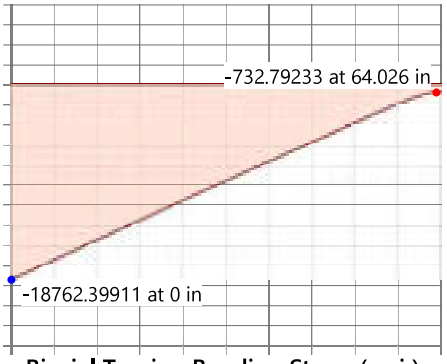
y-y Moment (lb-in)



Axial Stress (psi)



Biaxial Compression Bending Stress(p...

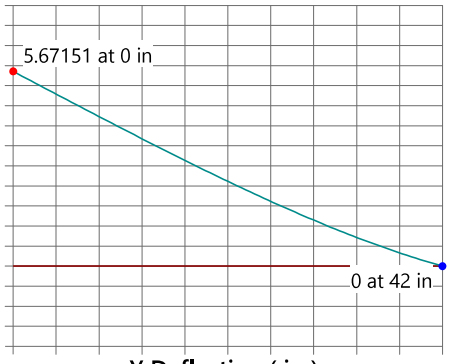


Biaxial Tension Bending Stress (psi)

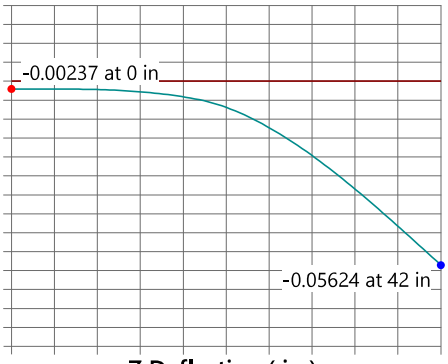
Detail Report: M3

Load Combination: LC 5: D + IBC 1

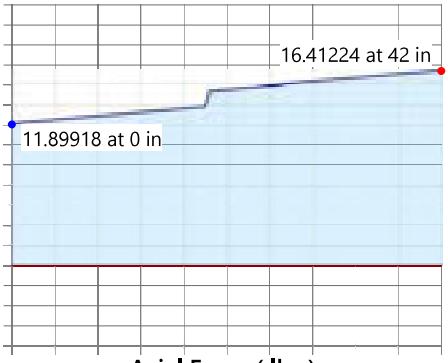
Diagrams:



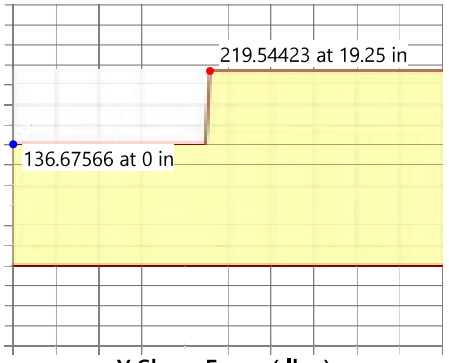
Y Deflection (in)



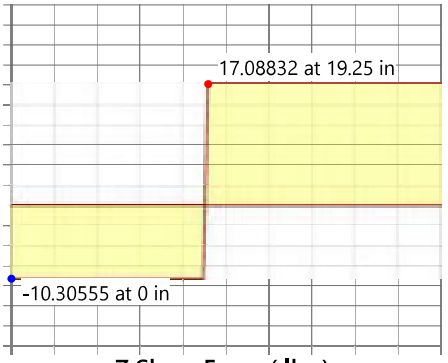
Z Deflection (in)



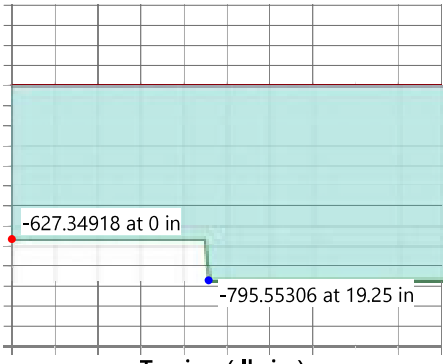
Axial Force (lbs)



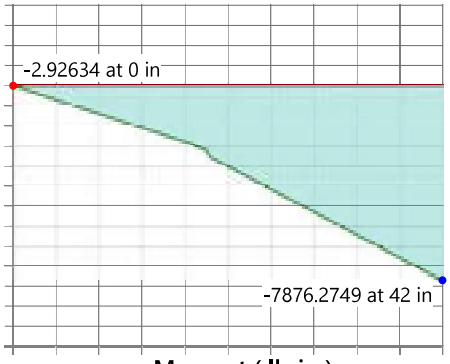
Y Shear Force (lbs)



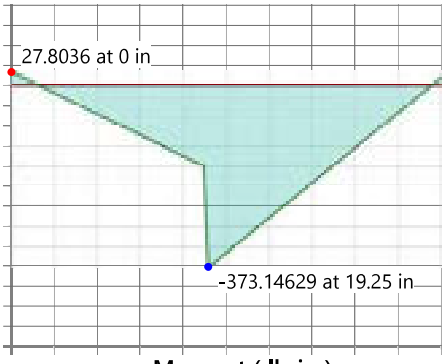
Z Shear Force (lbs)



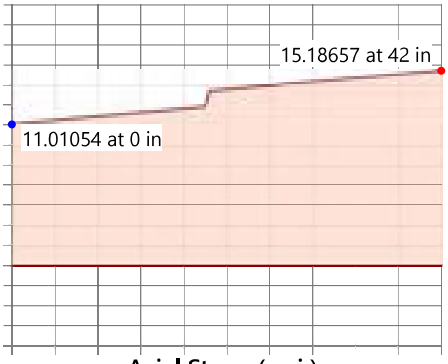
Torsion (lb-in)



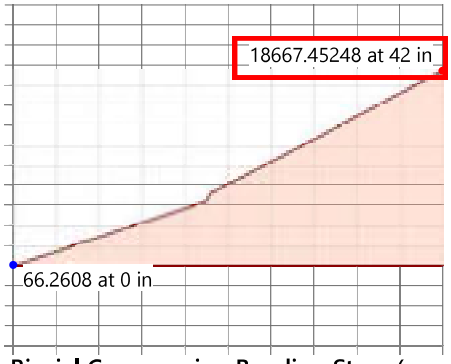
z-z Moment (lb-in)



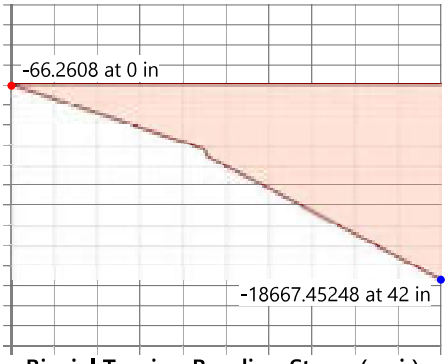
y-y Moment (lb-in)



Axial Stress (psi)



Biaxial Compression Bending Stress(p...



Biaxial Tension Bending Stress (psi)

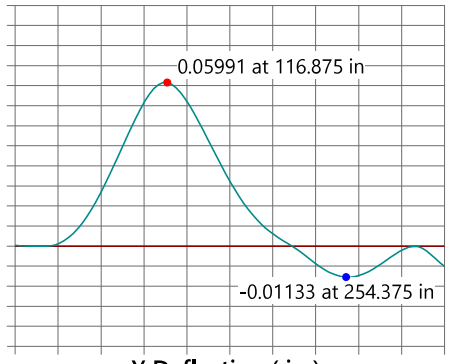
Company : Fibergrate Composite Structures…
Designer : Ethan Love, P.E.
Job Number :
Model Name : DynaRound Slimline - 'A' Outrigger

Checked By : _____
15

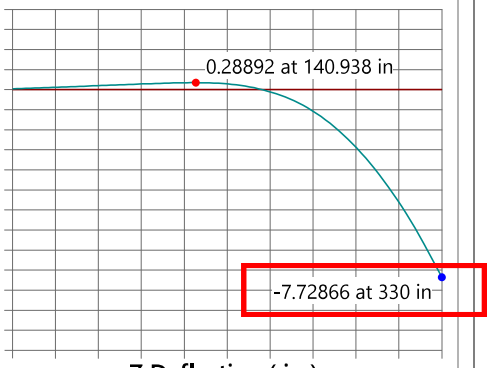
Detail Report: M11

Load Combination: LC 5: D + IBC 1

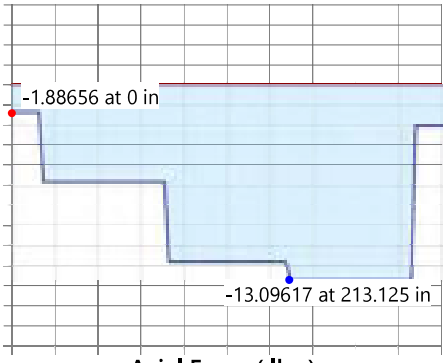
Diagrams:



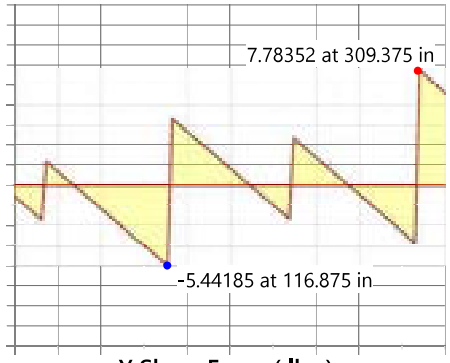
Y Deflection (in)



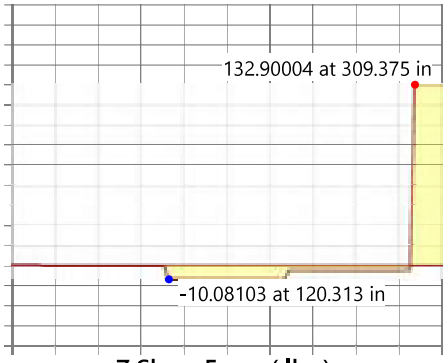
Z Deflection (in)



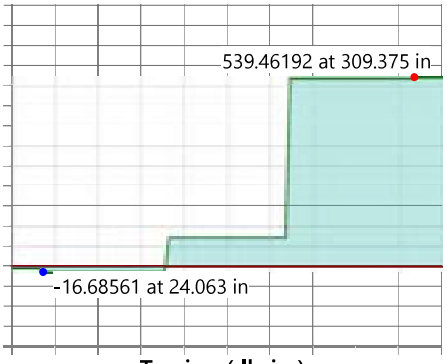
Axial Force (lbs)



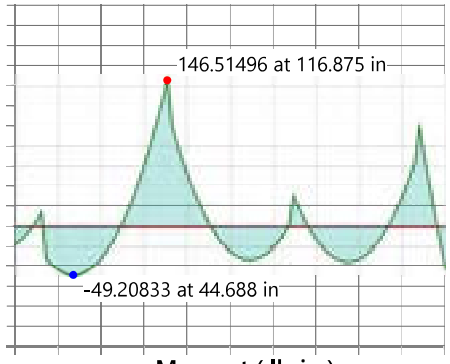
Y Shear Force (lbs)



Z Shear Force (lbs)



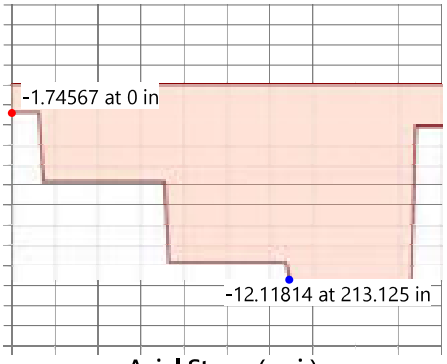
Torsion (lb-in)



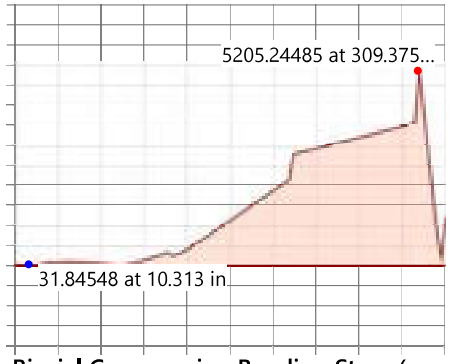
z-z Moment (lb-in)



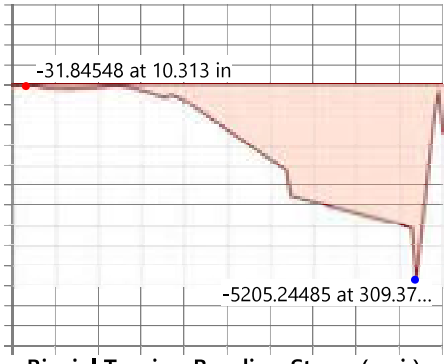
y-y Moment (lb-in)



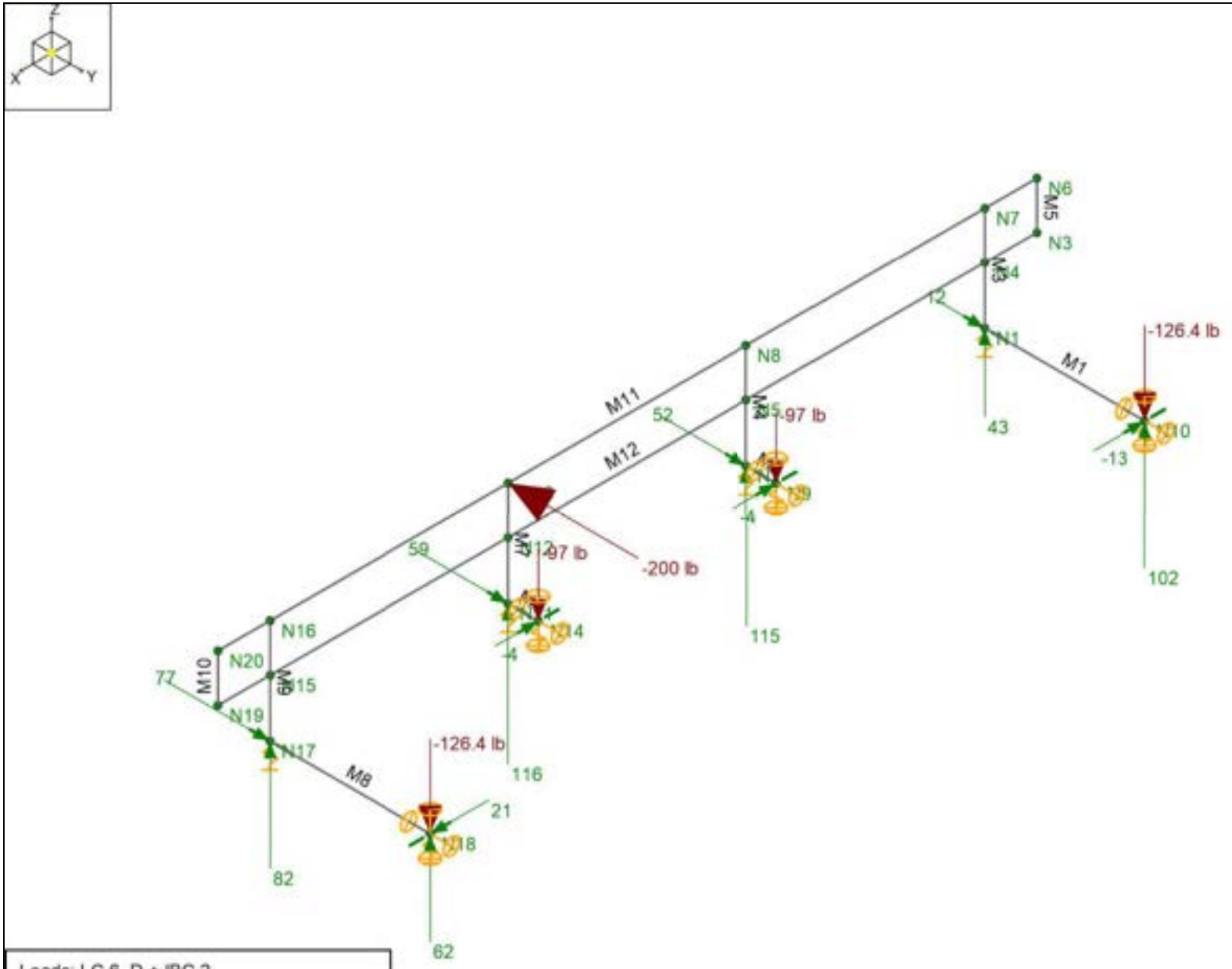
Axial Stress (psi)



Biaxial Compression Bending Stress(p...

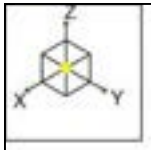


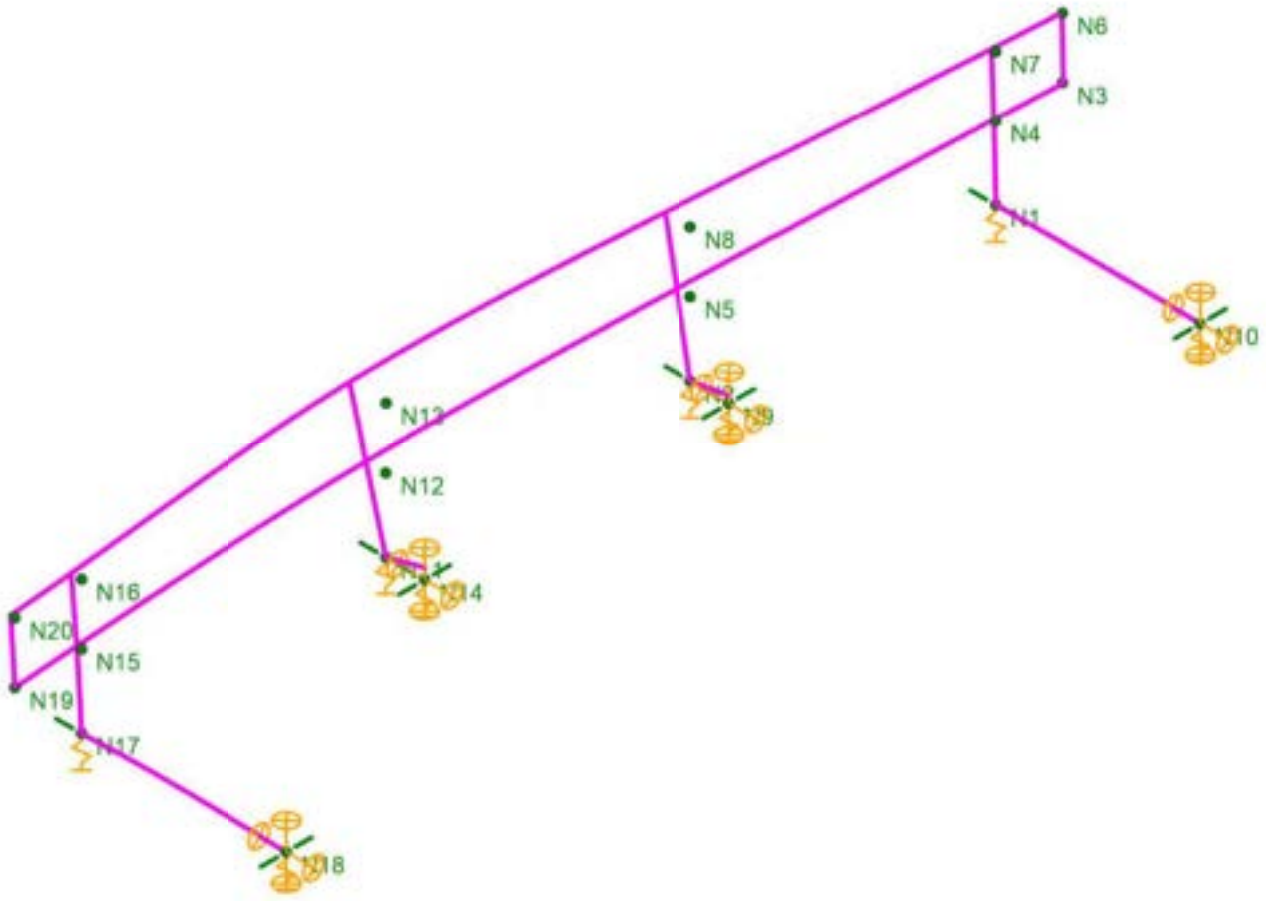
Biaxial Tension Bending Stress (psi)



Fibergrate Composite Structures, Inc	DynaRound Slimline - 'A' Outrigger	SK-4
Ethan Love, P.E.		Jan 21, 2020
	Load Case 2 - Loads and Reactions	Slimline 8 FT A Outrigger.r3d

COM-2310004





Results for LC 6, D + IBC 2

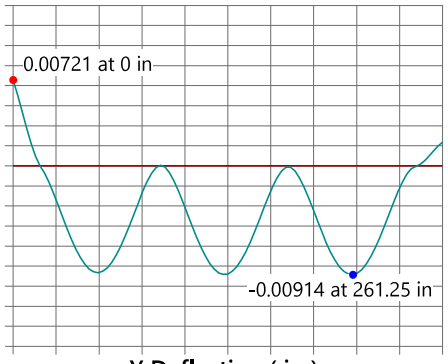
Fibergrate Composite Structures, Inc	DynaRound Slimline - 'A' Outrigger	SK-5
Ethan Love, P.E.		Jan 21, 2020
	Load Case 2 - Deflected Shape x 1	Slimline 8 FT A Outrigger.r3d

COM-2310004

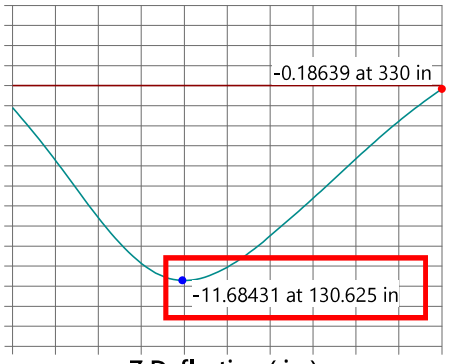
Detail Report: M11

Load Combination: LC 6: D + IBC 2

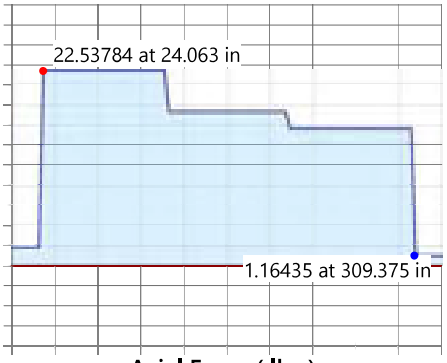
Diagrams:



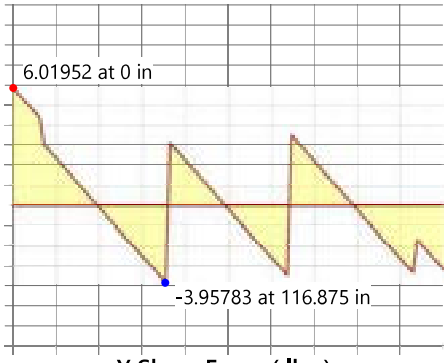
Y Deflection (in)



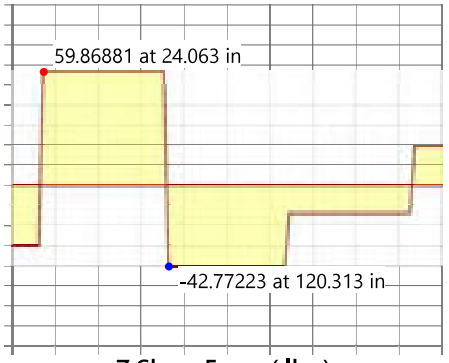
Z Deflection (in)



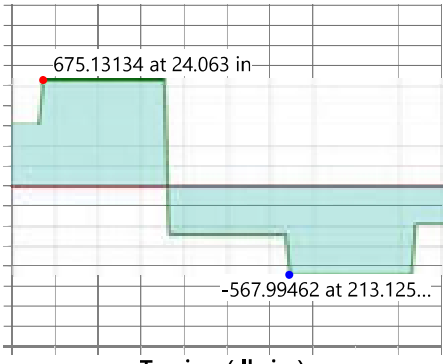
Axial Force (lbs)



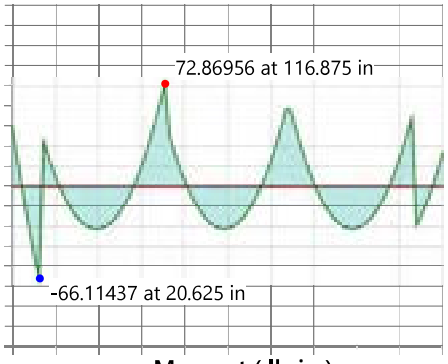
Y Shear Force (lbs)



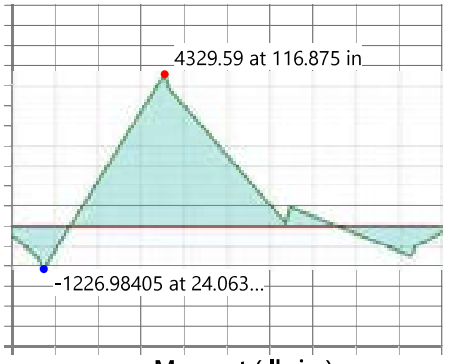
Z Shear Force (lbs)



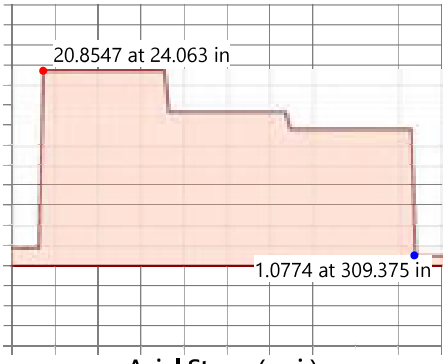
Torsion (lb-in)



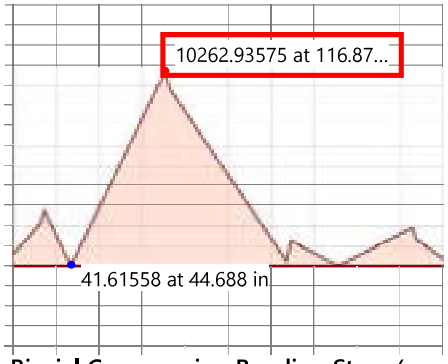
z-z Moment (lb-in)



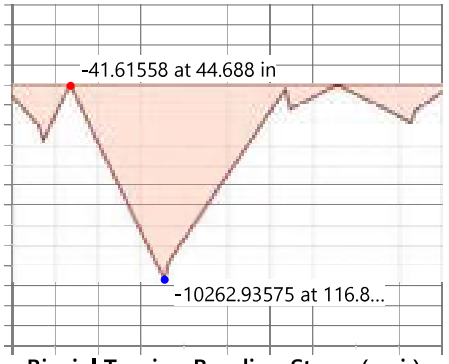
y-y Moment (lb-in)



Axial Stress (psi)



Biaxial Compression Bending Stress(p...

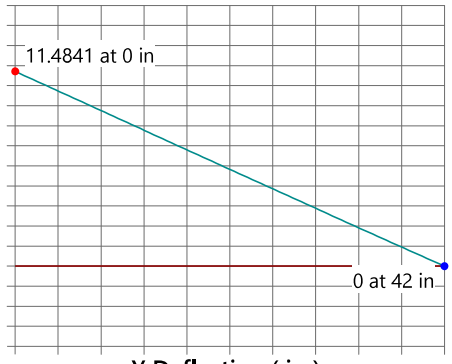


Biaxial Tension Bending Stress (psi)

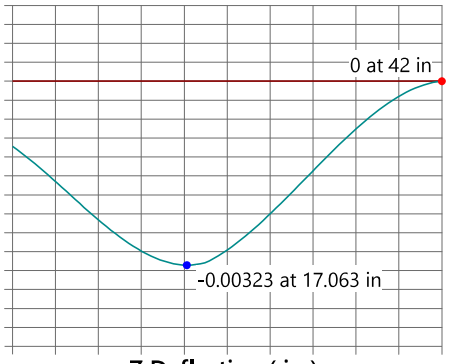
Detail Report: M7

Load Combination: LC 6: D + IBC 2

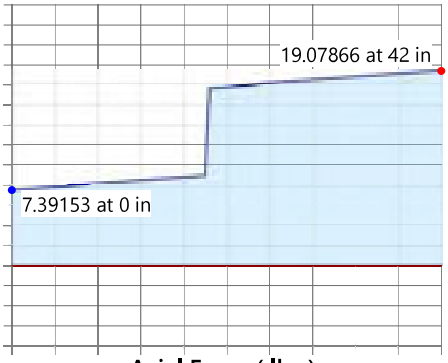
Diagrams:



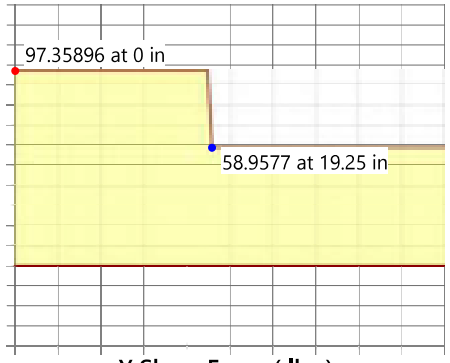
Y Deflection (in)



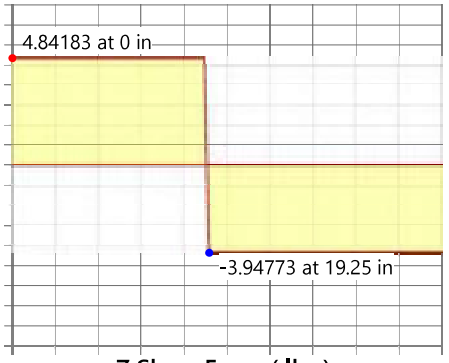
Z Deflection (in)



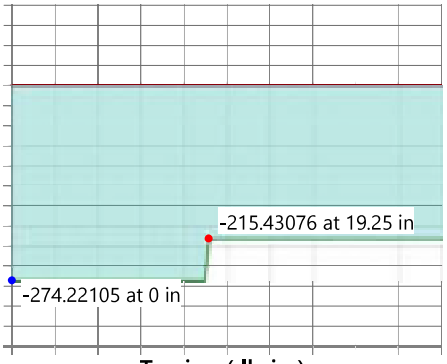
Axial Force (lbs)



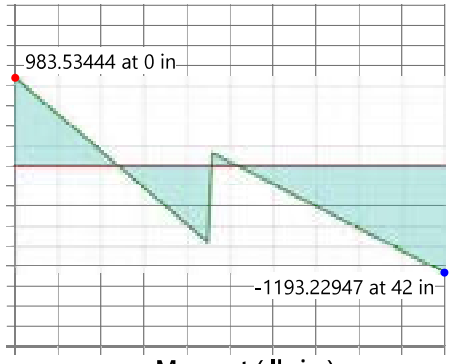
Y Shear Force (lbs)



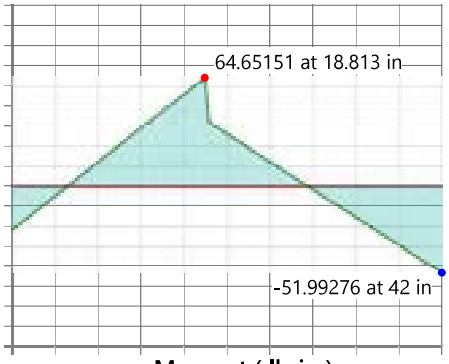
Z Shear Force (lbs)



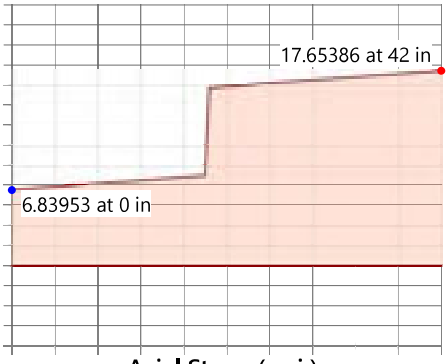
Torsion (lb-in)



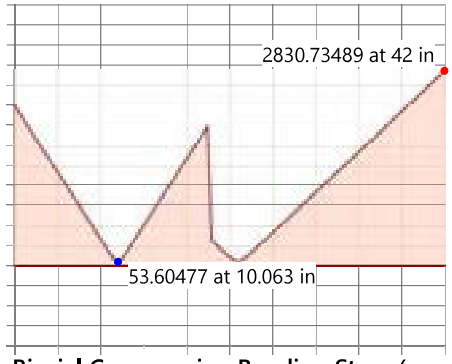
z-z Moment (lb-in)



y-y Moment (lb-in)



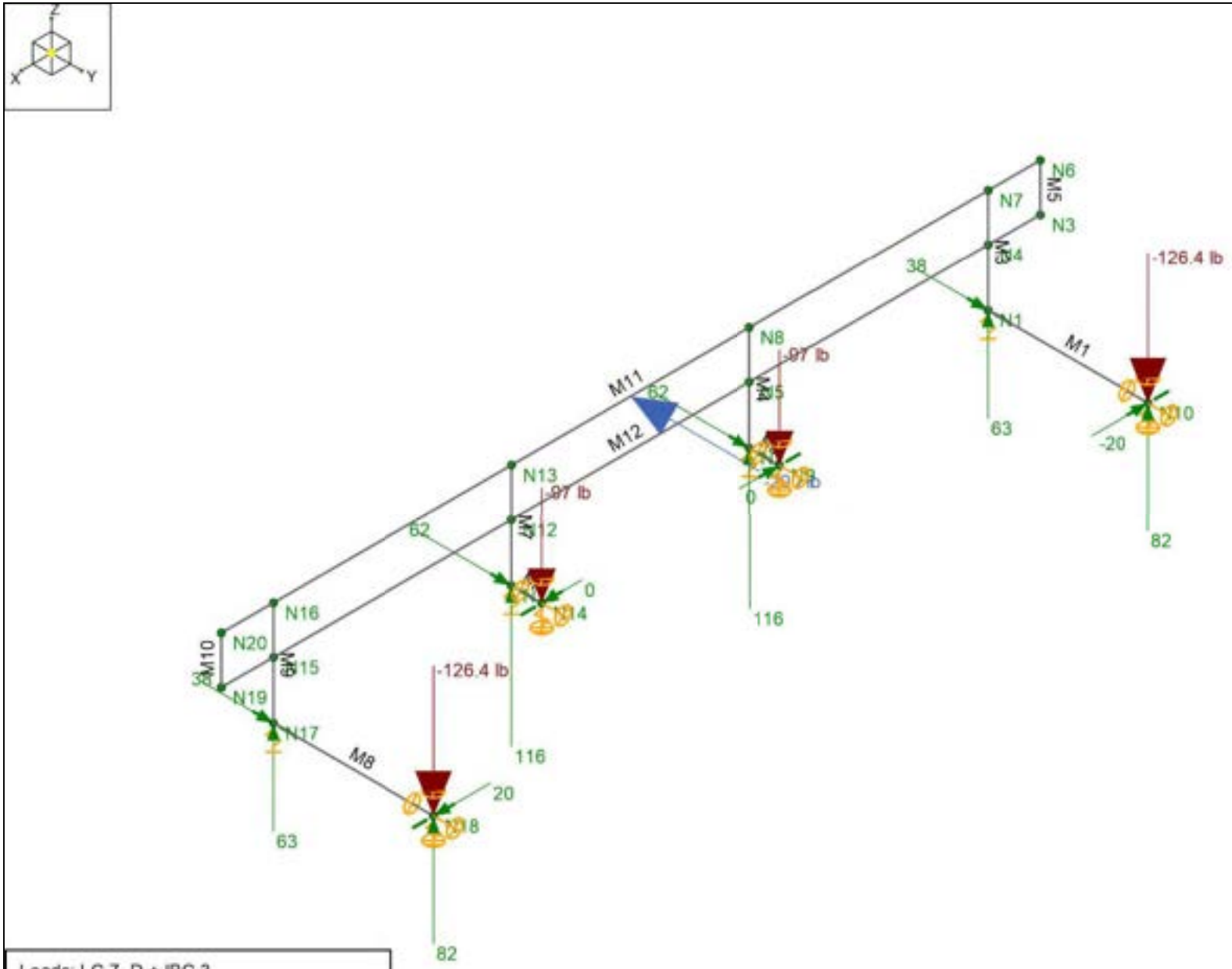
Axial Stress (psi)



Biaxial Compression Bending Stress(p...



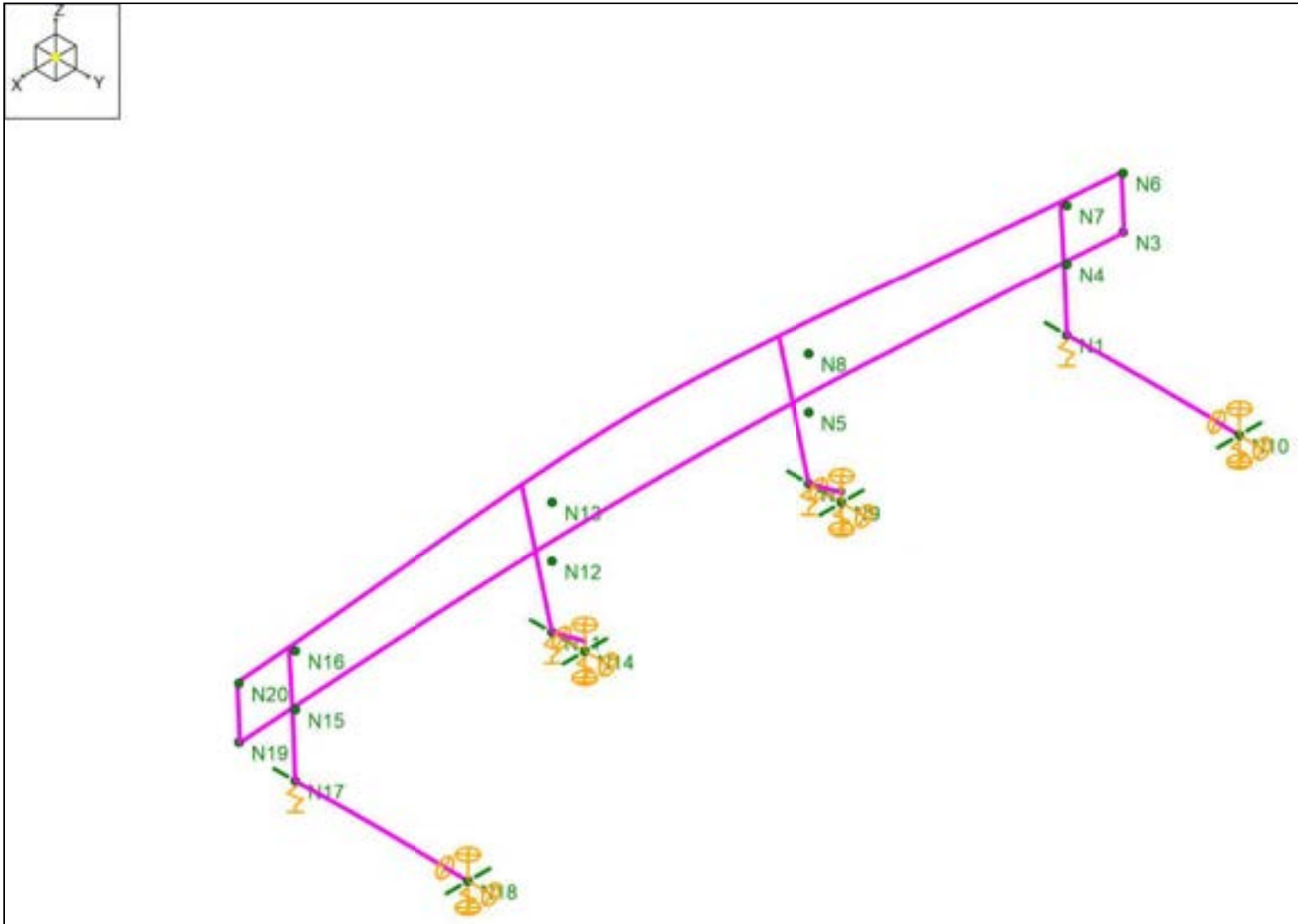
Biaxial Tension Bending Stress (psi)



Loads: LC 7, D + IBC 3
Results for LC 7, D + IBC 3
Reaction and Moment Units are lbs and lb-in

Fibergrate Composite Structures, Inc	DynaRound Slimline - 'A' Outrigger	SK-1
Ethan Love, P.E.		Jan 21, 2020
	Load Case 3 - Loads and Reactions	Slimline 8 FT A Outrigger.r3d

COM-2310004



Results for LC 7, D + IBC 3

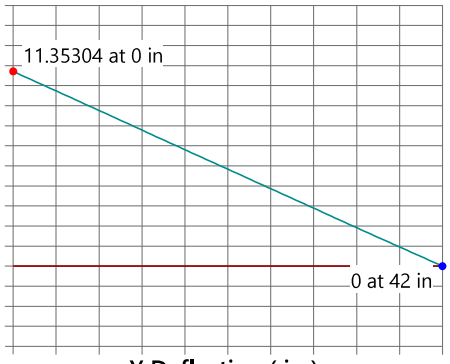
Fibergrate Composite Structures, Inc	DynaRound Slimline - 'A' Outrigger	SK-2
Ethan Love, P.E.		Jan 21, 2020
	Load Case 3 - Deflected Shape x 1	Slimline 8 FT A Outrigger.r3d

COM-2310004

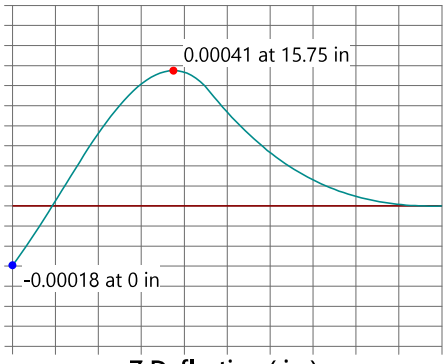
Detail Report: M4

Load Combination: LC 7: D + IBC 3

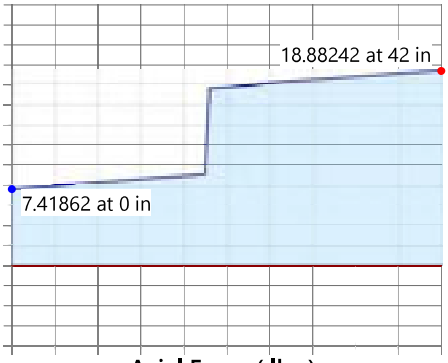
Diagrams:



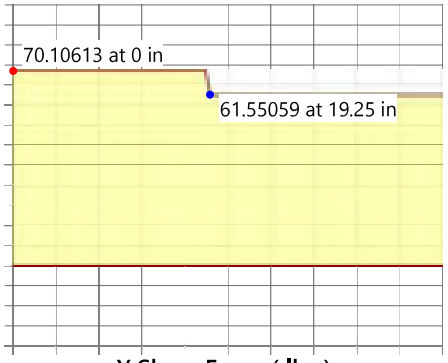
Y Deflection (in)



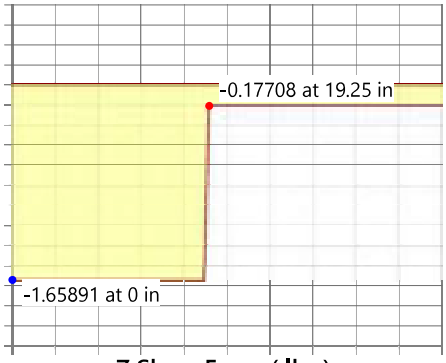
Z Deflection (in)



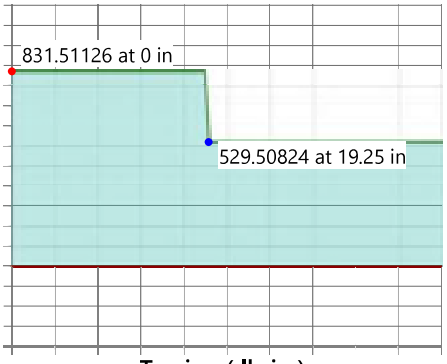
Axial Force (lbs)



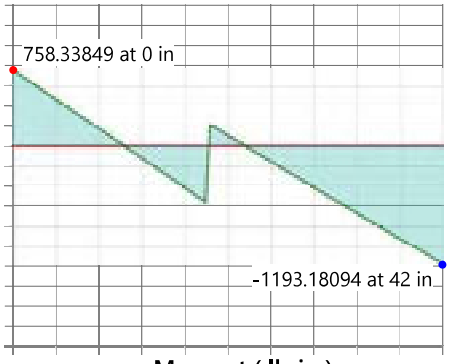
Y Shear Force (lbs)



Z Shear Force (lbs)



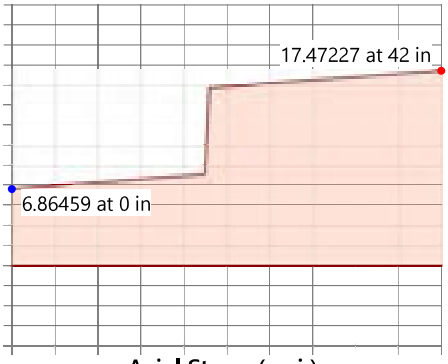
Torsion (lb-in)



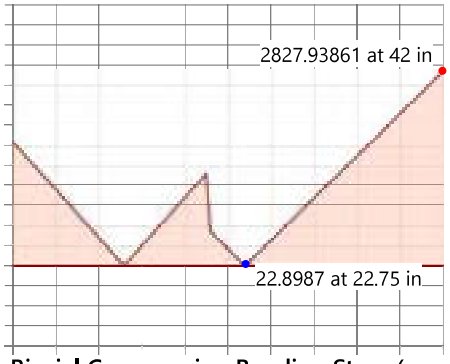
z-z Moment (lb-in)



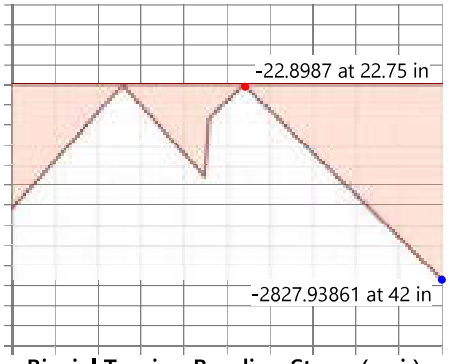
y-y Moment (lb-in)



Axial Stress (psi)



Biaxial Compression Bending Stress(p...

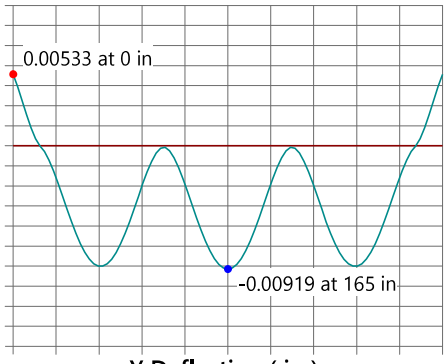


Biaxial Tension Bending Stress (psi)

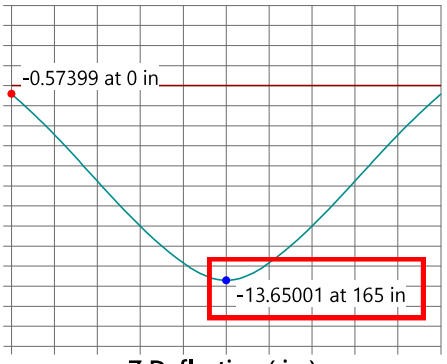
Detail Report: M11

Load Combination: LC 7: D + IBC 3

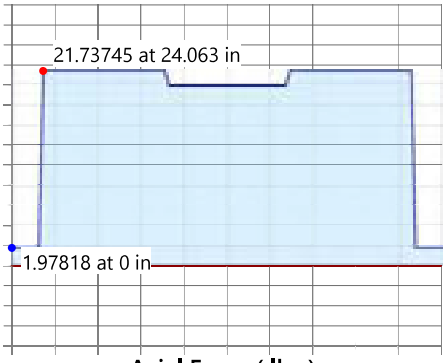
Diagrams:



Y Deflection (in)



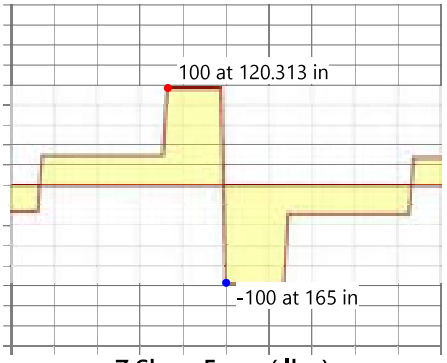
Z Deflection (in)



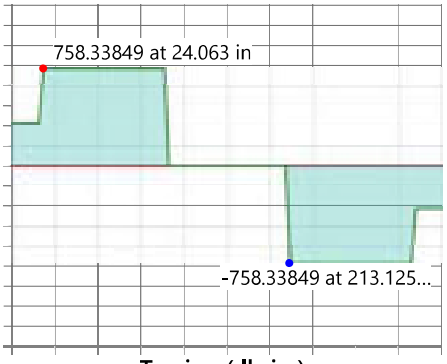
Axial Force (lbs)



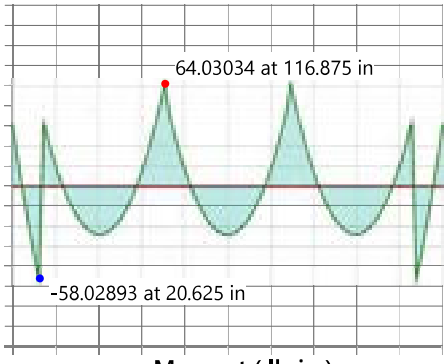
Y Shear Force (lbs)



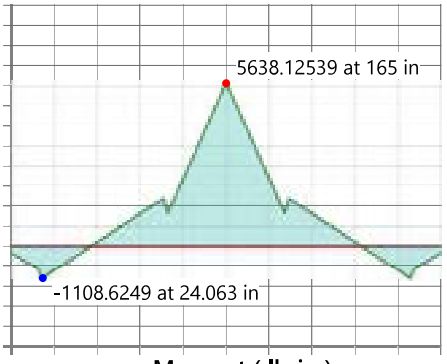
Z Shear Force (lbs)



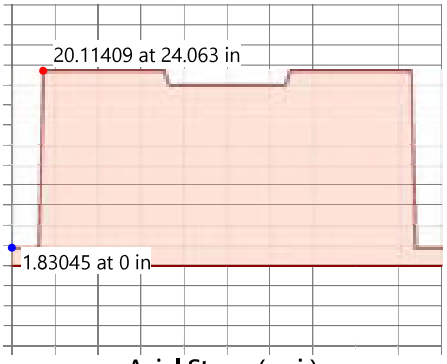
Torsion (lb-in)



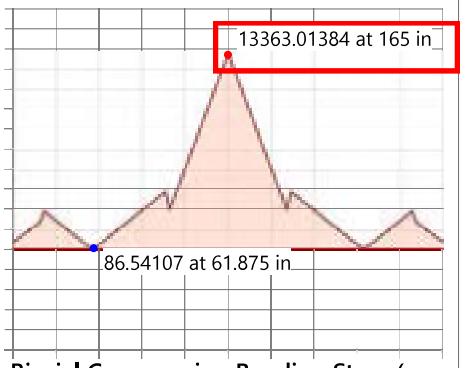
z-z Moment (lb-in)



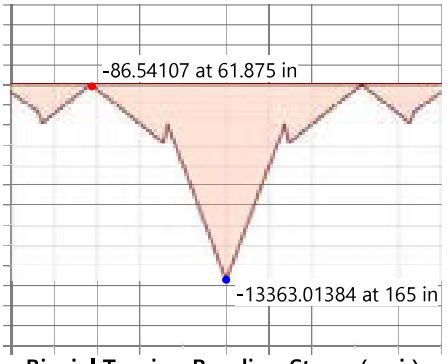
y-y Moment (lb-in)



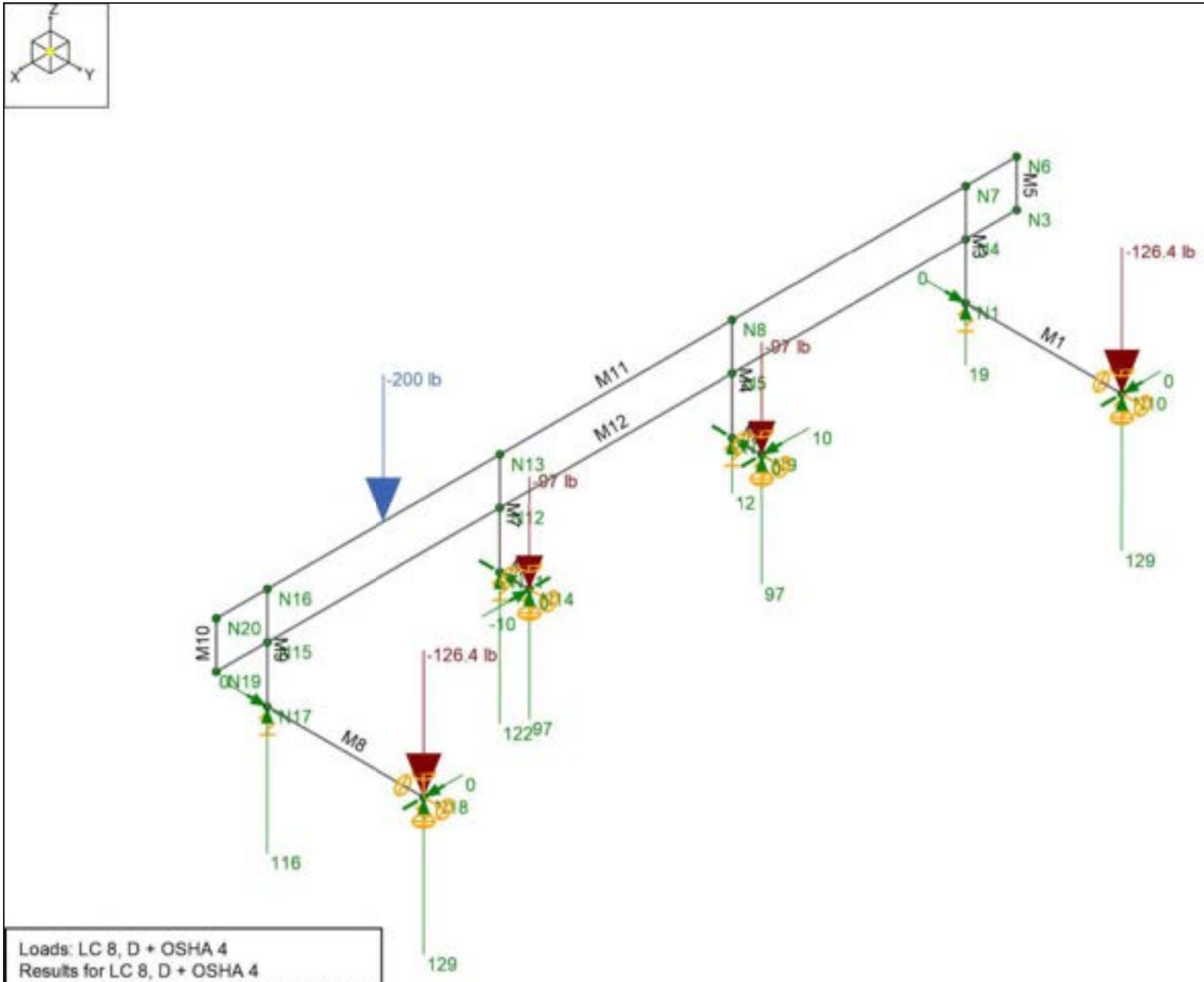
Axial Stress (psi)



Biaxial Compression Bending Stress(p...

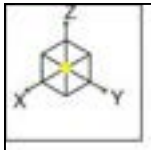


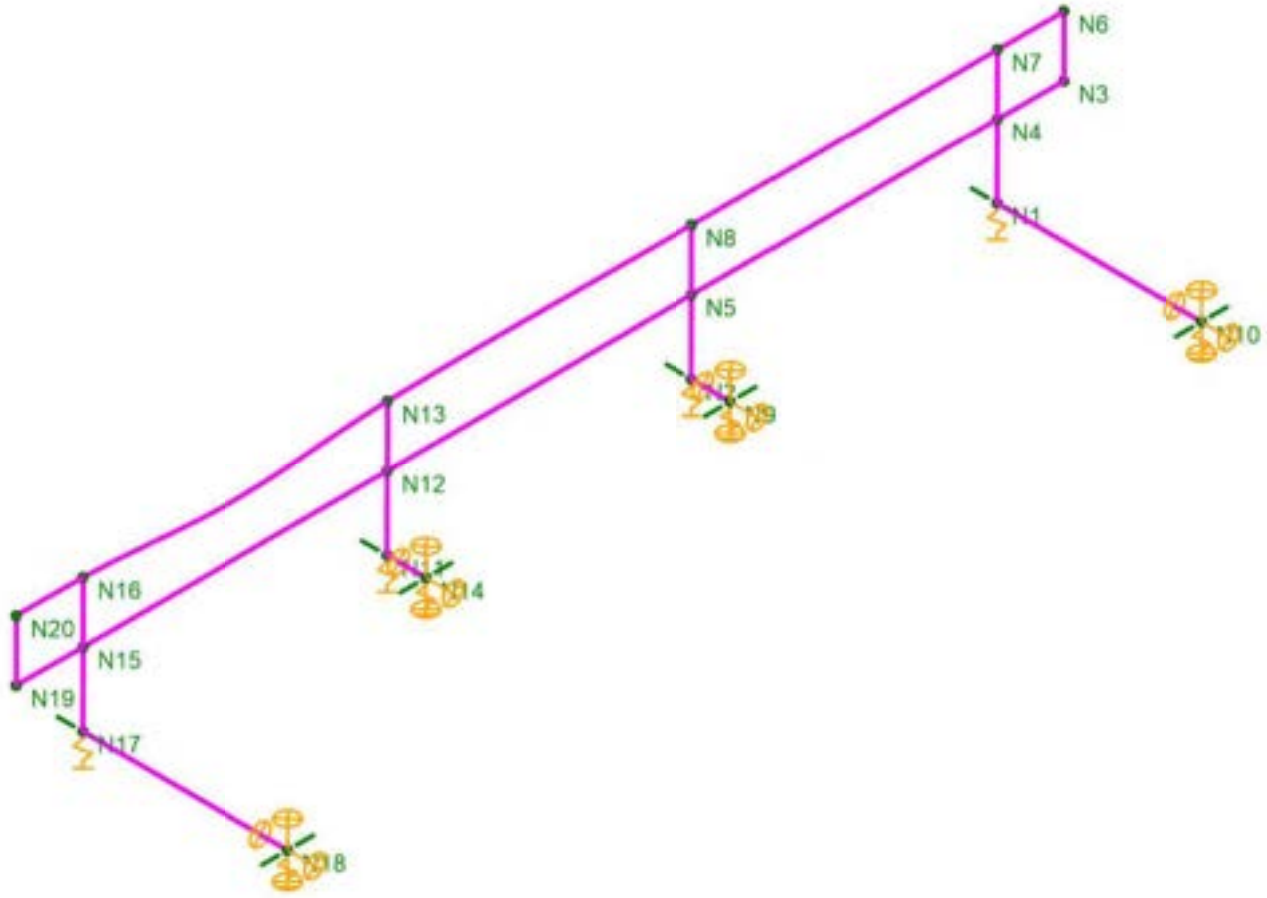
Biaxial Tension Bending Stress (psi)



Fibergrate Composite Structures, Inc	DynaRound Slimline - 'A' Outrigger	SK-3
Ethan Love, P.E.		Jan 21, 2020
	Load Case 4 - Loads & Reactions	Slimline 8 FT A Outrigger.r3d

COM-2310004





Results for LC 8, D + OSHA 4

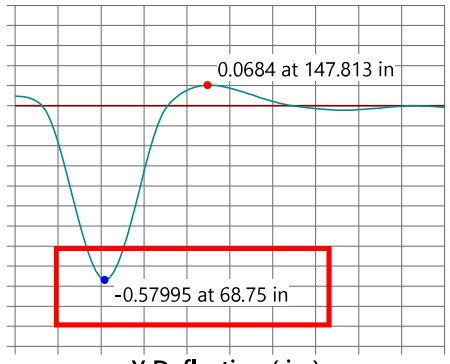
Fibergrate Composite Structures, Inc	DynaRound Slimline - 'A' Outrigger	SK-4
Ethan Love, P.E.		Jan 21, 2020
	Load Case 4 - Deflected Shape x5	Slimline 8 FT A Outrigger.r3d

COM-2310004

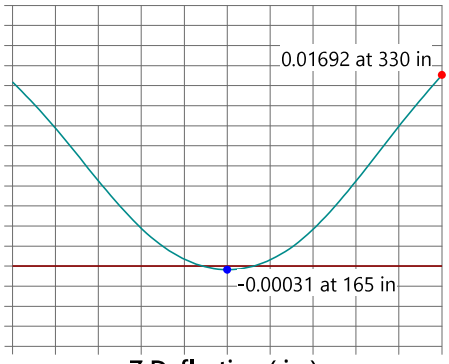
Detail Report: M11

Load Combination: LC 8: D + OSHA 4

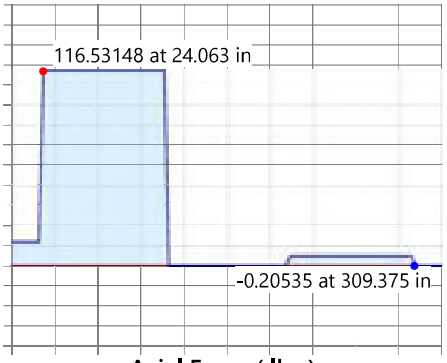
Diagrams:



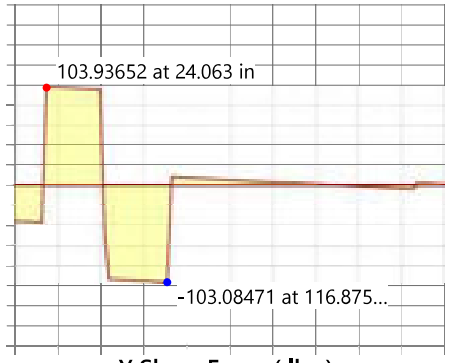
Y Deflection (in)



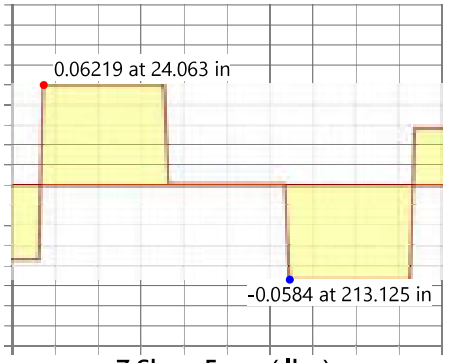
Z Deflection (in)



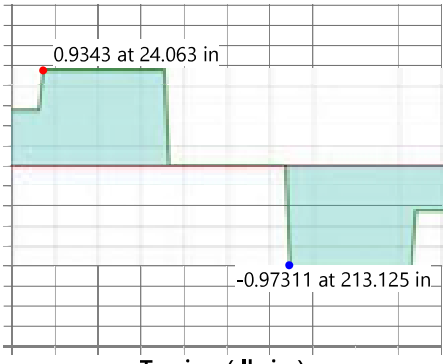
Axial Force (lbs)



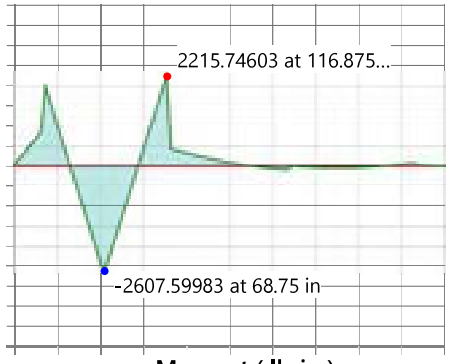
Y Shear Force (lbs)



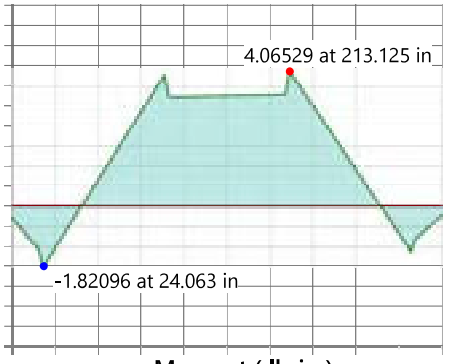
Z Shear Force (lbs)



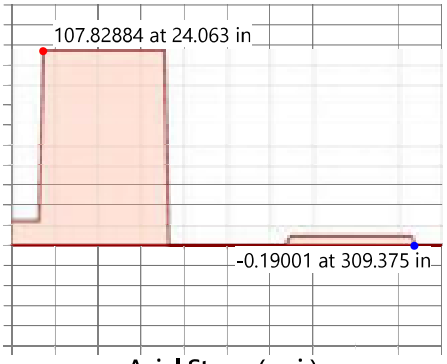
Torsion (lb-in)



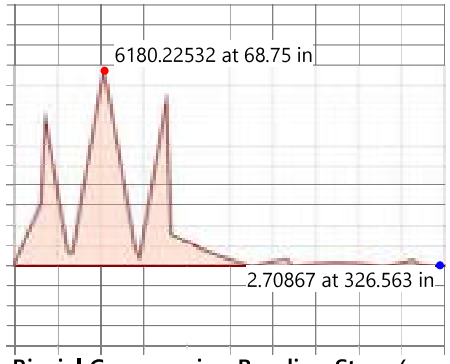
z-z Moment (lb-in)



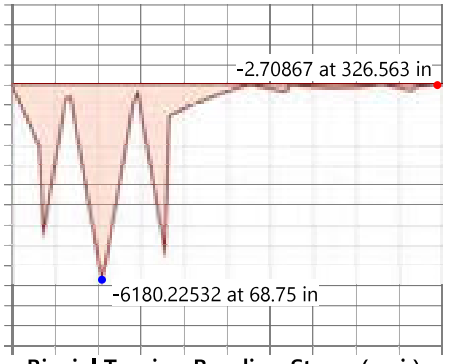
y-y Moment (lb-in)



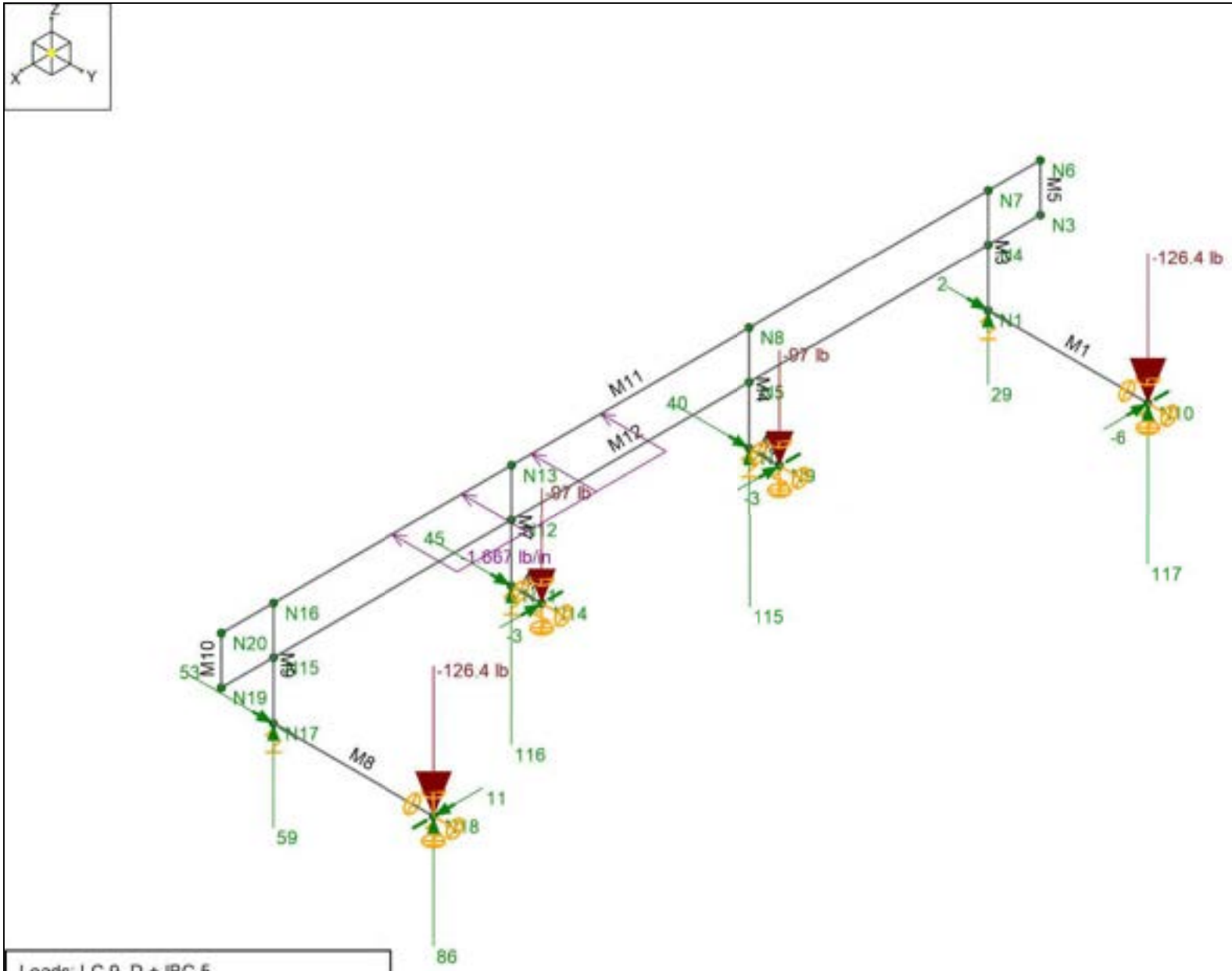
Axial Stress (psi)



Biaxial Compression Bending Stress(p...



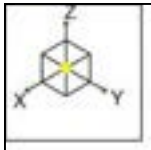
Biaxial Tension Bending Stress (psi)

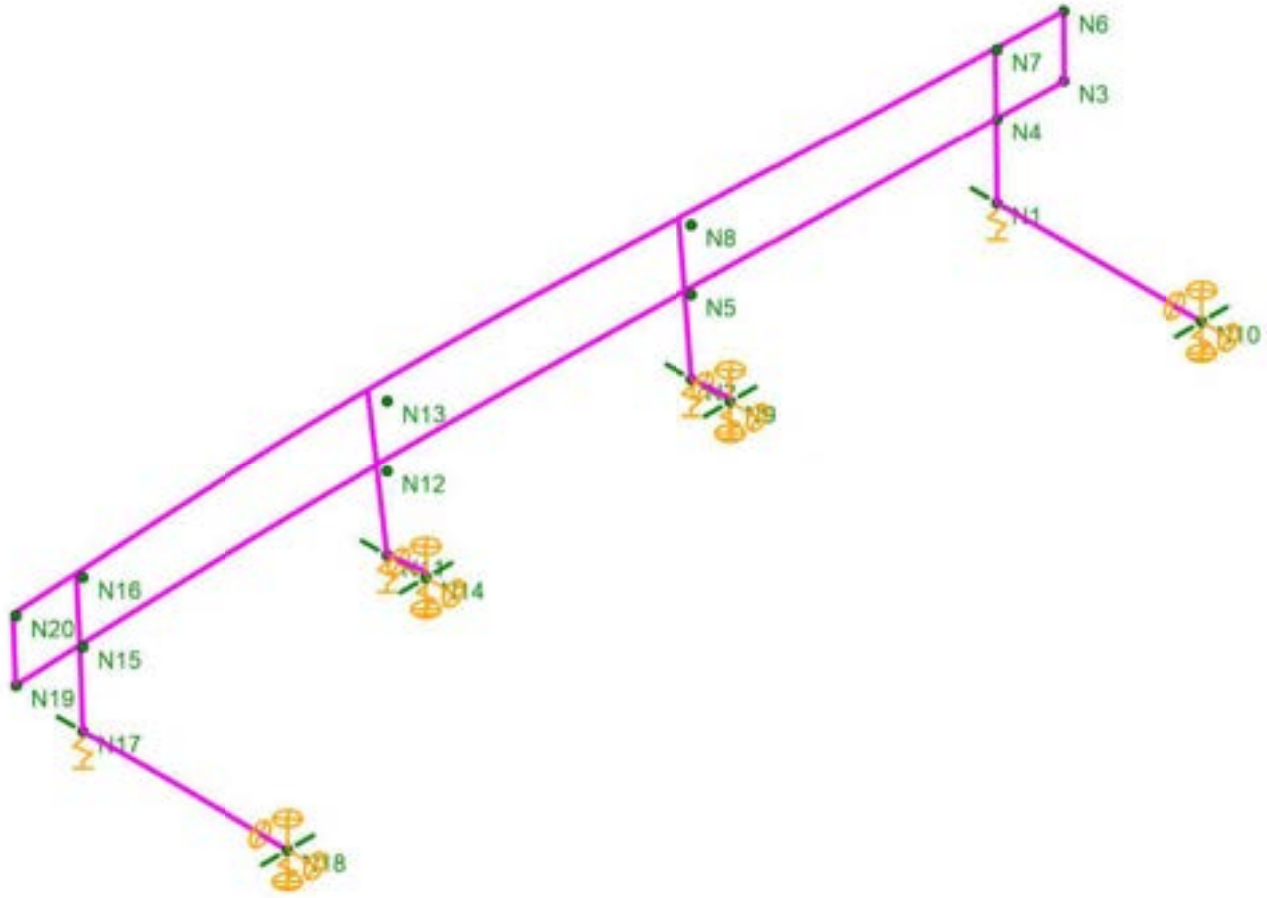


Loads: LC 9, D + IBC 5
Results for LC 9, D + IBC 5
Reaction and Moment Units are lbs and lb-in

Fibergrate Composite Structures, Inc	DynaRound Slimline - 'A' Outrigger	SK-5
Ethan Love, P.E.		Jan 21, 2020
	Load Case 5 - Loads & Reactions	Slimline 8 FT A Outrigger.r3d

COM-2310004





Results for LC 9, D + IBC 5

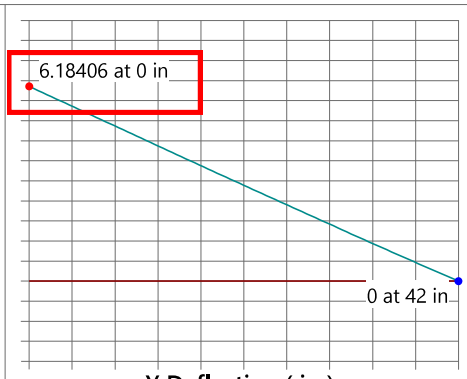
Fibergrate Composite Structures, Inc	DynaRound Slimline - 'A' Outrigger	SK-6
Ethan Love, P.E.		Jan 21, 2020
	Load Case 5 - Deflected Shape	Slimline 8 FT A Outrigger.r3d

COM-2310004

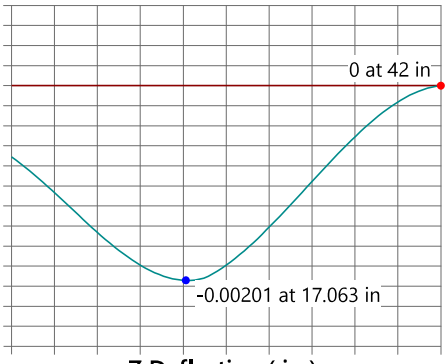
Detail Report: M7

Load Combination: LC 9: D + IBC 5

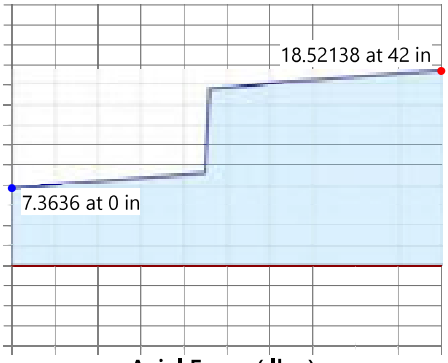
Diagrams:



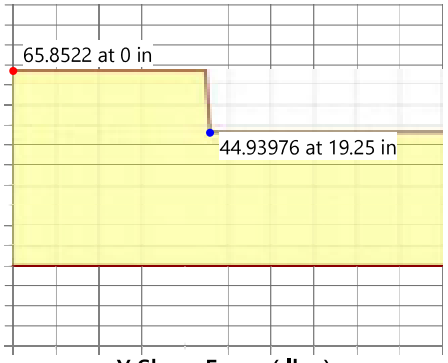
Y Deflection (in)



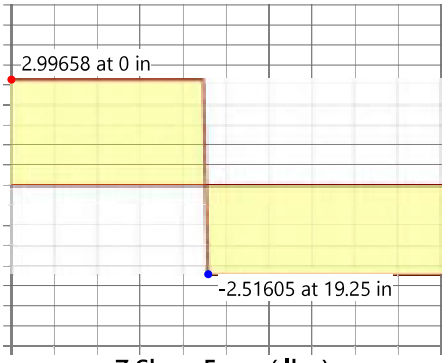
Z Deflection (in)



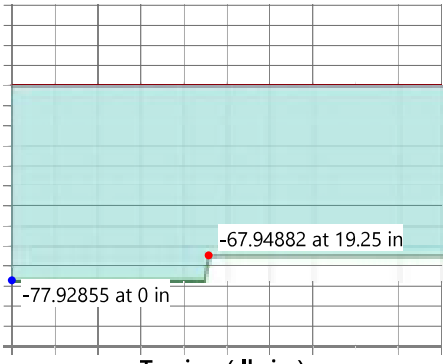
Axial Force (lbs)



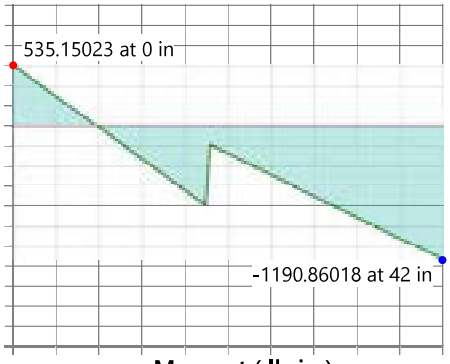
Y Shear Force (lbs)



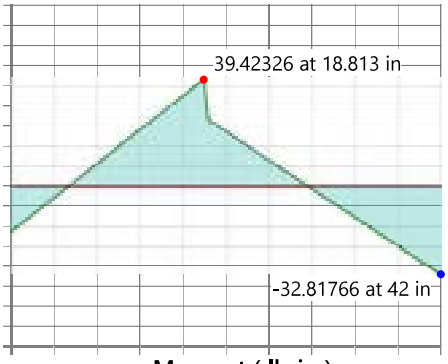
Z Shear Force (lbs)



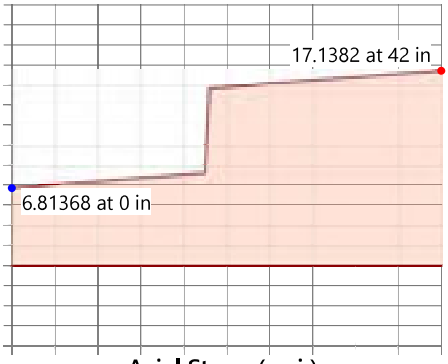
Torsion (lb-in)



z-z Moment (lb-in)



y-y Moment (lb-in)



Axial Stress (psi)



Biaxial Compression Bending Stress(p...

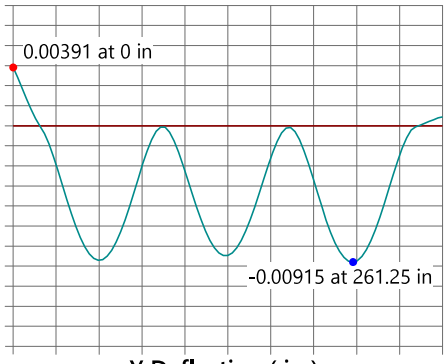


Biaxial Tension Bending Stress (psi)

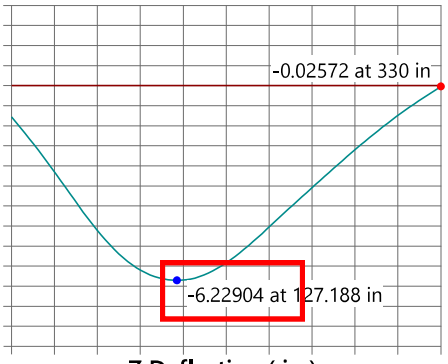
Detail Report: M11

Load Combination: LC 9: D + IBC 5

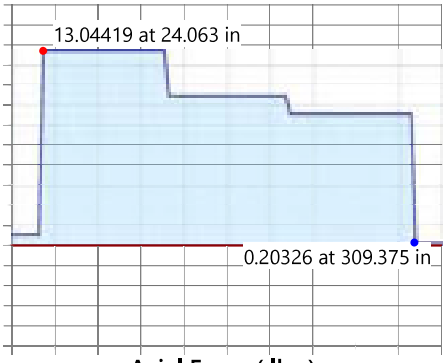
Diagrams:



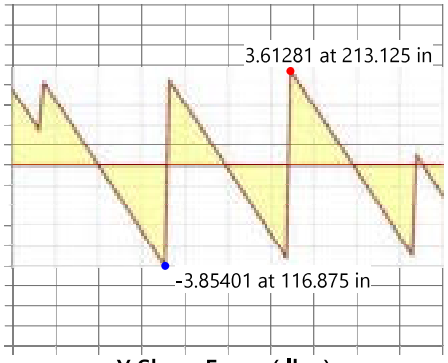
Y Deflection (in)



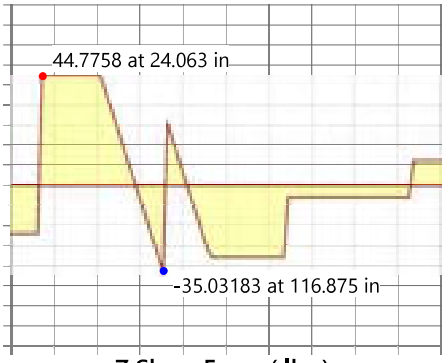
Z Deflection (in)



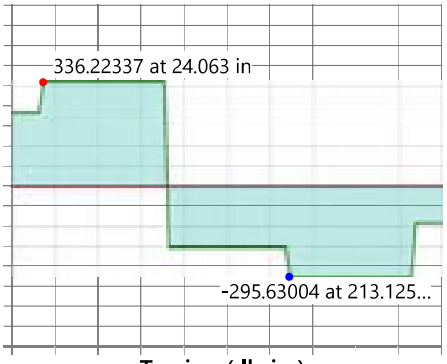
Axial Force (lbs)



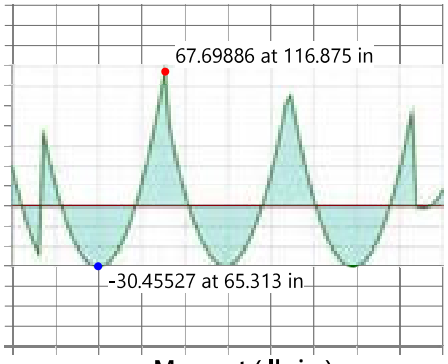
Y Shear Force (lbs)



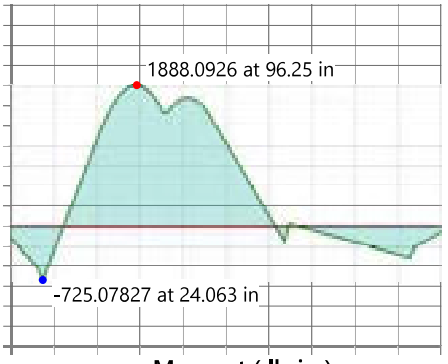
Z Shear Force (lbs)



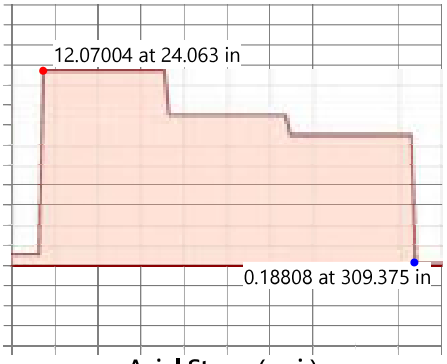
Torsion (lb-in)



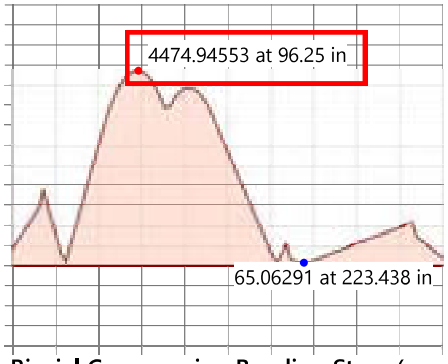
z-z Moment (lb-in)



y-y Moment (lb-in)



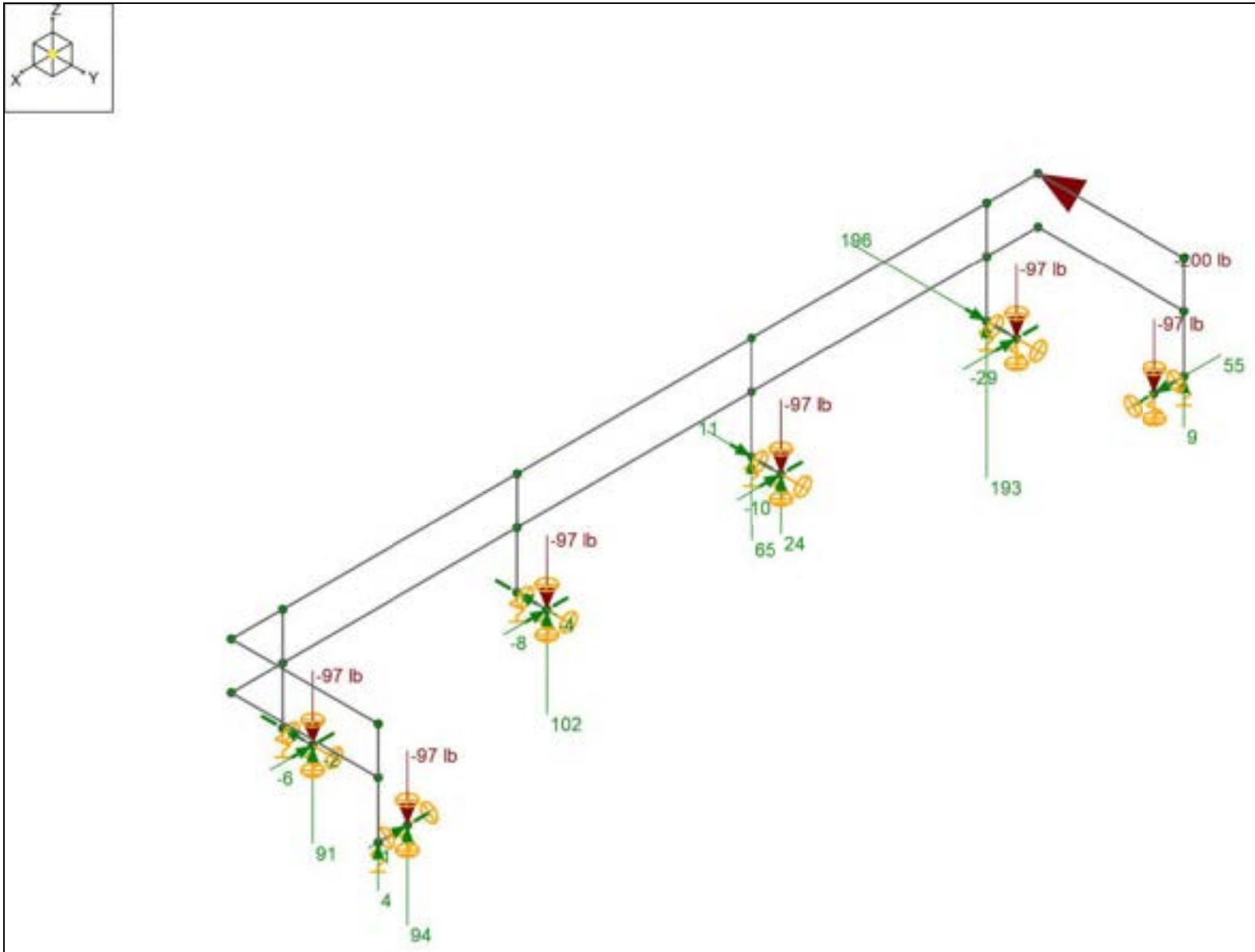
Axial Stress (psi)



Biaxial Compression Bending Stress(p...



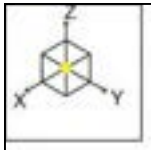
Biaxial Tension Bending Stress (psi)

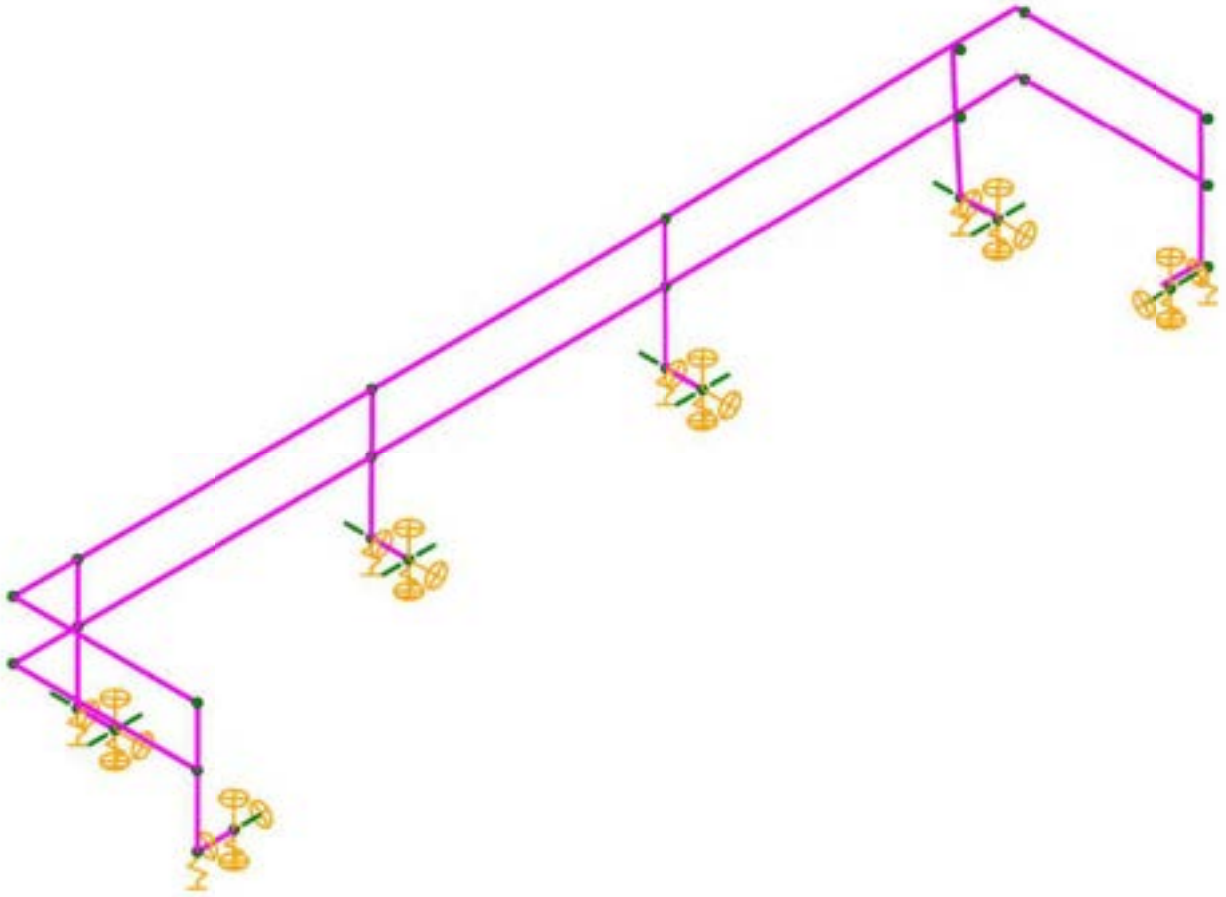


Loads: LC 5, D + IBC 1
Results for LC 5, D + IBC 1
Reaction and Moment Units are lbs and lb-in

Fibergrate Composite Structures, Inc	DynaRound Slimline - 8 ft Spacing with 5 ft Return	SK-1
Ethan Love, P.E.		Jan 22, 2020
	Load Case 1 - Loads and Reactions	Slimline 8 FT Return Assy.r3d

COM-2310004





Results for LC 5, D + IBC 1

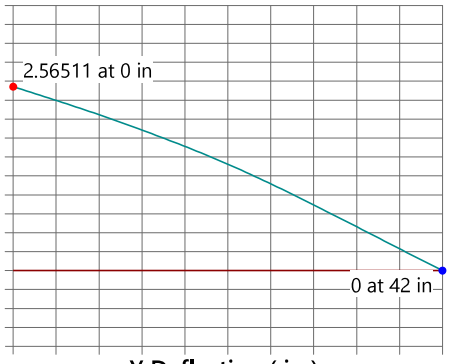
Fibergrate Composite Structures, Inc	DynaRound Slimline - 8 ft Spacing with 5 ft Return	SK-2
Ethan Love, P.E.		Jan 22, 2020
	Load Case 1 - Deflected Shape x 1	Slimline 8 FT Return Assy.r3d

COM-2310004

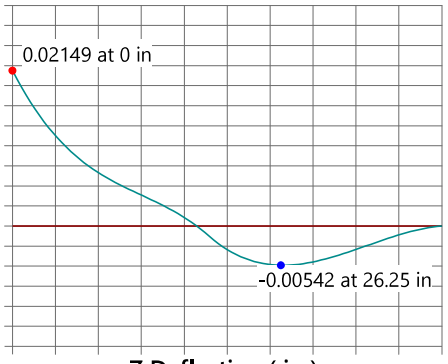
Detail Report: M3

Load Combination: LC 5: D + IBC 1

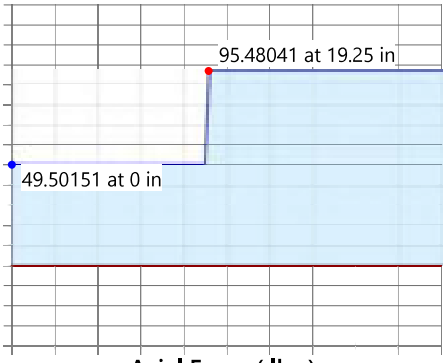
Diagrams:



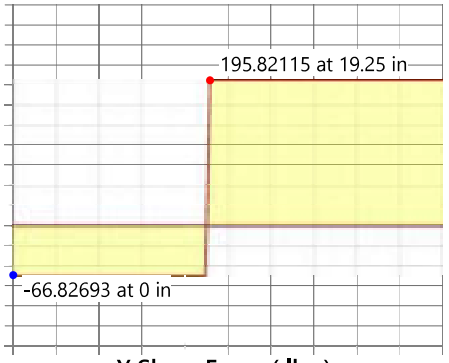
Y Deflection (in)



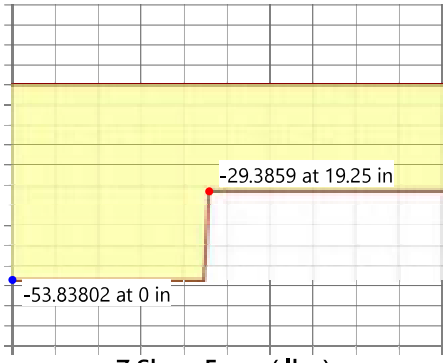
Z Deflection (in)



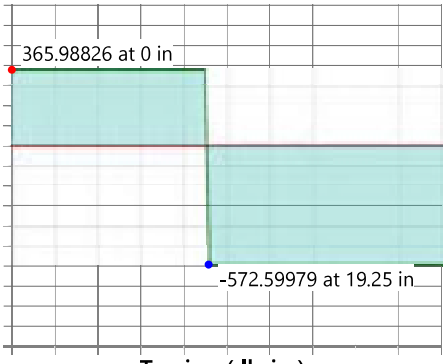
Axial Force (lbs)



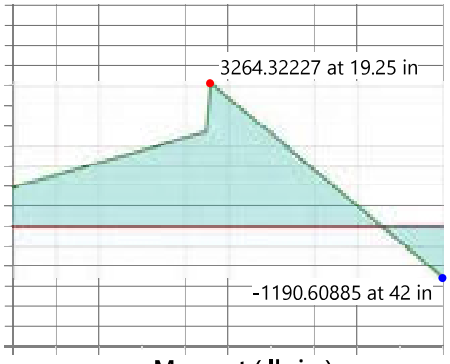
Y Shear Force (lbs)



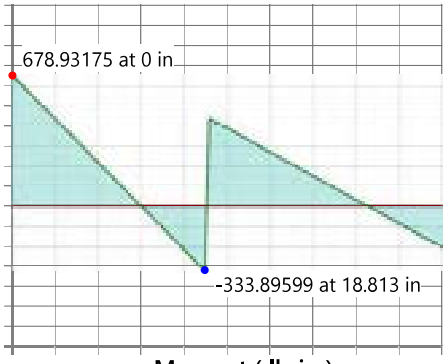
Z Shear Force (lbs)



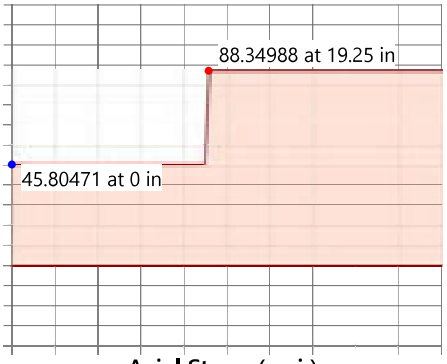
Torsion (lb-in)



z-z Moment (lb-in)



y-y Moment (lb-in)



Axial Stress (psi)



Biaxial Compression Bending Stress(p...

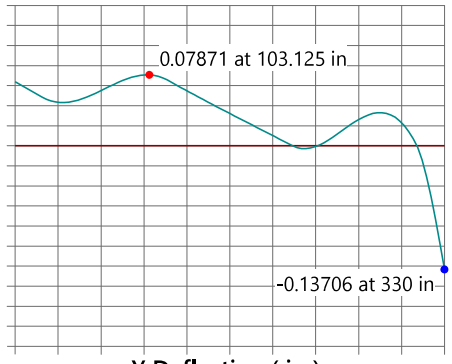


Biaxial Tension Bending Stress (psi)

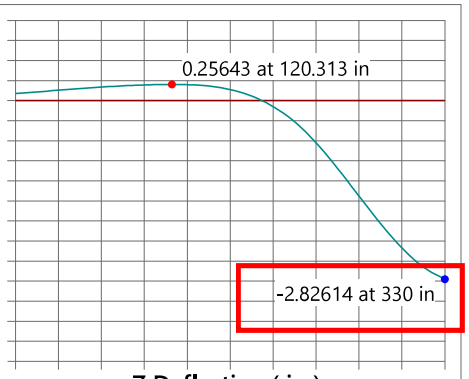
Detail Report: M11

Load Combination: LC 5: D + IBC 1

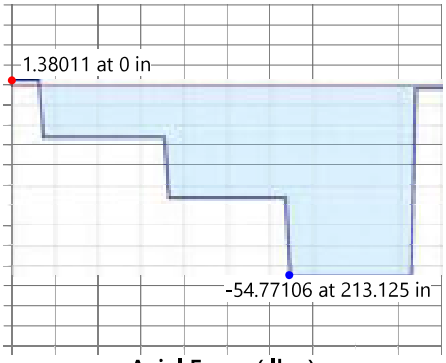
Diagrams:



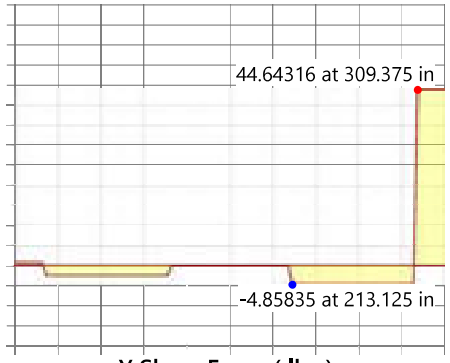
Y Deflection (in)



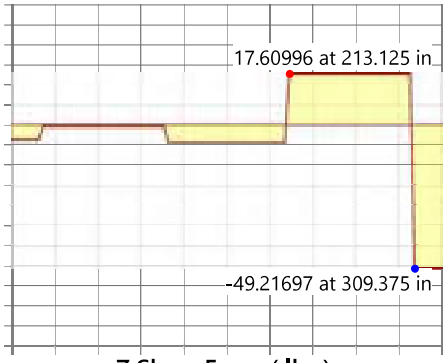
Z Deflection (in)



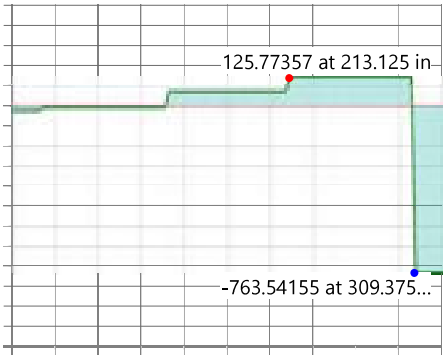
Axial Force (lbs)



Y Shear Force (lbs)



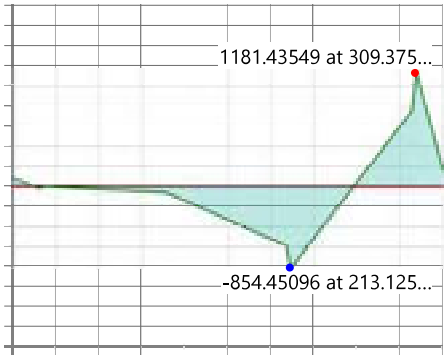
Z Shear Force (lbs)



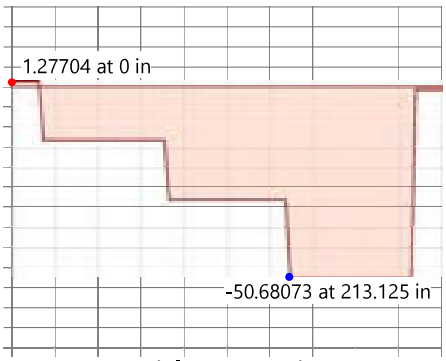
Torsion (lb-in)



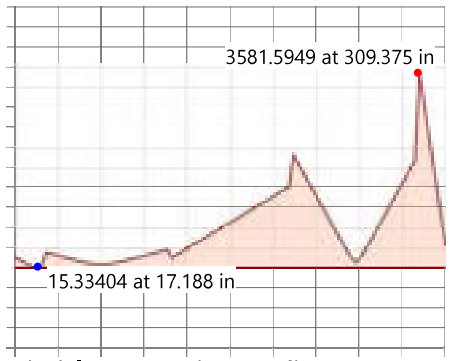
z-z Moment (lb-in)



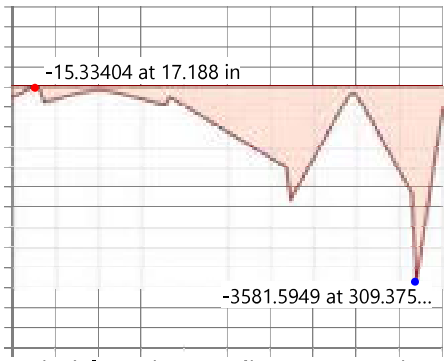
y-y Moment (lb-in)



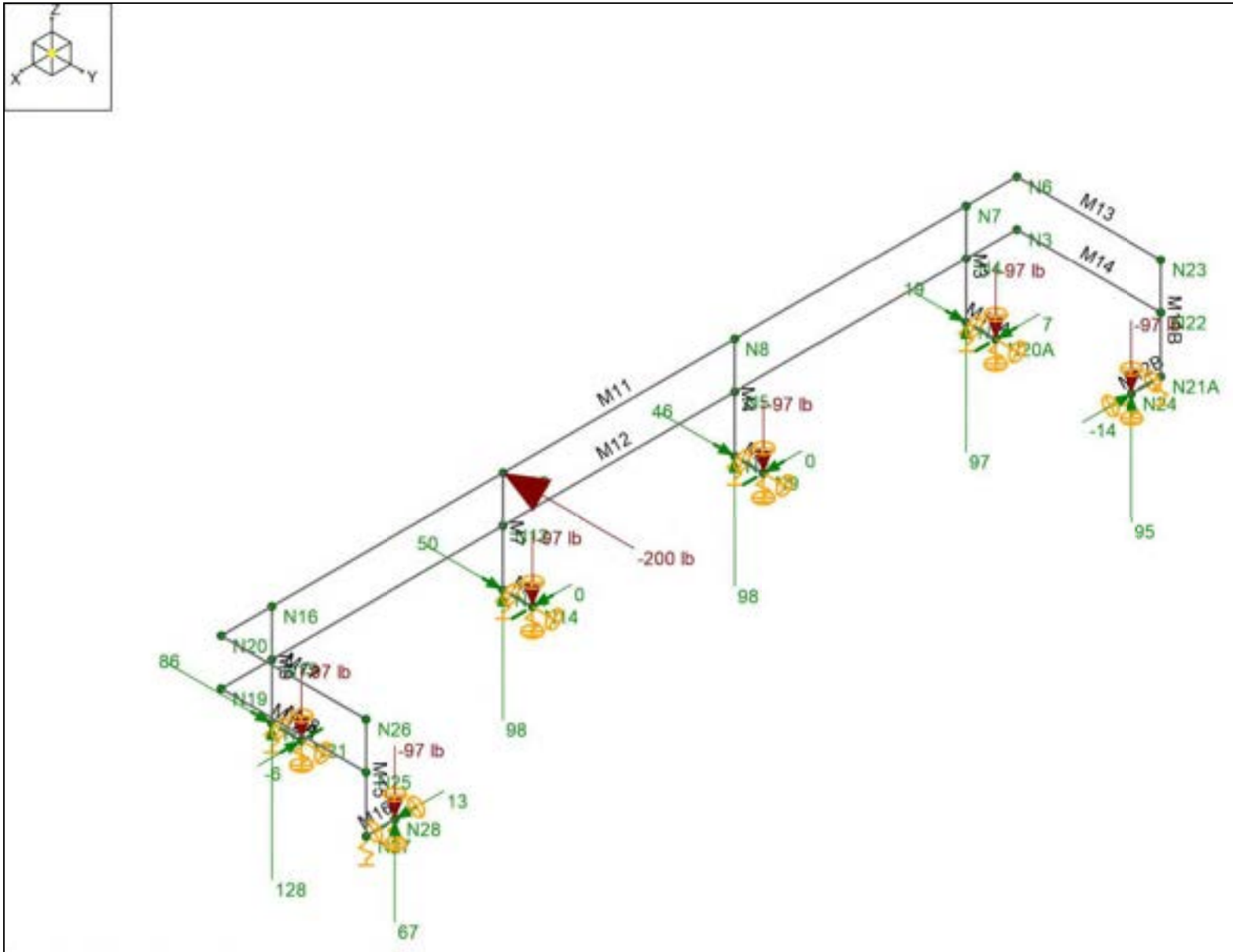
Axial Stress (psi)



Biaxial Compression Bending Stress(p...

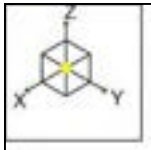


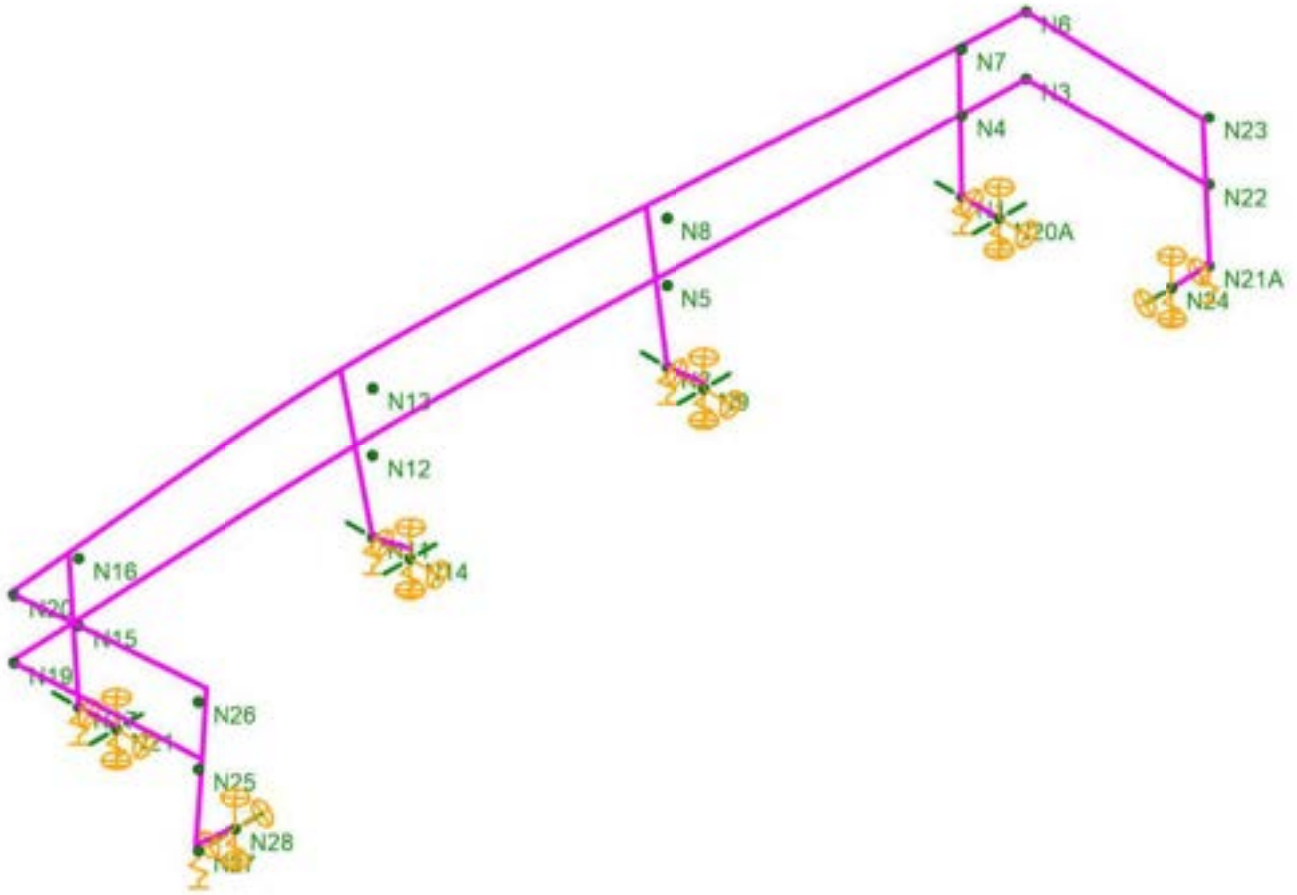
Biaxial Tension Bending Stress (psi)



Fibergrate Composite Structures, Inc	DynaRound Slimline - 8 ft Spacing with 5 ft Return	SK-3
Ethan Love, P.E.		Jan 22, 2020
	Load Case 2 - Loads and Reactions	Slimline 8 FT Return Assy.r3d

COM-2310004





Results for LC 6, D + IBC 2

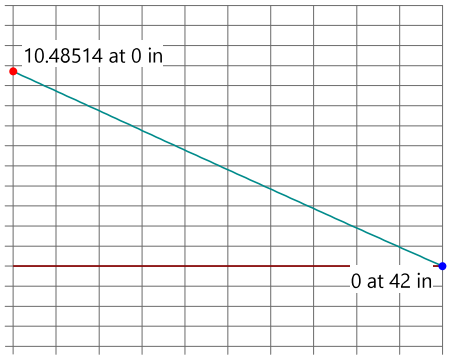
Fibergrate Composite Structures, Inc	DynaRound Slimline - 8 ft Spacing with 5 ft Return	SK-4
Ethan Love, P.E.		Jan 22, 2020
	Load Case 2 - Deflected Shape	Slimline 8 FT Return Assy.r3d

COM-2310004

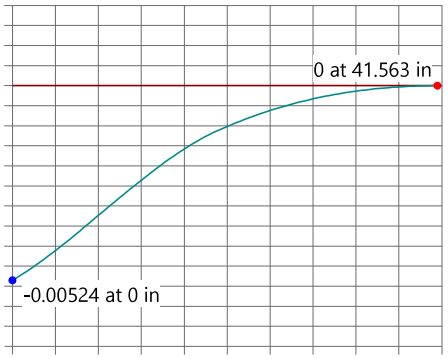
Detail Report: M7

Load Combination: LC 6: D + IBC 2

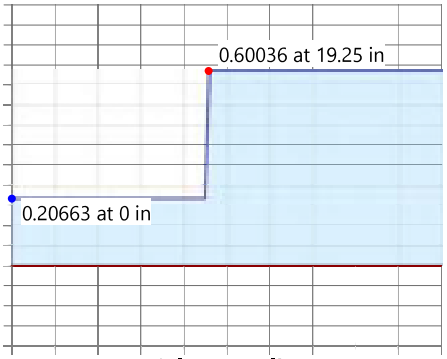
Diagrams:



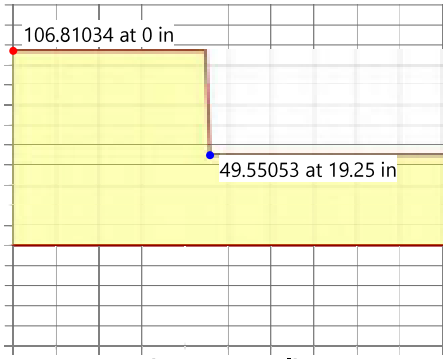
Y Deflection (in)



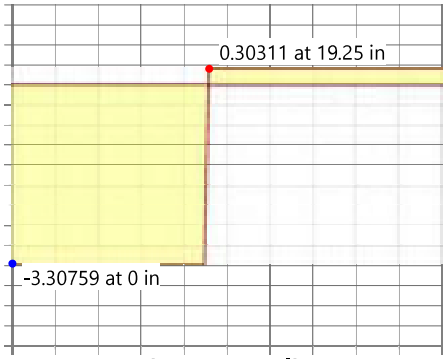
Z Deflection (in)



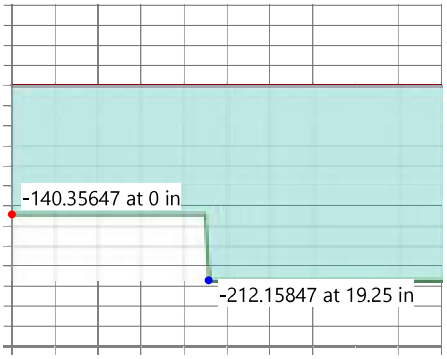
Axial Force (lbs)



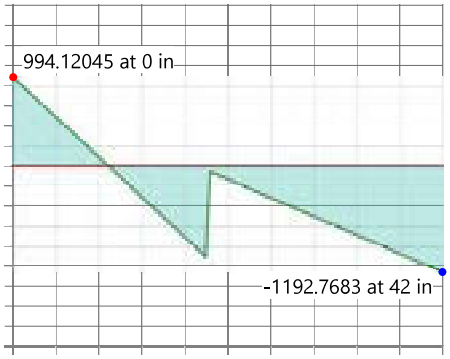
Y Shear Force (lbs)



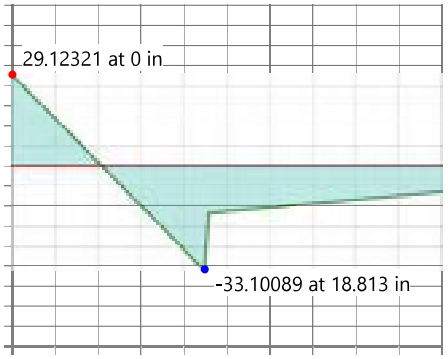
Z Shear Force (lbs)



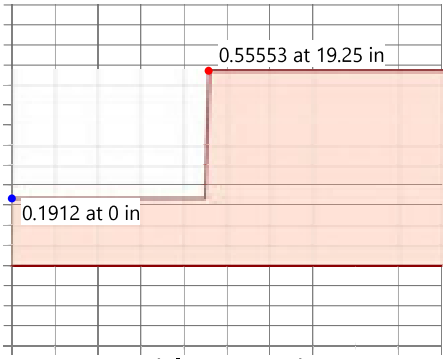
Torsion (lb-in)



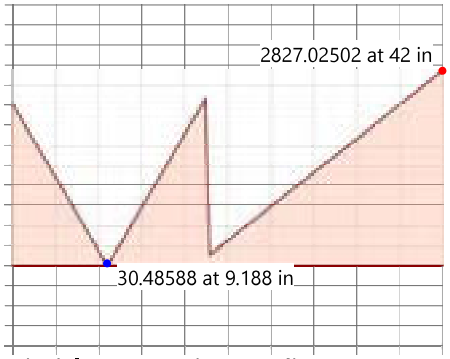
z-z Moment (lb-in)



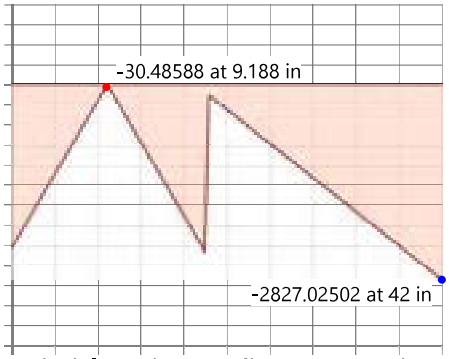
y-y Moment (lb-in)



Axial Stress (psi)



Biaxial Compression Bending Stress(p...

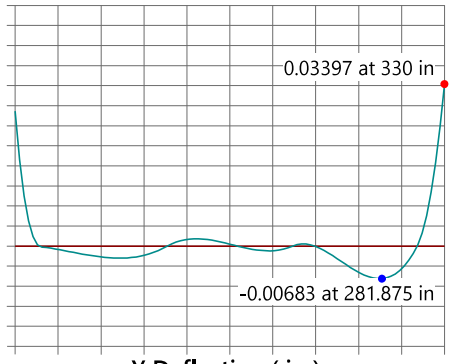


Biaxial Tension Bending Stress (psi)

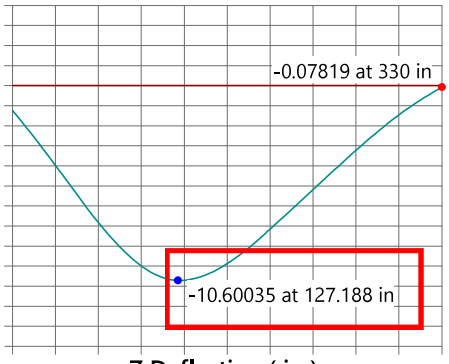
Detail Report: M11

Load Combination: LC 6: D + IBC 2

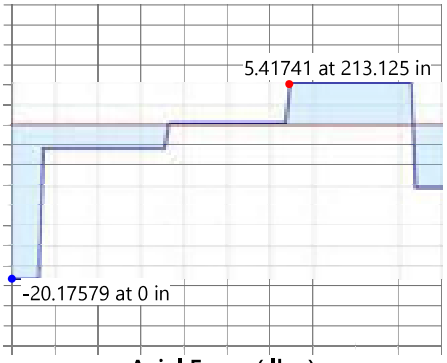
Diagrams:



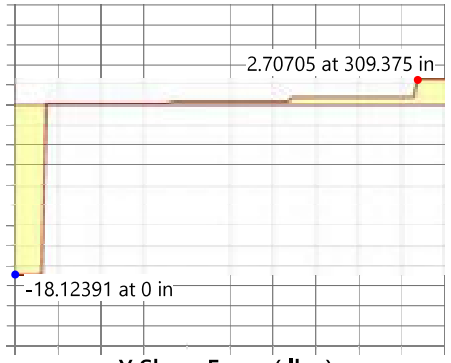
Y Deflection (in)



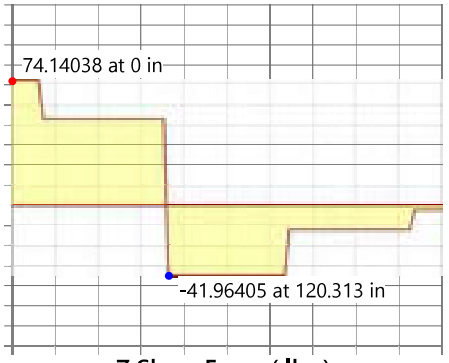
Z Deflection (in)



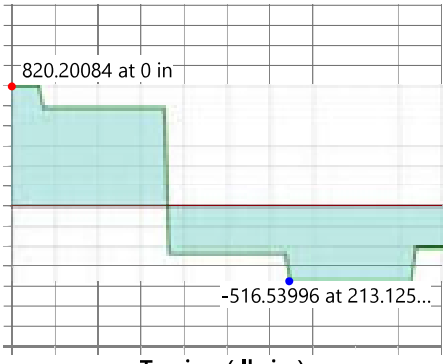
Axial Force (lbs)



Y Shear Force (lbs)



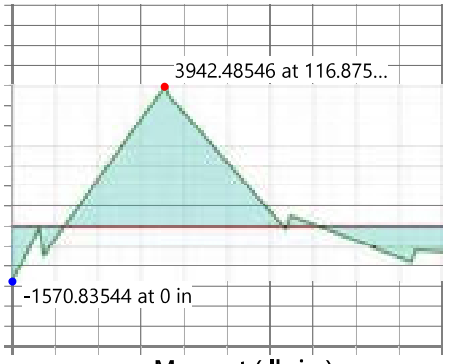
Z Shear Force (lbs)



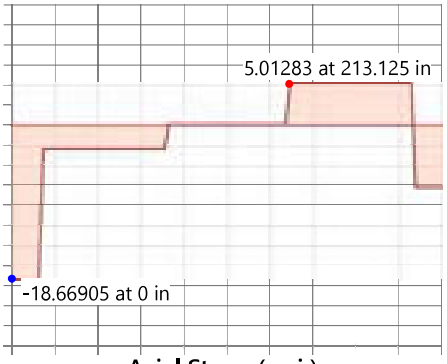
Torsion (lb-in)



z-z Moment (lb-in)



y-y Moment (lb-in)



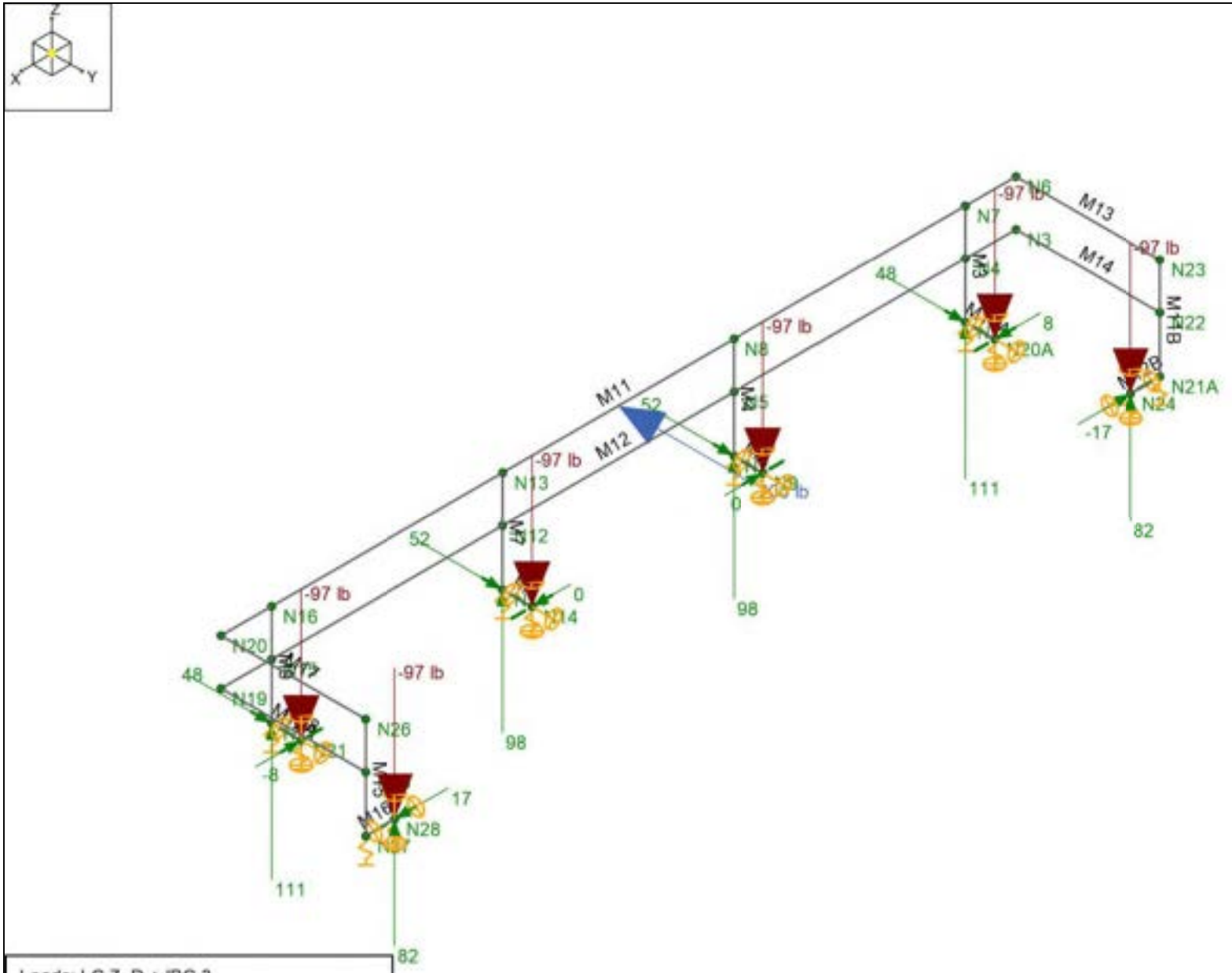
Axial Stress (psi)



Biaxial Compression Bending Stress(p...

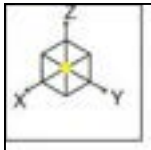


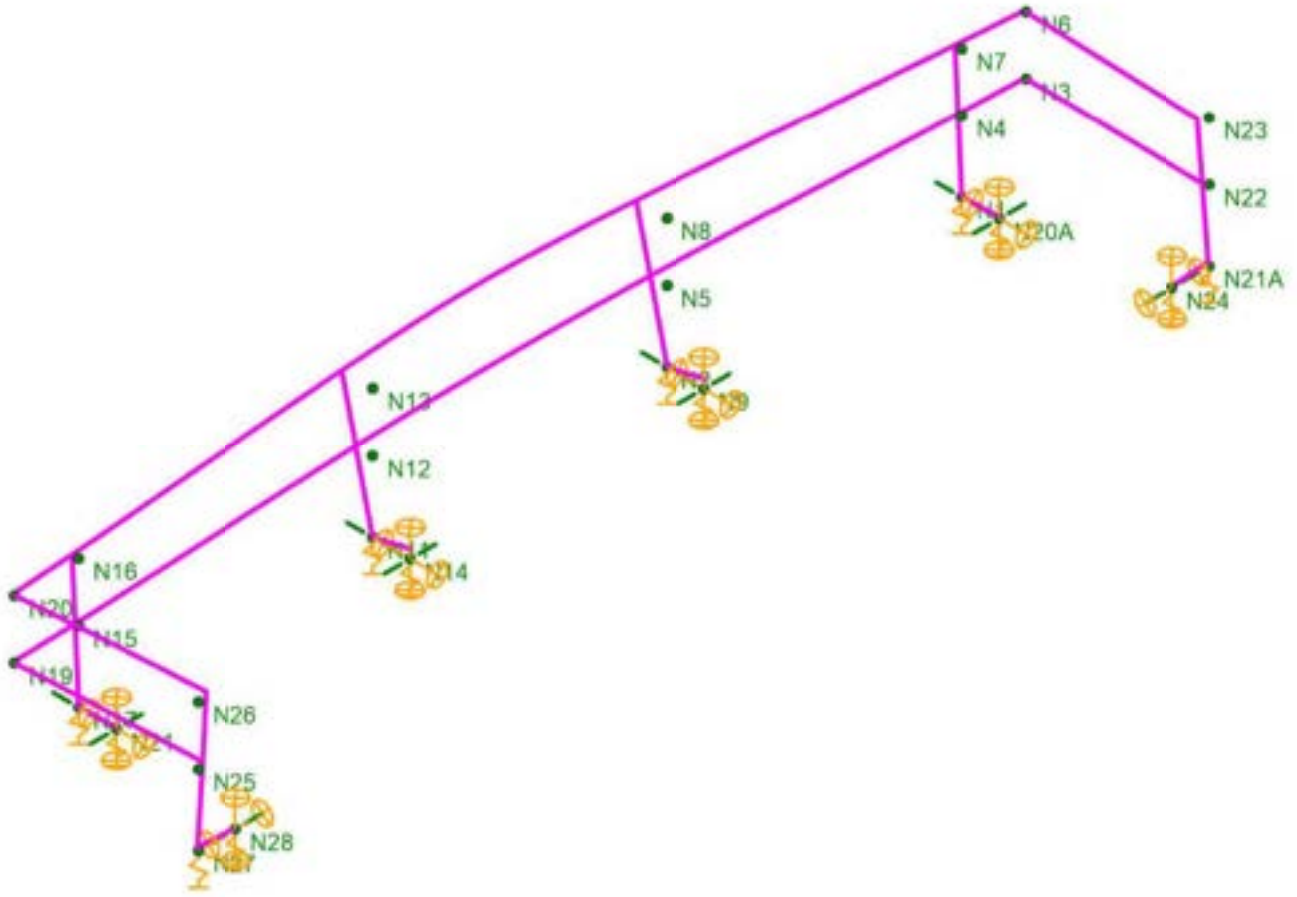
Biaxial Tension Bending Stress (psi)



Fibergrate Composite Structures, Inc	DynaRound Slimline - 8 ft Spacing with 5 ft Return	SK-7
Ethan Love, P.E.		Jan 23, 2020
	Load Case 3 - Loads & Reactions	Slimline 8 FT Return Assy.r3d

COM-2310004





Results for LC 7, D + IBC 3

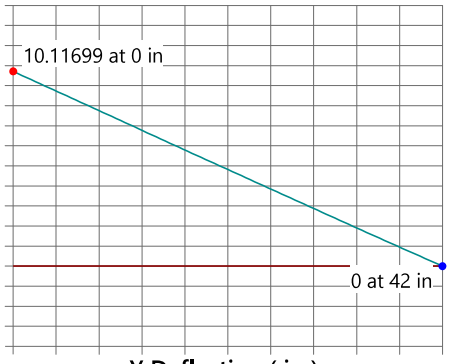
Fibergrate Composite Structures, Inc	DynaRound Slimline - 8 ft Spacing with 5 ft Return	SK-6
Ethan Love, P.E.		Jan 23, 2020
	Load Case 3 - Deflected Shape	Slimline 8 FT Return Assy.r3d

COM-2310004

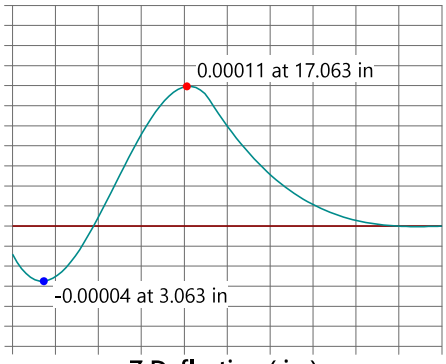
Detail Report: M4

Load Combination: LC 7: D + IBC 3

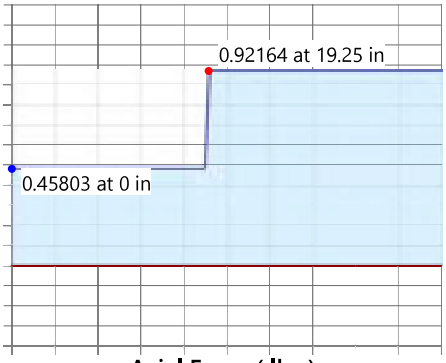
Diagrams:



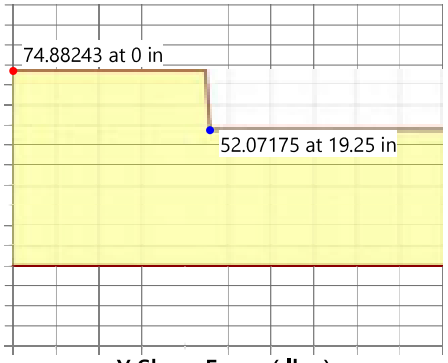
Y Deflection (in)



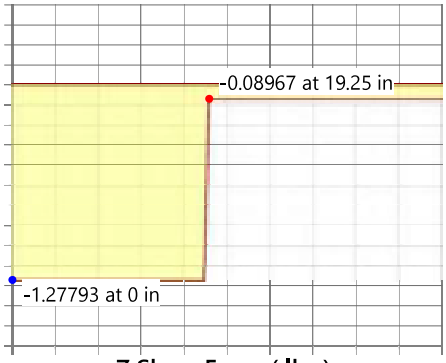
Z Deflection (in)



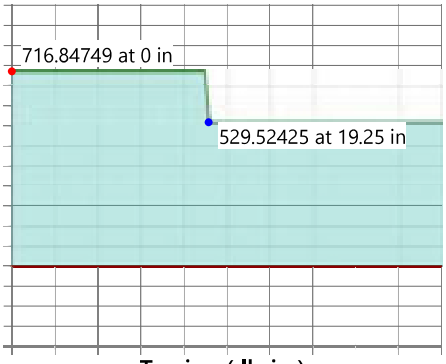
Axial Force (lbs)



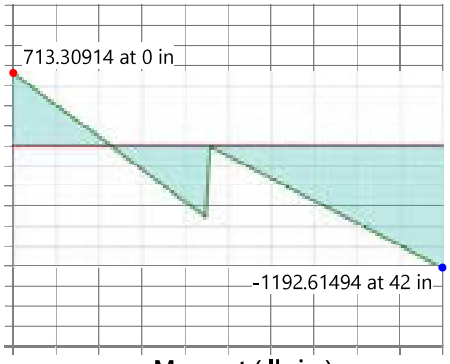
Y Shear Force (lbs)



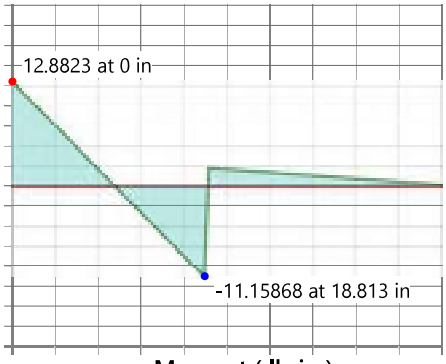
Z Shear Force (lbs)



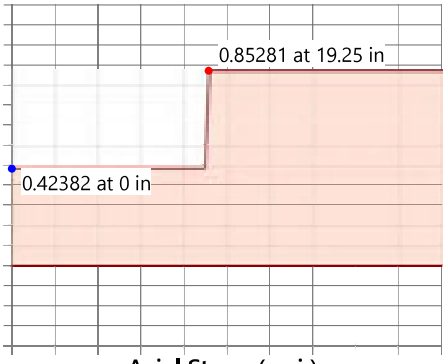
Torsion (lb-in)



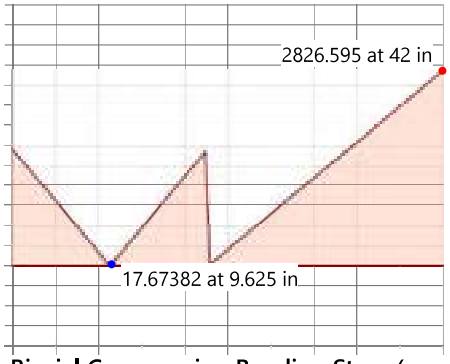
z-z Moment (lb-in)



y-y Moment (lb-in)



Axial Stress (psi)



Biaxial Compression Bending Stress(p...

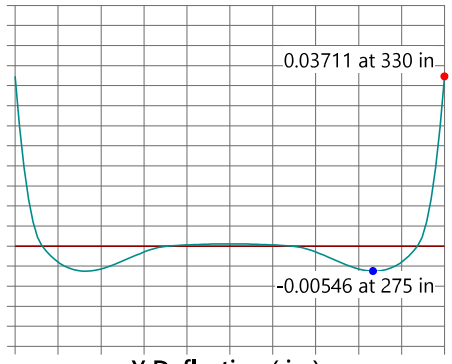


Biaxial Tension Bending Stress (psi)

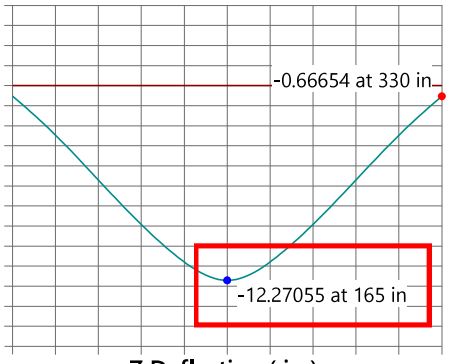
Detail Report: M11

Load Combination: LC 7: D + IBC 3

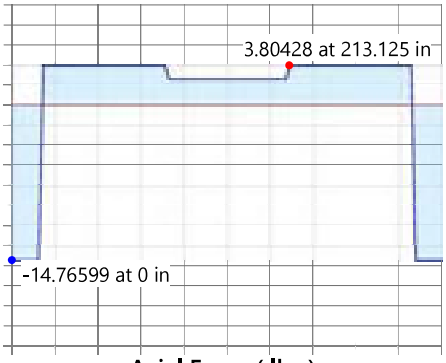
Diagrams:



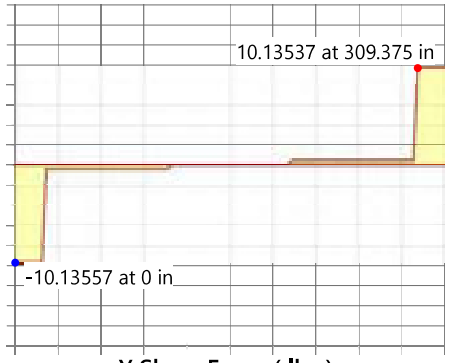
Y Deflection (in)



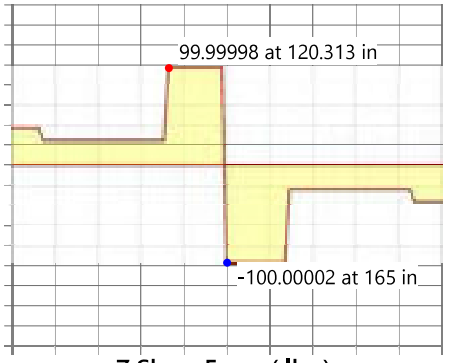
Z Deflection (in)



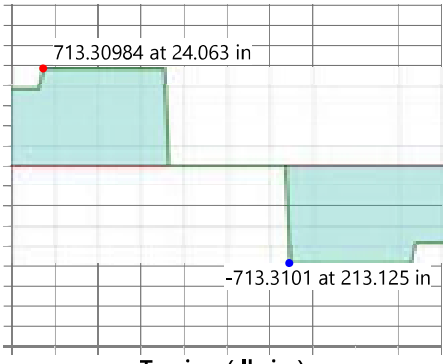
Axial Force (lbs)



Y Shear Force (lbs)



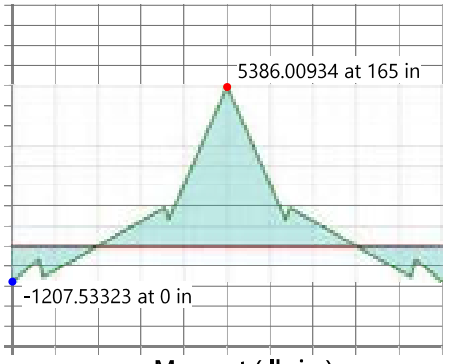
Z Shear Force (lbs)



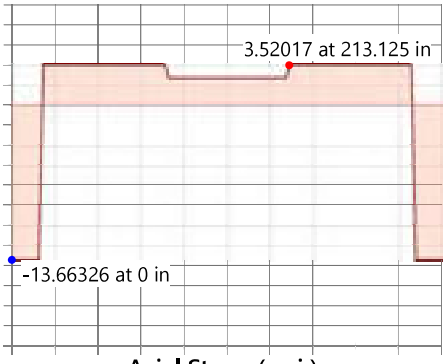
Torsion (lb-in)



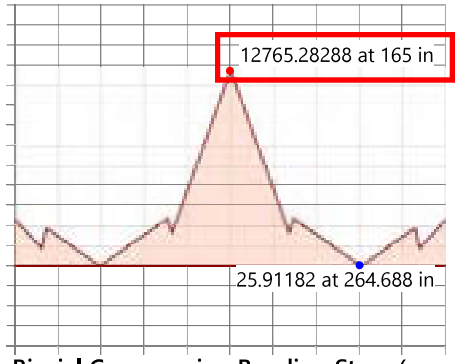
z-z Moment (lb-in)



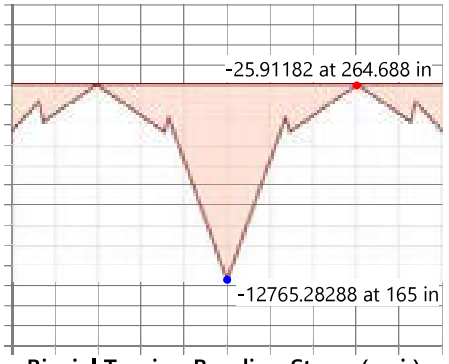
y-y Moment (lb-in)



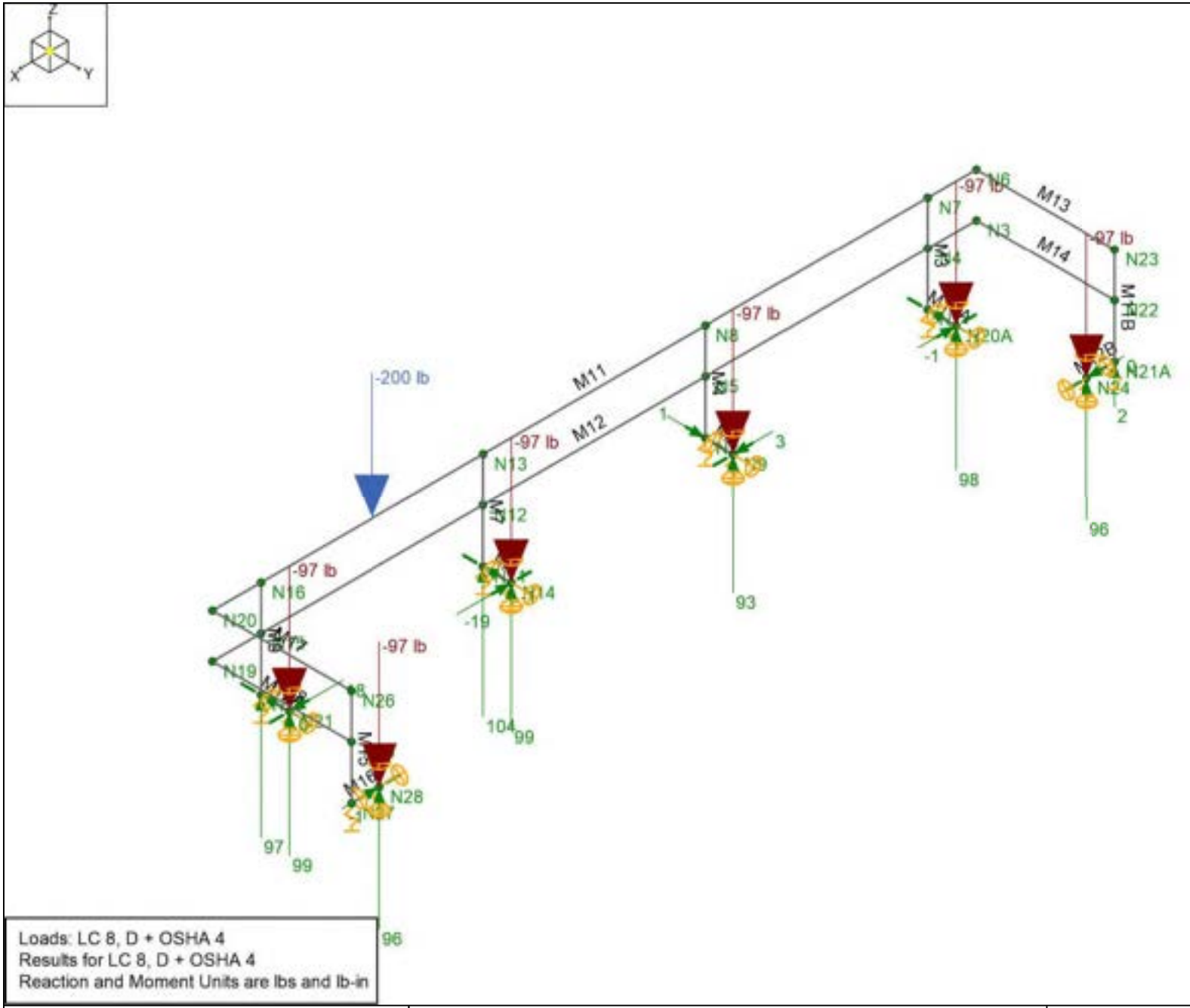
Axial Stress (psi)



Biaxial Compression Bending Stress(p...

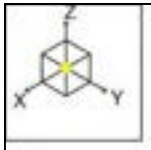


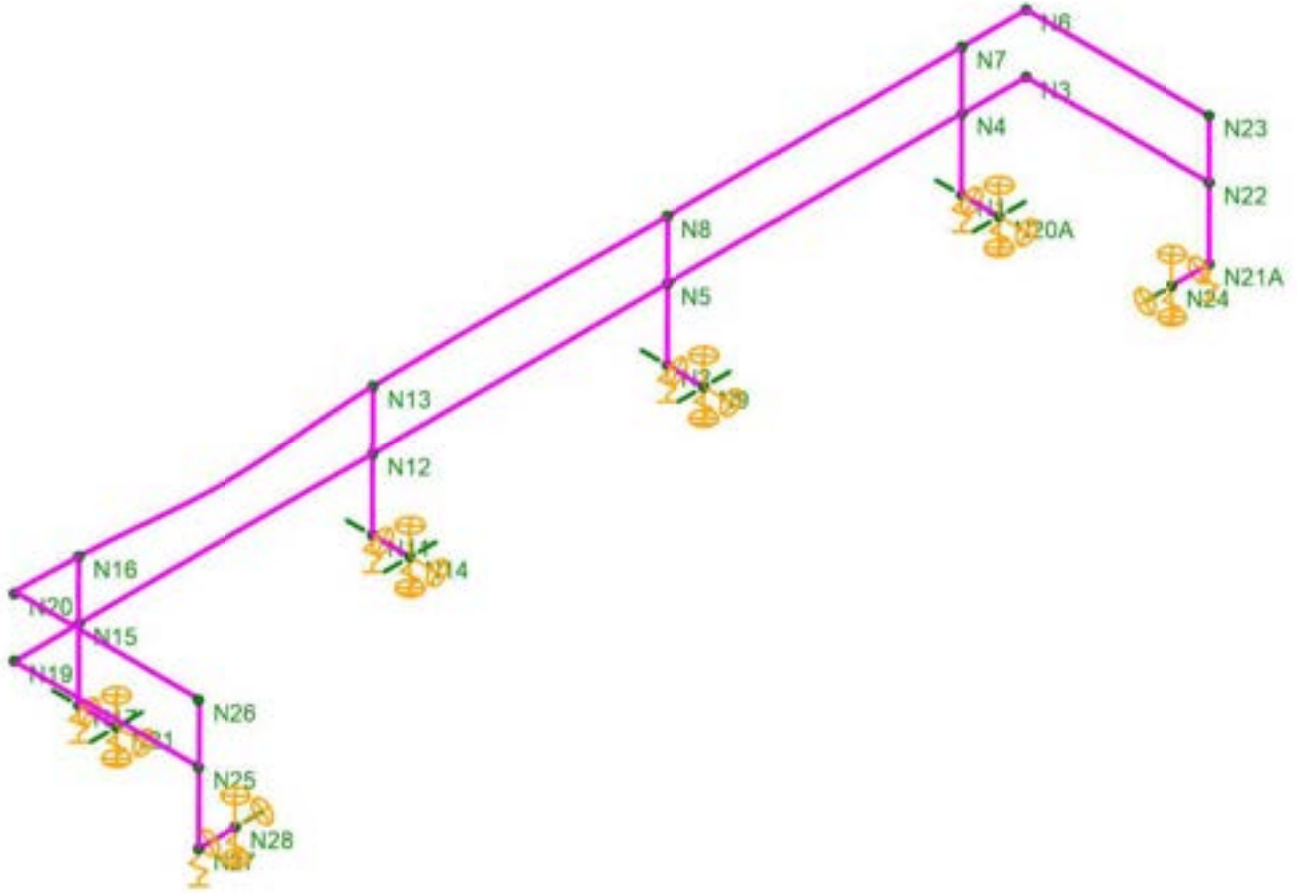
Biaxial Tension Bending Stress (psi)



Fibergrate Composite Structures, Inc	DynaRound Slimline - 8 ft Spacing with 5 ft Return	SK-8
Ethan Love, P.E.		Jan 23, 2020
	Load Case 4 - Loads & Reactions	Slimline 8 FT Return Assy.r3d

COM-2310004





Results for LC 8, D + OSHA 4

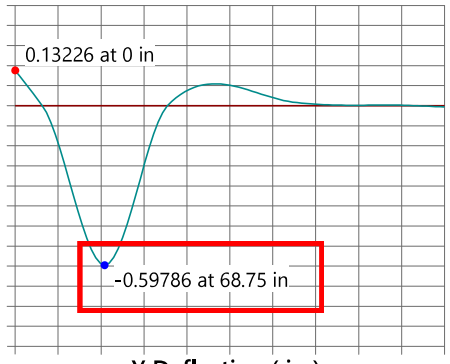
Fibergrate Composite Structures, Inc	DynaRound Slimline - 8 ft Spacing with 5 ft Return	SK-9
Ethan Love, P.E.		Jan 23, 2020
	Load Case 4 - Deflected Shape x 5	Slimline 8 FT Return Assy.r3d

COM-2310004

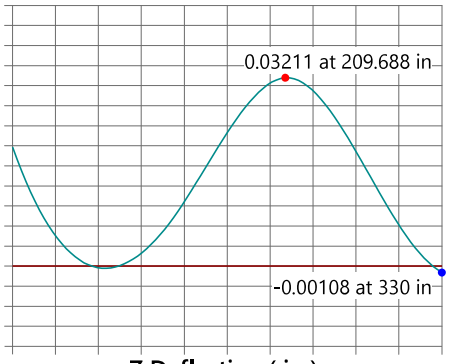
Detail Report: M11

Load Combination: LC 8: D + OSHA 4

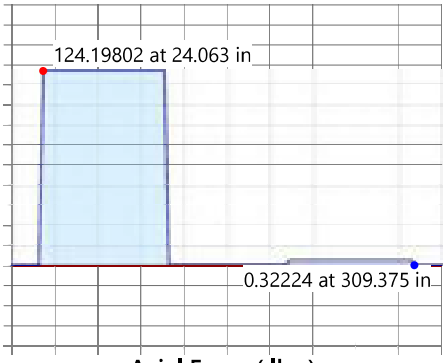
Diagrams:



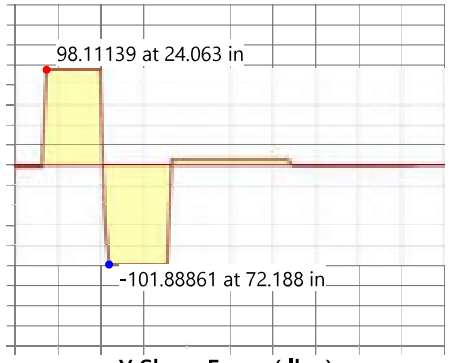
Y Deflection (in)



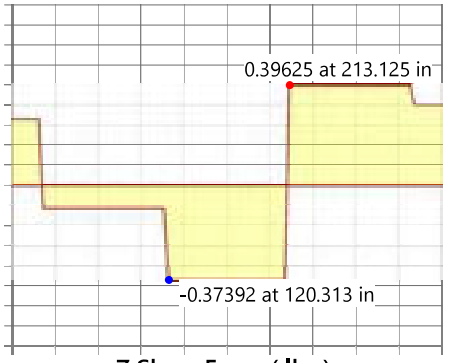
Z Deflection (in)



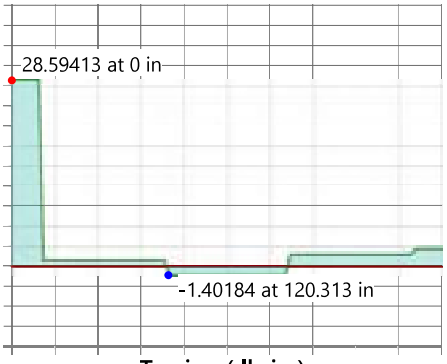
Axial Force (lbs)



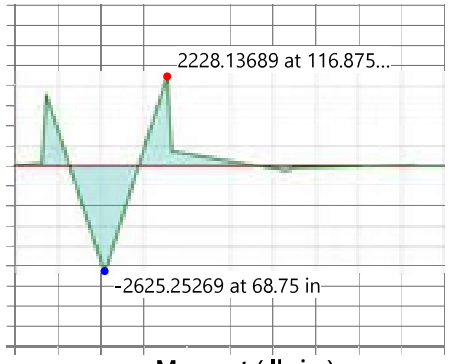
Y Shear Force (lbs)



Z Shear Force (lbs)



Torsion (lb-in)



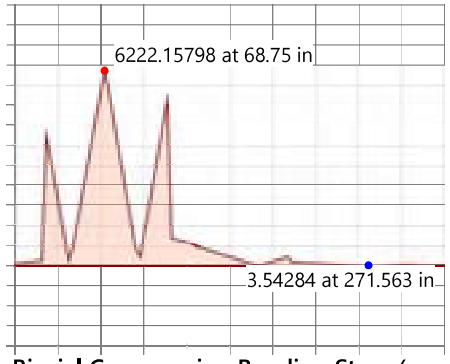
z-z Moment (lb-in)



y-y Moment (lb-in)



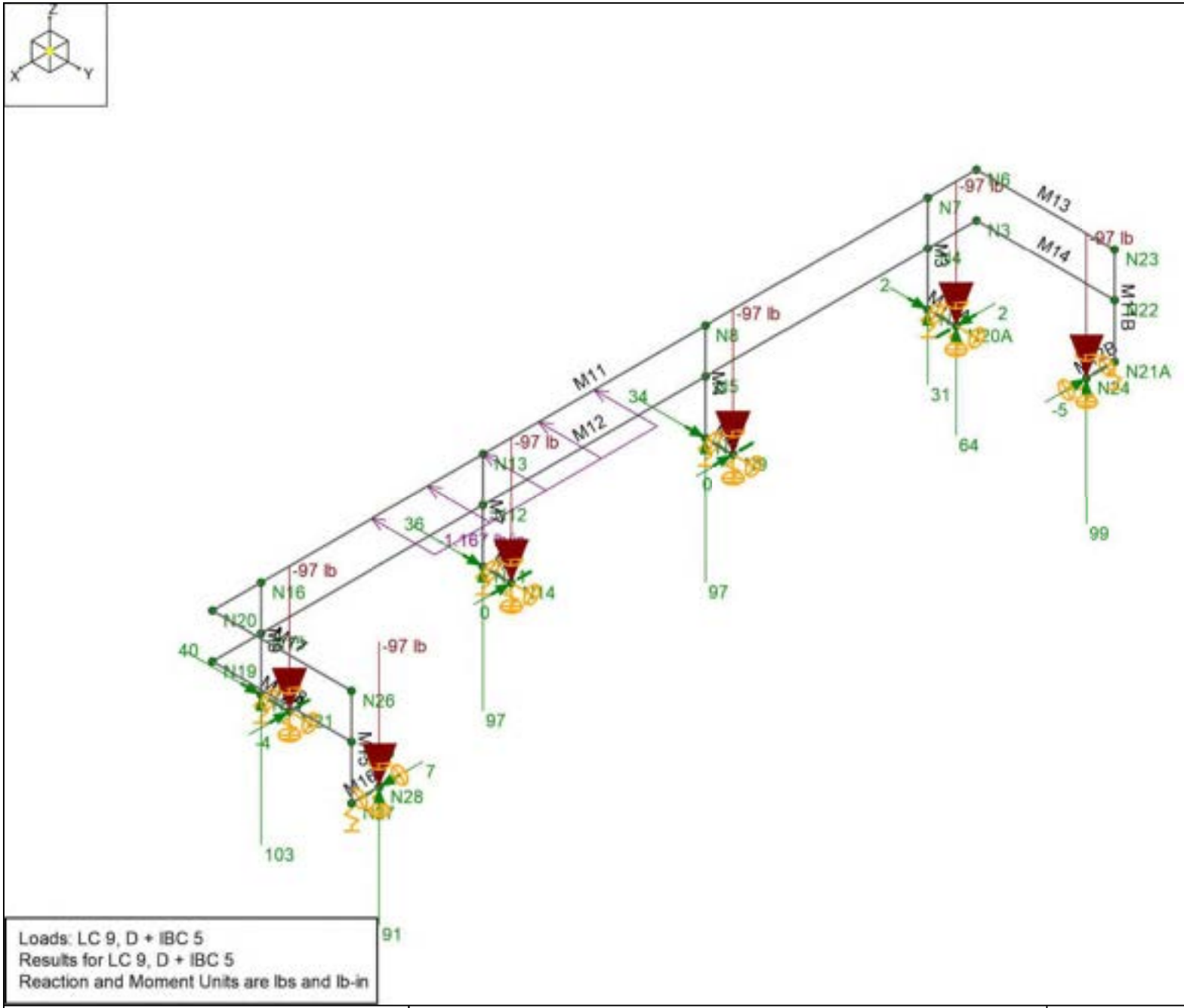
Axial Stress (psi)



Biaxial Compression Bending Stress(p...

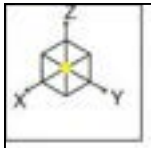


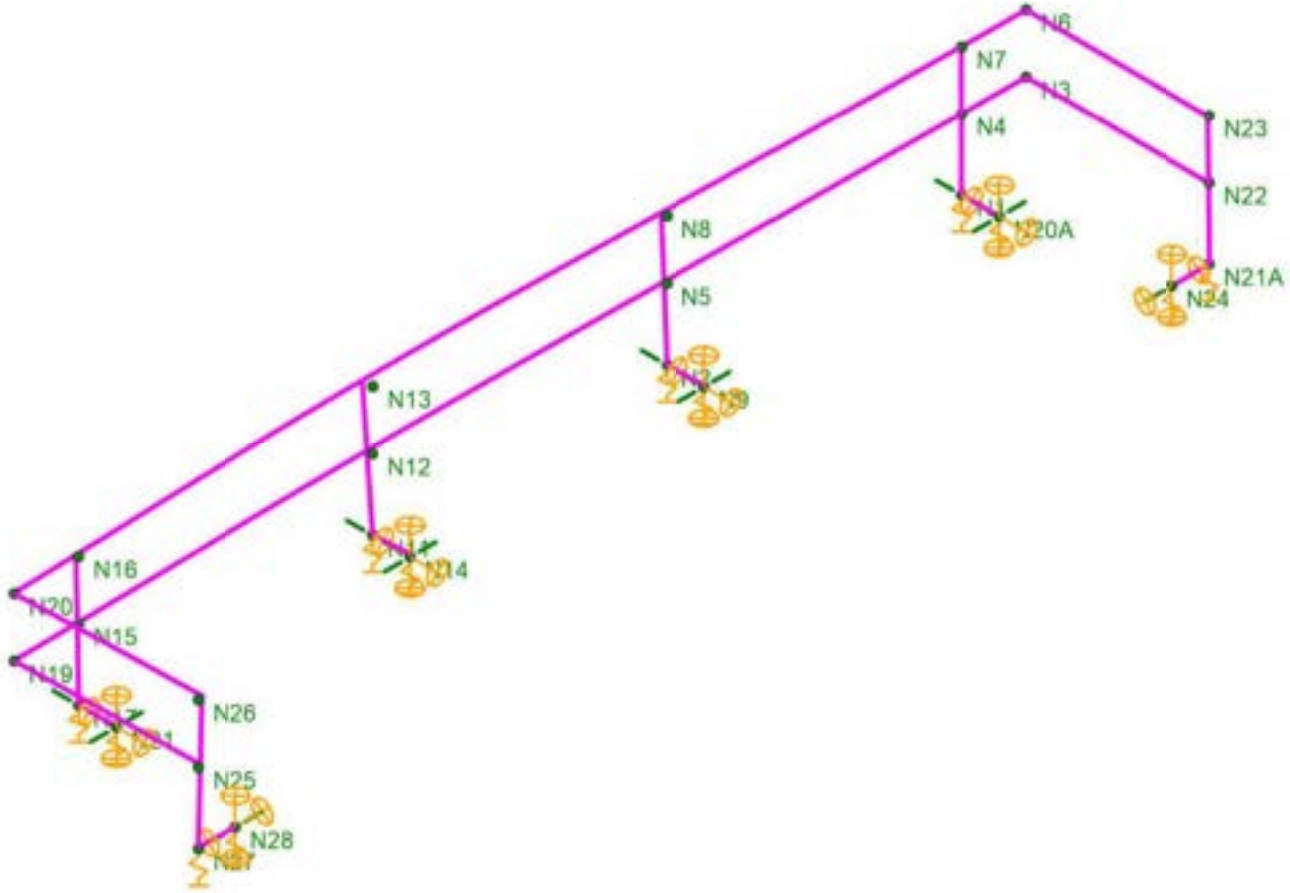
Biaxial Tension Bending Stress (psi)



Fibergrate Composite Structures, Inc	DynaRound Slimline - 8 ft Spacing with 5 ft Return	SK-10
Ethan Love, P.E.		Jan 23, 2020
	Load Case 5 - Loads & Reactions	Slimline 8 FT Return Assy.r3d

COM-2310004





Results for LC 9, D + IBC 5

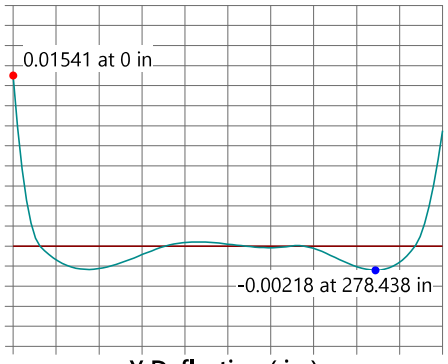
Fibergrate Composite Structures, Inc	DynaRound Slimline - 8 ft Spacing with 5 ft Return	SK-11
Ethan Love, P.E.		Jan 23, 2020
	Load Case 5 - Deflected Shape x 1	Slimline 8 FT Return Assy.r3d

COM-2310004

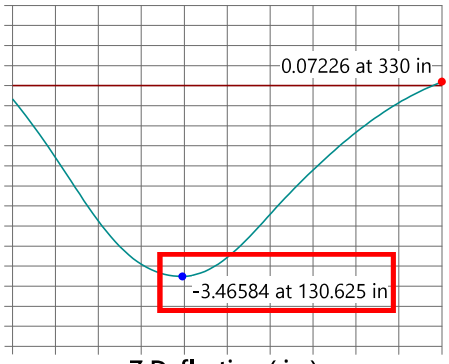
Detail Report: M11

Load Combination: LC 9: D + IBC 5

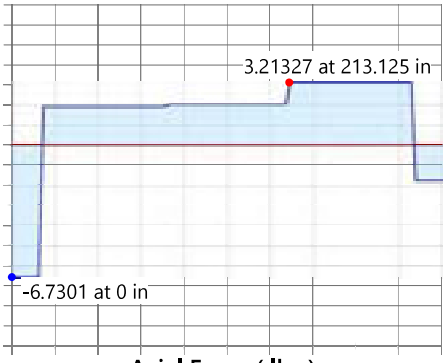
Diagrams:



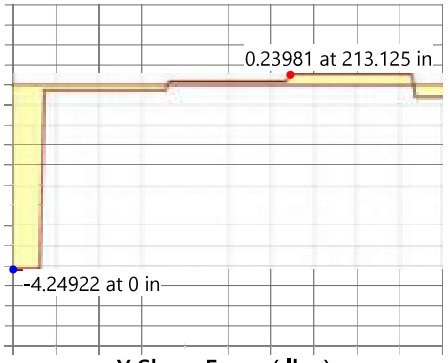
Y Deflection (in)



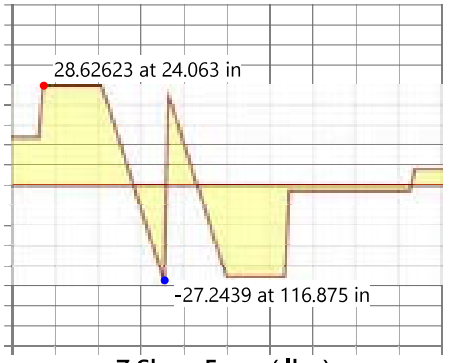
Z Deflection (in)



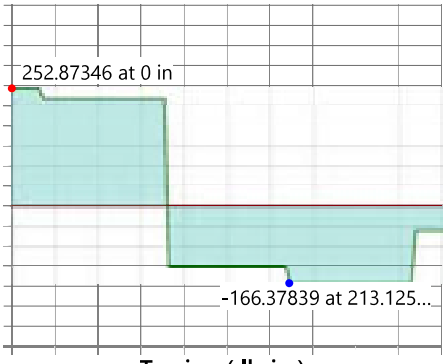
Axial Force (lbs)



Y Shear Force (lbs)



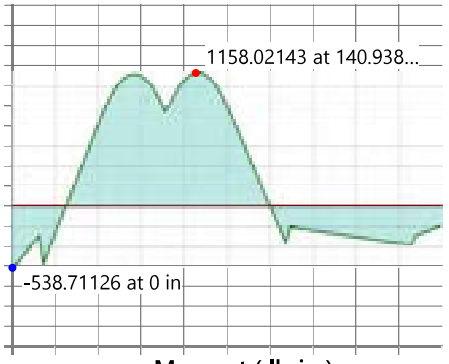
Z Shear Force (lbs)



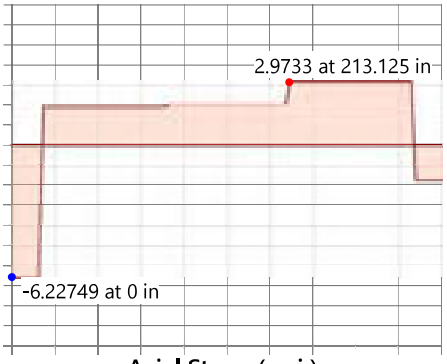
Torsion (lb-in)



z-z Moment (lb-in)



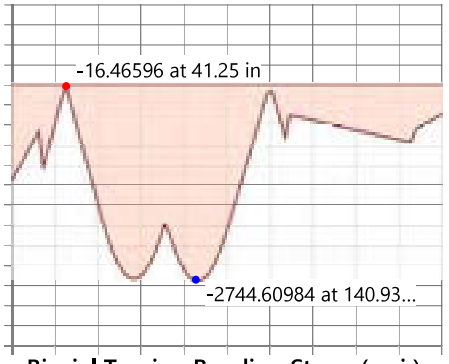
y-y Moment (lb-in)



Axial Stress (psi)



Biaxial Compression Bending Stress(p...

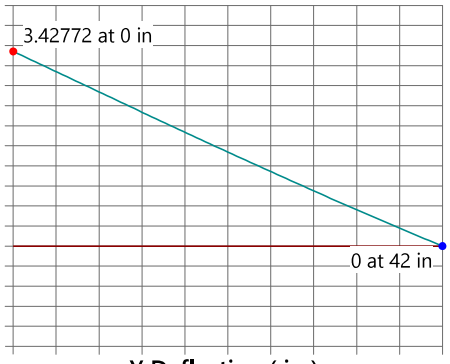


Biaxial Tension Bending Stress (psi)

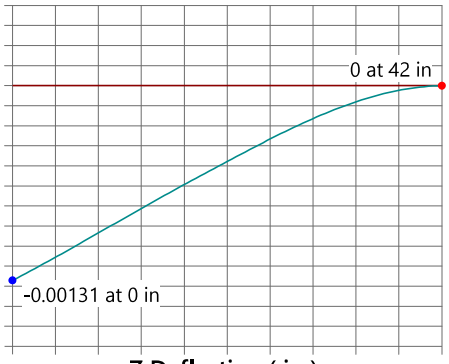
Detail Report: M7

Load Combination: LC 9: D + IBC 5

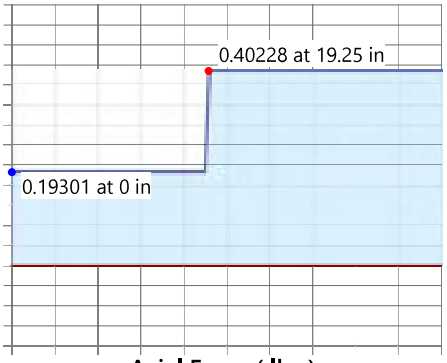
Diagrams:



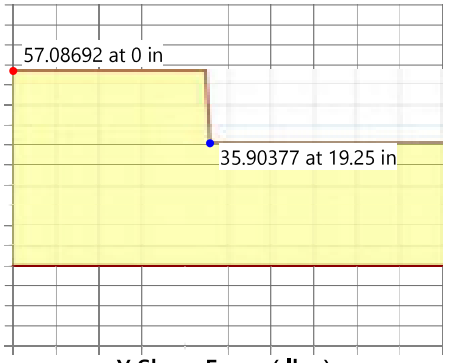
Y Deflection (in)



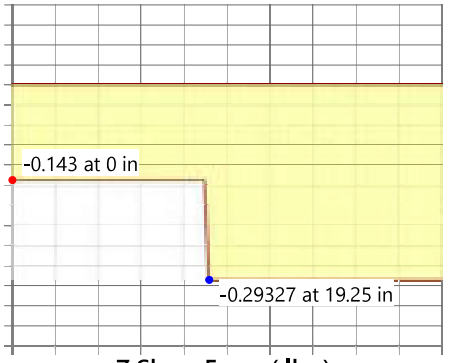
Z Deflection (in)



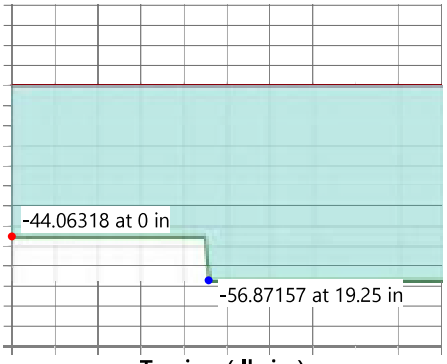
Axial Force (lbs)



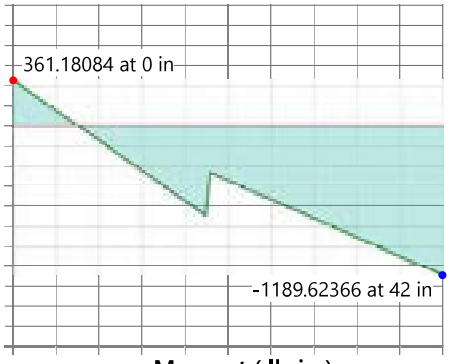
Y Shear Force (lbs)



Z Shear Force (lbs)



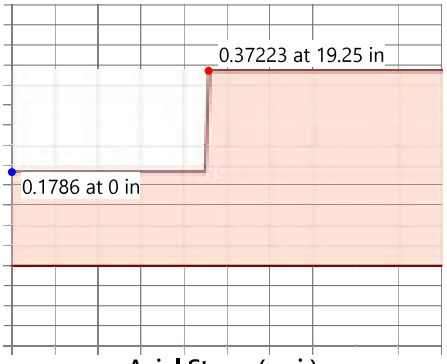
Torsion (lb-in)



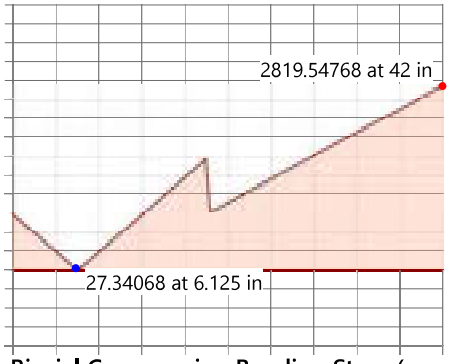
z-z Moment (lb-in)



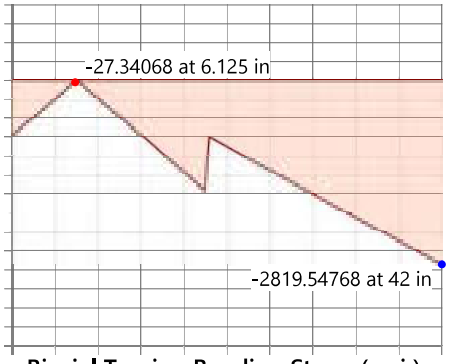
y-y Moment (lb-in)



Axial Stress (psi)



Biaxial Compression Bending Stress(p...



Biaxial Tension Bending Stress (psi)

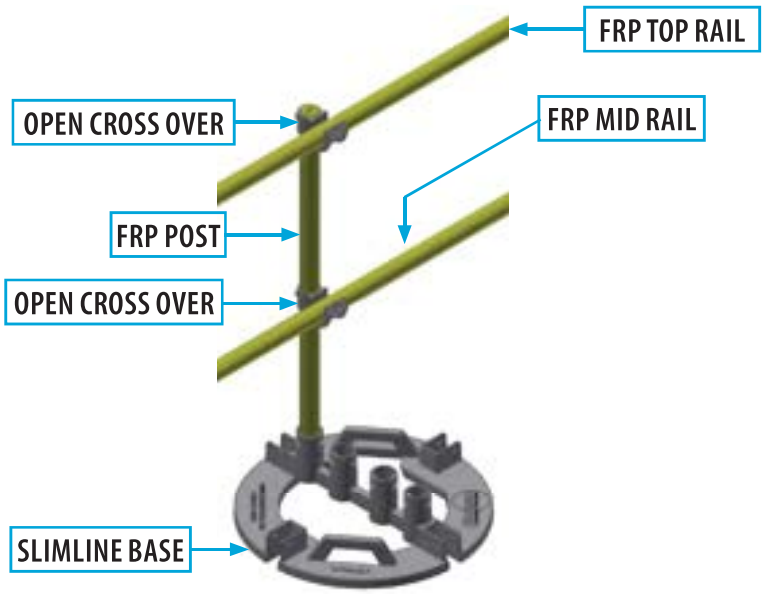
PRODUCT DATA SHEET

AVAILABLE THROUGH TREMCO ROOFING & BUILDING MAINTENANCE

Fibergrate Composite Structures
Building the World to Last™

DYNAROUND RG (ROOF GUARD) SLIMLINE™

Fibergrate's ballasted rooftop guardrail system, DynaRound RG Slimline™, provides safety and fall protection on rooftop applications. While our RG system utilizes counter balance bases, the SlimLine systems use both counterbalance bases in addition to circular galvanized bases. Similar to our DynaRound RG system, each Slimline system is made of durable, weather-resistantfiberglass reinforced plastic (FRP) composite uprights and rails, galvanized steel base weights, and galvanized connector components. This system meets applicable safety standards in the U.S. and Canada to protect people working at heights.



DynaRound RG Slimline provides the utmost in safety by protecting against injuries or death from accidental falls from the roof. The weighted base system means there is no drilling into the roof to attach the system. This eliminates any damage to the roof that could result from the drilling, including potential sources of leaks.

BENEFITS OF FRP

Corrosion Resistant: Fibergrate® fiberglass products are known for their ability to resist corrosion in the harshest environments.

Lightweight: Fibergrate FRP products lessen impact on rooftop installations, reduce installation time, can eliminate the need for heavy lifting equipment, and reduce shipping costs.

Low Maintenance: The corrosion resistant properties of FRP are easy to clean and reduce or eliminate the need for sandblasting, scraping and painting.

Long Service Life: Fiberglass products provide outstanding durability and corrosion resistance in demanding applications for improved product life over traditional materials.

Electrically & Thermally Non Conductive: Fiberglass is electrically non-conductive for safety and has low thermal connectivity - resulting in a more comfortable product when physical contact occurs.

UV Resistant: The FRP rails, post, and outriggers have an additional factory applied coating suitable for daily UV exposure, further reducing the low cost of maintenance.


DynaRound RG SlimLine Galvanized Base

SPECIFICATIONS

Safety Ratings

Meets OSHA Requirements:
- 1926.501(b)(1)
- 1926.502(b)
- 1910.28(b)(1)
- 1910.29(b)
- CAL/OSHA 3210
- CAL/OSHA 3212
- CAL OSHA 1620
- CAL/OSHA 3209

Meets IBC 2015 Requirements:
- 1015.3
- 1015.4.4
- 1015.7
- 1607.8.1
- 1607.8.1.1
- 1607.8.1.2

Materials of Construction

Rails, posts, and outriggers:
- VEFR *(Vinyl ester resin system with a flame spread of 25 or less for dependable resistance to both acidic and alkaline environments)*

Fittings and Base Weights:
- Galvanized, cast iron connectors with set screws
- Protective, durable rubber pads on parts that contact roof surface

Size

- 1.9" O.D. Pultruded Round Tube

Colors

Yellow with UV Coating

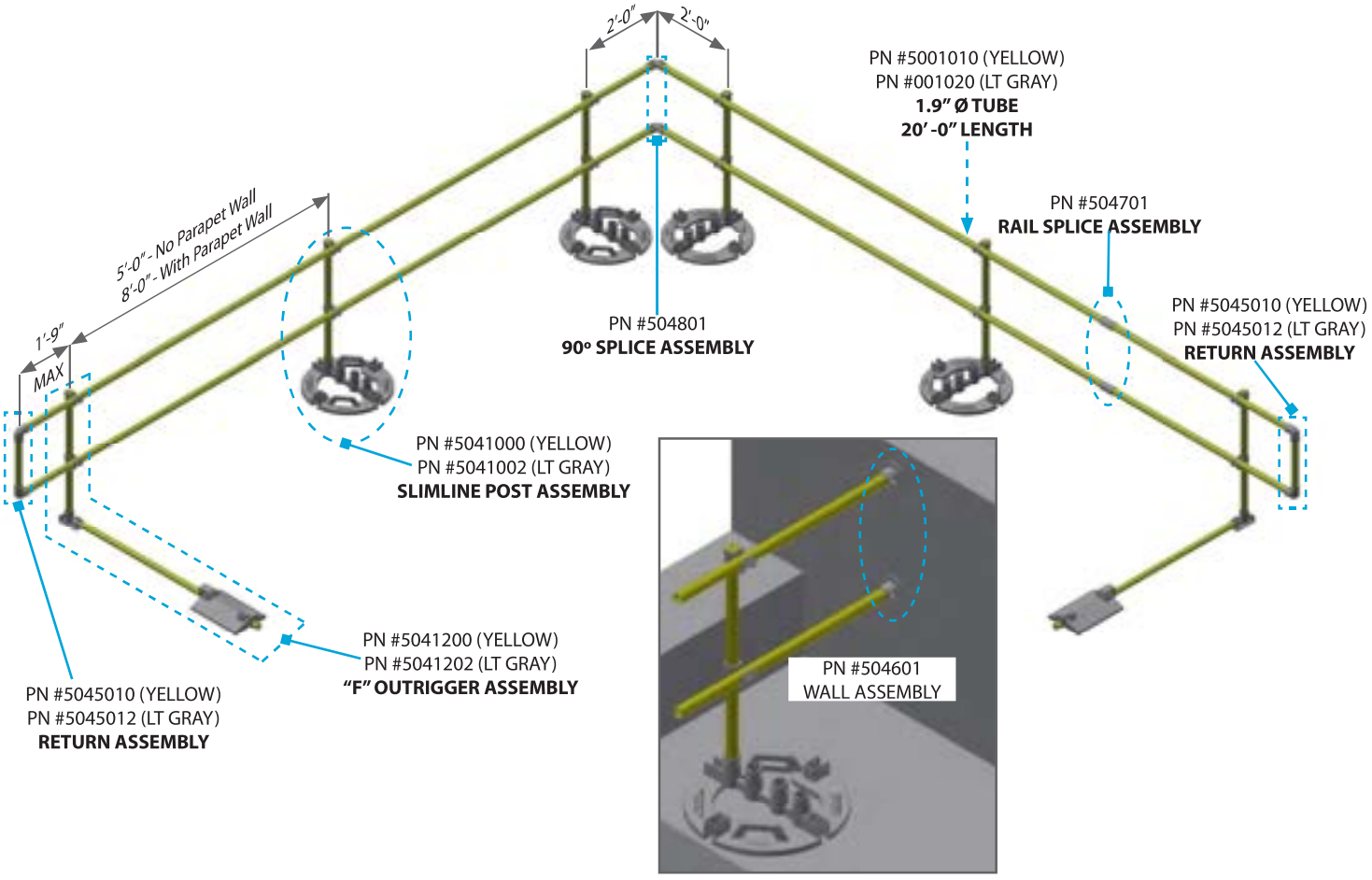
Light Gray with UV Coating

©Fibergrate Composite Structures Inc. 2017

ISO 9001-2008 QUALITY CERTIFIED FACILITIES

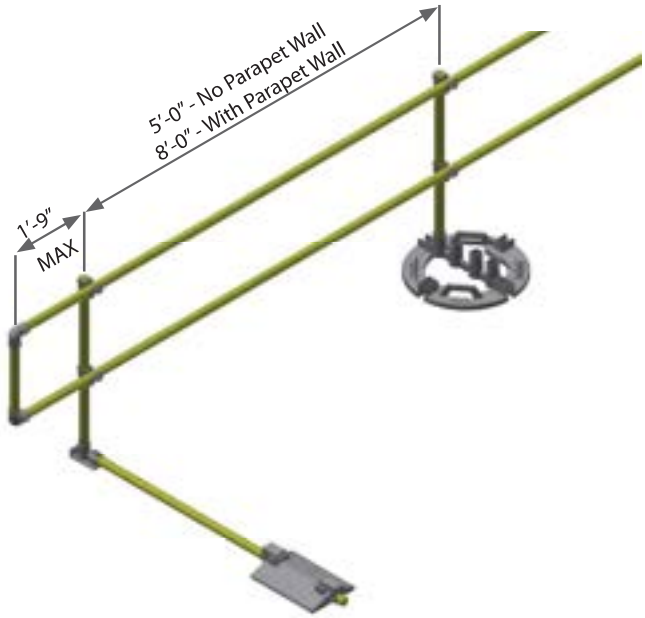
Heavy Metal SAFE
Arsenic Barium Cadmium Chromium Lead Mercury Nickel Selenium Silver

SYSTEM COMPONENTS



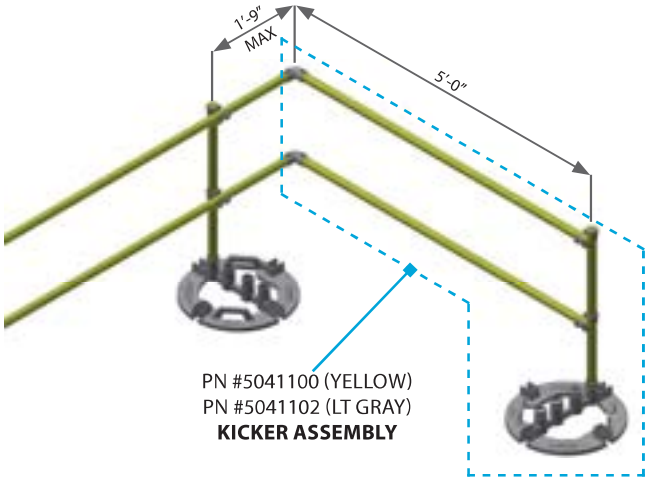
TYPICAL SPACING FOR ASSEMBLIES

RETURN CONDITION



KICKER ASSEMBLY

(A kicker assembly can be used as an alternative to the standard "F" outrigger.)



All assembly details can be found on the next page.

ASSEMBLY DETAILS

DynaRound SL Post Assembly, Yellow
ITEM #5041000
Weight = 97 lbs

DESCRIPTION	QTY	PN #
DynaRound SL Post - YL	1	5041610
Open Cross Over	2	793201
Lock Pin	1	793108.2
DynaRound SL Base	1	793108.7

DynaRound SL Post Assembly, LT GRAY
ITEM #5041002
Weight = 97 lbs

DESCRIPTION	QTY	PN #
DynaRound SL Post - GR	1	5041612
Open Cross Over	2	793201
Lock Pin	1	793108.2
DynaRound SL Base	1	793108.7

DynaRound SL Kicker Assembly, Yellow
ITEM #5041100
Weight = 110 lbs

DESCRIPTION	QTY	PN #
DynaRound SL Post - YL	1	5041610
Open Cross Over	2	793201
Lock Pin	1	793108.2
DynaRound SL Base	1	793108.7
Two Way Elbow	2	793125
Dynaround SL Kicker Rail - YL	2	5041710

DynaRound SL Kicker Assembly, LT GRAY
ITEM #5041102
Weight = 110 lbs

DESCRIPTION	QTY	PN #
DynaRound SL Post - LG	1	5041612
Open Cross Over	2	793201
Lock Pin	1	793108.2
DynaRound SL Base	1	793108.7
Two Way Elbow	2	793125
Dynaround SL Kicker Rail - LG	2	5041712

DynaRound SL 'F' Outrigger Assy, Yellow
ITEM #5041200
Weight = 108 lbs

DESCRIPTION	QTY	PN #
DynaRound RG Post - YL	1	5040010
Open Cross Over	2	793201
Slipper	1	793206
Roof	2	793208
Special Hook	2	793207
F Outrigger (L = 66") - YL	1	5043110

DynaRound SL 'F' Outrigger Assy, LT GRAY
ITEM #5041202
Weight = 108 lbs

DESCRIPTION	QTY	PN #
DynaRound RG Post - LG	1	5040012
Open Cross Over	2	793201
Slipper	1	793206
Roof	2	793208
Special Hook	2	793207
F Outrigger (L = 66") - LG	1	5043112

Swivel Elbow Assembly
ITEM #504802
Weight = 4 lbs

DESCRIPTION	QTY	PN #
Swivel Elbow	2	793126

WALL ASSEMBLY
ITEM #504601
Weight = 4 lbs

DESCRIPTION	QTY	PN #
Base Flange	2	793131

RAIL SPLICE ASSEMBLY
ITEM #504701
Weight = 3 lbs

DESCRIPTION	QTY	PN #
Sleeve Joint	2	793149

90° SPLICE ASSEMBLY
ITEM #504801
Weight = 4 lbs

DESCRIPTION	QTY	PN #
Two Way Elbow	2	793125

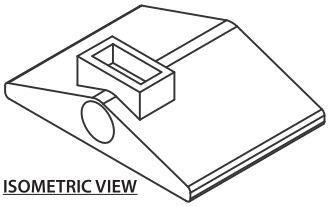
RETURN ASSEMBLY, Yellow
ITEM #5045010
Weight = 6 lbs

DESCRIPTION	QTY	PN #
Return (Length: 21-1/16")	1	5045110
Two Way Elbow	2	793125

RETURN ASSEMBLY, LT GRAY
ITEM #5045012
Weight = 6 lbs

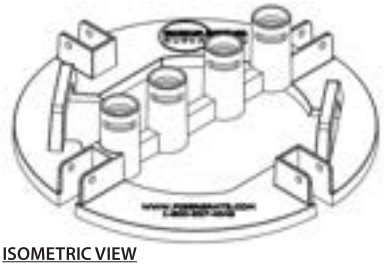
DESCRIPTION	QTY	PN #
Return (Length: 21-1/16")	1	5045112
Two Way Elbow	2	793125

PN #793208
ROOF WEIGHT



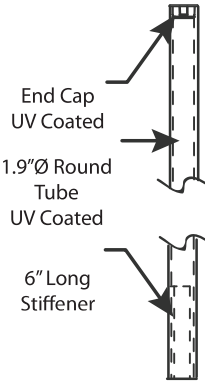
ISOMETRIC VIEW

PN #793108.7
DynaRound SL Base
Diameter=24"

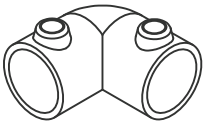


ISOMETRIC VIEW

PN # 5041610/5041612
DYNAROUND SL POST
(LENGTH =41-1/4")

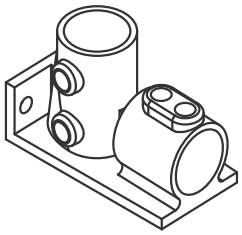


PN #793125
TWO WAY ELBOW



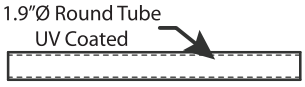
ISOMETRIC VIEW

PN #793206
SLIPPER

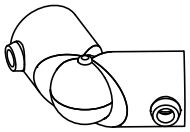


ISOMETRIC VIEW

PN #5045110
RETURN (Length = 21-1/16")

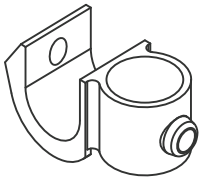


PN #793126
SWIVEL ELBOW



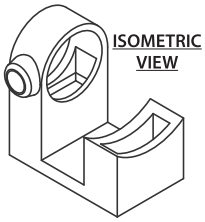
ISOMETRIC VIEW

PN #793201
OPEN CROSS OVER



ISOMETRIC VIEW

PN #793207
SPECIAL HOOK*



ISOMETRIC VIEW

*Shown upside down

PN #793108.2
LOCK PIN



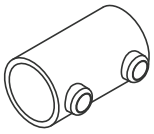
ISOMETRIC VIEW

PN #793131
BASE FLANGE



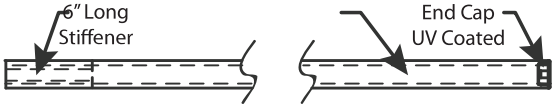
ISOMETRIC VIEW

PN #793149
SLEEVE JOINT



ISOMETRIC VIEW

PN #5043110/5043112
F OUTRIGGER
(LENGTH=66")
1.9"Ø Round
Tube - UV Coated



Fibergrate Composite Structures Inc.
900 FM 205 · Stephenville, Texas 76401 · phone (800) 527-4043 · fax (254) 965-6456

Fibergrate Test Report – 1.9" OD x 1.526" ID Round Tube

E. A. Love/Joe Burr/Sabino Esquivel Sept. 30, 2016 (R1 10-03-16)

Introduction:

This test report summarizes a series of 6 ft span, three-point bending tests conducted on VEFR 1.9" OD x 1.526" ID round tube on Sept. 26, 2016. Material was manufactured at Fibergrate, Stephenville on Sept. 23, 2016.

Test Procedure:

Three 84" long test specimens were cut from a single 288" long tube taken from production. All were tested in three point bending on a 72" span using the Tinius Olsen Test frame at Fibergrate Composite Structures. The supports were 1" diameter steel round bars and the load head was similar with the specimens protected by a steel reinforced HDPE load pad in contact with the specimen. Details of the test setup can be seen in the attached figures. All specimens were loaded to failure in a single cycle at a load rate of 1.5 inches per minute.

Summary of Results:

The load deflection curve is attached and the test results summarized below. The load deflection curve indicates fully elastic behavior until the point of failure.

Test No.	Curve Slope (lb/in)	Stiffness (lb-in2)	Apparent Modulus (psi)	Ultimate Load (lb)	Ultimate Bending (lb-in)	Ultimate Stress (psi)
1	249.875	1.943E+06	5.202E+06	2154	38,772	98,606
2	260.824	2.028E+06	5.430E+06	2084	37,512	95,402
3	249.367	1.939E+06	5.192E+06	1989	35,802	91,053

The mode of failure for all specimens was buckling of the upper surface of the tube with sudden splitting of the areas immediately adjacent to the load saddle and a tensile failure of the lower surface. The failed tube is nearly broken into two pieces. Details of the failure mode can be seen in Figure 4.

Conclusions and Recommendations:

The purpose of this test was as a proof test to verify the behavior of this profile in bending. In design work using this profile, I recommend using design values of ultimate flexural stress as 90,000 psi and apparent flexural modulus as 5.0×10^6 psi.

Load Deflection Curves:

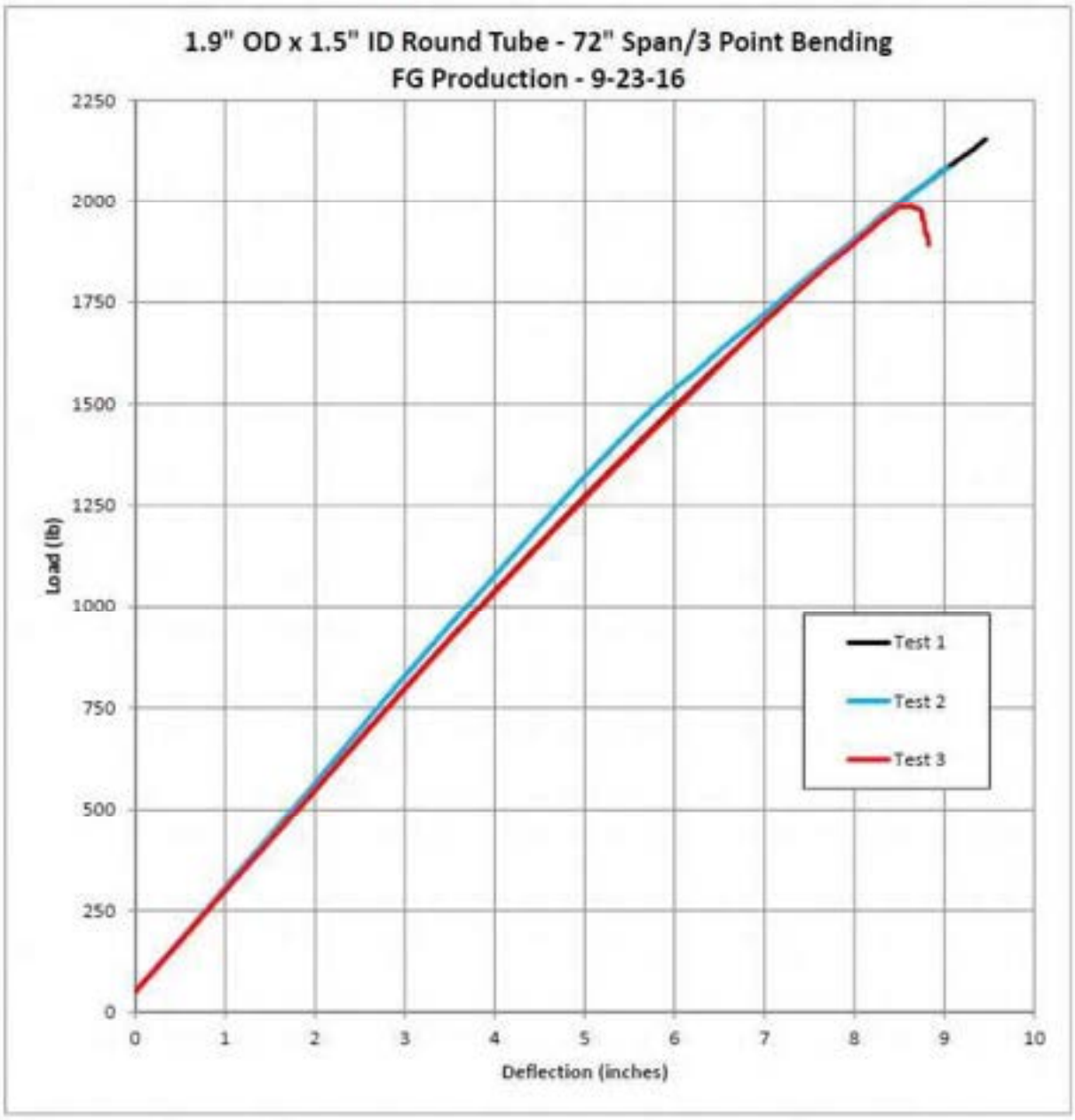




Figure 1 – Overall view of test setup.



Figure 2 – Support condition showing angles bolted to fixtures to maintain alignment.

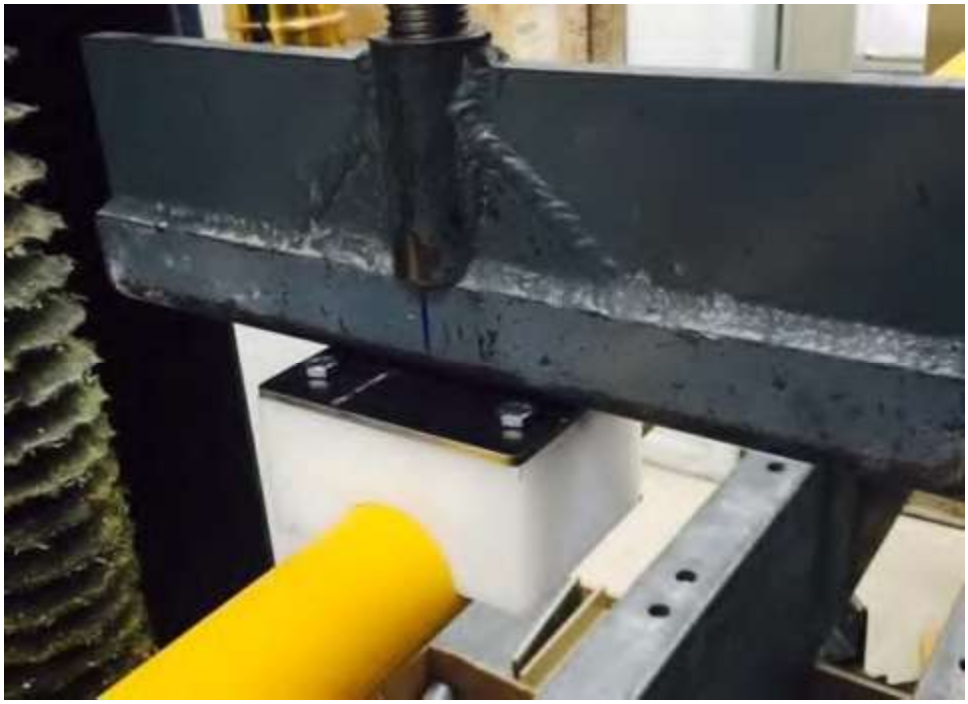


Figure 3 – View showing steel reinforced HDPE load saddle.



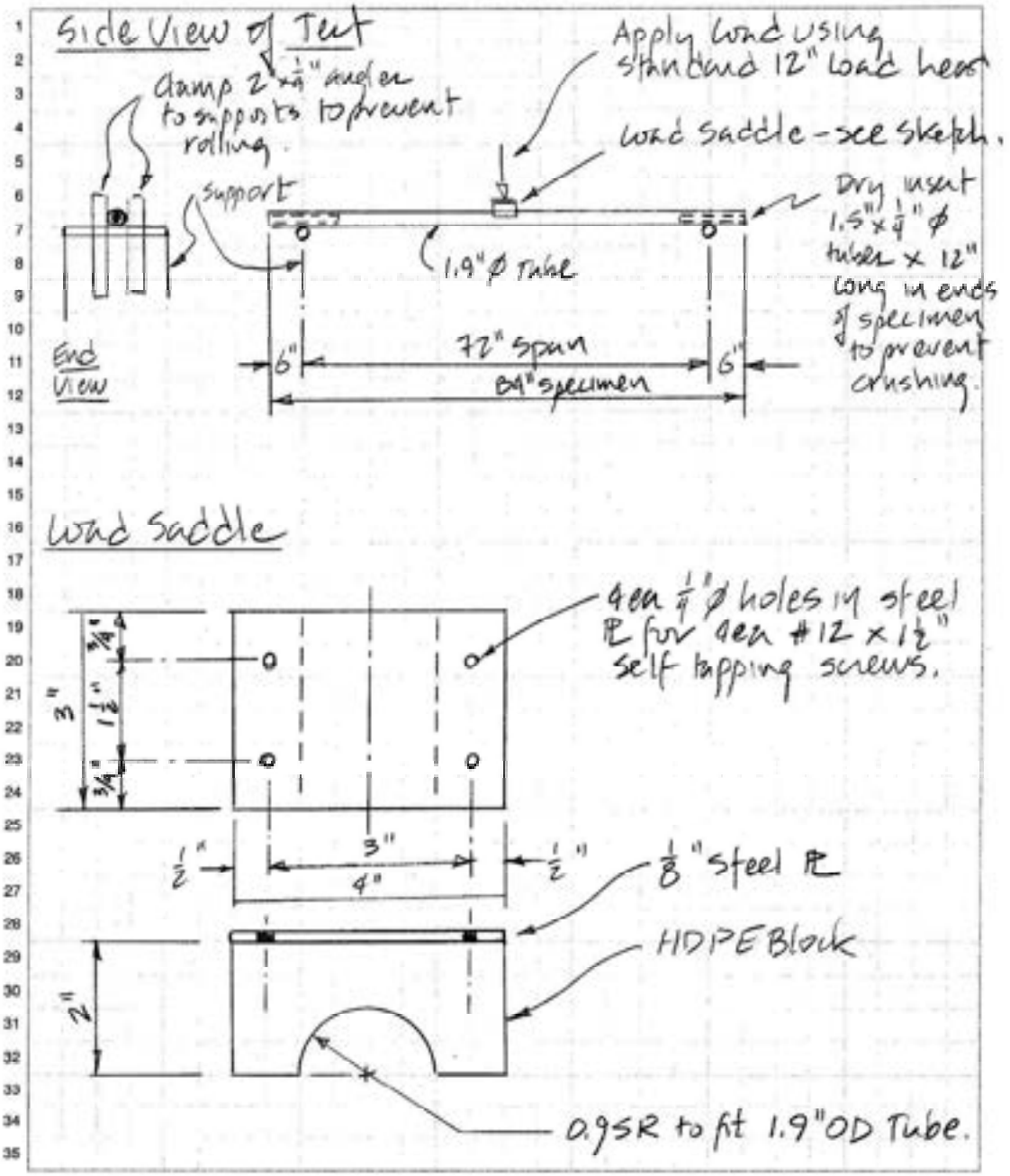
Figure 4 – Typical failure mode – Specimen 1 shown.

900 FM 205
Stephenville, Texas 76401 U.S.A.
Phone: 1-800-527-4043
www.fibergrate.com

Fibergrate
Composite Structures

DATE 5-3-16
W.O. NO.
BY GWare
PAGE NO 1 OF 1

1.9" Ø Tube Flexural Test



THIS DOCUMENT AND ALL DESIGN INFORMATION IS THE SOLE PROPERTY OF FIBERGRATE COMPOSITE STRUCTURES INC. AND IS NOT TO BE DISCLOSED OR COPIED WITHOUT THE WRITTEN AUTHORIZATION OF FIBERGRATE COMPOSITE STRUCTURES INC.

Figure 5 – Sketch of test setup and load saddle.

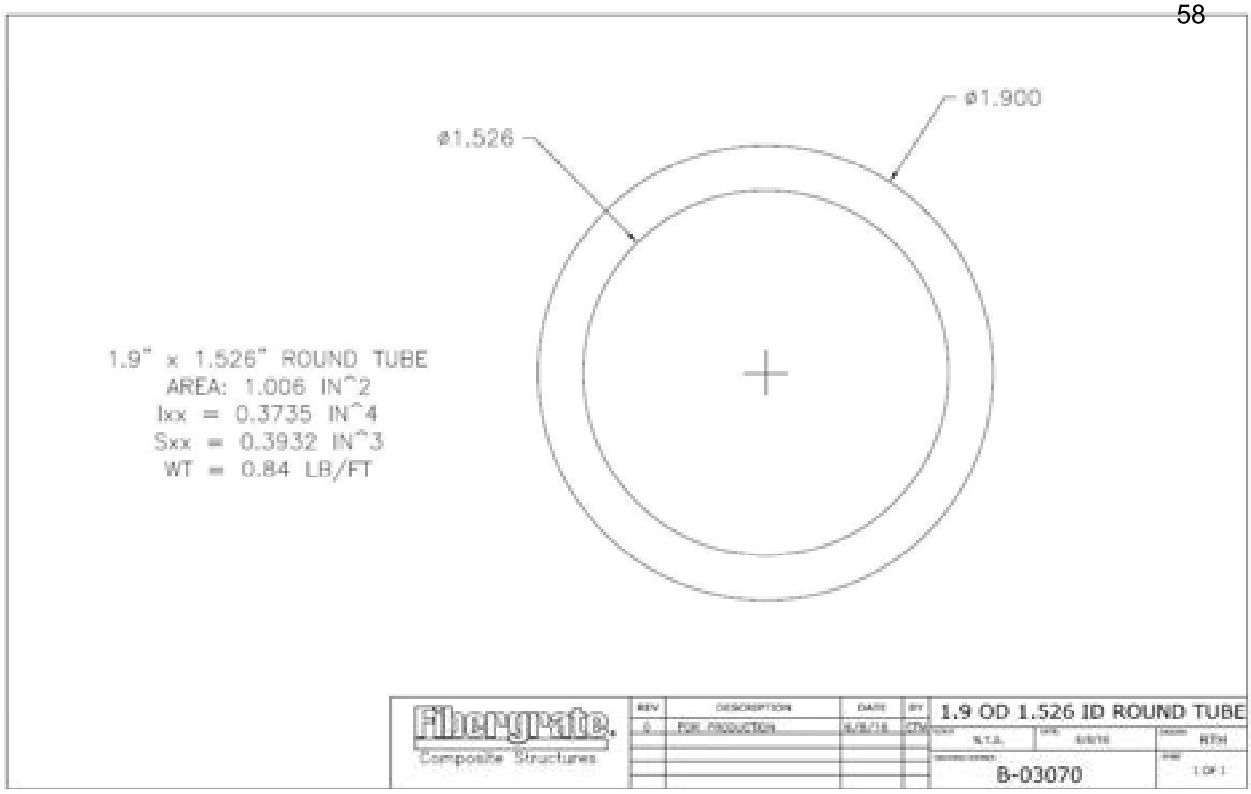


Figure 6 – Cross sectional dimensions and properties of 1.9" OD Tube. (I_{xx} = 0.3735 in^4, S_{xx} = 0.3932 in^3)

COM-2310004

ZFA STRUCTURAL ENGINEERS

san francisco
silicon valley
sacramento
santa rosa
napa

North Sacramento Library - ASCE 7/41 Structural Calculations

Sacramento, California
ZFA Project Number: 22689

SACRAMENTO Community Development
ISSUED BY
Community Development Department
By: *Jason Hone*
on Oct 05, 2023

COMMUNITY DEVELOPMENT DEPARTMENT
APPROVED
UNDER
TITLE 8 &15 & 17
CITY CODE
CITY OF
SACRAMENTO, CALIF.
BUILDING INSPECTION DIVISION

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

Plan Check #1

September 8, 2023

Prepared For:
PBK
Folsom, California

REGISTERED PROFESSIONAL ENGINEER
MICKEY C. KELLOGG
STRUCTURAL
No. 5851
STATE OF CALIFORNIA

Prepared By:
Miguel Arismendi-Pardi, Designer
Dudley Mei, PE, Senior Engineer
Mickey Kellogg, SE, Principal-in-Charge
Sacramento, California

SACRAMENTO Community Development
APPROVED
City of Sacramento Plan Review
STRUCTURAL
By: *Leticia Valenzuela*
on Sep 27, 2023

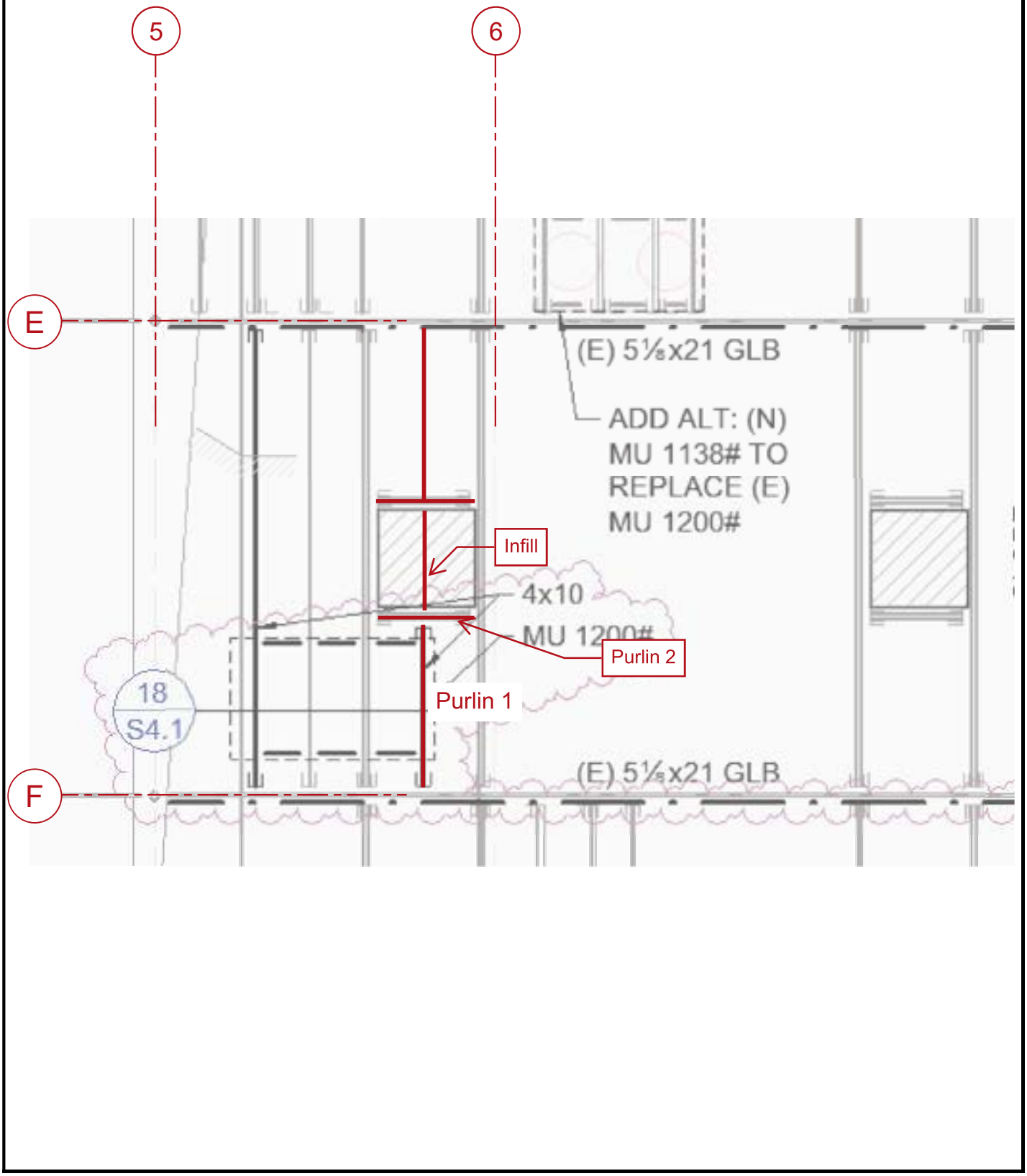
COM-2310004

ZFA STRUCTURAL ENGINEERS

ZFA Job #22689
Joist and Glulam Key Plan

Engineer: MAAP
Date: 03/09/2023

North Sacramento Library



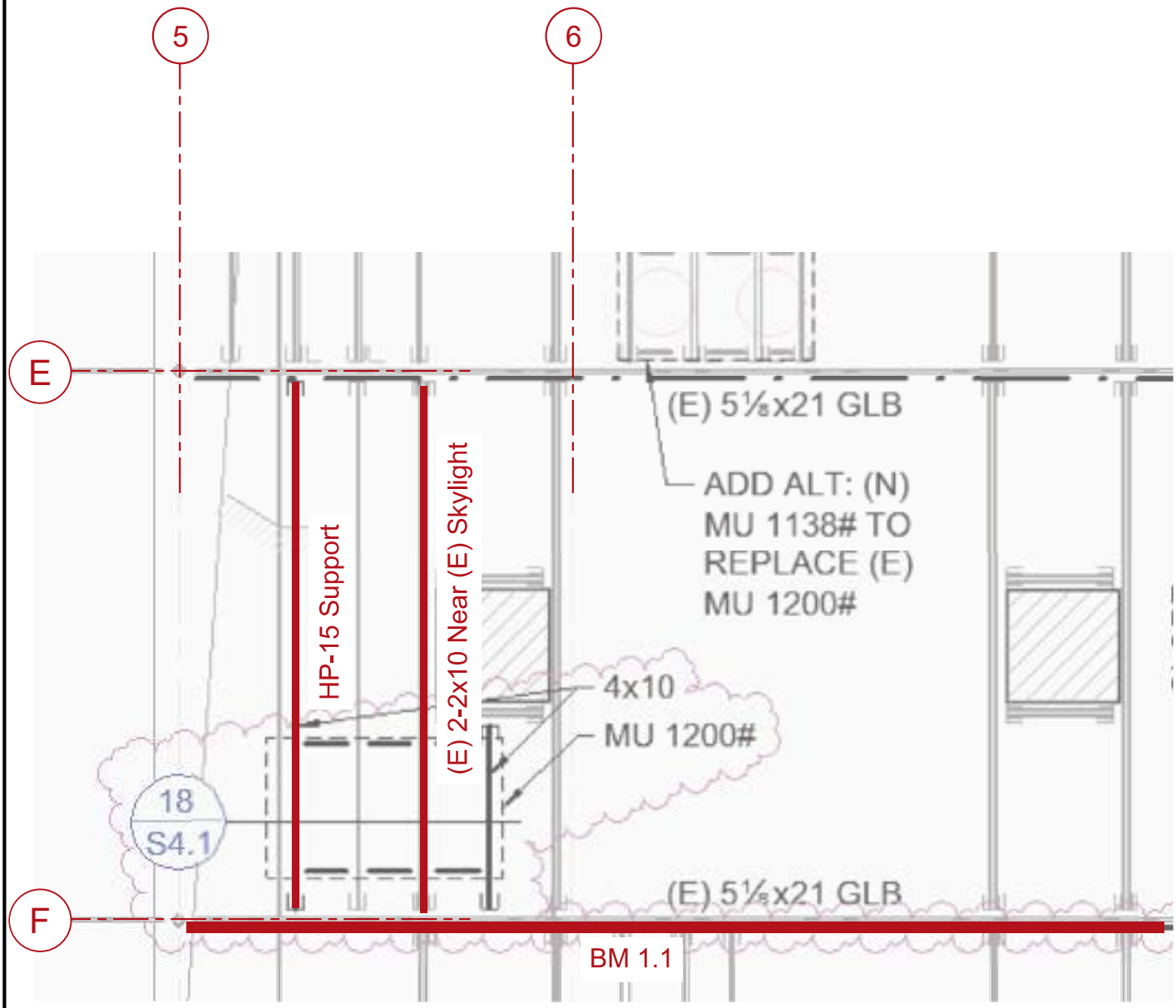
COM-2310004

ZFA STRUCTURAL ENGINEERS

ZFA Job #22689
Joist and Glulam Key Plan

Engineer: MAAP
Date: 03/09/2023

North Sacramento Library



COM-2310004

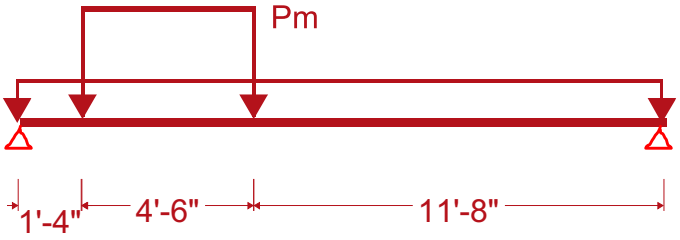
ZFA STRUCTURAL ENGINEERS

ZFA Job #22689
Hold Down

Engineer: MAAP
Date: 03/08/2023

North Sacramento Library

HP-15 Support

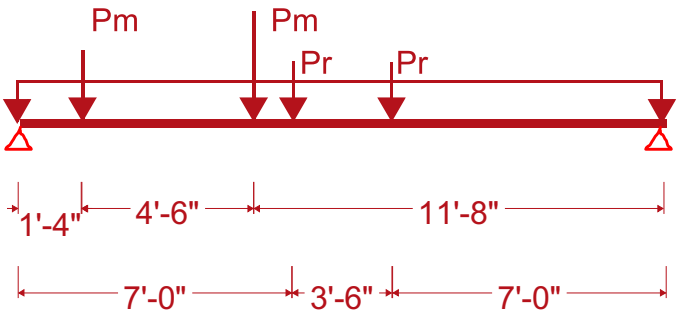


DL = 11 psf
RLL = 20 psf
Trib Width = 2 ft
Mech Load = Pm = 36 psf x 1 ft
≈ 36 lbs

4x10 is OK. Please see Enercalc for results.

DCR = 47.0%
L/502 < L/180 OK

(E) 2-2x10 Near (E) Skylight



DL = 11 psf
RLL = 20 psf
Trib Width = 2 ft
Mech Load = Pm = 36 psf x 2 ft
x 4 ft - 5 in/2 ≈ 159 lbs
Purlin 2 Reaction = Pr:
Pr DL = 115 lbs
Pr RLL = 103 lbs

(2) (E) 2-2x10 are OK. Please see Enercalc for results.

DCR = 96.2%
L/274 < L/180 OK

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.08.01 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: HP-15 Support

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,000.0 psi
Fb -	1,000.0 psi
Fc - Prll	1,500.0 psi
Fc - Perp	625.0 psi
Fv	180.0 psi
Ft	675.0 psi

E : Modulus of Elasticity

Ebend- xx	1,700.0 ksi
Eminbend - xx	620.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.0110, Lr = 0.020 ksf, Tributary Width = 2.0 ft
Load for Span Number 1
Uniform Load : D = 0.0360 k/ft, Extent = 1.250 -->> 5.750 ft, Tributary Width = 1.0 ft, (Mech Load)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.470 : 1	Maximum Shear Stress Ratio	=	0.140 : 1
Section used for this span		4x10	Section used for this span		4x10
fb: Actual	=	705.20 psi	fv: Actual	=	31.53 psi
F'b	=	1,500.00 psi	F'v	=	225.00 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	8.303 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.216 in	Ratio =	970 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.418 in	Ratio =	502 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.314	0.103	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.41	339.6	1,080.0	0.36	16.7	162.0
+D+Lr					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.470	0.140	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	2.93	705.2	1,500.0	0.68	31.5	225.0
+D+0.750Lr					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.409	0.124	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	2.55	613.5	1,500.0	0.60	27.8	225.0
+0.60D					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.106	0.035	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.85	203.7	1,920.0	0.22	10.0	288.0

ZFA STRUCTURAL ENGINEERS

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.08.01 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: HP-15 Support

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.4179	8.686		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.733	0.636
Max Upward from Load Combinations	0.733	0.636
Max Upward from Load Cases	0.383	0.350
D Only	0.383	0.286
+D+Lr	0.733	0.636
+D+0.750Lr	0.646	0.549
+0.60D	0.230	0.172
Lr Only	0.350	0.350

COM-2310004

ZFA STRUCTURAL ENGINEERS

ZFA Job #22689
Joist and Glulam Key Plan

Engineer: MAAP
Date: 03/09/2023

North Sacramento Library

Joist Size	Model No.	Ga.	Dimensions (in.)			Min./ Max.	Fasteners (in.)		DF/SP Allowable Loads (lb.)				Installed Cost Index (ICI)
			W	H	B		Header	Joist	Uplift (160)	Floor (100)	Snow (115)	Roof (125)	
4x10	LUS48	18	3⁹⁄₁₆	6¾	2	—	(6) 0.162 x 3½	(4) 0.162 x 3½	1,060	1,315	1,490	1,610	Lowest
	LUS410	18	3⁹⁄₁₆	8¾	2	—	(8) 0.162 x 3½	(6) 0.162 x 3½	1,445	1,830	2,075	2,245	19%
	U410	16	3⁹⁄₁₆	8⅜	2	—	(14) 0.162 x 3½	(6) 0.148 x 3	990	2,015	2,280	2,465	74%
	HUS410	14	3⁹⁄₁₆	8¹⁵⁄₁₆	2	—	(8) 0.162 x 3½	(8) 0.162 x 3½	3,220	2,110	2,385	2,575	154%
	HU410 / HUC410	14	3⁹⁄₁₆	8⅜	2½	Min.	(14) 0.162 x 3½	(6) 0.148 x 3	1,135	2,085	2,350	2,520	232%
		14	3⁹⁄₁₆	8⅜	2½	Max.	(18) 0.162 x 3½	(10) 0.148 x 3	1,795	2,680	3,020	3,250	253%
	HUCQ410-SDS	14	3⁹⁄₁₆	9	3	—	(12) ¼ x 2½ SDS	(6) ¼ x 2½ SDS	2,265	4,500	4,500	4,500	*

Demand = 733 lbs
HU410 Capacity = 2,520 lbs > 733 lbs OK

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.08.01 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Purlin 1

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,000.0 psi
Fb -	1,000.0 psi
Fc - Prll	1,500.0 psi
Fc - Perp	625.0 psi
Fv	180.0 psi
Ft	675.0 psi

E : Modulus of Elasticity

Ebend- xx	1,700.0 ksi
Eminbend - xx	620.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.0110, Lr = 0.020 ksf, Tributary Width = 2.0 ft
Load for Span Number 1
Uniform Load : D = 0.04050 k/ft, Extent = 1.250 -->> 5.750 ft, Tributary Width = 1.0 ft, (Mech Load)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.096 : 1	Maximum Shear Stress Ratio	=	0.057 : 1
Section used for this span		4x10	Section used for this span		4x10
fb: Actual	=	143.73 psi	fv: Actual	=	12.73 psi
F'b	=	1,500.00 psi	F'v	=	225.00 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	3.400 ft	Location of maximum on span	=	5.986 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.005 in	Ratio =	16914 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.012 in	Ratio =	6496 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 6.725 ft	1	0.082	0.049	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.37	89.0	1,080.0	0.17	7.9	162.0
Length = 0.02464 ft	1	0.001	0.049	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.00	1.1	1,080.0	0.17	7.9	162.0
+D+Lr					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.725 ft	1	0.096	0.057	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.60	143.7	1,500.0	0.27	12.7	225.0
Length = 0.02464 ft	1	0.001	0.057	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.01	1.9	1,500.0	0.27	12.7	225.0
+D+0.750Lr					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.725 ft	1	0.087	0.051	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.54	130.0	1,500.0	0.25	11.5	225.0

COM-2310004

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.08.01 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Purlin 1

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 0.02464 ft	1	0.001	0.051	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.01	1.7	1,500.0	0.25	11.5	225.0
+0.60D					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.725 ft	1	0.028	0.016	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.22	53.4	1,920.0	0.10	4.7	288.0
Length = 0.02464 ft	1	0.000	0.016	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.00	0.7	1,920.0	0.10	4.7	288.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.0125	3.400		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.321	0.327
Max Upward from Load Combinations	0.321	0.327
Max Upward from Load Cases	0.186	0.192
D Only	0.186	0.192
+D+Lr	0.321	0.327
+D+0.750Lr	0.287	0.294
+0.60D	0.111	0.115
Lr Only	0.135	0.135

COM-2310004

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.08.01 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Purlin 2

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,000.0 psi
Fb -	1,000.0 psi
Fc - Prll	1,500.0 psi
Fc - Perp	625.0 psi
Fv	180.0 psi
Ft	675.0 psi

E : Modulus of Elasticity

Ebend- xx	1,700.0 ksi
Eminbend - xx	620.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Point Load : D = 0.1920, Lr = 0.1350 k @ 2.0 ft, (Reaction from Purlin 1)
Point Load : D = 0.03850, Lr = 0.070 k @ 2.0 ft, (Infill Reaction)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.089 : 1	Maximum Shear Stress Ratio	=	0.052 : 1
Section used for this span		2-2x10	Section used for this span		2-2x10
fb: Actual	=	122.16 psi	fv: Actual	=	11.77 psi
F'b	=	1,375.00 psi	F'v	=	225.00 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	2.000 ft	Location of maximum on span	=	2.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.001 in	Ratio =	33997 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.003 in	Ratio =	16003 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 4.0 ft	1	0.065	0.038	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	0.23	64.7	990.0	0.12	6.2	162.0
+D+Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 4.0 ft	1	0.089	0.052	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	0.44	122.2	1,375.0	0.22	11.8	225.0
+D+0.750Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 4.0 ft	1	0.078	0.046	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	0.38	107.8	1,375.0	0.19	10.4	225.0
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 4.0 ft	1	0.022	0.013	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	0.14	38.8	1,760.0	0.07	3.7	288.0

ZFA STRUCTURAL ENGINEERS

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.08.01 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Purlin 2

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.0030	2.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.218	0.218
Max Upward from Load Combinations	0.218	0.218
Max Upward from Load Cases	0.115	0.115
D Only	0.115	0.115
+D+Lr	0.218	0.218
+D+0.750Lr	0.192	0.192
+0.60D	0.069	0.069
Lr Only	0.103	0.103

COM-2310004

ZFA STRUCTURAL ENGINEERS

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.08.01 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: (E) 2-2x10 Near (E) Skylight

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-16

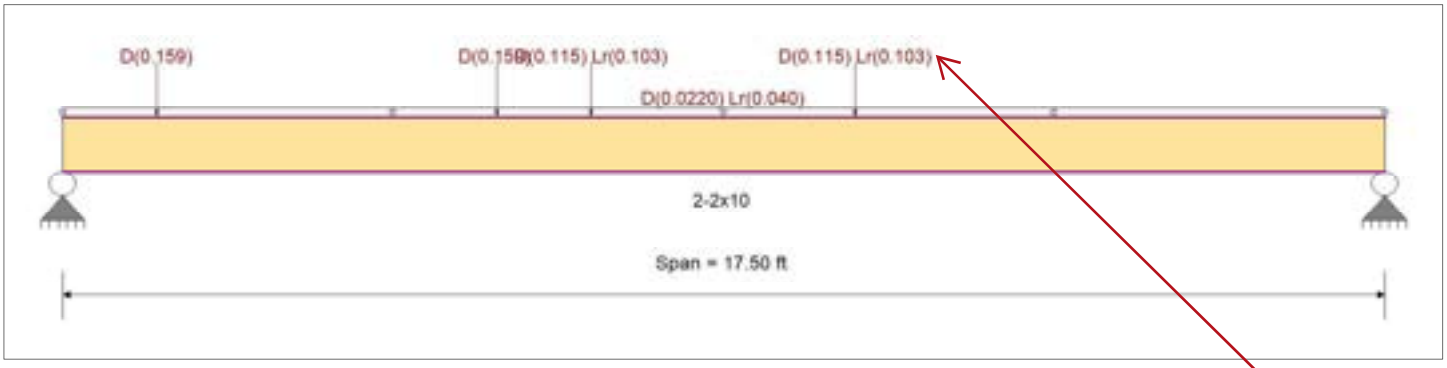
Wood Species : Douglas Fir-Larch
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,000.0 psi
Fb -	1,000.0 psi
Fc - Prll	1,500.0 psi
Fc - Perp	625.0 psi
Fv	180.0 psi
Ft	675.0 psi

E : Modulus of Elasticity

Ebend- xx	1,700.0 ksi
Eminbend - xx	620.0 ksi
Density	31.210 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.0110, Lr = 0.020 ksf, Tributary Width = 2.0 ft
Point Load : D = 0.1590 k @ 1.250 ft, (Mech Load)
Point Load : D = 0.1150, Lr = 0.1030 k @ 7.0 ft, (Purlin 2 Reaction)
Point Load : D = 0.1150, Lr = 0.1030 k @ 10.50 ft, (Purlin 2 Reaction)
Point Load : D = 0.1590 k @ 5.750 ft, (Mech Load)

Conservative, since live load is included under mechanical unit and same loading is used on purlin on other side of (E) skylight infill.

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.962 : 1	Maximum Shear Stress Ratio	=	0.244 : 1
Section used for this span		2-2x10	Section used for this span		2-2x10
fb: Actual	=	1,322.79 psi	fv: Actual	=	54.89 psi
F'b	=	1,375.00 psi	F'v	=	225.00 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	7.792 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.365 in	Ratio =	576 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.764 in	Ratio =	274 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.709	0.198	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.50	701.8	990.0	0.59	32.1	162.0
+D+Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.962	0.244	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	4.72	1,322.8	1,375.0	1.02	54.9	225.0
+D+0.750Lr					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.848	0.219	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	4.16	1,166.3	1,375.0	0.91	49.2	225.0

COM-2310004

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 22689 north sacramento library.pdf.ec6

LIC# : KW-06015331, Build:20.23.08.01 ZFA STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: (E) 2-2x10 Near (E) Skylight

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.239	0.067	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.50	421.1	1,760.0	0.36	19.2	288.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.7638	8.686		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.068	0.877
Max Upward from Load Combinations	1.068	0.877
Max Upward from Load Cases	0.615	0.453
D Only	0.615	0.424
+D+Lr	1.068	0.877
+D+0.750Lr	0.954	0.763
+0.60D	0.369	0.254
Lr Only	0.453	0.453

L70 Capacity + U hanger capacity = 595 + 990 LB = 1585 LB

COM-2310004

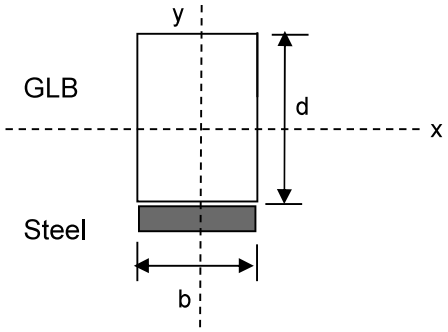
ZFA STRUCTURAL ENGINEERS

Job #22689 Engineer: MAAP North Sacramento Library - ASCE 7

Glulam Retrofit - BM 1.1 STL 09/06/2023

A retrofit for inadequate glulam girder is to attach a steel plate to the bottom of the girder.

Try a 1/4" plate.



Existing Glulam Properties:

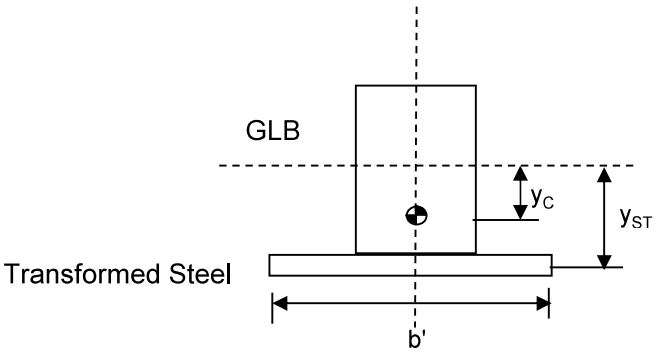
b=	5.125	in	A =	108 in^2
d =	21	in	I =	3955.219 in^4
L_{total} =	38	ft	E =	1.8E+06 psi
Spacing =	18.5	ft oc		

STL Plate Properties:

b_{STL}=	5.5	in
d_{STL} =	0.25	in
A =	1.38	in^2
I =	0.007161458	in^4
E =	2.9E+07	psi

Transformed Steel Properties:

n =	16.1	
b' =	88.6	in.
A' =	22.2	$in.^2$
I' =	2501	$in.^4$
y_{st} =	10.6	in.
y_c =	1.81	in.



Transformed Section Properties:

I_{GLB} =	4309	$in.^4$
I_{ST} =	1720	$in.^4$
I_{TR} =	6029	$in.^4$

COM-2310004

ZFA STRUCTURAL ENGINEERS

Job #22689 | Engineer: MAAP | North Sacramento Library - ASCE 7

Glulam Retrofit - BM 1.1 STL | 09/06/2023

Maximum Stresses:

Max Moment =	87.3	k-ft (per Risa)
σ_{GLB} =	2141	psi
σ_{STL} =	25028	psi

Allowable Stresses:

$F_{b,\ GLB}$ =	2400	psi
C_V =	0.891	
C_D =	1.25	
$F'_{b,\ GLB}$ =	2673.382	psi
F_{STL} =	360000	psi

DCR_{GLB} =	**0.80**	**< 1.0, OK**
DCR_{ST} =	**0.07**	**< 1.0, OK**

Connection Design:

q = VQ/I

V =	9625	lb.
Q =	$A_{st}*y_{st}$	
A_{st} =	22.15	$in.^2$
y_{st} =	10.63	in.
Q =	235.4	$in.^3$
I =	6029	$in.^4$
q =	375.7	lb./in.

Screw Spacing =	2.5	in oc
Load =	939	lb.
Cd =	1.25	
n =	2	number of screws
va =	420	lb/screw SDS per ESR-2236
Capacity=	1050	lb.
DCR =	**0.89**	**< 1.0, OK**

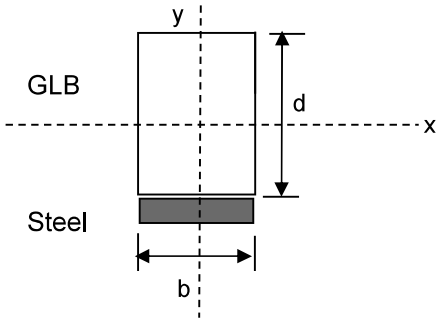
COM-2310004

ZFA STRUCTURAL ENGINEERS

Job #22689 Engineer: MAAP North Sacramento Library - ASCE 7

Glulam Retrofit - BM 1.1 STL DEFL 09/06/2023

A retrofit for inadequate glulam girder is to attach a steel plate to the bottom of the girder.



Existing Glulam Properties:

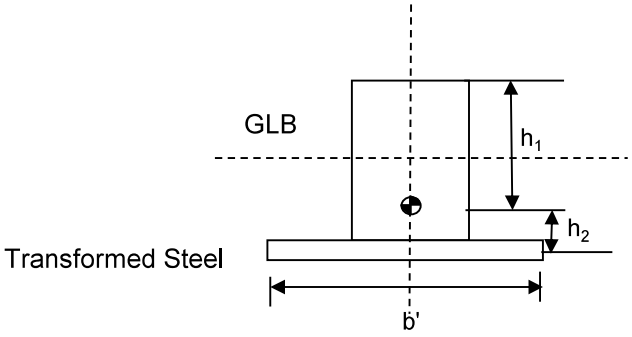
b=	5.125	in	A =	108	in^2
d =	21	in	I =	3955.219	in^4
L_{total} =	38	ft	E =	1.8E+06	psi
Spacing =	18.5	ft oc			

STL Plate Properties:

b_{STL}=	5.5	in
d_{STL} =	0.25	in
A =	1.38	in^2
I =	0.007161458	in^4
E =	2.9E+07	psi

Transformed Steel Properties:

n =	16.1	
b' =	88.6	in.
A' =	22.2	$in.^2$



Transformed Section Properties:

h_1 =	12.3	in
h_2 =	8.9	in
I_{GLB} =	4309	$in.^4$
I_{ST} =	1720	$in.^4$
I_{TR} =	6029	$in.^4$

ZFA STRUCTURAL ENGINEERS

Job #22689 Engineer: MAAP North Sacramento Library - ASCE 7

Glulam Retrofit - BM 1.1 STL DEFL 09/06/2023

Total Deflection:

w_{DL} =	12.7	psf
w_{LL} =	12	psf
w_{Trib} =	222	in
L =	456	in
I =	6029	in^4
E =	1.80E+06	psi
Δ_{TR} =	1.98	in
Deflection =	L/231	

P =	271	lbs
a =	36	in
b =	420	in
L =	456	in
x =	36	in
Δ_{TR} =	0.01	in
Deflection =	L/39359	

P =	542	lbs
a =	93	in
b =	363	in
L =	456	in
I =	6029	in^4
E =	1.80E+06	psi
x =	93	in
Δ_{TR} =	0.06	in
Deflection =	L/7998	

P =	271	lbs
a =	141	in
b =	315	in
L =	456	in
I =	6029	in^4
E =	1.80E+06	psi
x =	141	in
Δ_{TR} =	0.04	in
Deflection =	L/11422	

Total Deflection = L/55558 > 180, OK

ADDENDUM #1
North-Sacramento Hagginwood Library
08.07.2025

Questions Received via Email:

1. Q: In the Specs, it referenced a Sample PCO Form. What are the maximum markup percentages allowable for the Subs and Contractors?
    A. **Any self-performed Change Order work is allowed a 15% max. markup. Any direct prime markup over a subcontractor is 5% maximum. The total markup shall not exceed 25% (i.e. 15% for sub + 5% for prime sub + 5% for GC = 25%). Any added scope is subject to review by Construction Manager and City PM prior to execution and payment and will be reviewed on a case-by-case basis. Review the Division 1 Specifications for more information on this topic.**

2. Q: What will be the selection process for this bid?
    A. **Each of the five pre-qualified Contractors are invited to provide bids electronically. The base-bid cost will be the determining factor in the selection process. Please review the bid-form carefully and the determination of the low bidder is outlined.**

3. Q: Are contractors allowed to use the existing restrooms on-site?
    A. **Include in bid to supply port-o-lets as needed throughout construction for all workers on-site.**

4. Q: Do we need to provide temporary fencing?
    A. **Yes. Any temporary fencing required will need to be provided by the selected GC. City will be providing temporary fencing to secure the site after Library vacates and prior to construction beginning. Coordination will be needed to remove the City fence and install a temporary fence by the selected GC. All site security will be the responsibility of the selected GC from NTP through Final Completion and key handover. Refer to the Division 1 Specs, a security camera system will be required throughout construction.**

5. Q: Finish schedule A10.10 shows 02 Hallway to receive LVT. Finish plan on same page shows hatching for EXT in that hallway. Please clarify.
    A. **The Finish Plan is correct. LVT-1 in the Hallway between the Community Room and Public Restrooms. All other Hallways on the plan are EXT- existing concrete, treated. PBK is reviewing and may issue a clarifying exhibit with a future addendum.**

6. Q: Finish schedule A10.10 shows 12 Adult Area to receive LVT. Finish plan on same page shows hatching for CPT-1 in that area. Please clarify.
    A. **The Finish Plan is correct. CPT-1- Carpet Tile in the Adult Area is correct.**

7. Q: Finish schedule A10.10 shows 18 Staff Circulation Counter to receive CPT. Finish plan on same page shows hatching for LVT. Please clarify.
    A. **The Finish Plan is correct. Staff Circulation is to have LVT-1.**

8. Q: Specification 27 51 23.80 Local Sound Reinforcing Systems, Section 1.4 states, "Contractor shall employ the services of a professional structural engineer licensed to practice in the State of Texas to verify the loas ratings of hanging components. Provide attachment details on Shop/Submittal drawings reviewed by said engineer." Assuming these are intended to say State of California, does this apply to the projector, wall vault or speakers or any other AV component of this project?
    A. **Bid to provide Shop Drawings that are stamped by a Structural Engineer licensed in the State of California. This applies to mounting connection details for Projectors, speakers, and any other AV component associated with the project that are structurally mounted. PBK is reviewing this question and may issue some further clarification in a future addendum.**

9. Q: Specification 27 51 23.80 Local Sound Reinforcing Systems, Section 1.4 states, "Contractor shall employ the services of a professional structural engineer licensed to practice in the State of Texas to verify the loas ratings of hanging components. Provide attachment details on Shop/Submittal.
    A. **Same as answer above. Provide Shop Drawings signed by a Licensed Structural Engineer.**

10. Q: Drawing T0.01 technology legend (WF) Wi-Fi cabling states (1) category 6A cable to each device, however drawing T2.02 keynote 10 states to provide (2) category 6A cables to each device, which is correct?
    A. **Two CAT. 6A cables to each WiFi (WF) device.**

11. Q: Spec Section 271000 states cabling shall be category 6A, however on drawing T2.02 keynote 14 references category 6 cable, please confirm all cabling is category 6 or 6A.
    A. **Category 6A is correct.**

12. Q: Spec section 271000-2.2-A-3-a is a wall cabinet that states 48in cube it 11996-X48, however on drawing T2.02 keynote 9 it depicts same cabinet but 24in 11996-724, which is correct?
    A. **Drawing T2.02- Keynote 9 is correct. Cabinet is 24" 11996-724.**

13. Q: RFQ stage, Addendum #3, question 8 answer states the IT room is to remain with all existing racks along with the service fiber, however, on drawing T2.02 key note 9 states to provide a cube-it wall cabinet and the specs states additional accessories per the specification, please confirm if this cabinet and fiber is existing or is required.
    A. **All existing server racks are to remain on-site. Bid to provide the new 24" server cabinet for security as indicated on the drawings. Field-locate the cabinet inside the**

Room Comp Storage 37. PBK is reviewing this question, so additional details may be issued with a forthcoming Addendum.

14. Q: If fiber is required, please provide type of fiber SM or MM and strand count.
    A. **Existing fiber feed is to remain. Locate the new cabinet close to fiber and tie-in to existing fiber following security panel manufacturer's instructions.**

15. Q: Drawing T2.02 depicts camera locations on the floor plan, (new) assume 1 cat 6A cable to each, cameras that show existing (E) do these require a category 6A cable? Some cameras do not have a new or (E) next to them, will these cameras require a category 6A cable?
    A. **Provide (2) CAT6A cables to each new and existing building camera feed location. All existing cabling should be removed and new cabling installed, reuse conduit runs wherever feasible.**

16. Q: Drawing T2.02 in regard to the site cameras, we assume the site cameras only require a category 6A cable if it's within the 328 ft. threshold?
    A. **Bid to provide (2) CAT6A cables to each site camera. Any extra feeds can be coiled up at the closest J-box and left for future.**

17. Q: Detail 8/S1.01 includes a concrete curb detail. Please provide direction as to where these curbs are to be installed, if any.
    A. **Detail 8/S1.01 is a standard detail and does not appear to be referenced on the plans. All interior walls are non-bearing and this concrete curb detail does not apply to this project.**

18. Q: Specification section 12 24 13-2.2-A, indicates there are Shade Types 1 & 2. When referencing the drawings, it is unclear as to where the two types are to be installed. Please confirm the locations of the Type 1 and Type 2 shades.
    A. **There is only one type of manual rolling shades on the project, refer to Detail 12/A11.06. Follow specs for Type 1 for bidding purposes for exterior, manually-operated roller shades in exterior windows. Manual rolling shades are required at each exterior window/storefront. Type 2 does not apply to this project.**

19. Q: What does the existing roofing that is going to be torn off consist of?
    A. **The existing roof is TPO installed around 2010 and is beyond it's usable life. There are termination bars along each of the parapets that also need to be removed. Follow Roof Plans which indicate replacement of 50% of sheathing at the roof deck and roof structural improvements throughout.**

20. Q: When referencing detail 11/A10.02 of the Roof Plans, a Wood Nailer is shown underneath the TPA Membrane. Is this wood nailer to be installed New (N)? Please confirm.
    A. **New wood nailers above the exterior walls at the gutter locations. This new wood nailer needs to be field-coordinated to account for the thickness of insulation. Note**

that Tremco requires all roofing subcontractors to be Tremco certified, include roofing subs that are certified with Tremco or will have their certification completed prior to start of construction.

21. Q: Fabrication of Signage. We would like to bid as a manufacturer substitution and fabricate these signs in-house. We can conform to all CBC, CCR and ADA standards. Additionally, we would like to request alternative materials and fabrication methods from MP Plastic Plate and Mohawk Sign Systems Series 200A, Format D Sand Carved Process to Applied Tactile & Clear Braille on Back Painted or Pigmented Acrylic Panels. This will lower the cost and provide shorter turnaround times as we can fabricate in-house rather than outsource.
    A. **Bid all signs per plan. Once the bids are received and contract negotiations are underway, we may take this into account if there are cost-saving measures to discuss.**

22. Q: Deductive Alternate #1 – Interior Tree Feature – Wood to Light Gauge Metal Substitution. The rough framing for the interior tree feature is standard 2x wood. Please confirm if it would be acceptable to substitute the rough framing for light gauge metal instead. All visible finish carpentry would remain the same.
    A. **Bid wood framing per plan. Once the bids are received and contract negotiations are underway, we may consider changing to light-gauge metal framing if the selected team sees this as a cost-savings.**

23. Q: Hazmat Report – Would you be able to send me any Hamat reports you have for the site please. I think you mentioned they did a large abatement exercise on the property recently.
    A. **See question below from in-person questions for an answer on this topic.**

24. Q: HVAC Storage – It mentions that the existing roof top units are to be removed, stored and reinstalled once the new roof was completed. Does the City have storage space available for these units on any City premises? This could be very helpful in keeping costs down.
    A. **Most of the rooftop units are to be removed and replaced with Electrical HVAC units (All natural gas package units are being removed). For any HVAC units that need to be removed and reinstalled, Contractor shall make arrangements for secure on-site either in a locked Connex or another secure storage procedure.**

25. Q: On the PlanetBids site, under the "Attachments" tab, there is only a section to upload the Bid Bond paperwork. Will another section(s) be provided to attach the Phase 2 - Bid Proposal Forms to?
    A. **We have added another tab to upload the Forms to PlanetBids. This should be for the bid proposal and all other supporting documentation such as the Local Business Enterprise (LBE), Minimum Qualification Questionnaire, etc.**

26. Q: At the job walk it was noted that the building did not contain any hazardous lead or asbestos. Is a hazardous report available for review, and should we assume the owner will cover the costs of any testing that may be required to start construction?

A. **See question below from in-person questions for an answer on this topic.**

27. Q: Specification 095100 2.3 A. calls for Fine Fissured with linear plank pattern (secondlook). Item 4 calls for LR .85 while specified tile only has .82. Item 5 calls for NRC .65 while specified tile only has .55. Please confirm we are to provide Fine Fissured secondlook even though it doesn't meet performance requirements. Finish schedule also calls for Fine Fissured.
    A. **Spec 095100 Section 2.3.A is ACT-1- Acoustical Ceiling Tiles. A detailed response from PBK is pending and will be issued with an upcoming Addendum.**

28. Q: On A10.10, the finish schedule calls for wall panels to be tackboard. Specification 098413 Part 2 calls for Armstrong SoundSoak standard acoustical wall panel which is not tackable. Please confirm which is correct.
    A. **The tackboards are not acoustical wall panels and need to be tackable. Refer to the plans, tackboards are to meet the dimensions indicated on plans and include tackable surface and mounting hardware. Include shop drawings to confirm final materials and mounting techniques in each bid. A detailed response is forthcoming from PBK and additional details will be issued with an upcoming Addendum.**

29. Q: Detail 24/A11.06 shows details for ceiling clouds but this detail is for a specific Ecophon product. Specified product is by CSI so this method is not an option. Please provide required mounting method from CSI's options.
    A. **A detailed response from PBK is forthcoming and will be issued with an upcoming Addendum.**

30. Q: On page A10.01 - Door & Window Schedules, 1GL says to have gray tint insulating glass can you please confirm if interior glass is to be gray tinted.
    A. **A detailed response from PBK is forthcoming and will be issued with an upcoming Addendum.**

31. Q: Sheet G0.00 notes the exterior Awnings as a Deferred Approval Item for Structural design, calculations and drawings. However, the AOR provides the awning design requirements and the SEOR drawings contains detail 6/S4.01 which provides the anchorage details for the awnings. Please confirm if the Awnings are required to be a deferred approval, which may deviate from the existing anchorage detail.
    A. **Yes, the awnings are required as a deferred approval item. Contractor to hire a Structural Engineer (SE) and provide shop drawings for final product selected and for review prior to fabrication. Use design and mounting details as bid information, and include cost to hire SE for shop drawings. Include in your bid costs for separate permit for awnings. PBK is reviewing this question and additional details may be included in a future Addendum.**

32. Q: Specification 122413 have Type 1 (1000 Series) & Type 2 (0890 Series) shades but the plans do not have the types shown anywhere. The RCP's & Int elevations show locations but not fabric

types. These are very different fabric types and the specs states "as indicated on the drawings". However, the drawings do not indicate which material type is to be used. Please clarify which material type is to be used for each window.

A. See question above for an answer on this topic regarding manual rolling shades.

33. Q: There are two sets of mechanical plans. One is in the "remodel" set and the other is in the "roof" set. The mechanical equipment schedule is different on each set, and the drawing dates are very different. The "roof" mechanical set is dated 8/10/23 while the "remodel" mechanical set is dated 5/23/25. Also, the "roof" set shows the heat pumps as add alternate #1 on sheet M0.01, but that doesn't match up with your description of the alternates in the Bidders description. We're assuming the "remodel" set dated 5/23/25 is to be used for bidding - Please confirm.
    A. A detailed response from PBK is forthcoming and will be issued with an upcoming Addendum. See question below from site walk on outline of Mechanical scope.

Questions Received In-Person (at Mandatory Site Walk on 8/5/25):

34. Q: What is the timeline for construction?
    A. City anticipates starting construction in early Fall 2025, with completion by the end of the Calendar Year 2026. This project is funded with State Grant funding so key deadlines will need to be met and those will be discussed with the selected team.

35. Q: What is the Mechanical Scope?
    A. On the roof permit package, remove all existing gas pack units and replace with electrical HVAC units. On the remodel package- Additional Electrical Package and Split systems are to be installed. For interior improvements, some of the ductwork is existing to remain and some is new. Bid to clean all existing ducts and registers to remain and include Test and Balance report along with commissioning of all units. There is also a BMS system so that should be included along with testing and startup.

36. Q: Storefront glazing- replace glazing and mullions or just glazing?
    A. For the additive alternative, please bid to replace glazing only. Remove interior mullion facing, install new dual-pane glass and reinstall existing mullions. Adjustments to the mullions and new spacers or pieces may be required, but the existing mullions are to remain and be modified to receive the new glazing.

37. Q: On the Finish Plan it calls for EXT- Existing Concrete to be finished, what is that product and process?
    A. Grind concrete down to stable finish and remove top colorant coating to reveal a flat floor finish. Fill in any cracks or divots with a concrete epoxy filler and set flush. Clean bare concrete to prepare for sealer and sweep floor clean. Apply three (3) coats of Concrete Sealer Matte finish and let dry. After dried for minimum 24 hours, install floor protection over the top of the concrete areas to avoid scuffing or damage to finish during construction. Note: Substitutions for sealer will only be considered after

the bid process is completed. A Specification section and additional details including a specified product will be issued with an upcoming Adddendum.

38. Q: What are the expected working hours?
    A. **Standard Monday through Friday hours, typical hours we see are 6AM-4PM. Noise ordinance allows noisey work (i.e. tools, loud trucks, etc) to operate from 7AM- 10PM. For any early work (i.e. 5AM concrete pour), a minimum 48-hours notice will be required to alert surrounding residences and businesses of the upcoming work. Since there are apartments and housing directly behind and surrounding the site, advanced notice of early work will be required.**

39. Q: Do you have a bid form along with this bid that we should be filling out or is this just lump sum?
    A. **There is a bid form, please review the documents on PlanetBids. Please look it over and let us know if there are any discrepancies in the information provided so we can update the bid form accordingly. Please note that base bid final cost will be the determining factor in the bid award. We still need the line-items filled, Add Alt and Deduct Alt pricing to determine final scope, but the base bid lump sum amount will determine the low-bidder.**

40. Q: Is a survey required to be provided by the GC?
    A. **Setting grades to meet all slopes and maximum slopes at exterior improvements is the responsibility of the selected Contractor, and ensuring bottom slope break is achieved to meet code. Selected Contractor will need hire a surveyor to set a basepoint and staking to meet the Civil design grade requirements.**

41. Q: Are you able to provide unlocked plans, my subs are having a hard time doing take-offs?
    A. **Yes, unlocked PDF plan sets will be issued along with this addendum.**

42. Q: Where do we need to cut openings on the west side of the building? What about the south side?
    A. **Refer to the Structural drawings in the plans, there is a double door opening that will need to be cut into the existing CMU wall. Note that the existing mural needs to be protected throughout construction including murals on the west and south elevations. On the south side facing the alley, follow the Structural drawings for a steel frame that gets inserted into the existing cut openings.**

43. Q: There are existing Fire Extinguishers, what is the scope?
    A. **Follow the plans, which call for new semi-recessed fire extinguisher cabinets and fire extinguishers. Any re-used or re-installed fire extinguishers need to have an annual inspection and be tagged current to pass any Fire Final Inspection.**

44. Q: Is there a Hazardous Materials report and if so what are the results?

A. **Yes, all testing performed in 2022 generated "none detected" for asbestos and lead-based paint. We will provide a copy of this report as part of this Addendum. Please include in your bid an Allowance under the General Conditions line-item that covers $30,000 for hazardous materials abatement demolition. This will be reviewed on a case-by-case basis and all testing of suspect materials will be by others and conducted by City of Sacramento. No use of the allowance will be utilized without authorization from City PM and/or CM.**

45. Q: Plans call for existing T-bar to remain and be painted what is the scope on the ceiling tile?
    A. **Existing t-bar is to remain wherever called out on the plans. Paint existing t-bar track system and repair any damage or modified track during construction. Replace all T-Bar ceiling tiles in-kind with new after all utility runs are completed.**

46. Q: What is the scope for sheetrock on the restroom ceilings?
    A. **Bid to remove existing gypsum board ceiling at Men's and Women's restrooms and single-occupancy restrooms down to ceiling joists. Install new gypsum board, paint over gypsum board and follow finishes on the Finish Plan. For additional details on scope, refer to the plans.**

NOTE: Please provide a completed bid form prior to the posted deadline on PlanetBids. Additional technical details are pending review with PBK and will be issued with a forthcoming Addendum.

ENTEK
CONSULTING GROUP, INC.
4200 Rocklin Road, Suite 7, Rocklin, CA 95677 Phone (916) 632-6800 Fax (916) 632-6812 www.entekgroup.com

HAZARDOUS MATERIALS SURVEY
FINAL REPORT

OWNER/CLIENT

City of Sacramento
Department of Public Works Facilities &
Real Property Management
5730 24th Street, Building 4
Sacramento, CA 95822

CONTACT

Mr. Jim Roehl
Environmental Program Manager,
Brownsfields & HazMat

SURVEY ADDRESS

1124 Del Paso Road
Sacramento, California 95815

BUILDING SURVEYED

Sacramento News & Review Building
Phase 1 – Roof Replacement Project

PREPARED BY

Karl Suarez
CSST # 21-6935 and CDPH IA #11068
Entek Consulting Group, Inc.
4200 Rocklin Road, Suite 7
Rocklin, CA 95677

Entek Project #23-6713

June 9, 2023

ENTEK

TABLE OF CONTENTS

Executive Summary 3

Introduction 4

Building Description 4

Asbestos Inspection and Sample Collection Protocols 4

Asbestos Bulk Sample Results 5

Asbestos Regulatory Requirements 6

Lead Inspection, Sampling, & Results 7

Lead Regulatory Compliance 7

Limitations 7

Appendices

A. Asbestos Related Documents
B. Lead Related Documents
C. Backup Documents

Executive Summary

Entek Consulting Group, Inc. (Entek) is pleased to provide Mr. Jim Roehl, Environmental Program Manager for the City of Sacramento with this limited asbestos and lead survey report regarding the upcoming Roofing Replacement Project at the Sacramento News & Review Building located on 1124 Del Paso Boulevard in Sacramento, California.

The purpose of the inspection was to comply with the US EPA NESHAP requirements and the Sacramento Metropolitan Air Quality Management District (SMAQMD), which has jurisdiction for this project site to determine if asbestos containing materials are present which may be impacted during the upcoming Roofing Renovation Project. Anticipated work will be broken into two phases. Phase 1 will include renovation of the roof. Phase 2 will include renovation of the interior building components. For purposes of this report, this limited asbestos and lead survey is only for the Phase 1 Roofing Renovation Project.

It is our understanding that the Sacramento News and Review Building was constructed in the 1940s, with major renovations to the interior and exterior of the building occurring in approximately 2016.

The United States Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants (US EPA NESHAP), 40 CFR Part 61 - Nov. 20, 1990, requires an owner or operator of a demolition or renovation project to thoroughly inspect the affected facility or part of the facility where the demolition or renovation operation will occur for the presence of asbestos-containing materials (ACM) prior to the commencement of that project.

The attached drawing shows approximate sample locations and also identify those bulk sample materials analyzed and found to contain asbestos greater than 1% with a (+) after the sample number. Materials analyzed and found to contain less than 1% asbestos or reported as none detected have a (-) after each sample number. However, in some cases when several samples of one homogenous material are collected, sometimes not all samples are analyzed by the laboratory. In this instance, if one sample for a homogeneous material is reported as containing asbestos greater than 1%, then the remaining samples in the series that are not analyzed are assumed to contain asbestos greater than 1%. For the purposes of this report, all samples that were not analyzed in a series are assumed to contain asbestos greater than 1% and are identified on the attached drawing with a (+) after the sample number.

Contractors and other individuals who view the sample locations and associated results indicated with either a (-) or a (+) on the drawing(s) to make determinations take the risk of misidentifying a material and may arrive at determinations which are in direct conflict with the written findings of this report. This use of the drawing and the information provided on it relating to individual sample results in determining if a material does or does not contain asbestos is not recommended.

The report must be read in its entirety prior to making any interpretations or conclusions pertaining to the information. Any conclusions made by the reader about the information provided in the body of this report which are contradictory or not included in this report are the responsibility of the reader.

Asbestos

On May 23, 2023, Entek conducted a limited asbestos and lead survey specific to the roof areas designated by Jim Roehl, Environmental Program Manager for the City of Sacramento.

None of the materials collected were determined to contain asbestos. Specifics pertaining to individual materials are found in later parts of this report.

Lead

Entek investigated the existing paints that may be impacted by the renovation project to determine if lead was present. All paints collected from the exterior components that are expected to be impacted by the Roofing Renovation Project were determined to be below the laboratory's detectable limit of 100 parts per million (ppm).

Introduction

This report presents results of a limited asbestos and lead survey performed by Entek which included the roofing materials of the Sacramento News & Review Building located at 1124 Del Paso Boulevard in Sacramento, California. These areas were designated by Jim Roehl, Environmental Program Manager for the City of Sacramento.

The inspection was conducted on May 23, 2023, by Mr. Karl Suarez who is a Cal/OSHA Certified Site Surveillance Technician (CSST) and a California Department of Public Health Lead Inspector Assessor (I/A).

This report was prepared for Mr. Jim Roehl, Environmental Program Manager for the City of Sacramento.

Building Description

The Sacramento News & Review Building is a multistory wood framed building with a concrete slab foundation. The survey area included the entire roofing system of the Sacramento News & Review Building. The roofing materials consisted of a single ply membrane roofing and roofing penetration mastics.

Asbestos Inspection and Sample Collection Protocols

Entek included all specific designated roofing materials that are expected to be impacted by the upcoming Roofing Renovation Project in this report.

Entek did not use any demolition methods to look within enclosed wall or ceiling cavities during this investigation. Entek did include all suspect materials observed in, on, or associated with the areas included in this report.

Bulk samples were collected of various materials suspected to contain asbestos by utilizing a power drill and coring tube, cutting the materials with a razor knife, or use of other appropriate hand tools.

Miscellaneous materials were collected from each homogenous area in a manner sufficient to determine whether the material is or is not ACM as required in 40 CFR Part 763, Asbestos-Containing Materials in Schools; Final Rule and Notice, published October 30, 1987.

Approximate locations of all samples collected during this inspection are indicated on the "Bulk Asbestos Material Analysis Request Form for Entek", which served as the chain of custody for the samples, and on the building diagram(s) attached to this report.

Asbestos Bulk Sample Results

There were several materials observed which are considered "suspect" under US EPA guidelines. Under current US EPA guidelines for conducting building inspections for ACM, all "suspect" materials must be assumed to contain asbestos until otherwise determined by laboratory testing.

The samples of materials suspected of containing asbestos were submitted to Asbestech, a laboratory located in Carmichael, California. These samples were subsequently analyzed utilizing USEPA Method 600 by polarized light microscopy (PLM) with dispersion staining. Asbestech is a NVLAP accredited program.

The US EPA NESHAP and SMAQMD use the terms Regulated Asbestos Containing Material (RACM), Category I, and Category II when identifying materials which contain asbestos in amounts greater than 1%. Cal/OSHA uses the term ACCM which indicates a manufactured construction material contains greater than 0.1% asbestos by weight by the PLM method. This definition can be found in Title 8, 1529.

A total of 14 bulk samples were collected of all the materials considered to be "suspect", which had not been previously sampled, and which were observed during this investigation. Some of those samples contained multiple layers which were individually analyzed to determine their asbestos content. Analysis of all samples collected was by PLM with dispersion staining. Results of the analysis are listed in the following table:

Suspect Materials Found NOT TO Contain Asbestos Sacramento News & Review Building, Roof				
Sample ID#'s	**Suspect Material**	**EPA AHERA "Suspect" ACBM**	**Asbestos Content**	**Location**
01A-H	Singly Ply Roofing Membrane with Vapor Barrier	Miscellaneous Material	None Detected	Throughout Roof
02A-B	Gray Pipe Penetration Mastic with Foil Backing	Miscellaneous Material	None Detected	Throughout Roof at Pipe Penetrations
03A-B	Gray Pipe Penetration Mastic	Miscellaneous Material	None Detected	Throughout Roof at Pipe Penetrations

Suspect Materials Found NOT TO Contain Asbestos Sacramento News & Review Building, Roof				
Sample ID#'s	**Suspect Material**	**EPA AHERA "Suspect" ACBM**	**Asbestos Content**	**Location**
04A	Black Singly Ply Roofing Membrane over White Single Ply Roofing Membrane	Miscellaneous Material	None Detected	Throughout Roof
05A	Black Roofing Patch	Miscellaneous Material	None Detected	Throughout Roof

All sample numbers noted in the table above start with ECG-23-6713-

Any building materials which are considered "suspect" for containing asbestos which have not been identified in this report must be assumed to contain asbestos in amounts >1% until properly investigated and/or tested.

Materials commonly excluded from being suspected of containing asbestos include, but are not limited to: unwrapped pink and yellow fiberglass insulating materials or products, foam insulation, wood, metal, plastic, or glass. All other types of building materials or coatings on the materials listed above are commonly listed as "suspect" and must be tested prior to impact by a Contractor. Work impacting these untested or newly discovered materials must cease until an investigation can be completed.

Asbestos Regulatory Requirements

US EPA

The property included in this survey report is located in Sacramento County. Sacramento Metropolitan Air Quality Management District (SMAQMD) has been given authority for enforcement of the NESHAP regulations by means of their own rules (Rule 902 Asbestos).

A demolition is the wrecking, taking out, or burning of any load supporting structural member. A renovation is everything else. 10-day written notification to the US EPA Region IX, CARB or local AQMD is required prior to the performance of any demolition project regardless of asbestos being present or not. This notification would also apply to any renovation project which involves the wrecking, taking out, or burning of any load bearing structural member during a renovation as well.

Since none of the materials sampled were determined to contain asbestos, a 10-day notification to the SMAQMD is not required to be submitted prior to starting work for asbestos reasons.

Cal/OSHA

Disturbance of any ACM or ACCM could generate airborne asbestos fibers and would be regulated by Cal/OSHA. Cal/OSHA worker health and safety regulations apply during any

disturbance of ACM or ACCM by a person while in the employ of another. This is true regardless of friability or quantity disturbed.

Since none of the materials anticipated to be impacted as part of this project were determined to contain asbestos, a licensed asbestos contractor, registered with Cal/OSHA is not required to perform the demolition/renovation work.

Lead Inspection, Sampling, & Results

Two (2) bulk samples of the painted surfaces expected to be impacted by the renovation project were collected and submitted to MicroTest Laboratories, Inc. These samples were subsequently analyzed by atomic absorption spectrometry (AAS). Results of the analysis are listed in the following table:

Paints/Coatings/Materials Determined NOT TO Contain Lead (<100 ppm)	
Paint/Coating Color or Material	**Building Component**
Gray Paint over White Paint	Concrete Masonry Block – Northeast Side of Roof
Red Paint over Gray Paint	Metal Roof Flashing – Around Perimeter of Roof

Paints determined “NOT TO” contain lead for the purposes of this report are those samples which when analyzed did not indicate lead to be present at or above the limit of detection for the analysis method used. This limit of detection was 100 parts per million (ppm). As a result, any paints shown “NOT TO” contain lead will not require any special training or work practices related to lead when impacted.

Lead Regulatory Compliance

Any upcoming project which may result in the disturbance of lead containing products or surfaces but is not intended to remediate a lead hazard or specifically designed to remove LBP to reduce or eliminate a known hazard, would be considered “lead related construction work”.

Since no detectable amount of lead was found, CAL OSHA regulations found in 8 CCR 1532.1 Lead in Construction will not apply to this project.

Limitations

Entek inspected only the specific designated areas identified by Jim Roehl, Environmental Program Manager for the City of Sacramento to be included in the Roofing Renovation Project, which did not include all areas of the building’s interior and exterior components. This survey consisted of the single ply roofing membrane, caulking, penetration mastics, paints on concrete masonry block wall, and metal flashing on the roof of the Sacramento News & Review Building. As a result, the information provided in this inspection report may not be used to extend the inspection results to areas not included in this report without additional review and sampling as necessary.

Entek did not perform any destructive sampling to look into ceiling and wall cavities. As a result, it may be possible for materials to be hidden in these areas which are not included

in this report. Entek also did not employ any destructive measures on floors of interior spaces or exterior areas covered with asphalt, concrete, or dirt.

If any new materials not listed as having been sampled, or listed as assumed for containing asbestos or lead in this report are discovered, the new material must be assumed to contain asbestos or lead until properly inspected and tested for asbestos content.

Entek's policy is to retain a full copy of these written documents for three (3) years once the file is closed. At the end of the 3-year period the written files will be destroyed without further notice. It is suggested copies of the file(s) are maintained as per your policy.

Entek will be providing only this electronic copy of the report and its attachments for your use. However, if you would like a hard copy of this report please do not hesitate to ask. Entek will be happy to mail the report upon receipt of your request.

Thank you for choosing Entek for your environmental needs. Please call me at (916) 632-6800 if you have any questions regarding this report.

Prepared by:



Karl Suarez
Assistant Project Manager
Cal/OSHA CSST #21-6935
CDPH I/A #11068

Reviewed by:



Blake Howes
Vice President
Cal/OSHA CAC #13-5015
CDPH I/A #3315

Appendices

A. Asbestos Related Documents
B. Lead Related Documents
C. Backup Documents

APPENDIX A

ASBESTOS RELATED DOCUMENTS

- Bulk Asbestos Analysis Report From Asbestech
- Bulk Asbestos Material Analysis Request Form for Entek
- Asbestos Bulk Sample Location Drawing
- SMAQMD Asbestos Survey Form
- SMAQMD Demolition/Renovation Form
  (To be completed by Owner)

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
23-6713 City of Sacramento
Sacramento News & Review Bldg., 1124 Del Paso Blvd.
Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70422-1
Date/Time Collected: 5/23/23
Date Received: 5/23/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 5/24/23

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-23-6713-01A	White single ply membrane roofing, NW of roof	NONE DETECTED	Rubber
	White vapor barrier	NONE DETECTED	Gypsum Fibrous Glass
01B	White single ply membrane roofing, SW of roof	NONE DETECTED	Rubber
	White vapor barrier	NONE DETECTED	Gypsum Fibrous Glass
01C	White single ply membrane roofing, west of roof	NONE DETECTED	Rubber
	White vapor barrier	NONE DETECTED	Gypsum Fibrous Glass
01D	White single ply membrane roofing, NW of parapet roof	NONE DETECTED	Rubber
	White vapor barrier	NONE DETECTED	Gypsum Fibrous Glass
01E	White single ply membrane roofing, NE of parapet roof	NONE DETECTED	Rubber
	White vapor barrier	NONE DETECTED	Gypsum Fibrous Glass

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A),THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES 

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
23-6713 City of Sacramento
Sacramento News & Review Bldg., 1124 Del Paso Blvd.
Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70422-2
Date/Time Collected: 5/23/23
Date Received: 5/23/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 5/24/23

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-23-6713-01F	White single ply membrane roofing, west center of roof	NONE DETECTED	Rubber
	White vapor barrier	NONE DETECTED	Gypsum Fibrous Glass
	Black roofing	NONE DETECTED	Tar Binder Fibrous Glass
01G	White single ply membrane roofing, center of roof	NONE DETECTED	Rubber
	White vapor barrier	NONE DETECTED	Gypsum Fibrous Glass
	Black roofing	NONE DETECTED	Tar Binder Fibrous Glass
01H	White single ply membrane roofing, east of roof	NONE DETECTED	Rubber
	White vapor barrier	NONE DETECTED	Gypsum Fibrous Glass
02A	Gray pipe penetration mastic, west of roof at pipe penetration	NONE DETECTED	Calcite
	Silver foil backing	NONE DETECTED	Opaques

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A),THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
23-6713 City of Sacramento
Sacramento News & Review Bldg., 1124 Del Paso Blvd.
Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70422-3
Date/Time Collected: 5/23/23
Date Received: 5/23/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 5/24/23

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-23-6713-			
02B	Gray pipe penetration mastic, east of roof at pipe penetration	NONE DETECTED	Calcite
	Silver foil backing	NONE DETECTED	Opaques
03A	Gray pipe penetration mastic, west of roof at pipe penetration	NONE DETECTED	Calcite Opaques
03B	Gray pipe penetration mastic, east of roof at pipe penetration	NONE DETECTED	Calcite Opaques
04A	Black single ply membrane roofing over white single ply membrane roofing, NW of roof	NONE DETECTED	Rubber
05A	Black roofing patch, west of roof	NONE DETECTED	Tar Binder Cellulose

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A),THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES

70422

ENTEK
BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.
4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: 5/23/23

Job Number: 23-6713

Client Name: City of Sacramento

Site Address: Sacramento News & Review Building
1124 Del Paso Blvd,
Sacramento, CA

Lab: Asbestech

Collected by: Karl Suarez

Turnaround Time: Thursday, 5/25/23, End of day

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instructions: *Stop analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.*

Please e-mail results at mainoffice@entekgroup.com and rmetzen@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6713-01A	Single Ply-Roofing Membrane, With Vapor Barrier, Northwest of Roof
ECG-23-6713-01B	Single Ply-Roofing Membrane, With Vapor Barrier, Southwest of Roof
ECG-23-6713-01C	Single Ply-Roofing Membrane, With Vapor Barrier, West of Roof
ECG-23-6713-01D	Single Ply-Roofing Membrane, With Vapor Barrier, Northwest of Parapet Roof
ECG-23-6713-01E	Single Ply-Roofing Membrane, With Vapor Barrier, Northeast of Parapet Roof
ECG-23-6713-01F	Single Ply-Roofing Membrane, With Vapor Barrier, West Center of Roof
ECG-23-6713-01G	Single Ply-Roofing Membrane, With Vapor Barrier, Center of Roof
ECG-23-6713-01H	Single Ply-Roofing Membrane, With Vapor Barrier, East of Roof
ECG-23-6713-02A	Grey Pipe penetration Mastic With Foil Backing, West of Roof at Pipe Penetration
ECG-23-6713-02B	Grey Pipe penetration Mastic With Foil Backing, East of Roof at Pipe Penetration
ECG-23-6713-03A	Grey Pipe Penetration Mastic, West of Roof at Pipe Penetration
ECG-23-6713-03B	Grey Pipe Penetration Mastic, East of Roof at Pipe Penetration
ECG-23-6713-04A	Black Single Ply-Roofing Membrane over White Single Ply-Roofing Membrane, Northwest of Roof
ECG-23-6713-05A	Black Roofing Patch, West of roof

Https://entekgroupinc.sharepoint.com/sites/Entekgroup/Shared Documents/Clients/City of Sac/23-6713 Sac News & Review Roof - AsbPb/Bulk Asb/5-23-23.docx

Delivered by: _____ **Date:** 5/23/23 **Time:** 1:35 AM/PM

Received by: _____ **Date:** 5/23/23 **Time:** 1:35 AM/PM

N



01E
(-)

01D
(-)

01A
(-)

02A
(-)
03A
(-)

01B
(-)

01C
(-)

01F
(-)

01G
(-)

01H
(-)

02B
(-)
03B
(-)

City of Sacramento Sacramento News & Review Building 1124 Del Paso Road Sacramento, CA	Entek Consulting Group, Inc. 4200 Rocklin Road, Suite 7 Rocklin, CA 95677 Map Not to Scale	Bulk Asbestos Sampling Map Collected by Karl Suarez On 5/23/23 Project Number 23-6713

Asbestos Survey Form

(See Instructions)

777 12th Street, 3rd Floor
Sacramento, CA 95814
Office (916) 874-4800
Fax (916) 874-4899
Email:
asbestos@airquaility.org

1. Purpose of Survey	☑ Renovation	☐ Demolition

2. Facility Information

Project Area(s) Description		
Sacramento News & Review Building - Roof		
Address: 1124 Del Paso Boulevard	City: Sacramento	# of Structures: 1

3. Owner Information

Name: City of Sacramento			
Address: 5730 24th Street, Building 4	City/State: Sacramento	Zip: 95822	
Contact: Jim Roehl	Phone: (916) 808-3476	Fax: N/A	Email: jroehl@cityofsacramento.org

4. Consultant Information — **Survey Date(s):** May 23, 2023

Company Name: Entek Consulting Group, Inc.			
Name: Blake Howes		DOSH #: 13-5015	
Address: 4200 Rocklin Road, Suite 7	City/State: Rocklin, California	Zip: 95677	
Phone: (916) 632-6800	Fax: (916) 632-6812	Email: bhowes@entekgroup.com	Signature: Blake Howes

5. Client Information (If different than owner) ☐ General Contractor ☐ Insurance Company ☐ Architect ☐ Property Manager ☐ Other _____

Name			
Address	City/State	Zip: 95678	
Contact	Phone / Fax	Email	

6. Have all of the suspect materials that will be disturbed been sampled? ■ Yes ☐ No

If no, explain why:

7. Summary of Total Asbestos Containing Material (ACM) Findings

Regulated Asbestos Containing Material (RACM) (Includes materials subject to known mechanical removal and fire damaged materials)			Category II		Category I	
Square Ft.	Linear Ft.	Cubic Ft.	Square Ft.	Linear Ft.	Square Ft.	Linear Ft.
0	0	0	0	0	0	0

To receive future SMAQMD Rule updates and changes affecting your industry (check one box):

☐ Please send e-mail notices to ☐ I will sign up myself at www.airquality.org/listserve/ to receive emailed notices.

■ I am already subscribed. ☐ I want the District to mail notices to the address on this application: ☐ Owner ☐ Consultant

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Asbestos Renovation/Demolition Notification Form

777 12th Street, 3rd Floor
Sacramento, CA 95814
Office (279) 207-1122
Fax (279) 207-1144
Asbestos@airquality.org

1	Building Department Permit Application # (if known) : _____	☑ Renovation (Do not complete Section 5) ☐ Demolition (Complete all sections) ☐ Ordered Demo - Attach ordered demo letter ☐ Emergency Demo - SMAQMD Emergency #: _____
2	Contractor	Owner City of Sacramento
	Address	Address 5730 24th Street, Building 4
	City, State / Zip	City, State / Zip Sacramento, CA 95815
	Email	Email jroehl@cityofsacramento.org
	Telephone	Telephone (916)808-3476

3	Structure Name Sacramento News & Review Building	Renovation Area Roof	# of Floors 2
	Project Address 1124 Del Paso Boulevard	City / Zip Sacramento, 95815	Year Built 1990s

4	**Preference for return of form**	☐ **E-mail :**	☐ **Other :**

DEMOLITION ONLY – Start date must be at least 10 working days from the day of your postmark or hand delivery of this form.

5	Start Date _____ _____ _____ Completion Date _____ _____ _____	Revision # 1 2 3 4 5 6 7 8 9 (circle) New Start Date _____ _____ _____ New Completion Date _____ _____ _____
	Method of Demo (Check Applicable): ☐Manual/Hand Tools ☐Mechanical/Heavy Equipment ☐Other	
	Procedure to be followed if RACM is found or Category II material becomes friable:	

I have read and understand the directions. The information on this form is true and accurate.
I certify that the asbestos survey conducted represents the facility as built.

6	Applicant Name (Print)	☐ Owner ☐ Rep / Agent ☐ Contractor	**Permit may be issued on:**
	Phone Number		
	Applicant's Signature	Date	

Have DOSH Consultant complete and sign below OR attach completed Asbestos Survey Form and Consultant's report.

CONSULTANT USE ONLY

Company Name Entek Consulting Group, Inc.		Telephone (916) 632-6800	
Surveyor Name Blake Howes		DOSH # 13-5015	Survey Date 5/23/23
Analytical Method PLM by Dispersion Staining		Pt Count Materials <10%? ☐Yes ☑ No ☐ Declined by Client	
Amount of RACM	Square Feet 0	Linear Feet 0	Cubic Feet 0
Amount of Category I 0		Amount of Category II 0	
Project Address 1124 Del Paso Boulevard		City Sacramento	Zip 95815
Suspect Materials Present? ☑Yes ☐ No		Consultant's Signature	

SMAQMD USE ONLY

Date Received / Date Postmarked _____ Date Approved & Returned _____

Project # _____ Check # _____ Receipt # _____ Amount Paid _____ Staff _____

APPENDIX B

LEAD RELATED DOCUMENTS

- Lead in Paint Samples Analysis Report From Microtest
- Bulk Lead Material Analysis Request Form for Entek
- Lead Bulk Sample Location Drawing
- Lead Hazard Evaluation Report (CDPH 8552)

MicroTest Laboratories, Inc. | AIHA ELPAT #160934
3110 Gold Canal Dr, Ste. A, Rancho Cordova, CA 95670
PH 916.567.9808 | FX 916.404.0302
www.microtestlabsinc.com | service@microtestlabsinc.com

****for office use only****

Project ID

L32535-36

CLIENT INFORMATION

Company	Entek Consulting Group, Inc
Name	Ryan Metzen
Address	4200 Rocklin Road, Suite 7 Rocklin, CA 95677
Phone	916.632.6800
Email	mainoffice@entekgroup.com rmetzen@entekgroup.com

SAMPLE

Date	Tuesday, May 23, 2023
Time	

MicroTest Laboratories

Analytical Data

JOB SITE INFORMATION

Sampler	Karl Suarez
Project	City of Sacramento
Site	Sacramento News & Review Building
Address	1124 Del Paso Blvd Sacramento, CA
Job #	23-6713

EPA METHOD 7420/7000B

Client Sample ID	Laboratory Sample ID	Client Sample Location / Description	Matrix	Results	Units	Reporting Limits	Results Comments	Units
ECG-23-6713-01Pb	L32535	Gray Paint over White Paint , Northeast of Roof, On Concrete Masonry Block	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6713-02Pb	L32536	Red Paint over Gray Paint, East of Roof, on Metal Roof Flashing	Paint	<0.01%	Wt %	0.01%	<100	PPM

Date Received:	Tuesday, May 23, 2023
Date Analyzed:	Wednesday, May 24, 2023
Date Reported:	Thursday, May 25, 2023

Samples Received: 2

Samples Analyzed: 2

Analyst: **Erich Bowman**

Authorized Signatory:

Kelly Favero - Lab Manager

This report applies to the standards and procedures indicated and to the specific samples analyzed. Samples have NOT been corrected for blank values. EPA 3050B Hotblock Preparaton Method

L32535-36

ENTEK
BULK LEAD MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.
4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: 5/23/23

Job Number: 23-6713

Client Name: City of Sacramento

Site Address: Sacramento News & Review Building
1124 Del Paso Blvd,
Sacramento, CA

Lab: MicroTest

Collected by: Karl Suarez

Turnaround Time: Thursday, 5/25/23, End of Day

ANALYSIS REQUESTED: Lead by Flame Atomic Absorption Spectroscopy

Special Instructions: *Please report result in PPM and % by weight. Please email results as soon as possible.*

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6713-01Pb	Gray Paint over White Paint , Northeast of Roof, On Concrete Masonry Block
ECG-23-6713-02Pb	Red Paint over Gray Paint, East of Roof, on Metal Roof Flashing

Delivered by: _____ **Date:** 5/23/23 **Time:** 1:40 AM/PM

Received by: _____ **Date:** 5/23/23 **Time:** 1:40 AM/PM

N



01Pb

02Pb

City of Sacramento Sacramento News & Review Building 1124 Del Paso Road Sacramento, CA	Entek Consulting Group, Inc. 4200 Rocklin Road, Suite 7 Rocklin, CA 95677 Map Not to Scale	Bulk Lead Sampling Map Collected by Karl Suarez On 5/23/23 Project Number 23-6713

LEAD HAZARD EVALUATION REPORT

Section 1 — Date of Lead Hazard Evaluation 5/23/23

Section 2 — Type of Lead Hazard Evaluation (Check one box only)

☑ Lead Inspection ☐ Risk assessment ☐ Clearance Inspection ☐ Other (specify) _____

Section 3 — Structure Where Lead Hazard Evaluation Was Conducted

Address [number, street, apartment (if applicable)]	City	County	Zip Code
1124 Del Paso Boulevard	Sacramento	Sacramento	95815

Construction date (year) of structure	Type of structure	Children living in structure?
1940's	☐ Multi-unit building ☐ School or daycare ☐ Single family dwelling ☑ Other Office Building	☐ Yes ☑ No ☐ Don't Know

Section 4 — Owner of Structure (if business/agency, list contact person)

Name	Telephone number
City of Sacramento	916-808-3476

Address [number, street, apartment (if applicable)]	City	State	Zip Code
5730 24th Street, Building 4	Sacramento	California	95822

Section 5 — Results of Lead Hazard Evaluation (check all that apply)

☑ No lead-based paint detected ☐ Intact lead-based paint detected ☐ Deteriorated lead-based paint detected

☐ No lead hazards detected ☐ Lead-contaminated dust found ☐ Lead-contaminated soil found ☐ Other _____

Section 6 — Individual Conducting Lead Hazard Evaluation

Name	Telephone number
Entek Consulting Group, Inc. - Karl Suarez	(916) 632-6800

Address [number, street, apartment (if applicable)]	City	State	Zip Code
4200 Rocklin Road, Suite 7	Rocklin	CA	95677

CDPH certification number	Signature	Date
11068		6/8/23

Name and CDPH certification number of any other individuals conducting sampling or testing (if applicable)

N/A

Section 7 — Attachments

A. A foundation diagram or sketch of the structure indicating the specifc locations of each lead hazard or presence of lead-based paint;
B. Each testing method, device, and sampling procedure used;
C. All data collected, including quality control data, laboratory results, including laboratory name, address, and phone number.

First copy and attachments retained by inspector

Second copy and attachments retained by owner

Third copy only (no attachments) mailed or faxed to:

California Department of Public Health
Childhood Lead Poisoning Prevention Branch Reports
850 Marina Bay Parkway, Building P, Third Floor
Richmond, CA 94804-6403
Fax: (510) 620-5656

APPENDIX C

BACK UP DOCUMENTS

- Site Map
- Photo Log
- Inspector Accreditations and Certifications
- Laboratory Accreditations for Asbestos, Lead and Non-Viable Mold Analysis

N



City of Sacramento Sacramento News & Review Building 1124 Del Paso Road Sacramento, CA	Entek Consulting Group, Inc. 4200 Rocklin Road, Suite 7 Rocklin, CA 95677 Map Not to Scale	Site Map Project Number 23-6713

Photo Log

Job Number:	23-6713	Date:	5/23/23
Client:	City of Sacramento		
Site Address:	Sacramento News & Review Building – 1124 Del Paso Boulevard, Sacramento, CA 95815		

	
General view of the roof	General view of the roof
	
General view of the roof	General view of the roof

Photo Log

Job Number:	23-6713	Date:	5/23/23
Client:	City of Sacramento		
Site Address:	Sacramento News & Review Building – 1124 Del Paso Boulevard, Sacramento, CA 95815		

	
View of the pipe penetrations leading to an HVAC unit	View of the pipe penetrations leading to an HVAC unit
	
Additional view of the HVAC Unit and pipe penetrations	View of the black roofing patch

State of California
Division of Occupational Safety and Health

Certified Site Surveillance Technician



Karl S Suarez
Name

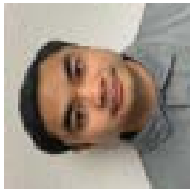
Certification No. 21-6935

Expires on 11/19/23

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC HEALTH

LEAD-RELATED CONSTRUCTION CERTIFICATE

INDIVIDUAL:	CERTIFICATE TYPE:	NUMBER:	EXPIRATION DATE:
	Lead Inspector/Assessor	LRC-00011068	4/7/2024
	Lead Sampling Technician	LRC-00008454	3/25/2024

Karl Suarez

Disclaimer: This document alone should not be relied upon to confirm certification status. Compare the individual's photo and name to another valid form of government issued photo identification. Verify the individual's certification status by searching for Lead-Related Construction Professionals at www.cdph.ca.gov/programs/clppb or calling (800) 597-LEAD

State of California
Division of Occupational Safety and Health
Certified Asbestos Consultant



Name **Blake W Howes**

Certification No. **13-5015**

Expires on **04/17/24**

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.

California Department of PublicHealth

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC HEALTH

LEAD-RELATED CONSTRUCTION CERTIFICATE

INDIVIDUAL:	CERTIFICATE TYPE:	NUMBER:	EXPIRATION DATE:
	Lead Inspector/Assessor	LRC-00003315	9/27/2023

Blake Howes

Disclaimer: This document alone should not be relied upon to confirm certification status. Compare the individual's photo and name to another valid form of government issued photo identification. Verify the individual's certification status by searching for Lead-Related Construction Professionals at www.cdph.ca.gov/programs/clppb or calling (800) 597-LEAD

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 101442-0

ASBESTECH

Rancho Cordova, CA

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2022-07-01 through 2023-06-30

Effective Dates

For the National Voluntary Laboratory Accreditation Program

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, CA 95670
Mr. Tommy Conlon
Phone: 916-481-8902 Fax: 916-481-3975
Email: asbestech@sbcglobal.net
http://www.asbestechlab.com

ASBESTOS FIBER ANALYSIS **NVLAP LAB CODE 101442-0**

Bulk Asbestos Analysis

Code	*Description*
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

Airborne Asbestos Analysis

Code	*Description*
18/A02	U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.

For the National Voluntary Laboratory Accreditation Program

CALIFORNIA STATE

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

CERTIFICATE OF ENVIRONMENTAL LABORATORY ACCREDITATION

Is hereby granted to

MicroTest Laboratories, Inc.

3110 Gold Canal Drive

Rancho Cordova, CA 95670

Scope of the certificate is limited to the
"Fields of Accreditation"
which accompany this Certificate.

Continued accredited status depends on compliance with applicable laws and regulations, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of
Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **2974**

Effective Date: **7/1/2022**

Expiration Date: **6/30/2024**

Sacramento, California
subject to forfeiture or revocation

Christine Sotelo, Program Manager
Environmental Laboratory Accreditation Program

CALIFORNIA STATE
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Fields of Accreditation

MicroTest Laboratories, Inc.

3110 Gold Canal Drive
Rancho Cordova, CA 95670
Phone: 9165679808

Certificate Number: **2974**
Expiration Date: **6/30/2024**

Field of Accreditation: 114 - Inorganic Constituents in Hazardous Waste			
114.345	002	Antimony	EPA 6020 B
114.345	003	Arsenic	EPA 6020 B
114.345	004	Barium	EPA 6020 B
114.345	005	Beryllium	EPA 6020 B
114.345	006	Cadmium	EPA 6020 B
114.345	008	Chromium	EPA 6020 B
114.345	009	Cobalt	EPA 6020 B
114.345	010	Copper	EPA 6020 B
114.345	012	Lead	EPA 6020 B
114.345	016	Nickel	EPA 6020 B
114.345	018	Selenium	EPA 6020 B
114.345	021	Thallium	EPA 6020 B
114.345	023	Zinc	EPA 6020 B
114.345	024	Molybdenum	EPA 6020 B
114.515	001	Lead	EPA 7420
114.545	001	Mercury	EPA 7471 B
Field of Accreditation: 115 - Leaching/Extraction Tests and Physical Characteristics of Hazardous Waste			
115.055	001	Waste Extraction Test (WET)	CCR Chapter11, Article 5, Appendix II
115.085	001	Toxicity Characteristic Leaching Procedure (TCLP)	EPA 1311
Field of Accreditation: 121 - Bulk Asbestos Analysis of Hazardous Waste			
121.010	001	Bulk Asbestos	EPA 600/M4-82-020

As of 7/1/2022 , this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

ENTEK
CONSULTING GROUP, INC.
4200 Rocklin Road, Suite 7, Rocklin, CA 95677 Phone (916) 632-6800 Fax (916) 632-6812 www.entekgroup.com

HAZARDOUS MATERIALS SURVEY
FINAL REPORT

OWNER/CLIENT

City of Sacramento
Department of Public Works Facilities &
Real Property Management
5730 24th Street, Building 4
Sacramento, CA 95822

CONTACT

Mr. Jim Roehl
Environmental Program Manager,
Brownsfields & HazMat

SURVEY ADDRESS

1124 Del Paso Road
Sacramento, California 95815

BUILDING SURVEYED

Sacramento News & Review Building
Phase 2 – Interior Renovation Project

PREPARED BY

Karl Suarez
CSST # 21-6935 and CDPH IA #11068
Entek Consulting Group, Inc.
4200 Rocklin Road, Suite 7
Rocklin, CA 95677

Entek Project #23-6713

July 3, 2023

ENTEK

TABLE OF CONTENTS

Executive Summary 3

Introduction 4

Building Description 4

Asbestos Inspection and Sample Collection Protocols 4

Asbestos Bulk Sample Results 5

Asbestos Regulatory Requirements 6

Lead Inspection, Sampling, & Results 6

Lead Regulatory Compliance 7

Limitations 7

Appendices

A. Asbestos Related Documents
B. Lead Related Documents
C. Backup Documents

Executive Summary

Entek Consulting Group, Inc. (Entek) is pleased to provide Mr. Jim Roehl, Environmental Program Manager for the City of Sacramento with this limited asbestos and lead survey report regarding the upcoming Interior Renovation Project at the Sacramento News & Review Building located on 1124 Del Paso Boulevard in Sacramento, California.

The purpose of the inspection was to comply with the US EPA NESHAP requirements and the Sacramento Metropolitan Air Quality Management District (SMAQMD), which has jurisdiction for this project site to determine if asbestos containing materials are present which may be impacted during the upcoming Interior Renovation Project. Anticipated work will be broken into two phases. Phase 1 will include renovation of the roof. Phase 2 will include renovation of the interior building components. For purposes of this report, this limited asbestos and lead survey is only for the Phase 2 Interior Renovation Project.

It is our understanding that the Sacramento News and Review Building was constructed in the 1940s, with major renovations to the interior of the building occurring in approximately 2016.

The United States Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants (US EPA NESHAP), 40 CFR Part 61 - Nov. 20, 1990, requires an owner or operator of a demolition or renovation project to thoroughly inspect the affected facility or part of the facility where the demolition or renovation operation will occur for the presence of asbestos-containing materials (ACM) prior to the commencement of that project.

The attached drawing shows approximate sample locations and also identify those bulk sample materials analyzed and found to contain asbestos greater than 1% with a (+) after the sample number. Materials analyzed and found to contain less than 1% asbestos or reported as none detected have a (-) after each sample number. However, in some cases when several samples of one homogenous material are collected, sometimes not all samples are analyzed by the laboratory. In this instance, if one sample for a homogeneous material is reported as containing asbestos greater than 1%, then the remaining samples in the series that are not analyzed are assumed to contain asbestos greater than 1%. For the purposes of this report, all samples that were not analyzed in a series are assumed to contain asbestos greater than 1% and are identified on the attached drawing with a (+) after the sample number.

Contractors and other individuals who view the sample locations and associated results indicated with either a (-) or a (+) on the drawing(s) to make determinations take the risk of misidentifying a material and may arrive at determinations which are in direct conflict with the written findings of this report. This use of the drawing and the information provided on it relating to individual sample results in determining if a material does or does not contain asbestos is not recommended.

The report must be read in its entirety prior to making any interpretations or conclusions pertaining to the information. Any conclusions made by the reader about the information provided in the body of this report which are contradictory or not included in this report are the responsibility of the reader.

Asbestos

On June 6, 2023, Entek conducted a limited asbestos and lead survey specific to the interior areas designated by Jim Roehl, Environmental Program Manager for the City of Sacramento.

None of the materials collected were determined to contain asbestos. Specifics pertaining to individual materials are found in later parts of this report.

Lead

Entek investigated the existing paints and coatings that may be impacted by the renovation project to determine if lead was present. All paints collected from the interior components that are expected to be impacted by the Interior Renovation Project were determined to be below the laboratory's detectable limit of 100 parts per million (ppm) for lead.

Introduction

This report presents results of a limited asbestos and lead survey performed by Entek which included the interior building materials of the Sacramento News & Review Building located at 1124 Del Paso Boulevard in Sacramento, California. These areas were designated by Jim Roehl, Environmental Program Manager for the City of Sacramento.

The inspection was conducted on June 9, 2023, by Mr. Karl Suarez who is a Cal/OSHA Certified Site Surveillance Technician (CSST) and a California Department of Public Health Lead Inspector Assessor (I/A) and Mr. Gerald Moralez who is a California Department of Health Lead Sample Technician.

This report was prepared for Mr. Jim Roehl, Environmental Program Manager for the City of Sacramento.

Building Description

The Sacramento News & Review Building is a multistory wood framed building with a concrete slab foundation. The survey area included the interior building materials expected to be impacted by the upcoming Interior Renovation Project of the Sacramento News & Review Building. The interior finished materials consisted of various types of drop-in acoustical ceiling tiles, drywall wall systems, fiberglass reinforced paneling, and vinyl cove base. The flooring consists mainly of finished concrete, but some rooms had carpet, ceramic tile, and 2'x2' vinyl floor tile. The plenum space consisted of both fiberglass insulated and un-insulated HVAC ducting, as well as electrical conduit.

Asbestos Inspection and Sample Collection Protocols

Entek included all specific designated interior materials that are expected to be impacted by the upcoming Interior Renovation Project in this report.

Entek did not use any demolition methods to look within enclosed wall or ceiling cavities during this investigation. Entek did include all suspect materials observed in, on, or associated with the areas included in this report.

Bulk samples were collected of various materials suspected to contain asbestos by utilizing a power drill and coring tube, cutting the materials with a razor knife, or use of other appropriate hand tools.

Miscellaneous materials were collected from each homogenous area in a manner sufficient to determine whether the material is or is not ACM as required in 40 CFR Part 763, Asbestos-Containing Materials in Schools; Final Rule and Notice, published October 30, 1987.

Approximate locations of all samples collected during this inspection are indicated on the “Bulk Asbestos Material Analysis Request Form for Entek”, which served as the chain of custody for the samples, and on the building diagram(s) attached to this report.

Asbestos Bulk Sample Results

There were several materials observed which are considered “suspect” under US EPA guidelines. Under current US EPA guidelines for conducting building inspections for ACM, all "suspect" materials must be assumed to contain asbestos until otherwise determined by laboratory testing.

The samples of materials suspected of containing asbestos were submitted to Asbestech, a laboratory located in Rancho Cordova, California. These samples were subsequently analyzed utilizing USEPA Method 600 by polarized light microscopy (PLM) with dispersion staining. Asbestech is a NVLAP accredited program.

The US EPA NESHAP and SMAQMD use the terms Regulated Asbestos Containing Material (RACM), Category I, and Category II when identifying materials which contain asbestos in amounts greater than 1%. Cal/OSHA uses the term ACCM which indicates a manufactured construction material contains greater than 0.1% asbestos by weight by the PLM method. This definition can be found in Title 8, 1529.

A total of 36 bulk samples were collected of all the materials considered to be "suspect", which had not been previously sampled, and which were observed during this investigation. Some of those samples contained multiple layers which were individually analyzed to determine their asbestos content. Analysis of all samples collected was by PLM with dispersion staining.

None of the materials collected were determined to contain asbestos. Specifics pertaining to individual materials are found in later parts of this report.

Any building materials which are considered “suspect” for containing asbestos which have not been identified in this report must be assumed to contain asbestos in amounts >1% until properly investigated and/or tested.

Materials commonly excluded from being suspected of containing asbestos include, but are not limited to: unwrapped pink and yellow fiberglass insulating materials or products, foam insulation, wood, metal, plastic, or glass. All other types of building materials or coatings on the materials listed above are commonly listed as “suspect” and must be tested prior to impact by a Contractor. Work impacting these untested or newly discovered materials must cease until an investigation can be completed.

Asbestos Regulatory Requirements

US EPA

The property included in this survey report is located in Sacramento County. Sacramento Metropolitan Air Quality Management District (SMAQMD) has been given authority for enforcement of the NESHAP regulations by means of their own rules (Rule 902 Asbestos).

A demolition is the wrecking, taking out, or burning of any load supporting structural member. A renovation is everything else. 10-day written notification to the US EPA Region IX, CARB or local AQMD is required prior to the performance of any demolition project regardless of asbestos being present or not. This notification would also apply to any renovation project which involves the wrecking, taking out, or burning of any load bearing structural member during a renovation as well.

Since none of the materials sampled were determined to contain asbestos, a 10-day notification to the SMAQMD is not required to be submitted prior to starting work for asbestos reasons.

Cal/OSHA

Disturbance of any ACM or ACCM could generate airborne asbestos fibers and would be regulated by Cal/OSHA. Cal/OSHA worker health and safety regulations apply during any disturbance of ACM or ACCM by a person while in the employ of another. This is true regardless of friability or quantity disturbed.

Since none of the materials anticipated to be impacted as part of this project were determined to contain asbestos, a licensed asbestos contractor, registered with Cal/OSHA is not required to perform the demolition/renovation work.

Lead Inspection, Sampling, & Results

Seven (7) bulk samples of the painted surfaces expected to be impacted by the renovation project were collected and submitted to MicroTest Laboratories, Inc. These samples were subsequently analyzed by atomic absorption spectrometry (AAS). Results of the analysis are listed in the following table:

Paints/Coatings/Materials Determined NOT TO Contain Lead (<100 ppm)	
Paint/Coating Color or Material	**Building Component**
White Paint	Drywall Wall System – Throughout Storage Room
Red Paint	Drywall Wall Systems – Throughout Building
Black Paint	Drywall Wall System – Throughout Building
White Ceramic Tile	Ceramic Wall Tile – Throughout Restroom
Brown Ceramic Tile	Ceramic Floor Tile – Throughout Restroom
Red Epoxy Coating	Concrete Flooring – Throughout Building

Paints/Coatings/Materials Determined NOT TO Contain Lead (<100 ppm)	
Paint/Coating Color or Material	**Building Component**
White Paint	Concrete Masonry Block Wall – Southeast Storage Room

Paints determined “NOT TO” contain lead for the purposes of this report are those samples which when analyzed did not indicate lead to be present at or above the limit of detection for the analysis method used. This limit of detection was 100 parts per million (ppm). As a result, any paints shown “NOT TO” contain lead will not require any special training or work practices related to lead when impacted.

Lead Regulatory Compliance

Any upcoming project which may result in the disturbance of lead containing products or surfaces but is not intended to remediate a lead hazard or specifically designed to remove LBP to reduce or eliminate a known hazard, would be considered “lead related construction work”.

Since no detectable amount of lead was found, CAL OSHA regulations found in 8 CCR 1532.1 Lead in Construction will not apply to this project.

Limitations

Entek inspected only the specific designated areas identified by Jim Roehl, Environmental Program Manager for the City of Sacramento to be included in the Interior Renovation Project, which did not include all areas of the building’s interior and exterior components. As a result, the information provided in this inspection report may not be used to extend the inspection results to areas not included in this report without additional review and sampling as necessary.

Entek did not perform any destructive sampling to look into ceiling and wall cavities. As a result, it may be possible for materials to be hidden in these areas which are not included in this report. Entek also did not employ any destructive measures on floors of interior spaces or exterior areas covered with asphalt, concrete, or dirt.

If any new materials not listed as having been sampled, or listed as assumed for containing asbestos or lead in this report are discovered, the new material must be assumed to contain asbestos or lead until properly inspected and tested for asbestos content.

Entek’s policy is to retain a full copy of these written documents for three (3) years once the file is closed. At the end of the 3-year period the written files will be destroyed without further notice. It is suggested copies of the file(s) are maintained as per your policy.

Entek will be providing only this electronic copy of the report and its attachments for your use. However, if you would like a hard copy of this report please do not hesitate to ask. Entek will be happy to mail the report upon receipt of your request.

Thank you for choosing Entek for your environmental needs. Please call me at (916) 632-6800 if you have any questions regarding this report.

Prepared by:



Karl Suarez
Assistant Project Manager
Cal/OSHA CSST #21-6935
CDPH I/A #11068

Reviewed by:



Blake Howes
Vice President
Cal/OSHA CAC #13-5015
CDPH I/A #3315

Appendices

A. Asbestos Related Documents
B. Lead Related Documents
C. Backup Documents

APPENDIX A

ASBESTOS RELATED DOCUMENTS

- Bulk Asbestos Analysis Report From Asbestech
- Bulk Asbestos Material Analysis Request Form for Entek
- Asbestos Bulk Sample Location Drawing
- SMAQMD Asbestos Survey Form
- SMAQMD Demolition/Renovation Form
  (To be completed by Owner)

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
23-6713 City of Sacramento
Sacramento News & Review Bldg.
1124 Del Paso Blvd., Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70460-1
Date/Time Collected: 6/6/23
Date Received: 6/6/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 6/9/23

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-23-6713-01A	White drywall , 2nd floor annex SE corner of west room	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite
01B	White drywall , SW corner in kitchenette	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite
01C	White drywall , SE corner in NE office	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite
01D	White drywall , SW corner in Systems office	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A),THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES 

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
23-6713 City of Sacramento
Sacramento News & Review Bldg.
1124 Del Paso Blvd., Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70460-2
Date/Time Collected: 6/6/23
Date Received: 6/6/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 6/9/23

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-23-6713-01E	White drywall , SE corner near SW offices	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite
01F	White drywall , NW corner in west staff area	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite
01G	White drywall , SW corner in center office cluster	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound 1	NONE DETECTED	Calcite
	White joint compound 2	NONE DETECTED	Calcite
02A	Brown 4” vinyl base cove , 2nd floor annex east wall within west room	NONE DETECTED	Calcite
	Tan mastic	NONE DETECTED	Calcite
	White joint compound	NONE DETECTED	Calcite

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A),THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
23-6713 City of Sacramento
Sacramento News & Review Bldg.
1124 Del Paso Blvd., Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70460-3
Date/Time Collected: 6/6/23
Date Received: 6/6/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 6/9/23

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-23-6713-02B	Brown 4" vinyl base cove , 1st floor west wall in Sales office area	NONE DETECTED	Calcite
	Tan mastic	NONE DETECTED	Calcite
	White joint compound	NONE DETECTED	Calcite
02C	Brown 4" vinyl base cove , 1st floor west wall in SW office area	NONE DETECTED	Calcite
	Tan mastic	NONE DETECTED	Calcite
	White joint compound	NONE DETECTED	Calcite
03A	White orange peel texture on drywall , 2nd floor annex east wall within west room	NONE DETECTED	Calcite
03B	White orange peel texture on drywall , 2nd floor annex west wall within east room	NONE DETECTED	Calcite
03C	White orange peel texture on drywall , east wall within SE Sales office area	NONE DETECTED	Calcite
03D	White orange peel texture on drywall , east wall in west staff area	NONE DETECTED	Calcite
03E	White orange peel texture on drywall , north wall in SW office	NONE DETECTED	Calcite

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A),THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES 

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
23-6713 City of Sacramento
Sacramento News & Review Bldg.
1124 Del Paso Blvd., Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70460-4
Date/Time Collected: 6/6/23
Date Received: 6/6/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 6/9/23

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-23-6713-03F	White orange peel texture on drywall , south wall near front lobby desk	NONE DETECTED	Calcite
03G	White orange peel texture on drywall , west wall in Design office area	NONE DETECTED	Calcite
04A	Brown carpet, 2nd floor annex within west room	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
	Clear mastic	NONE DETECTED	Synthetics
	Gray leveler	NONE DETECTED	Calcite
04B	Brown carpet, 2nd floor annex within east room	NONE DETECTED	Calcite
	Yellow mastic	NONE DETECTED	Synthetics
	Clear mastic	NONE DETECTED	Synthetics
	Gray leveler	NONE DETECTED	Calcite
05A	Tan vinyl sheet flooring w/ speckle pattern on stairs, stairs to 2nd floor annex	NONE DETECTED	Opaques
	Yellow mastic	NONE DETECTED	Synthetics

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A),THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES 

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
23-6713 City of Sacramento
Sacramento News & Review Bldg.
1124 Del Paso Blvd., Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70460-5
Date/Time Collected: 6/6/23
Date Received: 6/6/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 6/9/23

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-23-6713-06A	Gray window glazing putty on windows, 2nd floor annex south windows	NONE DETECTED	Calcite
	White putty	NONE DETECTED	Calcite
07A	Gray 2'x2' vinyl floor tile, computer storage room south by entrance into room	NONE DETECTED	Calcite
	Black mastic	NONE DETECTED	Opaques
07B	Gray 2'x2' vinyl floor tile, computer storage room north within room	NONE DETECTED	Calcite
	Black mastic	NONE DETECTED	Opaques
08A	Gray/white 2'x4' ceiling tile w/ pinhole & fissure pattern, east within computer storage room	NONE DETECTED	Cellulose Pumice
08B	Gray/white 2'x4' ceiling tile w/ pinhole & fissure pattern, west within computer storage room	NONE DETECTED	Cellulose Pumice
09A	Gray concrete flooring, center of SE storage room	NONE DETECTED	Granular Mins.

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A),THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES 

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
23-6713 City of Sacramento
Sacramento News & Review Bldg.
1124 Del Paso Blvd., Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70460-6
Date/Time Collected: 6/6/23
Date Received: 6/6/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 6/9/23

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-23-6713-10A	Red 2'x1' concrete masonry unit block, south wall in SE storage room	NONE DETECTED	Granular Mins.
	Gray grout	NONE DETECTED	Granular Mins.
11A	Gray vinyl sheet flooring, south within SE men's restroom	NONE DETECTED	Opaques Cellulose
	Brown mastic	NONE DETECTED	Synthetics
11B	Gray vinyl sheet flooring, south within SE women's restroom	NONE DETECTED	Opaques Cellulose
12A	Clear mastic behind tan fiberglass reinforced paneling, east wall within SE men's restroom	NONE DETECTED	Synthetics
12B	Clear mastic behind tan fiberglass reinforced paneling, east wall within SE women's restroom	NONE DETECTED	Synthetics
13A	Black sink undercoating, sink in east kitchenette	NONE DETECTED	Tar Binder Calcite
13B	Black sink undercoating	NONE DETECTED	Tar Binder Calcite

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A),THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES 

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
23-6713 City of Sacramento
Sacramento News & Review Bldg.
1124 Del Paso Blvd., Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 70460-7
Date/Time Collected: 6/6/23
Date Received: 6/6/23

NVLAP Lab Code 101442-0
CDPH # 1153
Date Analyzed: 6/9/23

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-23-6713-14A	Gray/white 2'x2' drop in acoustical ceiling tile, west within NE break room	NONE DETECTED	Cellulose Fibrous Glass
14B	Gray/white 2'x2' drop in acoustical ceiling tile	NONE DETECTED	Cellulose Fibrous Glass
15A	Brown 2"x2" ceramic floor tile, south restroom	NONE DETECTED	Granular Mins.
	Gray grout	NONE DETECTED	Granular Mins.
16A	White 4"x6" ceramic wall tile, south restroom	NONE DETECTED	Granular Mins.
	Gray grout	NONE DETECTED	Granular Mins.
17A	Gray seam sealant on HVAC duct work on ducting near north wall in SE storage room	NONE DETECTED	Calcite

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A),THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES

70460

ENTEK
BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.
4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: 6/6/23

Job Number: 23-6713

Client Name: City of Sacramento

Site Address: Sacramento News & Review Building
1124 Del Paso Boulevard
Sacramento, CA 95815

Lab: Asbestech

Collected by: Karl Suarez

Turnaround Time: Friday, 6/9/23, End of Day

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instructions: *Stop analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.*

Please e-mail results at mainoffice@entekgroup.com and rmetzen@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6713-01A	Drywall and Joint Compound, 2nd Floor Annex, Southeast Corner of West Room
ECG-23-6713-01B	Drywall and Joint Compound, Southwest Corner in Kitchenette
ECG-23-6713-01C	Drywall and Joint Compound, Southeast Corner in Northeast Office
ECG-23-6713-01D	Drywall and Joint Compound, Southwest Corner in Systems Office
ECG-23-6713-01E	Drywall and Joint Compound, Southeast Corner Near Southwest Offices
ECG-23-6713-01F	Drywall and Joint Compound, Northwest Corner in West Staff Area
ECG-23-6713-01G	Drywall and Joint Compound, Southwest Corner in Center Office Cluster
ECG-23-6713-02A	Brown 4" Vinyl Cove Base with Tan Mastic, 2nd Floor Annex, East Wall within West Room
ECG-23-6713-02B	Brown 4" Vinyl Cove Base with Tan Mastic, 1st Floor, West Wall in Sales Office Area
ECG-23-6713-02C	Brown 4" Vinyl Cove Base with Tan Mastic, 1st Floor, West Wall in Southwest Office Area
ECG-23-6713-03A	Orange Peel Texture on Drywall, 2nd Floor Annex, East Wall within West Room
ECG-23-6713-03B	Orange Peel Texture on Drywall, 2nd Floor Annex, West Wall within East Room
ECG-23-6713-03C	Orange Peel Texture on Drywall, East Wall Within Southeast Sales Office Area
ECG-23-6713-03D	Orange Peel Texture on Drywall, East Wall in West Staff Area
ECG-23-6713-03E	Orange Peel Texture on Drywall, North Wall in Southwest Office
ECG-23-6713-03F	Orange Peel Texture on Drywall, South Wall Near Front Lobby Desk

Delivered by: _____ **Date:** 6/6/23 **Time:** 12:36 AM/PM

Received by: _____ **Date:** 6/6/23 **Time:** 1235 AM/PM

70460

ENTEK
BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.
4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: 6/6/23

Job Number: 23-6713

Client Name: City of Sacramento

Site Address: Sacramento News & Review Building
1124 Del Paso Boulevard
Sacramento, CA 95815

Lab: Asbestech

Collected by: Karl Suarez

Turnaround Time: Friday, 6/9/23, End of Day

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instructions: *Stop analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.*

Please e-mail results at mainoffice@entekgroup.com and rmetzen@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6713-03G	Orange Peel Texture on Drywall, West Wall in Design Office Area
ECG-23-6713-04A	Brown Carpet Over Gray Vinyl Floor Tile with Yellow Mastic, 2nd Floor Annex, Within West Room
ECG-23-6713-04B	Brown Carpet Over Gray Vinyl Floor Tile with Yellow Mastic, 2nd Floor Annex, Within East Room
ECG-23-6713-05A	Tan Vinyl Sheet Flooring with Speckle Pattern on Stairs with Yellow Mastic, Stairs to 2nd Floor Annex
ECG-23-6713-06A	Gray Window Glazing Putty on Windows, 2nd Floor Annex, South Windows
ECG-23-6713-07A	Gray 2' x 2' Vinyl Floor Tile with Mastic, Computer Storage Room, South By Entrance into Room
ECG-23-6713-07B	Gray 2' x 2' Vinyl Floor Tile with Mastic, Computer Storage Room, North Within Room
ECG-23-6713-08A	2' x 4' Acoustical Ceiling Tile with Pinhole and Fissure Pattern, East Within Computer Storage Room
ECG-23-6713-08B	2' x 4' Acoustical Ceiling Tile with Pinhole and Fissure Pattern, West Within Computer Storage Room
ECG-23-6713-09A	Concrete Flooring, Center of Southeast Storage Room
ECG-23-6713-10A	2' x1' Concrete Masonry Unit Block with Gray Grout, South Wall in Southeast Storage Room
ECG-23-6713-11A	Gray Vinyl Sheet Flooring with Mastic, South within Southeast Men's Restroom

Delivered by: _____ **Date:** 6/6/23 **Time:** 12:38 AM/PM

Received by: _____ **Date:** 6/6/23 **Time:** 12:38 AM/PM

70460

ENTEK
BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.
4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: 6/6/23

Job Number: 23-6713

Client Name: City of Sacramento

Site Address: Sacramento News & Review Building
1124 Del Paso Boulevard
Sacramento, CA 95815

Lab: Asbestech

Collected by: Karl Suarez

Turnaround Time: Friday, 6/9/23, End of Day

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instructions: *Stop analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.*

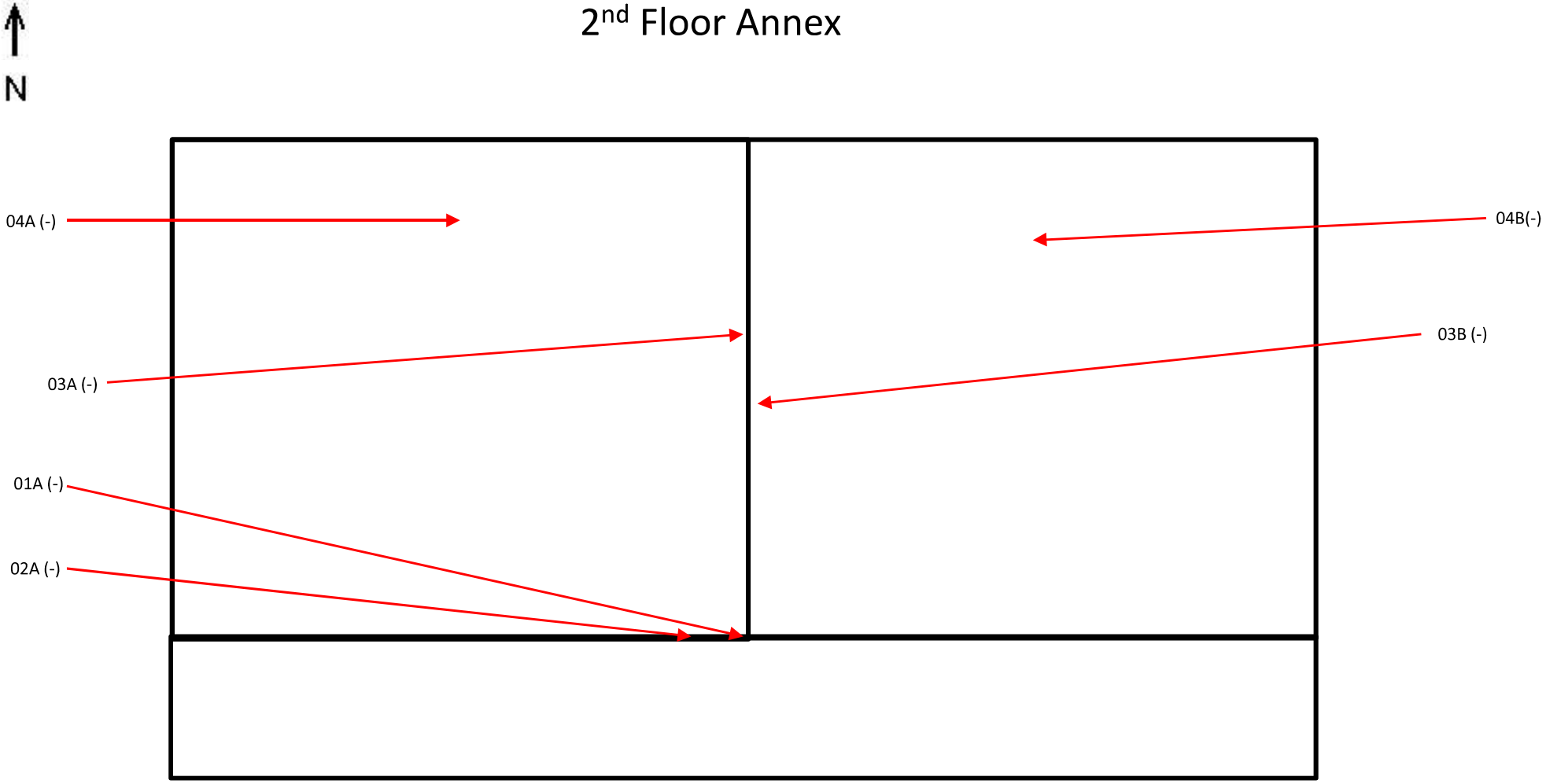
Please e-mail results at mainoffice@entekgroup.com and rmetzen@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6713-11B	Gray Vinyl Sheet Flooring with Mastic, South within Southeast Women's Restroom
ECG-23-6713-12A	Clear Mastic Behind Tan Fiberglass Reinforced Paneling, East Wall within Southeast Men's Restroom
ECG-23-6713-12B	Clear Mastic Behind Tan Fiberglass Reinforced Paneling, East Wall within Southeast Women's Restroom
ECG-23-6713-13A	Black Sink Undercoating, Sink in East Kitchenette
ECG-23-6713-14A	White 2' x 2' Drop-In Acoustical Ceiling Tile, West within Northeast Break Room
ECG-23-6713-15A	2" x 2" Brown Ceramic Floor Tile with Gray Grout, South Restroom
ECG-23-6713-16A	4" x 6" White Ceramic Wall Tile with Gray Grout, South Restroom
ECG-23-6713-17A	Gray Seam Sealant on HVAC Duct Work, On Ducting Near North Wall in Southeast Storage Room

Delivered by: _____ **Date:** 6/6/23 **Time:** 12:35 AM/PM

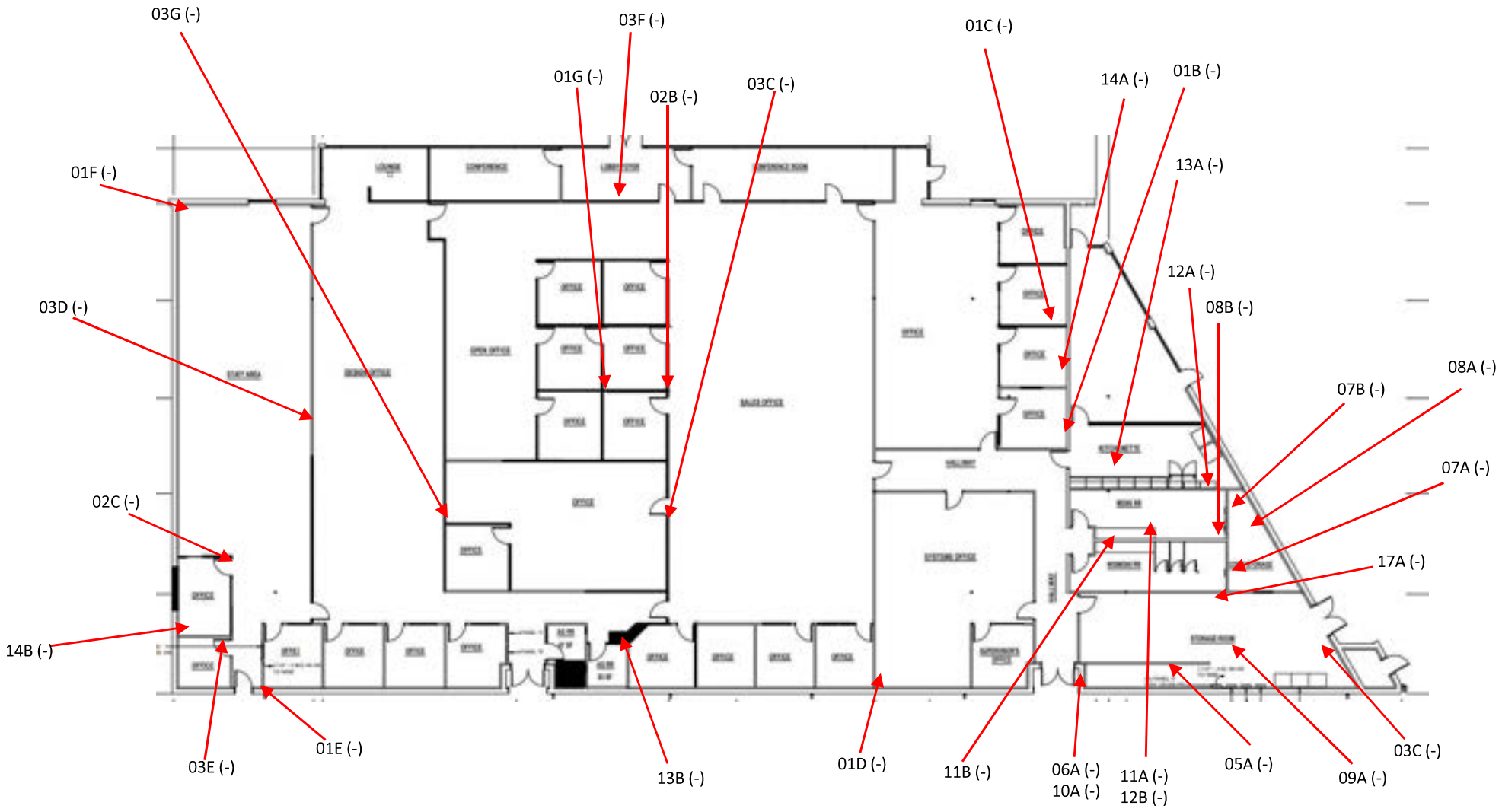
Received by: _____ **Date:** 6/6/23 **Time:** 1235 AM/PM

2nd Floor Annex



City of Sacramento Sacramento News & Review Building 1124 Del Paso Boulevard Sacramento, CA 95815	Entek Consulting Group, Inc. 4200 Rocklin Road, Suite 7 Rocklin, CA 95677 Map Not to Scale	Asbestos Bulk Sample Locations Collected by Karl Suarez On June 6, 2023 Project Number 23-6713

Sacramento News & Review Building- Interior



City of Sacramento Sacramento News & Review Building 1124 Del Paso Boulevard Sacramento, CA 95815	Entek Consulting Group, Inc. 4200 Rocklin Road, Suite 7 Rocklin, CA 95677 Map Not to Scale	Bulk Asbestos Sampling Map Collected by Karl Suarez On June 6, 2023 Project Number 23-6713

Asbestos Survey Form

(See Instructions)

777 12th Street, 3rd Floor
Sacramento, CA 95814
Office (916) 874-4800
Fax (916) 874-4899
Email:
asbestos@airquaility.org

1. Purpose of Survey	☑ Renovation	☐ Demolition

2. Facility Information

Project Area(s) Description		
Sacramento News & Review Building - Roof		
Address: 1124 Del Paso Boulevard	City: Sacramento	# of Structures:

3. Owner Information

Name			
Address	City/State	Zip: 95822	
Contact	Phone	Fax	Email

4. Consultant Information — **Survey Date(s):**

Company Name: Entek Consulting Group, Inc.		
Name		DOSH #: 13-5015
Address: 4200 Rocklin Road, Suite 7	City/State: Rocklin, California	Zip: 95677
Phone: (916) 632-6800	Fax: (916) 632-6812	Email
Signature: Blake Hovey		

5. Client Information (If different than owner) ☐ General Contractor ☐ Insurance Company ☐ Architect ☐ Property Manager ☐ Other _____

Name			
Address	City/State	Zip: 95678	
Contact	Phone	Fax	Email

6. Have all of the suspect materials that will be disturbed been sampled?	■ Yes ☐ No

If no, explain why:

7. Summary of Total Asbestos Containing Material (ACM) Findings

Regulated Asbestos Containing Material (RACM) (Includes materials subject to known mechanical removal and fire damaged materials)			Category II		Category I	
Square Ft.	Linear Ft.	Cubic Ft.	Square Ft.	Linear Ft.	Square Ft.	Linear Ft.

To receive future SMAQMD Rule updates and changes affecting your industry (check one box):

☐ Please send e-mail notices to	☐ I will sign up myself at www.airquality.org/listserve/ to receive emailed notices.
■ I am already subscribed.	☐ I want the District to mail notices to the address on this application: ☐ Owner ☐ Consultant

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Asbestos Renovation/Demolition Notification Form

777 12th Street, 3rd Floor
Sacramento, CA 95814
Office (279) 207-1122
Fax (279) 207-1144
Asbestos@airquality.org

1	Building Department Permit Application # (if known) : _____	☑ Renovation (Do not complete Section 5) ☐ Demolition (Complete all sections) ☐ Ordered Demo - Attach ordered demo letter ☐ Emergency Demo - SMAQMD Emergency #: _____

2	Contractor	Owner
	Address	Address
	City, State / Zip	City, State / Zip
	Email	Email
	Telephone	Telephone

3	Structure Name	Renovation Area	# of Floors
	Project Address	City / Zip	Year Built

4	**Preference for return of form**	☐ **E-mail :**	☐ **Other :**

DEMOLITION ONLY – Start date must be at least 10 working days from the day of your postmark or hand delivery of this form.

5	Start Date _____ _____ _____ Completion Date _____ _____ _____	Revision # 1 2 3 4 5 6 7 8 9 (circle) New Start Date _____ _____ _____ New Completion Date _____ _____ _____
	Method of Demo (Check Applicable): ☐Manual/Hand Tools ☐Mechanical/Heavy Equipment ☐Other	
	Procedure to be followed if RACM is found or Category II material becomes friable:	

I have read and understand the directions. The information on this form is true and accurate.
I certify that the asbestos survey conducted represents the facility as built.

6	Applicant Name (Print)	☐ Owner ☐ Rep / Agent ☐ Contractor	**Permit may be issued on:**
	Phone Number		
	Applicant's Signature	Date	

Have DOSH Consultant complete and sign below OR attach completed Asbestos Survey Form and Consultant's report.

CONSULTANT USE ONLY

Company Name Entek Consulting Group, Inc.		Telephone (916) 632-6800	
Surveyor Name Blake Howes		DOSH # 13-5015	Survey Date
Analytical Method		Pt Count Materials <10%? ☐Yes ☑ No ☐ Declined by Client	
Amount of RACM	Square Feet	Linear Feet	Cubic Feet
Amount of Category I		Amount of Category II	
Project Address		City Sacramento	Zip 95815
Suspect Materials Present? ☑Yes ☐ No		Consultant's Signature	

SMAQMD USE ONLY

Date Received / Date Postmarked _____ Date Approved & Returned _____

Project # _____ Check # _____ Receipt # _____ Amount Paid _____ Staff _____

APPENDIX B

LEAD RELATED DOCUMENTS

- Lead in Paint Samples Analysis Report From Microtest
- Bulk Lead Material Analysis Request Form for Entek
- Lead Bulk Sample Location Drawing
- Lead Hazard Evaluation Report (CDPH 8552)

MicroTest Laboratories, Inc. | AIHA ELPAT #160934
3110 Gold Canal Dr, Ste. A, Rancho Cordova, CA 95670
PH 916.567.9808 | FX 916.404.0302
www.microtestlabsinc.com | service@microtestlabsinc.com

****for office use only****

Project ID

L32602-08

CLIENT INFORMATION

Company	Entek Consulting Group, Inc
Name	Ryan Metzen
Address	4200 Rocklin Road, Suite 7 Rocklin, CA 95677
Phone	916.632.6800
Email	mainoffice@entekgroup.com rmetzen@entekgroup.com

SAMPLE

Date	Tuesday, June 6, 2023
Time	

MicroTest Laboratories

Analytical Data

JOB SITE INFORMATION

Sampler	Karl Suarez and Gerald Moralez
Project	City of Sacramento
Site	Sacramento News and Review Building
Address	1124 Del Paso Blvd Sacramento, CA
Job #	23-6713

EPA METHOD 7420/7000B

Client Sample ID	Laboratory Sample ID	Client Sample Location / Description	Matrix	Results	Units	Reporting Limits	Results Comments	Units
ECG-23-6713-01Pb	L323602	White Paint on Drywall Wall System, West Wall in Southeast Storage Room	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6713-02Pb	L32603	Red Paint on Drywall Wall System, South Wall in Systems Office	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6713-03Pb	L32604	Black Paint on Drywall Wall System, Southeast Corner in North East Conference Room	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6713-04Pb	L32605	4" x 6" White Ceramic Wall Tile, South Restrooms	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6713-05Pb	L32606	2" x 2" Brown Ceramic Floor Tile, South Restrooms	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6713-06Pb	L32607	Red Epoxy Coating on Concrete, Center of Southeast East Storage Room	Paint	<0.01%	Wt %	0.01%	<100	PPM
ECG-23-6713-07Pb	L32608	White Paint on Concrete Masonry Unit Block Under Stairs, South Wall in Southeast Storage Room	Paint	<0.01%	Wt %	0.01%	<100	PPM

Date Received:	Tuesday, June 6, 2023
Date Analyzed:	Wednesday, June 7, 2023
Date Reported:	Friday, June 9, 2023

Samples Received: 7

Samples Analyzed: 7

Analyst: **Erich Bowman**

Authorized Signatory:

Kelly Favero - Lab Manager

This report applies to the standards and procedures indicated and to the specific samples analyzed. Samples have NOT been corrected for blank values. EPA 3050B Hotblock Preparaton Method

L32602-08

ENTEK

BULK LEAD MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.
4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: 6/6/23

Job Number: 23-6713

Client Name: City of Sacramento

Site Address: Sacramento News & Review Building
1124 Del Paso Blvd,
Sacramento, CA

Lab: MicroTest

Collected by: Karl Suarez & Gerald Moralez

Turnaround Time: Friday, 6/9/23, End of Day

ANALYSIS REQUESTED: Lead by Flame Atomic Absorption Spectroscopy

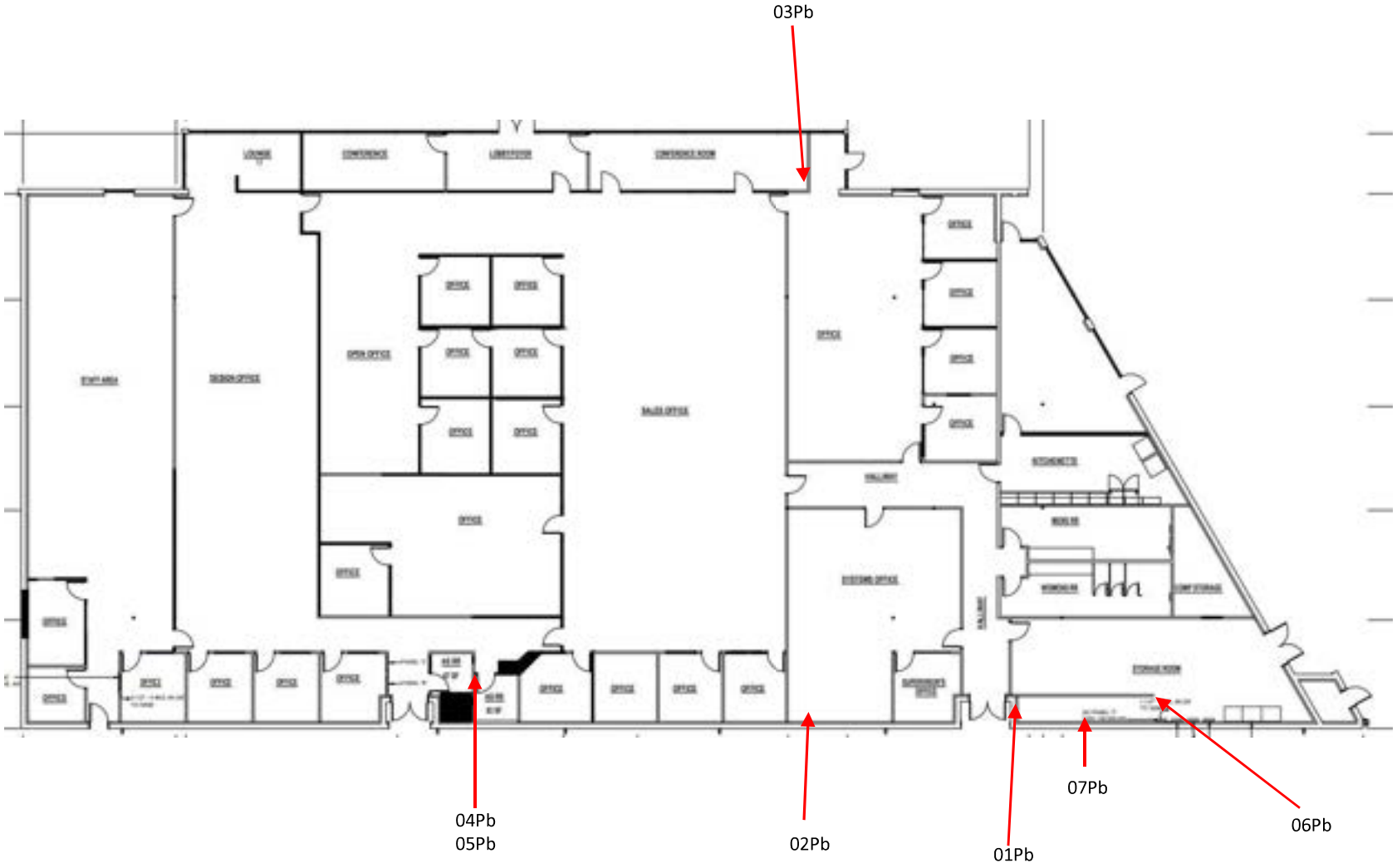
Special Instructions: *Please report result in PPM and % by weight. Please email results as soon as possible.*

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-23-6713-01Pb	White Paint on Drywall Wall System, West Wall in Southeast Storage Room
ECG-23-6713-02Pb	Red Paint on Drywall Wall System, South Wall in Systems Office
ECG-23-6713-03Pb	Black Painton Drywall Wall System, Southeast Comer in North East Conference Room
ECG-23-6713-04Pb	4" x 6" White Ceramic Wall Tile, South Restrooms
ECG-23-6713-05Pb	2" x 2" Brown Ceramic Floor Tile, South Restrooms
ECG-23-6713-06Pb	Red Epoxy Coating on Concrete, Center of Southeast East Storage Room
ECG-23-6713-07Pb	White Paint on Concrete Masonry Unit Block Under Stairs, South Wall in Southeast Storage Room

Delivered by: _____ **Date:** 6/6/23 **Time:** 12:43 AM/PM

Received by: _____ **Date:** 6/6/23 **Time:** 12:43 AM/PM

N



City of Sacramento Sacramento News & Review Building 1124 Del Paso Boulevard Sacramento, CA 95815	Entek Consulting Group, Inc. 4200 Rocklin Road, Suite 7 Rocklin, CA 95677 Map Not to Scale	Bulk Lead Sample Locations Collected by Karl Suarez & Gerald Moralez On June 6, 2023 Project Number 23-6713

Cloud\

LEAD HAZARD EVALUATION REPORT

Section 1 — Date of Lead Hazard Evaluation 5/23/23

Section 2 — Type of Lead Hazard Evaluation (Check one box only)

☑ Lead Inspection ☐ Risk assessment ☐ Clearance Inspection ☐ Other (specify) _____

Section 3 — Structure Where Lead Hazard Evaluation Was Conducted

Address [number, street, apartment (if applicable)]	City	County	Zip Code
1124 Del Paso Boulevard	Sacramento	Sacramento	95815

Construction date (year) of structure: 1940's

Type of structure: ☐ Multi-unit building ☐ School or daycare ☐ Single family dwelling ☑ Other Office Building

Children living in structure? ☐ Yes ☑ No ☐ Don't Know

Section 4 — Owner of Structure (if business/agency, list contact person)

Name	Telephone number
City of Sacramento	916-808-3476

Address [number, street, apartment (if applicable)]	City	State	Zip Code
5730 24th Street, Building 4	Sacramento	California	95822

Section 5 — Results of Lead Hazard Evaluation (check all that apply)

☑ No lead-based paint detected ☐ Intact lead-based paint detected ☐ Deteriorated lead-based paint detected

☐ No lead hazards detected ☐ Lead-contaminated dust found ☐ Lead-contaminated soil found ☐ Other _____

Section 6 — Individual Conducting Lead Hazard Evaluation

Name	Telephone number
Entek Consulting Group, Inc. - Karl Suarez	(916) 632-6800

Address [number, street, apartment (if applicable)]	City	State	Zip Code
4200 Rocklin Road, Suite 7	Rocklin	CA	95677

CDPH certification number	Signature	Date
11068		6/8/23

Name and CDPH certification number of any other individuals conducting sampling or testing (if applicable)

N/A

Section 7 — Attachments

A. A foundation diagram or sketch of the structure indicating the specifc locations of each lead hazard or presence of lead-based paint;
B. Each testing method, device, and sampling procedure used;
C. All data collected, including quality control data, laboratory results, including laboratory name, address, and phone number.

First copy and attachments retained by inspector

Second copy and attachments retained by owner

Third copy only (no attachments) mailed or faxed to:

California Department of Public Health
Childhood Lead Poisoning Prevention Branch Reports
850 Marina Bay Parkway, Building P, Third Floor
Richmond, CA 94804-6403
Fax: (510) 620-5656

APPENDIX C

BACK UP DOCUMENTS

- Site Map
- Photo Log
- Inspector Accreditations and Certifications
- Laboratory Accreditations for Asbestos, Lead and Non-Viable Mold Analysis

N



City of Sacramento Sacramento News & Review Building 1124 Del Paso Boulevard Sacramento, CA 95815	Entek Consulting Group, Inc. 4200 Rocklin Road, Suite 7 Rocklin, CA 95677 Map Not to Scale	Site Map Project Number 23-6713

Photo Log

Job Number:	23-6713	Date:	6/6/23
Client:	City of Sacramento		
Site Address:	Sacramento News & Review Building – 1124 Del Paso Boulevard, Sacramento, CA 95815		

	
View of the front receptionist desk area near the main entrance into the building	Additional view inside of the building
	
View of the exposed ceiling deck	Additional view of the exposed ceiling deck

Photo Log

Job Number:	23-6713	Date:	6/6/23
Client:	City of Sacramento		
Site Address:	Sacramento News & Review Building – 1124 Del Paso Boulevard, Sacramento, CA 95815		

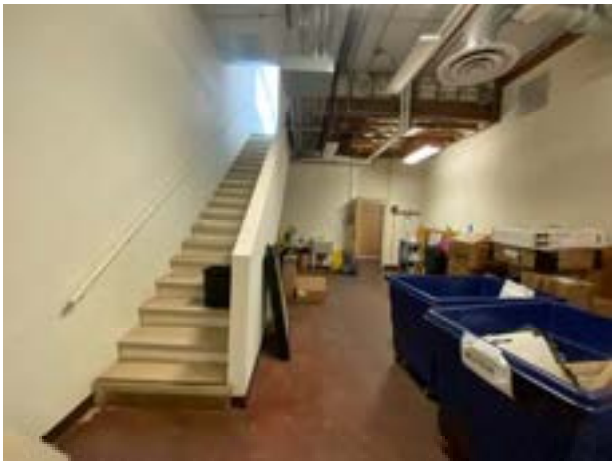
	
Additional view inside of the building	View of an office area inside of the building
	
View inside of the back storage room	View of the stairs leading to the second floor annex off of back storage room

Photo Log

Job Number:	23-6713	Date:	6/6/23
Client:	City of Sacramento		
Site Address:	Sacramento News & Review Building – 1124 Del Paso Boulevard, Sacramento, CA 95815		

	
View of the vinyl floor covering on the stairs to the second floor annex	Back server/computer room
	
Landing of the second floor annex	View within the room of the second floor annex

State of California
Division of Occupational Safety and Health

Certified Site Surveillance Technician



Karl S Suarez
Name

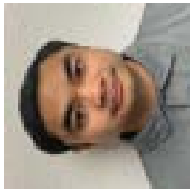
Certification No. 21-6935

Expires on 11/19/23

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC HEALTH

LEAD-RELATED CONSTRUCTION CERTIFICATE

INDIVIDUAL:	CERTIFICATE TYPE:	NUMBER:	EXPIRATION DATE:
	Lead Inspector/Assessor	LRC-00011068	4/7/2024
	Lead Sampling Technician	LRC-00008454	3/25/2024

Karl Suarez

Disclaimer: This document alone should not be relied upon to confirm certification status. Compare the individual's photo and name to another valid form of government issued photo identification. Verify the individual's certification status by searching for Lead-Related Construction Professionals at www.cdph.ca.gov/programs/clppb or calling (800) 597-LEAD

State of California
Division of Occupational Safety and Health
Certified Asbestos Consultant



Name **Blake W Howes**

Certification No. **13-5015**

Expires on **04/17/24**

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.

California Department of PublicHealth

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC HEALTH

LEAD-RELATED CONSTRUCTION CERTIFICATE

INDIVIDUAL:	CERTIFICATE TYPE:	NUMBER:	EXPIRATION DATE:
	Lead Inspector/Assessor	LRC-00003315	9/27/2023

Blake Howes

Disclaimer: This document alone should not be relied upon to confirm certification status. Compare the individual's photo and name to another valid form of government issued photo identification. Verify the individual's certification status by searching for Lead-Related Construction Professionals at www.cdph.ca.gov/programs/clppb or calling (800) 597-LEAD

California Department of PublicHealth

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC HEALTH

LEAD-RELATED CONSTRUCTION CERTIFICATE

INDIVIDUAL:	CERTIFICATE TYPE:	NUMBER:	EXPIRATION DATE:
	Lead Sampling Technician	LRC-00010718	12/28/2023
	Lead Supervisor	LRC-00005992	4/8/2023

Gerald Moralez Jr

Disclaimer: This document alone should not be relied upon to confirm certification status. Compare the individual's photo and name to another valid form of government issued photo identification. Verify the individual's certification status by searching for Lead-Related Construction Professionals at www.cdph.ca.gov/programs/clpph or calling (800) 597-LEAD

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 101442-0

ASBESTECH

Rancho Cordova, CA

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2022-07-01 through 2023-06-30

Effective Dates

For the National Voluntary Laboratory Accreditation Program

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, CA 95670
Mr. Tommy Conlon
Phone: 916-481-8902 Fax: 916-481-3975
Email: asbestech@sbcglobal.net
http://www.asbestechlab.com

ASBESTOS FIBER ANALYSIS **NVLAP LAB CODE 101442-0**

Bulk Asbestos Analysis

Code	*Description*
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

Airborne Asbestos Analysis

Code	*Description*
18/A02	U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.

For the National Voluntary Laboratory Accreditation Program

CALIFORNIA STATE

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

CERTIFICATE OF ENVIRONMENTAL LABORATORY ACCREDITATION

Is hereby granted to

MicroTest Laboratories, Inc.

3110 Gold Canal Drive

Rancho Cordova, CA 95670

Scope of the certificate is limited to the
"Fields of Accreditation"
which accompany this Certificate.

Continued accredited status depends on compliance with applicable laws and regulations, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of
Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **2974**

Effective Date: **7/1/2022**

Expiration Date: **6/30/2024**

Sacramento, California
subject to forfeiture or revocation

Christine Sotelo, Program Manager
Environmental Laboratory Accreditation Program

CALIFORNIA STATE
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Fields of Accreditation

MicroTest Laboratories, Inc.

3110 Gold Canal Drive
Rancho Cordova, CA 95670
Phone: 9165679808

Certificate Number: **2974**
Expiration Date: **6/30/2024**

Field of Accreditation: 114 - Inorganic Constituents in Hazardous Waste			
114.345	002	Antimony	EPA 6020 B
114.345	003	Arsenic	EPA 6020 B
114.345	004	Barium	EPA 6020 B
114.345	005	Beryllium	EPA 6020 B
114.345	006	Cadmium	EPA 6020 B
114.345	008	Chromium	EPA 6020 B
114.345	009	Cobalt	EPA 6020 B
114.345	010	Copper	EPA 6020 B
114.345	012	Lead	EPA 6020 B
114.345	016	Nickel	EPA 6020 B
114.345	018	Selenium	EPA 6020 B
114.345	021	Thallium	EPA 6020 B
114.345	023	Zinc	EPA 6020 B
114.345	024	Molybdenum	EPA 6020 B
114.515	001	Lead	EPA 7420
114.545	001	Mercury	EPA 7471 B
Field of Accreditation: 115 - Leaching/Extraction Tests and Physical Characteristics of Hazardous Waste			
115.055	001	Waste Extraction Test (WET)	CCR Chapter11, Article 5, Appendix II
115.085	001	Toxicity Characteristic Leaching Procedure (TCLP)	EPA 1311
Field of Accreditation: 121 - Bulk Asbestos Analysis of Hazardous Waste			
121.010	001	Bulk Asbestos	EPA 600/M4-82-020

As of 7/1/2022 , this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

NSHL- Roofing and Remodel

MANDATORY SITE WALK SIGN-IN SHEET FOR AUGUST 5, 2025 at 10:00 AM
1124 Del Paso Blvd.

	NAME	COMPANY	PHONE	EMAIL ADDRESS
1	Ezra Roati	City Of Sacramento	916-808-5877	eroati@cityofsacramento.org
2	Kirsten Wise	City Of Sacramento	916-808-4011	kwise@cityofsacramento.org
3	TERRY HOLMES	SWINERTON	415 463 0843	TERRY.HOLMES@SWINERTON.COM
4	Kevin Clendenin	Swinerton	415 918 7258	Kevin.Clendenin@swinerton.com
5	Ryan Lopez	Whiting-Turner	(916)-597-3409	ryan.lopez@whiting-turner.com
6	Jared May	Whiting-Turner	279-336-0450	jared.may@whiting-turner.com
7	Mark Norris	Collins Elec	916-849 4323	MNorris@collinselectric.com
8	Daniel Belcher	Swinerton	209.217.6484	Daniel.Belcher@swinerton.com
9	Josh Dahl	Airco Mech	916 381 4523	Joshd@Aircomech.com
10	Charlie Munns	Otto Construction	916 605 8064	cmunns@ottoconstruction.com
11	[illegible]	DFJ Flooring	209-603-0015	[illegible]@DFJFlooring.com
12	Samantha Bockie	Swinerton Builders	916 203 0359	Samantha.Bockie@swinerton.com

MANDATORY SITE WALK SIGN-IN SHEET FOR AUGUST 5, 2025 at 10:00 AM
1124 Del Paso Blvd.

13	Michael Coss	Gilbane	916-802-8247	mcoss@gilbaneco.com
14	JASON TABACCO	UNGER CONSTRUCTION	916 803 3300	jtabacco@ungerconstruction.com
15	Sammy Luther	Unger Construction	916 599 1053	sluther@ungerconstruction.com
16	Jeff Silva	Staxx inc	209-641-3151	Jeff@staxxinc.com
17	Bryan Risse	Iron mech	916-532-8029	brisse@ironmechanical.com
18	Jordan Overstreet	Iron Mechanical	530-718-0339	Joverstreet@Ironmechanical.com
19	Oscar Quintana	Parc Environmental	559-815-0965	OQuintana@parcenvironmental.com
20	TOM KLEIN	WHITING-TURNER	925 202 6087	Thomas.klein@whiting-turner.com
21	Sean McHugh	SUA	408-568-6226	smchugh@suainc.com
22	Eric Horton	ACCO	916-275-9859	ehorton@accoes.com
23	Tim Hicks	Frontier Fire Protection	916-488-2052	Tim@frontierfp.com
24	Glen Kuehne	" " "	(916) 712-4275	Glen@frontierFP.com
25	Bob Kemp	Absolut Electric	916 883-2568	BKemp@absolutelectricinc.com

MANDATORY SITE WALK SIGN-IN SHEET FOR AUGUST 5, 2025 at 10:00 AM
1124 Del Paso Blvd.

26	Ryder Phillips	Swinerton	916-296-6038	RPhillips@swinerton.com
27				
28				
29				
30				
31				
32				

City of SACRAMENTO

ADDENDUM #2
North-Sacramento Hagginwood Library
08.18.2025

BID DUE DATE HAS BEEN EXTENDED TO 8/26/2025 at 2:00 PM.

Questions Received via Email:

1. Q: Detail 8/S1.01 includes a concrete curb detail. Please provide direction as to where these curbs are to be installed, if any.
    A. **Detail 8/S1.01 is intended to be utilized for Type B partitions. These partitions are used in the Room 21 AG Restroom and Room 24 Children's Restroom. Please see A2.01 and 6/A11.02. Note: This answer supersedes answer from Addendum #1.**

2. Q: Specification 095100 2.3 A. calls for Fine Fissured with linear plank pattern (second look). Item 4 calls for LR .85 while specified tile only has .82. Item 5 calls for NRC .65 while specified tile only has .55. Please confirm we are to provide Fine Fissured secondlook even though it doesn't meet performance requirements. Finish schedule also calls for Fine Fissured.
    A. **Acoustical ceiling tile should be 24" x 48" per Reflected Ceiling Plan on A9.00. The Fine Fissured model shall still be used, .82 light reflectance is acceptable.**

3. Q: On A10.10, the finish schedule calls for wall panels to be tackboard. Specification 098413 Part 2 calls for Armstrong SoundSoak standard acoustical wall panel which is not tackable. Please confirm which is correct.
    A. **The tackboards are not acoustical wall panels and need to be tackable. Refer to Specification section 10 11 43 – Tackable Wallboard Systems is provided in this addendum response.**

4. Q: Detail 24/A11.06 shows details for ceiling clouds but this detail is for a specific Ecophon product. Specified product is by CSI so this method is not an option. Please provide required mounting method from CSI's options.
    A. **CSI product to be suspended similar to methods shown in 24/A11.06, incorporating the 'Profile Cloud 008' manufacturer installation instructions are provided in this addendum response. It is still required to provide 1 horizontal sway cable at each row of ceiling clouds continuous wall to wall per 23/A11.06. Follow other notes included in detail 24/A11.06.**

5. Q: On page A10.01 - Door & Window Schedules, 1GL says to have gray tint insulating glass can you please confirm if interior glass is to be gray tinted.
    A. **Interior windows shall be clear tempered glazing. Please note glazing shall be safety glazing type where window is within 24" radius/distance of adjacent door edge in closed position, and less than 60" above adjacent walking surface. Contractor to**

provide Shop Drawings of all doors and windows to confirm safety glazing locations prior to fabrication.

6. Q: There are two sets of mechanical plans. One is in the "remodel" set and the other is in the "roof" set. The mechanical equipment schedule is different on each set, and the drawing dates are very different. The "roof" mechanical set is dated 8/10/23 while the "remodel" mechanical set is dated 5/23/25. Also, the "roof" set shows the heat pumps as add alternate #1 on sheet M0.01, but that doesn't match up with your description of the alternates in the Bidders description. We're assuming the "remodel" set dated 5/23/25 is to be used for bidding - Please confirm.
    A. **All 'remodel' sheets that are duplicates of sheets included in the 'roof' set, supersede the 'roof' sheets. Heat pumps are no longer an additive alternate and will be provided as part of scope of this project, including units and installation fully operational.**

7. Q: On the Finish Plan it calls for EXT- Existing Concrete to be finished, what is that product and process?
    A. **See detailed response in Addendum #1. A Specification Section 09 97 23 is being provided with this Addendum.**

8. Q: There is a note on the Structural referencing a Post-tensioned concrete slab, is there post-tensioned cables on this site?
    A. **The existing conditions are understood to be concrete slab-on-grade with standard reinforcement. Please include in your bid GPR scanning of all concrete slabs prior to sawcut and removal. Prior to removing rebar or other reinforcing, an assessment will be made by Structural Engineer of Record (SEOR) hired by City and scope defined prior to patch-back. Care should be taken to avoid cutting rebar or damaging existing utilities under slab. Note: There is no known post-tensioned slabs on this site.**

9. Q: Bid Bond takes approximately 2 weeks to receive and we are still assembling our pricing, so we will not be able to order the bid bond based on our proposal amount. How should we proceed?
    A. **Bid bond amount should reflect the Engineer's Estimate on cost for construction.**

10. Q: Temp Security Camera and Interior Snapshot shown in the General Conditions cost breakdown. I wanted to confirm if there were locations you had in mind both Exterior and Interior for where the City would like temporary cameras?
    A. **Temporary cameras are to be: One (1) interior camera should be 360 view and cover the front entrance door and One (1) exterior camera should be 360 view and cover front entrance door and surrounding site. Each camera will be field-located with the selected team.**

11. Q: Please confirm the use of the specified sheet vinyl (SV-1) Tarkett sheet vinyl, style: Iconik, since this is a residential product made in Europe.

   A. **Bid SV-1 as Tarkett Sheet Vinyl, series iQ Granit, 2 mm thick, roll. Color to be Granit Warm Grey 0296. Install with adhesive, cove up the wall and welded seams. We will re-evaluate the final selection during the Submittal process to assess product availability. Provide 10% additional attic stock. SV-2 is not utilized, Loft Storage 39 shall be SV-1 finish.**

12. Q: Please confirm the style of carpet tile (CPT-1), since there's a discrepancy; the specifications list style: TextureMap and the Finish Plan lists style: Painted Desert.
    A. **CPT-1 is Painted Desert G0065 series, in Warm Adobe 65409 color. Install with manufacturer-approved adhesive using 24"x24" tiles and provide 10% additional attic stock.**

13. Q: Regarding Sheet S2.1 & detail C/S3.1: The Roof Plan sheet (S2.1) provides a note "Provide Replacement or Additional FRMG at missing truss TYP as occurs". The detail referenced for this condition (C/S3.1) denotes " Typical New Truss Elevation (As required at damaged trusses).
    A. **Framing per C/S3.1 shall be installed at all missing and damaged trusses. Final Quantity is TBD. For bidding purposes, include additional framing following detail C/S3.1 at (10) existing damaged trusses and (3) new trusses at missing locations.**

14. Q: Please clarify if a NEW truss is to be installed at damaged truss location(s)? If new truss is required, please provide quantities of damaged trusses for bidding purposes.
    A. **No, damaged trusses that are repairable need to have additional framing installed per structural details. For bidding purposes, see quantities for new and repaired trusses related to C/S3.1 in Question 12 answer.**

15. Q: Roof plan only shows one location for the missing truss. Please confirm the new truss framing requirement per detail C/S3.1 occurs at only one location? If not, please provide quantity for bidding purposes.
    A. **Final quantity of missing trusses needs to be verified. For bidding purposes, refer to Question 12 answer for new truss quantity at missing locations following detail C/3.1 and verify final quantity based on field conditions during construction.**

16. Q: Regarding Sheet S2.1: The Note "TYP AT ALL TRUSSES UNO" located left of the elevation tag "B/S3.1" which is located near gridline C and GL1.8, please confirm if the work is to apply to all of the trusses within the building or only the trusses between GL 1 & 2? Please provide quantity for bidding purposes.
    A. **Scope for "trusses" only occurs between grid lines 1 and 2. For bidding purposes, we estimate (45) total trusses will be installed at completion minus the (13) quantity provided in Question 12, so elevation B/S3.1 should occur at (22) trusses.**

17. Q: Structural: The Holdown or Lateral tie (HDU5, HTT4 & LTTP2) hardware installation requirements throughout the project are noted to be installed at "...(E) GROUTED CELLS, VIF". Please confirm the existing CMU wall is to be considered fully grouted for bidding purposes.

   A. **The existing CMU masonry wall is not fully grouted. For bidding purposes, assume all CMU cells are empty and need to be treated accordingly with injectable mortar adhesive at each anchor embedment. If grouted cells are discovered during construction, standard anchoring can occur.**

18. Q: Regarding the shoring requirements notes on the Roof replacement permit set on Sheet S2.1 for the replacement of the 2x10 existing wood member, would you please provide the loads the shoring is the support? Additionally, please confirm the shoring location is to span to the adjacent roof members as shown below.
    A. **Roof dead load is 13psf, roof live load is 20psf, and mechanical unit weights are per contract documents. Per B/S0.1 note 7, shoring is the GC's responsibility. Include costs for shoring to protect existing framing during structural retrofit at this location mentioned and all other locations.**

19. Q: Keynote D.01 on D2.01 states to "remove casework, casework to be salvaged by owner." The removal of the casework will likely be unsalvagable. Please clarify the intent to salvage the casework.
    A. **Casework that is set for demolition does not need to be salvaged. Plan to remove casework from the site, unless it is planned to be protected on-site or reused elsewhere.**

20. Q: It states that it is construction type VB which does not require any fireproofing. The spec calls for a cementitious fireproofing for steel. Is there any fire proofing required?
    A. **No fireproofing is required at exterior walls. There may be fireproofing required at the interior wall designated for fire protection.**

21. Q: We are having trouble finding Awnex Union installers. Are we able to use non-Awnex Awnings? Currently, the plans and specs have Awnex listed as the "Basis of Design". And/or can we use non-union installers for the Awnigs? Please advise.
    A. **Bid per plans and as detailed in Add #1. Any details with Union installer concerns will be resolved either with a Substitution for a comparable product or by getting an exemption through local union halls.**

22. Q: The Loft area (Storage 39) does not appear on the Finish Floor Plan (A10.10) or the Finish Schedule. However, Keynote 0915 on the Floor Plan (A2.01) calls for the "LOFT TO RECEIVE NEW SHEET VINYL, SV¬2, SEE FINISH SCHEDULE". Please advise if the loft should get any new finishes or not.
    A. **Remove all existing flooring down to plywood sheathing in the loft and stair. Yes, Sheet Vinyl SV-1 should be used in this area. See response on Sheet Vinyl clarification elsewhere on this Addendum. Existing sub-floor in the loft area (storage 39) is plywood, provide SV-1 is Tarkett Sheet Vinyl, series iQ Granit, 2 mm thick, roll. Color to be Granit Warm Grey 0296. Install with cove up the wall and welded seams. Provide 10% additional attic stock. SV-2 is not utilized.**

23. Q: RFI 37 from "Ad 02 08.07.2025" references the grinding, patching, and sealing process the existing concrete labeled, "EXT, EXISTING CONCRETE FLOOR TO RECEIVE TREATMENT" is to receive. The response never gives specific products and it states "A Specification section and additional details including a specified product will be issued with an upcoming Addendum." Please confirm this is still coming as bids are due soon.
    A. **Specification 09 97 23 is provided for concrete sealer as part of this Addendum.**

24. Q: Please confirm the Awnings will be a standard power-coat finish and NOT a custom power-coat finish NOR a standard or custom Kynar finish. Please note custom power-coat finishes and standard or custom Kynar finishes add longer lead times and increase the cost greatly (especially Kynar).
    A. **A standard powder-coat finish will be selected. Selected Contractor to provide color wheel with available colors for final selection during the Submittal process.**

25. Q: Please confirm Item 50 Built-In Furniture (bookshelves, Front Counter, Etc.) from the bid form is NOT in our scope of work (therefore it will be $0). Per Sheet A10.10 Furniture Schedule it has all items "BY OTHERS; NOT IN THIS SCOPE OF WORK". If not please advise on what exactly is included in item 50 that is within our scope of work.
    A. **All built-in furniture is CFCI including millwork, bookshelves, front counter and all other built-in furniture on Plan Sheet F3 and F4 details is CFCI. Refer to the Furniture Plans and provide a bid for all scope as outlined and selected team shall provide Shop Drawings to confirm scope. Ross McDonald is the preferred Library vendor for built-in library stacks as noted on the plans. Any unmarked mobile furniture including modular furniture, chairs, etc. is by Others.**

26. Q: Joint detail at new concrete landings and new asphalt (Ref. 5/A11.01). - Please provide the joint detail for the interface between new concrete landings and new asphalt at building entrances.
    A. **For interface of landing and new asphalt see detail provided on this addendum. For transition of landing with detectable domes and asphalt paving refer to 7/C3.0.**

27. Q: Joint detail at new concrete paving in parking and new asphalt (Ref. 5/A11.01). - Please provide the joint detail for the interface between new concrete paving and new asphalt at parking areas.
    A. **Joint detail for interface of new asphalt with new asphalt paving attached. Install with Sand Seal over all seams to blend old asphalt to new.**

28. Q: Fire-lane curb – location of curb detail and connection between new fire-lane curb and existing curb (Refs. G0.10 and 4/A11.01). - Please indicate the sheet(s) and location of the fire-lane curb detail, and provide the connection detail between the new fire-lane curb and the existing curb.
    A. **Refer to attached sheet G0.10 identifying fire lane curbs to be painted. The existing fire lane is identified in site plan G0.10, also to hatch pattern in Access Site Plan Legend. Connecting detail for new concrete curbs to existing concrete curb to be done**

with 1/2" smooth dowels in direction of the curb, 12' long with 3" minimum embed into curbs, grease half the length, upper and lower dowel as applicable.

29. Q: Per the Tarkett Rep. He stated that the specified SV-1 Tarkett Iconik-Catera Sheet Color Middle Gray and SV-2 Tarkett Fresh Start Color Light Grey are part of Tarkett's European branch. We would not be able to order these materials here is the US. Please verify that this is the correct sheet vinyl styles and colors for this project. If not, please provide the correct materials.
    A. **See question and answer above on this topic.**

30. Q: Please specify the location of the Sanitary Sewer Point of Connection.
    A. **The sanitary sewer point of connection shall be connected to existing piping as indicated on Enlarged Plumbing Floor Plans 2 and 3 on Sheet P2.01. Pothole at existing concrete slab to field-locate main sewer connection point on-site. Any saw-cutting to locate existing sewer is by Contractor.**

31. Q: Per Insulation installation spec 220389 3.3. Please confirm that all exposed ductwork is not insulated.
    A. **Correct, all exposed ductwork does not require insulation. Note: Rigid insulation is added to the roof and the existing insulation is to be reinstalled and faced.**

32. Q: The plans call for a Bobrick B-353 sanitary napkin disposal, which is recessed, but the drawings and keynote indicate it should be wall-mounted. Could you confirm if the correct model is Bobrick 270? The recessed model would not match with partitions.
    A. **Provide Bobrick 270, wall mounted fixture. These shall be installed at each adult All-Gender Restroom and at each stall within the Women's Restroom.**

33. Q: Please confirm the location of the tackboards?
    A. **Tackboard locations can be found in interior elevations on A6.20 and A6.30.**

34. Q: Are the LIBRARY letters that are on the monument sign going to be recessed concrete or are they aluminum letters?
    A. **Letters to be depressed into the concrete of the monument sign. Letters should be 12" high and depressed ½" deep. See 8/A11.01.**

35. Q: Wireless access points appear to be furnished by the Owner. Please provide make/model?
    A. **Correct, these are to be provided and installed by Library, OFCI. See attachment for WiFi data locations, all Wireless Access Points (WAPs).**

36. Q: Will the contractor need to provide a license for the wireless access points? If so, what make/model?
    A. **Library will provide license for each WAP. Quantity and locations outlined on the plans.**

37. Q: Camera's are to be furnished by the Owner. Please provide make/model?

A. **All CCTV cameras and network equipment are to be Contractor Furnished, Contractor Installed (CFCI), including wiring, mounting brackets, etc. For 360 cameras, bid: AXIS P4705-PLVE Panoramic Camera. For all 180 degree cameras, bid for AXIS P3818-PVE Panoramic Camera. Include ceiling-mount brackets and wall-mounted brackets and all cabling for power-over-ethernet cameras. Bid to include switches for cameras: Provide AXIS-approved switches, quantity based on number of cameras and tied into existing network system. Include a BCD BCD-228X-PVS-416S Network Video Recorder (NVR) and an 1.6TB SSD Accelerator Card BCD-SA-BVA-1.6T for NVR. Final equipment selection to be confirmed during the Submittal process.**

38. Q: Whom will be required to provide network equipment? If it is contractor furnished, what make/model?
    A. **All network equipment that is new needs to be provided by Library and installed by Contractor, OFCI. For WiFi Access points, CFCI main server/switch to OFCI serve these units. All existing servers/switches to remain, DO NOT power down the switches during construction, temporary power will need to be provided to the building to keep these servers online throughout construction.**

39. Q: The plan is calling for a 4-port faceplate for data locations (T0.01, Technology Legend). Is it the intention to have (1) cable per triangle (without a number) with a four-port faceplate?
    A. **As explained in Addendum #1, typical data drops are to include (2) cables and (2) port faceplates. In some instances, (4) port faceplates may be required (i.e. at Computer Lab or other high-use areas). It is the intent of the 4-port faceplates to install a single cable in each terminal of the 4-port faceplate locations (4 total) and labeled with each server name and port number.**

40. Q: I see references to projectors which are on the Architectural drawings, are the projectors OFCI? I see on page T0.01 it is calling for a 1" conduit but no other info.
    A. **Projector to be CFCI, Ultra Short Throw Projector, Model No. NP-UM361X manufactured by NEC, per Spec Section 11 90 00 Section 2. Substitutions only accepted during Submittal process with proper documentation. All wiring, mounting brackets and installation by Contractor.**

41. Q: I also see references to speakers are they OFCI? Need more details. I see on page T0.01 it is calling for a 1" conduit but no other info.
    A. **Speakers shall be CFCI, Lowell RPAK-810-72 speakers or equal, all wiring, mounting brackets and installation by contractor. Substitutions only accepted during Submittal process with proper documentation.**

42. Q: The locations marked for Card Readers at interior and exterior doors are clear, but what will be installed there?
    A. **Card Readers are OFCI. Card readers panel shall be STAR Ultra G2 SE w/enclosure, with Power Supply, I8 Eight-Input Reader Bus Module, Access Control Power Controller w/ Charger, 12V 7AH Rechargeable SLA Battery with F1 Terminal. Include**

Signo 40 Wall Mounted Card Readers at all wall-mounted card readers and Signo 20 Mullion Mounted Card Reader with quantities per plan. Each Card Reader location shall include a Request to Exit Sensor, Mushroom Push Button (where occurs), Intrusion IP Control Panel (qty. based on card readers), Universal enclosure, Transformer Plug In, Enclosure lock and key set, Universal Dual Path Communicator, Touch Screen Keypad (where occurs). Card readers panel to meet Library standards. All wiring and installation by contractor. Provide a dedicated circuit to each Card Reader panel and other equipment needs. Provide Submittal and Shop Drawings for confirmation of final equipment needs.

43. Q: The locations marked for Alarm System are shown on plans, but what will be installed?
    A. **Alarm System is by Others, OFOI. Include power to an Intrusion IP Control Panel, Transformer Plug- In and UPS System, Universal Dual Path Communicator, Touch Screen Keypad, Intrusion Power Controller w/ Charger, Emergency Station Button, Motion Sensor, etc. All wiring and infrastructure to these units is by contractor. Provide a dedicated circuit to each Alarm panel and coordination for power to each piece of equipment as outlined on the plans.**

44. Q: The plans call for protection of existing batt insulation, do we need to include reinstallation?
    A. **Yes, include reinstallation of any insulation that falls or needs to be removed as part of the construction process. Bid to include careful removal, set aside and reinstallation with facing as outlined in the plans.**

45. Q: If exposed CMU or concrete wall is damaged on the interior, should we bid to repair?
    A. **Yes, all walls need to be patched for any removed anchors within the interior face of the walls. Patch with concrete Sikaflex or similar and match surrounding texture as closely as possible.**

46. Please provide materials for decomposed granite as outlined in planting keynotes 1-05 on sheets L1.2 and L1.3.
    A. **Bid ¼" minus D.G. in standard color (i.e. Desert Brown), firmly placed in planter boxes and compacted at walkways.**

47. Please specify the size of lateral lines shown on sheets L2.1 and L2.2.
    A. **Bid per plan. ¾" minimum size to each tree or planter area, and larger if required due to run-length. Provide Shop Drawings to confirm sizes and include in bid investigation of existing lateral lines, repair and check for leaks.**

48. Please provide details for the irrigation controller and confirm if the irrigation system shall be conventional or two-wire.
    A. **Bid conventional system, provide Shop Drawings to confirm intent of Irrigation design.**

49. Please confirm if there are existing wires available for all proposed valves connected to the existing mainline.

A. **There are existing wires to all existing valves. Bid to provide new wiring to all new valve locations. Use existing sleeves and re-pull wiring and land at controller and each valve.**

50. Please confirm if mulch is limited to the mulch symbol and callouts at shrubs planter on sheets L1.2 and L1.3.
    A. **Mulch is to be at each landscape planter area, unless noted to receive D.G.**

51. Please provide the geotechnical report.
    A. **There is no Geotechnical Report to provide at this time. We will discuss context for why this would be needed in a landscape setting and provide Geotech Report to the selected Contractor.**

52. Please clarify the scope of bid item 41- Irrigation, Planting, O&M.
    A. **Bid per plans on this line-item. Provide testing and startup of Irrigation Controller and run all zones.**

NOTE: Hazardous Materials Clarifications for soils at the site are as follows:

- For Hazardous Materials information at this site, refer to the attached Case Closure Summary from the County in 2009 (attached). Also attached is a 2021 Indoor Air Sampling (IAS) report that documents no issues were found with the current building configuration with the recommendation that if the building is modified, additional air testing should occur. City will be paying for additional IAS testing.
- There is potential for low levels of PCE and other hazardous compounds in the soils beneath the concrete slab, underneath the parking lot and throughout the site. Any trenching, sawcut, demolition, etc. in the soil requires contractor to provide a minimum of Level D PPE to all workers and subcontractors when working in or handling the soil to minimize exposure.
- City will be hiring an environmental consultant to take air samples from inside the building to reconfirm there are no hazardous levels of PCE within the building. Contractor shall provide access to and coordinate with City consultants for appropriate testing after HVAC system is installed and operational.
- Any soils slated for off-haul from the site must be stored (either in containers or tarp top and bottom) and tested for hazardous materials. Soil removed for trenching can be used for backfill of trenches. All soil testing is by Contractor, with results provided to City. Any soils slated for off-haul and found to contain hazardous materials must be hauled to an appropriate facility and manifested to confirm it is disposed of properly. **Include in your bid cost to test soil, haul a single 10 cubic yard load of soil away from the site and replacement with 10 cubic yards of clean fill as an allowance. Final pricing for off-haul will be determined based on soil testing results.**
- All plumbing, electrical, or other utility penetrations through the concrete slab must be sealed with silicone sealer or approved. Any new floor-mounted toilets require new wax rings and

sealer around all pipes. At all floor drains, trap primers are required meaning water supply and power must be provided.

Geosyntec consultants

3043 Gold Canal Drive, #100
Rancho Cordova, California 95670
PH 916.637.8048
www.geosyntec.com

21 December 2021

Kirk Thompson
Environmental Program Manager
Facilities and Real Property Management, City of Sacramento
5730 24th Street, Building 4
Sacramento, California 95822

Subject: Phase II Vapor Intrusion Investigation Report
1124-1132 Del Paso Boulevard
Sacramento, California

Dear Mr. Thompson,

Geosyntec Consultants, Inc. (Geosyntec) has prepared this Phase II Vapor Intrusion (VI) Investigation Report to summarize the indoor air and sub-slab sampling investigation for the approximately 1.1-acre property located at 1124-1132 Del Paso Boulevard in Sacramento, California (the Site, **Figure 1**). In the Phase I Environmental Site Assessment (ESA) prepared by Geosyntec dated 26 July 2021, an unknown upgradient volatile organic compound (VOC) source, primarily tetrachloroethene (PCE) was identified, that had impacted a property owned by the Sacramento Regional Transit (RT), located adjacent to the southwest and hydraulically upgradient of the Site. Total petroleum hydrocarbons (TPH) and benzene, toluene, ethyl benzene and xylenes (BTEX) were also reported in groundwater samples on the RT property, below regional screening levels and California Maximum Contaminant Limits (MCLs). The source of this contamination has not yet been identified. The finding of elevated concentrations of VOCs reported in groundwater was considered a recognized environmental condition (REC) for the Site.[1] VOCs may be present beneath the Site due to releases from upgradient sources. The objective of this Phase II VI investigation was to assess the potential for VI for the building at the Site. To assess the potential for VI, indoor and outdoor ambient air samples were collected and sub-slab probes were installed and sampled at the Site. Additionally, cross-slab differential pressure monitoring was conducted. The following sections summarize the field activities and results of the VI investigation.

[1] Geosyntec, 2021. Phase I Environmental Site Assessment, 1124-1132 Del Paso Boulevard Sacramento, California. July 2021.

1. INDOOR AND OUTDOOR AIR SAMPLING

Six time-integrated indoor air samples, including five primary and one duplicate sample, were collected in individually-certified, 6-liter Summa canisters over an 8-hour period at the Site on August 12, 2021. The August 2021 indoor air samples were collected during heating, ventilation, and air-conditioning (HVAC)-on conditions. Three additional 8-hour time integrated ambient air samples were collected outside the building to the north, northeast and west (**Figure 2**). Six additional time-integrated indoor air samples were collected at the Site during HVAC-off conditions on November 13, 2021.

The sample canisters were submitted to Eurofins Air Toxics (a National Environmental Laboratory Accreditation Program [NELAP] -certified laboratory) in Folsom, California under chain-of-custody and analyzed for VOCs using United States Environmental Protection Agency (USEPA) Method TO-15 Selected Ion Monitoring (SIM). The Eurofins Air Toxics laboratory reports are included in **Attachment 1**.

2. SUB-SLAB PROBE INSTALLATION AND SAMPLING

Each sub-slab probe was constructed using an assembled Vapor Pin® consisting of a stainless-steel probe, silicone sleeve as a surface seal, and a filter to prevent particulates from the sub-slab from entering the sampling equipment. Five sub-slab sampling probes (VP-1 through VP-5) were installed at the Site on August 12, 2021 and were collocated with the indoor air sample locations. A location map of sub-slab probes is provided as **Figure 2**. Sub-slab probes were installed after all indoor air sampling activities had concluded to prevent possible leakage from the sub-slab floor penetrations to indoor air during indoor air sampling.

Sub-slab probe installation was completed by field personnel using a roto-hammer drill to set the Vapor Pin® and protective cap through the Site's concrete slab. This process included drilling a ⅝-inch diameter hole through the approximately 5-inch thick concrete slab. Vapor Pins® with silicone sleeves were installed as described in the manufacturer standard operating procedure (**Attachment 2**).

2.1 Sub-Slab Vapor Probe Sampling Procedures

Soil vapor sampling from the newly installed sub-slab probes was conducted on August 13, 2021 during HVAC-on conditions. A helium shroud was used during the collection of soil vapor samples at each sub-slab probe. The sampling procedures for collecting soil vapor samples from the sub-slab probes using a helium shroud are described below.

2.2 Purging and Leak Testing

Prior to sample collection at sub-slab probes VP-1 through VP-5, above ground sampling equipment was tested to ensure ambient air was not entrained into the sample. A "shut-in" test was completed once the above ground sampling equipment was assembled at each location. A vacuum of 100 inches of water was applied to the assembled aboveground sampling equipment. Vacuum was monitored for approximately one minute. If the vacuum dissipated during the shut-in test, all aboveground fittings were adjusted in the field, and the test repeated until the sampling equipment held a vacuum for the required time period. The shut-in test at each location was successful prior to sampling.

During the purging process and prior to sample collection, a leak test was performed at each sample location. A shroud filled with approximately 10 to 30 percent helium was placed over the sub-slab probe and all aboveground sampling equipment. The concentration of helium in the shroud was measured using a hand-held field helium detector and recorded. As each sub-slab probe was purged, samples were collected in a Tedlar® bag using a lung box, and the concentration of helium in the Tedlar® bag was measured with a field helium detector. If the concentration of helium was greater than 0.5 percent (or greater than 5 percent of the minimum concentration in the shroud) then all aboveground fittings were adjusted in the field, and a new leak test performed. No leaks were detected in the field prior to sampling at each location.

The purge process consisted of removing a minimum of three volumes of sub-slab soil vapor (approximately 50-75 milliliters [mL] per purge process) from sample tubing and probes prior to sampling to avoid sampling stagnant or ambient air. One purge volume is equivalent to the volume inside the Vapor Pin® added to the volume inside the sample tubing from the probe to the sampling equipment. The total volume of purged sub-slab soil vapor at each location was recorded in the field. Sub-slab soil vapor was purged from each probe using a flow rate between 100 and 200 milliliters per minute (mL/min) to prevent ambient air intrusion and to limit potential VOC stripping that may be adsorbed to sub-slab soil.

2.3 Sub-Slab Sample Collection

Vacuum was maintained at less than 100 inches of water (approximately 7 inches of mercury) during sampling at each probe. Vacuum was measured using an in-line gauge during purging and sampling. The shroud was maintained with approximately 10 to 30 percent helium during sampling at each probe. Each sub-slab soil vapor sample was collected in an individually-certified one-liter Summa™ canister fitted with a 200 mL/min flow controller. After samples were collected,

Summa™ canisters were closed and secured pending shipment to the analytical laboratory under chain-of-custody procedures. The sub-slab probes were additionally removed and backfilled with hydraulic cement.

A quality control (QC) sample (i.e., field duplicate) was collected along with the five primary sub-slab soil vapor samples. All samples were submitted to Eurofins Air Toxics and analyzed for VOCs using USEPA Method TO-15. For quality assurance purposes, samples were analyzed for helium using ASTM D-1946 to assess for potential ambient air leaks in the sampling equipment. The Eurofins Air Toxics laboratory reports are included in **Attachment 1**.

3. CROSS-SLAB PRESSURE MONITORING

Continuous cross-slab differential pressure measurements (i.e. the pressure differential between the sub-slab of the building and ambient indoor air) were collected during HVAC-off conditions to provide an additional line of evidence to complement the sampling program. A TEC DG-1000 anemometer was connected to a temporary sub-slab probe, installed near the center of the building, to measure and record the cross-slab differential pressure. Cross-slab differential pressure measurements were collected every 60 seconds from November 10 to November 13, 2021. The vapor probe was destroyed after the monitoring was completed. Pressure data is presented on **Figure 4**. The differential pressure measurements demonstrate that the building is under-pressurized during HVAC-off conditions.

4. RESULTS

The analytical results from the indoor air and sub-slab samples are presented in **Table 1** and on **Figures 2** (HVAC-on) **and Figure 3** (HVAC-off). A memorandum validating the analytical results is provided in **Attachment 1**. PCE was not reported in any indoor air samples during either HVAC condition. Other VOCs that were reported in indoor air samples under both HVAC conditions were carbon tetrachloride, freon 12, and BTEX at concentrations below commercial screening levels. Concentrations of these compounds in HVAC-on and HVAC-off conditions were generally similar. Although concentrations of BTEX in indoor air samples collected in HVAC-off conditions tended to be higher. VOCs reported in indoor air samples, including BTEX, carbon tetrachloride and freon 12, were also reported in outdoor air samples at similar concentrations, indicating that these concentrations are representative of background/ambient conditions.

PCE was reported in four of the five primary sub-slab soil vapor samples, VP-2 through VP-5, at concentrations ranging from 8.2 micrograms per cubic meter ($\mu g/m^3$) to 300 $\mu g/m^3$. Three of the four sub-slab soil vapor samples, and additionally the duplicate sample collected at VP-5, had

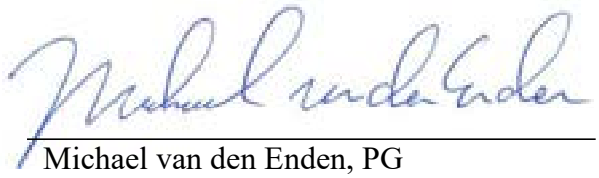
reported PCE concentrations exceeding the commercial screening level of 67 µg/m^3.[2] Other VOCs reported in sub-slab samples included acetone, chloroform, ethanol, 2-propanol and 2,2,4-trimethlpentane at concentrations below screening levels.

Sub-slab samples were analyzed for helium, the tracer gas, to inform on whether a leak in the sampling equipment occurred during sample collection. Helium was detected in two primary sub-slab samples, VP-2 and VP-5, at 0.41% and 2.3%, respectively and in the duplicate sample at 3.9%. As the helium concentrations at VP-5 were more than 5% the minimum helium concentration in the shroud at the time of sampling (20%), this indicates a leak in the sampling train may have occurred at this location which could indicate the results from VP-5 are biased low.

5. CLOSING

Concentrations of PCE in sub-slab samples were above default screening levels for commercial properties; however, PCE was not detected in indoor air samples during HVAC-on or HVAC-off conditions. The HVAC-off results indicate that VI is not occurring under conservative conditions for the building. Further, the results from the cross-slab differential pressure with the HVAC-off analytical results indicate the building-specific attenuation factor is lower (more protective) than the default attenuation factor used to calculate the sub-slab screening levels. Based on the results of this VI assessment, no additional work is proposed at this time to further assess the REC. However, if conditions change (e.g., changes to the building construction or increased subsurface PCE concentrations) additional sampling may be warranted to assess potential VI under the new conditions. Please contact the undersigned if you have any questions regarding this report.

Sincerely,



Michael van den Enden, PG
Senior Geologist



Laura Foot
Project Scientist

[2] DTSC, 2020. HHRA Note 3 Modified Screening Levels for Ambient Air Analytes for Commercial/Industrial Air. June 2020. An attenuation factor of 0.03 was applied to calculate sub-slab screening levels.

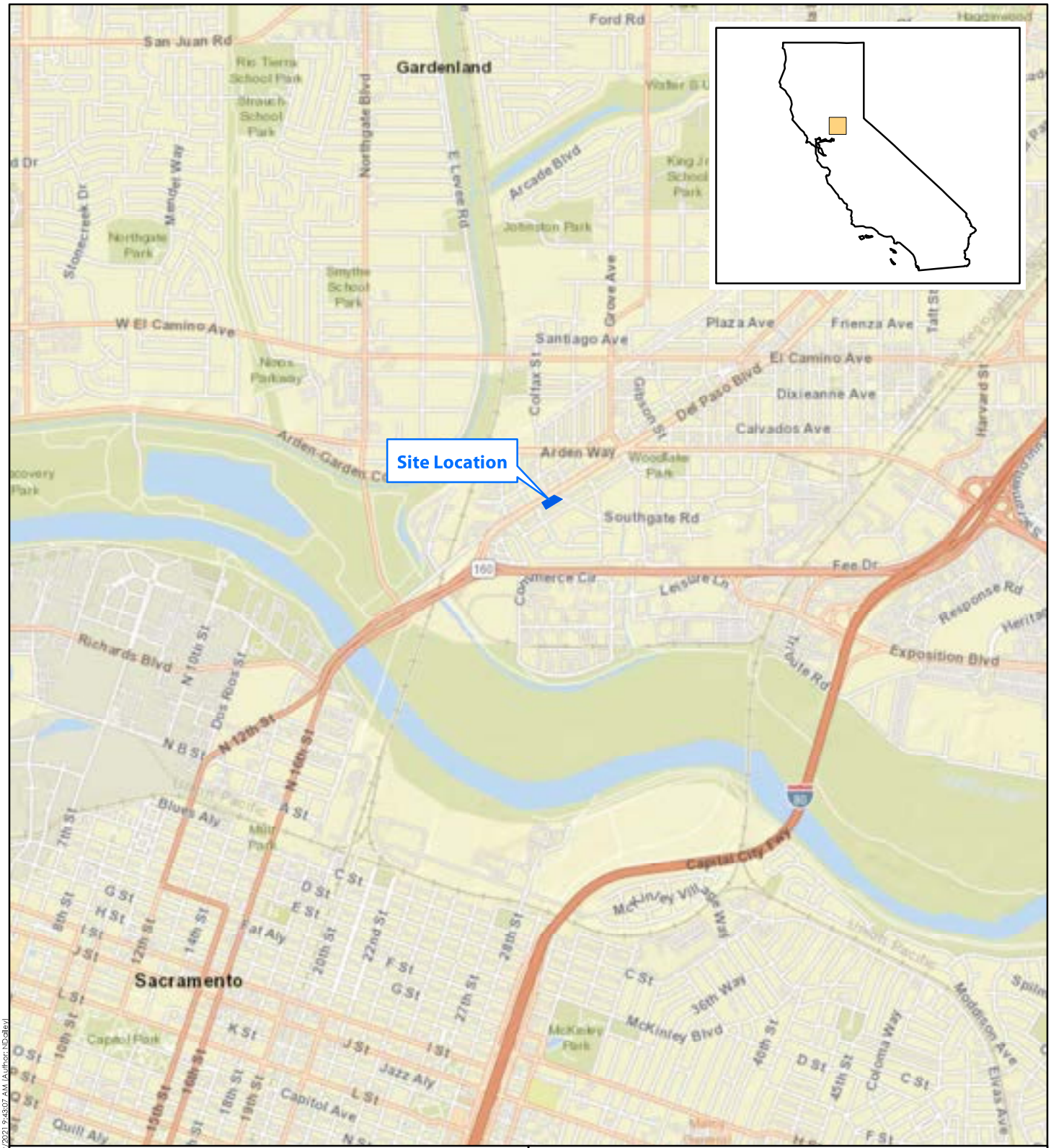
Enclosures:

Figure 1: Site Location Map
Figure 2: Tetrachloroethene (PCE) Analytical Results – HVAC-on
Figure 3: Tetrachloroethene (PCE) Analytical Results – HVAC-off
Figure 4: Cross-Slab Pressure Differential

Table 1: Analytical Results

Attachment 1: Eurofins Air Toxics Laboratory Reports
Attachment 2: Vapor Pin® Standard Operating Procedures

FIGURES



Legend

Site Location

Map Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012

N

0.75 0.375 0 0.75 Miles

P:\GIS\SAC299_SacDelPaso\Project\Fig01_SiteLocation.mxd 7/9/2021 9:43:07 AM (Author: NDaley)

Site Location Map

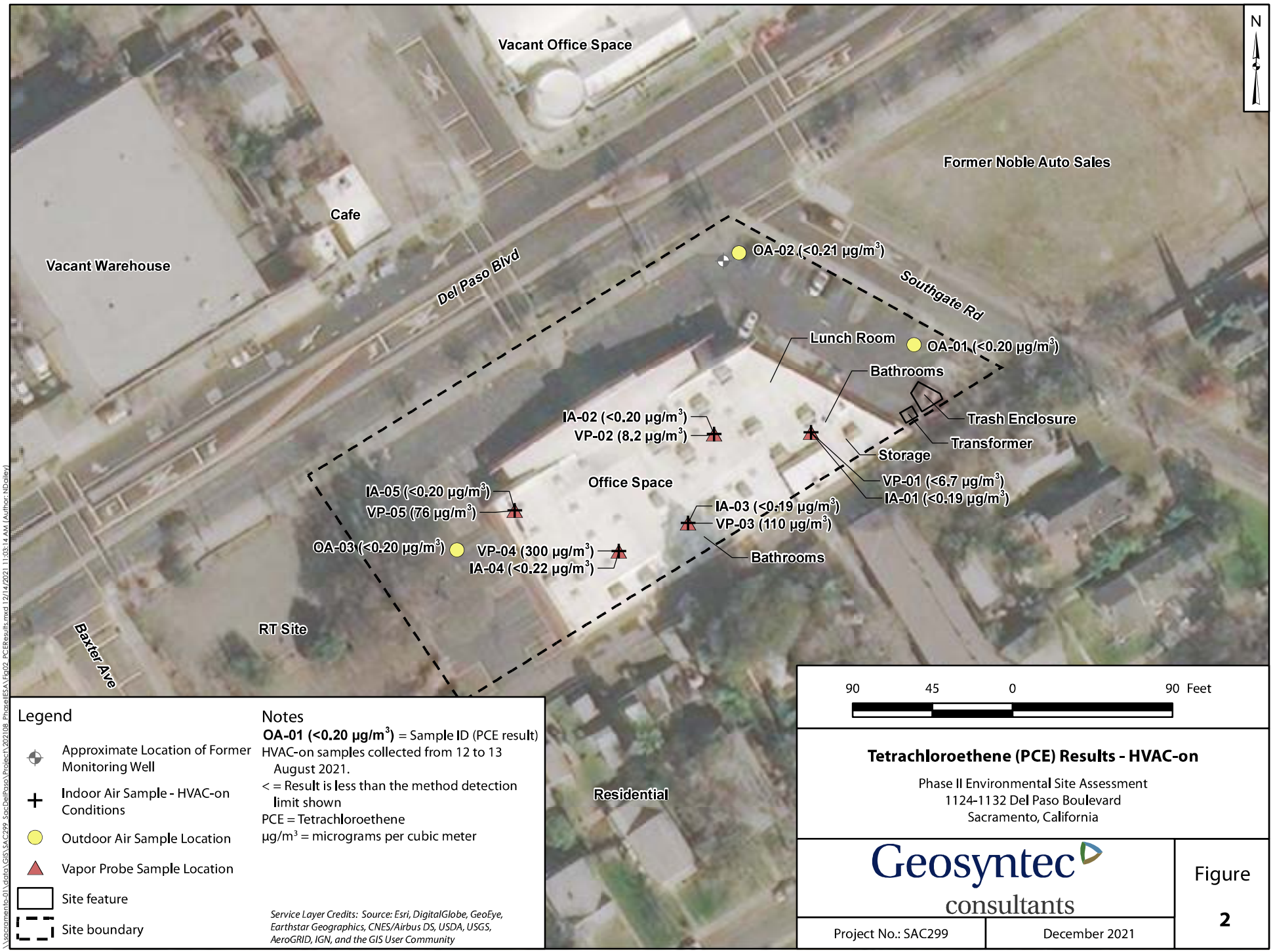
Phase II Environmental Site Assessment
1124-1132 Del Paso Boulevard
Sacramento, California

Geosyntec consultants

Project No.: SAC299

August 2021

Figure 1



Legend

- Approximate Location of Former Monitoring Well
- Indoor Air Sample - HVAC-on Conditions
- Outdoor Air Sample Location
- Vapor Probe Sample Location
- Site feature
- Site boundary

Notes

OA-01 (<0.20 µg/m^3) = Sample ID (PCE result)
HVAC-on samples collected from 12 to 13 August 2021.
< = Result is less than the method detection limit shown
PCE = Tetrachloroethene
µg/m^3 = micrograms per cubic meter

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Tetrachloroethene (PCE) Results - HVAC-on

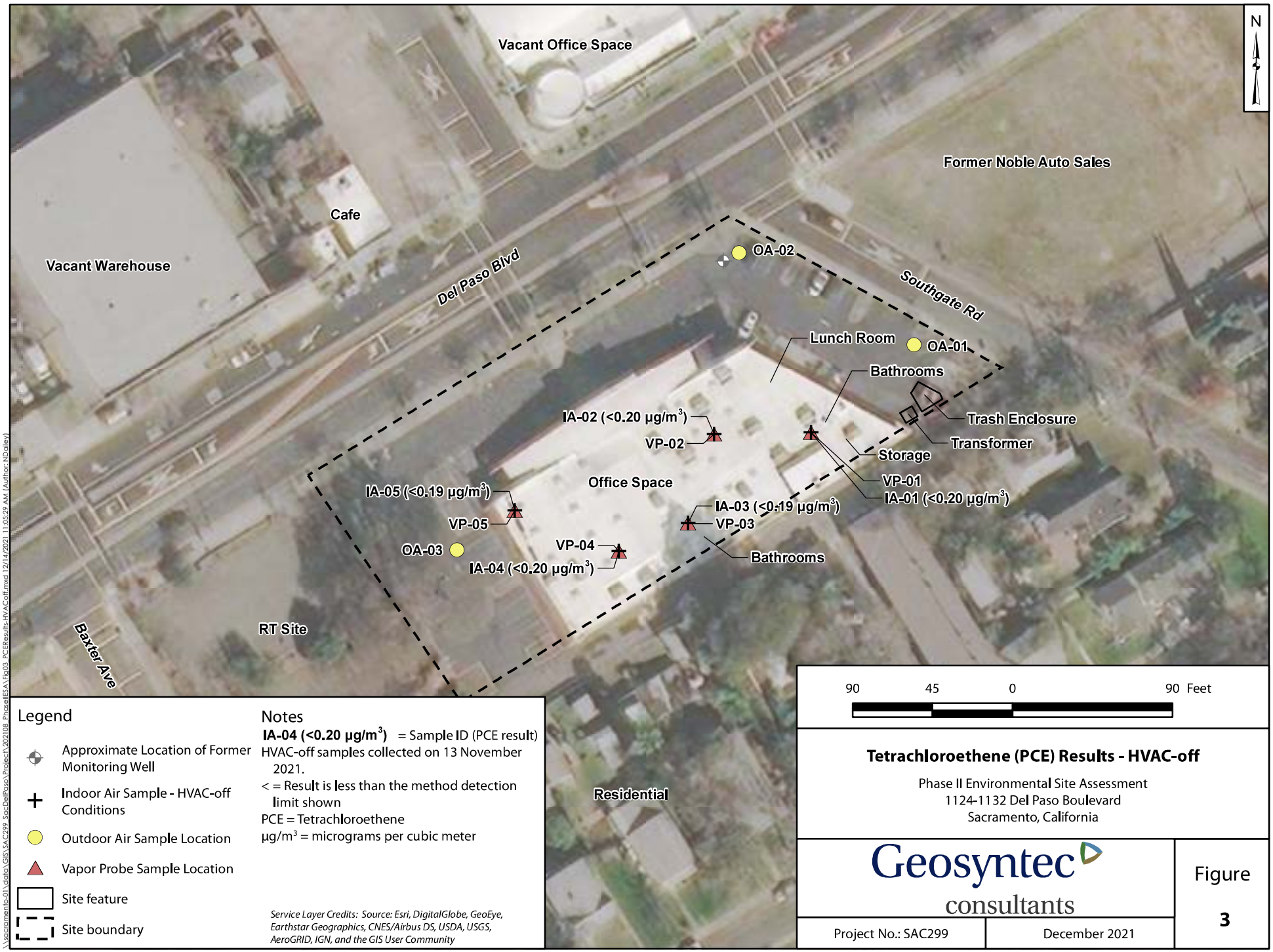
Phase II Environmental Site Assessment
1124-1132 Del Paso Boulevard
Sacramento, California

Geosyntec consultants

Project No.: SAC299 | December 2021

Figure 2

\\sacramento-01\data\GIS\SAC299_SacDelPaso\Project\202108_PhaseIIESA\Fig02_PCEResults.mxd 12/14/2021 11:03:14 AM (Author: NDailey)



Legend

- Approximate Location of Former Monitoring Well
- Indoor Air Sample - HVAC-off Conditions
- Outdoor Air Sample Location
- Vapor Probe Sample Location
- Site feature
- Site boundary

Notes

IA-04 (<0.20 µg/m^3) = Sample ID (PCE result)
HVAC-off samples collected on 13 November 2021.
< = Result is less than the method detection limit shown
PCE = Tetrachloroethene
µg/m^3 = micrograms per cubic meter

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Tetrachloroethene (PCE) Results - HVAC-off

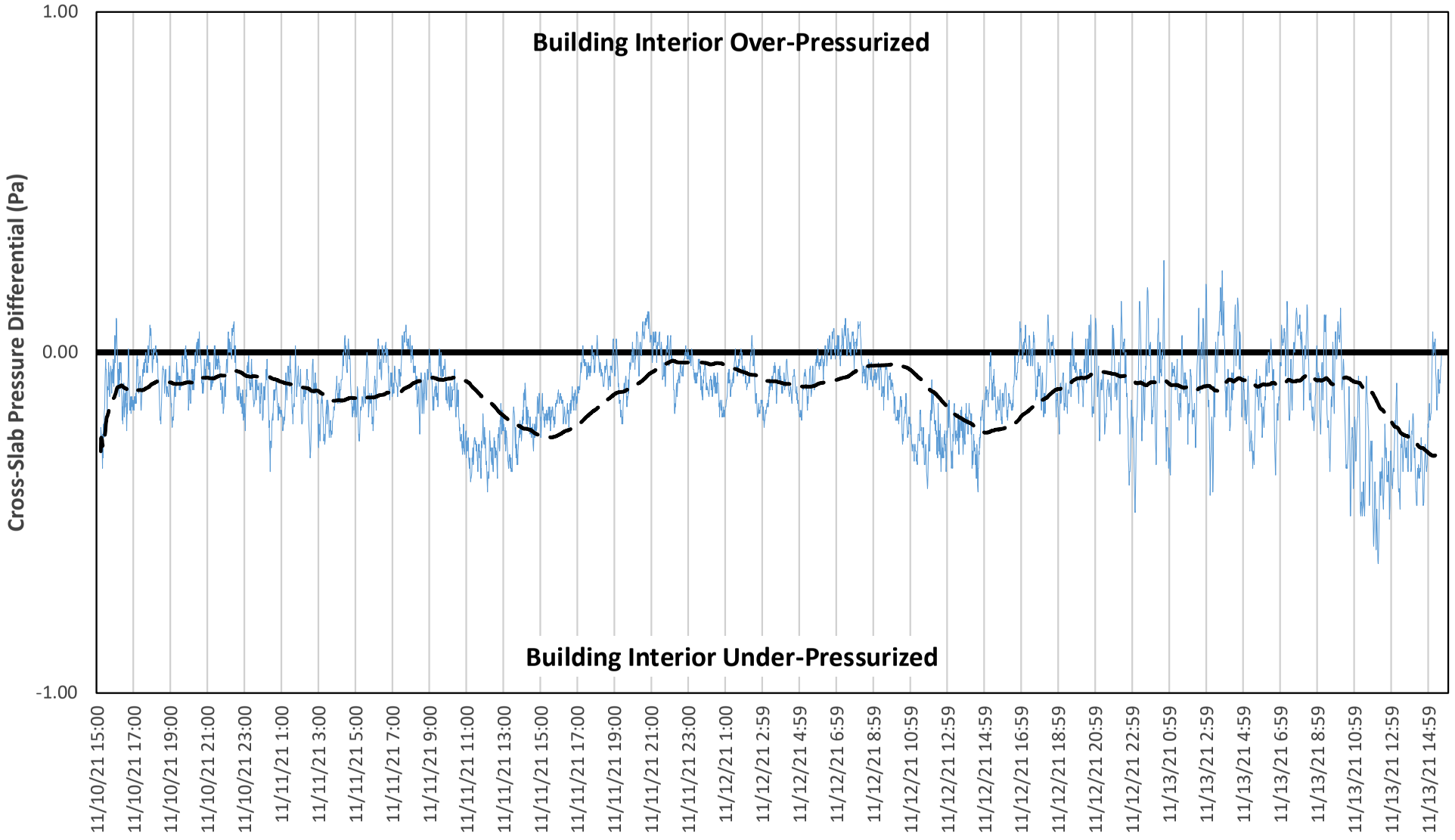
Phase II Environmental Site Assessment
1124-1132 Del Paso Boulevard
Sacramento, California

Geosyntec consultants

Project No.: SAC299 | December 2021

Figure 3

\\sacramento-01\data\GIS\SAC299 SacDelPaso\Project\20210108 Phase II ESA\Fig03_PCEResults-HVACoff.mxd 12/14/2021 11:05:29 AM (Author:NDailey)



Note: Cross-slab pressure differences are between sub-slab and building interior (ambient air) pressures.

Cross-Slab Pressure Differential

One-hour averaged Cross-Slab Pressure

Cross-Slab Pressure Differential

1124-1132 Del Paso Boulevard
Sacramento, California

Geosyntec consultants

SAC299	December 2021

Figure 4

TABLE

TABLE 1
ANALYTICAL RESULTS
Phase II Vapor Intrusion Investigation Report
1124-1132 Del Paso Boulevard, Sacramento, California

Sample Type	Sample Location	Duplicate	HVAC Conditions	Sample Date	ACETONE	BENZENE	CHLOROFORM	CARBON TETRACHLORIDE	ETHANOL	ETHYLBENZENE	FREON 12	TETRACHLOROETHENE	2-PROPANOL	CARBON DISULFIDE	2,2,4-TRIMETHYLPENTANE	M,P-XYLENES	O-XYLENE	TOLUENE	OTHER VOCS
Screening Levels [1]					*32,000*	*13*	*18*	*180*	*--*	*4.9*	*--*	*2*	*--*	*3,100*	*180*	*440*	*440*	*1,300*	*--*
Screening Levels [2]					*1,066,667*	*433*	*5,300*	*6,000*	*--*	*163*	*--*	*67*	*--*	*103,333*	*6,000*	*14,667*	*14,667*	*43,333*	*--*
Sub-Slab	VP-1		ON	8/13/2021	**42**	<3.2	<4.8	<6.3	**49**	<4.3	<4.9	<6.7	**84**	<12	<4.6	<4.3	<4.3	<3.7	ND
	VP-2		ON	8/13/2021	**59**	<3.2	<4.9	<6.3	**28**	<4.3	<4.9	**8.2**	**44**	**12**	<4.7	<4.3	<4.3	<3.7	ND
	VP-3		ON	8/13/2021	**26**	<3.3	**5.3**	<6.4	**34**	<4.3	<4.9	**110**	**260**	<13	**160**	<4.3	<4.3	<3.8	ND
	VP-4		ON	8/13/2021	**34**	<3.4	<4.8	<6.5	**41**	<4.3	<4.9	**300**	**84**	<12	<4.6	<4.3	<4.3	<3.9	ND
	VP-5		ON	8/13/2021	**46**	<3.5	<4.8	<6.6	**30**	<4.3	<4.9	**76**	**41**	<12	<4.6	<4.3	<4.3	<3.10	ND
		x	ON	8/13/2021	**55**	<3.6	<4.8	<6.7	**36**	<4.3	<4.9	**69**	**55**	<12	<4.6	<4.3	<4.3	<3.11	ND
Indoor Air	IA-1		ON	8/12/2021	NA	**0.37**	<0.14	**0.44**	NA	**0.24**	**2.2**	<0.19	NA	NA	NA	**0.83**	**0.30**	**1.1**	ND
			OFF	11/13/2021	NA	**0.85**	<0.14	**0.42**	NA	**0.43**	**0.1**	<0.20	NA	NA	NA	**1.20**	**0.39**	**1.3**	ND
	IA-2		ON	8/12/2021	NA	**0.35**	<0.14	**0.46**	NA	**0.20**	**2.3**	<0.20	NA	NA	NA	**0.66**	**0.24**	**0.98**	ND
			OFF	11/13/2021	NA	**0.89**	<0.14	**0.42**	NA	**0.55**	**1.9**	<0.20	NA	NA	NA	**1.90**	**0.66**	**1.40**	ND
	IA-3		ON	8/12/2021	NA	**0.37**	<0.14	**0.73**	NA	**0.21**	**2.3**	<0.19	NA	NA	NA	**0.70**	**0.26**	**1.0**	ND
			OFF	11/13/2021	NA	**0.82**	<0.14	**0.40**	NA	**0.42**	**1.9**	<0.19	NA	NA	NA	**1.40**	**0.48**	**1.3**	ND
	IA-4		ON	8/12/2021	NA	**0.35**	<0.16	**0.45**	NA	**0.22**	**2.3**	<0.22	NA	NA	NA	**0.70**	**0.25**	**1.0**	ND
			OFF	11/13/2021	NA	**0.84**	<0.14	**0.41**	NA	**0.58**	**1.9**	<0.20	NA	NA	NA	**2.00**	**0.72**	**1.4**	ND
		x	OFF	11/13/2021	NA	**0.84**	<0.15	**0.40**	NA	**0.58**	**1.9**	<0.21	NA	NA	NA	**2.00**	**0.72**	**1.4**	ND
	IA-5		ON	8/12/2021	NA	**0.36**	<0.14	**0.50**	NA	**0.24**	**2.3**	<0.20	NA	NA	NA	**0.82**	**0.28**	**1.0**	ND
		x	ON	8/12/2021	NA	**0.35**	<0.14	**0.45**	NA	**0.25**	**2.3**	<0.20	NA	NA	NA	**0.83**	**0.32**	**1.1**	ND
			OFF	11/13/2021	NA	**0.84**	<0.14	**0.41**	NA	**0.56**	**1.9**	<0.19	NA	NA	NA	**1.90**	**0.70**	**1.4**	ND
Outdoor Air	OA-1		--	8/12/2021	NA	**0.40**	<0.15	**0.47**	NA	**0.17**	**2.3**	<0.20	NA	NA	NA	**0.50**	**0.20**	**0.80**	ND
	OA-2		--	8/12/2021	NA	**0.41**	<0.15	**0.46**	NA	**0.19**	**2.3**	<0.21	NA	NA	NA	**0.59**	**0.22**	**0.90**	ND
	OA-3		--	8/12/2021	NA	**0.42**	<0.14	**0.46**	NA	**0.16**	**2.3**	<0.20	NA	NA	NA	**0.48**	**0.18**	**0.79**	ND

Notes:

1. Indoor air screening values are from DTSC HHRA Note 3 (DTSC, 2020). Where there were no DTSC screening levels, USEPA indoor air screening levels were used instead (USEPA, 2020). In both cases, the lifetime incremental cancer risk level was 1E-6 for carcinogens and the hazard index was 1.0
2. Subslab screening level calculated using the generic attenuation factor 0.03

All screening levels and analytical results are reported in micrograms per cubic meter ($\mu g/m^3$)
Bolded values indicate constituent was reported above laboratory reporting limit
Shaded detections represent exceedances of respective screening levels.
-- = not applicable
DTSC = Department of Toxic Substances Control
HHRA = Human Health Risk Assessment
HVAC = heating, ventilation and air conditioning
NA = not analyzed
ND = not detected above laboratory reporting limits
USEPA = United States Environmental Protection Agency

Attachment 1

Eurofins Air Toxics Laboratory Reports

Geosyntec consultants

3043 Gold Canal Drive Suite 100
Rancho Cordova, CA 95670
PH 916-637-8048
www.geosyntec.com

Memorandum

Date: 2 September 2021

To: Laura Foot

From: Morgan Greenwald

CC: Susan Scudder

Subject: Stage 2A Data Validation - Level II Data Deliverables, Eurofins Air Toxics LLC (Air Toxics) Laboratory Reports for Workorder Numbers 2108316A, 2108316B, and 2108316C

SITE: Del Paso Boulevard Site, Sacramento, California

INTRODUCTION

This report summarizes the findings of the Stage 2A data validation of three outdoor air samples, five indoor air samples, five soil vapor samples, one indoor air field duplicate sample, and one soil vapor field duplicate sample, collected on 12 and 13 August 2021, at the Del Paso Boulevard Site located in Sacramento, California. The samples were submitted to Air Toxics in Folsom, California. The samples were analyzed for the following tests:

- Volatile Organic Compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method TO-15 and Modified Method TO-15 using selective ion monitoring (SIM) mode
- Helium by Modified American Society for Testing Materials (ASTM) Method D-1946

EXECUTIVE SUMMARY

Overall, based on this Stage 2A data validation covering the quality control (QC) parameters listed below and based on the information provided, the data as qualified are usable for supporting project objectives. The qualified data should be used within the limitations of the qualifications.

The data were reviewed based on the USEPA National Functional Guidelines for Superfund Organic Methods Data Review, November 2020 (EPA 540-R-20-005), as well as the pertinent methods referenced by the laboratory reports and professional and technical judgment.

The following samples were analyzed and validated at a Stage 2A level in the data sets:

Laboratory ID	Additional Laboratory ID	Client ID
2108316A-01A	--	IA-1-20210812

Laboratory ID	Additional Laboratory ID	Client ID
2108316A-02A	--	IA-2-20210812

Laboratory ID	Additional Laboratory ID	Client ID
2108316A-03A	--	IA-3-20210812
2108316A-04A	--	IA-4-20210812
2108316A-05A	--	IA-5-20210812
2108316A-06A	--	DUP-IA-20210812
2108316A-07A	--	OA-1-20210812
2108316A-08A	--	OA-2-20210812
2108316A-09A	--	OA-3-20210812

Laboratory ID	Additional Laboratory ID	Client ID
2108316B-10A	2108316C-10A	VP-1-20210813
2108316B-11A	2108316C-10A	VP-2-20210813
2108316B-12A	2108316C-10A	VP-3-20210813
2108316B-13A	2108316C-10A	VP-4-20210813
2108316B-14A	2108316C-10A	VP-5-20210813
2108316B-15A	2108316C-10A	DUP-VP-20210813

Incorrect error corrections were observed on the chain of custody (COC) form, instead of the proper procedure of a single strike through, correction, and initials and date of person making the corrections.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per USEPA Method TO-15 and Modified USEPA Method TO-15 SIM.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Method Blank
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in the laboratory reports are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for these analyses, for the sample sets is 100%.

The continuing calibration verification (CCV) standards associated with the sample sets were reported. The percent differences (%Ds) were within the method specified acceptance criteria.

1.2 Holding Times

The holding time for the VOC analysis of an air sample collected in a canister is 30 days from sample collection to analysis. The holding times were met for the sample analyses.

1.3 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported for Method TO-15 (2108316B-16A) and one method blank was reported for Modified Method TO-15 SIM (2108316A-10A). VOCs were not detected in the method blanks above the reporting limits (RLs).

1.4 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCS/LCS duplicate (LCSD) pairs were reported. The recoveries and relative percent differences (RPDs) were within the laboratory specified acceptance criteria. The RPDs were not reported by Air Toxics; they were calculated by the data validator.

1.5 Surrogates

Acceptable surrogate recoveries were reported for the sample analyses.

1.6 Field Duplicate

One soil vapor field duplicate sample, DUP-VP-20210813, and one indoor air field duplicate sample, DUP-IA-20210812, were collected with the sample set. Acceptable precision (RPD $\leq$30%) was demonstrated between the field duplicates and the original samples, VP-5-20210813 and IA-5-20210812, respectively.

1.7 Sensitivity

The samples were reported to the RLs. Elevated non-detect results were reported due to the dilutions analyzed.

1.8 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level II reports at a minimum of 20%. No discrepancies were identified between the level II reports and the EDDs.

2.0 HELIUM

The samples were analyzed for helium per Modified Method ASTM D-1946.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Method Blank
✓ Laboratory Control Sample
⊗ Field Duplicate
✓ Sensitivity
✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The helium data reported in the laboratory report are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for the sample set is 100%.

The CCV standard associated with the sample set was reported. The %D was within the method specified acceptance criteria.

2.2 Holding Times

The holding time for the helium analysis of an air sample collected in a canister is 30 days from sample collection to analysis. The holding times were met for the sample analyses.

2.3 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (2108316C-16A). Helium was not detected in the method blank above the RL.

2.4 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCSD pair was reported. The recoveries and RPD were within

the laboratory specified acceptance criteria. The RPD was not reported by Air Toxics; it was calculated by the data validator.

2.5 Field Duplicate

One soil vapor field duplicate sample, DUP-VP-20210813, was collected with the sample set. Acceptable precision (RPD ≤30%) was not demonstrated between the field duplicate and the original sample, VP-5-20210813. Therefore, the helium concentrations in the field duplicate pair were J qualified as estimated.

Sample ID	Analyte	Laboratory Result (%)	Laboratory Flag	RPD (%)	Validation Result (%)	Validation Qualifier*	Reason Code**
VP-5-20210813	Helium	2.3	NA	52	2.3	J	7
DUP-VP-20210813	Helium	3.9	NA		3.9	J	7

% - percent
NA-not applicable
* Validation qualifiers are defined in Attachment 1 at the end of this report
** Reason codes are defined in Attachment 2 at the end of this report

2.6 Sensitivity

The samples were reported to the RL. Elevated non-detect results were reported due to the dilutions analyzed.

2.7 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level II report at a minimum of 20%. No discrepancies were identified between the level II report and the EDD.

---

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U — The analyte was analyzed for, but was not detected at or above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ — The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- — The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Extraction or analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits or RPD outside limits (LCS/LCSD)
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed: no validation qualification required

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

eurofins | Air Toxics

8/23/2021
Ms. Laura Foot
GeoSyntec Consultants
3043 Gold Canal Drive, Suite 100

Rancho Cordova CA 95670

Project Name: Del Paso Blvd
Project #: SAC299
Workorder #: 2108316A

Dear Ms. Laura Foot

The following report includes the data for the above referenced project for sample(s) received on 8/13/2021 at Eurofins Air Toxics LLC.

The data and associated QC analyzed by Modified TO-15 SIM are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics LLC. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Monica Tran at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Monica Tran

Project Manager

eurofins | Air Toxics

WORK ORDER #: 2108316A

Work Order Summary

CLIENT:	Ms. Laura Foot GeoSyntec Consultants 3043 Gold Canal Drive, Suite 100 Rancho Cordova, CA 95670	**BILL TO:**	Ms. Laura Foot GeoSyntec Consultants 3043 Gold Canal Drive, Suite 100 Rancho Cordova, CA 95670
PHONE:	916-637-8338	**P.O. #**	100028804
FAX:		**PROJECT #**	SAC299 Del Paso Blvd
DATE RECEIVED:	08/13/2021	**CONTACT:**	Monica Tran
DATE COMPLETED:	08/23/2021		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	IA-1-20210812	Modified TO-15 SIM	6.1 "Hg	1.9 psi
02A	IA-2-20210812	Modified TO-15 SIM	6.5 "Hg	1.9 psi
03A	IA-3-20210812	Modified TO-15 SIM	5.7 "Hg	1.8 psi
04A	IA-4-20210812	Modified TO-15 SIM	8.8 "Hg	1.9 psi
05A	IA-5-20210812	Modified TO-15 SIM	6.7 "Hg	1.8 psi
06A	DUP-IA-20210812	Modified TO-15 SIM	6.3 "Hg	2 psi
07A	OA-1-20210812	Modified TO-15 SIM	7.6 "Hg	1.9 psi
08A	OA-2-20210812	Modified TO-15 SIM	7.8 "Hg	1.9 psi
09A	OA-3-20210812	Modified TO-15 SIM	6.9 "Hg	2 psi
10A	Lab Blank	Modified TO-15 SIM	NA	NA
11A	CCV	Modified TO-15 SIM	NA	NA
12A	LCS	Modified TO-15 SIM	NA	NA
12AA	LCSD	Modified TO-15 SIM	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 08/23/21

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209220, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-20-16, UT NELAP – CA009332020-12, VA NELAP - 10615, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-014, Effective date: 10/18/2020, Expiration date: 10/17/2021.
Eurofins Air Toxics, LLC certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, LLC.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 351-8279

LABORATORY NARRATIVE
Modified TO-15 SIM
GeoSyntec Consultants
Workorder# 2108316A

Nine 6 Liter Summa Canister (100% SIM Ambient) samples were received on August 13, 2021. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the SIM acquisition mode.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the EATL modifications.

Requirement	*TO-15*	*ATL Modifications*
ICAL %RSD acceptance criteria	</=30% RSD with 2 compounds allowed out to < 40% RSD	Project specific; default criteria is </=30% RSD with 10% of compounds allowed out to < 40% RSD
Daily Calibration	+- 30% Difference	Project specific; default criteria is </= 30% Difference with 10% of compounds allowed out up to </=40%.; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

The following qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

CN- See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

eurofins | Air Toxics

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM

Client Sample ID: IA-1-20210812

Lab ID#: 2108316A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.028	0.45	0.14	2.2
Carbon Tetrachloride	0.028	0.071	0.18	0.44
Benzene	0.071	0.12	0.23	0.37
Toluene	0.071	0.29	0.27	1.1
Ethyl Benzene	0.028	0.056	0.12	0.24
m,p-Xylene	0.057	0.19	0.25	0.83
o-Xylene	0.028	0.069	0.12	0.30

Client Sample ID: IA-2-20210812

Lab ID#: 2108316A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.029	0.46	0.14	2.3
Carbon Tetrachloride	0.029	0.073	0.18	0.46
Benzene	0.072	0.11	0.23	0.35
Toluene	0.072	0.26	0.27	0.98
Ethyl Benzene	0.029	0.047	0.12	0.20
m,p-Xylene	0.058	0.15	0.25	0.66
o-Xylene	0.029	0.054	0.12	0.24

Client Sample ID: IA-3-20210812

Lab ID#: 2108316A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.028	0.46	0.14	2.3
Carbon Tetrachloride	0.028	0.12	0.17	0.73
Benzene	0.070	0.11	0.22	0.37
Toluene	0.070	0.27	0.26	1.0
Ethyl Benzene	0.028	0.048	0.12	0.21
m,p-Xylene	0.056	0.16	0.24	0.70
o-Xylene	0.028	0.060	0.12	0.26

eurofins | Air Toxics

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM

Client Sample ID: IA-4-20210812

Lab ID#: 2108316A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.032	0.47	0.16	2.3
Carbon Tetrachloride	0.032	0.072	0.20	0.45
Benzene	0.080	0.11	0.26	0.35
Toluene	0.080	0.27	0.30	1.0
Ethyl Benzene	0.032	0.050	0.14	0.22
m,p-Xylene	0.064	0.16	0.28	0.70
o-Xylene	0.032	0.057	0.14	0.25

Client Sample ID: IA-5-20210812

Lab ID#: 2108316A-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.029	0.46	0.14	2.3
Carbon Tetrachloride	0.029	0.079	0.18	0.50
Benzene	0.072	0.11	0.23	0.36
Toluene	0.072	0.28	0.27	1.0
Ethyl Benzene	0.029	0.055	0.12	0.24
m,p-Xylene	0.058	0.19	0.25	0.82
o-Xylene	0.029	0.066	0.12	0.28

Client Sample ID: DUP-IA-20210812

Lab ID#: 2108316A-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.029	0.46	0.14	2.3
Carbon Tetrachloride	0.029	0.072	0.18	0.45
Benzene	0.072	0.11	0.23	0.35
Toluene	0.072	0.30	0.27	1.1
Ethyl Benzene	0.029	0.057	0.12	0.25
m,p-Xylene	0.058	0.19	0.25	0.83
o-Xylene	0.029	0.073	0.12	0.32

eurofins | Air Toxics

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM

Client Sample ID: OA-1-20210812

Lab ID#: 2108316A-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.030	0.46	0.15	2.3
Carbon Tetrachloride	0.030	0.074	0.19	0.47
Benzene	0.076	0.13	0.24	0.40
Toluene	0.076	0.21	0.28	0.80
Ethyl Benzene	0.030	0.039	0.13	0.17
m,p-Xylene	0.060	0.12	0.26	0.50
o-Xylene	0.030	0.045	0.13	0.20

Client Sample ID: OA-2-20210812

Lab ID#: 2108316A-08A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.030	0.46	0.15	2.3
Carbon Tetrachloride	0.030	0.073	0.19	0.46
Benzene	0.076	0.13	0.24	0.41
Toluene	0.076	0.24	0.29	0.90
Ethyl Benzene	0.030	0.043	0.13	0.19
m,p-Xylene	0.061	0.14	0.26	0.59
o-Xylene	0.030	0.050	0.13	0.22

Client Sample ID: OA-3-20210812

Lab ID#: 2108316A-09A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.030	0.47	0.15	2.3
Carbon Tetrachloride	0.030	0.073	0.19	0.46
Benzene	0.074	0.13	0.24	0.42
Toluene	0.074	0.21	0.28	0.79
Ethyl Benzene	0.030	0.037	0.13	0.16
m,p-Xylene	0.059	0.11	0.26	0.48
o-Xylene	0.030	0.040	0.13	0.18

eurofins | Air Toxics

Client Sample ID: IA-1-20210812

Lab ID#: 2108316A-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v081709sim**	**Date of Collection:**	**8/12/21 4:33:00 PM**
Dil. Factor:	**1.42**	**Date of Analysis:**	**8/17/21 03:13 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.028	0.45	0.14	2.2
Freon 114	0.028	Not Detected	0.20	Not Detected
Chloromethane	0.71	Not Detected	1.5	Not Detected
Vinyl Chloride	0.014	Not Detected	0.036	Not Detected
Chloroethane	0.071	Not Detected	0.19	Not Detected
1,1-Dichloroethene	0.014	Not Detected	0.056	Not Detected
trans-1,2-Dichloroethene	0.14	Not Detected	0.56	Not Detected
Methyl tert-butyl ether	0.14	Not Detected	0.51	Not Detected
1,1-Dichloroethane	0.028	Not Detected	0.11	Not Detected
cis-1,2-Dichloroethene	0.028	Not Detected	0.11	Not Detected
Chloroform	0.028	Not Detected	0.14	Not Detected
1,1,1-Trichloroethane	0.028	Not Detected	0.15	Not Detected
Carbon Tetrachloride	0.028	0.071	0.18	0.44
Benzene	0.071	0.12	0.23	0.37
1,2-Dichloroethane	0.028	Not Detected	0.11	Not Detected
Trichloroethene	0.028	Not Detected	0.15	Not Detected
Toluene	0.071	0.29	0.27	1.1
1,1,2-Trichloroethane	0.028	Not Detected	0.15	Not Detected
Tetrachloroethene	0.028	Not Detected	0.19	Not Detected
1,2-Dibromoethane (EDB)	0.028	Not Detected	0.22	Not Detected
Ethyl Benzene	0.028	0.056	0.12	0.24
m,p-Xylene	0.057	0.19	0.25	0.83
o-Xylene	0.028	0.069	0.12	0.30
1,1,2,2-Tetrachloroethane	0.028	Not Detected	0.19	Not Detected
1,4-Dichlorobenzene	0.028	Not Detected	0.17	Not Detected

Container Type: 6 Liter Summa Canister (100% SIM Ambient)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	96	70-130

eurofins | Air Toxics

Client Sample ID: IA-2-20210812

Lab ID#: 2108316A-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v081712sim**	**Date of Collection: 8/12/21 3:42:00 PM**	
Dil. Factor:	**1.44**	**Date of Analysis: 8/17/21 05:27 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.029	0.46	0.14	2.3
Freon 114	0.029	Not Detected	0.20	Not Detected
Chloromethane	0.72	Not Detected	1.5	Not Detected
Vinyl Chloride	0.014	Not Detected	0.037	Not Detected
Chloroethane	0.072	Not Detected	0.19	Not Detected
1,1-Dichloroethene	0.014	Not Detected	0.057	Not Detected
trans-1,2-Dichloroethene	0.14	Not Detected	0.57	Not Detected
Methyl tert-butyl ether	0.14	Not Detected	0.52	Not Detected
1,1-Dichloroethane	0.029	Not Detected	0.12	Not Detected
cis-1,2-Dichloroethene	0.029	Not Detected	0.11	Not Detected
Chloroform	0.029	Not Detected	0.14	Not Detected
1,1,1-Trichloroethane	0.029	Not Detected	0.16	Not Detected
Carbon Tetrachloride	0.029	0.073	0.18	0.46
Benzene	0.072	0.11	0.23	0.35
1,2-Dichloroethane	0.029	Not Detected	0.12	Not Detected
Trichloroethene	0.029	Not Detected	0.15	Not Detected
Toluene	0.072	0.26	0.27	0.98
1,1,2-Trichloroethane	0.029	Not Detected	0.16	Not Detected
Tetrachloroethene	0.029	Not Detected	0.20	Not Detected
1,2-Dibromoethane (EDB)	0.029	Not Detected	0.22	Not Detected
Ethyl Benzene	0.029	0.047	0.12	0.20
m,p-Xylene	0.058	0.15	0.25	0.66
o-Xylene	0.029	0.054	0.12	0.24
1,1,2,2-Tetrachloroethane	0.029	Not Detected	0.20	Not Detected
1,4-Dichlorobenzene	0.029	Not Detected	0.17	Not Detected

Container Type: 6 Liter Summa Canister (100% SIM Ambient)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	92	70-130

eurofins | Air Toxics

Client Sample ID: IA-3-20210812

Lab ID#: 2108316A-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v081711sim**	**Date of Collection:**	**8/12/21 4:32:00 PM**
Dil. Factor:	**1.39**	**Date of Analysis:**	**8/17/21 04:33 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.028	0.46	0.14	2.3
Freon 114	0.028	Not Detected	0.19	Not Detected
Chloromethane	0.70	Not Detected	1.4	Not Detected
Vinyl Chloride	0.014	Not Detected	0.036	Not Detected
Chloroethane	0.070	Not Detected	0.18	Not Detected
1,1-Dichloroethene	0.014	Not Detected	0.055	Not Detected
trans-1,2-Dichloroethene	0.14	Not Detected	0.55	Not Detected
Methyl tert-butyl ether	0.14	Not Detected	0.50	Not Detected
1,1-Dichloroethane	0.028	Not Detected	0.11	Not Detected
cis-1,2-Dichloroethene	0.028	Not Detected	0.11	Not Detected
Chloroform	0.028	Not Detected	0.14	Not Detected
1,1,1-Trichloroethane	0.028	Not Detected	0.15	Not Detected
Carbon Tetrachloride	0.028	0.12	0.17	0.73
Benzene	0.070	0.11	0.22	0.37
1,2-Dichloroethane	0.028	Not Detected	0.11	Not Detected
Trichloroethene	0.028	Not Detected	0.15	Not Detected
Toluene	0.070	0.27	0.26	1.0
1,1,2-Trichloroethane	0.028	Not Detected	0.15	Not Detected
Tetrachloroethene	0.028	Not Detected	0.19	Not Detected
1,2-Dibromoethane (EDB)	0.028	Not Detected	0.21	Not Detected
Ethyl Benzene	0.028	0.048	0.12	0.21
m,p-Xylene	0.056	0.16	0.24	0.70
o-Xylene	0.028	0.060	0.12	0.26
1,1,2,2-Tetrachloroethane	0.028	Not Detected	0.19	Not Detected
1,4-Dichlorobenzene	0.028	Not Detected	0.17	Not Detected

Container Type: 6 Liter Summa Canister (100% SIM Ambient)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	96	70-130

eurofins | Air Toxics

Client Sample ID: IA-4-20210812

Lab ID#: 2108316A-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v081713sim**	**Date of Collection: 8/12/21 3:15:00 PM**	
Dil. Factor:	**1.60**	**Date of Analysis: 8/17/21 06:07 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.032	0.47	0.16	2.3
Freon 114	0.032	Not Detected	0.22	Not Detected
Chloromethane	0.80	Not Detected	1.6	Not Detected
Vinyl Chloride	0.016	Not Detected	0.041	Not Detected
Chloroethane	0.080	Not Detected	0.21	Not Detected
1,1-Dichloroethene	0.016	Not Detected	0.063	Not Detected
trans-1,2-Dichloroethene	0.16	Not Detected	0.63	Not Detected
Methyl tert-butyl ether	0.16	Not Detected	0.58	Not Detected
1,1-Dichloroethane	0.032	Not Detected	0.13	Not Detected
cis-1,2-Dichloroethene	0.032	Not Detected	0.13	Not Detected
Chloroform	0.032	Not Detected	0.16	Not Detected
1,1,1-Trichloroethane	0.032	Not Detected	0.17	Not Detected
Carbon Tetrachloride	0.032	0.072	0.20	0.45
Benzene	0.080	0.11	0.26	0.35
1,2-Dichloroethane	0.032	Not Detected	0.13	Not Detected
Trichloroethene	0.032	Not Detected	0.17	Not Detected
Toluene	0.080	0.27	0.30	1.0
1,1,2-Trichloroethane	0.032	Not Detected	0.17	Not Detected
Tetrachloroethene	0.032	Not Detected	0.22	Not Detected
1,2-Dibromoethane (EDB)	0.032	Not Detected	0.24	Not Detected
Ethyl Benzene	0.032	0.050	0.14	0.22
m,p-Xylene	0.064	0.16	0.28	0.70
o-Xylene	0.032	0.057	0.14	0.25
1,1,2,2-Tetrachloroethane	0.032	Not Detected	0.22	Not Detected
1,4-Dichlorobenzene	0.032	Not Detected	0.19	Not Detected

Container Type: 6 Liter Summa Canister (100% SIM Ambient)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	93	70-130

eurofins | Air Toxics

Client Sample ID: IA-5-20210812

Lab ID#: 2108316A-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v081714sim**	**Date of Collection: 8/12/21 4:30:00 PM**	
Dil. Factor:	**1.45**	**Date of Analysis: 8/17/21 06:47 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.029	0.46	0.14	2.3
Freon 114	0.029	Not Detected	0.20	Not Detected
Chloromethane	0.72	Not Detected	1.5	Not Detected
Vinyl Chloride	0.014	Not Detected	0.037	Not Detected
Chloroethane	0.072	Not Detected	0.19	Not Detected
1,1-Dichloroethene	0.014	Not Detected	0.057	Not Detected
trans-1,2-Dichloroethene	0.14	Not Detected	0.57	Not Detected
Methyl tert-butyl ether	0.14	Not Detected	0.52	Not Detected
1,1-Dichloroethane	0.029	Not Detected	0.12	Not Detected
cis-1,2-Dichloroethene	0.029	Not Detected	0.11	Not Detected
Chloroform	0.029	Not Detected	0.14	Not Detected
1,1,1-Trichloroethane	0.029	Not Detected	0.16	Not Detected
Carbon Tetrachloride	0.029	0.079	0.18	0.50
Benzene	0.072	0.11	0.23	0.36
1,2-Dichloroethane	0.029	Not Detected	0.12	Not Detected
Trichloroethene	0.029	Not Detected	0.16	Not Detected
Toluene	0.072	0.28	0.27	1.0
1,1,2-Trichloroethane	0.029	Not Detected	0.16	Not Detected
Tetrachloroethene	0.029	Not Detected	0.20	Not Detected
1,2-Dibromoethane (EDB)	0.029	Not Detected	0.22	Not Detected
Ethyl Benzene	0.029	0.055	0.12	0.24
m,p-Xylene	0.058	0.19	0.25	0.82
o-Xylene	0.029	0.066	0.12	0.28
1,1,2,2-Tetrachloroethane	0.029	Not Detected	0.20	Not Detected
1,4-Dichlorobenzene	0.029	Not Detected	0.17	Not Detected

Container Type: 6 Liter Summa Canister (100% SIM Ambient)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	92	70-130

eurofins | Air Toxics

Client Sample ID: DUP-IA-20210812

Lab ID#: 2108316A-06A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v081715sim**	**Date of Collection: 8/12/21 4:30:00 PM**	
Dil. Factor:	**1.44**	**Date of Analysis: 8/17/21 07:27 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.029	0.46	0.14	2.3
Freon 114	0.029	Not Detected	0.20	Not Detected
Chloromethane	0.72	Not Detected	1.5	Not Detected
Vinyl Chloride	0.014	Not Detected	0.037	Not Detected
Chloroethane	0.072	Not Detected	0.19	Not Detected
1,1-Dichloroethene	0.014	Not Detected	0.057	Not Detected
trans-1,2-Dichloroethene	0.14	Not Detected	0.57	Not Detected
Methyl tert-butyl ether	0.14	Not Detected	0.52	Not Detected
1,1-Dichloroethane	0.029	Not Detected	0.12	Not Detected
cis-1,2-Dichloroethene	0.029	Not Detected	0.11	Not Detected
Chloroform	0.029	Not Detected	0.14	Not Detected
1,1,1-Trichloroethane	0.029	Not Detected	0.16	Not Detected
Carbon Tetrachloride	0.029	0.072	0.18	0.45
Benzene	0.072	0.11	0.23	0.35
1,2-Dichloroethane	0.029	Not Detected	0.12	Not Detected
Trichloroethene	0.029	Not Detected	0.15	Not Detected
Toluene	0.072	0.30	0.27	1.1
1,1,2-Trichloroethane	0.029	Not Detected	0.16	Not Detected
Tetrachloroethene	0.029	Not Detected	0.20	Not Detected
1,2-Dibromoethane (EDB)	0.029	Not Detected	0.22	Not Detected
Ethyl Benzene	0.029	0.057	0.12	0.25
m,p-Xylene	0.058	0.19	0.25	0.83
o-Xylene	0.029	0.073	0.12	0.32
1,1,2,2-Tetrachloroethane	0.029	Not Detected	0.20	Not Detected
1,4-Dichlorobenzene	0.029	Not Detected	0.17	Not Detected

Container Type: 6 Liter Summa Canister (100% SIM Ambient)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	93	70-130

eurofins | Air Toxics

Client Sample ID: OA-1-20210812

Lab ID#: 2108316A-07A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v081716sim**	**Date of Collection: 8/12/21 4:35:00 PM**	
Dil. Factor:	**1.51**	**Date of Analysis: 8/17/21 08:36 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.030	0.46	0.15	2.3
Freon 114	0.030	Not Detected	0.21	Not Detected
Chloromethane	0.76	Not Detected	1.6	Not Detected
Vinyl Chloride	0.015	Not Detected	0.038	Not Detected
Chloroethane	0.076	Not Detected	0.20	Not Detected
1,1-Dichloroethene	0.015	Not Detected	0.060	Not Detected
trans-1,2-Dichloroethene	0.15	Not Detected	0.60	Not Detected
Methyl tert-butyl ether	0.15	Not Detected	0.54	Not Detected
1,1-Dichloroethane	0.030	Not Detected	0.12	Not Detected
cis-1,2-Dichloroethene	0.030	Not Detected	0.12	Not Detected
Chloroform	0.030	Not Detected	0.15	Not Detected
1,1,1-Trichloroethane	0.030	Not Detected	0.16	Not Detected
Carbon Tetrachloride	0.030	0.074	0.19	0.47
Benzene	0.076	0.13	0.24	0.40
1,2-Dichloroethane	0.030	Not Detected	0.12	Not Detected
Trichloroethene	0.030	Not Detected	0.16	Not Detected
Toluene	0.076	0.21	0.28	0.80
1,1,2-Trichloroethane	0.030	Not Detected	0.16	Not Detected
Tetrachloroethene	0.030	Not Detected	0.20	Not Detected
1,2-Dibromoethane (EDB)	0.030	Not Detected	0.23	Not Detected
Ethyl Benzene	0.030	0.039	0.13	0.17
m,p-Xylene	0.060	0.12	0.26	0.50
o-Xylene	0.030	0.045	0.13	0.20
1,1,2,2-Tetrachloroethane	0.030	Not Detected	0.21	Not Detected
1,4-Dichlorobenzene	0.030	Not Detected	0.18	Not Detected

Container Type: 6 Liter Summa Canister (100% SIM Ambient)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	92	70-130

eurofins | Air Toxics

Client Sample ID: OA-2-20210812

Lab ID#: 2108316A-08A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v081717sim**	**Date of Collection: 8/12/21 4:36:00 PM**	
Dil. Factor:	**1.52**	**Date of Analysis: 8/17/21 09:16 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.030	0.46	0.15	2.3
Freon 114	0.030	Not Detected	0.21	Not Detected
Chloromethane	0.76	Not Detected	1.6	Not Detected
Vinyl Chloride	0.015	Not Detected	0.039	Not Detected
Chloroethane	0.076	Not Detected	0.20	Not Detected
1,1-Dichloroethene	0.015	Not Detected	0.060	Not Detected
trans-1,2-Dichloroethene	0.15	Not Detected	0.60	Not Detected
Methyl tert-butyl ether	0.15	Not Detected	0.55	Not Detected
1,1-Dichloroethane	0.030	Not Detected	0.12	Not Detected
cis-1,2-Dichloroethene	0.030	Not Detected	0.12	Not Detected
Chloroform	0.030	Not Detected	0.15	Not Detected
1,1,1-Trichloroethane	0.030	Not Detected	0.16	Not Detected
Carbon Tetrachloride	0.030	0.073	0.19	0.46
Benzene	0.076	0.13	0.24	0.41
1,2-Dichloroethane	0.030	Not Detected	0.12	Not Detected
Trichloroethene	0.030	Not Detected	0.16	Not Detected
Toluene	0.076	0.24	0.29	0.90
1,1,2-Trichloroethane	0.030	Not Detected	0.16	Not Detected
Tetrachloroethene	0.030	Not Detected	0.21	Not Detected
1,2-Dibromoethane (EDB)	0.030	Not Detected	0.23	Not Detected
Ethyl Benzene	0.030	0.043	0.13	0.19
m,p-Xylene	0.061	0.14	0.26	0.59
o-Xylene	0.030	0.050	0.13	0.22
1,1,2,2-Tetrachloroethane	0.030	Not Detected	0.21	Not Detected
1,4-Dichlorobenzene	0.030	Not Detected	0.18	Not Detected

Container Type: 6 Liter Summa Canister (100% SIM Ambient)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	92	70-130

eurofins | Air Toxics

Client Sample ID: OA-3-20210812

Lab ID#: 2108316A-09A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v081718sim**	**Date of Collection:**	**8/12/21 4:37:00 PM**
Dil. Factor:	**1.48**	**Date of Analysis:**	**8/17/21 09:58 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.030	0.47	0.15	2.3
Freon 114	0.030	Not Detected	0.21	Not Detected
Chloromethane	0.74	Not Detected	1.5	Not Detected
Vinyl Chloride	0.015	Not Detected	0.038	Not Detected
Chloroethane	0.074	Not Detected	0.20	Not Detected
1,1-Dichloroethene	0.015	Not Detected	0.059	Not Detected
trans-1,2-Dichloroethene	0.15	Not Detected	0.59	Not Detected
Methyl tert-butyl ether	0.15	Not Detected	0.53	Not Detected
1,1-Dichloroethane	0.030	Not Detected	0.12	Not Detected
cis-1,2-Dichloroethene	0.030	Not Detected	0.12	Not Detected
Chloroform	0.030	Not Detected	0.14	Not Detected
1,1,1-Trichloroethane	0.030	Not Detected	0.16	Not Detected
Carbon Tetrachloride	0.030	0.073	0.19	0.46
Benzene	0.074	0.13	0.24	0.42
1,2-Dichloroethane	0.030	Not Detected	0.12	Not Detected
Trichloroethene	0.030	Not Detected	0.16	Not Detected
Toluene	0.074	0.21	0.28	0.79
1,1,2-Trichloroethane	0.030	Not Detected	0.16	Not Detected
Tetrachloroethene	0.030	Not Detected	0.20	Not Detected
1,2-Dibromoethane (EDB)	0.030	Not Detected	0.23	Not Detected
Ethyl Benzene	0.030	0.037	0.13	0.16
m,p-Xylene	0.059	0.11	0.26	0.48
o-Xylene	0.030	0.040	0.13	0.18
1,1,2,2-Tetrachloroethane	0.030	Not Detected	0.20	Not Detected
1,4-Dichlorobenzene	0.030	Not Detected	0.18	Not Detected

Container Type: 6 Liter Summa Canister (100% SIM Ambient)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	103	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	91	70-130

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 2108316A-10A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v081706sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/21 09:56 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.020	Not Detected	0.099	Not Detected
Freon 114	0.020	Not Detected	0.14	Not Detected
Chloromethane	0.50	Not Detected	1.0	Not Detected
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
Chloroethane	0.050	Not Detected	0.13	Not Detected
1,1-Dichloroethene	0.010	Not Detected	0.040	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected
1,1-Dichloroethane	0.020	Not Detected	0.081	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Chloroform	0.020	Not Detected	0.098	Not Detected
1,1,1-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Carbon Tetrachloride	0.020	Not Detected	0.12	Not Detected
Benzene	0.050	Not Detected	0.16	Not Detected
1,2-Dichloroethane	0.020	Not Detected	0.081	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Toluene	0.050	Not Detected	0.19	Not Detected
1,1,2-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
1,2-Dibromoethane (EDB)	0.020	Not Detected	0.15	Not Detected
Ethyl Benzene	0.020	Not Detected	0.087	Not Detected
m,p-Xylene	0.040	Not Detected	0.17	Not Detected
o-Xylene	0.020	Not Detected	0.087	Not Detected
1,1,2,2-Tetrachloroethane	0.020	Not Detected	0.14	Not Detected
1,4-Dichlorobenzene	0.020	Not Detected	0.12	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	92	70-130

eurofins | Air Toxics

Client Sample ID: CCV

Lab ID#: 2108316A-11A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v081702sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/21 07:15 AM**	

Compound	%Recovery
Freon 12	94
Freon 114	96
Chloromethane	93
Vinyl Chloride	78
Chloroethane	88
1,1-Dichloroethene	85
trans-1,2-Dichloroethene	92
Methyl tert-butyl ether	83
1,1-Dichloroethane	90
cis-1,2-Dichloroethene	89
Chloroform	88
1,1,1-Trichloroethane	97
Carbon Tetrachloride	105
Benzene	95
1,2-Dichloroethane	104
Trichloroethene	102
Toluene	103
1,1,2-Trichloroethane	100
Tetrachloroethene	98
1,2-Dibromoethane (EDB)	99
Ethyl Benzene	99
m,p-Xylene	85
o-Xylene	81
1,1,2,2-Tetrachloroethane	100
1,4-Dichlorobenzene	96

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	110	70-130
4-Bromofluorobenzene	96	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 2108316A-12A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v081703sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/21 07:55 AM**	

Compound	%Recovery	Method Limits
Freon 12	98	70-130
Freon 114	100	70-130
Chloromethane	100	70-130
Vinyl Chloride	84	70-130
Chloroethane	93	70-130
1,1-Dichloroethene	89	70-130
trans-1,2-Dichloroethene	95	70-130
Methyl tert-butyl ether	89	70-130
1,1-Dichloroethane	94	70-130
cis-1,2-Dichloroethene	93	70-130
Chloroform	90	70-130
1,1,1-Trichloroethane	100	70-130
Carbon Tetrachloride	74	60-140
Benzene	99	70-130
1,2-Dichloroethane	109	70-130
Trichloroethene	105	70-130
Toluene	102	70-130
1,1,2-Trichloroethane	106	70-130
Tetrachloroethene	102	70-130
1,2-Dibromoethane (EDB)	106	70-130
Ethyl Benzene	98	70-130
m,p-Xylene	82	70-130
o-Xylene	77	70-130
1,1,2,2-Tetrachloroethane	106	70-130
1,4-Dichlorobenzene	96	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	107	70-130
4-Bromofluorobenzene	90	70-130

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 2108316A-12AA

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**v081704sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/21 08:36 AM**	

Compound	%Recovery	Method Limits
Freon 12	98	70-130
Freon 114	100	70-130
Chloromethane	100	70-130
Vinyl Chloride	85	70-130
Chloroethane	93	70-130
1,1-Dichloroethene	90	70-130
trans-1,2-Dichloroethene	96	70-130
Methyl tert-butyl ether	90	70-130
1,1-Dichloroethane	95	70-130
cis-1,2-Dichloroethene	93	70-130
Chloroform	90	70-130
1,1,1-Trichloroethane	100	70-130
Carbon Tetrachloride	73	60-140
Benzene	97	70-130
1,2-Dichloroethane	107	70-130
Trichloroethene	104	70-130
Toluene	101	70-130
1,1,2-Trichloroethane	104	70-130
Tetrachloroethene	100	70-130
1,2-Dibromoethane (EDB)	104	70-130
Ethyl Benzene	98	70-130
m,p-Xylene	85	70-130
o-Xylene	81	70-130
1,1,2,2-Tetrachloroethane	105	70-130
1,4-Dichlorobenzene	99	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	91	70-130

eurofins | Air Toxics

8/20/2021
Ms. Laura Foot
GeoSyntec Consultants
3043 Gold Canal Drive, Suite 100

Rancho Cordova CA 95670

Project Name: Del Paso Blvd
Project #: SAC299
Workorder #: 2108316B

Dear Ms. Laura Foot

The following report includes the data for the above referenced project for sample(s) received on 8/13/2021 at Eurofins Air Toxics LLC.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics LLC. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Monica Tran at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Monica Tran

Project Manager

eurofins | Air Toxics

WORK ORDER #: 2108316B

Work Order Summary

CLIENT:	Ms. Laura Foot GeoSyntec Consultants 3043 Gold Canal Drive, Suite 100 Rancho Cordova, CA 95670	**BILL TO:**	Ms. Laura Foot GeoSyntec Consultants 3043 Gold Canal Drive, Suite 100 Rancho Cordova, CA 95670
PHONE:	916-637-8338	**P.O. #**	100028804
FAX:		**PROJECT #**	SAC299 Del Paso Blvd
DATE RECEIVED:	08/13/2021	**CONTACT:**	Monica Tran
DATE COMPLETED:	08/20/2021		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
10A	VP-1-20210813	TO-15	4.9 "Hg	9.8 psi
11A	VP-2-20210813	TO-15	4.7 "Hg	10.1 psi
12A	VP-3-20210813	TO-15	6.3 "Hg	9.8 psi
13A	VP-4-20210813	TO-15	4.7 "Hg	10 psi
14A	VP-5-20210813	TO-15	4.5 "Hg	10.1 psi
15A	DUP-VP-20210813	TO-15	4.5 "Hg	9.8 psi
16A	Lab Blank	TO-15	NA	NA
17A	CCV	TO-15	NA	NA
18A	LCS	TO-15	NA	NA
18AA	LCSD	TO-15	NA	NA

CERTIFIED BY:  DATE: 08/20/21

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209220, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-20-16, UT NELAP – CA009332020-12, VA NELAP - 10615, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-014, Effective date: 10/18/2020, Expiration date: 10/17/2021.
Eurofins Air Toxics, LLC certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, LLC.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 351-8279

LABORATORY NARRATIVE
EPA Method TO-15
GeoSyntec Consultants
Workorder# 2108316B

Six 1 Liter Summa Canister samples were received on August 13, 2021. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

eurofins | Air Toxics

Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-1-20210813

Lab ID#: 2108316B-10A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	10	26	19	49
Acetone	10	18	24	42
2-Propanol	4.0	34	9.8	84

Client Sample ID: VP-2-20210813

Lab ID#: 2108316B-11A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	10	15	19	28
Acetone	10	25	24	59
2-Propanol	4.0	18	9.8	44
Carbon Disulfide	4.0	4.0	12	12
Tetrachloroethene	1.0	1.2	6.8	8.2

Client Sample ID: VP-3-20210813

Lab ID#: 2108316B-12A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	10	18	20	34
Acetone	10	11	25	26
2-Propanol	4.2	110	10	260
Chloroform	1.0	1.1	5.2	5.3
2,2,4-Trimethylpentane	1.0	33	4.9	160
Tetrachloroethene	1.0	16	7.2	110

Client Sample ID: VP-4-20210813

Lab ID#: 2108316B-13A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	10	22	19	41
Acetone	10	14	24	34
2-Propanol	4.0	34	9.8	84

eurofins | Air Toxics

Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-4-20210813

Lab ID#: 2108316B-13A

Tetrachloroethene	1.0	44	6.7	300

Client Sample ID: VP-5-20210813

Lab ID#: 2108316B-14A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	9.9	16	19	30
Acetone	9.9	20	24	46
2-Propanol	4.0	17	9.7	41
Tetrachloroethene	0.99	11	6.7	76

Client Sample ID: DUP-VP-20210813

Lab ID#: 2108316B-15A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	9.8	19	18	36
Acetone	9.8	23	23	55
2-Propanol	3.9	22	9.6	55
Tetrachloroethene	0.98	10	6.6	69

eurofins | Air Toxics

Client Sample ID: VP-1-20210813

Lab ID#: 2108316B-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081713**	**Date of Collection:**	**8/13/21 10:50:00**
Dil. Factor:	**1.99**	**Date of Analysis:**	**8/17/21 04:22 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.0	Not Detected	4.9	Not Detected
Freon 114	1.0	Not Detected	7.0	Not Detected
Chloromethane	10	Not Detected	20	Not Detected
Vinyl Chloride	1.0	Not Detected	2.5	Not Detected
1,3-Butadiene	1.0	Not Detected	2.2	Not Detected
Bromomethane	10	Not Detected	39	Not Detected
Chloroethane	4.0	Not Detected	10	Not Detected
Freon 11	1.0	Not Detected	5.6	Not Detected
Ethanol	10	26	19	49
Freon 113	1.0	Not Detected	7.6	Not Detected
1,1-Dichloroethene	1.0	Not Detected	3.9	Not Detected
Acetone	10	18	24	42
2-Propanol	4.0	34	9.8	84
Carbon Disulfide	4.0	Not Detected	12	Not Detected
3-Chloropropene	4.0	Not Detected	12	Not Detected
Methylene Chloride	10	Not Detected	34	Not Detected
Methyl tert-butyl ether	4.0	Not Detected	14	Not Detected
trans-1,2-Dichloroethene	1.0	Not Detected	3.9	Not Detected
Hexane	1.0	Not Detected	3.5	Not Detected
1,1-Dichloroethane	1.0	Not Detected	4.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.0	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	1.0	Not Detected	3.9	Not Detected
Tetrahydrofuran	1.0	Not Detected	2.9	Not Detected
Chloroform	1.0	Not Detected	4.8	Not Detected
1,1,1-Trichloroethane	1.0	Not Detected	5.4	Not Detected
Cyclohexane	1.0	Not Detected	3.4	Not Detected
Carbon Tetrachloride	1.0	Not Detected	6.3	Not Detected
2,2,4-Trimethylpentane	1.0	Not Detected	4.6	Not Detected
Benzene	1.0	Not Detected	3.2	Not Detected
1,2-Dichloroethane	1.0	Not Detected	4.0	Not Detected
Heptane	1.0	Not Detected	4.1	Not Detected
Trichloroethene	1.0	Not Detected	5.3	Not Detected
1,2-Dichloropropane	1.0	Not Detected	4.6	Not Detected
1,4-Dioxane	4.0	Not Detected	14	Not Detected
Bromodichloromethane	1.0	Not Detected	6.7	Not Detected
cis-1,3-Dichloropropene	1.0	Not Detected	4.5	Not Detected
4-Methyl-2-pentanone	1.0	Not Detected	4.1	Not Detected
Toluene	1.0	Not Detected	3.7	Not Detected
trans-1,3-Dichloropropene	1.0	Not Detected	4.5	Not Detected
1,1,2-Trichloroethane	1.0	Not Detected	5.4	Not Detected
Tetrachloroethene	1.0	Not Detected	6.7	Not Detected
2-Hexanone	4.0	Not Detected	16	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-1-20210813

Lab ID#: 2108316B-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081713**	**Date of Collection:**	**8/13/21 10:50:00**
Dil. Factor:	**1.99**	**Date of Analysis:**	**8/17/21 04:22 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.0	Not Detected	8.5	Not Detected
1,2-Dibromoethane (EDB)	1.0	Not Detected	7.6	Not Detected
Chlorobenzene	1.0	Not Detected	4.6	Not Detected
Ethyl Benzene	1.0	Not Detected	4.3	Not Detected
m,p-Xylene	1.0	Not Detected	4.3	Not Detected
o-Xylene	1.0	Not Detected	4.3	Not Detected
Styrene	1.0	Not Detected	4.2	Not Detected
Bromoform	1.0	Not Detected	10	Not Detected
Cumene	1.0	Not Detected	4.9	Not Detected
1,1,2,2-Tetrachloroethane	1.0	Not Detected	6.8	Not Detected
Propylbenzene	1.0	Not Detected	4.9	Not Detected
4-Ethyltoluene	1.0	Not Detected	4.9	Not Detected
1,3,5-Trimethylbenzene	1.0	Not Detected	4.9	Not Detected
1,2,4-Trimethylbenzene	1.0	Not Detected	4.9	Not Detected
1,3-Dichlorobenzene	1.0	Not Detected	6.0	Not Detected
1,4-Dichlorobenzene	1.0	Not Detected	6.0	Not Detected
alpha-Chlorotoluene	1.0	Not Detected	5.2	Not Detected
1,2-Dichlorobenzene	1.0	Not Detected	6.0	Not Detected
1,2,4-Trichlorobenzene	4.0	Not Detected	30	Not Detected
Hexachlorobutadiene	4.0	Not Detected	42	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	99	70-130

eurofins | Air Toxics

Client Sample ID: VP-2-20210813

Lab ID#: 2108316B-11A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081715**	**Date of Collection:**	**8/13/21 09:20:00**
Dil. Factor:	**2.00**	**Date of Analysis:**	**8/17/21 05:51 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.0	Not Detected	4.9	Not Detected
Freon 114	1.0	Not Detected	7.0	Not Detected
Chloromethane	10	Not Detected	21	Not Detected
Vinyl Chloride	1.0	Not Detected	2.6	Not Detected
1,3-Butadiene	1.0	Not Detected	2.2	Not Detected
Bromomethane	10	Not Detected	39	Not Detected
Chloroethane	4.0	Not Detected	10	Not Detected
Freon 11	1.0	Not Detected	5.6	Not Detected
Ethanol	10	15	19	28
Freon 113	1.0	Not Detected	7.7	Not Detected
1,1-Dichloroethene	1.0	Not Detected	4.0	Not Detected
Acetone	10	25	24	59
2-Propanol	4.0	18	9.8	44
Carbon Disulfide	4.0	4.0	12	12
3-Chloropropene	4.0	Not Detected	12	Not Detected
Methylene Chloride	10	Not Detected	35	Not Detected
Methyl tert-butyl ether	4.0	Not Detected	14	Not Detected
trans-1,2-Dichloroethene	1.0	Not Detected	4.0	Not Detected
Hexane	1.0	Not Detected	3.5	Not Detected
1,1-Dichloroethane	1.0	Not Detected	4.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.0	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	1.0	Not Detected	4.0	Not Detected
Tetrahydrofuran	1.0	Not Detected	2.9	Not Detected
Chloroform	1.0	Not Detected	4.9	Not Detected
1,1,1-Trichloroethane	1.0	Not Detected	5.4	Not Detected
Cyclohexane	1.0	Not Detected	3.4	Not Detected
Carbon Tetrachloride	1.0	Not Detected	6.3	Not Detected
2,2,4-Trimethylpentane	1.0	Not Detected	4.7	Not Detected
Benzene	1.0	Not Detected	3.2	Not Detected
1,2-Dichloroethane	1.0	Not Detected	4.0	Not Detected
Heptane	1.0	Not Detected	4.1	Not Detected
Trichloroethene	1.0	Not Detected	5.4	Not Detected
1,2-Dichloropropane	1.0	Not Detected	4.6	Not Detected
1,4-Dioxane	4.0	Not Detected	14	Not Detected
Bromodichloromethane	1.0	Not Detected	6.7	Not Detected
cis-1,3-Dichloropropene	1.0	Not Detected	4.5	Not Detected
4-Methyl-2-pentanone	1.0	Not Detected	4.1	Not Detected
Toluene	1.0	Not Detected	3.8	Not Detected
trans-1,3-Dichloropropene	1.0	Not Detected	4.5	Not Detected
1,1,2-Trichloroethane	1.0	Not Detected	5.4	Not Detected
Tetrachloroethene	1.0	1.2	6.8	8.2
2-Hexanone	4.0	Not Detected	16	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-2-20210813

Lab ID#: 2108316B-11A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081715**	**Date of Collection:**	**8/13/21 09:20:00**
Dil. Factor:	**2.00**	**Date of Analysis:**	**8/17/21 05:51 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.0	Not Detected	8.5	Not Detected
1,2-Dibromoethane (EDB)	1.0	Not Detected	7.7	Not Detected
Chlorobenzene	1.0	Not Detected	4.6	Not Detected
Ethyl Benzene	1.0	Not Detected	4.3	Not Detected
m,p-Xylene	1.0	Not Detected	4.3	Not Detected
o-Xylene	1.0	Not Detected	4.3	Not Detected
Styrene	1.0	Not Detected	4.2	Not Detected
Bromoform	1.0	Not Detected	10	Not Detected
Cumene	1.0	Not Detected	4.9	Not Detected
1,1,2,2-Tetrachloroethane	1.0	Not Detected	6.9	Not Detected
Propylbenzene	1.0	Not Detected	4.9	Not Detected
4-Ethyltoluene	1.0	Not Detected	4.9	Not Detected
1,3,5-Trimethylbenzene	1.0	Not Detected	4.9	Not Detected
1,2,4-Trimethylbenzene	1.0	Not Detected	4.9	Not Detected
1,3-Dichlorobenzene	1.0	Not Detected	6.0	Not Detected
1,4-Dichlorobenzene	1.0	Not Detected	6.0	Not Detected
alpha-Chlorotoluene	1.0	Not Detected	5.2	Not Detected
1,2-Dichlorobenzene	1.0	Not Detected	6.0	Not Detected
1,2,4-Trichlorobenzene	4.0	Not Detected	30	Not Detected
Hexachlorobutadiene	4.0	Not Detected	43	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	99	70-130

eurofins | Air Toxics

Client Sample ID: VP-3-20210813

Lab ID#: 2108316B-12A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081716**	**Date of Collection:**	**8/13/21 14:15:00**
Dil. Factor:	**2.11**	**Date of Analysis:**	**8/17/21 06:20 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.0	Not Detected	5.2	Not Detected
Freon 114	1.0	Not Detected	7.4	Not Detected
Chloromethane	10	Not Detected	22	Not Detected
Vinyl Chloride	1.0	Not Detected	2.7	Not Detected
1,3-Butadiene	1.0	Not Detected	2.3	Not Detected
Bromomethane	10	Not Detected	41	Not Detected
Chloroethane	4.2	Not Detected	11	Not Detected
Freon 11	1.0	Not Detected	5.9	Not Detected
Ethanol	10	18	20	34
Freon 113	1.0	Not Detected	8.1	Not Detected
1,1-Dichloroethene	1.0	Not Detected	4.2	Not Detected
Acetone	10	11	25	26
2-Propanol	4.2	110	10	260
Carbon Disulfide	4.2	Not Detected	13	Not Detected
3-Chloropropene	4.2	Not Detected	13	Not Detected
Methylene Chloride	10	Not Detected	37	Not Detected
Methyl tert-butyl ether	4.2	Not Detected	15	Not Detected
trans-1,2-Dichloroethene	1.0	Not Detected	4.2	Not Detected
Hexane	1.0	Not Detected	3.7	Not Detected
1,1-Dichloroethane	1.0	Not Detected	4.3	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.2	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	1.0	Not Detected	4.2	Not Detected
Tetrahydrofuran	1.0	Not Detected	3.1	Not Detected
Chloroform	1.0	1.1	5.2	5.3
1,1,1-Trichloroethane	1.0	Not Detected	5.8	Not Detected
Cyclohexane	1.0	Not Detected	3.6	Not Detected
Carbon Tetrachloride	1.0	Not Detected	6.6	Not Detected
2,2,4-Trimethylpentane	1.0	33	4.9	160
Benzene	1.0	Not Detected	3.4	Not Detected
1,2-Dichloroethane	1.0	Not Detected	4.3	Not Detected
Heptane	1.0	Not Detected	4.3	Not Detected
Trichloroethene	1.0	Not Detected	5.7	Not Detected
1,2-Dichloropropane	1.0	Not Detected	4.9	Not Detected
1,4-Dioxane	4.2	Not Detected	15	Not Detected
Bromodichloromethane	1.0	Not Detected	7.1	Not Detected
cis-1,3-Dichloropropene	1.0	Not Detected	4.8	Not Detected
4-Methyl-2-pentanone	1.0	Not Detected	4.3	Not Detected
Toluene	1.0	Not Detected	4.0	Not Detected
trans-1,3-Dichloropropene	1.0	Not Detected	4.8	Not Detected
1,1,2-Trichloroethane	1.0	Not Detected	5.8	Not Detected
Tetrachloroethene	1.0	16	7.2	110
2-Hexanone	4.2	Not Detected	17	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-3-20210813

Lab ID#: 2108316B-12A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081716**	**Date of Collection:**	**8/13/21 14:15:00**
Dil. Factor:	**2.11**	**Date of Analysis:**	**8/17/21 06:20 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.0	Not Detected	9.0	Not Detected
1,2-Dibromoethane (EDB)	1.0	Not Detected	8.1	Not Detected
Chlorobenzene	1.0	Not Detected	4.8	Not Detected
Ethyl Benzene	1.0	Not Detected	4.6	Not Detected
m,p-Xylene	1.0	Not Detected	4.6	Not Detected
o-Xylene	1.0	Not Detected	4.6	Not Detected
Styrene	1.0	Not Detected	4.5	Not Detected
Bromoform	1.0	Not Detected	11	Not Detected
Cumene	1.0	Not Detected	5.2	Not Detected
1,1,2,2-Tetrachloroethane	1.0	Not Detected	7.2	Not Detected
Propylbenzene	1.0	Not Detected	5.2	Not Detected
4-Ethyltoluene	1.0	Not Detected	5.2	Not Detected
1,3,5-Trimethylbenzene	1.0	Not Detected	5.2	Not Detected
1,2,4-Trimethylbenzene	1.0	Not Detected	5.2	Not Detected
1,3-Dichlorobenzene	1.0	Not Detected	6.3	Not Detected
1,4-Dichlorobenzene	1.0	Not Detected	6.3	Not Detected
alpha-Chlorotoluene	1.0	Not Detected	5.5	Not Detected
1,2-Dichlorobenzene	1.0	Not Detected	6.3	Not Detected
1,2,4-Trichlorobenzene	4.2	Not Detected	31	Not Detected
Hexachlorobutadiene	4.2	Not Detected	45	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	100	70-130

eurofins | Air Toxics

Client Sample ID: VP-4-20210813

Lab ID#: 2108316B-13A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081717**	**Date of Collection:**	**8/13/21 12:01:00**
Dil. Factor:	**1.99**	**Date of Analysis:**	**8/17/21 06:50 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.0	Not Detected	4.9	Not Detected
Freon 114	1.0	Not Detected	7.0	Not Detected
Chloromethane	10	Not Detected	20	Not Detected
Vinyl Chloride	1.0	Not Detected	2.5	Not Detected
1,3-Butadiene	1.0	Not Detected	2.2	Not Detected
Bromomethane	10	Not Detected	39	Not Detected
Chloroethane	4.0	Not Detected	10	Not Detected
Freon 11	1.0	Not Detected	5.6	Not Detected
Ethanol	10	22	19	41
Freon 113	1.0	Not Detected	7.6	Not Detected
1,1-Dichloroethene	1.0	Not Detected	3.9	Not Detected
Acetone	10	14	24	34
2-Propanol	4.0	34	9.8	84
Carbon Disulfide	4.0	Not Detected	12	Not Detected
3-Chloropropene	4.0	Not Detected	12	Not Detected
Methylene Chloride	10	Not Detected	34	Not Detected
Methyl tert-butyl ether	4.0	Not Detected	14	Not Detected
trans-1,2-Dichloroethene	1.0	Not Detected	3.9	Not Detected
Hexane	1.0	Not Detected	3.5	Not Detected
1,1-Dichloroethane	1.0	Not Detected	4.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.0	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	1.0	Not Detected	3.9	Not Detected
Tetrahydrofuran	1.0	Not Detected	2.9	Not Detected
Chloroform	1.0	Not Detected	4.8	Not Detected
1,1,1-Trichloroethane	1.0	Not Detected	5.4	Not Detected
Cyclohexane	1.0	Not Detected	3.4	Not Detected
Carbon Tetrachloride	1.0	Not Detected	6.3	Not Detected
2,2,4-Trimethylpentane	1.0	Not Detected	4.6	Not Detected
Benzene	1.0	Not Detected	3.2	Not Detected
1,2-Dichloroethane	1.0	Not Detected	4.0	Not Detected
Heptane	1.0	Not Detected	4.1	Not Detected
Trichloroethene	1.0	Not Detected	5.3	Not Detected
1,2-Dichloropropane	1.0	Not Detected	4.6	Not Detected
1,4-Dioxane	4.0	Not Detected	14	Not Detected
Bromodichloromethane	1.0	Not Detected	6.7	Not Detected
cis-1,3-Dichloropropene	1.0	Not Detected	4.5	Not Detected
4-Methyl-2-pentanone	1.0	Not Detected	4.1	Not Detected
Toluene	1.0	Not Detected	3.7	Not Detected
trans-1,3-Dichloropropene	1.0	Not Detected	4.5	Not Detected
1,1,2-Trichloroethane	1.0	Not Detected	5.4	Not Detected
Tetrachloroethene	1.0	44	6.7	300
2-Hexanone	4.0	Not Detected	16	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-4-20210813

Lab ID#: 2108316B-13A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081717**	**Date of Collection:**	**8/13/21 12:01:00**
Dil. Factor:	**1.99**	**Date of Analysis:**	**8/17/21 06:50 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.0	Not Detected	8.5	Not Detected
1,2-Dibromoethane (EDB)	1.0	Not Detected	7.6	Not Detected
Chlorobenzene	1.0	Not Detected	4.6	Not Detected
Ethyl Benzene	1.0	Not Detected	4.3	Not Detected
m,p-Xylene	1.0	Not Detected	4.3	Not Detected
o-Xylene	1.0	Not Detected	4.3	Not Detected
Styrene	1.0	Not Detected	4.2	Not Detected
Bromoform	1.0	Not Detected	10	Not Detected
Cumene	1.0	Not Detected	4.9	Not Detected
1,1,2,2-Tetrachloroethane	1.0	Not Detected	6.8	Not Detected
Propylbenzene	1.0	Not Detected	4.9	Not Detected
4-Ethyltoluene	1.0	Not Detected	4.9	Not Detected
1,3,5-Trimethylbenzene	1.0	Not Detected	4.9	Not Detected
1,2,4-Trimethylbenzene	1.0	Not Detected	4.9	Not Detected
1,3-Dichlorobenzene	1.0	Not Detected	6.0	Not Detected
1,4-Dichlorobenzene	1.0	Not Detected	6.0	Not Detected
alpha-Chlorotoluene	1.0	Not Detected	5.2	Not Detected
1,2-Dichlorobenzene	1.0	Not Detected	6.0	Not Detected
1,2,4-Trichlorobenzene	4.0	Not Detected	30	Not Detected
Hexachlorobutadiene	4.0	Not Detected	42	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	99	70-130

eurofins | Air Toxics

Client Sample ID: VP-5-20210813

Lab ID#: 2108316B-14A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081718**	**Date of Collection:**	**8/13/21 13:11:00**
Dil. Factor:	**1.98**	**Date of Analysis:**	**8/17/21 07:19 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.99	Not Detected	4.9	Not Detected
Freon 114	0.99	Not Detected	6.9	Not Detected
Chloromethane	9.9	Not Detected	20	Not Detected
Vinyl Chloride	0.99	Not Detected	2.5	Not Detected
1,3-Butadiene	0.99	Not Detected	2.2	Not Detected
Bromomethane	9.9	Not Detected	38	Not Detected
Chloroethane	4.0	Not Detected	10	Not Detected
Freon 11	0.99	Not Detected	5.6	Not Detected
Ethanol	9.9	16	19	30
Freon 113	0.99	Not Detected	7.6	Not Detected
1,1-Dichloroethene	0.99	Not Detected	3.9	Not Detected
Acetone	9.9	20	24	46
2-Propanol	4.0	17	9.7	41
Carbon Disulfide	4.0	Not Detected	12	Not Detected
3-Chloropropene	4.0	Not Detected	12	Not Detected
Methylene Chloride	9.9	Not Detected	34	Not Detected
Methyl tert-butyl ether	4.0	Not Detected	14	Not Detected
trans-1,2-Dichloroethene	0.99	Not Detected	3.9	Not Detected
Hexane	0.99	Not Detected	3.5	Not Detected
1,1-Dichloroethane	0.99	Not Detected	4.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.0	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	0.99	Not Detected	3.9	Not Detected
Tetrahydrofuran	0.99	Not Detected	2.9	Not Detected
Chloroform	0.99	Not Detected	4.8	Not Detected
1,1,1-Trichloroethane	0.99	Not Detected	5.4	Not Detected
Cyclohexane	0.99	Not Detected	3.4	Not Detected
Carbon Tetrachloride	0.99	Not Detected	6.2	Not Detected
2,2,4-Trimethylpentane	0.99	Not Detected	4.6	Not Detected
Benzene	0.99	Not Detected	3.2	Not Detected
1,2-Dichloroethane	0.99	Not Detected	4.0	Not Detected
Heptane	0.99	Not Detected	4.0	Not Detected
Trichloroethene	0.99	Not Detected	5.3	Not Detected
1,2-Dichloropropane	0.99	Not Detected	4.6	Not Detected
1,4-Dioxane	4.0	Not Detected	14	Not Detected
Bromodichloromethane	0.99	Not Detected	6.6	Not Detected
cis-1,3-Dichloropropene	0.99	Not Detected	4.5	Not Detected
4-Methyl-2-pentanone	0.99	Not Detected	4.0	Not Detected
Toluene	0.99	Not Detected	3.7	Not Detected
trans-1,3-Dichloropropene	0.99	Not Detected	4.5	Not Detected
1,1,2-Trichloroethane	0.99	Not Detected	5.4	Not Detected
Tetrachloroethene	0.99	11	6.7	76
2-Hexanone	4.0	Not Detected	16	Not Detected

eurofins | Air Toxics

Client Sample ID: VP-5-20210813

Lab ID#: 2108316B-14A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081718**	**Date of Collection:**	**8/13/21 13:11:00**
Dil. Factor:	**1.98**	**Date of Analysis:**	**8/17/21 07:19 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.99	Not Detected	8.4	Not Detected
1,2-Dibromoethane (EDB)	0.99	Not Detected	7.6	Not Detected
Chlorobenzene	0.99	Not Detected	4.6	Not Detected
Ethyl Benzene	0.99	Not Detected	4.3	Not Detected
m,p-Xylene	0.99	Not Detected	4.3	Not Detected
o-Xylene	0.99	Not Detected	4.3	Not Detected
Styrene	0.99	Not Detected	4.2	Not Detected
Bromoform	0.99	Not Detected	10	Not Detected
Cumene	0.99	Not Detected	4.9	Not Detected
1,1,2,2-Tetrachloroethane	0.99	Not Detected	6.8	Not Detected
Propylbenzene	0.99	Not Detected	4.9	Not Detected
4-Ethyltoluene	0.99	Not Detected	4.9	Not Detected
1,3,5-Trimethylbenzene	0.99	Not Detected	4.9	Not Detected
1,2,4-Trimethylbenzene	0.99	Not Detected	4.9	Not Detected
1,3-Dichlorobenzene	0.99	Not Detected	6.0	Not Detected
1,4-Dichlorobenzene	0.99	Not Detected	6.0	Not Detected
alpha-Chlorotoluene	0.99	Not Detected	5.1	Not Detected
1,2-Dichlorobenzene	0.99	Not Detected	6.0	Not Detected
1,2,4-Trichlorobenzene	4.0	Not Detected	29	Not Detected
Hexachlorobutadiene	4.0	Not Detected	42	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	98	70-130

eurofins | Air Toxics

Client Sample ID: DUP-VP-20210813

Lab ID#: 2108316B-15A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081719**	**Date of Collection:**	**8/13/21 13:11:00**
Dil. Factor:	**1.96**	**Date of Analysis:**	**8/17/21 07:48 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.98	Not Detected	4.8	Not Detected
Freon 114	0.98	Not Detected	6.8	Not Detected
Chloromethane	9.8	Not Detected	20	Not Detected
Vinyl Chloride	0.98	Not Detected	2.5	Not Detected
1,3-Butadiene	0.98	Not Detected	2.2	Not Detected
Bromomethane	9.8	Not Detected	38	Not Detected
Chloroethane	3.9	Not Detected	10	Not Detected
Freon 11	0.98	Not Detected	5.5	Not Detected
Ethanol	9.8	19	18	36
Freon 113	0.98	Not Detected	7.5	Not Detected
1,1-Dichloroethene	0.98	Not Detected	3.9	Not Detected
Acetone	9.8	23	23	55
2-Propanol	3.9	22	9.6	55
Carbon Disulfide	3.9	Not Detected	12	Not Detected
3-Chloropropene	3.9	Not Detected	12	Not Detected
Methylene Chloride	9.8	Not Detected	34	Not Detected
Methyl tert-butyl ether	3.9	Not Detected	14	Not Detected
trans-1,2-Dichloroethene	0.98	Not Detected	3.9	Not Detected
Hexane	0.98	Not Detected	3.4	Not Detected
1,1-Dichloroethane	0.98	Not Detected	4.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.9	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	0.98	Not Detected	3.9	Not Detected
Tetrahydrofuran	0.98	Not Detected	2.9	Not Detected
Chloroform	0.98	Not Detected	4.8	Not Detected
1,1,1-Trichloroethane	0.98	Not Detected	5.3	Not Detected
Cyclohexane	0.98	Not Detected	3.4	Not Detected
Carbon Tetrachloride	0.98	Not Detected	6.2	Not Detected
2,2,4-Trimethylpentane	0.98	Not Detected	4.6	Not Detected
Benzene	0.98	Not Detected	3.1	Not Detected
1,2-Dichloroethane	0.98	Not Detected	4.0	Not Detected
Heptane	0.98	Not Detected	4.0	Not Detected
Trichloroethene	0.98	Not Detected	5.3	Not Detected
1,2-Dichloropropane	0.98	Not Detected	4.5	Not Detected
1,4-Dioxane	3.9	Not Detected	14	Not Detected
Bromodichloromethane	0.98	Not Detected	6.6	Not Detected
cis-1,3-Dichloropropene	0.98	Not Detected	4.4	Not Detected
4-Methyl-2-pentanone	0.98	Not Detected	4.0	Not Detected
Toluene	0.98	Not Detected	3.7	Not Detected
trans-1,3-Dichloropropene	0.98	Not Detected	4.4	Not Detected
1,1,2-Trichloroethane	0.98	Not Detected	5.3	Not Detected
Tetrachloroethene	0.98	10	6.6	69
2-Hexanone	3.9	Not Detected	16	Not Detected

eurofins | Air Toxics

Client Sample ID: DUP-VP-20210813

Lab ID#: 2108316B-15A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081719**	**Date of Collection:**	**8/13/21 13:11:00**
Dil. Factor:	**1.96**	**Date of Analysis:**	**8/17/21 07:48 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.98	Not Detected	8.3	Not Detected
1,2-Dibromoethane (EDB)	0.98	Not Detected	7.5	Not Detected
Chlorobenzene	0.98	Not Detected	4.5	Not Detected
Ethyl Benzene	0.98	Not Detected	4.2	Not Detected
m,p-Xylene	0.98	Not Detected	4.2	Not Detected
o-Xylene	0.98	Not Detected	4.2	Not Detected
Styrene	0.98	Not Detected	4.2	Not Detected
Bromoform	0.98	Not Detected	10	Not Detected
Cumene	0.98	Not Detected	4.8	Not Detected
1,1,2,2-Tetrachloroethane	0.98	Not Detected	6.7	Not Detected
Propylbenzene	0.98	Not Detected	4.8	Not Detected
4-Ethyltoluene	0.98	Not Detected	4.8	Not Detected
1,3,5-Trimethylbenzene	0.98	Not Detected	4.8	Not Detected
1,2,4-Trimethylbenzene	0.98	Not Detected	4.8	Not Detected
1,3-Dichlorobenzene	0.98	Not Detected	5.9	Not Detected
1,4-Dichlorobenzene	0.98	Not Detected	5.9	Not Detected
alpha-Chlorotoluene	0.98	Not Detected	5.1	Not Detected
1,2-Dichlorobenzene	0.98	Not Detected	5.9	Not Detected
1,2,4-Trichlorobenzene	3.9	Not Detected	29	Not Detected
Hexachlorobutadiene	3.9	Not Detected	42	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	100	70-130

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 2108316B-16A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081705**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/21 11:30 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	5.0	Not Detected	9.4	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	2.0	Not Detected	7.2	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 2108316B-16A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081705**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/21 11:30 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	100	70-130

eurofins | Air Toxics

Client Sample ID: CCV

Lab ID#: 2108316B-17A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081702**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/21 09:55 AM**

Compound	%Recovery
Freon 12	98
Freon 114	98
Chloromethane	94
Vinyl Chloride	88
1,3-Butadiene	79
Bromomethane	98
Chloroethane	96
Freon 11	96
Ethanol	90
Freon 113	95
1,1-Dichloroethene	92
Acetone	99
2-Propanol	97
Carbon Disulfide	100
3-Chloropropene	94
Methylene Chloride	99
Methyl tert-butyl ether	97
trans-1,2-Dichloroethene	97
Hexane	94
1,1-Dichloroethane	94
2-Butanone (Methyl Ethyl Ketone)	99
cis-1,2-Dichloroethene	96
Tetrahydrofuran	91
Chloroform	96
1,1,1-Trichloroethane	96
Cyclohexane	94
Carbon Tetrachloride	101
2,2,4-Trimethylpentane	96
Benzene	96
1,2-Dichloroethane	97
Heptane	97
Trichloroethene	96
1,2-Dichloropropane	95
1,4-Dioxane	97
Bromodichloromethane	96
cis-1,3-Dichloropropene	96
4-Methyl-2-pentanone	92
Toluene	98
trans-1,3-Dichloropropene	96
1,1,2-Trichloroethane	97
Tetrachloroethene	97
2-Hexanone	97

eurofins | Air Toxics

Client Sample ID: CCV

Lab ID#: 2108316B-17A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081702**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/21 09:55 AM**	

Compound	%Recovery
Dibromochloromethane	99
1,2-Dibromoethane (EDB)	96
Chlorobenzene	96
Ethyl Benzene	98
m,p-Xylene	97
o-Xylene	98
Styrene	98
Bromoform	98
Cumene	98
1,1,2,2-Tetrachloroethane	96
Propylbenzene	97
4-Ethyltoluene	99
1,3,5-Trimethylbenzene	95
1,2,4-Trimethylbenzene	98
1,3-Dichlorobenzene	97
1,4-Dichlorobenzene	96
alpha-Chlorotoluene	97
1,2-Dichlorobenzene	95
1,2,4-Trichlorobenzene	80
Hexachlorobutadiene	82

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	102	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 2108316B-18A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081703**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/21 10:23 AM**	

Compound	%Recovery	Method Limits
Freon 12	95	70-130
Freon 114	95	70-130
Chloromethane	91	70-130
Vinyl Chloride	85	70-130
1,3-Butadiene	76	70-130
Bromomethane	92	70-130
Chloroethane	96	70-130
Freon 11	93	70-130
Ethanol	73	70-130
Freon 113	94	70-130
1,1-Dichloroethene	94	70-130
Acetone	93	70-130
2-Propanol	98	70-130
Carbon Disulfide	97	70-130
3-Chloropropene	91	70-130
Methylene Chloride	93	70-130
Methyl tert-butyl ether	95	70-130
trans-1,2-Dichloroethene	93	70-130
Hexane	94	70-130
1,1-Dichloroethane	91	70-130
2-Butanone (Methyl Ethyl Ketone)	93	70-130
cis-1,2-Dichloroethene	95	70-130
Tetrahydrofuran	88	70-130
Chloroform	93	70-130
1,1,1-Trichloroethane	94	70-130
Cyclohexane	93	70-130
Carbon Tetrachloride	99	70-130
2,2,4-Trimethylpentane	93	70-130
Benzene	93	70-130
1,2-Dichloroethane	94	70-130
Heptane	105	70-130
Trichloroethene	95	70-130
1,2-Dichloropropane	92	70-130
1,4-Dioxane	86	70-130
Bromodichloromethane	94	70-130
cis-1,3-Dichloropropene	94	70-130
4-Methyl-2-pentanone	84	70-130
Toluene	94	70-130
trans-1,3-Dichloropropene	95	70-130
1,1,2-Trichloroethane	95	70-130
Tetrachloroethene	96	70-130
2-Hexanone	79	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 2108316B-18A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081703**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/21 10:23 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	97	70-130
1,2-Dibromoethane (EDB)	96	70-130
Chlorobenzene	95	70-130
Ethyl Benzene	96	70-130
m,p-Xylene	99	70-130
o-Xylene	97	70-130
Styrene	96	70-130
Bromoform	98	70-130
Cumene	96	70-130
1,1,2,2-Tetrachloroethane	95	70-130
Propylbenzene	96	70-130
4-Ethyltoluene	100	70-130
1,3,5-Trimethylbenzene	94	70-130
1,2,4-Trimethylbenzene	98	70-130
1,3-Dichlorobenzene	96	70-130
1,4-Dichlorobenzene	95	70-130
alpha-Chlorotoluene	94	70-130
1,2-Dichlorobenzene	94	70-130
1,2,4-Trichlorobenzene	94	70-130
Hexachlorobutadiene	99	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	102	70-130

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 2108316B-18AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081704**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/21 10:51 AM**	

Compound	%Recovery	Method Limits
Freon 12	94	70-130
Freon 114	93	70-130
Chloromethane	90	70-130
Vinyl Chloride	84	70-130
1,3-Butadiene	76	70-130
Bromomethane	90	70-130
Chloroethane	93	70-130
Freon 11	92	70-130
Ethanol	74	70-130
Freon 113	93	70-130
1,1-Dichloroethene	92	70-130
Acetone	92	70-130
2-Propanol	95	70-130
Carbon Disulfide	96	70-130
3-Chloropropene	91	70-130
Methylene Chloride	93	70-130
Methyl tert-butyl ether	95	70-130
trans-1,2-Dichloroethene	93	70-130
Hexane	93	70-130
1,1-Dichloroethane	90	70-130
2-Butanone (Methyl Ethyl Ketone)	91	70-130
cis-1,2-Dichloroethene	94	70-130
Tetrahydrofuran	88	70-130
Chloroform	92	70-130
1,1,1-Trichloroethane	93	70-130
Cyclohexane	92	70-130
Carbon Tetrachloride	98	70-130
2,2,4-Trimethylpentane	92	70-130
Benzene	94	70-130
1,2-Dichloroethane	94	70-130
Heptane	94	70-130
Trichloroethene	95	70-130
1,2-Dichloropropane	93	70-130
1,4-Dioxane	86	70-130
Bromodichloromethane	94	70-130
cis-1,3-Dichloropropene	96	70-130
4-Methyl-2-pentanone	85	70-130
Toluene	94	70-130
trans-1,3-Dichloropropene	94	70-130
1,1,2-Trichloroethane	94	70-130
Tetrachloroethene	96	70-130
2-Hexanone	79	70-130

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 2108316B-18AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3081704**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/21 10:51 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	98	70-130
1,2-Dibromoethane (EDB)	95	70-130
Chlorobenzene	95	70-130
Ethyl Benzene	97	70-130
m,p-Xylene	98	70-130
o-Xylene	97	70-130
Styrene	95	70-130
Bromoform	98	70-130
Cumene	96	70-130
1,1,2,2-Tetrachloroethane	95	70-130
Propylbenzene	96	70-130
4-Ethyltoluene	96	70-130
1,3,5-Trimethylbenzene	96	70-130
1,2,4-Trimethylbenzene	99	70-130
1,3-Dichlorobenzene	97	70-130
1,4-Dichlorobenzene	97	70-130
alpha-Chlorotoluene	96	70-130
1,2-Dichlorobenzene	96	70-130
1,2,4-Trichlorobenzene	103	70-130
Hexachlorobutadiene	109	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	101	70-130

eurofins | Air Toxics

8/21/2021
Ms. Laura Foot
GeoSyntec Consultants
3043 Gold Canal Drive, Suite 100

Rancho Cordova CA 95670

Project Name: Del Paso Blvd
Project #: SAC299
Workorder #: 2108316C

Dear Ms. Laura Foot

The following report includes the data for the above referenced project for sample(s) received on 8/13/2021 at Eurofins Air Toxics LLC.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics LLC. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Monica Tran at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Monica Tran

Project Manager

eurofins | Air Toxics

WORK ORDER #: 2108316C

Work Order Summary

CLIENT:	Ms. Laura Foot GeoSyntec Consultants 3043 Gold Canal Drive, Suite 100 Rancho Cordova, CA 95670	**BILL TO:**	Ms. Laura Foot GeoSyntec Consultants 3043 Gold Canal Drive, Suite 100 Rancho Cordova, CA 95670
PHONE:	916-637-8338	**P.O. #**	100028804
FAX:		**PROJECT #**	SAC299 Del Paso Blvd
DATE RECEIVED:	08/13/2021	**CONTACT:**	Monica Tran
DATE COMPLETED:	08/21/2021		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
10A	VP-1-20210813	Modified ASTM D-1946	4.9 "Hg	9.8 psi
11A	VP-2-20210813	Modified ASTM D-1946	4.7 "Hg	10.1 psi
12A	VP-3-20210813	Modified ASTM D-1946	6.3 "Hg	9.8 psi
13A	VP-4-20210813	Modified ASTM D-1946	4.7 "Hg	10 psi
14A	VP-5-20210813	Modified ASTM D-1946	4.5 "Hg	10.1 psi
15A	DUP-VP-20210813	Modified ASTM D-1946	4.5 "Hg	9.8 psi
16A	Lab Blank	Modified ASTM D-1946	NA	NA
17A	CCV	Modified ASTM D-1946	NA	NA
18A	LCS	Modified ASTM D-1946	NA	NA
18AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY:  DATE: 08/21/21

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209220, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-20-16, UT NELAP – CA009332020-12, VA NELAP - 10615, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-014, Effective date: 10/18/2020, Expiration date: 10/17/2021.
Eurofins Air Toxics, LLC certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, LLC.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 351-8279

LABORATORY NARRATIVE
Modified ASTM D-1946
GeoSyntec Consultants
Workorder# 2108316C

Six 1 Liter Summa Canister samples were received on August 13, 2021. The laboratory performed analysis via Modified ASTM Method D-1946 for Helium in air using GC/TCD. The method involves direct injection of 1.0 mL of sample.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the EATL modifications.

Requirement	*ASTM D-1946*	*ATL Modifications*
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

eurofins | Air Toxics

Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VP-1-20210813

Lab ID#: 2108316C-10A

No Detections Were Found.

Client Sample ID: VP-2-20210813

Lab ID#: 2108316C-11A

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.10	0.41

Client Sample ID: VP-3-20210813

Lab ID#: 2108316C-12A

No Detections Were Found.

Client Sample ID: VP-4-20210813

Lab ID#: 2108316C-13A

No Detections Were Found.

Client Sample ID: VP-5-20210813

Lab ID#: 2108316C-14A

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.099	2.3

Client Sample ID: DUP-VP-20210813

Lab ID#: 2108316C-15A

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.098	3.9

eurofins | Air Toxics

Client Sample ID: VP-1-20210813

Lab ID#: 2108316C-10A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081920c**	**Date of Collection: 8/13/21 10:50:00 AM**	
Dil. Factor:	**1.99**	**Date of Analysis: 8/19/21 07:20 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.10	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-2-20210813

Lab ID#: 2108316C-11A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081921c**	**Date of Collection: 8/13/21 9:20:00 AM**	
Dil. Factor:	**2.00**	**Date of Analysis: 8/19/21 07:43 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.10	0.41

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-3-20210813

Lab ID#: 2108316C-12A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081922c**	**Date of Collection: 8/13/21 2:15:00 PM**	
Dil. Factor:	**2.11**	**Date of Analysis: 8/19/21 08:24 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.10	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-4-20210813

Lab ID#: 2108316C-13A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081923c**	**Date of Collection: 8/13/21 12:01:00 PM**	
Dil. Factor:	**1.99**	**Date of Analysis: 8/19/21 08:47 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.10	Not Detected

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: VP-5-20210813

Lab ID#: 2108316C-14A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081924c**	**Date of Collection: 8/13/21 1:11:00 PM**	
Dil. Factor:	**1.98**	**Date of Analysis: 8/19/21 09:10 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.099	2.3

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: DUP-VP-20210813

Lab ID#: 2108316C-15A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081925c**	**Date of Collection: 8/13/21 1:11:00 PM**	
Dil. Factor:	**1.96**	**Date of Analysis: 8/19/21 09:33 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.098	3.9

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 2108316C-16A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081904c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/19/21 12:04 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.050	Not Detected

Container Type: NA - Not Applicable

eurofins | Air Toxics

Client Sample ID: CCV

Lab ID#: 2108316C-17A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081901c**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/19/21 10:44 AM**

Compound	%Recovery
Helium	98

Container Type: NA - Not Applicable

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 2108316C-18A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081902c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/19/21 11:13 AM**	

Compound	%Recovery	Method Limits
Helium	111	85-115

Container Type: NA - Not Applicable

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 2108316C-18AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081903c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/19/21 11:37 AM**	

Compound	%Recovery	Method Limits
Helium	111	85-115

Container Type: NA - Not Applicable

Attachment 2

Vapor Pin Standard Operating Procedures

Standard Operating Procedure Installation and Extraction of the Vapor Pin®

Updated March 16, 2018

Scope:

This standard operating procedure describes the installation and extraction of the VAPOR PIN® for use in sub-slab soil-gas sampling.

Purpose:

The purpose of this procedure is to assure good quality control in field operations and uniformity between field personnel in the use of the VAPOR PIN® for the collection of sub-slab soil-gas samples or pressure readings.

Equipment Needed:

- Assembled VAPOR PIN® [VAPOR PIN® and silicone sleeve(Figure 1)]; Because of sharp edges, gloves are recommended for sleeve installation;
- Hammer drill;
- 5/8-inch (16mm) diameter hammer bit (hole **must** be 5/8-inch (16mm) diameter to ensure seal. It is recommended that you use the drill guide). (Hilti™ TE-YX 5/8" x 22" (400 mm) #00206514 or equivalent);
- 1½-inch (38mm) diameter hammer bit (Hilti™ TE-YX 1½" x 23" #00293032 or equivalent) for flush mount applications;
- ¾-inch (19mm) diameter bottle brush;
- Wet/Dry vacuum with HEPA filter (optional);
- VAPOR PIN® installation/extraction tool;
- Dead blow hammer;
- VAPOR PIN® flush mount cover, if desired;
- VAPOR PIN® drilling guide, if desired;
- VAPOR PIN® protective cap; and
- VOC-free hole patching material (hydraulic cement) and putty knife or trowel for repairing the hole following the extraction of the VAPOR PIN®.



Figure 1. Assembled VAPOR PIN®

Installation Procedure:

1) Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding.

2) Set up wet/dry vacuum to collect drill cuttings.

3) If a flush mount installation is required, drill a 1½-inch (38mm) diameter hole at least 1¾-inches (45mm) into the slab. Use of a VAPOR PIN® drilling guide is recommended.

4) Drill a 5/8-inch (16mm) diameter hole through the slab and approximately 1-inch (25mm) into the underlying soil to form a void. Hole **must** be 5/8-inch (16mm) in diameter to ensure seal. It is recommended that you use the drill guide.

VAPOR PIN® protected under US Patent # 8,220,347 B2, US 9,291,531 B2 and other patents pending

5) Remove the drill bit, brush the hole with the bottle brush, and remove the loose cuttings with the vacuum.

6) Place the lower end of VAPOR PIN® assembly into the drilled hole. Place the small hole located in the handle of the installation/extraction tool over the vapor pin to protect the barb fitting, and tap the vapor pin into place using a dead blow hammer (Figure 2). Make sure the installation/extraction tool is aligned parallel to the vapor pin to avoid damaging the barb fitting.



Figure 2. Installing the VAPOR PIN®

During installation, the silicone sleeve will form a slight bulge between the slab and the VAPOR PIN® shoulder. Place the protective cap on VAPOR PIN® to prevent vapor loss prior to sampling (Figure 3).

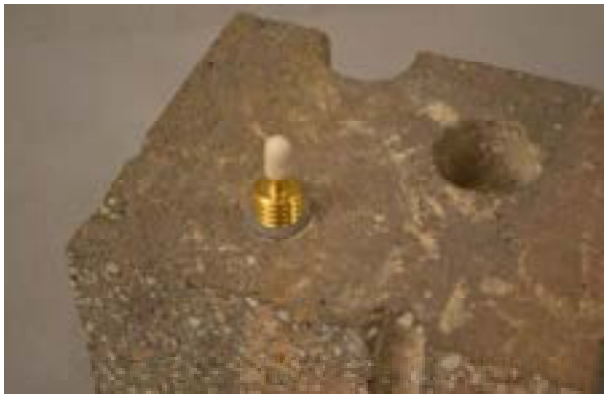


Figure 3. Installed VAPOR PIN®

7) For flush mount installations, cover the vapor pin with a flush mount cover, using either the plastic cover or the optional stainless-steel Secure Cover (Figure 4).



Figure 4. Secure Cover Installed

8) Allow 20 minutes or more (consult applicable guidance for your situation) for the sub-slab soil-gas conditions to re-equilibrate prior to sampling.

9) Remove protective cap and connect sample tubing to the barb fitting of the VAPOR PIN®. This connection can be made using a short piece of Tygon™ tubing to join the VAPOR PIN® with the

Nylaflow tubing (Figure 5). Put the Nylaflow tubing as close to the VAPOR PIN® as possible to minimize contact between soil gas and Tygon™ tubing.



Figure 5. VAPOR PIN® sample connection

10) Conduct leak tests in accordance with applicable guidance. If the method of leak testing is not specified, an alternative can be the use of a water dam and vacuum pump, as described in SOP Leak Testing the VAPOR PIN® via Mechanical Means (Figure 6). For flush-mount installations, distilled water can be poured directly into the 1 1/2 inch (38mm) hole.



Figure 6. Water dam used for leak detection

11) Collect sub-slab soil gas sample or pressure reading. When finished, replace the protective cap and flush mount cover until the next event. If the sampling is complete, extract the VAPOR PIN®.

Extraction Procedure:

1) Remove the protective cap, and thread the installation/extraction tool onto the barrel of the VAPOR PIN® (Figure 7). Turn the tool clockwise continuously, don't stop turning, the VAPOR PIN® will feed into the bottom of the installation/extraction tool and will extract from the hole like a wine cork, DO NOT PULL.

2) Fill the void with hydraulic cement and smooth with a trowel or putty knife.



Figure 7. Removing the VAPOR PIN®

- Prior to reuse, remove the silicone sleeve and protective cap and discard. Decontaminate the VAPOR PIN® in a hot water and Alconox® wash, then heat in an oven to a temperature of 265° F (130° C) for 15 to 30 minutes. For both steps, **STAINLESS – ½ hour, BRASS 8 minutes**

VAPOR PIN® protected under US Patent # 8,220,347 B2, US 9,291,531 B2 and other patents pending

3) Replacement parts and supplies are available online.

VAPOR PIN® protected under US Patent # 8,220,347 B2, US 9,291,531 B2 and other patents pending

Countywide Services Agency

Environmental Management Department

Water Protection Division
Dennis Green, Chief

County of Sacramento

Terry Schutten, County Executive
Jim Hunt, Acting Agency Administrator
Val F. Siebal, Department Director

January 30, 2009

Mr. Brad Satterwhite
Sacramento Housing and Redevelopment Agency (SHRA)
630 I Street, Second Floor
Sacramento, CA 95814

RE: LOCAL REMEDIATION PROGRAM (LRP) SITE NO. C367
FORMER BUDGET CLEANERS SITE
1124-1132 DEL PASO BLVD. APN: 275-0165-021
SACRAMENTO, CA RO 1644

Dear Mr. Satterwhite:

The subject site was presented November 14, 2008 at a joint meeting of EMD's Site Assessment and Mitigation Section (SAMS) and the California Central Valley Regional Water Quality Control Board (CVRWQCB). The site has Global ID No. T10000000457.

You are directed to proceed in a timely manner with the results of the joint meeting review, as memorialized on the attached excerpt from the November 14, 2008 SAMS meeting *Minutes*. For future reference, when you and/or your project consultant are able to attend the Closure Review Committee meetings, often we are collectively able to come up with project directions that are less generic than those shown on the attached Minutes.

Please contact me anytime at 875-8467 or vonaspernd@saccounty.net should you have any questions or concerns.

Sincerely,

REGISTERED ENVIRONMENTAL ASSESSOR-II
DAVID L. VON ASPERN
No. 20258
Expires: 6/09
STATE OF CALIFORNIA

David L. Von Aspern
ES III, Site Assessment and Mitigation

c: Kathryn Dominic, CVRWQCB
Greg Fasiano, Nichols Consulting Engineers, Chtd. (email only)

W:\DATA\VONASPERND\1124 Del Paso Blvd\Post closure meeting dir.doc

Attachment to EMD Ltr. of 1-30-09

6. A Feasibility Study is required including the results of 5-day pilot testing. Data tables for historical analytical results (referenced report, Appendix C, for example), should include the table headers on each subsequent page of the tables (Table 1 in Appendix C seems to be the only table lacking headers on subsequent pages). At some point ahead of another project discussion of this site at the Closure Review Committee, exhibits must be prepared that include all sampling points, including samples taken along piping runs, with analytical data preferably presented in summary boxes near each tested location (similar to the manner in which Figure 4 in the referenced report was prepared). EMD recognizes that only so much data can be placed onto a single figure. A possible solution would be the presentation of sampled locations and summary data on clear acetate sheets that could be overlaid one upon another over a base site plan on white paper.

Excerpt from EMD SA/Ms Meeting Minutes of 11-14-08 DLA

7. David will attempt to retrieve available public-record data concerning the supply well formerly located at the Perry's Café near the subject site. David additionally will request EMD's Imaging Section to prepare a CD of all site remediation (Water Protection Div.) and tank removal (Hazmat Div.) results and provide it to Mr. Zipp.

B. **1124-1132 Del Paso Blvd., Former Budget Dry Cleaners, City of Sacramento, RO 1644/204; LRP C367, 9:54 to 10:06am; 12 minutes**

1. The RP is directed to fully characterize the nature and extent of subsurface soils and groundwater contamination. Future report exhibits shall include all relevant data laid onto a site base map to facilitate more efficient interpretation of data. Legally required uploads to GeoTracker shall be brought current and QSRs shall continue uninterrupted.

C. **5400-5452 Auburn Blvd., Auburn Garfield Redevelopment Site, unincorporated Sacramento County, RO 1654/204; LRP C370, 10:06 to 10:48am; 42 minutes**

1. The RP is directed to fully characterize the nature and extent of subsurface soils and groundwater contamination. Since the RP and their consultant attended the meeting for this site, the Committee attempted to provide more specific suggestions. It is suggested that additional soil vapor assessment be performed along the interior sewer pipeline that formerly served the dry

NICHOLS CONSULTING ENGINEERS, Chtd.
Engineering and Environmental Services

8795 Folsom Blvd., Suite 250 • Sacramento, CA 95826 • 916.388.5655 • FAX 916.388.5676

May 29, 2009

A487.11.35

Mr. David L. Von Aspern
Senior Environmental Specialist
Sacramento County Environmental Management Department
Water Protection Division
8475 Jackson Road, Suite 230
Sacramento, CA 95826

Case Closure Summary
Local Remediation Program (LRP) Site No. C637
1124 and 1132 Del Paso Boulevard (APN: 275-0165-021)
Sacramento, California 95815

Dear Mr. Von Aspern:

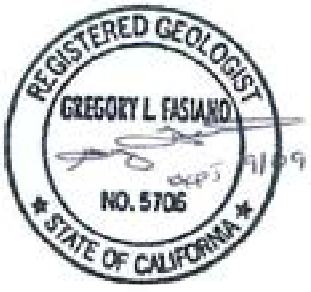
Please find the enclosed revised Case Closure Summary for the above referenced site prepared by Nichols Consulting Engineers (NCE) on behalf of the Sacramento Housing and Redevelopment Agency (SHRA). This final revision includes the "housekeeping" items that were discussed this morning at the Closure Committee meeting at your office. These revisions include:

1. This signed and stamped cover letter
2. Addition of a new appendix A including a figure depicting the distribution of VOCs and results from the passive soil gas survey, and
3. Revision to the Case Closure Summary form (Title and in Section III)

A hard copy of this revised summary will be sent o Ms Kathryn Dominic at ch CVRWQCB. Thanks you for your assistance in this matter.

Yours Very Truly,

Nichols Consulting Engineers Chtd.



Gregory L. Fasiano, P.G.
Principal Geologist

Enclosures: Case Closure Summary

Cc: Mr. Brad Satterwhite – SHRA
Ms. Kathryn Dominic - CVRWQCB

C:\NCE\projects\SHRA\Del Paso Blvd_Case Closure.doc

Case Closure Summary: 1124 – 1132 Del Paso Blvd, Sacramento

DATE: May 29, 2009

I. AGENCY INFORMATION

Agency Name: Sacramento County Environmental Mgmt. Dept.	Address: 10590 Armstrong Ave., Suite A
City/State/Zip: Sacramento, CA 95826	Phone/email: (916) 875-8467 email: vonaspernd@saccounty.net
Responsible staff person: David Von Aspern	Title: Environmental Specialist III

II. CASE INFORMATION

Site Facility Name: Budget Cleaners (Former Site of)	APN: 275-0165-021	
Site Facility Address: 1124 – 1132 Del Paso Blvd., Sacramento CA 95815		
RB LUSTIS Case No:	Local Case No: RO 1644	LOP Case No: C367
URF file date: 10-29-08	Global ID No. T10000000457	
Responsible Parties: Attn: Brad Satterwhite	Address: 630 I Street, 2nd Floor	Phone Number: 916-440-1399
Sacramento Housing and Redevelopment Agency (SHRA)	Sacramento CA 95814	

Tank No.	Size in Gallons	Contents	Closed in-Place/Removed?	Date
1	No history of onsite tanks			
2				

III. RELEASE AND SITE CHARACTERIZATION INFORMATION

Cause and type of release: Unknown (Suspected up-gradient off-site source)		
Site characterization complete? (x)YES ()NO	Date approved by oversight agency:	
Monitoring Wells Installed? () YES (x) NO	Number:	Proper screen interval? () YES () NO
Highest GW depth below ground surface: Approx. 35 feet	Lowest Depth: Approx, 40 feet	Flow Direction: NE
Most Sensitive Current Use: Municipal		
Are drinking water wells affected? () YES (x) NO	Aquifer name: Sacramento River Basin	
Is surface water affected? () YES (x) NO	Nearest/affected SW name: N/A	
Off-site beneficial use impacts (addresses/locations): None		
Report(s) on file? (X) YES () NO	Where is report(s) filed? SCEMD	

Treatment and Disposal of Affected Material

Materials	Amount (Include Units)	Action (Treatment or Disposal w/Destination)	Date
Tank	No tanks present		
Piping	No piping treatment or disposal		
Free Product	No free product treatment or disposal		
Soil	Approximately 35 gallons of soil cuttings	Soil contained in 55 gallon drum awaiting disposal at designated landfill.	April 3, 2009
Groundwater	No groundwater treatment or disposal.		
Barrels	One partially full 55 gallon drum containing soil cuttings. One partially full 55 gallon drum	Soil and grout contained in 55 gallon drums awaiting disposal at designated landfill.	April 3, 2009

	containing grout.		

Case Closure Summary

III. RELEASE AND SITE CHARACTERIZATION INFORMATION (CONTINUED)

Maximum Documented Contaminant Concentrations--Before and After

Contaminant ▼	Soil (mg/Kg)		Water (μg/L)		Contaminant ▼	Soil (mg/Kg)		Water (μg/L)	
	Before	After	Before	After		Before	After	Before	After
TPH (Gas)	<1.0	<1.0	<50	<50	Xylene	<0.0050	<0.0050	<0.5	<0.5
TPH (Diesel)	52	52	240	240	Ethylbenzene	<0.0050	<0.0050	<0.5	<0.5
Benzene	<0.0050	<0.0050	<0.5	<0.5	Oil & Grease	Not analyzed	Not analyzed	Not analyzed	Not analyzed
Toluene	<0.0050	<0.0050	<0.5	<0.5	Cis-1,2-DCE	<0.0050	<0.0050	6.0	6.0
MTBE	<0.0050	<0.0050	<0.5	<0.5	PCE	<0.0050	<0.0050	11.0	11.0

Comments (Depth/Type of Remediation, Mass Balance Calculations, Fate & Transport Results, etc.):
No remedial efforts have been performed at the site. Note that maximum concentrations of TPH-D and TPH-G and VOCs in groundwater found as part of this investigation were from in samples taken were from an off-site boring (B-7) on adjacent RT Property.

IV. CLOSURE

Does completed corrective action protect existing beneficial uses per the Regional Basin Plan? (x) YES () NO		
Does the completed corrective action protect potential beneficial uses per the Regional Board Basin Plan? (x) YES () NO		
Does corrective action protect public health for current land use? (x) YES () NO		
Site management requirements: None		
Should corrective action be reviewed if land use changes? () Yes (x) No		
Monitoring wells Decommissioned: () Yes () No (x) N/A	No. Decommissioned:	No. Retained:
Fee Title Certification: Pending		
GeoTracker Input Verification: Completed		
List Enforcement Actions Taken: None		
List enforcement actions rescinded: None		

V. LOCAL AGENCY REPRESENTATIVE DATA

Name: Mr. Val F. Siebal	Title: Director, EMD
Signature:	Date:

VI. RWQCB NOTIFICATION

Date Submitted to RB:	RB Response:	
RWQCB Staff Name: Kathryn Dominic	Title: Engineering Geologist	Date:

VII. ADDITIONAL COMMENTS, DATA, ETC.

"Human Health Risk Assessment" results:

No Further Action Summary
1124 and 1132 Del Paso Boulevard
LRP Site No. C637
Sacramento, California
May 19, 2009

This summary presents information regarding the nature and extent of Total petroleum Hydrocarbons (TPH) in soil and groundwater, and volatile organic compounds (VOCs) in groundwater for the property located at 1124 Del Paso Boulevard, Sacramento, California (Site). This summary has been prepared by Nichols Consulting Engineers (NCE on behalf of the Sacramento Housing and Redevelopment Agency (SHRA). The Site is bounded by Del Paso Boulevard to the north, Southgate Road to the east, a parking lot and a parcel owned by Regional Transit (RT) to the southwest and residential development to the south, as shown on Plates 1 and 2. One onsite structure exists at the Site that consists of a large building of block masonry, frame and stucco and poured concrete construction on a slab on grade foundation. The Site encompasses approximately 1.34 acres (58,444 square feet) of land and is currently not occupied although there is a vacant structure on the Site currently in the initial stages of tenant improvements.

This summary presents a chronology of site investigation activities and the results of those investigations in Section 1.0. Its qualification as a low-risk groundwater site is provided in Section 2.0. Section 3.0 provides responses to the requirements listed in California Regional Water Quality Control Board's (CRWQCB) Tri-Regional Board Appendix B checklist.

1.0 CHRONOLOGY

This section provides a chronological summary of previous site investigations and their results.

November, 2006

Phase I ESA Including Limited Phase II
NCE conducted a Phase I Environmental Site Assessment and Limited Subsurface Investigation (Phase I ESA) for SHRA for this property in 2006 the results of which are presented in NCE's Phase I/II ESA dated November 11, 2008. The ESA indicated that there was a likelihood that at least two historical dry cleaning businesses operated out of the building at this location between approximately 1952 and 1980. These findings were based solely on historical City Directory listings and no independent confirmation of the existence of on-site historical dry cleaning operations was uncovered. Based on these findings, SHRA retained NCE to conduct a limited Phase II investigation consisting of a passive soil gas survey to further evaluate these findings.

April, 2006

Passive Soil Gas Survey
Passive soil gas probes (using EMFLUX technology) were deployed at the 21 sample locations (PSG-1 through PSG-21 [Plate 3]). The results of the investigation are included in NCE's November 11, 2008 Phase I/II ESA. The probes were installed to a depth of about 12-inches below concrete and/or asphalt paving. The probes were left in place for

approximately 7 days, retrieved and then sent to the analytical laboratory for analysis. Relative ionic counts associated with chlorinated compounds including tetrachloroethene (PCE), trichloroethene (TCE), chloroform and benzene, toluene, ethylbenzene and xylenes (BTEX) were reported in soil gas at the site. The highest ionic counts of both chlorinated compounds and TPH related volatiles were found at the same probe location (PSG-21) and their relative distribution was similar (Appendix A).

May - June, 2006

Soil and Grab Groundwater Sampling

A subsequent limited subsurface investigation was conducted to evaluate potential onsite releases, confirm soil-gas results, and to evaluate potential off-site releases associated with the adjacent RT (old Regal station) property. The results of the investigation are included in NCE's November 11, 2008 Phase I/II ESA. Sampling locations are shown on the attached Plates 2 through 6. Eight soil borings (B-1 through B-6, B-8 and B-9) were drilled at locations both inside and outside of the structure. Borings were located in areas that exhibited the highest relative soil-gas readings. Groundwater was collected for analysis from five of the eight on-site borings. The two borings drilled inside the structure met with refusal just below the concrete slab at approximately 3 feet bgs. The results of the subsurface investigation revealed the presence of relatively low levels of total petroleum hydrocarbons (TPH) in soil (maximum concentration of 52 mg/kg TPH-D), and groundwater (maximum concentration of 240 ug/L TPH-D) at the Site. In addition, volatile organic compounds (VOC) were detected in groundwater beneath the site (maximum concentration of 11 ug/L PCE).

On behalf of SHRA, and with access granted to the RT site by RT, NCE drilled and sampled two additional borings (B-7 & B-9) on the RT site. Soil and groundwater samples were collected and analyzed from Boring B-7 although only soil was collected from Boring B-9 which was terminated at 15 feet bgs. This follow-up subsurface investigation also revealed the presence of VOCs and TPH in soil and groundwater beneath the adjacent RT property to the southwest.

Concentrations of TPH-D in groundwater were highest at borings B-4 and B-7 (240 ug/L), located near the southwestern side of the Site, and on the RT property, respectively (Table 1). TPH-D was reported at a lower concentration of 70 micrograms per liter (ug/L) in the groundwater sample collected from boring B-1 located on the eastern side of the Site. TPH-G was only found in groundwater form boring B-7 located on the RT property. TPH-D was reported at concentrations of 1.4 milligrams per liter (mg/Kg), 1.5 mg/Kg, 52 mg/Kg and 3.3 mg/Kg in the soil samples collected from borings B-1, B-2, B-5 and B-6, respectively (Plate 6).

VOC concentrations were highest on the RT property (B-7) where PCE was reported in the groundwater sample at 400 ug/L. PCE was reported in the groundwater samples from boring B-3 and B-4, located on the western portion of the SHRA Site, at concentrations of 11 ug/l and 1.1 ug/L, respectively. The highest levels of cis-1,2-dichloroethene (cis-1,2- DCE) and TCE in groundwater were also reported in boring B-7 (on RT property) at a concentrations of 42 ug/L and 12 ug/L, respectively. With the exception of 6.0 ug/L of cis-1,2 DCE in the groundwater form boring B-8 located along the sewer line in the alley, VOCs were not reported at concentrations above their respective detection limits in any of the groundwater samples in borings east of borings B-3 and B-4.

Based on the northeast groundwater flow direction calculated for the Site vicinity, and the distribution of TPH and VOCs in groundwater and soil, it was postulated that the TPH and VOCs found in the groundwater at the Site may be the result of migration to the Site from an unidentified off-site source to the southwest. Additional collection of grab groundwater samples was advised to support this conclusion including off-site sampling locations on the RT property, and up-gradient of the RT property, in and around the vicinity where the highest VOC concentrations were reported.

January, 2007

Indoor Air Quality Sampling

As requested by SHRA, NCE conducted indoor air quality sampling and analysis at the Site. Data evaluation was performed by NCE's teaming partner, LFR Environmental Management & Consulting Engineering (LFR). The air sampling was performed to provide information on whether subsurface VOCs were migrating upward and into the building. The results of the indoor air quality sampling and analysis are presented in LFR's January 23, 2007 Indoor Air Quality Evaluation letter. In December 2006 NCE collected three indoor samples and one outdoor sample using Summa canisters (IA-1 through IA-3 and IA-R) at the Site (Plate 2). The outdoor sample was collected on the building's roof for ambient air quality comparison. The indoor air samples were collected in locations where the subsurface passive sampling indicated the highest VOC levels.

Freon 11, Freon 12, chloromethane, ethanol, acetone, benzene and toluene were identified in the ambient air at concentrations ranging from 0.62 to 4.2 micrograms per cubic meter (ug/m^3). Freon 11, Freon 12, chloromethane, ethanol, acetone, benzene and toluene were identified in the indoor air at concentrations ranging from 0.57 to 6.2 ug/m^3 (Table 2). It was concluded that their identification in the indoor air most likely represents ambient conditions and not subsurface vapor intrusion. Relatively low concentrations of carbon disulfide, 2-butanone (MEK) and 2-propanol (rubbing alcohol) also identified in the air are likely related to tenant improvement projects observed in the buildings. These three VOCs were not identified in the previous subsurface sampling events. No PCE, TCE, cis-1,2-DCE or Vinyl Chloride were reported in the indoor air samples.

The air sample results were compared to the passive soil gas results. The passive soil gas results identified several chlorinated VOCs which were not identified in the air samples. Benzene and toluene were the only VOCs identified in the passive soil gas that were also identified in the air sample. However, as previously stated, benzene and toluene in the indoor air are likely related to ambient air and not vapor intrusion.

The air sample results were also screened against established health based air criteria including criteria from the U.S. EPA, California EPA, and the Bay Area Regional Water Quality Control Board. These regulatory agencies each used human health risk based methodology to derive safe air concentrations for workers. With the exception of benzene and chloromethane, the detected indoor air concentrations are significantly below levels considered to be a health concern. The benzene and chloromethane detections indoors are lower than their respective outdoor detections and most likely represent ambient conditions.

Based on the review of the air and subsurface data, vapor intrusion does not appear to be occurring at the Site. The majority of the VOCs detected in groundwater samples were not detected in the indoor samples. As previously stated, Freon 11, Freon 12, chloromethane,

ethanol, acetone, benzene and toluene were detected in indoor air most likely represent outdoor influences on indoor air quality and not subsurface intrusion. A copy of the LFR report is included in Appendix C.

November 2007

RT Site Sampling - Geocon

In 2007, the Sacramento Regional Transit District (RT) in cooperation with the Business Environmental Resource Center (BERC) retained Geocon Consultants (Geocon) to conduct a Phase II assessment of the RT property immediately west of the subject site. The Geocon results were presented in their November 2007 report titled *Phase II Environmental Site Assessment, Sacramento Regional Transit Property, 1100 Del Paso Boulevard, Sacramento County, California*. The Geocon investigation consisted of drilling and sampling nine soil borings (DP1 through DP9) on the RT site generally within the boundaries of geophysical anomalies that were previously identified at the site. Four of the borings were advanced to groundwater and groundwater samples were collected for analysis. PCE, TCE and *cis* 1,2-DCE were detected in each of the four groundwater samples collected with the highest concentrations of each chemical reported in Boring DP9 located near the southwestern boundary of the RT site near Baxter Avenue (Plates 3 through 5). PCE, TCE and *cis* 1,2-DCE were reported in the groundwater from Boring DP9 at 400, 6.2 and 14 ug/l, respectively. The Geocon report did not identify the source of the chlorinated solvents found in the groundwater in the site vicinity. TPH compounds including gas, diesel and motor oil were also found in the soil and groundwater at the RT site in the Geocon borings (Plate 6).

The attached Plates 3 through 5 show PCE, TCE and *cis* 1,2-DCE groundwater concentrations, and interpreted isoconcentration contours, based on existing available data for the RT and Subject Sites. Soil analytical data for both the Site and the adjacent RT property is shown on Plate 6.

April 2009

Additional Phase II Sampling

As requested by SHRA, in April 2009 NCE conducted Additional Phase II Sampling activities at the Site. The primary objectives of the Additional Phase II Sampling activities were to further evaluate and determine if there is a vadose zone source of VOCs on the SHRA Site and further evaluate the distribution of chlorinated solvents in the shallow groundwater beneath the Site. The results of the investigation are included in NCE's May 19, 2009 *Summary Report, Additional Phase II Sampling*. Additional Phase II Sampling activities were performed in April 2009 and included the advancement of Geoprobe borings B-11 through B-15 (Plate 2). Two borings including B-11 and B-12 were advanced to a maximum depth of 15 feet bgs to evaluate the shallow subsurface soils within selected proposed utility trench alignments. Three borings including B-13, B-14 and B-15 were advanced to a maximum depth of 40 feet bgs to further evaluate and determine if there is a vadose zone source of VOCs on the SHRA Site. An attempt was made to collect a grab groundwater sample at a fourth location (B-16) located in the center of the parking lot between the RT and SHRA sites. Due to unfavorable soil conditions the drilling contractor (Vironex) was not successful

in advancing B-16 to a depth required to collect a groundwater sample. No soil samples were collected from boring B-16.

A total of 12 soil samples from Geoprobe borings B-11 through B-15 were collected and submitted for VOCs and PAH analysis. Groundwater samples collected from borings B-13 and B-15 were also submitted for VOC analyses. Of the soil samples submitted, none contained VOC or PAHs at concentrations above the laboratory detection limit (Table 1). The groundwater sample from borings B-13 contained *cis* 1,2-DCE at a concentration of 0.89 ug/L. Chloromethane, naphthalene, acetone and 2-butanone were also reported in the groundwater sample from B-13 at concentrations of 0.87ug/L, 0.76 ug/L, 13 ug/L and 3.1 ug/L, respectively. No other VOC constituents were reported above their respective reporting limits in the groundwater samples collected from borings B-13 and B-15. The distribution of PCE, TCE and *cis* 1,2-DCE are shown on Plates 3, 4 and 5, respectively and the results of analytical testing are presented on Table 1. Soil analytical results are presented on Plate 6.

The presence of *cis* 1,2-DCE in the groundwater at Boring B-13 is consistent with the previous groundwater chemical data collected at the Site and fits well with the interpreted distribution of VOCs in shallow groundwater beneath the Site. The lack of any detectable VOCs in soil beneath the Site, from samples collected during this additional investigation and previous investigations, suggests the lack of a vadose zone source of VOCs on the property. The data collected during this additional investigation substantiates the previously collected data for the Site and further supports the reasonable conclusion that the VOCs found in the shallow groundwater beneath the Site is from a yet identified up-gradient source located southwest of the Site.

2.0 LOW RISK GROUNDWATER CRITERIA

2.1 *The release has been stopped and sources, including free product, have been removed or remediated*:

Hazardous substance release mechanisms must be identified, if possible, and the release must be sufficiently abated so as to prevent ongoing pollution.

If the release was from a petroleum underground storage tank, the tank or appurtenant structure that leaked must be repaired or permanently closed per Article 7, Section 2672 of the UST regulations. Free-product shall be removed to the extent practicable per Article 5, Section 2655 of the UST regulations.

Soil that contains sufficient mobile constituents (leachate, vapors, or NAPL), as determined by the site-specific plume characteristics and soil analytical data, to continue to degrade water, or result in a significant threat to human health, should be considered a source.

No on-site source or potential release area(s) have been identified associated with the site. The lack of any detectable VOCs in soil beneath the Site, from samples collected during investigation activities, suggests the lack of a vadose zone source of VOCs on the property. The data collected for the Site substantiates and further supports the reasonable conclusion that the VOCs found in the shallow groundwater beneath the Site is from a yet identified up-gradient source located southwest of the Site.

2.2 *The site has been adequately characterized*:

The vertical and lateral extent of the subsurface impact must be defined to the degree that is necessary to evaluate whether the site currently poses, or in the future may pose, a significant threat to human health, water of the State, or other nearby sensitive receptors. The level of detail required at a given site will depend upon the contaminant(s) of concern, the types of potential receptors and exposure pathways, and the proximity of other potential receptors.

It is assumed that subsurface conditions are highly variable and that there is always some uncertainty associated with evaluating data at a site. However, the cost of obtaining additional data must be weighed against the benefit of obtaining that data and the effect the data may have on the certainty of decisions to be made at the site.

The presence or absence of horizontal and vertical conduits that could act as preferential pathways for contaminant migration should be evaluated as a part of the site characterization process. Vertical gradient evaluation may be necessary.

Soil, groundwater and air sampling efforts for the site are summarized below:

- **Fifteen soil borings drilled and logged**
- **Twenty-two soil samples submitted for TPH analyses (eight detections with maximum concentration of 52 mg/Kg TPH-D)**
- **Thirty-three soil samples submitted for VOC analysis (no detections)**
- **Three soil samples submitted for SVOC analyses (no detections)**
- **Seven on-site groundwater grab samples**
    - **TPH-D detections in three samples (maximum concentration of 240 ug/L)**
    - **No TPH-G or BTEX detections**
    - **VOC detections in four samples (maximum concentration of 11 ug/L PCE)**

Considering the amount of Phase II sampling and analysis that has been performed at the site, the lack of any VOC's detected in the vadose zone soils, the relatively low levels of TPH related impacts in subsurface soils, and the distribution of VOC impacts in groundwater, it is NCE's opinion that the site itself has been adequately characterized and it is reasonable to conclude that the site is not the source of the VOCs found in the shallow groundwater in the site vicinity.

Laboratory results for groundwater samples collected from borings B-1 and B-2 located on the down gradient portion of the Site were below laboratory detection limits for VOCs. These findings suggest that the downgradient lateral extent of subsurface VOC groundwater impacts has been defined. As the source of the impacts appears to be related to a "yet to be identified up gradient source", the vertical and cross-gradient lateral limits of groundwater related VOC impacts in the site vicinity has not been fully evaluated.

2.3 *The contaminant plume is not migrating and chemical concentrations in groundwater are projected to meet water quality objectives through natural attenuation or engineered*

solutions prior to the beneficial use of groundwater.

If groundwater within the plume is likely to be used before natural attenuation or engineered solutions are projected to complete the cleanup, then active or additional remediation may be required. Plumes often display short-term variability in groundwater concentrations. These effects are due to changes in groundwater flow, degradation rates, sampling procedures, and other factors that are inherently variable. This variability should not necessarily be construed as evidence of plume migration or degradation. The site characterization database must support the conclusion that a plume is degrading and not migrating.

Since the source of the impacts appears to be related to a "yet to be identified up gradient source", an evaluation of the natural attenuation and migration characteristics of the subsurface impacts has not been conducted.

2.4 *No other waters of the State, water supply wells or other sensitive receptors are likely to be impacted*.

Water supply wells include municipal, local service or private wells, agricultural and industrial wells. Central Valley aquifers generally are not segregated in discrete units, but are subject to vertical and horizontal migration of water and any pollutants carried by or in the water, often by local pumping.

The Sensitive Receptor Survey (SRS) shows that the closest identified water supply wells are non-operational offsite production wells (well numbers 109 and 110) that are located approximately 1,960 feet north and 1,635 feet east of the Site respectively. These wells are maintained by the City of Sacramento and have been out of operation for at least the past 25 years. The locations of the wells identified by the SRS are shown on Plate 1.

2.5 *The site presents no significant risk to human health or safety*.

Remaining site conditions shall not exceed a hazard index of one, a one-in-one million excess cancer risk (10-6) for residential receptors and a one-in-one-hundred thousand (10-5) excess cancer risk for commercial receptors (including construction workers). Site representative concentrations shall either be the maximum reported concentration, the 95% upper confidence level, or a weighted average, as appropriate. At a minimum, exposure pathways to be considered shall include surface soil ingestion, and surface soil, subsurface soil, and groundwater volatilization to indoor and outdoor air (via basements, buildings, subsurface utilities, etc.).

Note: The Responsible Party is required to demonstrate the acceptability of the model(s) used to determine the human health risk.

As requested by SHRA, NCE conducted indoor air quality sampling and analysis at the Site. The air sampling was performed to provide information on whether subsurface VOCs were migrating upward and into the building.

Based on the review of the air and subsurface data, vapor intrusion does not appear to

be occurring at the Site. The majority of the VOCs detected in subsurface samples were not detected in the indoor samples. As previously stated, Freon 11, Freon 12, chloromethane, ethanol, acetone, benzene and toluene were detected in indoor air but most likely represent outdoor influences on indoor air quality and not subsurface intrusion. Based on these findings the site currently presents no significant risk to human health or safety.

3.0 CVRWQCB APPENDIX B CHECKLIST

3.1 *For groundwater-impacted sites, distance to production wells for municipal, domestic, agriculture, industry and other uses within 2,000 feet of the site.*

Shown on Plate 1

3.2 *Site maps, to scale, of area impacted showing locations of former and existing tank systems, excavation contours and sample locations, borings and monitoring well elevation contours, gradients, and nearby surface waters, buildings, streets, and subsurface utilities.*

Site maps depicting the site layout, distribution of PCE in groundwater, distribution of TCE in groundwater, distribution of *cis* 1,2-DCE in groundwater and soil data are presented in Plate 2 through 6.

3.3 *Figures depicted lithology (cross sections), treatment system diagrams.*

Boring Logs for borings B-1 through B-15 are included in Appendix B

3.4 *Stockpiled soil remaining onsite or offsite disposal (quantity).*

No stockpiled soils exist on site.

3.5 *Monitoring wells remaining onsite, fate.*

No monitoring wells exist on site.

3.6 *Tabulated data of all groundwater elevations and depth to water.*

Groundwater elevations are not applicable as no monitoring wells exist at the Site. Depth to groundwater at time of drilling is indicated on boring logs. Groundwater flow directions for the site vicinity have been established and documented for the Wyluda UST site on Del Paso Boulevard and the El Monte Triangle various ongoing investigations.

3.7 *Tabulated results of all sampling and analyses;*

Sampling and analyses results are included in Tables 1 and 2.

3.8 *Concentration contours of contaminants found and those remaining in soil and groundwater, both onsite and offsite;*

- *Lateral extent of soil contamination*
- *Vertical extent of soil contamination*
- *Lateral extent of groundwater contamination*

Vertical extent of groundwater contamination

Site maps depicting the distribution of PCE in groundwater, distribution of TCE in groundwater, distribution of *cis* 1,2-DCE in groundwater and soil data are presented in Plate 3 through 6, respectively.

3.9 *Zone of influence calculated and assumptions used for the subsurface remediation system and the zone of capture attained for the soil and groundwater remediation systems*;

No remediation systems are designed or have been installed at the Site.

3.10 *Reports/information*

- **NCE – *Phase I Environmental Site Assessment and Limited Subsurface Investigation, Assessors Parcel No's 275-0165-002, 003, 016, 017 and 018, 1124 and 1132 Del Paso Boulevard, Sacramento, California 95815. November 11, 2008***
- **NCE - *Vapor Intrusion Analyses*, Assessors Parcel No's 275-0165-002, 003, 016, 017 and 018, 1124 and 1132 Del Paso Boulevard, Sacramento, California. January 26, 2007**
- **Geocon - *Phase II Environmental Site Assessment, Sacramento Regional Transit Property, 1100 Del Paso Boulevard, Sacramento County, California,* November, 2007**
- **NCE - *Summary Report, Additional Phase II Sampling, Local Remediation Program (LRP) Site No. C637, 1124 and 1132 Del Paso Boulevard, (APN: 275-0165-021), Sacramento, California 95815. May 19, 2009***

3.11 *Best Available Technology (BAT) used or an explanation for not using BAT;*

Implementation of BAT was not pursued as the source of the impacts appears to be related to a "yet to be identified up gradient source".

3.12 *Reasons why background was/is unattainable using BAT;*

Not applicable

3.13 *Mass balance calculation of the subsurface treated versus that remaining;*

VOCs were below laboratory detection limits in all soil samples submitted for analysis.

TPH-D was reported at concentrations of 1.4 mg/Kg, 1.5 mg/Kg, 52 mg/Kg and 3.3 mg/Kg in the soil samples collected from borings B-1, B-2, B-5 and B-6, respectively. An extremely conservative estimate of the diesel remaining in on site soils is approximately 130 pounds.

3.14 *Assumptions, parameters, calculations and model used in risk assessments, and fate and transport modeling**;***

Fate and transport modeling was not conduced as the source of the impacts appears to be related to a "yet to be identified up gradient source". The potential for vapor intrusion exposures was evaluated by collecting and analyzing direct indoor air samples from within the structure at the site to provide information on whether subsurface VOCs were migrating upward and into the building. Air sample analytical results were compared to established health based air criterion from the U.S. EPA, California EPA and the Bay Area Regional Water Quality Control Board including the following:

- **California Human Health Screening Level (CHHSL)**
- **Environmental Screening Level (ESL)**
- **Preliminary Remedial Goal (PRG)**

3.15 *Rationale why conditions remaining at the site will not adversely impact groundwater quality, health, or other beneficial uses*

See Section 2.0

3.16 *Waste Extraction Test (WET) or TCLP results*

Not applicable

LIST OF TABLES AND PLATES

Table 1 – Summary of Analytical Results
Table 2 – Indoor Air Analytical Results
Plate 1 – Vicinity Map
Plate 2 – Site Plan
Plate 3 – Distribution of PCE in Groundwater
Plate 4 – Distribution of TCE in Groundwater
Plate 5 – Distribution of cis-1,2-DCE in Groundwater
Plate 6 - Analytical Data - Soil

Appendix A – Passive Sol Gas Results – Total Chlorinated Compounds
Appendix B – Boring Logs
Appendix C - LFR Indoor Air sampling Summary Report

TABLES

Table 1
Summary of Analytical Results
No Further Action Summary
Local Remediation Program (LRP) Site No. C637
1124 and 1132 Del Paso Boulevard
(APN: 275-0165-021)
Sacramento, California 95815

			Soil											Water									
Sample Id.	Depth (feet)	Date Sampled	TPHd (mg/kg)	TPHg (mg/kg)	cis-1,2-DCE (mg/kg)	PCE (mg/kg)	TCE (mg/kg)	Chlorofrom (mg/kg)	Chloromethane (mg/kg)	Napthalene (mg/kg)	Acetone (mg/kg)	2-Butanone (mg/kg)	SVOCs 8270C * (mg/kg)	TPHd (ug/L)	TPHg (ug/L)	cis-1,2-DCE (ug/L)	PCE (ug/L)	TCE (ug/L)	Chloroform (ug/L)	Chloromethane (ug/L)	Napthalene (ug/L)	Acetone (ug/L)	2-Butanone (ug/L)	SVOCs 8270 C * (ug/L)
B-1	---	5/16/06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	70	<50	<0.50	<0.50	<0.50	<0.50	---	---	---	---	NA
B-1	5	5/16/06	1.4	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-2	---	5/16/06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<50	<50	<0.50	<0.50	<0.50	<0.50	---	---	---	---	NA
B-2	6	5/16/06	1.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-3	---	5/16/06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<50	<50	<0.50	11	<0.50	<0.50	---	---	---	---	NA
B-3	6	5/16/06	<1.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-3	16	5/16/06	<1.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-3	26	5/16/06	<1.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-3	36	5/16/06	<1.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-4	---	5/17/06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	240	<50	2.5	1.1	<0.50	<0.50	---	---	---	---	NA
B-4	6	5/17/06	<1.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-4	11	5/17/06	<1.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-4	21	5/17/06	<1.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-4	31	5/17/06	<1.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-5	2.5	5/17/06	52	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-5	2.5	5/17/06	32 #	---	---	---	---	---	NA	NA	NA	NA	NA	---	---	---	---	---	---	---	---	---	---	NA
B-6	2.5	5/17/06	3.3	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-6	2.5	5/17/06	1.5 #	---	---	---	---	---	NA	NA	NA	NA	NA	---	---	---	---	---	---	---	---	---	---	NA
B-7	---	6/13/06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	640 #	660	42	400	12	0.88	---	---	---	---	NA
B-7	5	6/13/06	46 #	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-7	15	6/13/06	34 #	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-7	25	6/13/06	<1.0 #	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-8	---	6/13/06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<50 #	<50	6.0	<0.50	<0.50	2.7	---	---	---	---	NA
B-8	5	6/13/06	<1.0 #	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-8	15	6/13/06	<1.0 #	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-8	25	6/13/06	<1.0 #	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-9	5	6/13/06	<1.0 #	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-10	15	6/13/06	<1.0 #	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-11-4.5	4.5	4/2/09	---	---	---	---	---	---	<0.01	<0.005	<0.1	<0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-12-4.5	4.5	4/2/09	---	---	---	---	---	---	<0.01	<0.005	<0.1	<0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-13	---	4/2/09	---	---	---	---	---	---	NA	NA	NA	NA	NA	NA	NA	0.89	<0.5	<0.5	<0.5	0.87	0.76	13	3.1	NA
B-13-4.5	4.5	4/3/09	---	---	---	---	---	---	<0.01	<0.005	<0.1	<0.02	ND *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-13-9.5	9.5	4/3/09	---	---	---	---	---	---	<0.01	<0.005	<0.1	<0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-13-24.5	24.5	4/3/09	---	---	---	---	---	---	<0.01	<0.005	<0.1	<0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-14-4.5	4.5	4/2/09	---	---	---	---	---	---	<0.01	<0.005	<0.1	<0.02	ND *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-14-9.5	9.5	4/2/09	---	---	---	---	---	---	<0.01	<0.005	<0.1	<0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-14-19.5	19.5	4/2/09	---	---	---	---	---	---	<0.01	<0.005	<0.1	<0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-14-27.5	27.5	4/2/09	---	---	---	---	---	---	<0.01	<0.005	<0.1	<0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-15	---	4/2/09	---	---	---	---	---	---	NA	NA	NA	NA	NA	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	NA
B-15-4	4.0	4/2/09	---	---	---	---	---	---	<0.01	<0.005	<0.1	<0.02	ND *	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-15-9.5	9.5	4/2/09	---	---	---	---	---	---	<0.01	<0.005	<0.1	<0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-15-14.5	14.5	4/2/09	---	---	---	---	---	---	<0.01	<0.005	<0.1	<0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-15-32.5	32.5	4/2/09	---	---	---	---	---	---	<0.01	<0.005	<0.1	<0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TPHd = Total petroleum hydrocarbons as diesel
TPHg = Total petroleum hydrocarbons as gasoline
cis-1,2-DCE = cis-1,2-Dichloroethene
PCE = Tetrachloroethene
TCE = Trichloroethene

mg/kg = milligrams per kilogram
ug/L = micrograms per Liter
< ( ) = Below laboratory reporting limit
NA = Not analyzed
# = Silica Gel Cleanup Result

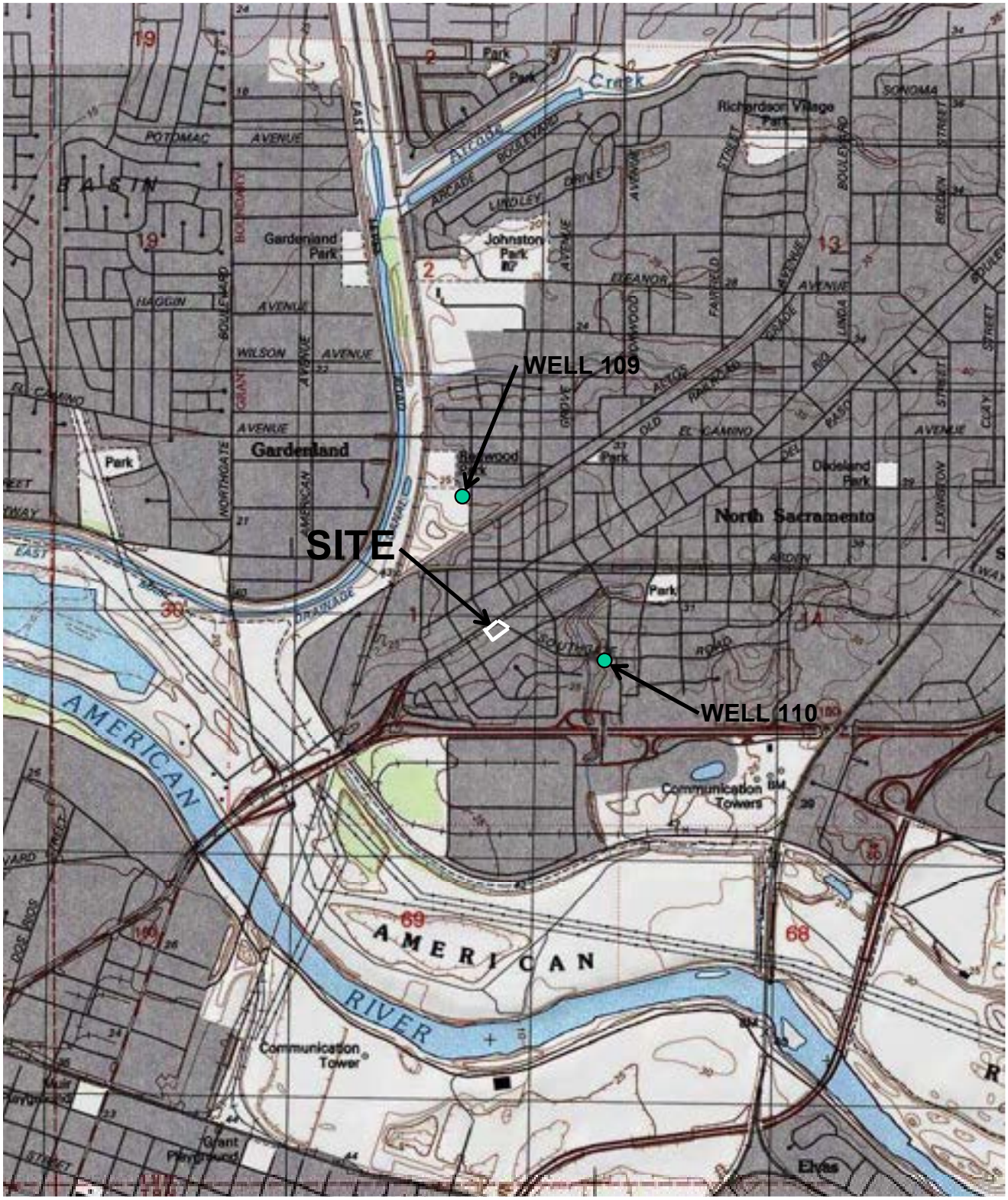
SVOC = Semivolatile organic compounds
* ND = Non detect for all constituents

Table 2
Air Analytical Results
No Further Action Summary
Del Paso Boulevard Site
Sacramento, California
all concentrations in micrograms per cubic meter

Sample	Freon 12	Chloromethane	Freon 11	Ethanol	Acetone	Benzene	Toluene	Carbon Disulfide	2-Butanone	2-Propanol
IA-1	4.1	1	1.3	2.3	4.1	0.57	0.7	8.5	1.4	ND
IA-2	3.5	1.1	1.4	7.6	6	0.61	0.78	ND	1	2.3
IA-3	6.2	1.1	1.4	2.6	3.6	0.61	0.79	ND	ND	ND
IA-4R	**2.6**	**1.1**	**1.4**	**2.7**	**4.2**	**0.62**	**0.75**	**ND**	**ND**	**ND**
Screening Criteria										
CHHSL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESL	NA	0.55	NA	NA	NA	NA	NA	NA	NA	NA
PRG	NA	95	730	NA	NA	NA	NA	NA	NA	NA

CHHSL = California Human Health Screening Level (California EPA)
ESL = Environmental Screening Level (Regional Water Quality Control Board)
PRG = Preliminary Remedial Goal (U.S. EPA Region 9)
ND = not detected above analytical reporting limits
NA = not available
Bold = outdoor sample (collected on roof)

PLATES



Reference: Sacramento East, California, USGS 7.5 Series Quadrangle, Photorevised 1992.

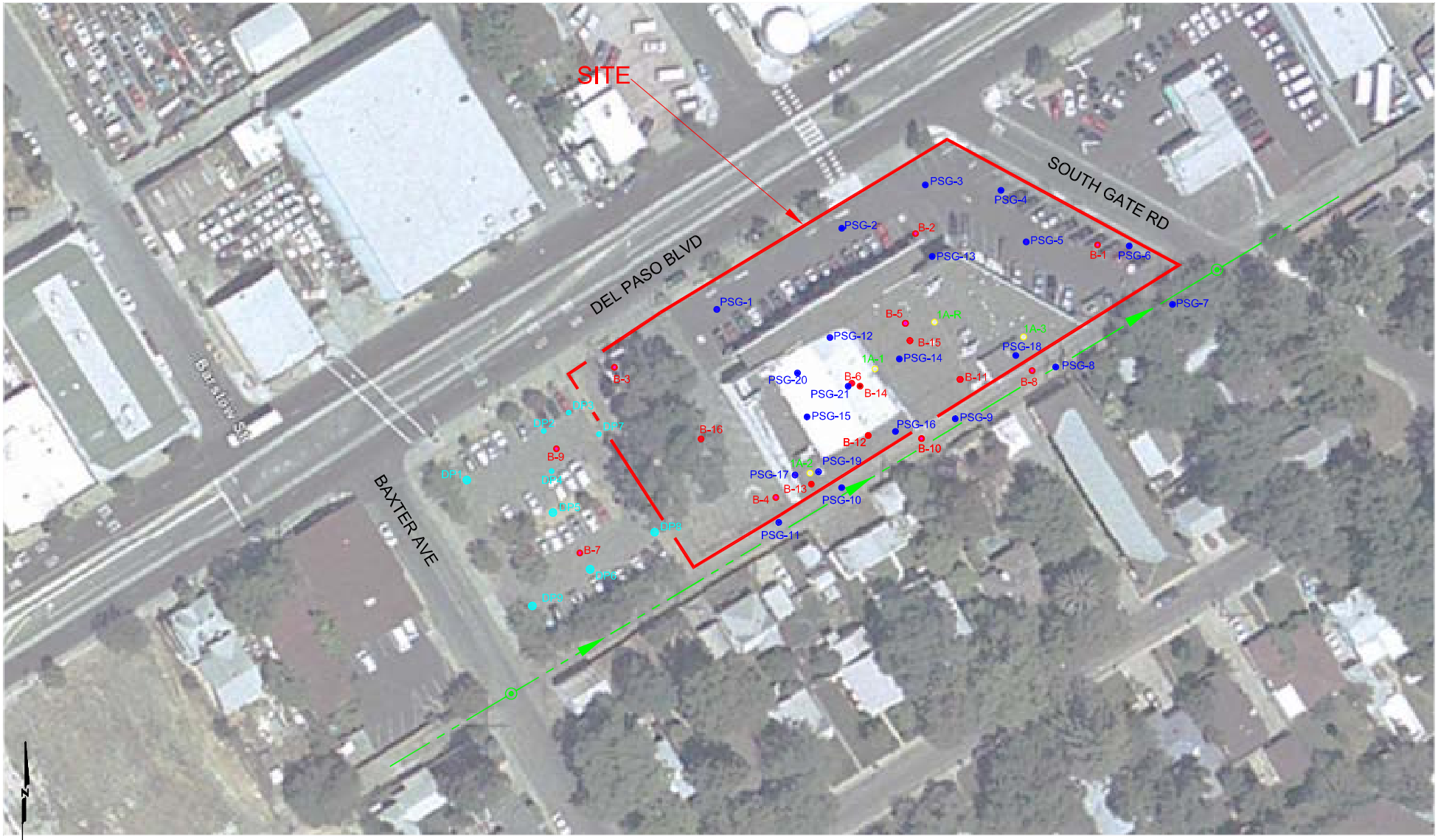
4871135400.PPT

Nichols Consulting Engineers, Chtd.
8795 Folsom Blvd., Suite 250
Sacramento, California 95826
(916) 388-5655

Vicinity Map
No Further Action Summary
Local Remediation Program (LRP) Site No. C637
1124 and 1132 Del Paso Boulevard (APN: 275-0165-021)
Sacramento, California

PLATE **1**

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
YVG	A487.11.35		4/09	



LEGEND

- B-9 — BORING LOCATION
- DP2 — RT PERFORMED BORING (2007)
- PSG-11 — PASSIVE SOIL GAS
- 1A-2 — AIR SAMPLE
- SEWER - 14" CCP

0 60

SCALE: 1 INCH = 60 FEET

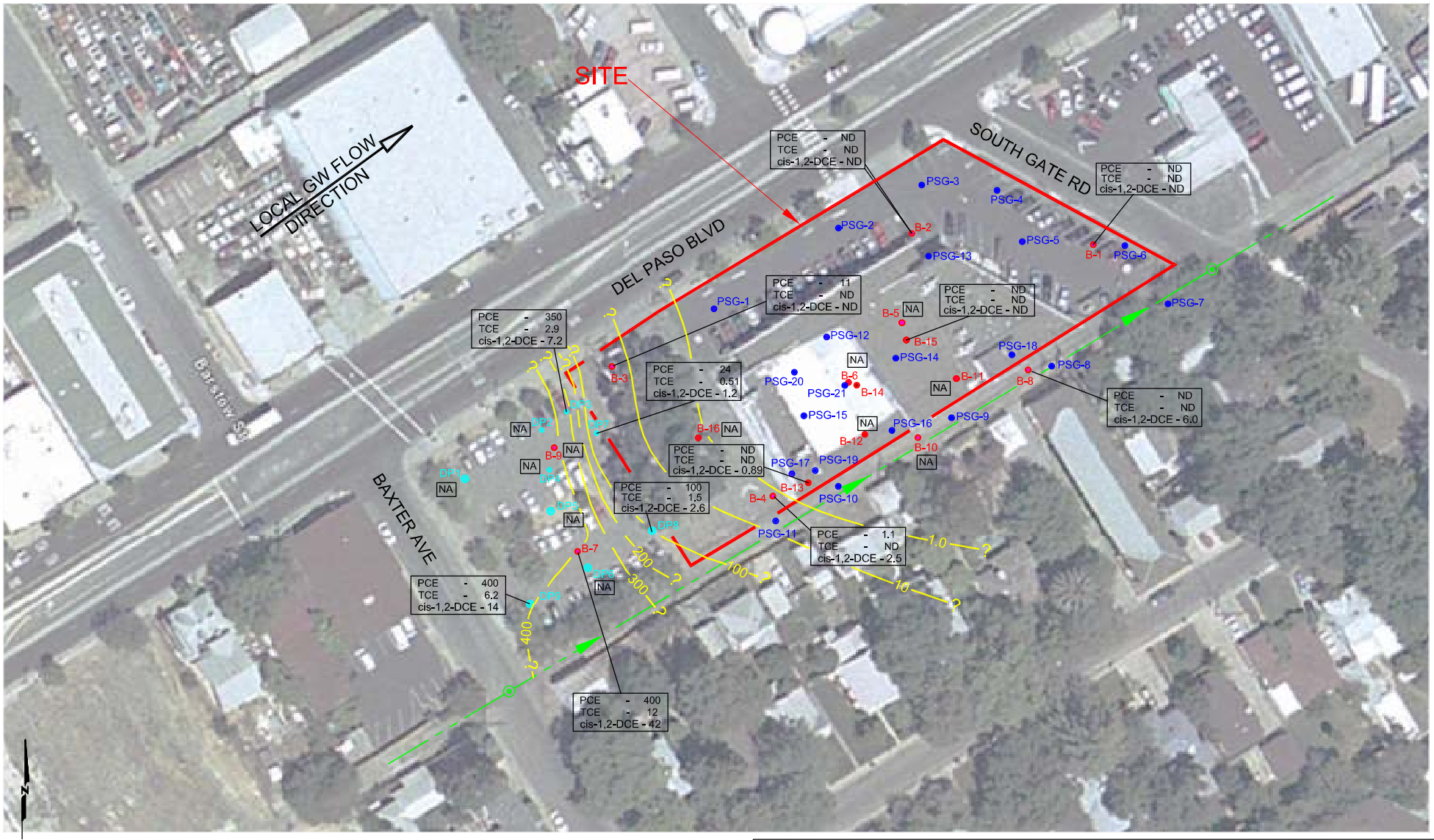
Reference:
Google Earth Pro - Aerial Photograph, 2003

Nichols Consulting Engineers, Chtd.
8795 Folsom Blvd., Suite 250
Sacramento, CA 95826
(916) 388 5655

Site Plan
No Further Action Summary
Local Remediation Program (LRP) Site No. C637
1124 and 1132 Del Paso Boulevard (APN: 275-0165-021)
Sacramento, California

PLATE 2

DRAWN	FILE NAME	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
YG	4871135033.dwg	A487.11.35		4/09	



LEGEND

- B-9 — BORING LOCATION
- DP2 — RT PERFORMED BORING (2007)
- PSG-11 — PASSIVE SOIL GAS
- 100 — PCE CONTOUR (in ug/L)
- SEWER - 14" CCP

PCE = TETRACHLOROETHENE
TCE = TRICHLOROETHENE
CIS-1,2-DCE = CIS-1,2-DICHLOROETHENE
ALL RESULTS IN ug/L (MICROGRAMS PER LITER)
ND = NOT DETECTED AT OR ABOVE LABORATORY REPORTING LIMIT
NA = NOT ANALYZED

0 60
SCALE: 1 INCH = 60 FEET

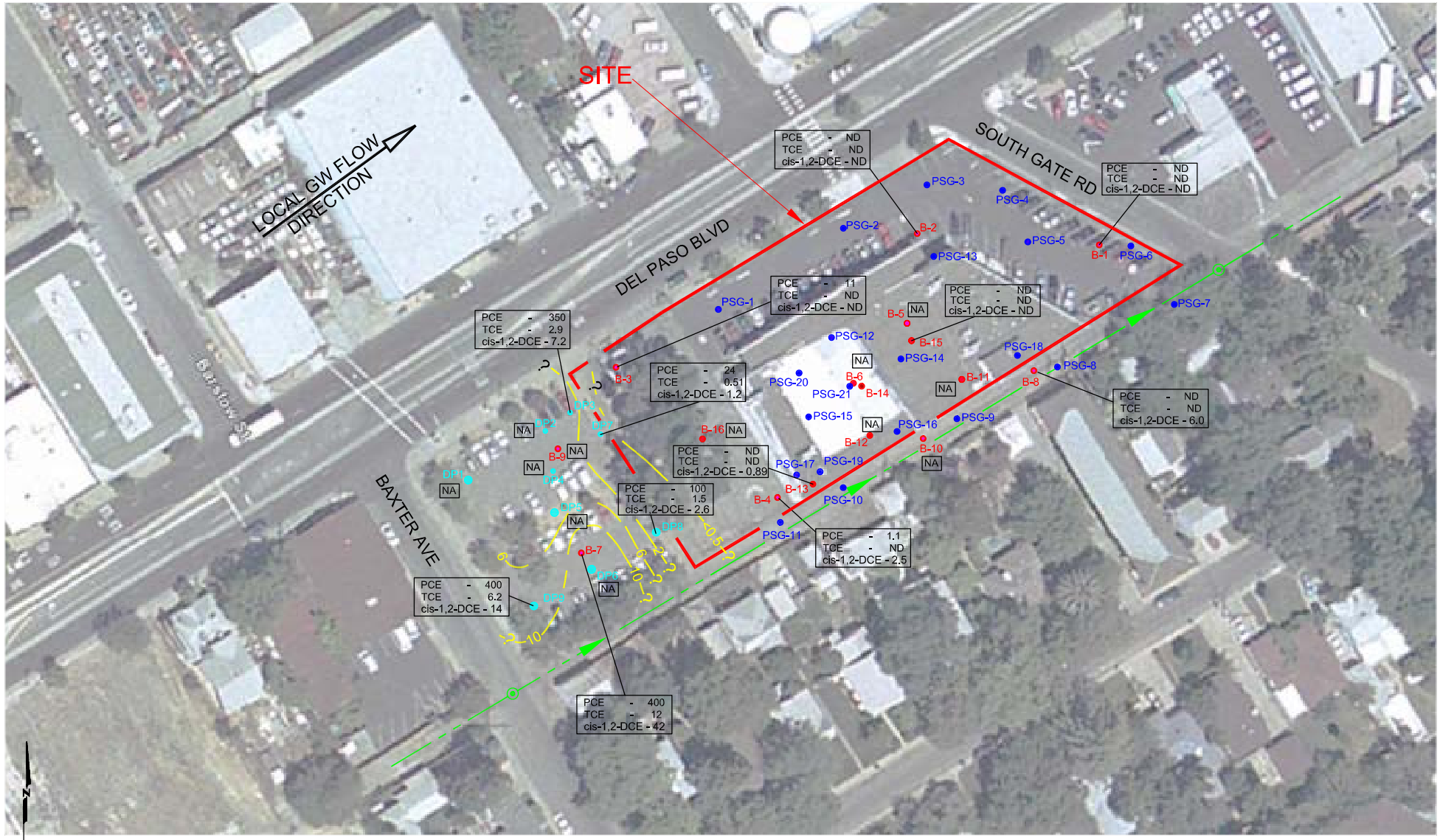
Reference:
Google Earth Pro - Aerial Photograph, 2003

Nichols Consulting Engineers, Chtd.
8795 Folsom Blvd., Suite 250
Sacramento, CA 95826
(916) 388 5655

Distribution of PCE in Groundwater
No Further Action Summary
Local Remediation Program (LRP) Site No. C637
1124 and 1132 Del Paso Boulevard (APN: 275-0165-021)
Sacramento, California

PLATE 3

DRAWN	FILE NAME	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
YG	4871135031.dwg	A487.11.35		4/09	



LEGEND

- B-9 — BORING LOCATION
- DP2 — RT PERFORMED BORING (2007)
- PSG-11 — PASSIVE SOIL GAS
- 10 — TCE CONTOUR (in ug/L)
- SEWER - 14" CCP

PCE = TETRACHLOROETHENE
TCE = TRICHLOROETHENE
CIS-1,2-DCE = CIS-1,2-DICHLOROETHENE
ALL RESULTS IN ug/L (MICROGRAMS PER LITER)
ND = NOT DETECTED AT OR ABOVE LABORATORY REPORTING LIMIT
NA = NOT ANALYZED

0 60
SCALE: 1 INCH = 60 FEET

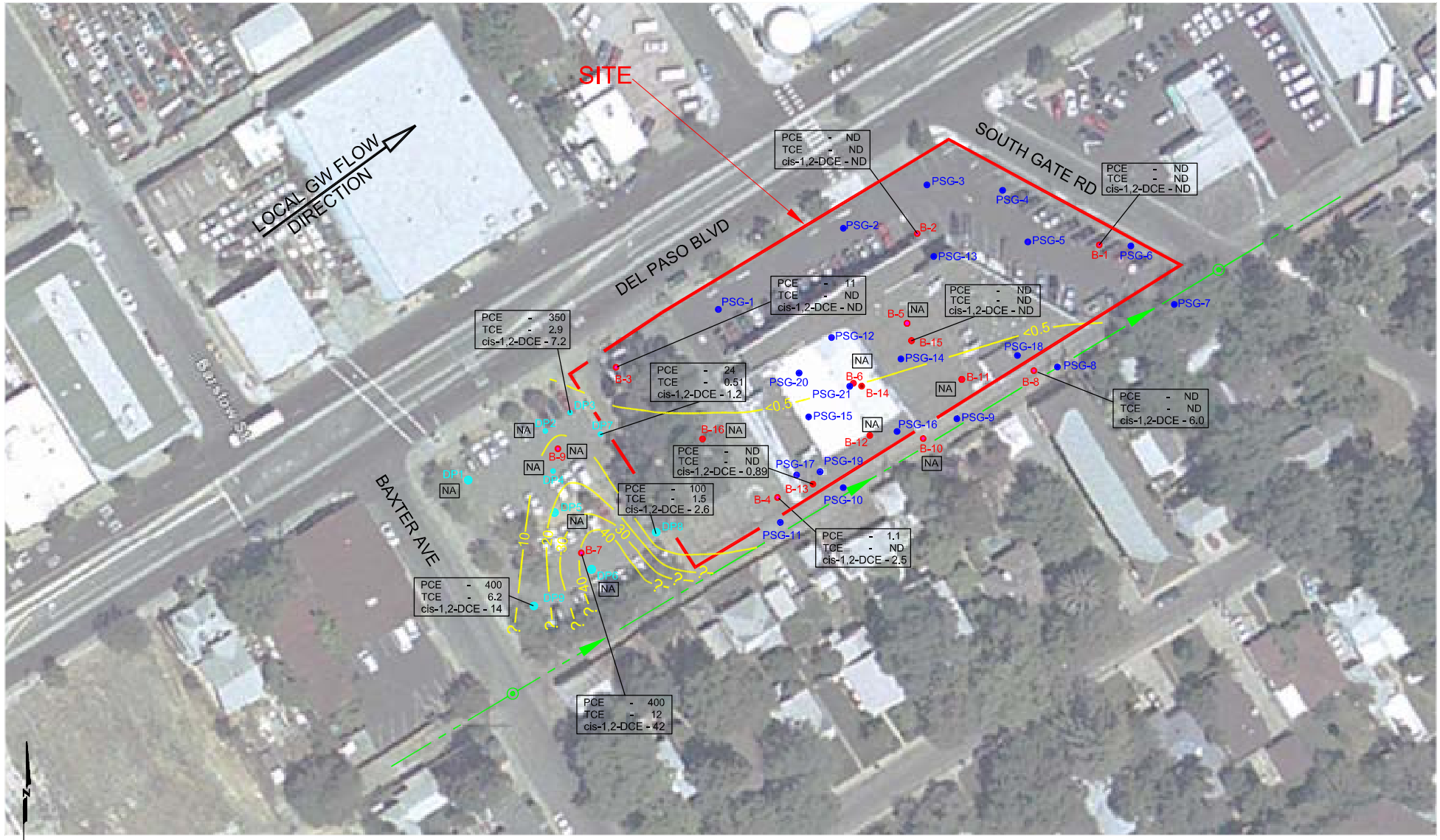
Reference:
Google Earth Pro - Aerial Photograph, 2003

Nichols Consulting Engineers, Chtd.
8795 Folsom Blvd., Suite 250
Sacramento, CA 95826
(916) 388 5655

Distribution of TCE in Groundwater
No Further Action Summary
Local Remediation Program (LRP) Site No. C637
1124 and 1132 Del Paso Boulevard (APN: 275-0165-021)
Sacramento, California

PLATE 4

DRAWN	FILE NAME	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
YG	4871135031.dwg	A487.11.35		4/09	



LEGEND

B-9 BORING LOCATION
DP2 RT PERFORMED BORING (2007)
PSG-11 PASSIVE SOIL GAS
10 CIS-1,2-DCE CONTOUR (in ug/L)
SEWER - 14" CCP

PCE = TETRACHLOROETHENE
TCE = TRICHLOROETHENE
CIS-1,2-DCE = CIS-1,2-DICHLOROETHENE
ALL RESULTS IN ug/L (MICROGRAMS PER LITER)
ND = NOT DETECTED AT OR ABOVE LABORATORY REPORTING LIMIT
NA = NOT ANALYZED

0 60
SCALE: 1 INCH = 60 FEET

Reference:
Google Earth Pro - Aerial Photograph, 2003

Nichols Consulting Engineers, Chtd.
8795 Folsom Blvd., Suite 250
Sacramento, CA 95826
(916) 388 5655

Distribution of cis-1,2-DCE in Groundwater
No Further Action Summary
Local Remediation Program (LRP) Site No. C637
1124 and 1132 Del Paso Boulevard (APN: 275-0165-021)
Sacramento, California

PLATE 5

DRAWN	FILE NAME	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
YG	4871135031.dwg	A487.11.35		4/09	



LEGEND

B-9 BORING LOCATION

DP2 RT PERFORMED BORING (2007)

SEWER - 14" CCP

TPHd = TOTAL PETROLUEM AS DIESEL
TPHg = TOTAL PETROLUEM AS GASOLINE
PCE = TETRACHLOROETHENE
TCE = TRICHLOROETHENE
cis-1,2-DCE = cis-1,2-DICHLOROETHENE
8260B = VOLATILE ORGANIC COMPOUNDS (VOCs)
8270C = SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)
mg/kg = MILLIGRAMS PER KILOGRAM
<( ) = BELOW ABORATORY REPORTING LIMIT
NA = NOT ANALYZED
NT = NOT TESTED
# = SILICA GEL CLEANUP RESULT

0 40
SCALE: 1 INCH = 40 FEET

Reference:
Google Earth Pro - Aerial Photograph, 2003

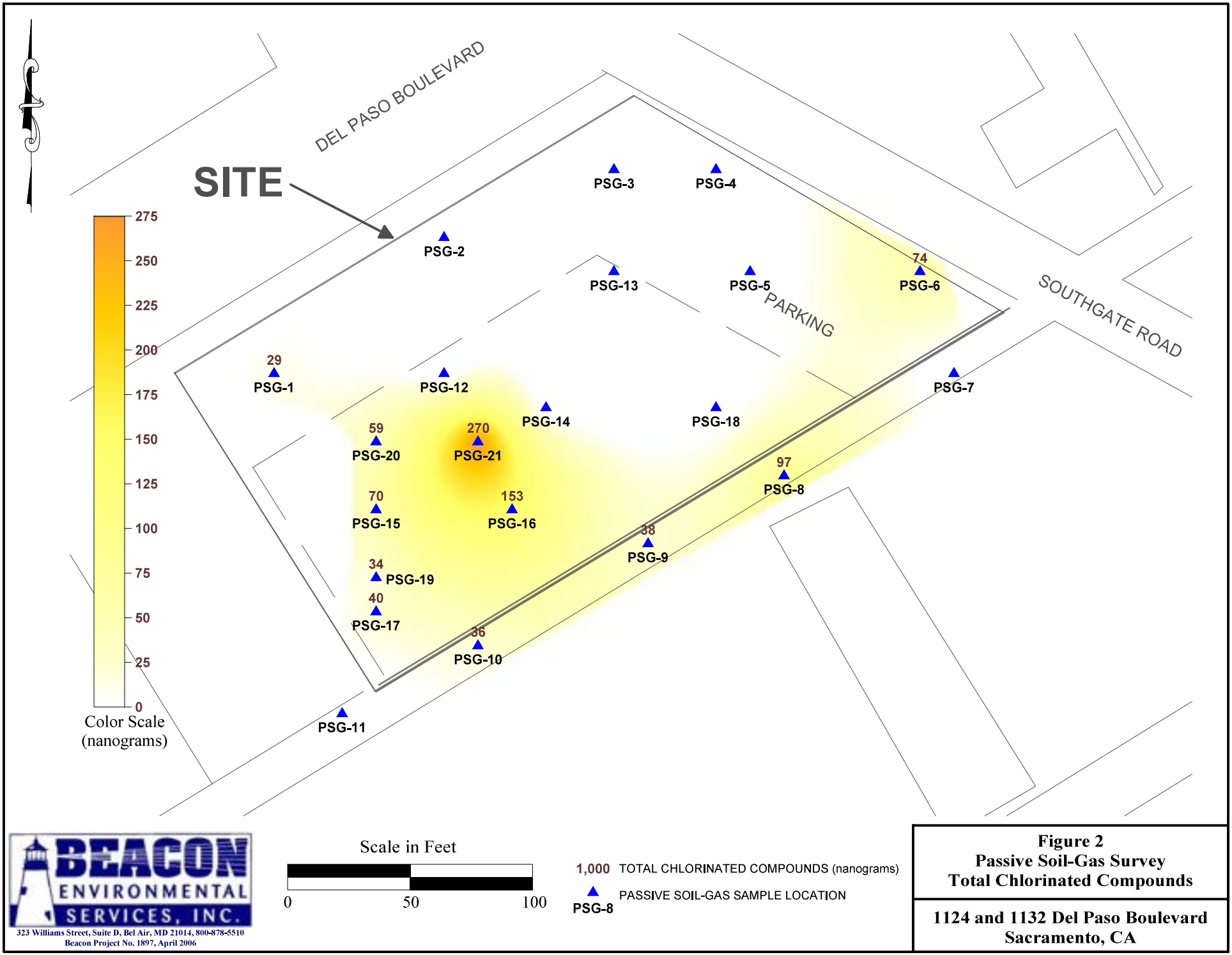
Nichols Consulting Engineers, Chtd.
8795 Folsom Blvd., Suite 250
Sacramento, CA 95826
(916) 388-5655

Analytical Data – Soil
No Further Action Summary
Local Remediation Program (LRP) Site No. C637
1124 and 1132 Del Paso Boulevard (APN: 275-0165-021)
Sacramento, California

PLATE 6

DRAWN	FILE NAME	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
YG	4871135030.dwg	A487.11.35		4/09	

APPENDIX A
PASSIVE SOL GAS RESULTS – TOTAL CHLORINATED COMPOUNDS



BEACON ENVIRONMENTAL SERVICES, INC.

323 Williams Street, Suite D, Bel Air, MD 21014, 800-878-5510
Beacon Project No. 1897, April 2006

Figure 2
Passive Soil-Gas Survey
Total Chlorinated Compounds

1124 and 1132 Del Paso Boulevard
Sacramento, CA

SECTION 09 97 23

CONCRETE SEALERS

PART 1 GENERAL

1.1 SUMMARY

A. This Section specifies an applied sealer for horizontal cast-in-place concrete surfaces.

B. Related Sections: Refer to the following specification sections for coordination.

1. Section 033000 - Cast-In-Place Concrete.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions.

B Mock-Up: Prepare a test area minimum 2 by 2 feet in size to verify suitability of the sealer and final appearance.

1.3 QUALITY ASSURANCE

A. Manufacturer: Minimum 10 years experience producing concrete coatings.

B. Installer: Licensed installers experienced and trained in the use of specified products.

C. Suitability of Substrate: Concrete surface must be clean and dry with all stains, oil, grease, dust and dirt removed prior to application. Contractor to grind and clean existing concrete set to receive sealer.

D. Regulatory Requirements: Comply with requirements of authorities having jurisdiction and applicable codes at the location of the project.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in unopened factory labeled packages. Protect from damage.

B. Store in a safe place, out of direct sunlight. Keep containers tightly sealed. Do not allow product to freeze. Use within manufacturer’s recommended shelf life, approximately 12 months.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete Sealer: High-performance, non-yellowing, clear acrylic-based sealer by Concrete Coatings Inc., 1105 North 1600 West, Layton, UT 84041, 800-443-2871, www.concretecoatingsinc.com. Provide the following or as approved:

8. Sealer with Matte Finish: **CCI SuperSeal 2000-M, with 600 g/L VOC.**
9. Performance: Concrete sealers shall meet or exceed the following:
   a. Coverage: As recommended by manufacturer.
   b. Moisture Retention, Test ASTM C 309: 0.21 kg/m² at 200 ft² per gallon and 0.32 kg/m² at 300 ft² per gallon.
   c. Gasoline Resistance: Slight dulling after15-minute exposure (ponding).

d. Tg: 50°C.
e. Tukon Hardness: 30 minutes at 180°F, 9.3; 30 minutes at 300°F, 13.7.
f. Pencil Hardness: 30 minutes at 180°F, F; 30 minutes at 300°F, H.
g. Spray Conditions, Viscosity: 19 seconds, No. 2 Zhan cup.
h. Abrasion Resistance: 160 mg lost, CS-17 wheel, 1000 g load, 1000 cycles.

PART 3 - EXECUTION

3.1 PREPARATION

A. Inspection: Prior to start of application, inspect existing conditions to ensure surfaces are suitable for installation including the following:

1. Concrete has cured for a minimum of 28 days prior to application of sealer.
2. Surface is completely free of sealers, oils, dirt, paint, alkali, penetrating sealers and foreign materials that would prevent the sealer from penetrating the concrete surface.
3. Existing concrete is grinded down to remove any paint or surface overlays.
4. Concrete has been swept clean.
5. Test area has been approved.

3.2 APPLICATION

A. Concrete Sealer: Strictly comply with manufacturer’s installation recommendations including the following.

1. Apply after stain has dried at rate recommended by manufacturer.
2. Clean surface as recommended by manufacturer.
3. All concrete flatwork designated as being sealed in the plans and specifications shall be sealed with 3 even coats of sealer, at the rate of approximately 150 to 200 square feet per gallon.

3.3 CLEANING AND PROTECTION

A. Protection: Do not cover, but protect floor area from paint and other contaminates that could inhibit the sealer until it is cured for 24 hours.
B. Protection: Cover the sealed concrete floor to prevent gouging, damage or chipping of sealed concrete. Strictly follow manufacturer’s requirements for protection of sealed concrete.

END OF SECTION

SECTION 10 11 43

TACKABLE WALLBOARD SYSTEMS

1. PART 1 GENERAL

1.1 WORK INCLUDED

A. Tackable wall board.

B. Aluminum trim.

1.2 REFERENCES

A. ASTM C208 - Insulation Board (cellulose fiber)

B. ASTM C557 - Adhesive for Fastening to Wood Framing.

C. ASTM E84 - Test Method of Surface Burning Characteristics of Building Materials.

D. ASTM D-1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes.

E. CFFA-W-101-B - Chemical fabrics and Film Association Quality Standard for Vinyl Coated Fabric Wallcovering.

F. FS CCC-W-408 A and B - Wall Covering, Vinyl Coated.

G. FS L-P-1040-B - Plastic Sheets and Strips (Polyvinyl Fluoride).

H. UL - Underwriters Laboratories, Inc.

1.3 QUALITY ASSURANCE

A. Applicator: Company specializing in Tackable Wallboard work with ten years documented experience.

B. Stain Resistance: ASTM D1308, spot test open; shall show no staining by reagents when cleaned using soap and water.

1.4 REGULATORY REQUIREMENTS

A. Conform to flame spread and smoke developed ratings of no more than 25/50 for vinyl fabric covered tack surfaces when tested in accordance with ASTM E84 by UL.

1.5 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 33 00.

B. Provide product data on vinyl coated fabric and fiberboard.

C. Submit samples under provisions of Section 01 33 00.

D. Submit full range of manufacturers color selection for vinyl wallcovering specified.

E. Submit test reports verifying flame/smoke ratings.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and protect products to site under provisions of Section 01 61 00.

B. Deliver tackable wallboard panels to site in unbroken and undamaged factory wrappings, clearly labeled with manufacturers lot number.

C. Protect tackable wallboard panels from moisture during shipment, storage, and installation.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not begin installation of tackable wall board system until spaces have been enclosed and are ventilated and heated to maintain substrate surface temperature.

B. Maintain constant temperature of no less than 60 degrees F and humidity level of 30 to 50 percent 72 hours prior to, during and after installation of the work of this section.

1.8 EXTRA STOCK

A. Provide 25 lineal feet of each pattern and color of wallcovering under provisions of Section 01 77 00.

B. Package and label each roll by manufacturer, color, and pattern, and designated room number; store where directed.

C. Provide 50 lineal feet of aluminum panel trim under provisions of Section 01 77 00.

D. Provide 10 panels of each pattern and color under provisions of Section 01 77 00.

2. PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - WALLBOARD SYSTEM

A. ABC School Equipment Co., www.abcschoolequipment.com.

B. Chatfield Clarke Co., www.chatfield-clarke.com.

C. Claridge Products and Equipment, Inc., www.claridgeproducts.com.

D. Fabricmate Systems, www.fabricmate.com.

E. InWest Manufacturing, www.inwestmfg.com.

F. Lamvin Inc., www.lamvin.com.

G. LBI-Boyd, www.lbiboyd.com.

H. Nelson Adams, www.nelsonadamsnaco.com.

I. Substitutions: Under provisions of Section 01 25 13.

2.2 ACCEPTABLE MANUFACTURERS - WALLCOVERING

A. Guilford of Maine, www.guilfordofmaine.com.

B. Bolta Wallcoverings, www.omnova.com.

C. Brewster Wall Coverings, www.brewsterwallcoverings.com.

D. Contract Wallcoverings Inc., www.contract-wallcoverings.com.

E. Essex Wallcoverings, www.omnova.com.

F. Genon, www.muraspecna.com.

G. Guard, www.muraspecna.com.

H. Koroseal Wallcoverings, www.koroseal.com.

I. JM Lynne Co., www.jmlynne.com.

J. Metro Wallcoverings, www.metrowallcoverings.com.

K. Trikes, www.trikes.com.

L. Vicrtex Wallcovering, www.koroseal.com.

M. Wolf-Gordon, Inc., www.wolf-gordon.com.

N. Substitutions: Under provisions of Section 01 25 13.

2.3 MATERIALS – WALLCOVERING

A. Basis of Design: Guilford of Maine, FR701 Style 2100, www.guilfordofmaine.com

B. Substitutions: Under provisions of Section 01 25 00.

2.4 ACCESSORIES

A. Fiberboard: Industrial Insulation Board, ironed and prime coated, ASTM C208, cellulosic, 1/2 inch thick, 4 foot wide x required length, square edges, 16 lb/cu ft density made with binder containing no urea formaldehyde; flame spread and smoke developed rating of 20/30 when tested according to ASTM E84.

B. Wallcovering Adhesive: Manufacturer's standard for use with specified wallcovering and substrate application. Mildew-resistant, nonstaining, and strippable. Shall meet South Coast Air Quality Management District (SCAQMD) Rule #1168.

C. Panel Adhesive: ASTM C557.

D. Trim: Clear anodized edges vinyl wrapped.

E. Substitutions: Under provisions of Section 01 25 00.

3. PART 3 EXECUTION

3.1 FABRICATION

A. Machine apply vinyl wallcovering continuous over length of fiberboard sheet.

B. Wrap vinyl continuous around edges. Return vinyl a minimum of 2 inches on back of panel.

C. No seams permitted on individual panels.

D. Field application of vinyl is not permitted.

E. Laminate wall covering in numbered sequence of covering.

F. Laminate wall covering to core free from bubbles, sags, wrinkles, distortion and free of adhesive.

3.2 INSPECTION

A. Verify that site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.

B. Insure backing materials are firmly attached, free from warps and surface defects and ready to receive individual panels.

C. Beginning of installation means acceptance of substrate.

3.3 INSTALLATION

A. Erect fiberboard in vertical direction. Install in full length sections with no horizontal joints.

B. Install panels beginning at center point of wall and working to room corners.

C. Install panels in order of sequence of wall covering.

D. Install panels with vertical surfaces and edges plumb, top edges level and in alignment with other panels.

E. Install panels butted tight to adjacent materials; casework, chair rail, door frames, ceilings, floors, and soffits as indicated on the Drawings. Provide lap beneath other tack or chalk board systems to conceal unfinished edges.

F. Provide cutouts for electrical outlets, switches, thermostats, and other services.

G. Attachment: Secure fiberboard to substrate with adhesive and sufficient support to hold in place. Apply adhesive in accordance with manufacturer's instruction.

3.4 TOLERANCES

A. Maximum Variation from True Flatness: 1/8 inch in 10 feet in any direction.

3.5 CLEANING PROCEDURES

A. Remove by rubbing lightly with a moistened cloth, sponge, or stiff bristle brush using a mild soap, detergent, or non-abrasive cleanser and clean water.

B. Strong organic solvents (such as Ketones) and harsh abrasive cleaners are not to be used.

C. Contact wall covering manufacturer for special cleaning problems and follow their recommendations if required.

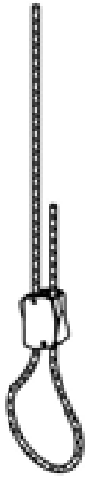
END OF SECTION

AIRCRAFT CABLE: OVERVIEW

ID# SYS-IND-CBL

*Mounting screw not provided





System Components



Aircraft cable

*No. 1 ¼" 90 ° eyelet

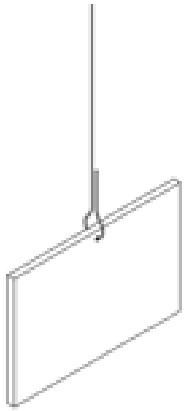


Cable gripper

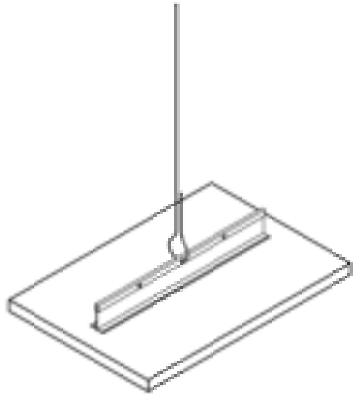


Grommet

Product Suspension Conditions

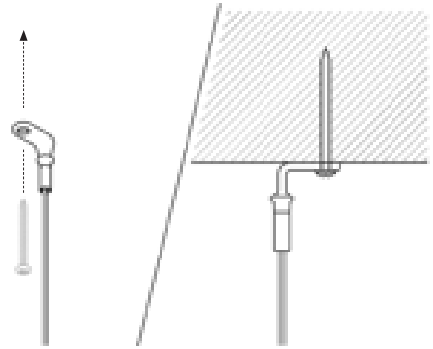


Substrate connection

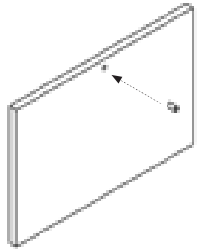


Hardware connection

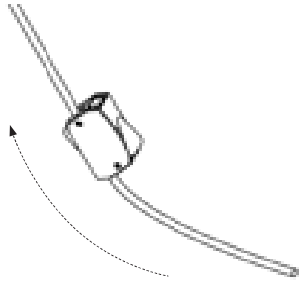
AIRCRAFT CABLE: INSTALLATION



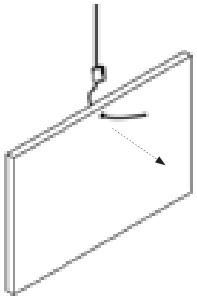
1. Screw 90° eyelet to mounting surface



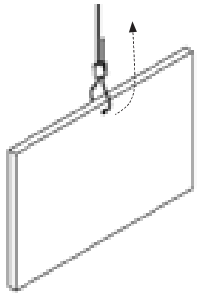
2. Place grommet in holes



3. Thread cable through gripper

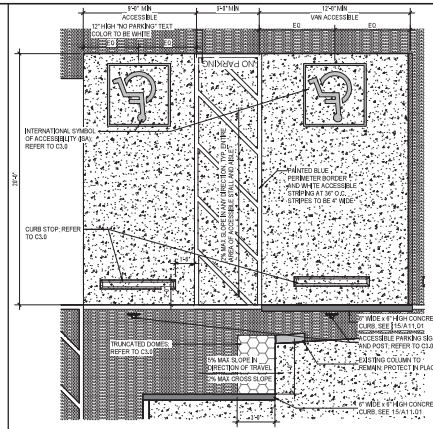


4. Thread cable through grommet

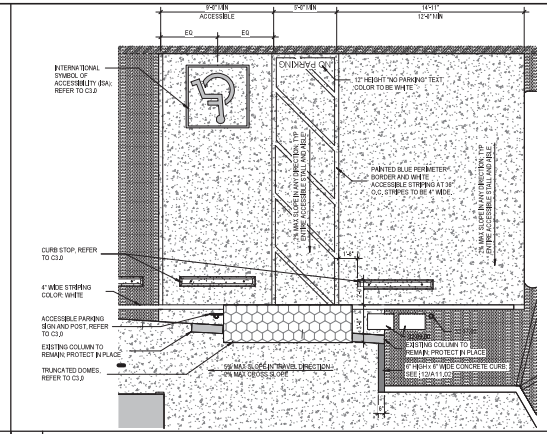


5. Tighten cable gripper and level

APPROVED
Fire Department
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



3 ENLARGED ACCESSIBLE PARKING - WEST
SCALE: 1/4" = 1'-0"



2 ENLARGED ACCESSIBLE PARKING - EAST
SCALE: 1/4" = 1'-0"

GATE SCHEDULE

GATE	GATE SIZE	DETAIL	NOTES	SPEC
G1	4'-0" x 11'-0"	16/A11.01	KNOX BOX	32 31 13
G2	4'-0" x 11'-0"	16/A11.01		32 31 13
G3	4'-0" x 14'-0"	16/A11.01	KNOX BOX	32 31 13
G4	4'-0" x 10'-0"	16/A11.01		32 31 13
G5	4'-0" x 12'-0"	16/A11.01		32 31 13
G6	4'-0" x 10'-0"	16/A11.01		32 31 13
G7	4'-0" x 10'-0"	16/A11.01		32 31 13

GENERAL NOTES

1. SEE CIVIL DRAWINGS FOR GRADING AND UTILITY DESIGN.
2. SEE LANDSCAPE, ELECTRICAL, AND FIRE PROTECTION SITE PLANS FOR ADDITIONAL INFORMATION.
3. SEE A11.00 FOR ADDITIONAL SIGNAGE REQUIREMENTS.
4. ALL STRIPING SHOWN ON PLAN IS NEW 4" WIDE STRIPING.
5. DO NOT SCALE DRAWINGS.

ACCESS SITE PLAN LEGEND

- PROPERTY LINE
- BUILDING ID SIGN
- ACCESSIBLE PATH OF TRAVEL AS INDICATED ON PLAN IS A BARRIER-FREE ACCESS ROUTE WITHOUT ANY ABRUPT LEVEL CHANGES EXCEEDING ½" BEVELED AT 1:2 MAXIMUM SLOPE OR VERTICAL LEVEL CHANGES NOT EXCEEDING ¼" MAXIMUM AND AT LEAST 48" IN WIDTH.

  SURFACE IS STABLE, FIRM AND SLIP RESISTANT; CROSS SLOPE IS MIN. 1% AND MAX. 2% AND THE SLOPE IN THE DIRECTION OF TRAVEL IS LESS THAN 5% AT ALL ACCESSIBLE PATHS.
- EXISTING BUILDING TO BE MODERNIZED
- (E) FIRE ACCESS LANE
- ACCESSIBLE TOILET ROOM
- FIRE ALARM CONTROL ROOM / FIRE SPRINKLER RISER LOCATION
- EXISTING ASPHALT TO RECEIVE SEAL COAT SEE SPEC SECTION 32 14 00
- EXISTING CONCRETE
- CONCRETE
- S1 "DO NOT ENTER" SIGN. RE: 11 / A11.01
- S6 DIRECTIONAL ACCESS SIGN RE: 5 / A11.01
- (E) FIRE HYDRANT
- FIRE DEPARTMENT CONNECTION
- EXISTING TREE TO REMAIN
- NEW TREE; SEE LANDSCAPE DWGS
- NEW TRUNCATED DOMES; SEE C3.0
- NEW 6" HIGH 6" WIDE CONCRETE FIRE CURB RE: 15 / A11.01 & 4 / A11.01
- LANDSCAPE AREA SEE LANDSCAPE DRAWINGS

KEYNOTE LEGEND

03.06.00	EXISTING COLUMN TO REMAIN, TYP.
03.30.01	NEW 6" CONCRETE CURB; SEE DETAIL 15 / A11.01
03.30.01	CONCRETE WHEEL STOP; SEE C3.0, DWGS
22.05.00	EXISTING GAS METER TO BE REMOVED, CONTRACTOR TO COORDINATE REMOVAL WITH PG&E
22.06.00	EXISTING WATER METER, PROTECT IN PLACE
26.51.01	LIGHTING FIXTURE; REFER TO ELECTRICAL DWGS
26.56.01	EXISTING EXTERIOR LIGHTING FIXTURE TO REMAIN
32.01.03	NEW BOLLARD; PAINT SAFETY YELLOW RE: 9 / A11.01
32.01.08	EXISTING TRASH ENCLOSURE AND DOOR TO REMAIN; PAINT ALL DOORS AND WALLS
32.06.00	5-BIKE RACK; SEE SPEC SECTION 11 90 66 RE: 3 / A11.01
32.06.01	5-BIKE RACK; SEE SPEC SECTION 11 90 66 RE: 3 / A11.01
32.06.03	IN-GROUND J-BOX FOR FUTURE EV CHARGERS, 2 X 48A CIRCUITS
32.11.00	FUTURE EV PARKING STALL
32.15.00	EXISTING BACKFLOW PREVENTOR
32.16.00	4" WIDE WHITE STRIPING, DIAGONAL STRIPING AT 36" O.C. WITH "NO PARKING" AND "LOADING ZONE" TO BE 12" HIGH LETTERING
32.17.00	NEW SIGN POST AND FOOTING, NO SIGN TO BE ADDED IN THIS SCOPE, RE: 1 / A11.01
32.18.00	2" DIA GALVANIZED STEEL GATE RECEIVER POST PER MANUF. RE: 16 / A11.01
32.18.00	12" HIGH LETTERING; COLOR: WHITE
32.31.02	PICNIC TABLE; SEE FURNITURE SCHEDULE
3201	MONUMENT SIGN RE: 8 / A11.01
3202	STEEL PIPE SWING GATE. RE: 16 / A11.01
3205	SALVAGED BENCH TO BE REINSTALLED AT THIS LOCATION. RE: 13 / A11.01
3220	BACKFLOW PREVENTOR W/ CAGE; SEE C3.0 AND C3.0
3221	TRUNCATED DOMES; SEE C3.0, DWGS
D.41	EXISTING BIKE RACK TO REMAIN, (6) BIKE CAPACITY

PARKING CALCULATION

(E) PARKING LOT 1:

COMPACT STALLS	18
STANDARD STALLS	23
VAN ACCESSIBLE STALLS	1
STD ACCESSIBLE STALLS	2
TOTAL STALLS ON SITE	44

PER SACRAMENTO CITY CODE TABLE 17.608.030.B "ASSEMBLY - CULTURAL"

URBAN DISTRICT REQUIRED:
REQUIRED NUMBER OF STALLS = 1 SPACE PER 6 OCCUPANTS

PER SACRAMENTO CITY CODE 17.608.030.D.2: OFF STREET VEHICLE PARKING MAY BE REDUCED BY 50% > ½A MILE BUT LESS THAN ½2 MILE FROM CENTER OF LIGHT RAIL PLATFORM

GLOBE AVENUE EAST AND WEST BOUND LIGHTRAIL STATIONS ARE ~0.3 AND 0.4 MILES FROM PROJECT SITE, THEREFORE, WITH 50% REDUCTION, 52/2 = 26 REQUIRED PARKING STALLS

TOTAL OCCUPANTS = 322
322/6 x 50% = 27
2 MOTORCYCLE STALLS PROVIDED -> 26 - 2 = 24 REQUIRED PARKING STALLS
43 PARKING STALLS PROVIDED > 24 = OK

ACCESSIBLE STALLS:
PER 2022 CBC TABLE 11B-208.2

TOTAL NUMBER OF STALLS: 43
REQUIRED NUMBER OF ACCESSIBLE STALLS = 2 PER 2022 CBC 11B-208.2
3 ACCESSIBLE STALLS PROVIDED = OK

PER 11B-208.2.4 FOR EVERY 6 ACCESSIBLE PARKING STALLS, AT LEAST (1) SHALL BE VAN PARKING = 1 VAN PARKING STALL REQUIRED AND PROVIDED.

COMPACT STALL:

NOTE: PER SACRAMENTO CITY CODE CHAPTER 17.608.040.F.B "UP TO 55% OF ALL REQUIRED AND NON-REQUIRED VEHICLE PARKING SPACES, EXCLUDING ACCESSIBLE SPACES, MAY BE SIZED FOR COMPACT CARS PER 17.616.040,
STANDARD STALL WIDTH IS 8'-6" WIDE X 18'-0" LONG MIN
COMPACT STALL WIDTH IS 8'-0" WIDE X 15'-0" LONG MIN
COMPACT 45 DEG STALL IS 8'-9" WIDE X 16'-0" LONG MIN

CALCULATION:
TOTAL STALLS (NOT INCLUDING ACCESSIBLE STALLS) = 41
40/50% = 20 MAXIMUM

PROPOSED COMPACT PARKING STALLS = 18
18<20 = OK

BIKE PARKING:

NOTE: PER SACRAMENTO CITY CODE TABLE 17.608.030C FOR ASSEMBLY USE SHORT TERM BIKE PARKING SPACES SHALL BE PROVIDED FOR 5% OF OCCUPANCY.

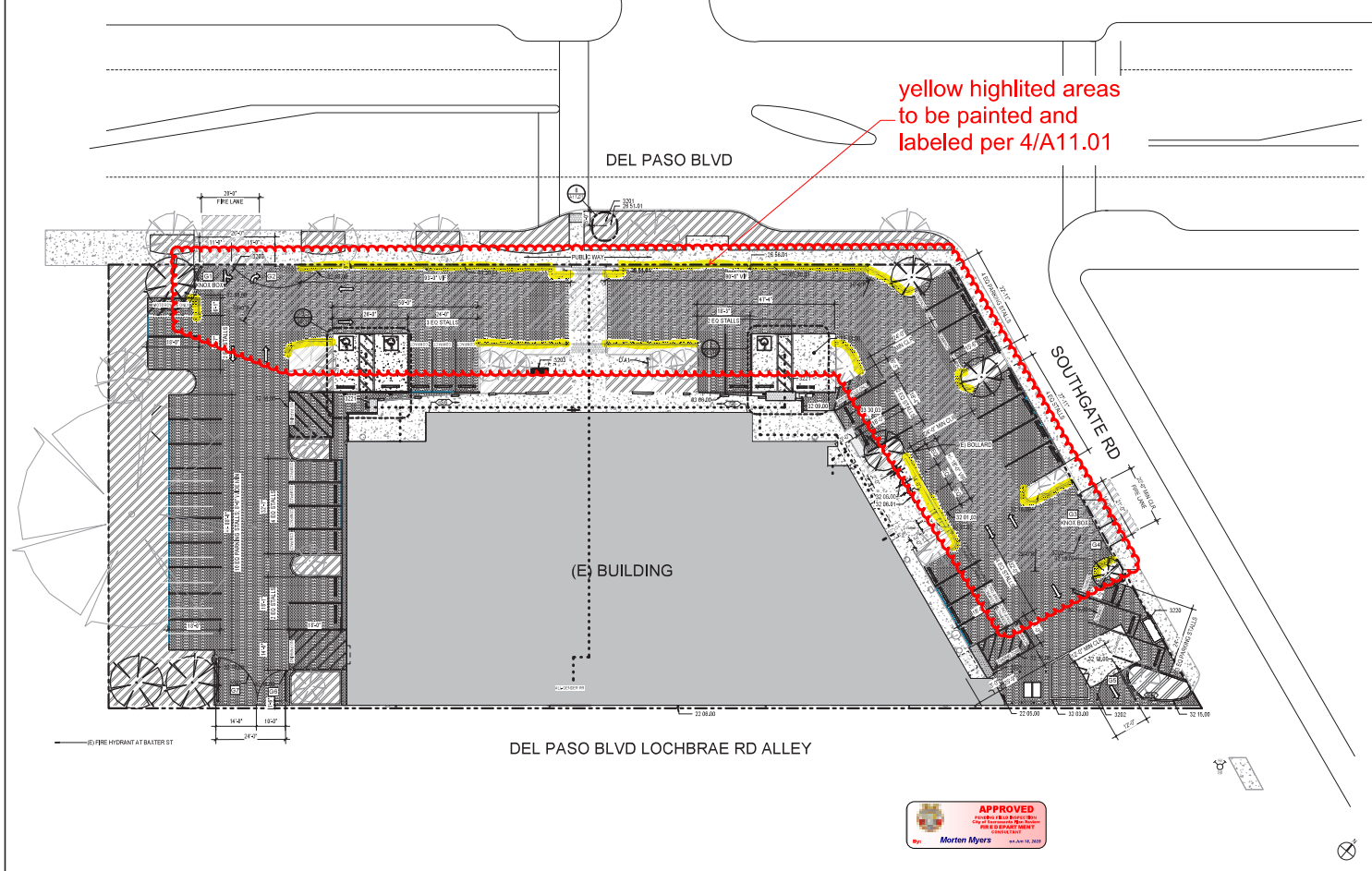
CALCULATION:
TOTAL OCCUPANTS: 311
311 X 5%=15.55 = 16 SHORT TERM BIKE PARKING REQUIRED
(1) EXISTING 4 BIKE CAPACITY RACK
(1) 7 BIKE CAPACITY RACKS PROVIDED
(1) 5 BIKE CAPACITY RACKS PROVIDED = 16 SHORT TERM = OK

FOR LONG-TERM BIKE PARKING 1 SPACE PER 13 EMPLOYEES OR 2 SPACES WHICHEVER IS GREATER IS REQUIRED.

2 LONG TERM BIKE PARKING STALLS PROVIDED FOR STAFF INSIDE THE BUILDING IN STORAGE ROOM #51

MOTORCYCLE PARKING
(2) STALLS PROPOSED > 0 REQUIRED = OK

PER SACRAMENTO CITY CODE 17.608.040.F.3 MOTORCYCLE SPACES SHALL BE A MINIMUM OF 4' WIDE AND 8' LONG



1 SITE PLAN
SCALE: 1/16" = 1'-0"

APPROVED
PERMANENT FINAL INSPECTION
Community Development Department
PUBLIC IMPROVEMENT CONSULTANT
By: Morten Myers
on Jun 16, 2025

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9822

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
A
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

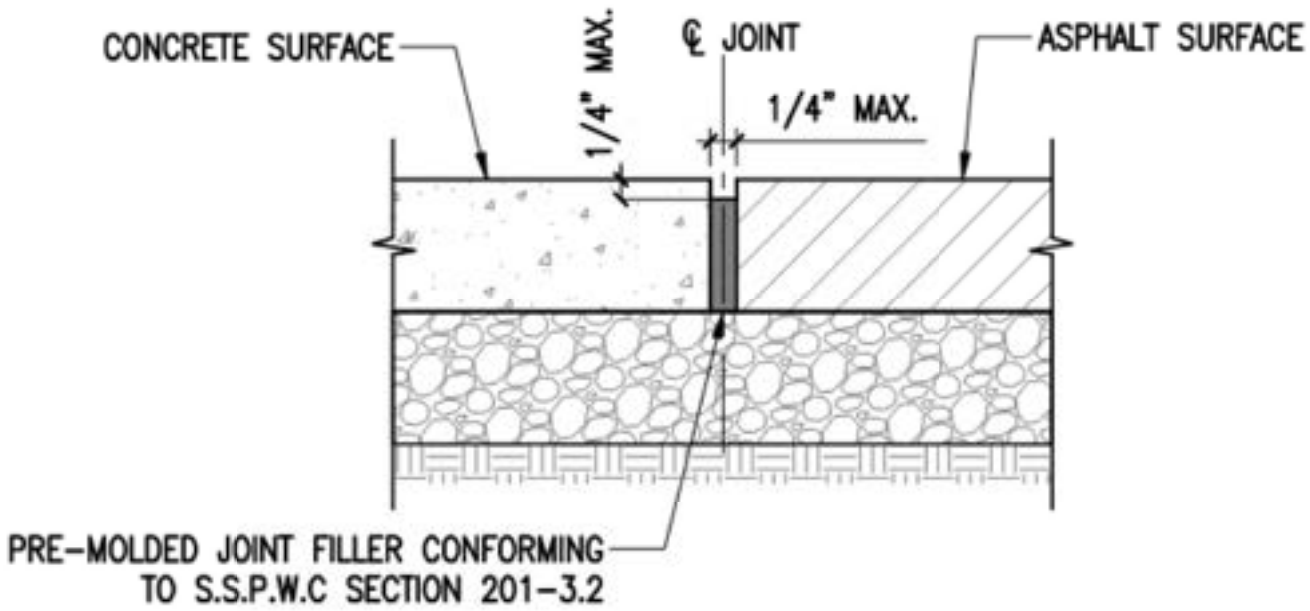
CONSTRUCTION DOCUMENT

SITE PLAN

G0.10

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

Not for permitting or construction



EXPANSION JOINT

CONCRETE - ASPHALT TRANSITION

CITY OF SACRAMENTO

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESMENT AND REPAIR

09/06/2023

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

SPECIAL INSPECTION REQUIRED

GENERAL NOTES

1. THESE DRAWINGS DO NOT CONTAIN THE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.

2. LOCATIONS OF ALL UTILITIES SHOWN ARE APPROXIMATE AND CONTRACTOR SHALL EXERCISE EXTREME CAUTION IN EXCAVATING AND TRENCHING ON THIS SITE TO AVOID INTERCEPTING EXISTING PIPING OR CONDUITS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES WHETHER SHOWN HEREON OR NOT AND TO PROTECT THEM FROM DAMAGE. THE ARCHITECT IS NOT RESPONSIBLE FOR THE LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN OR DETAILED AND INSTALLED BY ANY OTHER CONTRACT. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT SHOULD ANY UNIDENTIFIED CONDITIONS BE DISCOVERED. THE CONTRACTOR SHALL BEAR ALL EXPENSE OF REPAIR OR REPLACEMENT OF UTILITIES OR OTHER PROPERTY DAMAGED BY OPERATIONS IN CONJUNCTION WITH THE EXECUTION OF THIS WORK.

3. THESE DOCUMENTS AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, ARE THE PROPERTY OF PBK ARCHITECTS, INC., AND ARE NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF PBK ARCHITECTS, INC.

4. THE WORK SHOWN ON THESE DRAWINGS AS EXISTING CONDITIONS WAS PREPARED FROM INFORMATION FURNISHED BY THE OWNER AND VISUAL OBSERVATIONS IN THE FIELD BY THE PBK ARCHITECTS TEAM. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, PBK ARCHITECTS DOES NOT GUARANTEE THAT ALL EXISTING CONDITONS HAVE BEEN VERIFIED. CONTRACTOR IS RESPONSIBLE TO PERFORM ITS OWN DUE DILIGENCE TO VERIFY EXISTING CONDITIONS PRIOR TO START OF WORK. PBK ARCHITECTS IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS IN WORK DESCRIBED IN THESE DOCUMENTS AS A RESULT OF UNKNOWN CONDITIONS DISCOVERED ONCE CONSTRUCTION IS UNDERWAY.

5. EACH BIDDER SHALL POSSESS AT THE TIME OF BID A CLASS B OR THE APPROPRIATE CLASS C CONTRACTOR'S LICENSE PURSUANT TO PUBLIC CONTRACT CODE SECTION 3300 AND BUSINESS AND PROFESSIONS CODE SECTION 7028.15. THE SUCCESSFUL BIDDER MUST MAINTAIN THE LICENSE THROUGHOUT THE DURATION OF THIS CONTRACT.

6. FIRE SAFETY DURING CONSTRUCTION
   A. GENERAL: FIRE SAFETY DURING CONSTRUCTION SHALL COMPLY WITH CALIFORNIA FIRE CODE (CFC) CALIFORNIA CODE OF REGULATIONS (CCR) TITLE 24, PART 9, CHAPTER 5 AND CHAPTER 33.
   B. ACCESS ROADS: FIRE DEPARTMENT ACCESS ROADS SHALL BE ESTABLISHED AND MAINTAINED IN ACCORDANCE WITH CHAPTER 5, SECTION 501.4 AND CHAPTER 33, SECTION 3310.
   C. WATER SUPPLY: WATER MAINS AND HYDRANTS SHALL BE OPERATIONAL IN ACCORDANCE WITH CHAPTER 5, SECTION 501.4 AND CHAPTER 33, SECTION 3312.
   D. BUILDING ACCESS: ACCESS TO BUILDINGS FOR THE PURPOSE OF FIREFIGHTING SHALL BE PROVIDED. CONSTRUCTION MATERIAL SHALL NOT BLOCK ACCESS TO BUILDINGS, HYDRANTS, OR FIRE APPLIANCES.
   E. ALTERATIONS OF BUILDINGS: SHALL COMPLY WITH APPLICABLE PROVISIONS OF CHAPTER 33.
   F. DEMOLITION OF BUILDINGS: SHALL COMPLY WITH APPLICABLE PROVISIONS OF CHAPTER 33.
   G. FIRE WATCH: MAINTAIN FIRE WATCH WHEN REQUIRED BY THE BUILDING OFFICIAL AND WHEN EXISTING FIRE PROTECTION SYSTEMS ARE SHUT DOWN FOR ALTERATIONS IN ACCORDANCE WITH CHAPTER 33, SECTION 3304.5. FIRE WATCH SHALL REMAIN IN EFFECT UNTIL EXISTING FIRE PROTECTION SYSTEMS ARE RETURNED TO SERVICE OR AS ALLOWED BY THE BUILDING OFFICIAL.

7. PENETRATIONS TO FIRE RATED MATERIALS OR ASSEMBLIES SHALL BE RESTORED TO EQUAL RATING. FIRE STOP SYSTEMS AS LISTED BY UNDERWRITERS LABORATORIES SHALL BE INSTALLED PER FIRE RESISTANCE DIRECTORY. FIRE STOP SYSTEMS SHALL BE AS SPECIFIED.

8. NONRESIDENTIAL ENERGY STANDARDS COMPLIANCE STATEMENT (TITLE 24, PART 6):

   THE DESIGN INDICATED HEREIN COMPLIES WITH THE REQUIREMENTS OF THE ENERGY CONSERVATION STANDARDS OF TITLE 24, PART 6, CALIFORNIA CODE OF REGULATIONS. THE PROPOSED BUILDING(S) WILL BE IN COMPLIANCE WITH THE ENERGY CONSERVATION STANDARDS PROVIDED IT (THEY) IS (ARE) BUILT ACCORDING TO THESE DRAWINGS AND SPECIFICATIONS AND PROVIDED ANY FUTURE IMPROVEMENTS ARE COMPLETED ACCORDING TO THE REQUIREMENTS OF TITLE 24, PART 6, CALIFORNIA CODE OF REGULATIONS. THESE PLANS AND SPECIFICATIONS HAVE BEEN PREPARED TO INCLUDE ALL SIGNIFICANT ENERGY CONSERVATION FEATURES REQUIRED FOR COMPLIANCE WITH THE STANDARDS. BUILDING AREAS THAT ARE UNCONDITIONED AND/OR NOT SUBJECT TO THE STANDARDS ARE INDICATED ON THE PLANS.

   ENVELOPE MANDATORY MEASURES:
   A. INSTALLED INSULATING MATERIALS SHALL HAVE BEEN CERTIFIED BY THE MANUFACTURER TO COMPLY WITH THE CALIFORNIA QUALITY STANDARDS FOR INSULATING MATERIAL.
   B. ALL INSULATING MATERIALS SHALL BE INSTALLED IN COMPLIANCE WITH THE FLAME SPREAD RATING AND SMOKE DENSITY REQUIREMENTS OF TITLE 24, PART 2, CALIFORNIA CODE OF REGULATIONS, SECTIONS 720 AND 2603.
   C. ALL EXTERIOR JOINTS AND OPENINGS IN THE BUILDING ENVELOPE THAT ARE POTENTIAL AND OBSERVABLE SOURCES OF AIR LEAKAGE SHALL BE CAULKED, GASKETED, WEATHERSTRIPPED, OR OTHERWISE SEALED.
   D. SITE CONSTRUCTED DOORS, WINDOWS, AND SKYLIGHTS SHALL BE CAULKED BETWEEN THE UNIT AND THE BUILDING, AND SHALL BE WEATHERSTRIPPED (EXCEPT FOR UNFRAMED GLASS DOORS AND FIRE DOORS).
   E. MANUFACTURED DOORS AND WINDOWS INSTALLED SHALL HAVE AIR INFILTRATION RATES CERTIFIED BY THE MANUFACTURER IN ACCORDANCE WITH TITLE 24, PART 6, CALIFORNIA CODE OF REGULATIONS, SECTION 110.6.
   F. MANUFACTURED FENESTRATION PRODUCTS IN THE ENVELOPE OF THE BUILDING, INCLUDING, BUT NOT LIMITED TO, WINDOWS, SLIDING GLASS DOORS, FRENCH DOORS, SKYLIGHTS, CURTAIN WALLS, AND GARDEN WINDOWS MUST BE LABELED FOR U-VALUE & SHGC IN ACCORDANCE WITH THE (NFRC) NATIONAL FENESTRATION RATING COUNCIL'S INTERIM U-VALUE & SHGC RATING PROCEDURE.
   G. DEMISING R-19 WALL INSULATION SHALL BE INSTALLED IN ALL OPAQUE PORTIONS OF FRAMED WALLS (EXCEPT DOORS).

9. DEFERRED APPROVAL ITEMS:

   INSTALLATION OF DEFERRED APPROVAL ITEMS SHALL NOT BE STARTED UNTIL DETAILED PLANS, SPECIFICATIONS, AND ENGINEERING CALCULATIONS HAVE BEEN ACCEPTED AND SIGNED BY THE ARCHITECT OR ENGINEER IN GENERAL RESPONSIBLE CHARGE OF DESIGN AND SIGNED BY A CALIFORNIA REGISTERED ARCHITECT OR PROFESSIONAL ENGINEER WHO HAS BEEN DELEGATED RESPONSIBILITY COVERING THE WORK SHOWN ON A PARTICULAR PLAN OR SPECIFICATION AND APPROVED BY THE AUTHORITY HAVING JURISDICTION.

   DEFFERED APPROVAL ITEMS SHALL BE SUBMITTED FOR REVIEW NO LATER THAN 60 DAYS AFTER THE NOTICE TO PROCEED.

   DEFERRED APPROVAL ITEMS FOR THIS PROJECT ARE THE FOLLOWING ITEMS:

   A. NONE

10. INSPECTOR REQUIREMENTS
    A. ONE OR MORE INSPECTORS EMPLOYED BY THE OWNER IN ACCORDANCE WITH THE REQUIREMENTS OF TITLE 24 OF THE CALIFORNIA CODE OF REGULATIONS WILL BE ASSIGNED TO THE WORK. THE INSPECTOR'S DUTIES ARE SPECIFICALLY DEFINED IN SECTION 4-342 OF SAID TITLE 24, PART 1 AND IN ADDITION SHALL BE AS STIPULATED IN INTERPRETATION OF REGULATION DOCUMENT IR A-8.

11. ALL WORK SHOWN ON THESE DRAWINGS SHALL COMPLY WITH THE REQUIREMENTS OF TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR).

12. CHANGES TO THE APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY AN ADDENDUM OR A CONSTRUCTION CHANGE DOCUMENT APPROVED BY THE AUTHORITY HAVING JURISDICTION, AS REQUIRED BY TITLE 24, CCR, PART 1, SECTION 4-338.

13. GRADING PLANS, DRAINAGE IMPROVEMENTS, ROAD AND ACCESS REQUIREMENTS AND ENVIRONMENTAL HEALTH CONSIDERATIONS SHALL COMPLY WITH ALL LOCAL ORDINANCES.

14. DRINKING WATER SHALL COMPLY WITH ALL LOCAL HEALTH DEPARTMENT REQUIREMENTS.

15. THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS IS THAT THE WORK OF THE ADDITION, ALTERATION OR RECONSTRUCTION IS IN COMPLIANCE WITH THE REQUIREMENTS OF TITLE 24, CALIFORNIA CODE OF REGULATIONS. SHOULD ANY COMNDITIONS SUCH AS DETERIORATION OR NON-COMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT IDENTIFIED BY THE CONTRACT DOCUMENTS WHERIN THE FINAL WORK WOULD NOT COMPLY WITH THE REQUIREMENTS OF TITLE 24, CALIFORNIA CODE OF REGULATIONS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND THE ARCHITECT OF THE CONDITION IN WRITING. NECESSARY INFORMATION REQUIRED TO CORRECT THE CONDITIONS ENCOUNTERED WILL BE ISSUED BY THE ARCHITECT. A CHANGE ORDER MAY BE ISSUED TO ADJUST THE CONTRACT SUM OR TIME COMMENSURATE WITH THE AMOUNT OF ADDITIONAL WORK REQUIRED, IF ANY. THE CHANGE ORDER SHALL BE APPROVED BY THE CITY OF SACRAMENTO PRIOR TO PROCEEDING WITH THE WORK REQUIRED BY THE CHANGE ORDER.

CODES & STANDARDS

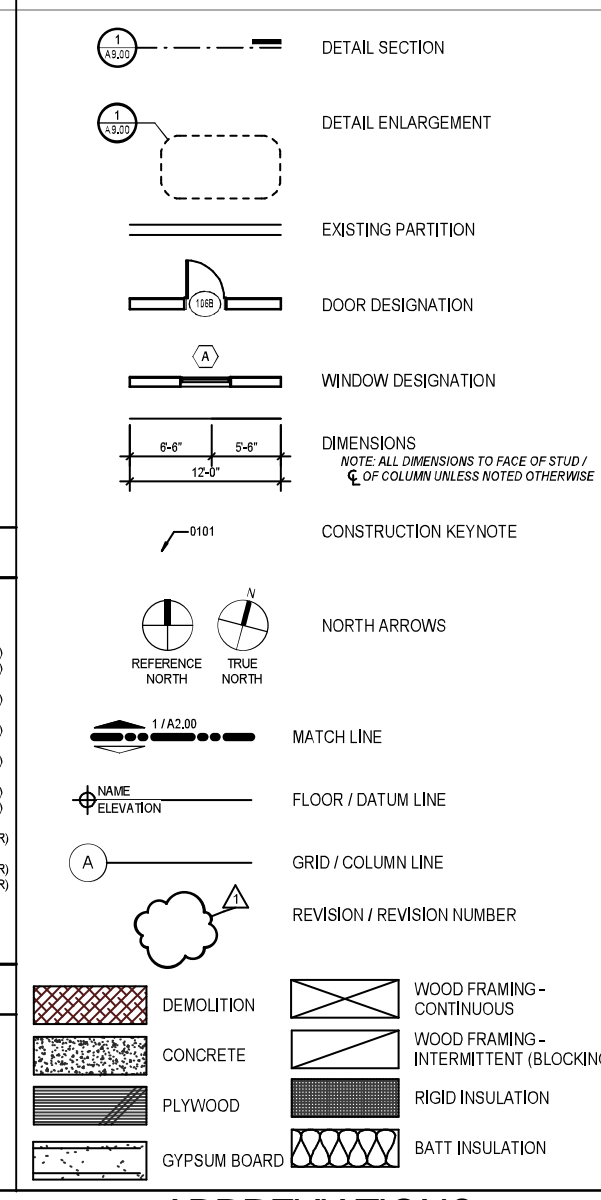
PARTIAL LIST OF APPLICABLE CODES

2022 California Administrative Code (CAC) .... (Part 1, Title 24, CCR)
2022 California Building Code (CBC) .... (Part 2, Title 24, CCR)
(2021 International Building Code Volumes 1 & 2 with 2022 California Amendments)
2022 California Electrical Code (CEC) .... (Part 3, Title 24, CCR)
(2020 National Electrical Code with 2022 California Amendments)
2022 California Mechanical Code (CMC) .... (Part 4, Title 24, CCR)
(2021 IAPMO Uniform Mechanical Code with 2022 California Amendments)
2022 California Plumbing Code (CPC) .... (Part 5, Title 24, CCR)
(2021 IAPMO Uniform Plumbing Code with 2022 California Amendments)
2022 California Energy Code (CEC) .... (Part 6, Title 24, CCR)
2022 California Fire Code (CFC) .... (Part 9, Title 24, CCR)
(2021 International Fire Code with 2022 California Amendments)
2022 California Existing Building Code (CEBC) .... (Part 10, Title 24, CCR)
(2021 International Existing Building Code with 2022 California Amendments)
2022 California Green Building Standards Code (CALGreen) .... (Part 11, Title 24, CCR)
2022 California Referenced Standards Code .... (Part 12, Title 24, CCR)

DEFERRED APPROVAL ITEMS

NONE.

DWG CONVENTIONS



PROJECT TEAM

OWNER
CITY OF SACRAMENTO
5730 24TH STREET; BUILDING 4
SACRAMENTO, CA 95822
PHONE: (916) 808-5877
EZRA ROATI

MEP ENGINEER
LEAF ENGINEERS
1110 IRON POINT ROAD; SUITE 200
FOLSOM, CA 95630
PHONE: (916) 682-9494
ROLAND THOMAS

ARCHITECT
PBK ARCHITECTS, INC.
1110 IRON POINT ROAD, SUITE 200
FOLSOM, CA 95630
PHONE: (909) 987-0909
KELLY CLANCY

STRUCTURAL ENGINEER
ZFA STRUCTURAL ENGINEERS
601 UNIVERSITY AVE; SUITE 185
SACRAMENTO, CA 95825
PHONE: (916) 924-7072
DUDLEY MEI

SCOPE OF WORK

THE SCOPE OF THE WORK AS STATED BELOW IS FOR PLAN REVIEW PURPOSES ONLY AND DOES NOT CONSTITUTE A DETAILED AND FULL EXPLANATION OF THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

1. REMOVE ENTIRE ROOFING SYSTEM, INCLUDING PARTIAL REPLACEMENT OF STRUCTURAL SUB-ROOF MATERIAL, AND INSTALL NEW THERMOPLASTIC MEMBRANE ROOFING SYSTEM, WITH ALL REQUIRED FLASHING ACCESSORIES FOR A COMPLETE WATER-TIGHT ROOF SYSTEM.
2. RMEOVE ALL MECHANICAL EQUIPMENT FROM ROOF TO ACCOMODATE RE-ROOFING. EXISTING ROOF CURBS TO REMAIN ON MOST PACKAGE ROOFTOP AC UNITS. SEE SCHEDULE, NOTES AND SECURED AREA DURING RE-ROOFING.
3. AFTER RE-ROOFING IS COMPLETE, RE-INSTALL EXISTING EQUIPMENT AND/OR REPLACE EQUIPMENT WITH NEW UNITS, AS CALLED OUT ON THE DRAWINGS. PROVIDE NEW ROOF TOP EQUIPMENT AND ACCESSORIES AS SHOWN.

ADDITIVE ALTERNATIVE #1:
1. REPLACEMENT OF PACKAGE ROOFTOP GAS-ELECTRIC AC UNITS WITH NEW PACKAGE ROOFTOP HEAT PUMPS. PROVIDE AND INSTALL NEW HEAT PUMPS PER MECHANICAL SCHEDULE.

ABBREVIATIONS

A.F.F.	ABOVE FINISH FLOOR
A.F.G.	ABOVE FINISH GRADE
A.H.J.	AUTHORITY HAVING JURISDICTION
AC	ASPHALT CONCRETE PAVEMENT
ACC	ACCESSIBLE, ACCESSIBILITY
ACP	ACOUSTICAL PANEL
ACT	ACOUSTICAL TILE
AD	AREA DRAIN
ADA	AMERICANS WITH DISABILITIES ACT
ADA	2010 ADA STANDARDS FOR ACCESSIBLE DESIGN
ADAAG	AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES
ADJ	ADJACENT
ALT	ALTERNATE
ALUM	ALUMINUM
ASPH	ASPHALT
B.O.D.	BOTTOM OF DECK
BD	BOARD
BLDG	BUILDING
BLK	BLOCK
BM	BEAM
BUR	BUILT-UP ROOF
C	CHANNEL
CAB, CABT	CABINET
CBC	CALIFORNIA BUILDING CODE / TITLE 24, CALIFORNIA CODE OF REGULATIONS
CFMF	COLD-FORMED METAL FRAMING
CFSF	COLD-FORMED STEEL FRAMING
CJ	CONTROL JOINT
CL	CENTERLINE
CLG	CEILING
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
COMP	COMPRESSIBLE
CONC	CONCRETE
COND	CONDITION
CONT	CONTINUOUS
CORR	CORRIDOR
CPT	CARPET (ED)
CT	CERAMIC TILE
CTSK	COUNTER SINK
CW	COLD WATER
D	DRYER
D.A.	DISABLED ACCESS(IBILITY)
DF	DRINKING FOUNTAIN
DIA / Ø	DIAMETER
DIM	DIMENSION
DS	DOWNSPOUT
DTL	DETAIL
DWG	DRAWING
EA	EACH
EJ	EXPANSION JOINT
EL	ELEVATION (HEIGHT)
ELEC	ELECTRICAL
ELECT	ELECTRICAL
ELEV	ELEVATION (DRAWING)
EQ	EQUAL
EQUIP	EQUIPMENT
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FHC	FIRE HOSE CABINET
FIN	FINISH (ED)
FIXT	FIXTURE
FLR	FLOOR (ING)
FLUOR	FLUORESCENT
FRP	FIBER-REINFORCED PLASTIC
GA	GAUGE
GALV	GALVANIZED
GCMU	GLAZED CONCRETE MASONRY UNIT
GEN	GENERAL
GI	GALVANIZED IRON
GL	GLASS / GLAZING
GL	GLASS
GR	GRADE
GTP	GLAZED TILE PAVER
GYP	GYPSUM DRYWALL
HM	HOLLOW METAL FRAME
HORIZ	HORIZONTAL
HT	HEIGHT
HVAC	HEATING, VENTILATION, AIR CONDITIONING
HW	HOT WATER
ID	INSIDE DIAMETER
INSUL	INSULATE (ED), (ION)
INT	INTERIOR
IPS	IRON PIPE SIZE
JT	JOINT
LA	LANDSCAPED AREA
LAM	LAMINATE (D)
LAV	LAVATORY
LT	LIGHT
LT WT	LIGHTWEIGHT
M.O.	MASONRY OPENING
MAS	MASONRY
MATL	MATERIAL (S)
MAX	MAXIMUM
MB	MARKER BOARD
MECH	MECHANICAL
MEP	MECHANICAL, ELECTRICAL, PLUMBING
MEPT	MECHANICAL, ELECTRICAL, PLUMBING, TECHNOLOGY
MEZZ	MEZZANINE
MFR / MANUF	MANUFACTURE (R)
MIN	MINIMUM
MISC	MISCELLANEOUS
MOD	MODULAR
MTL	METAL
N.I.C.	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
NO.	NUMBER
NOM	NOMINAL
O.C.	ON CENTER (S)
O.C.E.W.	ON CENTER EACH WAY
O.D.	OUTSIDE DIAMETER
O.H.	OPPOSITE HAND
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OPNG	OPENING
OPP	OPPOSITE
P. LAM / PLAM	PLASTIC LAMINATE
PCC	PORTLAND CEMENT CONCRETE PAVING
PKG	PARKING
PL	PLATE
PLUMB	PLUMBING
POL	POLISHED
PR	PAIR
PREFIN	PRE-FINISHED
PT	POINT
PT	PRESSURE-TREATED
PTD	PAINTED
PWD / PLYWD	PLYWOOD
QT	QUARRY TILE
R / RAD	RADIUS
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
RE / REF	REFER TO / REFERENCE / SEE
RECP	RECEPTACLE
REINF	REINFORCE (D), (ING)
REQ'D	REQUIRED
RES	RESILIENT
REV	REVISION (S), REVISED
SC	SEALED CONCRETE
SCHED	SCHEDULE
SD	SOAP DISPENSER
SECT	SECTION
SHT	SHEET
SIM	SIMILAR
SND	SANITARY NAPKIN DISPOSAL
SPC	SPECIAL COATING SYSTEM
SPEC	SPECIFICATION (S)
SQ	SQUARE
SS	STAINLESS STEEL
STL	STEEL
STR / STRUCT	STRUCTURAL
SUSP	SUSPENDED
SVF	SHEET VINYL FLOORING
T.O.	TOP OF
T.O.M.	TOP OF MASONRY
T.O.P.	TOP OF PARAPET
T.O.S.	TOP OF STEEL
TB	TACK BOARD
TEL	TELEPHONE
TERR	TERRAZZO
THK	THICK (NESS)
TYP	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
UR	URINAL
V	VENT
V.I.F.	VERIFY IN FIELD
VCT	VINYL COMPOSITION TILE
VENT	VENTILATING, VENTILATED
VER	VERIFY
VERT	VERTICAL
VWC	VINYL WALL COVERING
W/	WITH
WC	WATER CLOSET
WD	WOOD
WDW	WINDOW
WT	WEIGHT
WWF	WELDED WIRE FABRIC
WWM	WOVEN WIRE MESH
∠	ANGLE

APPROVED
PENDING FIELD INSPECTION
City of Sacramento Plan Review
FIRE DEPARTMENT
CONSULTANT
By: Morten Myers
on Sep 28, 2023

DRAWING INDEX

GENERAL
G0.00 COVER SHEET & SHEET INDEX

ARCHITECTURAL
A3.00 DEMOLITION ROOF PLAN
A3.01 NEW ROOF PLAN
A10.02 ROOF DETAILS
A10.03 ROOF DETAILS

STRUCTURAL *
S0.1 GENERAL NOTES & TYPICAL DETAILS
S2.2 ROOF FRAMING PLAN
S3.1 TRUSS ELEVATIONS & SCHEDULES
S4.1 FRAMING DETAILS

MECHANICAL *
M0.00 MECHANICAL INDEX, NOTES, CODES, SCHEDULES
M0.01 MECHANICAL SCHEDULES
M3.01 MECHANICAL ROOF PLAN - DEMOLITION BASE DESIGN
M3.01A MECHANICAL ROOF PLAN - DEMOLITION (ADDITIVE ALTERNATE)
M3.02 MECHANICAL ROOF PLAN - NEW BASE DESIGN
M3.02A MECHANICAL ROOF PLAN - NEW ADDITIVE ALTERNATE
M3.03 MECHANICAL PIPING - DEMOLITION BASE DESIGN
M3.04 MECHANICAL PIPING - NEW BASE DESIGN
M6.01 MECHANICAL DETAILS
M7.01 TITLE 24 DOCUMENTATION - BASE DESIGN
M7.02 TITLE 24 DOCUMENTATION - ADDITIVE ALTERNATE #1
M7.03 TITLE 24 DOCUMENTATION - ADDITIVE ALTERNATE #1
M7.04 TITLE 24 DOCUMENTATION - ADDITIVE ALTERNATE #1

ELECTRICAL *
E0.0 ELECTRICAL COVER SHEET
E2.01 ELECTRICAL FLOOR PLAN
E2.02 ELECTRICAL FLOOR PLAN - ADDITIVE ALTERNATE #1
E3.01 ELECTRICAL DEMOLITION ROOF PLAN BASE DESIGN
E3.02 ELECTRICAL DEMOLITION ROOF PLAN ADDITIVE ALTERNATE #1
E4.01 ELECTRICAL ROOF PLAN - NEW (BASE DESIGN)
E4.02 ELECTRICAL ROOF PLAN - NEW (ADDITIVE ALTERNATE #1)
E6.01 ONE LINE DIAGRAM & NEW PANEL SCHEDULES - BASE DESIGN
E6.02 ONE LINE DIAGRAM & NEW PANEL SCHEDULES (ADD ALTERNATE #1)
E6.03 EXISTING PANEL SCHEDULES - BASE DESIGN
E6.04 EXISTING PANEL SCHEDULES - ADDITIVE ALTERNATE #1

TOTAL: 33

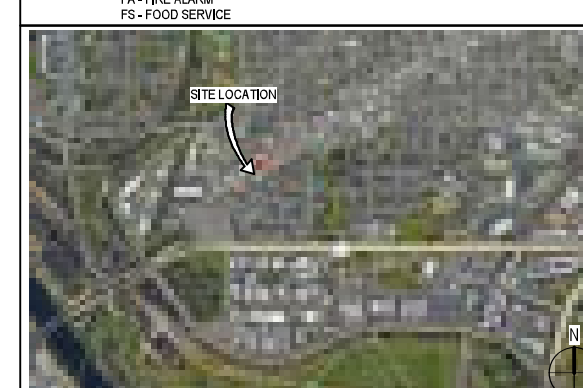
SHEET NUMBERING

A2.01

SEQUENCE (.01 - .99,.....etc.)

SHEET TYPE
1 - SITE PLANS & DETAILS
2 - FLOOR PLANS
3 - ROOF
4 - ENLARGED PLANS
5 - PLAN DETAILS
6 - BUILDING SECTIONS, EXTERIOR/INTERIOR ELEVATIONS
7 - PARTITION TYPES & WALL SECTIONS
8 - CASEWORK DETAILS
9 - WINDOWS, DOORS, FRAME ELEVATIONS & DETAILS
10 - REFLECTED CEILING, FLOOR FINISH PLANS & DETAILS
11 - EQUIPMENT AND FURNITURE PLANS

DISCIPLINE
G - GENERAL
C - CIVIL
L - LANDSCAPE
D - DEMO
A - ARCHITECTURAL
S - STRUCTURAL
M - MECHANICAL
P - PLUMBING
FP - FIRE PROTECTION
E - ELECTRICAL
T - TECHNOLOGY
FA - FIRE ALARM
FS - FOOD SERVICE



VICINITY MAP NTS

PBK
ARCHITECT
PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

APPROVED
City of Sacramento Plan Review
LIFE SAFETY
By: Saul Moran
on Sep 28, 2023

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF
ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
PLAN NORTH TRUE NORTH

STAMP
LICENSED ARCHITECT
BILL LOUIE
C-27933
05/31/23
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: KC CHKED BY: BL

REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

COVER SHEET & SHEET INDEX

G0.00

JOB COPY
1124 DEL PASO BLVD
COM-2310004

A3.00 - DEMOLITION ROOF PLAN

GENERAL SHEET NOTES

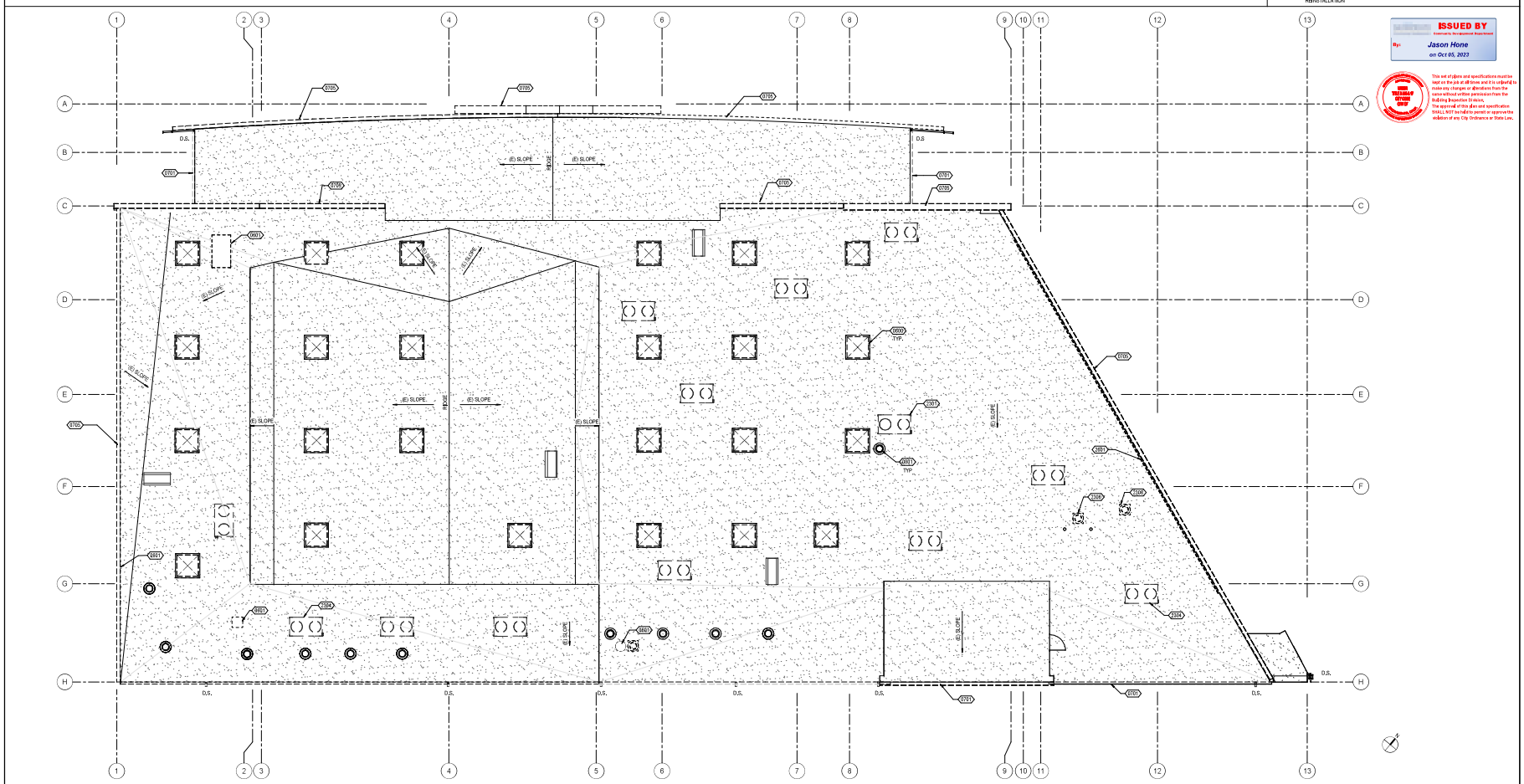
1. CONTRACTOR TO PROVIDE A SECURED AND PROTECTED TEMPORARY ENCLOSURE WITHIN THE WEST SIDE PARKING LOT AREA TO STORE AND PROTECT EXISTING MECHANICAL UNITS AND FANS THAT ARE TO BE RE-INSTALLED AFTER NEW ROOFING SYSTEM IS COMPLETE. COORDINATE EXACT LOCATION WITH THE OWNER.

ROOF PLAN LEGEND

- SKYLIGHT AND CURB TO BE REMOVED
- MECHANICAL EXHAUST FAN / OUTSIDE AIR INTAKE HOOD TO REMAIN. REMOVE FROM CURB, STORE AND PROTECT FOR RE-INSTALLATION
- MECHANICAL EQUIPMENT TO BE REMOVED DURING RE-ROOFING. SEE MECHANICAL DWGS FOR UNIT SPECIFICS. REMOVE ASSOCIATED FLASHING AND UTILITY LINES. CURB TO REMAIN.
- TUBE SKYLIGHT TO REMAIN
- MECHANICAL EXHAUST FAN AND CURB TO BE REMOVED.
- VENT PIPE TO REMAIN
- EXISTING ITEM TO DEMOLISHED
- (E) SINGLE PLY ROOFING TO BE REMOVED, INCLUDING ALL PERIMETER METAL EDGE FLASHING/STOPS. WHERE OCCURS. SEE STRUCTURAL FOR SUB-ROOF REPLACEMENT.
- METAL PARAPET CAP COPING TO BE REMOVED.

KEYNOTE LEGEND

0000	(E) SKYLIGHT AND CURB TO BE REMOVED AND INFILLED PER STRUCTURAL DWGS
0001	CUT AND REMOVE SUB-ROOF MATERIAL FOR NEW MECHANICAL UNIT.
0101	REMOVE METAL GUTTER AND DOWNSPOUTS, INCLUDING SHEET METAL FLASHING BEHIND GUTTER
0705	METAL PARAPET CAP COPING TO BE REMOVED AND REPLACED
0801	(E) TUBE SKYLIGHT TO REMAIN
2301	(E) MECHANICAL UNIT TO BE REMOVED AND REPLACED; SEE MECHANICAL DWGS
2304	REMOVE CURB AT THIS LOCATION
2305	(E) MECHANICAL EXHAUST FAN AND CURB TO BE REMOVED AN REPLACED, SEE MECH DWGS
2308	(E) MECHANICAL EXHAUST FAN AND CURB TO BE REMOVED AND INFILLED, SEE MECH DWGS
2901	TEMPORARILY DISCONNECT AND REMOVE CONDUIT ON PARAPET WALL AND PREP FOR REINSTALLATION



1 DEMOLITION ROOF PLAN
SCALE: 1/8" = 1'-0"

ISSUED BY
Examiner by Development Department
By: Jason Hone
on Oct 05, 2023

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

APPROVED
City of Sacramento Plan Review
LIFE SAFETY
By: Saul Moran
on Sep 28, 2023

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

SACRAMENTO

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP
LICENSED ARCHITECT
BILL LOUIE
C-27933
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: KC CHKED BY: BL
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

DEMOLITION ROOF PLAN

A3.00

JOB COPY

1124 DEL PASO BLVD

COM-231004

C:\Users\kclancy\Documents\NSHL_kelly.clancyYSZ4T.rvt
5/8/2023 1:22:10 PM

A3.01 - NEW ROOF PLAN

ROOF PLAN LEGEND

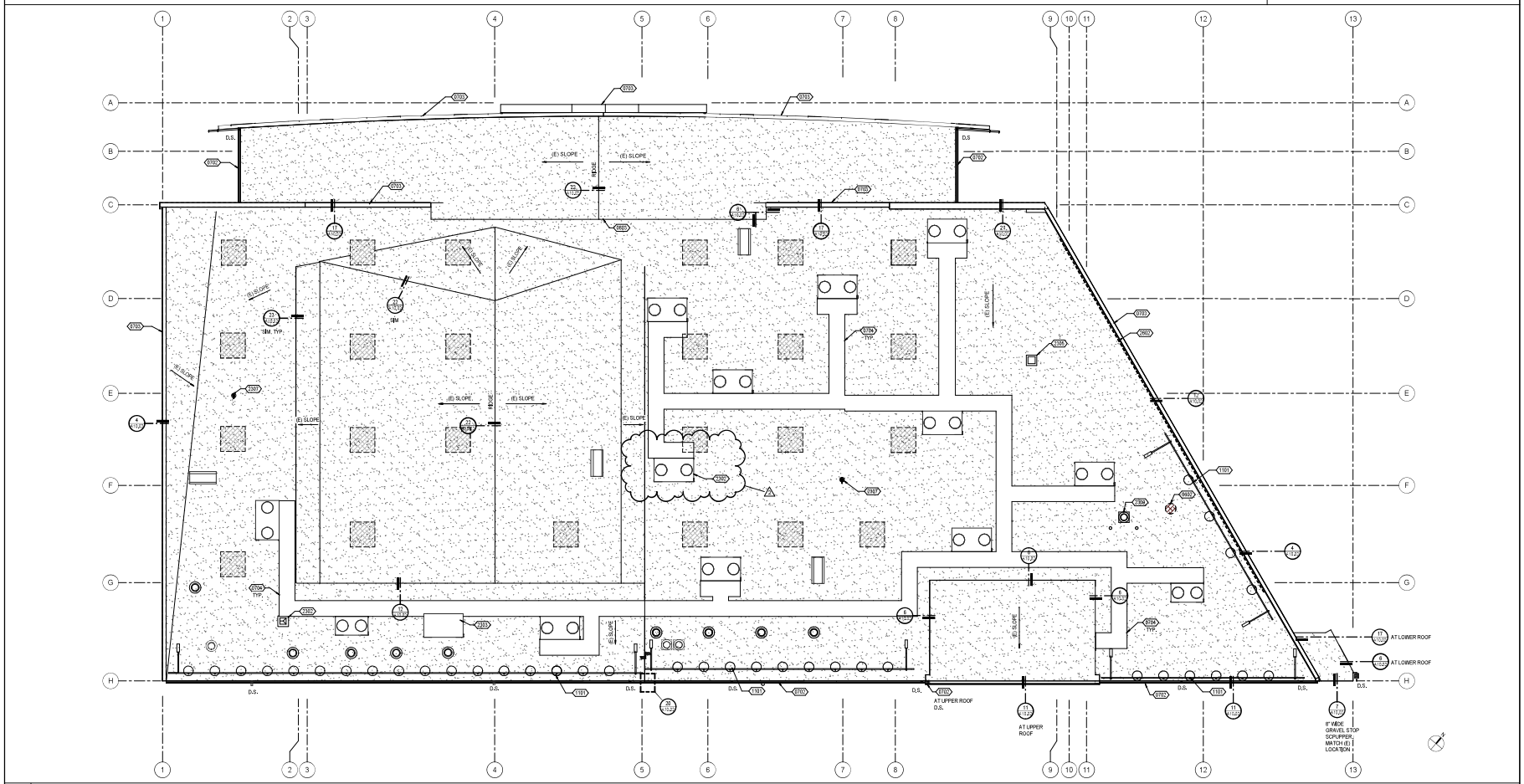
- INFILL DEMO'D SKYLIGHTS. SEE STRUCTURAL DWGS ROOFING OVER LOCATION PER DETAIL 1 / A10.02
- REINSTALL (E) EXHAUST FAN / AIR INTAKE HOOD. SEE SIMILAR DETAIL 6 / A10.03
- NEW -OR- RE-INSTALLED MECHANICAL EQUIPMENT ON NEW -OR- EXISTING CURB. SEE MECHANICAL DWGS FOR UNIT SPECIFICS. SEE DETAIL 6 / A10.03
- (N) GUTTER AND DOWNSPOUT LOCATION TO MATCH EXISTING.
- (N) EXHAUST FAN AND CURB
- (N) AIR INTAKE HOOD ON (N) CURB
- (N) THERMOPLASTIC MEMBRANE ROOFING SYSTEM. SEE SPEC SECTION 07 54 19, AND SYSTEM DETAIL 1 / A10.02
- VENT PIPE TO REMAIN
- TUBE SKYLIGHT SEE DETAIL 5 / A10.02

KEYNOTE LEGEND

0002	INFILL NEW SUB-ROOFING AT REMOVED EXHAUST FAN. SEE STRUCTURAL
0003	REMOVE AND REPLACE WOOD FASCIA TRIM UNDERNEATH GRAVEL STOP FLASHING.
0702	(N) METAL GUTTER AND DOWNSPOUTS, INLUDING SHEET METAL WALL FLASHING BEHIND GUTTER, REINSTALL DOWNSPOUTS AT SIMILAR LOCATIONS TO (E), SEE DETAIL 11 / A10.02
0703	METAL PARAPET COPING SYSTEM. SEE DETAIL 8 / A10.03
0704	3'-6" WIDE WALKING PAD SEE DETAIL 5 / A10.03
1101	NON-PENETRATING FALL PROTECTION SYSTEM. SEE SPEC SECTION 11 24 29
2302	NEW MECHANICAL UNIT. SEE STRUCTURAL FOR UNDER ROOF BLOCKING FOR (N) MECHANICAL CURB.
2303	MECHANICAL PLATFORM ONLY. NO UNIT. SEE MECHANICAL DRAWINGS.
2305	(N) MECHANICAL CURB FOR FUTURE EXHAUST FAN. SEE MECHANICAL DRAWINGS. SEE SIMILAR DETAIL 6 / A10.03
2307	HOSE BIB. SEE MECHANICAL DWGS.
2308	NEW EXHAUST FAN TO BE INSTALL AT SAME LOCATION AS (E)
2902	REINSTALL LIGHTING CONDUIT ON PARAPET WALL

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.



1 ROOF PLAN
SCALE: 1/8" = 1'-0"

PBK

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-8922

APPROVED
City of Sacramento Plan Review
LIFE SAFETY
By: Saul Moran
on Sep 28, 2023

JOB COPY

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP
LICENSED ARCHITECT
BILL LOVE
C-27903
05/31/23
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: KC CHKED BY: BL
REVISIONS

#	DESCRIPTION	DATE
2	PLAN CHECK CYCLE #2	09/06/2023

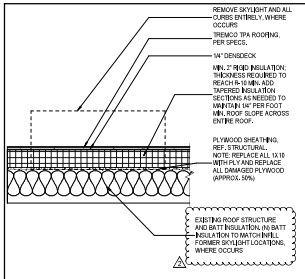
CONSTRUCTION DOCUMENT

NEW ROOF PLAN

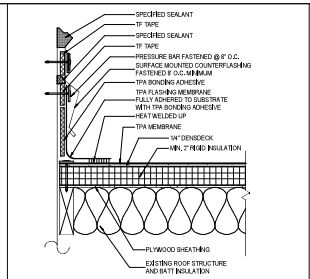
COM-2310004

A3.01

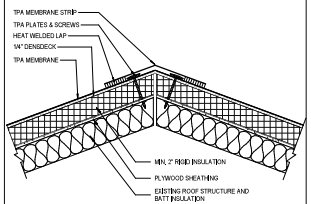
C:\Users\kdancy\Documents\NSHL_kelly.dancyYSZ4T.rvt
9/12/2023 8:42:51 AM



1 TYP. ROOFING DETAIL
SCALE: 1" = 1'-0"

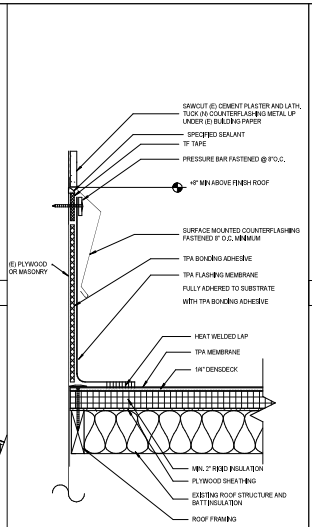


21 WALL FLASHING @ CMU
SCALE: 3/8" = 1'-0"

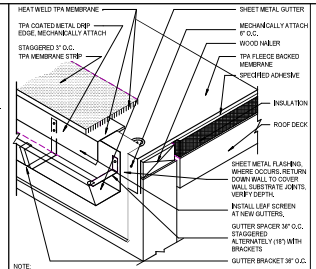


NOTES:
MEMBRANE FASTENER SPACING NOT TO EXCEED 12" O.C.

22 RIDGE FLASHING
SCALE: 12" = 1'-0"

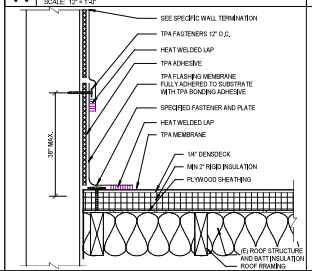


17 WALL FLASHING @ CEMENT PLASTER
SCALE: 12" = 1'-0"

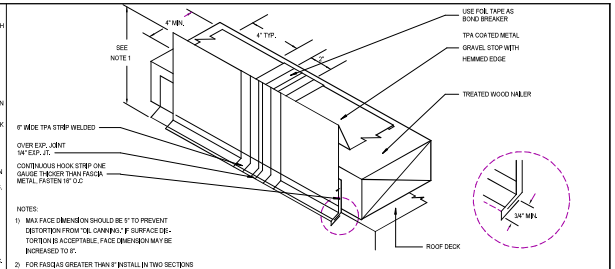


NOTE:
1. ALL METAL SURFACES SHALL BE PRIMED BEFORE CONTACT WITH ANY ADHESIVE OR MASTIC.

11 ROOF EDGE WITH GUTTER
SCALE: 12" = 1'-0"

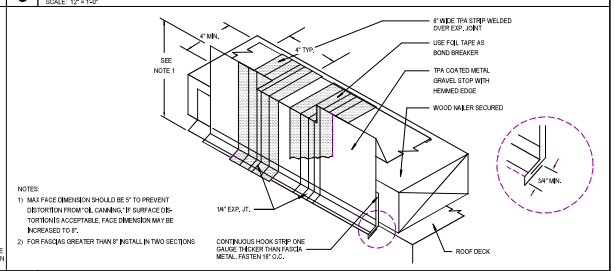


12 HIGH PARAPET WALL FLASHING DETAIL
SCALE: 12" = 1'-0"



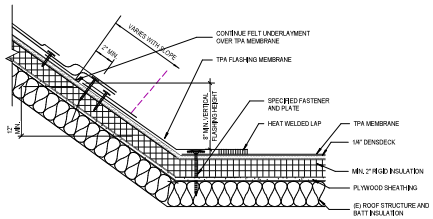
NOTES:
1) MAX FACE DIMENSION SHOULD BE 5" TO PREVENT DISTORTION FROM "OIL CANNING." IF SURFACE DISTORTION IS ACCEPTABLE, FACE DIMENSION MAY BE INCREASED TO 8".
2) FOR FASCIAS GREATER THAN 8" INSTALL IN TWO SECTIONS

6 TPA COATED METAL GRAVEL STOP
SCALE: 12" = 1'-0"

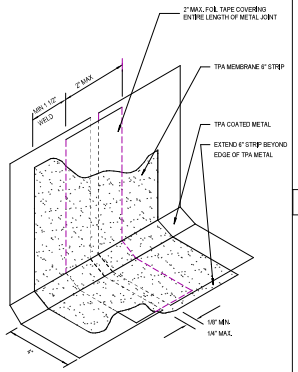


NOTES:
1) MAX FACE DIMENSION SHOULD BE 5" TO PREVENT DISTORTION FROM "OIL CANNING." IF SURFACE DISTORTION IS ACCEPTABLE, FACE DIMENSION MAY BE INCREASED TO 8".
2) FOR FASCIAS GREATER THAN 8" INSTALL IN TWO SECTIONS

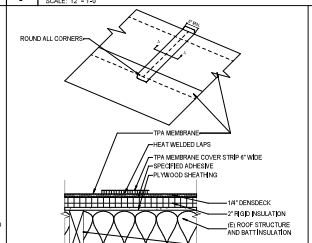
7 GRAVEL STOP SCUPPER DETAIL
SCALE: 12" = 1'-0"



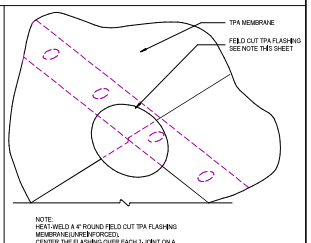
23 MEMBRANE TERMINATION @ SLOPED ROOF
SCALE: 12" = 1'-0"



14 BASE FLASHING BUTT JOINT METAL
SCALE: 12" = 1'-0"

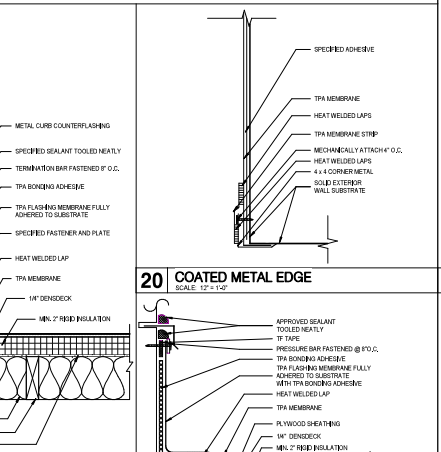


8 END LAP DETAIL
SCALE: 3/8" = 1'-0"



NOTE:
HEAT-WELD A 4" ROUND FIELD CUT TPA FLASHING MEMBRANE(UNREINFORCED), CENTER THE FLASHING OVER EACH T-JOINT ON A 6"-MIL THICK OR GREATER MEMBRANE (AS SHOWN).

3 T-JOINT
SCALE: 12" = 1'-0"



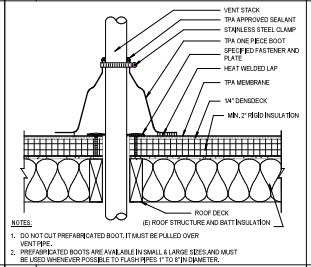
NOTE:
1. ALL FLASHING SHALL BE A MINIMUM OF 8" HIGH.

25 CURB FLASHING DETAIL
SCALE: 12" = 1'-0"

20 COATED METAL EDGE
SCALE: 12" = 1'-0"

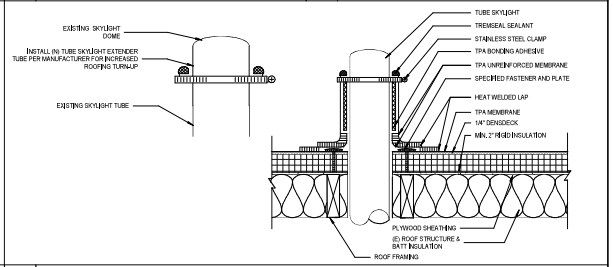
NOTE:
1) FLASHING MUST BE A MINIMUM OF 8" HIGH. DO NOT COVER OR BLOCK WEEP HOLES WITH FLASHING OR SEALANT.

15 REGLET METAL COUNTERFLASHING
SCALE: 12" = 1'-0"

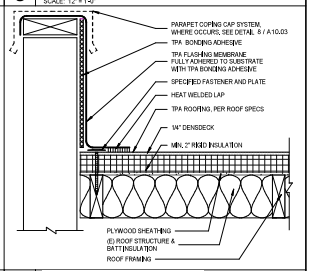


NOTES:
1. DO NOT CUT PREFABRICATED BOOT. IT MUST BE PULLED OVER VENT PIPE.
2. PREFABRICATED BOOTS ARE AVAILABLE IN SMALL & LARGE SIZES AND MUST BE USED WHENEVER POSSIBLE TO FLASH PIPES 1" TO 8" IN DIAMETER.

10 PREFABRICATED VENT PIPE FLASHING
SCALE: 12" = 1'-0"



9 PARAPET THESHOLD ROOFING
SCALE: 12" = 1'-0"



4 PARAPET WALL FLASHING
SCALE: 12" = 1'-0"

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

WORKSET
ISSUED FOR PERMIT
OCT 2023

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from this same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8515
916-355-9922

APPROVED
City of Sacramento Plan Review
LIFE SAFETY
By: Saul Moran
on Sep 28, 2023

JOB COPY

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP
LICENSED ARCHITECT
JILL LOVE
C-27023
RENEW: 08/31/25
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
2203B9
DATE 09.07.2023
DRAWN BY: KC CHKED BY: BL
REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE 2	09/28/23

CONSTRUCTION DOCUMENT

ROOF DETAILS

A10.02

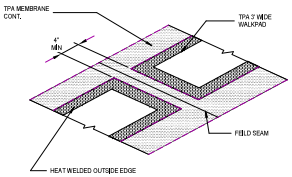
COM-2310004

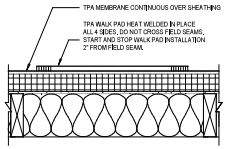
A10.03 - ROOF DETAILS

C:\Users\kdancy\Documents\NSHL_kelly.dancy^SZ47.rvt
5/8/2023 1:52:46 PM

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

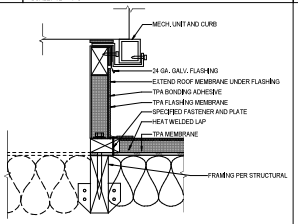
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.



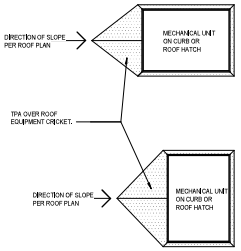


NOTE: FOLLOW ALL MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION TO ENSURE WARRANTY IS MAINTAINED AT ALL WALK PAD LOCATIONS.

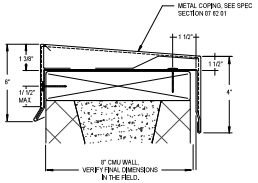
5 WALKING PAD
SCALE: 1/2" = 1'-0"



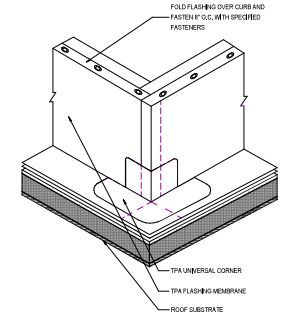
6 MECHANICAL CURB FLASHING
SCALE: 1 1/2" = 1'-0"



7 ROOF EQUIPMENT CRICKETS
SCALE: 1/2" = 1'-0"

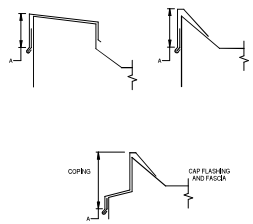


8 COPING DETAIL
SCALE: 1 1/2" = 1'-0"



NOTE:
1. USE THIS DETAIL WHEN COUNTERFLASHING IS PART OF THE CURB MOUNTED EQUIPMENT.
2. USE THE SPECIFIED FASTENERS AND PLATE AROUND THE CURB PER WRITTEN SPECIFICATIONS

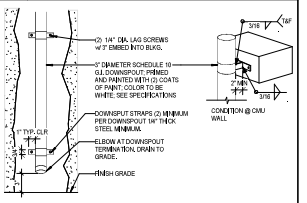
2 CURB FLASHING DETAIL
SCALE: 1/2" = 1'-0"



VARIATIONS

EXPOSED FACE WITHOUT BRAKES "A" DIMENSIONS	GALVANIZED IRON	COLD ROLLED COPPER	ALUMINUM 3003-H14
UP TO 6" FACE	24 GA.	16 OZ.	.040" (18 GA.)
6" TO 8" FACE	24 GA.	16 OZ.	.050" (16 GA.)
8" TO 10" FACE	22 GA.	20 OZ.	.064" (14 GA.)
10" TO 15" FACE	20 GA.	ADD BRAKES TO STIFFEN	.080" (12 GA.)

3 GAGE OR THICKNESS GUIDE (MINIMUM)
SCALE: 1/2" = 1'-0"



NOTE:
1. MOUNT WITH STANDOFF AND WALL PLATE WITH LAGS, PROVIDE BACKING AT MOUNT.
2. INSTALL DOWNSPOUTS AT SAME QUANTITY AND LOCATIONS AS EXISTING. WHERE A NEW LOCATION IS IN CONFLICT, FIELD - LOCATE.

4 DOWNSPOUT STRAIGHT
SCALE: 1 1/2" = 1'-0"

PBK

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

APPROVED
City of Sacramento Plan Review
LIFE SAFETY
By: Saul Moran
on Sep 28, 2023

JOB COPY

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO

1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH
TRUE NORTH

STAMP
LICENSED ARCHITECT
JILL DUKE
C-27033
RENEW 08/31/24
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09.07.2023
DRAWN BY: KC CHKED BY: BL
REVISIONS

#	DESCRIPTION	DATE

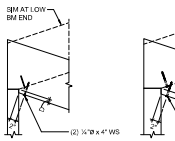
CONSTRUCTION DOCUMENT

ROOF DETAILS

COM-2310004

A10.03

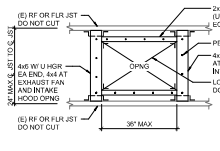
S0.1 - GENERAL NOTES AND TYPICAL DETAILS



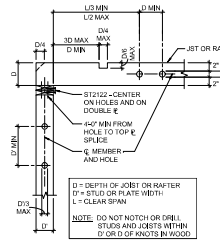
(A) CASE 1 (WHERE D IS LESS THAN OR EQUAL TO 11½") (B) CASE 2 (WHERE D IS GREATER THAN 11½")

NOTES:
1. DO NOT OVERCUT NOTCHES OR SEAT CUTS.
2. D MAX = BEAM DEPTH-4 SEE OTHER DETAILS FOR ADDITIONAL NOTCH OR SEAT CUT SIZE INFORMATION.
3. MINIMUM LAG SCREW LENGTH = D + 2½".

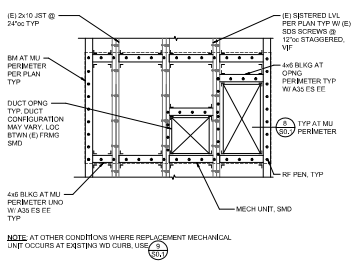
10 BEAM SEAT CUT/NOTCH REINFORCEMENT
3/4" = 1'-0"



5 NEW 24"x36" MAXIMUM OPENING
3/4" = 1'-0"



6 HOLES AND NOTCHES IN WOOD STUDS, JOISTS, AND PLATES
3/4" = 1'-0"

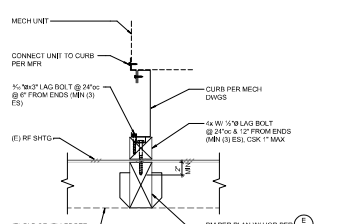


NOTE: AT OTHER CONDITIONS WHERE REPLACEMENT MECHANICAL UNIT OCCURS AT EXISTING WD CURB, USE (9)

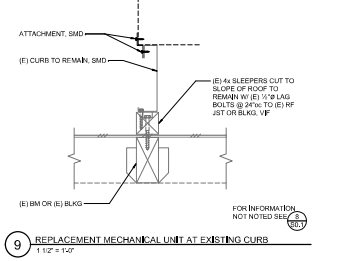
ISSUED BY Community Development Department
By: Jason Hone on Oct 05, 2023

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

7 PLAN VIEW - SUPPORT FRAMING AT MECHANICAL UNIT
1/2" = 1'-0"

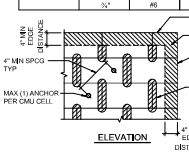


8 MECHANICAL CURB DETAIL
1 1/2" = 1'-0"



9 REPLACEMENT MECHANICAL UNIT AT EXISTING CURB
1 1/2" = 1'-0"

ADHESIVE ANCHOR IN FACE OF 2000 PSI MIN CMU				
ANCHOR TYPE	THRD ROD DIAMETER	REBAR SIZE	PILOT HOLE DIAMETER	MINIMUM EMBEDMENT DEPTH
SIMPSON SET-XP (ICC-ES ESR-4057)	⅜"	#3	½"	3½"
	½"	#4	½"	4½"
	⅝"	#5	¾"	5¼"
	¾"	-	⅞"	6¼"
HILTI HIT-HY 270 (ICC ESR-4143)	⅜"	#3	⅝"	3⅜"
	½"	#4	⅝"	4½"
	⅝"	#5	¾"	5⅝"
	¾"	#6	⅞"	6¾"



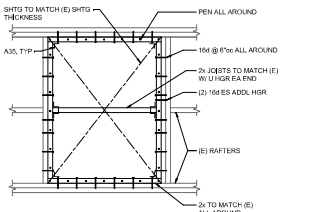
ELEVATION

NOTES:
1. INSTALL ADHESIVE ANCHORS PER MANUFACTURER'S INFORMATION AND ICC REPORT INSTRUCTIONS. SPECIAL INSPECTION IS REQUIRED PER SECTION 1705 OF THE CBC AND THE REQUIREMENTS OF THE ICC REPORTS.
2. CONTRACTOR TO VERIFY MINIMUM EDGE DISTANCES, SPACING AND LOCATION ARE IN ACCORDANCE W/ THE TABLE ABOVE PRIOR TO INSTALLING ANCHOR.
3. NO CORE DRILLING PERMITTED. USE CARE AND CAUTION TO AVOID CUTTING OR DAMAGING THE EXISTING REINFORCING BARS, MAINTAIN A 1" CLEARANCE BETWEEN REINFORCEMENT AND THE DRILLED-IN ANCHOR. FILL ABANDONED HOLES W/ HIGH STRENGTH GROUT.
4. THE SPECIAL INSPECTOR SHALL PERFORM PERIODIC/CONTINUOUS INSPECTION IN ACCORDANCE WITH TABLE 1705.3. THE SPECIAL INSPECTOR SHALL INSPECT ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE CLEANLINESS, EMBEDMENT DEPTH, CMU TYPE, CMU COMPRESSIVE STRENGTH, DRILL BIT DIAMETER, HOLE DEPTH, EDGE DISTANCE(S), ANCHOR SPACING(S), AND CMU THICKNESS.

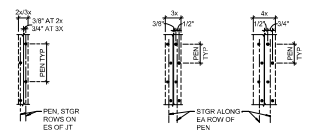
1 ADHESIVE ANCHOR IN FACE OF CMU
3/4" = 1'-0"

RIM JOIST/BLKG TO TOP ℄, TOE NAIL	10d @ 6"oc
TRUSSES, JOISTS OR RAFTERS AT ALL BEARING POINTS TOE NAILS EACH SIDE	(2) 10d
TRUSSES, JOISTS OR RAFTERS TO SIDE OF STUDS FACE NAIL @ INCH JOISTS OR LESS	(3) 16d
FOR EACH ADDITIONAL INCHES OF DEPTH OF JOIST	(1) 16d
BLOCKING BETWEEN JOISTS OR RAFTERS TO JOIST OR RAFTER, TOE NAILS EA SIDE, EA END	(2) 10d
TO JOIST OR RAFTER BEARINGS - TOE NAILS EA SIDE	(2) 10d
BLOCKING BETWEEN STUDS, EACH END TOE NAIL	(2) 10d OR (2) 16d
BRIDGING TO JOIST, TOE NAIL EACH END	(2) 8d
2" SUBFLOOR TO JOIST OR GIRDER, BLIND & FACE NAIL	(2) 16d
SOLE PLATE TO JOIST OR BLOCKING, FACE NAIL	16d @ 16"oc
SOLE PLATE TO JOIST OR BLOCKING AT BRACED WALL PANELS	(3) 16d @ 16"oc
TOP PLATE TO STUD, END NAIL	(2) 16d
STUD TO SOLE PLATE, TOE NAIL	(4) 8d
DOUBLE STUDS AT EXTERIOR WALLS, FACE NAIL	16d @ 12"oc
DOUBLE STUDS, FACE NAIL	16d @ 24"oc
DOUBLE TOP PLATES, FACE NAIL	16d @ 12"oc
TOP PLATES, LAPS & INTERSECTIONS, FACE NAIL	(3) 16d
CONTINUOUS HEADER, TWO PIECES	16d @ 16"oc ALONG EACH EDGE
DOUBLE TOP PLATE LAP AT CORNER	(3) 16d
CONTINUOUS HEADER TO STUD, TOE NAIL	(4) 8d
CEILING JOISTS, LAPS OVER PARTITIONS, FACE NAIL	(3) 16d
CEILING JOISTS TO PARALLEL RAFTERS, FACE NAIL	(3) 16d
BUILT-UP CORNER STUDS	16d @ 12"oc
POST TO SILL/SOLE/TOP PLATE, EACH SIDE TOE NAIL	(4) 10d

2 NAILING SCHEDULE
3/4" = 1'-0"



3 NEW INFILL AT EXISTING ROOF
3/4" = 1'-0"



¾" GAP BTWN PANELS
1¾" MIN PENETRATION AT 8d
1½" MIN PENETRATION AT 10d INTO JST, STUD OR BLKG

SECTION AT TYPICAL NAIL SPACING (4"oc OR MORE SPACING AT FLOOR OR ROOF) (6"oc SPACING AT SHEAR WALL)

¾" GAP BTWN PANELS
1¾" MIN PENETRATION AT 8d
1½" MIN PENETRATION AT 10d INTO JST, STUD OR BLKG

SECTION AT CLOSE NAIL SPACING (3"oc OR LESS SPACING AT FLOOR OR ROOF) (4"oc OR LESS SPACING AT SHEAR WALL)

NOTE:
SHEATHING SHEETS ARE TO BE AS LARGE AS POSSIBLE. STAGGER SHEETS. JOINTS ARE TO BE CENTERED OVER BEARING. NAIL HEADS SHALL BE DRIVEN FLUSH W/ SHEATHING. MINIMUM SHEATHING SIZE IS 24" WIDTH x 48" LENGTH AT FLOOR AND ROOF, AND 12"x48" AT WALLS.

4 SHEATHING NAILING
1 1/2" = 1'-0"

SPECIAL INSPECTION BY OWNERS TESTING AGENCY

(D)

SPECIAL INSPECTIONS AND TESTING SHALL BE PERFORMED BY AN APPROVED AGENCY IN ACCORDANCE WITH CBC CHAPTER 17 AND THE STATEMENT OF SPECIAL INSPECTIONS AS REQUIRED BY CBC SECTIONS 1704.2.3 AND 1704.3 FOR BUILDING STRUCTURAL ELEMENTS SUMMARIZED AS FOLLOWS:

1. WOOD CONSTRUCTION PER CBC SECTIONS 1705.5, 1705.11.1, AND 1705.12.2 INCLUDING NAILING, BOLTING, AND ANCHORING OF ALL DRAG STRUTS, SIMPSON HARDWARE, AND HOLDOWNS FOR OUT-OF-PLANE WALL ANCHORAGE.
2. SPECIAL CASES PER CBC SECTION 1705.1.1 AND PRODUCT ICC REPORTS FOR ALL STRUCTURAL MATERIALS AND SYSTEMS REQUIRED TO BE INSTALLED IN ACCORDANCE WITH ADDITIONAL MANUFACTURER'S INSTRUCTIONS THAT PRESCRIBE REQUIREMENTS NOT CONTAINED IN THE CBC OR REFERENCED STANDARDS INCLUDING POST-INSTALLED ANCHOR BOLTS IN CMU.

WOOD FRAMING NOTES

(E)

1. ALL BEAMS AND JOISTSSHALL BE SEAT CUT FOR FULL UNIFORM BEARING AT SUPPORTS, INCLUDING BEAM SEATS AND COLUMN CAPS.
2. SEE 4/S5.1 FOR SHEATHING NAILING REQUIREMENTS. ALL NAILING NOT NOTED OR DETAILED OTHERWISE SHALL BE PER 2/S5.1 , NAIL LENGTH TO BE SUFFICIENT TO MEET CBC PENETRATION REQUIREMENTS, NAILS INTO PRESSURE TREATED MATERIAL SHALL BE HOT DIP GALVANIZED, NAILS AT BORATE TREATED LUMBER MAY BE CLEAR ZINC COATED. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS AT EXTERIOR EXPOSURES.
3. EXTERIOR STUD WALL SHALL BE 2x6 @ 16"oc UNLESS NOTED OTHERWISE. INTERIOR BEARING WALLS AND SHEAR WALLS SHALL BE 2x6 @ 16"oc UNLESS NOTED OTHERWISE, SEE ARCHITECTURAL DRAWINGS FOR OTHER INTERIOR WALL FRAMING SIZES. COORDINATE STUD AND PLATE SIZES WITH THE REQUIREMENTS OF THE SHEAR WALL SCHEDULE.
4. WOOD POST SIZES ARE TO MATCH BEAM AND STUD WIDTH, UNO.
5. FOR ROOF DRAINAGE, TOP OF FRAMING BETWEEN NOTED POINTS IS A STRAIGHT LINE.
6. ALL MECHANICAL SUPPLY AND RETURN OPENINGS TO BE BETWEEN FRAMING UNO.
7. JOISTS, RAFTERS, AND BEAMS ARE PER PLAN, UNLESS NOTED OTHERWISE. PROVIDE "LU" HANGER AT FLUSH FRAMING AND "HU" HANGER WHERE HANGER IS SHOWN SKEWED PER PLAN AND/OR HANGER SEAT IS INDICATED TO BE SLOPED. HANGER SIZE TO BE CORRECT FULL SIZE FOR JOIST SIZE (I.E, LU210 FOR 2x10), FILL ALL NAIL HOLES.
8. ROUND HOLES IN STEEL PLATES TO BE ⅛" OVERSIZE. INSTALL BOLT AT THE CENTER LINE OF THE HOLE-BOLT HOLES IN WOOD SHALL BE ROUND AND ⅞" OVERSIZE. CUT OFF BOLT THREADED END FLUSH WITH NUT WHEN REQUIRED BY FINISHES AND 1" MAXIMUM FROM NUT OTHERWISE, PROVIDE STANDARD CUT WASHERS UNDER HEAD AND NUT WHERE BOLT BEARS ON WOOD. USE PLATE OR MALLEABLE IRON WASHERS AT EXPOSED CONDITIONS OR AS INDICATED.
9. ALL BOLTED OR NAILED STRAP CONNECTIONS SHALL HAVE AN EQUAL NUMBER OF BOLTS OR NAILS EACH SIDE OF THE SPLICE JOINT. THE FIRST BOLT OR NAIL FROM EACH SIDE OF THE SPLICED OR STRAPPED MEMBER SHALL BE EQUIDISTANT FROM THE SPLICE. STRAPS USING 16d NAILS ON 2x MATERIAL TO BE INSTALLED ON THE 1½" EDGE OF THE MEMBER.
10. THE CONTRACTOR SHALL VERIFY THAT THE MOISTURE CONTENT OF ALL FRAMING LUMBER AND SHEATHING MEET THE REQUIREMENTS OF THE SPECIFICATIONS AT THE TIME OF INSTALLATION AND AT CLOSE-IN. THE CONTRACTOR SHALL PROVIDE ALLOWANCE FOR DIFFERENTIAL SHRINKAGE BETWEEN FLOORS, ETC.
11. ALL SHEATHING SHALL HAVE ⅛" GAP AT ALL EDGES AND JOINTS, SEE ROOF SUBSTRATE REMOVAL AND REPLACEMENT SCHEDULE ON 5/S2.1 FOR AREA REPLACEMENT FOR BID. TYPICAL SHEATHING:
   A. REMOVE AND REPLACE 100% OF (E) DAMAGED OR DRY ROTTED ROOF SHEATHING WITH (N) ROOF SHEATHING. SHEATHING TO REPLACE (E) DAMAGED OR DRY ROTTED ROOF SHEATHING: APA RATED SHEATHING (40/20) EXP 1 W/ THICKNESS TO MATCH (E) WITH 10d COMMON @ 6"oc EDGES (PEN) AND 12"oc FIELD, LAY PERPENDICULAR TO FRAMING MEMBERS. NO PANELS LESS THAN 24" WIDE SHALL BE USED. STAGGER SHEETS.
   B. REMOVE AND REPLACE 100% OF (E) 1x10 DECKING WITH (N) ROOF SHEATHING: ⅞"- APA RATED SHEATHING (48/24) EXP 1 WITH 10d COMMON @ 6"oc EDGES (PEN) AND 12"oc FIELD, LAY PERPENDICULAR TO FRAMING MEMBERS. NO PANELS LESS THAN 24" WIDE SHALL BE USED. STAGGER SHEETS.

SHEET INDEX	
S0.1	GENERAL NOTES AND TYPICAL DETAILS
S2.1	ROOF FRAMING PLAN
S3.1	TRUSS ELEVATIONS AND DETAILS
S4.1	FRAMING DETAILS

ABBREVIATIONS

@	AT	FTG	FOOTING	PNL	PANEL
ABV	ABOVE	GA	GAGE or GAUGE	PSF	POUNDS PER SQUARE FOOT
ACT	ACOUSTIC	GALV	GALVANIZED	PSI	POUNDS PER SQUARE INCH
ADJ	ADJACENT	GB	GRADE BEAM	PSL	PARALLEL STRAND LUMBER
ADDL	ADDITIONAL	GL	GIRDER	PTDF	PRESSURE TREATED DOUGLAS FIR
ALT	ALTERNATE	GLB	GLUE LAMINATED BEAM	PT	POINT
ALUM	ALUMINUM	GO	GRID OPENING	PWD	PLYWOOD
ANOD	ANODIZED	GSW	GALVANIZED SHEET WORK	R	RISER
APC	ACRYLIC YELLOW CEDAR	HDG	HOT-DIP GALVANIZED	RBS	REDUCED BEAM SECTION
@	ANGLE	HDR	HEADER	RFTR	RAFTER
BF	BOARD FEET	HGR	HANGER	REINF	REINFORCE
BLDG	BUILDING	HK	HOOK	REQ'D	REQUIRED
BLK/BLKG	BLOCK/BLOCKING	HORIZ	HORIZONTAL	RESID	RESIDENCE
BLW	BELOW	HSB	HIGH STRENGTH BOLT	RET	RETAINED
BM	BEAM	HSG	HIGH STRENGTH GROUT	RM	ROOM
BN	BOUNDARY NAIL	HSN	HIGH STRENGTH NUT	RO	ROUGH OPENING
BOT	BOTTOM	HSS	HOLLOW STRUCTURAL SECTION	RWD	REDWOOD
BTG	BEARING			S	SOUTH
BTWN	BETWEEN	I	INCH	SAO	SAWN ALL AROUND
BU	BUILT-UP	ID	INSIDE DIAMETER	SB	SQUARE BOX
BYND	BEYOND	IJ	I-JOIST, ENGINEERED WOOD	SCD	SEE CIVIL DRAWINGS
C	CHANNEL		I-PITCH	SCHED	SCHEDULE
CA	CALIFORNIA	INT	INTERIOR	SD	SEE DRAWINGS
CANT	CANTILEVER	JST	JOIST	SHD	SHEAR DRAWINGS
CB	CATCH BASIN	JT	JOINT	SHDW	STRUCTURAL ENGINEERS OF RECORD
CFS	COLD FORMED STEEL	JSP	JOINT SEALANT	SHT	SHEET
CIP	CAST IN PLACE	L	ANGLE	SIM	SIMILAR
CJS	CONTINUOUS LUMBER	LB or #	POUND(S)	SL	SLOPE
CL	CENTERLINE	LGMT	LIGHT GAUGE METAL FRAMING	SMTG	SHEET METAL
CLG	CEILING	LGMTC	LIGHT GAUGE METAL FRAMING CONTRACTOR	SND	SAND
CLR	CLEAR	LL	LIVE LOAD	SNR	SENIOR
COL	COLUMN	LLH	LONG LEG HORIZONTAL	SOG	SLAB ON GRADE
CONC	CONCRETE	LLV	LONG LEG VERTICAL	SPCG	SPACING
CONN	CONNECTION	LS	LAG SCREW	SPD	SPECIFICATIONS
CONST	CONSTRUCTION	LSL	LAMINATED STRAND LUMBER	SPEC	SPECIFICATION
COORD	COORDINATION	LVL	LAMINATED VENEER LUMBER	SQ	SQUARE
CP	CONCRETE PIER	LW	LIGHTWEIGHT CONCRETE	SS	SEE STRUCTURAL or STAINLESS STEEL
CMU	CONCRETE MASONRY UNIT	MAT	MAT SLAB		
CSK	COUNTERSINK	MB	MACHINE BOLT	STGR	STAGGERED
CTR	CENTER	MBM	MULTI-BEAM	STIFF	STIFFENER
DBA	DEFORMED BAR ANCHOR		MANUFACTURER	STL	STEEL
DBL	DOUBLE	MC	MECH LUMINOUS CHANNEL	STR	STRUCTURAL
DCW	DIAPHRAGM CHORD, WALD	MECO	MECHANICAL	STRUCT	STRUCTURAL
DF	DOUGLAS FIR	MEZZ	MEZZANINE	SW	SHEAR WALL
DF or F	DRINKING FOUNTAIN	MFR	MANUFACTURER	SYP	SOUTHERN YELLOW PINE
DBC	DRAINAGE	MFRS	MANUFACTURERS	T&B	TOP AND BOTTOM
DEPT	DEPARTMENT	MIN	MINIMUM	T&G	TONGUE AND GROOVE
DET	DETAIL	MISC	MISCELLANEOUS	TB	TOP BEAM
DJ	DOVEL JOINT	MLF	MALLEABLE IRON WASHER	THKD	THICKENED
DL	DEAD LOAD	MTL	METAL	THRU	THROUGH
DN	DOWN	MU	MECH UNIT	TL	TOTAL LOAD
DNG	DETAIL	MTR	MOTOR	TOC	TOP OF CONCRETE
DWG	DRAWING	N/A	NOT APPLICABLE	TOF	TOP OF FRAMING
DWL	DOWEL	NO #	NUMBER	TOM	TOP OF MASONRY
EA	EACH	NS	NEAR SIDE	TOP	TOP OF PARAPET
EF	EXHAUST FAN	NTG	NON-TOXIC GROUT	TOS	TOP OF STEEL
ELEC	ELECTRICAL	NWC	NORMAL WEIGHT CONCRETE	TOT	TOTAL
ELEV	ELEVATOR, ELEVATION	OA	OVERALL	TP	TOP PLATE
EMBED	EMBEDMENT	OC	ON CENTER	TYP	TYPICAL
EQ	EQUAL	OD	OUTSIDE DIAMETER	UNO	UNLESS NOTED OTHERWISE
EQUIP	EQUIPMENT	OH	OPPOSITE HAND	VERT	VERTICAL
EW	EACH WAY	OPNG	OPENING	W	WIDE
EXC	EXCAVATION	OPP	OPPOSITE	WH	WITH
EXIST	EXISTING	OVH	OVERHEAD	W/	WITH
FDN	FOUNDATION	OW	OPEN WEB TRUSS	W/O	WITHOUT
FIN	FINISH	P	PLATE or PROPERTY LINE	WD	WOOD
FL	FLOOR	PA	POST ANCHOR	WD-S	WELDED HEADED STUD
FLR	FLOOR, GARAGE	PAF	POST ANCHOR FLATTENED	WP	WORK POINT
FLR	FLOOR		FASTENING	WPR	WORK PORCH/WATERPROOF
FN	FACE NAIL	PEN	PANEL EDGE NAIL	WS	WOOD SCREW
FOC	FACE OF CONCRETE	PERP	PERPENDICULAR	WT	WEIGHT
FOM	FACE OF MASONRY	PEF	PANEL EDGE SCREW	WTD	WELDED THREADED STUD
FOS	FACE OF STUD	PF	PANEL FIELD SCREW/NAIL	WWR	WINDOW TO WALL RATIO
FTRMG	FRAMING	PCF	POUNDS PER CUBIC FOOT		VERT DISCONNECT
FW	FAR SIDE				

(A) DESIGN CRITERIA

DESIGN CRITERIA:	2022 CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 2 (CBC) AND 2022 CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 10 (CEBC)
ROOF LIVE LOAD:	20 PSF (REDUCIBLE)
MEZZANINE FLOOR LIVE LOAD:	40 PSF (REDUCIBLE)
RISK CATEGORY:	II
WIND DATA:	ULTIMATE WIND SPEED (3 SEC GUST) IN MPH: 94 WIND EXPOSURE: B INTERNAL WIND PRESSURE COEFFICIENT (GCPi) = ±0.18 COMPONENTS AND CLADDING DESIGN PRESSURES FOR SYSTEMS DESIGNED BY OTHERS SHALL COMPLY WITH THE "ASCE 7-16" DESIGN STANDARD
ASCE 7-16 EARTHQUAKE DATA:	DESIGN STANDARD: 2016 AMERICAN SOCIETY OF CIVIL ENGINEERS STANDARD (ASCE 7-16) SEISMIC IMPORTANCE FACTOR, I_e: 1.0 MAPPED SPECTRAL RESPONSE ACCELERATIONS: S_S = 0.541; S_1 = 0.247 SITE CLASS: D (DEFAULT) SPECTRAL RESPONSE COEFFICIENTS: S_{DS} = 0.493; S_{D1} = 0.347 SEISMIC DESIGN CATEGORY: D
ASCE 41-17 EARTHQUAKE DATA:	DESIGN STANDARD: 2017 AMERICAN SOCIETY OF CIVIL ENGINEERS STANDARD (ASCE 41-17) SITE CLASS: D (DEFAULT) LEVEL OF SEISMICITY: HIGH KNOWLEDGE FACTOR FOR EXISTING COMPONENTS: VARIES PER COMPONENT HAZARD LEVEL: BSE-1E PERFORMANCE OBJECTIVES STRUCTURAL: LIFE SAFETY NON-STRUCTURAL: LIFE SAFETY MAPPED SPECTRAL RESPONSE ACCELERATIONS: S_S = 0.22; S_1 = 0.10 SPECTRAL RESPONSE COEFFICIENTS: S_{XS} = 0.36; S_{X1} = 0.25 RESPONSE SPECTRAL ACCELERATION: S_a = 0.36 HAZARD LEVEL: BSE-2E PERFORMANCE OBJECTIVES STRUCTURAL: LIFE SAFETY NON-STRUCTURAL: NOT CONSIDERED MAPPED SPECTRAL RESPONSE ACCELERATIONS: S_S = 0.40; S_1 = 0.19 SPECTRAL RESPONSE COEFFICIENTS: S_{XS} = 0.50; S_{X1} = 0.42 RESPONSE SPECTRAL ACCELERATION: S_a = 0.60
SCOPE:	VOLUNTARY SEISMIC UPGRADE TO OUT-OF-PLANE WALL ANCHORAGE PER CALIFORNIA EXISTING BUILDING CODE 2022 SECTION 315.1.10. NO CLAIM IS MADE THESE IMPROVEMENTS BRING THE BUILDING INTO CURRENT CODE COMPLIANCE. THE INTENT IS TO IMPROVE SEISMIC PERFORMANCE. ROOF FRAMING REPAIR AND STRENGTHENING TO MEET CURRENT 2022 CBC LOADING CRITERIA.

(B) GENERAL NOTES

1. REFER TO SHEETS S0.1 FOR STANDARD DETAILS OF CONSTRUCTION. REFER TO THE PROJECT SPECIFICATIONS FOR MATERIALS AND METHODS.
2. BUILDING DIMENSIONS SHOWN ARE FOR GENERAL REFERENCE ONLY. SEE ARCHITECTURAL DRAWINGS (GAD) FOR ALL ACTUAL BUILDING DIMENSIONS, ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER SO CLARIFICATION CAN BE MADE PRIOR TO COMMENCING WORK.
3. STRUCTURAL DRAWINGS SHALL NOT BE SCALED. ALL DIMENSIONS AND FIT SHALL BE DETERMINED AND VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCING WORK.
4. DETAILS NOT FULLY OR SPECIFICALLY SHOWN SHALL BE OF SAME NATURE AS OTHER SIMILAR CONDITIONS.
5. COORDINATION OF MECHANICAL, ELECTRICAL, PLUMBING, AND SITE UTILITY SYSTEMS WITH THE STRUCTURAL SYSTEM IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. USE DETAILS ON SHEET S0.1, AT CONDITIONS WHERE THESE DETAILS DO NOT APPEAR TO APPLY, NOTIFY THE STRUCTURAL ENGINEER PRIOR TO INSTALLATION. AT CONDITIONS WHERE FIELD MODIFICATIONS OF MECHANICAL, ELECTRICAL, PLUMBING, OR SITE UTILITIES AFFECT STRUCTURAL SYSTEMS, NOTIFY STRUCTURAL ENGINEER PRIOR TO INSTALLATION.
6. VERIFY WEIGHTS AND LOCATIONS OF MECHANICAL UNITS WITH MECHANICAL ENGINEER PRIOR TO PLACEMENT. UNITS VARYING OVER 10% IN WEIGHT SHALL BE REVIEWED BY THE STRUCTURAL ENGINEER PRIOR TO INSTALLATION. MECHANICAL WEIGHTS SHOWN ARE MAXIMUMS. CONTRACTOR TO VERIFY MECHANICAL UNIT SIZES AND WEIGHTS AS INSTALLED PRIOR TO INSTALLATION. SPECIAL FRAMING TO ENSURE CORRECT PLACEMENT UNDER CURBS, ETC., SEE 7/S5.1 FOR NEW MECHANICAL UNITS UNO ON PLAN AND 9/S5.1 FOR NEW REPLACEMENT MECHANICAL UNITS AT EXISTING CURBS.
7. SHORING AND BRACING DESIGN, MATERIALS AND INSTALLATION SHALL BE PROVIDED BY THE GENERAL CONTRACTOR, AND SHALL BE ADEQUATE FOR ALL LOADS, LEAVE IN PLACE AS LONG AS MAY BE REQUIRED FOR SAFETY AND UNTIL FINAL STRUCTURAL SYSTEM IS COMPLETED.
8. SPECIAL INSPECTIONS ARE REQUIRED PER D/S0.1 AND THE TESTING AND INSPECTION FORM.
9. VEHICULAR TRAFFIC, HEAVY EQUIPMENT AND MATERIAL STAGING SHALL NOT BE ALLOWED ADJACENT TO ANY NEW FRAMING/ASSEMBLY WALL, NEW OR EXISTING WITHIN A HORIZONTAL DISTANCE EQUAL TO THE WALL HEIGHT MEASURED FROM THE BOTTOM OF FOOTING OR S-O-G WHICHEVER IS GREATER, UNLESS APPROVED BY THE STRUCTURAL ENGINEER OR NOTED OTHERWISE ON THE CONSTRUCTION ZONE. ONLY HAND-OPERATED EQUIPMENT ("WHACKERS", VIBRATORY PLATES, OR PNEUMATIC COMPACTORS) SHALL BE USED TO COMPACT THE BACKFILL SOILS.
10. SEE MECHANICAL DRAWINGS FOR BASE DESIGN MECHANICAL UNITS AND ADDITIVE ALTERNATE (ADD ALT) OPTIONS.

(C) EXISTING CONSTRUCTION NOTES

1. ORIGINAL CONSTRUCTION DRAWINGS WERE NOT AVAILABLE FOR REVIEW AT THE TIME THESE DOCUMENTS WERE PREPARED. EXISTING BUILDING CONDITIONS SHOWN ARE ASSUMED BASED ON INFORMATION PROVIDED BY OTHERS, SITE VISITS, AND ASSUMPTIONS BASED ON PROBABLE CONSTRUCTION METHODS. ACTUAL FIELD CONDITIONS MAY VARY.
2. ALL WORK NOT INDICATED AS EXISTING (E) SHALL BE ASSUMED TO BE NEW (N).
3. ANY REMOVAL, CUTTING, DRILLING, ETC OF EXISTING WORK SHALL BE PERFORMED WITH GREAT CARE, SMALL TOOLS SHALL BE USED IN ORDER NOT TO JEOPARDIZE THE STRUCTURAL INTEGRITY OF THE STRUCTURE. IF STRUCTURAL MEMBERS OR MECHANICAL, ELECTRICAL, OR ARCHITECTURAL ELEMENTS NOT INDICATED FOR REMOVAL INTERFERE WITH THE NEW WORK, THE ARCHITECT/ENGINEER SHALL BE IMMEDIATELY NOTIFIED AND PRIOR APPROVAL SHALL BE OBTAINED BEFORE REMOVAL OF THE MEMBERS.
4. DO NOT OVER CUT EXISTING WOOD, CONCRETE, MASONRY OR OTHER WORK TO REMAIN. CUTS SHALL BE MADE NEATLY TO A CORNER, THEN ALTERNATE MEANS SHALL BE USED TO REMOVE REMAINING MATERIAL. CONTRACTOR IS RESPONSIBLE FOR REPAIR/REPLACEMENT OF OVER CUT MATERIAL AS DIRECTED BY THE ARCHITECT AND/OR ENGINEER.
5. EXISTING DAMAGED STRUCTURAL MEMBERS WHICH ARE UNCOVERED SHALL BE REPORTED TO THE ARCHITECT/ENGINEER FOR REVIEW AND REPAIR.
6. EXISTING CONCRETE SURFACE ABUTTING NEW CONCRETE SHALL BE ROUGHENED TO ½" AMPLITUDE AND THOROUGHLY CLEANED OF DUST, LOOSE AGGREGATE, LATTANCE, ETC.
7. EXISTING REINFORCING AND/OR STEEL EMBEDS THAT ARE EXPOSED DURING DEMOLITION SHALL BE WIRE-BRUSHED AND FOREIGN MATERIAL REMOVED PRIOR TO PLACEMENT OF NEW CONCRETE.
8. REMODELING REQUIRES ASSUMPTIONS BE MADE REGARDING EXISTING CONDITIONS WHICH MAY NOT BE VERIFIABLE WITHOUT DESTROYING OTHERWISE ADEQUATE OR SERVICEABLE PORTIONS OF THE STRUCTURE. THIS ANALYSIS DOES NOT MAKE ANY GUARANTEE TO THE ADEQUACY OF THE STRUCTURAL DESIGN OF THE EXISTING BUILDING NOT SPECIFICALLY ADDRESSED IN THE STRUCTURAL CALCULATIONS. ZFA SHALL NOT BE RESPONSIBLE FOR UNSATISFACTORY PERFORMANCE OF EXISTING PORTIONS OF THE STRUCTURE NOT SPECIFICALLY ADDRESSED IN THE CONSTRUCTION DOCUMENTS.

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point

S2.1 - ROOF FRAMING PLAN

APPROVED
City of Sacramento Web Portal
STRUCTURAL
By: Leticia Valenzuela
on Sep 27, 2023

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plans and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

ROOF SUBSTRATE REMOVAL AND REPLACEMENT SCHEDULE			
SUBSTRATE	TOTAL AREA	% REPLACEMENT	AREA REPLACEMENT
(E) 1x10 DECKING	7,582 SQ FT	100%	7,582 SQ FT
(E) SHEATHING	12,936 SQ FT	50%	6,418 SQ FT

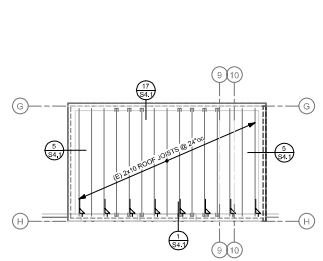
NOTES:
1. CONTRACTOR SHALL ASSUME THE QUANTITY OF REPLACEMENT FOR BID BASED ON THIS TABLE.
2. ONCE ROOFING IS REMOVED, AREAS SHALL BE VERIFIED AND ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE CITY AND ARCHITECT.

FRAMING PLAN NOTES:

1. REFER TO SHEET S0.1 FOR GENERAL NOTES AND TYPICAL DETAILS. THE FOLLOWING DETAIL REFERENCES ARE PROVIDED FOR THE CONTRACTOR'S CONVENIENCE ONLY. ALL GENERAL NOTES AND TYPICAL DETAIL SHEETS NOTED ABOVE ARE APPLICABLE AND SHALL BE FOLLOWED.
2. DIMENSIONS ARE TO FACE OF STUD UNLESS NOTED OTHERWISE. COORDINATE ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES.
3. MECHANICAL, ELECTRICAL AND PLUMBING PENETRATIONS THROUGH WALLS, ROOFS OR FLOORS SHALL BE PER REFERENCES BELOW UNLESS SHOWN AND DETAILED OTHERWISE ON THE STRUCTURAL PLANS. NOTIFY ARCHITECT/ENGINEER PRIOR TO ANY INSTALLATION NOT CONFORMING TO THESE DETAILS.

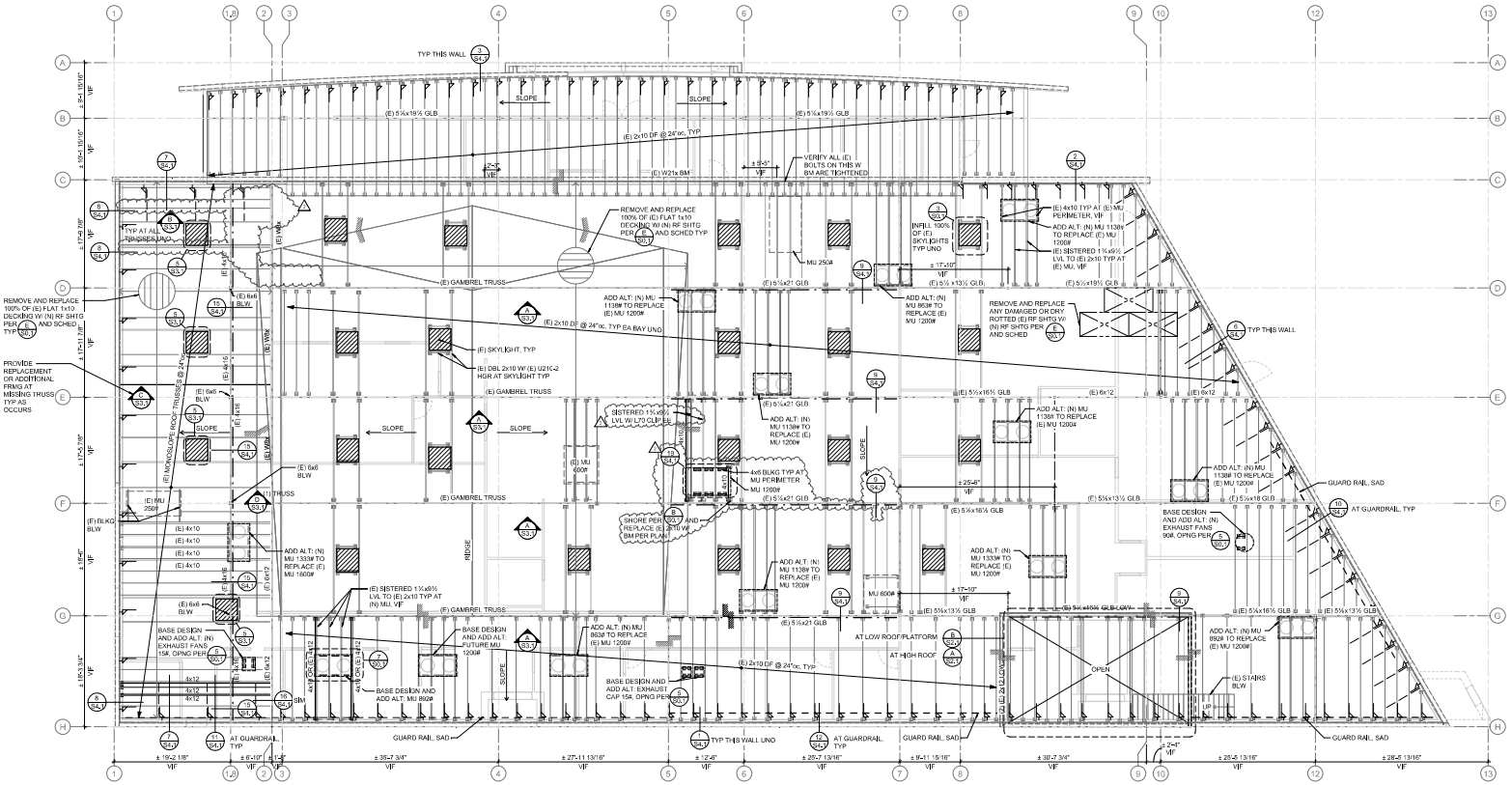
PENETRATIONS THROUGH FLOORS/ROOFS SHALL BE PER S0.1

PLAN LEGEND		
SYMBOL	REFERENCE DETAIL	DESCRIPTION
B6		INDICATES GRIDLINE.
1 / S3.1		INDICATES ELEVATION.
MU 1,000#	7/S0.1 9/S0.1	INDICATES APPROXIMATE LOCATION, SIZE AND MAXIMUM WEIGHT OF MECHANICAL UNIT. SEE MECHANICAL DRAWINGS FOR ANCHORAGE AND ADDITIONAL INFORMATION.
		INDICATES (E) STEP IN ELEVATION. SEE ARCHITECTURAL DRAWINGS.
		INDICATES EXISTING FRAMING.
		INDICATES EXISTING STEEL COLUMN.
4x10		INDICATES BEAM SIZE.
(E) 5½x21 GLB		INDICATES EXISTING BEAM SIZE.
	E/S0.1	INDICATES HANGER.
		INDICATES EXISTING HANGER.
		INDICATES EXISTING LEDGER.
		INDICATES NEW LEDGER.
		INDICATES HOLDOWN OR LATERAL TIE. SEE DETAIL CUTS ON PLAN
	9/S4.1 AT (E) GLB 15/S4.1 AT (E) 4x	INDICATES GIRDERS THAT REQUIRE STRENGTHENING
	3/S0.1 9/S3.1	INDICATES INFILL AT EXISTING SKYLIGHT



A HIGH ROOF FRAMING PLAN
1/8" = 1'-0"

B LOW ROOF/PLATFORM FRAMING PLAN
1/8" = 1'-0"

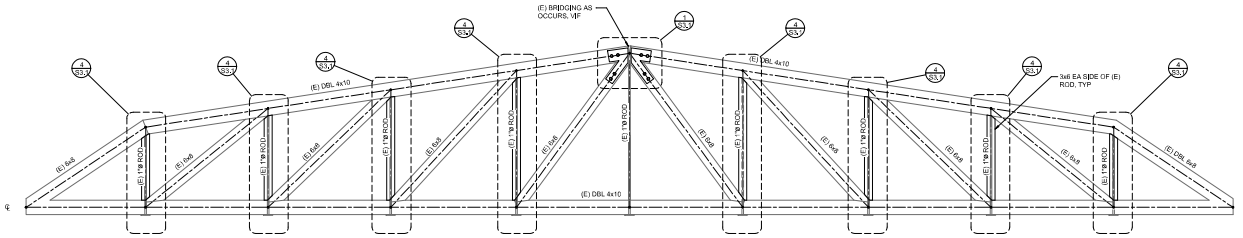

TYP THIS WALL
(E) 5¼x19½ GLB
(E) 2x10 DF @ 24"oc, TYP
(E) W21x BM
VERIFY ALL (E) BOLTS ON THIS W BM ARE TIGHTENED
REMOVE AND REPLACE 100% OF (E) FLAT 1x10 DECKING W/ (N) RF SHTG PER E AND SCHED TYP
(E) GAMBREL TRUSS
(E) SKYLIGHT, TYP
(E) DBL 2x10 W/ (E) U21C-2 HGR AT SKYLIGHT TYP
PROVIDE REPLACEMENT OR ADDITIONAL FRMG AT MISSING TRUSS TYP AS OCCURS
(E) HIP/VALLEY ROOF TRUSS @ 24"oc
(E) 6x6 BLW
(E) BLKG BLW
(E) 4x10
(E) 4x12
(E) 4x16
(E) MU 250#
(E) 5½x21 GLB
(E) 5½x16½ GLB
(E) 5½x13½ GLB
(E) 6x12
(E) 4x16 BLW
(E) 4x20 BLW
(E) 6x20 BLW
(E) 6x16 BLW
(E) 6x18 BLW
(E) 6x24 BLW
(E) 4x6 BLW
(E) 4x8 BLW
(E) 4x10 BLW
(E) 4x12 BLW
(E) 4x16 BLW
(E) 4x20 BLW
(E) 6x12 BLW
(E) 6x16 BLW
(E) 6x20

S3.1 - TRUSS ELEVATIONS AND DETAILS

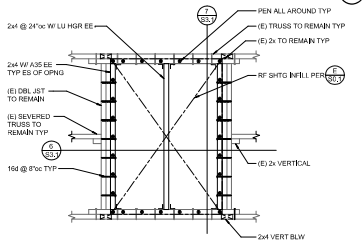
APPROVED
City of Sacramento Web Version
STRUCTURAL
By: Leticia Valenzuela
on Sep 27, 2023

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

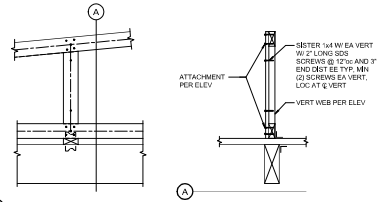
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.



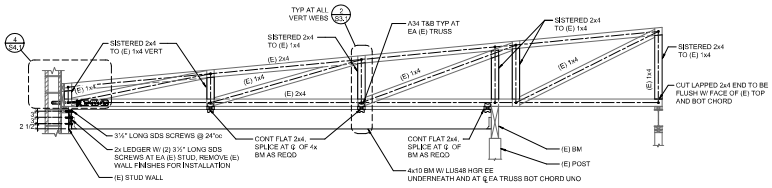
A GAMBREL TRUSS ELEVATION
3/8" = 1'-0"



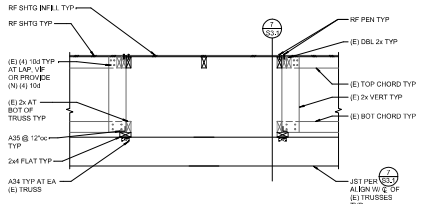
5 PLAN VIEW AT NEW INFILL
3/4" = 1'-0"



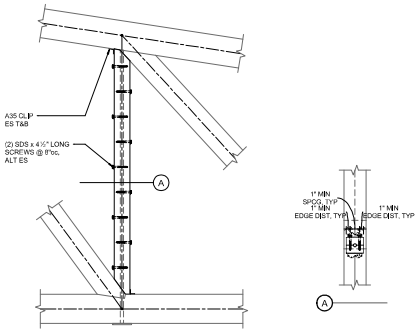
3 (N) CONNECTION OF WEB TO BEAM
1" = 1'-0"



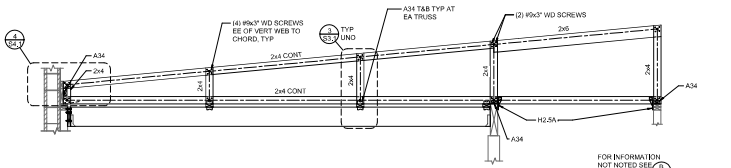
B TYPICAL TRUSS ELEVATION
1/2" = 1'-0"



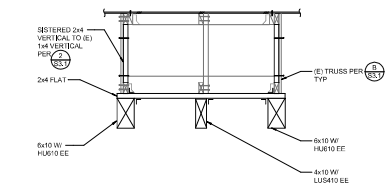
6 EAST-WEST SECTION AT NEW INFILL
3/4" = 1'-0"



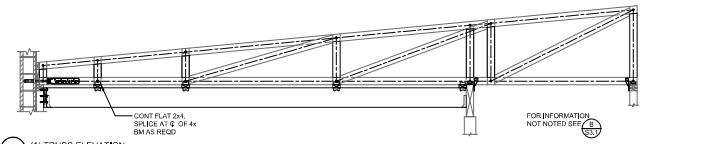
4 1" ø ROD REINFORCEMENT
3/4" = 1'-0"



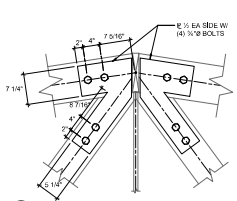
C TYPICAL NEW TRUSS ELEVATION (AS REQUIRED AT DAMAGED TRUSSES)
1/2" = 1'-0"



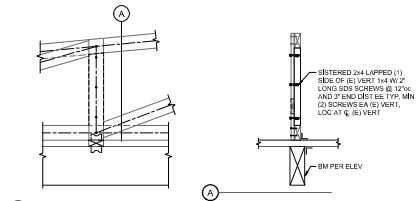
7 NORTH-SOUTH SECTION AT NEW INFILL
3/4" = 1'-0"



D (1) TRUSS ELEVATION
1/2" = 1'-0"



1 RIDGE AT TOP OF GAMBREL TRUSS
1" = 1'-0"



2 SPLICE CONNECTION OF WEB TO BEAM
1" = 1'-0"

PBK

ARCHITECT PBK, Inc.
FBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

CONSULTANT
[redacted]
601 university avenue| suite 185 sfa.com
sacramento ca 95825 916.930.6724
sfa job no. 22059 copyright © 2023

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

JOB COPY
1124 DEL PASO BLVD
COM-2310004

KEY PLAN
A
PLAN NORTH
TRUE NORTH

REGISTERED PROFESSIONAL ENGINEER
MICKEY C. KELLOGG
STRUCTURAL
No. 5851
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
22059
DATE 09/07/2023
DRAWN BY: MAAP/DM CHKED BY: MCK
REVISIONS

#	DESCRIPTION	DATE

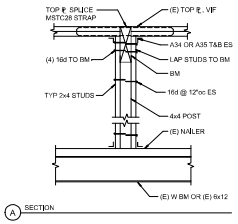
PERMIT SET

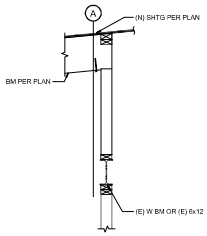
TRUSS ELEVATIONS AND DETAILS

S3.1

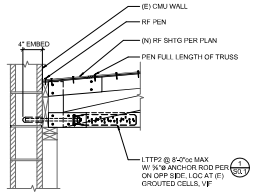
5/4/2023 8:47:44 AM

13 UNUSED
3/4" = 1'-0"





16 MECHANICAL UNIT SUPPORT
3/4" = 1'-0"

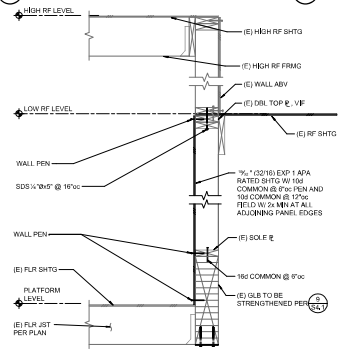


14 NEW SMALL TRUSS ANCHORAGE
1" = 1'-0"

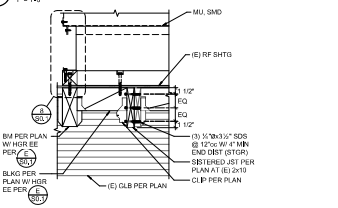


NOTE:
INSTALL STRENGTHENING PLATE BEFORE INSTALLING ANY NEW FRAMING OR EQUIPMENT.

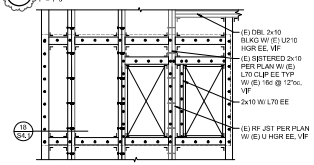
15 DF GIRDER STRENGTHENING
3/4" = 1'-0"



17 NEW SHEATHING AT (E) PLATFORM WITH JOISTS PERPENDICULAR TO EXISTING WALL
1" = 1'-0"

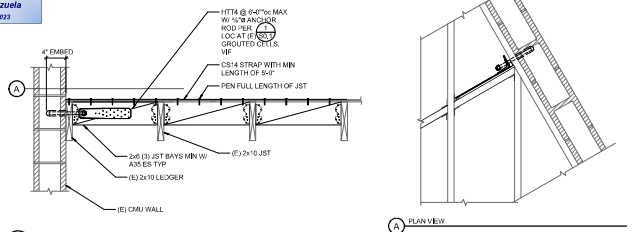


18 FRAMING AT NEW MECHANICAL UNIT
1" = 1'-0"

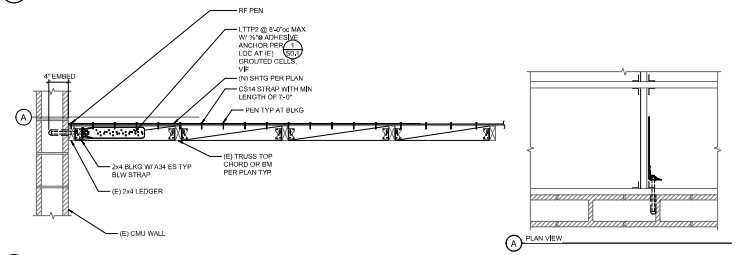


19 PLAN VIEW - SUPPORT FRAMING AT NEW MECHANICAL UNIT
1/2" = 1'-0"

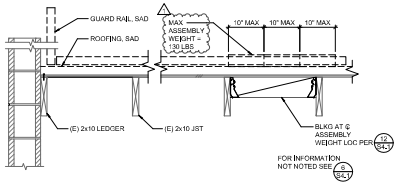
APPROVED
STRUCTURAL
By: Leticia Valenzuela
on Sep 27, 2023



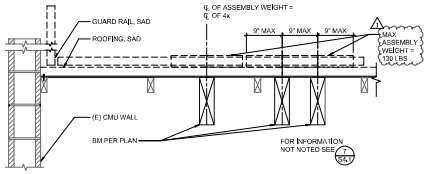
6 ANGLED ANCHOR RETROFIT
1" = 1'-0"



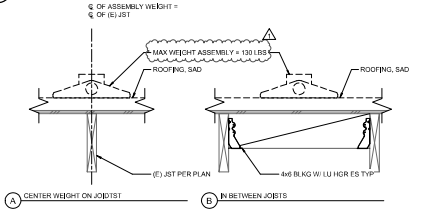
7 ANCHOR RETROFIT THROUGH SMALL TRUSS
1" = 1'-0"



10 GUARD RAIL DIAGONAL SUPPORT
1" = 1'-0"

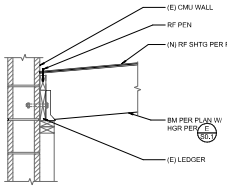


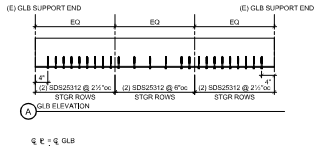
11 GUARD RAIL SUPPORT
1" = 1'-0"

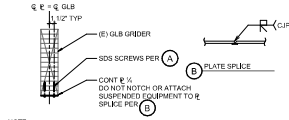


12 JOIST AT GUARD RAIL AT (E) 2x
1 1/2" = 1'-0"

8 NEW BEAM AT CMU WALL
1" = 1'-0"







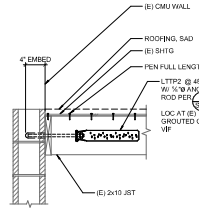
NOTE:
1. INSTALL STRENGTHENING PLATE BEFORE INSTALLING ANY NEW FRAMING OR EQUIPMENT.

9 EXISTING GLULAM GIRDER STRENGTHENING
3/4" = 1'-0"

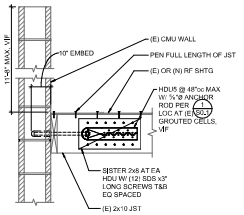
ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023



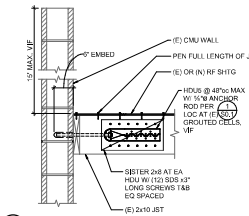
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.



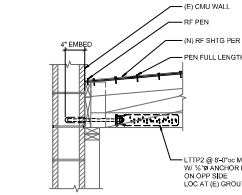
1 SUB-PURLIN ANCHOR RETROFIT
1" = 1'-0"



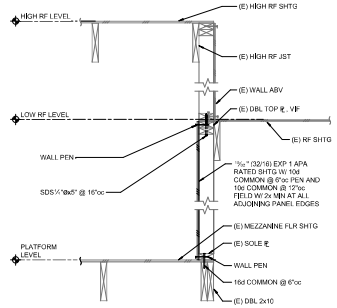
2 ANCHOR RETROFIT AT TALL PARAPET
1" = 1'-0"



3 ANCHOR RETROFIT AT FRONT
1" = 1'-0"



4 SMALL TRUSS ANCHOR RETROFIT
1" = 1'-0"



5 NEW SHEATHING AT (E) PLATFORM WITH (E) JOISTS PARALLEL WITH (E) WALL
1" = 1'-0"

Not for permitting or construction

PBK

JOB COPY

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

CONSULTANT

601 university avenue | suite 185 sacramento ca 95825 916.204.7024
sfa job no. 22089 copyright © 2023

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
PERMIT SET

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

LICENSED PROFESSIONAL ENGINEER
MICKEY C. KELLOGG
No. 5851
STRUCTURAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
22089
DATE 09/07/2023
DRAWN BY: MAAP/DM CHKED BY: MCK
REVISIONS

#	DESCRIPTION	DATE
1	Plan Check B	09/8/2023
2	Plan Check #2	09/8/2023

PERMIT SET

FRAMING DETAILS

S4.1

COM-2310004

DUCT LEGEND

SINGLE LINE SYMBOL	DOUBLE LINE SYMBOL	DESCRIPTION
24x12	24x12	RECTANGULAR DUCT - WIDTH X DEPTH (PLAN VIEW) DEPTH X WIDTH (SECTION VIEW)
26x14L	26x14L	ACOUSTICALLY LINED RECTANGULAR DUCT - DIMENSIONS ARE OUTSIDE.
		MANUAL AIR DAMPER
R OR D	RISE OR DROP	RISE OR DROP DUCT IN DIRECTION OF AIR FLOW
	OR	RECTANGULAR TO RECTANGULAR TRANSITION, MAX SLOPE OF 1:3 RECTANGULAR TO ROUND TRANSITION, MAX SLOPE OF 1:3
	W, R, R/W = 1.5	ELBOW, RECTANGULAR, SMOOTH RADIUS, WITHOUT TURNING VANES.
		SQUARE/RECTANGULAR DUCT ELBOW WITH TURNING VANES
		CONVERGING OR DIVERGING TEE, 45° ENTRY, RECTANGULAR MAIN AND BRANCH. WHEN REDUCING MAIN, SIDE OF TAKE OFF OR ENTRY BRANCH TO BE FLAT, OTHER SIDES MAXIMUM SLOPE OF 1:3.
		CONICAL DUCT TAKE OFF FROM RECTANGULAR VIA SPIN-IN W/DAMPER AND SCOOP.
	ROUND DUCT	ROUND DUCT TAKE OFF FROM RECTANGULAR VIA SMOOTH CONVERGING BELL MOUTH.
		RECTANGULAR DUCT TEE, MAD'S ON THE 2 BRANCHES, THROAT SIZED FOR EQUAL PRESSURE DROP.
		RECTANGULAR DUCT SPLIT MAD'S, THROAT SIZED FOR EQUAL PRESSURE DROP.
		3-WAY RECTANGULAR SPLIT WITH TWO TRANSITIONAL ELBOWS AND TRANSITIONING MAIN. DOWNSTREAM MAD'S ON THE TREE BRANCHES. THROATS SIZED FOR EQUAL PRESSURE DROP.
		FOR CONCEALED DUCT: DROP TO DIFFUSER SHALL BE FULL SIZE OF DIFFUSER NECK. FOR EXPOSED DUCT: DROP SHALL BE FULL SIZE OF OD DIFFUSER FRAME, FLANGE FOR MOUNTING DIFFUSER TURNED IN, AIR EXTRACTOR AND EQUALIZER GRID AT CONNECTION TO MAIN.
		SUPPLY AIR, SUPPLY AIR DUCT IN SECTION, SUPPLY DROP
		RETURN AIR, RETURN AND OUTSIDE AIR DUCT IN SECTION , RETURN AIR DROP.
		EXHAUST AIR, EXHAUST AIR DUCT IN SECTION, EXHAUST AIR DROP.
		FLEXIBLE DUCT (ROUND)
		FLEXIBLE DUCT (FABRIC)
MAD, 18"Ø, 10"Ø, 12"Ø	18"Ø, 10"Ø, 12"Ø, 12"Ø	45° REDUCING LATERAL FITTING
MAD, 18"Ø, 12"Ø	18"Ø, 12"Ø, 10"Ø	90° REDUCING TEE FITTING MECHANICAL DEMOLITION PLAN

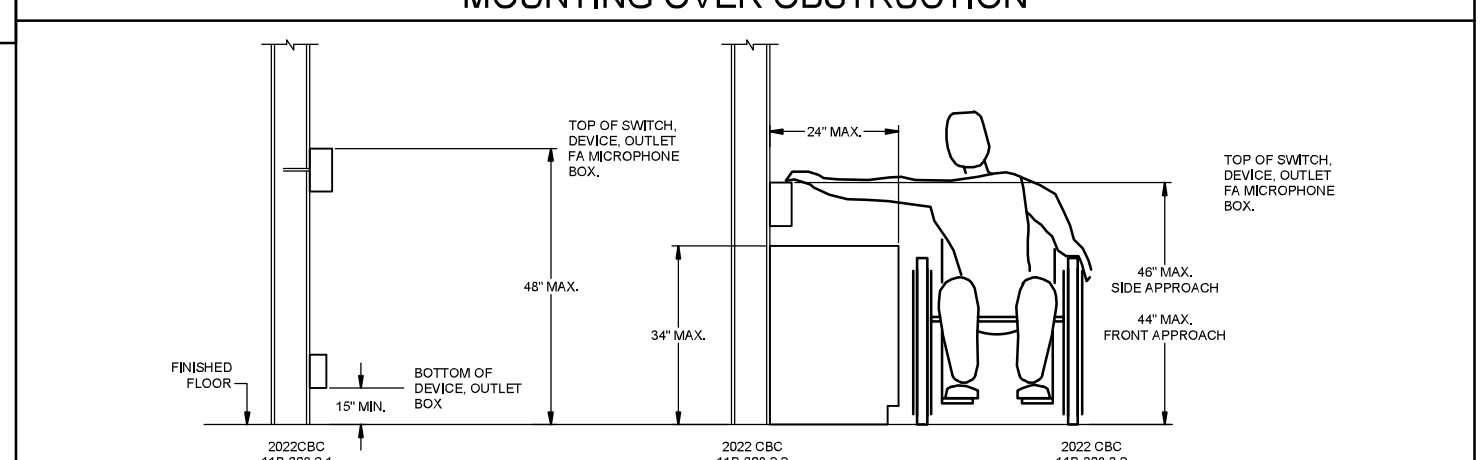
MECHANICAL LEGEND

SYMBOL	ITEM	ABBR.
	SUPPLY AIR	SA
	RETURN AIR	RA
	EXHAUST AIR	EA
	OUTSIDE AIR	OA
01 M-1	DETAIL DESIGNATION DETAIL NUMBER SHEET NO. WHERE SHOWN	
AC 1	EQUIPMENT DESIGNATION UNIT ABBREVIATION NUMBER	
A 10x10-3 120 F/S	GRILLE DESIGNATION NECK SIZE & BLOW FIRE/SMOKE DAMPER WHERE REQ'D CFM	
	ACOUSTIC LINED DUCT	
	TURNING VANES	TV
	DUCT FLEXIBLE CONNECTION	
	SUPPLY DUCT THRU ROOF	
	RETURN DUCT THRU ROOF	
	VOLUME CONTROL DAMPER	VCD
	FIRE/SMOKE DAMPER W/ACCESS	F/S
	OPPOSED BLADE DAMPER	OBD
	BACKDRAFT DAMPER	BDD
(T)	EMS TEMP. SENSOR/ THERMOSTAT, MOUNT @ 48" AFF TO TOP OF BOX	T'STAT
(B)	BYPASS TIMER	
(S)	SWITCH	
(E)	EXISTING	EXIST.
(N)	NEW	NEW
	METAL & FLEXIBLE DUCT	
	PIPE RISER	
	PIPE DROP	
— CWS —	CHILLED WATER SUPPLY	CWS
— CWR —	CHILLED WATER RETURN	CWR
— HWS —	HEATING WATER SUPPLY	HWS
— HWR —	HEATING WATER RETURN	HWR
	INCREASER/REDUCER	
	SAFETY RELIEF VALVE	
	GATE VALVE	GV
	GLOBE VALVE	
	PLUG VALVE	
	BALL VALVE	
	CHECK VALVE	CHK
	STRAINER	STR
	BUTTERFLY VALVE	
	NEEDLE VALVE	
	3-WAY VALVE	
	BALANCING VALVE	
	SENSOR WELL	
	THERMOMETER	
	PRESSURE GAUGE	PG
	GAUGE COCK	GC
FS	FLOW SWITCH	FS
	THERMOMETER WELL	
	MOISTURE SENSOR	
	PRESSURE REGULATING VALVE	PRV
	PIPING FIRE WALL PENETRATION	
	POINT OF CONNECTION	POC
	EXHAUST DUCT THRU ROOF	
SD	DUCT SMOKE DETECTOR	
— CS —	COMBO HOT/CHILLED WATER SUPPLY	CS
— CR —	COMBO HOT/CHILLED WATER RETURN	CR
(R)	RA TEMP. SENSOR	
(C)	CARBON DIOXIDE SENSOR	
(P)	PRESSURE SENSOR	
	TEMPERATURE CONTROL PANEL	TCP
	UNLESS OTHERWISE NOTED	U.O.N.
	TRANSFER AIR GRILLE	TAG
	ABOVE FINISHED FLOOR	AFF
	ABOVE	ABV
	ABOVE CEILING	ABC
	ABOVE FINISHED GRADE	AFG
	ACCESS PANEL	AP
	AIR CONDITIONING	AC
	AIR PRESSURE DROP, INCHES WATER COLUMN	APD
	ANCHOR BOLT	AB
	BRAKE HORSE POWER	BHP
	BRITISH THERMAL UNITS (PER HOUR)	BTU(H)
	CENTER TO CENTER	CC
	CEILING	CLG
	CLEAR	CLR

MECHANICAL LEGEND CONTINUED

SYMBOL	ITEM	ABBR.
	CONCRETE	CONC
	CONDENSER	COND
	CONNECTION	CONN
	CONTINUATION	CONT
	CONTRACTOR	CONTR
	CUBIC FEET OF AIR FLOW PER MINUTE	CFM
	DAMPER	DPR
	DEGREES FAHRENHEIT	°F
Ø	DIAMETER, PHASE	DIA
	DOOR LOUVER	DL
	DOWN	DN
	DRAIN	DR
	DRY BULB (DEGREES FAHRENHEIT)	DB
	ELECTRICAL PANEL	EP
	ELEVATION	EL
	ENTERING	ENT
	ENTERING DRY BULB	EDB
	ENTERING WET BULB	EWB
	EVAPORATOR	EVAP
	EVAPORATIVE COOLER	EC
	EXHAUST AIR DAMPER	EAD
	EXHAUST FAN	EF
	EXTERNAL STATIC PRESSURE	ESP
	FEET PER MINUTE	FPM
	FIRE DAMPER	FD
	FLOOR	FLR
	FROM ABOVE	FA
	FROM BELOW	FB
	FULL LOAD AMPS	FLA
	GALLONS PER HOUR	GPH
	GALLONS PER MINUTE	GPM
	GALVANIZED	GALV
	GALVANIZED IRON	GI
	GAUGE	GA
	HEATING	HTG
	HUMIDSTAT, 'X' INDICATES DEVICE CONTROLLED	H
	KILOWATTS	KW
	KILOWATT HOUR	KWH
	LEAVING DRY BULB IN DEGREES (FAHRENHEIT)	LDB
	LEAVING WET BULB IN DEGREES FAHRENHEIT	LWB
	LOCKED ROTOR AMPERES	LRA
	LOVER	LVR
	MANUFACTURER	MFR
	MAXIMUM	MAX
	MINIMUM	MIN
	ON CENTER	OC
	OUTSIDE AIR DAMPER	OAD
	OUTSIDE DIAMETER	OD
	OUTLET VELOCITY	OV
	OVERHEAD	OH
	POUNDS	LBS
	POUNDS PER SQUARE INCH (GAUGE) (ABSOLUTE)	PSI (G) (A)
	PRESSURE DROP	PD
	REFRIGERANT SUCTION PIPING	RS
	REFRIGERANT LIQUID PIPING	RL
	RETURN AIR DAMPER	RAD
	REVOLUTIONS PER MINUTE	RPM
	RUNNING LOAD AMPERES	RLA
	SHEET METAL	SM
	SPLITTER DAMPER	SD
	SQAURE FEET	SQFT
	SQAURE INCHES	SQIN
	STATIC PRESSURE	SP
	STATIC PRESSURE DROP	SPD
	SUPPLY FAN	SF
	TEMPERATURE CONTROL PANEL	TCP
	TEMPERATURE CONTROL VALVE	TCV
	THOUSAND BRITISH THERMAL UNITS PER HOUR	MBH
	TO ABOVE	TA
	TO BELOW	TB
	TOTAL PRESSURE	TP
	TOTAL STATIC PRESSURE	TSP
	TYPICAL	TYP
	UNDERGROUND	UG
	UNDER CUT DOOR	UCD
	VALVE	VLV
	WATTS	W
	WEIGHT	WT
	WET BULB	WB
	WIRE MESH SCREEN	WMS

MOUNTING OVER OBSTRUCTION



NOTE:
1. THIS DETAIL APPLIES TO MOUNTING OF ANY MECHANICAL AND ELECTRICAL DEVICE WHICH CONTAINS AN OPERABLE PART THAT IS ADJUSTABLE BY THE OCCUPANT. THIS DOES NOT APPLY TO SENSORS OR CONTROLS THAT ARE ONLY ADJUSTABLE THROUGH THE BUILDING AUTOMATION SYSTEM (IE: TEMPERATURE AND HUMIDITY SENSORS).

SHEET INDEX

M0.00	MECHANICAL SHEET INDEX, LEGEND & NOTES	
M0.01	MECHANICAL SCHEDULES	
M3.01	MECHANICAL ROOF PLAN - DEMOLITION BASE DESIGN	
M3.01A	MECHANICAL ROOF PLAN - DEMOLITION (ADDITIVE ALTERNATE #1)	
M3.02	MECHANICAL ROOF PLAN - NEW BASE DESIGN	
M3.02A	MECHANICAL ROOF PLAN - NEW (ADDITIVE ALTERNATE #1)	
M3.03	MECHANICAL PIPING - DEMOLITION BASE DESIGN	
M3.04	MECHANICAL PIPING - NEW BASE DESIGN	
M6.01	MECHANICAL DETAILS	
M7.01	TITLE 24 DOCUMENTATION - BASE DESIGN	
M7.02	TITLE 24 DOCUMENTATION - ADDITIVE ALTERNATE #1	
M7.03	TITLE 24 DOCUMENTATION - ADDITIVE ALTERNATE #1	
M7.04	TITLE 24 DOCUMENTATION - ADDITIVE ALTERNATE #1	

CAL-GREEN REQUIREMENTS

1. TESTING AND ADJUSTING. TESTING AND ADJUSTING OF SYSTEMS SHALL BE REQUIRED FOR NEW BUILDINGS LESS THAN 10,000 SQUARE FEET OR NEW SYSTEMS TO SERVE AN ADDITION OR ALTERATION SUBJECT TO SECTION 303.1
2. SYSTEMS. DEVELOP A WRITTEN PLAN OF PROCEDURES FOR TESTING AND ADJUSTING SYSTEMS. SYSTEMS TO BE INCLUDED FOR TESTING AND ADJUSTING SHALL INCLUDE, AS APPLICABLE TO THE PROJECT:
   A. HVAC SYSTEMS AND CONTROLS.
   B. INDOOR AND OUTDOOR LIGHTING AND CONTROLS.
   C. WATER HEATING SYSTEMS.
   D. RENEWABLE ENERGY SYSTEMS.
   E. LANDSCAPE IRRIGATION SYSTEMS.
   F. WATER REUSE SYSTEMS.
3. PROCEDURES. PERFORM TESTING AND ADJUSTING PROCEDURES IN ACCORDANCE WITH MANUFACTURE'S SPECIFICATIONS AND APPLICABLE STANDARDS ON EACH SYSTEM.
   A. HVAC BALANCING. IN ADDITION TO TESTING AND ADJUSTING, BEFORE A NEW SPACE-CONDITIONING SYSTEM SERVING A BUILDING OR SPACE IS OPERATED FOR NORMAL USE, BALANCE THE SYSTEM IN ACCORDANCE WITH THE PROCEDURES DEFINED BY THE TESTING ADJUSTING AND BALANCING BUREAU NATIONAL STANDARDS; THE NATIONAL ENVIRONMENTAL BALANCING BUREAU PROCEDURAL STANDARDS; ASSOCIATED AIR BALANCE COUNCIL NATIONAL STANDARDS OR AS APPROVED BY THE ENFORCING AGENCY.
4. REPORTING. AFTER COMPLETION OF TESTING, ADJUSTING AND BALANCING, PROVIDE A FINAL REPORT OF TESTING SIGNED BY THE INDIVIDUAL RESPONSIBLE FOR PERFORMING THESE SERVICES.
5. OPERATION AND MAINTENANCE (O & M) MANUAL. PROVIDE THE BUILDING OWNER OR REPRESENTATIVE WITH DETAILED OPERATING AND MAINTENANCE INSTRUCTIONS AND COPIES OF GUARANTIES/WARRANTIES FOR EACH SYSTEM. O & M INSTRUCTIONS SHALL BE CONSISTENT WITH OSHA REQUIREMENTS IN CCR, TITLE 8, SECTION 5142, AND OTHER RELATED REGULATIONS.
   A. INSPECTIONS AND REPORTS. INCLUDE A COPY OF ALL INSPECTION VERIFICATIONS AND REPORTS REQUIRED BY THE ENFORCING AGENCY.
6. TEMPORARY VENTILATION. THE PERMANENT HVAC SYSTEM SHALL ONLY BE USED DURING CONSTRUCTION IF NECESSARY TO CONDITION THE BUILDING WITHIN THE REQUIRED TEMPERATURE RANGE FOR MATERIAL AND EQUIPMENT INSTALLATION. IF THE HVAC SYSTEM IS USED DURING CONSTRUCTION, USE RETURN AIR FILTERS WITH A MINIMUM REPORTING VALUE (MERV) OF 13, BASED ON ASHRAE 52.2-1999 OR AN AVERAGE EFFICIENCY OF 30 PERCENT BASED ON ASHRAE 52.1-1992. REPLACE ALL FILTERS IMMEDIATELY PRIOR TO OCCUPANCY, OR, IF THE BUILDING IS OCCUPIED DURING ALTERATIONS, AT THE CONCLUSION OF CONSTRUCTION.
7. COVERING OF DUCT OPENINGS AND PROTECTION OF MECHANICAL EQUIPMENT DURING CONSTRUCTION. AT THE TIME OF ROUGH INSTALLATION AND DURING STORAGE ON THE CONSTRUCTION SITE UNTIL FINAL STARTUP OF THE HEATING, COOLING AND VENTILATION EQUIPMENT, ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH WRAP, PLASTIC, SHEET METAL OR OTHER METHODS ACCEPTABLE TO THE ENFORCING AGENCY TO REDUCE THE AMOUNT OF DUST, WATER AND DEBRIS WHICH MAY ENTER THE SYSTEM.
8. FILTERS. IN MECHANICALLY VENTILATED BUILDINGS, PROVIDE REGULARLY OCCUPIED AREAS OF THE BUILDING WITH AIR FILTRATION MEDIA FOR OUTSIDE AND RETURN AIR PRIOR TO OCCUPANCY THAT PROVIDE AT LEAST A MINIMUM EFFICIENCY REPORTING VALUE (MERV) OF 13. MERV 13 FILTERS SHALL BE INSTALLED PRIOR TO OCCUPANCY AND RECOMMENDATIONS FOR MAINTENANCE WITH FILTERS OF THE SAME VALUE SHALL BE INCLUDED IN THE OPERATION AND MAINTENANCE MANUAL.
   EXCEPTIONS:
   A. AN ASHRAE 10-PERCENT TO 15-PERCENT EFFICIENCY FILTER SHALL BE PERMITTED FOR AN HVAC UNIT MEETING THE 2022 CALIFORNIA ENERGY CODE HAVING 60,000 BTU/H OR LESS CAPACITY PER FAN COIL, IF THE ENERGY USE OF THE AIR DELIVERY SYSTEM IS 0.4 W/CFM OR LESS AT DESIGN AIR FLOW.
   B. EXISTING MECHANICAL EQUIPMENT.
9. OZONE DEPLETION AND GREENHOUSE GAS REDUCTIONS. INSTALLATIONS OF HVAC, REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT SHALL COMPLY WITH SECTIONS 5.508.1.1 AND 5.508.1.2.
   A. CHLOROFLOUROCARBONS (CFCS). INSTALL HVAC, REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT THAT DO NOT CONTAIN CFCS.
   B. HALONS. INSTALL HVAC REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT THAT DO NOT CONTAIN HALONS.
10. ADHESIVES. ADHESIVE BONDING PRIMERS, ADHESIVE PRIMERS, SEALANTS, SEALANT PRIMERS AND CAULKS SHALL COMPLY WITH LOCAL OR REGIONAL AIR POLLUTION CONTROL OR AIR QUALITY MANAGEMENT DISTRICT RULES WHERE APPLICABLE, OR SCAQMD RULE 1168 VOC LIMITS, AS SHOWN IN TABLES 5.504.4.1

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

Not for permitting or construction

JOB COPY

PBK

ARCHITECT
PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-335-9992 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-335-9992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF
ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH
TRUE NORTH

APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: TCastaneda
on Oct 05, 2023

THE APPROVAL OF ALL PLUMBING AND MECHANICAL WORK IS SUBJECT TO FIELD INSPECTIONS

CLIENT: CITY OF SACRAMENTO
PROJECT NUMBER: 220389
DATE: 09/07/2023
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	6/23/23
2	BACKCHECK 2	8/10/23

CONSTRUCTION DOCUMENT

MECHANICAL INDEX, NOTES, CODES, SCHEDULES

M0.00

COM-2310004

This document is for plan review only

1/9/2023 11:36:41 AM
C:\Users\kclancy\Documents\NSHL_kelly.clancyYSZ4T.rvt

EXISTING AND NEW PACKAGE GAS-ELECTRIC AND HEAT PUMP SCHEDULE - BASE BID

NUMBER		(E) AC-1	(N) HP-3	(E) AC-5	(E) AC-6	(E) AC-7	(E) AC-8	(E) AC-9	(E) AC-10	(E) AC-11	(E) AC-12	(E) AC-13	(E) AC-14	(N) HP-15
TYPE		GAS / ELECTRIC	HEAT PUMP	GAS / ELECTRIC	GAS / ELECTRIC	GAS / ELECTRIC	GAS / ELECTRIC	GAS / ELECTRIC	GAS / ELECTRIC	GAS / ELECTRIC	GAS / ELECTRIC	GAS / ELECTRIC	GAS / ELECTRIC	HEAT PUMP
MANUFACTURER		TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE
MODEL		YCH092	WHC036H	YCH060	YCH048	YCH060	YCH036	YCH060	YCH060	YCH092	YCH060	YCH060	YCH060	WHC060H
DISCHARGE		VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL
VOLTS / PHASE		208 / 3	208 / 3	208 / 3	208 / 3	208 / 3	208 / 3	208 / 3	208 / 3	208 / 3	208 / 3	208 / 3	208 / 3	208 / 3
FLA / MCA		43,3	42,0	32,1	25,7	32,1	23,2	32,1	32,1	43,3	32,1	32,1	32,1	43,0
MAX. OCP.		50	50	45	40	45	30	45	45	50	45	45	45	50,0
SEER / EER / IEER		15,0 / - / -	15,0 / - / -	15,0 / - / -	15,0 / - / -	15,0 / - / -	15,0 / - / -	15,0 / - / -	15,0 / - / -	15,0 / - / -	15,0 / - / -	15,0 / - / -	15,0 / - / -	16,4 / 13,0 / -
AFUE %		81,0	NA	81,0	81,0	81,0	81,0	81,0	81,0	81,0	81,0	81,0	81,0	NA
BLOWER	MOTOR HP	-	1,5	-	-	-	-	-	-	-	-	-	-	1,5
	DESIGN BHP	-	0,64	-	-	-	-	-	-	-	-	-	-	0,81
	SUPPLY AIR CFM	3000	1200	2000	1600	2000	1200	2000	2000	3000	2000	2000	2000	2000
	E.S.P. (IN. W.C.)	0,5	0,7	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,7
	MIN. OUTSIDE AIR CFM	290	250	290	200	290	200	290	290	290	290	290	290	400
	DRIVE	BELT	DIRECT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT
COOL	COOLING TYPE	DX	DX	DX	DX	DX	DX	DX	DX	DX	DX	DX	DX	DX
	NOMINAL CAP. (TONS)	7,5	3,0	5,0	4,0	5,0	5,0	5,0	5,0	7,5	5,0	5,0	5,0	5,0
	TOTAL CAP. (MBH)	-	33,54	-	-	-	-	-	-	-	-	-	-	-
	SENS. CAP. (MBH)	-	26,56	-	-	-	-	-	-	-	-	-	-	-
	E.A. DB (°F)	80	80	80	80	80	80	80	80	80	80	80	80	80
	E.A. WB (°F)	67	67	67	67	67	67	67	67	67	67	67	67	67
	AMB. TEMP. (°F)	102	102	102	102	102	102	102	102	102	102	102	102	102
HEAT	HEATING TYPE	GAS	HEAT PUMP	GAS	GAS	GAS	GAS	GAS	GAS	GAS	GAS	GAS	GAS	HEAT PUMP
	ELECTRIC STRIP HEAT (KW)	-	6,0	-	-	-	-	-	-	-	-	-	-	6,0
	INPUT (MBH)	120	-	60	60	60	60	60	60	120	60	60	60	-
	OUTPUT (MBH)	97,2	23,6	48	48	48	48	48	48	97,2	48	48	48	48
	FUEL	NATURAL GAS	NA	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS
FILTER SIZE (IN.)		(2) 20 x 12 x 1	(2) 20 x 35 x 2	(2) 20 x 12 x 1	(2) 20 x 12 x 1	(2) 20 x 12 x 1	(2) 20 x 12 x 1	(2) 20 x 12 x 1	(2) 20 x 12 x 1	(2) 20 x 12 x 1	(2) 20 x 12 x 1	(2) 20 x 12 x 1	(2) 20 x 12 x 1	(2) 20 x 12 x 1
FILTER TYPE		MERV 13	MERV 13	MERV 13	MERV 13	MERV 13	MERV 13	MERV 13	MERV 13	MERV 13	MERV 13	MERV 13	MERV 13	MERV 13
SERVICE		-	-	-	-	-	-	-	-	-	-	-	-	-
ACCESSORIES		SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES
(N) OPER. WT. (LBS)		-	892	-	-	-	-	-	-	-	-	-	-	-
(E) OPER. WT. (LBS)		1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1068

***EXISTING UNITS ARE SHOWN FOR REFERENCE AND COORDINATION PURPOSES ONLY. EXISTING UNITS SHALL BE REMOVED DURING RE-ROOF, AND RE-INSTALLED AT SAME LOCATION AFTER ROOFING IS COMPLETE. EQUIPMENT SHALL BE STORED ON SITE IN A SECURED LOCATION. COORDINATE STORAGE LOCATION OF ALL EQUIPMENT WITH OWNER.

NOTES: FOR NEW HEAT PUMP UNITS, PROVIDE THE FOLLOWING:
1. 14" TALL, FACTORY CURB, ALL WELDED CONSTRUCTION, WITH WOOD NAILER.
2. PROVIDE THROUGH BASE ELECTRICAL CONNECTIONS.
3. PROVIDE ANTI-RECYCLE TIMER, CRANKCASE HEATER, LOW AMBIENT KIT AND HIGH CAPACITY FILTER RACK.
4. PROVIDE LOW-LEAKAGE DRY BULB ECONOMIZER WTIH BAROMETRIC RELIEF.
5. BYPASS UNITS ANTI-RECYCLE TIMER WHEN ANTI-RECYCLE FUNCTION IS INCLUDED IN THE THERMOSTAT.
6. ALL UNITS OVER 2000 CFM SUPPLY AIR SHALL BE PROVIDED WITH A DUCT SMOKE DETECTOR TO SHUT-OFF THE UNIT UPON DETECTION OF SMOKE AND ACTIVATE THE FIRE ALARM SYSTEM. INSTALL IN STRICT ACCORDANCE WITH THE 2022 CALIFORNIA MECHANICAL CODE, SECTION 608.1.
7. PROVIDE FACTORY INSTALLED AUXILARY ELECTRIC HEATER. UNIT SHALL BE FURNISHED WITH SINGLE POINT POWER CONNECTION.
8. PROVIDE FACTORY FURNISHED DISCONNECT AND UNPOWERED SERVICE RECEPTACLE, COORINATE POWER AND WIRING REQUIREMENTS WITH ELECTRICAL CONTRACTOR.
9. PROVIDE HINGED ACCESS PANELS.
10. PROVIDE FACTORY CONDENSER COIL GUARDS.
11. PROVIDE TITLE 24 COMPLIANT HONEYWELL, TOUCH SCREEN, PROGRAMMABLE THERMOSTAT CONTROLLER. PROVIDE A MINIMUM 50'-0" ADDITIONAL CONTROL WIRING LOOPED AND SECURED FOR RELOCATION OF THERMOSTAT/SENSOR IN FUTURE TENANT IMPROVEMENT SCOPE OF WORK. LOCATE AND SECURE WITHIN ROOF FRAMING MEMEBERS.

EXHAUST CAP SCHEDULE

NUMBER	EH-1
MANUFACTURER	GREENHECK
MODEL	GRSI-8
TYPE	GRAVITY
LOCATION	ROOF
CURB CAP SIZE (IN.)	19x19
ROOF OPENING (IN.)	10,5 x 10,5
OVERALL SIZE (IN.)	20,5 x 20,5
HOOD HEIGHT (IN.)	19,25
CFM	150
FPM / S.P. LOSS	405 / 0,012
SERVICE	RESTROOMS
OPER. WT. (LBS)	15

NOTES:
1. PROVIDE FACTORY 12" ROOF CURB.
2. PROVIDE FACTORY CURB CAP.
3. PROVIDE INSECT SCREEN.
4. PROVIDE BACKDRAFT DAMPER.

INTAKE HOOD SCHEDULE

NUMBER	IH-1
MANUFACTURER	GREENHECK
MODEL	GRSI-12
TYPE	GRAVITY
LOCATION	ROOF
CURB CAP SIZE (IN.)	29x29
ROOF OPENING (IN.)	14x14
OVERALL SIZE (IN.)	29x29
HOOD HEIGHT (IN.)	22
CFM	300
FPM / S.P. LOSS	366 / 0,022
SERVICE	SEE PLAN
OPER. WT. (LBS)	15

NOTES:
1. PROVIDE FACTORY 12" ROOF CURB.
2. PROVIDE FACTORY CURB CAP.
3. PROVIDE INSECT SCREEN.
4. PROVIDE BACKDRAFT DAMPER.

EXHAUST FAN SCHEDULE

NUMBER	REF-1
MANUFACURER	GREENHECK
MODEL	G-130-VG
TYPE	CENTRIFUGAL
MOUNTING	ROOF
WATTS / BHP / HP	- / 0,2 / 0,5
VOLTS / PHASE	115 / 1
MAXIMUM CFM	1200
E.S.P. (IN. W.C.)	0,625
DRIVE	DIRECT
FAN RPM	1004
SONES / dBA	9,4 / 59
CONTROL	INTERLOCK W/ HP-11
(N) OPER. WT. (LBS)	90
(E) OPER. WT. (LBS)	90

NOTES:
1. PROVIDE BACKDRAFT DAMPER.
2. PROVIDE FACTORY SOLID STATE SPEED CONTROLLER.
3. PROVIDE FACTORY ROOF CURB - GREENHECK MODEL GPI
4. INTERLOCK REF-1 START/STOP OPERATION WITH AC-11. INTERLOCK WITH HP-11 FOR ADDITIVE ALTERNATE #1.

ROOF HYDRANT SCHEDULE

MARK	FIXTURE	S or W	V	CW	HW	DESCRIPTION
HB 1	ROOF HYDRANT	-	-	3/4"	–	WOODFORD MODEL SRH-MS, FREEZE PROOF ROOF HYDRANT W/ MODEL 50H-BR DOUBLE CHECK BACKFLOW PREVENTER. PROVIDE WITH MOUNTING SYSTEM COMPLETE WITH UNDER DECK FLANGE AND EPDM BOOT COVER.

PACKAGED HEAT PUMP SCHEDULE - ADDITIVE ALTERNATE #1

NUMBER		HP-14	HP-8	HP-6	HP-5,7,9, 10,12,13	HP-1,11
MANUFACTURER		TRANE	TRANE	TRANE	TRANE	TRANE
MODEL		WHC036H	WHC036H	WHC048H	WHC060H	WHC092H
TYPE/DISCHARGE		PACKAGED/DOWN	PACKAGED/DOWN	PACKAGED/DOWN	PACKAGED/DOWN	PACKAGED/DOWN
VOLTS / PHASE		208 / 3	208 / 3	208 / 3	208 / 3	208 / 3
INDOOR FAN MOTOR HP/FLA		1,5/4,3	1,5/4,3	1,5/4,3	1,5/4,3	2,75/7,3
OUTDOOR FAN MOTOR HP/FLA		0,25/1,1	0,25/1,1	0,4/1,5	0,4/1,5	0,7/3,3
COMPRESSOR HP/RLA1		3,9/11,6	3,9/11,6	4,3/14,0	4,3/14,0	5,2/14,0 & 5,6/14,5
AUX. ELEC. HEATER KW/FLA		6,0/ -	6,0/ -	6,0/ -	6,0/ -	9,0/ -
MCA		36,0	36,0	42,0	43,0	67,0
MAX. OCP.		45,0	45,0	50,0	50,0	70,0
SEER / EER / COP AT 47F		15,8 / 12,9 / -	15,8 / 12,9 / -	16,5 / 13,0 / -	16,4 / 13,0 / -	15,5 / 11,8 / -
NOMINAL TONS		3,0	3,0	4,0	5,0	7,5
BLOWER	MOTOR HP	1,5	1,5	1,5	1,5	2,75
	DESIGN BHP	0,52	0,52	0,64	0,81	0,74
	SUPPLY AIR CFM	1200	1200	1600	2000	3000
	E.S.P. (IN. W.C.)	0,7	0,7	0,7	0,7	0,7
	MIN. OUTSIDE AIR CFM	200	200	300	400	500
	DRIVE	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT
COOL	COOLING TYPE	DX	DX	DX	DX	DX
	TOTAL CAP. (MBH)	33,54	33,54	43,46	56,62	90,59
	SENS. CAP. (MBH)	26,56	26,56	35,87	47,11	72,2
	E.A. DB (°F)	80	80	80	80	80
	E.A. WB (°F)	67	67	67	67	67
	AMB. TEMP. (°F)	105	105	105	105	105
HEAT	HEATING TYPE	HEAT PUMP	HEAT PUMP	HEAT PUMP	HEAT PUMP	HEAT PUMP
	HEATING OUTPUT (MBH)	23,6	23,6	32,35	43,22	66,14
	AUX. ELEC. HEATER KW	6,0	6,0	6,0	6,0	9,0
FILTER SIZE (IN.)		(2) 20 x 35 x 2	(2) 20 x 35 x 2	(4) 16 x 25 x 2	(4) 16 x 25 x 2	(4) 20 x 25 x 2
FILTER TYPE		MERV 13	MERV 13	MERV 13	MERV 13	MERV 13
SERVICE		-	-	-	-	-
ACCESSORIES		SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES
(N) OPER. WT. (LBS)		793	793	1068	1068	1218
(E) OPER. WT. (LBS)		1600	1600	1600	1600	1600
CURB	MANUFACTURER	MICROMETL	-	-	-	-
	MODEL	CRBW-PRC0BGA	-	-	-	-
	CLIPS	-	-	-	-	-
	SCREWS PER CLIP	-	-	-	-	-
	(E) CURB WEIGHT (LBS)	-	70	70	70	115
	(N) CURB WEIGHT (LBS)	99	-	-	-	-
TOTAL WT. W. CURB (LBS)		892	863	1138	1138	1333

NOTES:
1. HP-1 AND HP-4 THRU HP-13 SHALL BE INSTALLED ON EXISTING CURBS.
2. PROVIDE 14" TALL, FACTORY CURB, ALL WELDED CONSTRUCTION, WITH WOOD NAILER FOR HP-14.
3. PROVIDE THROUGH BASE ELECTRICAL CONNECTIONS.
4. PROVIDE ANTI-RECYCLE TIMER, CRANKCASE HEATER, LOW AMBIENT KIT AND HIGH CAPACITY FILTER RACK.
5. PROVIDE LOW-LEAKAGE DRY BULB ECONOMIZER WTIH BAROMETRIC RELIEF.
6. BYPASS UNITS ANTI-RECYCLE TIMER WHEN ANTI-RECYCLE FUNCTION IS INCLUDED IN THE THERMOSTAT.
7. ALL UNITS OVER 2000 CFM SUPPLY AIR SHALL BE PROVIDED WITH A DUCT SMOKE DETECTOR TO SHUT-OFF THE UNIT UPON DETECTION OF SMOKE AND ACTIVATE THE FIRE ALARM SYSTEM. INSTALL IN STRICT ACCORDANCE WITH THE 2022 CALIFORNIA MECHANICAL CODE, SECTION 608.1.
8. PROVIDE FACTORY INSTALLED AUXILARY ELECTRIC HEATER. UNIT SHALL BE FURNISHED WITH SINGLE POINT POWER CONNECTION.
9. PROVIDE FACTORY FURNISHED DISCONNECT AND UNPOWERED SERVICE RECEPTACLE, COORDINATE POWER AND WIRING REQUIRMENTS WITH ELECTRICAL CONTRACTOR.
10. PROVIDE HINGED ACCESS PANELS.
11. PROVIDE FACTORY CONDENSER COIL GUARDS.
12. PROVIDE TITLE 24 COMPLIANT HONEYWELL, TOUCH SCREEN, PROGRAMMABLE THERMOSTAT CONTROLLER. PROVIDE A MINIMUM 50'-0" ADDITIONAL CONTROL WIRING LOOPED AND SECURED FOR RELOCATION OF THERMOSTAT/SENSOR IN FUTURE TENANT IMPROVEMENT SCOPE OF WORK. LOCATE AND SECURE WITHIN ROOF FRAMING MEMEBERS.

APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: TCastaneda
on Oct 05, 2023

THE APPROVAL OF ALL PLUMBING AND MECHANICAL WORK IS SUBJECT TO FIELD INSPECTIONS

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

Not for permitting or construction

JOB COPY

1124 DEL PASO BLVD

COM-2310004

This document is for plan review only

PBK

ARCHITECT
PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-335-6992 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-335-6992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF
ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
A
PLAN NORTH
TRUE NORTH

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	6/23/23
2	BACKCHECK 2	8/10/23

CONSTRUCTION DOCUMENT

MECHANICAL SCHEDULES

M0.01

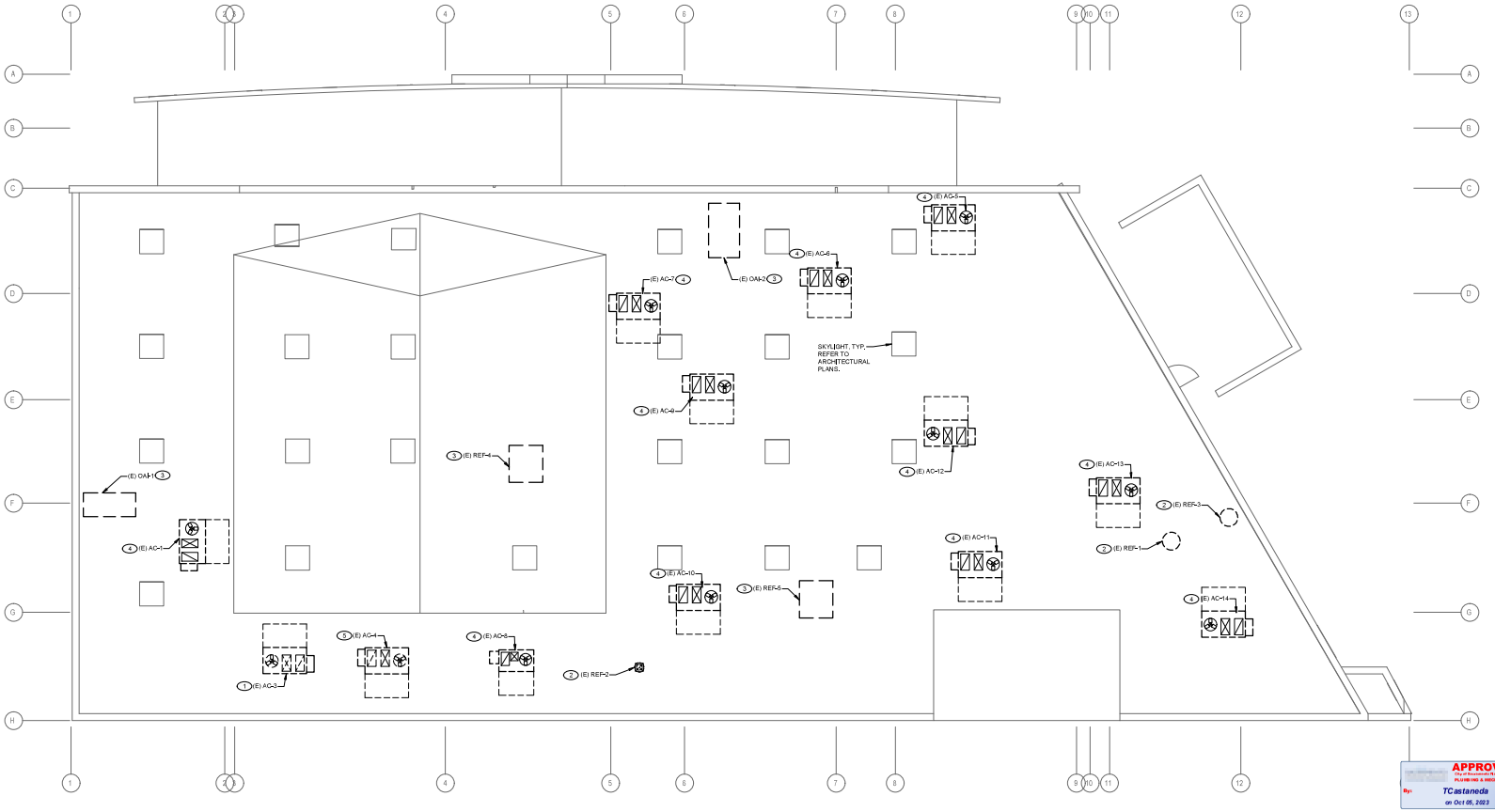
C:\Users\kclancy\Documents\NSHL_kelly.clancyYSZ4T.rvt
1/9/2023 11:36:41 AM

GENERAL NOTES

1. ALL EQUIPMENT SHALL BE REMOVED FROM ROOF TO ACCOMMODATE RE-ROOFING. UNITS SHALL BE STORED IN A SECURE LOCATION, COORDINATED WITH THE OWNER.
2. FIELD VERIFY ALL CONDITIONS, REPORT ANY DISCREPANCIES/ISSUES WITH THE ARCHITECT/ENGINEER PRIOR TO PERFORMING WORK.

KEYNOTES

1. DEMOLISH EXISTING AC UNIT, CURB, AND CORRESPONDING THERMOSTAT, DEMOLISH SUPPLY AND RETURN DUCT TRANSITIONS AND PREPARE FOR NEW DUCT CONNECTIONS. DEMOLISH GAS PIPING TO BELOW ROOF DECK, CAP AND SEAL, ABANDON PIPING IN PLACE WITHIN BUILDING.
2. DEMOLISH ROOF EXHAUST FAN AND ASSOCIATED CURB.
3. ROOF OUTSIDE AIR INTAKE VENT OR RELIEF EXHAUST FAN, TYPICAL OF (4). UNITS SHALL BE REMOVED DURING RE-ROOFING AND STORED IN A SECURED AREA IN PARKING LOT. UNITS SHALL BE RE-INSTALLED AS SAME LOCATION AFTER ROOFING IS COMPLETE. COORDINATE STORAGE LOCATION WITH OWNER. CONTRACTOR TO VERIFY ALL UNITS AND COMPONENTS TO ENSURE UNIT IS OPERATIONAL. CHECK ALL DAMPERS, LINKAGE, AND MOTORS FOR OPENING AND CLOSING OPERATION AND PERFORMANCE. DOCUMENT AND REPORT ANY ISSUES TO ENGINEERING/ARCHITECT. REPAIR AND REPLACE COMPONENTS FOR A FULLY OPERATING UNIT.
4. EXISTING AC UNIT. UNITS SHALL BE REMOVED DURING RE-ROOFING AND STORED IN A SECURED AREA IN PARKING LOT. UNITS SHALL BE RE-INSTALLED AT SAME LOCATION AFTER ROOFING IS COMPLETE. COORDINATE STORAGE LOCATION WITH OWNER. ALL COMPONENTS SHALL BE CHECKED TO ENSURE UNIT OPERATION MEETS MANUFACTURES PERFORMANCE CAPACITY AND AS PER INSTALLED DESIGN, TYPICAL.
5. DEMOLISH EXISTING AC UNIT AND CORRESPONDING THERMOSTAT, EXISTING CURB TO REMAIN, DEMOLISH SUPPLY AND RETURN DUCT TRANSITIONS, DEMOLISH GAS PIPING TO BELOW ROOF DECK, CAP AND SEAL, PREPARE FOR INSTALLATION OF NEW EQUIPMENT PLATFORM FOR FUTURE CONDENSING UNITS



APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: TCastaneda
on Oct 05, 2023

THE APPROVAL OF ALL PLUMBING AND MECHANICAL WORK IS SUBJECT TO FIELD INSPECTIONS

1 MECHANICAL ROOF PLAN - DEMOLITION BASE DESIGN
SCALE: 1/8" = 1'-0"

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

Not for Permit or Construction

PBK

JOB COPY

ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-365-6992 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-365-6992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: FM CHECKED BY: RT
REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	8/30/23
2	BACKCHECK 2	8/10/23

CONSTRUCTION DOCUMENT

MECHANICAL ROOF PLAN - DEMOLITION BASE DESIGN

This document is for plan review only

COM-2310004

M3.01

C:\Users\kclancy\Documents\NSHL_kelly.clancy\YSZ4T.rvt
1/9/2023 11:36:41 AM

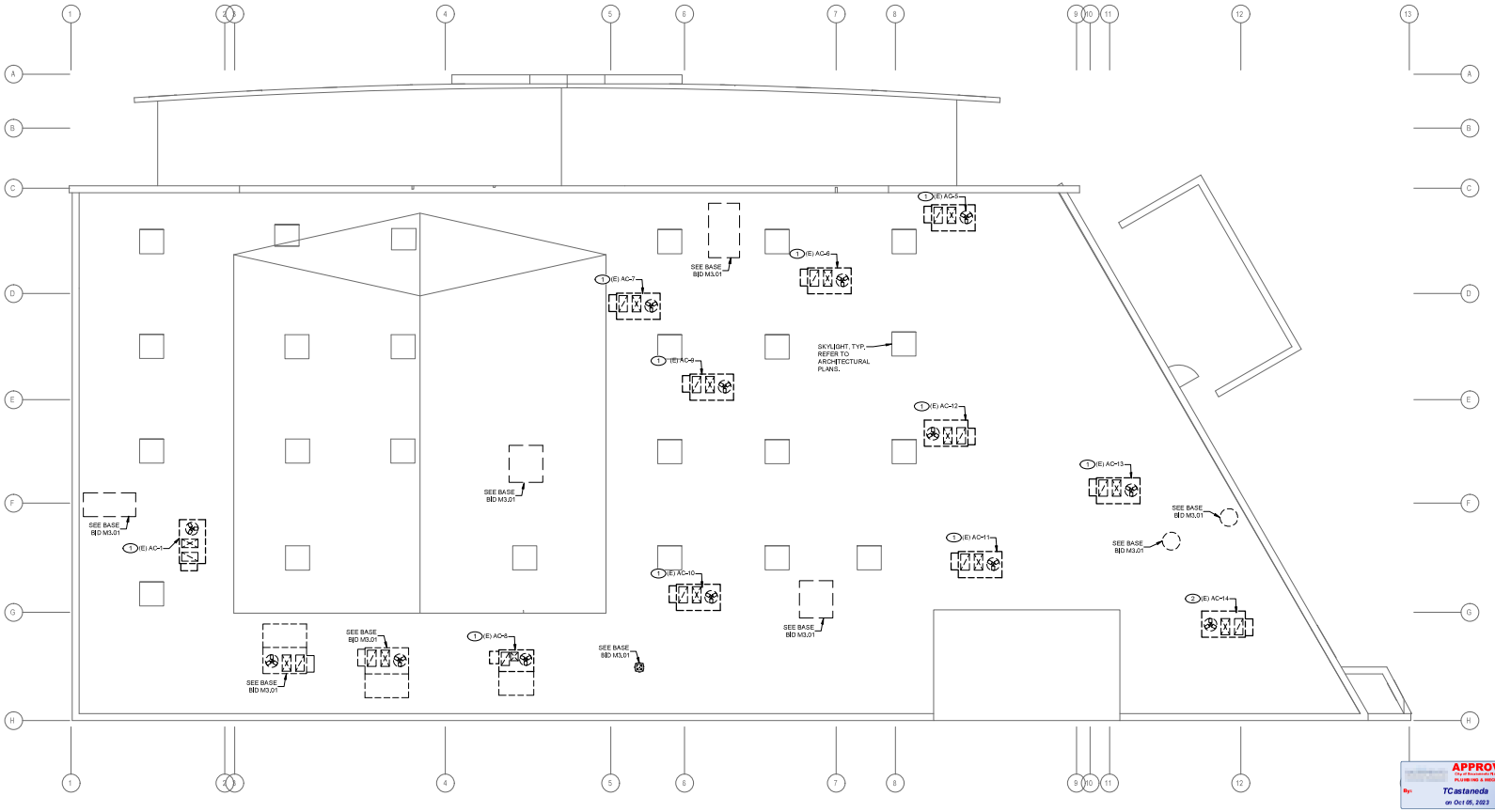
GENERAL NOTES

1. ALL EQUIPMENT SHALL BE REMOVED FROM ROOF TO ACCOMMODATE RE-ROOFING. UNITS SHALL BE STORED IN A SECURE LOCATION, COORDINATED WITH THE OWNER.
2. FIELD VERIFY ALL CONDITIONS, REPORT ANY DISCREPANCIES/ISSUES WITH THE ARCHITECT/ENGINEER PRIOR TO PERFORMING WORK.

KEYNOTES

1. DEMOLISH EXISTING AC UNIT AND CORRESPONDING THERMOSTAT, CURB TO REMAIN. DEMOLISH SUPPLY AND RETURN DUCT TRANSITIONS INSIDE CURB AND PREPARE FOR NEW DUCT CONNECTIONS. DEMOLISH GAS PIPING TO BELOW ROOF DECK, CAP AND SEAL. ABANDON GAS PIPING WITHIN BUILDING.
2. DEMOLISH EXISTING AC UNIT, CURB, AND CORRESPONDING THERMOSTAT. DEMOLISH SUPPLY AND RETURN DUCT TRANSITIONS. DEMOLISH GAP PIPING TO BELOW ROOF DECK, CAP AND SEAL. ABANDON GAS PIPING WITHIN BUILDING.

APPROVED
City of Sacramento Plan Review
STRUCTURAL
By: Leticia Valenzuela
on Sep 27, 2023



APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: TCastaneda
on Oct 05, 2023

THE APPROVAL OF ALL PLUMBING AND MECHANICAL WORK IS SUBJECT TO FIELD INSPECTIONS

1 MECHANICAL ROOF PLAN - DEMOLITION (ADDITIVE ALERNATE #1)
SCALE: 1/8" = 1'-0"

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

Not for Construction

PBK

JOB COPY

ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
919-356-6992 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
919-356-6992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

A

KEY PLAN
PLAN NORTH
TRUE NORTH

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220089
DATE 09/07/2023
DRAWN BY: FM CHKD BY: RT
REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	8/30/23
2	BACKCHECK 2	8/10/23

CONSTRUCTION DOCUMENT

MECHANICAL
ROOF PLAN - DEMOLITION
(ADDITIVE ALTERNATE #1)

This document is for plan review only

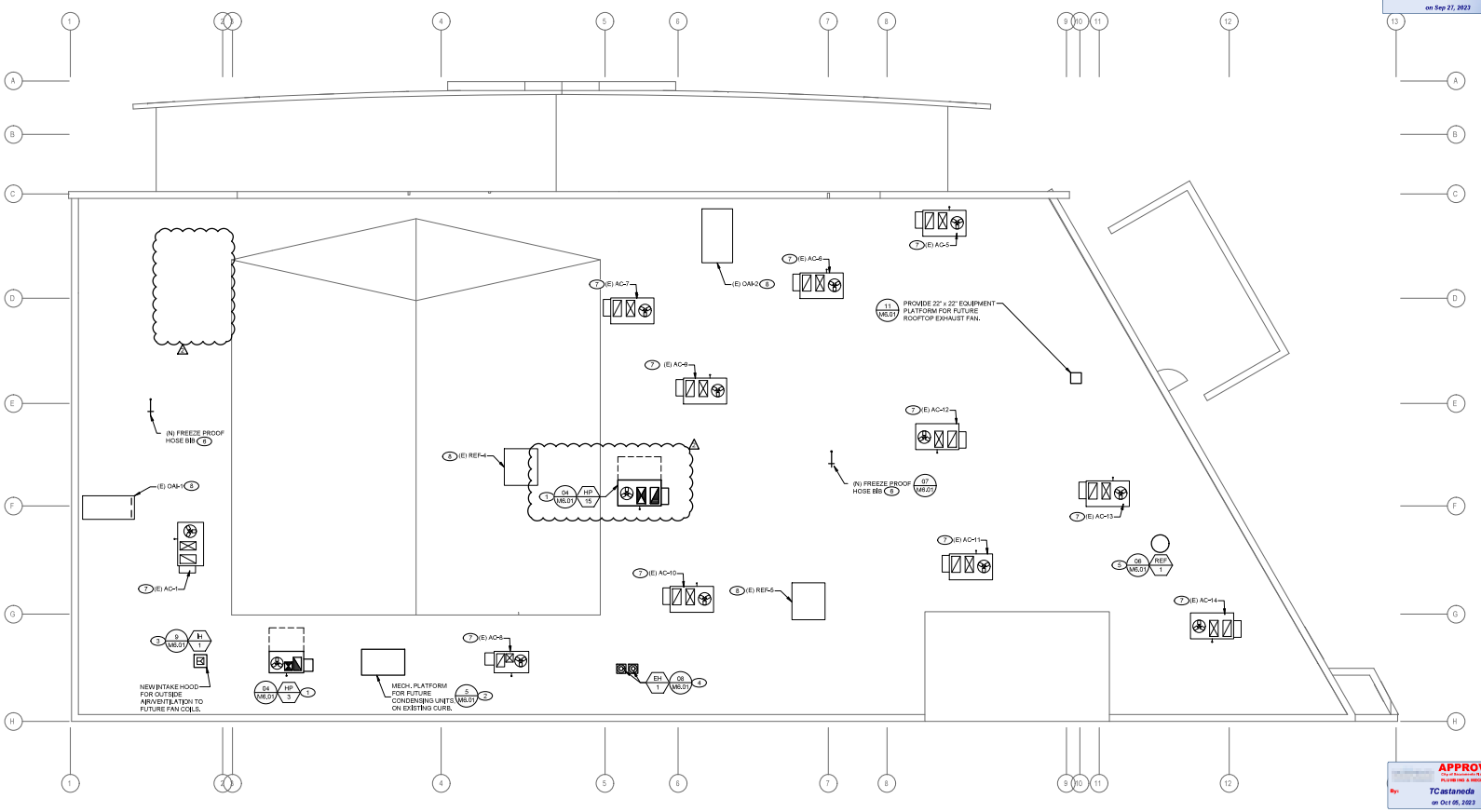
COM-2310004

M3.01A

C:\Users\kclancy\Documents\NSHL_kelly.clancy\YSZ4T.rvt
1/9/2023 11:36:41 AM

KEYNOTES

1. (N) HEAT PUMP ON (N) CURB, PROVIDE LINED SUPPLY AND RETURN PLENUM DROPS FROM UNIT TO 3'-0" BELOW ROOF DECK. PROVIDE STEEL WIRE MESH SCREEN AT ENDS OF EACH DROP. PROVIDE 3/4" CONDENSATE AND ROUTE TO NEAREST DRAIN. PREPARE FOR CONNECTION OF FUTURE DUCTWORK UNDER THE TENANT IMPROVEMENT SCOPE OF WORK.
2. ROOFTOP EQUIPMENT PLATFORM, ON EXISTING CURB. PREPARE PLATFORM FOR FUTURE OUTDOOR HEAT PUMP UNITS UNDER TENANT IMPROVEMENT SCOPE OF WORK.
3. (N) OUTSIDE AIR INTAKE HOOD, FOR FUTURE FAN COIL UNITS UNDER TENANT IMPROVEMENT SCOPE OF WORK.
4. (N) 8'-0" ROUND EXHAUST ROOF VENT FOR FUTURE CEILING EXHAUST FANS.
5. (N) ROOFTOP EXHAUST FANS, CONNECT NEW EXHAUST DUCTWORK FROM EXHAUST FAN AND TRANSITION AS REQUIRED TO CONNECT EXISTING DUCTWORK BELOW.
6. (N) FREEZE PROOF HOSE BIBB, PROVIDE 3/4" COLD WATER BRANCH LINE FROM MAIN WITHIN BUILDING AND EXTEND TO LOCATION ON ROOF. SEE PIPING PLANS, COORDINATE AND FIELD VERIFY ALL CONDITIONS.
7. (E) PACKAGE GAS-ELECTRIC ROOFTOP, INSTALL UNITS AT SAME LOCATION AFTER BEING REMOVED DURING DEMOLITION PHASE TO ACCOMMODATE RE-ROOF, PROVIDE LINED TRANSITIONS AND RECONNECT TO EXISTING DUCTWORK BELOW, PROVIDE NEW CONDENSATE P-TRAP AND NEW CONDENSATE PIPING, ROUTE CONDENSATE DOWN THROUGH ROOF AND CONNECT TO EXISTING CONDENSATE LINE BELOW.
8. INSTALL EXISTING REF-4, REF-5 AND OAH-1,OAH-2 AT SAME LOCATION AFTER BEING REMOVED DURING DEMOLITION PHASE TO ACCOMMODATE RE-ROOF.



1 MECHANICAL ROOF PLAN - NEW BASE DESIGN
SCALE: 1/8" = 1'-0"

THE APPROVAL OF ALL PLUMBING AND MECHANICAL WORK IS SUBJECT TO FIELD INSPECTIONS

ISSUED BY
By: Jason Hone
on Oct 05, 2023

APPROVED
STRUCTURAL
By: Leticia Valenzuela
on Sep 27, 2023

APPROVED
PLUMBING & MECHANICAL
By: TCastaneda
on Oct 05, 2023

Not Approved for Construction

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the plans without permission from the Building Inspection Division.
The approval of this plans and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

JOB COPY

ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-985-4992 P

MEP Engineering
LEAF Engineering
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-294-4992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY FM CHECKED BY RT

REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	9/15/23
2	BACKCHECK 2	9/18/23

CONSTRUCTION DOCUMENT

MECHANICAL ROOF PLAN - NEW BASE DESIGN

This document is for plan review only

COM-2310004

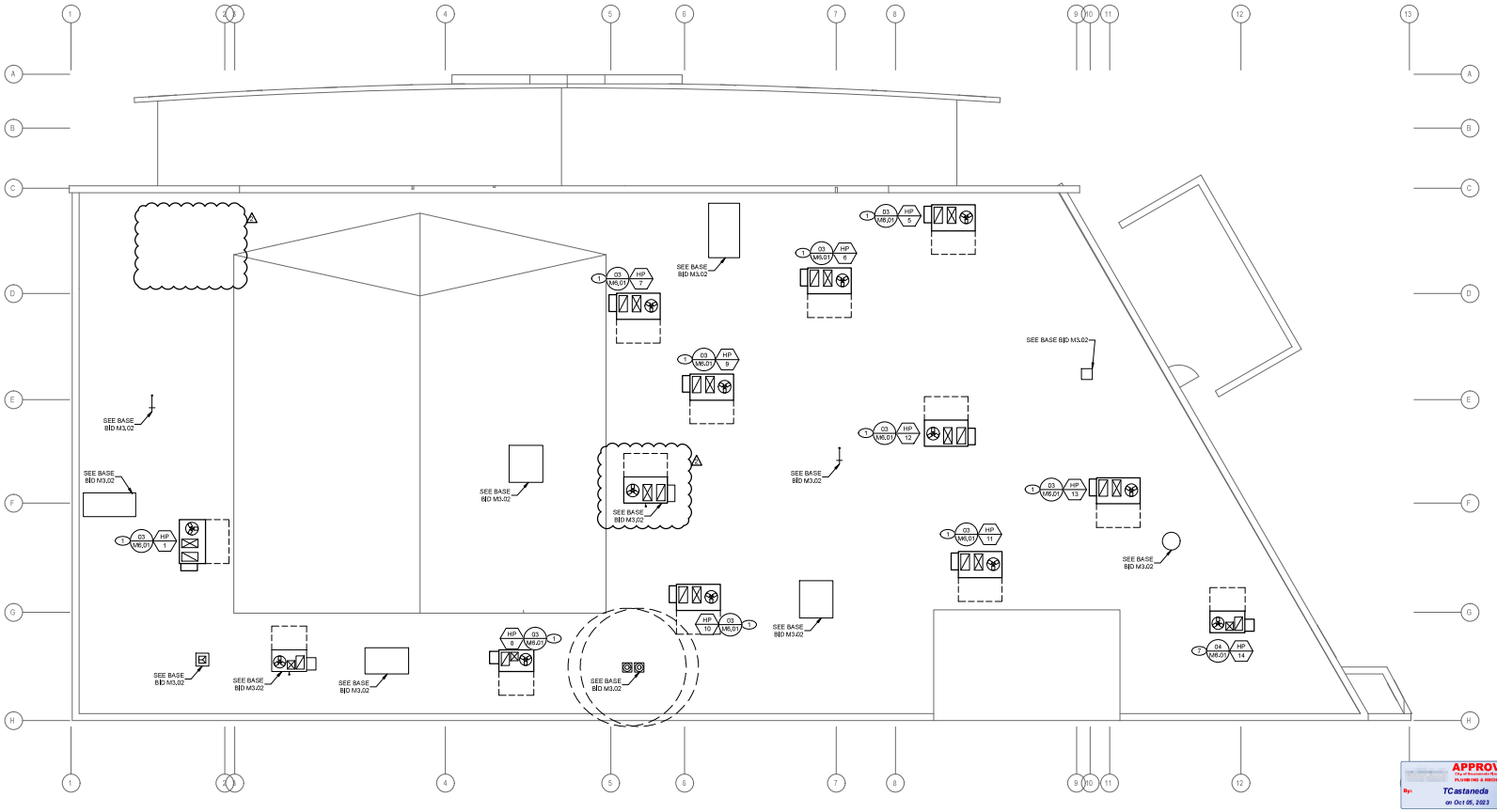
M3.02

C:\Users\kdavy\Documents\NSHL_kelly.davy'SC4T.rvt
1/9/2023 11:36:41 AM

KEYNOTES

1. (N) HEAT PUMP ON EXISTING CURB, CONNECT NEW LINED DUCTWORK FROM HEAT PUMP UNIT SUPPLY AND RETURN AIR FLAGNES AND TRANSITION AS REQUIRED TO CONNECT EXISTING DUCTWORK BELOW.
2. ROOFTOP EQUIPMENT PLATFORM, ON EXISTING CURB. PREPARE PLATFORM FOR FUTURE OUTDOOR HEAT PUMP UNITS UNDER TENANT IMPROVEMENT SCOPE OF WORK.
3. (N) OUTSIDE AIR INTAKE HOOD, FOR FUTURE FAN COIL UNITS UNDER TENANT IMPROVMENT SCOPE OF WORK.
4. (N) 8"Ø ROUND EXHAUST ROOF VENT FOR FUTURE CEILING EXHAUST FANS.
5. (N) ROOFTOP EXHAUST FANS, CONNECT NEW EXHAUST DUCTWORK FROM EXHAUST FAN AND TRANSITION AS REQUIRED TO CONNECT EXISTING DUCTWORK BELOW.
6. (N) FREEZE PROOF HOSE BIBB, PROVIDE 3/4" COLD WATER BRANCH LINE FROM MAIN WITHIN BUILDING AND EXTEND TO LOCATION ON ROOF, COORDINATE AND FIELD VERIFY ALL CONDITIONS.
7. (N) HEAT PUMP ON (N) CURB, PROVIDE SUPPLY AND PLENUM DROPS TO 3'-0" BELOW CEILING AND CAP. PLENUMS SHALL BE INSTALLED TO ACCOMMODATE CONNECTION OF FUTURE DUCTWORK.

APPROVED
City of Sacramento Plan Review
STRUCTURAL
By: Leticia Valenzuela
on Sep 27, 2023



APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: TCastaneda
on Oct 05, 2023

THE APPROVAL OF ALL PLUMBING AND MECHANICAL WORK IS SUBJECT TO FIELD INSPECTIONS

1 MECHANICAL ROOF PLAN - NEW (ADDITIVE ALTERNATE #1)
SCALE: 1/8" = 1'-0"

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

Not for Permit or Construction

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK

JOB COPY

ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
919-336-6992 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
919-336-6992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: FM CHKD BY: RT
REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	8/30/23
2	BACKCHECK 2	8/10/23

CONSTRUCTION DOCUMENT

MECHANICAL ROOF PLAN - NEW (ADDITIVE ALERNATE #1)

This document is for plan review only

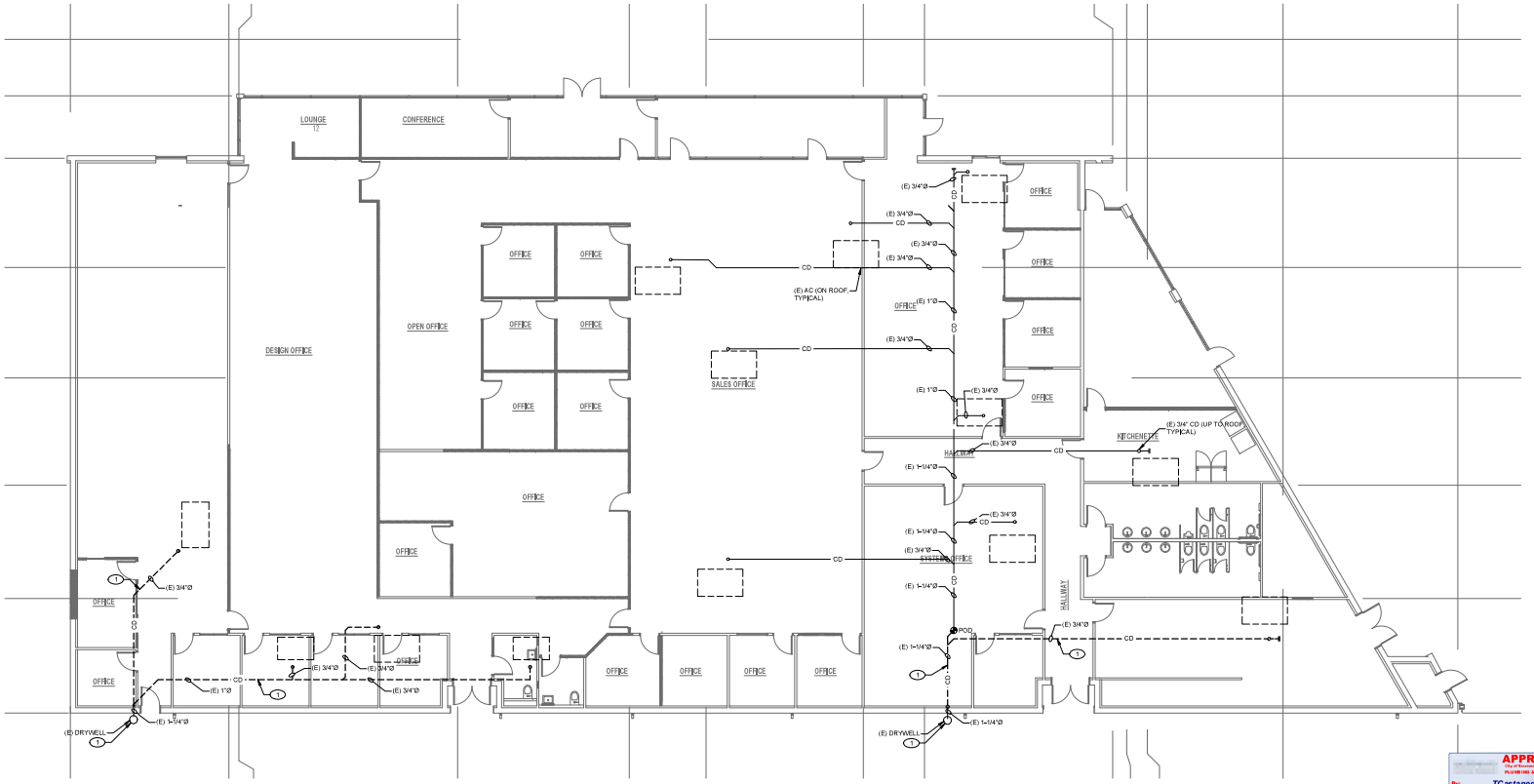
COM-2310004

M3.02A

C:\Users\kclancy\Documents\NSHL_kelly.clancy\YSZ4T.rvt
1/9/2023 11:36:41 AM

KEYNOTES

1. DEMOLISH EXISTING CONDENSATE PIPING TO POINT OF DISCONNECT SHOWN. CAP PIPING EXTENDED FROM DRYWELL TO BEHIND FINISHED WALL/CEILING SURFACES. CAP AND ABANDON DRYWELL IN PLACE.



1 MECHANICAL PIPING - DEMOLITION BASE DESIGN
SCALE: 1/8" = 1'-0"

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

Not to be Issued for Construction

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the stamp approved plans or deviate from the building inspection services.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

JOB COPY

PBK

ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-355-8992 P

MEP Engineering
LEAF Engineering
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-790-4992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF
ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

APPROVED
City of Sacramento Community Development Department
PLUMBING & MECHANICAL
By: TCastaneda
on Oct 05, 2023

THE APPROVAL OF ALL PLUMBING AND MECHANICAL WORK IS SUBJECT TO FIELD INSPECTIONS

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: FM CHECKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	9/15/23
2	BACKCHECK 2	9/15/23

CONSTRUCTION DOCUMENT

MECHANICAL PIPING - DEMOLITION BASE DESIGN

COM-2310004

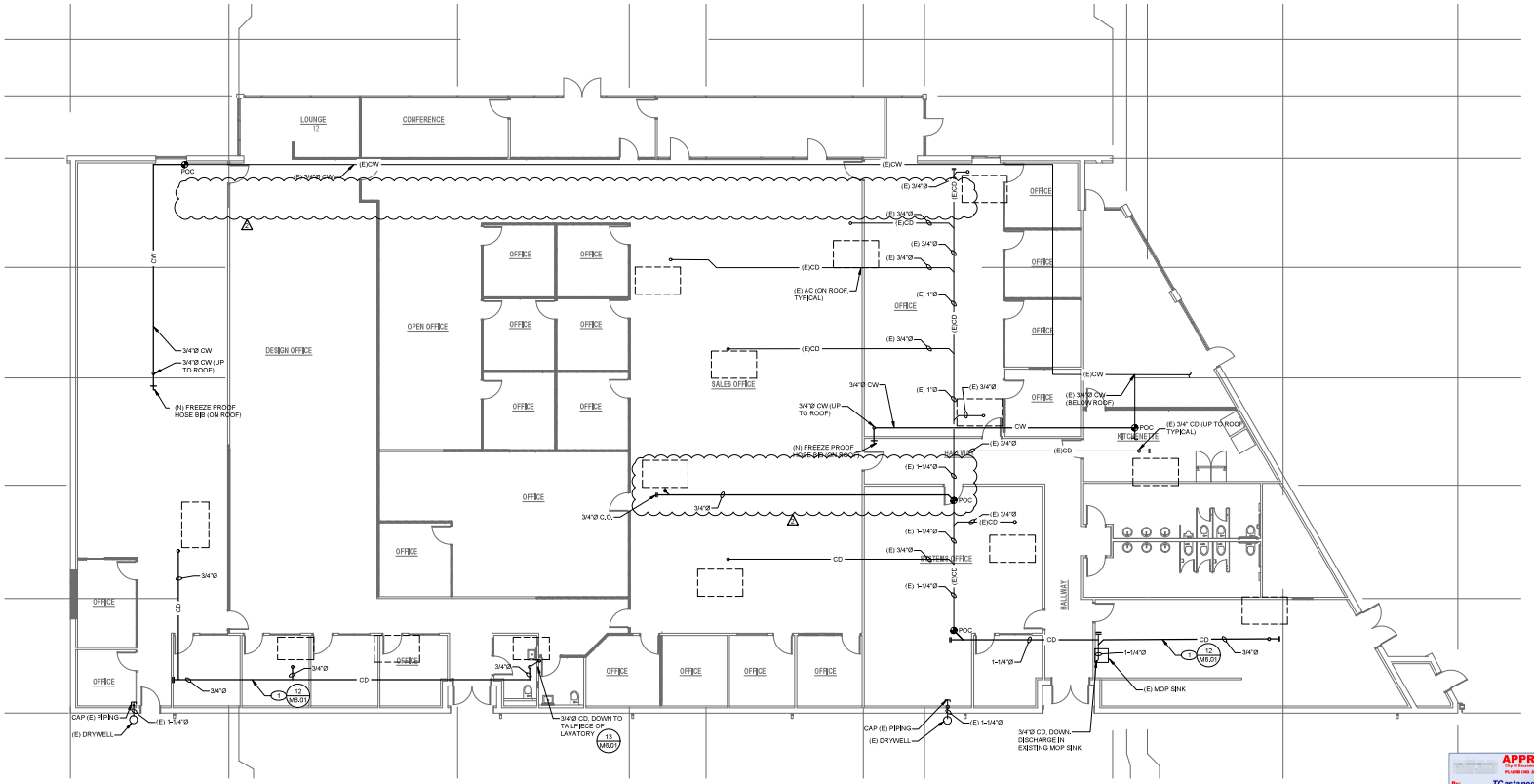
M3.03

This document is for plan review only

C:\Users\kdancy\Documents\NSHL_kelly.dancy.YSC4T.rvt
1/9/2023 11:36:41 AM

KEYNOTES

1. PROVIDE NEW CONDENSATE PIPING AND CLEANOUTS. ROUTE DISCHARGE TO APPROVED PLUMBING RECEPTOR AS SHOWN ON PLANS.



APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: TCastaneda
on Oct 05, 2023

THE APPROVAL OF ALL PLUMBING AND MECHANICAL WORK IS SUBJECT TO FIELD INSPECTIONS

1 MECHANICAL PIPING - NEW BASE DESIGN
SCALE: 1/8" = 1'-0"

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

Not for Construction

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK

JOB COPY

ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
919-395-6992 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
919-395-6992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: FM CHECKED BY: RT
REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	8/30/23
2	BACKCHECK 2	8/10/23

CONSTRUCTION DOCUMENT

MECHANICAL PIPING - NEW BASE DESIGN

This document is for plan review only

COM-2310004

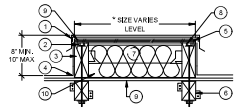
M3.04

C:\Users\kclancy\Documents\NSHL_kelly.clancy\YSZ4T.rvt
1/9/2023 11:36:41 AM

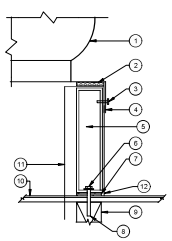
APPROVED
STRUCTURAL
By: Leticia Valenzuela
on Sep 27, 2023

1. 20 GA. GALV. SHT MTL. COVER, LAP, FOLD, & SOLDER ALL HORIZ. JOINTS.
2. 1/2" DIA. GALV. BLOT, OR 1/2" ALLTHREAD ROD, W/ DOUBLE NUT & WASHER EACH END AT 24" O.C. (MIN. 2 EA. SIDE WITHIN 9" OF EA. END OF RAIL).
3. 4x D.F. SUPPORT RAIL ALL AROUND, SHAPED FOR ROOF SLOPE.
4. ROOF, FLASHING AND WATERPROOFING, SEE ARCHITECTURAL PLANS.
5. LEVEL 1-1/8" PLYWOOD PLATFORM.
6. 4x8 BLOCKING W/ (2) A34 EACH END (STAGGER VERTICALLY).
7. 2x6 CROSS BRACING WITH SIMPSON U26 HANGER BRACKET AT 12" O.C.
8. COUNTERSINK BOLT HEAD AND WASHER.
9. 100 AT 4" O.C. AT EDGES AND FIELD.
10. R-19 BATT INSULATION.

* VERIFY UNIT DIMENSIONS AND COORDINATE PLATFORM SIZE WITH GENERAL CONTRACTOR TO BE BUILT ACCORDINGLY. SHEET METAL COVER SHALL BE BUILT 30 RAIN WATER RUNS OFF PLATFORM.



ROOF EQUIPMENT PLATFORM N.T.S 11



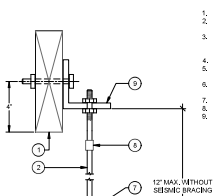
1. EXHAUST FAN.
2. 2"x 1/4" CONTINUOUS DENSE NEOPRENE SPONGE GASKET.
3. 1/4" DIA. SHEET METAL SCREW. (2) EACH SIDE.
4. FLASHING.
5. FACTORY CURB.
6. SILICONE SEAL, BOLT HEAD.
7. SILICONE SEAL.
8. 3/8" DIA. LAG BOLT WITH 3" PENETRATION, (ONE PER CORNER)
9. STRUCTURAL BLOCKING. SEE STRUCT. DWGS.
10. ROOF - SEE ARCH. DWGS.
11. EXHAUST DUCT.
12. FLASHING AND WATERPROOFING. PER ARCHITECTURAL.

ROOF EXHAUST FAN ON NEW CURB N.T.S 06

DIMENSION OF LONGEST SIDE INCHES	SHEET METAL GAGE (ALL FOUR SIDES)	TRANSVERSE REINFORCING (1)					
		MINIMUM REINFORCING ANGLE SIZE AND MAXIMUM LONGITUDINAL SPACING BETWEEN TRANSVERSE JOINTS &OR INTERMEDIATE REINFORCING	AT JOINTS				
			MIN. HT. IN.	DRIVE SLIP PLAIN S SLIP	HEMMED S SLIP	ALTERNT BAR SLIP	REINFORCED BAR SLIP
				RECOMMENDED GAGE	RECOMMENDED GAGE	RECOMMENDED GAGE	RECOMMENDED GAGE
UP THRU 12	26	NONE REQUIRED	1	26	26	24	24
13 - 18	24	NONE REQUIRED	1	24	24	24	24
19 - 30	24	1" x 1" x 1/8" @ 60 IN.	1		24	24	24
31 - 42	22	1" x 1" x 1/8" @ 60 IN.	1			22	22
43 - 60	20	1" x 1" x 1/8" @ 60 IN.	1				20
61 & ABOVE	18	1" x 1" x 1/8" @ 60 IN.	1				18

(1) TRANSVERSE REINFORCING SIZE IS DETERMINED BY DIMENSION OF SIDE TO WHICH ANGLE IS APPLIED.

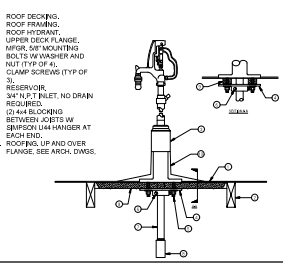
DUCT CONSTRUCTION STANDARDS N.T.S 01



1. BOTTOM OF STRUCTURE.
2. (N) HANGER ROD PER SCHEDULE, LENGTH AS REQUIRED.
3. PROVIDE 18" LONG CALCIUM SILICATE BLOCKS AT ALL INSULATED PIPE SUPPORTS.
4. (N) PIPE.
5. (N) UNISTRUT ADJUSTABLE J-HANGER.
6. EXTEND ROD DOWN TO TOP OF PIPE TO HOLD IN PLACE.
7. (N) NUT (TYP.)
8. ROD COUPLING.
9. HANGER ROD ATTACHMENT AT 2X FRAMING: USE 2" x 2" x 1/4" ANGLE WITH DOUBLE NUT. ATTACH ANGLE TO STRUCTURE WITH THRU BOLT AND NUT.

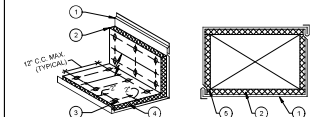
HANGER ROD	MAX. PIPE SIZE	BOLT AND NUT SIZE	MAX. SUPPORT SPACING
3/8"Ø	1/2"Ø	3/8"Ø	6'-0" O.C.
3/8"Ø	3/4"Ø - 1"Ø	3/8"Ø	6'-0" O.C.
3/8"Ø	1-1/4"Ø - 2"Ø	3/8"Ø	10'-0" O.C.
1/2"Ø	3"Ø - 4"Ø	1/2"Ø	10'-0" O.C.

PIPE SUPPORT & TABLE N.T.S 12



1. ROOF DECKING.
2. ROOF FRAMING.
3. ROOF HYDRANT.
4. UPPER DECK FLANGE.
5. MFGR. 5/8" MOUNTING BOLTS W/ WASHER AND NUT (TYP OF 4).
6. CLAMP SCREWS (TYP OF 3).
7. RESERVOIR.
8. 3/4" N.P.T INLET, NO DRAIN REQUIRED.
9. (2) 4x4 BLOCKING BETWEEN JOISTS W/ SIMPSON U44 HANGER AT EACH END.
10. ROOFING. UP AND OVER FLANGE, SEE ARCH. DWGS.

ROOF HYDRANT N.T.S 07

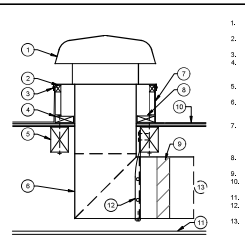


1. GALVANIZED SHEET METAL DUCT.
2. ACOUSTIC DUCT LINER. LINER TO BE ADHERED TO DUCT WITH 100% ADHESIVE. (MIRACLE PF90)
3. NOT MORE THAN 2" FROM EDGE OF DUCT LINER.
4. ALL ENDS OF LINER TO BE COATED WITH ADHESIVE. (MIRACLE PF90) ENDS OF LINER SHALL BE BUTTED FIRMLY TOGETHER.
5. TOP AND BOTTOM SECTIONS OF LINER SHALL OVERLAP THE SIDES.

METAL FASTENERS: OMARK INSULCRIMP, DURA DYNE FASTENERS OR GRIP NAILS.

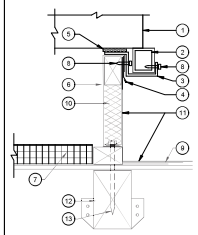
GRIP NAILS SHALL BE INSTALLED BY "SIMPANAIL AIR HAMMER" OR BY AUTOMATIC FASTENER EQUIPMENT.

ACOUSTIC LINED DUCTS 02



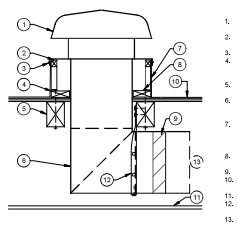
1. EXHAUST HOOD. SEE MECH. PLAN.
2. FACTORY ROOF CURB FURNISHED WITH HOOD.
3. #12 SMS LAG SCREW.
4. 2x WOOD LEVELING BLOCK. SHAPED TO MATCH ROOF SLOPE.
5. 4x4 BLKG W/ U HGR SSD EA. END.
6. 22 GA. GALV. SHEET METAL DUCT WITH ELBOW. SEE MECH. PLAN.
7. ROOF FLASHING AND WATER PROOFING (UP CURB FACE AND UNDER CAP). SEE ARCH. DWGS.
8. 1/2"Ø BOLT W/ WASHER & NUT THRU STRUCT. AT 24" O.C.
9. BACKDRAFT DAMPER.
10. FINISHED ROOF. SEE ARCH. DWGS.
11. CEILING. SEE ARCH. DWGS.
12. DUCT STRAP HANGER, PER SMACNA STANDARDS.
13. DUCT CONTINUATION TO EXHAUST FANS

EXHAUST ROOF CAP N.T.S 08



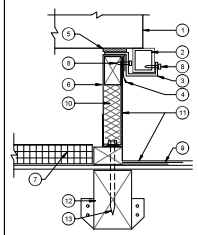
1. AIR CONDITIONING UNIT.
2. UNIT BASE RAIL. SEE MANUFACTURER'S CUT SHEET.
3. MANUFACTURER'S HOLD DOWN S-CLIP, 16 GA. GALVANIZED STEEL. 2 PER LONG SIDE. AT EACH CORNER. 4 TOTAL.
4. GALVANIZED SIM FLASHING.
5. 2"x1/4" CONTINUOUS DENSE NEOPRENE SPONGE GASKET.
6. (E) CURB.
7. MINIMUM R-13 RIGID INSULATION.
8. #10x1/2 TEK SCREWS. 3 PER S-CLIP, 12 TOTAL.
9. (E) ROOF.
10. 1-1/2" RIGID INSULATION COMPATIBLE WITH ROOFING.
11. FLASHING AND WATERPROOFING. SEE ARCHITECTURAL.
12. (E) BLOCKING OR WOOD FRAMING.
13. (E) ATTACHMENT TO STRUCTURE.

HEAT PUMP ON EXISTING CURB N.T.S 03



1. RELIEF HOOD. SEE MECH. PLAN.
2. FACTORY ROOF CURB FURNISHED WITH HOOD.
3. #12 SMS LAG SCREW.
4. 2x WOOD LEVELING BLOCK. SHAPED TO MATCH ROOF SLOPE.
5. 4x4 BLKG W/ U HGR SSD EA. END.
6. 22 GA. GALV. SHEET METAL DUCT WITH ELBOW. SEE MECH. PLAN.
7. ROOF FLASHING AND WATERPROOFING (UP CURB FACE AND UNDER CAP). SEE ARCH. DWGS.
8. 1/2"Ø BOLT W/ WASHER & NUT THRU STRUCT. AT 24" O.C.
9. BACKDRAFT DAMPER.
10. FINISHED ROOF. SEE ARCH. DWGS.
11. CEILING. SEE ARCH. DWGS.
12. DUCT STRAP HANGER, PER SMACNA STANDARDS.
13. DUCT CONTINUATION TO FAN COILS.

INTAKE HOOD ON NEW CURB N.T.S 09



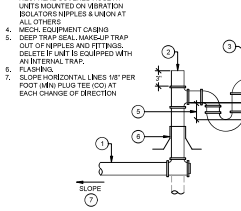
1. AIR CONDITIONING UNIT.
2. UNIT BASE RAIL. SEE MANUFACTURER'S CUT SHEET.
3. MANUFACTURER'S HOLD DOWN S-CLIP, 16 GA. GALVANIZED STEEL.
4. GALVANIZED SIM FLASHING.
5. 2"x1/4" CONTINUOUS DENSE NEOPRENE SPONGE GASKET.
6. (N) METAL ROOF CURB, BY FACTORY.
7. MINIMUM R-13 RIGID INSULATION.
8. #10x1/2 TEK SCREWS. 4 PER SIDE, 8 TOTAL.
9. (E) ROOF.
10. 1-1/2" RIGID INSULATION COMPATIBLE WITH ROOFING.
11. FLASHING AND WATERPROOFING. SEE ARCHITECTURAL PLANS.
12. BLOCKING. SEE STRUCTURAL PLANS.
13. ATTACHMENT TO STRUCTURE. SEE STRUCTURAL PLANS.

HEAT PUMP ON NEW CURB N.T.S 04

1. LAVATORY OR SINK.
2. SLIP-JOINT FITTING.
3. TRAP.
4. AREA CLEAR FOR ACCESS.
5. FINISHED FLOOR.
6. 3/4" CONDENSATE DRAIN IN WALL.
7. NEOPRENE HOSE & CLAMPS.
8. ESCUTCHEON PLATE.
9. WALL.
10. INSULATE SUPPLY AND DRAIN PER SPECIFICATIONS.

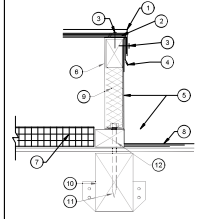
NOTE:
SEE ARCHITECT'S DRAWINGS FOR ACCESSIBLE REQUIREMENTS.

CONDENSATE TO TAILPIECE DETAIL N.T.S 13



1. SEE PLAN FOR CONTINUATION.
2. OPEN TEE
3. CONNECTION TO DRAIN STUB. NEOPRENE COVERED HOSE AT UNITS MOUNTED ON VIBRATION ISOLATORS NIPPLES & UNION AT ALL OTHERS
4. MECH. EQUIPMENT CASING
5. DEEP TRAP SEAL. MAKEUP TRAP OUT OF NIPPLES AND FITTINGS. DELETE IF UNIT IS EQUIPPED WITH AN INTERNAL TRAP.
6. FLASHING.
7. SLOPE HORIZONTAL LINES 1/8" PER FOOT (MIN) PLUG TEE (CO) AT EACH CHANGE OF DIRECTION

CONDENSATE DRAIN CONNECTION N.T.S 10



1. 20 GA. GALV. SHT MTL. COVER, LAP, FOLD, & SOLDER ALL HORIZ. JOINTS
2. LEVEL 1-1/8" PLYWOOD PLATFORM
3. #10 GALV. SCREWS, @ 12" O.C. (MIN 1" EMBED), SEAL WATER TIGHT.
4. GALVANIZED SIM FLASHING.
5. FLASHING AND WATERPROOFING. SEE ARCHITECTURAL.
6. (E) CURB.
7. MINIMUM R-13 RIGID INSULATION.
8. (E) ROOF
9. 1-1/2" RIGID INSULATION COMPATIBLE WITH ROOFING.
10. (E) BLOCKING OR WOOD FRAMING.
11. (E) ATTACHMENT TO STRUCTURE.
12. (E) LEVELING BLOCK

ROOF EQUIPMENT PLATFORM ON EXISTING CURB N.T.S 05

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

Not to be Issued for Construction

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the plans without permission from the Building Inspection Division.
The approval of this plans and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

JOB COPY

PBK

ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-357-4900 P

MEP Engineering
LEAF Engineers
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-357-4900 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

APPROVED
City of Sacramento Plan Review
PLUMB INS & MECH REVIEW
By: TCastaneda
on Oct 05, 2023

THE APPROVAL OF ALL PLUMBING AND MECHANICAL WORK IS SUBJECT TO FIELD INSPECTIONS

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY FM CHKED BY RT

REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	9/15/23
2	BACKCHECK 2	9/18/23

CONSTRUCTION DOCUMENT

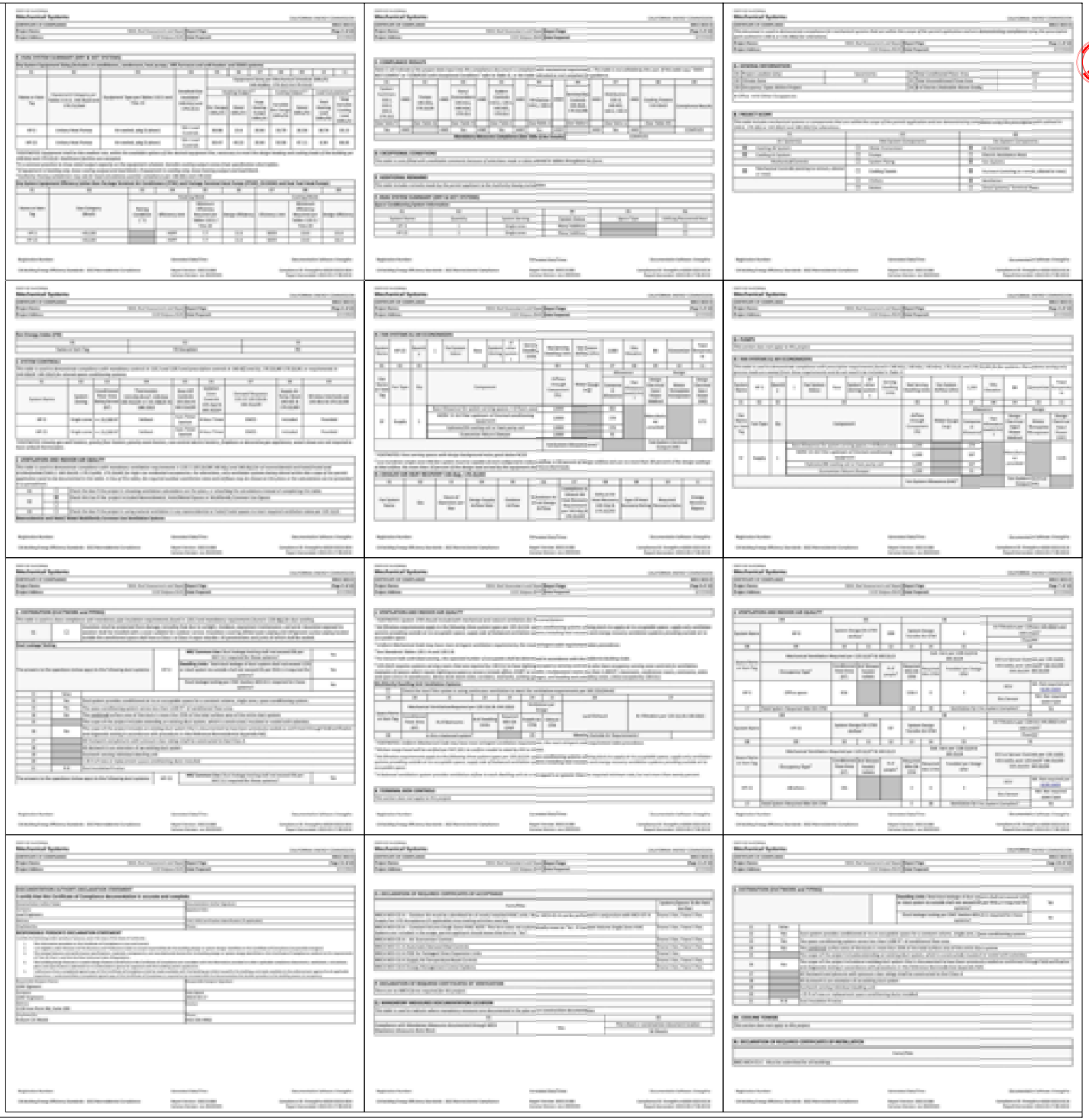
MECHANICAL DETAILS

COM-2310004

M6.01

This document is for plan review only

C:\Users\kdavy\Documents\NSHL_kelly.davy.YSC47.rvt
1/9/2023 11:36:41 AM



ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

Not for Permit or Construction

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK

JOB COPY

ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-365-6992 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-365-6992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR

CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN

PLAN NORTH
TRUE NORTH

APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: TCastaneda
on Oct 05, 2023

THE APPROVAL OF ALL PLUMBING AND MECHANICAL WORK IS SUBJECT TO FIELD INSPECTIONS

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: FM CHKD BY: RT
REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	9/30/23
2	BACKCHECK 2	9/10/23

CONSTRUCTION DOCUMENT

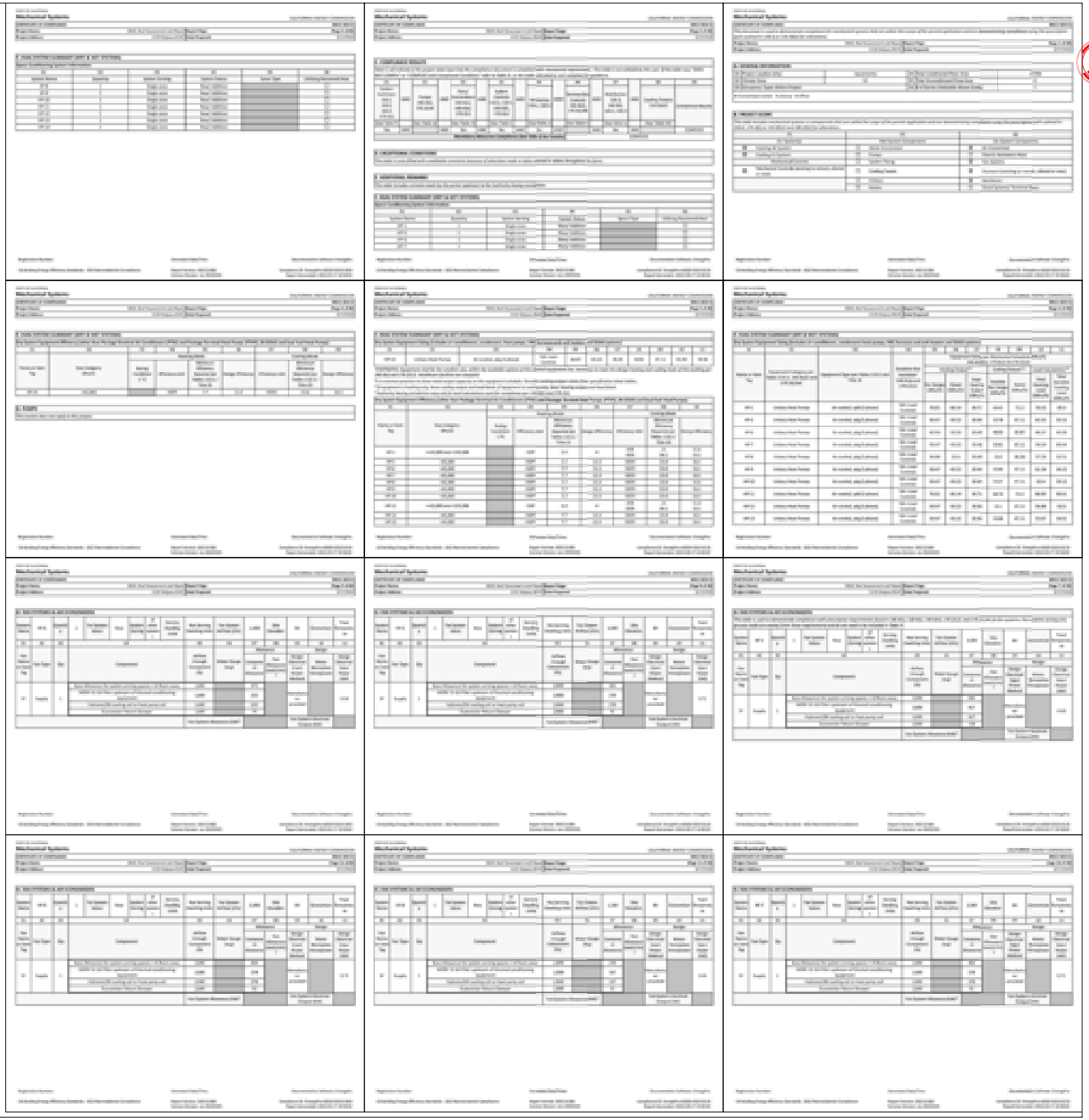
TITLE 24 DOCUMENTATION - BASE DESIGN

This document is for plan review only

COM-2310004

M7.01

C:\Users\kclancy\Documents\NSHL_kelly.clancy\YSZ47.rvt
1/9/2023 11:36:41 AM



ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

Not for Permit or Construction

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK

JOB COPY

ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-365-6992 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-365-6992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR

CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

A

KEY PLAN

PLAN NORTH
TRUE NORTH

APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: TCastaneda
on Oct 05, 2023

THE APPROVAL OF ALL PLUMBING AND MECHANICAL WORK IS SUBJECT TO FIELD INSPECTIONS

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: FM CHECKED BY: RT
REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	9/15/23
2	BACKCHECK 2	9/10/23

CONSTRUCTION DOCUMENT

TITLE 24
DOCUMENTATION - ADDITIVE ALTERNATE #1

This document is for plan review only

COM-2310004

M7.02

C:\Users\kcliancy\Documents\NSHL_kelly.cliancy\YSZ4T.rvt
1/9/2023 11:36:41 AM



ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

Not for Construction

These set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the approved plans without permission from the Building Inspection Division.
The approval of this plans and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

JOB COPY

PBK

ARCHITECT
PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-355-8992 P

MEP Engineering
LEAF ENGINEERING
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-790-4992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF
ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH
TRUE NORTH

APPROVED
The plans and specifications comply with the applicable 2022 CALIFORNIA RESIDENTIAL CODE
By: TCastaneda
on Oct 05, 2023

THE APPROVAL OF ALL PLUMBING AND MECHANICAL WORK IS SUBJECT TO FIELD INSPECTIONS

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
210389
DATE 09/07/2023
DRAWN BY FM CHECKED BY RT

REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	9/15/23
2	BACKCHECK 2	9/18/23

CONSTRUCTION DOCUMENT

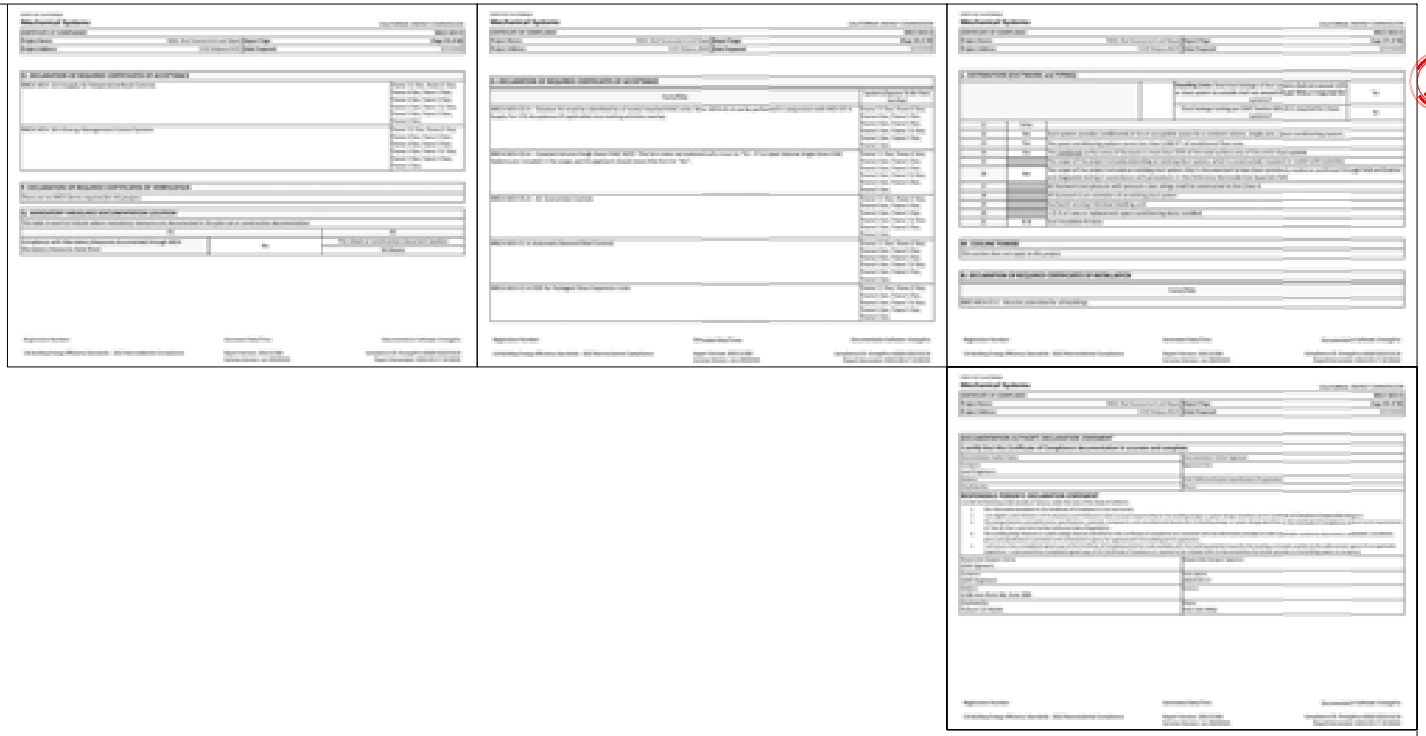
TITLE 24 DOCUMENTATION - ADDITIVE ALTERNATE #1

This document is for plan review only

COM-2310004

M7.03

C:\Users\kdancy\Documents\NSHL_kdancy-YSZ4T.rvt
1/9/2023 11:36:41 AM



APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: TCastaneda
on Oct 05, 2023

THE APPROVAL OF ALL PLUMBING AND MECHANICAL WORK IS SUBJECT TO FIELD INSPECTIONS

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

Not for Permit or Construction

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK

JOB COPY

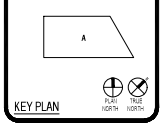
ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-365-6992 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-365-6992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

SACRAMENTO

1124 DEL PASO BLVD



KEY PLAN

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: FM CHECK BY: RT
REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	8/30/23
2	BACKCHECK 2	8/10/23

CONSTRUCTION DOCUMENT

TITLE 24 DOCUMENTATION - ADDITIVE ALTERNATE #1

This document is for plan review only

COM-2310004

M7.04

C:\Users\kclancy\Documents\NSHL_kelly.clancy\YSZ4T.rvt
1/9/2023 11:36:41 AM

ELECTRICAL SYMBOL LEGEND

1. EVERY SYMBOL SHOWN ON LEGEND MAY NOT APPEAR ON DRAWINGS.
2. DASHED ELECTRICAL EQUIPMENT GENERALLY INDICATES EXISTING EQUIPMENT.
3. LONG-SHORT-SHORT-LONG DASHING GENERALLY INDICATES MATCH LINE OR DEFINES AREA FOR SPECIAL NOTE.

CIRCUIT RELATED:

- LIGHTING OR POWER CIRCUIT(S). ARROW INDICATES HOME RUN, LONGER TICK(S) INDICATE NEUTRAL WIRE(S), SHORTER STRAIGHT TICK(S) INDICATE PHASE WIRE(S), SLANTED SHORTER TICK(S) INDICATE SWITCH LEG(S), DOT(S) INDICATE GROUNDING CONDUCTOR(S). DASHED WIRING (LONG-SHORT-LONG DASHES) INDICATES WIRING BELOW SLAB OR GRADE. DASHED WIRING (SERIES OF SHORT DASHES) INDICATES EXISTING WIRING. SLASH THROUGH ARROW INDICATES PARTIAL CIRCUIT. "D" ON HOMERUN ARROW INDICATES DEDICATED CIRCUIT: PROVIDE A SEPARATE NEUTRAL FOR EACH PHASE CONDUCTOR FOR ENTIRE LENGTH OF CIRCUIT FROM PANEL TO OUTLET; COUNT EACH NEUTRAL AS CURRENT-CARRYING AND GROUP A MAXIMUM OF SIX THHN/THWN CONDUCTORS IN A SINGLE RACEWAY; GROUNDING CONDUCTOR IS NOT COUNTED.
- TELEPHONE CONDUIT SYSTEM. DASHED WIRING (LONG-SHORT-LONG DASHES) INDICATES WIRING IN OR BELOW SLAB OR GRADE. DASHED WIRING (SERIES OF SHORT DASHES) INDICATES EXISTING WIRING.
- JUNCTION BOX. "J" MAY BE OMITTED IF BOX IS WITHIN OR ATTACHED TO FLUORESCENT LIGHT FIXTURE SYMBOL ON PLANS.
- POINT OF BRANCH CIRCUIT TAP FOR SEPARATELY SWITCHED FIXTURE GROUP. REFERENCE CATEGORY "B" LIGHTING SYMBOLS FOR FURTHER INFORMATION.
- GROUNDING ELECTRODE.

LIGHTING:

- LED LIGHTING FIXTURE. LETTER INDICATES TYPE, SMALL LETTER INDICATES SWITCH CONTROL, NUMBER INDICATES CIRCUIT. CROSS HATCHING INDICATES FIXTURE ON EMERGENCY SYSTEM. FOR SOLID CIRCLE WITHIN FIXTURE REFERENCE APPROPRIATE CATEGORY "A" CIRCUIT RELATED SYMBOL.
- STRIP TYPE LED LIGHTING FIXTURE. LETTER INDICATES TYPE, SMALL LETTER INDICATES SWITCH CONTROL, NUMBER INDICATES CIRCUIT. FOR SOLID CIRCLE ATTACHED TO FIXTURE REFERENCE APPROPRIATE CATEGORY "A" CIRCUIT RELATED SYMBOL.
- LED LIGHTING FIXTURE. LETTER INDICATES TYPE, SMALL LETTER INDICATES SWITCH CONTROL, NUMBER INDICATES CIRCUIT. FOR SOLID CIRCLE REFERENCE APPROPRIATE CATEGORY "A" CIRCUIT RELATED SYMBOL.
- DESIGNATES FIXTURE ON EMERGENCY POWER. RE: LIGHTING PLAN NOTES AND FIXTURE SCHEDULE NOTES FOR ADDITIONAL INFORMATION.
- WALL OR BRACKET MOUNTED FIXTURE OR DEVICE.
- EXIT LIGHT FIXTURE. LETTER INDICATES TYPE, NUMBER INDICATES CIRCUIT. NUMBER AND LOCATION OF SHADED TRIANGLE SECTIONS INDICATES NUMBER OF EXIT SIGN FACES AND DIRECTION OF EACH FACE. PROVIDE CHEVRON DIRECTIONAL INDICATORS AS SHOWN ON DRAWINGS.

CONTROL:

- $ — SWITCH. SMALL LETTER INDICATES FIXTURES CONTROLLED. "P" INDICATES PILOT LIGHT. "WP" INDICATES WEATHERPROOF. "K" INDICATES KEY OPERATED. "MO" INDICATES SPDT MOMENTARY CONTACT. "2" INDICATES DPDT. "3" INDICATES 3-WAY. "4" INDICATES 4-WAY. "M" INDICATES MANUAL MOTOR STARTER. CIRCUIT DESIGNATION NEXT TO SWITCH INDICATES BRANCH CIRCUIT NUMBER.
- $D — WALL BOX DIMMER SWITCH. "MARK" INDICATES WATTAGE IF OTHER THAN 600. "3D" INDICATES 3-WAY DIMMER.
- $$ — MULTI-LEVEL SWITCH. CIRCUIT DESIGNATION NEXT TO SWITCH INDICATES BRANCH CIRCUIT NUMBER.
- $T — DIGITAL TIME SWITCH
- PHOTOELECTRIC CONTROL.
- EMERGENCY POWER OFF (EPO) PUSHBUTTON.
- PUSH BUTTON.
- $OC — WALL MOUNT OCCUPANCY SENSOR.
- DUAL TECHNOLOGY CEILING MOUNTED OCCUPANCY SENSOR.
- CEILING MOUNTED RESTROOM OCCUPANCY SENSOR.
- CEILING MOUNTED CORRIDOR OCCUPANCY SENSOR.
- HB — CEILING MOUNTED HIGH CEILING OCCUPANCY SENSOR.
- CO — WALL MOUNTED CARBON DIOXIDE SENSOR.
- T — WALL MOUNTED THERMOSTAT.

POWER OUTLETS:

- 20A-125V DUPLEX RECEPTACLE. "G" INDICATES GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLE.
- 20A-125V DUPLEX RECEPTACLE. OCCUPANCY CONTROLLED RECEPTACLE
- 20A-125V FOURPLEX RECEPTACLE.
- 20A-125V FOURPLEX RECEPTACLE. OCCUPANCY CONTROLLED RECEPTACLE
- SPECIAL PURPOSE SINGLE POWER RECEPTACLE. RATED AS INDICATED (IF NO RATING INDICATED, RECEPTACLE RATING SHALL MATCH BRANCH CIRCUIT OVERCURRENT PROTECTIVE DEVICE SIZE AND SHALL MEET REQUIREMENTS OF EQUIPMENT BEING CONNECTED). "C" INDICATES CLOCK OUTLET.
- 20A-125V FLUSH FLOOR DUPLEX RECEPTACLE. 20A WHEN INDICATED OR IF BRANCH CIRCUIT SERVES ONLY SINGLE DUPLEX. PROVIDE CARPET FLANGE WHERE APPLICABLE.
- 20A-125V CEILING DUPLEX RECEPTACLE. 20A UNLESS OTHERWISE INDICATED.
- CH — 20A-125V DUPLEX TAMPER RESISTANT RECEPTACLE WITH (2) USB CHARGING PORTS.
- SAME AS DUPLEX RECEPTACLE EXCEPT ISOLATED GROUND TYPE RECEPTACLE.
- SAME AS FOURPLEX RECEPTACLE EXCEPT ISOLATED GROUND TYPE RECEPTACLE.
- AC — INDICATES RECEPTACLE SHALL BE MOUNTED ABOVE COUNTER TOP. REFER TO ARCHITECT FOR EXACT HEIGHT ABOVE COUNTER.
- LC1−X — CIRCUIT DESIGNATION NEXT TO RECEPTACLE DEVICES INDICATES BRANCH CIRCUIT NUMBER. RE: PANEL SCHEDULES FOR INFORMATION.
- WP — "WP" INDICATES WEATHER PROOF DEVICE.

TELEPHONE/DATA:

- WALL TELEPHONE OUTLET. "P" INDICATES PAY TYPE. "W" INDICATES WALL MOUNTED PHONE. PROVIDE NEMA 5-15R OUTLET FOR EACH TTY, TDD OR OTHER SCREEN OR CARD-ACCESS TELEPHONE.
- FLUSH FLOOR TELEPHONE OUTLET WITH CARPET FLANGE WHERE APPLICABLE.
- SURFACE FLOOR TELEPHONE OUTLET. "T" INDICATES TWO OUTLETS IN ONE BOX. PROVIDE CARPET FLANGE WHERE APPLICABLE.
- WALL COMMUNICATIONS OR DATA OUTLET. REFER TO 'TS' SERIES SHEETS FOR EXACT BOX/ CONDUIT REQUIREMENTS.
- FLUSH FLOOR COMMUNICATIONS OR DATA OUTLET. REFER TO 'TS' SERIES SHEETS FOR EXACT BOX/ CONDUIT REQUIREMENTS. PROVIDE CARPET FLANGE WHERE APPLICABLE.
- SURFACE FLOOR COMMUNICATIONS OR DATA OUTLET. REFER TO 'TS' SERIES SHEETS FOR EXACT BOX/ CONDUIT REQUIREMENTS. PROVIDE CARPET FLANGE WHERE APPLICABLE.

EQUIPMENT:

- +42" — A NOTATION INDICATING THE MOUNTING HEIGHT OF A DEVICE AS MEASURED FROM FINISHED FLOOR OR GRADE TO CENTER LINE OF DEVICE.
- M — MOTOR.
- DISCONNECT SWITCH. FRAME SIZE/FUSE SIZE/POLES AS INDICATED. "NF" INDICATES NON-FUSIBLE. NEMA 1 ENCLOSURE UNLESS OTHERWISE NOTED. PROVIDE FUSED BUSWAY PLUG WHEN SWITCH IS INDICATED ON BUSWAY. ALL DISCONNECT SWITCHES SHALL BE 30/NF/3 UNLESS OTHERWISE NOTED.
- SINGLE CIRCUIT BREAKER IN INDIVIDUAL ENCLOSURE.
- MAGNETIC MOTOR CONTROLLER. NUMBER INDICATES NEMA SIZE, STARTER NEMA SIZE SHALL BE "NEMA 1" UNLESS OTHERWISE NOTED.
- COMBINATION DISCONNECT SWITCH/MOTOR CONTROLLER.
- CONTACTOR
- 1-HR RATED WALL ASSEMBLY

CAL-GREEN REQUIREMENTS

1. TESTING AND ADJUSTING. TESTING AND ADJUSTING OF SYSTEMS SHALL BE REQUIRED FOR NEW BUILDINGS LESS THAN 10,000 SQUARE FEET OR NEW SYSTEMS TO SERVE AN ADDITION OR ALTERATION SUBJECT TO SECTION 303.1
2. SYSTEMS. DEVELOP A WRITTEN PLAN OF PROCEDURES FOR TESTING AND ADJUSTING SYSTEMS. SYSTEMS TO BE INCLUDED FOR TESTING AND ADJUSTING SHALL INCLUDE, AS APPLICABLE TO THE PROJECT:
   - A. HVAC SYSTEMS AND CONTROLS.
   - B. INDOOR AND OUTDOOR LIGHTING AND CONTROLS.
   - C. WATER HEATING SYSTEMS.
   - D. RENEWABLE ENERGY SYSTEMS.
   - E. LANDSCAPE IRRIGATION SYSTEMS.
   - F. WATER REUSE SYSTEMS.
3. PROCEDURES. PERFORM TESTING AND ADJUSTING PROCEDURES IN ACCORDANCE WITH MANUFACTURE'S SPECIFICATIONS AND APPLICABLE STANDARDS ON EACH SYSTEM.
   - A. HVAC BALANCING. IN ADDITION TO TESTING AND ADJUSTING, BEFORE A NEW SPACE-CONDITIONING SYSTEM SERVING A BUILDING OR SPACE IS OPERATED FOR NORMAL USE, BALANCE THE SYSTEM IN ACCORDANCE WITH THE PROCEDURES DEFINED BY THE TESTING ADJUSTING AND BALANCING BUREAU NATIONAL STANDARDS; THE NATIONAL ENVIRONMENTAL BALANCING BUREAU PROCEDURAL STANDARDS; ASSOCIATED AIR BALANCE COUNCIL NATIONAL STANDARDS OR AS APPROVED BY THE ENFORCING AGENCY.
4. REPORTING. AFTER COMPLETION OF TESTING, ADJUSTING AND BALANCING, PROVIDE A FINAL REPORT OF TESTING SIGNED BY THE INDIVIDUAL RESPONSIBLE FOR PERFORMING THESE SERVICES.
5. OPERATION AND MAINTENANCE (O & M) MANUAL. PROVIDE THE BUILDING OWNER OR REPRESENTATIVE WITH DETAILED OPERATING AND MAINTENANCE INSTRUCTIONS AND COPIES OF GUARANTIES/WARRANTIES FOR EACH SYSTEM. O & M INSTRUCTIONS SHALL BE CONSISTENT WITH OSHA REQUIREMENTS IN CCR, TITLE 8, SECTION 5142, AND OTHER RELATED REGULATIONS.
   - A. INSPECTIONS AND REPORTS. INCLUDE A COPY OF ALL INSPECTION VERIFICATIONS AND REPORTS REQUIRED BY THE ENFORCING AGENCY.
6. TEMPORARY VENTILATION. THE PERMANENT HVAC SYSTEM SHALL ONLY BE USED DURING CONSTRUCTION IF NECESSARY TO CONDITION THE BUILDING WITHIN THE REQUIRED TEMPERATURE RANGE FOR MATERIAL AND EQUIPMENT INSTALLATION. IF THE HVAC SYSTEM IS USED DURING CONSTRUCTION, USE RETURN AIR FILTERS WITH A MINIMUM REPORTING VALUE (MERV) OF 8, BASED ON ASHRAE 52.2-1999 OR AN AVERAGE EFFICIENCY OF 30 PERCENT BASED ON ASHRAE 52.1-1992. REPLACE ALL FILTERS IMMEDIATELY PRIOR TO OCCUPANCY, OR, IF THE BUILDING IS OCCUPIED DURING ALTERATIONS, AT THE CONCLUSION OF CONSTRUCTION.
7. COVERING OF DUCT OPENINGS AND PROTECTION OF MECHANICAL EQUIPMENT DURING CONSTRUCTION. AT THE TIME OF ROUGH INSTALLATION AND DURING STORAGE ON THE CONSTRUCTION SITE UNTIL FINAL STARTUP OF THE HEATING, COOLING AND VENTILATION EQUIPMENT, ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH WRAP, PLASTIC, SHEET METAL OR OTHER METHODS ACCEPTABLE TO THE ENFORCING AGENCY TO REDUCE THE AMOUNT OF DUST, WATER AND DEBRIS WHICH MAY ENTER THE SYSTEM.
8. FILTERS. IN MECHANICALLY VENTILATED BUILDINGS, PROVIDE REGULARLY OCCUPIED AREAS OF THE BUILDING WITH AIR FILTRATION MEDIA FOR OUTSIDE AND RETURN AIR PRIOR TO OCCUPANCY THAT PROVIDE AT LEAST A MINIMUM EFFICIENCY REPORTING VALUE (MERV) OF 8. MERV 8 FILTERS SHALL BE INSTALLED PRIOR TO OCCUPANCY AND RECOMMENDATIONS FOR MAINTENANCE WITH FILTERS OF THE SAME VALUE SHALL BE INCLUDED IN THE OPERATION AND MAINTENANCE MANUAL.
   EXCEPTIONS:
   - A. AN ASHRAE 10-PERCENT TO 15-PERCENT EFFICIENCY FILTER SHALL BE PERMITTED FOR AN HVAC UNIT MEETING THE 2019 CALIFORNIA ENERGY CODE HAVING 60,000 BTY/H OR LESS CAPACITY PER FAN COIL, IF THE ENERGY USE OF THE AIR DELIVERY SYSTEM IS 0.4 W/CFM OR LESS AT DESIGN AIR FLOW.
   - B. EXISTING MECHANICAL EQUIPMENT.
9. OZONE DEPLETION AND GREENHOUSE GAS REDUCTIONS. INSTALLATIONS OF HVAC, REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT SHALL COMPLY WITH SECTIONS 5.508.1.1 AND 5.508.1.2.
   - C. CHLOROFLOUROCARBONS (CFCS). INSTALL HVAC, REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT THAT DO NOT CONTAIN CFCS.
   - D. HALONS. INSTALL HVAC REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT THAT DO NOT CONTAIN HALONS.
10. ADHESIVES, ADHESIVE BONDING PRIMERS, ADHESIVE PRIMERS, SEALANTS, SEALANT PRIMERS AND CAULKS SHALL COMPLY WITH LOCAL OR REGIONAL AIR POLLUTION CONTROL OR AIR QUALITY MANAGEMENT DISTRICT RULES WHERE APPLICABLE, OR SCAQMD RULE 1168 VOC LIMITS, AS SHOWN IN TABLES 5.504.4.1

MEP COMPONENT ANCHORAGE NOTE

ALL MECHANICAL, PLUMBING AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS. THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2019 CBC, SECTIONS 1617A.1.18 THROUGH 1617A.1.26 AND ASCE 7-16 CHAPTER 13, 26 AND 30:

1. ALL PERMANENT EQUIPMENT AND COMPONENTS.
2. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT THAT IS PERMANENTLY ATTACHED (e.g. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRIC, GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/220 VOLT RECEPTACLES HAVING A FLEXIBLE CABLE.
3. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN 400 POUNDS OR HAS A CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT IS REQUIRED TO BE RESTRAINED IN A MANNER APPROVED BY DSA.

THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE BUT NEED NOT DEMONSTRATE DESIGN COMPLIANCE WITH THE REFERENCES NOTED ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTIONS:

1. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
2. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUND PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

THE ANCHORAGE OF ALL MECHANICAL, ELECTRICAL AND PLUMBING COMPONENTS SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY AND ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH ABOVE REQUIREMENTS.

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-16 SECTION 13.3 AS DEFINED IN ASCE 7-16 SECTION 13.6.5, 13.6.6, 13.6.7, 13.6.8; AND 2019 CBC, SECTION 1617A.1.24, 1617A.1.25, AND 1617A.1.26.

THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW. WHEN BRACING AND ATTACHMENTS ARE BASED ON A PREAPPROVED INSTALLATION GUIDE (E.G., OSHPD OPM FOR 2013 CBC OR LATER), COPIES OF THE BRACING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO START OF AND DURING THE HANGING AND BRACING OF DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEMS (E):

MP	MD	PP	E		
☐	☐	☐	☒	OPTION 1:	DETAILED ON THE APPROVED DRAWINGS WITH PROJECT SPECIFIC NOTES AND DETAILS.
☐	☐	☐	☐	OPTION 2:	SHALL COMPLY WITH THE APPLICABLE OSHPD PRE-APPROVAL (OPM-0295-13).

SHEET INDEX

E0.00	COVER SHEET
E2.01	ELECTRICAL FLOOR PLAN - BASE DESIGN
E2.02	ELECTRICAL FLOOR PLAN - ADD. ALTERNATE #1
E3.01	ELECTRICAL ROOF PLAN - DEMOLITION - BASE DESIGN
E3.02	ELECTRICAL ROOF PLAN - DEMOLITION - ADD. ALTERNATE #1
E4.01	ELECTRICAL ROOF PLAN - NEW - BASE DESIGN
E4.02	ELECTRICAL ROOF PLAN - NEW - ADD. ALTERNATE #1
E6.01	ONE LINE & NEW PANEL SCHEDULES - BASE DESIGN
E6.02	ONE LINE & NEW PANEL SCHEDULES - ADD. ALTERNATE #1
E6.03	EXISTING PANEL SCHEDULES - BASE DESIGN
E6.04	EXISTING PANEL SCHEDULES - ADD. ALTERNATE #1

2

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.
Not for permitting or construction
JOB COPY

ARCHITECT
PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-335-6992 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-335-6992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF
ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH
TRUE NORTH

REGISTERED PROFESSIONAL ENGINEER RONALD C DELA CRUZ No. E 23576 Exp. ELECTRICAL STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: K.G. CHKED BY: L.M.

REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	6/23/23
2	BACKCHECK 2	8/10/23

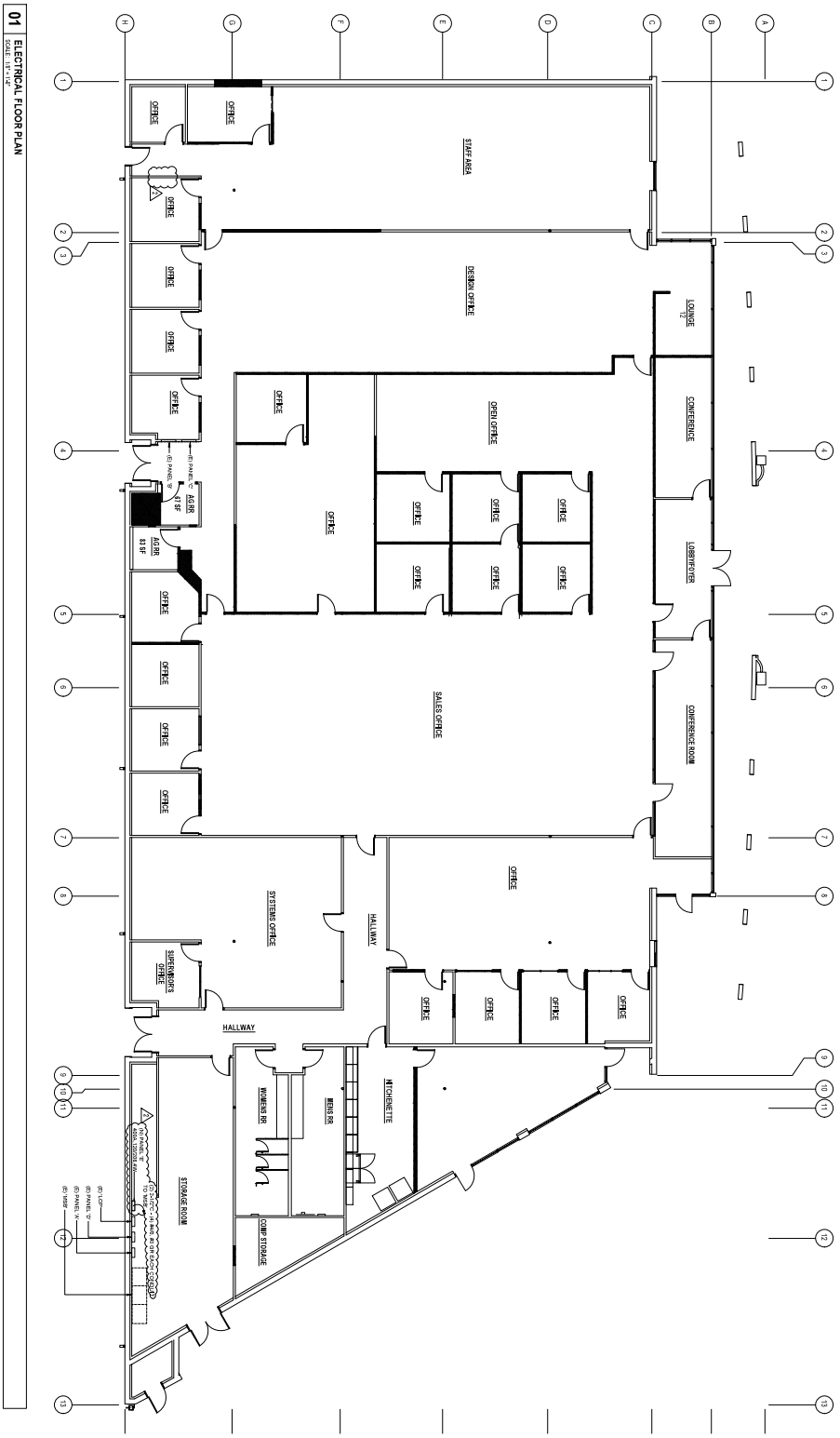
CONSTRUCTION DOCUMENT
COVER SHEET
E0.00

This document is for plan review only
THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS
APPROVED
City of Sacramento Plan Review
ELECTRICAL DIVISION
By: Nick Larson
on Sep 27, 2023
COM-2310004

C:\Users\lclancy\Documents\NSHL_lkelly.clancyYSZ4T.rvt

1/9/2023 11:38:41 AM

01 ELECTRICAL FLOOR PLAN
SCALE: 1/8" = 1'-0"



KEY PLAN

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

ARCHITECT
PBK Architects
1121 L Street, Suite 320
Sacramento, CA 95814
916.442.6827

LEAF Engineers

ISSUED BY
Jason Horie
on Oct 06, 2023

CITY OF SACRAMENTO
PROJECT NUMBER
M22000003
DATE
DRAWN BY: KG
REVIEW BY: LK
CONSTRUCTION DOCUMENT

ELECTRICAL
FLOOR PLAN - BASE
DESIGN

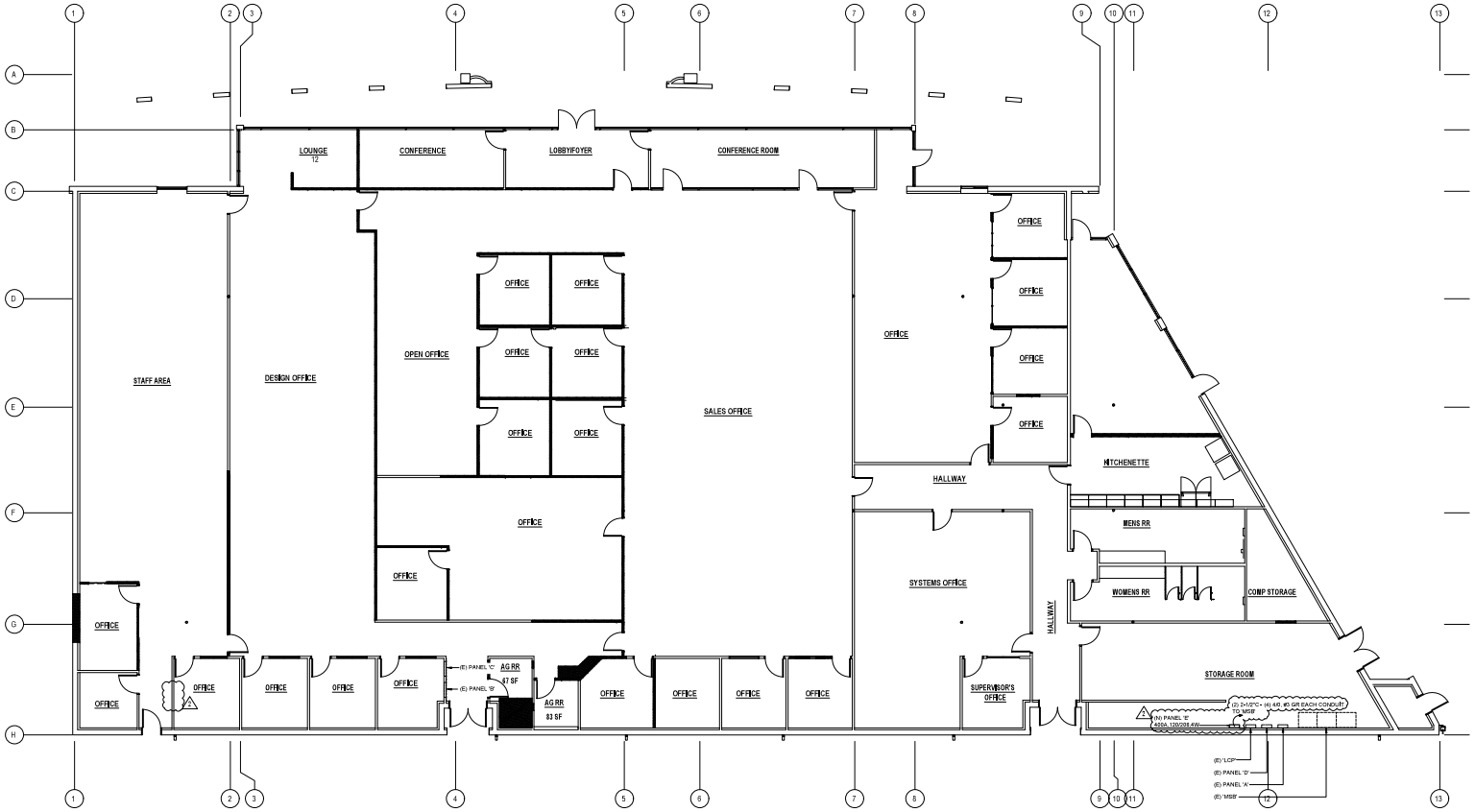
E2.01

APPROVED
ELECTRICAL DIVISION
Nick Larson
on May 01, 2023
THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTION

This document is for plan review only

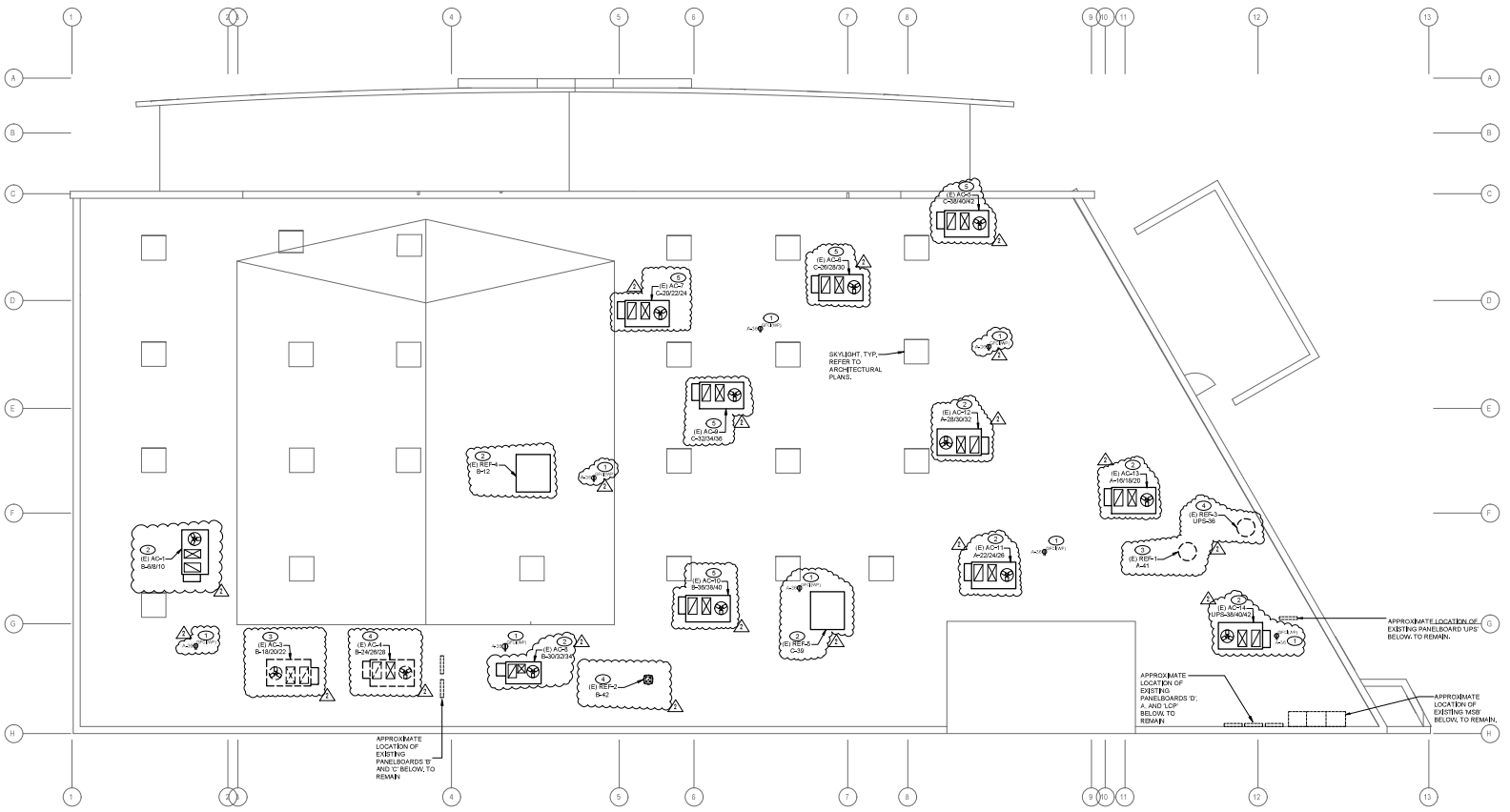
Not for permitting or construction

COM-2310004 1124 DEL PASO BLVD JOB COPY


LOUNGE
12
CONFERENCE
LOBBY/FOYER
CONFERENCE ROOM
OFFICE
OFFICE
OFFICE

KEYNOTES

1. DISCONNECT AND REMOVE THE SERVICE RECEPTACLES AND RELATED BOXES AND COVERPLATES, PRESERVE THE CONDUIT PENETRATION AND STUB-UP AND PROTECT THE DISCONNECTED LINE SIDE CONDUCTORS.
2. EXISTING MACHINE TO BE REMOVED FOR RE-ROOFING AND THEN REPLACED IN THE SAME LOCATION AFTERWARD, DISCONNECT AND REMOVE THE (E) DISCONNECT SWITCH AND TERMINAL CONDUIT/WIRING TO THE MACHINE, PRESERVE THE CONDUIT PENETRATION AND STUB-UP AND PROTECT THE DISCONNECTED LINE SIDE CONDUCTORS. RECONNECT THE EXISTING MACHINE AFTER IT IS RE-INSTALLED.
3. EXISTING MACHINE TO BE REMOVED AND REPLACED WITH NEW. DISCONNECT AND REMOVE THE (E) DISCONNECT SWITCH AND TERMINAL CONDUIT/WIRING TO THE MACHINE, PRESERVE THE CONDUIT PENETRATION AND STUB-UP AND PROTECT THE DISCONNECTED LINE SIDE CONDUCTORS.
4. EXISTING MACHINE TO BE DEMOLISHED. DISCONNECT THE EXISTING DISCONNECT SWITCH AND TERMINAL CONDUIT/WIRING TO THE MACHINE BACK TO THE NEAREST ACCESSIBLE JUNCTION BOX BELOW ROOF AND SAFE OFF REMAINING CONDUCTORS.
5. EXISTING MACHINE TO BE REMOVED FOR RE-ROOFING AND THEN REPLACED IN THE SAME LOCATION AFTERWARD, DISCONNECT AND REMOVE THE (E) DISCONNECT SWITCH AND TERMINAL CONDUIT/WIRING TO THE MACHINE, PRESERVE THE CONDUIT PENETRATION AND STUB-UP. REMOVE AND DEMOLISH THE FEEDER CONDUCTORS BACK TO SOURCE PANEL.



1 ELECTRICAL ROOF PLAN - DEMOLITION
SCALE: 1/8" = 1'-0"

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTION
APPROVED
ELECTRICAL DIVISION
By: Nick Larson
on Sep 27, 2023

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

Not to be used for Construction
Permit Set

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the approved construction plans.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

JOB COPY

PBK

ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-985-4662 P

MEP Engineering
LEAF Engineering
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-294-4662 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
210189
DATE 09/07/2023
DRAWN BY: KA CHECKED BY: LM

REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	9/5/23
2	BACKCHECK 2	9/18/23

CONSTRUCTION DOCUMENT

ELECTRICAL ROOF PLAN - DEMOLITION - BASE DESIGN

COM-2310004

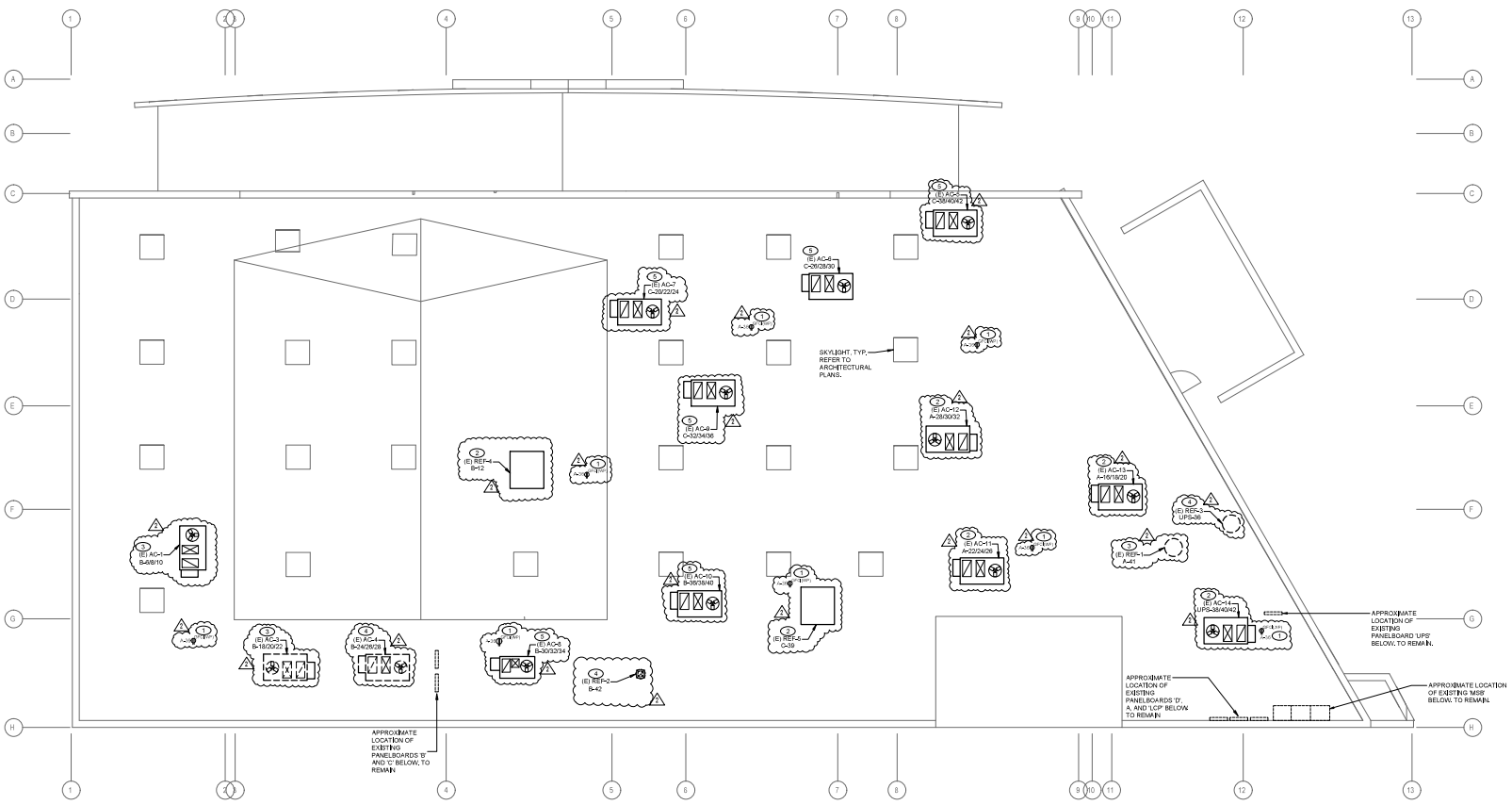
E3.01

This document is for plan review only

C:\Users\kdavy\Documents\NSHL_kelly.davy.rvt
1/9/2023 11:36:41 AM

KEYNOTES

1. DISCONNECT AND REMOVE THE SERVICE RECEPTACLES AND RELATED BOXES AND COVERPLATES. PRESERVE THE CONDUIT PENETRATION AND STUB-UP AND PROTECT THE DISCONNECTED LINE SIDE CONDUCTORS.
2. EXISTING MACHINE TO BE REMOVED FOR RE-ROOFING AND THEN REPLACED IN THE SAME LOCATION AFTERWARD. DISCONNECT AND REMOVE THE (E) DISCONNECT SWITCH AND TERMINAL CONDUIT/WIRING TO THE MACHINE. PRESERVE THE CONDUIT PENETRATION AND STUB-UP AND PROTECT THE DISCONNECTED LINE SIDE CONDUCTORS. RECONNECT THE EXISTING MACHINE AFTER IT IS RE-INSTALLED.
3. EXISTING MACHINE TO BE REMOVED AND REPLACED WITH NEW. DISCONNECT AND REMOVE THE (E) DISCONNECT SWITCH AND TERMINAL CONDUIT/WIRING TO THE MACHINE. PRESERVE THE CONDUIT PENETRATION AND STUB-UP AND PROTECT THE DISCONNECTED LINE SIDE CONDUCTORS.
4. EXISTING MACHINE TO BE DEMOLISHED. DISCONNECT THE EXISTING DISCONNECT SWITCH AND TERMINAL CONDUIT/WIRING TO THE MACHINE BACK TO THE NEAREST ACCESSIBLE JUNCTION BOX BELOW ROOF AND SAFE OFF REMAINING CONDUCTORS.
5. EXISTING MACHINE TO BE REMOVED FOR RE-ROOFING AND THEN REPLACED IN THE SAME LOCATION AFTERWARD. DISCONNECT AND REMOVE THE (E) DISCONNECT SWITCH AND TERMINAL CONDUIT/WIRING TO THE MACHINE. PRESERVE THE CONDUIT PENETRATION AND STUB-UP. REMOVE AND DEMOLISH THE FEEDER CONDUCTORS BACK TO SOURCE PANEL.



1 ELECTRICAL ROOF PLAN - DEMOLITION
SCALE: 1/8" = 1'-0"

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTION
APPROVED
ELECTRICAL DIVISION
By: Nick Larson
on Sep 27, 2023

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 06, 2023

Not to be used for construction unless signed by the Building Official

JOB COPY

1124 DEL PASO BLVD

ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-3954662 P

MEP Engineering
LEAF Engineers
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-3954662 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1112 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
PLAN NORTH
TRUE NORTH

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: K.A. CHECKED BY: L.M.

REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	9/15/23
2	BACKCHECK 2	9/18/23

CONSTRUCTION DOCUMENT

ELECTRICAL
ROOF PLAN - DEMOLITION
- ADDITIVE ALTERNATE #1

E3.02

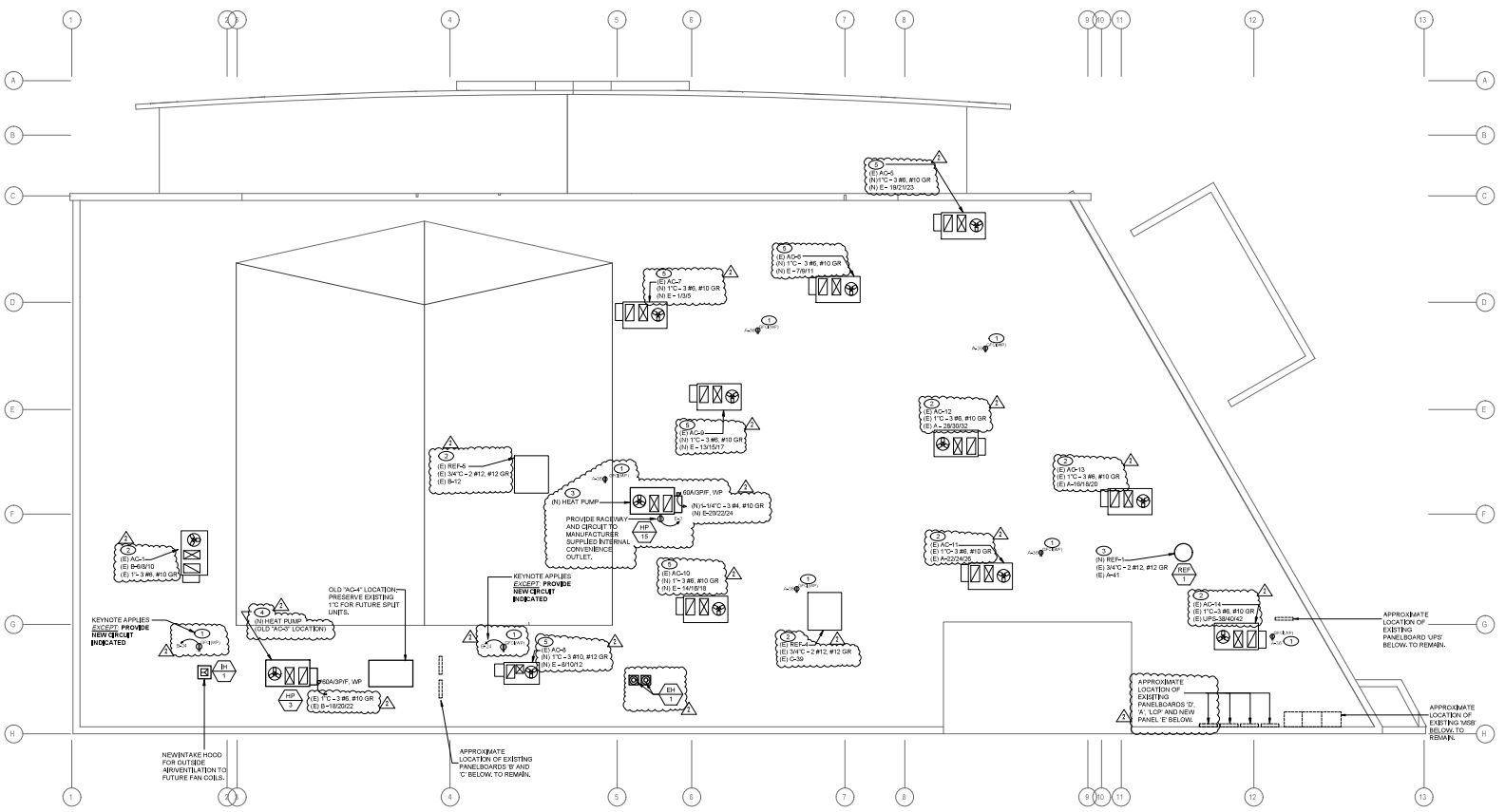
COM-2310004

This document is for plan review only

C:\Users\kdacey\Documents\NSHL_kelly.dacey.YSC4T.rvt
1/9/2023 11:36:41 AM

KEYNOTES

1. INSTALL (N) 20A GFCI SERVICE RECEPTACLE FROM (E) STUB-UP USING (E) CIRCUIT CONDUCTORS, EXTEND CONDUIT AS NEEDED FOR A COMPLETE INSTALLATION.
2. RE-INSTALL (E) DISCONNECT SWITCH AND BRING CONDUCTORS FROM (E) STUB-UP TO DISCONNECT, MAKE ALL LINE AND LOAD TERMINATIONS TO DISCONNECT AND (E) UNIT. EXTEND CONDUIT/CONDUCTORS AS NECESSARY TO COMPLETE INSTALLATION.
3. UTILIZE EXISTING STUB-UP IF AVAILABLE OR COORDINATE WITH MECHANICAL FOR EXACT LOCATION TO PENETRATE ROOF AND INSTALL CONDUIT STUB-UP THROUGH PENETRATION FOR (N) UNIT POWER. BRING (N) CONDUCTORS FROM STUB-UP TO DISCONNECT, MAKE ALL LINE AND LOAD TERMINATIONS TO DISCONNECT AND (N) UNIT. EXTEND CONDUIT/CONDUCTORS AS NECESSARY TO COMPLETE INSTALLATION.
4. INSTALL (N) DISCONNECT SWITCH AND BRING (E) CONDUCTORS FROM (E) STUB-UP TO DISCONNECT, MAKE ALL LINE AND LOAD TERMINATIONS TO DISCONNECT AND (N) UNIT. EXTEND CONDUIT/CONDUCTORS AS NECESSARY TO COMPLETE INSTALLATION.
5. RE-INSTALL (E) DISCONNECT SWITCH, RE-ROUTE AND EXTEND EXISTING RACEWAYS AND FEEDER CONDUCTORS TO NEW SOURCE PANEL AND CIRCUIT SHOWN. MAKE LINE AND LOAD CONNECTIONS TO DISCONNECT AND (E) UNIT.



1 ELECTRICAL ROOF PLAN - NEW BASE DESIGN
SCALE: 1/8" = 1'-0"

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS
APPROVED
ELECTRICAL DIVISION
By: Nick Larson
on Sep 27, 2023

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

Not to be used for Construction

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the approved construction plans.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

JOB COPY

PBK

ARCHITECT: PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-355-8992 P

MEP Engineering
LEAF Engineering
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-294-8992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

Exp. 08/31/2024
ELECTRICAL ENGINEER
STATE OF CALIFORNIA

CLIENT: CITY OF SACRAMENTO
PROJECT NUMBER: 220389
DATE: 09/07/2023
DRAWN BY: K.S. CHKED BY: L.M.

REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	9/15/23
2	BACKCHECK 2	9/18/23

CONSTRUCTION DOCUMENT

ELECTRICAL ROOF PLAN - NEW - BASE DESIGN

This document is for plan review only

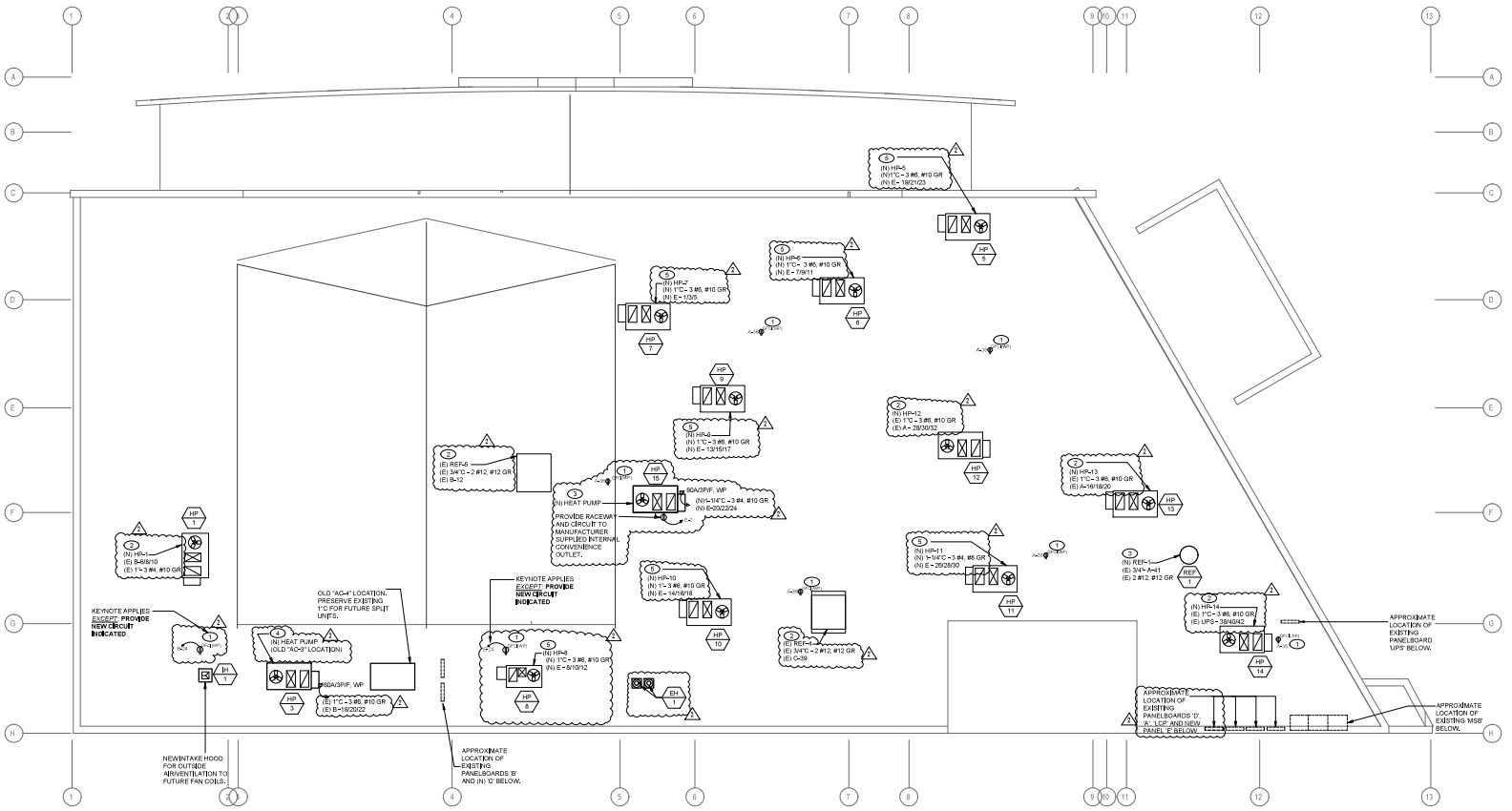
COM-2310004

E4.01

C:\Users\kdavy\Documents\NSHL_kelly.davy.YSC4T.rvt
1/9/2023 11:36:41 AM

KEYNOTES

1. INSTALL (N) 20A GFCI SERVICE RECEPTACLE FROM (E) STUB-UP USING (E) CIRCUIT CONDUCTORS. EXTEND CONDUIT AS NEEDED FOR A COMPLETE INSTALLATION.
2. RE-INSTALL (E) DISCONNECT SWITCH AND BRING CONDUCTORS FROM (E) STUB-UP TO DISCONNECT. MAKE ALL LINE AND LOAD TERMINATIONS TO DISCONNECT AND (N) UNIT. EXTEND CONDUIT/CONDUCTORS AS NECESSARY TO COMPLETE INSTALLATION.
3. UTILIZE EXISTING STUB-UP IF AVAILABLE OR COORDINATE WITH MECHANICAL FOR EXACT LOCATION TO PENETRATE ROOF AND INSTALL CONDUIT STUB-UP THROUGH PENETRATION FOR (N) UNIT POWER. BRING (N) CONDUCTORS FROM STUB-UP TO DISCONNECT. MAKE ALL LINE AND LOAD TERMINATIONS TO DISCONNECT AND (N) UNIT. EXTEND CONDUIT/CONDUCTORS AS NECESSARY TO COMPLETE INSTALLATION.
4. INSTALL (N) DISCONNECT SWITCH AND BRING (E) CONDUCTORS FROM (E) STUB-UP TO DISCONNECT. MAKE ALL LINE AND LOAD TERMINATIONS TO DISCONNECT AND (N) UNIT. EXTEND CONDUIT/CONDUCTORS AS NECESSARY TO COMPLETE INSTALLATION.
5. IF AMPACITY RATING OF (E) DISCONNECT SWITCH AND FUSES IS SUFFICIENT FOR NEW UNIT, RE-INSTALL IF EXISTING DISCONNECT SWITCH AND FUSES ARE NOT RATED FOR THE NEW UNIT'S AMPACITY. PROVIDE NEW DISCONNECT AND FUSES PER CEC TO MATCH. PROVIDE NEW RACEWAYS AND FEEDER CONDUCTORS TO NEW SOURCE PANEL AND CIRCUITS SHOWN. MAKE LINE AND LOAD CONNECTIONS TO DISCONNECT AND (N) UNIT.



1 ELECTRICAL ROOF PLAN - NEW (ADDITIVE ALTERNATE #1)
SCALE: 1/8" = 1'-0"

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS
APPROVED
City of Sacramento Plan Review
ELECTRICAL DIVISION
By: Nick Larson
on Sep 27, 2023

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.
Not for Construction

PBK

JOB COPY

ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
919-395-6992 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
919-395-6992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH
TRUE NORTH

REGISTERED PROFESSIONAL ENGINEER
RONALD C. DELA CRUZ
No. E 23576
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220089
DATE 09/07/2023
DRAWN BY: K.G. CHECKED BY: L.M.
REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	8/23/23
2	BACKCHECK 2	8/10/23

CONSTRUCTION DOCUMENT

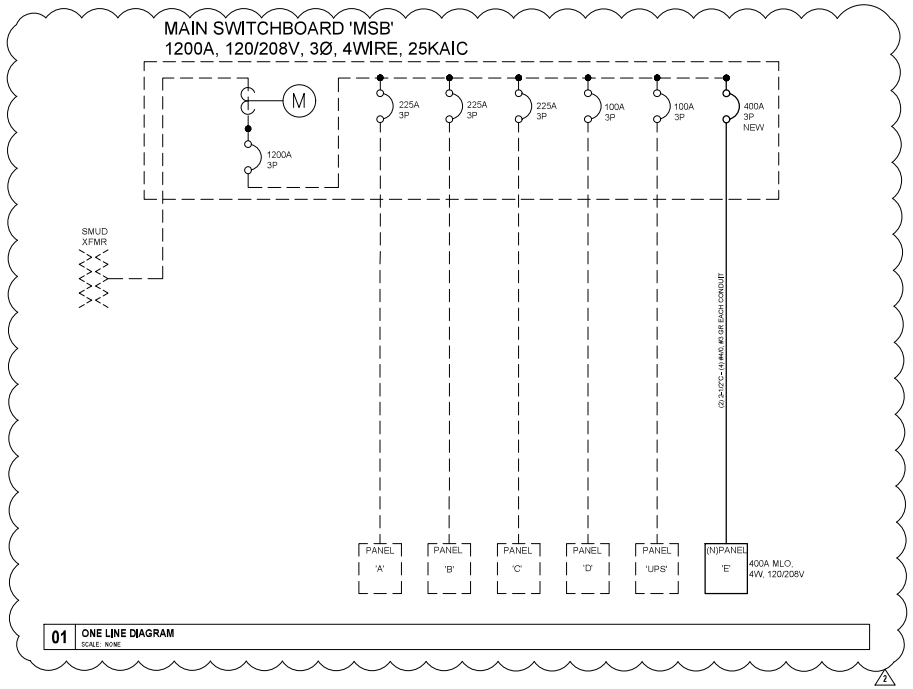
ELECTRICAL ROOF PLAN - NEW - ADDITIVE ALTERNATE #1

This document is for plan review only

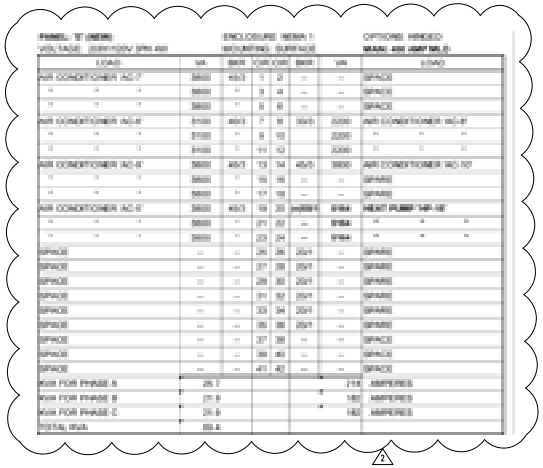
COM-231004

E4.02

C:\Users\kclancy\Documents\NSHL_Nelly.clancy\YSZ4T.rvt
1/9/2023 11:36:41 AM



01 ONE LINE DIAGRAM
SCALE: NONE



THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS
APPROVED
City of Sacramento Plan Review
ELECTRICAL DIVISION
By: Nick Larson
on Sep 27, 2023

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023
Not for Permitting or Construction
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK

JOB COPY

ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-355-6992 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-355-6992 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

REGISTERED PROFESSIONAL ENGINEER
RICHARD C. DELA CRUZ
No. E 23676
Exp.
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: K.G. CHECKED BY: L.M.
REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	6/8/23
2	BACKCHECK 2	8/10/23

CONSTRUCTION DOCUMENT

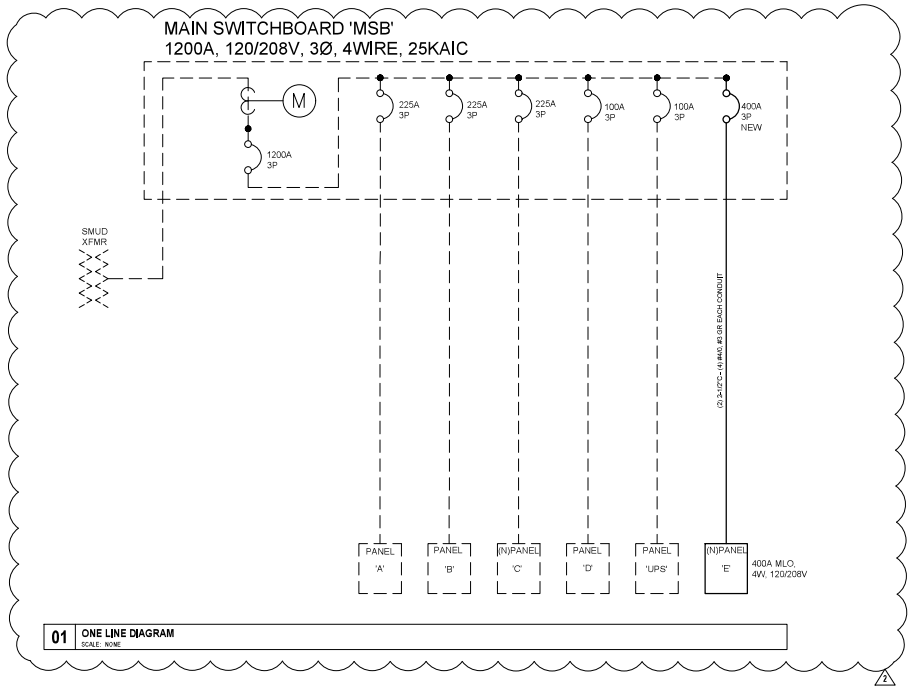
ONE LINE & NEW PANEL SCHEDULES - BASE DESIGN

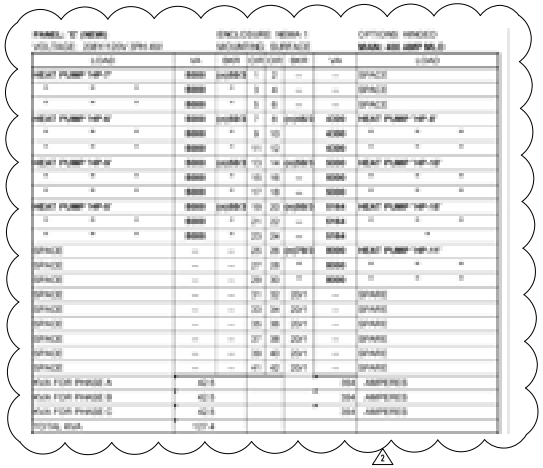
This document is for plan review only

COM-2310004

E6.01

C:\Users\clancy\Documents\NSHL_kelly.clancy\E2-47.rvt
1/9/2023 11:36:41 AM





THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

APPROVED
City of Sacramento Plan Review
ELECTRICAL DIVISION
By: Nick Larson
on Sep 27, 2023

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

Not for Permitting or Construction

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK

JOB COPY

ARCHITECT PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-355-6902 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-355-6902 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF
ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

SACRAMENTO

A

KEY PLAN

PLAN NORTH
TRUE NORTH

REGISTERED PROFESSIONAL ENGINEER
RICHARD C. DELA CRUZ
No. E 23576
Exp.
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: K.G. CHECKED BY: L.M.
REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	6/23/23
2	BACKCHECK 2	8/17/23

CONSTRUCTION DOCUMENT
ONE LINE & NEW
PANEL SCHEDULES
ADD. ALTERNATE #1

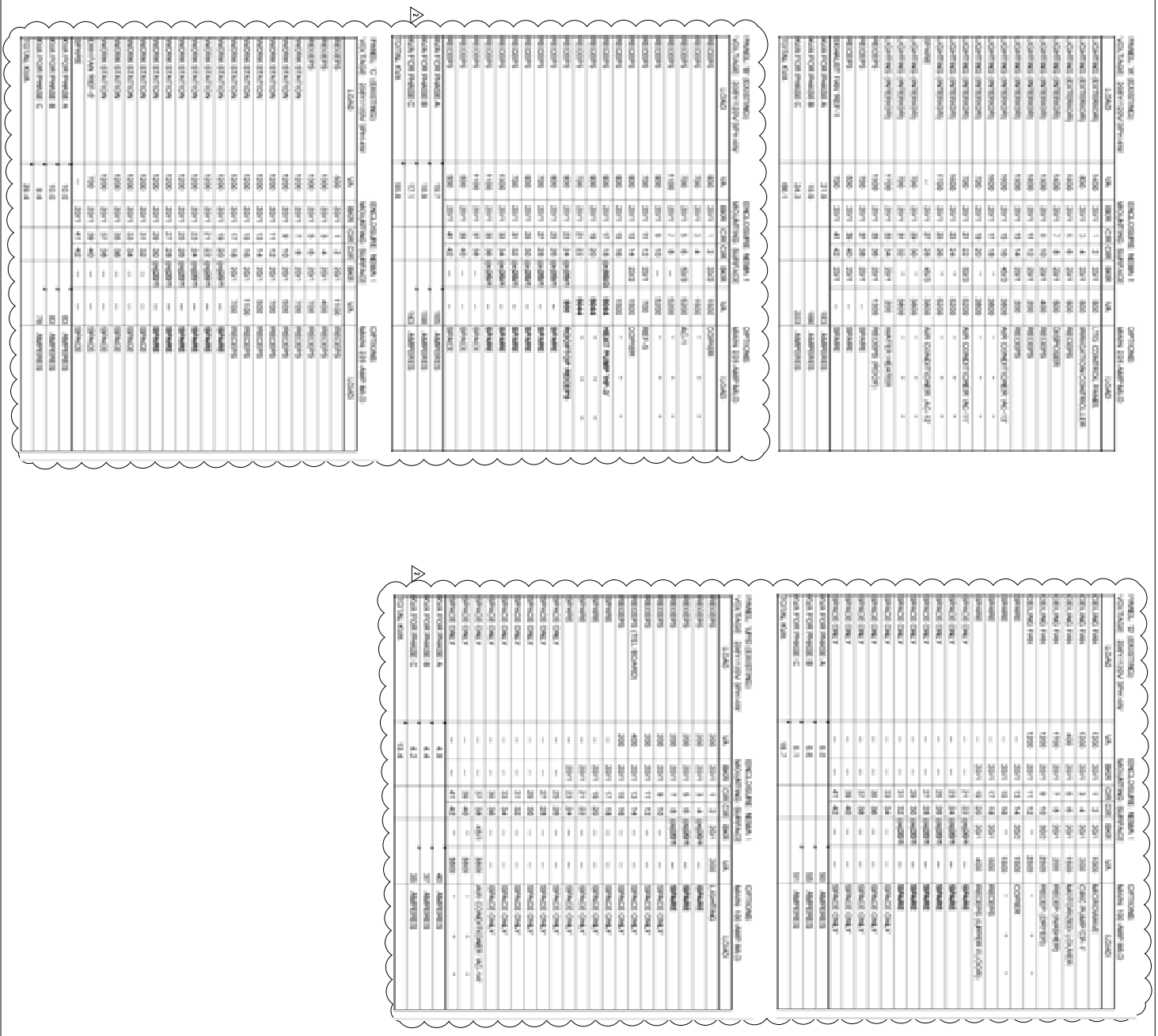
This document is for plan review only.

COM-2310004

E6.02

C:\Users\lclancy\Documents\NSHL_Jeffy.clancy\YSZ47.rvt
1/9/2023 11:36:41 AM

PANEL 'A' (EXISTING) — ENCLOSURE: NEMA 1 — OPTIONS:
VOLTAGE: 208Y/120V 3PH-4W — MOUNTING: SURFACE — MAIN: 225 AMP MLO



LOAD	VA	BKR	CIR	CIR	BKR	VA	LOAD
LIGHTING (EXTERIOR)	1400	20/1	1	2	20/1	600	LTG CONTROL PANEL
LIGHTING (EXTERIOR)	800	20/1	3	4	20/1	600	IRRIGATION CONTROLLER
LIGHTING (EXTERIOR)	1400	20/1	5	6	20/1	600	RECEPS
LIGHTING (INTERIOR)	1400	20/1	7	8	20/1	600	DISPOSER
LIGHTING (INTERIOR)	1400	20/1	9	10	20/1	400	RECEPS
LIGHTING (INTERIOR)	1400	20/1	11	12	20/1	200	RECEPS
LIGHTING (INTERIOR)	1400	20/1	13	14	20/1	200	RECEPS
LIGHTING (INTERIOR)	1400	20/1	15	16	40/2	2600	AIR CONDITIONER (AC-12)
LIGHTING (INTERIOR)	1400	20/1	17	18	--	2600	" " "
LIGHTING (INTERIOR)	700	20/1	19	20	--	2600	" " "
LIGHTING (INTERIOR)	700	20/1	21	22	50/2	5200	AIR CONDITIONER (AC-11)
LIGHTING (INTERIOR)	1400	20/1	23	24	--	5200	" " "
LIGHTING (INTERIOR)	1700	20/1	25	26	--	5200	" " "
SPARE	--	20/1	27	28	45/3	5600	AIR CONDITIONER (AC-12)
LIGHTING (INTERIOR)	700	20/1	29	30	--	5600	" " "
LIGHTING (INTERIOR)	700	20/1	31	32	--	5600	" " "
LIGHTING (INTERIOR)	1700	20/1	33	34	20/1	200	WATER HEATER
RECEPS	1500	20/1	35	36	20/1	1500	RECEPS (ROOF)
RECEPS	700	20/1	37	38	20/1	--	SPARE
RECEPS	500	20/1	39	40	20/1	--	SPARE
EXHAUST FAN REF-1	700	20/1	41	42	20/1	--	SPARE
KVA FOR PHASE A	21.9					183	AMPERES
KVA FOR PHASE B	19.9					166	AMPERES
KVA FOR PHASE C	24.3					203	AMPERES
TOTAL KVA	66.1						

PANEL 'B' (EXISTING) — ENCLOSURE: NEMA 1 — OPTIONS:
VOLTAGE: 208Y/120V 3PH-4W — MOUNTING: SURFACE — MAIN: 225 AMP MLO

LOAD	VA	BKR	CIR	CIR	BKR	VA	LOAD
RECEPS	800	20/1	1	2	20/2	1500	COPIER
RECEPS	700	20/1	3	4		1500	" " "
RECEPS	700	20/1	5	6	50/3	5200	AC-1
RECEPS	1100	20/1	7	8	--	5200	" " "
RECEPS	800	20/1	9	10	--	5200	" " "
RECEPS	700	20/1	11	12	20/1	700	REF-5
RECEPS	800	20/1	13	14	20/2	1500	COPIER
RECEPS	800	20/1	15	16		1500	" " "
RECEPS	800	20/1	17	18	(x)60/2	1044	HEAT PUMP "HP-2"
RECEPS	800	20/1	19	20		1044	" " "
RECEPS	700	20/1	21	22		1044	" " "
RECEPS	800	20/1	23	24	(x)20/1	1500	ROOFTOP RECEPS
RECEPS	800	20/1	25	26	(x)20/1	--	SPARE
RECEPS	700	20/1	27	28	(x)20/1	--	SPARE
RECEPS	800	20/1	29	30	(x)20/1	--	SPARE
RECEPS	700	20/1	31	32	(x)20/1	--	SPARE
RECEPS	1500	20/1	33	34	(x)20/1	--	SPARE
RECEPS	1100	20/1	35	36	(x)20/1	--	SPARE
RECEPS	1100	20/1	37	38	--	--	SPACE
RECEPS	500	20/1	39	40	--	--	SPACE
RECEPS	500	20/1	41	42	--	--	SPACE
KVA FOR PHASE A	19.7					165	AMPERES
KVA FOR PHASE B	19.9					166	AMPERES
KVA FOR PHASE C	17.1					143	AMPERES
TOTAL KVA	56.8						

PANEL 'C' (EXISTING) — ENCLOSURE: NEMA 1 — OPTIONS:
VOLTAGE: 208Y/120V 3PH-4W — MOUNTING: SURFACE — MAIN: 225 AMP MLO

LOAD	VA	BKR	CIR	CIR	BKR	VA	LOAD
RECEPS	500	20/1	1	2	20/1	1100	RECEPS
RECEPS	1500	20/1	3	4	20/1	400	RECEPS
RECEPS	1500	20/1	5	6	20/1	700	RECEPS
WORK STATION	1200	20/1	7	8	20/1	700	RECEPS
WORK STATION	1200	20/1	9	10	20/1	500	RECEPS
WORK STATION	1200	20/1	11	12	20/1	700	RECEPS
WORK STATION	1200	20/1	13	14	20/1	500	RECEPS
WORK STATION	1200	20/1	15	16	20/1	1100	RECEPS
WORK STATION	1200	20/1	17	18	20/1	700	RECEPS
WORK STATION	1200	20/1	19	20	(x)20/1	--	SPARE
WORK STATION	1200	20/1	21	22	(x)20/1	--	SPARE
WORK STATION	1200	20/1	23	24	(x)20/1	--	SPARE
WORK STATION	1200	20/1	25	26	(x)20/1	--	SPARE
WORK STATION	1200	20/1	27	28	(x)20/1	--	SPARE
WORK STATION	1200	20/1	29	30	(x)20/1	--	SPARE
WORK STATION	1200	20/1	31	32	--	--	SPACE
WORK STATION	1200	20/1	33	34	--	--	SPACE
WORK STATION	1200	20/1	35	36	--	--	SPACE
WORK STATION	1200	20/1	37	38	--	--	SPACE
EXHAUST FAN REF-2	700	20/1	39	40	--	--	SPACE
SPARE	--	20/1	41	42	--	--	SPACE
KVA FOR PHASE A	10.0					83	AMPERES
KVA FOR PHASE B	10.0					83	AMPERES
KVA FOR PHASE C	9.4					78	AMPERES
TOTAL KVA	29.4						

PANEL 'D' (EXISTING) — ENCLOSURE: NEMA 1 — OPTIONS:
VOLTAGE: 208Y/120V 3PH-4W — MOUNTING: SURFACE — MAIN: 100 AMP MLO

LOAD	VA	BKR	CIR	CIR	BKR	VA	LOAD
CEILING FAN	1200	20/1	1	2	20/1	1500	MICROWAVE
CEILING FAN	1200	20/1	3	4	20/1	200	CMC PUMP CR-1
CEILING FAN	400	20/1	5	6	20/1	1500	MOTORIZED CLEANER
CEILING FAN	1700	20/1	7	8	20/1	200	RECEP (WASHER)
CEILING FAN	1200	20/1	9	10	20/1	2500	RECEP (DRYER)
CEILING FAN	1200	20/1	11	12	--	2500	" " "
SPARE	--	20/1	13	14	20/1	1500	COPIER
SPARE	--	20/1	15	16	--	1500	" " "
SPARE	--	20/1	17	18	20/1	1500	RECEPS
SPARE	--	20/1	19	20	20/1	400	RECEPS (UPPER FLOOR)
SPACE ONLY	--	--	21	22	(x)20/1	--	SPARE
SPACE ONLY	--	--	23	24	(x)20/1	--	SPARE
SPACE ONLY	--	--	25	26	(x)20/1	--	SPARE
SPACE ONLY	--	--	27	28	(x)20/1	--	SPARE
SPACE ONLY	--	--	29	30	(x)20/1	--	SPARE
SPACE ONLY	--	--	31	32	(x)20/1	--	SPARE
SPACE ONLY	--	--	33	34	--	--	SPACE ONLY
SPACE ONLY	--	--	35	36	--	--	SPACE ONLY
SPACE ONLY	--	--	37	38	--	--	SPACE ONLY
SPACE ONLY	--	--	39	40	--	--	SPACE ONLY
SPACE ONLY	--	--	41	42	--	--	SPACE ONLY
KVA FOR PHASE A	6.8					50	AMPERES
KVA FOR PHASE B	6.8					50	AMPERES
KVA FOR PHASE C	6.1					51	AMPERES
TOTAL KVA	18.7						

PANEL 'LPS' (EXISTING) — ENCLOSURE: NEMA 1 — OPTIONS:
VOLTAGE: 208Y/120V 3PH-4W — MOUNTING: SURFACE — MAIN: 100 AMP MLO

LOAD	VA	BKR	CIR	CIR	BKR	VA	LOAD
RECEPS	200	20/1	1	2	20/1	200	LIGHTING
RECEPS	200	20/1	3	4	(x)20/1	--	SPARE
RECEPS	200	20/1	5	6	(x)20/1	--	SPARE
RECEPS	200	20/1	7	8	(x)20/1	--	SPARE
RECEPS	200	20/1	9	10	--	--	SPACE ONLY
RECEPS	200	20/1	11	12	--	--	SPACE ONLY
RECEPS (TEL BOARD)	400	20/1	13	14	--	--	SPACE ONLY
RECEPS	200	20/1	15	16	--	--	SPACE ONLY
SPARE	--	20/1	17	18	--	--	SPACE ONLY
SPARE	--	20/1	19	20	--	--	SPACE ONLY
SPARE	--	20/1	21	22	--	--	SPACE ONLY
SPARE	--	20/1	23	24	--	--	SPACE ONLY
SPACE ONLY	--	--	25	26	--	--	SPACE ONLY
SPACE ONLY	--	--	27	28	--	--	SPACE ONLY
SPACE ONLY	--	--	29	30	--	--	SPACE ONLY
SPACE ONLY	--	--	31	32	--	--	SPACE ONLY
SPACE ONLY	--	--	33	34	--	--	SPACE ONLY
SPACE ONLY	--	--	35	36	--	--	SPACE ONLY
SPACE ONLY	--	--	37	38	45/3	5600	AIR CONDITIONER (AC-14)
SPACE ONLY	--	--	39	40	--	5600	" " "
SPACE ONLY	--	--	41	42	--	5600	" " "
KVA FOR PHASE A	4.8					40	AMPERES
KVA FOR PHASE B	4.4					37	AMPERES
KVA FOR PHASE C	4.2					35	AMPERES
TOTAL KVA	13.4						

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS
APPROVED
City of Sacramento Plan Review
ELECTRICAL DIVISION
By: Nick Larson
on Sep 27, 2023

ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

Not for Construction

PBK

JOB COPY

ARCHITECT — PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
919-233-5900 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
919-233-5902 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: K.G. CHECKED BY: L.M.
REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	9/5/23
2	BACKCHECK 2	9/7/23

CONSTRUCTION DOCUMENT

EXISTING PANEL SCHEDULES - BASE DESIGN

This document is for plan review only

COM-2310004

E6.03

C:\Users\lucbancy\Documents\NSHL_Jelly.cbancy\FSZ47.rvt
10/2023 11:36:41 AM

PANEL "H" (NEW) — ENCLOSURE: NEMA 1 — MOUNTING: SURFACE — OPTIONS: MAIN: 225 AMP MLO

VOLTAGE: 208Y/120V 3PH 4W

LOAD	VA	BKR	CIR	CIR	BKR	VA	LOAD
LIGHTING (EXTERIOR)	1400	20/1	1	2	20/1	600	LTG CONTROL PANEL
LIGHTING (EXTERIOR)	800	20/1	3	4	20/1	600	IRRIGATION CONTROLLER
LIGHTING (EXTERIOR)	1400	20/1	5	6	20/1	500	RECEPS
LIGHTING (INTERIOR)	1400	20/1	7	8	20/1	500	DISPOSER
LIGHTING (INTERIOR)	1300	20/1	9	10	20/1	400	RECEPS
LIGHTING (INTERIOR)	1600	20/1	11	12	20/1	200	RECEPS
LIGHTING (INTERIOR)	1300	20/1	13	14	20/1	200	RECEPS
LIGHTING (INTERIOR)	1600	20/1	15	16	(2)(60)3	5000	HEAT PUMP "HP-12"
LIGHTING (INTERIOR)	1600	20/1	17	18	"	5000	" " "
LIGHTING (INTERIOR)	700	20/1	19	20	"	5000	" " "
LIGHTING (INTERIOR)	700	20/1	21	22	20/1	—	SPARE
LIGHTING (INTERIOR)	1600	20/1	23	24	20/1	—	SPARE
LIGHTING (INTERIOR)	1700	20/1	25	26	20/1	—	SPARE
SPARE	—	20/1	27	28	(2)(60)3	5000	HEAT PUMP "HP-12"
LIGHTING (INTERIOR)	700	20/1	29	30	"	5000	" " "
LIGHTING (INTERIOR)	700	20/1	31	32	"	5000	" " "
LIGHTING (INTERIOR)	1700	20/1	33	34	20/1	300	WATER HEATER
RECEPS	1300	20/1	35	36	20/1	1300	RECEPS (ROOF)
RECEPS	700	20/1	37	38	20/1	—	SPARE
RECEPS	500	20/1	39	40	20/1	—	SPARE
EXHAUST FAN FCF-1	700	20/1	41	42	20/1	—	SPARE
KVA FOR PHASE A	19.1					159	AMPERES
KVA FOR PHASE B	17.1					143	AMPERES
KVA FOR PHASE C	21.5					179	AMPERES
TOTAL KVA	62.7						

PANEL "B" (EXISTING) — ENCLOSURE: NEMA 1 — MOUNTING: SURFACE — OPTIONS: MAIN: 225 AMP MLO

VOLTAGE: 208Y/120V 3PH 4W

LOAD	VA	BKR	CIR	CIR	BKR	VA	LOAD
RECEPS	900	20/1	1	2	20/2	1500	COPIER
RECEPS	700	20/1	3	4		1500	" " "
RECEPS	700	20/1	5	6	(2)(70)3	5000	HEAT PUMP "HP-1"
RECEPS	1100	20/1	7	8	—	5000	" " "
RECEPS	900	20/1	9	10	—	5000	" " "
RECEPS	700	20/1	11	12	20/1	700	REF-5
RECEPS	900	20/1	13	14	20/2	1500	COPIER
RECEPS	900	20/1	15	16		1500	" " "
RECEPS	900	20/1	17	18	(2)(60)3	5000	HEAT PUMP "HP-2"
RECEPS	900	20/1	19	20		5000	" " "
RECEPS	700	20/1	21	22		5000	" " "
RECEPS	900	20/1	23	24	(2)(20)1	—	ROOFTOP RECEPS
RECEPS	900	20/1	25	26	(2)(20)1	—	SPARE
RECEPS	700	20/1	27	28	(2)(20)1	—	SPARE
RECEPS	900	20/1	29	30	(2)(20)1	—	SPARE
RECEPS	700	20/1	31	32	(2)(20)1	—	SPARE
RECEPS	1000	20/1	33	34	(2)(20)1	—	SPARE
RECEPS	1100	20/1	35	36	(2)(20)1	—	SPARE
RECEPS	1100	20/1	37	38	—	—	SPACE
RECEPS	500	20/1	39	40	—	—	SPACE
RECEPS	500	20/1	41	42	—	—	SPACE
KVA FOR PHASE A	22.5					188	AMPERES
KVA FOR PHASE B	21.7					181	AMPERES
KVA FOR PHASE C	19.4					162	AMPERES
TOTAL KVA	63.7						

PANEL "C" — ENCLOSURE: NEMA 1 — MOUNTING: SURFACE — OPTIONS: MAIN: 225 AMP MLO

VOLTAGE: 208Y/120V 3PH 4W

LOAD	VA	BKR	CIR	CIR	BKR	VA	LOAD
RECEPS	1600	20/1	1	2	20/1	1500	RECEPS
RECEPS	1500	20/1	3	4	20/1	400	RECEPS
RECEPS	1500	20/1	5	6	20/1	300	RECEPS
WORK STATION	1500	20/1	7	8	20/1	700	RECEPS
WORK STATION	1500	20/1	9	10	20/1	500	RECEPS
WORK STATION	1500	20/1	11	12	20/1	700	RECEPS
WORK STATION	1500	20/1	13	14	20/1	500	RECEPS
WORK STATION	1500	20/1	15	16	20/1	1500	RECEPS
WORK STATION	1500	20/1	17	18	20/1	700	RECEPS
WORK STATION	1500	20/1	19	20	(2)(20)1	—	SPARE
WORK STATION	1500	20/1	21	22	(2)(20)1	—	SPARE
WORK STATION	1500	20/1	23	24	(2)(20)1	—	SPARE
WORK STATION	1500	20/1	25	26	(2)(20)1	—	SPARE
WORK STATION	1500	20/1	27	28	(2)(20)1	—	SPARE
WORK STATION	1500	20/1	29	30	(2)(20)1	—	SPARE
WORK STATION	1500	20/1	31	32	—	—	SPARE
WORK STATION	1500	20/1	33	34	—	—	SPARE
WORK STATION	1500	20/1	35	36	—	—	SPARE
WORK STATION	1500	20/1	37	38	—	—	SPARE
EXH FAN REF-5	700	20/1	39	40	—	—	SPARE
SPARE	—	20/1	41	42	—	—	SPARE
KVA FOR PHASE A	10.0					80	AMPERES
KVA FOR PHASE B	10.0					80	AMPERES
KVA FOR PHASE C	9.6					76	AMPERES
TOTAL KVA	29.6						

PANEL "D" (EXISTING) — ENCLOSURE: NEMA 1 — MOUNTING: SURFACE — OPTIONS: MAIN: 100 AMP MLO

VOLTAGE: 208Y/120V 3PH 4W

LOAD	VA	BKR	CIR	CIR	BKR	VA	LOAD
DELING FAN	1300	20/1	1	2	20/1	1500	MICROWAVE
DELING FAN	1300	20/1	3	4	20/1	300	CHIC PUMP CR-1
DELING FAN	400	20/1	5	6	20/1	1500	MOTORIZED LOUVER
DELING FAN	1700	20/1	7	8	20/1	200	RECEP (WASHER)
DELING FAN	1200	20/1	9	10	30/2	2500	RECEP (DRYER)
DELING FAN	1200	20/1	11	12	"	2500	" " "
SPARE	—	20/1	13	14	20/2	1500	COPIER
SPARE	—	20/1	15	16	"	1500	" " "
SPARE	—	20/1	17	18	20/1	500	RECEPS
SPARE	—	20/1	19	20	20/1	400	RECEPS (UPPER FLOOR)
SPACE ONLY	—	—	21	22	(2)(20)1	—	SPARE
SPACE ONLY	—	—	23	24	(2)(20)1	—	SPARE
SPACE ONLY	—	—	25	26	(2)(20)1	—	SPARE
SPACE ONLY	—	—	27	28	(2)(20)1	—	SPARE
SPACE ONLY	—	—	29	30	(2)(20)1	—	SPARE
SPACE ONLY	—	—	31	32	(2)(20)1	—	SPARE
SPACE ONLY	—	—	33	34	—	—	SPACE ONLY
SPACE ONLY	—	—	35	36	—	—	SPACE ONLY
SPACE ONLY	—	—	37	38	—	—	SPACE ONLY
SPACE ONLY	—	—	39	40	—	—	SPACE ONLY
SPACE ONLY	—	—	41	42	—	—	SPACE ONLY
KVA FOR PHASE A	6.8					50	AMPERES
KVA FOR PHASE B	6.8					50	AMPERES
KVA FOR PHASE C	6.1					51	AMPERES
TOTAL KVA	18.7						

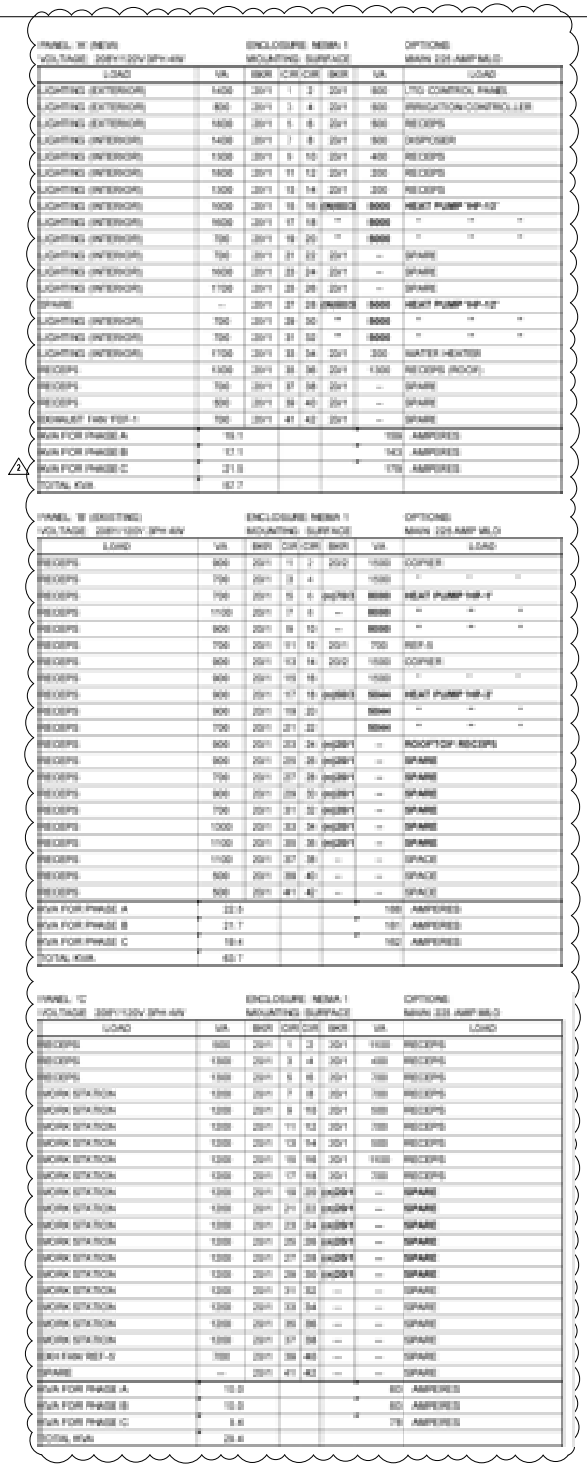
PANEL "UPS" (EXISTING) — ENCLOSURE: NEMA 1 — MOUNTING: SURFACE — OPTIONS: MAIN: 100 AMP MLO

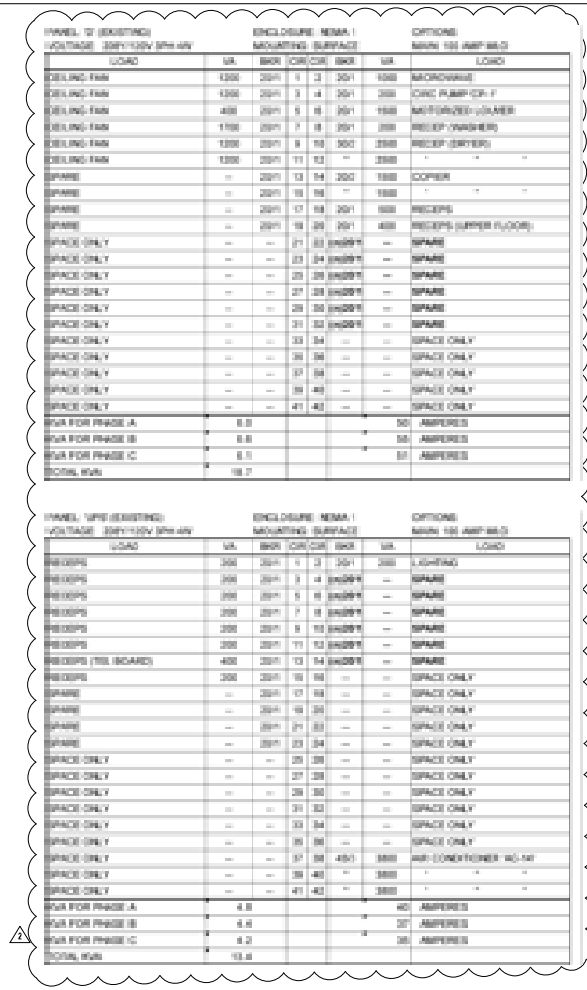
VOLTAGE: 208Y/120V 3PH 4W

LOAD	VA	BKR	CIR	CIR	BKR	VA	LOAD
RECEPS	200	20/1	1	2	20/1	200	LIGHTING
RECEPS	200	20/1	3	4	(2)(20)1	—	SPARE
RECEPS	200	20/1	5	6	(2)(20)1	—	SPARE
RECEPS	200	20/1	7	8	(2)(20)1	—	SPARE
RECEPS	200	20/1	9	10	(2)(20)1	—	SPARE
RECEPS	200	20/1	11	12	(2)(20)1	—	SPARE
RECEPS (TEL BOARD)	400	20/1	13	14	(2)(20)1	—	SPARE
RECEPS	200	20/1	15	16	—	—	SPACE ONLY
SPARE	—	20/1	17	18	—	—	SPACE ONLY
SPARE	—	20/1	19	20	—	—	SPACE ONLY
SPARE	—	20/1	21	22	—	—	SPACE ONLY
SPARE	—	20/1	23	24	—	—	SPACE ONLY
SPACE ONLY	—	—	25	26	—	—	SPACE ONLY
SPACE ONLY	—	—	27	28	—	—	SPACE ONLY
SPACE ONLY	—	—	29	30	—	—	SPACE ONLY
SPACE ONLY	—	—	31	32	—	—	SPACE ONLY
SPACE ONLY	—	—	33	34	—	—	SPACE ONLY
SPACE ONLY	—	—	35	36	—	—	SPACE ONLY
SPACE ONLY	—	—	37	38	40/1	3800	AIR CONDITIONER AC-14
SPACE ONLY	—	—	39	40	"	3800	" " "
SPACE ONLY	—	—	41	42	"	3800	" " "
KVA FOR PHASE A	4.8					40	AMPERES
KVA FOR PHASE B	4.4					37	AMPERES
KVA FOR PHASE C	4.2					35	AMPERES
TOTAL KVA	13.4						

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

APPROVED
City of Sacramento Plan Review
ELECTRICAL DIVISION
By: Nick Larson
on Sep 27, 2023





ISSUED BY
Community Development Department
By: Jason Hone
on Oct 05, 2023

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

Not for Construction

PBK

JOB COPY

ARCHITECT
PBK Architects, Inc.
PBK Architects
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-235-0002 P

MEP Engineering
LEAF ENGINEERS
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
916-235-0002 P

NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

REGISTERED PROFESSIONAL ENGINEER
PHILIP D. DEL PASO
No. E 13678
Exp. 06/30/2023
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 09/07/2023
DRAWN BY: K.G. CHECKED BY: L.M.

REVISIONS

#	DESCRIPTION	DATE
1	BACKCHECK 1	9/8/23
2	BACKCHECK 2	9/7/23

CONSTRUCTION DOCUMENT

EXISTING PANEL SCHEDULES - ADDITIVE ALTERNATE #1

This document is for plan review only.

COM-2310004

E6.04

C:\Users\kclancy\Documents\NSHL_kelly.clancy\FSZ47.rvt
10/2023 11:36:41 AM

CITY OF SACRAMENTO

NORTH SACRAMENTO HAGGINWOOD LIBRARY

MAY 23, 2025
CONSTRUCTION DOCUMENT

APPROVED
ON CALIFORNIA BUILDING CODE
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

GENERAL NOTES

1. THESE DRAWINGS DO NOT CONTAIN THE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.

2. LOCATIONS OF ALL UTILITIES SHOWN ARE APPROXIMATE AND CONTRACTOR SHALL EXERCISE EXTREME CAUTION IN EXCAVATING AND TRENCHING ON THIS SITE TO AVOID INTERCEPTING EXISTING PIPING OR CONDUITS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES WHETHER SHOWN HEREON OR NOT AND TO PROTECT THEM FROM DAMAGE. THE ARCHITECT IS NOT RESPONSIBLE FOR THE LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN OR DETAILED AND INSTALLED BY ANY OTHER CONTRACT. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT SHOULD ANY UNIDENTIFIED CONDITIONS BE DISCOVERED. THE CONTRACTOR SHALL BEAR ALL EXPENSE OF REPAIR OR REPLACEMENT OF UTILITIES OR OTHER PROPERTY DAMAGED BY OPERATIONS IN CONJUNCTION WITH THE EXECUTION OF THIS WORK. CONTRACTOR IS REQUIRED TO CONTACT AND SUBMIT A TICKET WITH 8-1-1 PRIOR TO ANY DIGGING. CALL 8-1-1 OR VISIT USANORTH811.ORG

3. THESE DOCUMENTS AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, ARE THE PROPERTY OF PBK ARCHITECTS, INC., AND ARE NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF PBK ARCHITECTS, INC.

4. EACH CONTRACTOR SHALL POSSESS A CLASS B OR THE APPROPRIATE CLASS C CONTRACTOR'S LICENSE PURSUANT TO PUBLIC CONTRACT CODE SECTION 3300 AND BUSINESS AND PROFESSIONS CODE SECTION 7028.15. THE SUCCESSFUL BIDDER MUST MAINTAIN THE LICENSE THROUGHOUT THE DURATION OF THIS CONTRACT.

5. FIRE SAFETY DURING CONSTRUCTION

A. GENERAL: FIRE SAFETY DURING CONSTRUCTION SHALL COMPLY WITH CALIFORNIA FIRE CODE (CFC) CALIFORNIA CODE OF REGULATIONS (CCR) TITLE 24, PART 9, CHAPTER 5 AND CHAPTER 33.

B. ACCESS ROADS: FIRE DEPARTMENT ACCESS ROADS SHALL BE ESTABLISHED AND MAINTAINED IN ACCORDANCE WITH CHAPTER 5, SECTION 501.4 AND CHAPTER 33, SECTION 3310.

C. WATER SUPPLY: WATER MAINS AND HYDRANTS SHALL BE OPERATIONAL IN ACCORDANCE WITH CHAPTER 5, SECTION 501.4 AND CHAPTER 33, SECTION 3312.

D. BUILDING ACCESS: ACCESS TO BUILDINGS FOR THE PURPOSE OF FIREFIGHTING SHALL BE PROVIDED, CONSTRUCTION MATERIAL SHALL NOT BLOCK ACCESS TO BUILDINGS, HYDRANTS, OR FIRE APPLIANCES.

E. ALTERATIONS OF BUILDINGS: SHALL COMPLY WITH APPLICABLE PROVISIONS OF CHAPTER 33.

F. FIRE WATCH: MAINTAIN FIRE WATCH WHEN REQUIRED BY THE BUILDING OFFICIAL AND WHEN EXISTING FIRE PROTECTION SYSTEMS ARE SHUT DOWN FOR ALTERATIONS IN ACCORDANCE WITH CHAPTER 33, SECTION 3304.5. FIRE WATCH SHALL REMAIN IN EFFECT UNTIL EXISTING FIRE PROTECTION SYSTEMS ARE RETURNED TO SERVICE OR AS ALLOWED BY THE BUILDING OFFICIAL.

6. PENETRATIONS TO FIRE RATED MATERIALS OR ASSEMBLIES SHALL BE RESTORED TO EQUAL RATING. FIRE STOP SYSTEMS AS LISTED BY UNDERWRITERS LABORATORIES SHALL BE INSTALLED PER FIRE RESISTANCE DIRECTORY. FIRE STOP SYSTEMS SHALL BE AS SPECIFIED.

7. NONRESIDENTIAL ENERGY STANDARDS COMPLIANCE STATEMENT (TITLE 24, PART 6):

THE DESIGN INDICATED HEREIN COMPLIES WITH THE REQUIREMENTS OF THE ENERGY CONSERVATION STANDARDS OF TITLE 24, PART 6, CALIFORNIA CODE OF REGULATIONS, THE PROPOSED BUILDING(S) WILL BE IN COMPLIANCE WITH THE ENERGY CONSERVATION STANDARDS PROVIDED IT (THEY) IS (ARE) BUILT ACCORDING TO THESE DRAWINGS AND SPECIFICATIONS AND PROVIDED ANY FUTURE IMPROVEMENTS ARE COMPLETED ACCORDING TO THE REQUIREMENTS OF TITLE 24, PART 6, CALIFORNIA CODE OF REGULATIONS. THESE PLANS AND SPECIFICATIONS HAVE BEEN PREPARED TO INCLUDE ALL SIGNIFICANT ENERGY CONSERVATION FEATURES REQUIRED FOR COMPLIANCE WITH THE STANDARDS. BUILDING AREAS THAT ARE UNCONDITIONED AND/OR NOT SUBJECT TO THE STANDARDS ARE INDICATED ON THE PLANS.

ENVELOPE MANDATORY MEASURES:

A. INSTALLED INSULATING MATERIALS SHALL HAVE BEEN CERTIFIED BY THE MANUFACTURER TO COMPLY WITH THE CALIFORNIA QUALITY STANDARDS FOR INSULATING MATERIAL.

B. ALL INSULATING MATERIALS SHALL BE INSTALLED IN COMPLIANCE WITH THE FLAME SPREAD RATING AND SMOKE DENSITY REQUIREMENTS OF TITLE 24, PART 2, CALIFORNIA CODE OF REGULATIONS, SECTIONS 720 AND 2603.

C. ALL EXTERIOR JOINTS AND OPENINGS IN THE BUILDING ENVELOPE THAT ARE POTENTIAL AND OBSERVABLE SOURCES OF AIR LEAKAGE SHALL BE CAULKED, GASKETED, WEATHERSTRIPPED, OR OTHERWISE SEALED.

D. SITE CONSTRUCTED DOORS, WINDOWS, AND SKYLIGHTS SHALL BE CAULKED BETWEEN THE UNIT AND THE BUILDING, AND SHALL BE WEATHERSTRIPPED (EXCEPT FOR UNFRAMED GLASS DOORS AND FIRE DOORS).

E. MANUFACTURED DOORS AND WINDOWS INSTALLED SHALL HAVE AIR INFILTRATION RATES CERTIFIED BY THE MANUFACTURER IN ACCORDANCE WITH TITLE 24, PART 6, CALIFORNIA CODE OF REGULATIONS, SECTION 116.

F. MANUFACTURED FENESTRATION PRODUCTS IN THE ENVELOPE OF THE BUILDING, INCLUDING, BUT NOT LIMITED TO, WINDOWS, SLIDING GLASS DOORS, FRENCH DOORS, SKYLIGHTS, CURTAIN WALLS, AND GARDEN WINDOWS MUST BE LABELED FOR U-VALUE & SHGC IN ACCORDANCE WITH THE (NFRC) NATIONAL FENESTRATION RATING COUNCIL'S INTERIM U-VALUE & SHGC RATING PROCEDURE.

G. DEMISING R-19 WALL INSULATION SHALL BE INSTALLED IN ALL OPAQUE PORTIONS OF FRAMED WALLS (EXCEPT DOORS).

8. POWDER-DRIVEN CONCRETE FASTENERS:

A. GENERAL: USE OF POWDER-DRIVEN CONCRETE FASTENERS FOR TENSION LOADS IS LIMITED TO SUPPORT OF MINOR LOADS LIKE ACOUSTICAL CEILINGS, DUCT WORK, CONDUIT.

B. ALLOWABLE LOADS: IN GENERAL, LOADS SHOULD BE LIMITED TO LESS THAN 90 POUNDS PER ASCE 7, SECTION 13.4.5.

C. TESTING: THE OPERATOR, TOOL, AND FASTENER SHALL BE PREQUALIFIED BY THE PROJECT INSPECTOR. HE SHALL OBSERVE THE TESTING OF THE FIRST 10 FASTENER INSTALLATIONS. A TEST "PULL-OUT" LOAD OF NOT LESS THAN TWICE THE DESIGN LOAD, OR 200 POUNDS, WHICHEVER IS GREATER SHALL BE APPLIED TO THE PIN IN SUCH A MANNER AS NOT TO RESIST THE SPALLING TENDENCY OF THE CONCRETE AROUND THE PIN. THEREAFTER, RANDOM TESTS UNDER THE PROJECT INSPECTOR'S SUPERVISION SHALL BE MADE OF APPROXIMATELY 1 IN 10 PINS. EXCEPT THAT WHEN THE DESIGN LOAD EXCEEDS 100 POUNDS, ONE HALF OF THE PINS SHALL BE TESTED. SHOULD FAILURES OCCUR ON ANY PIN TESTED, ALL INSTALLATIONS MUST BE TESTED AND UNFAIR PINS REPLACED.

D. ALL POWDER-DRIVEN CONCRETE FASTENERS SHALL BE ONE OF THE FOLLOWING:

1. HILTI, INC.
   X-CP 72 PINS – WOOD PLATE – ICC/ES NO. 2379
   X-U PINS – STEEL TRACK – ICC/ES NO. 2269
2. ITW RAMSET/REDHEAD
   DRIVE PIN – WOOD PLATE – ICC/ES NO. 2690
   DRIVE PIN – STEEL TRACK – ICC/ES NO. 1799
3. SIMPSON STRONG-TIE CO., INC.
   PDPWL-300MG-WOODPLATE-ICC/ES NO. 2138
   PDPA-125-STEEL TRACK-ICC/ES NO. 2138

9. SPECIFICATIONS FOR AUTOMATIC END WELDED STUDS

A. MATERIAL: AUTOMATIC END WELDED STUDS SHALL BE NELSON GRANULAR FLUX-FILLED SHEAR CONNECTOR OR ANCHOR STUDS (OR APPROVED EQUAL). STUDS SHALL BE MANUFACTURED OF C-1010 THROUGH C-1020 COLD DRAWN STEEL WHICH CONFORMS TO ASTM A29, ICC/ES ESR-2856

B. INSTALLATION: THE STUDS SHALL BE AUTOMATICALLY END WELDED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS IN SUCH A MANNER AS TO PROVIDE COMPLETE FUSION BETWEEN THE END OF THE STUD AND THE PLATE. THERE SHOULD BE NO POROSITY OR EVIDENCE OF LACK OF FUSION BETWEEN THE WELDED END OF THE STUD AND THE PLATE. THE STUD SHALL DECREASE IN LENGTH DURING WELDING APPROXIMATELY 1/8" FOR 5/8" AND UNDER AND 3/16" FOR OVER 5/8" DIAMETER. WELDING SHALL BE DONE ONLY BY QUALIFIED WELDERS APPROVED BY THE WELDING INSPECTOR.

C. INSPECTION AND TESTS: INSPECTION, IN ACCORDANCE WITH TITLE 24, PART 2, SECTION 2213A.2, ALL THE SHOP AND FIELD WELDING OPERATIONS FOR THE AUTOMATIC END WELDED STUDS SHALL BE MADE BY A QUALIFIED WELDING INSPECTOR, THE TYPE AND CAPACITY OF THE WELDING EQUIPMENT SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND SHALL BE CHECKED AND APPROVED BY A WELDING INSPECTOR.

D. AT THE BEGINNING OF EACH DAY'S WORK, A MINIMUM OF TWO TEST STUD WELDS SHALL BE MADE WITH THE EQUIPMENT TO BE USED TO METAL WHICH IS THE SAME AS THE ACTUAL WORK PIECE. THE TEST STUDS SHALL BE SUBJECTED TO A 90° BEND TEST BY STRIKING THEM WITH A HEAVY HAMMER, AFTER THE ABOVE TEST, THE WELD SECTION SHALL NOT EXHIBIT ANY TEARING OUT OR CRACKING.

10. ALL WORK SHOWN ON THESE DRAWINGS SHALL COMPLY WITH THE REQUIREMENTS OF TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR).

11. CHANGES TO THE APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY AN ADDENDUM OR A CONSTRUCTION CHANGE DOCUMENT APPROVED BY THE CITY OF SACRAMENTO, AS REQUIRED BY TITLE 24, CCR, PART 1, SECTION 4-338.

12. GRADING PLANS, DRAINAGE IMPROVEMENTS, ROAD AND ACCESS REQUIREMENTS AND ENVIRONMENTAL HEALTH CONSIDERATIONS SHALL COMPLY WITH ALL LOCAL ORDINANCES.

13. DRINKING WATER SHALL COMPLY WITH ALL LOCAL CITY DEPARTMENT OF UTILITIES REQUIREMENTS.

14. THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS IS THAT THE WORK OF THE ADDITION, ALTERATION OR RECONSTRUCTION IS IN COMPLIANCE WITH THE REQUIREMENTS OF TITLE 24, CALIFORNIA CODE OF REGULATIONS. SHOULD ANY CONDITIONS SUCH AS DETERIORATION OR NON-COMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT IDENTIFIED BY THE CONTRACT DOCUMENTS WHERIN THE FINAL WORK WOULD NOT COMPLY WITH THE REQUIREMENTS OF TITLE 24, CALIFORNIA CODE OF REGULATIONS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND THE ARCHITECT OF THE CONDITION IN WRITING. NECESSARY INFORMATION REQUIRED TO CORRECT THE CONDITIONS ENCOUNTERED WILL BE ISSUED BY THE ARCHITECT. A CHANGE ORDER MAY BE ISSUED TO ADJUST THE CONTRACT SUM OR TIME COMMENSURATE WITH THE AMOUNT OF ADDITIONAL WORK REQUIRED, IF ANY. THE CHANGE ORDER SHALL BE APPROVED BY THE CITY OF SACRAMENTO PRIOR TO PROCEEDING WITH THE WORK REQUIRED BY THE CHANGE ORDER.

16. ALL SLOPE AND CROSS SLOPE OF ACCESSIBLE ROUTE PAVING INDICATED ON THESE DRAWINGS WAS DESIGNED IN COMPLIANCE WITH THE 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN AND THE ACCESSIBILITY STANDARDS OF THE CALIFORNIA BUILDING CODE, (CBC) TITLE 24, PART 2, CHAPTER 11B OF THE CALIFORNIA CODE OF REGULATIONS (CCR). STRICT EXECUTION OF THE SLOPE AND CROSS SLOPE OF ACCESSIBLE ROUTE PAVING IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. SHOULD A CONDITION PRESENT ITSELF THAT WOULD RESULT IN AN INSTALLATION OTHER THAN WHAT IS INDICATED IN THESE DRAWINGS, PBK ARCHITECTS, INC. SHALL BE NOTIFIED IN WRITING AND A COMPLIANT RESOLUTION WILL BE FORMULATED.

VICINITY MAP



PROJECT TEAM

OWNER
CITY OF SACRAMENTO
5730 24TH STREET, BUILDING 4
SACRAMENTO, CA 95822
PHONE: (916) 808-5877
EZRA ROATI

ARCHITECT
PBK ARCHITECTS, INC.
1110 IRON POINT ROAD, SUITE 200
FOLSOM, CA 95630
PHONE: (916) 355-9922
KELLY CLANCY

LANDSCAPE ARCHITECT
WILSON DESIGN STUDIO
1631 ALHAMBRA BLVD, SUITE 100
SACRAMENTO, CA 95861
PHONE: (916) 907-2642
JESSICA MCWILLIAMS

CIVIL ENGINEER
BKF ENGINEERS
980 9TH STREET, SUITE 2200
SACRAMENTO, CA 9514
PHONE: (916) 556-5800
MONA SADEGHIAN

STRUCTURAL ENGINEER
ZFA STRUCTURAL ENGINEERS
601 UNIVERSITY AVE, SUITE 185
SACRAMENTO, CA 95825
PHONE: (916) 924-70/2
DUDLEY MEI

MEP ENGINEER
LEAP ENGINEERS
1110 IRON POINT ROAD, SUITE 200
FOLSOM, CA 95630
PHONE: (916) 853-9494
ROLAND THOMAS

PROJECT INFORMATION

ASSESSOR PARCEL #:	275-0165-021
ADDRESS:	1124 DEL PASO BLVD SACRAMENTO, CA 95815
BUILDING AREA:	19,120 SF
CONSTRUCTION TYPE:	VB
OCCUPANCY TYPES:	A-3 B
FIRE SPRINKLER:	YES (PROPOSED)
FIRE ALARM:	YES (PROPOSED

DEFERRED APPROVAL ITEMS

1. EXTERIOR AWNINGS: STRUCTURAL DESIGN, CALCULATION, AND DRAWINGS BY A CALIFORNIA LICENSED STRUCTURAL ENGINEER FOR EXTERIOR AWNINGS, SEE A1.01 FOR AWNING LOCATION AND DIMENSIONS, SEE SPEC SECTION 10 73 00 FOR BASIS OF DESIGN INFORMATION.

SCOPE OF WORK

THE SCOPE OF THE WORK AS STATED BELOW IS FOR PLAN REVIEW PURPOSES ONLY AND DOES NOT CONSTITUTE A DETAILED AND FULL EXPLANATION OF THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

1. ADA UPGRADES AND OTHER IMPROVEMENTS TO AN EXISTING SITE. SITE IMPROVEMENTS INCLUDE BUT ARE NOT LIMITED TO: REGRADING TO ENSURE COMPLIANT PATH OF TRAVEL, EXISTING ASPHALT TO RECEIVE NEW SEAL COAT, RESTRIPING OF ENTIRE PARKING LOT, AND LANDSCAPE IMPROVEMENTS.
2. ACCESSIBLE UPGRADES INCLUDING, UPGRADED ACCESSIBLE PARKING STALLS, UPGRADED ACCESSIBLE PATH OF TRAVEL, ALL RESTROOMS BROUGHT TO COMPLIANCE, UPGRADED DOORS TO BE FULLY ACCESSIBLE, UPGRADED AND ADDITIONAL SIGNAGE THROUGHOUT THE INTERIOR AND EXTERIOR.
3. INTERIOR DEMOLITION OF EXISTING FIXTURES, INTERIOR WALLS, DOORS, CASEWORK, ETC.
4. MODIFICATION OF EXISTING INTERIOR SPACES TO MEET LIBRARY USE, TENANT IMPROVEMENT INCLUDES NEW INTERIOR PARTITIONS, NEW FINISHES, AND FURNISHINGS THROUGHOUT ALL EXISTING SPACES, CODE UPGRADES INCLUDING BUT LIMITED TO EXISTING DOORS, RESTROOMS, DRINKING FOUNTAIN ETC.
5. EXTERIOR FACADE IMPROVEMENTS.
6. EXISTING BUILDING TO RECEIVE NEW AUTOMATIC FIRE-SPRINKLER SYSTEM AND FIRE ALARM SYSTEM.
7. UPGRADES TO EXISTING MECHANICAL, ELECTRICAL, PLUMBING, TECHNOLOGY SYSTEMS TO MEET LIBRARY USE, REPLACEMENT OF PLUMBING FIXTURES AND ADDITION OF NEW FIXTURES,
8. EXISTING STRUCTURE TO BE IMPROVED AS NEEDED.

ADDITIVE ALTERNATE #1
- ROOF OPENINGS TO BE CREATED FOR NEW SOLAR TUBES, SEE A8.0/8 & 24/A11.07
- INSTALLATION OF (13) NEW TUBULAR SKYLIGHTS IN LIBRARY AREA.

ADDITIVE ALTERNATE #2
- DEMOLISH EXISTING GLAZING AT ENTIRE FRONT FACADE AND REPLACE WITH NEW ACOUSTICAL GLAZING 14 / A11.03

DEDUCTIVE ALTERNATE #1
- ELIMINATE INTERIOR TREE FEATURE; REFER TO SHEET A6.40

DEDUCTIVE ALTERNATE #2
- ELIMINATE ALL TACKBOARD, WALL AREA TO BE PAINTED INSTEAD; REFER TO A6.20 AND A6.30

SHEET NUMBERING

A2.01
- SEQUENCE (01 • 02 ... etc.)
- SHEET TYPE
- DISCIPLINE

DISCIPLINE:
G - GENERAL
D - DEMO
A - ARCHITECTURAL
F - FURNITURE
C - CIVIL
L - LANDSCAPE
S - STRUCTURAL
M - MECHANICAL
P - PLUMBING
E - ELECTRICAL
T - TECHNOLOGY
FA - FIRE ALARM
FP - FIRE PROTECTION

SHEET TYPE:
1 - SITE PLANS & DETAILS
2 - FLOOR PLANS
3 - ROOF
4 - ENLARGED PLANS
5 - PLAN DETAILS
6 - BUILDING SECTIONS, EXTERIOR/INTERIOR ELEVATIONS
7 - PARTITION TYPES & WALL SECTIONS
8 - CASEWORK DETAILS
9 - WINDOWS, DOORS, FRAME ELEVATIONS & DETAILS
10 - REFLECTED CEILING, FLOOR FINISH PLANS & DETAILS
11 - EQUIPMENT AND FURNITURE PLANS

APPROVED
ACCORDING TO BUILDING CODES
City of Sacramento Plan Review
FIRE DEPARTMENT
CONSULTANT
By: Morten Myers on Jun 19, 2025

DRAWING INDEX

GENERAL
G0.00 COVER SHEET
G0.01 STANDARDS & DRAWING CONVENTIONS
G0.10 SITE PLAN
G0.20 BUILDING DATA & CODE REVIEW
G0.30 CALGREEN CHECKLIST
G0.31 CALGREEN CHECKLIST
G0.32 CALGREEN CHECKLIST
G0.33 CALGREEN CHECKLIST

DEMOLITION
D1.01 DEMOLITION SITE PLAN
D2.01 DEMOLITION FLOOR PLAN
D10.01 DEMOLITION RCP

ARCHITECTURAL
A2.01 FLOOR PLAN
A3.01 ROOF PLAN
A4.01 ENLARGED RESTROOM PLANS & ELEVATIONS
A6.01 EXTERIOR ELEVATIONS
A6.10 BUILDING SECTIONS
A6.20 INTERIOR ELEVATIONS
A6.30 INTERIOR ELEVATIONS
A6.40 INTERIOR TREE FEATURE (DEDUCTIVE ALTERNATE #1)
A9.00 REFLECTED CEILING PLAN
A10.01 DOOR & WINDOW SCHEDULES
A10.10 FINISH & FURNITURE PLAN
A11.01 SITE PLAN DETAILS
A11.02 INT PARTITION DETAILS
A11.03 DOOR AND WINDOW DETAILS
A11.04 SUSPENDED CEILING DETAILS
A11.05 CEILING DETAILS
A11.06 SPECIALTY DETAILS
A11.07 SPECIALITY DETAILS
A11.08 MILLWORK DETAILS AND SCHEDULES
A11.09 SIGNAGE DETAILS

FURNITURE*
F1 DEMCO CIRCULATION DESK
F2 DEMCO CIRCULATION DESK
F3 ROSS MCDONALD SHELVING
F4 ROSS MCDONALD SHELVING

CIVIL *
C1.0 EXISTING CONDITIONS AND DEMOLITION PLAN
C2.0 HORIZONTAL CONTROL AND GRADING PLAN
C3.0 CONSTRUCTION DETAILS

LANDSCAPE *
L1.0 PLANTING NOTES AND SCHEDULE
L1.1 TREE PRESERVATION PLAN & DETAIL
L1.2 PLANTING PLAN
L1.3 PLANTING PLAN
L1.4 PLANTING DETAILS
L2.0 IRRIGATION NOTES AND SCHEDULE
L2.1 IRRIGATION PLAN
L2.2 IRRIGATION PLAN
L2.4 IRRIGATION DETAILS

STRUCTURAL *
S0.01 GENERAL NOTES
S1.01 TYPICAL MODERNIZATION AND CONCRETE DETAILS
S1.02 TYPICAL CFS ELEVATION AND CONNECTION DETAILS
S1.03 TYPICAL CFS SOFFIT AND MISCELLANEOUS DETAILS
S1.04 TYPICAL MODERNIZATION WOOD DETAILS
S2.01 SLAB PLAN AND ROLL-UP DOOR ELEVATION
S2.02 CEILING FRAMING PLAN
S2.03 ROOF FRAMING PLAN
S4.01 DETAILS

MECHANICAL *
M0.00 MECHANICAL INDEX, NOTES, CODES, SCHEDULES
M0.01 MECHANICAL SCHEDULES
M1.01 MECHANICAL DEMOLITION FLOOR PLAN
M2.01 MECHANICAL FLOOR PLAN
M3.02 MECHANICAL ROOF PLAN
M5.01 MECHANICAL CONTROLS
M6.01 MECHANICAL DETAILS

PLUMBING *
P0.00 PLUMBING INDEX, NOTES, CODES, SCHEDULES
P1.01 PLUMBING DEMOLITION FLOOR PLAN
P2.01 PLUMBING FLOOR PLAN
P3.01 PLUMBING ROOF PLAN - DEMOLITION
P3.02 PLUMBING ROOF PLAN - NEW
P6.01 PLUMBING DETAILS

ELECTRICAL *
E0.01 ELECTRICAL INDEX, NOTES, AND CODES
E01.1 ELECTRICAL SITE PLAN - DEMO
E1.1 ELECTRICAL SITE PLAN
E1.1P SITE PHOTOMETRICS PLAN
E2.1 LIGHTING PLAN - DEMOLITION
E2.2 POWER PLAN - DEMOLITION
E2.3 ELECTRICAL ROOF PLAN - DEMOLITION
E3.1 LIGHTING PLAN - NEW
E3.1P LIGHTING PLAN - NEW - PHOTOMETRIC
E3.1S LIGHTING PLAN - NEW - STATISTICS & SCHEDULE
E3.2 POWER FLOOR PLAN - NEW
E3.3 ELECTRICAL ROOF PLAN - NEW
E4.1 ELECTRICAL SINGLE LINE DIAGRAM
E5.1 ELECTRICAL PANEL SCHEDULES
E6.1 ELECTRICAL DETAILS

TECHNOLOGY *
T0.01 TECHNOLOGY SHEET, INDEX, NOTES & LEGEND
T2.01 TECHNOLOGY DEMOLITION FLOOR PLAN
T2.02 TECHNOLOGY NEW FLOOR PLAN
T6.01 TECHNOLOGY DETAILS

FIRE ALARM *
FA0.0 FIRE ALARM COVER SHEET
FA1.0 FIRE ALARM FLOOR PLAN
FA1.1 FIRE ALARM ROOF PLAN
FA2.0 FIRE ALARM DETAILS
FA3.0 FIR ALARM CALCULATIONS & RISER DIAGRAM

FIRE PROTECTION *
FS0.01 FIRE SPRINKLER SHEET INDEX, LEGEND, SYMBOL & NOTES
FS0.02 FIRE SPRINKLER REFERENCE SITE PLAN
FS2.01 FIRE SPRINKLER FLOOR PLAN
FS3.01 FIRE SPRINKLER REFLECTED CEILING PLAN
FS6.01 FIRE SPRINKLER DETAILS
FS6.02 FIRE SPRINKLER SECTIONS

ENERGY COMPLIANCE*
EC0.01 ENERGY COMPLIANCE DOCUMENTATION SHEET INDEX & NOTES
EC1.01 ENERGY COMPLIANCE DOCUMENTATION
EC1.02 ENERGY COMPLIANCE DOCUMENTATION
EC1.03 ENERGY COMPLIANCE DOCUMENTATION
EC1.04 ENERGY COMPLIANCE DOCUMENTATION
EC1.05 ENERGY COMPLIANCE DOCUMENTATION

TOTAL: 105

SPECIAL INSPECTION REQUIRED

Not for permitting or construction

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

JOBCOPY

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
2203B9
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK COMM.	05/23/25

CONSTRUCTION DOCUMENT

COVER SHEET

G0.00

COM-2500586

C:\Users\kclancy\Documents\2203B9_NSHL_06.20.24_kelly_clancy YSZ4T.rvt
5/23/2025 10:55:04 AM

G0.00 - COVER SHEET

APPROVED
Fire Department
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

DRAWING CONVENTIONS

- ENLARGED PLAN (1 / A4.00)
- EXTERIOR ELEVATION (1 / A6.00)
- BUILDING SECTION (1 / A6.10)
- WALL SECTION (1 / A7.10)
- DETAIL SECTION (1 / A7.20)
- DETAIL ENLARGEMENT (1 / A7.20)
- INTERIOR ELEVATIONS (1 / A101)
- ROOM NAME — ROOM NAME & NUMBER
- NEW PARTITION
- PARTITION TYPE — REFER TO SHEET A7.01 FOR DEFINITION
- EXISTING PARTITION
- DOOR DESIGNATION (108)
- WINDOW DESIGNATION (A)
- DIMENSIONS — NOTE: ALL DIMENSIONS TO FACE OF STUD / ℄ OF COLUMN UNLESS NOTED OTHERWISE (5'-6", 5'-4", 12'-0")
- W.I. CABINET REFERENCE — WIDTH x DEPTH x HEIGHT (W02)
- EQUIPMENT DESIGNATION (TA3)
- CONSTRUCTION KEYNOTE (09 21.00)
- DEMOLITION KEYNOTE (D.20)
- NORTH ARROWS — REFERENCE NORTH / TRUE NORTH
- MATCH LINE (1 / A2.00)
- FLOOR / DATUM LINE (NAME, ELEVATION)
- GRID / COLUMN LINE (A)
- EXISTING GRID / COLUMN LINE (A)
- REVISION / REVISION NUMBER (1)

MATERIAL CONVENTIONS

- DEMOLITION
- EARTH
- GRAVEL
- LANDSCAPED AREA
- CONCRETE
- BRICK
- STONE
- STEEL
- ALUMINUM
- PLYWOOD
- PLYWOOD (SMALL SCALE)
- FINISH WOOD
- WOOD FRAMING - CONTINUOUS
- WOOD FRAMING - INTERMITTENT (BLOCKING)
- PLASTER
- GROUT
- RIGID INSULATION
- BATT INSULATION
- GLASS
- ACOUSTICAL TILE / WALL PANEL
- GYPSUM BOARD
- MEDIUM-DENSITY FIBERBOARD (MDF)
- SOLID SURFACE

CODES & STANDARDS

PARTIAL LIST OF APPLICABLE CODES

2022 California Administrative Code (CAC)	(Part 1, Title 24, CCR)
2022 California Building Code (CBC)	(Part 2, Title 24, CCR)
(2021 International Building Code Volumes 1 & 2 with 2022 California Amendments)	
2022 California Electrical Code (CEC)	(Part 3, Title 24, CCR)
(2020 National Electrical Code with 2022 California Amendments)	
2022 California Mechanical Code (CMC)	(Part 4, Title 24, CCR)
(2021 IAPMO Uniform Mechanical Code with 2022 California Amendments)	
2022 California Plumbing Code (CPC)	(Part 5, Title 24, CCR)
(2021 IAPMO Uniform Plumbing Code with 2022 California Amendments)	
2022 California Energy Code (CEC)	(Part 6, Title 24, CCR)
2022 California Fire Code (CFC)	(Part 9, Title 24, CCR)
(2021 International Fire Code with 2022 California Amendments)	
2022 California Existing Building Code (CEBC)	(Part 10, Title 24, CCR)
(2021 International Existing Building Code with 2022 California Amendments)	
2022 California Green Building Standards Code (CALGreen)	(Part 11, Title 24, CCR)
2022 California Referenced Standards Code	(Part 12, Title 24, CCR)

AND ALL LOCAL AMENDMENTS

ABBREVIATIONS

A.F.F.	ABOVE FINISH FLOOR
A.F.G.	ABOVE FINISH GRADE
A.H.J.	AUTHORITY HAVING JURISDICTION
AC	ASPHALT CONCRETE PAVEMENT
ACC	ACCESSIBLE, ACCESSIBILITY
ACP	ACOUSTICAL PANEL
ACT	ACOUSTICAL TILE
AD	AREA DRAIN
ADA	AMERICANS WITH DISABILITIES ACT
ADA	2010 ADA STANDARDS FOR ACCESSIBLE DESIGN
ADAAG	AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES
ADJ	ADJACENT
ALT	ALTERNATE
ALUM	ALUMINUM
ASPH	ASPHALT
B.O.D.	BOTTOM OF DECK
BD	BOARD
BLDG	BUILDING
BLK	BLOCK
BM	BEAM
BUR	BUILT-UP ROOF
C	CHANNEL
CAB, CABT	CABINET
CBC	CALIFORNIA BUILDING CODE / TITLE 24, CALIFORNIA CODE OF REGULATIONS
CFMF	COLD-FORMED METAL FRAMING
CFSF	COLD-FORMED STEEL FRAMING
CJ	CONTROL JOINT
CL	CENTERLINE
CLG	CEILING
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
COMP	COMPRESSIBLE
CONC	CONCRETE
COND	CONDITION
CONT	CONTINUOUS
CORR	CORRIDOR
CPT	CARPET (ED)
CT	CERAMIC TILE
CTSK	COUNTER SINK
C/W	COLD WATER
D	DRYER
D.A.	DISABLED ACCESS(IBILITY)
DF	DRINKING FOUNTAIN
DIA / Ø	DIAMETER
DIM	DIMENSION
DS	DOWNSPOUT
DTL	DETAIL
DWG	DRAWING
EA	EACH
EJ	EXPANSION JOINT
EL	ELEVATION (HEIGHT)
ELEC	ELECTRICAL
ELECT	ELECTRICAL
ELEV	ELEVATION (DRAWING)
EQ	EQUAL
EQUIP	EQUIPMENT
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FHC	FIRE HOSE CABINET
FIN	FINISH (ED)
FIXT	FIXTURE
FLR	FLOOR (ING)
FLUOR	FLUORESCENT
FRP	FIBER-REINFORCED PLASTIC
GA	GAUGE
GALV	GALVANIZED
GCMU	GLAZED CONCRETE MASONRY UNIT
GEN	GENERAL
GI	GALVANIZED IRON
GL	GLASS / GLAZING
GL	GLASS
GR	GRADE
GTP	GLAZED TILE PAVER
GYP	GYPSUM DRYWALL
HM	HOLLOW METAL FRAME
HORIZ	HORIZONTAL
HT	HEIGHT
HVAC	HEATING, VENTILATION, AIR CONDITIONING
HW	HOT WATER
ID	INSIDE DIAMETER
INSUL	INSULATE (ED), (ION)
INT	INTERIOR
IPS	IRON PIPE SIZE
JT	JOINT
LA	LANDSCAPED AREA
LAM	LAMINATE (D)
LAV	LAVATORY
LT	LIGHT
LT WT	LIGHTWEIGHT
M.O.	MASONRY OPENING
MAS	MASONRY
MATL	MATERIAL (S)
MAX	MAXIMUM
MB	MARKER BOARD
MECH	MECHANICAL
MEP	MECHANICAL, ELECTRICAL, PLUMBING
MEPT	MECHANICAL, ELECTRICAL, PLUMBING, TECHNOLOGY
MEZZ	MEZZANINE
MFR / MANUF	MANUFACTURE (R)
MIN	MINIMUM
MISC	MISCELLANEOUS
MOD	MODULAR
MTL	METAL
N.I.C.	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
NO.	NUMBER
NOM	NOMINAL
O.C.	ON CENTER (S)
O.C.E.W.	ON CENTER EACH WAY
O.D.	OUTSIDE DIAMETER
O.H.	OPPOSITE HAND
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OPNG	OPENING
OPP	OPPOSITE
P. LAM / PLAM	PLASTIC LAMINATE
PCC	PORTLAND CEMENT CONCRETE PAVING
PKG	PARKING
PL	PLATE
PLUMB	PLUMBING
POL	POLISHED
PR	PAIR
PREFIN	PRE-FINISHED
PT	POINT
PT	PRESSURE-TREATED
PTD	PAINTED
PWD / PLYWD	PLYWOOD
QT	QUARRY TILE
R / RAD	RADIUS
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
RE / REF	REFER TO / REFERENCE / SEE
RECP	RECEPTACLE
REINF	REINFORCE (D), (ING)
REQ'D	REQUIRED
RES	RESILIENT
REV	REVISION (S), REVISED
SC	SEALED CONCRETE
SCHED	SCHEDULE
SD	SOAP DISPENSER
SECT	SECTION
SHT	SHEET
SIM	SIMILAR
SND	SANITARY NAPKIN DISPOSAL
SPC	SPECIAL COATING SYSTEM
SPEC	SPECIFICATION (S)
SQ	SQUARE
SS	STAINLESS STEEL
STL	STEEL
STR / STRUCT	STRUCTURAL
SUSP	SUSPENDED
SVF	SHEET VINYL FLOORING
T.O.	TOP OF
T.O.M.	TOP OF MASONRY
T.O.P.	TOP OF PARAPET
T.O.S.	TOP OF STEEL
TB	TACK BOARD
TEL	TELEPHONE
TERR	TERRAZZO
THK	THICK (NESS)
TYP	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
UR	URINAL
V	VENT
V.I.F.	VERIFY IN FIELD
VCT	VINYL COMPOSITION TILE
VENT	VENTILATING, VENTILATED
VER	VERIFY
VERT	VERTICAL
VWC	VINYL WALL COVERING
W	WITH
WC	WATER CLOSET
WD	WOOD
WDW	WINDOW
WT	WEIGHT
WWF	WELDED WIRE FABRIC
WWM	WOVEN WIRE MESH
∠	ANGLE

C:\Users\eladanc\Documents\220389_NSHL_06.20.24_eladanc_YSZ4T.rvt
5/23/2025 10:55:05 AM

Not for permitting or construction

PBK
JOBCOPY

ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9822

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH / TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

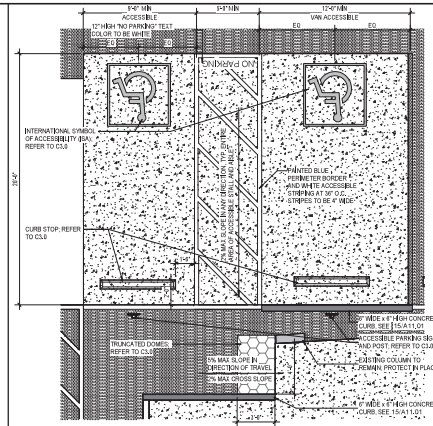
CONSTRUCTION DOCUMENT

STANDARDS & DRAWING CONVENTIONS

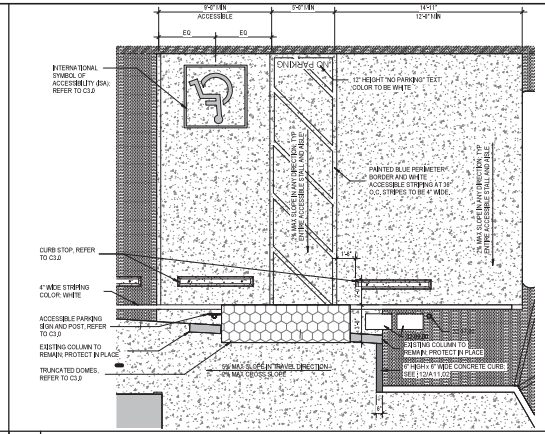
G0.01

COM-2500586

APPROVED
Fire Department
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



3 ENLARGED ACCESSIBLE PARKING - WEST
SCALE: 1/4" = 1'-0"



2 ENLARGED ACCESSIBLE PARKING - EAST
SCALE: 1/4" = 1'-0"

GATE SCHEDULE

GATE	GATE SIZE	DETAIL	NOTES	SPEC
G1	4'-0" x 11'-0"	16/A11.01	KNOX BOX	32 31 13
G2	4'-0" x 11'-0"	16/A11.01		32 31 13
G3	4'-0" x 14'-0"	16/A11.01	KNOX BOX	32 31 13
G4	4'-0" x 10'-0"	16/A11.01		32 31 13
G5	4'-0" x 12'-0"	16/A11.01		32 31 13
G6	4'-0" x 10'-0"	16/A11.01		32 31 13
G7	4'-0" x 10'-0"	16/A11.01		32 31 13

GENERAL NOTES

1. SEE CIVIL DRAWINGS FOR GRADING AND UTILITY DESIGN.
2. SEE LANDSCAPE, ELECTRICAL, AND FIRE PROTECTION SITE PLANS FOR ADDITIONAL INFORMATION.
3. SEE A11.00 FOR ADDITIONAL SIGNAGE REQUIREMENTS.
4. ALL STRIPING SHOWN ON PLAN IS NEW 4" WIDE STRIPING.
5. DO NOT SCALE DRAWINGS.

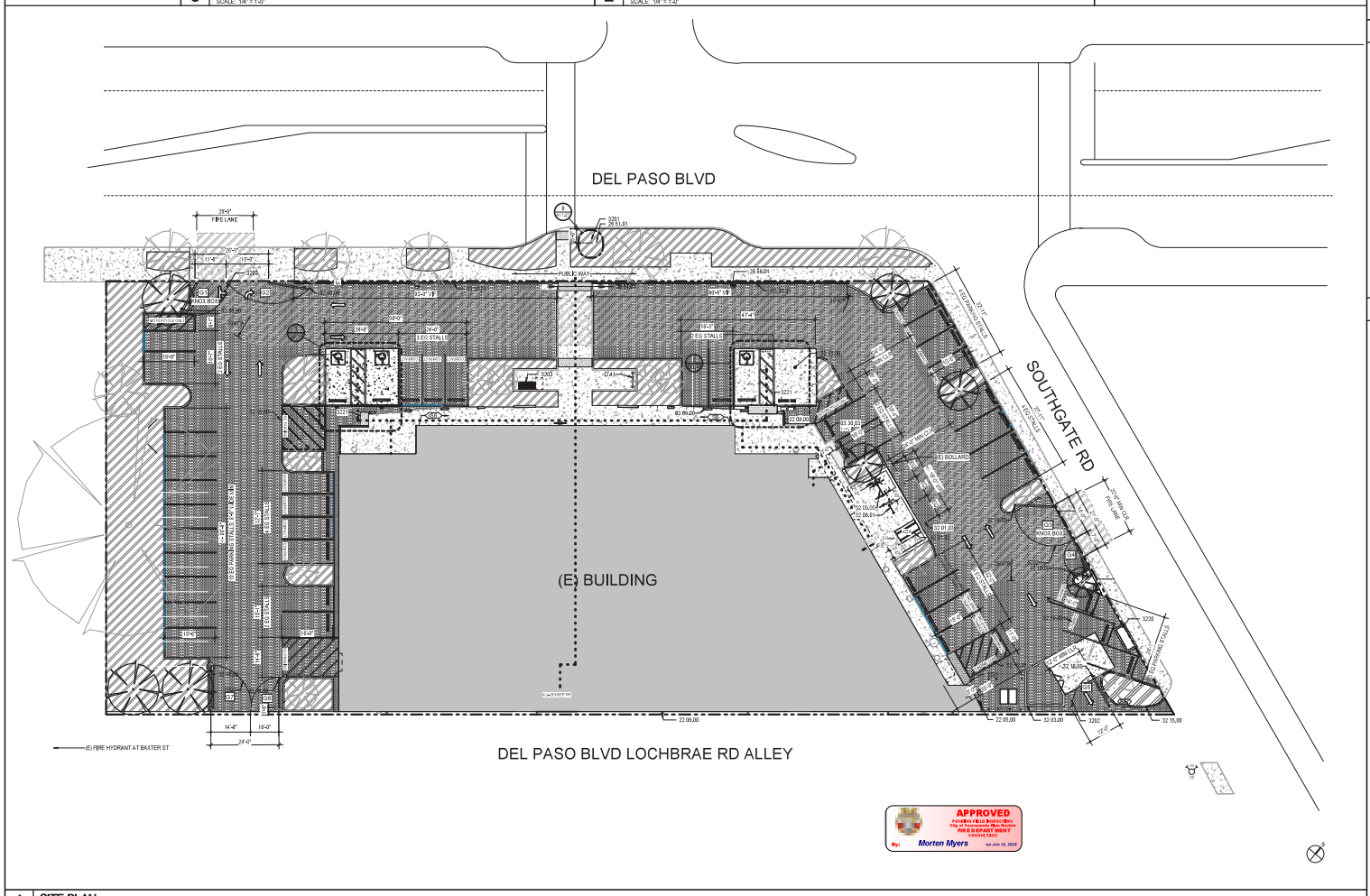
ACCESS SITE PLAN LEGEND

- PROPERTY LINE
- BUILDING ID SIGN
- ACCESSIBLE PATH OF TRAVEL AS INDICATED ON PLAN IS A BARRIER-FREE ACCESS ROUTE WITHOUT ANY ABRUPT LEVEL CHANGES EXCEEDING ½" BEVELED AT 1:2 MAXIMUM SLOPE OR VERTICAL LEVEL CHANGES NOT EXCEEDING ¼" MAXIMUM AND AT LEAST 48" IN WIDTH.

  SURFACE IS STABLE, FIRM AND SLIP RESISTANT; CROSS SLOPE IS MIN. 1% AND MAX. 2% AND THE SLOPE IN THE DIRECTION OF TRAVEL IS LESS THAN 5% AT ALL ACCESSIBLE PATHS.
- EXISTING BUILDING TO BE MODERNIZED
- (E) FIRE ACCESS LANE
- ACCESSIBLE TOILET ROOM
- FIRE ALARM CONTROL ROOM / FIRE SPRINKLER RISER LOCATION
- EXISTING ASPHALT TO RECEIVE SEAL COAT SEE SPEC SECTION 32 14 00
- EXISTING CONCRETE
- CONCRETE
- (S1) "DO NOT ENTER" SIGN. RE: 11 / A11.01
- (S6) DIRECTIONAL ACCESS SIGN RE: 5 / A11.01
- (E) FIRE HYDRANT
- FIRE DEPARTMENT CONNECTION
- EXISTING TREE TO REMAIN
- NEW TREE: SEE LANDSCAPE DWGS
- NEW TRUNCATED DOMES; SEE C3.0
- NEW 6" HIGH 6" WIDE CONCRETE FIRE CURB RE: 15 / A11.01 & 4 / A11.01
- LANDSCAPE AREA SEE LANDSCAPE DRAWINGS

KEYNOTE LEGEND

03.06.00	EXISTING COLUMN TO REMAIN, TYP.
03.30.01	NEW 6" CONCRETE CURB, SEE DETAIL 15 / A11.01
03.30.01	CONCRETE WHEEL STOP; SEE CIVIL DWGS
22.05.00	EXISTING GAS METER TO BE REMOVED, CONTRACTOR TO COORDINATE REMOVAL WITH PG&E
22.06.00	EXISTING WATER METER, PROTECT IN PLACE
26.51.01	LIGHTING FIXTURE; REFER TO ELECTRICAL DWGS
26.56.01	EXISTING EXTERIOR LIGHTING FIXTURE TO REMAIN
32.01.03	NEW BOLLARD; PAINT SAFETY YELLOW RE: 9 / A11.01
32.01.08	EXISTING TRASH ENCLOSURE AND DOOR TO REMAIN; PAINT ALL DOORS AND WALLS
32.06.00	5-BIKE RACK; SEE SPEC SECTION 11 90 66 RE: 3 / A11.01
32.06.01	5-BIKE RACK; SEE SPEC SECTION 11 90 66 RE: 3 / A11.01
32.06.03	IN-GROUND J-BOX FOR FUTURE EV CHARGERS; 2 X 40A CIRCUITS
32.11.00	FUTURE EV PARKING STALL
32.16.00	EXISTING BACKFLOW PREVENTOR
32.16.00	4" WIDE WHITE STRIPING, DIAGONAL STRIPING AT 36" O.C. WITH "NO PARKING" AND "LOADING ZONE" TO BE 12" HIGH LETTERING
32.17.00	NEW SIGN POST AND FOOTING, NO SIGN TO BE ADDED IN THIS SCOPE, RE: 1 / A11.01
32.16.00	2" DIA GALVANIZED STEEL GATE RECEIVER POST PER MANUF. RE: 16 / A11.01
32.16.00	12" HIGH LETTERING; COLOR: WHITE
32.31.02	PICNIC TABLE; SEE FURNITURE SCHEDULE
3201	MONUMENT SIGN RE: 8 / A11.01
3202	STEEL PIPE SWING GATE. RE: 16 / A11.01
3205	SALVAGED BENCH TO BE REINSTALLED AT THIS LOCATION RE: 13 / A11.01
3220	BACKFLOW PREVENTOR W/ CAGE; SEE C2.0 AND C3.0
3221	TRUNCATED DOMES; SEE C3.0, DWGS
D.41	EXISTING BIKE RACK TO REMAIN, (4) BIKE CAPACITY



1 SITE PLAN
SCALE: 1/16" = 1'-0"

APPROVED
PERMANENT FIELD INSPECTION
Fire Department
FIRE DEPARTMENT CONSULTANT
By: Morten Myers
on Jun 16, 2025

PARKING CALCULATION

(E) PARKING LOT 1:

COMPACT STALLS	18
STANDARD STALLS	23
VAN ACCESSIBLE STALLS	1
STD ACCESSIBLE STALLS	2
TOTAL STALLS ON SITE	44

PER SACRAMENTO CITY CODE TABLE 17.608.030.B "ASSEMBLY - CULTURAL"

URBAN DISTRICT REQUIRED
REQUIRED NUMBER OF STALLS = 1 SPACE PER 6 OCCUPANTS

PER SACRAMENTO CITY CODE 17.608.030.D.2: OFF STREET VEHICLE PARKING MAY BE REDUCED BY 50% > ¼ MILE BUT LESS THAN ½ MILE FROM CENTER OF LIGHT RAIL PLATFORM

GLOBE AVENUE EAST AND WEST BOUND LIGHTRAIL STATIONS ARE ~0.3 AND 0.4 MILES FROM PROJECT SITE, THEREFORE, WITH 50% REDUCTION, 52/2 = 26 REQUIRED PARKING STALLS

TOTAL OCCUPANTS = 322
10MP x 50% = 27
2 MOTORCYCLE STALLS PROVIDED -> 26 - 2 = 24 REQUIRED PARKING STALLS
43 PARKING STALLS PROVIDED > 24 = OK

ACCESSIBLE STALLS:
PER 2022 CBC TABLE 11B-208.2

TOTAL NUMBER OF STALLS: 43
REQUIRED NUMBER OF ACCESSIBLE STALLS = 2 PER 2022 CBC 11B-208.2
3 ACCESSIBLE STALLS PROVIDED = OK

PER 11B-208.2.4 FOR EVERY 6 ACCESSIBLE PARKING STALLS, AT LEAST (1) SHALL BE VAN PARKING = 1 VAN PARKING STALL REQUIRED AND PROVIDED.

COMPACT STALL:

NOTE: PER SACRAMENTO CITY CODE CHAPTER 17.608.040.F.B "UP TO 50% OF ALL REQUIRED AND NON-REQUIRED VEHICLE PARKING SPACES, EXCLUDING ACCESSIBLE SPACES, MAY BE SIZED FOR COMPACT CARS PER 17.608.040,
STANDARD STALL WIDTH IS 8'-6" WIDE X 18'-0" LONG MIN
COMPACT STALL WIDTH IS 8'-0" WIDE X 15'-0" LONG MIN
COMPACT 45 DEG STALL IS 8'-5" WIDE X 16'-0" LONG MIN

CALCULATION:
TOTAL STALLS (NOT INCLUDING ACCESSIBLE STALLS) = 41
40/50% = 20 MAXIMUM

PROPOSED COMPACT PARKING STALLS = 18
18<20 = OK

BIKE PARKING:

NOTE: PER SACRAMENTO CITY CODE TABLE 17.608.030C FOR ASSEMBLY USE SHORT TERM BIKE PARKING SPACES SHALL BE PROVIDED FOR 5% OF OCCUPANCY.

CALCULATION:
TOTAL OCCUPANTS: 311
311 X 5%=15.55 = 16 SHORT TERM BIKE PARKING REQUIRED
(1) EXISTING 4 BIKE CAPACITY RACK
(1) 7 BIKE CAPACITY RACKS PROVIDED
(1) 5 BIKE CAPACITY RACKS PROVIDED = 16 SHORT TERM = OK

FOR LONG-TERM BIKE PARKING 1 SPACE PER 13 EMPLOYEES OR 2 SPACES WHICHEVER IS GREATER IS REQUIRED.

2 LONG TERM BIKE PARKING STALLS PROVIDED FOR STAFF INSIDE THE BUILDING IN STORAGE ROOM #51

MOTORCYCLE PARKING
(2) STALLS PROPOSED > 0 REQUIRED = OK

PER SACRAMENTO CITY CODE 17.608.040.F.3 MOTORCYCLE SPACES SHALL BE A MINIMUM OF 4' WIDE AND 8' LONG

PBK JOBCOPY
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9822

Not for permitting or construction

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH / TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

SITE PLAN

G0.10

COM-2500586

G0.20 - BUILDING DATA & CODE REVIEW

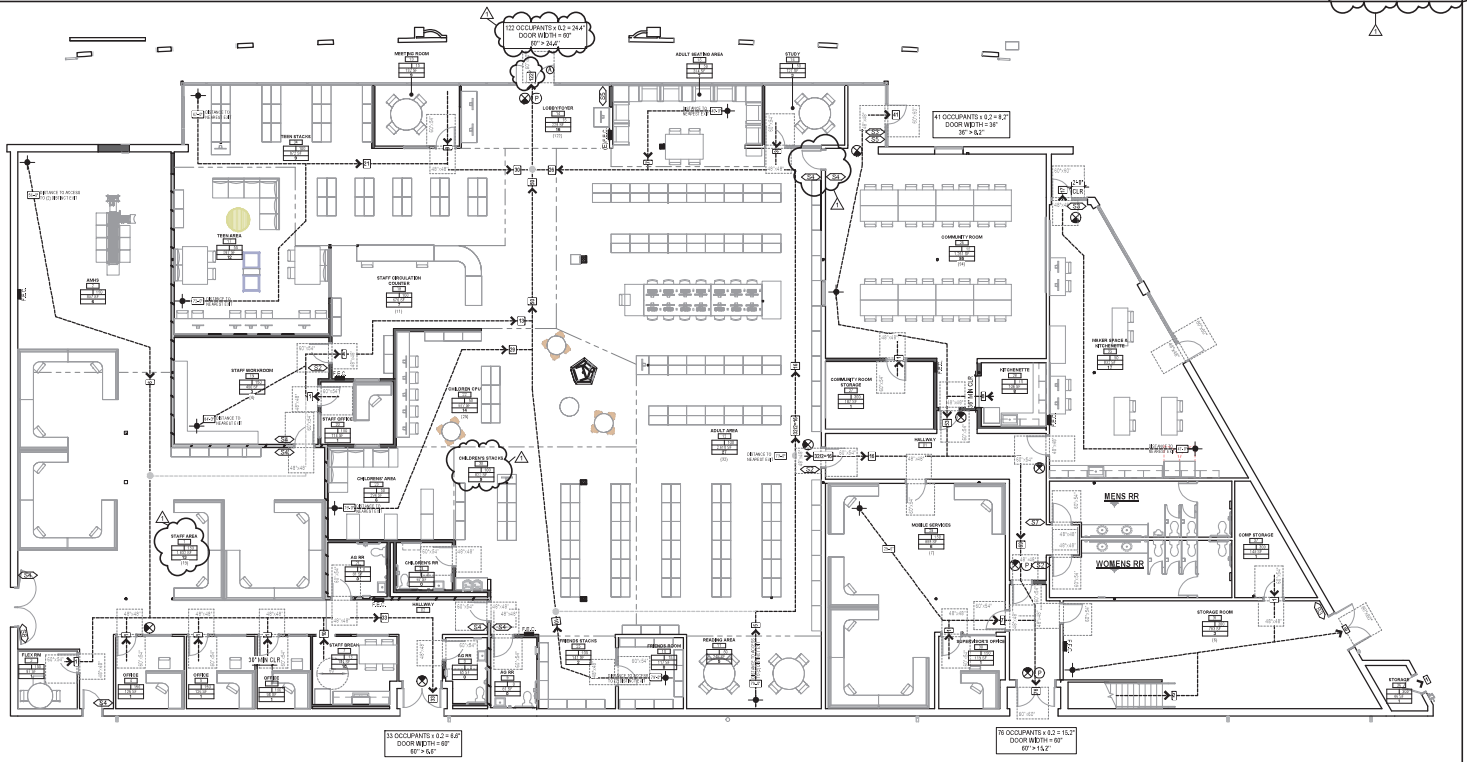
APPROVED
City of Sacramento Community Development Department
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

Illuminated exit sign locations subject to field inspections

Provide tactile exit and/or exit route signage

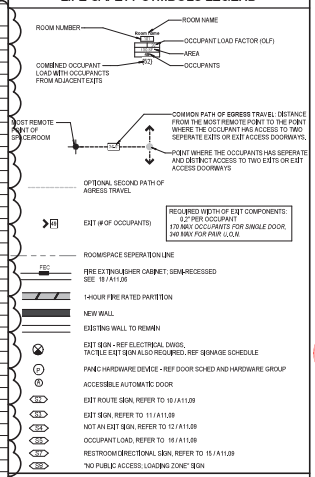
ROOM SCHEDULE

ROOM #	ROOM NAME	USE (OCCUPANCY LOAD FACTOR PER CBC 1004.5)	AREA	OCC LOAD FACTOR	OCC LOAD
00	HALLWAY		114 SF		0
1	STAFF AREA	OPEN OFFICE SPACE (CONCENTRATED BUSINESS AREA)	1,832 SF	150 SF	13
01	HALLWAY		399 SF		0
2	AMHS	AUTOMATED MATERIAL HANDLING SYSTEM (CONCENTRATED BUSINESS AREA)	857 SF	150 SF	6
02	HALLWAY		192 SF		0
3	FLEX RM	SPARE OFFICE SPACE (CONCENTRATED BUSINESS USE)	87 SF	100 SF	1
4	OFFICE	CONCENTRATED BUSINESS USE	126 SF	150 SF	1
5	OFFICE	CONCENTRATED BUSINESS USE	126 SF	150 SF	1
6	OFFICE	CONCENTRATED BUSINESS USE	98 SF	150 SF	1
7	STAFF BREAK	BREAK ROOM (ASSEMBLY W/O FIXED SEATING-TABLES & CHAIRS)	141 SF	15 SF	10
8	AG RR	RESTROOM	65 SF		0
9	AG RR	RESTROOM	81 SF		0
10	FRIENDS ROOM	FRIENDS GROUP BOOK SHOP (ASSEMBLY W/O FIXED SEATING)	117 SF	15 SF	8
11	READING AREA	LIBRARY - READING ROOM	248 SF	50 SF	5
12	ADULT AREA	LIBRARY - STACK AREA	2,610 SF	100 SF	27
13	MEETING ROOM	ASSEMBLY SPACE W/O FIXED SEATING	132 SF	15 SF	9
14	LOBBY/FOYER	ASSEMBLY SPACE W/O FIXED SEATING	229 SF	15 SF	16
15	ADULT SEATING AREA	LIBRARY - READING ROOM	314 SF	50 SF	7
16	STUDY	OFFICE (CONCENTRATED BUSINESS USE)	127 SF	50 SF	3
17	TEEN AREA	LIBRARY - READING ROOM	587 SF	50 SF	12
18	STAFF CIRCULATION COUNTER	LIBRARY - STACK AREA	676 SF	100 SF	7
19	STAFF WORKROOM	CONCENTRATED BUSINESS USE	400 SF	150 SF	3
20	STAFF OFFICE	CONCENTRATED BUSINESS USE	114 SF	150 SF	1
21	AG RR	ALL GENDER RESTROOM	81 SF		0
22	CHILDREN CPU	LIBRARY - READING ROOM	677 SF	50 SF	14
23	CHILDRENS' AREA	LIBRARY - READING ROOM	294 SF	50 SF	6
24	CHILDREN'S RR	CHILDREN'S RESTROOM	67 SF		0
25	FRIENDS STACKS	LIBRARY - STACK AREA	141 SF	100 SF	2
26	COMMUNITY ROOM	ASSEMBLY AREA W/O FIXED SEATING	1,261 SF	15 SF	85
27	COMMUNITY ROOM STORAGE	STORAGE	187 SF	300 SF	1
28	KITCHENETTE	KITCHENETTE/BREAK ROOM	106 SF	15 SF	8
29	MOBILE SERVICES	OPEN OFFICE SPACE	889 SF	150 SF	6
30	SUPERVISOR'S OFFICE	CONCENTRATED BUSINESS USE	119 SF	150 SF	1
31	STORAGE ROOM	STORAGE	763 SF	300 SF	3
32	WOMENS RR	RESTROOM	245 SF		0
33	MENS RR	RESTROOM	244 SF		0
34	TEEN STACKS	LIBRARY - STACK AREA	872 SF	100 SF	9
35	MAKER SPACE & KITCHENETTE	SPACE INTENDED FOR 3D PRINTER, COMPUTER STATIONS, HANDS ON LEARNING (SHOP & VOCATIONAL)	832 SF	50 SF	17
36	STORAGE	EQUIPMENT ROOM	46 SF	300 SF	1
37	COMP STORAGE	STORAGE	145 SF	300 SF	1
38	CHILDREN'S STACKS	LIBRARY - STACK AREA	822 SF	100 SF	9
39	STORAGE	STORAGE	477 SF	300 SF	2
				TOTAL OCCUPANTS:	296



1 CODE ANALYSIS FLOOR PLAN
SCALE: 1/8" = 1'-0"

LIFE SAFETY SYMBOLS LEGEND



BUILDING CODE ANALYSIS

1. OCCUPANCY GROUP: A-3 AND B
2. CONSTRUCTION TYPE: VB
3. BASIC ALLOWABLE FLOOR AREA: A-3: 24,000 SF (MOST STRINGENT)
4. ACTUAL FLOOR AREA: 19,120 SF
5. ALLOWABLE AREA INCREASES: NA
6. BASIC ALLOWABLE BUILDING HEIGHT / NO. OF STORIES: 60'/2 STORIES
7. ACTUAL BUILDING HEIGHT / NO. OF STORIES: 30'/1 STORY
8. FIRE SPRINKLER: [YES]
9. TOTAL OCCUPANTS: 296 OCCUPANTS

FIRE RESISTANCE RATING REQUIREMENTS (CBC TABLE 601)

1. STRUCTURAL FRAME: [0 HOUR RATING - UL NO. D902]
2. EXTERIOR BEARING WALLS: [0 HOUR RATING - UL NO. D902]
3. INTERIOR BEARING WALLS: 0 HOUR RATING

FIRE RESISTANCE RATING REQUIREMENTS OF EXTERIOR WALLS: CBC TABLE 602)

1. FIRE SEPARATION DISTANCE (TYPE VB): 10 </X <30, OCC GROUP, NO PROTECTION REQUIRED, 0 HOURS REQUIRED AND PROVIDED.

INTERIOR WALL AND CEILING FINISH REQUIREMENTS (CBC TABLE 803.13)

1. CORRIDORS: CLASS B
2. ROOMS AND ENCLOSED SPACES: CLASS C
3. SEE FINISH SCHEDULE FOR CLASSIFICATION.

ROOFING COVERING CLASS REQUIREMENTS PER CBC TABLE 1505.1

1. ROOF COVERING: CLASS C

MINIMUM EGRESS WIDTH PER CBC SECTION 1005

1. DOORS: SEE PLAN, MINIMUM OF 36"
2. 2 EXITS ARE PROVIDED IN ALL ROOMS WHERE OCCUPANT LOAD EXCEEDS 49

MAXIMUM EXIT TRAVEL DISTANCE PER CBC TABLE 1017.2

1. A OCCUPANCY WITH SPRINKLER SYSTEM = 200' MAXIMUM EXIT ACCESS TRAVEL DISTANCE
2. SEE CODE ANALYSIS FLOOR PLAN FOR TRAVEL DISTANCES

FIRE EXTINGUISHERS

1. TRAVEL DISTANCE TO FIRE EXTINGUISHERS MUST NOT EXCEED 75 FT. PER CALIFORNIA FIRE CODE, SECTION 906.3. SEE PLAN FOR FIRE EXTINGUISHER LOCATIONS.
2. NUMBER OF EXTINGUISHERS PROVIDED: 8

Not for permitting or construction

JOBCOPY

PBK
ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9822

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP

REVISIONS

#	DESCRIPTION	DATE
	PLAN CHECK DOCS #1	07/2025

CONSTRUCTION DOCUMENT

BUILDING DATA & CODE REVIEW

G0.20

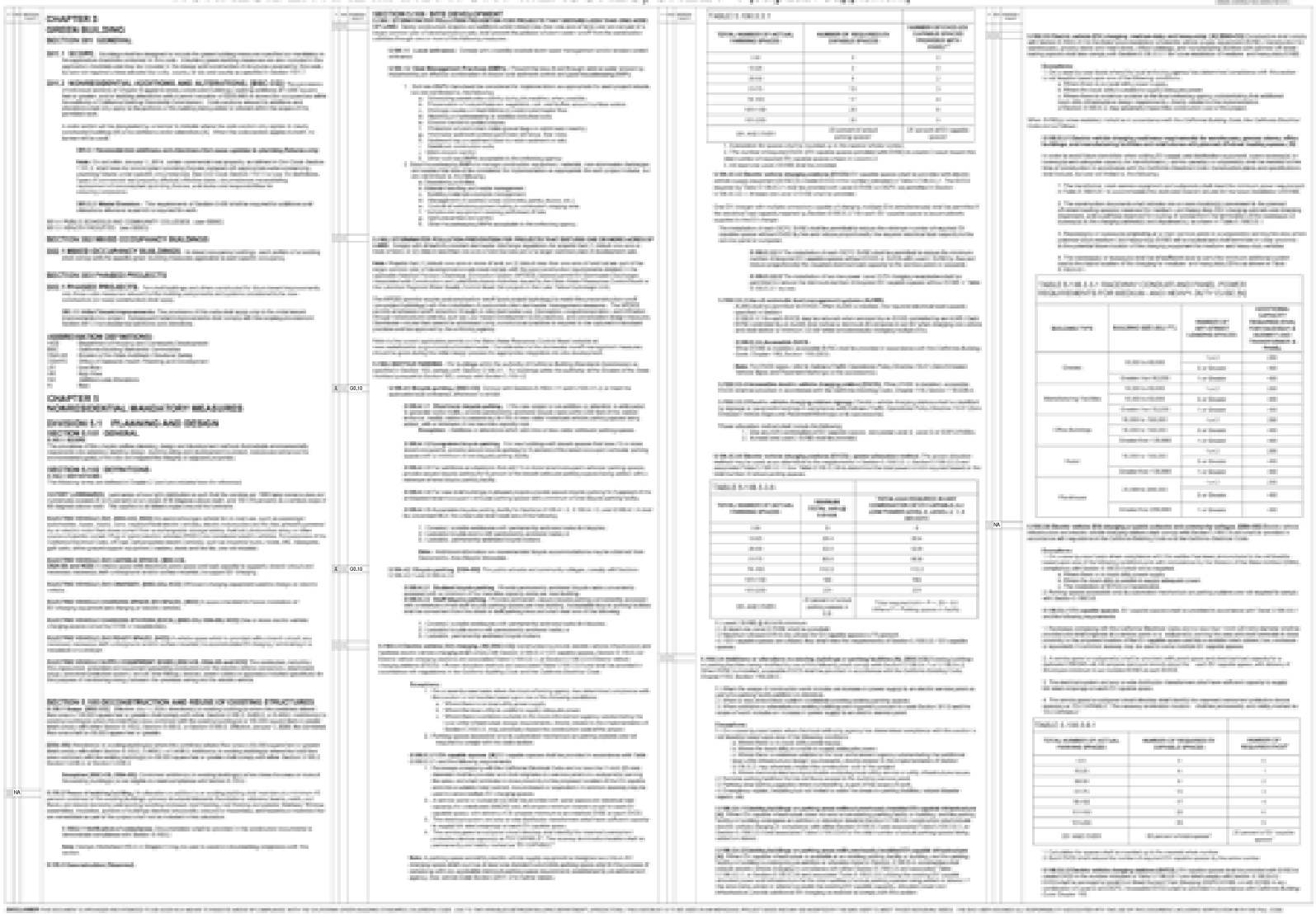
COM-2500586

C:\Users\kellyc\Documents\220389_NSHL_06.20.24_kelly.clancy.YSZ4T.rvt
5/23/2025 10:55:09 AM

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

2022 CALIFORNIA GREEN BUILDING STANDARDS CODE

NONRESIDENTIAL MANDATORY MEASURES, SHEET 1 (July 2024 Supplement)



Not for permitting or construction

JOBCOPY

PBK

ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
2203189
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

CALGREEN CHECKLIST

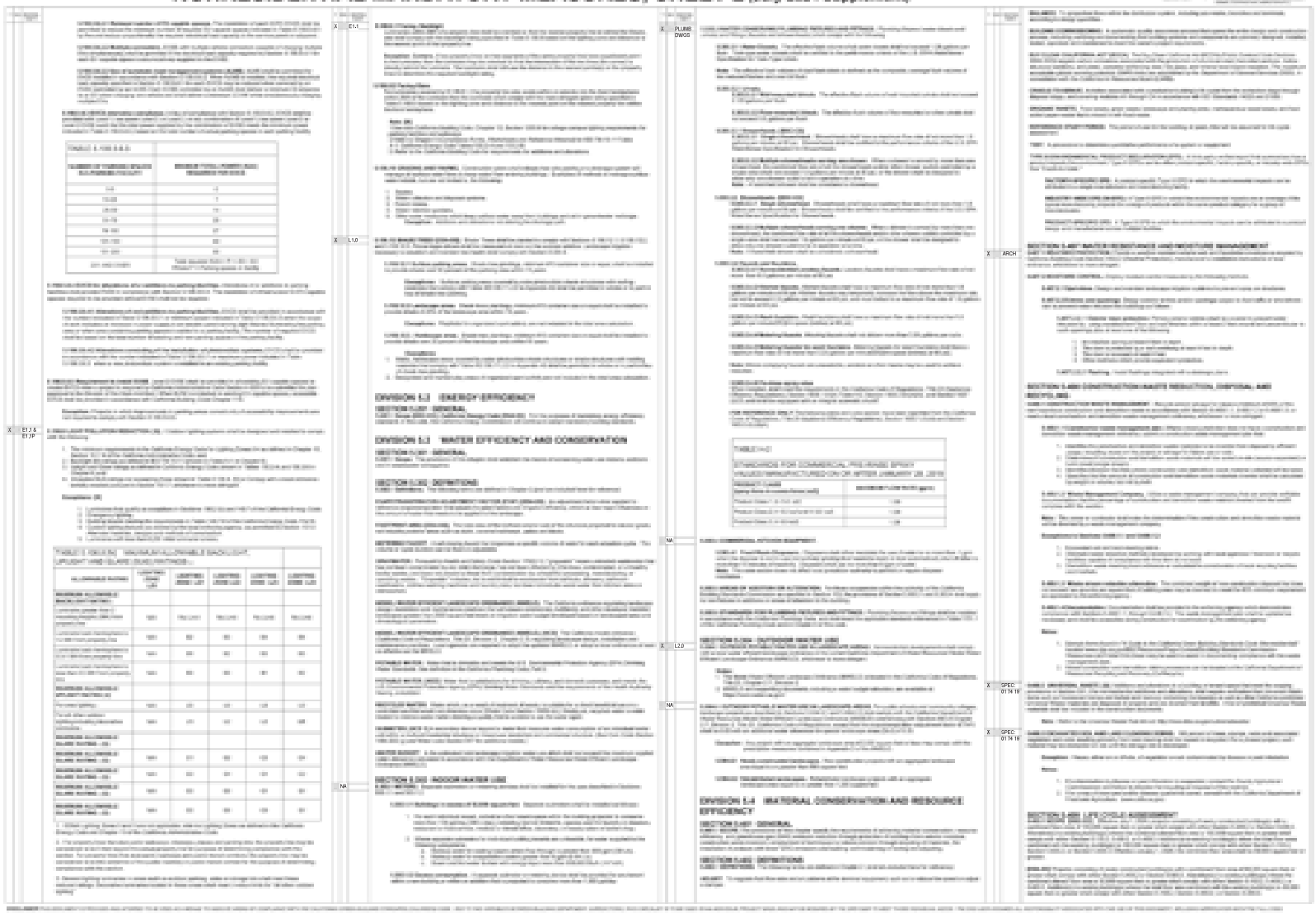
G0.30

COM-2500586

APPROVED
City of Sacramento Life Safety
By: Chad Aleck
on Jul 01, 2025

2022 CALIFORNIA GREEN BUILDING STANDARDS CODE

NONRESIDENTIAL MANDATORY MEASURES, SHEET 2 (July 2024 Supplement)



Not for permitting or construction

JOBCOPY

PBK
ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
2203189
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

CALGREEN CHECKLIST

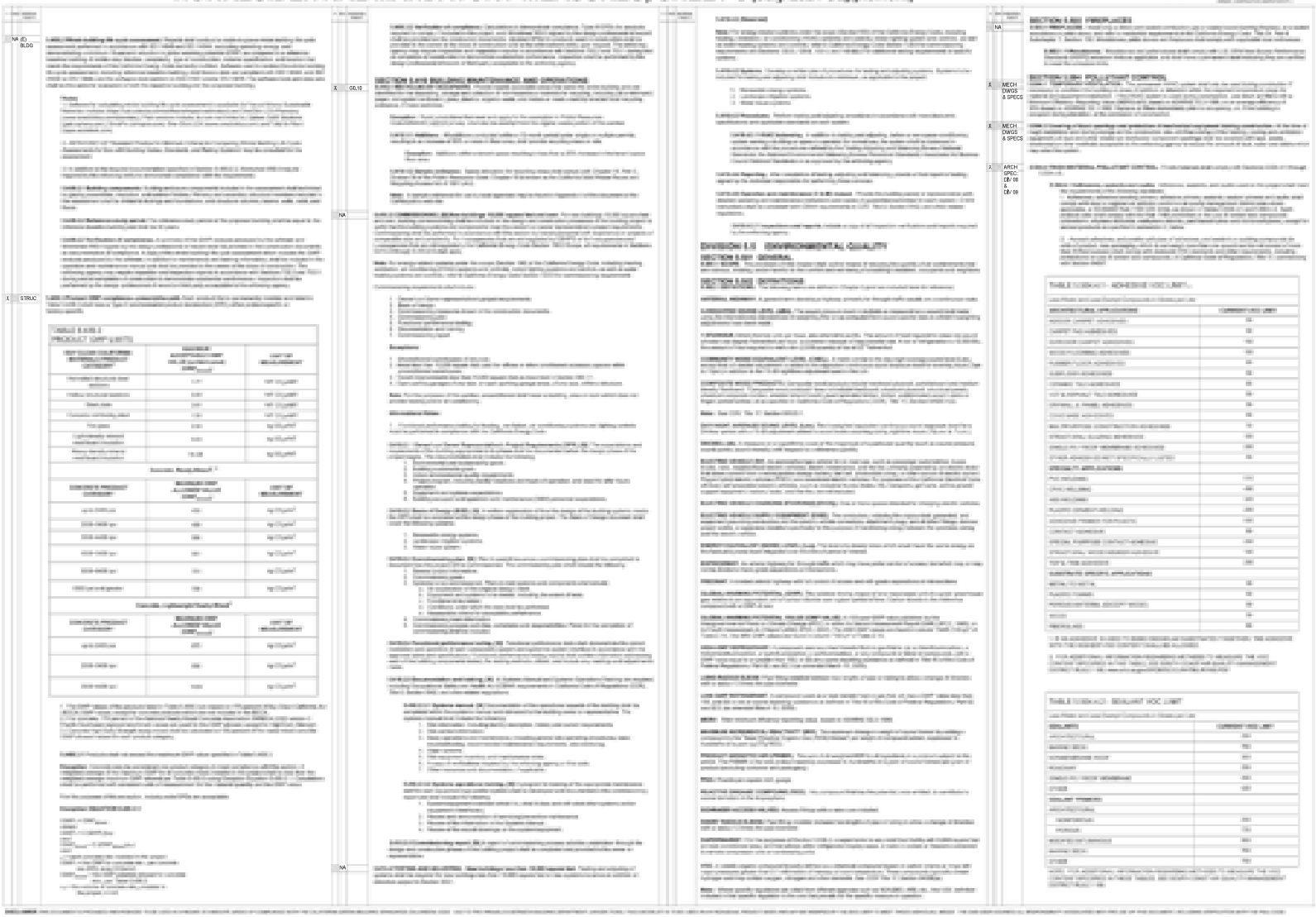
G0.31

COM-2500586

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

2022 CALIFORNIA GREEN BUILDING STANDARDS CODE

NONRESIDENTIAL MANDATORY MEASURES, SHEET 3 (July 2024 Supplement)



Not for permitting or construction

JOBCOPY

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

CALGREEN CHECKLIST

G0.32

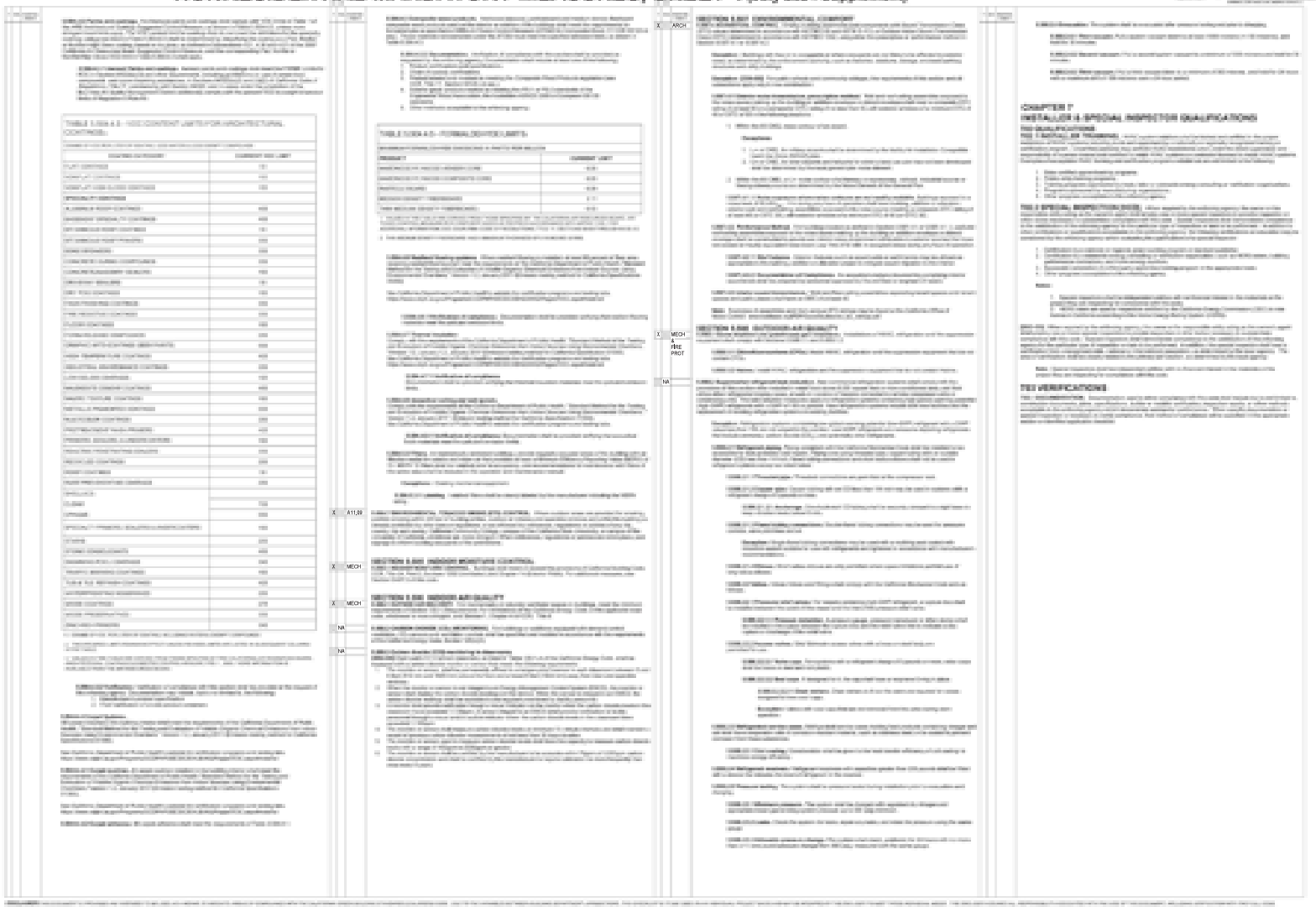
COM-2500586

G0.33 - CALGREEN CHECKLIST

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

2022 CALIFORNIA GREEN BUILDING STANDARDS CODE

NONRESIDENTIAL MANDATORY MEASURES, SHEET 4 (July 2024 Supplement)



Not for permitting or construction

JOBCOPY

PBK

ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8515
916-355-9822

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

CALGREEN CHECKLIST

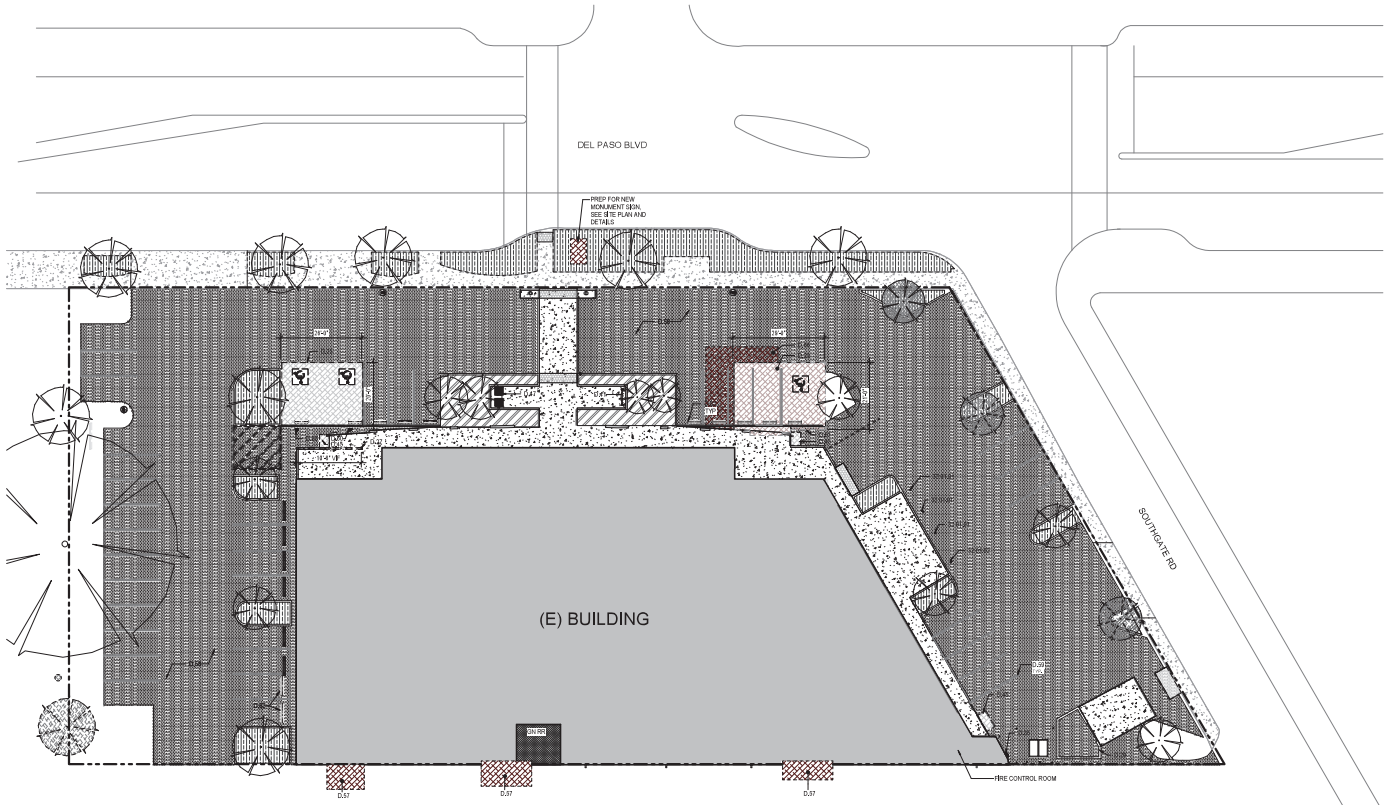
G0.33

COM-2500586

C:\Users\edianc\Documents\220389_NSHL_06.20.24_kelly.diancy.YSZ4T.rvt
5/23/2025 10:55:56 AM

D1.01 - DEMOLITION SITE PLAN

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



1 DEMOLITION SITE PLAN
SCALE: 1/16" = 1'-0"

DEMOLITION NOTES

1. DEMOLITION PLANS INDICATE SOME OF THE SCOPE-OF-WORK INVOLVED FOR THE DEMOLITION PHASE OF THIS PROJECT. CONTRACTOR SHALL REVIEW ALL SHEETS FOR ADDITIONAL DEMOLITION SCOPE.
2. CONTRACTOR SHALL VERIFY EXISTING SITE AND BUILDING CONDITIONS AND DIMENSIONS IN THE FIELD PRIOR TO DEMOLITION ACTIVITIES AND WORK.
3. CONTRACTOR SHALL NOTIFY ARCHITECT OF ANY DISCREPANCIES IN WRITING.
4. CONTRACTOR SHALL NOTIFY ARCHITECT AND OWNER OF ANY POSSIBLE ASBESTOS CONTAINING MATERIALS DISCOVERED BEFORE PROCEEDING WITH WORK. PROTECT INTERIOR CONSTRUCTION TO REMAIN DURING DEMOLITION AND CONSTRUCTION.
5. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS BEFORE COMMENCING WORK.
6. AFTER AWARD OF THE CONTRACT, CHANGE ORDER REQUESTS FOR ADDITIONAL MONEY WILL NOT BE APPROVED IF THE WORK COULD HAVE BEEN ANTICIPATED DURING A SITE VISIT BY THE CONTRACTOR.
7. CONTRACTOR SHALL NOT SCALE DRAWINGS.
8. CONTRACTOR SHALL PROVIDE ALL NECESSARY TEMPORARY SHORING, TEMPORARY BRACING, AND OR TEMPORARY SUPPORTS AS REQUIRED TO MAINTAIN STRUCTURAL INTEGRITY OF EXISTING STRUCTURE TO REMAIN AND OR EXISTING BUILDING ELEMENTS TO REMAIN.
9. CONTRACTOR IS TO VERIFY THE EXACT LOCATION OF ALL EXISTING UTILITIES PRIOR TO DEMOLITION ACTIVITIES AND WORK.
10. CONTRACTOR SHALL REMOVE TRASH AND DEBRIS REGULARLY AS NECESSARY TO ELIMINATED INTERFERENCE WITH ROADS, STREET, WALKS, AND ALL OTHER ADJACENT FACILITIES.
11. CONTRACTOR SHALL REMOVE TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
12. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION OF TEMPORARY DUST AND OR SOUND PARTITION BETWEEN CONSTRUCTION AREA AND AREAS NOT IN SCOPE AS NECESSARY. DEMOLITION ACTIVITIES SHALL BE PERFORMED SO AS TO PRODUCE MINIMAL DISTURBANCE TO EXISTING FACILITY AND OCCUPANTS (I.E. MINIMIZE EXCESSIVE AND PROLONGED NOISE LEVELS AND DUST).
13. CONTRACTOR SHALL REPAIR, REPLACE, OR PATCH EXISTING BUILDINGS, DRIVEWAYS, SIDEWALKS, CANOPIES, AND OR PARKING AREAS DAMAGED, MODIFIED, AND OR DISTURBED BY DEMOLITION WORK AT NO COST TO THE OWNER.
14. ALL EXISTING EQUIPMENT THAT REMAINS SHALL BE PROTECTED DURING DEMOLITION AND OR CONSTRUCTION TO PREVENT DAMAGE. ANY DAMAGE TO REMAINING EXISTING EQUIPMENT SUSTAINED DURING DEMOLITION AND OR CONSTRUCTION SHALL BE EQUIVALENTLY REPLACED OR EQUIVALENTLY REPAIRED AT NO COST TO THE OWNER.
15. CONTRACTOR SHALL PROVIDE TRAFFIC HANDLING MEASURES TO PROTECT THE GENERAL PUBLIC AT ALL TIMES, AS NECESSARY AND AS REQUIRED BY AUTHORITIES HAVING JURISDICTION.
16. DO NOT INTERRUPT EXISTING UTILITIES, EXCEPT WHEN AUTHORIZED IN WRITING BY AUTHORITIES HAVING JURISDICTION. PROVIDE TEMPORARY SERVICES DURING INTERRUPTIONS TO EXISTING UTILITIES, AS ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
17. WHEN UTILITY SERVICES ARE REQUIRED TO BE REMOVED, RELOCATED, OR ABANDONED, PROVIDE BYPASS CONNECTIONS TO MAINTAIN CONTINUITY OF SERVICE BEFORE PROCEEDING WITH DEMOLITION.
18. CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES INCLUDING BUT NOT LIMITED TO THE FOLLOWING: ELECTRIC, GAS, WATER, TELEPHONE, STORM SEWER, AND SANITARY SEWER FOR FIELD LOCATION OF ALL UNDERGROUND AND OVERHEAD UTILITY LINES, PRIOR TO COMMENCEMENT OF ANY DEMOLITION WORK. CONTRACTOR SHALL IDENTIFY ALL ELECTRICAL CIRCUITS SERVICING THE AREA INVOLVED WITH THIS DEMOLITION. THOSE CIRCUITS SHALL THEN BE LOCKED OUT AND TAGGED OUT IF THEY DO NOT SERVICE ANY OF THE REMAINING BUILDING. THOSE CIRCUITS WHICH ARE IDENTIFIED TO SERVICE BOTH THE AREA TO BE DEMOLISHED AND THE REMAINING BUILDING SHALL BE SPLIT SO AS TO KILL ALL ELECTRICAL POWER TO THE AREA TO BE DEMOLISHED WHILE MAINTAINING POWER TO THE REMAINDER OF THE BUILDING.
19. CONTRACTOR SHALL RELOCATE UTILITIES AND EQUIPMENT AS REQUIRED TO ACCOMMODATE NEW HVAC, ELECTRICAL, PLUMBING, AND TECHNOLOGY REQUIREMENTS FOR NEW WORK.
20. PROTECT EXISTING SITE ELEMENTS AND EXISTING LANDSCAPING TO REMAIN. PROTECTION SHALL INCLUDE BUT NOT BE LIMITED TO EXISTING TREES AND OTHER EXISTING VEGETATION INDICATED TO REMAIN IN PLACE AGAINST UNNECESSARY CUTTING, BREAKING, OR SKINNING OF ROOTS, SKINNING OR BRUISING OF BARK, SMOTHERING OF TREES BY STOCKPILING CONSTRUCTION MATERIAL OR EXCAVATED MATERIAL WITHIN DRIP LINES.
21. CONTRACTOR SHALL REGRADE AND HYDROMULCH AREAS AFFECTED BY DEMOLITION.
22. OWNER HAS RIGHT OF FIRST REFUSAL OF ALL ITEMS REMOVED AS PART OF THE SCOPE OF WORK, WHETHER IDENTIFIED AS SALVAGE OR NOT.
23. NOTIFY THE BUILDING OWNER OF ANY MATERIALS, FIXTURES, ETC, TO BE REMOVED THAT ARE DEEMED SALVAGEABLE. TURN OVER ANY REQUESTED ITEMS TO THE BUILDING OWNER IN GOOD AND CLEAN CONDITION.
24. ALL DASHED LINES ARE DEMOLITION LINES U.N.O.

DEMOLITION LEGEND

- PROPERTY LINE; SCOPE OF WORK
- EXISTING BUILDING IN SCOPE OF WORK
- EXISTING ITEM TO BE DEMOLISHED
- EXISTING PLANTER AREA
  REMOVE AND DISPOSE OF 3" OF EXISTING GROUND COVER. REMOVE ANY EXISTING VEGETATION. SCRAPE AND RECOMPACT EXISTING BASE. ANY EXISTING TREES OR PLANTING TO REMAIN PROTECT IN PLACE.
- EXISTING CONCRETE PAVING TO REMAIN
- EXISTING ASPHALT PAVING TO RECEIVE NEW SEAL COAT AND NEW STRIPING SEE SPEC SECTION 32 14 00
- EXISTING LANDSCAPED AREA SEE LANDSCAPE DWGS
- EXISTING TRUNCATED DOMES
- EXISTING TREE TO REMAIN; SEE LANDSCAPE DWGS
- EXISTING TREE TO BE REMOVED; SEE LANDSCAPE DWGS
- EXISTING LIGHT FIXTURE WITH CONCRETE BASE. CLEAN ALL EXISTING CONCRETE LIGHT POLE BASES. REMOVE DIRT AND GRAFFITI FROM CONCRETE. SEE ELECTRICAL DWGS

KEYNOTE LEGEND

32 01.01	EXISTING BOLLARD TO REMAIN; BOLLARD TO BE PAINTED
32 01.02	EXISTING DAMAGED BOLLARD TO BE REMOVED AND REPLACED
D.25	ASPHALT PAVING TO BE REMOVED AND PREPPED FOR NEW CONCRETE; SEE SITE PLAN AND CIVIL DWGS
D.27	DEMOLISH EXISTING CURB AND PREP FOR NEW CONCRETE; SEE SITE PLAN
D.29	EXISTING TRASH ENCLOSURE TO REMAIN
D.35	EXISTING GAS METER TO BE ABANDONED; SEE PLUMBING DWGS
D.41	EXISTING BIKE RACK TO REMAIN, (6) BIKE CAPACITY
D.45	EXISTING TRUNCATED DOMES TO BE REMOVED
D.47	EXISTING BENCH TO BE REMOVED AND SALVAGED FOR RE-USE, PATCH AND REPAIR ANY DAMAGES TO SLAB DUE TO BENCH ANCHORAGE. SEE SITE PLAN FOR NEW LOCATION.
D.57	EXISTING ALCOVES TO RECEIVE RENOVATIONS. SEE C1.2 AND S2.01
D.58	EXISTING ASPHALT PAVING TO RECEIVE NEW SEAL COAT AND NEW STRIPING
D.59	EXISTING STRIPING, EXISTING ASPHALT SHALL RECEIVE NEW SEAL COAT AND ALL NEW STRIPING. SEE SITE PLAN.
D.60	EXISTING ACCESSIBLE PARKING SIGN; EXISTING FOOTING AND SLEEVE TO REMAIN. EXISTING POST AND SIGN TO BE REPLACED WITH NEW; SEE SITE PLAN.
D.61	EXISTING ACCESSIBLE PARKING SIGN TO BE DEMOLISHED
D.62	EXISTING CONCRETE WHEEL STOP TO BE REMOVED, SALVAGED AND REUSED WHEN POSSIBLE
D.66	EXISTING ASPHALT TO BE REMOVED AND REPLACED, SEE C2.6

Not for permitting or construction

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
PLAN NORTH / TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

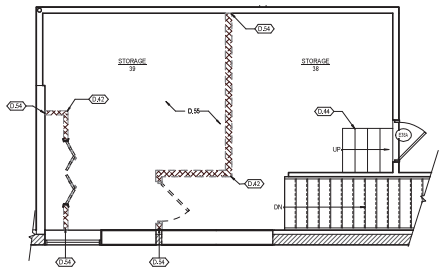
DEMOLITION SITE PLAN

D1.01

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

C:\Users\kelly.clancy\Documents\220389_NSHL_06.20.24_kelly.clancy.YSZ4T.rvt
5/23/2025 10:55:01 AM

APPROVED
City of Sacramento Community Development Department
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



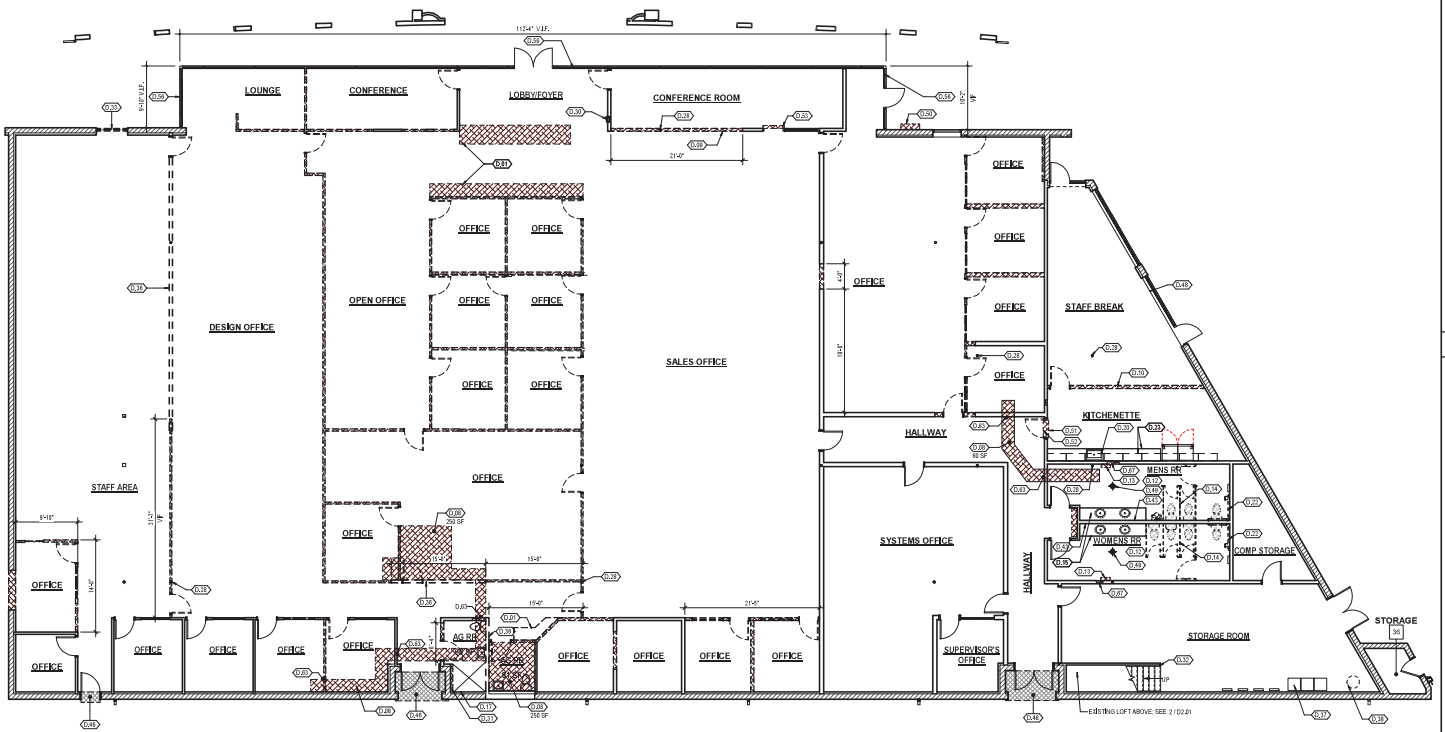
2 DEMOLITION LOFT FLOOR PLAN
SCALE: 1/4" = 1'-0"

KEYNOTE LEGEND

D.01 REMOVE (E) CASEWORK. CASEWORK TO BE SALVAGED BY OWNER.
D.08 REMOVE (E) CONCRETE AND PREP FOR PLUMBING, HATCHED AREA TO SHOW EXTENTS OF DEMOLITION
D.09 REMOVE (E) SLIDING GLASS DOORS
D.10 EXISTING FOLDING PARTITION TO BE REMOVED, FLOOR SLAB TO BE FLOATED AND PREPPED FOR NEW FLOOR FINISH
D.12 REMOVE EXISTING SHEET VINYL FLOORING, FLOAT SLAB AS NEEDED AND PREP FOR NEW FLOORING.
D.13 EXISTING PAPER TOWEL DISPENSER TO BE REMOVED AND SALVAGED BY THE OWNER; TYP.
D.14 REMOVE EXISTING TOILET PARTITIONS, STORE, AND PROTECT FOR RE-INSTALLATION AFTER NEW FLOORING IS INSTALLED, TYP ALL PARTITIONS.
D.15 EXISTING COUNTER TOP TO REMAIN, PROTECT IN PLACE
D.17 EXISTING SHOWER TO BE DEMOLISHED
D.20 REMOVE EXISTING CASEWORK BELOW SINK, REMOVE (E) GARBAGE DISPOSAL AND WATER FILTER.
D.22 REMOVE EXISTING GRAB BARS, STORE, AND PROTECT FOR RE-INSTALLATION AFTER NEW WALL FINISH IS INSTALLED, SEE FLOOR PLAN.
D.23 EXISTING CASEWORK TO REMAIN, CLEAN AND TOUCH UP PAINT AS NEEDED
D.28 EXISTING STRUCTURE; PROTECT IN PLACE
D.29 EXISTING FIRE EXTINGUISHER TO REMAIN
D.31 EXISTING PORTION OF FURRED WALL TO BE REMOVED, EXPOSED CMU WALL TO RECEIVE NEW FINISH PER ROOM SCHEDULE
D.32 EXISTING HAND RAIL TO BE REMOVED AND REPLACED
D.33 EXISTING WINDOW TO BE REMOVED, AREA TO BE INFILLED AS REQUIRED FOR NEW BOOK-DROP, SEE FLOOR PLAN.
D.36 EXISTING PARTITION TO BE A FIRE RATED WALL, SEE FLOOR PLAN, DEMOLISH FINISHES ON BOTH SIDES OF WALL AND PREP FOR NEW 5/8" TYPE X GYP BD. SEE PARTITION TYPES.
D.37 EXISTING ELECTRICAL EQUIP TO REMAIN; SEE ELECTRICAL DWGS
D.38 EXISTING WATER HEATER TO BE REMOVED; SEE PLUMBING DWGS
D.42 EXISTING CLOSET WALLS AND DOORS TO BE DEMOLISHED
D.43 EXISTING MIRRORS TO BE REMOVED, STORE, AND PROTECT FOR RE-INSTALLATION AFTER NEW WALL FINISH IS INSTALLED
D.44 EXISTING STAIR TO BE RELOCATED DIRECTLY UNDER ACCESS DOOR
D.48 GRIND EXISTING ASPHALT/CONCRETE TO SLOPE AWAY FROM THE BUILDING; SEE C2.2 FOR ADDITIONAL INFO
D.49 EXISTING BLINDS TO REMAIN, PROTECT IN PLACE
D.50 EXISTING FLOOR DRAIN COVER TO BE REMOVED AND REPLACED AFTER NEW FLOORING IS INSTALLED, SEE PLUMBING DWGS
D.50 EXISTING DROPBOX TO BE REMOVED
D.51 SMOOTH SURFACE AT DOOR THRESHOLD TO COMPLY WITH ACCESSIBILITY STANDARDS
D.52 EXISTING EXIT SIGN TO BE REMOVED
D.53 EXISTING SLIDING DOOR TO BE REPLACED WITH NEW DOOR; SEE FLOOR PLAN AND DOOR SCHEDULE
D.54 INFILL WITH NEW GYP BOARD TO ALIGN AND BE FLUSH WITH EXISTING GYP BOARD, FINISH AND PAINT TO MATCH ADJACENT WALL
D.55 REMOVE ALL EXISTING LOFT FLOORING
D.58 ADDITIVE ALTERNATE #2: (E) GLAZING TO BE REMOVED AND REPLACED WITH ACOUSTICAL GLAZING AT ENTIRE FACADE; SEE PLAN, (E) STOREFRONT FRAMING TO REMAIN, PROTECT IN PLACE
D.61 DEMOLISH CONCRETE UNDERNEATH EXISTING WALL, WALL TO REMAIN, PROTECT IN PLACE, REPAIR ANY DAMAGE TO EXISTING WALLS.
D.67 SELECTIVE DEMOLITION FOR NEW SEMI-RECESSED TOILET ACCESSORIES; SEE A4.21

GENERAL DEMOLITION NOTES

1. DEMOLITION PLANS INDICATE SOME OF THE SCOPE-OF-WORK INVOLVED FOR THE DEMOLITION PHASE OF THIS PROJECT. CONTRACTOR SHALL REVIEW ALL SHEETS FOR ADDITIONAL DEMOLITION SCOPE.
2. CONTRACTOR SHALL VERIFY EXISTING SITE AND BUILDING CONDITIONS AND DIMENSIONS IN THE FIELD PRIOR TO DEMOLITION ACTIVITIES AND WORK.
3. CONTRACTOR SHALL NOTIFY ARCHITECT OF ANY DISCREPANCIES IN WRITING.
4. CONTRACTOR SHALL NOTIFY ARCHITECT AND OWNER OF ANY POSSIBLE ASBESTOS CONTAINING MATERIALS DISCOVERED BEFORE PROCEEDING WITH WORK. PROTECT INTERIOR CONSTRUCTION TO REMAIN DURING DEMOLITION AND CONSTRUCTION.
5. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS BEFORE COMMENCING WORK.
6. AFTER AWARD OF THE CONTRACT, CHANGE ORDER REQUESTS FOR ADDITIONAL MONEY WILL NOT BE APPROVED IF THE WORK COULD HAVE BEEN ANTICIPATED DURING A SITE VISIT BY THE CONTRACTOR.
7. CONTRACTOR SHALL NOT SCALE DRAWINGS.
8. CONTRACTOR SHALL PROVIDE ALL NECESSARY TEMPORARY SHORING, TEMPORARY BRACING, AND OR TEMPORARY SUPPORTS AS REQUIRED TO MAINTAIN STRUCTURAL INTEGRITY OF EXISTING STRUCTURE TO REMAIN AND OR EXISTING BUILDING ELEMENTS TO REMAIN.
9. CONTRACTOR IS TO VERIFY THE EXACT LOCATION OF ALL EXISTING UTILITIES PRIOR TO DEMOLITION ACTIVITIES AND WORK.
10. CONTRACTOR SHALL REMOVE TRASH AND DEBRIS REGULARLY AS NECESSARY TO ELIMINATED INTERFERENCE WITH ROADS, STREET, WALKS, AND ALL OTHER ADJACENT FACILITIES.
11. CONTRACTOR SHALL REMOVE TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
12. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION OF TEMPORARY DUST AND OR SOUND PARTITION BETWEEN CONSTRUCTION AREA AND AREAS NOT IN SCOPE AS NECESSARY. DEMOLITION ACTIVITIES SHALL BE PERFORMED SO AS TO PRODUCE MINIMAL DISTURBANCE TO EXISTING FACILITY AND OCCUPANTS (I.E. MINIMIZE EXCESSIVE AND PROLONGED NOISE LEVELS AND DUST).
13. CONTRACTOR SHALL REPAIR, REPLACE, OR PATCH EXISTING BUILDINGS, DRIVEWAYS, SIDEWALKS, CANOPIES, AND OR PARKING AREAS DAMAGED, MODIFIED, AND OR DISTURBED BY DEMOLITION WORK AT NO COST TO THE OWNER.
14. ALL EXISTING EQUIPMENT THAT REMAINS SHALL BE PROTECTED DURING DEMOLITION AND OR CONSTRUCTION TO PREVENT DAMAGE. ANY DAMAGE TO REMAINING EXISTING EQUIPMENT SUSTAINED DURING DEMOLITION AND OR CONSTRUCTION SHALL BE EQUIVALENTLY REPLACED OR EQUIVALENTLY REPAIRED AT NO COST TO THE OWNER.
15. CONTRACTOR SHALL PROVIDE TRAFFIC HANDLING MEASURES TO PROTECT THE GENERAL PUBLIC AT ALL TIMES, AS NECESSARY AND AS REQUIRED BY AUTHORITIES HAVING JURISDICTION.
16. DO NOT INTERRUPT EXISTING UTILITIES, EXCEPT WHEN AUTHORIZED IN WRITING BY AUTHORITIES HAVING JURISDICTION. PROVIDE TEMPORARY SERVICES DURING INTERRUPTIONS TO EXISTING UTILITIES, AS ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
17. WHEN UTILITY SERVICES ARE REQUIRED TO BE REMOVED, RELOCATED, OR ABANDONED, PROVIDE BYPASS CONNECTIONS TO MAINTAIN CONTINUITY OF SERVICE BEFORE PROCEEDING WITH DEMOLITION.
18. CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES INCLUDING BUT NOT LIMITED TO THE FOLLOWING: ELECTRIC, GAS, WATER, TELEPHONE, STORM SEWER, AND SANITARY SEWER FOR FIELD LOCATION OF ALL UNDERGROUND AND OVERHEAD UTILITY LINES, PRIOR TO COMMENCEMENT OF ANY DEMOLITION WORK. CONTRACTOR SHALL IDENTIFY ALL ELECTRICAL CIRCUITS SERVICING THE AREA INVOLVED WITH THIS DEMOLITION. THOSE CIRCUITS SHALL THEN BE LOCKED OUT AND TAGGED OUT IF THEY DO NOT SERVICE ANY OF THE REMAINING BUILDING. THOSE CIRCUITS WHICH ARE IDENTIFIED TO SERVICE BOTH THE AREA TO BE DEMOLISHED AND THE REMAINING BUILDING SHALL BE SPLIT SO AS TO KILL ALL ELECTRICAL POWER TO THE AREA TO BE DEMOLISHED WHILE MAINTAINING POWER TO THE REMAINDER OF THE BUILDING.
19. CONTRACTOR SHALL RELOCATE UTILITIES AND EQUIPMENT AS REQUIRED TO ACCOMMODATE NEW HVAC, ELECTRICAL, PLUMBING, AND TECHNOLOGY REQUIREMENTS FOR NEW WORK.
20. PROTECT EXISTING SITE ELEMENTS AND EXISTING LANDSCAPING TO REMAIN. PROTECTION SHALL INCLUDE BUT NOT BE LIMITED TO EXISTING TREES AND OTHER EXISTING VEGETATION INDICATED TO REMAIN IN PLACE AGAINST UNNECESSARY CUTTING, BREAKING, OR SKINNING OF ROOTS, SKINNING OR BRUISING OF BARK, SMOTHERING OF TREES BY STOCKPILING CONSTRUCTION MATERIAL OR EXCAVATED MATERIAL WITHIN DRIP LINES.
21. OWNER HAS RIGHT OF FIRST REFUSAL OF ALL ITEMS REMOVED AS PART OF THE SCOPE OF WORK, WHETHER DEMOLITED AS SALVAGE OR NOT.
22. NOTIFY THE BUILDING OWNER OF ANY MATERIALS, FIXTURES, ETC., TO BE REMOVED THAT ARE DEEMED SALVAGEABLE. TURN OVER ANY REQUESTED ITEMS TO THE BUILDING OWNER IN GOOD AND CLEAN CONDITION.
23. ALL FURNITURE WILL BE REMOVED OR RELOCATED BY THE OWNER AS NECESSARY PRIOR TO THE DEMOLITION WORK OF THIS PROJECT. CONTRACTOR SHALL COORDINATE WITH OWNER AS REQUIRED.
24. REMOVE EXISTING CONSTRUCTION TO THE EXTENT INDICATED ON THE DRAWINGS. SHOULD ANY DAMAGE OCCUR TO ANY EXISTING CONSTRUCTION TO REMAIN, THE CONTRACTOR SHALL REPAIR THE DAMAGE TO MATCH EXISTING AND OR ADJACENT CONSTRUCTION AT NO COST TO THE OWNER.
25. MAINTAIN ANY AND ALL EXISTING FIRE-RATED ASSEMBLIES THAT ARE TO REMAIN, AND THEIR ASSOCIATED FIRE-RATINGS, INCLUDING BUT NOT LIMITED TO ALL ASSOCIATED EXISTING FIRE-RATED OPENINGS, ALL ASSOCIATED EXISTING FIRE-RATED PENETRATIONS, AND ALL ASSOCIATED EXISTING FIRE-RATED FIRESTOPPING CONDITIONS.
26. WHEN UNANTICIPATED MECHANICAL, ELECTRICAL, OR STRUCTURAL ELEMENTS THAT CONFLICT WITH THE INTENDED FUNCTION OR DESIGN ARE ENCOUNTERED, DETERMINE THE NATURE AND EXTENT OF THE CONFLICT AND NOTIFY THE ARCHITECT IMMEDIATELY FOR RESOLUTION.
27. REMOVE, PATCH, AND REPAIR ALL ABANDONED ROOF PENETRATIONS RESULTING FROM WORK.
28. SAW-CUT AND REMOVE EXISTING FLOOR FINISHES AND FLOOR SLAB AS REQUIRED TO INSTALL NEW FIXTURES, ITEMS, AND OR DEVICES FOR ALL SCOPE-OF-WORK PERTAINING TO NEW MECHANICAL WORK, NEW PLUMBING UTILITIES, NEW PLUMBING WORK, NEW ELECTRICAL WORK, AND NEW TECHNOLOGY WORK. SPLICE NEW REINFORCING BARS DOWELLED INTO EXISTING CONCRETE AND PROVIDE NEW VAPOR RETARDER AND NEW CONTINUOUS WATERSTOP AT JOINT BETWEEN NEW CONCRETE FLOOR SLAB AND EXISTING CONCRETE FLOOR SLAB. PATCH WITH NEW 3,500 PSI MINIMUM CONCRETE AND PREPARE FLOOR, INCLUDING NEW CONCRETE, TO RECEIVE NEW FLOOR FINISHES. COORDINATE WITH STRUCTURAL.
29. EXISTING WALLS OR PORTIONS OF WALLS TO BE REMOVED SHALL BE CUT FLUSH WHERE INTERSECTING WITH WALLS TO REMAIN. REMAINING WALLS TO BE PATCHED AND FINISHED SMOOTH.
30. NEW OPENING TO BE CUT IN EXISTING WALLS SHALL BE SAW-CUT AT LOCATIONS INDICATED TO THE HEIGHT AND WIDTH INDICATED. NEW LINTELS SHALL BE INSTALLED TO SUPPORT EXISTING WALL CONSTRUCTION ABOVE AS INDICATED ON THE DRAWINGS, OR IF NOT INDICATED, AS REQUIRED FOR NEW WALL CONSTRUCTION PER STRUCTURAL DRAWINGS. COORDINATE LOCATIONS OF ALL NEW OPENINGS IN EXISTING WALLS AND PARTITIONS WITH ARCHITECTURAL PLANS.
31. WHERE EXISTING WALL OPENINGS ARE TO BE NEWLY CLOSED-OFF, REMOVE ANY EXISTING OPENING FRAME AND PATCH AND REPAIR EXISTING WALL TO MATCH EXISTING ADJACENT MATERIALS AND FINISHES, UNLESS NOTED OTHERWISE.
32. WHERE EXISTING INTERIOR WALLS ARE REPLACED OR REMOVED, REMOVE MEPT SYSTEMS BACK TO PANEL, OR MECHANICAL ROOM, OR FARTHEST POSSIBLE POINT WITHOUT DISTURBING EXISTING CONSTRUCTION. REMOVE EXISTING MECHANICAL EQUIPMENT, RELOCATE POWER PER MEPT DRAWINGS
33. REFER TO MEPT DRAWINGS FOR DEMOLITION OF MEPT SYSTEMS. IDENTIFY WORK REQUIRED BY THIS CONTRACTOR WHICH MAY AFFECT DEMOLITION AND OR REMOVAL OF ARCHITECTURAL ELEMENTS. COORDINATE WITH RELATED SUBCONTRACTORS THE EXTENT OF ALL DEMOLITION WORK.
34. PATCH FLOORS, WALLS CEILINGS WHICH REMAIN AT LOCATIONS WHERE PIPES, CONDUITS, ETC, ARE REMOVED AS REQUIRED TO MATCH EXISTING CONDITIONS OR TO RECEIVE NEW FINISHES.
35. WHERE EXISTING FINISH FLOOR IS REMOVED, PREPARE FLOOR SURFACE TO RECEIVE NEW FLOORING.
36. ALL DASHED LINES ARE DEMOLITION LINES U.N.O.



1 DEMOLITION FLOOR PLAN
SCALE: 1/8" = 1'-0"

DEMOLITION LEGEND

- EXISTING ITEM TO DEMOLISHED
- EXISTING METAL STUD WALL TO REMAIN
- EXISTING WALL TO DEMOLISHED
- EXISTING WALL FINISHES TO BE DEMOLISHED, EXISTING FRAMING TO REMAIN
- EXISTING CONCRETE/CMU WALL TO REMAIN
- EXISTING DOOR TO REMAIN
- EXISTING DOOR PANEL AND FRAME TO BE REMOVED
  NOTE: ALL WOOD DOORS TO BE SALVAGED AND STORED FOR RE-USE

Not for permitting or construction

PBK JOBCOPY

ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8515
916-353-9922

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH / TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

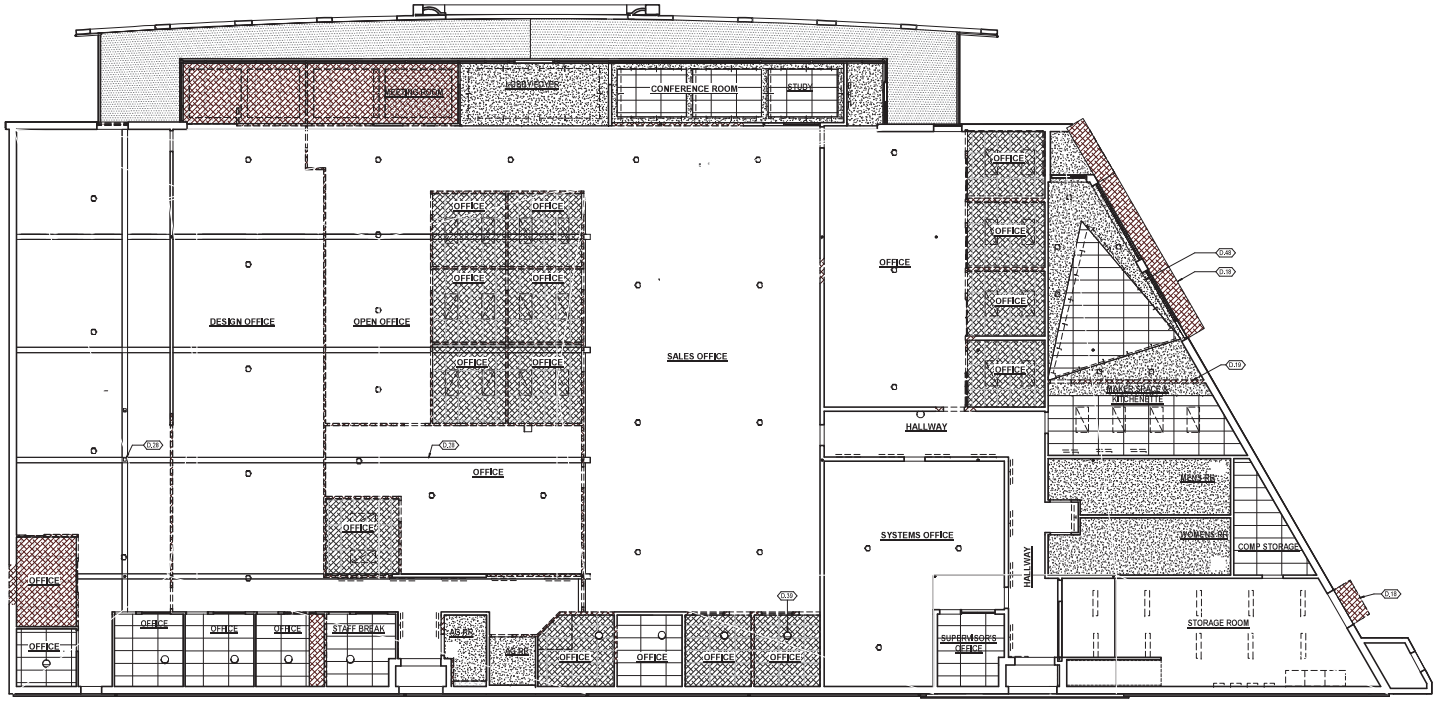
CONSTRUCTION DOCUMENT

DEMOLITION FLOOR PLAN

D2.01

COM-2500586

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



1 DEMOLITION REFLECTED CEILING PLAN
SCALE: 1/8" = 1'-0"

DEMOLITION NOTES

1. SEE MECHANICAL AND ELECTRICAL DEMOLITION SHEETS FOR ADDITIONAL INFORMATION.

DEMOLITION LEGEND

- EXISTING ITEM TO DEMOLISHED
- EXISTING ACT AND GRID TO BE DEMOLISHED
- EXISTING ACT CEILING CEILING GRID TO REMAIN AND RE-PAINTED ALL ACT TO BE REPLACED WITH NEW TILES PER SPEC SECTION 09 51 00
- EXISTING GYP BD CIELING TO REMAIN; PATCH AND REPAIR AS NEEDED, ASSUME 20% GYP BD CEILING TO BE PAINTED
- EXISTING CEMENT PLASTER SOFFIT TO BE PAINTED
- EXPOSED TO STRUCTURE
- EXISTING LIGHTING FIXTURE TO BE REMOVED, SEE ELECTRICAL DWGS

KEYNOTE LEGEND

D.18	EXISTING AWNING TO BE REMOVED
D.19	EXISTING PARTITION TO BE DEMOLISHED, PATCH, REPAIR, AND REPAINT SOFFIT AS NEEDED.
D.20	EXISTING STRUCTURE; PROTECT IN PLACE
D.39	EXISTING SOLATUBE TO REMAIN; PROTECT IN PLACE; TYP OF (19)
D.40	EXISTING BLINDS TO REMAIN; PROTECT IN PLACE

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9822

Not for permitting or construction

JOBCOPY

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

DEMOLITION RCP

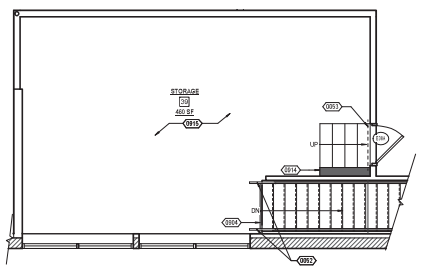
D10.01

COM-2500586

D10.01 - DEMOLITION RCP

C:\Users\kelly.clancy\Documents\220389_NSHL_06.20.24_kelly.clancy.YSZ4T.rvt
5/23/2025 10:55:04 AM

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



2 LOFT
SCALE: 1/4" = 1'-0"

KEYNOTE LEGEND

12 06 01	54MM RACK; SEE SPEC SECTION 11 66 00
0052	METAL HANDRAIL RE: 7 / A11.27
0053	WALL MOUNTED CHAIN AND SIGN TO READ "NO PUBLIC ACCESS, SERVICE PERSONNEL ONLY" RE: 17 / A11.09
0310	CMU WALL INFILL; SEE 10/S4.01
0501	EXISTING COLUMN TO BE WITHIN NEW WALL; PROTECT IN PLACE, WALL TO BE 1" WIDE IN ORDER TO ENCAPSULATE (E) COLUMN IN NEW WALL
0904	2" MIN WIDE CONTRASTING MARKING STRIPE AT TOP AND BOTTOM TREAD
0908	EXISTING COLUMN TO RECEIVE NEW FAUX WOOD WRAP; FB; SEE FINISH LEGEND
0911	CUSTOM INTERIOR TREE FEATURE (DEDUCTIVE ALTERNATE #1)
0913	BUILT-IN COUNTERTOP RE: 7 / A11.06
0914	WALL INFILL RE: 17 / A11.09
0915	LOFT TO RECEIVE NEW SHEET VINYL, SV-2, SEE FINISH SCHEDULE
0916	APPROXIMATE LOCATION SHOWN; COORDINATE LOCATION OF NEW WALL TO BE PLACED TO AVOID CONFLICTS WITH DUCTWORK
1001	KODO SPECTRUM LIGHT LAB; NOT INCLUDED IN SCOPE OF WORK
1002	LOCOMOTION STATION TRACKS; NOT INCLUDED IN SCOPE OF WORK
1011	12" X 4" WAINSCOTING RE: 8 / A11.09
1012	WALL MOUNTED SHORT THROW PROJECTOR
1013	KNUCKLEY KNOCKOFF RETURN THROUGH WALL RETURN RE: 6 / A11.07
1015	SELF CHECK-OUT RE: 24 / A11.08
1016	SELF CHECK-OUT; CHILDREN'S HEIGHT RE: 24 / A11.08
1017	HUBLET, POWER AND DATA REQUIRED; SEE ELEC DWGS
1044	FIRE EXTINGUISHER CABINET, SEMI-RECESSED LOCKED CABINET RE: 18 / A11.06
1117	36" VERTICAL PUSH BAR ACCESSIBLE AUTOMATIC DOOR OPENER TO BE MOUNTED TO ALUMINUM MULLION; SEE SPEC SECTION 08 71 13
1118	3D PRINTER; BY OTHERS
1119	LASER CUTTER; BY OTHERS
1121	WALL MOUNTED KNOX BOX RE: 5 / A11.07
2310	DUAL DRINKING FOUNTAIN WITH BOTTLE FILLER RE: 19 / A11.06 & 10 / A4.01
2347	WATER HEATER; SEE PLUMBING DWGS
2803	POWER POLE, TYP OF (5); SEE ELECTRICAL DWGS
2804	DF; SEE ELECTRICAL DWGS
2701	GPAC; SEE FURNITURE DWGS F3 & F4

FLOOR PLAN LEGEND

Room name 101 — ROOM NAME & NUMBER

EXISTING PARTITION TO REMAIN

NEW PARTITION
4" (U.N.O.) METAL STUD PARTITION W/ 5/8" GYP BD EA SIDE FILLED WITH COMPRESSION FIT R13 BATT INSULATION
ALL NEW PARTITIONS TYPE A UNLESS NOTED OTHERWISE
SEE A11.02 FOR WALL TYPE DEFINITION

NEW CMU WALL
8x8x16 CMU INFILL W/ 4" WALL FURRING ON THE INTERIOR TO ALIGN WITH EXISTING FURRING CONDITION
SEE 10/S4.01 FOR ADDITIONAL INFORMATION ON INFILL AT CMU WALL

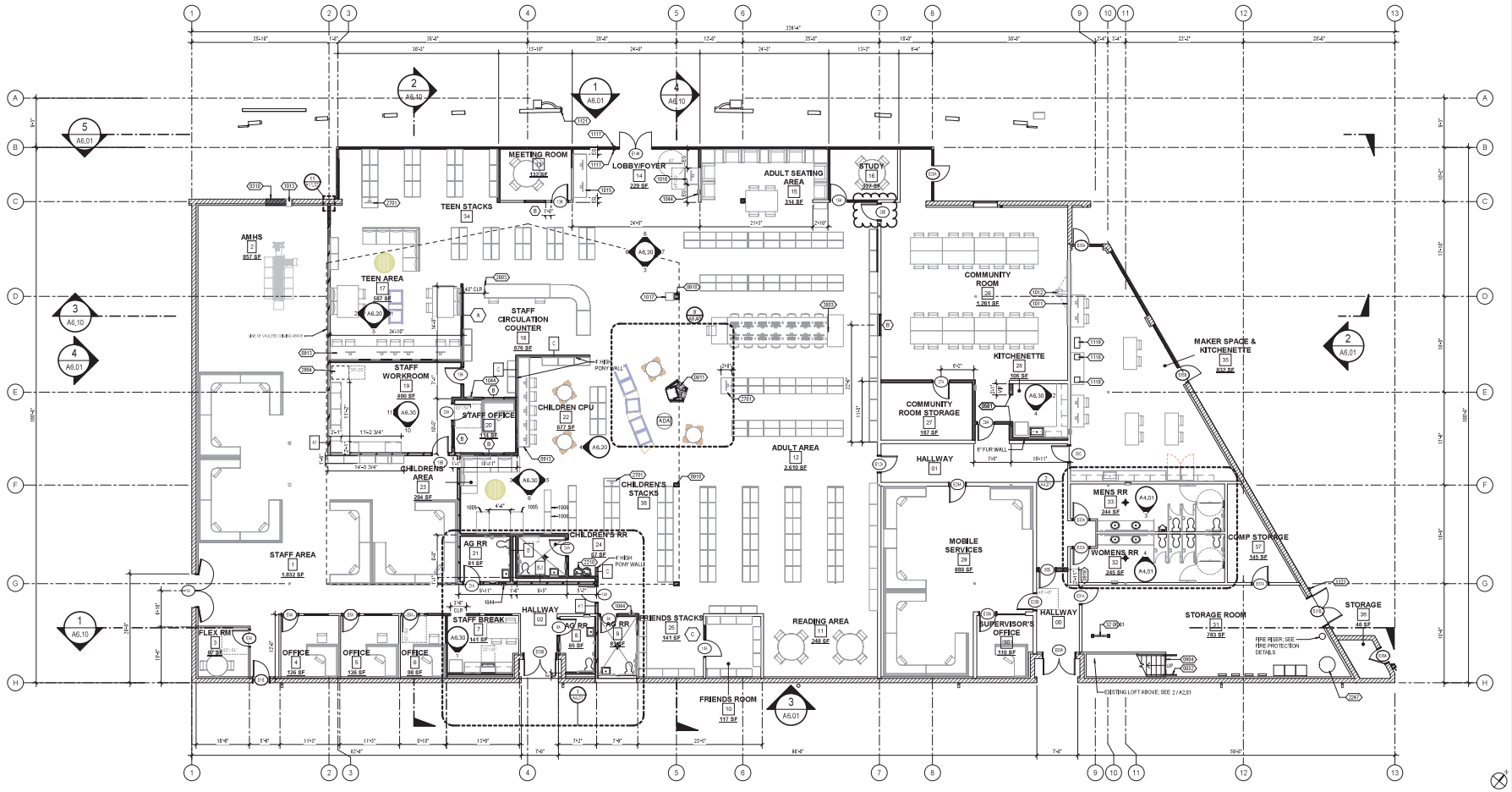
NEW DOOR DESIGNATION

NEW WINDOW DESIGNATION

NEW 1-HOUR FIRE RATED PARTITION
4" METAL STUDS WITH TYPE X GYPSUM BOARD ON EA SIDE, FROM TOP OF FOUNDATION TO UNDERSIDE OF ROOF DECK.
SEE A11.02 FOR RATED PARTITION DETAILS.
PROVIDE IDENTIFICATION MARK IN 3" HIGH TEXT TO READ "FIRE BARRIER/FIRE PARTITION – PROTECT ALL OPENINGS" AT TOP OF WALL AT INTERVAL NOT EXCEEDING 30 FEET AND WITHIN 15 FEET OF THE END OF EACH WALL ALONG BOTH SIDES OF THE WALL. PAINTED RED. 2022 CBC, SECTION 703.5

GENERAL FLOOR PLAN NOTES

1. DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS TAKE PRECEDENCE. CONTACT ARCH IF CLARIFICATION IS NECESSARY IN ORDER TO DETERMINE THE INTENT OF THE CONTRACT DOCUMENTS
2. DRAWINGS NOTED AS "N.T.S" OR "NTS" ARE NOT TO SCALE
3. ALL DIMENSIONS ARE TO STRUCTURAL COLUMN LINES OR THE SURFACE OF PARTITION ASSEMBLY U.N.O.
4. FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITION BEFORE COMMENCING WORK. NOTIFY ARCH, OF ANY DISCREPANCIES PRIOR TO PROCEEDIN WITH AFFECTED WORK
5. NOTES OR DIMENSIONS NOTED AS "TYPICAL" OR "TYP." OR "TYP" SHALL APPLY TO CONDITIONS THAT ARE THE SAME OR SIMILAR
6. DIMENSIONS NOTED AS "FIELD VERIFY" OR "V.I.F." OR "VIF" SHALL BE MEASURED AND CONFIRMED AT THE PROJECT SITE BY THE CONTRACTOR AND REVIEWED WITH THE ARCH, BEFORE INCORPORATING INTO THE WORK
7. DIMENSIONS NOTED AS "CLEAR" OR "CLEAR INSIDE" REQUIRE SPECIFIC COORDINATION AMONG DISCIPLINES AND OR MANUFACTURERS
8. ALIGN FINISHED FACE OF WALLS WHERE WALL PARTITIONS OF DIFFERING THICKNESS ABUT AND OR ADJOIN IN THE SAME PLANE
9. PROVIDE AND INSTALL CONT. REVEAL TRIM AT JOINT WHERE GYPSUM BOARD WALL PARTITIONS ABUT AND OR ADJOIN MASONRY WALL PARTITIONS IN THE SAME PLANE
10. ALL DOORS SHALL BE SET 6 INCHES OFF THE ADJACENT PERPENDICULAR WALL ON THE HINGE SIDE OF THE DOOR U.N.O., NOTIFY ARCH, OF ANY DOOR-RELATED CONFLICTS, INCLUDING BUT NOT LIMITED TO CONFLICTS CONCERNING ACCESSIBILITY STANDARDS
11. ALL DOOR THRESHOLDS AT ALL EXTERIOR DOORS SHALL BE SET IN FULL BED OF SEALANT
12. ALL FLOOR SLOPES TO FLOOR DRAINS SHALL NOT EXCEED 1:48
13. PROVIDE AND INSTALL SELF-LEVELING UNDERLAYMENT WHERE UNEVEN FLOOR SLAB EXISTS PRIOR TO INSTALLATION OF FLOOR FINISHES
14. COORD. HOUSEKEEPING PAD LOCATIONS AND DIMENSIONS WITH EQUIPMENT TO BE INSTALLED
15. ALL FLOOR FINISH CHANGES SHALL OCCUR AT THE CENTERLINE OF DOORS U.N.O.
16. ALL FLOOR FINISH MATERIAL CHANGES SHALL HAVE REDUCER STRIPS
17. ALL REQUIRED ACCESSIBLE CLEARANCES FOR ALL ITEMS, INCLUDING BUT NOT LIMITED TO ALL COUNTER TOPS, ALL PLUMBING FIXTURES, ALL DRINKING FOUNTAINS, ALL ELECTRIC WATER COOLERS, ALL LAVATORIES, ALL URINALS, ALL TOILETS SHALL BE STRICTLY ENFORCED
18. REFER TO OTHER DISCIPLINE DOCUMENTS FOR ADDITIONAL SCOPE OF WORK.
19. ALL WALLS TYPE "A" U.N.O., SEE INT PARTITION DETAILS ON A11.02



15 FLOOR PLAN
SCALE: 1/8" = 1'-0"

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

JOBCOPY

Not for permitting or construction

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK COMMENTS	05/23/25
2	OWNER CHANGES	05/23/25

CONSTRUCTION DOCUMENT

FLOOR PLAN

A2.01

COM-2500586

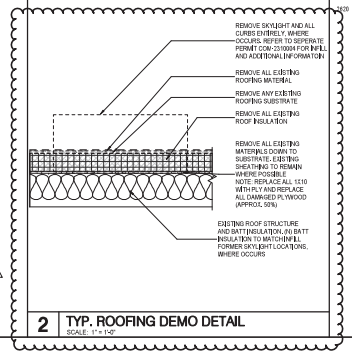
APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

GENERAL NOTES

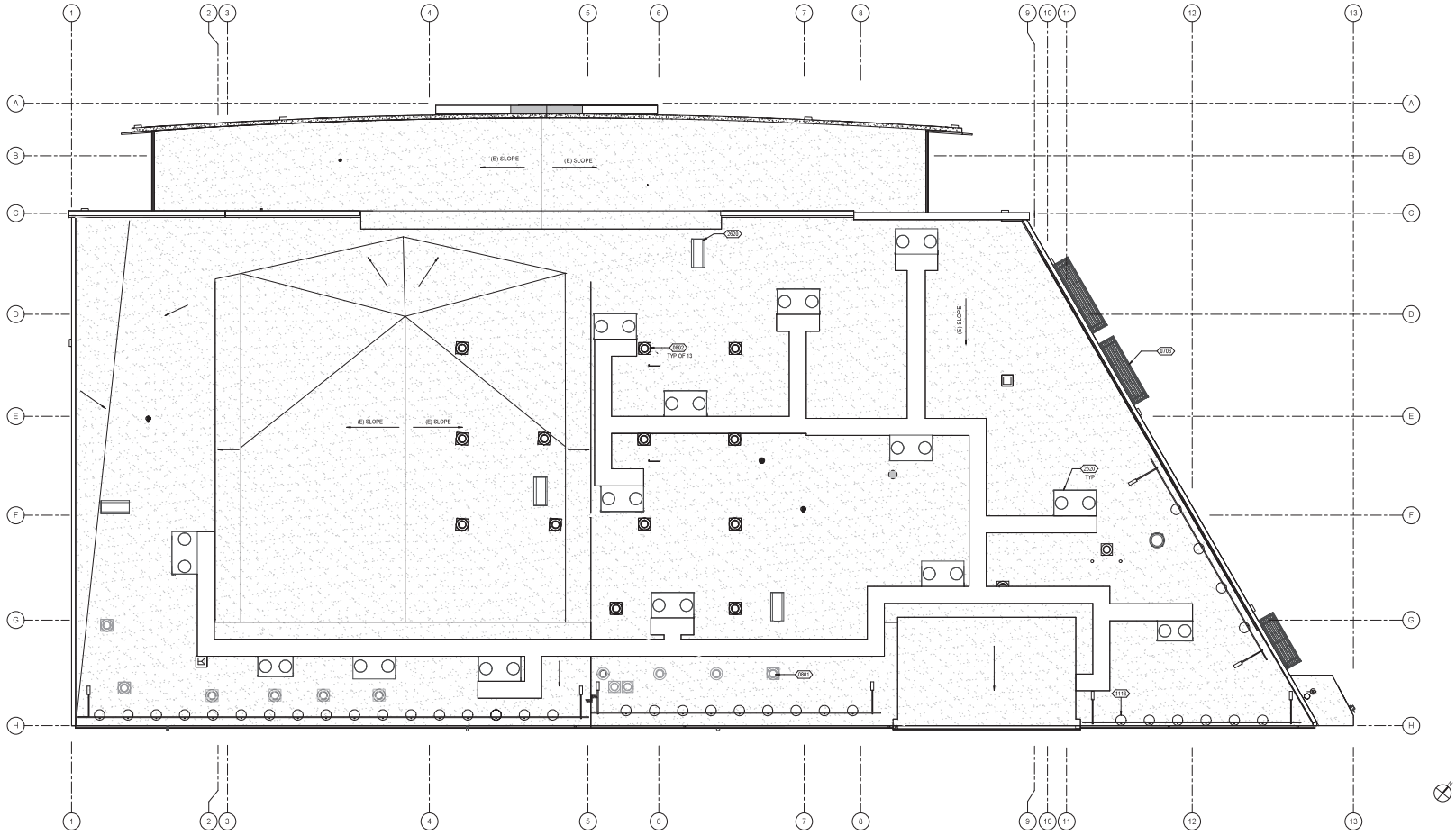
1. REFER TO SEPERATE PERMIT COM-2310004 FOR ROOF AND HVAC IMPROVEMENTS ASSOCIATED WITH THIS SCOPE OF WORK.
2. ALL EXISTING GUTTERS AND DOWNSPOUTS TO BE REMOVED AND REPLACED AS PART OF ROOF REPAIR SCOPE OF WORK.

KEYNOTE LEGEND

0706	EXTERIOR PERFORATED METAL AWNING; SEE SPEC SECTION 10 73 00 AND S-04.01
0901	(E) TUBE SKYLIGHT TO REMAIN
0902	ADDITIVE ALTERNATE #1 TUBULAR SKYLIGHT, TYP OF 13, SEE 24/A11.01
1116	NON-PENETRATING FALL PROTECTION SYSTEM; INCLUDED IN ROOF SCOPE, SHOWN FOR REFERENCE. REFER TO PERMIT COM-2310004
2020	MECHANICAL EQUIPMENT INCLUDED IN ROOF SCOPE, SHOWN FOR REFERENCE.



2 TYP. ROOFING DEMO DETAIL
SCALE: 1" = 1'-0"



1 ROOF PLAN (SHOWN FOR REFERENCE ONLY)
SCALE: 1/8" = 1'-0"

Not for permitting or construction

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE
2	OWNER CHANGES	05/23/25

CONSTRUCTION DOCUMENT

ROOF PLAN

A3.01

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

RESTROOM GENERAL NOTES

1. REFER TO 9 / A4.01 FOR ACCESSORY MOUNTING HEIGHTS.

TOILET ACCESSORY TYPES

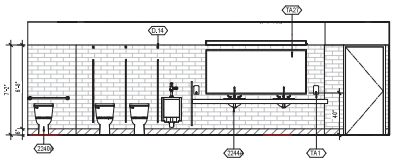
Keynote	DESCRIPTION	REMARKS	Manufacturer	Comments
TA1	SOAP DISPENSER	Surface Mounted	Bobrick Washroom Equipment Inc	B-2111
TA2	MIRROR	Surface Mounted	Bobrick Washroom Equipment Inc	B-290 3436
TA3	TOILET PAPER DISPENSER	Surface Mounted	Bobrick Washroom Equipment Inc	B-2888
TA5	GRAB BAR	Surface Mounted	Bobrick Washroom Equipment Inc	B-5806
TA14	PAPER TOWEL DISPENSER / TRASH RECEPTACLE COMBO	Semi-Recessed	Bobrick Washroom Equipment Inc	B-3942
TA16	BABY CHANGING STATION; SURFACE MOUNTED	Baby Changing Station	Bradley Corporation	KB300-ES
TA26	SANITARY NAPKIN DISPOSAL	4 inch recess	Bobrick Washroom Equipment Inc	B-353

RESTROOMS LEGEND

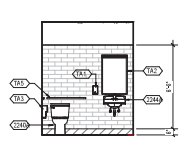
- CT-1 CERAMIC TILE SEE FINISH LEGEND
- FRP FIBER REINFORCED PLASTIC SEE FINISH LEGEND
- SV SHEET VINYL SEE FINISH LEGEND

KEYNOTE LEGEND

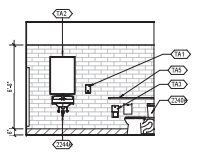
22 40.05	FLOOR DRAIN; SEE PLUMBING DWGS RE: 21 / A11.06
1044	FIRE EXTINGUISHER CABINET; SEMI-RECESSED LOCKED CABINET RE: 19 / A11.06
1114	16"x16" ACCESS PANEL
2210	DUAL DRINKING FOUNTAIN WITH BOTTLE FILLER RE: 19 / A11.06
2240A	ACCESSIBLE WATER CLOSET
2243	SINK; EXPOSED DRAINAGE PIPES TO BE INSULATED PER ADA 606.5
2244A	ACCESSIBLE LAVATORY; EXPOSED PIPE TO BE PROTECTED PER ADA 606.5
D.14	REMOVE EXISTING TOILET PARTITIONS, STORE, AND PROTECT FOR RE-INSTALLATION AFTER NEW FLOORING IS INSTALLED, TYP. ALL PARTITIONS.
D.28	EXISTING STRUCTURE; PROTECT IN PLACE
TA1	WALL MOUNTED SOAP DISPENSER; TAMPER RESISTANT
TA2	MIRROR (24"x36" U.N.O.)
TA3	TOILET PAPER DISPENSER
TA5	REINSTALL GRAB BARS AT ACCESSIBLE TOILET STALLS; SEE MOUNTING HEIGHT SCHEDULE FOR LENGTH RE: 3 / A11.06
TA14	COMBO PAPER TOWEL DISPENSER/TRASH RECEPTACLE
TA16	WALL MOUNTED BABY CHANGING STATION
TA26	SANITARY NAPKIN DISPOSAL; WALL MOUNTED
TA27	RE-INSTALL SALVAGED MIRROR AT THIS LOCATION



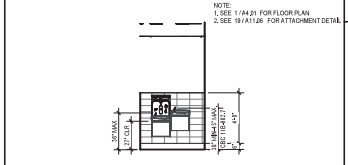
3 MEN'S RR - SOUTH
SCALE: 1/4" = 1'-0"



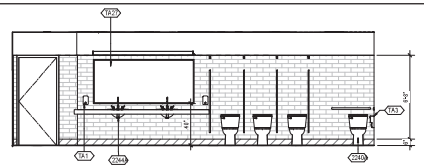
7 9 AG RR - SOUTH
SCALE: 1/4" = 1'-0"



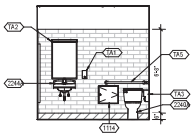
5 8 AG RR - EAST
SCALE: 1/4" = 1'-0"



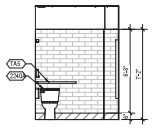
10 DRINKING FOUNTAIN ELEVATION
SCALE: 1/4" = 1'-0"



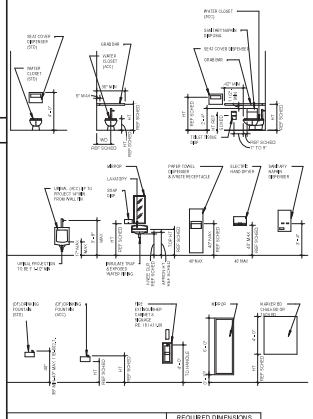
4 WOMEN'S RR - NORTH
SCALE: 1/4" = 1'-0"



8 CHILDREN'S RR - SOUTH
SCALE: 1/4" = 1'-0"



6 8 AG RR - SOUTH
SCALE: 1/4" = 1'-0"



FIXTURE	REQUIRED DIMENSIONS A	REQUIRED DIMENSIONS E
TOILET CENTER LINE FROM WALL	1'-5" – 1'-9"	1'-3" – 1'-9"
TOILET SEAT HEIGHT (TOP OF SEAT)	1'-5" – 1'-7"	1'-3" – 1'-5"
GRAB BAR HEIGHT (TOP OF BAR)	2'-9" – 3'-0"	1'-8" – 2'-1"
TOILET PAPER DISPENSER HT TO OUTLET	1'-7" MIN	1'-2" – 1'-5"
NAPKIN DISPOSAL IN BACK OF TOILET	6" MAX	6" MAX
DISPENSER OR MIRROR HEIGHT	3'-4" MAX	3'-4" MAX
LAVATORY/SINK TOP HEIGHT	2'-10" MAX	2'-7" MAX
LAVATORY APRON CLEARANCE	2'-5" MIN	N / A
LAVATORY/SINK KNEE CLEARANCE	2'-3" MIN	2'-0" MIN
DF BUBBLER HEIGHT	3'-0" MAX	2'-6" MAX
DF BUBBLER FROM FRONT EDGE	5" MAX	3-1/2" MAX
DF CONTROL FROM FRONT EDGE	6" MAX	6" MAX
DF KNEE CLEARANCE	2'-7" MIN	PARALLEL APPROACH
RAMP/STAIR HANDRAIL HEIGHT	2'-10" – 3'-7"	2'-4" MAX
MARKER BOARD HEIGHT	3'-0"	2'-6"

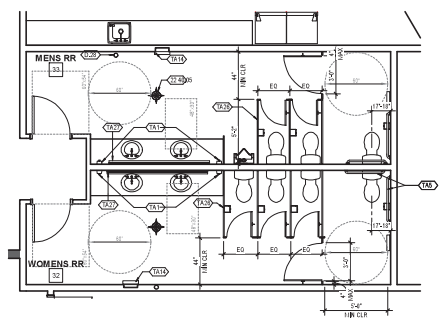
LEGEND

A = ADULT DIMENSIONS (AGE 12 AND OVER)
E = ELEMENTARY DIMENSIONS (AGE 6 TO 11)

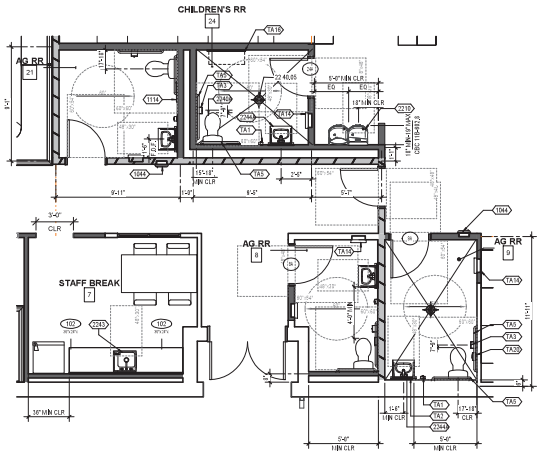
NOTE

1. ALL FIXTURES AND ACCESSORIES ARE ACCESSIBLE UNLESS OTHERWISE NOTED OR DIMENSIONED.
2. THERE SHALL BE NO SHARP OR ABRASIVE SURFACES UNDER LAVATORIES.
3. SEE ENLARGED TOILET PLANS FOR TOILET ACCESSORY LOCATIONS.
4. ALL ACCESSORIES SHALL HAVE A MAXIMUM REACH HEIGHT OF 48" FROM FLOOR TO TOP OF FUNCTIONAL POINT UNLESS OTHERWISE NOTED OR DIMENSIONED. MIRROR HEIGHT IS TO BOTTOM OF REFLECTIVE SURFACE.

9 MOUNTING HEIGHT SCHEDULE
SCALE: 3/16" = 1'-0"



2 MENS RR 33 & WOMENS RR 32 - ENLARGED PLAN
SCALE: 1/4" = 1'-0"



1 AG RR 8 & AG RR 9 - ENLARGED PLAN
SCALE: 1/4" = 1'-0"

Not for permitting or construction

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

JOBCOPY

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP

REVISIONS

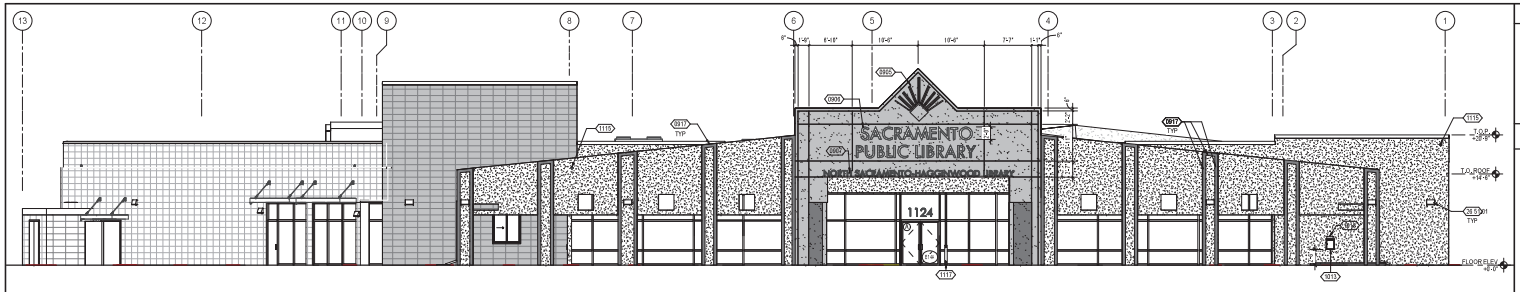
#	DESCRIPTION	DATE
2	OWNER CHANGES	05/23/25

CONSTRUCTION DOCUMENT

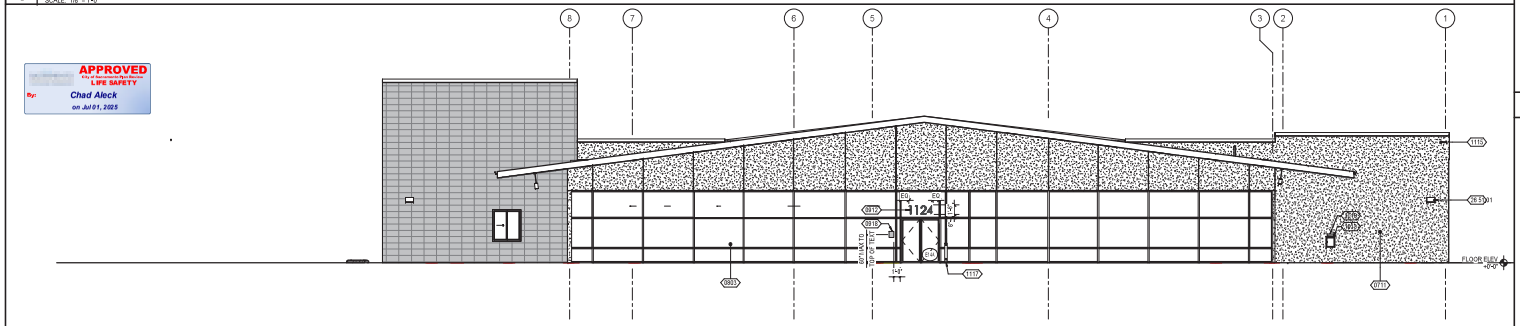
ENLARGED RESTROOM PLANS & ELEVATIONS

A4.01

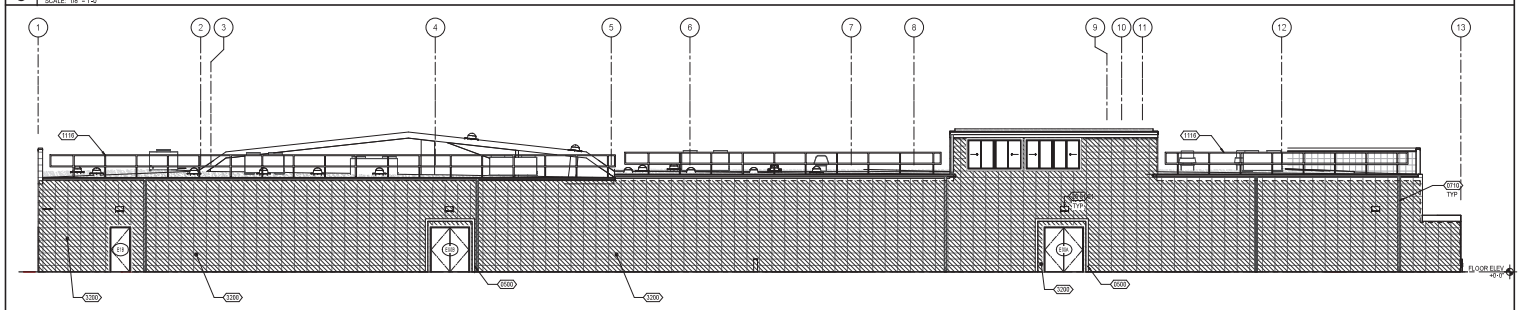
COM-2500586



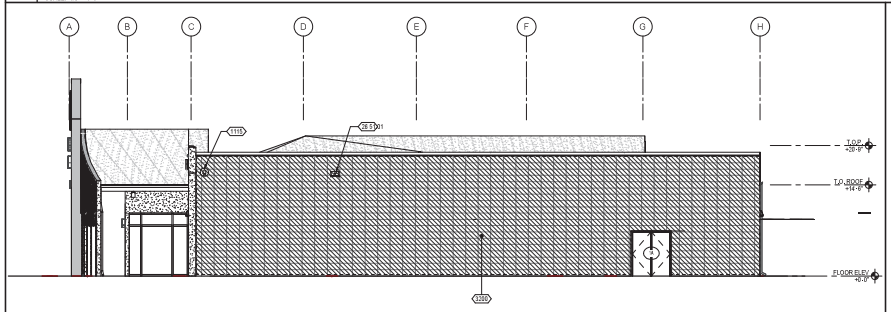
1 EXTERIOR ELEVATION - NORTH
SCALE: 1/8" = 1'-0"



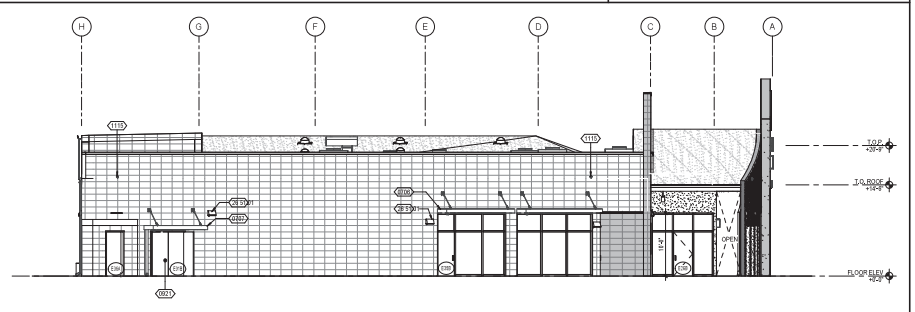
5 EXTERIOR ELEVATION - NORTH/BUILDING SECTION
SCALE: 1/8" = 1'-0"



3 EXTERIOR ELEVATION - SOUTH
SCALE: 1/8" = 1'-0"



4 EXTERIOR ELEVATION - WEST
SCALE: 1/8" = 1'-0"



2 EXTERIOR ELEVATION - EAST
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. PROTECT ALL EXISTING MURAL/SIGNAGE AND AVOID PAINTING OVER ANY EXISTING MURAL/SIGNAGE.

LEGEND

- EXISTING CMU WALL TO BE PAINTED P-7 SEE FINISH SCHEDULE
- EXISTING CMU WALL TO BE PAINTED P-6 SEE FINISH SCHEDULE
- EXISTING CEMENT PLASTER WALL TO BE PAINTED P-7 PATCH AND REPAIR AS NECESSARY; ASSUME 10% SEE FINISH SCHEDULE
- EXISTING CEMENT PLASTER WALL TO BE PAINTED P-6 PATCH AND REPAIR AS NECESSARY; ASSUME 10% SEE FINISH SCHEDULE
- EXISTING CEMENT PLASTER WALL TO BE PAINTED P-4 PATCH AND REPAIR AS NECESSARY; ASSUME 10% SEE FINISH SCHEDULE
- NEW WOOD TRIM TO BE PAINTED P-4
- EXISTING MURAL; PROTECT IN PLACE
- (A) ACCESSIBLE AUTOMATIC DOOR

KEYNOTE LEGEND

26 51 01	LIGHTING FIXTURE; REFER TO ELECTRICAL DWGS
0500	STRUCTURAL FRAMING SEE S1.01; PAINT ALL EXPOSED FRAMING P-7
0706	EXTERIOR PERFORATED METAL AWNING; SEE SPEC SECTION 10 73 00 AND 5 554.01
0707	EXTERIOR SOLID METAL AWNING WITH GUTTER AND DOWNSPOUT PER MNFR. SEE SPEC SECTION 10 73 00 AND 5 554.01
0710	DOWNSPOUT AND GUTTER UNDER SEPERATE SCOPE REFER TO SEPERATE PERMIT COM-2310004
0711	(E) CEMENT PLASTER, PRIOR TO RE-PAINTING OF EXT WALLS, CRACKS IN CEMENT PLASTER SHALL BE FILLED WITH ACRYLIC-BASED PATCHING MATERIAL DESIGNED TO FILL CEMENT PLASTER CRACKS SUCH AS OMEGA-S SOOTH PATCH. PATCHING MATERIAL TO BE TEXTURED TO MATCH (E) CEMENT PLASTER. ASSUME 5% OF CEMENT PLASTER TO BE PATCHED.
0803	ADDITIVE ALTERNATE #2 EXISTING GLAZING AT STOREFRONT FACADE TO BE REPLACED WITH ACOUSTICAL GLAZING. SEE SPEC SECTION 08 80 00 RE: 14 / A11.03
0805	APPROX SIZE 6'-0" x 6'-0" PAINTED WALL LOGO
0806	24" HIGH, FONT: FUTURA; WALL MOUNTED ALUMINUM LETTERS, SEE SPEC SECTION 10 14 00
0807	12" HIGH, FONT: FUTURA; FREE-STANDING ALUMINUM LETTERS, SEE SPEC SECTION 10 14 00 & 10 54 21
0812	18" HIGH VINYL DECAL TO BE PLACED ON GLAZING
0817	NEW 1"X4" WOOD TRIM TO BE FASTENED TO WALL WITH 1/4" CONCRETE SCREWS AT 12" O.C. STAGGERED. WOOD TRIM TO BE PAINTED ON THREE SIDES WITH ACCENT COLOR P-4.
0818	VINYL DECAL CONTAINING LIBRARY HOURS TO BE PLACED ON GLAZING
0821	4" HIGH VINYL STICKER LETTERS TO SPELL OUT FIRE CONTROL ROOM TO BE PLACED ON EXTERIOR SIDE OF DOORS. COLOR OF VINYL STICKER TO CONTRAST COLOR OF DOOR. SEE 9 / A11.01
1013	KINGSLEY KV40DROP RETURN THROUGH WALL RETURN. RE: 6 / A11.07
1018	BOOK DROP SIGNAGE. RE: 21 / A11.20
1115	SECURITY CAMERA; SEE TECHNOLOGY DWGS
1116	NON-PENETRATING FALL PROTECTION SYSTEM, INCLUDED IN ROOF SCOPE. SHOWN FOR REFERENCE, REFER TO PERMIT COMM-2310004
1117	ACCESSIBLE AUTOMATIC DOOR OPENER TO BE 36" VERTICAL PUSH BAR; SEE SPEC SECTION 08 71 13
3200	EXISTING MURAL TO BE PROTECTED IN PLACE, DO NOT PAINT.

Not for permitting or construction

PBK JOBCOPY

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9822

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

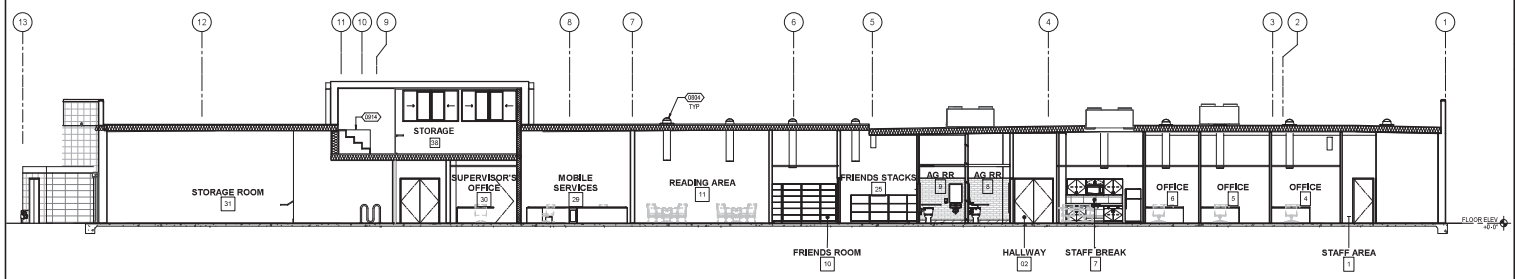
#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

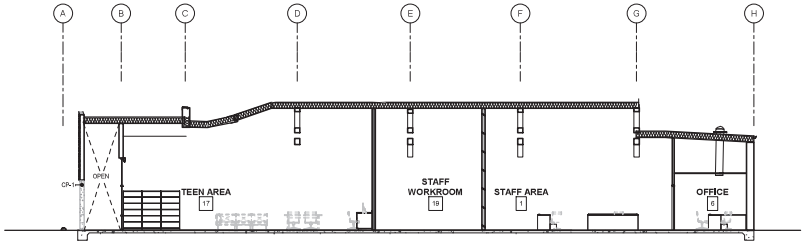
EXTERIOR ELEVATIONS

A6.01

COM-2500586

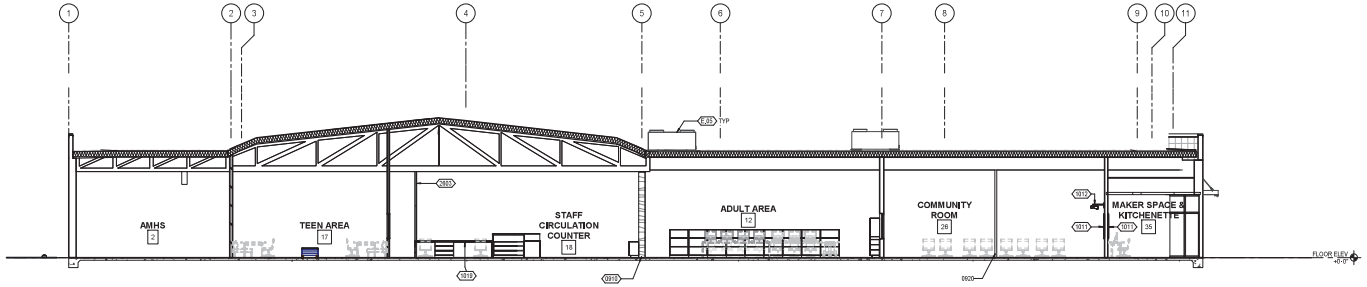


1 BUILDING SECTION
SCALE: 1/8" = 1'-0"

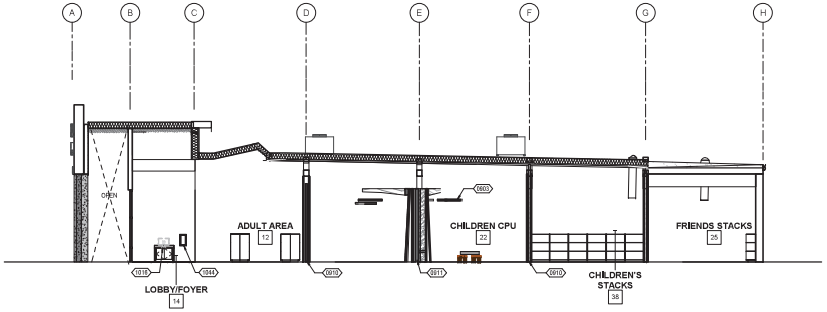


APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

2 BUILDING SECTION
SCALE: 1/8" = 1'-0"



3 BUILDING SECTION
SCALE: 1/8" = 1'-0"



4 BUILDING SECTION
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. PROVIDE R-19 INSULATION AT NEW INTERIOR WALLS.
2. ALL HM FRAMES TO BE PAINTED P-5
3. REFER TO A10.10 FOR ADDITIONAL FINISH INFORMATION.
4. FIRE SAFING REQUIRED AT ALL FIRE-RATED AND CEILING INTERSECTIONS; SEE A11.02

LEGEND

- EXISTING CMU WALL TO BE PAINTED P-1 SEE FINISH SCHEDULE
- CT-1 CERAMIC TILE SEE FINISH LEGEND
- FB - FAUX BARK PANEL SEE FINISH SCHEDULE
- 1-HOUR FIRE RATED PARTITION SEE A11.02 FOR FIRE RATED PARTITION DETAILS
- EXISTING CEMENT PLASTER WALL TO BE PAINTED P-7 PATCH AND REPAIR AS NECESSARY; ASSUME 10% SEE FINISH SCHEDULE
- EXISTING CEMENT PLASTER WALL TO BE PAINTED P-8 PATCH AND REPAIR AS NECESSARY; ASSUME 10% SEE FINISH SCHEDULE
- EXISTING CEMENT PLASTER WALL TO BE PAINTED P-4 PATCH AND REPAIR AS NECESSARY; ASSUME 10% SEE FINISH SCHEDULE

KEYNOTE LEGEND

0004	TUBULAR SKYLIGHT; SEE SPEC SECTION 08 62 23 RE: 24 / A11.07
0003	DEDUCTIVE ALTERNATE #1 SUSPENDED ACOUSTICAL CEILING CLOUD; SEE RCP 24/A11.06
0010	EXISTING COLUMN TO RECEIVE NEW FAUX WOOD WRAP; FB: SEE FINISH LEGEND
0011	CUSTOM INTERIOR TREE FEATURE (DEDUCTIVE ALTERNATE #1)
0014	WALL INFILL RE: 17 / A11.09
0020	(E) COLUMN TO BE RE-PAINTED P-1
1011	12' X 4' MARKERBOARD RE: 9 / A11.06
1012	WALL MOUNTED SHORT THROW PROJECTOR RE: 10 / A11.07
1016	SELF CHECK-OUT; CHILDREN'S HEIGHT RE: 24 / A11.08
1018	CIRCULATION DESK; SEE F02
1044	FIRE EXTINGUISHER CABINET, SEMI-RECESSED LOCKED CABINET RE: 18 / A11.06
2003	POWER POLE, TYP OF (5); SEE ELECTRICAL DWGS
E.05	(E) ROOF TOP MECHANICAL UNITS, REFERENCE SEPERATE PERMIT SET

Not for permitting or construction

PBK

ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-8822

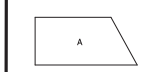
ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY

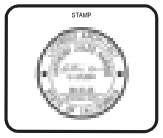
CITY OF SACRAMENTO

1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT



KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP



CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

BUILDING SECTIONS

A6.10

JOBCOPY

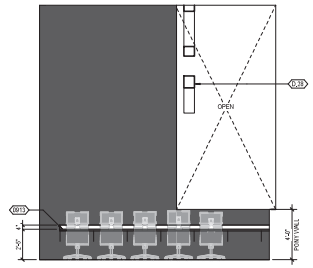
1124 DEL PASO BLVD

COM-2500586

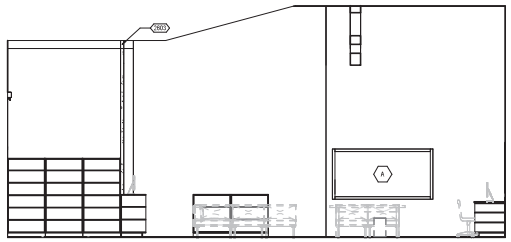
A6.10 - BUILDING SECTIONS

C:\Users\kclancy\Documents\220389_NSHL_06.20.24_kelly.clancy\YSZ4T.rvt
6/5/2025 3:23:04 PM

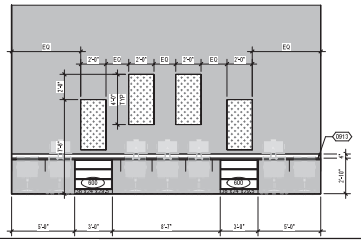
APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



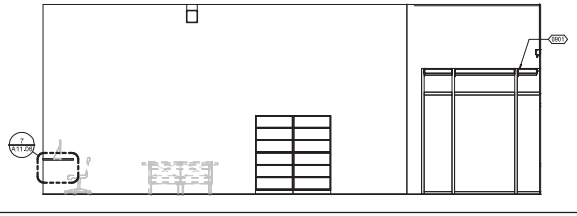
4 CHILDREN'S AREA - WEST ELEVATION
SCALE: 1/4" = 1'-0"



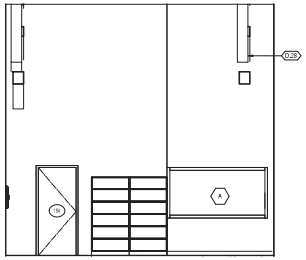
1 TEEN AREA - EAST
SCALE: 1/4" = 1'-0"



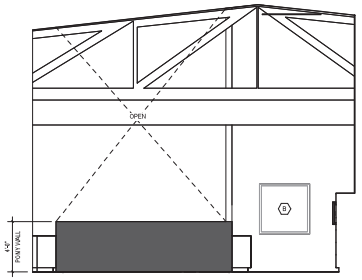
5 TEEN AREA - SOUTH INTERIOR ELEVATION
SCALE: 1/4" = 1'-0"



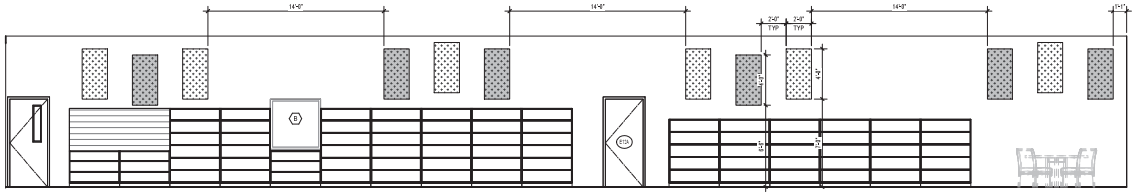
2 TEEN AREA - WEST INTERIOR ELEVATION
SCALE: 1/4" = 1'-0"



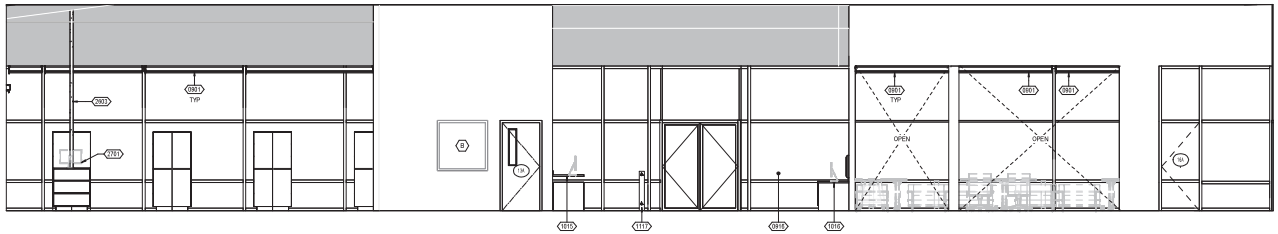
6 LIBRARY - WEST INTERIOR ELEVATION
SCALE: 1/4" = 1'-0"



3 LIBRARY - SOUTH INTERIOR ELEVATION
SCALE: 1/4" = 1'-0"



7 LIBRARY - EAST INTERIOR ELEVATION
SCALE: 1/4" = 1'-0"



8 LIBRARY - NORTH INTERIOR ELEVATION
SCALE: 1/4" = 1'-0"

INTERIOR MATERIALS LEGEND

- P-1 PAINT, FIELD SEE FINISH SCHEDULE
- P-2 PAINT, ACCENT SEE FINISH SCHEDULE
- P-3 PAINT, ACCENT SEE FINISH SCHEDULE
- P-5 PAINT, ACCENT SEE FINISH SCHEDULE
- DEDUCTIVE ALTERNATE #2 TE-1 TACKBOARD; COLOR TYPE 1 SEE FINISH SCHEDULE
- DEDUCTIVE ALTERNATE #2 TE-2 TACKBOARD; COLOR TYPE 2 SEE FINISH SCHEDULE
- MAGNET WALL
- MAGAZINE SLATWALL
- FRP-1 FIBER REINFORCED PLASTIC SEE FINISH SCHEDULE
- (A) NEW WINDOW DESIGNATION
- (##) DOOR DESIGNATION
- (AAA) CASEWORK DESIGNATION
  LENGTH X DEPTH X HEIGHT
- XX-1 CASEWORK FINISH DESIGNATION SEE FINISH SCHEDULE

KEYNOTE LEGEND

0901	MANUAL ROLLER SHADES; SEE REFLECTED CEILING PLAN AND INT ELEVATIONS FOR LOCATIONS RE: 12 / A11.00
0913	BUILT-IN COUNTERTOP RE: 7 / A11.00
0916	ALL EXISTING LOBBY GLAZING TO RECEIVE NEW WINDOW TINT FILM; FILM TO BE INSTALLED ON INTERIOR SIDE OF WINDOW, TYP ALL WINDOW BAYS AT LOBBY; ADD'TVE ALTERNATE #6
1015	SELF CHECK-OUT RE: 24 / A11.00
1016	SELF CHECK-OUT; CHILDREN'S HEIGHT RE: 24 / A11.00
1117	36" VERTICAL PUSH BAR ACCESSIBLE AUTOMATED DOOR OPENER TO BE MOUNTED TO ALUMINUM MULLION; SEE SPEC SECTION 08 71 13
2603	POWER POLE, TYP OF (5); SEE ELECTRICAL DWGS
2701	OPAC; SEE FURNITURE DWGS F3 & F4
0.28	EXISTING STRUCTURE; PROTECT IN PLACE

Not for permitting or construction

PBK

ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
PLAN NORTH / TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

INTERIOR ELEVATIONS

A6.20

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

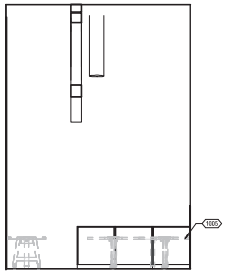
APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

INTERIOR MATERIALS LEGEND

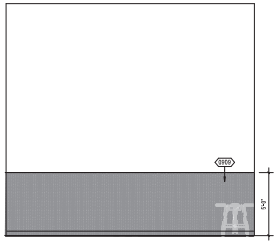
- P-1 PAINT, FIELD SEE FINISH SCHEDULE
- P-2 PAINT, ACCENT SEE FINISH SCHEDULE
- P-3 PAINT, ACCENT SEE FINISH SCHEDULE
- P-5 PAINT, ACCENT SEE FINISH SCHEDULE
- DEDUCTIVE ALTERNATE #2 TE-1 TACKBOARD; COLOR TYPE 1 SEE FINISH SCHEDULE
- DEDUCTIVE ALTERNATE #2 TE-2 TACKBOARD; COLOR TYPE 2 SEE FINISH SCHEDULE
- MAGNET WALL
- MAGAZINE SLATWALL
- FRP-1 FIBER REINFORCED PLASTIC SEE FINISH SCHEDULE
- (A) NEW WINDOW DESIGNATION
- (##) DOOR DESIGNATION
- (XXX) CASEWORK DESIGNATION LENGTH X DEPTH X HEIGHT
- XX-1 CASEWORK FINISH DESIGNATION SEE FINISH SCHEDULE

KEYNOTE LEGEND

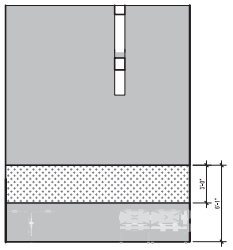
0909	MAGNETIC WALL
1005	KOOD SPECTRUM LIGHT LAB, NOT INCLUDED IN SCOPE OF WORK
1112	REFRIGERATOR, CFCI, SEE SPEC SECTION 11 90 00
1122	MICROWAVE, CFCI, SEE SPEC SECTION 11 90 00
2243	SINK, EXPOSED DRAINAGE PIPES TO BE INSULATED PER ADA 606.5



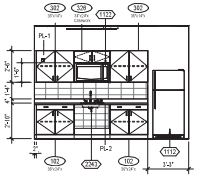
5 CHILDRENS AREA - EAST ELEVATION
SCALE: 1/4" = 1'-0"



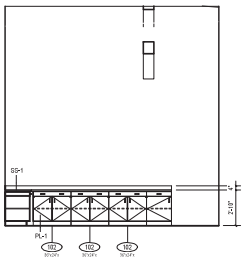
6 CHILDRENS AREA - SOUTH ELEVATION
SCALE: 1/4" = 1'-0"



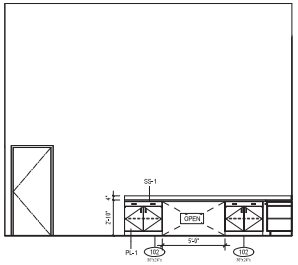
3 CHILDRENS AREA - WEST ELEVATION
SCALE: 1/4" = 1'-0"



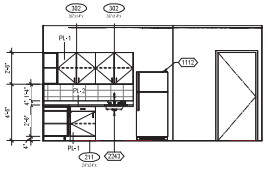
1 STAFF BREAK
SCALE: 1/4" = 1'-0"



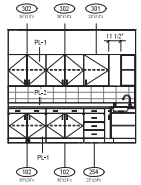
11 STAFF WORKROOM - WEST
SCALE: 1/4" = 1'-0"



10 STAFF WORKROOM - SOUTH
SCALE: 1/4" = 1'-0"



4 KITCHENETTE - SOUTH
SCALE: 1/4" = 1'-0"



2 KITCHENETTE - EAST
SCALE: 1/4" = 1'-0"

Not for permitting or construction

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

SACRAMENTO

A

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

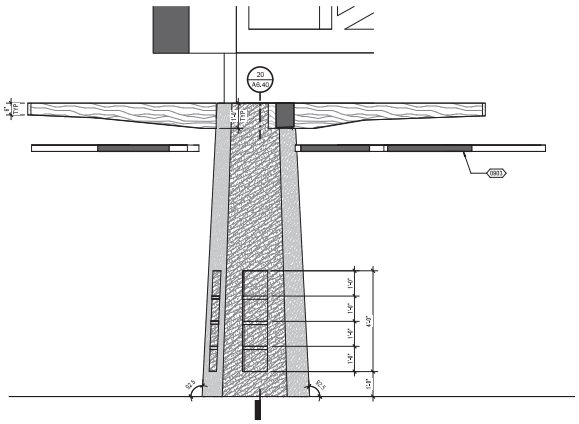
#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

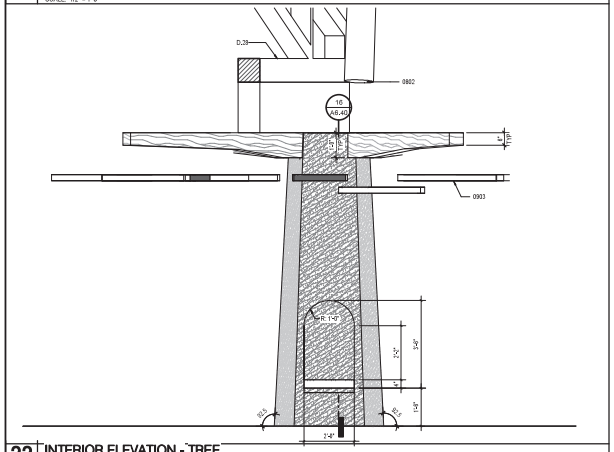
INTERIOR ELEVATIONS

A6.30

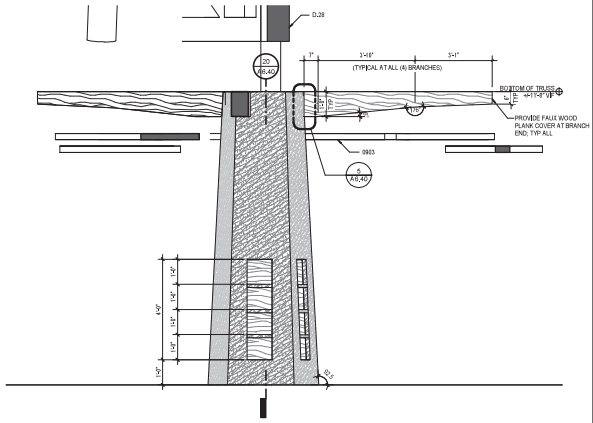
JOBCOPY
1124 DEL PASO BLVD
COM-2500586



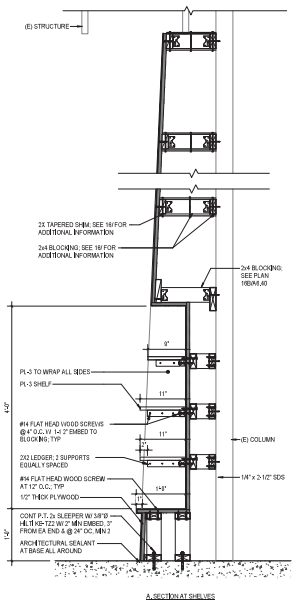
21 INTERIOR ELEVATION - TREE
SCALE: 1/2" = 1'-0"



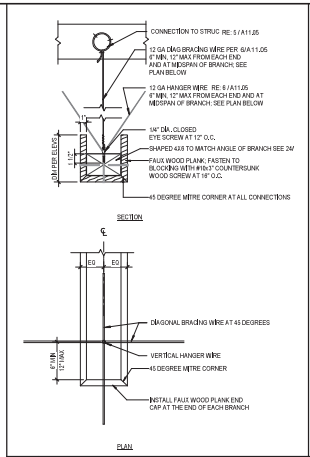
22 INTERIOR ELEVATION - TREE
SCALE: 1/2" = 1'-0"



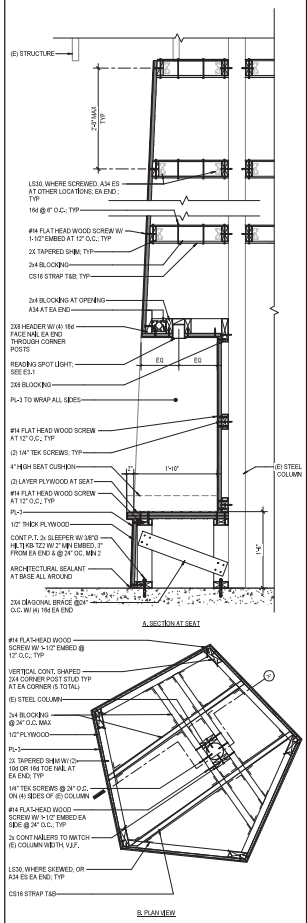
24 INTERIOR ELEVATION - TREE
SCALE: 1/2" = 1'-0"



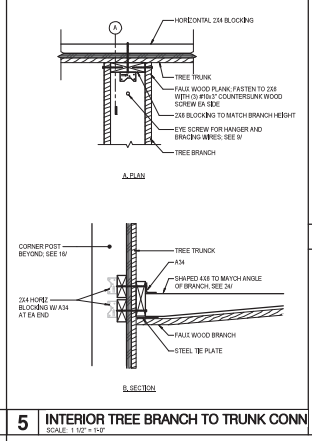
20 INTERIOR TREE TRUNK AT SHELVES
SCALE: 1" = 1'-0"



9 INTERIOR TREE BRANCH
SCALE: 1 1/2" = 1'-0"



16 INT TREE TRUNK AT SEAT
SCALE: 1" = 1'-0"



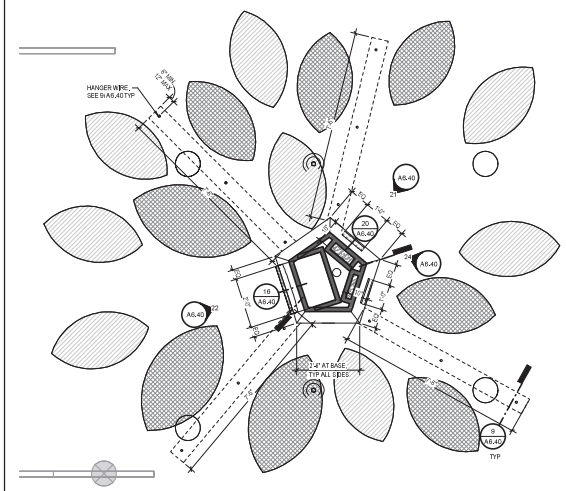
5 INTERIOR TREE BRANCH TO TRUNK CONN
SCALE: 1 1/2" = 1'-0"

LEGEND

- DEDUCTIVE ALTERNATE #1 FB - FAUX BARK PANEL SEE FINISH SCHEDULE
- DEDUCTIVE ALTERNATE #1 PL-3 - PLASTIC LAMINATE SEE FINISH SCHEDULE
- DEDUCTIVE ALTERNATE #1 ACC-1 ACOUSTICAL CEILING CLOUD @ 9'-9" U.N.O TYPE 1; SEE FINISH SCHEDULE
- DEDUCTIVE ALTERNATE #1 ACC-2 ACOUSTICAL CEILING CLOUD @ 10'-0" U.N.O TYPE 2; SEE FINISH SCHEDULE

KEYNOTE LEGEND

0802	ADDITIVE ALTERNATE #1 TUBULAR SKYLIGHT; TYP OF 13.; SEE 2A/A11.07
0903	DEDUCTIVE ALTERNATE #1 SUSPENDED ACOUSTICAL CEILING CLOUD; SEE RCP
D.28	EXISTING STRUCTURE; PROTECT IN PLACE



8 ENLARGED PLAN - INTERIOR TREE FEATURE
SCALE: 1/2" = 1'-0"

Not for permitting or construction

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9822

APPROVED
City of Sacramento Plan Review
STRUCTURAL
By: Vincent Wang
on Jul 01, 2025

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

INTERIOR TREE FEATURE (DEDUCTIVE ALTERNATE #1)

A6.40

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

A9.00 - REFLECTED CEILING PLAN

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

CEILING LEGEND

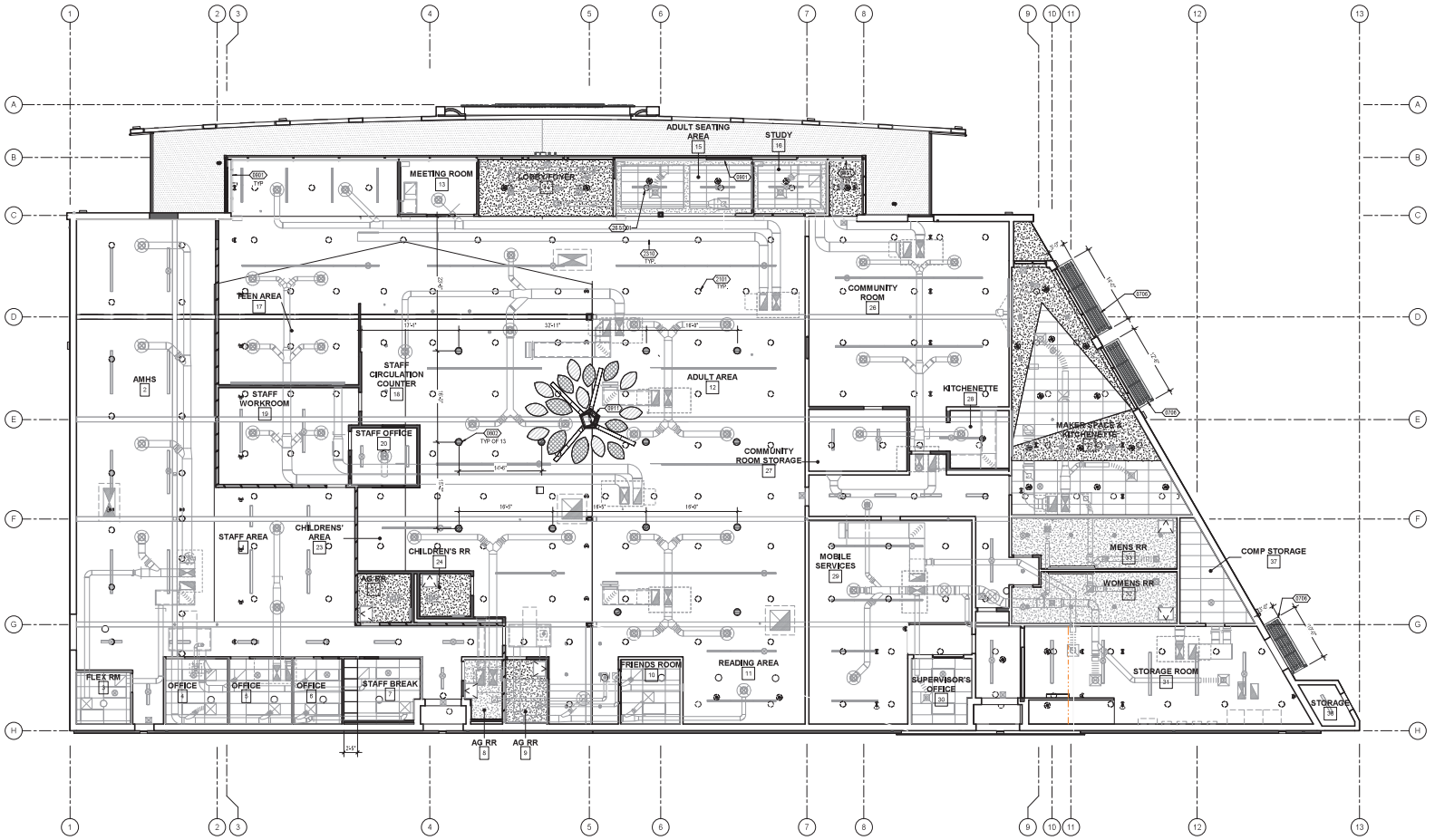
- EXISTING ACT CEILING
  CEILING GRID TO REMAIN AND RE-PAINTED
  ALL ACT TO BE REPLACED WITH NEW TILES
  PER SPEC SECTION 09 51 00
- ACT-1 - 2' x 4' ACOUSTIC PANEL
  ALIGN WITH EXISTING ACT WHERE APPLICABLE
  OR 9'-0" A.F.F., UNO
  RE: FINISH SCHEDULE & SPEC SECTION 09 51 00
- GWB - GYPSUM BOARD
  9'-0" A.F.F., UNO
  ALL NEW AND EXISTING GYP BD TO BE PAINTED P-2
  RE: FINISH SCHEDULE
- CP-1 - EXISTING CEMENT PLASTER SOFFIT
  TO BE PATCHED AND PAINTED P-7
  RE: FINISH SCHEDULE
- EXP - EXPOSED TO STRUCTURE
  PROVIDE DARK BLUE/NAVY SCRIM SHEET
  ATTACHED TO ROOF FRAMING AT
  UNDERSIDE OF INSULATION, TYP
- DEDUCTIVE ALTERNATE #1
  ACC-1 ACOUSTICAL CEILING CLOUD @ 9'-6" U.N.O
  TYPE 1, SEE FINISH SCHEDULE
- DEDUCTIVE ALTERNATE #1
  ACC-2 ACOUSTICAL CEILING CLOUD @ 10'-0" U.N.O
  TYPE 2, SEE FINISH SCHEDULE
- ADDITIVE ALTERNATE # 1
  TUBULAR SKYLIGHT (13 TOTAL)
  SEE 24 / A11.07 & SPEC SECTION 08 62 23
- CEILING ACCESS PANEL
  SEE 20 / A11.05
- ROLLER SHADES
  SEE 12 / A11.05
- FIRE SPRINKLER HEAD
  SEE FIRE PROTECTION DRAWINGS
- MECHANICAL EQUIPMENT; SEE MECH DWGS
  MECH DIFFUSERS AT 12'-0" A.F.F. U.N.O.
- LIGHTING FIXTURE; SEE ELECTRICAL DWGS
  LIGHT FIXTURES AT 10'-0" A.F.F U.N.O.

GENERAL CEILING PLAN NOTES

1. REFER TO AND COORD. WITH ROOM FINISH SCHEDULES FOR SPECIFIC CEILING TYPES.
2. ALL SCHEDULED CEILING HEIGHTS ARE FROM THE MAIN FLOOR LEVEL WITHIN THE ROOM AND OR SPACE, AND ARE NOT FROM AN ELEVATED FLOOR LEVEL, AND ARE NOT FROM A RECESSED FLOOR LEVEL.
3. NO FIRE SPRINKLER HEADS ARE SHOWN ON ARCH. CEILING PLANS, ALL SPRINKLER HEADS SHALL BE CENTERED WITHIN CEILING TILES U.N.O.
4. ONLY CEILING MOUNTED FIXTURES AND EQUIP. IS SHOWN ON ARCH. CEILING PLANS. REFER TO INTERIOR ELEVATIONS FOR WALL MOUNTED FIXTURES. REFER TO MEPT DOCUMENTS FOR ADDITIONAL INFORMATION CONCERNING CEILING MOUNTED FIXTURES AND OR WALL MOUNTED FIXTURES.
5. CEILING MOUNTED LIGHT FIXTURES ARE SHOWN FOR LOCATION PURPOSES ONLY. COORD. WITH ELEC. DOCUMENTS FOR LIGHT FIXTURE DESIGNATIONS.
6. CEILING MOUNTED LIGHT FIXTURES WITHIN FIRE RATED CEILING ASSEMBLIES SHALL HAVE LIGHT FIXTURE PROTECTION AND BE TENTED OR OTHERWISE FIRE RATED TO MATCH CEILING ASSEMBLY FIRE RATING.
7. VERIFY LOCATIONS OF ALL CEILING ACCESS PANELS WITH MEPT DOCUMENTS. COORD. LOCATIONS OF CEILING ACCESS PANELS WITH ARCH. PRIOR TO INSTALLATION. CEILING ACCESS PANEL FIRE RATINGS SHALL MATCH CEILING ASSEMBLY FIRE RATINGS.

KEYNOTE LEGEND

26 51 01	LIGHTING FIXTURE; REFER TO ELECTRICAL DWGS
0709	EXTERIOR PERFORATED METAL AWNING; SEE SPEC SECTION 10 73 00 AND 5/A4.01
0902	ADDITIVE ALTERNATE #1 TUBULAR SKYLIGHT, TYP OF 13, SEE 24/A11.07
0901	MANUAL ROLLER SHADES; SEE REFLECTED CEILING PLAN AND INT ELEVATIONS FOR LOCATIONS
0911	CUSTOM INTERIOR TREE FEATURE (DEDUCTIVE ALTERNATE #1)
2101	FIRE SPRINKLER HEAD; SEE FIRE PROTECTION DWGS
2310	MECHANICAL EQUIPMENT; SEE MECH DWGS



1 REFLECTED CEILING PLAN
SCALE: 1/8" = 1'-0"

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

Not for permitting or construction

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS
#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

REFLECTED CEILING PLAN

A9.00

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

C:\Users\kelly.clancy\Documents\220389_NSHL_06.20.24_kelly.clancy.YSZ4T.rvt
6/5/2025 2:52:28 PM

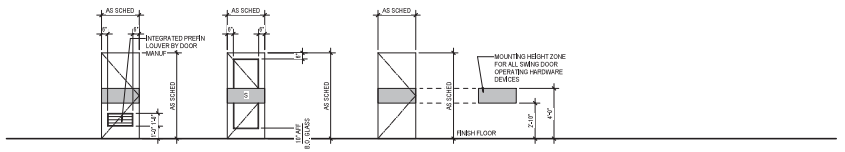
APPROVED
City of Sacramento Fire Prevention LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

DOOR SCHEDULE

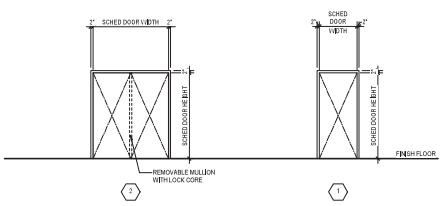
MARK	PH #	ROOM NAME	DOOR PANEL OPENING: PANEL	SIZE W x H		DOOR FRAME: ELEV.	MATL.	ELEV.	MATL.	DETAILS: HEAD	JAMB	THRESHOLD	H.W.	FIRE RATING LABEL	REMARKS
00B	00	HALLWAY	SING	3'-0"	7'-0"	F	WD	1	HM	2 / A11.03	3 / A11.03	11 / A11.06	6		CARD READER
1A	1	STAFF AREA	PAIR	6'-0"	7'-0"	F	HM	2	HM	20 / A11.03	20 / A11.03	12 / A11.03	18		CARD READER
8A	8	AG RR	SING	3'-0"	7'-0"	F	WD	1	HM	2 / A11.03	3 / A11.03	11 / A11.06	8		
9A	9	AG RR	SING	3'-0"	7'-0"	F	WD	1	HM	2 / A11.03	3 / A11.03	11 / A11.06	8		
10A	25	FRIENDS STACKS	SING	3'-0"	7'-0"	FG	ALUM	1	ALUM	6 / A11.03	7 / A11.03	11 / A11.06	7		
13A	13	MEETING ROOM	SING	3'-0"	7'-0"	F	WD	1	HM	2 / A11.03	3 / A11.03	11 / A11.06	1		
14A	82	HALLWAY	SING	3'-0"	7'-0"	F	WD	1	HM	2 / A11.03	3 / A11.03	11 / A11.06	9	45#/IN	CARD READER
16A	16	STUDY	SING	3'-0"	7'-0"	FG	ALUM	1	ALUM	6 / A11.03	7 / A11.03	11 / A11.06	2		
19A	19	STAFF WORKROOM	SING	3'-0"	7'-0"	F	WD	1	HM	2 / A11.03	3 / A11.03	11 / A11.06	13		CARD READER
19B	19	STAFF WORKROOM	SING	3'-0"	7'-0"	F	WD	1	HM	6 / A11.03	8 / A11.03	11 / A11.06	11	45#/IN	
20A	20	STAFF OFFICE	SING	3'-0"	7'-0"	F	WD	1	HM	2 / A11.03	3 / A11.03	11 / A11.06	12		
21A	21	AG RR	SING	3'-0"	7'-0"	F	WD	1	HM	2 / A11.03	3 / A11.03	11 / A11.06	10	45#/IN	
24A	24	CHILDREN'S RR	SING	3'-0"	7'-0"	F	WD	1	HM	2 / A11.03	3 / A11.03	11 / A11.06	6		
26A	81	HALLWAY	SING	3'-0"	7'-0"	F	WD	1	HM	2 / A11.03	3 / A11.03	11 / A11.06	1		
27	13	ADULT AREA	SING	3'-0"	7'-0"	F	WD	1	HM	6 / A11.03	3 / A11.03	11 / A11.06	13		CARD READER
27A	27	COMMUNITY ROOM STORAGE	SING	3'-0"	7'-0"	F	WD	1	HM	2 / A11.03	3 / A11.03	11 / A11.06	3		
35C	81	HALLWAY	SING	3'-0"	7'-0"	F	WD	1	HM	2 / A11.03	3 / A11.03	11 / A11.06	4		CARD READER
E00A	00	HALLWAY	PAIR	6'-0"	7'-0"	F	RH	2	HM	NA	NA	NA	15		ADJUST (E) DOOR CLOSER TO ENSURE OPENING FORCE IS 5 LBS MAX
E00B	02	HALLWAY	PAIR	6'-0"	7'-0"	F	HM	2	HM	NA	NA	NA	15		ADJUST (E) DOOR CLOSER TO ENSURE OPENING FORCE IS 5 LBS MAX
E1B	1	STAFF AREA	SING	3'-0"	7'-0"	F	WD	1	HM	NA	NA	NA	17		(E) DOOR TO RECEIVE NEW HARDWARE
E3A	3	FLEX RM	SING	3'-0"	7'-0"	F	WD	1	HM	NA	NA	NA	(E)		
E4A	4	OFFICE	SING	3'-0"	7'-0"	F	WD	1	HM	NA	NA	NA	(E)		
E5A	5	OFFICE	SING	3'-0"	7'-0"	F	WD	1	HM	NA	NA	NA	(E)		
E6A	6	OFFICE	SING	3'-0"	7'-0"	F	WD	1	HM	NA	NA	NA	(E)		
E13A	81	HALLWAY	SING	3'-0"	7'-0"	F	WD	1	HM	NA	NA	NA	14		CARD READER, (E) DOOR TO RECEIVE NEW HARDWARE
E24A	14	LOBBY/FOYER	PAIR	6'-0"	7'-0"	FG	ALUM	2	ALUM	NA	NA	NA	16		AUTO-RATE OPEN, CARD READER, (E) DOOR TO RECEIVE NEW HARDWARE
E26A	26	COMMUNITY ROOM	SING	3'-0"	7'-0"	FG	ALUM	1	ALUM	NA	NA	NA	18		CARD READER, (E) DOOR TO RECEIVE NEW HARDWARE
E28A	28	MOBILE SERVICES	SING	3'-0"	7'-0"	F	WD	1	HM	NA	NA	NA	14		CARD READER, (E) DOOR TO RECEIVE NEW HARDWARE
E28B	28	MOBILE SERVICES	SING	3'-0"	7'-0"	F	WD	1	HM	NA	NA	NA	14		CARD READER
E30A	30	SUPERVISOR'S OFFICE	SING	3'-0"	7'-0"	F	WD	1	HM	NA	NA	NA	(E)		
E31A	31	STORAGE ROOM	SING	3'-0"	7'-0"	F	WD	1	HM	NA	NA	NA	14		CARD READER, (E) DOOR TO RECEIVE NEW HARDWARE
E31B	31	STORAGE ROOM	PAIR	6'-0"	7'-0"	F	RM	2	HM	NA	NA	NA	18		CARD READER
E32A	32	WOMENS RR	SING	3'-0"	7'-0"	F	WD	1	HM	NA	NA	NA	15		(E) DOOR TO RECEIVE NEW HARDWARE
E33A	33	MENS RR	SING	3'-0"	7'-0"	F	WD	1	HM	NA	NA	NA	15		(E) DOOR TO RECEIVE NEW HARDWARE
E35A	35	MAKER SPACE & KITCHENETTE	SING	3'-0"	7'-0"	FG	ALUM	1	ALUM	NA	NA	NA	18		CARD READER, (E) DOOR TO RECEIVE NEW HARDWARE. ADJUST (E) DOOR CLOSER TO ENSURE OPENING FORCE IS 5 LBS MAX
E35B	35	MAKER SPACE & KITCHENETTE	SING	3'-0"	7'-0"	FG	ALUM	1	ALUM	NA	NA	NA	17		(E) DOOR TO RECEIVE NEW HARDWARE. ADJUST (E) DOOR CLOSER TO ENSURE OPENING FORCE IS 5 LBS MAX
E36A	36	STORAGE	SING	3'-0"	7'-0"	F	WD	1	HM	NA	NA	NA	(E)		
E37A	37	COMP STORAGE	SING	3'-0"	7'-0"	F	WD	1	HM	NA	NA	NA	14		CARD READER
E38A	38	STORAGE	SING	3'-0"	7'-0"	F	WD	1	WD	NA	NA	NA	(E)		

DOOR AND WINDOW GENERAL NOTES

1. DOOR AND WINDOWS ARE IDENTIFIED AS DEFINED IN SYMBOL LEGEND ON SHEET A2.01
2. ALL DOORS ARE 1 3/4" THICK U.N.O. ALL HOLLOW METAL FRAME MEMBERS ARE 2" U.N.O. REFER TO DETAIL 2.
3. MOUNTING HEIGHT FOR DOOR HARDWARE TO BE 34" MIN. 44" MAX.
4. THE ARM LEVER HARDWARE SHALL BE CURVED TO RETURN TO WITHIN 1/2" OF THE FACE OF THE DOOR.
5. ALL EXISTING AND NEW HM EXTERIOR DOORS AND FRAMES SHALL BE PAINTED TO MATCH ADJACENT SURFACES.
6. ALL EXISTING AND NEW INTERIOR HM DOOR FRAMES TO BE PAINTED TO MATCH ADJACENT SURFACE.
7. THE MAXIMUM EFFORT TO OPERATE DOORS SHALL BE AS FOLLOWS:
   - A. INTERIOR DOORS = 5 LBS
   - B. EXTERIOR DOORS = 5 LBS
   - C. FIRE DOORS = THE AUTHORITY HAVING JURISDICTION MAY INCREASE THE MAXIMUM EFFORT TO OPERATE FIRE DOORS TO ACHIEVE POSITIVE LATCHING BUT NOT TO EXCEED 15 LBS. MAXIMUM
   - D. HARDWARE SHALL BE OPERABLE WITH ONE HAND WITHOUT THE NEED FOR GRASPING, A PITCHING MOTION, TWISTING OR TURNING OF THE WRIST TO OPERATE.
8. FLOOR MOUNTED DOOR STOP AND SIMILAR OBSTRUCTIONS TO BE INSTALLED 4" MAX., FROM FACE OF WALL OR PARTITION.
9. PROVIDE ROOM IDENTIFICATION SIGNAGE AT ALL DOORS: U.N.O. REFER TO DOOR SCHEDULE. CONTRACTOR SHALL SUBMIT A DOOR SIGNAGE SCHEDULE TO ARCHITECT FOR APPROVAL PRIOR TO FABRICATION.
10. REFER TO DOOR SCHEDULE FOR DOOR WIDTHS, HEIGHTS AND MATERIALS.
11. REFER TO FLOOR PLANS FOR DOOR LOCATIONS AND DIRECTION OF SWINGS.
12. IN ADDITION TO THE LOCATIONS INDICATED, PROVIDE TEMPERED OR LAMINATED GLASS IN THE FOLLOWING LOCATIONS (FOLLOW DESIGNATIONS AT WINDOW TYPES)
    - A. WITHIN A 24" RADIUS OF DOOR JAMBS.
    - B. IN FIXED PANELS WHICH HAVE A GLAZED AREA IN EXCESS OF 9 SQUARE FEET AND THE LOWEST EDGE IS LESS THAN 18" ABOVE FINISHED FLOOR LEVEL.
    - C. ANY LIGHT WITHIN A DOOR.
13. UNDERCUT INTERIOR DOOR AS REQUIRED BY MECHANICAL DRAWINGS, (NOTE: NO DOOR UNDERCUTS ARE PERMITTED AT RATED CORRIDOR.)
14. WINDOW HEIGHTS INDICATED ARE RELATIVE TO FINISH FLOOR ELEVATION IN WHICH WINDOW OCCURS.
15. CONTRACTOR SHALL FIELD VERIFY ALL DOOR SIZES PRIOR TO CONSTRUCTION.
16. ALL RATED DOORS ARE TO BE POSITIVE LATCHING AND SELF-CLOSING PER CBC 716.5.9
17. "LABEL" SHALL MEAN "FIRE ASSEMBLY" AS DEFINED IN CBC 716.5.8.3.
    - FIRE DOORS AND FIRE WINDOWS SHALL HAVE AN APPROVED LABEL OR LISTING MARK INDICATING THE FIRE-PROTECTION RATING, WHICH IS PERMANENTLY AFFIXED AT THE FACTORY WHERE FABRICATION AND ASSEMBLY ARE DONE- CBC 716.5.2.1 & 716.5.8.3
    - ALL 20-MINUTE FIRE RATED ASSEMBLIES SHALL BE PROVIDED WITH APPROVED GASKETING MATERIAL SO INSTALLED TO PROVIDE A SEAL WHERE THE DOOR MEETS THE STOP ON BOTH SIDES AND ACROSS THE TOP. THE DOOR AND FRAME SHALL BEAR AN APPROVED LABEL OR OTHER IDENTIFICATION SHOWING THE RATING THEREOF, FOLLOWED BY THE LETTER "S" CBC 716.5.3
    - FIRE RATED DOOR FRAMES SHALL BE INSTALLED STRICTLY PER MANUFACTURERS PRINTED INSTRUCTIONS. MANUFACTURER'S PRINTED INSTRUCTIONS SHALL BE MADE AVAILABLE TO THE INSPECTING AUTHORITIES 2016 716.3.2.
18. ALL LABELED DOORS SHALL HAVE APPROPRIATE CLOSER AND HARDWARE ASSEMBLIES AS REQUIRED BY DOOR LABELING AGENCY.
19. CLOSERS SHALL HAVE A CLOSING TIME OF 5 SECONDS FROM A FULLY OPEN 90 DEGREE POSITION TO A POSITION 12 DEGREES FROM THE LATCH.



2 DOOR PANEL ELEVATION TYPES
SCALE: 1/4" = 1'-0"



DOOR FRAME ELEVATION TYPES
SCALE: 1/4" = 1'-0"

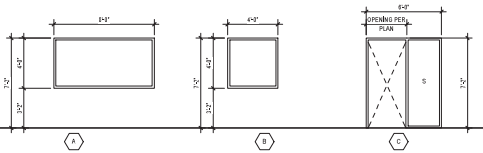
WINDOW SCHEDULE

MARK	SIZE: WIDTH	HEIGHT	DETAILS: HEAD HEIGHT	MATRL	FINISH	SILL	HEAD	JAMB	GLAZING: THICKNESS	TYPE	RATING	WINDOW TREATMENT	REMARKS
A	8'-0"	4'-0"	SEE ELEV	ALUM	PF	7 / A11.05	6 / A11.05	7 / A11.03	1"	1GI	NR	-	
B	4'-0"	4'-0"	SEE ELEV	ALUM	PF	7 / A11.05	6 / A11.05	7 / A11.03	1"	1GI	NR	-	
C	PER FLOOR PLAN	7'-7"	SEE ELEV	ALUM	PF	8 / A11.03	8 / A11.03	7 / A11.03	1"	3SI	NR	MANUAL ROLLER SHADES	

LEGEND:
1GI = GRAY-TINT INSULATING GLASS, TEMPERED / TEMPERED
2GI = GRAY-TINT INSULATING GLASS, TEMPERED / LAMINATED SAFETY GLAZING
CT = CLEAR TEMPERED GLASS
FRS = FIRE RESISTANT GLAZING

-S = SAFETY GLAZING WHERE OCCURS, WHEN WINDOW IS WITHIN 24 IN. RADIUS OF ADJACENT DOOR EDGE IN CLOSED POSITION & 60" ABOVE WALKING SURFACE, AND WHEN WITHIN 18" OF FINISH FLOOR, TYP.

3 WINDOW ELEVATIONS
SCALE: 1/4" = 1'-0"



PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

JOBCOPY

Not for permitting or construction

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK COMMENTS	10/2025

CONSTRUCTION DOCUMENT

DOOR & WINDOW SCHEDULES

A10.01

COM-2500586

PBK
Not for permitting or construction
ARCHITECT
PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

ISSUED BY
Community Development Department
By: [signature]
Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122-1124 DEL PASO BLVD
SACRAMENTO, CA 95815

CONSTRUCTION DOCUMENT

KEY PLAN

A

PLAN NORTH
TRUE NORTH

STAMP

CLIENT	CITY OF SACRAMENTO
PROJECT NUMBER	220389
DATE	MAY 23, 2025
DRAWN BY: KC	CHKED BY: JP

REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

FINISH & FURNITURE PLAN

A10.10

GENERAL FINISH NOTES

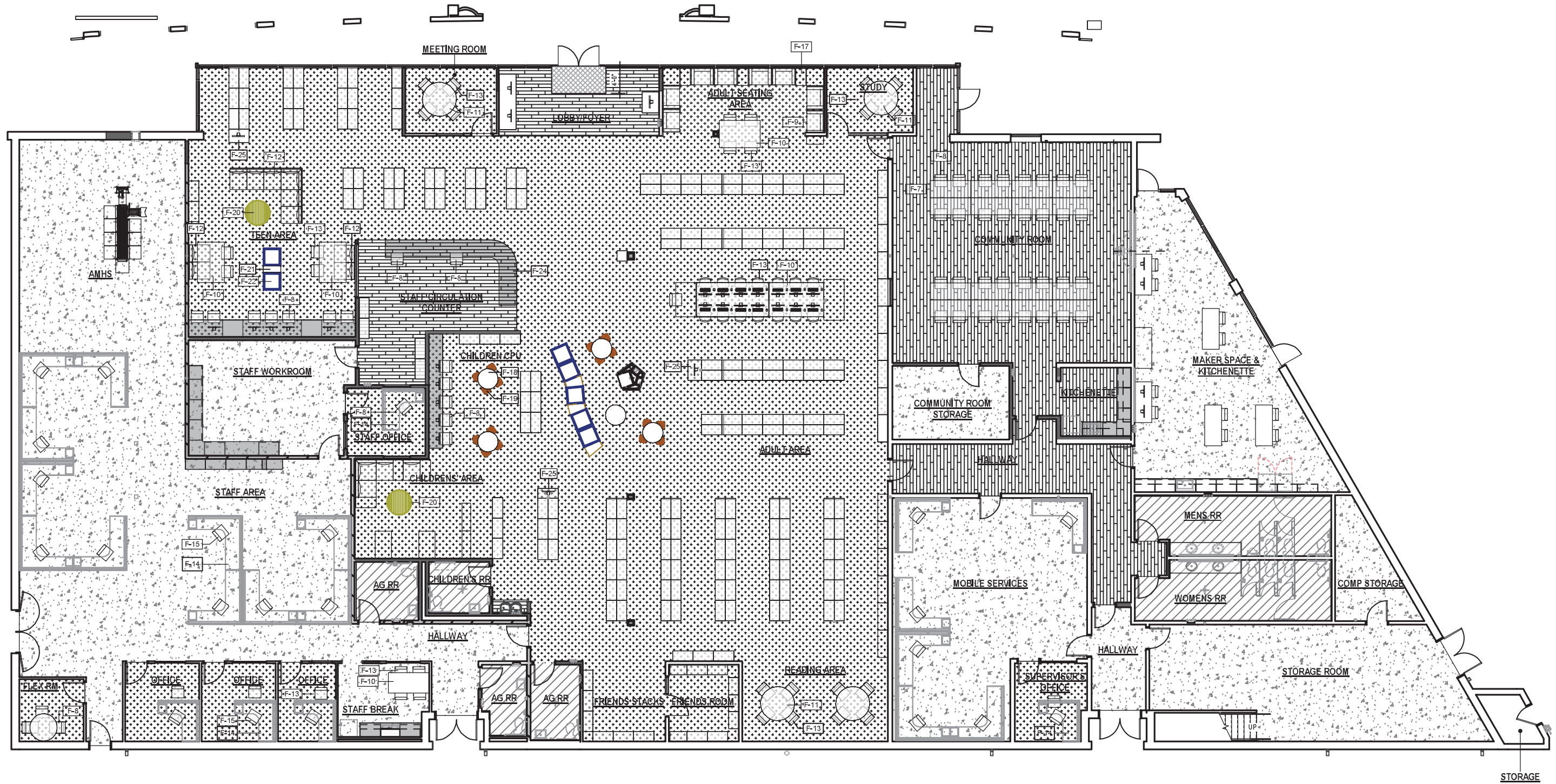
1. ALL SCHEDULED DIRECTIONS (NORTH, EAST, SOUTH, WEST) ARE PER PLAN DIRECTIONS, NOT TRUE COMPASS DIRECTIONS.
2. ALL SCHEDULED CEILING HEIGHTS ARE FROM THE PRIMARY FLOOR LEVEL WITHIN THE ROOM AND OR SPACE, AND ARE NOT FROM AN ELEVATED FLOOR LEVEL, AND ARE NOT FROM A RECESSED FLOOR LEVEL.
3. REFER TO REFLECTED CEILING PLANS FOR CEILING HEIGHTS.
4. ALL FINISH MATERIALS SHALL MEET THE FLAME SPREAD RATINGS PER THE BUILDING CODE.
5. REFER TO INTERIOR ELEVATIONS FOR SPECIFIC MATERIAL LOCATIONS.
6. PAINT ALL NON-FACTORY FINISHED EXPOSED METAL.
7. PAINT ALL H.M. DOORS U.N.O.
8. PAINT ALL H.M. DOOR FRAMES U.N.O.
9. REFER TO TYPICAL FLOORING TRANSITION DETAILS FOR FLOORING MATERIAL TRANSITIONS.
10. SEE 11 / A11.06 FOR INTERIOR FLOORING MATERIAL TRANSITIONS.
11. ALL FLOORING TRANSITIONS AT DOORS SHALL BE LOCATED UNDER THE DOOR IN THE CLOSED POSITION, U.N.O.
12. PROTECT ALL FINISHED FLOORING SURFACES FROM DAMAGE DURING ALL CONSTRUCTION PHASES.
13. PROVIDE AND INSTALL BULLNOSE TRIM AT ALL TRANSITIONS FROM CERAMIC WALL TILE TO OTHER MATERIALS U.N.O.
14. ALL ELECTRICAL DEVICE COVERS ARE TO BE WHITE U.N.O.
15. MOBILE FURNITURE BY OTHERS. NOT IN THIS SCOPE OF WORK, SHOWN FOR REFERENCE ONLY.
16. 48" HIGH STAINLESS STEEL CORNER GUARD TO BE INSTALLED AT EACH CORNER.
17. SEE A11.09 FOR SIGNAGE SCHEDULE AND INFORMATION.
18. FURNITURE IS SHOWN ON THIS SHEET FOR REFERENCE ONLY. SEE FURNITURE DWGS F01-F4. LOOSE FURNITURE IS NOT PART OF THIS SCOPE OF WORK.

FINISH SCHEDULE REMARKS

A. REFER TO INTERIOR ELEVATIONS
B. REFER TO REFLECTED CEILING PLAN
C. PAINT ALL EXPOSED CEILING-RELATED ITEMS, INCLUDING BUT NOT LIMITED TO, STRUCT. MEMBERS, STRUCT. DECK, DUCTWORK, DIFFUSERS, PIPING, CONDUIT, EQUIP. HOUSINGS, LIGHT FIXTURE HOUSINGS, CABLE SUPPORTS, CABLE TRAYS, EQUIP. SUPPORTS, HANGERS

FLOOR FINISH MATERIALS LEGEND

- CPT-1, CARPET TYPE 1 — *RE: FINISH SCHEDULE*
- LVT-1, LUXURY VINYL TILE — *RE: FINISH SCHEDULE*
- EXT, EXISTING CONCRETE FLOOR TO RECEIVE TREATMENT
- SV-1, SHEET VINYL — *RE: FINISH SCHEDULE*
- WM, WALK OFF MAT — RE: FINISH SCHEDULE
- FURNITURE — *SEE FURNITURE SCHEDULE*
- BUILT-IN CASEWORK — *RE: FINISH SCHEDULE & MILLWORK DETAILS*



1 FLOOR FINISH & FURNITURE PLAN
SCALE: 1/8" = 1'-0"

FINISH SCHEDULE

RM #	ROOM NAME	FLOOR	BASE	WALL FINISH: NORTH WALL	WALL FINISH: EAST WALL	WALL FINISH: SOUTH WALL	WALL FINISH: WEST WALL	CEILING FINISH	CEILING HEIGHT	CBCCalc - Fire Area
00	HALLWAY	EXT	RB-1	P-1	P-1	P-1	P-1	EXP	NA	B
1	STAFF AREA	EXT	RB-1	P-1	P-2	P-1	P-1	EXP	NA	C
01	HALLWAY	LVT	RB-1	P-1	P-1	P-1	P-1	EXP	NA	B
2	AMHS	EXT	RB-1	P-1	P-1	P-1	P-1	EXP	NA	C
02	HALLWAY	LVT	RB-1	P-1	P-1	P-1	P-1	EXP	NA	B
3	FLEX RM	CPT	RB-1	P-1	P-1	P-1	P-3	ACT	9'-0"	C
4	OFFICE	CPT	RB-1	P-1	P-1	P-3	P-1	ACT	9'-0"	C
5	OFFICE	CPT	RB-1	P-1	P-1	P-3	P-1	ACT	9'-0"	C
6	OFFICE	CPT	RB-1	P-1	P-1	P-3	P-1	ACT	9'-0"	C
7	STAFF BREAK	EXT	RB-1	P-1	P-1	P-1	P-2	ACT	9'-0"	C
8	AG RR	SV	SV	CT-1, P-1	CT-1, P-1	CT-1, P-1	CT-1, P-1	GYP	9'-0"	C
9	AG RR	SV	SV	CT-1, P-1	CT-1, P-1	CT-1, P-1	CT-1, P-1	GYP	9'-0"	C
10	FRIENDS ROOM	CPT	RB-1	P-1	P-1	P-1	P-1	ACT	9'-0"	C
11	READING AREA	CPT	RB-1	–	P-1	P-2	P-1	EXP	NA	C
12	ADULT AREA	LVT	RB-1	P-1	P-1	P-1	–	EXP	NA	C
13	MEETING ROOM	CPT	RB-1	–	P-1	P-2	P-1	EXP	NA	C
14	LOBBY/FOYER	LVT	RB-1	P-4	P-1	–	P-1	EXP	NA	C
15	ADULT SEATING AREA	CPT	RB-1	–	P-1	P-1	P-1	ACT	13'-0"	C
16	STUDY	CPT	RB-1	–	P-3	P-1	P-1	ACT	13'-0"	C
17	TEEN AREA	CPT	RB-1	P-1	P-1	P-2	P-1	EXP	NA	C
18	STAFF CIRCULATION COUNTER	CPT	RB-1	P-1	P-1	P-1	P-1	EXP	NA	C
19	STAFF WORKROOM	EXT	RB-1	P-1	P-1	P-1	P-1	EXP	NA	C
20	STAFF OFFICE	CPT	RB-1	P-1	P-3	P-1	P-1	EXP	NA	C
21	AG RR	SV	SV	CT-1, P-1	CT-1, P-1	CT-1, P-1	CT-1, P-1	GYP	9'-0"	C
22	CHILDREN CPU	CPT	RB-1	P-1	–	–	P-4	EXP	NA	C
23	CHILDRENS' AREA	CPT	SV	P-1	–	P-1	P-2	EXP	NA	C
24	CHILDREN'S RR	SV	SV	CT-1, P-1	CT-1, P-1	CT-1, P-1	CT-1, P-1	GYP	9'-0"	C
25	FRIENDS STACKS	CPT	RB-1		P-1	P-2	P-1	EXP	NA	C
26	COMMUNITY ROOM	LVT	RB-1	P-3	P-1	P-1	P-1	EXP	NA	C
27	COMMUNITY ROOM STORAGE	EXT	RB-1	P-1	P-1	P-1	P-1	EXP	NA	C
28	KITCHENETTE	LVT	RB-1	P-1	P-1	P-1	P-1	EXP	NA	C
29	MOBILE SERVICES	EXT	RB-1	P-1	P-1	P-1	P-1	EXP	NA	C
30	SUPERVISOR'S OFFICE	CPT	RB-1	P-1	P-1	P-1	P-3	ACT	9'-0"	C
31	STORAGE ROOM	EXT	RB-1	P-1	P-1	P-1	P-1	EXP	NA	C
32	WOMENS RR	SV	SV	CT-1, P-1	CT-1, P-1	CT-1, P-1	CT-1, P-1	GYP	9'-0"	C
33	MENS RR	SV	SV	CT-1, P-1	CT-1, P-1	CT-1, P-1	CT-1, P-1	GYP	9'-0"	C
34	TEEN STACKS	CPT	RB-1	P-2	P-1	P-2	P-1	EXP	NA	C
35	MAKER SPACE & KITCHENETTE	EXT	RB-1	P-1	P-2	P-1	P-1	ACT	12'-7"	C
36	STORAGE	EXT	RB-1	P-1	P-1	P-1	P-1	EXP	NA	C
37	COMP STORAGE	EXT	RB-1	P-1	P-1	P-1	P-1	ACT	8'-0"	C
38	CHILDREN'S STACKS	CPT	RB-1	P-1	P-1	P-1	P-1	EXP	NA	C

FURNITURE SCHEDULE (BY OTHERS; NOT IN THIS SCOPE OF WORK)

MARK	TYPE	MNFR	MODEL	SIZE LxHxD	COLOR
F-7	TABLE	KRUEGER INTERNATIONAL	PIROUTTE - RECTANGULAR		
F-8	CHAIR	HERMANMILLER	CAPER STACKING/ROLLING		WHITE
F-9	CHAIR	STEELCASE	LEELA		
F-10	TABLE	KIMBALL INTERNATIONAL	STRASSA		
F-11	TABLE	KIMBALL INTERNATIONAL	UNIVERSAL TABLE	60" ROUND	
F-12	CHAIR	TMC	WHISTLER		
F-13	CHAIR	SPEC FURNITURE	SNOWBALL 3 1901		
F-14	DESK	ALLSTEEL	APPROAH		
F-15	CHAIR	STEELCASE	SERIES 1		
F-16	CHAIR	TMC	PUDDLE STOOL - DUNE		GREEN
F-17	TABLE	STEELCASE	LEELA TABLE		
F-18	TABLE	TMC	PLOVER TABLE	36" DIA	
F-19	CHAIR	TMC	PLOVER STOOL	16" W	CLEAR
F-20	OTTOMAN	TMC	WHISTLER OTTOMAN		
F-21	TABLE	TMC	WHISTLER TABLE		
F-22	BENCH	TMC	WHISTLER BENCH		
F-23	PICNIC TABLE	ULTRA PLAY SYSTEMS	ADA HEAVY-DUTY PICNIC TABLE		
F-24	CIRCULATION	DEMCO	SEE F02		
F-25	OPAC	ROSS MCDONALD	SEE F4		

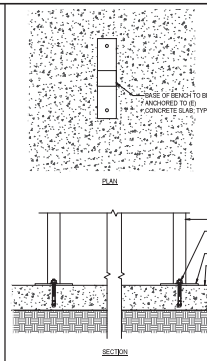
FINISH LEGEND

ITEM	DESCRIPTION	MANUFACTURER	SERIES	COLOR	SIZE	REMARKS
ACC-1	ACOUSTICAL CEILING CLOUD, TYPE 1	CSI CREATIVE	PROFILE CLOUDS 008	PARAKEET		
ACC-2	ACOUSTICAL CEILING CLOUD, TYPE 2	CSI CREATIVE	PROFILE CLOUDS 008	SHAMROCK		
ACT-1	ACOUSTICAL CEILING TILE	ARMSTRONG	FINE FISSURES	WHITE	4' X 2'	
CG	CORNER GUARD	ULINE		STAINLESS STEEL	48" HIGH	@ EA OUTSIDE CORNER
CP-1	CEMENT PLASTER (EXISTING)			PAINT P-7		
CPT-1	CARPET TILE, TYPE 1	TARKETT	PAINTED DESERT	WARM ADOBE		
CT-1	CERAMIC TILE	DALTILE	COLOR MATCH	STARLIGHT	4"X8"	
EXT	EXISTING CONCRETE					TO RECEIVE TREATMENT
FB	FAUX BARK	BARRON DESIGNS	HAND HEWN FAUX WOOD PLANK	CINNAMON		
FRP-1	FIBER REINFORCED PLASTIC	MARLITE	SYMMETRIX - RECTANGLE	WHITE W/ WHITE GROUT	6"X3"	WINDSWEPT
GWB	GYPSUM WALL BOARD			PAINT P-2		SEE SPEC SECTION 09 21 16
LVT-1	LUXURY VINYL TILE	TANDUS CENTIVA	WOODLOT	HOLLY OAK		
P-1	PAINT - FIELD, TYPE 1	SHERMAN WILLIAMS		CRUSHED ICE		
P-2	PAINT - ACCENT	SHERMAN WILLIAMS		CLASSICAL GOLD		
P-3	PAINT - ACCENT	SHERMAN WILLIAMS		RIVULET		
P-4	PAINT - ACCENT	SHERMAN WILLIAMS		GOLDEN RULE		
P-5	PAINT - ACCENT	SHERMAN WILLIAMS		AGATE GREEN		
P-6	PAINT - ACCENT (EXTERIOR)	SHERMAN WILLIAMS		TEMPE STAR		
P-7	PAINT - EXTERIOR	SHERMAN WILLIAMS		MODERNE WHITE		
PL-1	PLASTIC LAMINATE, TYPE 1	WILSONART		WHITE SAND		
PL-2	PLASTIC LAMINATE, TYPE 2	WILSONART		ALMOND LEATHER		
PL-3	PLASTIC LAMINATE, TYPE 3	WILSONART		WALNUT HEIGHTS		
RB-1	RUBBER BASE, TYPE 1	TARKETT		PEPPERCORN		
SL	SLATWALL PANEL	MARLITE	LPM	744 SWISS ALMOND		
SS-1	SOLID SURFACE	WILSONART		OATMEAL		
SV-1	SHEET VINYL	TARKETT	ICONK-CATERA	MIDDLE GRAY		6" COVE BASE UP WALL
SV-2	SHEET VINYL	TARKETT	FRESH START	LIGHT GREY		
TB-1	TACKBOARD	GUILFORD OF MAINE	FR701	TEAL		
TB-2	TACKBOARD	GUILFORD OF MAINE	FR701	QUARTZ		
WM	WALK-OFF MAT	TARKETT	ASSERTIVE ACTION	GOLD ORE		

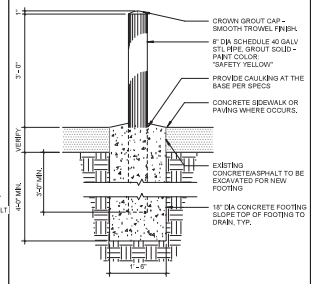
APPROVED
City of Sacramento Plan Review
LIFE SAFETY
By: [signature]
Chad Aleck
on Jul 01, 2025

A11.01 - SITE PLAN DETAILS

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

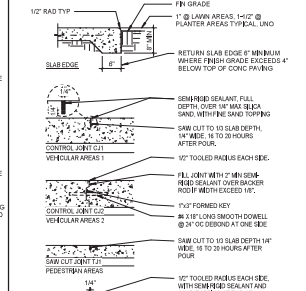


13 BENCH ANCHORAGE
SCALE: NTS

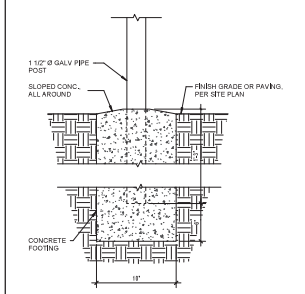


NOTE:
AT EXISTING BOLLARDS TO REMAIN, PAINT ONE COAT PRIMER, TWO COATS SAFETY YELLOW PAINT

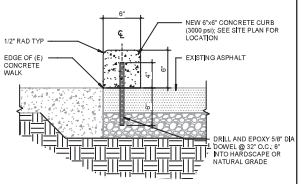
9 BOLLARD
SCALE: 3/4" = 1'-0"



5 CONCRETE JOINTS
SCALE: 3/4" = 1'-0"

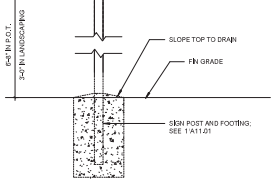


1 SIGN POST FOOTING DETAIL
SCALE: 1 1/2" = 1'-0"

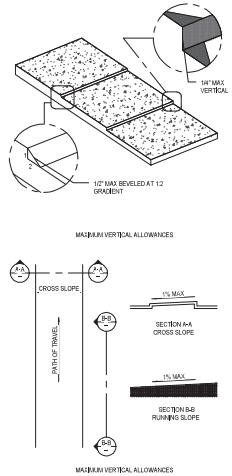


NOTE: SEE 4/ FOR FIRE LANE CURB DETAIL WHERE REQUIRED

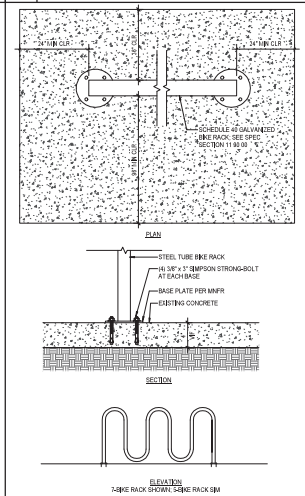
15 EXTRUDED VERTICAL CURB
SCALE: 1 1/2" = 1'-0"



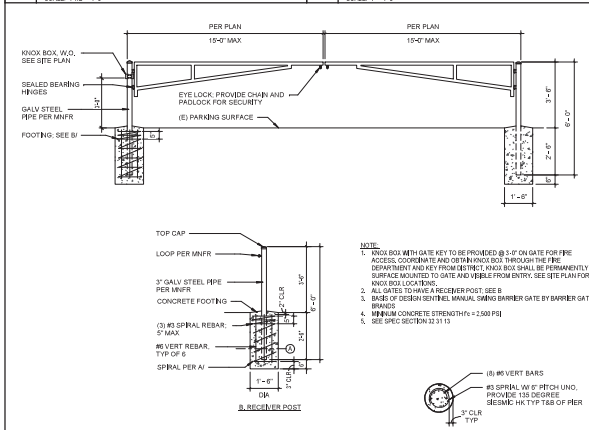
11 DO NOT ENTER SIGN
SCALE: 1" = 1'-0"



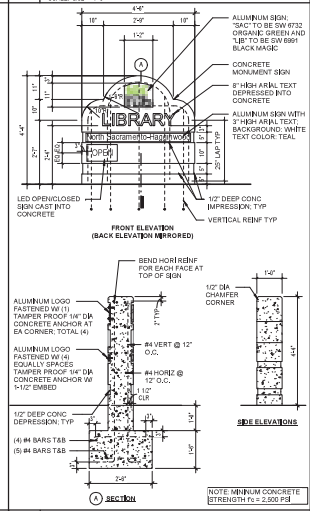
7 WALKS AND SIDEWALKS
SCALE: 3/32" = 1'-0"



3 BIKE RACK
SCALE: NTS



16 STEEL PIPE SWING GATE
SCALE: 3/8" = 1'-0"



NOTE: MINIMUM CONCRETE STRENGTH f'c = 2,500 PSI

8 MONUMENT SIGN
SCALE: 1/2" = 1'-0"



NOTE:
APPROVED SIGNAGE TO BE PLACED EVERY 25'-0" ALONG ROADWAY, SEE DETAIL.

4 FIRE LANE CURB
SCALE: 1 1/2" = 1'-0"

C:\Users\edianc\Documents\220389_NSHL_06.20.24_kelly.clancy.YSZ4T.rvt
5/23/2025 10:54:51 AM

Not for permitting or construction

PBK
JOBCOPY

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9822

APPROVED
STRUCTURAL
By: Vincent Wang
on Jul 01, 2025

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE
MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

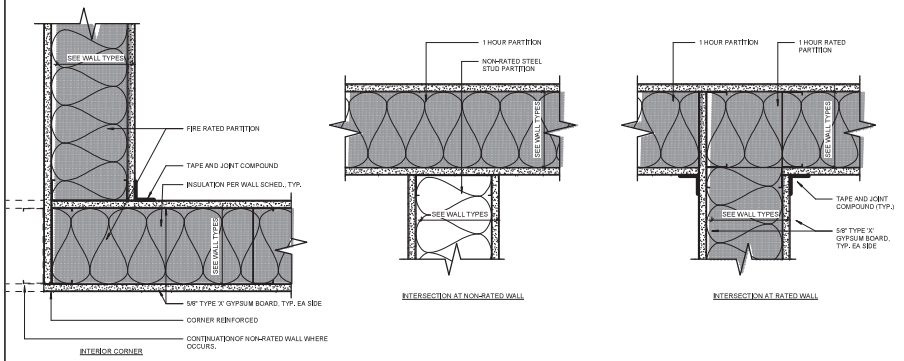
CONSTRUCTION DOCUMENT

SITE PLAN DETAILS

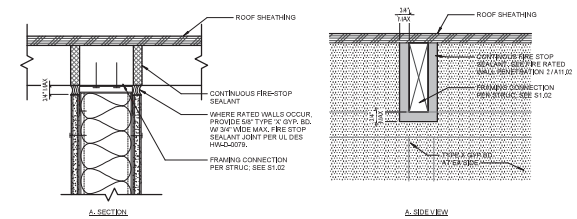
A11.01

COM-2500586

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



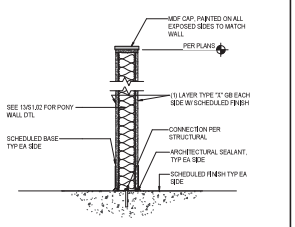
11 TYPICAL FIRE RATED WALL INTERSECTIONS
SCALE: 3" = 1'-0"



NOTES:
1. CONDUIT, CABLE, PIPE, ETC., PENETRATIONS OF FIRE-RATED PARTITIONS SHALL BE SEALED AS SHOWN, IN COMPLIANCE WITH MANUFACTURER'S INSTRUCTIONS. ANY GAP LARGER THAN ALLOWED FOR SPECIFIED FIRESTOP SEALANT SHALL BE FILLED WITH FIRE BLOCKS CUT TO SIZE FOR PENETRATIONS IN PLACE, PRIOR TO INSTALLING FIRESTOP SEALANT.
2. FIRE BLOCK AND FIRESTOP SEALANT PROVISIONS FOR PENETRATIONS AT FIRE-RATED WALL ASSEMBLIES TAKE PRIORITY OVER ACOUSTICAL PROVISIONS.

2 CONDUIT / PIPE PENETRATION FIRESTOP
SCALE: 1" = 1'-0"

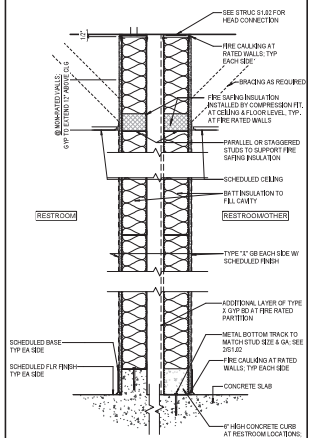
12 1HR FIRE RESISTIVE HEAD CONNECTION UL DES HW-D-0079
SCALE: 3" = 1'-0"



FOR STEEL SUPPORT INFORMATION SEE STRUCTURAL

TYPE	SIZE / SHEATHING	FIRE RATED
C	6" METAL STUD @ 16" O.C. (1) LAYER GYP BD ON EA SIDE	NR

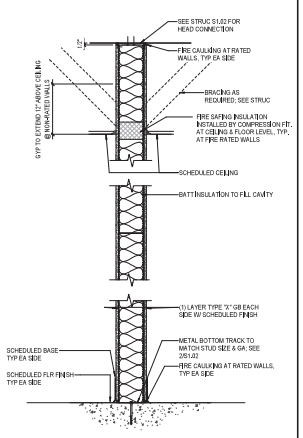
9 INTERIOR PARTITION - TYPE C
SCALE: 1" = 1'-0"



TYPE	SIZE / SHEATHING	FIRE RATED
B	DOUBLE METAL STUD WALL W/ 12" CLR, 4" METAL STUDS @ 16" O.C., (1) LAYER GYP BD ON EA SIDE; FIRE RATED WALL TO HAVE ADDITIONAL LAYER OF TYPE X GYP BD AT FIRE RATED WALL	PER PLAN
B.1	DOUBLE METAL STUD WALL W/ 12" CLR, 4" METAL STUDS @ 16" O.C., (1) LAYER GYP BD ON EA SIDE; FIRE RATED WALL TO HAVE ADDITIONAL LAYER OF TYPE X GYP BD AT FIRE RATED WALL	1 HR

PLAN INDICATION:
NON RATED
1-HR RATED PER CBC TABLE 721.1(2) (ITEM NO. 13-1.1) FOR HEAD CONDITION SEE 12 / A11.02 FOR INTERSECTIONS SEE 11 / A11.02

6 INTERIOR PARTITION - TYPE B
SCALE: 1" = 1'-0"



TYPE	SIZE / SHEATHING	FIRE RATED
A	4" METAL STUD @ 16" O.C., (1) LAYER GYP BD ON EA SIDE	NR
A.1	4" METAL STUD @ 16" O.C., (1) LAYER TYPE 'X' GYP BD ON EA SIDE	1 HR

PLAN INDICATION:
NON RATED
1-HR RATED PER CBC TABLE 721.1(2) (ITEM NO. 13-1.1) FOR HEAD CONDITION SEE 12 / A11.02

3 INTERIOR PARTITION - TYPE A
SCALE: 1" = 1'-0"

Not for permitting or construction

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9822
JOBCOPY

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT
1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

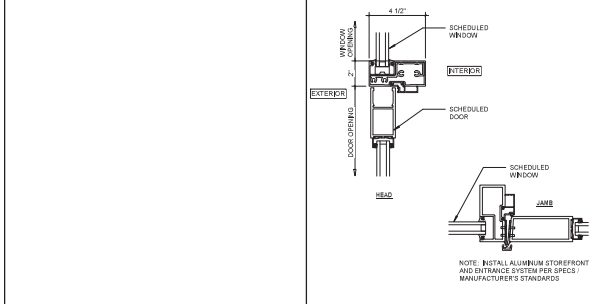
INT PARTITION DETAILS

A11.02

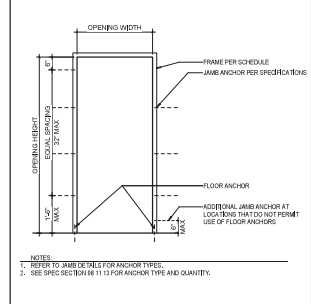
COM-2500586

A11.03 - DOOR AND WINDOW DETAILS

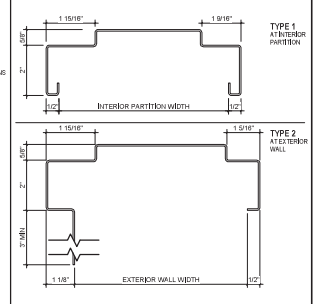
APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



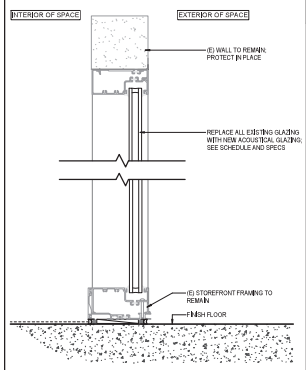
9 ALUM DOOR/WINDOW TRANS.
SCALE: 3" = 1'-0"



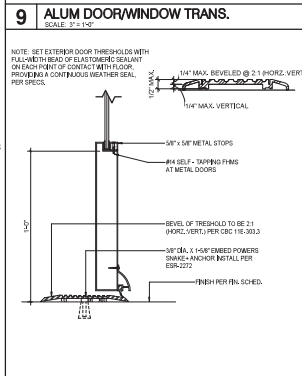
5 FRAME ANCHOR LOCATIONS
SCALE: 1/2" = 1'-0"



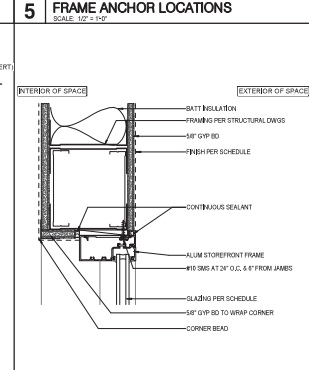
1 HM DOOR FRAME PROFILES
SCALE: 6" = 1'-0"



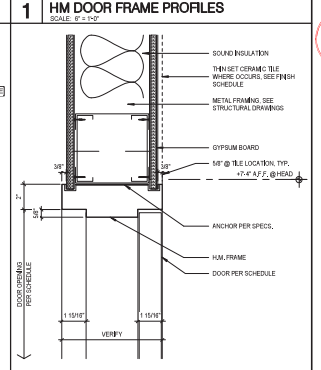
14 ACOUSTICAL GLAZING (ADD ALT #2)
SCALE: 3" = 1'-0"



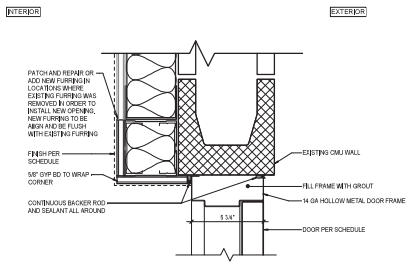
10 EXT ALUM DOOR SILL
SCALE: 3" = 1'-0"

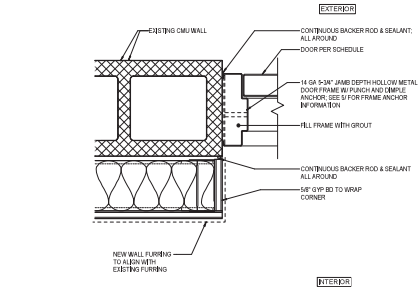


6 INTERIOR STOREFRONT HEAD
SCALE: 3" = 1'-0"

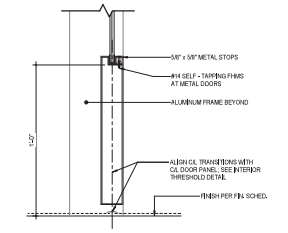


2 HEAD / JAMB SIM.
SCALE: 3" = 1'-0"

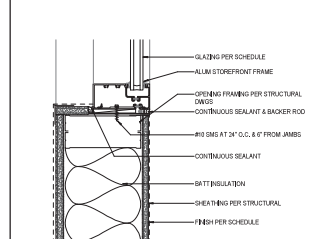




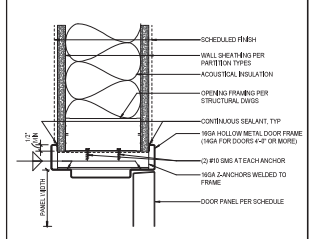
20 EXT HM HEAD/JAMB @ CMU WALL
SCALE: 3" = 1'-0"



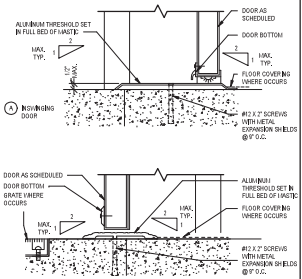
11 INTERIOR STOREFRONT DOOR SILL
SCALE: 3" = 1'-0"



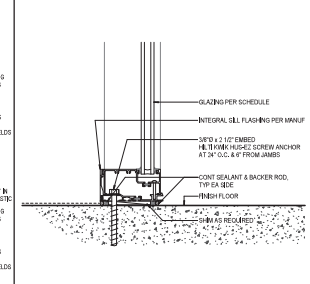
7 INT STOREFRONT SILL/JAMB
SCALE: 3" = 1'-0"



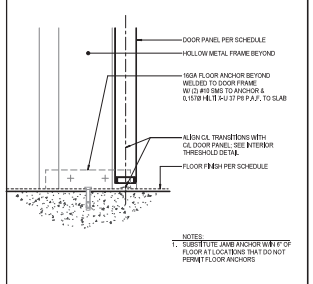
3 INTERIOR HM DOOR FRAME JAMB
SCALE: 3" = 1'-0"



12 EXTERIOR DR THRESHOLD
SCALE: 3" = 1'-0"



8 INTERIOR STOREFRONT SILL
SCALE: 3" = 1'-0"



4 INTERIOR HM DOOR FRAME SILL
SCALE: 3" = 1'-0"

Not for permitting or construction

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9822

APPROVED
STRUCTURAL
By: Vincent Wang
on Jul 01, 2025

ISSUED BY
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
A
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

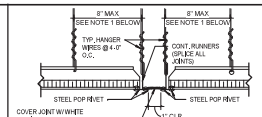
DOOR AND WINDOW DETAILS

A11.03

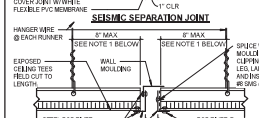
JOBCOPY
1124 DEL PASO BLVD
COM-2500586

C:\Users\edanc\Documents\220389_NSHL_06.20.24_kelly.clancy.YSZ4T.rvt
5/23/2025 10:54:53 AM





SEISMIC SEPARATION JOINT



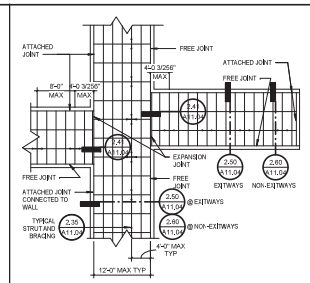
ALTERNATE SEISMIC SEPARATION JOINT

SEISMIC SEPARATION JOINT AT CONTINUOUS CEILING AREAS EXCEEDING 2,000 SQ. FT. SEE CEILING PLANS FOR LOCATIONS

NOTE:

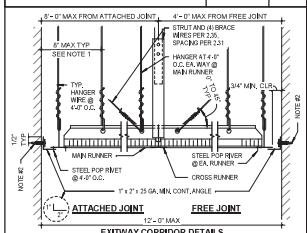
1. PROVIDE #12 GAGE HANGER WIRES AT THE ENDS OF ALL MAIN AND CROSS RUNNERS WITHIN EIGHT (8) INCHES OF THE SUPPORT OR WITHIN ONE-FOURTH (1/4) OF THE LENGTH OF THE END TEE, WHICHEVER IS LESS. FOR THE PERIMETER OF THE CEILING AREA, PERIMETER WIRES ARE NOT REQUIRED WHEN THE LENGTH OF THE END TEE IS EIGHT (8) INCHES OR LESS.

SEISMIC SEPARATION JOINT | 3" = 1'-0" | 2.45



LOCATION OF EXPANSION/SLIP JOINTS IN CORRIDORS

CORRIDOR CEILING PLAN | 3/32" = 1'-0" | 2.31

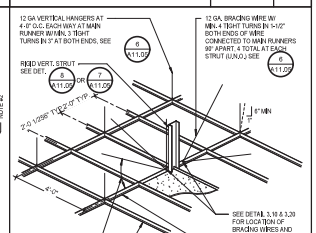


EXITWAY CORRIDOR DETAILS

NOTE:

1. PROVIDE #12 GAGE HANGER WIRES AT THE ENDS OF ALL MAIN AND CROSS RUNNERS WITHIN EIGHT (8) INCHES OF THE SUPPORT OR WITHIN ONE-FOURTH (1/4) OF THE LENGTH OF THE END TEE, WHICHEVER IS LESS. FOR THE PERIMETER OF THE CEILING AREA, PERIMETER WIRES ARE NOT REQUIRED WHEN THE LENGTH OF THE END TEE IS EIGHT (8) INCHES OR LESS.
2. REFER TO GENERAL NOTE 4.08 FOR WALL ANGLE ATTACHMENT

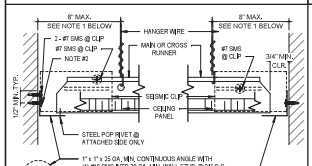
CEILING SECTION @ EXITWAYS | 3" = 1'-0" | 2.50



NOTE:

1. STRUTS SHALL NOT REPLACE HANGER WIRES.
2. THE MINIMUM ACCEPTABLE ANGLE IS DETERMINED SUCH THAT THE WIRES DO NOT INTERFERE WITH THE RUNNERS, LIGHT FIXTURES, ETC. AND REMAIN STRAIGHT AND UNOBSTRUCTED.

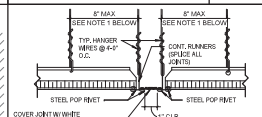
SUSPENSION AND BRACING | 3/8" = 1'-0" | 2.35



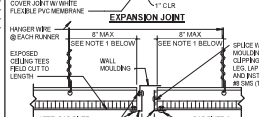
NOTE:

1. PROVIDE #12 GAGE HANGER WIRES AT THE ENDS OF ALL MAIN AND CROSS RUNNERS WITHIN EIGHT (8) INCHES OF THE SUPPORT OR WITHIN ONE-FOURTH (1/4) OF THE LENGTH OF THE END TEE, WHICHEVER IS LESS. FOR THE PERIMETER OF THE CEILING AREA, PERIMETER WIRES ARE NOT REQUIRED WHEN THE LENGTH OF THE END TEE IS EIGHT (8) INCHES OR LESS.
2. REFER TO GENERAL NOTE 4.08 FOR WALL ANGLE ATTACHMENT
3. REFER TO GENERAL NOTE 1.04 FOR SEISMIC CLIP

CEILING PERIMETER | 6" = 1'-0" | 2.60



EXPANSION JOINT



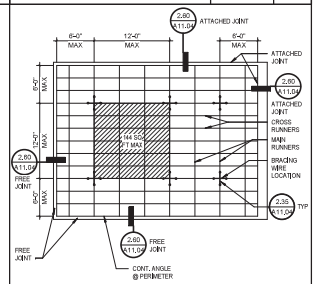
EXPANSION JOINT ALTERNATE

EXPANSION JOINTS AT THE INTERSECTIONS OF CORRIDORS AND AT JUNCTIONS OF OF CORRIDORS AND LOBBIES OR OTHER SIMILAR AREAS

NOTE:

1. PROVIDE #12 GAGE HANGER WIRES AT THE ENDS OF ALL MAIN AND CROSS RUNNERS WITHIN EIGHT (8) INCHES OF THE SUPPORT OR WITHIN ONE-FOURTH (1/4) OF THE LENGTH OF THE END TEE, WHICHEVER IS LESS. FOR THE PERIMETER OF THE CEILING AREA, PERIMETER WIRES ARE NOT REQUIRED WHEN THE LENGTH OF THE END TEE IS EIGHT (8) INCHES OR LESS.

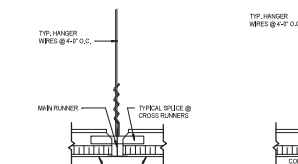
EXP. JOINT @ INTERSECTIONS | 3" = 1'-0" | 2.40



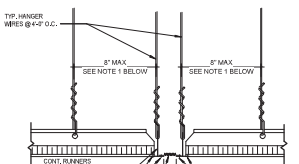
NOTE:

1. BRACING WIRES AND COMP. STRUT SHALL OCCUR AT EVERY 144 SQ. FT. MAX. IN ROOMS OVER 144 SQ. FT.

12'-0"x12'-0" BRACE ASSEMBLY | 1/8" = 1'-0" | 2.12



RUNNER SPLICE



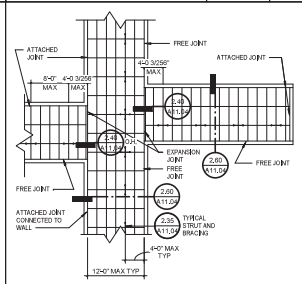
EXPANSION JOINT

EXPANSION JOINTS AT THE INTERSECTIONS OF CORRIDORS AND AT JUNCTIONS OF OF CORRIDORS AND LOBBIES OR OTHER SIMILAR AREAS

NOTE:

1. PROVIDE #12 GAGE HANGER WIRES AT THE ENDS OF ALL MAIN AND CROSS RUNNERS WITHIN EIGHT (8) INCHES OF THE SUPPORT OR WITHIN ONE-FOURTH (1/4) OF THE LENGTH OF THE END TEE, WHICHEVER IS LESS. FOR THE PERIMETER OF THE CEILING AREA, PERIMETER WIRES ARE NOT REQUIRED WHEN THE LENGTH OF THE END TEE IS EIGHT (8) INCHES OR LESS.

EXPANSION JOINT AT INTERSECTIONS | 3" = 1'-0" | 2.41



LOCATION OF EXPANSION/SLIP JOINTS IN CORRIDORS

CORRIDOR CEILING PLAN | 3/32" = 1'-0" | 2.30

METAL SUSPENSION SYSTEMS FOR LAY IN PANEL CEILINGS NOTES

1. CEILING SYSTEM GENERAL NOTES:

1.01 CEILING SYSTEM COMPONENTS SHALL COMPLY WITH ASTM C635-07 AND SECTION 5.1 OF ASTM E580-10A.

1.02 THE CEILING GRID SYSTEM MUST BE RATED HEAVY DUTY AS DEFINED BY ASTM C635-08.

1.03 CEILING SYSTEMS: THE FOLLOWING CEILING SYSTEM(S) IS/ARE PART OF THE SCOPE OF THIS PROJECT:

MANUFACTURER	ICC/ES REPORT	MAIN RUNNER	CROSS RUNNER
ARMSTRONG	ESR-1308	7301	XL7341 (1)
CHICAGO METALLIC	ESR-2631	200	1274 (2)
USG INTERIORS (DONN)	ESR-1222	DX26	DX424 (3)
CERTAINTEED	ESR-3336	CS12-12-20	CS4-12-12 (4)

FOOTNOTES:
(1) FOR 2X2 GRID USE XL8320
(2) FOR 2X2 GRID USE 1202
(3) FOR 2X2 GRID USE DX216
(4) FOR 2X2 GRID USE CS2-12-12

1.04 SEISMIC WALL CLIP:

MANUFACTURER	SEISMIC WALL CLIP MODEL NO.
ARMSTONG	BERC 2 / ESR-1308
CHICAGO METALLIC	1496 / ESR-2631
USG INTERIORS (DONN)	ACM7 / ESR-1222
CERTAINTEED	SEISMIC PERIM CLIP / ESR-3336

1.05 CEILING PANELS SHALL NOT SUPPORT ANY LIGHT FIXTURES, AIR TERMINALS OR DEVICES.

1.06 FOR CEILING INSTALLATIONS UTILIZING ACOUSTICAL TILE PANELS OF MINERAL OR GLASS FIBER, IT IS NOT MANDATORY TO PROVIDE 3/4 INCH CLEARANCE BETWEEN THE ACOUSTICAL TILE PANELS AND THE WALL ON THE SIDES OF THE CEILING WHICH ARE FREE TO SLIP. FOR ALL OTHER CEILING PANEL TYPES, PROVIDE 3/4" CLEARANCE BETWEEN THE CEILING PANEL AND THE WALL ON THE SIDES OF THE CEILING FREE TO SLIP.

1.07 SUSPENDED ACOUSTICAL CEILING SYSTEMS WITH A CEILING AREA OF 144 SQUARE FEET OR LESS, SURROUNDED BY WALLS WHICH CONNECT DIRECTLY TO THE STRUCTURE ABOVE, DO NOT REQUIRE BRACING ASSEMBLIES WHEN ATTACHED TO TWO ADJACENT WALLS.

1.08 EXPANSION JOINTS SHALL BE PROVIDED IN THE CEILING AT INTERSECTIONS OF CORRIDORS AND AT JUNCTIONS OF CORRIDORS AND LOBBIES OR OTHER SIMILAR AREAS.

1.09 FOR CEILING AREAS EXCEEDING 2,500 SQUARE FEET, A SEISMIC SEPERATION JOINT SHALL BE PROVIDED TO DIVIDE THE CEILING INTO SYMETRICAL AREAS NOT EXCEEDING 2,500 SQUARE FEET.

1.10 FOR ACOUSTICAL TILE PANELS OF MINERAL OR GLASS FIBER, IT IS NOT MANDATORY TO PROVIDE A 3/4 INCH CLEARANCE BETWEEN THE TILE PANEL AND THE WALL ON THE FREE ENDS OF THE CEILING WHERE IT IS ALLOWED TO SLIP.

1.11 PANELS WEIGHING MORE THAN ONE-HALF (1/2) PSF, OTHER THAN MINERAL AND GLASS FIBER ACOUSTICAL TILE, AND ALL METAL AND WOOD PANELS SHALL BE POSITIVELY ATTACHED TO THE CEILING SUSPENSION RUNNERS BY MECHANICAL MEANS, SUCH AS BOLTS, SCREWS, OR RIVETS, AND EACH ATTACHMENT SHALL HAVE THE ALLOWABLE DESIGN STRENGTH TO SUPPORT 100 PERCENT OF THE WEIGHT OF THE PANEL ACTING IN ANY DIRECTION. A MINIMUM OF TWO (2) ATTACHMENTS ARE REQUIRED FOR EACH PANEL. IT IS ALSO PERMITTED TO PROVIDE A SECONDARY MEANS OF CONNECTING THE PANEL TO THE STRUCTURE ABOVE TO RETAIN THE PANEL FROM DROPPING OUT. CEILING GRID DISTORTION AND THE CEILING GRID BECOMING OUT-OF-LEVEL.

1.12 FREE FLOATING CEILING SHALL BE SUPPORTED BY WIRES AS DETAILED AND SHALL ALSO BE BRACED WITH WIRES AS DETAILED. THE PERIMETER EDGE SHALL BE SUPPORTED BY A CONTINOUS RUNNER AT THE PERIMETER EDGE AND SHALL BE SPLICED IN COMPLIANCE WITH ASTM E580.

1.13 COMPRESSION STRUTS SHALL HAVE A MAXIMUM KL/R NOT TO EXCEED 300. STRUTS SHALL NOT BE MORE THAN ONE (HORIZONTAL) IN SIX (VERTICAL) OUT OF PLUMB.

1.14 DETAILS FOR CEILING SYSTEM INSTALLATION ARE TAKEN FROM DSA IR 25.2.13 AND ARE SUBJECT TO THE CONDITIONS OF USE OF THE CEILING NOTES AND DETAILS AS INDICATED IN ARTICLE 6.2.1 OF SAID IR 25.2.13. DETAIL NUMBERS HAVE NOT BEEN REVISED FROM THOSE IDENTIFIED IN IR 25.2.13 FOR EASE OF THE PLAN REVIEW PROCESS BY DSA, THEREFORE THE DETAIL NUMBERS MAY NOT BE CONSECUTIVE AS ONLY THOSE DETAILS THAT INTEGRATED WITH THE SPECIFIC SCOPE AND REQUIREMENTS OF THIS PROJECT HAVE BEEN SELECTED FOR USE.

2. MATERIALS:

2.01 CEILING WIRE SHALL BE CLASS 1 ZINC COATED (GALVANIZED) CARBON STEEL CONFORMING TO ASTM A641-09A. WIRE SHALL BE #12 GAGE (0.106" DIAMETER) WITH SOFT TEMPER AND MINIMUM TENSILE STRENGTH = 70 KSI.

2.02 GALVANIZED SHEET STEEL (INCLUDING THAT USED FOR METAL STUD AND TRACK COMPRESSION STRUTS/POST) SHALL CONFORM TO ASTM A653-11, OR OTHER EQUIVALENT SHEET STEEL LISTED IN SECTION A2.1 OF THE NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS 2007 INCLUDING SUPPLEMENT 2 DATED 2010 (AISI S100-07/S2-10). MATERIAL 43 MIL (18 GAGE) AND LIGHTER SHALL HAVE MINIMUM YIELD STRENGTH OF 33 KSI, MATERIAL 54 MIL (16 GAGE) AND HEAVIER SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KSI.

2.03 ELECTRICAL METALLIC TUBE (EMT) SHALL BE ANSI C80.3/UL 797 CARBON STEEL WITH G90 GALVANIZING. EMT SHALL MINIMUM YIELD STRENGTH (FY) OF 30 KSI AND MINIMUM ULTIMATE STRENGTH (FU) OF 48 KSI.

3. ATTACHMENT OF HANGER AND BRACING WIRES:

3.01 SEPARATE ALL CEILING HANGER AND BRACING WIRES AT LEAST SIX (6) INCHES FROM ALL UNBRACED DUCTS, PIPES, CONDUIT, ETC.

3.02 HANGER AND BRACING WIRES SHALL NOT ATTACH TO OR BEND AROUND OBSTRUCTIONS INCLUDING BUT NOT LIMITED TO: PIPING, DUCTWORK, CONDUIT AND EQUIPMENT.

3.03 HANGER WIRES THAT ARE MORE THAN ONE (HORIZONTAL) IN SIX (VERTICAL) OUT OF PLUMB SHALL HAVE COUNTER-SLOPING WIRES.

3.04 SLACK SAFETY WIRES SHALL BE CONSIDERED HANGER WIRES FOR INSTALLATION AND TESTING REQUIREMENTS.

3.05 HANGER AND BRACING WIRE ANCHORAGE TO THE STRUCTURE SHALL BE INSTALLED IN SUCH A MANNER THAT THE DIRECTION OF THE ANCHORAGE ALIGNS CLOSELY WITH THE DIRECTION OF THE WIRE, (E.G. BRACING WIRE CEILING CLIPS MUST BE BENT AS SHOWN IN THE DETAILS AND ROTATED AS REQUIRED TO ALIGN CLOSELY WITH THE DIRECTION OF THE WIRE. SCREW EYES IN WOOD MUST BE INSTALLED SO THEY ALIGN CLOSELY WITH THE DIRECTION OF THE WIRE, ETC.)

3.06 FASTEN HANGER WIRES WITH NOT LESS THAN THREE (3) TIGHT TURNS IN THREE (3) INCHES. HANGER WIRE LOOPS SHALL BE TIGHTLY WRAPPED AND SHARPLY BENT TO PREVENT VERTICAL MOVEMENT OR ROTATION WITH IN LOOPS PER ASTM E580.

3.07 FASTEN BRACING WIRES WITH NOT LESS THAN FOUR (4) TIGHT TURNS IN ONE AND ONE-HALF (1-1/2) INCHES.

3.08 WIRE TURNS MADE BY MACHINE WHERE BOTH STRANDS HAVE BEEN DEFORMED OR BENT IN WRAPPING CAN HAVE THE ONE AND ONE-HALF (1-1/2) INCH REQUIREMENT WAIVED, BUT THE NUMBER OF TURNS SHOULD BE MAINTAINED, AND BE AS TIGHT AS POSSIBLE.

3.09 PROVIDE TRAPEZE OR OTHER SUPPLEMENTARY SUPPORT MEMBERS AT OBSTRUCTIONS TO ALLOW TYPICAL HANGER SPACING.

3.10 PROVIDE ADDITIONAL HANGERS, STRUCTS, AND BRACE ASSEMBLIES AS REQUIRED AT ALL CEILING BREAKS, SOFFITS, OR DISCONTINUOUS AREAS.

3.11 SPLICES WILL NOT BE PERMITTED IN ANY HANGER WIRES UNLESS THE SPLICE IS CONSTURCTED ACCORDING TO THE SPECIFIC DETAILS PROVIDED IN THESE DOCUMENTS.

3.12 THE GAGE AND SPACING OF ANY EXISTING WIRE TO BE SPLICED MUST COMPLY WITH CURRENT CODE REQUIREMENTS.

3.12 THE SLOPE OF BRACING WIRES SHALL NOT EXCEED 45 DEGREES FROM THE HORIZONTAL PLANE AND WIRES SHALL BE TAUT.

4. FASTENERS AND WELDING:

4.01 SHEET METAL SCREWS SHALL COMPLY WITH ASTM C1513-10, ASME B18.6.4-89 (R2005). PENETRATION OF SCREWS THROUGH JOINED MATERIAL SHALL NOT BE LESS THAN THREE EXPOSED THREADS.

4.02 EXPANSION ANCHORS SHALL BE: AS LISTED IN THE GENERAL NOTES ON DRAWING A0.1. DIAMETER, EMBEDMENTAND ICC/ES REPORT SHALL BE AS SHOWN ON DRAWING A0.1 AND AS INDICATED ON THE DETAILS.

4.03 POWER-ACTUATED FASTENERS SHALL BE: AS LISTED IN THE GENERAL NOTES ON DRAWING A0.1. DIAMETER, EMBEDMENTAND ICC/ES REPORT SHALL BE AS SHOWN ON DRAWING A0.1 AND AS INDICATED ON THE DETAILS.

4.04 IF NOT OTHERWISE SPECIFIED IN THE EVALUATION REPORT, POWER-ACTUATED FASTENERS INSTALLED IN STEEL SHALL BE INSTALLED SO THE ENTIRE POINTED END OF THE FASTENER IS DRIVEN THROUGH THE STEEL MEMBER.

4.05 POWER-ACTUATED FASTENERS IN CONCRETE ARE NOT PERMITTED FOR BRACING WIRES.

4.06 CONCRETE REINFORCEMENT AND PRESTRESSING TENDONS SHALL BE LOCATED BY NON-DESTRUCTIVE MEANS PRIOR TO INSTALLING POST-INSTALLED ANCHOR.

4.07 WELDING SHALL BE IN ACCORDANCE WITH AWS D1.3 USING E60XX SERIES ELECTRODES.

4.08 ANCHORS FOR WALL ANGLES:

A. AT WOOD STUD WALL: 8D COMMON NAIL AT 16" O.C. INTO SOLID BLOCKING.
B. AT METAL STUD WALL: NO. 10 SMS INTO MIN. 33 MIL THK METAL STUD AT 24" O.C.
C. AT MASONRY WALL: 1/4" DIA X 1-3/4" LONG TAP CON ANCHOR SCREW AT 16" O.C. ICC ESR-1671.

5. TESTING: ALL FIELD TESTING MUST BE PERFORMED IN THE PRESENCE OF THE PROJECT INSPECTOR.

5.01 POST-INSTALLED ANCHORS IN CONCRETE USED TO SUPPORT HANGER WIRES SHALL BE TESTED AT A FREQUENCY OF 10 PERCENT. POWER-ACTUATED FASTENERS IN CONCRETE SHALL BE FIELD TESTED FOR 200 LB. IN TENSION. ALL OTHER POST-INSTALLED ANCHORS IN CONCRETE SHALL BE TESTED IN ACCORDANCE WITH CBC SECTION 1913A.7.

5.02 POST-INSTALLED ANCHORS IN CONCRETE USED TO ATTACH BRACING WIRES SHALL BE TESTED AT A FREQUENCY OF 50 PERCENT IN ACCORDANCE WITH CBC SECTION 1913A.7.

5.03 ALL EXISTING CEILING HANGER WIRE/ANCHOR ASSEMBLIES MUST BE TESTED TO 200 LBS.

5.04 ALL EXISTING BRACING WIRE/ANCHOR ASSEMBLIES MUST BE FIELD TESTED TO 440 LB.

5.05 WHERE A NEW WIRE IS SPLICED TO AN EXISTING WIRE, EACH SPLICED WIRE/ANCHOR ASSEMBLY MUST BE FIELD TESTED TO THE LOADS REQUIRED FOR EXISTING CEILING OR BRACE WIRES.

6. LIGHT FIXTURES:

6.01 ALL LIGHT FIXTURES SHALL BE POSITIVELY ATTACHED TO THE CEILING SUSPENSION SYSTEMS BY MECHANICAL MEANS TO RESIST A HORIZONTAL FORCE EQUAL TO THE WEIGHT OF THE FIXTURE. A MINIMUM OF TWO SCREWS OR APPROVED FASTENERS ARE REQUIRED AT EACH LIGHT FIXTURE, PER ASTM E580, SECTION 5.3.1.

6.02 SURFACE-MOUNTED LIGHT FIXTURES SHALL BE ATTACHED TO THE MAIN RUNNER WITH AT LEAST TWO POSITIVE CLAMPING DEVICES, THE CLAMPING DEVICE SHALL COMPLETELY SURROUND THE SUPPORTING CEILING RUNNER AND BE MADE OF STEEL WITH A MINIMUM THICKNESS OF #14 GAGE. ROTATIONAL SPRING CATCHES DO NOT COMPLY. A #12 GAGE SLACK SAFETY WIRE SHALL BE CONNECTED FROM EACH CLAMPING DEVICE TO THE STRUCTURE ABOVE. PROVIDE ADDITIONAL SUPPORTS WHEN LIGHT FIXTURES ARE EIGHT (8) FEET OR LONGER OR EXCEED 56 LB. MAXIMUM SPACING BETWEEN SUPPORTS SHALL NOT EXCEED EIGHT (8) FEET.

6.03 LIGHT FIXTURES WEIGHING LESS THAN OR EQUAL TO 10 LB. SHALL HAVE A MINIMUM OF ONE (1) #12 GAGE SLACK SAFETY WIRE CONNECTED FROM THE FIXTURE HOUSING TO THE STRUCTURE ABOVE.

6.04 LIGHT FIXTURES WEIGHING GREATER THAN 10 LB. BUT LESS THAN OR EQUAL TO 56 LB. MAY BE SUPPORTED DIRECTLY ON THE CEILING RUNNERS, BUT THEY SHALL HAVE A MINIMUM OF TWO (2) #12 GAGE SLACK SAFETY WIRES CONNECTED FROM THE FIXTURE HOUSING AT DIAGONAL CORNERS TO THE STRUCTURE ABOVE.

EXCEPTION: ALL LIGHT FIXTURES GREATER THAN TWO BY FOUR FEET WEIGHING LESS THAN 56 LB. SHALL HAVE A #12 GAGE SLACK SAFETY WIRE AT EACH CORNER.

6.05 ALL LIGHT FIXTURES WEIGHING GREATER THAN 56 LB. SHALL BE INDEPENDENTLY SUPPORTED BY NOT LESS THAN FOUR (4) TAUT #12 GAGE HANGER WIRES (ONE AT EACH CORNER) ATTACHED FROM THE FIXTURE HOUSING TO THE STRUCTURE ABOVE OR OTHER APPROVED HANGERS. THE FOUR (4) TAUT #12 GAGE WIRES OR OTHER APPROVED HANGERS, INCLUDING THEIR ATTACHMENT TO THE STRUCTURE ABOVE, SHALL BE CAPABLE OF SUPPORTING FOUR (4) TIMES THE WEIGHT OF THE FIXTURE.

6.06 WHERE PENDANT MOUNTED LIGHT FIXTURES ARE INSTALLED IN AN AREA WITH A SUSPENDED CEILING THE LIGHT FIXTURE SHALL BE SUPPORTED DIRECTLY FROM THE STRUCTURE ABOVE WITH HANGER WIRES OR CABLE PASSING THRU EACH PENDANT HANGER AND SHALL BE CAPABLE OF SUPPORTING TWO (2) TIMES THE WEIGHT OF THE FIXTURE.

6.07 IF A PENDANT MOUNTED LIGHT FIXTURE IS DIRECTLY AND INDEPENDENTLY BRACED BELOW THE CEILING THEN A BRACE ASSEMBLY IS NOT REQUIRED ABOVE THE THE CEILING.

6.08 IF A PENDANT MOUNTED LIGHT FIXTURE IS FREE TO SWING 45 DEGREES FROM THE VERTICAL IN ALL DIRECTIONS, AND IS NOT DIRECTLY OR INDEPENDENTLY BRACED BELOW THE CEILING, THEN A BRACING ASSEMBLY IS ONLY REQUIRED WHERE THE PENDANT HANGER PENETRATES THE CEILING.

6.09 WHERE THE WEIGHT OF THE PENDANT FIXTURE IS LESS THAN 20 LB. THE VERTICAL COMPONENT OF THE BRACE FORCE NEED NOT BE CONSIDERED. NO COMPRESSION POST/STRUT IS REQUIRED.

7. SERVICES WITHIN THE CEILING:

7.01 ALL FLEXIBLE SPRINKLER HOSE FITTING MOUNTING BRACKETS, CEILING-MOUNTED AIR TERMINALS OR OTHER SERVICES SHALL BE POSITIVELY ATTACHED TO THE CEILING SUSPENSION SYSTEMS BY MECHANICAL MEANS. SCREWS OR APPROVED FASTENERS ARE REQUIRED. A MINIMUM OF TWO ATTACHMENTS ARE REQUIRED AT EACH COMPONENT.

7.02 CEILING-MOUNTED AIR TERMINALS OR OTHER SERVICES WEIGHING LESS THAN OR EQUAL TO 20 LB. SHALL HAVE ONE (1) #12 GAGE SLACK SAFETY WIRE ATTACHED FROM THE TERMINAL OR SERVICE TO THE STRUCTURE ABOVE.

7.03 FLEXIBLE SPRINKLER HOSE FITTINGS, CEILING-MOUNTED AIR TERMINALS OR OTHER SERVICES WEIGHING MORE THAN 20 LB. BUT LESS THAN OR EQUAL TO 56 LB. SHALL HAVE TWO (2) #12 GAGE SLACK SAFETY WIRES (AT DIAGONAL CORNERS) CONNECTED FROM THE TERMINAL OR SERVICE TO THE STRUCTURE ABOVE.

7.04 FLEXIBLE SPRINKLER HOSE FITTINGS, CEILING-MOUNTED AIR TERMINALS OR OTHER SERVICES WEIGHING MORE THAN 56 LB. SHALL BE SUPPORTED DIRECTLY FROM THE STRUCTURE ABOVE BY NOT LESS THAN FOUR (4) TAUT #12 GAGE HANGER WIRES ATTACHED FROM THE TERMINAL OR SERVICE TO THE STRUCTURE ABOVE OR OTHER APPROVED HANGERS.

7.05 PENETRATIONS THRU CEILING PANELS FOR SPRINKLER HEADS AND OTHER SIMILAR DEVICES THAT ARE NOT INTEGRALLY TIED TO THE CEILING SYSTEM SHALL HAVE A TWO (2) INCH OVERSIZED RING OR SLEEVE THRU THE CEILING PANEL TO ALLOW ONE (1) INCH OF MOVEMENT IN ALL HORIZONTAL DIRECTIONS. PENETRATIONS TO BE COVERED WITH AN ESCUTCHEON PLATE. FLEXIBLE SPRINKLER HOSE THAT CAN ACCOMODATE THE ONE (1) INCH OF MOVEMENT SHALL NOT REQUIRE THE OVERSIZED SLEEVE OR ADAPTER.

8. OTHER DEVICES WITHIN THE CEILING:

8.01 ALL LIGHTWEIGHT MISCELLANEOUS DEVICES, SUCH AS STROBE LIGHTS, OCCUPANCY SENSORS, SPEAKERS, EXIT SIGNS, ETC., SHALL BE ATTACHED TO THE CEILING GRID. IN ADDITION, DEVICES WEIGHING MORE THAN 10 LB. SHALL HAVE A #12 GAGE SLACK SAFETY WIRE ANCHORED TO THE STRUCTURE ABOVE. DEVICES WEIGHING MORE THAN 20 LB. SHALL BE SUPPORTED INDEPENDENTLY FROM THE STRUCTURE ABOVE.

8.02 ALL AIR TERMINALS AND OTHER DEVICES SHALL BE MOUNTED IN A MANNER THAT WILL NOT COMPROMISE CEILING PERFORMANCE IN ACCORDANCE WITH SECTION 13.5.6.2.2 ITEM 5 OF ASCE 7 AS AMENDED BY CBC SECTION 1616A.1.20 AND ASTM E580 SECTIONS 5.3 AND 5.4.

8.03 CEILING PANELS SHALL NOT SUPPORT ANY LIGHT FIXTURES, AIR TERMINALS OR OTHER DEVICES.

Not for permitting or construction

PBK
JOBCOPY
ARCHITECT
PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

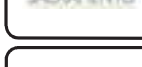


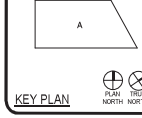


This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

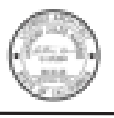
NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD





STAMP



CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
2203B9
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

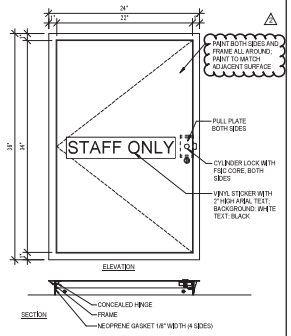
CONSTRUCTION DOCUMENT

SUSPENDED CEILING DETAILS

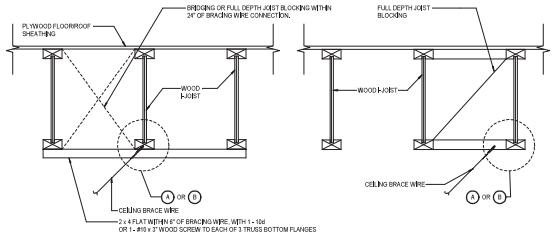
A11.04

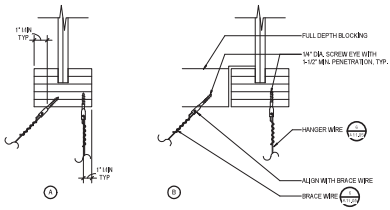
COM-2500586

APPROVED
City of Sacramento Fire Department
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



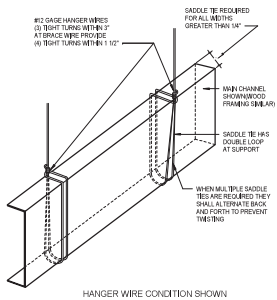
CEILING ACCESS DOOR | 1 1/2" = 1'-0" | 20





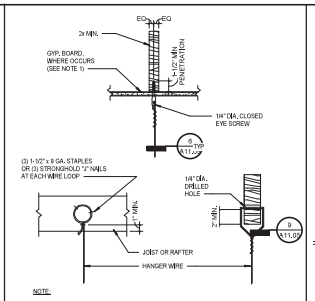
NOTES:
1. DO NOT INSERT SCREW EYES PARALLEL TO LAMINATIONS
2. WHEN FIRE RATED GYP BD IS INSTALLED ON THE BOTTOM FLANGES, USE SCREWS EYED w/ SUFFICIENT LENGTH TO AVOID DAMAGING THE FIRE RATED GYP BD AND MEET MINIMUM PENETRATION.
3. AT SLOPED RAFTERS, INSTALL FASTENERS IN THE DIRECTION OF THE WIRE.

BRACING WIRE ATTACHMENT TO WOOD I-JOIST | NOT TO SCALE | 14



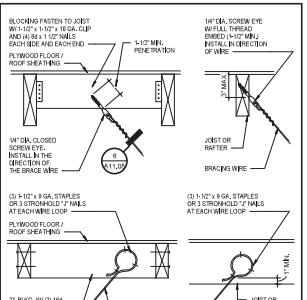
HANGER WIRE CONDITION SHOWN
BRACE WIRE CONDITION SIMILAR

TYPICAL SADDLE TIE | 3" = 1'-0" | 9



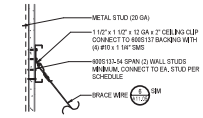
NOTE:
1. WHEN FIRE RATED GYP. BOARD IS INSTALLED ON THE BOTTOM FLANGES, USE SCREW EYES W/ SUFFICIENT LENGTH TO AVOID DAMAGING THE FIRE RATED GYP. BOARD AND MEET MIN. PENETRATION

HANGER TO SAWN TIMBER | 1 1/2" = 1'-0" | 5



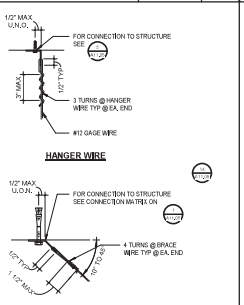
BRACE TO SAWN TIMBER | 1 1/2" = 1'-0" | 1

WALL STUD GAUGE	CONNECTION TO WALL STUD (WITH GYP. BD.)	CONNECTION TO WALL STUD (WITHOUT GYP. BD.)
20 GAUGE	(5) #10 x 1 1/8" SJMS	(3) #10 x 1 1/4" SJMS
18 GAUGE	(4) #10 x 1 1/8" SJMS	(2) #10 x 1 1/4" SJMS

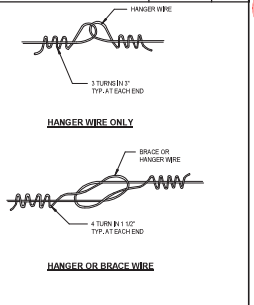


NOTE:
THE CLIP CAN BE ATTACHED DIRECTLY TO THE WALL FLANGE, PROVIDED BOTH OF THE FOLLOWING CONDITIONS ARE MET:
1. THE WALL STUD IS 18 GA MIN. AND CAPABLE OF SUPPORTING THE BRACE FORCES
2. THE BRACE WIRE ALIGNS WITH THE WALL STUD WEB

BRACING WIRE | NOT TO SCALE | 10

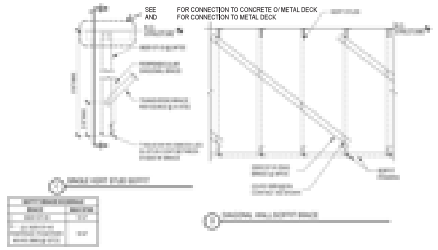


TYPICAL WIRE TURNS | 3" = 1'-0" | 6

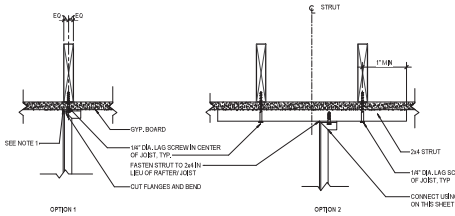


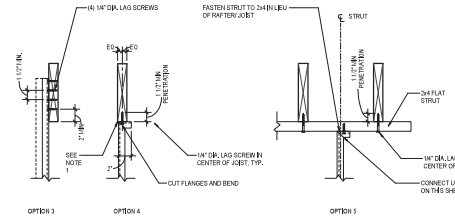
NOTE:
1. WIRE SPLICES ARE SHOWN LOOSELY TIED FOR ILLUSTRATIVE PURPOSES ONLY AND SHALL BE DRAWN TIGHT TO COMPLETE INSTALLATION WHEN CONSTRUCTED

CEILING WIRE SPLICES | 3" = 1'-0" | 2



CEILING TRANSITION WALL FRAMING | NO SCALE | 17

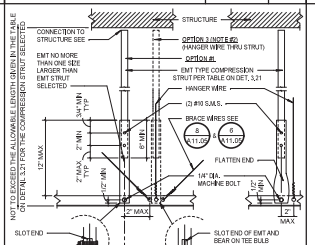




CHANNEL STRUT

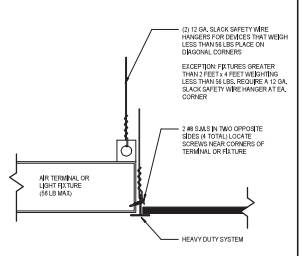
NOTES:
1. WEB OF CHANNEL TO BARE WITHIN WIDTH OF THE WOOD MEMBER.
2. FOR ANGLE OF ORIENTED IN THE STANDARD POSITION, VERTICAL LEG TO FALL WITHIN THE WIDTH OF THE WOOD MEMBER.
3. ATTACHMENT TO I-JOIST SIMILAR TO OPTIONS 1, 2, 4, & 5.

COMPRESSION STRUT ATTACHMENT | 1 1/2" = 1'-0" | 12

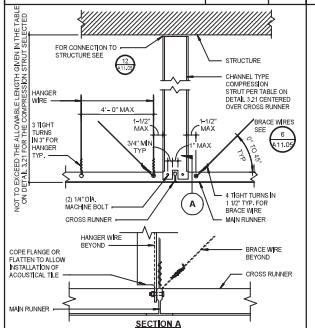


NOTE:
1. MACHINE BOLT IS NOTE REQUIRED ON OPTION 3
2. APPLIABLE TO SAWN TIMBER WITHOUT GYPSUM BOARD ONLY

EMT TYPE STRUT | 1 1/2" = 1'-0" | 7



LIGHT/AIR TERMINAL SUPPORT | 3" = 1'-0" | 3

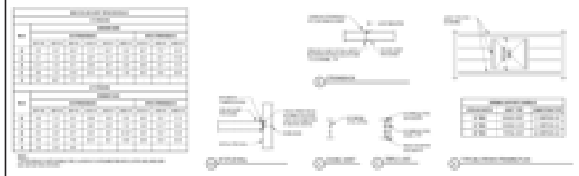


COMPRESSION TYPE STRUT | 1 1/2" = 1'-0" | 8

EMT COMPRESSION STRUT	MAXIMUM LENGTH
1/2" DIAMETER EMT (0.42" WALL THICKNESS)	5' - 10"
3/4" EMT DIAMETER (0.049" WALL THICKNESS)	7' - 5"
1" EMT DIAMETER (0.057" WALL THICKNESS)	8' - 9"
1 1/4" EMT DIAMETER (0.065" WALL THICKNESS)	12' - 9"
1 1/2" EMT DIAMETER (0.065" WALL THICKNESS)	14' - 9"
2" EMT DIAMETER (0.065" WALL THICKNESS)	18' - 10"

CHANNEL COMPRESSION STRUT	MAXIMUM LENGTH
2505125-33	9' - 8"
2505137-33	8' - 10"
3625137-33	8' - 8"
2505137-43	8' - 10"
4005137-43	10' - 10"

COMPRESSION STRUT TABLE | 3" = 1'-0" | 4



GYP BD CEILING | 1 1/2" = 1'-0" | 18

Not for permitting or construction

PBK
ARCHITECT
PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9822

APPROVED
City of Sacramento
STRUCTURAL
By: Vincent Wang
on Jul 01, 2025

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

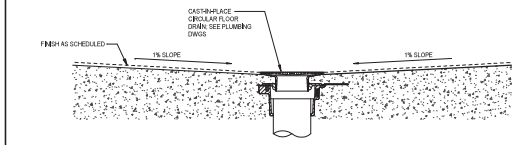
#	DESCRIPTION	DATE
1	OWNER CHANGES	05/23/25

CONSTRUCTION DOCUMENT

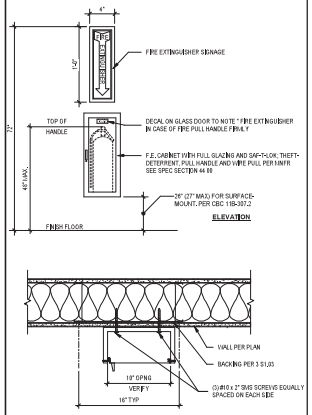
CEILING DETAILS

A11.05

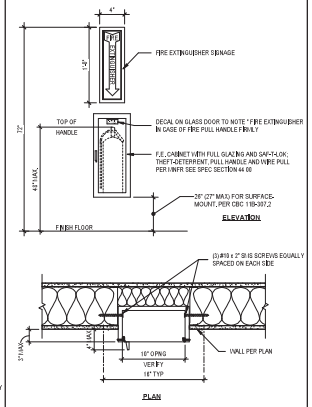
JOBCOPY
1124 DEL PASO BLVD
COM-2500586



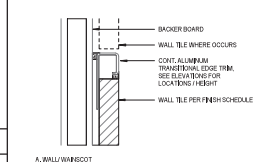
21 FLOOR DRAIN
SCALE: 3" = 1'-0"



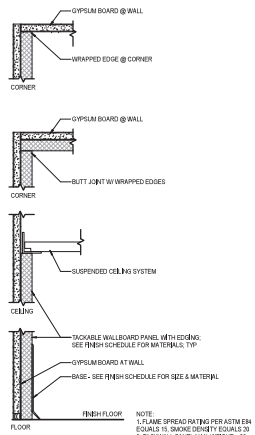
22 FEC - MOUNTED
SCALE: 1 1/2" = 1'-0"



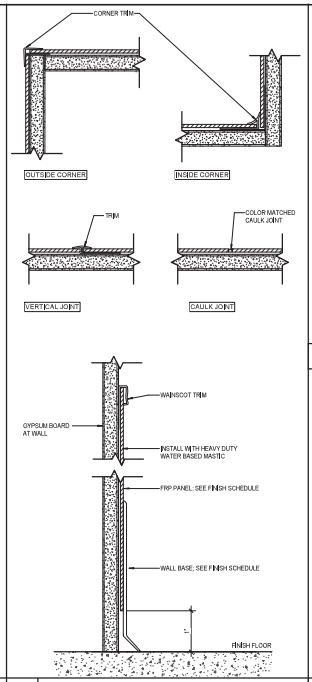
18 FEC - SEMI-RECESSED
SCALE: 1 1/2" = 1'-0"



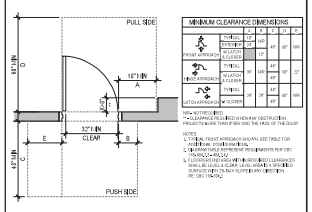
14 TILE TRANSITIONS
SCALE: 12" = 1'-0"



10 TACKABLE WALL
SCALE: 3" = 1'-0"

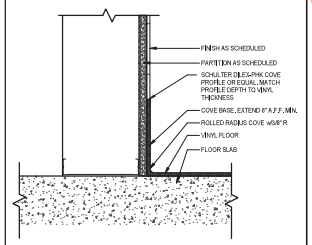


6 FRP
SCALE: 6" = 1'-0"

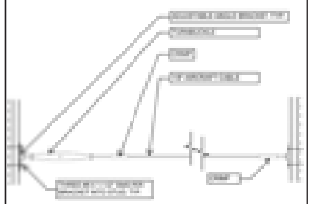


MINIMUM MANEUVERING CLEARANCES AT DOORWAYS

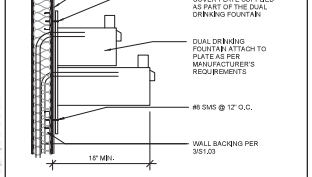
1 CLEARANCE AT DOORS
SCALE: NTS



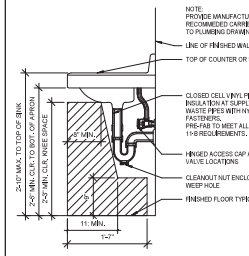
2 COVE BASE DETAIL
SCALE: 3" = 1'-0"



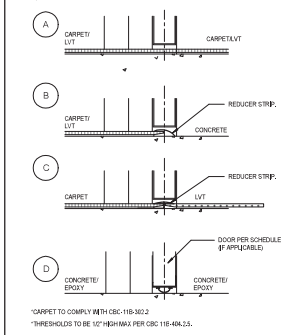
23 SWAY CABLE BRACING
SCALE: 3/4" = 1'-0"



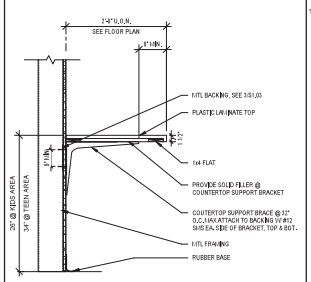
19 DRINKING FOUNTAIN SECTION
SCALE: 1" = 1'-0"



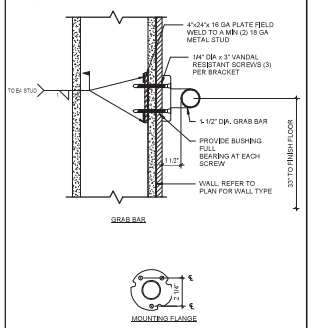
15 ACCESSIBLE SINK
SCALE: 1" = 1'-0"



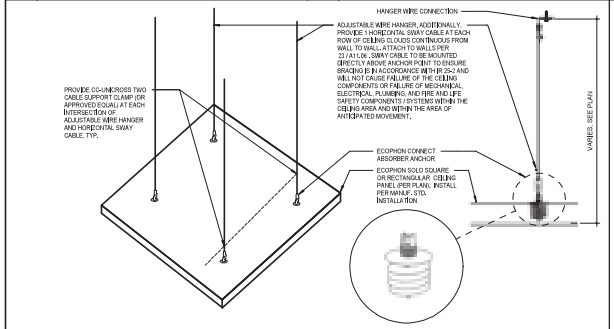
11 INT THRESHOLDS
SCALE: 3" = 1'-0"



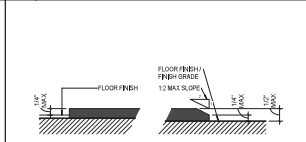
7 WALL MOUNTED COUNTER
SCALE: 1" = 1'-0"



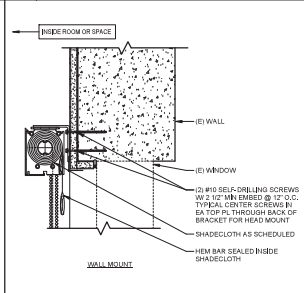
3 GRAB BAR
SCALE: 3" = 1'-0"



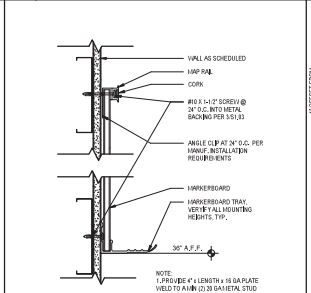
24 SUSPENDED CEILING CLOUDS - DEDUCTIVE ALTERNATE
SCALE: 3/4" = 1'-0"



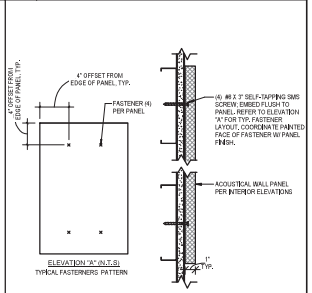
16 TRESHOLD/TRANSTION
SCALE: 6" = 1'-0"



12 ROLLER SHADE - MANUAL
SCALE: 3" = 1'-0"



8 MARKERBOARD
SCALE: 3" = 1'-0"



4 TACKBOARD (DEDUCTIVE ALT #2)
SCALE: 3" = 1'-0"

Not for permitting or construction

JOBCOPY

PBK
ARCHITECT PBK, Inc.
FOLSOM
1100 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

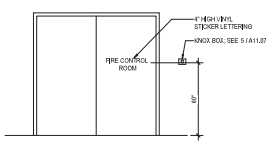
CONSTRUCTION DOCUMENT

SPECIALTY DETAILS

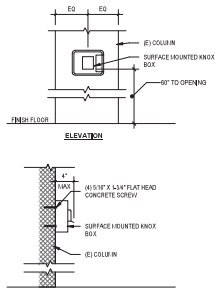
A11.06

COM-2500586

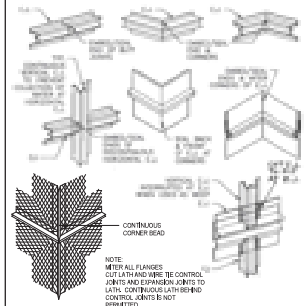
APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



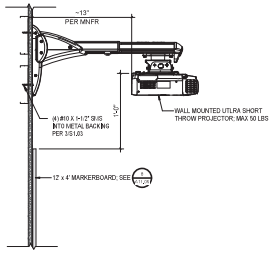
9 FIRE CONTROL ROOM
SCALE: 1 1/2" = 1'-0"



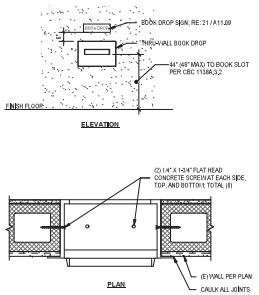
5 KNOX BOX
SCALE: 1 1/2" = 1'-0"



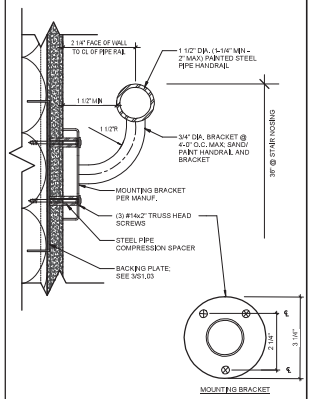
1 PLASTER CONTROL
SCALE: 3" = 1'-0"



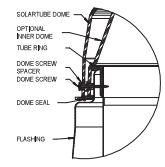
10 SHORT THROW PROJECTOR
SCALE: 1 1/2" = 1'-0"



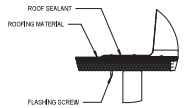
6 BOOK DROP
SCALE: 1 1/2" = 1'-0"



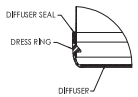
2 HANDRAIL MOUNT
SCALE: 6" = 1'-0"



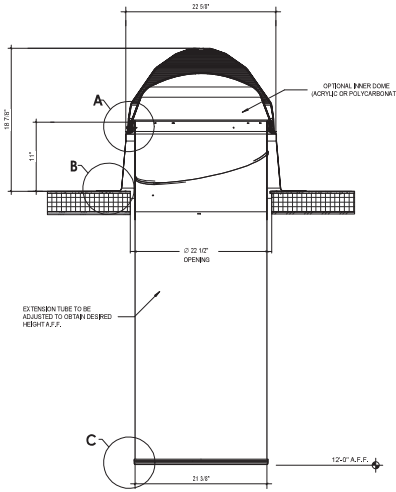
DETAIL A



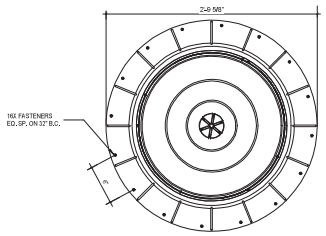
DETAIL B



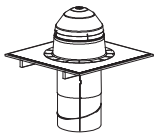
DETAIL C



FULL SECTION

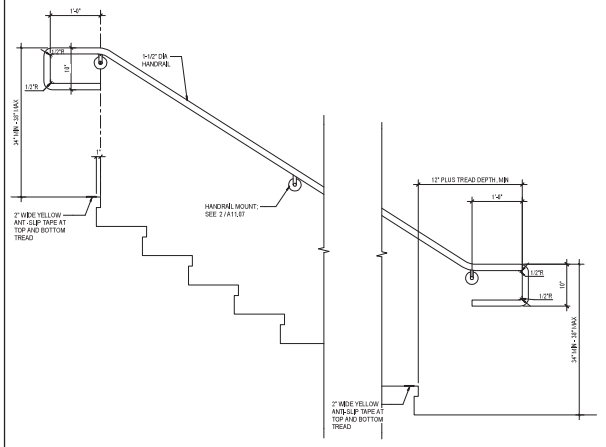


TOP VIEW



NOTES:
1. ALL TUBE JOINTS & SEAMS TAPED WITH 2" FOIL TAPE (NOT SHOWN).
2. 6" MIN CLEARANCE SHOULD BE MAINTAINED FROM ALL SOLATUBE COMPONENTS AND OTHER PLENUM COMPONENTS

24 TUBULAR SKYLIGHT (ADDITIVE ALTERNATE #1)
SCALE: 1 1/2" = 1'-0"



7 STAIR HANDRAIL DETAIL
SCALE: 1" = 1'-0"

Not for permitting or construction

JOBCOPY

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

A
KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

SPECIALITY DETAILS

A11.07

COM-2500586

Not for permitting or construction

PBK
ARCHITECT
PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

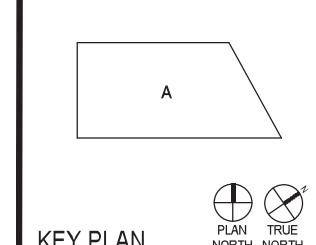
APPROVED
City of Sacramento Plan Review
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN



STAMP

CLIENT	CITY OF SACRAMENTO
PROJECT NUMBER	220389
DATE	MAY 23, 2025
DRAWN BY: KC	CHKED BY: JP

REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

MILLWORK DETAILS AND SCHEDULES

A11.08

---

1. ALL CASEWORK SHOWN ON SCHEDULE NOT NECESSARILY USED. ONLY THOSE CASEWORK ITEMS CALLED OUT ON INTERIOR ELEVATIONS AND/OR FLOOR PLANS SHALL BE USED.
2. CASEWORK NUMBERS SHOWN ON SCHEDULE ARE THOSE OF THE WOODWORK INSTITUTE (WI) DESIGN NUMBERING SYSTEM.
3. ALL CASEWORK TO BE INSTALLED ACCORDING TO THE WI CERTIFIED SEISMIC INSTALLATION AND MONITORED COMPLIANCE PROGRAM.
4. ALL CABINET DIMENSIONS INDICATED IN SCHEDULE ARE NOMINAL OUTSIDE DIMENSIONS.
5. ALL DIMENSIONS NOTED ON SCHEDULE ARE IN INCHES.
6. FILLER STRIPS ARE REQUIRED AT ENDS OF CABINETS WHERE CABINETS ARE ADJACENT TO WALLS.
7. ALL FILLER STRIPS AT ALL TALL AND WALL CABINETS TO HAVE TOP AND BOTTOM RETURNS.
8. HEIGHT DIMENSIONS OF BASE CABINETS INCLUDE FINISHED TOP THICKNESS OF 1 1/2" & SUBBASE HEIGHT OF 4" UNLESS OTHERWISE NOTED.
9. HEIGHT DIMENSIONS OF APRONS INCLUDE FINISHED TOP THICKNESS OF 1 1/2" UNLESS OTHERWISE NOTED.
10. HEIGHT DIMENSIONS OF TOPS WITH APRONS FROM FINISHED FLOOR LINE SHALL MATCH HEIGHT OF ADJACENT BASE CABINETS UNLESS OTHERWISE NOTED.
11. ALL PLAN DIMENSIONS OF CASEWORK ARE CABINET DIMENSIONS ONLY & DO NOT INCLUDE TOPS.
12. PROVIDE FINISHED END PANELS FOR SUPPORT OF COUNTERTOPS AT UNDERCOUNTER EQUIPMENT OR KNEE SPACES WHERE THERE IS NO ADJACENT WALL OR CABINET THAT CAN BE USED FOR SUPPORT.
13. FINISH ALL EXPOSED PORTIONS OF CASEWORK AND COUNTERTOPS.
14. ALL UNITS INCLUDING OPEN UNITS SHALL HAVE CASEWORK MANUFACTURER'S STANDARD CABINET LINER UNLESS OTHERWISE NOTED.
15. ALL TOE SPACES SHALL BE 4" IN HEIGHT AND 3" IN DEPTH AND SHALL RETURN TO WALL WHERE ENDS OF CABINETS ARE EXPOSED.
16. ALL SHELVING SHALL BE ADJUSTABLE UNLESS OTHERWISE NOTED.
17. PROVIDE DUST CLOSURE PANELS TO CEILING OR DROPPED SOFFIT AS INDICATED ON ELEVATIONS OR PLAN.
18. ALL COUNTERTOPS SHALL BE OF DEPTHS AS SHOWN IN SCHEDULE AND SHALL BE OF MAXIMUM PRACTICAL LENGTHS REQUIRED TO CONFORM TO OVERALL BASE CABINET DIMENSIONS.
19. PROVIDE BACKSPLASH RETURN AT ENDS OF COUNTERTOPS WHERE ADJACENT TO WALL OR OTHER FULL HEIGHT CASEWORK.
20. ALL SINKS, SINK TRIM & ELECTRICAL ITEMS SHALL BE FURNISHED BY OTHER THAN THE CASEWORK MANUFACTURER UNLESS OTHERWISE NOTED.
21. ALL COUNTERTOPS SHALL BE PLASTIC LAMINATE UNLESS OTHERWISE NOTED.

1 GEN NOTES FOR CASEWORK
SCALE: NTS

1. CASEWORK (FRONT) (BACK) (TOP) (BOTTOM)
2. FACE OF WALL
3. 1 x CONT WOOD CLEAT
4. CLG OR SOFFIT. REF REFL CLG PLAN AND INTERIOR ELEVATIONS.
5. FASTENER-TYPE VARIES BASE UPON WALL CONSTRUCTION AS FOLLOWS: WOOD STUD FRAMING - #14 FHWS W/ 2-1/2" MIN PENETRATION INTO 3X6 WD BLKG, 3" MAX FROM EA END, ANC BLKG TO EA WALL STUD W/ A34 ANC T& B, REF CASEWORK FSTN LOCATION EL FOR ANC SPACING.
OR
METAL STUD FRAMING - #14 FHMS W/ MIN 3 THREADS EXPOSED BEYOND BACKING PLATE, 3" MAX FROM EA END, BACKING PL TO BE 0.0538" THK X 6" HIGH GALV 50 KSI STL PL, ANC PL TO EA WALL STUD W/ 3-#10X1" LONG FHMS, REF CASEWORK FSTN LOCATION EL FOR ANC SPACING.
OR
MASONRY- 3/8" DIA HILTI KWIK BOLT 3 W/ 2-1/2" MIN EMBEDMENT & 4" MIN EDGE DISTANCE, ICC/ES NO. 1385, 3" MAX FROM EA END, INSTAL TORQUE 15 FT LB. REF CASEWORK FSTN EL FOR ANC SPACING.
OR
CONCRETE - 3/8" DIA HILTI KWIK BOLT TZ W/ 2" MIN EMBEDMENT & 6" MIN EDGE DISTANCE ICC/ES NO. 1917, 3" MAX FROM EA END, INSTAL TORQUE 25 FT LB. REF CASEWORK FSNT EL FOR ANC SPACING.
6. 3/4" PARTICLE BOARD BASE
7. CONT 2-1/2" X 2-1/2" X 0.0538" THK GALV 50 KSI BENT SHT STL ANGLE
8. 3/4" MEDIUM DENSITY FIBERBOARD FASCIA
9. 2 x 12 GUSSET @ 16"OC, 3" FROM EACH END W/ #12 x 2" LONG FHWS, SET 2X IN GLUE, NO EXPOSED SCREW HEADS IN EXPOSED VERTICAL PORTIONS OF FASCIA.
10. #12 x 1-1/2" LONG FHWS - 4" FROM EA END AND @ 12" OC
11. 3/8" DIA SIMPSON STRONG BOLT 2 W/ 2" MIN EMBEDDMENT, 3" FROM EA END & AT 24" OC W/ 6" MIN EDGED DISTANCE, ICC/ES NO. 3037, INSTAL TORQUE 30 FT LB MINIMUM 2 PER CABINET.

NOTE: REFER TO CASEWORK ANCHORAGE DETAILS, CASEWORK FASTENER SCHEDULE AND LOCATION ELEVATIONS FOR FURTHER EXPLANATION AND DETAIL.

5 FASTENER SCHEDULE
SCALE: NTS

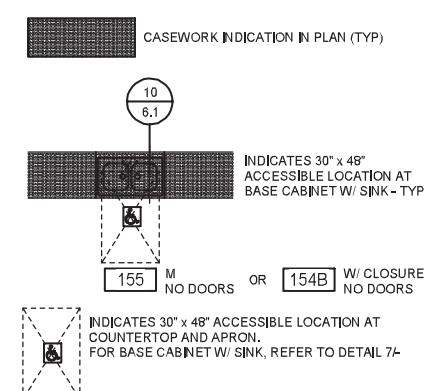
FASTENER SCHEDULE
FSTN QUANTITY INDICATED IN EA BOX IS TOTAL NUMBER OF FSTN IN EACH ROW, REF CASEWORK FSTNR LOCATION ELEVATION.

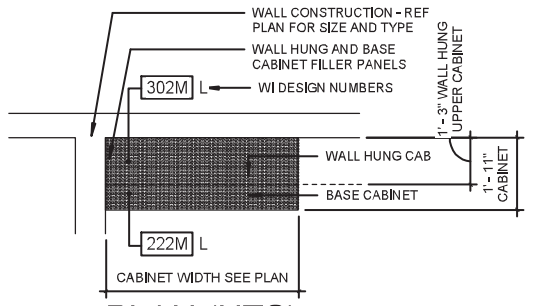
CABINET TYPE AND SIZE	WALL TYPE	CABINET WIDTH (W) 12"	18"	24"	30"	36"	42"	48"
BASE CABINET 36" H 24" D	WD	2	3	3	4	4	5	5
	MTL	2	3	3	4	4	5	5
	CMU	2	2	2	3	3	4	4
	CONC	2	2	2	3	3	3	3

1. CABINET DIMENSIONS SHOWN IS MAXIMUM SIZE. FOR CABINETS OF OTHER SIZES USE FSTN QUANITIES FOR NEXT LARGER CABINET SIZE.
2. WALL TYPE SHOWN AS WD, MTL, CMU AND CONC IS WALL MATERIAL TO WHICH FSTN IS TO BE ATTACHED.
3. FSTN TO BE SPACED EQUALLY IN EACH ROW OR LINE, WHERE SCREW FSTN IS USED, SPACING NOT TO EXCEED 12" O.C.

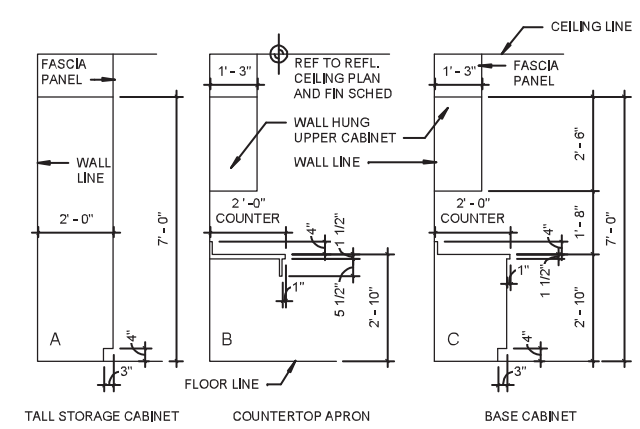
GENERAL NOTES:

1. REFER TO CASEWORK ANCHORAGE DETAILS 4/4.2
2. REFER TO CASEWORK ANCHORAGE NOTES 2/4.2
3. REFER TO GENERAL NOTES FOR CASEWORK 1/4.2
4. REFER TO ACCESSIBLE BASE CABINET DETAIL 10/4.2





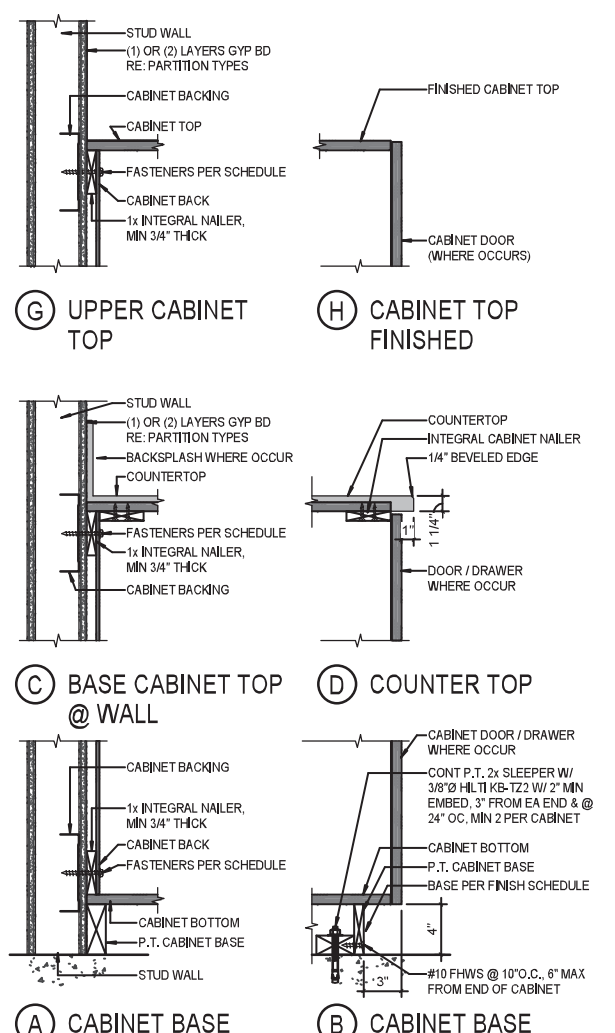
PLAN (NTS)



TALL STORAGE CABINET — COUNTERTOP APRON — BASE CABINET

TYPICAL CABINET SECTIONS (NTS)

17 TYPICAL CASEWORK LEGEND1
SCALE: NTS



(G) UPPER CABINET TOP — (H) CABINET TOP FINISHED — (C) BASE CABINET TOP @ WALL — (D) COUNTER TOP — (A) CABINET BASE @ WALL — (B) CABINET BASE

19 CABINET ANCHORAGE
SCALE: 1 1/2" = 1'-0"

WALL CABINET FASTENING SCHEDULE

TALL CABINETS
12" MAX, DEPTH, 96" MAX. HEIGHT

WALL TYPE	FASTENER TYPE/ SPACING	MIN. EMBEDMENT	# OF FASTENERS
(1) LAYER GYP BD / METAL STUD	(1) #14 HEX WH SMS @ 12"O.C.	MINIMUM (3) THREADS EXTENDING BEYOND METAL BLOCKING	MIN (8) SCREWS PER CABINET, (1) AT EA CORNER, (4) AT MIDDLE ROW
(2) LAYERS GYP BD / METAL STUD	(1) #14 HEX WH SMS @ 12"O.C.		

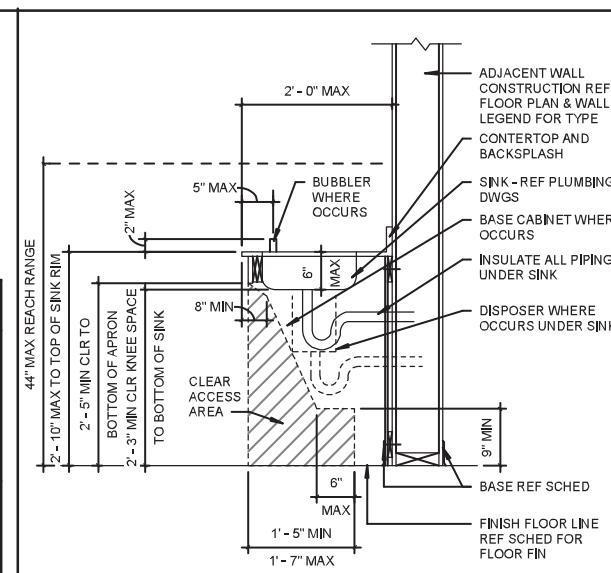
TALL CABINETS
24" MAX, DEPTH, 96" MAX. HEIGHT

WALL TYPE	FASTENER TYPE/ SPACING	MIN. EMBEDMENT	# OF FASTENERS
(1) LAYER GYP BD / METAL STUD	(1) #14 HEX WH SMS @ 6" O.C.	MINIMUM (3) THREADS EXTENDING BEYOND METAL BLOCKING	MIN (8) SCREWS PER CABINET, (1) AT EA CORNER, (4) AT MIDDLE ROW
(2) LAYERS GYP BD / METAL STUD			

BASE CABINETS

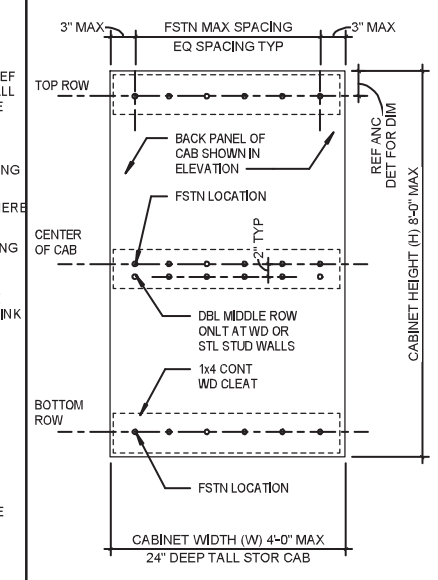
WALL TYPE	FASTENER TYPE/ SPACING	MIN. EMBEDMENT	# OF FASTENERS
METAL STUD	(1) #14 HEX WASHER HEAD SMS @ 8" O.C.	MINIMUM (3) THREADS EXTENDING BEYOND METAL BLOCKING	MIN (1) SCREW AT EACH CORNER, MIN (6) PER CABINET

CABINET ANCHORAGE NOTES:
1. FASTENERS AT CORNERS TO BE MIN 2" MAX 3" FROM EACH EDGE.
2. TAPPING SCREW FASTENERS SHALL HAVE DATA IN ACCORDANCE WITH ICC-ES AC118
3. REFER TO FASTENER SPACING DIAGRAMS 3 / A11.08
4. REFER TO TYPICAL BACKING DETAIL 3/S1.03



NOTE:
PROVIDE WI CAB NO. 155-M W/ NO DOORS OR NO. 154B W/ REM CLOSURE PANEL.
REF PLAN & EL FOR TYPE OF CAB REQUIRED.

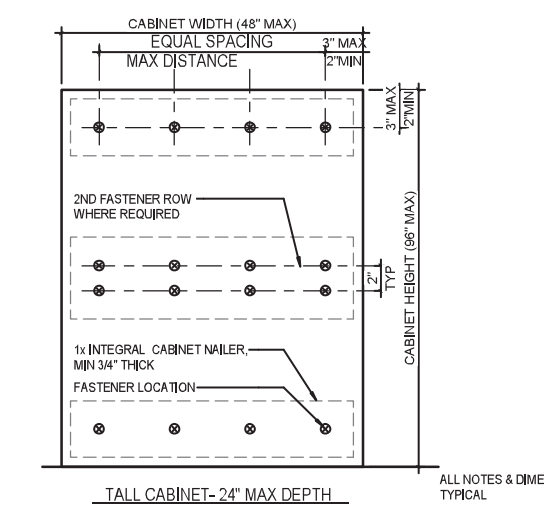
10 ACCESSIBLE CASEWORK
SCALE: 3/4" = 1'-0"



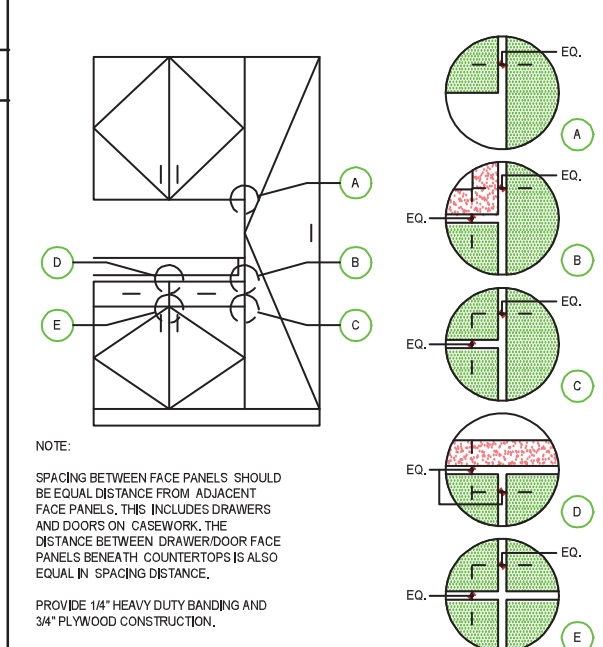
FASTENER MAX SPACING:
1. WOOD STUD WALLS W/ 1 OR 2 LAYERS OF GYP BD = 6" OC
2. MET STUD WALLS W/ 1 LAYER OF GYP BD = 5-1/4" OC
3. MET STUD WALL W/ 2 LAYERS OF GYP BD = 4-1/4" OC
4. MASONRY WALL = 1'-2" OC
5. CONCRETE WALL = 1'-9" OC
6. MASONRY AND CONCRETE WALLS TO HAVE A MIN OF 6 ANCHORS PER CABINET, 1 AT EA CORNER AND 2 AT MIDDLE ROW

NOTE: REF CASEWORK ANC DETAILS AND NOTES FOR FURTHER EXPLANATION AND DETAIL

6 FASTENER LOCATION @ TALL CAB
SCALE: NTS



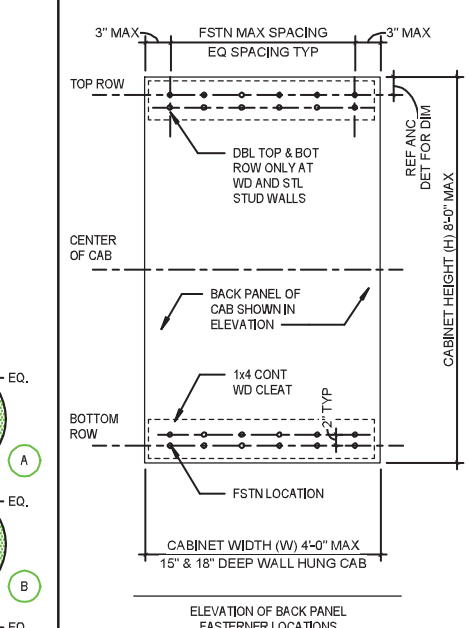
2 ANCHORAGE NOTES
SCALE: NTS



NOTE:
SPACING BETWEEN FACE PANELS SHOULD BE EQUAL DISTANCE FROM ADJACENT FACE PANELS. THIS INCLUDES DRAWERS AND DOORS ON CASEWORK. THE DISTANCE BETWEEN DRAWER/DOOR FACE PANELS BENEATH COUNTERTOPS IS ALSO EQUAL IN SPACING DISTANCE.

PROVIDE 1/4" HEAVY DUTY BANDING AND 3/4" PLYWOOD CONSTRUCTION.

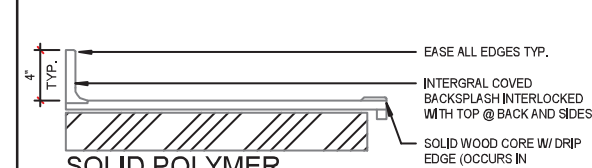
12 CASEWORK
SCALE: 1/2" = 1'-0"



FASTENER MAX SPACING:
1. WOOD OR MET STUD WALL W/ 1 LAYER OF GYP BD = 2 @ 12" OC (10 SCREWS MIN AT TOP & BOT FOR 4'-0" WIDE CAB IN WD STUD WALL)
2. WOOD OR MET STUD WALL W/ 2 LAYERS OF GYP BD = 2 @ 10" OC (10 SCREWS MIN AT TOP & BOT FOR 4'-0" WIDE CAB IN WD STUD WALL)
3. MASONRY WALL = 1 @ 10-1/2" OC
4. CONCRETE WALL = 1 @ 10-1/2" OC
5. MASONRY AND CONCRETE WALLS MIN 1 ANC AT EA CORNER

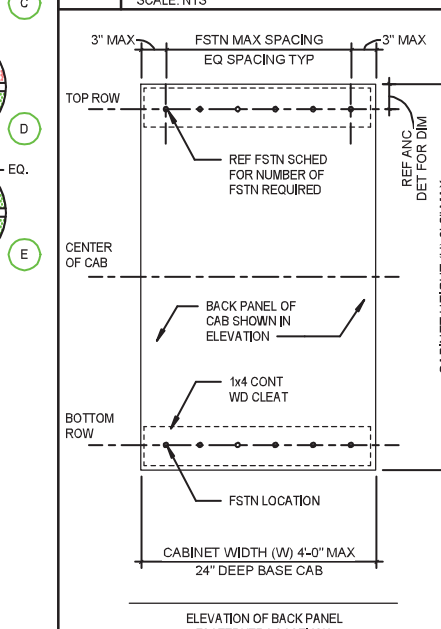
NOTE: REF CASEWORK ANC DETAILS AND NOTES FOR FURTHER EXPLANATION AND DETAIL

7 FASTENER LOCATION @ WALL HUNG
SCALE: NTS



NOTE: UNDERSIDE OF COUNTERTOP SHOULD HAVE 3/4" PLYWOOD IN ALL ROOMS.

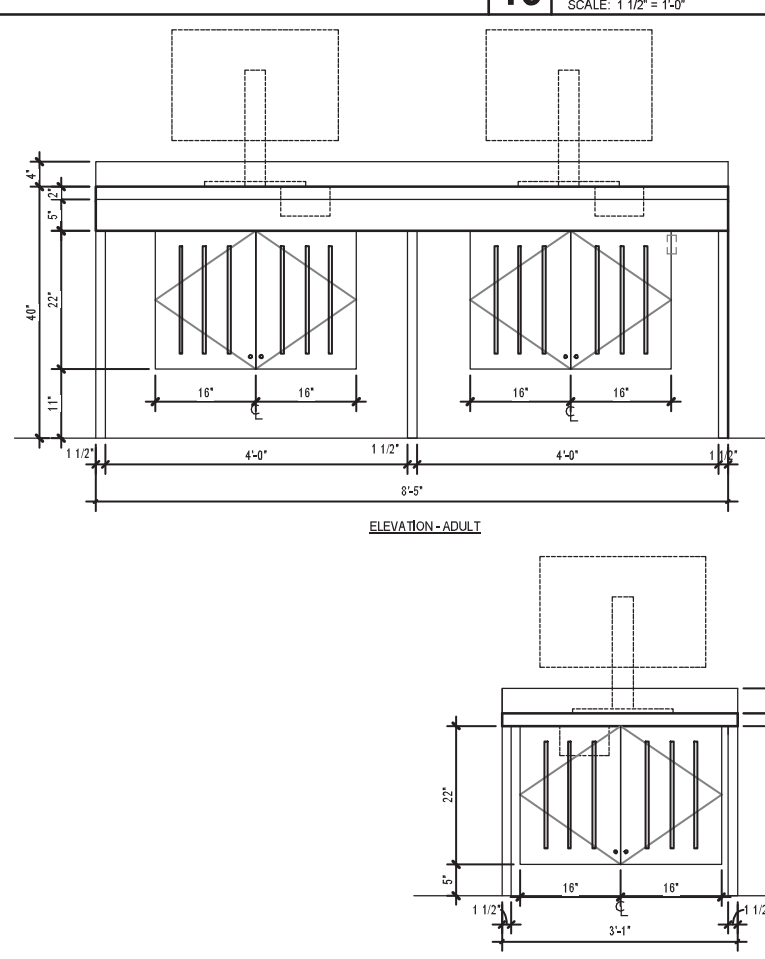
3 CABINET FASTENER LOCAT.
SCALE: 1 1/2" = 1'-0"

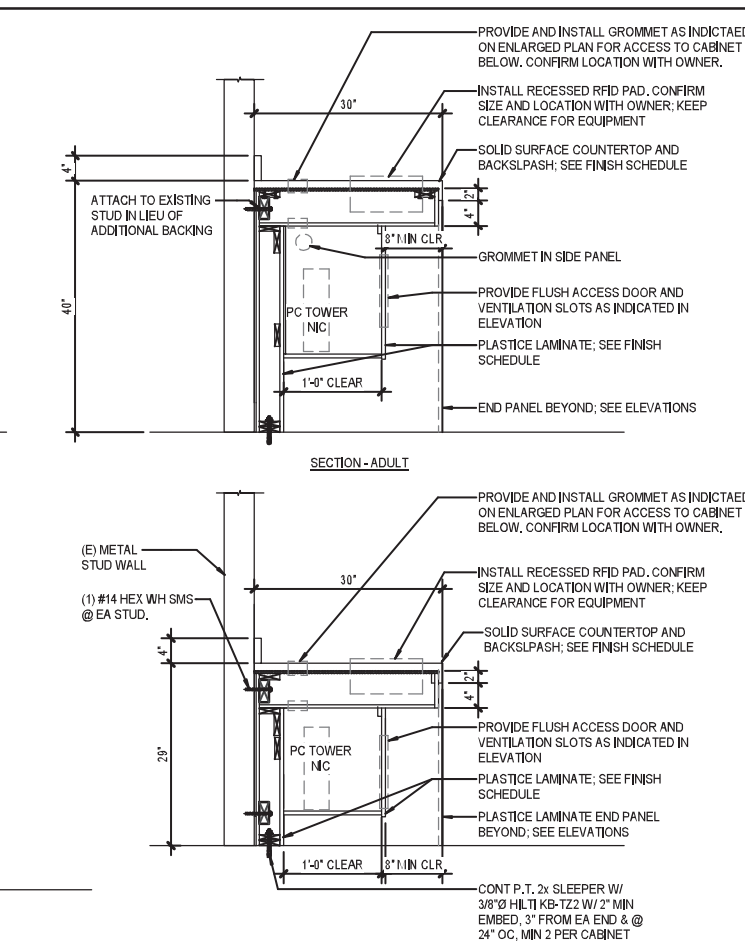


NOTE: REF CASEWORK ANC DETAILS, NOTES, AND CASEWORK FSTN SCHEDULE FOR FURTHER EXPLANATION AND DETAIL

8 FASTENER LOCATION @ BASE CABINET
SCALE: NTS

4 COUNTERTOPS
SCALE: 1 1/2" = 1'-0"





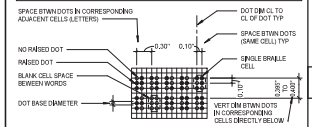
24 SELF CHECK-OUT CASEWORK
SCALE: 3/4" = 1'-0"

A11.09 - SIGNAGE DETAILS

REF CBC TABLE 11B-703.3.1 BRAILLE DIMENSIONS

MEASUREMENT RANGE	MINIMUM AND MAXIMUM IN INCHES
BASE DOT DIAMETER	0.059 TO 0.063
DISTANCE BETWEEN 2 DOTS IN THE SAME CELL *	0.100
DISTANCE BETWEEN CORRESPONDING DOTS IN ADJACENT CELLS *	0.300
DOT HEIGHT	0.025 TO 0.037
DISTANCE BETWEEN CORRESPONDING DOTS FROM 1 CELL DIRECTLY BELOW *	0.395 TO .400

* MEASUREMENT IS CENTER TO CENTER OF DOT



GENERAL NOTE:
1. CALIFORNIA CONTRACTED GRADE 2 BRAILLE SHALL BE USED WHERE EVER BRAILLE IS REQUIRED.
INDIVIDUAL BRAILLE DOTS SHALL EACH BE DISTINCT AND SEPARATE, EACH DOT SHALL BE ROUNDED OR DOMED IN LIEU OF SQUARE SIDED AND FLAT TOPPED. DOT SHALL BE 0.059" TO 0.097" DIA., A 0.025" TO 0.037" HIGH, REF CBC 11B-703.3, 11B-703.3.1 & 11B-703.4.

BRAILLE TEMPLATE | 12" = 1'-0" | 18



WIDTH TO HEIGHT PROPORTION TEMPLATE

TACTILE TEXT TEMPLATE PER (CBC) CALIFORNIA BUILDING CODE (CCR) CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 2, SECTION 11B-703

GENERAL NOTES:
1. FINISH AND CONTRAST: CHARACTERS AND THEIR FINISH SHALL BE NON GLARE, CHARACTERS SHALL CONTRAST WITH THEIR BACKGROUND WITH EITHER LIGHT CHARACTERS ON A DARK BACKROUND OR DARK CHARACTERS ON A LIGHT BACKGROUND. REF CBC 11B-703.5.1.

2. PROPORTIONS: CHARACTERS SHALL HAVE A FONT WHERE THE WIDTH OF THE UPPER CASE LETTER "O" IS 60% MINIMUM AND 110% MAXIMUM OF THE UPPER CASE LETTER "I". STROKE THICKNESS SHALL BE 15% MAXIMUM OF THE THICKNESS OF THE UPPERCASE "I" AS INDICATED ABOVE, REF CBC SECTION 11B-703.2.4. AND 11B-703.2.6.

3. TACTILE FONT: SHALL BE UPPER CASE SAN SERIF & BE RAISED A MINIMUM OF 1/32". FONT SHALL BE DUPLICATED IN BRAILLE, REF CBC 11B-703.2.3.

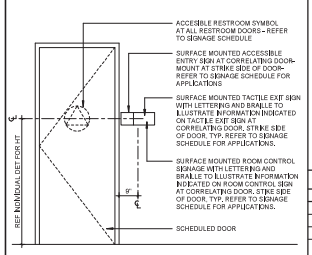
4. HEIGHT: FONT SHALL BE 5/8" MINIMUM AND 2" MAXIMUM BASED UPON HEIGHT OF THE UPPERCASE "I". REF CBC 11B-703.2.5 AND TABLE 11B-703.5.5.

5. CHARACTER SPACING: MIN OF 1/8" AND MAX OF 4 TIMES CHARACTER STROKE WIDTH MEASURED BETWEEN CLOSEST POINTS OF ADJACENT LETTERS AND SHALL BE SEPERATED FROM RAISED BORDERS AND DECORATIVE ELEMENTS 3/8" MINIMUM. REF CBC SECTION 11B-703.2.7.

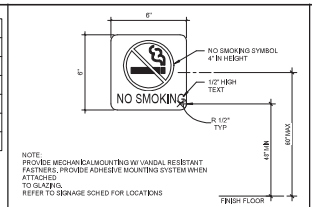
6. LINE SPACING: MIN OF 135% AND MAX OF 170% OF THE UPPERCASE "I" HEIGHT MEASURED BASELINE TO BASELINE OF CHARACTERS. TEXT SHALL BE HORIZONTAL FORMAT. REF CBC 11B-703.2.8.

SIGNAGE TEMPLATE | 1 : 1 | 19

NOTE: AT ALL DOUBLE DOORS LOCATE SIGNAGE ADJACENT TO JAMB OF INACTIVE LEAF OF DOOR PAIR, PROVIDE 90 DEGREE INHIBITOR TYPE CLOSER ON INACTIVE DOOR.



SIGNAGE MOUNTING DETAIL | 1/2" = 1'-0" | 20



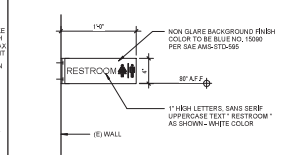
NOTE:
PROVIDE MECHANICALMOUNTING W/ VANDAL RESISTANT FASTNERS, PROVIDE ADHESIVE MOUNTING SYSTEM WHEN ATTACHED TO GLAZING. REFER TO SIGNAGE SCHED FOR LOCATIONS

NO SMOKING SYMBOL | 3" = 1'-0" | 13



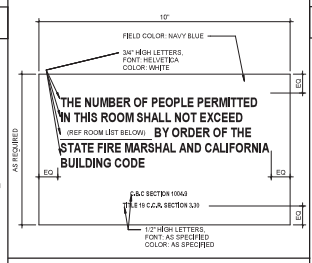
NOTE:
ATTACH AT TOP OF FIRE RATED WALLS ON EACH SIDE AT 30' MAX INTERVALS AND WITHIN 15' MAX FROM WALL ENDS

FIRE WALL ID SIGN | 1 1/2" = 1'-0" | 14



NOTE:
ATTACH SIGNS USING FLATHEAD VANDAL RESISTANT COUNTERSUNK SCREWS AND ADHESIVE.

RR DIRECTIONAL SIGN | 1 1/2" = 1'-0" | 15

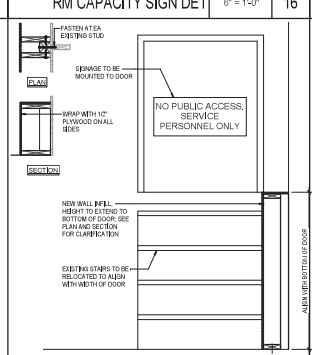


ROOM SCHEDULE

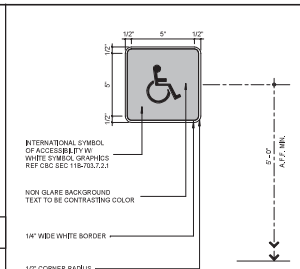
ROOM NAME	MAX OCCUPANCY LOAD
COMMUNITY ROOM	82
READING AREAS	87

NOTE:
1. PROVIDE ONE SIGN IN EACH ROOM WITH AN OCCUPANT LOAD OF 50 OR MORE.
2. LOCATE SIGN ADJACENT TO MAIN EXIT DOOR OF ROOM.

RM CAPACITY SIGN DET | 6" = 1'-0" | 16

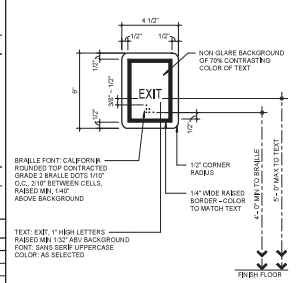


NO PUBLIC ACCESS SIGN | 3/4" = 1'-0" | 17



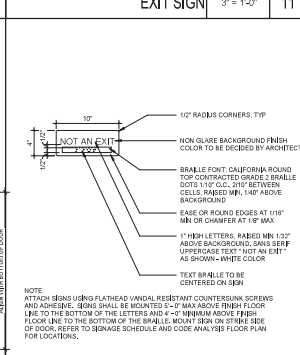
NOTE: PROVIDE MECHANICALMOUNTING W/ VANDAL RESISTANT FASTNERS, PROVIDE ADHESIVE MOUNTING SYSTEM WHEN ATTACHED TO GLAZING. REFER TO SIGNAGE SCHED FOR LOCATIONS

EXIT ROUTE SIGN | 3" = 1'-0" | 10



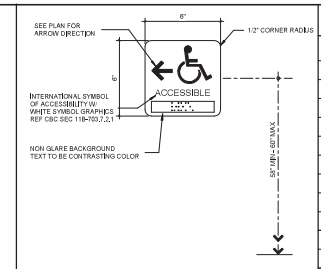
NOTE: PROVIDE MECHANICALMOUNTING W/ VANDAL RESISTANT FASTNERS, PROVIDE ADHESIVE MOUNTING SYSTEM WHEN ATTACHED TO GLAZING. REFER TO SIGNAGE SCHED FOR LOCATIONS

EXIT SIGN | 3" = 1'-0" | 11



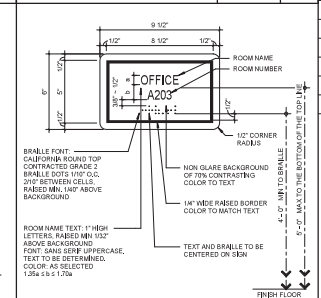
NOTE:
ATTACH SIGNS USING FLATHEAD VANDAL RESISTANT COUNTERSUNK SCREWS AND ADHESIVE. SIGNS SHALL BE MOUNTED 5'-0" MAX ABOVE FINISH FLOOR LINE TO THE BOTTOM OF THE LETTERS AND 4'-0" MINIMUM ABOVE FINISH FLOOR LINE TO THE BOTTOM OF THE BRAILLE. MOUNT SIGN ON STRIKE SIDE OF DOOR. REFER TO SIGNAGE SCHEDULE AND CODE ANALYSIS FLOOR PLAN FOR LOCATIONS.

NOT AN EXIT SIGN | 1 1/2" = 1'-0" | 12



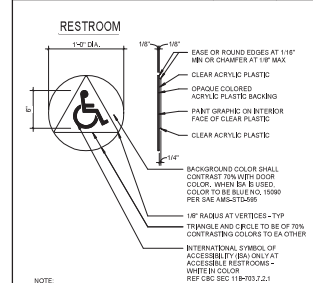
NOTE: PROVIDE MECHANICAL MOUNTING W/ VANDAL RESISTANT FASTNERS. PROVIDE ADHESIVE MOUNTING SYSTEM WHEN ATTACHED TO GLAZING. REFER TO SIGNAGE SCHED FOR LOCATIONS

DIRECTIONAL ACCESS SIGN | 3" = 1'-0" | 5



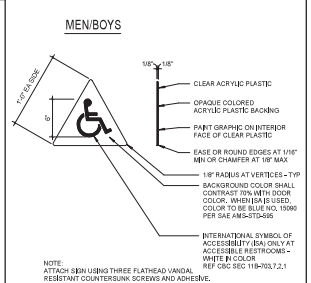
NOTE:
PROVIDE MECHANICAL MOUNTING W/ VANDAL RESISTANT FASTENERS. PROVIDE ADHESIVE MOUNTING SYSTEM WHEN ATTACHED TO GLAZING, REFER TO SIGNAGE SCHED FOR LOCATIONS.

ROOM CONTROL SIGNAGE | 3" = 1'-0" | 6



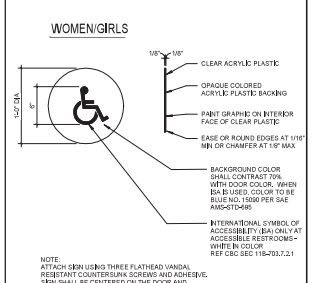
NOTE:
ATTACH SIGN USING FLATHEAD VANDAL RESISTANT COUNTERSUNK SCREWS AND ADHESIVE. SIGN SHALL BE CENTERED ON THE DOOR AND MOUNTED 5'-0" ABOVE FIN FLOOR LINE TO CENTER OF SIGN. REFER TO SIGNAGE SCHED FOR LOCATIONS

AG RESTROOM SYMBOL | 1 1/2" = 1'-0" | 7



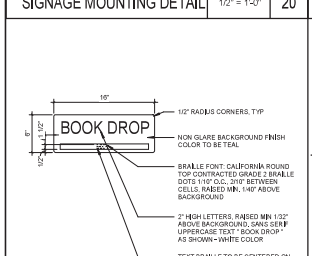
NOTE:
ATTACH SIGN USING THREE FLATHEAD VANDAL RESISTANT COUNTERSUNK SCREWS AND ADHESIVE. SIGN SHALL BE CENTERED ON THE DOOR AND MOUNTED 5'-0" ABOVE FIN FLOOR LINE TO CENTER OF SIGN. REFER TO SIGNAGE SCHED FOR LOCATIONS

MENS RESTROOM SYMBOL | 1 1/2" = 1'-0" | 3



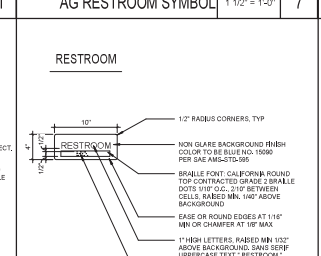
NOTE:
ATTACH SIGN USING THREE FLATHEAD VANDAL RESISTANT COUNTERSUNK SCREWS AND ADHESIVE. SIGN SHALL BE CENTERED ON THE DOOR AND MOUNTED 5'-0" ABOVE FIN FLOOR LINE TO CENTER OF SIGN. REFER TO SIGNAGE SCHED FOR LOCATIONS

WOMENS RESTROOM SYMBOL | 1 1/2" = 1'-0" | 1



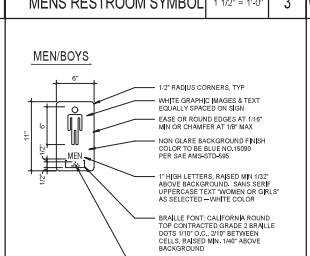
NOTE:
ATTACH SIGNS USING FLATHEAD VANDAL RESISTANT COUNTERSUNK SCREWS AND ADHESIVE. SIGNS SHALL BE MOUNTED 5'-0" MAX ABOVE FINISH FLOOR LINE TO THE BOTTOM OF THE LETTERS AND 4'-0" MINIMUM ABOVE FINISH FLOOR LINE TO THE BOTTOM OF THE BRAILLE. MOUNT SIGN ON STRIKE SIDE OF DOOR. REFER TO EXTERIOR ELEVATIONS FOR LOCATIONS

BOOK DROP SIGN | 1 1/2" = 1'-0" | 21



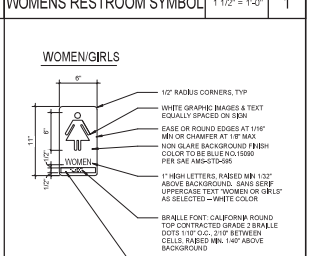
NOTE:
ATTACH SIGNS USING FLATHEAD VANDAL RESISTANT COUNTERSUNK SCREWS AND ADHESIVE. SIGNS SHALL BE MOUNTED 5'-0" MAX ABOVE FINISH FLOOR LINE TO THE BOTTOM OF THE LETTERS AND 4'-0" MINIMUM ABOVE FINISH FLOOR LINE TO THE BOTTOM OF THE BRAILLE. MOUNT SIGN ON STRIKE SIDE OF DOOR. REFER TO SIGNAGE SCHEDULE FOR LOCATIONS

AG WALL RESTROOM SIGN | 1 1/2" = 1'-0" | 8



NOTE:
ATTACH SIGNS USING FLATHEAD VANDAL RESISTANT COUNTERSUNK SCREWS AND ADHESIVE. SIGNS SHALL BE MOUNTED 5'-0" MAX ABOVE FINISH FLOOR LINE TO THE BOTTOM OF THE LETTERS AND 4'-0" MINIMUM ABOVE FINISH FLOOR LINE TO THE BOTTOM OF THE BRAILLE. MOUNT SIGN ON STRIKE SIDE OF DOOR. REFER TO SIGNAGE SCHEDULE FOR LOCATIONS.

WALL MTD RESTRM SIGN | 1 1/2" = 1'-0" | 4



NOTE:
ATTACH SIGNS USING FLATHEAD VANDAL RESISTANT COUNTERSUNK SCREWS AND ADHESIVE. SIGNS SHALL BE MOUNTED 5'-0" MAX ABOVE FINISH FLOOR LINE TO THE BOTTOM OF THE LETTERS AND 4'-0" MINIMUM ABOVE FINISH FLOOR LINE TO THE BOTTOM OF THE BRAILLE. MOUNT SIGN ON STRIKE SIDE OF DOOR. REFER TO SIGNAGE SCHEDULE FOR LOCATIONS.

WALL MTD RESTRM SIGN | 1 1/2" = 1'-0" | 2

SIGNAGE SCHEDULE

ITEM DESCRIPTION	DETAIL	LOCATION
FEMALE RESTROOM DOOR SYMBOL	1 / A11.09	ALL FEMALE RESTROOM DOORS
MALE RESTROOM DOOR SYMBOL	3 / A11.09	ALL MALE RESTROOM DOORS
RESTROOM DOOR SYMBOL	7 / A11.09	ALL SINGLE USE RESTROOM DOORS
MALE RESTROOM WALL SIGN	4 / A11.09	ALL MALE RESTROOMS
FEMALE RESTROOM WALL SIGN	2 / A11.09	ALL FEMALE RESTROOMS
RESTROOM WALL SIGN	8 / A11.09	ALL SINGLE USE RESTROOMS
ACCESSIBLE ENTRY SIGN	9 / A11.09	ALL MAIN EXTERIOR BUILDING ENTRIES
TACTILE EXIT SIGN (EXTERIOR EXIT)	11 / A11.09	EXTERIOR EXIT DOORS
TACTILE EXIT SIGN (CORRIDOR OR HALLWAY)	10 / A11.09	CORRIDOR AND HALLWAY EXIT DOORS
ROOM CONTROL SIGNAGE	6 / A11.09	ALL INTERIOR & EXTERIOR ROOMS
NO SMOKING SIGN	13 / A11.09	ALL MAIN EXTERIOR BUILDING ENTRIES
DIRECTIONAL ACCESS SIGN	5 / A11.09	REFER TO SITE PLAN FOR LOCATIONS
ACCESSIBLE PARKING SIGN	SEE C3.0	ALL ACCESSIBLE AUTO PARKING STALLS
ACCESSIBLE VAN PARKING SIGN	SEE C3.0	ONE ACCESSIBLE VAN PARKING STALLS
ACCESSIBLE SYMBOL	SEE C3.0	ALL ACCESSIBLE PARKING STALLS
ROOM CAPACITY SIGN	16 / A11.09	REFER TO DETAIL FOR ROOM LOCATIONS
FIRE WALL BARRIER IDENTIFICATION SIGN	14 / A11.09	ALL FIRE AND SMOKE BARRIER WALLS; SEE FLOOR PLAN
NOT AN EXIT	12 / A11.09	SEE FLOOR PLAN
NO PUBLIC ACCESS	17 / A11.09	SEE DRAWINGS
BOOK DROP	21 / A11.09	AT BOOK DROP; SEE PLAN AND EXTERIOR ELEVATION
DO NOT ENTER	11 / A11.01	AT ONE-WAY DRIVEWAYS, SEE SITE PLAN
RESTROOM DIRECTIONAL	15 / A11.09	SEE FLOOR PLAN

GENERAL NOTES:

1. REF DET 20 / A11.09 FOR MOUNTING
2. REF DET 16 & 17/ FOR SIGNAGE AND BRAILLE TEMPLATE
3. REF PLANS FOR DOOR LOCATIONS AND QUANTITY
4. REF FLOOR PLANS AND SITE PLAN FOR SIGN LOCATIONS

APPROVED
City of Sacramento Fire Marshal
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

Not for permitting or construction

PBK
JOBCOPY

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
20089
DATE MAY 23, 2025
DRAWN BY: KC CHKED BY: JP
REVISIONS

#	DESCRIPTION	DATE

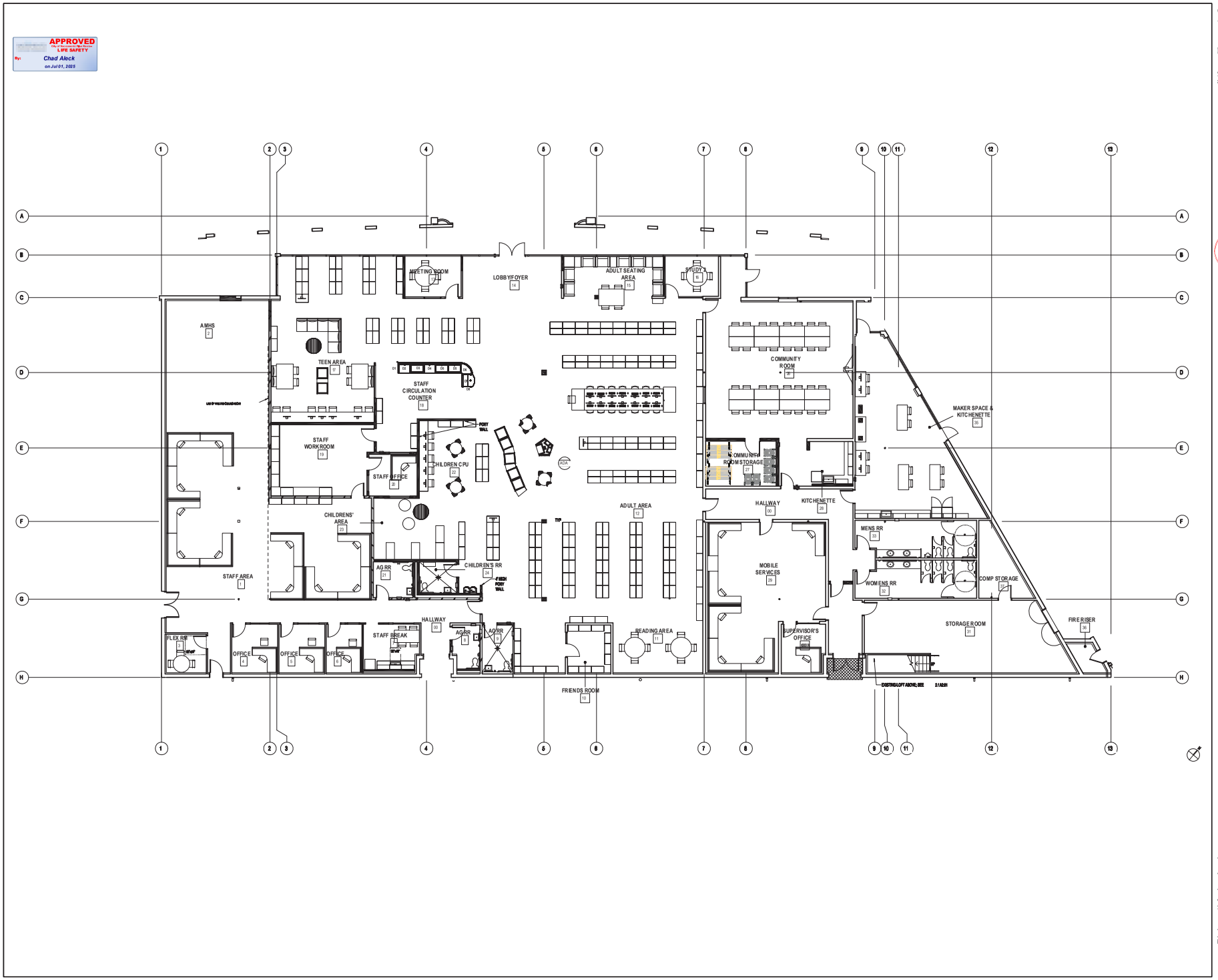
CONSTRUCTION DOCUMENT

SIGNAGE DETAILS

A11.09

COM-2500586

C:\Users\eladanc\Documents\20089_NSHL_06.20.24_eladanc.rvt
5/23/2025 10:55:00 AM



Not for permitting or construction

PBK

ARCHITECT PBK, Inc.

FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8318
916-365-8822

MEP Engineering & Technology

LEAF ENGINEERS

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122-1124 DEL PASO BLVD
SACRAMENTO, CA 95815

CONSTRUCTION DOCUMENT

one workplace

KEY PLAN

PLAN NORTH TRUE NORTH

Architect / Engineer

LICENSED ARCHITECT ANTHONY JULES HARRIS C-31264 09-30-25 STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO

PROJECT NUMBER
220369

DATE 12/16/2024

DRAWN BY: LJW CHKED BY: LJW

REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

CASEWORK-DEMCO CIRCULATION

F01

This document is for plan review only

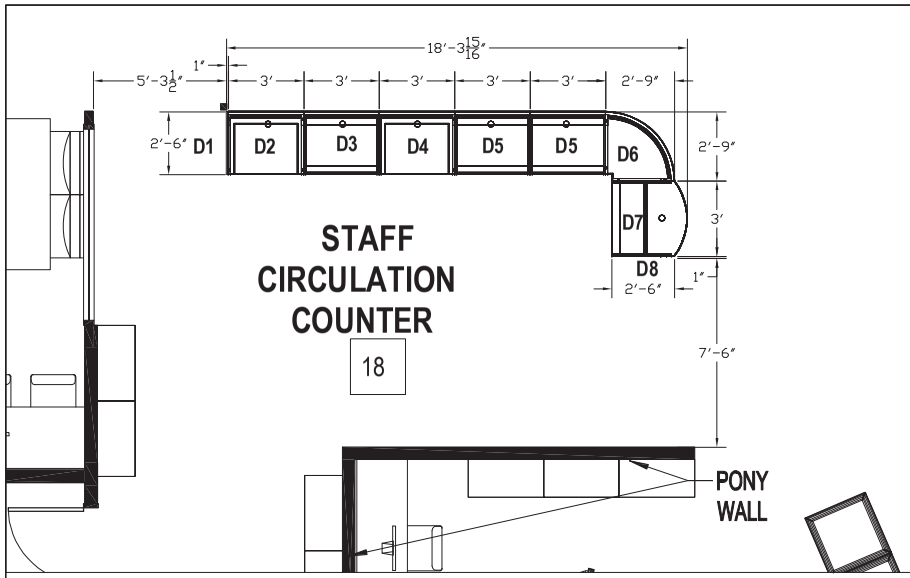
JOBCOPY

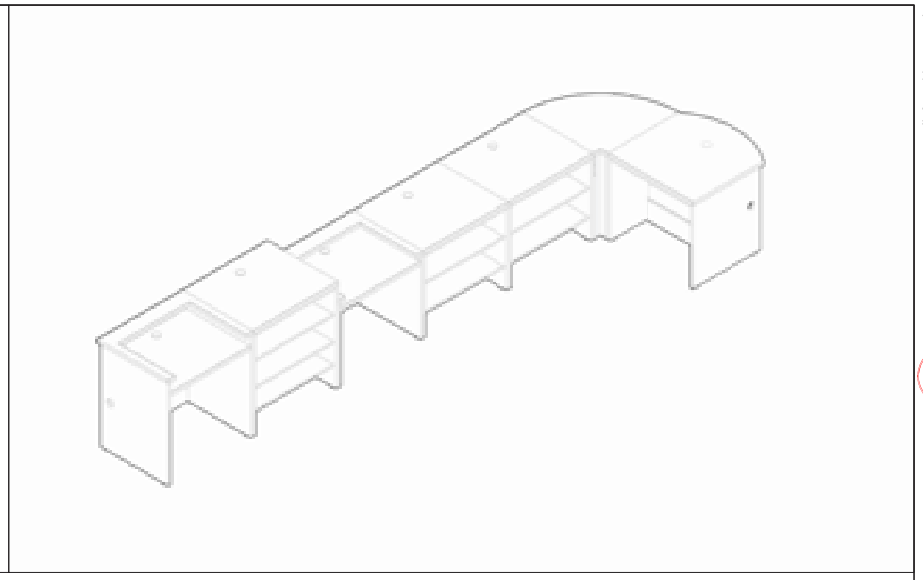
1124 DEL PASO BLVD

COM-2500586

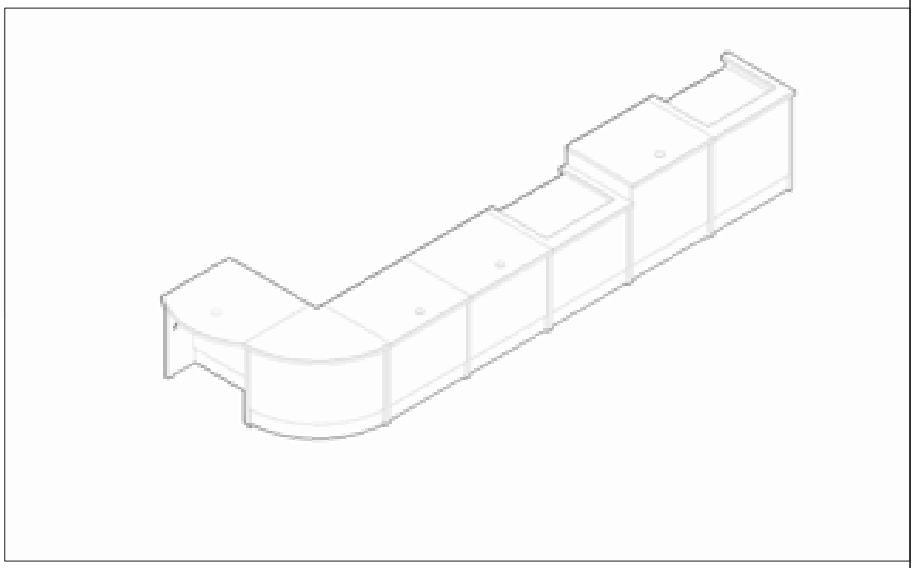
A2.01 - SHEET NAME
FIRE/ATTN: 2 2019/10/03

File Path
6/8/2006 10:14:26 PM





Tag	Part Number	QTY	Manufacturer	Description
D1	P13574930	1	Demco	ColorScape Finished End Panel for Desk 39"H x 1"W x 31"D
D2	P12242870	1	Demco	ColorScape Desk Standard Unit 39"H x 36"W x 30"D
D3	P12243060	1	Demco	ColorScape Cabinet; Open Shelf 39"H x 36"W x 30"D
D4	P12242900	1	Demco	ColorScape Patron Desk Adjust Surf. 32"H x 36"W x 30"D
D5	P12243050	2	Demco	ColorScape Cabinet; Open Shelf 32"H x 36"W x 30"D
D6	P12242950	1	Demco	ColorScape Desk 90 Radiused Closed Corner 32"H x 33"W x 33"D
D7	P12242920	1	Demco	ColorScape ADA Desk 32"H x 36"W x 36"D
D8	P13574920	1	Demco	ColorScape Finished End Panel for Desk 32"H x 1"W x 31"D



Not for permitting or construction

PBK

ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8018
916-300-6022

MEP Engineering & Technology

LEAF ENGINEERS
SACRAMENTO

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

one workplace

KEY PLAN

PLAN NORTH
TRUE NORTH

Architect / Engineer

LICENSED ARCHITECT
ANTHONY JULES HARRIS
C-31264
09-30-25
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220359
DATE 12/16/2024
DRAWN BY: LJW CHKED BY: LJW
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

CASEWORK-
DEMCO
CIRCULATION

F02

This document is for plan review only

JOBCOPY

1124 DEL PASO BLVD

COM-2500586

File Path
6/8/2026 10:14:26 PM

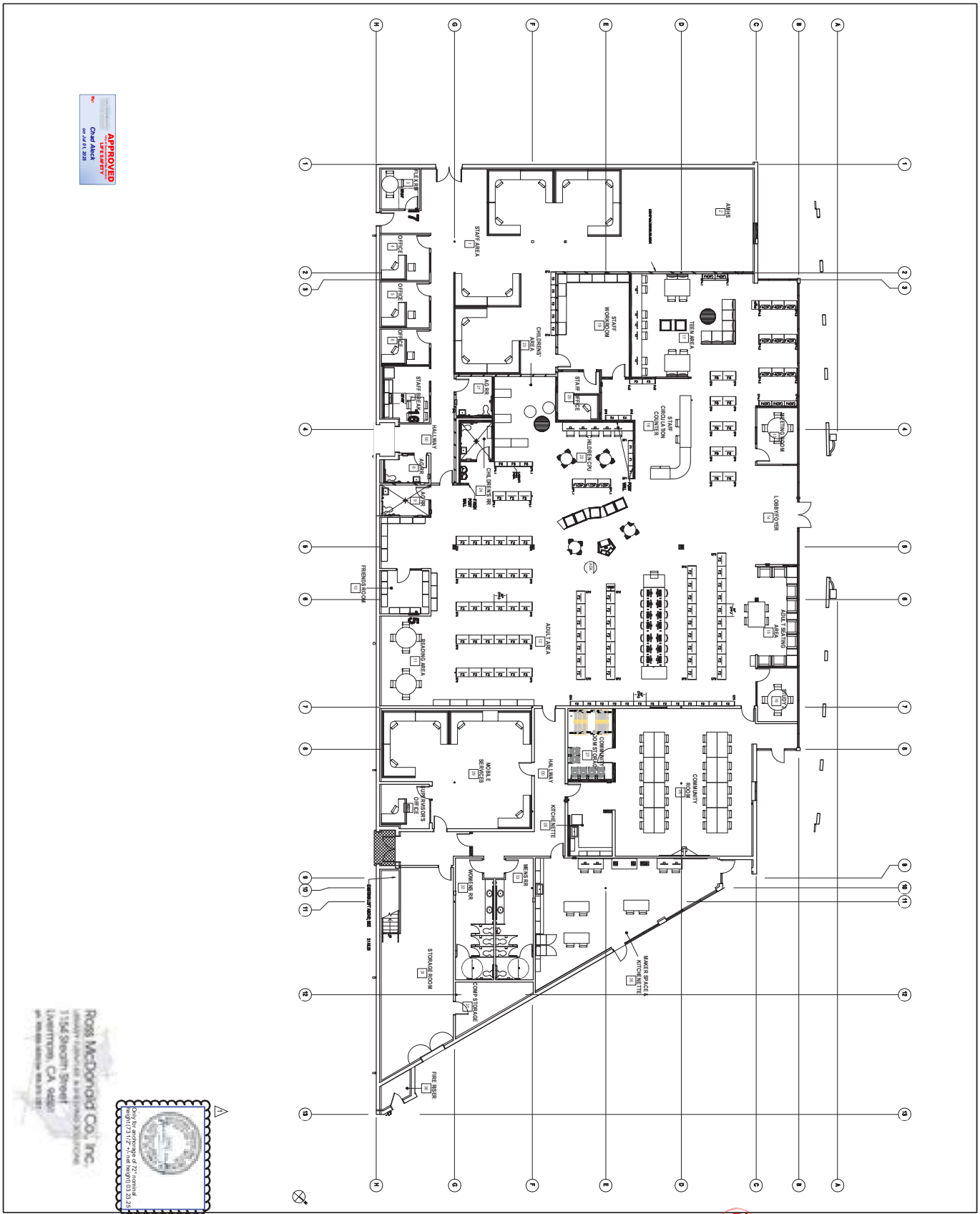
A2.01 - SHEET NAME

File Path

6/8/2008 10:14:26 PM

A2.01 - SHEET NAME

PWidth TWxH 2 2018.10.23



APPROVED
LIFE SAFETY
By:
Chad Alnck
on Jul 01, 2025

Ross McDonald Co., Inc.
1154 Shoom Street
Livermore, CA 94550

Plotted by: jmontemayor
Plot Date/Time: Tuesday, March 11, 2025 - 11:12:29 am
Drawing Name: C:\Users\jmontemayor\Documents\Projects\Ross McDonald\Casework - Shelving - Ross McDonald_F3_jmontemayor.rvt

This document is for plan review only

Not for permitting or construction

F3

CASEWORK - SHELVING ROSS MCDONALD

CONSTRUCTION DOCUMENT

#	DESCRIPTION	DATE
1	CONSTRUCTION DOCUMENT	12/16/2024

CLIENT: CITY OF SACRAMENTO
PROJECT NUMBER:
DATE: 12/16/2024
DRAWN BY: LJW
CHKD BY: LJW

Architect of Record

KEY PLAN

A

Architect/Engineer

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122-1124 DEL PASO BLVD
SACRAMENTO, CA
95815
CONSTRUCTION DOCUMENT

ISSUED BY
By:
Saul Moran
on Jul 10, 2025

ARCHITECT
RBR Engineering & Telecommunications
1150 Iron Point Road, Suite 200
Folsom, CA 95630
916-294-4000

LEAF
LEAF ENGINEERS

PLANS
PLAN NO.

COM-2500586
1124 DEL PASO BLVD
JOBCOPY

PBR
PBK No.
PBR Engineering & Technology
LEAF
APPROVED
STRUCTURAL
By: Vincent Wang
on Jul 01, 2025
ISSUED BY
Saul Moran
on Jul 01, 2025

This set of plans and specifications must be returned on demand by the Architect and must not be loaned, copied or disclosed to any unauthorized person or used in any way detrimental to the interests of the Architect. Reproduction or publication of these plans and specifications is forbidden without the written consent of the Architect and any unauthorized use will be at the risk of the user. Visual contact with these plans and specifications shall constitute prima facie evidence of acceptance of these restrictions.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122-1124 DEL PASO BLVD
SACRAMENTO, CA
95815
CONSTRUCTION DOCUMENT

KEY PLAN

Architect Register

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
20.089
DATE
12/16/2024
DRAWN BY: LJW CHKD BY: LJW

#	DESCRIPTION	DATE
1	ADDENDUM #1	03.23.25
		MAY 27, 2025
	CONSTRUCTION DOCUMENT	

CASEWORK - SHELVING
ROSS MCDONALD

F4

Title document is for plan review only

Not for permitting or construction

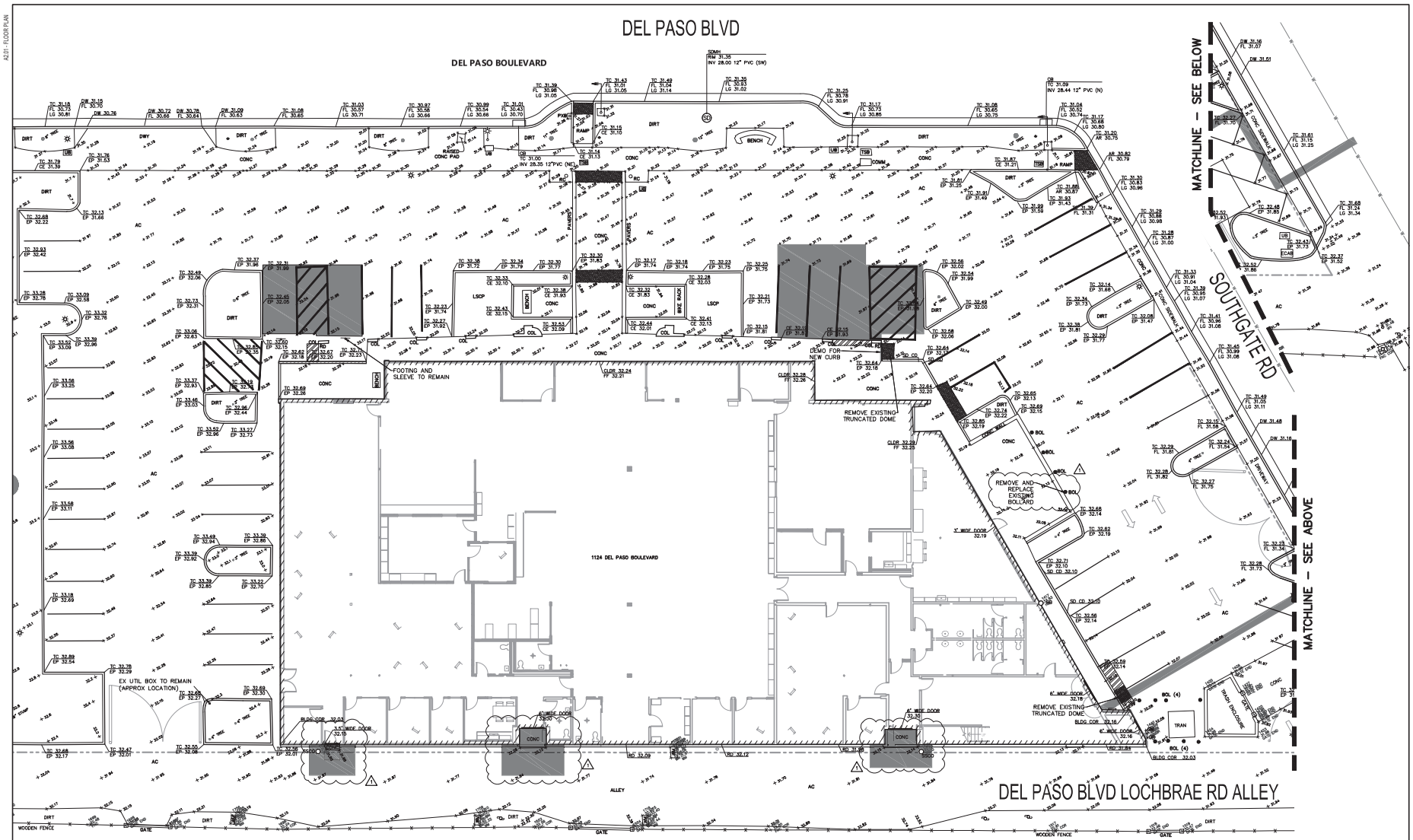
ELEVATION - SHELVING

ELEVATION - OPAC

ANCHORING DETAIL

APPROVED
LIFE SAFETY
By: Chad Alsck
on Jul 01, 2025

Ross McDonald Co., Inc.
1154 Stealth Street
Livermore, CA 94551



LEGEND

AC	ASPHALT CONCRETE
AR	ACCESSIBLE RAMP
BOL	BOLLARD
CB	CATCH BASIN
CE	CONCRETE EDGE
COL	COLUMN
COMM	COMMUNICATION BOX
CONC	CONCRETE
DW	DRIVEWAY
EP	EDGE OF PAVEMENT
FL	FLOW LINE
LG	LIP OF GUTTER
LSCP	LANDSCAPE AREA
PXB	PEDESTRIAN CROSSWALK BUTTON PEDESTAL
RC	RAISED CONCRETE
RD	ROOF DRAIN
SDCD	STROM DRAIN, CURB DRAIN
SDMH	STORMDRAIN, MANHOLE
TC	TOP OF CURB, AT FACE
TSB	TRAFFIC SIGNAL BOX
UB	UTILITY BOX
	AREA LIGHT
	GUY WIRE
	SIGN
	STREET LIGHT
	TRAFFIC SIGNAL

SURVEY NOTES

1. ALL DISTANCES AND DIMENSIONS ARE IN FEET AND DECIMALS THEREOF.
2. DATE OF THE FIELD SURVEY: JUNE 06, 2024.
3. DATE OF THE SUPPLEMENTAL SURVEY: OCTOBER 21, 2024.
4. THE LOCATIONS OF EXISTING UNDERGROUND FACILITIES SHOWN ON THESE DRAWINGS ARE APPROXIMATE AND ARE BASED ON OBSERVED TOPOGRAPHIC SURFACE FEATURES. THE PROFESSIONAL PREPARING THIS MAP ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THESE FACILITIES OR FOR THE INADVERTENT OMISSION OF RELATED INFORMATION.

ELEVATION DATUM

CITY OF SACRAMENTO BENCHMARK 277–H7A

3" BRASS DISK IN TC STAMPED CAL TRANS LR–97 AT THE SOUTHWEST CORNER OF ARDEN WAY & FORREST STREET.

ELEVATION = 30.598' (NAVD88, GPS DERIVED).

SITE BENCHMARK

BKF CONTROL POINT NO.11

CUT CROSS ON EAST CORNER OF INTERSECTION OF DEL PASEO BLVD. & SOUTHGATE RD. 5' SOUTHEAST OF STORMDRAIN CATCH BASIN.

ELEVATION = 31.15 (NAVD88, GPS DERIVED)

BASIS OF BEARINGS

THE BEARING NORTH 58°18'17" EAST BETWEEN CONTROL POINTS 14 & 15, SAID BEARING IS ON ASSUMED COORDINATE.

DEMO LEGEND

DEMO FULL ASPHALT/CONCRETE SECTION

GRIND ASPHALT/CONCRETE FOR TRUNCATED DOME INSTALLATION. CONTRACTOR TO DETERMINE BASED ON SITE CONDITION.

DEMO CURB

ISSUED BY
Saul Moran
on Jul 16, 2025

APPROVED
Chad Aleck
on Jul 01, 2025

811 Know what's below. Call before you dig.

Not for permitting or construction

JOBCOPY

PBK

ARCHITECT
PBK, Inc.
Architecture
FOLSOM
1113 Iron Point Road, Suite 200
Folsom, CA 95630-8415
916-985-4822

MEP Engineering & Technology
LEAF ENGINEERS
SACRAMENTO
3341 Industrial Blvd, Suite 140
West Sacramento, CA 95691
916-372-0019
leafengineers.com

Civil Engineering
BKF
1646 N. California Blvd, Ste 400
Walnut Creek, CA 94596
925-940-2200 / bkf.com

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP
REGISTERED PROFESSIONAL ENGINEER
ERIC S. SWANSON
No. 64607
CIVIL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 05/23/2025
DRAWN BY: HH CHKD BY: LD

	REVISIONS	
1	PLAN CHECK COMMENTS	09/24/2025
2	OWNER CHANGES	09/24/2025

CONSTRUCTION DOCUMENT

EXISTING CONDITIONS AND DEMOLITION PLAN

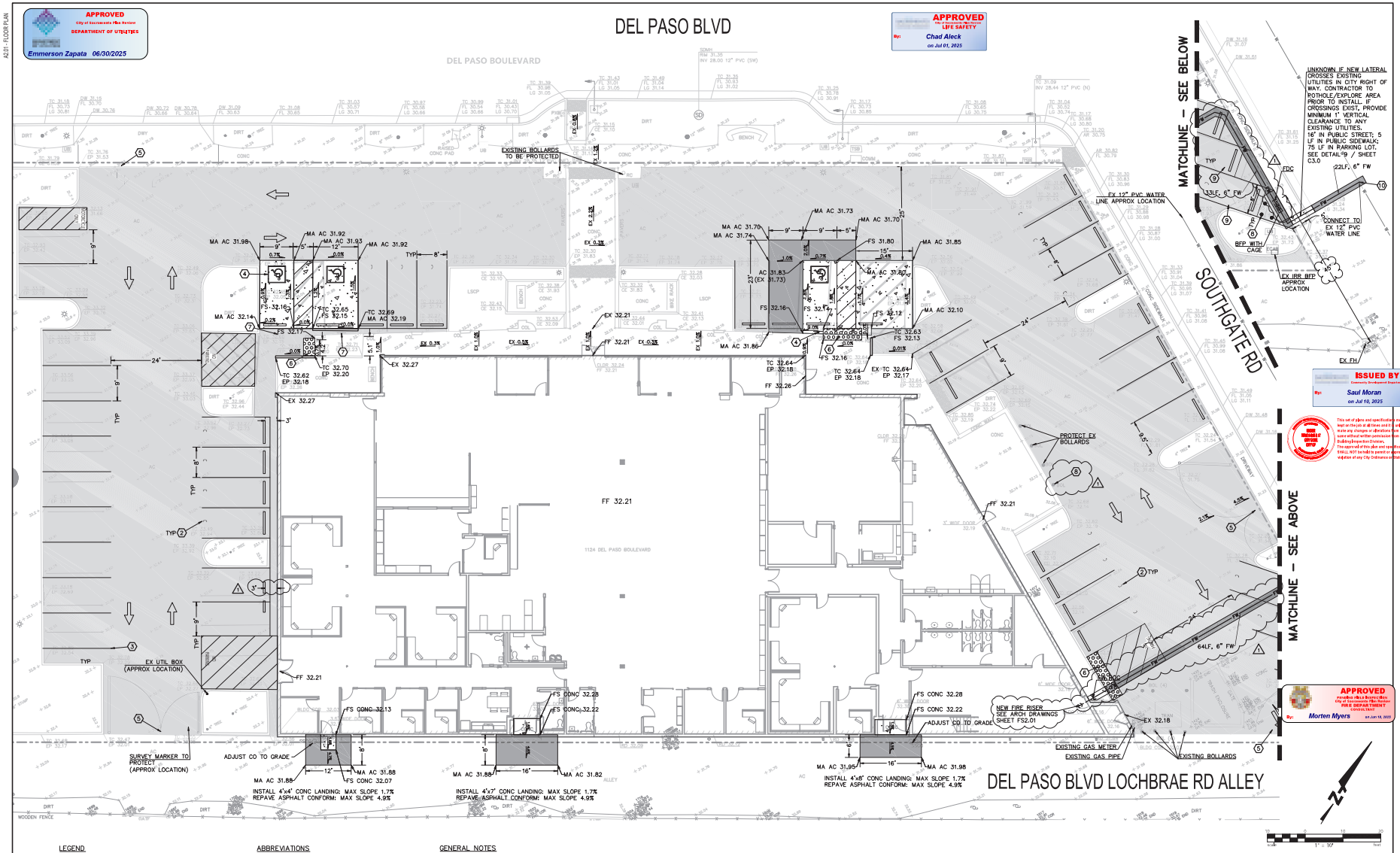
C1.0

COM-2500586

A2.01 - FLOOR PLAN

C:\Users\kclancy\Documents\220389_NSHL_05.20.24_kelly.clancy.YSZ4T.rvt

7/9/2025 9:42:43 AM



LEGEND

- SEAL COAT
- NEW CONCRETE PAVEMENT SEE DETAIL 5/C3.0
- NEW ASPHALT PAVEMENT SEE DETAIL 6/C3.0
- PARKING STRIPE, SEE DETAIL 1/C3.0
- SLOPE ARROW
- EX WATER LINE
- FW PROPOSED FIRE WATER LINE, DUCTILE IRON
- DOUBLE CHECK DETECTOR BACKFLOW PREVENTER WITH FIRE DEPT CONNECTION. SEE DETAIL 10/C3.0

NOTE

CONTRACTOR SHALL REMOVE AND SALVAGE WHEEL STOPS PRIOR TO SEAL COAT. AFTER SEAL COAT AND RESTRIPING, CONTRACTOR SHALL REINSTALL SALVAGED WHEEL STOPS PER DETAIL 3/C3.0.

ABBREVIATIONS

AC	ASPHALT
C	COMPACT PARKING
EX	EXISTING
EP	EDGE OF PAVEMENT
FF	FINISH FLOOR
FS	FINISH SURFACE
TC	TOP OF CURB
TYP	TYPICAL

KEYNOTES

1. WHEEL STOP SEE DETAIL 3/C3.0
2. COMPACT PARKING
3. PARKING STRIPE SEE DETAIL 1/C3.0
4. ACCESSIBLE SIGNAGE SEE DETAIL 4/C3.0
5. BOLLARD GATE, SEE ARCHITECTURAL PLANS
6. TRUNCATED DOME SEE DETAIL 7/C3.0
7. FOOTING AND SLEEVE TO REMAIN; NEW POST AND ACCESSIBLE SIGN TO BE ADDED PER 4/C3.0
8. BOLLARDS, SEE CITY DETAIL T-230/C3.0
9. 8'x16' PARKING STALL
10. CITY CREWS WILL INSTALL A 6" FIRE TAP AND GATE VALVE FOR A FEE OF $4,112 (PAID BY CONTRACTOR). CONTRACTOR SHALL PROVIDE ALL EXCAVATION, BACKFILL, SURFACE RESTORATION AND INSTALL A 6" FIRE SERVICE CONNECTION. CONTRACTOR SHALL FURNISH, INSTALL AND TEST A 6" APPROVED DOUBLE CHECK VALVE PER CITY STANDARD DRAWING W-510.

GENERAL NOTES

- BACKFLOW PREVENTION ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE APPROPRIATE STANDARD DRAWINGS IN SECTION 38 OF CITY OF SACRAMENTO STANDARD SPECIFICATIONS (DRAWING NUMBERS W-501 THRU W-511 AND W-601 THRU W- 607). THE BACKFLOW PREVENTION ASSEMBLY MUST BE INSTALLED SUCH THAT THE DEVICE IS READILY ACCESSIBLE FOR TESTING AND MAINTENANCE, AND SHALL BE LOCATED AS CLOSE AS PRACTICAL TO THE POINT OF SERVICE DELIVERY (METER).
- ALL ASSEMBLIES SHALL BE INSTALLED TO PROVIDE PROTECTION FROM VANDALISM AND FREEZING. CAGES MUST BE INSTALLED SO THAT ADEQUATE CLEARANCE IS AVAILABLE FOR MAINTENANCE AND TESTING OR IT SHOULD BE COMPLETELY REMOVABLE AND ALLOW FOR ANY DISCHARGE FROM THE RELIEF VALVE TO FULLY DRAIN FROM THE PROTECTIVE CAGE OR COVER.
- AS A MINIMUM, BACKFLOW PREVENTION ASSEMBLIES SHALL BE SIZED EQUIVALENT TO THE DIAMETER OF THE SERVICE CONNECTION. THE INSTALLATION OF BACKFLOW PREVENTION ASSEMBLIES SHALL BE ABOVEGROUND.
- PIPE BEDDING AND INITIAL BACKFILL FOR WATER MAINS, FIRE HYDRANT BRANCH LEADS, AND WATER SERVICES SHALL BE FURNISHED AND PLACED ACCORDING TO THE REQUIREMENTS CONTAINED HEREIN AND AS DETAILED ON STANDARD DRAWING W-701 IN SECTION 38 OF CITY OF SACRAMENTO STANDARD SPECIFICATIONS. THE PIPE BEDDING AND INITIAL BACKFILL MATERIAL SHALL CONSIST OF SAND MEETING THE REQUIREMENTS AS GIVEN IN SECTION 10-13 OF THESE STANDARD SPECIFICATIONS UNLESS OTHERWISE SPECIFIED IN THE SPECIAL PROVISIONS.
- BEDDING MATERIAL SHALL BE PLACED AND COMPACTED ALONG THE BOTTOM OF THE TRENCH TO PROVIDE UNIFORM SUPPORT FOR THE WATER MAIN PIPE AT EVERY POINT BETWEEN THE JOINTS. SUPPORT OF THE PIPE BY WEDGING OR BLOCKING SHALL NOT BE PERMITTED. AT THE LOCATION OF EACH JOINT, HOLES OF ADEQUATE SIZE SHALL BE PROVIDED IN THE BOTTOM AND SIDES OF THE TRENCH TO PERMIT EASY JOINT PREPARATION, PIPE ASSEMBLY, AND VISUAL INSPECTION OF THE ENTIRE JOINT.
- INITIAL BACKFILL SHALL BE PLACED IMMEDIATELY AFTER PIPE JOINTS HAVE BEEN COMPLETED, INSPECTED, AND PASSED BY THE ENGINEER. TRENCH BACKFILL SHALL BE EARTH MATERIAL, UNLESS OTHERWISE SPECIFIED IN THE SPECIAL PROVISIONS, PLACED AND COMPACTED ABOVE THE GRANULAR BEDDING AND INITIAL BACKFILL MATERIAL TO THE LEVEL OF THE SUBGRADE IN PAVED AREAS OR TO THE TOP OF THE TRENCH IN UNPAVED AREAS. BACKFILL SHALL BE PROVIDED BY CONTRACTOR AND SHALL BE PLACED IN ACCORDANCE WITH SECTION 14-5 OF CITY OF SACRAMENTO STANDARD SPECIFICATIONS AND THE PIPE MANUFACTURER'S RECOMMENDATIONS.
- REPAVING OF TRENCHES FOR WATER MAINS, FIRE HYDRANT BRANCH LEADS, AND WATER SERVICES SHALL BE AS SPECIFIED IN THIS SECTION OF THESE STANDARD SPECIFICATIONS UNLESS OTHERWISE INDICATED ON THE PLANS OR IN THE SPECIAL PROVISIONS
- CONTRACTOR SHALL RESTORE ALL SURFACES, WHICH HAVE BEEN REMOVED OR DAMAGED BY CONTRACTOR IN KIND, USING THE SAME MATERIAL AS EXISTING, UNLESS OTHERWISE NOTED ON THE PLANS OR IN THE SPECIAL PROVISIONS. THE REPAVING IS TO BE DONE IN SUCH A MANNER TO, AS CLOSELY AS POSSIBLE, REPLACE THE CUT PAVEMENT WITH A SIMILAR TYPE AND AN EQUAL OR GREATER STRUCTURAL SECTION.
- ASPHALTIC CONCRETE PAVEMENT AND ITS PLACEMENT SHALL CONFORM TO THE REQUIREMENTS OF SECTION 22 OF CITY OF SACRAMENTO STANDARD SPECIFICATIONS.
- CONCRETE USED IN THE REPAIR AND/OR REPLACEMENT OF CURB, GUTTER, OR SIDEWALK SHALL CONFORM TO SECTION 24-1 OF CITY OF SACRAMENTO STANDARD SPECIFICATIONS. CONCRETE USED IN THE REPLACEMENT OF EXISTING CONCRETE 'V' GUTTER OR PAVEMENT SHALL BE CLASS 'A' CONCRETE IN ACCORDANCE WITH SECTION 10 OF THESE STANDARD SPECIFICATIONS. PLACEMENT OF CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF SECTION 24 OF THESE STANDARD SPECIFICATIONS.
- MATERIALS FOR SERVICES SHALL MEET THE REQUIREMENTS SPECIFIED IN SECTION 10 AND SHALL BE INSTALLED IN ACCORDANCE WITH THE STANDARD DRAWINGS. ALL NEW AND RECONNECTED SERVICES SHALL BE METERED.
- THE LOCATION OF WATER SERVICES EXTENDING BENEATH CURBS, GUTTERS AND SIDEWALKS SHALL BE DENOTED BY IMPRINTING A TWO INCH (2") SIZE GOTHIC LETTER 'W' ON THE UPPER FACE OF THE CURB, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- GATE VALVES FOR WATER SERVICES FOUR INCHES (4") AND LARGER IN DIAMETER SHALL BE INSTALLED AT THE MAIN WITH A FLANGED CONNECTION AND SHALL INCLUDE A VALVE BOX AND RISER. BOXES AND RISERS SHALL BE AS SPECIFIED IN AND INSTALLED IN ACCORDANCE WITH STANDARD DRAWING W-303 IN SECTION 38 OF CITY OF SACRAMENTO STANDARD SPECIFICATIONS.
- WATER TAPS ON NEW MAINS PRIOR TO BEING ACCEPTED BY THE CITY SHALL BE MADE BY CONTRACTOR. WATER TAPS ON EXISTING CITY MAINS SHALL ONLY BE MADE BY CITY CREWS AT CONTRACTOR'S EXPENSE.
- CONTRACTOR SHALL NOTIFY THE ENGINEER THAT A SHUTDOWN IS REQUIRED AND THE CITY WILL SCHEDULE THE SHUTDOWN WITHIN FIVE (5) WORKING DAYS OF NOTIFICATION. THE ENGINEER WILL NOTIFY CONTRACTOR OF THE TIME OF SHUTDOWN AT LEAST TWO (2) WORKING DAYS PRIOR TO THE SHUTDOWN. CONTRACTOR SHALL EXCAVATE AROUND THE WATER MAIN, PER STANDARD DRAWING W-404, TWENTY-FOUR (24) HOURS PRIOR TO THE CITY TAPPING THE WATER MAIN.
- FOR ALL NEW WATER VALVES INSTALLED, CONTRACTOR SHALL FURNISH AND INSTALL VALVE BOXES, COVERS, DROP CAPS, AND STEEL RISERS IN ACCORDANCE WITH STANDARD DRAWINGS W-303 AND W-304 IN SECTION 38 OF CITY OF SACRAMENTO STANDARD SPECIFICATIONS UNLESS OTHERWISE SHOWN ON THE PLANS, OR SPECIFIED IN THE SPECIAL PROVISIONS, IN CONSTRUCTION AREAS INVOLVING ELEVATION CHANGES OR WHERE EXISTING VALVE BOXES OR RISERS ARE DISTURBED, OR AS INDICATED ON THE PLANS, CONTRACTOR SHALL FURNISH AND ADJUST TO FINAL GRADE ALL EXISTING VALVE BOXES IN ACCORDANCE WITH STANDARD DRAWINGS W-303, W-304 AND W-306 IN SECTION 38 OF THESE STANDARD SPECIFICATIONS. ALL NON-STEEL RISERS SHALL BE REPLACED WITH STEEL RISERS IN ACCORDANCE WITH STANDARD DRAWINGS W-303 AND W-306 IN SECTION 38 OF THESE STANDARD SPECIFICATIONS. WHEN APPROVED BY THE ENGINEER, CONTRACTOR MAY REUSE EXISTING VALVE BOXES THAT MEET THESE STANDARDS SPECIFICATIONS AND ARE IN AN UNDAMAGED CONDITION.
- ALL WATER VALVE BOXES REMOVED FOR SUBSEQUENT REINSTALLATION TO ALLOW RECONSTRUCTION OF EXISTING STREETS SHALL BE TEMPORARILY REPLACED WITH A PROTECTIVE METAL CONTAINER. THE TEMPORARY CONTAINER SHALL COVER THE RISER OVER THE VALVE AND WILL ASSIST IN KEEPING THE LOCATION OF THE VALVE VISIBLE DURING STREET RECONSTRUCTION ACTIVITIES. THE RISERS AT EACHVALVE SHALL BE KEPT FREE OF DEBRIS AND THE VALVE OPERATING NUT LEFT EXPOSED.

Not for permitting or construction
JOBCOPY
PBK
ARCHITECT PBK, Inc.
MEP Engineering & Technology LEAF ENGINEERS
Civil Engineering BKF
NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT
1124 DEL PASO BLVD
KEY PLAN
STAMP
REGISTERED PROFESSIONAL ENGINEER
No. 64607
CIVIL
STATE OF CALIFORNIA
CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 05/23/2025
DRAWN BY: HH CHKED BY: LD
REVISIONS
1 PLAN CHECK COMMENTS 09/24/2025
2 OWNER CHANGES 10/24/2025
CONSTRUCTION DOCUMENT

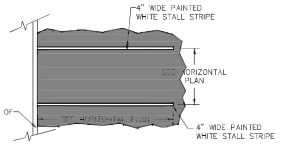
HORIZONTAL CONTROL, GRADING AND UTILITY PLAN

C2.0

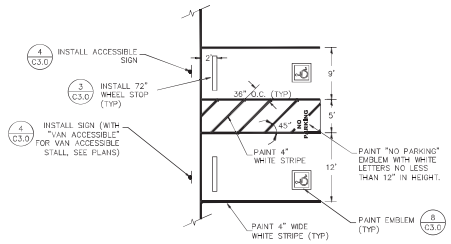
COM-2500586

A2.01 - FLOOR PLAN
C:\Users\kclancy\Documents\220389_NSHL_05.20.24_kelly.clancy@SZAT.rvt
7/9/2025 9:42:43 AM

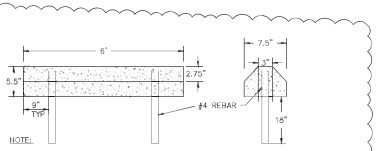
APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



1 PARKING STALL STRIPING DETAIL
NTS

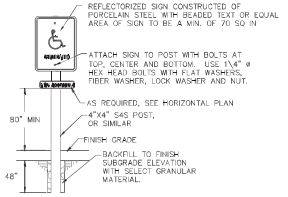


2 TYPICAL ADA PARKING
NTS



NOTE:
1. ADHESIVE FOR ANCHORING WHEEL STOPS TO PAVEMENT SHALL BE AN EPOXY ADHESIVE MANUFACTURED FOR THE PURPOSE, SIMILAR AND EQUAL TO THE ADHESIVES SPECIFIED IN SECTION 95 OF THE CALTRANS STANDARD SPECIFICATIONS, SECTION 95-2.04 (RAPID SET EPOXY ADHESIVE) OR 95-2.05 (STANDARD SET EPOXY ADHESIVE).

3 WHEEL STOP
NTS



SEE POST FOOTING DETAIL 1 SHEET A11.01

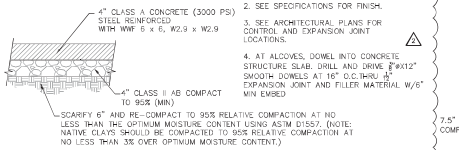
4 ACCESSIBLE SIGNAGE DETAIL
NTS

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

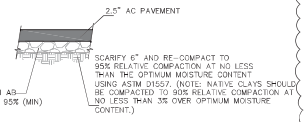
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

△

PAVING NOTES:
1. ADA STALL TO HAVE MAX 2% SLOPE IN ANY DIRECTION.
2. SEE SPECIFICATIONS FOR FINISH.
3. SEE ARCHITECTURAL PLANS FOR CONTROL AND EXPANSION JOINT LOCATIONS.
4. AT ALCOVES, DOWEL INTO CONCRETE STRUCTURE SLAB. DRILL AND DRIVE ⅝"ØX12" SMOOTH DOWELS AT 16" O.C.THRU ½" EXPANSION JOINT AND FILLER MATERIAL W/6" MIN EMBED

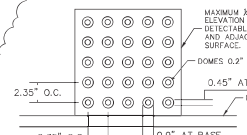


5 NEW CONCRETE PAVEMENT
NTS



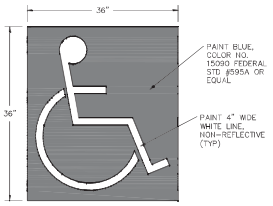
6 AC PAVEMENT DETAIL
NTS

△

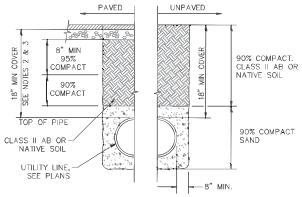


NOTES:
1. DETECTABLE WARNING SURFACE SHALL BE CAST-IN-PLACE WITHIN CONCRETE ARMOR-TILE OR APPROVED EQUAL.
2. THE DETECTABLE WARNING SURFACE SHALL BE INSTALLED ALONG THE FULL WIDTH AND 3' DEPTH ON THE CURB RAMP, EXCLUDING THE FLARED SIDES AND INSIDE THE GROOVED BORDER. THE EDGE OF THE DETECTABLE WARNING SURFACE NEAREST THE STREET SHALL BE PLACED BETWEEN 6 AND 8 INCHES FROM THE FACE OF FLUSH CURB, UNLESS INDICATED OTHERWISE.
3. DETECTABLE WARNING SURFACES SHALL BE YELLOW AND APPROXIMATE 33538 OF SAE AMSSTD-595A.
4. DETECTABLE WARNING SURFACE SHALL BE SLIP-RESISTANT.
5. DETECTABLE WARNING SURFACE SHALL DIFFER FROM ADJOINING SURFACES IN RESILIENCY OR SOUND-ON-CANE CONTACT.
6. DETECTABLE WARNING SURFACE SHALL BE CAST-IN PLACE WHERE INSTALLED WITHIN NEW PAVEMENT, GLUED DOWN WHERE INSTALLED IN EXISTING PAVEMENT.

7 DETECTABLE WARNING SURFACE
NTS



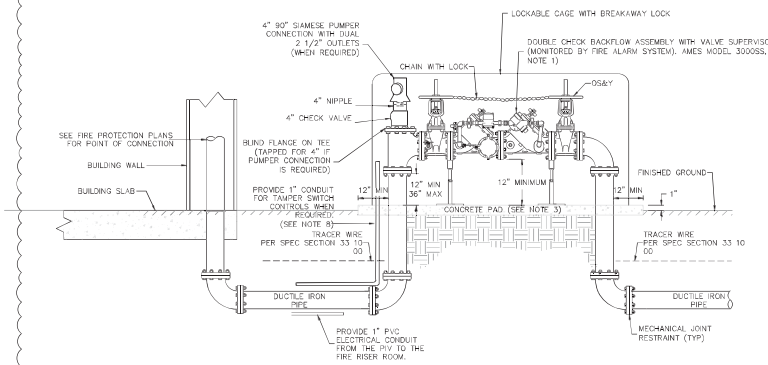
8 ADA EMBLEM
NTS



NOTES:
1. RESTORE EXISTING SURFACE TO EXISTING CONDITIONS AFTER TRENCH WORK AND COMPACTION IS COMPLETE.
2. COVER FOR ASPHALT AREAS IS DEFINED FROM TOP OF PIPE TO TOP OF AGGREGATE BASE.
3. COVER FOR CONCRETE AREAS IS DEFINED FROM TOP OF PIPE TO TOP OF FINISHED SURFACE.

9 TYPICAL UTILITY TRENCH
NTS

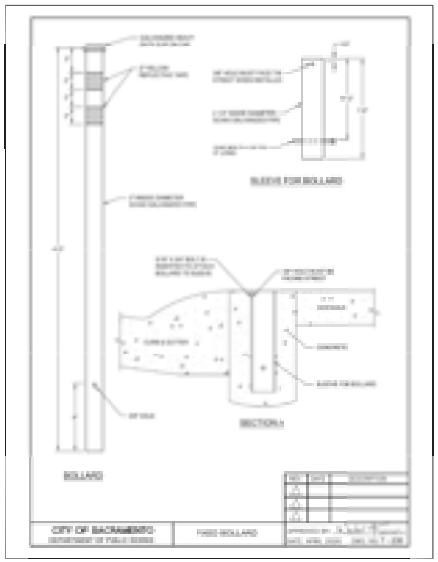
△



10 FDC AND BFP
NTS

NOTES

1. DOUBLE CHECK DETECTOR ASSEMBLIES AND THEIR ORIENTATIONS SHALL BE LIMITED TO THOSE SPECIFIED ON THE "LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES," BY THE UNIVERSITY OF SOUTHERN CALIFORNIA'S FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH, 2010 OR LATEST EDITION.
2. THE BACKFLOW DEVICE SHALL HAVE A MINIMUM CLEARANCE OF 3' AROUND EACH DIRECTION FOR MAINTENANCE PURPOSES.
3. CONCRETE PAD SHALL BE CLASS B CONCRETE, 4" MINIMUM THICKNESS, REINFORCED WITH WELDED WIRE MESH.
4. IF EXPOSED TO CORROSIVE SOIL OR CONCRETE, METAL PIPES SHALL BE COATED WITH 3M SCOTCHWRAP PIPE PRIMER AND WRAPPED WITH 3M SCOTCHWRAP NO. 51 BLACK PVC TAPE (2" OVERLAP).
5. BACKFLOW ASSEMBLIES SHALL BE SECURED BY A DOUBLE-LOCKED, GALVANIZED STRAIGHT LINK CHAIN THAT LOCKS THE VALVE HANDWHEELS IN THE OPEN POSITION AND EITHER LOCK CAN RELEASE THE CHAIN.
6. BACKFLOW ASSEMBLIES INSTALLED ON POTABLE WATER SERVICES SHALL BE LEAD FREE.
7. PROVIDE PLASTIC CAPS AND APPLY "LOCKTIGHT" AT ALL BRASS OR BRONZE FITTINGS TO DISSUADE THEFT.
8. PROVIDE A RED PERMANENT SIGN WHITE ENGRAVED OR STAMPED 1.5-INCH TALL LETTERS, HAVING A 1/4-INCH STROKE, WHICH IDENTIFIES "1124 DEL PASO BLVD". MOUNT THE SIGN ON THE STAND PIPE 4-6 INCHES BELOW THE PUMPER CONNECTION IN A MANNER WHICH MAY BE READ FROM THE DRIVE LANE.
9. THE INSTALLATION SHALL BE PROVIDED WITH ELECTRONIC SUPERVISION MONITORING WHEN REQUIRED REQUIRED BY THE FIRE DEPARTMENT.



Not for permitting or construction

PBR
ARCHITECT PBR, Inc.
FOLSOM
1101 Iron Point Road, Suite 200
Folsom, CA 95630-8416
916-355-1822
MEP Engineering & Technology
LEAF ENGINEERS
SACRAMENTO
2020 Walton Creek Way, Suite 140
Sacramento, CA 95833
916-520-2020 P
916-520-2027 F
Civil Engineering
BKF
1646 N. California Blvd, Suite 400
Walnut Creek, CA 94596
925-940-2200 / bkf.com

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124-1134 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP
REGISTERED PROFESSIONAL ENGINEER
ERIC J. SWANSON
No. 64607
CIVIL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 05/23/2025
DRAWN BY: HH CHKD BY: LD
REVISIONS

1	PLAN CHECK COMMENTS	09-04-2025
2	OWNER COMMENTS	09-24-2025

CONSTRUCTION DOCUMENT

CONSTRUCTION DETAILS

C3.0

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

A2.01 - FLOOR PLAN
C:\Users\kdavy\Documents\220389_NSHL_05.20.24_kellydavy.rvt
7/9/2025 9:42:43 AM

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

PLANTING NOTES

1. PLANT MATERIAL QUANTITIES SHOWN ON DRAWINGS ARE INFORMATIONAL ONLY. THE CONTRACTOR IS RESPONSIBLE FOR ALL PLANT MATERIAL REQUIRED.
2. IMMEDIATELY AFTER AWARD OF CONTRACT, THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT IF SPECIFIED PLANT MATERIAL IS AVAILABLE FROM COMMERCIAL NURSERIES. IN CASE A PLANT IS NOT AVAILABLE, THE LANDSCAPE ARCHITECT WILL PROVIDE ALTERNATE PLANT MATERIAL SELECTIONS. SUCH CHANGES WILL NOT ALTER THE CONTRACTOR'S ORIGINAL BID PRICE UNLESS A CREDIT IS DUE THE OWNER.
3. EXCAVATED PLANT PITS SHALL HAVE POSITIVE DRAINAGE. PLANT PITS WHEN FULLY FLOODED WITH WATER SHALL DRAIN WITHIN 6 HOURS OF FILLING. THE CONTRACTOR SHALL ENSURE ALL PLANT PITS HAVE POSITIVE DRAINAGE. SEE SPECIFICATIONS FOR EXACT REQUIREMENTS.
4. ALL PLANT MATERIALS SHALL COMPLY WITH FORM AND CHARACTERISTIC REQUIREMENTS AS SPECIFIED. ALL PLANT MATERIAL WILL COMPLY WITH ANSI Z60.1 STANDARD FOR NURSERY STOCK.
5. THE CONTRACTOR SHALL CONFORM TO ALL CONDITIONS AND REQUIREMENTS CONTAINED WITHIN THE LANDSCAPE INSTALLATION SPECIFICATIONS. THE CONTRACTOR SHALL HAVE AVAILABLE ON THE JOB SITE AT ALL TIMES, THE CONSTRUCTION ISSUE SPECIFICATIONS FOR INSPECTION BY THE LANDSCAPE ARCHITECT. THE CONTRACTOR SHALL INSERT IN THE PLANS ALL OFFICIAL/APPROVED ADDENDUMS AND/OR CHANGE ORDERS RELATIVE TO THE LANDSCAPE INSTALLATION IN CHRONOLOGICAL ORDER.
6. THE CONTRACTOR IS RESPONSIBLE FOR SOIL EROSION CONTROL MEASURES THAT MAY BE REQUIRED THROUGH THE DURATION OF THE CONTRACT PERIOD. SHOULD THERE BE EXISTING SOIL EROSION CONDITIONS THAT REQUIRE MITIGATION WHEN THE CONTRACTOR INITIALLY ACCEPTS THE SITE, THE LANDSCAPE ARCHITECT AND OWNER SHOULD BE ALERTED TO ITS EXISTENCE. FAILURE OF THE CONTRACTOR TO NOTIFY THE LANDSCAPE ARCHITECT AND OWNER IMPLIES ACCEPTANCE OF THE SITE BY THE CONTRACTOR IN ITS EXISTING CONDITION. ALL COSTS NECESSARY TO MITIGATE EXISTING EROSION PROBLEMS SHALL BE AT THE CONTRACTOR'S EXPENSE AND AT NO EXTRA COST TO THE OWNER OR INCREASE THE ORIGINAL BID AMOUNT.
7. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ALL UNDERGROUND UTILITY SYSTEMS PRIOR TO BEGINNING ANY PHASE OF CONSTRUCTION THAT MAY CAUSE DAMAGE TO EXISTING STRUCTURES. CALL U.S.A. TO LOCATE ALL EXISTING UTILITIES (800) 227-2600. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR/REPLACEMENT OF DAMAGED UTILITIES, TO THE SATISFACTION OF THE OWNER OR GOVERNING AGENCY AND AT NO EXTRA COST TO THE OWNER OR INCREASE IN BID AMOUNT.
8. INCORPORATE COMPOST AT A RATE OF AT LEAST FOUR CUBIC YARDS PER 1,000 SQUARE FEET TO A DEPTH OF SIX INCHES INTO LANDSCAPE AREA (UNLESS CONTRA-INDICATED BY A SOIL TEST).
9. ALL NON-TURF PLANTING AREAS (EXCEPT L.I.D. TREATMENT AREAS) SHALL BE TOP DRESSED WITH A 3" LAYER OF CHIPPED BARK MULCH. PARTICLE SIZE SHALL BE A MINIMUM OF TWO (2) INCHES. L.I.D. TREATMENT AREAS TO RECEIVE A 3" MIN. LAYER OF 1"-3" COBBLE IN LIEU OF BARK MULCH.
10. NO TREE SHALL BE PLANTED WITHIN FIVE (5) FEET OF UNDERGROUND WATER MAINS.
11. TREES PLANTED WITHIN FIVE (5) FEET OF SIDEWALKS OR CURBS SHALL RECEIVE ROOT BARRIERS
12. ALL PLANTING WORK SHALL BE IN ACCORDANCE WITH CURRENT CITY OF SACRAMENTO STANDARD SPECIFICATIONS.
13. AT THE END OF THE ESTABLISHMENT PERIOD, A FINAL WALK THROUGH WILL BE CONDUCTED BY THE CONTRACTOR, TO INCLUDE THE LANDSCAPE ARCHITECT OF RECORD AND THE OWNER'S REPRESENTATIVE.

PLANTING KEYNOTES

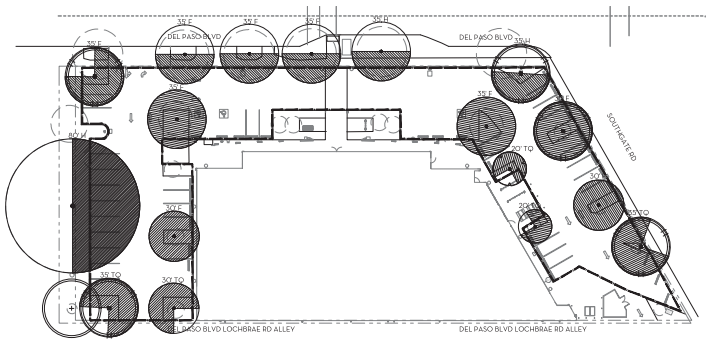
CODE	DESCRIPTION
1 GENERAL KEYNOTES	
1-01	(E) ON-SITE TREES, PROTECT IN PLACE, TYP.
1-02	(E) TREE STRUMP TO BE REMOVED. ABIDE BY TREE PRESERVATION NOTES.
1-03	(E) TREE TO BE REMOVED AND REPLACED AS SHOWN, TYP. OF (4).
1-04	(E) GRASS TO BE CLEARED AND GRUBBED WITHIN PARKING LOT PLANTERS. FINISH GRADE TO ALLOW FOR MULCH TO SIT 1" BELOW TOP OF CURB, TYP. REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL INFO.
1-05	(E) GRASS TO BE CLEARED AND GRUBBED WITHIN STREET PLANTERS. INSTALL 4" DEPTH OF DECOMPOSED GRANITE, TYP. CONTRACTOR TO REFER TO TREE PRESERVATION NOTES WHEN WORKING IN AREA BELOW TREE CANOPY. REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL INFO.

PLANTING SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	WATER USE	PLANT SIZE	QTY
TREES						
	CERCIS OCCIDENTALIS	WESTERN REDBUD	15 GAL.	LOW	25' X25'	1
	PISTACIA CHINENSIS 'KEITH DAVEY'	KEITH DAVEY CHINESE PISTACHE	15 GAL.	LOW	35' X35'	5
	QUERCUS SUBER	CORK OAK	15 GAL.	LOW	40' X40'	1

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	WATER USE	PLANT SIZE	QTY
SHRUBS						
	CALAMAGROSTIS X ACUTIFLORA 'KARL FOERSTER'	KARL FOERSTER FEATHER REED GRASS	5 GAL.	LOW	4' X2'	8
	LOMANDRA LONGIFOLIA 'BREEZE'	BREEZE MAT RUSH	1 GAL.	LOW	3' X3'	26
	MUHLENBERGIA RIGENS	DEER GRASS	5 GAL.	LOW	4' X4'	6
	SALVIA LEUCANTHA 'SANTA BARBARA'	SANTA BARBARA MEXICAN BUSH SAGE	1 GAL.	LOW	3' X4'	8
	DECOMPOSED GRANITE					
	MULCH ONLY					

TOTAL LANDSCAPE RENOVATED: 1046 SF



LIMIT OF AREA FOR SHADE CALCULATIONS:

APPROVED
MEET WATER CONSERVATION ORDINANCE
City of Sacramento
Levi Rynearson
Levi Rynearson 07/01/2025

Not for permitting or construction

PBR
JOBCOPY

ARCHITECT
PBR, INC.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8815
916-985-4822

WDSLA
Wilson Design Studio Landscape Architecture
2030 I Street, Suite 220
Sacramento, CA 95811
916.524.5614 | www.wdsla.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP
REGISTERED LANDSCAPE ARCHITECT
KEITH F. WILSON
No. 4728
Signature
EXPIRATION DATE: MAY 31, 2027
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220189
DATE 5/30/2025
DRAWN BY: JR CHKED BY: JM
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

PLANTING NOTES, SCHEDULE & SHADE CALCULATIONS

L1.0

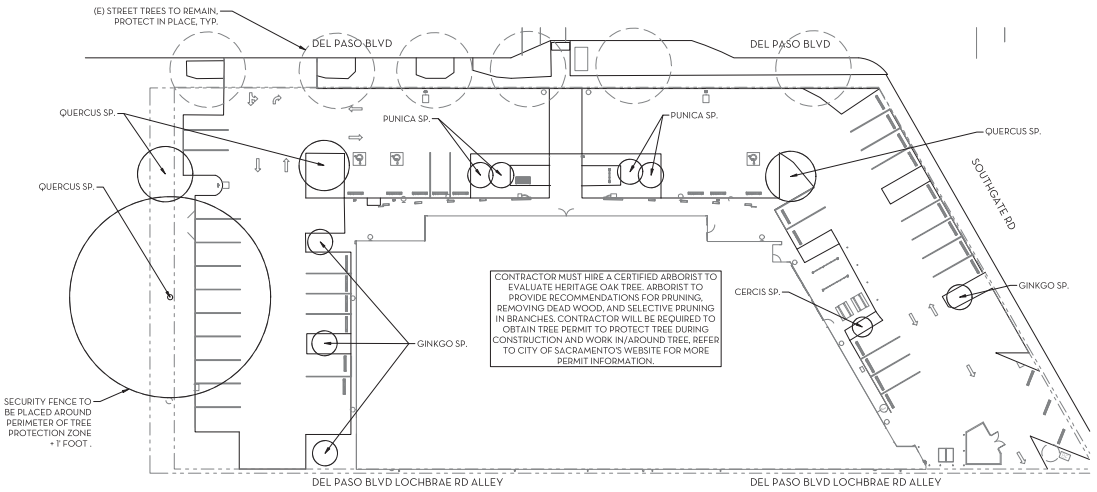
This document is for plan review only

COM-2500586

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

TREE PRESERVATION NOTES

1. REFER TO CITY OF SACRAMENTO ORDINANCE NO. 2016-0026 FOR THE FULL EXTENT OF TREE MAINTENANCE AND CONSERVATION NOTES.
2. PRIOR TO ANY GRADING, MOVEMENTS OF HEAVY EQUIPMENT, APPROVAL OF IMPROVEMENT PLANS, OR THE ISSUANCE OF ANY PERMITS. TREE PROTECTION FENCING SHALL BE INSTALLED CONSISTING OF A MINIMUM 4 FOOT TALL HIGH VISIBILITY FENCE (ORANGE PLASTIC SNOW FENCE OR SIMILAR) SHALL BE PLACED AROUND THE PERIMETER FOR THE TREE PROTECTION ZONE (DRIPLINE RADIUS +1 FOOT) FOR ALL TREES TO BE PRESERVED. THE CRZ (CRITICAL ROOT ZONE) IS THE MINIMUM DISTANCE FOR PLACING PROTECTIVE FENCING, BUT TREE PROTECTION FENCING SOULD BE PLACED AS FAR OUTSIDE OF THE CRZ AS POSSIBLE. FENCING SHALL BE REMOVED FOLLOWING CONSTRUCTION BUT PRIOR TO INSTALLATION OF LANDSCAPING MATERIAL.
3. WHENEVER POSSIBLE, FENCE MULTIPLE TREES TOGETHER IN A SINGLE CRZ.
4. SIGNS SHALL BE POSTED ON ALL SIDES OF THE FENCES SURROUNDING EACH TREE, STATING THAT EACH TREE IS TO BE PRESERVED.
5. NO PARKING, PORTABLE TOILETS, DUMPING OR STORAGE OF ANY CONSTRUCTION MATERIALS, INCLUDING OIL, GAS, OR OTHER CHEMICALS, OR OTHER INFRINGEMENT BY WORKERS OR DOMESTICATED ANIMALS IS ALLOWED IN THE CRZ.
6. DO NOT PLACE OR STORE ANY EQUIPMENT OR CONSTRUCTION MATERIALS OR ALLOW FLOW OF ANY OIL, FUEL, CONCRETE MIX OR OTHER DELETERIOUS SUBSTANCE INTO OR OVER WITHIN THE CRZ OF ANY PROTECTED TREE.
7. ALL TREES LOCATED WITHIN 25 FEET OF STRUCTURES SHALL BE PROTECTED FROM STUCCO AND/OR PAINT DURING CONSTRUCTION.
8. GRADING SHALL BE DESIGNED TO AVOID PONDING AND ENSURE PROPER DRAINAGE WITHIN DRIPLINES OF ALL TREES.
9. MINIMIZE DISTURBANCE TO THE NATIVE GROUND SURFACE (GRASS, LEAF, LITTER, OR MULCH) UNDER PRESERVED TREES TO THE GREATEST EXTENT FEASIBLE. ALL BRUSH, EARTH, AND DEBRIS SHALL BE REMOVED IN A MANNER THAT PREVENTS INJURY TO THE TREE.
10. AVOID TRENCHING, GRADING, PAVING, OR OTHERWISE DAMAGING OR DISTURBING ANY EXPOSED ROOTS WITHIN THE CRZ OF A PROTECTED TREE.
11. IF UNDERGROUND UTILITIES AND/OR IRRIGATION TRENCHING ENCROACH WITHIN THE CRZ, THEY SHALL BE BORED OR DRILLED UNDER THE ROOT SYSTEM OF A PROTECTED TREE. IF THIS IS IMPOSSIBLE, TRENCHING SHALL BE COMPLETED BY HAND TOOLS, AIR SPADES, OR OTHER ACCEPTABLE MEASURES UNDER THE SUPERVISION OF AN ISA-CERTIFIED ARBORIST. BORING MACHINERY, BORING PITS, AND SPOILS SHALL BE SET
    OUTSIDE OF THE CRZ FENCING.
12. ALL WORK SHALL CONFORM TO THE MOST CURRENT AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) TREE CARE STANDARDS.
13. DO NOT SEVER MAJOR ROOTS (1-INCH OR GREATER) UNLESS PERMITTED BY AN ISA-CERTIFIED ARBORIST. CUT ALL ROOTS, REGARDLESS OF SIZE, CLEANLY AT THE EDGE OF GROUND DISTURBANCE WITH PRUNING INSTRUMENTS AND KEEP MOIST UNTIL COVERED WITH SOIL.
14. PRUNING OF LIVING LIMBS OR ROOTS SHALL BE DONE UNDER THE SUPERVISION OF AN ISA-CERTIFIED ARBORIST. ALL PRUNING SHOULD BE DONE BY HAND, AIR KNIFE, OR WATER JET, IN ACCORDANCE WITH ISA STANDARDS USING TREE MAINTENANCE BEST PRACTICES. CLIMBING SPIKES SHOULD NOT BE USED ON LIVING TREES. LIMBS SHOULD BE REMOVED WITH CLEAN CUTS JUST OUTSIDE THE CROWN COLLAR.
15. NATIVE WOODY PLANT MATERIAL (TREES AND SHRUBS TO BE REMOVED) MAY BE CHIPPED OR MULCHED ON THE PROJECT SITE AND PLACED IN A 4 TO 6-INCH DEEP LAYER AROUND EXISTING TREES TO REMAIN. DO NOT PLACE MULCH IN CONTACT WITH THE TRUNK OF PRESERVED TREES.
16. ANY AND ALL EXPOSED ROOTS SHALL BE COVERED WITH PROTECTIVE MATERIAL (E.G. DAMP BURLAP) DURING CONSTRUCTION TO PREVENT DRYING OUT.
17. NO SUPPLEMENTARY IRRIGATION SHALL OCCUR WITHIN SIX FEET OF THE DRIPLINE OF ANY PROTECTED NATIVE OAK.
18. NO SIGNS, ROPES, CABLES, OR ANY OTHER ITEM SHALL BE ATTACHED TO A PROTECTED TREE.
19. NO BURNING OR USE OF EQUIPMENT WITH AN OPEN FLAME MAY OCCUR NEAR OR WITHIN THE PROTECTED PERIMETER. APPROPRIATE FIRE PREVENTION TECHNIQUES SHALL BE EMPLOYED AROUND ALL TREES TO BE PRESERVED. THIS INCLUDES CUTTING TALL GRASS, REMOVING FLAMMABLE DEBRIS WITHIN THE TREE PROTECTION ZONE (TPZ), AND PROHIBITING THE USE OF TOOLS THAT MAY CAUSE SPARKS, SUCH AS METAL BLADE TRIMMERS OR MOWERS.

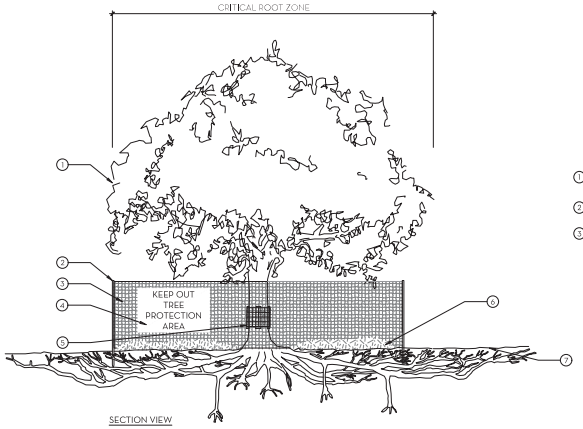


EXISTING TREES TO REMAIN

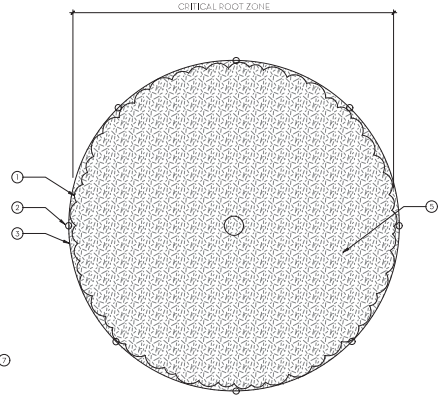


KEY NOTES
1. (E) OAK TREE CRITICAL ROOT ZONE (CRZ). TO APPROXIMATE THE CRZ, MEASURE THE DIAMETER OF THE TREE AT 4-1/2 FEET FROM THE GROUND. THIS IS THE DIAMETER AT BREAST HEIGHT OR DBH. FOR EVERY INCH OF DBH, ALLOW 1-1/2 FEET OF RADIUS FOR THE CRZ.
2. 2"x6" STEEL POSTS OR APPROVED EQUAL.
3. TREE PROTECTION FENCE- HIGH DENSITY POLYETHYLENE FENCING WITH 3.5"x1.5" OPENINGS; COLOR-ORANGE. STEEL POSTS INSTALLED AT 8' O.C.
4. 8.5"X11" SIGN LAMINATED IN PLASTIC SPACED EVERY 50' ALONG THE FENCE.
6. TREE TRUNK PROTECTION BARRIER - TREES CLOSE TO ACCESS ROUTE SHOULD HAVE TRUNKS WRAPPED FOR PROTECTION. PLACE STRAW WATTLES OR 2X4'S PLACED VERTICALLY + WIRED TOGETHER TO CREATE PROTECTION LAYER.
7. MIN. 5" THICK LAYER INSIDE TREE PROTECTION AREA.
8. MAINTAIN EXISTING GRADE WITHIN THE TREE PROTECTION FENCE UNLESS OTHERWISE INDICATED ON THE PLANS.

NOTES
A. IDENTIFY ANY TREES THAT ARE TO BE RETAINED AND USE HIGH VISIBILITY, DURABLE FENCING TO DEMARCATE CRZ AREAS. ENSURE THAT FENCING IS MAINTAINED AT ALL TIMES DURING THE CONSTRUCTION PHASE.
B. CLEARLY MARK DESIGNATED AREAS FOR WASH-OUT, STOCKPILING, AND MATERIALS STORAGE WELL OUTSIDE OF THE CRZ. MAKE SURE RUNOFF FROM WASH-OUT AREAS IS DIRECTED AWAY FROM TREES.
C. MAKE SURE CHANGES IN SITE GRADING DO NOT RESULT IN CONCENTRATING WATER FLOWS INTO THE CRZ OR DEPRIVING TREES OF A SOURCE OF SURFACE WATER TO WHICH THEY HAVE ADAPTED.
D. DO NOT ALTER THE TERRAIN OR COMPOSITION OF THE NATURAL SOIL IN THE CRZ. THIS INCLUDES CUTTING, FILLING, OR COMPACTION. SUCH ACTIVITIES CAN SEVER ROOTS, SUFFOCATE ROOTS, EXPOSE ROOTS TO DRYING AIR, DEPLETE TOPSOIL, AND CREATE EXCESSIVE POOLING OR RUNOFF.
E. DO NOT ATTACH ROPES, NAILS, CABLES, WIRES OR SIGNS TO PROTECTED TREES.
F. IF ANY EXCAVATION WORK MUST BE DONE IN THE CRZ, USE HAND TOOLS. WHEN FEASIBLE, TO MINIMIZE THE DISTURBANCE AREA.



SECTION VIEW



PLAN VIEW

A TREE PROTECTION
3/4" = 1'-0"

P-99-NOR2-92

APPROVED
MEET WATER CONSERVATION ORDINANCE
City of Sacramento
Levi Rynearson
Levi Rynearson 07/01/2025

PBR
JOBCOPY
Not for permitting or construction

ARCHITECT
PBR, INC.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8115
916-355-4822

WDSLA
William Douglas Studio Landscape Architecture
2030 I Street, Suite 220
Sacramento, CA 95811
916.524.5614 | www.wdsla.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1120 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT
1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP
REGISTERED LANDSCAPE ARCHITECT
BETHE P. WILSON
No. 4728
Signature
EXPIRATION DATE: MAY 30, 2027
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220189
DATE 5/30/2025
DRAWN BY: JR CHKED BY: JM
REVISIONS

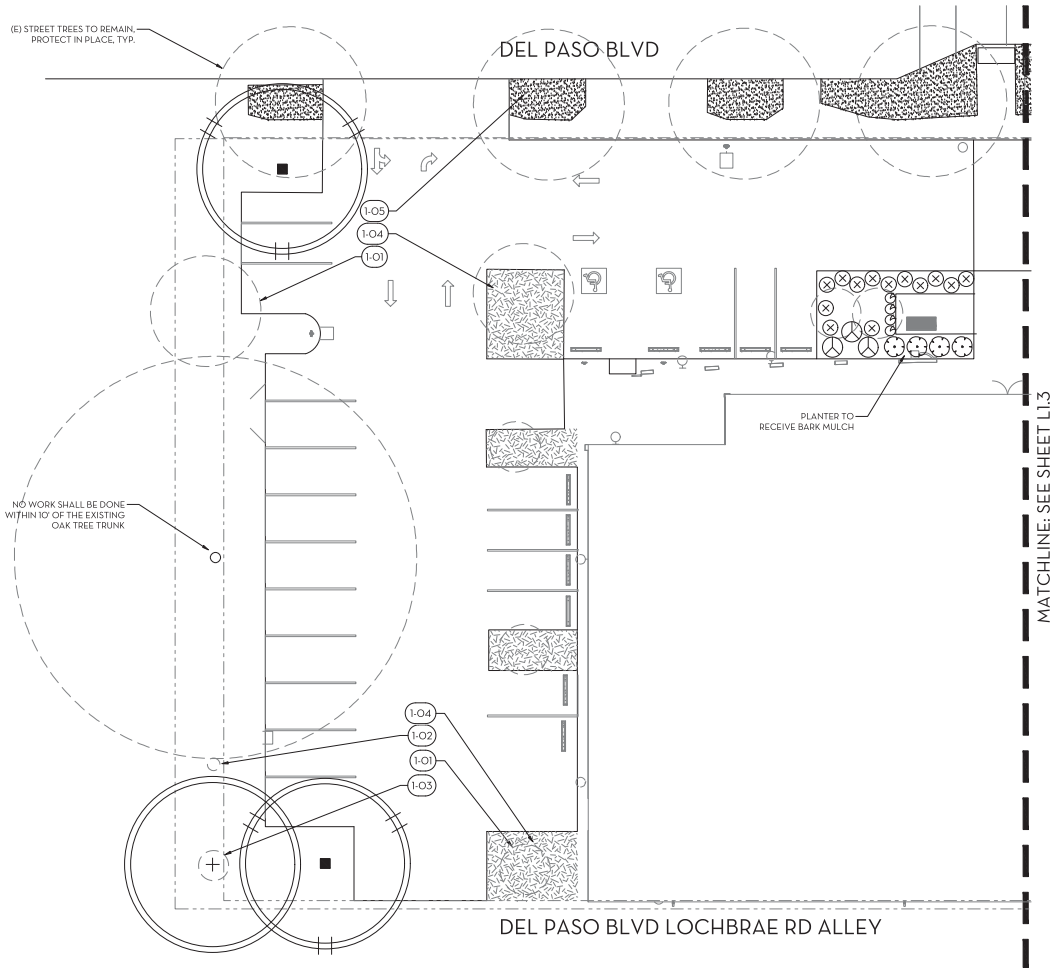
#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

TREE PRESERVATION PLAN & DETAILS

L1.1

This document is for plan review only
COM-2500586



PLANTING SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME
TREES		
	CERCIS OCCIDENTALIS	WESTERN REDBUD
	PISTACIA CHINENSIS 'KEITH DAVEY'	KEITH DAVEY CHINESE PISTACHE
	QUERCUS SUBER	CORK OAK

SYMBOL	BOTANICAL NAME	COMMON NAME
SHRUBS		
	CALAMAGROSTIS X ACUTIFLORA 'KARL FOERSTER'	KARL FOERSTER FEATHER REED GRASS
	LOMANDRA LONGIFOLIA 'BREEZE'	BREEZE MAT RUSH
	MUHLENBERGIA RIGENS	DEER GRASS
	SALVIA LEUCANTHA 'SANTA BARBARA'	SANTA BARBARA MEXICAN BUSH SAGE
	DECOMPOSED GRANITE	
	MULCH ONLY	

SEE SHEET L1.0 FOR FULL PLANTING NOTES

PLANTING KEYNOTES

CODE	DESCRIPTION
1 GENERAL KEYNOTES	
1-01	(E) ON-SITE TREES, PROTECT IN PLACE, TYP.
1-02	(E) TREE STRUMP TO BE REMOVED. ABIDE BY TREE PRESERVATION NOTES.
1-03	(E) TREE TO BE REMOVED AND REPLACED AS SHOWN, TYP. OF (4).
1-04	(E) GRASS TO BE CLEARED AND GRUBBED WITHIN PARKING LOT PLANTERS. FINISH GRADE TO ALLOW FOR MULCH TO SIT 1" BELOW TOP OF CURB, TYP. REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL INFO.
1-05	(E) GRASS TO BE CLEARED AND GRUBBED WITHIN STREET PLANTERS. INSTALL 4" DEPTH OF DECOMPOSED GRANITE, TYP. CONTRACTOR TO REFER TO TREE PRESERVATION NOTES WHEN WORKING IN AREA BELOW TREE CANOPY. REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL INFO.

APPROVED
MEET WATER CONSERVATION ORDINANCE
City of Sacramento
Levi Rynearson
Levi Rynearson 07/01/2025

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

0' 5' 10'
(1" = 10'-0")

Not for permitting or construction

PBK

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8815
916-355-4822

WDSLA
Wilson Design Studio Landscape Architecture
2020 I Street, Suite 220
Sacramento, CA 95811
916.524.5614 | www.wdsla.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

SACRAMENTO

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP
REGISTERED LANDSCAPE ARCHITECT
KEITH P. WILSON
No. 4728
Signature
EXPIRATION DATE: MAY 30, 2027
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 5/30/2025
DRAWN BY: JR CHKED BY: JM
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

PLANTING PLAN

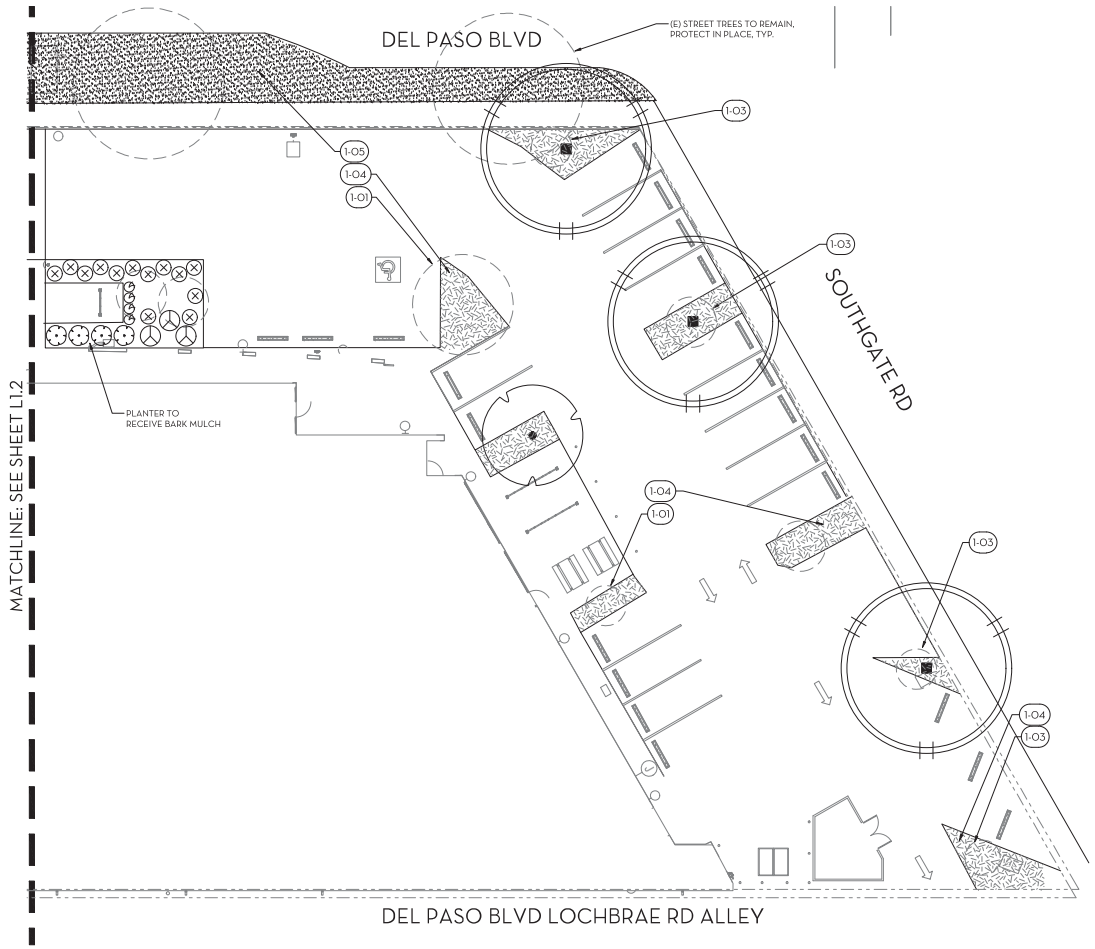
L1.2

This document is for plan review only

JOBCOPY

1124 DEL PASO BLVD

COM-2500586



PLANTING SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME
TREES		
	CERCIS OCCIDENTALIS	WESTERN REDBUD
	PISTACIA CHINENSIS 'KEITH DAVEY'	KEITH DAVEY CHINESE PISTACHE
	QUERCUS SUBER	CORK OAK

SYMBOL	BOTANICAL NAME	COMMON NAME
SHRUBS		
	CALAMAGROSTIS X ACUTIFLORA 'KARL FOERSTER'	KARL FOERSTER FEATHER REED GRASS
	LOMANDRA LONGIFOLIA 'BREEZE'	BREEZE MAT RUSH
	MUHLENBERGIA RIGENS	DEER GRASS
	SALVIA LEUCANTHA 'SANTA BARBARA'	SANTA BARBARA MEXICAN BUSH SAGE
	DECOMPOSED GRANITE	
	MULCH ONLY	

SEE SHEET 1.0 FOR PLANTING NOTES

PLANTING KEYNOTES

CODE	DESCRIPTION
1 GENERAL KEYNOTES	
1-01	(E) ON-SITE TREES, PROTECT IN PLACE, TYP.
1-02	(E) TREE STRUMP TO BE REMOVED. ABIDE BY TREE PRESERVATION NOTES.
1-03	(E) TREE TO BE REMOVED AND REPLACED AS SHOWN, TYP. OF (4).
1-04	(E) GRASS TO BE CLEARED AND GRUBBED WITHIN PARKING LOT PLANTERS. FINISH GRADE TO ALLOW FOR MULCH TO SIT 1" BELOW TOP OF CURB, TYP. REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL INFO.
1-05	(E) GRASS TO BE CLEARED AND GRUBBED WITHIN STREET PLANTERS. INSTALL 4" DEPTH OF DECOMPOSED GRANITE, TYP. CONTRACTOR TO REFER TO TREE PRESERVATION NOTES WHEN WORKING IN AREA BELOW TREE CANOPY. REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL INFO.

APPROVED
City of Sacramento Planning Division
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

APPROVED
MEET WATER CONSERVATION ORDINANCE
City of Sacramento
Levi Rynearson
Levi Rynearson 07/01/2025

0' 5' 10'
(1" = 10'-0")

Not for permitting or construction

PBK

ARCHITECT PBK, Inc.
PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8815
916-355-4822

WDSLA
Wilson Design Studio Landscape Architecture
2020 I Street, Suite 220
Sacramento, CA 95811
916.524.5614 | www.wdsla.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

SACRAMENTO

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP
REGISTERED LANDSCAPE ARCHITECT
KEITH P. WILSON
No. 4728
Signature
EXPIRATION DATE: MAY 30, 2027
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 5/30/2025
DRAWN BY: JR CHKD BY: JM
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

PLANTING PLAN

L1.3

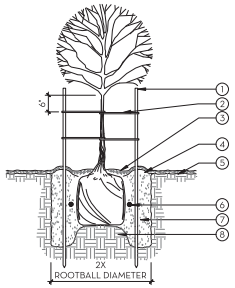
This document is for plan review only

JOBCOPY

1124 DEL PASO BLVD

COM-2500586

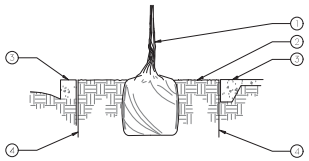
APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



KEY NOTES
1. TREE STAKES: 2" DIA. X 10'-0" PRESSURE-TREATED LODGEPOLE PINE, 2 PER 15 GAL. TREE AND 3 PER 24" BOX TREE.
2. RUBBER TREE TIES: 2 PER STAKE. WRAP NO WIRE AROUND TRUNK OR LIMB. LOCATE TREE TIES NO HIGHER THAN NECESSARY TO KEEP TREE UPRIGHT DURING WINDY CONDITIONS.
3. MULCH, 3" LAYER.
4. 4" HIGH EARTH MOUND.
5. FINISH GRADE. KEEP ROOT CROWN 1" ABOVE FINISH GRADE.
6. PLANT TABS AS RECOMMENDED IN SOIL ANALYSIS REPORT.
7. PREPARE BACKFILL. BACKFILL AS PER SOIL ANALYSIS RECOMMENDATIONS.
8. EXISTING UNDISTURBED SOIL.

NOTES
A. REMOVE EXISTING NURSERY STAKES FROM TREES BEFORE PLANTING.
B. LOCATE FERTILIZER TABLETS A FEW INCHES AWAY FROM ROOTBALL TO AVOID BURNING ROOT TIPS.
C. LOOSEN AND/OR CUT ANY ROOTS ENCIRCLING ROOTBALL PRIOR TO PLANTING.
D. SCARIFY SIDES OF PLANTING HOLE PRIOR TO PLANTING ROOT BALL.

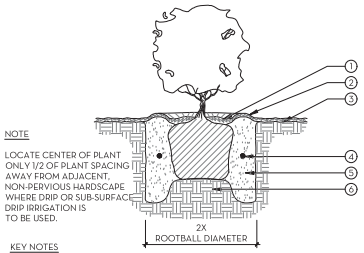
A TREE PLANTING
NOT TO SCALE — P-PR-NOR2-02



KEY NOTES
1. TREE
2. FINISH GRADE (1/2" IN TURF SEED, 1" IN TURF SOD, 3-1/2" IN PLANTER BEDS BELOW ADJACENT HARDSCAPE, TYP.)
3. ADJACENT HARDSCAPE (WALKWAY OR CURB)
4. 20'-0" LONG X 24" DEEP ROOT BARRIER PANEL BY DEEP ROOT CORP, OR EQUAL. INSTALL CENTERED ON TREES ON ALL SIDES LOCATED CLOSER THAN 5'-0" TO ADJACENT HARDSCAPE PER MANUFACTURER'S SPECIFICATIONS.

NOTES
A. SEE "TREE PLANTING" DETAIL FOR PLANTING AND STAKING OF PROPOSED TREES.

B TREE ROOT BARRIER
NOT TO SCALE — P-PR-NOR2-01

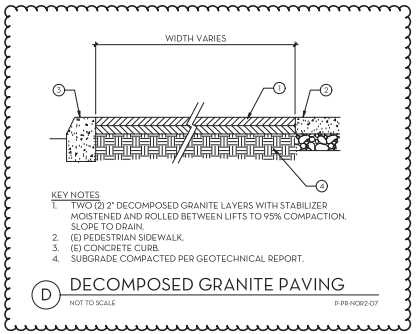


NOTE
LOCATE CENTER OF PLANT ONLY 1/2 OF PLANT SPACING AWAY FROM ADJACENT, NON-PERVIOUS HARDSCAPE WHERE DRIP OR SUB-SURFACE DRIP IRRIGATION IS TO BE USED.

KEY NOTES
1. 3" LAYER OF BARK MULCH.
2. 3" HIGH UNDISTURBED SOIL MOUND.
3. FINISH GRADE: PLANT ROOT CROWN 1" ABOVE FINISH GRADE. PROVIDE POSITIVE DRAINAGE AWAY FROM ROOTBALL.
4. FERTILIZER TABLETS.
5. PREPARED BACKFILL PER SOIL ANALYSIS RECOMMENDATIONS.
6. EXISTING UNDISTURBED SOIL. PROVIDE POSITIVE DRAINAGE AWAY FROM ROOTBALL.

NOTES
A. LOCATE FERTILIZER TABLETS A FEW INCHES AWAY FROM ROOTBALL TO AVOID BURNING ROOT TIPS.
B. LOOSEN AND/OR CUT ANY ROOTS ENCIRCLING ROOTBALL PRIOR TO PLANTING.
C. SCARIFY SIDES OF PLANTING HOLE PRIOR TO PLANTING ROOTBALL.

C SHRUB PLANTING
NOT TO SCALE — P-PR-NOR2-03



KEY NOTES
1. TWO (2) 2" DECOMPOSED GRANITE LAYERS WITH STABILIZER MOISTENED AND ROLLED BETWEEN LIFTS TO 95% COMPACTION. SLOPE TO DRAIN.
2. (E) PEDESTRIAN SIDEWALK.
3. (E) CONCRETE CURB.
4. SUBGRADE COMPACTED PER GEOTECHNICAL REPORT.

D DECOMPOSED GRANITE PAVING
NOT TO SCALE — P-PR-NOR2-07

APPROVED
MEET WATER CONSERVATION ORDINANCE
City of Sacramento
Levi Rynearson
Levi Rynearson 07/01/2025

Not for permitting or construction

PBR

ARCHITECT — PBR, INC.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8618
916-985-4822

WDSLA
Wilson Design Studio Landscape Architecture
2030 I Street, Suite 220
Sacramento, CA 95811
916.524.5614 | www.wdsla.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1102 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
PLAN NORTH / TRUE NORTH

STAMP
REGISTERED LANDSCAPE ARCHITECT
KEITH P. WILSON
No. 4728
Signature
EXPIRATION DATE: MAY 31, 2027
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220189
DATE 5/30/2025
DRAWN BY: JR CHKED BY: JM
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

PLANTING DETAILS

L1.4

This document is for plan review only

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

IRRIGATION NOTES

1. THIS DESIGN IS DIAGRAMMATIC. ALL IRRIGATION EQUIPMENT, PIPING, VALVES, ETC... SHOWN WITHIN PAVED AREAS ARE FOR DESIGN PURPOSES ONLY AND SHALL BE INSTALLED IN PLANTING AREAS WHEREVER POSSIBLE. ALL IRRIGATION LINES AND WIRING SHALL BE IN SLEEVING WHEN CROSSING UNDER PAVING.
2. THE EXISTING IRRIGATION WATER METER IS CAPABLE OF PROVIDING APPROPRIATE FLOW TO THE EXISTING SYSTEM. THE ADDITIONS TO THIS IRRIGATION SYSTEM SHOULD NOT EXCEED 50% OF THE MAXIMUM CONTINUOUS FLOW OF THE WATER METER.
3. THIS SYSTEM IS EXPECTED TO MAINTAIN A MINIMUM OPERATING PRESSURE OF 30 PSI AT THE FURTHEST POINTS AWAY FROM THE P.O.C.S THE CONTRACTOR SHALL VERIFY THE AVAILABLE WATER PRESSURE ON THE SITE PRIOR TO INSTALLATION OF THE SYSTEM. REPORT TO THE OWNER AND THE LANDSCAPE ARCHITECT ANY DIFFERENCES BETWEEN THE CONDITIONS ASSUMED ON THESE PLANS AND THE CONDITIONS ON SITE. IN THE EVENT PRESSURE AND/OR FLOW DIFFERENCES ARE NOT REPORTED PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY REVISIONS REQUIRED.
4. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FAMILIARIZE HIMSELF WITH ALL GRADE DIFFERENCES, STRUCTURES AND FACILITIES. THE IRRIGATION CONTRACTOR SHALL REPAIR OR REPLACE ALL ITEMS DAMAGED BY HIS WORK. HE SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS FOR THE LOCATION AND INSTALLATION OF PIPE SLEEVES AND LATERALS AROUND EXISTING AND PROPOSED SITE STRUCTURES AND FACILITIES, UNDER PAVING, ETC...
5. DO NOT WILLFULLY INSTALL THE IRRIGATION SYSTEM AS SHOWN ON THE DRAWINGS WHEN IT IS OBVIOUS IN THE FIELD THAT UNKNOWN OBSTRUCTIONS, GRADE DIFFERENCES OR DIFFERENCES IN THE AREA DIMENSIONS EXIST THAT MIGHT NOT HAVE BEEN CONSIDERED IN THE ENGINEERING. SUCH OBSTRUCTIONS OR DIFFERENCES SHOULD BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE. IN THE EVENT THAT THIS NOTIFICATION IS NOT PERFORMED, THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY REVISIONS NECESSARY.
6. THE CONTRACTOR SHALL FLUSH AND ADJUST ALL EQUIPMENT AND VALVES FOR OPTIMUM COVERAGE. INSTALL ALL SPRINKLER HEADS WITH NOZZLE OF THE APPROPRIATE DEGREE AND RADIUS FOR THE AREAS TO BE COVERED. ADJUST ADDITIONAL NOZZLES TO ELIMINATE SPRAYING ONTO WALKS, STREETS, WALLS, ETC...
7. ALL IRRIGATION EQUIPMENT NOT OTHERWISE DETAILED OR SPECIFIED SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.
8. PRESSURE REGULATING DEVICES ARE REQUIRED IF WATER PRESSURE EXCEEDS THE RECOMMENDED PRESSURE OF THE SPECIFIED IRRIGATION DEVICES.
9. CHECK VALVES OR ANTI-DRAIN VALVES ARE REQUIRED ON ALL SPRINKLER HEADS WHERE LOW POINT DRAINAGE COULD OCCUR.
10. THE CONTRACTOR SHALL PROVIDE THE FOLLOWING DOCUMENTATION TO THE LANDSCAPE ARCHITECT OF RECORD AND CLIENT FOR SIGN OFF AT THE END OF THE MAINTENANCE PERIOD. CONTRACTOR SHALL PROVIDE THE FOLLOWING IRRIGATION DOCUMENTATION:
    A. AS-BUILTS FOR THE IRRIGATION SYSTEM.
    B. A DIAGRAM OF THE IRRIGATION PLAN SHOWING HYDROZONES SHALL BE KEPT WITH THE IRRIGATION CONTROLLER FOR SUBSEQUENT MANAGEMENT PURPOSES.
    C. MANUAL DETAILING ALL COMPONENTS AND COMPLETE OPERATION AND MAINTENANCE OF SYSTEM

IRRIGATION KEYNOTES

SYMBOL	IRRIGATION DESCRIPTION
I-101	(E) POC - PROTECT IN PLACE
I-102	(E) MAINLINE TO REMAIN, PROTECT IN PLACE.
I-103	(E) VALVES TO BE REPLACED AS SHOWN.
I-104	(E) ROOT ZONE WATERING EQUIPMENT- PROTECT IN PLACE. CONTRACTOR TO REPLACE ONLY IF NECCESSARY, TYP.
I-105	(E) IRRIGATION GATE VALVES TO REMAIN, PROTECT IN PLACE.
I-106	(E) QUICK COUPLER VALVES TO REMAIN, PROTECT IN PLACE.
I-107	(E) IRRIGATION CONTROLLER TO BE REPLACED AS SHOWN.
I-108	(E) IRRIGATION SPRAYHEADS TO BE REPLACED AS SHOWN.
I-109	(E) BACKFLOW PREVENTER TO REMAIN, PROTECT IN PLACE.

NOTE:

BECAUSE PROPER SCHEDULING OF IRRIGATION RUN TIMES RELIES ON SOIL TEXTURE AND INFILTRATION RATE INFORMATION, COMPREHENSIVE IRRIGATION SCHEDULES WILL BE COMPLETED AFTER THE SOIL ANALYSIS HAS BEEN ADMINISTERED. THE COMPLETED IRRIGATION SCHEDULES WILL BE SUBMITTED AS PART OF THE LANDSCAPE CERTIFICATE OF COMPLETION AS REQUIRED FOR PERMIT ACCEPTANCE AND SIGN OFF.

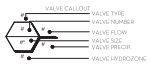
A IRRIGATION SCHEDULING

NOT TO SCALE P-99-NOR2-14

IRRIGATION SCHEDULE

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	PSI	DETAIL
LST SST RST	HUNTER MP STRIP PROS-12-PRS30-CV SHRUB ROTATOR, 12IN. POP-UP WITH FACTORY INSTALLED CHECK VALVE, PRESSURE REGULATED TO 30 PSI, MP ROTATOR NOZZLE ON PRS30 BODY. LST=IVORY LEFT STRIP, SST=BROWN SIDE STRIP, RST=COPPER RIGHT STRIP.	30	C/L2.4
MP1000	HUNTER MP1000 PROS-12-PRS30-CV SHRUB ROTATOR, 12IN. POP-UP WITH CHECK VALVE, PRESSURE REGULATED TO 30 PSI, MP ROTATOR NOZZLE ON PRS30 BODY. M=MAROON ADJ ARC 90 TO 210, L=LIGHT BLUE 210 TO 270 ARC, O=OLIVE 360 ARC.	30	C/L2.4
800 A 800 B	HUNTER MP800SR PROS-12-PRS30-CV SHRUB ROTATOR, 12IN. POP-UP WITH CHECK VALVE, PRESSURE REGULATED TO 30 PSI, MP ROTATOR NOZZLE ON PRS30 BODY. ADJ=ORANGE AND GRAY (ARC 90-210), 360=LIME GREEN AND GRAY (ARC 360)	30	C/L2.4
RWS RWS	(E) RAINBIRD RWS 18IN. LONG RZWS WITH INSTALLED .25 GPM OR .50 GPM BUBBLER OPTIONS. CONTRACTOR TO REPLACE ONLY IF NECCESARY, TYP.	15	N/A
1401 1402 1404	RAIN BIRD RWS-B-C 1400 SERIES ROOT WATERING SYSTEM WITH 4.0IN. DIAMETER X 36.0IN. LONG WITH LOCKING GRATE, SEMI-RIGID MESH TUBE, AND CHECK VALVE. RAIN BIRD BUBBLER OPTION AS INDICATED: 1401 0.25 GPM, 1402 0.5 GPM, 1404 1.0 GPM, 1408 2.0 GPM.	20	D/L2.4

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	DETAIL
	HUNTER ICV-G 1IN., 1-1/2IN., 2IN., AND 3IN. PLASTIC ELECTRIC REMOTE CONTROL VALVES, GLOBE CONFIGURATION, WITH NPT THREADED INLET/OUTLET, FOR COMMERCIAL/MUNICIPAL USE.	B/L2.4
	(E) QUICK COUPLER VALVE EXISITING QUICK COUPLER VALVE, CONTRACTOR TO FIELD VERIFY.	N/A
	(E) GATE VALVE EXISITING GATE VALVE, CONTTRACTOR TO FIELD VERIFY.	
BF	(E) BACKFLOW PREVENTER EXISITING BACKFLOW PREVENTER, CONTRACTOR TO FIELD VERIFY.	N/A
	HUNTER HCC-1600-M-SS 16 STATION OUTDOOR WI-FI ENABLED, FULL-FUNCTIONING CONTROLLER WITH TOUCHSCREEN & ONE ICM-800 MODULE. STAINLESS STEEL CABINET.	N/A
	HUNTER RFC-SGM RAIN AND FREEZE SENSOR, WITH CONDUIT INSTALLATION, MOUNT AS NOTED. NORMALLY CLOSED SWITCH. OPTIONAL GUTTER MOUNT. WITH WS-GUARD TO PROTECT SENSOR.	N/A
	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21	
	(E) IRRIGATION MAINLINE: CONTRACTOR TO FIELD VERIFY	



APPROVED
MEET WATER CONSERVATION ORDINANCE
City of Sacramento
Levi Rynearson
Levi Rynearson 07/01/2025

JOBCOPY

Not for permitting or construction

PBR
ARCHITECT PBR, INC.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8518
916-985-4822

WDSLA
Wilson Design Studio Landscape Architecture
2030 I Street, Suite 220
Sacramento, CA 95811
916.524.5614 | www.wdsla.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH
TRUE NORTH

STAMP
REGISTERED LANDSCAPE ARCHITECT
KEITH P. WILSON
No. 4728
Signature
EXPIRATION DATE: MAY 30, 2027
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220189
DATE 5/30/2025
DRAWN BY JR CHKED BY JM
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

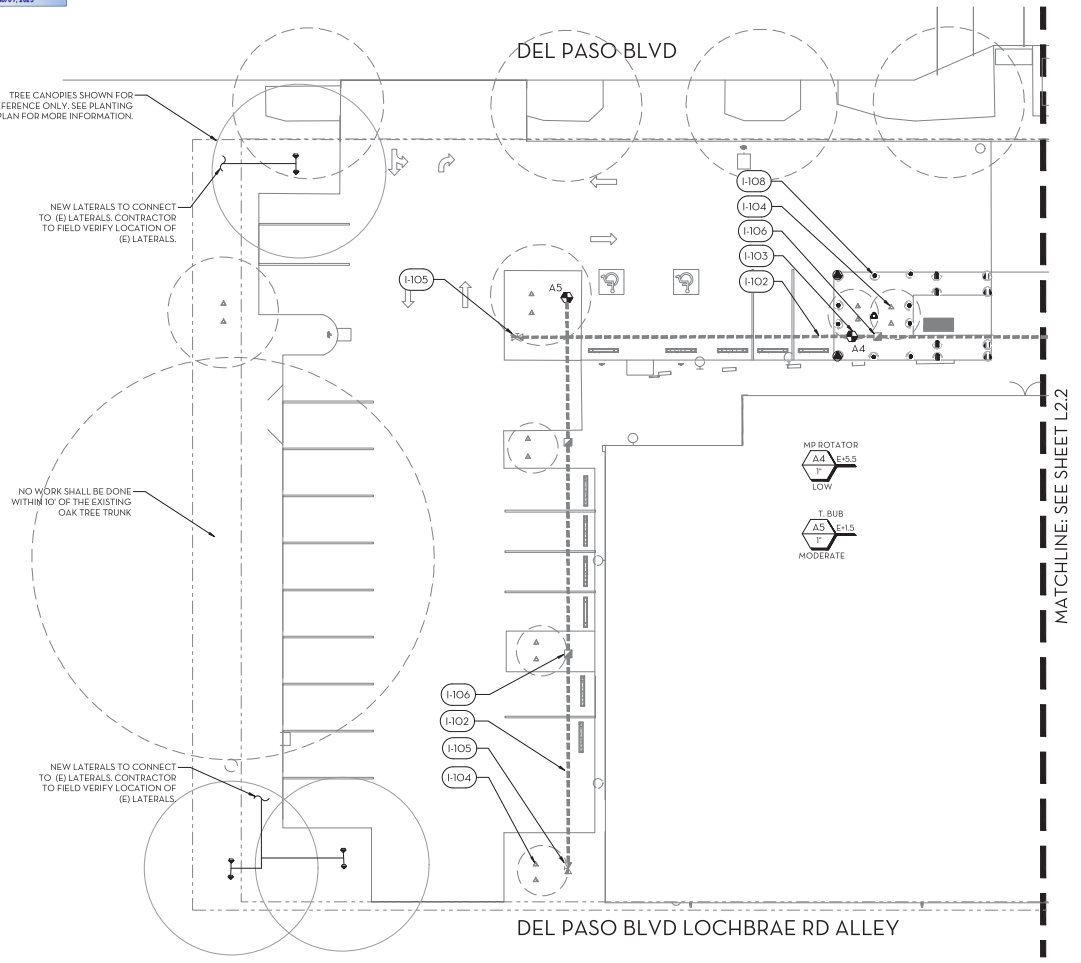
IRRIGATION NOTES AND SCHEDULE

L2.0

This document is for plan review only

COM-2500586

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



IRRIGATION MAINLINE AND (E) VALVE LOCATIONS BASED ON SITE VISIT. LANDSCAPE CONTRACTOR TO CONFIRM MAINLINE LOCATIONS ARE CORRECT.

IRRIGATION MAINLINE SLEEVES AND CONDUIT TO BE REUSED, PROTECT IN PLACE.

IRRIGATION LOCATED ON WEST SIDE OF SITE TO BE CONFIRMED BY LANDSCAPE CONTRACTOR.

IRRIGATION SCHEDULE

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	PSI	DETAIL
LST SST RST	HUNTER MP STRIP PROS-12-PRS30-CV SHRUB ROTATOR, 12IN, POP-UP WITH FACTORY INSTALLED CHECK VALVE, PRESSURE REGULATED TO 30 PSI, MP ROTATOR NOZZLE ON PRS30 BODY. LST=IVORY LEFT STRIP, SST=BROWN SIDE STRIP, RST=COPPER RIGHT STRIP.	30	C/L2.4
M/O	HUNTER MP1000 PROS-12-PRS30-CV SHRUB ROTATOR, 12IN, POP-UP WITH CHECK VALVE, PRESSURE REGULATED TO 30 PSI, MP ROTATOR NOZZLE ON PRS30 BODY. M=MAROON ADJ ARC 90 TO 210; L=LIGHT BLUE 210 TO 270 ARC, O=OLIVE 360 ARC.	30	C/L2.4
800 A 800 F	HUNTER MP800SR PROS-12-PRS30-CV SHRUB ROTATOR, 12IN, POP-UP WITH CHECK VALVE, PRESSURE REGULATED TO 30 PSI, MP ROTATOR NOZZLE ON PRS30 BODY. ADJ=ORANGE AND GRAY (ARC 90-210), 360=LIME GREEN AND GRAY (ARC 360)	30	C/L2.4
QUIC DRIP	(E) RAINBIRD RWS 18IN. LONG RZWS WITH INSTALLED .25 GPM OR .50 GPM BUBBLER OPTIONS. CONTRACTOR TO REPLACE ONLY IF NECCESARY, TYP.	15	N/A
1401 1402 1404	RAIN BIRD RWS-B-C 1400 SERIES ROOT WATERING SYSTEM WITH 4.0IN. DIAMETER X 36.0IN. LONG WITH LOCKING GRATE, SEMI-RIGID MESH TUBE, AND CHECK VALVE. RAIN BIRD BUBBLER OPTION AS INDICATED: 1401 0.25 GPM, 1402 0.5 GPM, 1404 1.0 GPM, 1408 2.0 GPM.	20	D/L2.4

SEE SHEET 2.0 FOR FULL IRRIGATION NOTES AND SCHEDULE

IRRIGATION KEYNOTES

SYMBOL	IRRIGATION DESCRIPTION
I-101	(E) POC - PROTECT IN PLACE
I-102	(E) MAINLINE TO REMAIN, PROTECT IN PLACE.
I-103	(E) VALVES TO BE REPLACED AS SHOWN.
I-104	(E) ROOT ZONE WATERING EQUIPMENT- PROTECT IN PLACE. CONTRACTOR TO REPLACE ONLY IF NECCESSARY, TYP.
I-105	(E) IRRIGATION GATE VALVES TO REMAIN, PROTECT IN PLACE.
I-106	(E) QUICK COUPLER VALVES TO REMAIN, PROTECT IN PLACE.
I-107	(E) IRRIGATION CONTROLLER TO BE REPLACED AS SHOWN.
I-108	(E) IRRIGATION SPRAYHEADS TO BE REPLACED AS SHOWN.
I-109	(E) BACKFLOW PREVENTER TO REMAIN, PROTECT IN PLACE.

APPROVED
MEET WATER CONSERVATION ORDINANCE
City of Sacramento
Levi Rynearson
Levi Rynearson 07/01/2025

0' 5' 10'
(1" = 10'-0")

Not for permitting or construction
JOBCOPY

PBR
ARCHITECT PBR, INC.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8518
916-985-4822
WDSLA
Wilson Design Studio Landscape Architecture
2020 I Street, Suite 220
Sacramento, CA 95811
916.524.5614 | www.wdsla.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP
REGISTERED LANDSCAPE ARCHITECT
BETHE P. WILSON
No. 4728
Signature
EXPIRATION DATE: MAY 31, 2027
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220189
DATE 5/30/2025
DRAWN BY: JR CHKED BY: JM
REVISIONS

#	DESCRIPTION	DATE

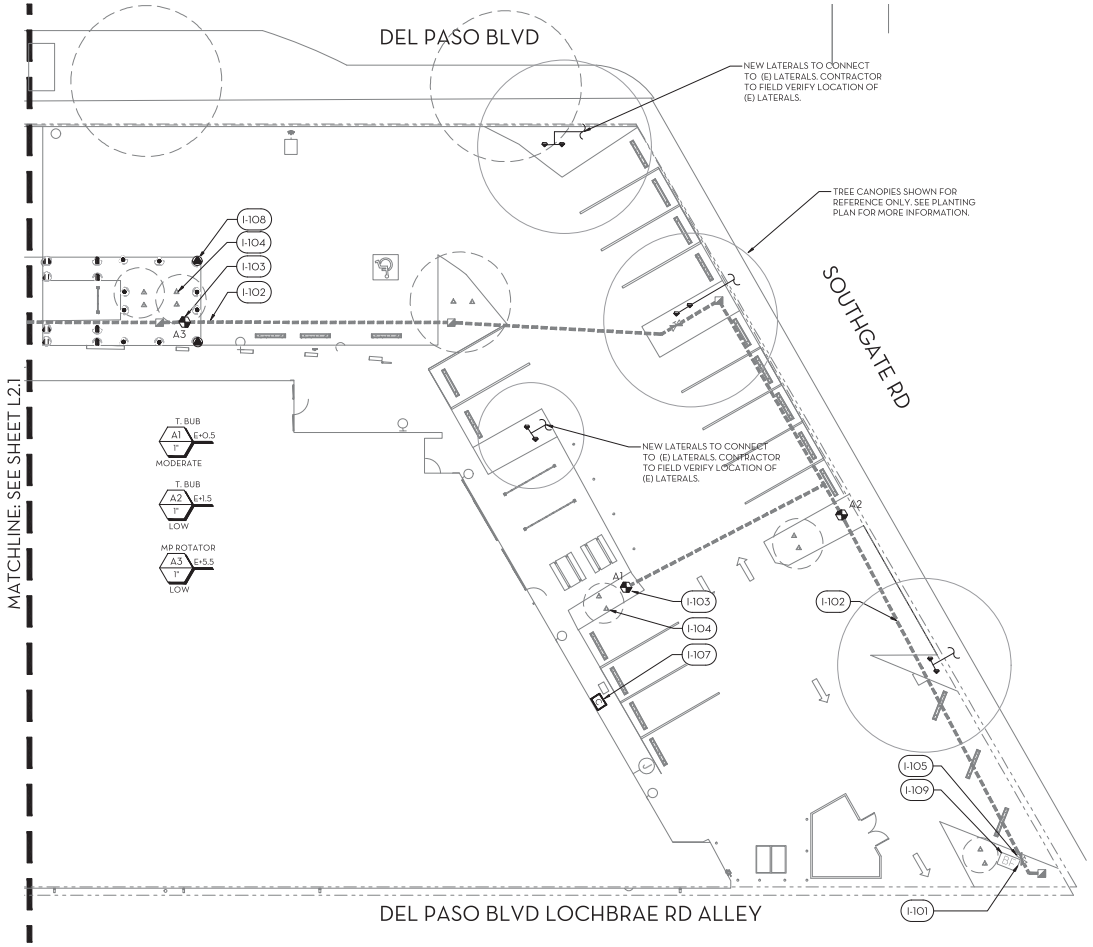
CONSTRUCTION DOCUMENT

IRRIGATION PLAN

L2.1

This document is for plan review only
COM-2500586

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025



IRRIGATION SCHEDULE

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	PSI	DETAIL
LST SST RST	HUNTER MP STRIP PROS-12-PRS30-CV SHRUB ROTATOR, 12IN, POP-UP WITH FACTORY INSTALLED CHECK VALVE, PRESSURE REGULATED TO 30 PSI, MP ROTATOR NOZZLE ON PRS30 BODY. LST=IVORY LEFT STRIP, SST=BROWN SIDE STRIP, RST=COPPER RIGHT STRIP.	30	C/L2.4
MAR	HUNTER MP1000 PROS-12-PRS30-CV SHRUB ROTATOR, 12IN, POP-UP WITH CHECK VALVE, PRESSURE REGULATED TO 30 PSI, MP ROTATOR NOZZLE ON PRS30 BODY. M=MAROON ADJ ARC 90 TO 210, L=LIGHT BLUE 210 TO 270 ARC, O=OLIVE 360 ARC.	30	C/L2.4
ADJ-A ADJ-B	HUNTER MP800SR PROS-12-PRS30-CV SHRUB ROTATOR, 12IN, POP-UP WITH CHECK VALVE, PRESSURE REGULATED TO 30 PSI, MP ROTATOR NOZZLE ON PRS30 BODY. ADJ=ORANGE AND GRAY (ARC 90-210), 360=LIME GREEN AND GRAY (ARC 360)	30	C/L2.4
EXIS EXIS	(E) RAINBIRD RWS 18IN. LONG RZWS WITH INSTALLED .25 GPM OR .50 GPM BUBBLER OPTIONS. CONTRACTOR TO REPLACE ONLY IF NECCESARY, TYP.	15	N/A
1401 1402 1404	RAIN BIRD RWS-B-C 1400 SERIES ROOT WATERING SYSTEM WITH 4.0IN. DIAMETER X 36.0IN. LONG WITH LOCKING GRATE, SEMI-RIGID MESH TUBE, AND CHECK VALVE. RAIN BIRD BUBBLER OPTION AS INDICATED. 1401 0.25 GPM, 1402 0.5 GPM, 1404 1.0 GPM, 1408 2.0 GPM.	20	D/L2.4

SEE SHEET 2.0 FOR FULL IRRIGATION NOTES AND SCHEDULE

IRRIGATION KEYNOTES

SYMBOL	IRRIGATION DESCRIPTION
I-101	(E) POC - PROTECT IN PLACE
I-102	(E) MAINLINE TO REMAIN, PROTECT IN PLACE.
I-103	(E) VALVES TO BE REPLACED AS SHOWN.
I-104	(E) ROOT ZONE WATERING EQUIPMENT- PROTECT IN PLACE. CONTRACTOR TO REPLACE ONLY IF NECCESSARY, TYP.
I-105	(E) IRRIGATION GATE VALVES TO REMAIN, PROTECT IN PLACE.
I-106	(E) QUICK COUPLER VALVES TO REMAIN, PROTECT IN PLACE.
I-107	(E) IRRIGATION CONTROLLER TO BE REPLACED AS SHOWN.
I-108	(E) IRRIGATION SPRAYHEADS TO BE REPLACED AS SHOWN.
I-109	(E) BACKFLOW PREVENTER TO REMAIN, PROTECT IN PLACE.

IRRIGATION MAINLINE AND (E) VALVE LOCATIONS BASED ON SITE VISIT. LANDSCAPE CONTRACTOR TO CONFIRM MAINLINE LOCATIONS ARE CORRECT.

IRRIGATION MAINLINE SLEEVES AND CONDUIT TO BE REUSED, PROTECT IN PLACE.

APPROVED
MEET WATER CONSERVATION ORDINANCE
City of Sacramento
Levi Rynearson
Levi Rynearson 07/01/2025

0' 5' 10'
(1" = 10'-0")

Not for permitting or construction

PBR
ARCHITECT PBR, INC.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8815
916.985.4822

WDSLA
Wilson Design Studio Landscape Architecture
2020 I Street, Suite 320
Sacramento, CA 95811
916.524.5614 | www.wdslac.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1120 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP
REGISTERED LANDSCAPE ARCHITECT
KEITH P. WILSON
No. 4728
CORPORATION DATE: MAY 30, 2027
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220188
DATE 5/30/2025
DRAWN BY: JR CHKED BY: JM
REVISIONS

#	DESCRIPTION	DATE

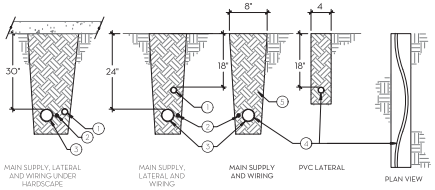
CONSTRUCTION DOCUMENT

IRRIGATION PLAN

L2.2

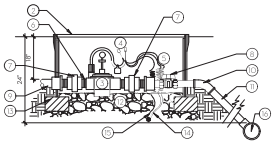
This document is for plan review only

JOBCOPY
1124 DEL PASO BLVD
COM-2500586



KEY NOTES
1. IRRIGATION LATERAL.
2. WIRING: TAPE AND BUNDLE WIRING AT 10'-0" INTERVALS. COMMON TRENCHING OF IRRIGATION PIPE AND REMOTE CONTROL VALVE WIRING TO BE DONE WHEREVER POSSIBLE (INSTALL TRACE WIRE ALONG ALL MAIN LINE PIPE THAT DOES NOT HAVE CONTROL WIRES ADJACENT TO PIPE.
3. MAIN LINE: ALL MAIN LINE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS. MAINTAIN 4" SPACE BETWEEN PARALLEL PIPE LINES AND 6" VERTICAL SPACE BETWEEN MAIN LINE AND LATERAL LINES. WIRING AND MAIN LINE TO BE AT SAME MINIMUM DEPTH OF 24".
4. ALL PVC PIPE TO BE CENTERED IN TRENCHES OR SNAKED AS NECESSARY TO ACCOMMODATE UNTRUE ALIGNMENT.
5. BACKFILL, SEE SPECS.
6. ALL PIPING UNDER PAVING SHALL BE SLEEVED.

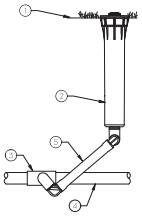
A TRENCHING DETAIL
NOT TO SCALE — P-PR-NOR2-04



KEY NOTES
1. FINISHED GRADE (1/2" IN SEED, 1" IN SOD, 3-1/2" IN PLANTER BEDS) BELOW LID.
2. RAINBIRD VB-STD (21.8"X16.6") PLASTIC VALVE BOX WITH BOLT DOWN LID (OR EQUAL). HEAT BRAND RCV AND VALVE NUMBER ON COVER. SEE IRRIGATION PLANS AND LEGEND FOR LOCATIONS AND VALVE NUMBERS).
3. REMOTE CONTROL VALVE (SEE IRRIGATION LEGEND) W/ POLYURETHANE ID TAG ATTACHED TO THE VALVE CONTROL WIRE BY T. CHRISTY ENTERPRISES (OR EQUAL). SEE IRRIGATION PLANS AND LEGEND FOR LOCATIONS AND VALVE NUMBERS).
4. UL LISTED WATERPROOF CONNECTORS, TYP.
5. LEAVE 24" EXCESS WIRE IN EACH VALVE BOX. WRAP AROUND 1/2" PIPE TO CREATE COILS.
6. SCH. 80 PVC NIPPLE W/FEMALE ADAPTERS.
7. SCH. 80 PVC UNION, BOTH SIDES OF VALVE ASSEMBLY.
8. LINE SIZE PLASTIC BALL VALVE UPSTREAM OF REMOTE CONTROL VALVE.
9. PVC LATERAL TO ZONE DISTRIBUTION (SEE IRRIGATION PLANS).
10. SCH. 80 PVC 45° ELL.
11. SCH. 80 PVC NIPPLE EXTENSION TO MAINLINE.
12. 6" MIN. DEPTH OF 3/4" DIA. CRUSHED DRAIN ROCK.
13. STANDARD RED BRICK (TYP. OF 4).
14. CONTROL WIRE FROM CONTROLLER.
15. COMMON WIRES.
16. PVC MAINLINE & FITTINGS.

NOTES
A. INSTALL ALL WIRES PER LOCAL CODE.
B. INSTALL 12" MAX. FROM PAVING, MOWSTRIPS OR HEADERS.

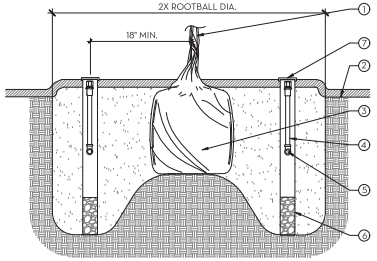
B REMOTE CONTROL VALVE
3/4" = 1'-0" — P-PR-NOR2-25



KEY NOTES:
1. FINISH GRADE BEFORE PLANTING, FLUSH IN TURF AREAS, AND 1-1/2" ABOVE GRADE IN MULCH AREAS.
2. MODEL PROS-O6-PRS40-CV
3. LATERAL TEE OR ELL
4. LATERAL PIPE
5. HUNTER SWING JOINT MODEL SJ-5XX-X

NOTES
A. USE TEFLON TAPE ON ALL THREADED FITTINGS.

C MP ROTATOR
3" = 1'-0" — P-PR-NOR2-10



KEY NOTES
1. TREE, REFER TO TREE PLANTING DETAIL.
2. FINISH GRADE, REFER TO TREE PLANTING DETAIL.
3. ROOT BALL, REFER TO TREE PLANTING DETAIL.
4. ROOT WATERING SYSTEM (SEE IRRIGATION LEGEND)
5. LATERAL PIPE WITH SWING JOINT ATTACHMENT.
6. PEA GRAVEL (6" DEEP) BELOW ROOT WATERING SYSTEM SLEEVE, TYP.
7. SET FLUSH WITH GRADE.

D TREE ROOT ZONE WATERING SYSTEM
NOT TO SCALE — P-PR-NOR2-32

APPROVED
MEET WATER CONSERVATION ORDINANCE
City of Sacramento
Levi Rynearson
Levi Rynearson 07/01/2025

Not for permitting or construction
JOBCOPY

PBR
ARCHITECT PBR, INC.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8819
916-985-4822

WDSLA
Wilson Design Studio Landscape Architecture
2020 I Street, Suite 320
Sacramento, CA 95811
916.524.5614 | www.wdslla.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

STAMP
REGISTERED LANDSCAPE ARCHITECT
WAYNE F. WILSON
No. 4728
Signature
EXPIRATION DATE: MAY 30, 2027
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220188
DATE 5/30/2025
DRAWN BY: JR CHKED BY: JM
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

IRRIGATION DETAILS

L2.4

This document is for plan review only
COM-2500586

S0.01 - GENERAL NOTES

ABBREVIATIONS

AB	ANCHOR BOLT	FTG	FOOTING	PWL	PANEL
ABV	ABOVE	GA	GAGE or GAUGE	PSF	POUNDS PER SQUARE FOOT
ACT	ACOUSTICAL TILE/CEILING	GALV	GALVANIZED	PSI	POUNDS PER SQUARE INCH
ADJ	ADJACENT	GB	GRADE BEAM	PSL	PARALLEL STRAND LUMBER
ADDL	ADDITIONAL	GL	GIRDER	PTDF	PRESSURE TREATED
AGGR	AGGREGATE	GLB	GLUE-LAMINATED BEAM		DOUGLAS FIR
ALUM	ALUMINUM	GR	GRADE	PT	POINT
ARCH	ARCHITECT	HD	HOLD-DOWN	R	RADIUS
ATC	ALASKAN YELLOW CEDAR	HDG	HOT-DIP GALVANIZED	RBB	RECESSED BEAM SECTION
@	AT	HDR	HEADER	RFTR	RAFTER
BF	BRACED FRAME	HGR	HANGER	REF	REFERENCE
BLDG	BUILDING	HS	HOOK	RGHT	RIGHT/RIGHTING
BLK/BLKG	BLOCK/BLOCKING	HORIZ	HORIZONTAL	RDGD	RIDGE/RIDGED
BM	BEAM	HT	HEIGHT/WIDTH BOLT	RWD	REDWOOD
BW	BEAM	HSB	HIGH STRENGTH GROUT	RWL	RAILING
BN	BOUNDARY NAIL	HSN	HORIZONTAL SLOTTED	RF	ROOF
BOT	BOTTOM		HOLE	RWD	REDWOOD
BRG	BEARING	HSS	HOLLOW STRUCTURAL SECTION	S	SIMPSON STANDARD BEAM
BTWN	BETWEEN			SAD	SEE ARCHITECTURAL DRAWINGS
BU	BUILT-UP	HT	HEIGHT		
BYND	BEYOND	ID	INSIDE DIAMETER	SE	SQUARE EDGE
C	CHANNEL	IB	IRREGULAR/IRREGULAR BOLT	SECT	SECTION
	CHANNEL		LIP TYPE	SCD	SEE DETAIL/DRAWING
CA	CALIFORNIA	INT	INTERIOR	SCHED	SCHEDULE
CAB	CABINET	JT	JOINT	SAD	SEE ARCHITECTURAL DRAWINGS
CB	CARRIAGE BOLT	LT	LIGHT	SFDN	STRUCTURAL ENGINEER OF RECORD
CFS	COLD FORMED STEEL	KP	KING POST		
CIP	CAST IN PLACE		KNEE WALL	SFRS	SEISMIC FORCE RESISTING SYSTEM
CJ	CONTROL JOINT/CUT GROOVE	LAM-F	LAMINATED LUMBER	SHTG	SHEATHING
CL	CENTERLINE	LGMF	LIGHT GAGE METAL FRAMING	SIM	SIMILAR
CLP	CONFLICT JOINT	LGMFC	LIGHT GAGE METAL FRAMING CONTRACTOR	SHTLT	SHEETLIGHT
	CONSTRUCTION			SAD	SEE ARCHITECTURAL DRAWINGS
CLG	CEILING	LL	LIVE LOAD	SMD	SHEET METAL SCREW
CLR	CLEAR	LLH	LONG/LED HORIZONTAL	SMD	SEE MECHANICAL DRAWINGS
CMU	CONCRETE	LLV	LONG/LED VERTICAL	SOG	SLAB ON GROUND
CONC	CONCRETE	LOC	LOCATION	SPCD	SPACED
CONN	CONNECTION	LS	LAG SCREW	SPD	SEE PLUMBING DRAWINGS
CONT	CONTINUOUS	LSL	LAMINATED STRAND LUMBER	SPEC	SPECIFICATION
COORD	COORDINATE/ COORDINATION	LVL	LAMINATED VENEER LUMBER	SQ	SQUARE
		LWC	LIGHT WEIGHT CONCRETE	SS	SEE STRUCTURAL or STAINLESS STEEL
CMU	CONCRETE MASONRY UNIT	MAX	MAXIMUM		
CSK	COUNTERSINK	MB	MACHINE BOLT	STGR	STAGGERED
CTR	CENTER/ING	MBR	MEMBER/MEMBRANE	STD	STANDARD
DBA	DEFORMED BAR ANCHOR		MALLEABLE/FLUTED	STRT	STRETCHER
DBL	DOUBLE	MC	MISCELLANEOUS CHANNEL	STL	STEEL
DCW	DOUGLAS FIR/FINAL WELD	MECH	MECHANICAL	STRUCT	STRUCTURAL
DF	DOUGLAS FIR	MEQ	MECHANICAL EQUIPMENT	SYM	SYMMETRICAL
DIA or ø	DIAMETER	MF	MOMENT FRAME	SYM	SYMMETRICAL
DIAG	DIAGONAL	MFR	MANUFACTURER	T&B	TOP AND BOTTOM
DIM	DIMENSION	MIN	MINIMUM	T&G	TONGUE AND GROOVE
DN	DOWN	MISC	MISCELLANEOUS	TEMP	TEMPORARY
DJ	DOWEL JOINT	MN	MALLEABLE IRON WASHER	THRD	THREADED
DL	DEAD LOAD	MTL	METAL	THRU	THROUGH
DO	DITTO	MU	MICRO LAM	TJI	TJI JOIST
DO	DITTO	MV	MEW	TN	TOE NAIL
DWG	DRAWING	N/A	NOT APPLICABLE	TOC	TOP OF CONCRETE
EA	EACH	NAT	NATURAL	TOF	TOP OF FOOTING
EA	EACH	NB	NAIL BED	TOM	TOP OF MASONRY
EE	EACH END	NBW	NON-WARPING GROUT	TOP	TOP OF PLYWOOD
EJ	EXPANSION JOINT	NTS	NOT TO SCALE	TOS	TOP OF STEEL
ELEC	ELECTRICAL	NWC	NORMAL-WEIGHT CONCRETE	TOT	TOTAL
ELEV	ELEVATION/ELEVATOR	OC	ON CENTER	TYP	TYPICAL
EMBED	EMBEDMENT	OC	ON CENTER	TYP	TYPICAL
EQ	EQUAL	OD	OUTSIDE DIAMETER	UNO	UNLESS NOTED OTHERWISE
EQUIP	EQUIPMENT	OH	OPPOSITE HAND	VERT	VERTICAL
EE	EACH END	OPNG	OPENING	VIF	VERIFY IN FIELD
EW	EACH WAY	OPP	OPPOSITE	VSH	VERTICAL SLOTTED HOLE
EXP	EXPANSION	OVE	OVERHEAD	W	WIDE FLANGE STEEL BEAM
EXT	EXTERIOR	PAF	POWDER ACTUATED FASTENER	W/	WITH
FAN	FOUNDATION	PWF	PREFABRICATED WOOD TRUSS	W/O	WITHOUT
FIN	FINISH	PL	PLATE or PROPERTY LINE	WD	WOOD
FP	FIREPROOF	PA	PLANT AGGREGATE	WHA	WELDED HEADED STUD
FPG	FINISH PLYWOOD GRADE	PC	PRECAST CONCRETE	WP	WORK POINT
FCR	FLOOR	PNT	PAINTED/PAINT	WPT	WORK POINT/WATERPROOF
FC	FACE NAIL	PEN	PANEL EDGE NAIL	WS	WOOD SCREW
FOC	FACE OF CONCRETE	PERP	PERPENDICULAR	WT	WEIGHT
FOM	FACE OF MASONRY	PJP	PARTIAL JOINT PENETRATION	WTS	WELDED THREADED STUD
FOS	FACE OF STUD	PJO	PARTIAL JOINT PENETRATION	WWR	WELDED WIRE REINFORCEMENT
FRMG	FRAMING	PLF	POUNDS PER LINEAR FOOT		
FS	FAR SIDE				

H ALUMINUM NOTES AND SPECIFICATIONS

1. TOP OF ALUMINUM ELEVATIONS ARE TO BE DETERMINED BY THE CONTRACTOR BASED ON ARCHITECTURAL DRAWINGS AND STRUCTURAL DRAWINGS & DETAILS.
2. STRUCTURAL DESIGN ASSUMES CAPACITY REDUCTION FROM WELDING.
3. ALL STEEL SURFACES (CARBON OR STAINLESS) IN CONTACT WITH ALUMINUM AND ALUMINUM SURFACES IN CONTACT WITH STEEL (CARBON OR STAINLESS) SHALL BE COATED WITH ZINC CHROMATE PAINT OR EQUIVALENT.
4. COAT ALL ALUMINUM SURFACES IN CONTACT WITH CONCRETE WITH BITUMINOUS PAINT OR EQUIVALENT.
5. SPECIFICATIONS
   A. ALUMINUM GRADES:
      STANDARD STRUCTURAL PROFILES.....6061-T6 ASTM B308 - Fty = 11 OR 15 KSI*
      *NOTES: WELDED YIELD STRENGTHS ARE DETERMINED BY WELD FILLER SPECIFIED BELOW.
   B. WELDING FILLER
      WELD SIZES OR ¼" OR SMALLER.....4043 - Ftuw = 24 KSI MIN
      ALL OTHER WELD SIZES.....5356 OR 5556 - Ftuw = 35 KSI MIN
   C. WORKMANSHIP AND DETAILS SHALL CONFORM TO THE ALUMINUM DESIGN MANUAL SPECIFICATIONS AND THE CBC UNLESS NOTED OTHERWISE.
   D. BOLT OR SCREW HOLES SHALL BE 1/16" LARGER IN DIAMETER THAN THE BOLT OR SCREW.
   E. WELDING ELECTRODES SHALL MEET AWS REQUIREMENTS.
   F. TEMPORARY SHORING AND BRACING SHALL BE USED AND SHALL BE ADEQUATE FOR ALL LOADS TO WHICH IT MAY BE SUBJECTED, LEAVE TEMPORARY BRACING AND SHORING IN PLACE AS LONG AS MAY BE REQUIRED FOR SAFETY, AND UNTIL FINAL FRAMING CONSTRUCTION IS COMPLETED.

I MATERIAL DATA

(INFORMATION SHOWN IS FOR STRUCTURAL DESIGN REFERENCE ONLY. SEE THE PROJECT SPECIFICATIONS FOR ALL MATERIAL SPECIFICATIONS.)

CONCRETE 28-DAY MINIMUM DESIGN STRENGTH:
F'c = 3,000 PSI INTERIOR SLAB ON GRADE

REINFORCING STEEL:
ASTM A615 GRADE 60 OR A706 GRADE 60 (F_y = 60,000 PSI)

STRUCTURAL STEEL (UNO):
W SHAPES - ASTM A992 (F_y = 50,000 PSI)
ANGLES, CHANNELS, AND PLATES - ASTM A36 (F_y = 36,000 PSI)
RECTANGULAR HSS - ASTM A500 GRADE C (F_y = 50,000 PSI)
ROUND HSS - ASTM A500 GRADE C (F_y = 46,000 PSI)
PIPES - ASTM A53 GRADE B (F_y = 35,000 PSI)

FASTENERS:
MACHINE BOLTS SHALL BE ASTM A307 GRADE A
HIGH STRENGTH BOLTS SHALL BE ASTM F3125 GRADE A325 OR F1852 UNO
ANCHOR RODS SHALL BE ASTM F1554 GR 36 UNO
ARC-WELDING ELECTRODES SHALL BE E70

COLD FORMED METAL FRAMING YIELD STRENGTH:
F_y = 33,000 PSI 33 & 43 MILS (20 & 18 GAUGE)
F_y = 50,000 PSI 54, 68, & 97 MILS (16, 14, & 12 GAUGE)

WOOD BASE DESIGN STRESSES (UNO):

SAWN LUMBER MEMBER	SPECIES AND MINIMUM GRADE, UNO	F_c (PSI)	F_v (PSI)	E (PSI)
6x POSTS	DOUGLAS FIR - #1	1200	170	$1.6x10^6$
6x BEAMS	DOUGLAS FIR - #1	1350	170	$1.6x10^6$
4x POSTS & BEAMS	DOUGLAS FIR - #1	1000	180	$1.7x10^6$
2x JOISTS, RAFTERS	DOUGLAS FIR - #2	900	180	$1.6x10^6$
@ MATERIAL	DOUGLAS FIR - #2	900	180	$1.6x10^6$
2x STUDS	DOUGLAS FIR - #2	900	180	$1.6x10^6$

FOR METAL CONNECTOR DESIGNATION REFER TO SIMPSON STRONG-TIE PER SPECIFICATIONS.

J EXISTING CONSTRUCTION NOTES

1. ORIGINAL CONSTRUCTION DRAWINGS WERE NOT AVAILABLE FOR REVIEW AT THE TIME THESE DOCUMENTS WERE PREPARED. EXISTING BUILDING CONDITIONS SHOWN ARE ASSUMED BASED ON INFORMATION PROVIDED BY OTHERS, SITE VISITS, AND ASSUMPTIONS BASED ON PROBABLE CONSTRUCTION METHODS. ACTUAL FIELD CONDITIONS MAY VARY.
2. ALL WORK NOT INDICATED AS EXISTING (E) SHALL BE ASSUMED TO BE NEW (N).
3. ANY REMOVAL, CUTTING, DRILLING, ETC OF EXISTING WORK SHALL BE PERFORMED WITH GREAT CARE. SMALL TOOLS SHALL BE USED IN ORDER NOT TO JEOPARDIZE THE STRUCTURAL INTEGRITY OF THE STRUCTURE. IF STRUCTURAL MEMBERS OR MECHANICAL, ELECTRICAL, OR ARCHITECTURAL ELEMENTS NOT INDICATED FOR REMOVAL INTERFERE WITH THE NEW WORK, THE ARCHITECT/ENGINEER SHALL BE IMMEDIATELY NOTIFIED AND PRIOR APPROVAL SHALL BE OBTAINED BEFORE REMOVAL OF THE MEMBERS.
4. DO NOT OVER CUT EXISTING WOOD, CONCRETE, MASONRY OR OTHER WORK TO REMAIN, CUTS SHALL BE MADE NEATLY TO A CORNER, THEN ALTERNATE MEANS SHALL BE USED TO REMOVE REMAINING MATERIAL. CONTRACTOR IS RESPONSIBLE FOR REPAIR/REPLACEMENT OF OVER CUT MATERIAL AS DIRECTED BY THE ARCHITECT AND/OR ENGINEER.
5. EXISTING DAMAGED STRUCTURAL MEMBERS WHICH ARE UNCOVERED SHALL BE REPORTED TO THE ARCHITECT/ENGINEER FOR REVIEW AND REPAIR.
6. EXISTING CONCRETE SURFACE ABUTTING NEW CONCRETE SHALL BE ROUGHENED TO ¼" AMPLITUDE AND THOROUGHLY CLEANED OF DUST, LOOSE AGGREGATE, LATTANCE, ETC.
7. EXISTING REINFORCING AND/OR STEEL EMBEDS THAT ARE EXPOSED DURING DEMOLITION SHALL BE WIRE-BRUSHED AND FOREIGN MATERIAL REMOVED PRIOR TO PLACEMENT OF NEW CONCRETE.
8. REMODELING REQUIRES ASSUMPTIONS BE MADE REGARDING EXISTING CONDITIONS WHICH MAY NOT BE VERIFIABLE WITHOUT DESTROYING OTHERWISE ADEQUATE OR SERVICEABLE PORTIONS OF THE STRUCTURE. THIS ANALYSIS DOES NOT MAKE ANY GUARANTEE TO THE ADEQUACY OF THE STRUCTURAL DESIGN OF THE EXISTING BUILDING NOT SPECIFICALLY ADDRESSED IN THE STRUCTURAL CALCULATIONS. ZFA SHALL NOT BE RESPONSIBLE FOR UNSATISFACTORY PERFORMANCE OF EXISTING PORTIONS OF THE STRUCTURE NOT SPECIFICALLY ADDRESSED IN THE CONSTRUCTION DOCUMENTS.

C FOUNDATION NOTES

1. ZFA RECOMMENDS GEOTECHNICAL REPORTS FOR ALL CONSTRUCTION PROJECTS. NO GEOTECHNICAL REPORT HAS BEEN PROVIDED FOR THIS PROJECT AND UNDER DIRECTION OF THE CLIENT, ZFA IS PROCEEDING WITH FOUNDATION DESIGN BASED ON THE CONVENTIONAL PROVISIONS AND THE MINIMUM ALLOWABLE SOIL BEARING PRESSURE ALLOWED PER THE CALIFORNIA BUILDING CODE, CHAPTER 18, HOWEVER, GEOTECHNICAL AND GEOLOGICAL CONDITIONS SUCH AS EXPANSIVE AND COMPRESSIBLE SOILS, LIQUEFACTION, SLOPE INSTABILITY, ETC MAY EXIST WHICH WARRANT SPECIAL DESIGN CONSIDERATIONS. ZFA SHALL NOT BE RESPONSIBLE FOR UNSATISFACTORY PERFORMANCE RESULTING FROM THESE CONDITIONS. ALLOWABLE (ASD) FOUNDATION DESIGN PRESSURES ARE PER CBC SECTION 1806.2
   SHALLOW FOOTINGS:
   DEAD LOAD + LIVE LOAD = 1,500 PSF
   DEAD LOAD + LIVE LOAD + LATERAL = 2,000 PSF
2. ALL SOILS WORK SHALL BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS AND THE REQUIREMENTS OF CHAPTER 18 OF THE CBC. ALL FOUNDATIONS SHALL BEAR ON FIRM, UNDISTURBED, NATIVE SOILS AT OR EXCEEDING DEPTHS SHOWN ON THE DRAWINGS, INCREASE FILL AND OR FOOTING DEPTH AS REQUIRED. ALL FOOTING EXCAVATIONS SHALL BE AS NEAT AS PRACTICABLE, MINIMUM OVER EXCAVATION IN WIDTH SHALL BE LESS THAN 12 INCHES OR 25% OF FOOTING WIDTH, WHICH EVER IS LESS, 6 INCHES MAXIMUM PER SIDE. LARGER OVER-EXCAVATIONS IN WIDTH SHALL BE FILLED WITH ADDITIONAL REINFORCED CONCRETE AS DIRECTED BY THE ENGINEER. OR FORMWORK SHALL BE PROVIDED. OVER-EXCAVATIONS IN DEPTH MAY BE FILLED WITH LEAN CONCRETE OR COMPACTED APPROVED BACKFILL. ALL LOOSE SOILS SHALL BE REMOVED FROM EXCAVATIONS PRIOR TO PLACEMENT OF REINFORCING OR CONCRETE.
3. TYPICAL SLAB CONCRETE TO MATCH (E) SLAB THICKNESS (4" MIN. 6" MAX. VIF) REINFORCED WITH #4 @ 16"oc EACH WAY AT MID-DEPTH OVER VAPOR RETARDER (PER SPECIFICATIONS) AND 4" MINIMUM FREE DRAINING COMPACTED ¾" CRUSHED ROCK ON SUBGRADE. DO NOT DRIVE CONCRETE TRUCKS OR LARGE SCREED MACHINES ON VAPOR RETARDER WITHOUT ADDITIONAL BUFFER MATERIAL AND APPROVAL FROM THE STRUCTURAL ENGINEER.
4. REFER TO ARCHITECTURAL AND PLUMBING DRAWINGS FOR PIPES OR CONDUITS AT SLAB. SEE 2/S1.01, 3/S1.01, 4/S1.01, AND 8/S1.01 FOR PIPES AND CONDUITS.
5. CONTROL JOINTS ARE NOT REQUIRED AT SLAB ON GRADE INFILLS.
6. FORMWORK STAKES ARE NOT PERMITTED WITHIN CONCRETE PLACEMENTS. IF REQUIRED, PROVIDE STEEL STAKES SLEEVED WITH PLASTIC PIPE OR SOLID PLASTIC STAKES. WOOD STAKES NOT PERMITTED. FLUSH CUT SLEEVE OR STAKE AND FILL SLEEVES IMMEDIATELY WITH GROUT. WHERE STAKES PENETRATE VAPOR RETARDER, TAPE OR SEAL PER MANUFACTURER'S RECOMMENDATIONS.
7. DO NOT UNDERCUT EXISTING FOUNDATIONS. NOTIFY ENGINEER FOR REVIEW AND POSSIBLE REVISIONS, IF EXISTING FOUNDATION CONDITIONS ARE NOT AS SHOWN.

D SPECIAL INSPECTION BY OWNERS TESTING AGENCY

SPECIAL INSPECTIONS AND TESTING SHALL BE PERFORMED BY AN APPROVED AGENCY IN ACCORDANCE WITH CBC CHAPTER 17 AND THE STATEMENT OF SPECIAL INSPECTIONS AS REQUIRED BY CBC SECTIONS 1704.2 AND 1704.3 FOR BUILDING STRUCTURAL ELEMENTS SUMMARIZED AS FOLLOWS:

1. **STRUCTURAL STEEL CONSTRUCTION** PER CBC SECTIONS 1705.2, 1705.13.1, 1705.14.1, AND TABLE 1705.2.3 INCLUDING MATERIAL IDENTIFICATION, SHOP AND FIELD WELDING, AND INSTALLATION OF HIGH-STRENGTH BOLTS.
2. **SOILS** PER CBC SECTION 1705.6, TABLE 1705.6, AND THE APPROVED SOILS REPORT INCLUDING SUBGRADE PREPARATION, FOUNDATION BEARING MATERIALS AND DEPTH OF EXCAVATIONS, AND VERIFICATION, PLACEMENT AND TESTING OF CONTROLLED FILL.
3. **SPECIAL CASES** PER CBC SECTION 1705.1.1 AND PRODUCT ICC REPORTS FOR ALL STRUCTURAL MATERIALS AND SYSTEMS REQUIRED TO BE INSTALLED IN ACCORDANCE WITH ADDITIONAL MANUFACTURER'S INSTRUCTIONS THAT PRESCRIBE REQUIREMENTS NOT CONTAINED IN THE CBC OR REFERENCED STANDARDS INCLUDING POST-INSTALLED ANCHOR BOLTS IN CONCRETE AND CMU.

E WOOD FRAMING NOTES

1. FOR ROOF DRAINAGE, TOP OF FRAMING BETWEEN NOTED POINTS IS A STRAIGHT LINE.
2. ALL MECHANICAL SUPPLY AND RETURN OPENINGS TO BE BETWEEN FRAMING UNO.
3. THE CONTRACTOR SHALL VERIFY THAT THE MOISTURE CONTENT OF ALL FRAMING LUMBER AND SHEATHING MEET THE REQUIREMENTS OF THE SPECIFICATIONS AT THE TIME OF INSTALLATION AND AT CLOSE-IN.
4. VENTING IS REQUIRED IN ENCLOSED FRAMING AREAS, SAD.
5. HANGERS, CLIPS, NAILS ETC, ATTACHED TO PRESEVATIVE TREATED LUMBER SHALL BE GALVANIZED OR SIMILAR PER CBC 2304.10.6.

F STEEL NOTES

1. TOP OF STEEL ELEVATIONS ARE TO BE DETERMINED BY THE CONTRACTOR BASED ON ARCHITECTURAL DRAWINGS AND STRUCTURAL DRAWINGS.

G COLD-FORMED STEEL FRAMING NOTES

1. SEE PLANS, DETAILS, AND ARCHITECTURAL DRAWINGS FOR METAL FRAMING LOCATIONS. SEE ARCHITECTURAL DRAWINGS FOR WALL WIDTHS AND CONFIGURATIONS.
2. EACH FRAMING MEMBER IS DESIGNATED BY A FOUR PART CODE INDICATING THE SIZE (BOTH DEPTH AND FLANGE WIDTH), STYLE, AND MATERIAL THICKNESS, FOR EXAMPLE, 600S162-54:
   600 - MEMBER DEPTH IN 1/100" (6")
   S - MEMBER STYLE - S=STUD, T=TRACK
   162 - FLANGE WIDTH IN 1/100" (1¾")
   54 - MATERIAL THICKNESS IN MILS (0.054")
3. TYPICAL METAL STUDS AND FRAMING ARE PER SCHEDULE 1/S1.02 UNO. SUBMIT MANUFACTURER'S INFORMATION SHOWING CONFORMANCE TO CRITERIA SHOWN ON DRAWINGS AND SPECIFICATIONS. MINIMUM METAL THICKNESS = 33MILS (20GA).
4. TYPICAL TRACKS ARE SAME GAUGE (MILS) AS STUD, 43 MILS MINIMUM UNO. FLANGE TO BE 1¼" MIN.
5. ALL STUDS TO BE CONTINUOUS, ALL TRACKS IN HEADERS AND SILLS TO BE CONTINUOUS SINGLE-PIECE BETWEEN JAMB STUDS.
6. FASTENING OF COMPONENTS SHALL BE WITH SELF-DRILLING SCREWS OR WELDING, SCREWS OR WELDS NOT SHOWN SHALL BE OF SUFFICIENT SIZE TO ENSURE THE STRENGTH OF THE CONNECTION. ALL WELDS OF GALVANIZED STEEL SHALL BE TOUCHED-UP WITH A ZINC-RICH PAINT. WIRE TYING OF COMPONENTS SHALL NOT BE PERMITTED.
7. EXPANSION ANCHOR OR SCREW ANCHOR SIZE AND EMBEDMENT ARE AS REQUIRED PER DRAWINGS. MINIMUM STEEL EDGE DISTANCE IN TRACK IS 2x ANCHOR DIAMETER AND MINIMUM SPACING IS 3x ANCHOR DIAMETER UNO, SEE EXPANSION OR SCREW ANCHOR SCHEDULE FOR CONCRETE REQUIREMENTS. FOR EXPANSION ANCHOR THROUGH METAL TRACK, USE 3" SQUARE x ¼" PLATE WASHER (OR EQUIVALENT ROUND WASHER) AT TRACK, DRILL HOLE IN PLATE WASHER FOR EXPANSION ANCHOR AS NEEDED TO ACHIEVE MINIMUM EDGE DISTANCES.
8. NON-BEARING STUDS TO BE LATERALLY BRACED WITH GYPSUM BOARD BOTH SIDES PER CBC OR BRACED AT 4'-0"oc MAXIMUM PER 1/S5.03.
9. TYPICAL STUD-TO-TRACK CONNECTIONS PER 3/S1.02 UNO. MAXIMUM GAP OF ¼" IS ALLOWED BETWEEN STUDS AND TRACK AT STANDARD WALLS. TRIM STUDS TO FULLY BEAR.
10. TYPICAL WALL INTERSECTIONS PER 2/S1.02 UNO.
11. PROVIDE LIGHT GAUGE METAL BACKING FOR ARCHITECTURAL FINISHES AND FURNISHINGS, SAD.
12. CEILING FRAMING PER 7/S1.02.
13. FOR POWER ACTUATED FASTENERS (PAF) UNO:

BASE MATERIAL	FASTENER TYPE	SIZE	MINIMUM SPACING	MINIMUM EDGE DISTANCE	NOTES
CONCRETE	HILTI X-U (ICC ESR-2269)	0.157"ø MIN ¾" LONG	4"	3"	DO NOT USE PAF AT CONCRETE CURB
STRUCTURAL STEEL	HILTI X-U (ICC ESR-2269)	0.157"ø x ¾" LONG	1"	½"	

A DESIGN CRITERIA

DESIGN CRITERIA:	2022 CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 2 (CBC) AND 2022 CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 10 (CEBC)
ROOF LIVE LOAD:	20 PSF (REDUCIBLE)
RISK CATEGORY:	II
WIND DATA:	ULTIMATE WIND SPEED (3 SEC GUST) IN MPH: 94 WIND EXPOSURE: B INTERNAL WIND PRESSURE COEFFICIENT (GCPI) = ±0.18 COMPONENTS AND CLADDING DESIGN PRESSURES FOR SYSTEMS DESIGNED BY OTHERS SHALL COMPLY WITH THE "ASCE 7-16" DESIGN STANDARD
ASCE 7-16 EARTHQUAKE DATA:	DESIGN STANDARD: 2016 AMERICAN SOCIETY OF CIVIL ENGINEERS STANDARD (ASCE 7-16) SEISMIC IMPORTANCE FACTOR, I_e 1.0 MAPPED SPECTRAL RESPONSE ACCELERATIONS: S_s = 0.541; S_1 = 0.347 SITE CLASS: D (DEFAULT) SPECTRAL RESPONSE COEFFICIENTS: S_{DS} = 0.493; S_{D1} = 0.347 SEISMIC DESIGN CATEGORY: D
SCOPE:	INTERIOR TENANT IMPROVEMENTS INCLUDING ROOF TOP MECHANICAL UNITS AND NON-BEARING WALLS, NEW ROLL-UP DOOR OPENING IN EXISTING EXTERIOR CMU WALL, NEW AWNING ATTACHMENTS, AND NEW OVERHANG SUPPORT AT FRONT ENTRANCE FACADE.

B GENERAL NOTES

1. REFER TO SHEETS S1.01, S1.02, S1.03 AND S1.04 FOR STANDARD DETAILS OF CONSTRUCTION. REFER TO THE PROJECT SPECIFICATIONS FOR MATERIALS AND METHODS.
2. BUILDING DIMENSIONS SHOWN ARE FOR GENERAL REFERENCE ONLY. SEE ARCHITECTURAL DRAWINGS (SAD) FOR ALL ACTUAL BUILDING DIMENSIONS. ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER SO CLARIFICATION CAN BE MADE PRIOR TO COMMENCING WORK.
3. STRUCTURAL DRAWINGS SHALL NOT BE SCALED, ALL DIMENSIONS AND FIT SHALL BE DETERMINED AND VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCING WORK.
4. DETAILS NOT FULLY OR SPECIFICALLY SHOWN SHALL BE OF SAME NATURE AS OTHER SIMILAR CONDITIONS.
5. REFER TO ARCHITECTURAL DRAWINGS FOR SIDEWALK SLABS AND DIMENSIONS.
6. COORDINATION OF MECHANICAL, ELECTRICAL, PLUMBING, AND SITE UTILITY SYSTEMS WITH THE STRUCTURAL SYSTEM IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. USE DETAILS ON SHEETS S1.01 THROUGH S1.04, AT CONDITIONS WHERE THESE DETAILS DO NOT APPEAR TO APPLY, NOTIFY THE STRUCTURAL ENGINEER PRIOR TO INSTALLATION, AT CONDITIONS WHERE FIELD MODIFICATIONS OF MECHANICAL, ELECTRICAL, PLUMBING, OR SITE UTILITIES AFFECT STRUCTURAL SYSTEMS, NOTIFY STRUCTURAL ENGINEER PRIOR TO INSTALLATION.
7. VERIFY WEIGHTS AND LOCATIONS OF MECHANICAL UNITS WITH MECHANICAL ENGINEER PRIOR TO PLACEMENT. UNITS VARYING OVER 10% IN WEIGHT SHALL BE REVIEWED BY THE STRUCTURAL ENGINEER PRIOR TO INSTALLATION (MECHANICAL WEIGHTS SHOWN ARE MAXIMUM). CONTRACTOR TO VERIFY MECHANICAL UNIT SIZES AND WEIGHTS AS INSTALLED PRIOR TO INSTALLATION OF SPECIAL FRAMING TO ENSURE CORRECT PLACEMENT UNDER CURBS, ETC, SEE 1/M- .
8. SHORING AND BRACING DESIGN, MATERIALS AND INSTALLATION SHALL BE PROVIDED BY THE GENERAL CONTRACTOR, AND SHALL BE ADEQUATE FOR ALL LOADS, LEAVE IN PLACE AS LONG AS MAY BE REQUIRED FOR SAFETY AND UNTIL FINAL STRUCTURAL CONSTRUCTION IS COMPLETED. THE CONTRACTOR SHALL ENGAGE A LICENSED CIVIL OR STRUCTURAL ENGINEER TO PROVIDE SHORING.
9. SPECIAL INSPECTIONS ARE REQUIRED PER D/S5.01 AND THE TESTING AND INSPECTION FORM.
10. VEHICULAR TRAFFIC, HEAVY EQUIPMENT AND MATERIAL STAGING SHALL NOT BE ALLOWED ADJACENT TO ANY RETAINING/BASEMENT WALL, NEW OR EXISTING WITHIN A HORIZONTAL DISTANCE EQUAL TO THE WALL HEIGHT MEASURED FROM THE BOTTOM OF FOOTING OR 5'-0" WHICHEVER IS GREATER, UNLESS APPROVED BY THE STRUCTURAL ENGINEER OR NOTED OTHERWISE. WITHIN THE ZONE, ONLY HAND-OPERATED EQUIPMENT ("WHACKERS", VIBRATORY PLATES, OR PNEUMATIC COMPACTORS) SHALL BE USED TO COMPACT THE BACKFILL SOILS. BACKFILL & DRAINAGE ARE PER GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. DO NOT BACKFILL UNTIL CONCRETE HAS REACHED SPECIFIED STRENGTH AND 14 DAYS MINIMUM.
11. STRUCTURAL OBSERVATION PER CBC SECTION 1704.6 IS NOT REQUIRED.
12. ON THE NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR DRAWINGS APPROVED BY THE CITY OF SACRAMENTO STRUCTURAL PLAN REVIEW ON SEPTEMBER 27, 2023, THE FOLLOWING CHANGES SHALL BE IMPLEMENTED:
    - 1/S4.1: LTTP2 SUB-PURLIN ANCHOR SPACING SHALL BE CHANGED TO 8'-0"oc IN LIEU OF 48"oc
    - 3/S4.1: HDU5 ANCHOR SPACING SHALL BE CHANGED TO 8'-0"oc IN LIEU OF 48"oc
    - 6/S4.1: HTT4 ANCHOR SPACING SHALL BE CHANGED TO 12'-0"oc IN LIEU OF 6'-0"oc
13. SUBMIT ENGINEERING FOR DEFERRED APPROVAL ITEMS TO ARCHITECT/ENGINEER OR REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE, WHO SHALL REVIEW THEM. GENERAL CONTRACTOR SHALL FORWARD THEM TO THE BUILDING OFFICIAL, WITH A NOTATION INDICATING THAT THE DEFERRED SUBMITTAL DOCUMENTS HAVE BEEN REVIEWED AND THAT THEY HAVE BEEN FOUND TO BE IN GENERAL CONFORMANCE WITH THE DESIGN OF THE BUILDING. THE DEFERRED SUBMITTAL ITEMS SHALL NOT BE FABRICATED OR INSTALLED UNTIL THEIR DESIGN AND SUBMITTAL DOCUMENTS HAVE BEEN APPROVED BY THE BUILDING OFFICIAL. DEFERRED APPROVAL ITEMS SHALL BE DESIGNED AND DETAILED BY MANUFACTURER TO ACCOMMODATE HORIZONTAL AND VERTICAL MOVEMENTS AS NOTED IN STRUCTURAL DRAWINGS. GENERAL CONTRACTOR SHALL REVIEW AND APPROVE DIMENSIONS AND DETAILS SHOWN ON THE SHOP DRAWINGS PRIOR TO SUBMITTAL. MANUFACTURER TO PROVIDE DRAWINGS AND CALCULATIONS DESIGNED IN ACCORDANCE WITH THE CBC AND SPECIFICATIONS, PREPARED AND SIGNED BY A CALIFORNIA LICENSED CIVIL OR STRUCTURAL ENGINEER FOR THE FOLLOWING ITEMS, UNLESS NOTED OTHERWISE:
    A. AWNINGS - STRUCTURAL DESIGN AND DRAWINGS OF AWNING SHALL BE PROVIDED BY THE AWNING MANUFACTURER/SUPPLIER.

SHEET INDEX	
S0.01	GENERAL NOTES
S1.01	TYPICAL MODERNIZATION CONCRETE DETAILS
S1.02	TYPICAL CFS ELEVATION AND CONNECTION DETAILS
S1.03	TYPICAL CFS SOFFIT & MISCELLANEOUS DETAILS
S1.04	TYPICAL MODERNIZATION WOOD DETAILS
S2.01	SLAB PLAN AND ELEVATIONS
S2.02	CEILING FRAMING PLAN
S2.03	ROOF FRAMING PLAN
S4.01	DETAILS

APPROVED
City of Sacramento Development Services
STRUCTURAL
By: Vincent Wang
on Jul 01, 2025
SPECIAL INSPECTION REQUIRED

JOBCOPY

PBK

ARCHITECT PBK, Inc.
FOLSOM PBK.com
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

CONSULTANT
[redacted]
601 university avenue | suite 185 zfa.com
sacramento ca 95825 916.204.7924
zfa job no. 23089 copyright © 2023

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1120 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCT

JOBCOPY

APPROVED
City of Sacramento Plan Review
STRUCTURAL
By: Vincent Wang
on Jul 01, 2025

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

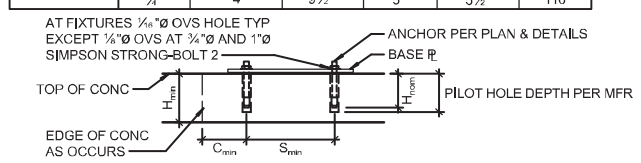
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

STAINLESS STL EXPANSION ANCHORS IN 2500 PSI MIN CONC

ANCHOR TYPE	ANCHOR & PILOT HOLE DIA	MIN NOMINAL EMBED H_{nom}	MIN EDGE DISTANCE C_{min}	MIN SPACING S_{min}	MIN CONC THICKNESS H_{min}	INSTALL TORQUE (FT-LB)
SIMPSON STRONG-BOLT 2 (ICC-ESR 3037)	3/8"	1 5/8"	6"	10"	3 1/4"	30
	1/2"	2 3/4"	6 1/2"	8"	4 1/2"	65
	5/8"	3 3/8"	4"	8"	5 1/2"	80
	3/4"	4 1/2"	6"	6 1/2"	6 3/4"	150
HILTI KB-TZ2 (ICC-ESR 4266)	3/8"	1 7/8"	5"	8"	3 1/4"	30
	1/2"	2 1/2"	2 3/4"	5 1/2"	4"	40
	5/8"	3 1/4"	4"	7"	5"	60
	3/4"	4"	5"	11"	5 1/2"	125

CARBON STEEL EXPANSION ANCHORS IN 2500 PSI MIN CONC

ANCHOR TYPE	ANCHOR & PILOT HOLE DIA	MIN NOMINAL EMBED H_{nom}	MIN EDGE DISTANCE C_{min}	MIN SPCG S_{min}	MIN CONC THICKNESS H_{min}	INSTALL TORQUE (FT-LB)
SIMPSON STRONG-BOLT 2 (ICC-ESR 3037)	3/8"	1 7/8"	6"	3"	3 1/4"	30
	1/2"	2 3/4"	6"	6"	4"	60
	5/8"	3 3/8"	6 1/2"	5"	5 1/2"	90
	3/4"	4 1/2"	4 1/4"	10"	6"	150
	1"	5 1/4"	8"	8"	9"	230
HILTI KB1 (IAPMO-ER 678)	3/8"	1 7/8"	8"	8"	3 3/8"	20
	1/2"	2 3/8"	4"	8 1/2"	4"	40
	5/8"	3 1/4"	5 1/2"	8"	5"	60
	3/4"	4"	9 1/2"	5"	5 1/2"	110



NOTES:
1. EXCEPT AT EXTERIOR EXPOSURE CONDITIONS, PROVIDE CARBON STEEL ANCHORS UNO. INSTALL EXPANSION ANCHORS PER MANUFACTURER'S INFORMATION AND ICC REPORT INSTRUCTIONS. SPECIAL INSPECTION IS REQUIRED PER SECTION 1705 AND THE REQUIREMENTS OF THE ICC REPORTS.
2. CONTRACTOR TO VERIFY MINIMUM EDGE DISTANCES, SPACING AND THICKNESS ARE IN ACCORDANCE W/ SCHEDULE PRIOR TO INSTALLING ANCHOR.
3. NO CORE DRILLING PERMITTED. USE CARE AND CAUTION TO AVOID CUTTING OR DAMAGING THE EXISTING REINFORCING BARS. MAINTAIN 1" CLEARANCE BETWEEN REINFORCEMENT AND THE DRILLED-IN ANCHOR. FILL ABANDONED HOLES W/ HIGH STRENGTH GROUT.
4. THE SPECIAL INSPECTOR SHALL PERFORM PERIODIC/CONTINUOUS INSPECTION IN ACCORDANCE WITH TABLE 1705.3. THE SPECIAL INSPECTOR SHALL INSPECT ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE CLEANLINESS, EMBEDMENT DEPTH, CONCRETE TYPE, CONCRETE COMPRESSIVE STRENGTH, DRILL BIT DIAMETER, HOLE DEPTH, EDGE DISTANCE(S), ANCHOR SPACING(S), CONCRETE THICKNESS, AND TIGHTENING TORQUE.

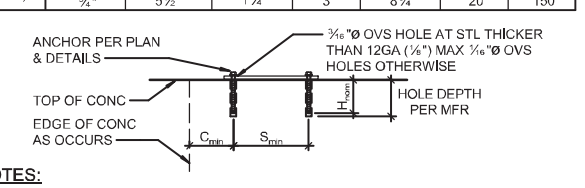
12 EXPANSION ANCHOR IN CONCRETE
3/4" = 1'-0"

CARBON SCREW ANCHOR IN 2500 PSI MIN CONCRETE

ANCHOR TYPE	ANCHOR AND PILOT HOLE DIA	MINIMUM EMBEDMENT H_{nom}	MINIMUM EDGE DIST C_{min}	MINIMUM SPCG S_{min}	MINIMUM CONCRETE THICKNESS H_{min}	MINIMUM INSTALL TORQUE (FT-LB)	MAXIMUM INSTALL TORQUE (FT-LB)
SIMPSON TITEN HD (ICC-ESR 2713)	1/4"	1 5/8"	1 1/2"	1 1/2"	3 1/4"	10	24
	3/8"	2 1/2"	1 3/4"	3"	4"	10	50
	1/2"	3 1/4"	1 3/4"	3"	5"	10	65
	5/8"	4"	1 3/4"	3"	6"	10	100
	3/4"	5 1/2"	1 3/4"	3"	8 3/4"	20	150
HILTI KH-EZ (ICC-ESR 3027)	1/4"	1 5/8"	1 1/2"	1 1/2"	3 1/4"	10	18
	3/8"	2 1/2"	1 1/2"	3"	4"	10	40
	1/2"	3"	1 3/4"	3"	4 3/4"	10	45
	5/8"	3 1/4"	1 3/4"	4"	5"	10	85
	3/4"	4"	1 3/4"	4"	6"	20	95

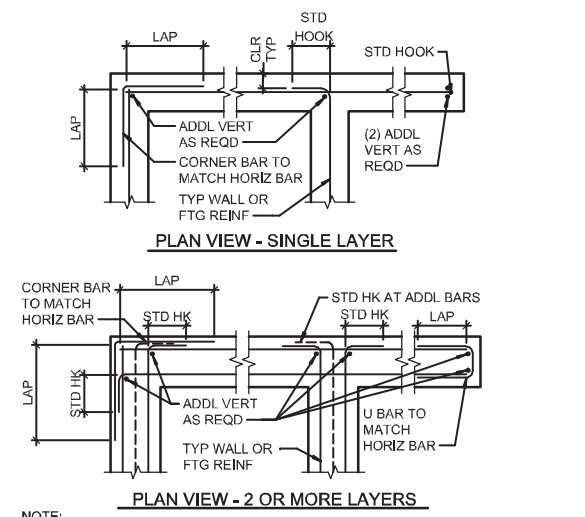
STAINLESS STEEL SCREW ANCHOR IN 2500 PSI MIN CONCRETE

ANCHOR TYPE	ANCHOR AND PILOT HOLE DIA	MINIMUM EMBEDMENT H_{nom}	MINIMUM EDGE DIST C_{min}	MINIMUM SPCG S_{min}	MINIMUM CONCRETE THICKNESS H_{min}	MINIMUM INSTALL TORQUE (FT-LB)	MAXIMUM INSTALL TORQUE (FT-LB)
SIMPSON TITEN HDSS (IAPMO UES ER-493)	3/8"	2 1/2"	1 3/4"	3"	4"	10	40
	1/2"	3 1/4"	1 3/4"	4"	5"	10	70
	5/8"	4"	1 3/4"	3"	6"	10	85
	3/4"	5 1/2"	1 3/4"	3"	8 3/4"	20	150



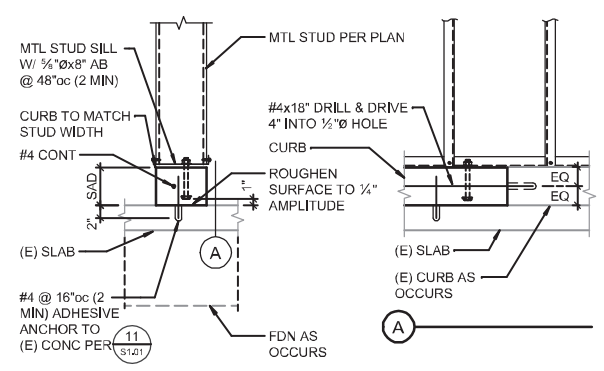
NOTES:
1. EXCEPT AT EXTERIOR EXPOSURE CONDITIONS, PROVIDE CARBON STEEL ANCHORS UNO. INSTALL SCREW ANCHORS PER MANUFACTURER'S INFORMATION AND ICC REPORT INSTRUCTIONS. SPECIAL INSPECTION IS REQUIRED PER SECTION 1705 OF THE CBC AND THE REQUIREMENTS OF THE ICC REPORTS. INSTALLED ANCHORS SHALL BRING CONNECTED PLIES INTO FIRM CONTACT, MEETING THE INSTALL TORQUE BUT NOT EXCEEDING THE MAXIMUM INSTALL TORQUE.
2. CONTRACTOR TO VERIFY MINIMUM EDGE DISTANCES, SPACING AND THICKNESS ARE IN ACCORDANCE W/ SCHEDULE PRIOR TO INSTALLING ANCHOR.
3. HOLES TO BE DRILLED W/ ROTARY DRILL ONLY. WHEN INSTALLING DRILLED-IN ANCHORS IN EXISTING REINFORCED CONCRETE, USE CARE AND CAUTION TO AVOID CUTTING OR DAMAGING THE EXISTING REINFORCING BARS. MAINTAIN 1" CLEARANCE BETWEEN REINFORCEMENT AND THE DRILLED-IN ANCHOR. FILL ABANDONED HOLES W/ HIGH STRENGTH GROUT.
4. THE SPECIAL INSPECTOR SHALL PERFORM PERIODIC/CONTINUOUS INSPECTION IN ACCORDANCE WITH TABLE 1705.3. THE SPECIAL INSPECTOR SHALL INSPECT ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE CLEANLINESS, EMBEDMENT DEPTH, CONCRETE TYPE, CONCRETE COMPRESSIVE STRENGTH, DRILL BIT DIAMETER, HOLE DEPTH, EDGE DISTANCE(S), ANCHOR SPACING(S), CONCRETE THICKNESS, AND TIGHTENING TORQUE.

10 SCREW ANCHOR IN CONCRETE
3/4" = 1'-0"



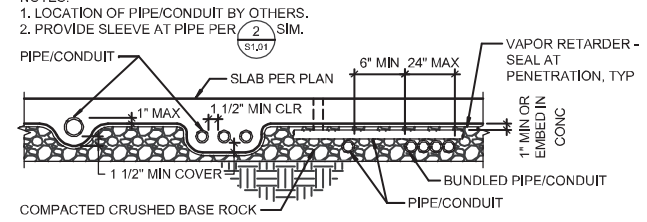
NOTE:
FOOTING REINFORCING AT CORNER AND INTERSECTION TO BE SIMILAR

7 TYPICAL CORNER, INTERSECTION AND END REINFORCING
3/4" = 1'-0"

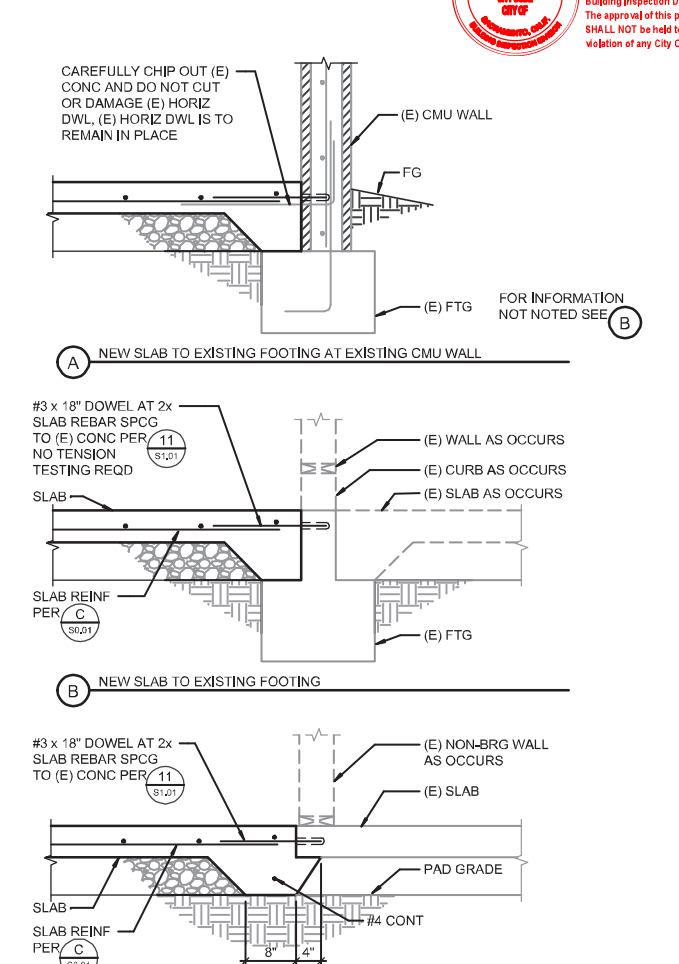


8 NEW CURB AT EXISTING SLAB
3/4" = 1'-0"

NOTES:
1. LOCATION OF PIPE/CONDUIT BY OTHERS.
2. PROVIDE SLEEVE AT PIPE PER 2/S1.01 SIM.



9 CONDUIT & PIPE AT SLAB ON GRADE
3/4" = 1'-0"



5 NEW SLAB TO EXISTING SLAB
3/4" = 1'-0"

MINIMUM BAR LAPS FOR REINFORCING STEEL CONCRETE STRENGTH: 3000 PSI OR GREATER (STAGGER SPLICES)

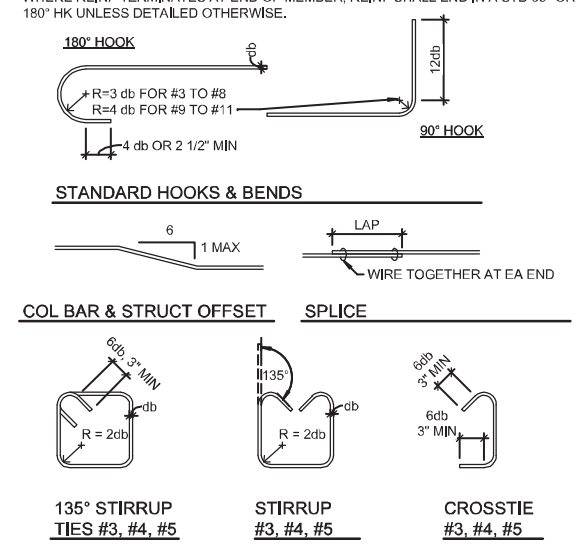
SIZE	LAP LENGTH
#3	19"
#4	25"
#5	37"*

(CLASS B TOP BAR)
BAR SPCG SHALL NOT BE LESS THAN 4x BAR DIA OR 4".
* WHERE COVER NOT LESS THAN 1½", #5 LAP LENGTH = 31"

CONC COVER FOR REINF STL ---------------'CLR'

CAST AGAINST EARTH OR GR ---------------------- 3"
EXPOSED TO EARTH (FORMED) OR WEATHER
#5 & SMALLER ---------------------- 1½"
#6 & LARGER ---------------------- 2"
NOT EXPOSED TO EARTH OR WEATHER
#5 & SMALLER ---------------------- 1"
#6 & LARGER, & ALL BM STIRRUPS, COL TIES & SPIRALS ------ 1½"

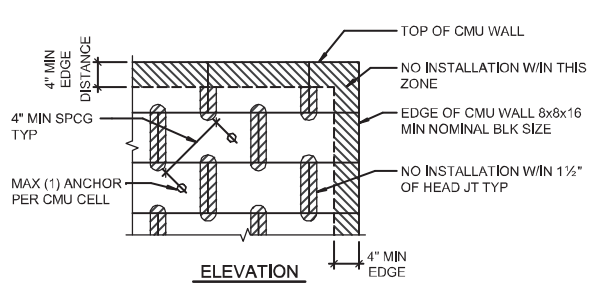
ALL REINF SHALL EXTEND AS FAR AS POSSIBLE, WHERE BAR SPLICES ARE REQUIRED, BARS SHALL BE LAPPED PER SCHEDULE ABOVE UNLESS DETAILED OTHERWISE. WHERE REINF TERMINATES AT END OF MEMBER, REINF SHALL END IN A STD 90° OR 180° HK UNLESS DETAILED OTHERWISE.



1 TYPICAL REINFORCING DETAILS (f'c = 3000psi MIN)
3/4" = 1'-0"

ADHESIVE ANCHOR IN FACE OF 2000 PSI MIN CMU

ANCHOR TYPE	THRD ROD DIAMETER	REBAR SIZE	PILOT HOLE DIAMETER	MINIMUM EMBEDMENT DEPTH
SIMPSON SET-3G (ICC ESR-4844)	-	#3	1/2"	3"
	-	#4	5/8"	4"
	-	#5	3/4"	5"
	3/8"	-	7/16"	3"
	1/2"	-	9/16"	4"
	5/8"	-	11/16"	5"
	3/4"	-	7/8"	6"
HILTI HIT-HY 270 (ICC ESR-4143)	-	#3	1/2"	3"
	-	#4	5/8"	4"
	3/8"	-	7/16"	3"
	1/2"	-	9/16"	4"
	5/8"	#5	3/4"	5"
	3/4"	#6	7/8"	6"

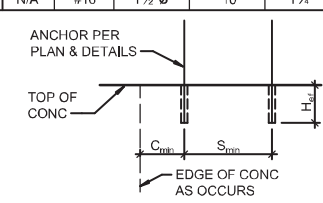


NOTES:
1. INSTALL ADHESIVE ANCHORS PER MANUFACTURER'S INFORMATION AND ICC REPORT INSTRUCTIONS. SPECIAL INSPECTION IS REQUIRED PER SECTION 1705 OF THE CBC AND THE REQUIREMENTS OF THE ICC REPORTS.
2. CONTRACTOR TO VERIFY MINIMUM EDGE DISTANCES, SPACING AND LOCATION ARE IN ACCORDANCE W/ THE TABLE ABOVE PRIOR TO INSTALLING ANCHOR.
3. NO CORE DRILLING PERMITTED. USE CARE AND CAUTION TO AVOID CUTTING OR DAMAGING THE EXISTING REINFORCING BARS. MAINTAIN A 1" CLEARANCE BETWEEN REINFORCEMENT AND THE DRILLED-IN ANCHOR. FILL ABANDONED HOLES W/ HIGH STRENGTH GROUT.
4. THE SPECIAL INSPECTOR SHALL PERFORM PERIODIC/CONTINUOUS INSPECTION IN ACCORDANCE WITH TABLE 1705.3. THE SPECIAL INSPECTOR SHALL INSPECT ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE CLEANLINESS, EMBEDMENT DEPTH, CMU TYPE, CMU COMPRESSIVE STRENGTH, DRILL BIT DIAMETER, HOLE DEPTH, EDGE DISTANCE(S), ANCHOR SPACING(S), AND CMU THICKNESS.

13 ADHESIVE ANCHOR IN FACE OF CMU
3/4" = 1'-0"

ADHESIVE ANCHOR IN 2500 PSI MIN CONCRETE

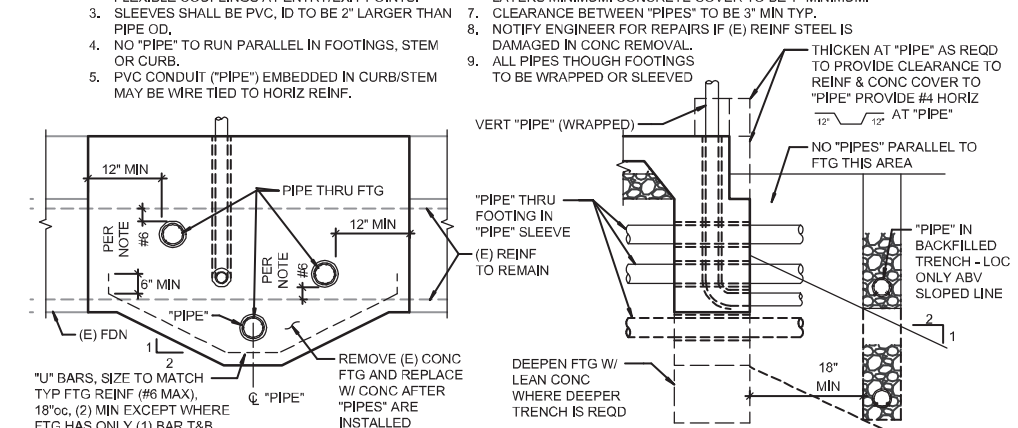
ADHESIVE TYPE	ANCHOR THRD ROD	ANCHOR REBAR	PILOT HOLE	MIN EMBED UNO H_{ef}	MIN EDGE DISTANCE C_{min}	MIN SPCG S_{min}	MIN CONC DEPTH H_{min}
SIMPSON SET-3G (ICC-ESR 4057)	-	#3	1/2"Ø	3"	1 3/4"	3"	H_{ef} + 1 1/4"
	-	#4	5/8"Ø	4"	1 3/4"	3"	H_{ef} + 1 1/4"
	-	#5	3/4"Ø	5"	1 3/4"	3"	H_{ef} + 1 1/2"
	3/8"Ø	-	7/16"Ø	3"	1 3/4"	3"	H_{ef} + 1 1/4"
	1/2"Ø	-	9/16"Ø	4"	1 3/4"	3"	H_{ef} + 1 1/4"
	5/8"Ø	-	11/16"Ø	5"	1 3/4"	3"	H_{ef} + 1 3/8"
	3/4"Ø	#6	7/8"Ø	6"	1 3/4"	3"	H_{ef} + 1 3/4"
	7/8"Ø	#7	1"Ø	7"	1 3/4"	3"	H_{ef} + 2"
	1"Ø	#8	1 1/8"Ø	8"	1 3/4"	3"	H_{ef} + 2 1/4"
	1 1/4"Ø	#10	1 3/8"Ø	10"	2 3/4"	6"	H_{ef} + 2 3/4"
HILTI HIT-HY 200R V3 (ICC-ESR 4868)	3/8"Ø	N/A	7/16"Ø	3"	1 3/4"	1 7/8"	H_{ef} + 1 1/4"
	N/A	#3	1/2"Ø	3"	1 3/4"	1 7/8"	
	1/2"Ø	N/A	9/16"Ø	4"	1 3/4"	2 1/2"	
	N/A	#4	5/8"Ø	4"	1 3/4"	2 1/2"	
	5/8"Ø	#5	3/4"Ø	5"	1 3/4"	3 1/8"	H_{ef} + 1 1/2"
	3/4"Ø	#6	7/8"Ø	6"	1 3/4"	3 3/4"	H_{ef} + 1 3/4"
	7/8"Ø	#7	1"Ø	7"	1 3/4"	4 3/8"	H_{ef} + 2"
	1"Ø	#8	1 1/8"Ø	8"	1 3/4"	5"	H_{ef} + 2 1/4"
	N/A	#9	1 3/8"Ø	9"	1 3/4"	5 5/8"	H_{ef} + 2 3/4"
	1 1/4"Ø	N/A	1 3/8"Ø	10"	1 3/4"	6 1/4"	
	N/A	#10	1 1/2"Ø	10"	1 3/4"	6 1/4"	H_{ef} + 3"



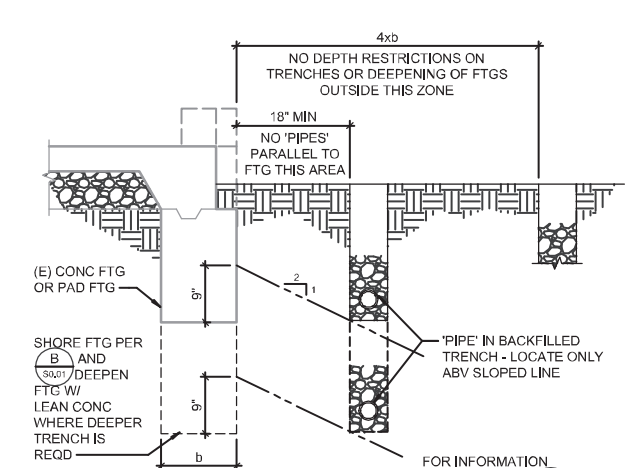
NOTES:
1. INSTALL ADHESIVE ANCHORS PER MANUFACTURER'S INFORMATION AND ICC REPORT.
2. CONTRACTOR TO VERIFY MINIMUM EDGE DISTANCES, SPACING, AND THICKNESS ARE IN ACCORDANCE W/ SCHEDULE PRIOR TO INSTALLING ANCHOR.
3. HOLES TO BE DRILLED W/ ROTARY DRILL ONLY. WHEN DRILLING HOLES IN EXISTING CONCRETE, USE CARE AND CAUTION TO AVOID CUTTING OR DAMAGING THE EXISTING REINFORCING BARS. MAINTAIN 1" CLEARANCE BETWEEN REINFORCEMENT AND THE DRILLED-IN ANCHOR. FILL ABANDONED HOLES W/ HIGH STRENGTH GROUT.
4. SPECIAL INSPECTION IS REQUIRED PER SECTION 1705 AND THE REQUIREMENTS OF THE ICC REPORTS. THE SPECIAL INSPECTOR SHALL PERFORM PERIODIC/CONTINUOUS INSPECTION IN ACCORDANCE WITH TABLE 1705.3. THE SPECIAL INSPECTOR SHALL INSPECT ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE CLEANLINESS, EMBEDMENT DEPTH, CONCRETE TYPE, CONCRETE COMPRESSIVE STRENGTH, DRILL BIT DIAMETER, HOLE DEPTH, EDGE DISTANCE(S), ANCHOR SPACING(S), CONCRETE THICKNESS, AND ADHESIVE INJECTION.

11 ADHESIVE ANCHOR IN CONCRETE
3/4" = 1'-0"

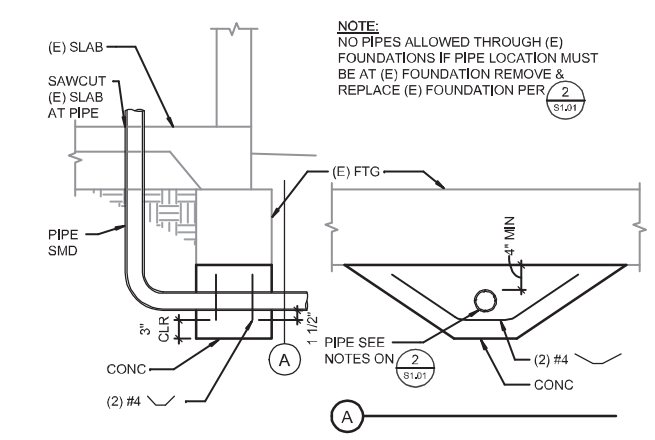
NOTES:
1. "PIPE" = ANY PENETRATION THROUGH OR EMBEDDED IN FOUNDATION STRUCTURE.
2. "PIPE" EMBEDDED IN CONC TO BE PROVIDED W/ FLEXIBLE COUPLINGS AT ENTRY/EXIT POINTS.
3. SLEEVES SHALL BE PVC, ID TO BE 2" LARGER THAN PIPE OD.
4. NO "PIPE" TO RUN PARALLEL IN FOOTINGS, STEM OR CURB.
5. PVC CONDUIT ("PIPE") EMBEDDED IN CURB/STEM MAY BE WIRE TIED TO HORIZ REINF.
6. WRAPPED PIPES SHALL HAVE 1½" CLEAR FROM WRAPPING TO REINF. SLEEVED PIPES SHALL HAVE 1½" MINIMUM CLEAR TO REINF. WRAP W/ ⅛" FOAM SHEET,(8) LAYERS MINIMUM. CONCRETE COVER TO BE 1" MINIMUM.
7. CLEARANCE BETWEEN "PIPES" TO BE 3" MIN TYP.
8. NOTIFY ENGINEER FOR REPAIRS IF (E) REINF STEEL IS DAMAGED IN CONC REMOVAL.
9. ALL PIPES THOUGH FOOTINGS TO BE WRAPPED OR SLEEVED



2 TYPICAL PIPE THROUGH FOOTING
3/4" = 1'-0"

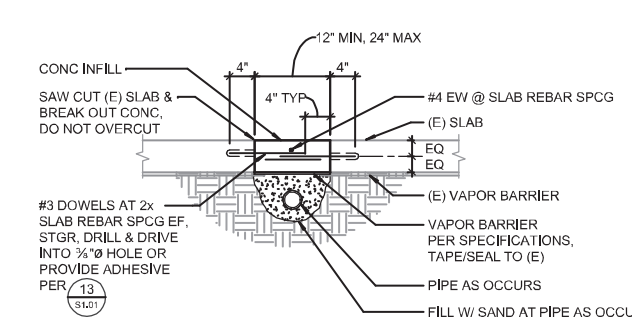


6 TRENCHING ADJACENT TO FOOTING
3/4" = 1'-0"



NOTE:
NO PIPES ALLOWED THROUGH (E) FOUNDATIONS IF PIPE LOCATION MUST BE AT (E) FOUNDATION REMOVE & REPLACE (E) FOUNDATION PER 2/S1.01

3 NEW PIPE AT EXISTING FOUNDATION
3/4" = 1'-0"



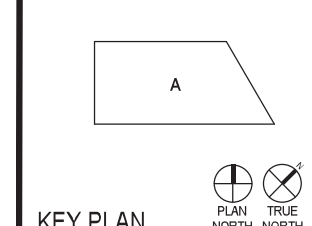
4 NEW PIPE AT EXISTING SLAB
3/4" = 1'-0"

ARCHITECT
PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

CONSULTANT
601 university avenue | suite 185
sacramento ca 95825
zfa job no. 22689
zfa.com
916.924.7024
copyright © 2023

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENTS

KEY PLAN



REGISTERED PROFESSIONAL ENGINEER MICKEY C. KELLOGG No. 5851 STRUCTURAL STATE OF CALIFORNIA

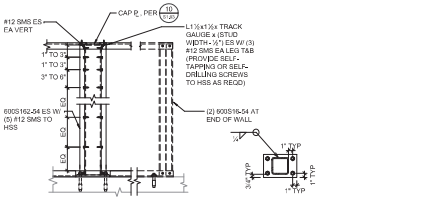
CLIENT CITY OF SACRAMENTO
PROJECT NUMBER 22689
DATE MAY 19, 2025
DRAWN BY: DM/JP CHKED BY: MCK

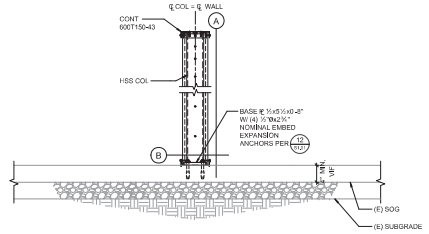
REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK #1	03/04/2025

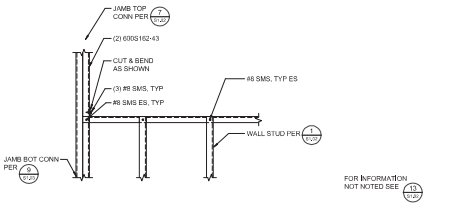
THIS DOCUMENT IS FOR PLAN REVIEW ONLY

CONSTRUCTION DOCUMENTS
TYPICAL MODERNIZATION CONCRETE DETAILS
S1.01

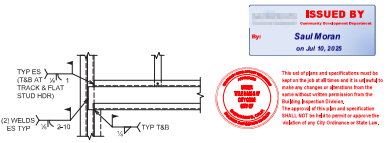




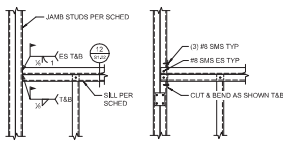
13 TYPICAL SECTION AT PONY WALL
1" = 1'-0"



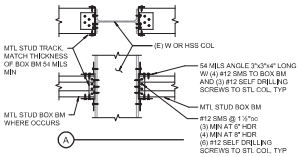
14 PONY WALL TO FULL HEIGHT WALL
1" = 1'-0"



9 TYPICAL HEADER CONNECTION
1" = 1'-0"

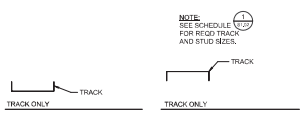


10 TYPICAL SILL CONNECTION
1" = 1'-0"



11 BOX HEADER CONN TO EXISTING STEEL FRAMING
1" = 1'-0"





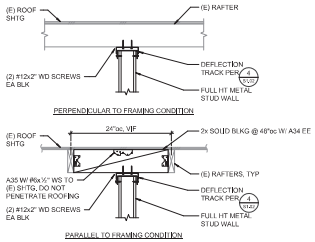
12 TYPICAL NON-BEARING HEADERS AND SILLS
1 1/2" = 1'-0"



	ANCHOR TYPE, DIAMETER AND SPACING			
LOCATION	SCREW ANCHOR	POWDER DRIVEN PINS	EXPANSION ANCHOR	DETAIL
INTERIOR WALL AT CURB (H=15'-0" MAX)	½"ø @ 32"oc	NOT PERMITTED	½"ø @ 32"oc	A
INTERIOR WALL SLAB ON GRADE	½"ø @ 48"oc	0.157"ø @ 16"oc	½"ø @ 48"oc	B
STL FRAMING (H=14'-0" MAX)	N/A	0.157"ø @ 16"oc	N/A	C
MIN CONC EDGE DISTANCE	1¾"	3"	3"	
REF DETAIL & NOTES	10/S1.01	STAGGER PINS	12/S1.01	

NOTES:
1. PROVIDE (2) ANCHORS MIN PER TRACK SEGMENT.
2. FOUNDATION AND SLAB REINFORCING PER OTHER DETAILS.
3. CENTER FASTENERS W/ TRACK, UNO.
4. PROVIDE ANCHOR EACH END OF TRACK, END DISTANCE MIN 1½" AND MAX 3" OR MIN CONCRETE EDGE DISTANCE AS OCCURS.

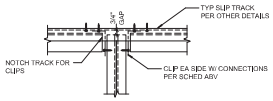
5 TYPICAL BOTTOM TRACK ANCHORS AT CONCRETE AND STEEL
1" = 1'-0"



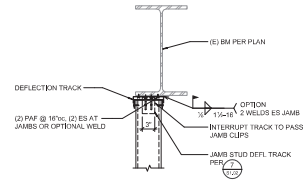
6 METAL STUD TO EXISTING WOOD FRAMING CONNECTION
1" = 1'-0"

CLIP	CONN TO STUD	CONN TO ABV
SIMPSON SCW	(2) #14 SMS	(2) #12 SMS AT CFS OR PAF AT HOT-ROLLED STEEL
STL NETWORK SL CLIP	(3) #12 SMS	(3) #12 SMS AT CFS OR PAF AT HOT-ROLLED STEEL

NOTE: PROVIDE CLIP ES JAMB STUD AT ALL OPENING GREATER THAN 4'-0"



7 JAMB STUD DEFLECTION TRACK
1 1/2" = 1'-0"

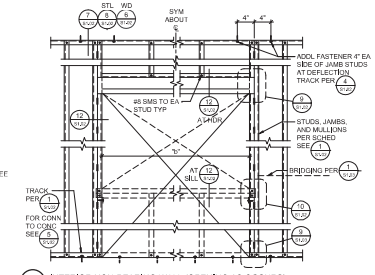


8 ATTACHMENT OF JAMB STUDS TO STEEL BEAM
1" = 1'-0"

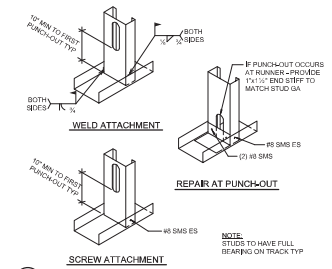
COLD FORMED FRAMING SCHEDULE				
LOCATION	MINIMUM MEMBER SIZE	MAX SPAN/LENGTH	MAX SPACING UNO	REFERENCE DETAIL
PONY WALL STUDS	600S162-54	4'-0"	16"oc	
INTERIOR STUDS	400S162-43	16'-0"	16"oc	
	400S162-54	22'-0"	16"oc	
INTERIOR STUDS W/ SHELVING OR EQUIPMENT ANCHORAGE	400S162-54	16'-0"	16"oc	
	400S162-68	22'-0"	16"oc	
INTERIOR HEADERS	(2) 400S162-43 STUDS AND (2) 400T150-43 TRACKS	b ≤ 8'-0"		SEE 12/S1.01
	(2) 400S162-33 STUDS AND (2) 400T150-33 TRACKS	b ≤ 4'-0"		
INTERIOR SILLS	400T150-43	b ≤ 8'-0"		SEE 12/S1.01
INTERIOR JAMBS	(2) 400S162-43	22'-0"	b ≤ 8'-0"	SEE 12/S1.01
CEILING JOISTS	400S162-33	10'-0"	16"oc	SEE 7/S1.01

1. TYPICAL TRACKS TO BE SAME GAUGE AS STUD, 43 MIL MIN (UNO), FLANGE TO BE 1½" MIN.
2. MULTIPLE ADJACENT WINDOWS TO EACH HAVE INDIVIDUAL HEADERS AND FULL JAMB STUDS BETWEEN WINDOWS.
3. TYP WALL BRIDGING/BLKG PER 1/S1.03.
4. TYP STUD/JOIST TO TRACK PER 3/S1.02.
5. COORDINATE STUD DEPTH W/ ARCH DRAWINGS, INCREASE MIN HDR, SILL OR JAMB MEMBER DEPTHS AS REQD TO MATCH ACTUAL WALL STUD DEPTH.
6. "b" INDICATES OPENING WIDTH PER 2/S1.02.
7. METAL STUD SECTIONS THAT ARE PART OF BUILT-UP HEADERS SHALL BE UNPUNCHED.

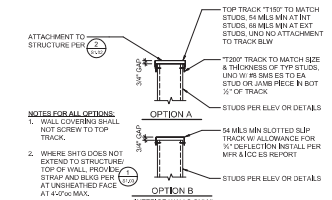
1 SCHEDULE - COLD FORMED METAL FRAMING, UNO
3/4" = 1'-0"



2 INTERIOR NON-BEARING WALL (OPENING AS OCCURS)
1" = 1'-0"



3 STUD OR JOIST TO TRACK
1" = 1'-0"



4 NON-BEARING WALL TRACK AT TOP
1" = 1'-0"

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.
APPROVED
Community Development Department
STRUCTURAL
By: Vincent Wang
on Jul 01, 2025
JOBCOPY

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922
CONSULTANT
601 university avenue | suite 185 sacramento ca 95825 ofa job no. 225B9
916.204.7924
copyright © 2023

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENTS
1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

PROFESSIONAL ENGINEER STRUCTURAL Vincent Wang No. S7-24178 OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
225B9
DATE MAY 19, 2025
DRAWN BY: DMU/P CHKED BY: MCK
REVISIONS

#	DESCRIPTION	DATE

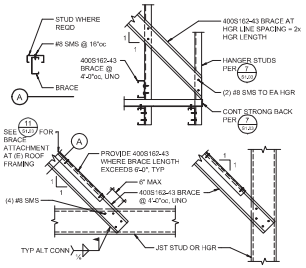
CONSTRUCTION DOCUMENTS

TYPICAL CFS ELEVATION AND CONNECTION DETAILS

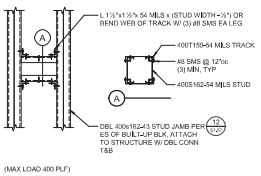
S1.02

THESE DOCUMENTS ARE FOR PLAN REVIEW ONLY

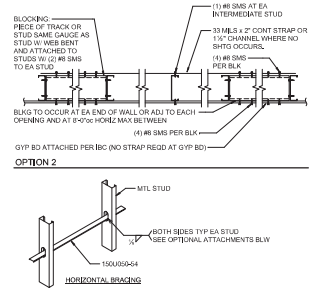
COM-2500586



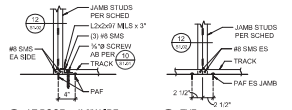
8 TYPICAL BRACE CONNECTIONS
1" = 1'-0"



4 HEAVY DUTY WALL BACKING PLATE
1" = 1'-0"

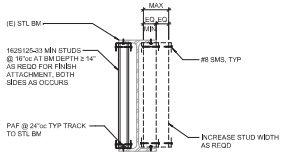


1 WALL BRIDGING/BLOCKING
1" = 1'-0"

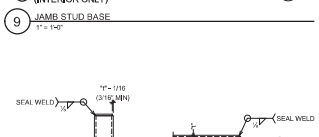




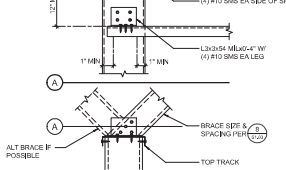
9 JAMB STUD BASE
1" = 1'-0"



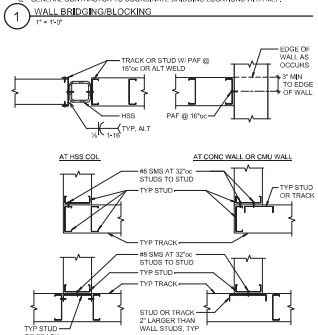
5 INFILL AT STEEL BEAM
1 1/2" = 1'-0"



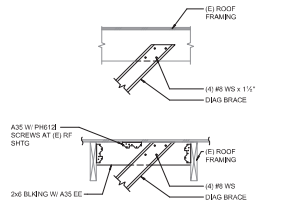
10 TYPICAL CAP PLATE
3/4" = 1'-0"



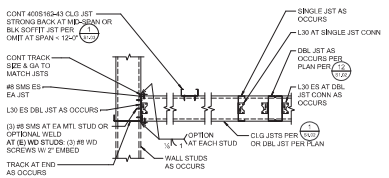
6 TYPICAL BRACE AT TOP OF PARTIAL HT WALL
1 1/2" = 1'-0"



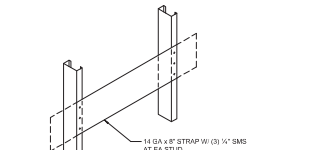
2 TYPICAL CORNERS AND INTERSECTIONS
1" = 1'-0"



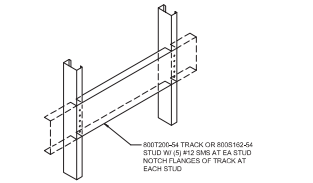
11 BRACES AT ROOF FRAMING
1" = 1'-0"



7 TYPICAL CEILING JOIST FRMG
1" = 1'-0"



TYPE 1
(MAX LOAD 50 PLF)



TYPE 2
(MAX LOAD 200 PLF)

3 WALL BACKING PLATE
1" = 1'-0"

ISSUED BY
Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plans and specifications SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

APPROVED
STRUCTURAL
Vincent Wang
on Jul 01, 2025

JOBCOPY

PBK

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922
CONSULTANT
601 university avenue | suite 185 sfacom
sacramento ca 95825 916.204.7024
sfa job no. 23089 copyright © 2023

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENTS

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

PROFESSIONAL ENGINEER STRUCTURAL CALIFORNIA 07-31-2026

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
23089
DATE MAY 19, 2025
DRAWN BY: DM/JP CHKED BY: MCK
REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK #1	10/03/25

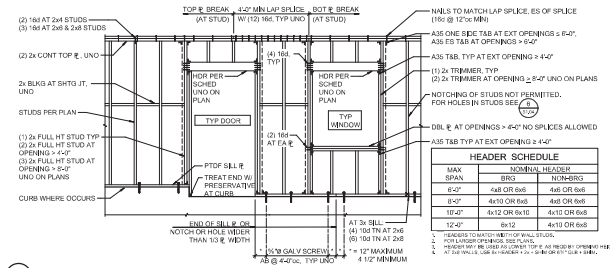
CONSTRUCTION DOCUMENTS

TYPICAL CFS SOFFIT & MISCELLANEOUS DETAILS

S1.03

COM-2500586

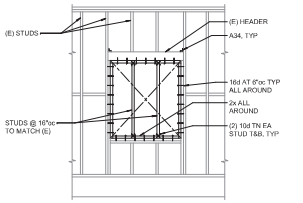
THESE DOCUMENTS FOR PLAN REVIEW ONLY



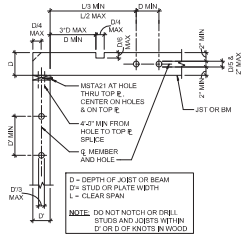
HEADER SCHEDULE		
MAX SPAN	NOMINAL HEADER	
	BRG	NON-BRG
6'-0"	4x8 OR 6x6	4x6 OR 6x6
8'-0"	4x10 OR 6x8	4x8 OR 6x6
10'-0"	4x12 OR 6x10	4x10 OR 6x8
12'-0"	6x12	4x10 OR 6x8

1. HEADERS TO MATCH WIDTH OF WALL STUDS. FOR LARGER OPENINGS, SEE PLANS.
2. HEADER W/ MB USED AS LOWER TOP ℄, AS REQD BY OPENING HEIGHT.
3. AT 2x6 WALLS, USE 6x HEADER + 2x + SHIM OR 6"+ DLB + SHIM.

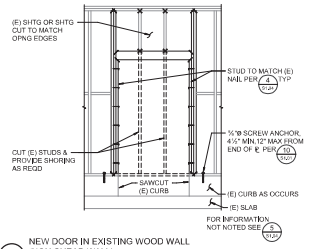
5 TYPICAL STUDWALL AND OPENING FRAMING
3/8" = 1'-0"



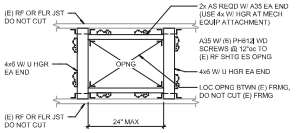
1 WINDOW INFILL AT EXISTING WALL
3/8" = 1'-0"



6 HOLES AND NOTCHES IN WOOD STUDS, JOISTS, AND PLATES (OVE)
3/4" = 1'-0"



2 NEW DOOR IN EXISTING WOOD WALL (NON-SHEAR WALL)
3/8" = 1'-0"



3 NEW 24" MAXIMUM OPENING
3/4" = 1'-0"

RIM JOIST/BLKG TO TOP ℄, TOE NAIL	10d @ 6"oc
TRUSSES, JOISTS OR RAFTERS AT ALL BEARING POINTS TOE NAILS EACH SIDE	(2) 10d
TRUSSES, JOISTS OR RAFTERS TO SIDE OF STUDS EIGHT (8) INCH JOISTS OR LESS	(3) 16d
FOR EACH ADDITIONAL 4 INCHES OF DEPTH OF JOIST	(1) 16d
BLOCKING BETWEEN JOISTS OR RAFTERS TO JOIST OR RAFTERS - TOE NAILS EA SIDE, EA END	(2) 10d
TO JOIST OR RAFTER BEARINGS - TOE NAILS EA SIDE	(2) 10d
BLOCKING BETWEEN STUDS, EACH END TOE NAILS	(2) 10d OR (2) 16d
BRIDGING TO JOIST, TOE NAIL EACH END	(2) 8d
2" SUBFLOOR TO JOIST OR GIRDER, BLIND & FACE NAIL	(2) 16d
SOLE PLATE TO JOIST OR BLOCKING, FACE NAIL	16d @ 16"oc
SOLE PLATE TO JOIST OR BLOCKING AT BRACED WALL PANELS	(3) 16d @ 16"oc
TOP PLATE TO STUD, END NAIL	(2) 16d
STUD TO SOLE PLATE, TOE NAIL	(4) 8d
DOUBLE STUDS AT EXTERIOR WALLS, FACE NAIL	16d @ 12"oc
DOUBLE STUDS, FACE NAIL	16d @ 24"oc
DOUBLE TOP PLATES, FACE NAIL	16d @ 12"oc
TOP PLATES, LAPS & INTERSECTIONS, FACE NAIL	(3) 16d
CONTINUOUS HEADER, TWO PIECES	16d @ 16"oc ALONG EACH EDGE
DOUBLE TOP PLATE LAP AT CORNER	(3) 16d
CONTINUOUS HEADER TO STUD, TOE NAIL	(4) 8d
CEILING JOISTS, LAPS OVER PARTITIONS, FACE NAIL	(3) 16d
CEILING JOISTS TO PARALLEL RAFTERS, FACE NAIL	(3) 16d
BUILT-UP CORNER STUDS	16d @ 12"oc
POST TO SILL-SOLE/TOP PLATE, EACH SIDE TOE NAIL	(4) 10d

4 NAILING SCHEDULE
3/4" = 1'-0"

ISSUED BY
Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

APPROVED
STRUCTURAL
By: Vincent Wang
on Jul 01, 2025

JOBCOPY

PBK

ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

CONSULTANT

001 university avenue | suite 105 sacramento ca 95825 cfa job no. 23589

916.204.7024 cfacom copyright © 2023

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENTS

SACRAMENTO

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

PROFESSIONAL ENGINEER STRUCTURAL CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
23589
DATE MAY 19, 2025
DRAWN BY: DM/JP CHKED BY: MCK

REVISIONS

#	DESCRIPTION	DATE

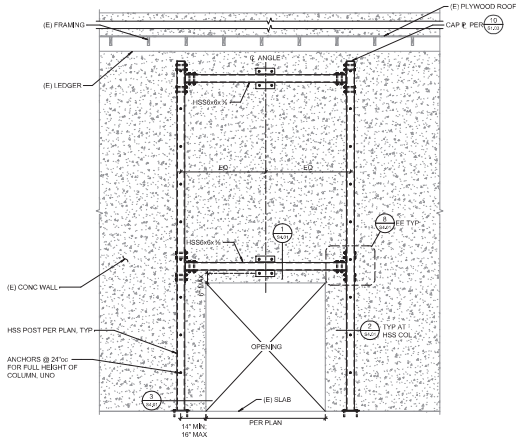
CONSTRUCTION DOCUMENTS

THESE DOCUMENTS FOR PLAN REVIEW ONLY

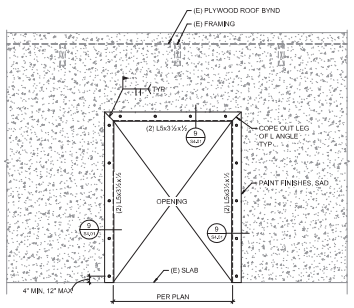
TYPICAL MODERNIZATION WOOD DETAILS

S1.04

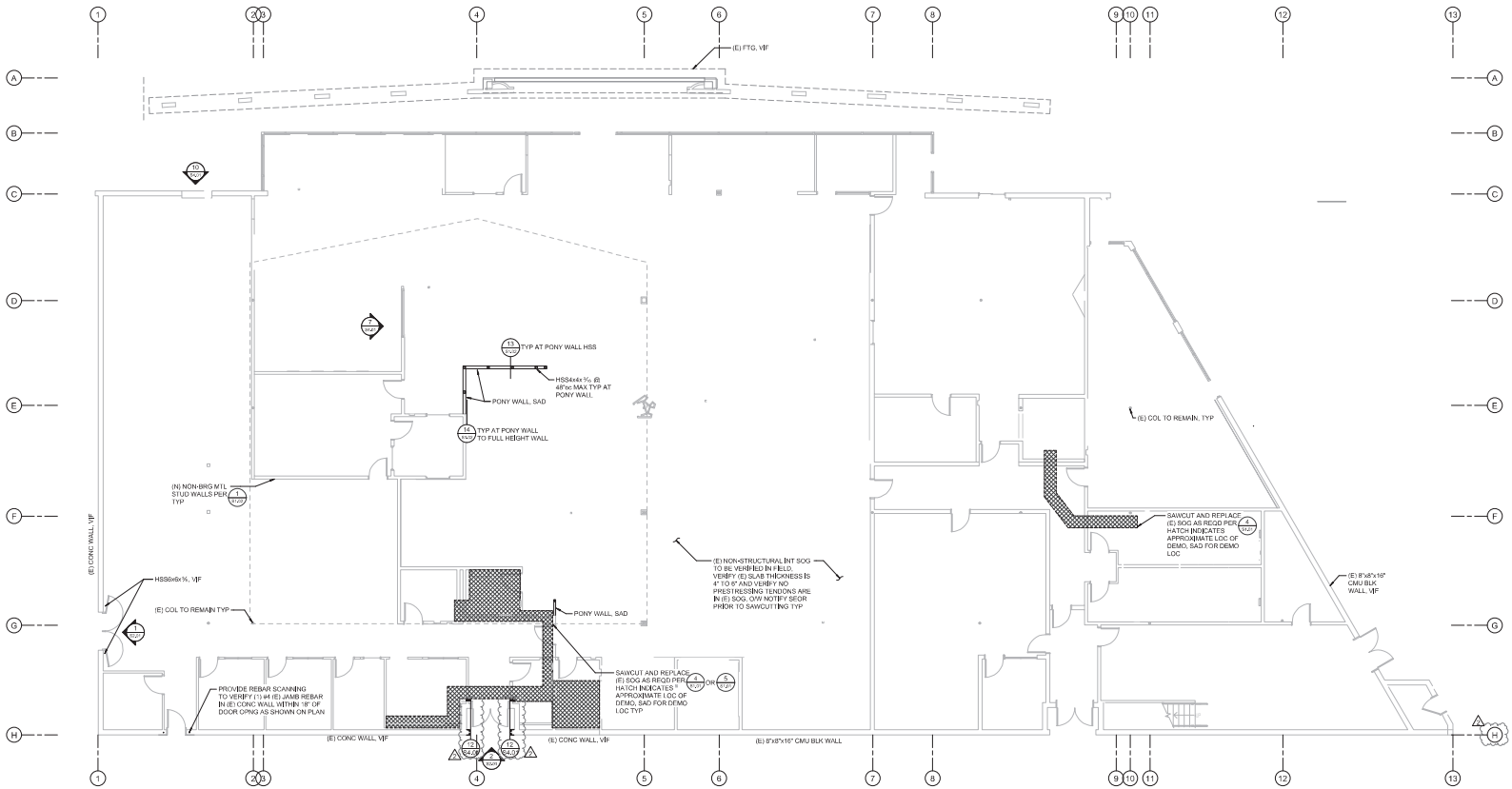
COM-2500586



1 STEEL FRAMING ELEVATION AT DOOR CMU OPENING
3/8" = 1'-0"



2 STEEL FRAMING ELEVATION AT ALCOVE CONCRETE OPENING
3/8" = 1'-0"



NORTH
SLAB PLAN
1/8" = 1'-0"

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

APPROVED
City of Sacramento
STRUCTURAL
By: Vincent Wang
on Jul 01, 2025

FOUNDATION PLAN NOTES:

1. REFER TO SHEETS S001, S101, S102, S103, S104 FOR GENERAL NOTES AND TYPICAL DETAILS. THE FOLLOWING DETAIL REFERENCES ARE PROVIDED FOR THE CONTRACTOR'S CONVENIENCE ONLY, ALL GENERAL NOTES AND TYPICAL DETAILS NOTED ABOVE ARE APPLICABLE AND SHALL BE FOLLOWED.
2. COORDINATE ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES.
3. SEE DETAILS OR CURB PLAN FOR CURB LOCATIONS. COORDINATE WITH ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES.
4. PLUMBING AND ELECTRICAL CONDUIT AND GROUND STRAP SHALL NOT BE LAID WITHIN FOUNDATIONS. NO UTILITY PIPES OR CONDUITS SHALL BE LOCATED THRU COLUMN FOOTINGS FOOTINGS. NO VERTICAL OR HORIZONTAL PIPES OR CONDUITS SHALL BE LOCATED THROUGH STEEL FRAMES, STEEL COLUMNS, OR STEEL BASE PLATES. PROVIDE FURRING AND/OR THICKENED CONCRETE WHERE REQUIRED TO CLEAR UTILITY SYSTEMS. NOTIFY STRUCTURAL ENGINEER/ARCHITECT PRIOR TO ANY INSTALLATION NOT CONFORMING TO THE DETAILS ON S101.

PLAN LEGEND

SYMBOL	REFERENCE DETAIL	DESCRIPTION
		INDICATES STEEL COLUMN.
88		INDICATES GRIDLINE.
		INDICATES ELEVATION.
		INDICATES EXISTING OR NEW FRAMING, SAD
		INDICATES EXISTING FOUNDATION.
		INDICATES (E) CONCRETE MASONRY UNIT WALL.
		INDICATES (E) CONCRETE WALL.
		INDICATES APPROXIMATE LOC OF SOG DEMO SAD

JOBCOPY

PBK

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922
CONSULTANT
601 university avenue | suite 185 sacramento ca 95825 ofc job no. 23089
916.204.7024 copyright © 2023

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENTS

KEY PLAN
PLAN NORTH
TRUE NORTH

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
23089
DATE MAY 19, 2025
DRAWN BY: DMU/P CHKED BY: MCK

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK #1	10/31/2023
2	OWNER CHANGES	11/03/2023

CONSTRUCTION DOCUMENTS

SLAB PLAN AND ELEVATIONS

S2.01

THESE DOCUMENTS FOR PLAN REVIEW ONLY

1124 DEL PASO BLVD

COM-2500586

S2.02 - CEILING FRAMING PLAN

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

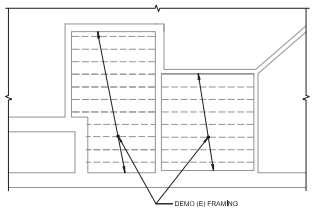
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

FRAMING PLAN NOTES:

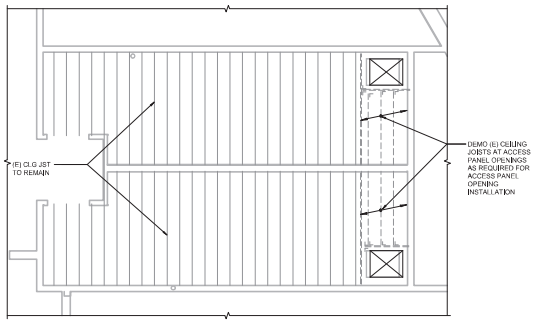
1. REFER TO SHEETS S0.1, S1.01, S1.02, S1.03, AND S1.04 FOR GENERAL NOTES AND TYPICAL DETAILS. THE FOLLOWING DETAIL REFERENCES ARE PROVIDED FOR THE CONTRACTOR'S CONVENIENCE ONLY. ALL GENERAL NOTES AND TYPICAL DETAIL SHEETS NOTED ABOVE ARE APPLICABLE AND SHALL BE FOLLOWED.
2. DIMENSIONS ARE TO FACE OF STUD UNLESS NOTED OTHERWISE. COORDINATE ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES.
3. MECHANICAL, ELECTRICAL AND PLUMBING PENETRATIONS THROUGH WALLS, ROOFS OR FLOORS SHALL BE PER REFERENCES BELOW UNLESS SHOWN AND DETAILED OTHERWISE ON THE STRUCTURAL PLANS. NOTIFY ARCHITECT/ENGINEER PRIOR TO ANY INSTALLATION NOT CONFORMING TO THESE DETAILS.

PENETRATIONS THROUGH FLOORS/ROOFS SHALL BE PER 3/S1.04.

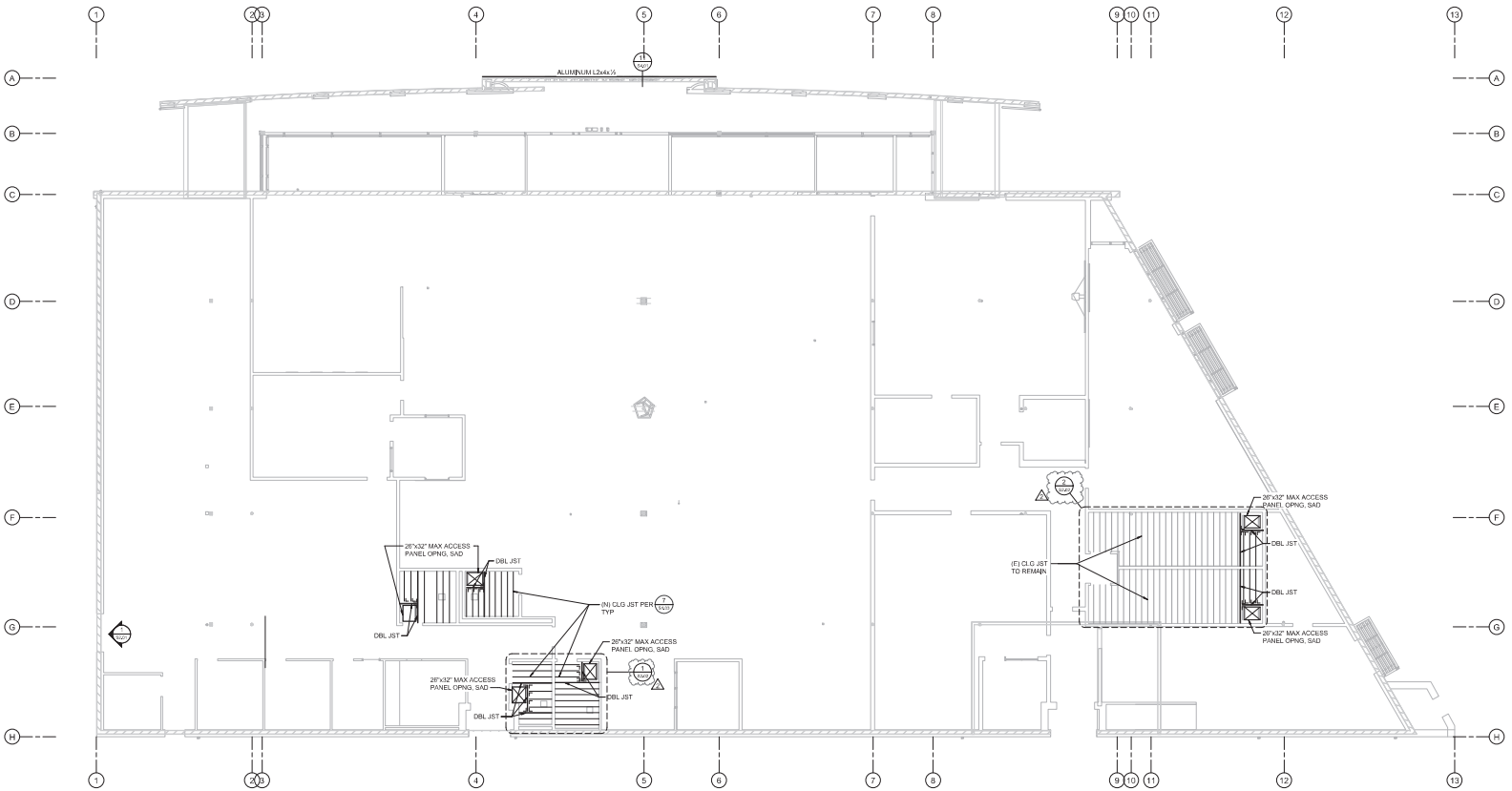
PLAN LEGEND		
SYMBOL	REFERENCE DETAIL	DESCRIPTION
□		INDICATES STEEL COLUMN.
W12x14		INDICATES BEAM SIZE
88		INDICATES GRIDLINE.
1 S3.1		INDICATES ELEVATION.
MU 1.000#		INDICATES APPROXIMATE LOCATION, SIZE AND MAXIMUM WEIGHT OF MECHANICAL UNIT. SEE MECHANICAL DRAWINGS FOR ANCHORAGE AND ADDITIONAL INFORMATION.
		INDICATES EXISTING OR NEW FRAMING.
		INDICATES NON-FRAME MOMENT CONNECTION



1 PARTIAL CEILING FRAMING DEMO PLAN
1/4" = 1'-0"



2 PARTIAL CEILING FRAMING DEMO PLAN
1/4" = 1'-0"



CEILING FRAMING PLAN
1/8" = 1'-0"

APPROVED
City of Sacramento Plan Review
STRUCTURAL
By: Vincent Wang
on Jul 01, 2025

JOBCOPY

PBK

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-8922

CONSULTANT

601 university avenue | suite 185 sfa.com
sacramento ca 95825 916.924.7624
sfa job no. 22689 copyright © 2023

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENTS

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
22689
DATE MAY 19, 2025
DRAWN BY: DMUP CHKED BY: MCK

REVISIONS

#	DESCRIPTION	DATE
2	OWNER CHANGES	05/23/2025

CONSTRUCTION DOCUMENTS

CEILING FRAMING PLAN

THIS DOCUMENT IS FOR PLAN REVIEW ONLY

S2.02

COM-2500586

5/22/2025 10:50:54 AM

S2.03 - ROOF FRAMING PLAN

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

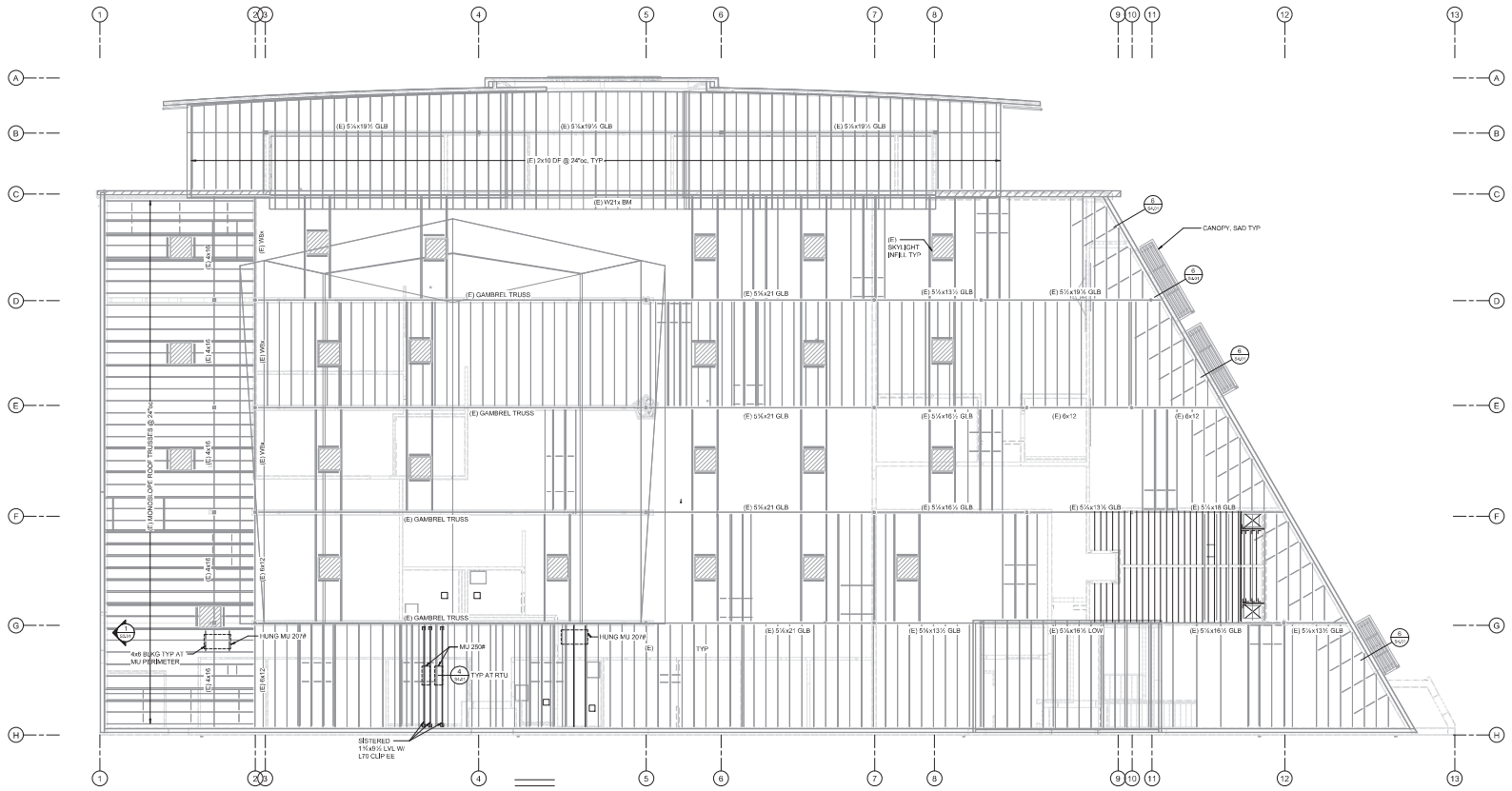
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

FRAMING PLAN NOTES:

1. REFER TO SHEETS S0.1, S1.01, S1.02, S1.03, AND S1.04 FOR GENERAL NOTES AND TYPICAL DETAILS. THE FOLLOWING DETAIL REFERENCES ARE PROVIDED FOR THE CONTRACTOR'S CONVENIENCE ONLY. ALL GENERAL NOTES AND TYPICAL DETAIL SHEETS NOTED ABOVE ARE APPLICABLE AND SHALL BE FOLLOWED.
2. DIMENSIONS ARE TO FACE OF STUD UNLESS NOTED OTHERWISE. COORDINATE ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES.
3. MECHANICAL, ELECTRICAL AND PLUMBING PENETRATIONS THROUGH WALLS, ROOFS OR FLOORS SHALL BE PER REFERENCES BELOW UNLESS SHOWN AND DETAILED OTHERWISE ON THE STRUCTURAL PLANS. NOTIFY ARCHITECT/ENGINEER PRIOR TO ANY INSTALLATION NOT CONFORMING TO THESE DETAILS.

PENETRATIONS THROUGH FLOORS/ROOFS SHALL BE PER 3/S1.04.

PLAN LEGEND		
SYMBOL	REFERENCE DETAIL	DESCRIPTION
□		INDICATES STEEL COLUMN.
W12x14		INDICATES BEAM SIZE
88		INDICATES GRIDLINE.
S3.1		INDICATES ELEVATION.
MU 1,000#		INDICATES APPROXIMATE LOCATION, SIZE AND MAXIMUM WEIGHT OF MECHANICAL UNIT. SEE MECHANICAL DRAWINGS FOR ANCHORAGE AND ADDITIONAL INFORMATION.
		INDICATES EXISTING OR NEW FRAMING.
▷		INDICATES NON-FRAME MOMENT CONNECTION



ROOF FRAMING PLAN
1/8" = 1'-0"

5/22/2025 10:50:56 AM

APPROVED
City of Sacramento Plan Review
STRUCTURAL
By: Vincent Wang
on Jul 01, 2025

JOBCOPY

PBK

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-8922

CONSULTANT

601 university avenue | suite 185 sfacom
sacramento ca 95825 916.924.7624
sfa job no. 22689 copyright © 2023

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENTS

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
22689
DATE MAY 19, 2025
DRAWN BY: DMJP CHKED BY: MCK
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENTS

ROOF FRAMING PLAN

THIS DOCUMENT IS FOR PLAN REVIEW ONLY

S2.03

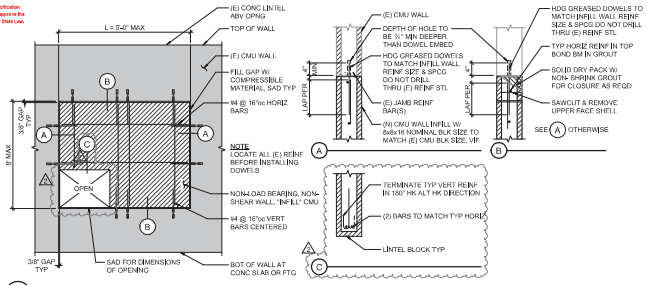
COM-2500586

ISSUED BY
Sacramento Development Department
By: Saul Moran
on Jul 10, 2025

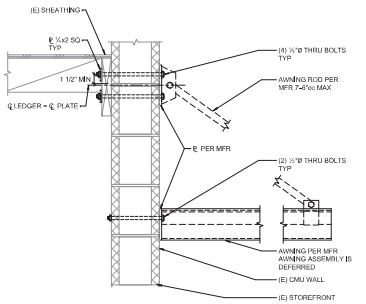
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

APPROVED
Sacramento Development Department
STRUCTURAL
By: Vincent Wang
on Jul 01, 2025

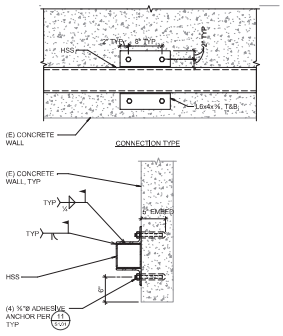
JOBCOPY



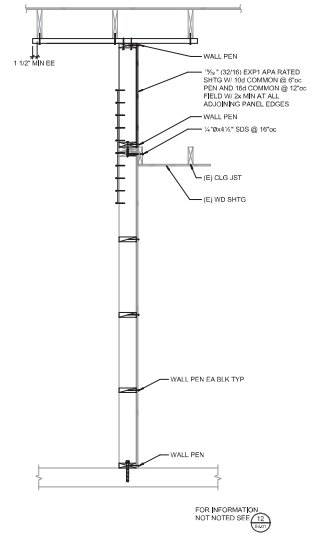
10 TYPICAL INFILL AT CMU WALL
3/4" = 1'-0"



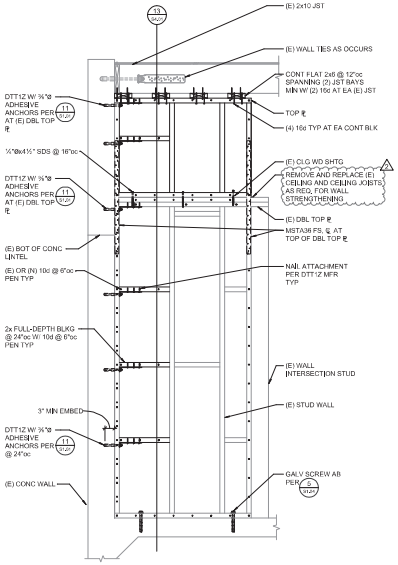
6 CANOPY ANCHORAGE
1 1/2" = 1'-0"



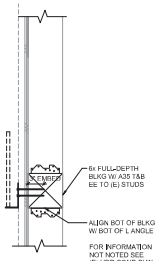
1 HSS WALL ANCHORAGE ANGLES AT (E) CONCRETE WALL
1" = 1'-0"

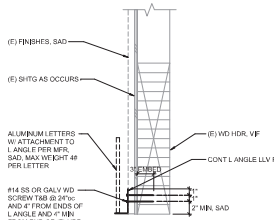


13 EXISTING WOOD-FRAMED WALL STRENGTHENING - SECTION
3/4" = 1'-0"

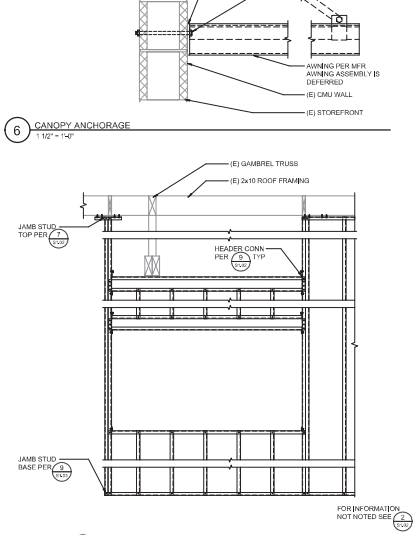


12 EXISTING WOOD-FRAMED WALL STRENGTHENING - ELEVATION
3/4" = 1'-0"

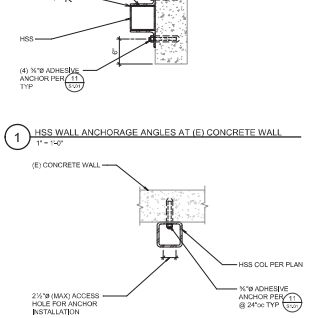




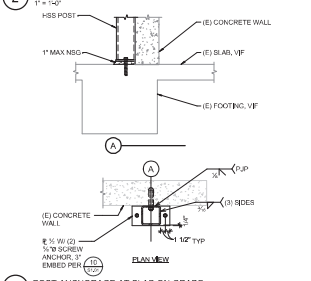
11 ANGLE SUPPORT FOR ALUMINUM LETTERING
1 1/2" = 1'-0"



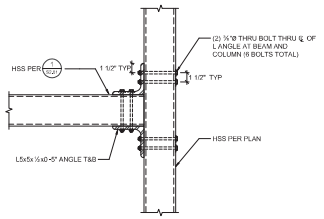
7 METAL STUD WALL OPENING ELEVATION
1/2" = 1'-0"



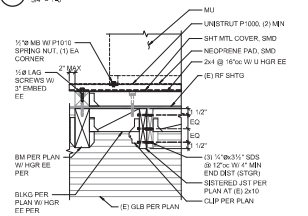
2 HSS COLUMN AT (E) CMU WALL
1" = 1'-0"



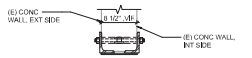
3 POST ANCHORAGE AT SLAB ON GRADE
3/4" = 1'-0"

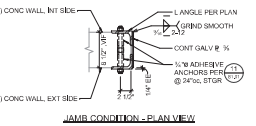


8 HSS HEADER TO COLUMN
1 1/2" = 1'-0"



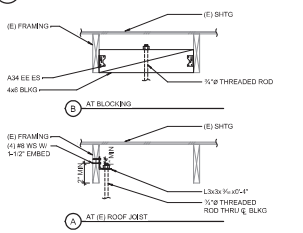
4 FRAMING AT NEW MECHANICAL UNIT
1" = 1'-0"



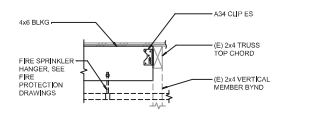


NOTE VIF THICKNESS OF (E) CONC WALLS PRIOR TO FABRICATION

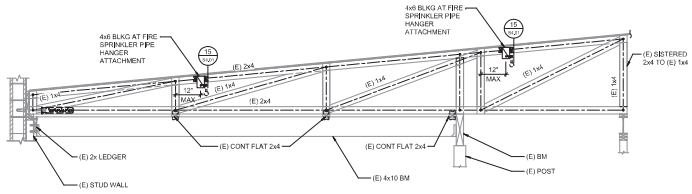
9 L ANGLE ANCHORAGE AT EXISTING CONCRETE WALL
1" = 1'-0"



5 FAN COIL ATTACHMENT TO WOOD JOIST
1" = 1'-0"



15 SPRINKLER BLOCKING TO TRUSS
1 1/2" = 1'-0"



14 TYPICAL TRUSS ELEVATION
1/2" = 1'-0"

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922
CONSULTANT
601 university avenue | suite 105 sacramento ca 95825 916.204.7024
sfe job no. 23089 copyright © 2023

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENTS

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
23089
DATE MAY 19, 2025
DRAWN BY: DM/JP CHKED BY: MCK
REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK #1	10/6/2025
2	OWNER CHANGES	11/3/2025

CONSTRUCTION DOCUMENTS

DETAILS

S4.01

THESE DOCUMENTS FOR PLAN REVIEW ONLY

COM-2500586

JOBCOPY

1124 DEL PASO BLVD

COM-2500586

DUCT LEGEND

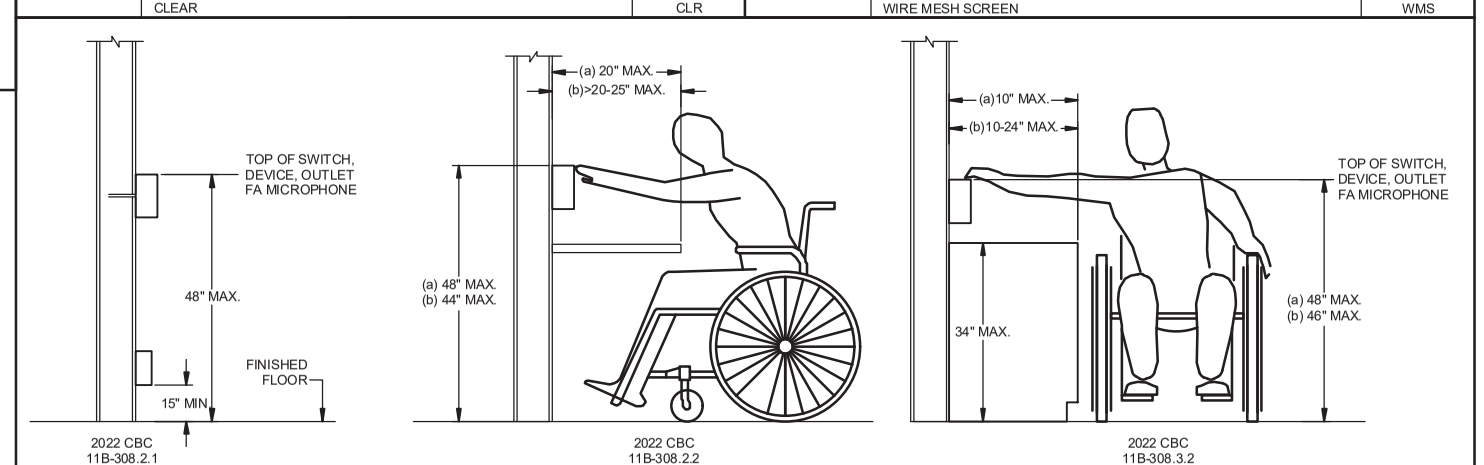
SINGLE LINE SYMBOL	DOUBLE LINE SYMBOL	DESCRIPTION
24x12	24x12	RECTANGULAR DUCT - WIDTH X DEPTH (PLAN VIEW) DEPTH X WIDTH (SECTION VIEW)
26x14L	26x14L	ACOUSTICALLY LINED RECTANGULAR DUCT - DIMENSIONS ARE OUTSIDE.
		MANUAL AIR DAMPER
R OR D	RISE OR DROP	RISE OR DROP DUCT IN DIRECTION OF AIR FLOW
	OR	RECTANGULAR TO RECTANGULAR TRANSITION, MAX SLOPE OF 1:3 RECTANGULAR TO ROUND TRANSITION, MAX SLOPE OF 1:3
	W, R, R/W = 1.5	ELBOW, RECTANGULAR, SMOOTH RADIUS, WITHOUT TURNING VANES.
		SQUARE/RECTANGULAR DUCT ELBOW WITH TURNING VANES
		CONVERGING OR DIVERGING TEE, 45° ENTRY, RECTANGULAR MAIN AND BRANCH. WHEN REDUCING MAIN, SIDE OF TAKE OFF OR ENTRY BRANCH TO BE FLAT, OTHER SIDES MAXIMUM SLOPE OF 1:3.
		CONICAL DUCT TAKE OFF FROM RECTANGULAR VIA SPIN-IN W/DAMPER AND SCOOP.
	ROUND DUCT	ROUND DUCT TAKE OFF FROM RECTANGULAR VIA SMOOTH CONVERGING BELL MOUTH.
		RECTANGULAR DUCT TEE, MAD'S ON THE 2 BRANCHES, THROAT SIZED FOR EQUAL PRESSURE DROP.
		RECTANGULAR DUCT SPLIT MAD'S, THROAT SIZED FOR EQUAL PRESSURE DROP.
		3-WAY RECTANGULAR SPLIT WITH TWO TRANSITIONAL ELBOWS AND TRANSITIONING MAIN. DOWNSTREAM MAD'S ON THE TREE BRANCHES. THROATS SIZED FOR EQUAL PRESSURE DROP.
		FOR CONCEALED DUCT: DROP TO DIFFUSER SHALL BE FULL SIZE OF DIFFUSER NECK. FOR EXPOSED DUCT: DROP SHALL BE FULL SIZE OF OD DIFFUSER FRAME, FLANGE FOR MOUNTING DIFFUSER TURNED IN. AIR EXTRACTOR AND EQUALIZER GRID AT CONNECTION TO MAIN.
		SUPPLY AIR, SUPPLY AIR DUCT IN SECTION, SUPPLY DROP
		RETURN AIR, RETURN AND OUTSIDE AIR DUCT IN SECTION , RETURN AIR DROP.
		EXHAUST AIR, EXHAUST AIR DUCT IN SECTION, EXHAUST AIR DROP.
		FLEXIBLE DUCT (ROUND)
		FLEXIBLE DUCT (FABRIC)
MAD, 18"Ø, 10"Ø, 12"Ø	12"Ø	45° REDUCING LATERAL FITTING
18"Ø, 12"Ø, MAD	18"Ø, 12"Ø, 10"Ø	90° REDUCING TEE FITTING MECHANICAL DEMOLITION PLAN

MECHANICAL LEGEND

SYMBOL	ITEM	ABBR.
	SUPPLY AIR	SA
	RETURN AIR	RA
	EXHAUST AIR	EA
	OUTSIDE AIR	OA
01 / M-1	DETAIL DESIGNATION DETAIL NUMBER SHEET NO. WHERE SHOWN	
AC / 1	EQUIPMENT DESIGNATION UNIT ABBREVIATION NUMBER	
A 10x10-3 120 F/S	GRILLE DESIGNATION NECK SIZE & BLOW FIRE/SMOKE DAMPER WHERE REQ'D CFM	
	ACOUSTIC LINED DUCT	
	TURNING VANES	TV
	DUCT FLEXIBLE CONNECTION	
	SUPPLY DUCT THRU ROOF	
	RETURN DUCT THRU ROOF	
	VOLUME CONTROL DAMPER	VCD
	FIRE/SMOKE DAMPER W/ACCESS	F/S
	OPPOSED BLADE DAMPER	OBD
	BACKDRAFT DAMPER	BDD
(T)	EMS TEMP. SENSOR/ THERMOSTAT, MOUNT @ 48" AFF TO TOP OF BOX	T'STAT
(B)	BYPASS TIMER	
(S)	SWITCH	
(E)	EXISTING	EXIST.
(N)	NEW	NEW
	METAL & FLEXIBLE DUCT	
	PIPE RISER	
	PIPE DROP	
— CWS —	CHILLED WATER SUPPLY	CWS
— CWR —	CHILLED WATER RETURN	CWR
— HWS —	HEATING WATER SUPPLY	HWS
— HWR —	HEATING WATER RETURN	HWR
	INCREASER/REDUCER	
	SAFETY RELIEF VALVE	
	GATE VALVE	GV
	GLOBE VALVE	
	PLUG VALVE	
	BALL VALVE	
	CHECK VALVE	CHK
	STRAINER	STR
	BUTTERFLY VALVE	
	NEEDLE VALVE	
	3-WAY VALVE	
	BALANCING VALVE	
	SENSOR WELL	
	THERMOMETER	
	PRESSURE GAUGE	PG
	GAUGE COCK	GC
FS	FLOW SWITCH	FS
	THERMOMETER WELL	
	MOISTURE SENSOR	
	PRESSURE REGULATING VALVE	PRV
	PIPING FIRE WALL PENETRATION	
	POINT OF CONNECTION	POC
	EXHAUST DUCT THRU ROOF	
SD	DUCT SMOKE DETECTOR	
— CS —	COMBO HOT/CHILLED WATER SUPPLY	CS
— CR —	COMBO HOT/CHILLED WATER RETURN	CR
(R)	RA TEMP. SENSOR	
(C)	CARBON DIOXIDE SENSOR	
(P)	PRESSURE SENSOR	
	TEMPERATURE CONTROL PANEL	TCP
	UNLESS OTHERWISE NOTED	U.O.N.
	TRANSFER AIR GRILLE	TAG
	ABOVE FINISHED FLOOR	AFF
	ABOVE	ABV
	ABOVE CEILING	ABC
	ABOVE FINISHED GRADE	AFG
	ACCESS PANEL	AP
	AIR CONDITIONING	AC
	AIR PRESSURE DROP, INCHES WATER COLUMN	APD
	ANCHOR BOLT	AB
	BRAKE HORSE POWER	BHP
	BRITISH THERMAL UNITS (PER HOUR)	BTU(H)
	CENTER TO CENTER	CC
	CEILING	CLG
	CLEAR	CLR

MECHANICAL LEGEND CONTINUED

SYMBOL	ITEM	ABBR.
	CONCRETE	CONC
	CONDENSER	COND
	CONNECTION	CONN
	CONTINUATION	CONT
	CONTRACTOR	CONTR
	CUBIC FEET OF AIR FLOW PER MINUTE	CFM
	DAMPER	DPR
	DEGREES FAHRENHEIT	°F
Ø	DIAMETER, PHASE	DIA
	DOOR LOUVER	DL
	DOWN	DN
	DRAIN	DR
	DRY BULB (DEGREES FAHRENHEIT)	DB
	ELECTRICAL PANEL	EP
	ELEVATION	EL
	ENTERING	ENT
	ENTERING DRY BULB	EDB
	ENTERING WET BULB	EWB
	EVAPORATOR	EVAP
	EVAPORATIVE COOLER	EC
	EXHAUST AIR DAMPER	EAD
	EXHAUST FAN	EF
	EXTERNAL STATIC PRESSURE	ESP
	FEET PER MINUTE	FPM
	FIRE DAMPER	FD
	FLOOR	FLR
	FROM ABOVE	FA
	FROM BELOW	FB
	FULL LOAD AMPS	FLA
	GALLONS PER HOUR	GPH
	GALLONS PER MINUTE	GPM
	GALVANIZED	GALV
	GALVANIZED IRON	GI
	GAUGE	GA
	HEATING	HTG
	HUMIDSTAT, 'X' INDICATES DEVICE CONTROLLED	H
	KILOWATTS	KW
	KILOWATT HOUR	KWH
	LEAVING DRY BULB IN DEGREES (FAHRENHEIT)	LDB
	LEAVING WET BULB IN DEGREES FAHRENHEIT	LWB
	LOCKED ROTOR AMPERES	LRA
	LOVER	LVR
	MANUFACTURER	MFR
	MAXIMUM	MAX
	MINIMUM	MIN
	ON CENTER	OC
	OUTSIDE AIR DAMPER	OAD
	OUTSIDE DIAMETER	OD
	OUTLET VELOCITY	OV
	OVERHEAD	OH
	POUNDS	LBS
	POUNDS PER SQUARE INCH (GAUGE) (ABSOLUTE)	PSI (G) (A)
	PRESSURE DROP	PD
	REFRIGERANT SUCTION PIPING	RS
	REFRIGERANT LIQUID PIPING	RL
	RETURN AIR DAMPER	RAD
	REVOLUTIONS PER MINUTE	RPM
	RUNNING LOAD AMPERES	RLA
	SHEET METAL	SM
	SPLITTER DAMPER	SD
	SQAURE FEET	SQFT
	SQAURE INCHES	SQIN
	STATIC PRESSURE	SP
	STATIC PRESSURE DROP	SPD
	SUPPLY FAN	SF
	TEMPERATURE CONTROL PANEL	TCP
	TEMPERATURE CONTROL VALVE	TCV
	THOUSAND BRITISH THERMAL UNITS PER HOUR	MBH
	TO ABOVE	TA
	TO BELOW	TB
	TOTAL PRESSURE	TP
	TOTAL STATIC PRESSURE	TSP
	TYPICAL	TYP
	UNDERGROUND	UG
	UNDER CUT DOOR	UCD
	VALVE	VLV
	WATTS	W
	WEIGHT	WT
	WET BULB	WB
	WIRE MESH SCREEN	WMS



NOTE:
1. THIS DETAIL APPLIES TO MOUNTING OF ANY MECHANICAL AND ELECTRICAL DEVICE WHICH CONTAINS AN OPERABLE PART THAT IS ADJUSTABLE BY THE OCCUPANT, THIS DOES NOT APPLY TO SENSORS OR CONTROLS THAT ARE ONLY ADJUSTABLE THROUGH THE BUILDING AUTOMATION SYSTEM (IE: TEMPERATURE AND HUMIDITY SENSORS).

MOUNTING OVER OBSTRUCTION DETAIL — N.T.S — 01

SHEET INDEX

M0.00	MECHANICAL SHEET INDEX, SCHEDULES, LEGEND & NOTES
M0.01	MECHANICAL SCHEDULES
M1.01	MECHANICAL DEMOLITION FLOOR PLAN
M2.01	MECHANICAL FLOOR PLAN
M3.02	MECHANICAL ROOF PLAN
M5.01	MECHANICAL CONTROLS
M6.01	MECHANICAL DETAILS

CAL-GREEN REQUIREMENTS

1. TESTING AND ADJUSTING. TESTING AND ADJUSTING OF SYSTEMS SHALL BE REQUIRED FOR NEW BUILDINGS LESS THAN 10,000 SQUARE FEET OR NEW SYSTEMS TO SERVE AN ADDITION OR ALTERATION SUBJECT TO SECTION 303.1
2. SYSTEMS. DEVELOP A WRITTEN PLAN OF PROCEDURES FOR TESTING AND ADJUSTING SYSTEMS. SYSTEMS TO BE INCLUDED FOR TESTING AND ADJUSTING SHALL INCLUDE, AS APPLICABLE TO THE PROJECT:
   A. HVAC SYSTEMS AND CONTROLS.
   B. INDOOR AND OUTDOOR LIGHTING AND CONTROLS.
   C. WATER HEATING SYSTEMS.
   D. RENEWABLE ENERGY SYSTEMS.
   E. LANDSCAPE IRRIGATION SYSTEMS.
   F. WATER REUSE SYSTEMS.
3. PROCEDURES. PERFORM TESTING AND ADJUSTING PROCEDURES IN ACCORDANCE WITH MANUFACTURE'S SPECIFICATIONS AND APPLICABLE STANDARDS ON EACH SYSTEM.
   A. HVAC BALANCING. IN ADDITION TO TESTING AND ADJUSTING, BEFORE A NEW SPACE-CONDITIONING SYSTEM SERVING A BUILDING OR SPACE IS OPERATED FOR NORMAL USE, BALANCE THE SYSTEM IN ACCORDANCE WITH THE PROCEDURES DEFINED BY THE TESTING ADJUSTING AND BALANCING BUREAU NATIONAL STANDARDS; THE NATIONAL ENVIRONMENTAL BALANCING BUREAU PROCEDURAL STANDARDS; ASSOCIATED AIR BALANCE COUNCIL NATIONAL STANDARDS OR AS APPROVED BY THE ENFORCING AGENCY.
4. REPORTING. AFTER COMPLETION OF TESTING, ADJUSTING AND BALANCING, PROVIDE A FINAL REPORT OF TESTING SIGNED BY THE INDIVIDUAL RESPONSIBLE FOR PERFORMING THESE SERVICES.
5. OPERATION AND MAINTENANCE (O & M) MANUAL. PROVIDE THE BUILDING OWNER OF REPRESENTATIVE WITH DETAILED OPERATING AND MAINTENANCE INSTRUCTIONS AND COPIES OF GUARANTIES/WARRANTIES FOR EACH SYSTEM. O & M INSTRUCTIONS SHALL BE CONSISTENT WITH OSHA REQUIREMENTS IN CCR, TITLE 8, SECTION 5142, AND OTHER RELATED REGULATIONS.
   A. INSPECTIONS AND REPORTS. INCLUDE A COPY OF ALL INSPECTION VERIFICATIONS AND REPORTS REQUIRED BY THE ENFORCING AGENCY.
6. TEMPORARY VENTILATION. THE PERMANENT HVAC SYSTEM SHALL ONLY BE USED DURING CONSTRUCTION IF NECESSARY TO CONDITION THE BUILDING WITHIN THE REQUIRED TEMPERATURE RANGE FOR MATERIAL AND EQUIPMENT INSTALLATION. IF THE HVAC SYSTEM IS USED DURING CONSTRUCTION, USE RETURN AIR FILTERS WITH A MINIMUM REPORTING VALUE (MERV) OF 13, BASED ON ASHRAE 52.2-1999 OR AN AVERAGE EFFICIENCY OF 30 PERCENT BASED ON ASHRAE 52.1-1992. REPLACE ALL FILTERS IMMEDIATELY PRIOR TO OCCUPANCY, OR, IF THE BUILDING IS OCCUPIED DURING ALTERATIONS, AT THE CONCLUSION OF CONSTRUCTION.
7. COVERING OF DUCT OPENINGS AND PROTECTION OF MECHANICAL EQUIPMENT DURING CONSTRUCTION. AT THE TIME OF ROUGH INSTALLATION AND DURING STORAGE ON THE CONSTRUCTION SITE UNTIL FINAL STARTUP OF THE HEATING, COOLING AND VENTILATION EQUIPMENT, ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH WRAP, PLASTIC, SHEET METAL OR OTHER METHODS ACCEPTABLE TO THE ENFORCING AGENCY TO REDUCE THE AMOUNT OF DUST, WATER AND DEBRIS WHICH MAY ENTER THE SYSTEM.
8. FILTERS. IN MECHANICALLY VENTILATED BUILDINGS, PROVIDE REGULARLY OCCUPIED AREAS OF THE BUILDING WITH AIR FILTRATION MEDIA FOR OUTSIDE AND RETURN AIR PRIOR TO OCCUPANCY THAT PROVIDE AT LEAST A MINIMUM EFFICIENCY REPORTING VALUE (MERV) OF 13. MERV 13 FILTERS SHALL BE INSTALLED PRIOR TO OCCUPANCY AND RECOMMENDATIONS FOR MAINTENANCE WITH FILTERS OF THE SAME VALUE SHALL BE INCLUDED IN THE OPERATION AND MAINTENANCE MANUAL.
   EXCEPTIONS:
   A. AN ASHRAE 10-PERCENT TO 15-PERCENT EFFICIENCY FILTER SHALL BE PERMITTED FOR AN HVAC UNIT MEETING THE 2022 CALIFORNIA ENERGY CODE HAVING 60,000 BTU H OR LESS CAPACITY PER FAN COIL, IF THE ENERGY USE OF THE AIR DELIVERY SYSTEM IS 0.4 W/CFM OR LESS AT DESIGN AIR FLOW.
   B. EXISTING MECHANICAL EQUIPMENT.
9. OZONE DEPLETION AND GREENHOUSE GAS REDUCTIONS. INSTALLATIONS OF HVAC, REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT SHALL COMPLY WITH SECTIONS 5.508.1.1 AND 5.508.1.2.
   A. CHLOROFLOUROCARBONS (CFCS). INSTALL HVAC, REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT THAT DO NOT CONTAIN CFCS.
   B. HALONS. INSTALL HVAC REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT THAT DO NOT CONTAIN HALONS.
10. ADHESIVES. ADHESIVE BONDING PRIMERS, ADHESIVE PRIMERS, SEALANTS, SEALANT PRIMERS AND CAULKS SHALL COMPLY WITH LOCAL OR REGIONAL AIR POLLUTION CONTROL OR AIR QUALITY MANAGEMENT DISTRICT RULES WHERE APPLICABLE, OR SCAQMD RULE 1168 VOC LIMITS, AS SHOWN IN TABLES 5.504.4.1

PBK
ARCHITECT: PBK, Inc. PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

MEP Engineering \\ Technology
LEAF ENGINEERS
FOLSOM
1100 Iron Point Rd., Suite 200
Folsom, CA 95630
916.355.9992 p
LEAFengineers.com

ISSUED BY Community Development Department
By: Saul Moran on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN — A — PLAN NORTH — TRUE NORTH

Architect / Engineer

REGISTERED PROFESSIONAL ENGINEER — GAREN M. LENCIONI — NO. 33380 — MECHANICAL — STATE OF CALIFORNIA

CLIENT: CITY OF SACRAMENTO
PROJECT NUMBER: 220389
DATE: 12/16/2024
DRAWN BY: FM — CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/23/25
2	OWNER CHANGES	5/23/25

CONSTRUCTION DOCUMENT

MECHANICAL INDEX, NOTES, CODES, SCHEDULES

M0.00

This document is for plan review only

APPROVED City of Sacramento Plan Review PLUMBING & MECHANICAL
By: Robert Bottino on Jun 19, 2025

PACKAGED HEAT PUMP SCHEDULE

	NUMBER	HP-3,14	HP-8	HP-6	HP-5,7,9, 10,12,13	HP-1,11	HP-15
	MANUFACTURER	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE
	MODEL	WHK036A3S0B	WHK036A3S0B	WHK048A3S0B	WHK060A3S0B	WHK090A3S0B	WHK060A3S0B
	TYPE/DISCHARGE	PACKAGED/DOWN	PACKAGED/DOWN	PACKAGED/DOWN	PACKAGED/DOWN	PACKAGED/DOWN	PACKAGED/DOWN
	VOLTS / PHASE	208 / 3	208 / 3	208 / 3	208 / 3	208 / 3	208 / 3
	AUX. ELEC. HEATER KW/FLA	6.0 / -	6.0 / -	6.0 / -	6.0 / -	9.0 / -	6.0 / -
	MCA	41.0	41.0	46.0	49.0	70.0	49.0
	MAX. OCP.	45.0	45.0	50.0	60.0	80.0	60.0
	SEER / EER / COP AT 47F	15.0 / 13.5 / 3.8	15.0 / 13.5 / 3.8	16.5 / 13.5 / -	16.4 / 13.5 / -	15.5 / 12.0 / -	16.4 / 13.5 / -
	NOMINAL TONS	3.0	3.0	4.0	5.0	7.5	5.0
BLOWER	MOTOR HP	3.0	3.0	3.0	3.0	3.0	3.0
	DESIGN BHP	0.331	0.331	0.431	0.564	0.84	0.564
	SUPPLY AIR CFM	1200	1200	1600	2000	3000	2000
	E.S.P. (IN. W.C.)	0.7	0.7	0.7	0.7	0.7	0.7
	MIN. OUTSIDE AIR CFM	200	200	300	400	500	400
	DRIVE	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT
COOL	COOLING TYPE	DX	DX	DX	DX	DX	DX
	TOTAL CAP. (MBH)	24.65	24.65	45.40	55.98	80.30	55.98
	SENS. CAP. (MBH)	22.93	22.93	35.94	45.24	59.67	45.24
	E.A. DB (°F)	80	80	80	80	80	80
	E.A. WB (°F)	67	67	67	67	67	67
	AMB. TEMP. (°F)	105	105	105	105	105	105
HEAT	HEATING TYPE	HEAT PUMP	HEAT PUMP	HEAT PUMP	HEAT PUMP	HEAT PUMP	HEAT PUMP
	HEAT PUMP OUTPUT (MBH)	16.62	16.62	32.44	41.11	66.14	41.11
	AUX. ELEC. HEATER KW	6.0	6.0	6.0	6.0	9.0	6.0
	REFRIGERANT	R-454B	R-454B	R-454B	R-454B	R-454B	R-454B
	FILTER SIZE (IN.)	(4) 20 x 20 x 2	(4) 20 x 20 x 2	(4) 20 x 20 x 2	(4) 20 x 20 x 2	(4) 20 x 20 x 2	(4) 20 x 20 x 2
	FILTER TYPE	MERV 13	MERV 13	MERV 13	MERV 13	MERV 13	MERV 13
	SERVICE	-	-	-	-	-	-
	ACCESSORIES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES	SEE NOTES
	(N) OPER. WT. (LBS)	992	992	950	957	1044	957
	(E) OPER. WT. (LBS)	1600	1600	1600	1600	1600	1600
CURB	MANUFACTURER	MICROMETL	-	-	-	-	MICROMETL
	MODEL	CRBW-PRC0BGA	-	-	-	-	CRBW-PRCCCGA
	CLIPS	PER MFGR	-	-	-	-	PER MFGR
	SCREWS PER CLIP	PER MFGR	-	-	-	-	PER MFGR
	(E) CURB WEIGHT (LBS)	-	70	70	70	115	-
	(N) CURB WEIGHT (LBS)	99	-	-	-	-	130
	TOTAL WT. W. CURB (LBS)	1091	1062	1020	1027	1159	1087

NOTES:
1. HP-1 AND HP-5 THRU HP-13 SHALL BE INSTALLED ON EXISTING CURBS.
2. PROVIDE 14" TALL, STRUCTURALLY CALCULATED FACTORY CURB, ALL WELDED CONSTRUCTION, WITH WOOD NAILER FOR HP-3, HP-14 AND HP-15.
3. PROVIDE THROUGH BASE ELECTRICAL CONNECTIONS.
4. PROVIDE ANTI-RECYCLE TIMER, CRANKCASE HEATER, LOW AMBIENT KIT AND HIGH CAPACITY FILTER RACK.
5. PROVIDE LOW-LEAKAGE DRY BULB ECONOMIZER WITH BAROMETRIC RELIEF.
6. BYPASS UNITS ANTI-RECYCLE TIMER WHEN ANTI-RECYCLE FUNCTION IS INCLUDED IN THE THERMOSTAT.
7. ALL UNITS OVER 2000 CFM SUPPLY AIR SHALL BE PROVIDED WITH A DUCT SMOKE DETECTOR TO SHUT-OFF THE UNIT UPON DETECTION OF SMOKE AND ACTIVATE THE FIRE ALARM SYSTEM. INSTALL IN STRICT ACCORDANCE WITH THE 2022 CALIFORNIA MECHANICAL CODE, SECTION 608.1.
8. PROVIDE FACTORY INSTALLED AUXILARY ELECTRIC HEATER. UNIT SHALL BE FURNISHED WITH SINGLE POINT POWER CONNECTION.
9. PROVIDE FACTORY FURNISHED DISCONNECT AND UNPOWERED SERVICE RECEPTACLE. COORDINATE POWER AND WIRING REQUIREMENTS WITH ELECTRICAL CONTRACTOR.
10. PROVIDE HINGED ACCESS PANELS.
11. ~~PROVIDE FACTORY CONDENSER COIL GUARDS.~~
12. PROVIDE TITLE 24 COMPLIANT PROGRAMMABLE THERMOSTAT, HONEYWELL 'RTH6500WF'. PROVIDE A MINIMUM 50'-0" ADDITIONAL CONTROL WIRING LOOPED AND SECURED FOR RELOCATION OF THERMOSTAT. STANDALONE THERMOSTAT REQUIRED FOR HVAC REPLACEMENT DURING THE RE-ROOF PHASE.
13. DURING THE TENANT IMPROVEMENT PHASE, PROVIDE NEW JOHNSON CONTROLS BMS SYSTEM FOR CONTROL AND MONITORING OF ALL HVAC UNITS, INCLUDING NEW FRONT END, CONTROLLERS, SENSORS, AND ALL COMPONENTS AS REQUIRED FOR A FULLY FUNCTIONING HVAC CONTROLS SYSTEM. SEE M5.01 FOR CONTROLS SCOPE OF WORK SCHEMATICS. **CONTACT TOTAL CONTROL, STEVE IGNOFFO @ 916.780.5929 .**

2

EXHAUST CAP SCHEDULE

NUMBER	EH-1
MANUFACTURER	GREENHECK
MODEL	GRSR-8
TYPE	GRAVITY
LOCATION	ROOF
CURB CAP SIZE (IN.)	19x19
ROOF OPENING (IN.)	10.5 x 10.5
OVERALL SIZE (IN.)	20.5 x 20.5
HOOD HEIGHT (IN.)	19.25
CFM	150
FPM / S.P. LOSS	405 / 0.012
SERVICE	RESTROOMS
OPER. WT. (LBS)	15

NOTES:
1. PROVIDE FACTORY 14" ROOF CURB.
2. PROVIDE FACTORY CURB CAP.
3. PROVIDE INSECT SCREEN.
4. PROVIDE BACKDRAFT DAMPER.

INTAKE HOOD SCHEDULE

NUMBER	IH-1
MANUFACTURER	GREENHECK
MODEL	GRSI-12
TYPE	GRAVITY
LOCATION	ROOF
CURB CAP SIZE (IN.)	29x29
ROOF OPENING (IN.)	14x14
OVERALL SIZE (IN.)	29x29
HOOD HEIGHT (IN.)	22
CFM	300
FPM / S.P. LOSS	366 / 0.022
SERVICE	SEE PLAN
OPER. WT. (LBS)	15

NOTES:
1. PROVIDE FACTORY 14" ROOF CURB.
2. PROVIDE FACTORY CURB CAP.
3. PROVIDE INSECT SCREEN.
4. PROVIDE BACKDRAFT DAMPER.

CEILING EXHAUST FAN SCHEDULE

NUMBER	CEF-1, 2, 3, 4
MANUFACURER	GREENHECK
MODEL	SP-A390-VG
TYPE	CENTRIFUGAL
MOUNTING	CEILING
MOTOR BHP	0.02
FLA / MCA	1.5 / 1.9
VOLTS / PHASE	115 / 1
CFM	150
E.S.P. (IN. W.C.)	0.25
DRIVE	DIRECT
FAN RPM	916
SONES / dBA	2.0 / 39
CONTROL	LIGHT SWITCH/OCC. SENSOR
(N) OPER. WT. (LBS)	29
(E) OPER. WT. (LBS)	NA

NOTES:
1. PROVIDE BACKDRAFT DAMPER.
2. PROVIDE FACTORY SOLID STATE SPEED CONTROLLER.
3. INTERLOCK START/STOP OPERATION WITH ROOM LIGHT SWITCH/OCCUPANCY SENSOR.

ROOFTOP EXHAUST FAN SCHEDULE

NUMBER	REF-1
MANUFACURER	GREENHECK
MODEL	G-130-VG
TYPE	CENTRIFUGAL
MOUNTING	ROOF
WATTS / BHP / HP	- / 0.2 / 0.5
VOLTS / PHASE	115 / 1
MAXIMUM CFM	1200
E.S.P. (IN. W.C.)	0.625
DRIVE	DIRECT
FAN RPM	1004
SONES / dBA	9.4 / 59
CONTROL	INTERLOCK W/ HP-11
(N) OPER. WT. (LBS)	90
(E) OPER. WT. (LBS)	90

NOTES:
1. PROVIDE BACKDRAFT DAMPER.
2. PROVIDE FACTORY SOLID STATE SPEED CONTROLLER.
3. PROVIDE 14" FACTORY ROOF CURB - GREENHECK MODEL GPI
4. INTERLOCK REF-1 START/STOP OPERATION WITH HP-11.

AIR DISTRIBUTION SCHEDULE

SYMBOL	TYPE	DESCRIPTION
A	CEILING SUPPLY	MODULAR CORE DIFFUSER WITH FRAME FOR LAY-IN T-BAR CEILING, FLUSH FACE MOUNTING. TITUS MODEL MCD-3.
B	CEILING RETURN	PERFORATED FACE DIFFUSER WITH FRAME FOR LAY-IN T-BAR CEILING FLUSH FACE MOUNTING. TITUS MODEL PAR-3. INTERIOR PAINTED FLAT BLACK.
D	CEILING / WALL RETURN	35° ANGLE SINGLE DEFLECTION FIXED BLADE AT 1/2" O.C. WITH FRAME FOR SURFACE MOUNTING. TITUS MODEL 355RL.
E	DUCT SUPPLY	ROUND CEILING DIFFUSER WITH UNIFORM 360° DISCHARGE PATTERN AND TWO HORIZONTAL DISCHARGE PATTERNS. PROVIDE WITH DAMPER/EXTRACTOR. TITUS MODEL TMR.
F	DUCT RETURN	DOUBLE DEFLECTION ADJUSTABLE 3/4" SPACING BLADE GRILLE WITH CURVED FRAME TO MATCH DUCT DIAMETER FOR FLUSH FACE MOUNTING. PROVIDE WITH EXTRACTOR. TITUS MODEL S300FS.

NOTES:
1. EQUIVALENT MODELS OF NAILOR, KRUEGER, ANEMOSTAT, PRICE OR J&J ARE ACCEPTABLE.
2. REFER TO THE FLOOR PLANS FOR NECK SIZE, CFM, AIR DIFFUSION PATTERN AND FIRE/ SMOKE DAMPER, IF REQUIRED.
3. PROVIDE AIR CONTROL GRID FOR ALL CEILING SUPPLY DIFFUSERS SET AT 90°.

HEAT PUMP UNIT SCHEDULE

NUMBER	ODU-1	ODU-2
TYPE	HEAT PUMP	HEAT PUMP
MANUFACTURER	TRANE	TRANE
MODEL	TRUZA024	TRUZA024
VOLTS / PHASE	208 / 1	208 / 1
RATED LOAD AMPS	-	-
MIN. CIRCUIT AMPS	19	19
M.O.C.P.	26	26
SEER / EER / HSPF / COP	19.6 / 12.0 / - / 4.3	19.6 / 12.0 / - / 4.3
MINIMUM TURNDOWN	-	-
NOMINAL COOLING (MBH)	26.0	26.0
HEATING CAPACITY (MBH)	26.0	26.0
AMBIENT TEMP. (°F)	102	102
REFRIGERANT TYPE	R-454B	R-454B
REFRIG. LINE SIZE (LIQ./SUC.)	SEE NOTES	SEE NOTES
UNIT SERVED	SEE PLAN	SEE PLAN
ACCESSORIES	SEE NOTES	SEE NOTES
OPER. WT. (LBS.)	153	153

NOTES:
1. MAINTAIN MANUFACTURER'S REQUIRED SERVICE CLEARANCES.
2. PROVIDE FACTORY CONDENSER COIL GUARDS.
3. PROVIDE FACTORY CRANKCASE HEATER, VARIABLE SPEED COMPRESSOR, LOW AMBIENT KIT, AND HIGH & LOW PRESSURE SWITCHES.
4. SIZE REFRIGERANT LINES PER MANUFACTURER RECOMMENDATIONS.

FAN COIL SCHEDULE

	NUMBER	FC-1	FC-2
	OUTDOOR SYSTEM SERVED	ODU-1	ODU-2
	MANUFACTURER	TRANE	TRANE
	MODEL	TPEADA024	TPEADA024
	TYPE	HORIZONTAL DUCTED	HORIZONTAL DUCTED
	MOUNTING	SUSPENDED	SUSPENDED
	VOLTS / PHASE	208 / 1	208 / 1
	FLA / MCA	- / 2.28	- / 2.28
	M.O.C.P.	-	-
	HSPF / SEER	4.3 / 19.6	4.3 / 19.6
BLOWER	MOTOR OUTPUT (WATTS)	121	121
	SUPPLY CFM / SPEED	740	740
	E.S.P. (IN. WC.)	0.5	0.5
	RPM	-	-
	DRIVE	DIRECT	DIRECT
	MIN. O.A. (CFM)	150	150
COOLING	TOTAL CAP. (MBH)	24.0	24.0
	SENS. CAP. (MBH)	19.0	19.0
	E.A. DB / WB (°F)	80 / 67	80 / 67
	L.A. DB / WB (°F)	-	-
	AMBIENT TEMP. (°F)	102	102
	COIL TYPE	DIRECT EXP.	DIRECT EXP.
	REFRIGERANT	R-454B	R-454B
HEAT	NOMINAL CAP. (MBH)	28.0	28.0
	E.A. DB (°F)	70	70
	L.A. DB (°F)	92	92
	FILTER	MERV 13	MERV 13
	SERVICE	SEE PLANS	SEE PLANS
	ACCESSORIES	SEE NOTES	SEE NOTES
	OPER. WT. (LBS.)	67	67

NOTES:
1. PROVIDE T24 COMPLIANT HONEYWELL THERMOSTAT.
2. PROVIDE COMMERCIAL THERMOSTAT INTERFACE KIT WITH BACNET CAPABILITIES FOR CONNECTION TO JOHNSON CONTROLS BMS.
3. PROVIDE FACTORY DISCONNECT SWITCH.
4. PROVIDE FLEX CONNECTIONS AT DUCT CONNECTIONS TO UNIT.
5. PROVIDE MERV-13 FILTER.
6. PROVIDE SECONDARY CONDENSATE PAN UNDER UNIT.
7. UNITS SHALL BE EQUIPPED WITH SENSOR IN THE CONDENSATE DRAIN PAN THAT SHUTS OFF UNIT WHEN CONDENSATE LEVEL IS TOO HIGH.
8. PROVIDE FACTORY BUILT-IN CONDENSATE PUMP.
9. INDOOR UNIT POWERED BY OUTDOOR UNIT.

APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: Robert Bottino
on Jun 19, 2025

JOBCOPY

ARCHITECT
PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

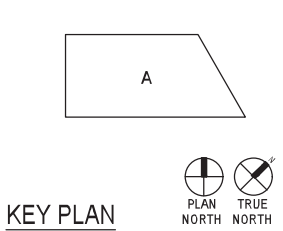
MEP Engineering \\ Technology
LEAF ENGINEERS
FOLSOM
1100 Iron Point Rd., Suite 200
Folsom, CA 95630
916.355.9992 p
LEAFengineers.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

1124 DEL PASO BLVD

KEY PLAN


Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
GAREN M. LENCIONI
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/23/25
2	OWNER CHANGES	5/23/25

CONSTRUCTION DOCUMENT
MECHANICAL SCHEDULES
M0.01

COM-2500586

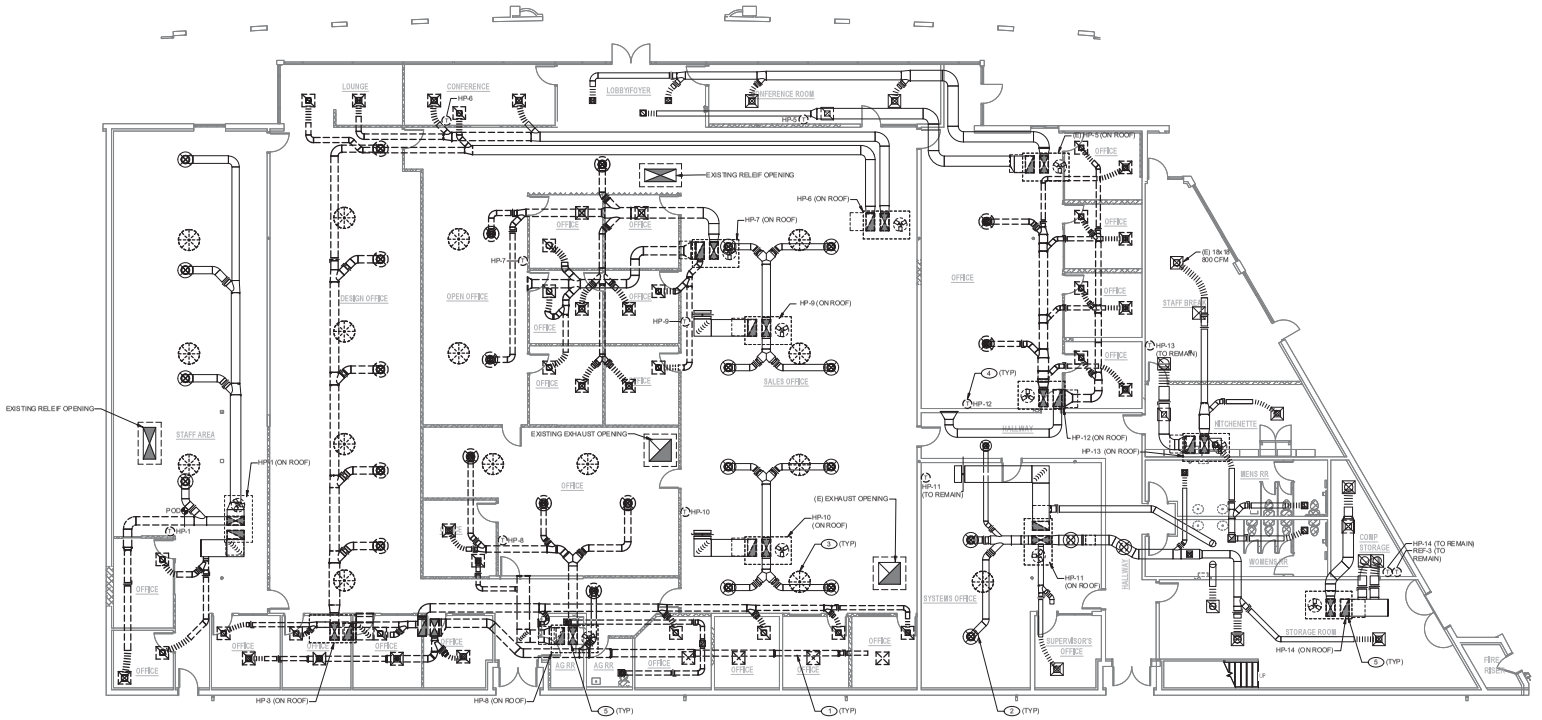
This document is for plan review only

M0_01 SCHEDULES
PBKca TBv1.2 2019.10.03

\\PBKdfs\PBKInc\Projects\FOL\2022\220389\3-CD\Drawings\Cns\MEPT\M_TI
5/20/2025 3:36:49 PM

KEYNOTES

1. DEMOLISH EXISTING DUCTWORK, DUCT SUPPORTS, DIFFUSERS AND GRILLES. PREPARE FOR INSTALLATION OF NEW EQUIPMENT AND RECONNECTION TO EXISTING DUCTWORK.
2. EXISTING DUCTWORK TO REMAIN.
3. DEMOLISH ALL EXISTING CEILING CIRCULATION FANS AND FAN CONTROLLERS/SWITCH.
4. DEMOLISH EXISTING THERMOSTATS. PREPARE FOR INSTALLATION OF NEW BMS SYSTEM AND SENSORS. RETURN ALL THERMOSTATS TO CITY OF SACRAMENTO.
5. DEMOLISH EXISTING SUPPLY AND RETURN PLENUM DROPS. PREPARE FOR INSTALLATION OF NEW PLENUM DROPS FROM NEW ROOFTOP UNITS.



APPROVED
For Permit Issuance Only
PLUMBING & MECHANICAL
By: Robert Bottino
on Jun 19, 2025

1 MECHANICAL DEMOLITION FLOOR PLAN
SCALE: 1/8" = 1'-0"

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-365-9922
MEP Engineering & Technology
LEAF ENGINEERS

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
JOSEPH M. LEONG
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/31/25
2	OWNER CHANGES	6/23/25

CONSTRUCTION DOCUMENT

MECHANICAL DEMOLITION FLOOR PLAN

M1.01

This document is for plan review only

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

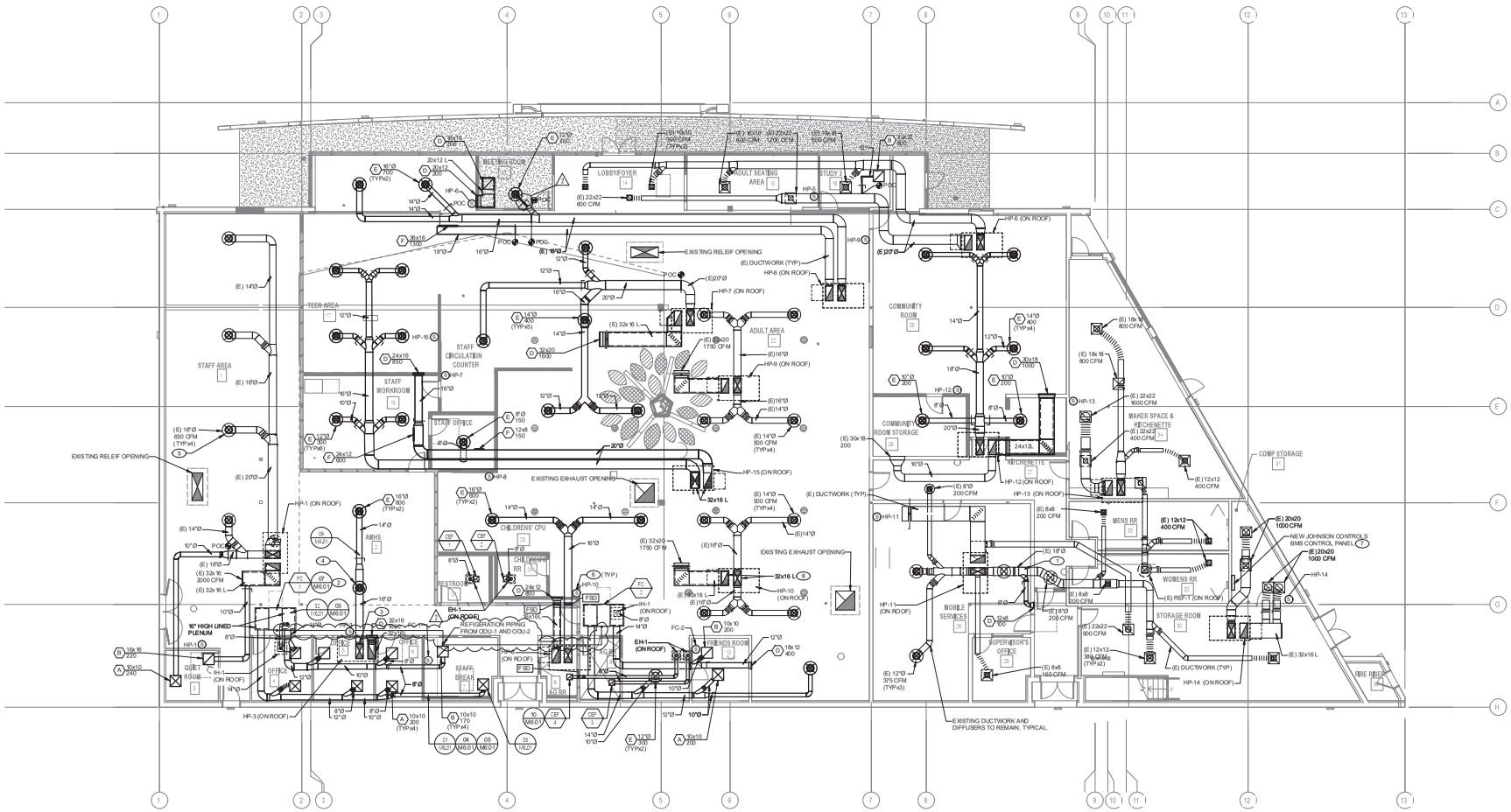
M1_01 DEMOFP
PBKx1 TBx1 2 2019/10/03

W:\PBKdfs\PBKncProjects\FOL\2022\220389\3-CD\Drawings\Cnst\MEP\M1_T1
5/20/2025 3:36:55 PM

M2_01 NEWFP
PBKcs TBv12 2019.10.03

KEYNOTES

1. NEW DUCTWORK AND WYE FITTING FOR SUPPLY AIR TO CORRIDOR.
2. MOUNT FAN COIL UNITS AS TIGHT TO STRUCTURE AS POSSIBLE. COORDINATE WITH OTHER DISCIPLINES PRIOR TO COMMENCING WORK. MAINTAIN MINIMUM SERVICE CLEARANCES. PROVIDE REFRIGERATION PIPING (RSR/L) PER MANUFACTURE REQUIREMENTS AND CONNECT TO CORRESPONDING OUTDOOR UNIT.
3. CONNECT NEW SUPPLY/RETURN DUCTWORK TO PLENUM DROPS FROM HEAT PUMP UNITS. FOR EXISTING DUCTWORK, RECONNECT EXISTING SUPPLY/RETURN DUCT WORK TO NEW PLENUM DROPS. PROVIDE TRANSITIONS AND FITTINGS AS REQUIRED. TYPICAL.
4. TEST AND BALANCE EXISTING AND NEW AIR DISTRIBUTION SYSTEMS.
5. CLEAN ENTIRE EXISTING AIR DISTRIBUTION SYSTEM (DUCTS, GRILLES, AND REGISTERS). SEE SPECS FOR CLEANING REQUIREMENTS.
6. INSTALL NEW SENSORS FOR BMS @ 48" A.F.F. AND PER ADA REQUIREMENTS.
7. JOHNSON CONTROLS HVAC CONTROL SYSTEM AND FRONT END. SEE CONTROLS M5.01 FOR DETAILS. PROVIDE ALL HARDWARE, WIRING AND COMPONENTS TO PROVIDE A FULLY FUNCTIONING CONTROLS SYSTEM PER CITY OF SACRAMENTO STANDARDS.
8. 32x16L SUPPLY AND RETURN PLENUM DROPS FROM HEAT PUMP UNITS, TYPICAL.



PROVIDE AIR BALANCE REPORT FOR FINAL MECHANICAL INSPECTION

FIRE & FIRE / SMOKE DAMPER INSTALLATIONS REQUIRE A FRAMING AND MECHANICAL INSPECTION PRIOR TO SHEETROCK

APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: Robert Bottino
on Jun 19, 2025

1 MECHANICAL FLOOR PLAN
SCALE: 1/8" = 1'-0"

PBK

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-355-9922

MEP Engineering & Technology
LEAF ENGINEERS
FOLSOM
1110 Iron Point Rd, Suite 200
Folsom, CA 95630
916.290.9910
LEAFengineering.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

SACRAMENTO

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
JAREN M. LEACHMAN
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/23/25
2	OWNER CHANGES	5/23/25

CONSTRUCTION DOCUMENT

MECHANICAL FLOOR PLAN

This document is for plan review only

M2.01

JOBCOPY

1124 DEL PASO BLVD

COM-2500586

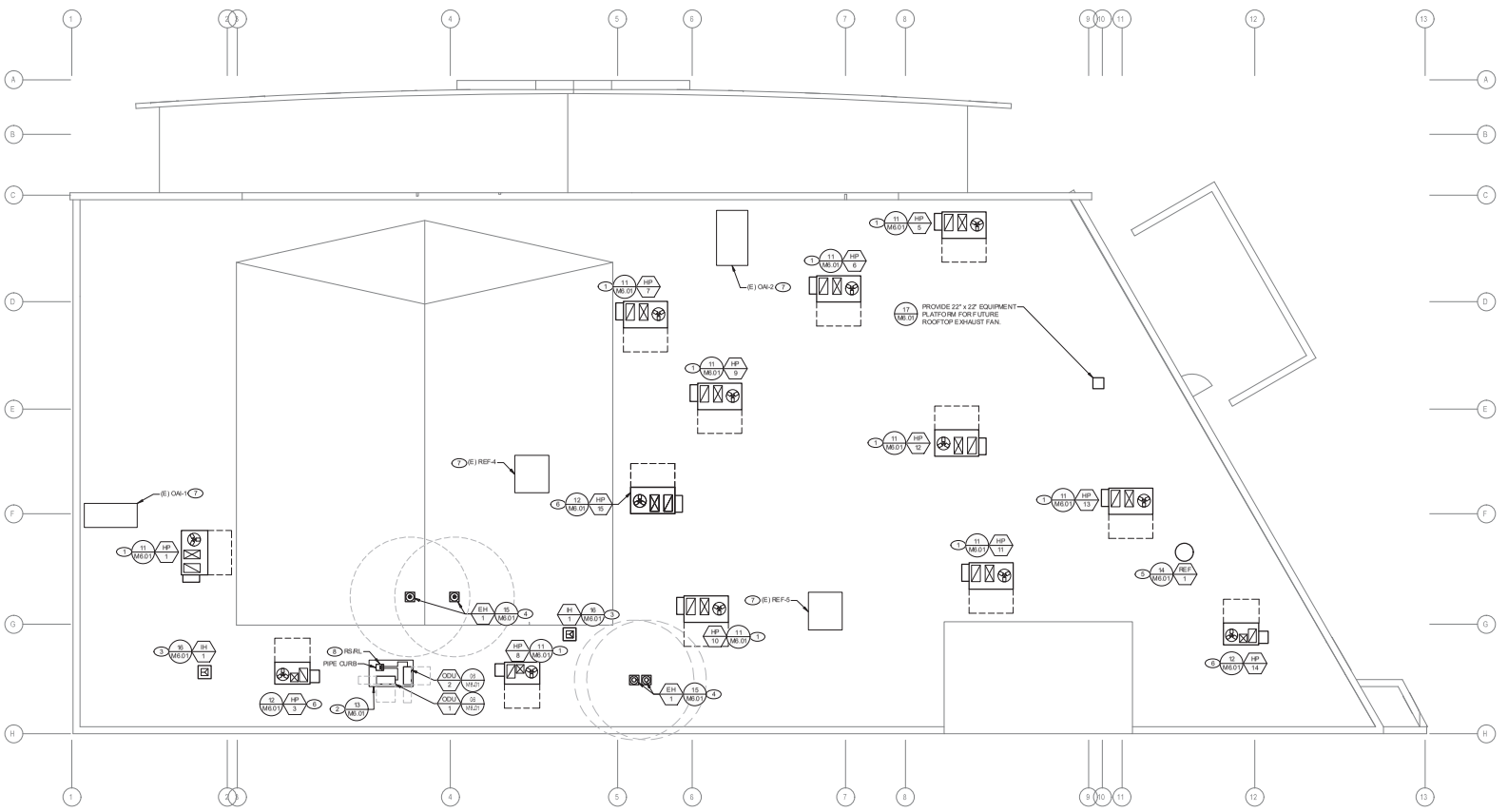
\\PBKdfs\PBKInc\Projects\FOL\2022\220389\3-CD\Drawings\Civil\MEP\TM_T1
5/20/2025 3:37:00 PM

GENERAL NOTES

1. FOR DEMOLITION SCOPE OF WORK, SEE APPROVED *NORTH SACRAMENTO HAGGINWOOD LIBRARY ROOF ASSESSMENT AND REPAIR PLANS (#COM-231004)*

KEYNOTES

1. (N) PACKAGE ROOFTOP HEAT PUMP UNIT ON (E) CURB. PROVIDE LINED SUPPLY AND RETURN PLENUM DROPS TO 3'-0" BELOW ROOF DECK.
2. (N) ROOFTOP EQUIPMENT PLATFORM, ON (E) CURB. SEE DETAIL SHEET FOR WORK REQUIRED TO RE-PURPOSE EXISTING CURB INTO NEW EQUIPMENT PLATFORM.
3. (N) OUTSIDE AIR INTAKE HOOD, SERVING NEW INDOOR FAN COIL UNITS. SEE FLOOR PLAN FOR FAN COIL UNIT LOCATIONS.
4. (N) 8'0Ø ROUND EXHAUST ROOF VENT. CONNECT TO EXHAUST DUCTWORK FROM NEW CEILING EXHAUST FANS. SEE FLOOR PLAN FOR CEILING EXHAUST FAN LOCATIONS.
5. (N) ROOFTOP EXHAUST FANS. CONNECT NEW EXHAUST DUCTWORK FROM EXHAUST FAN AND TRANSITION AS REQUIRED TO CONNECT EXISTING DUCTWORK BELOW.
6. (N) PACKAGE ROOFTOP HEAT PUMP UNIT ON (N) CURB. PROVIDE LINED SUPPLY AND PLENUM DROPS TO 3'-0" BELOW ROOF DECK.
7. INSTALL REF-4, REF-5, OA-1, AND OA-2 AT SAME LOCATION AFTER BEING REMOVED DURING DEMOLITION PHASE TO ACCOMMODATE RE-ROOFING OF ENTIRE BUILDING.
8. PROVIDE REFRIGERATION PIPING FROM ODU-1 AND ODU-2 TO CORRESPONDING FAN COIL UNIT. SEE FLOOR PLAN FOR UNIT LOCATION. PROVIDE PIPE CURB ON EQUIPMENT PLATFORM FOR PENETRATIONS THROUGH ROOF.



APPROVED
City of Sacramento Key Service
PLUMBING & MECHANICAL
By: Robert Bottino
on Jun 19, 2025

1 MECHANICAL ROOF PLAN
SCALE: 1/8" = 1'-0"

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-365-9922
MEP Engineering & Technology
LEAF ENGINEERS
TOLLO
1110 Iron Point Rd, Suite 200
Folsom, CA 95630
ISSUED BY
By: Saul Moran
on Jul 10, 2025
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
ROBERT M. TOLLO
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/31/25
2	OWNER CHANGES	6/23/25

CONSTRUCTION DOCUMENT

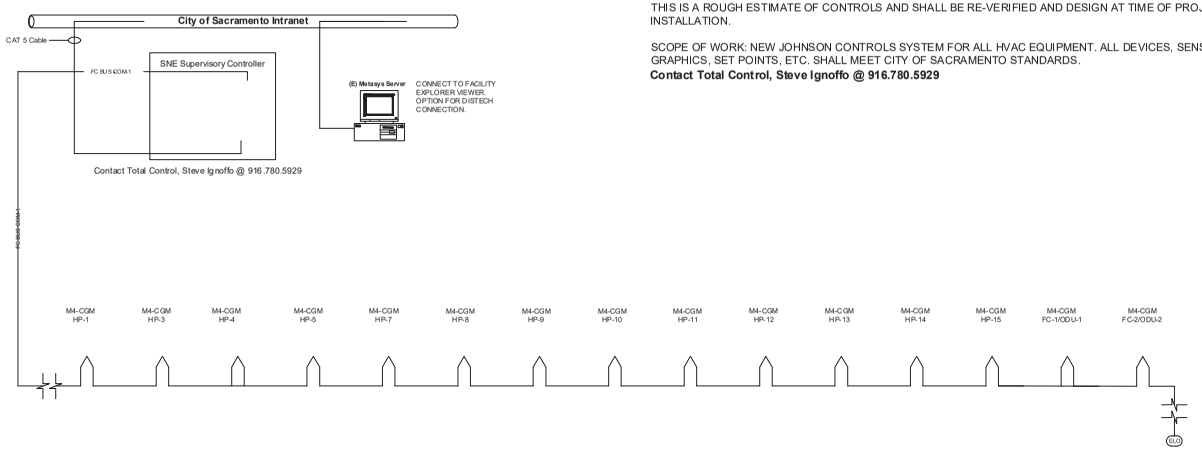
MECHANICAL ROOF PLAN

M3.02

This document is for plan review only

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

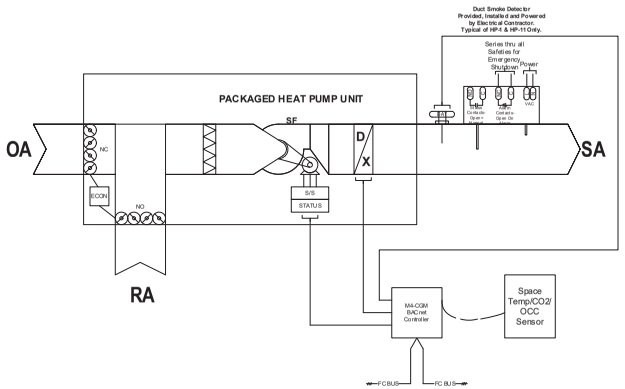
M3_01 NEWRP
PBKv1 Tbl=1.2 2019/1003
\\PBKdfs\PBKncP\Projects\FOL\2022\220389.3-CD\Drawings\Cnst\MEP\M_T1
5/20/2025 3:37:04 PM



GENERAL NOTES:
PROPOSED CONTROL SCHEMATIC SHALL NOT BE USED FOR CONSTRUCTION, INSTALLATION, OR DESIGN. THIS IS A ROUGH ESTIMATE OF CONTROLS AND SHALL BE RE-VERIFIED AND DESIGN AT TIME OF PROJECT INSTALLATION.

SCOPE OF WORK: NEW JOHNSON CONTROLS SYSTEM FOR ALL HVAC EQUIPMENT. ALL DEVICES, SENSORS, GRAPHICS, SET POINTS, ETC. SHALL MEET CITY OF SACRAMENTO STANDARDS.
Contact Total Control, Steve Ignoffo @ 916.780.5929

1 LAN Architecture Layout



SEQUENCE OF OPERATION

PACKAGED HEAT PUMP UNIT

OCCUPIED/UNOCCUPIED MODE: SHALL BE SCHEDULED BY THE BAS SYSTEM. IN THE UNOCCUPIED MODE THE SPACE COOLING AND HEATING SET POINTS SHALL BE RESET TO UNOCCUPIED SETPOINTS, AND SUPPLY FANS SHALL ONLY ENERGIZE ON A CALL FOR HEAT/COOL. DURING UNOCCUPIED HOURS, WHEN THE NETWORK SENSOR SENSES AN OCCUPANT, THE UNIT SHALL GO INTO THE OCCUPANCY MODE.

SUPPLY FAN CONTROL: SHALL RUN CONTINUOUSLY DURING THE OCCUPIED MODE.

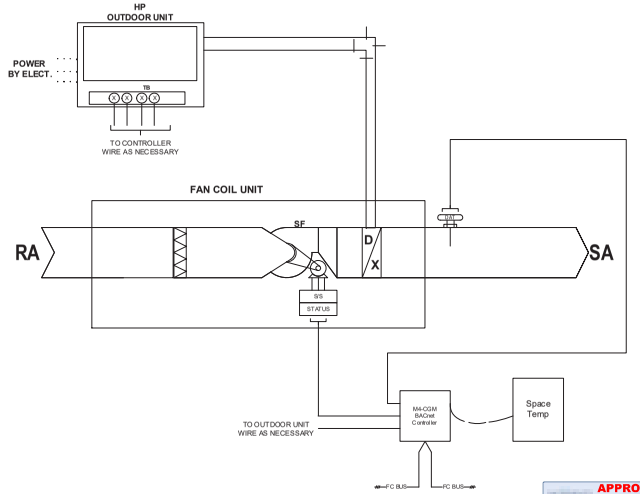
HEATING CONTROL: WHEN THE SPACE TEMPERATURE FALLS BELOW THE SPACE HEATING SETPOINT, ENERGIZE THE HEAT PUMP HEATING STAGE(S) AS REQUIRED TO MAINTAIN SPACE SETPOINT.

COOLING CONTROL: WHEN THE SPACE TEMPERATURE FALLS BELOW THE SPACE COOLING SETPOINT, ENERGIZE HEAT PUMP COOLING STAGE(S) AS REQUIRED TO MAINTAIN SETPOINT.

DEMAND CONTROLLED VENTILATION (DCV): THE UNIT SHALL PROVIDE DCV PER T24, PART 6 REQUIREMENTS. UPON ENTERING DCV MODE, THE UNIT ENABLE ECONOMIZER MODE UNTIL CO2 SET POINTS ARE BELOW THE SET POINT.

SAFETIES/ALARMS: IF THE DISCHARGE AIR TEMPERATURE FALLS BELOW 40°F (ADJ.), THE UNIT SHALL BE COMMANDED INTO THE UNOCCUPIED MODE AND ALARM SHALL BE GENERATED. WHEN ANY CONTROL POINT DEVIATES FROM SET POINT BY MORE THAN 5°F (ADJ.), AN ALARM SHALL BE GENERATED. WHEN ANY SENSED OUTPUT DIFFERS FROM ITS COMMANDED STATE, AN ALARM SHALL BE GENERATED.

2 Packaged Heat Pump Unit Control Detail



SEQUENCE OF OPERATION

FAN COIL CONTROL

OCCUPIED/UNOCCUPIED MODE: SHALL BE SCHEDULED BY THE BAS SYSTEM. IN THE UNOCCUPIED MODE THE SPACE COOLING AND HEATING SET POINTS SHALL BE RESET TO UNOCCUPIED SETPOINTS, AND SUPPLY FANS SHALL ONLY ENERGIZE ON A CALL FOR HEAT/COOL.

SUPPLY FAN CONTROL: SHALL RUN CONTINUOUSLY DURING THE OCCUPIED MODE.

HEATING CONTROL: WHEN THE SPACE TEMPERATURE FALLS BELOW THE SPACE HEATING SETPOINT, ENERGIZE THE HEAT PUMP HEATING STAGE(S) AS REQUIRED TO MAINTAIN SPACE SETPOINT.

COOLING CONTROL: WHEN THE SPACE TEMPERATURE FALLS BELOW THE SPACE COOLING SETPOINT, ENERGIZE HEAT PUMP COOLING STAGE(S) AS REQUIRED TO MAINTAIN SETPOINT.

SAFETIES/ALARMS: IF THE DISCHARGE AIR TEMPERATURE FALLS BELOW 40°F (ADJ.), THE UNIT SHALL BE COMMANDED INTO THE UNOCCUPIED MODE AND ALARM SHALL BE GENERATED. WHEN ANY CONTROL POINT DEVIATES FROM SET POINT BY MORE THAN 5°F (ADJ.), AN ALARM SHALL BE GENERATED. WHEN ANY SENSED OUTPUT DIFFERS FROM ITS COMMANDED STATE, AN ALARM SHALL BE GENERATED.

3 Split-System Heat Pump Unit Control Detail

APPROVED
By: Robert Bottino
on Jun 19, 2025

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-365-9922
MEP Engineering & Technology
LEAF ENGINEERS
1110 Iron Point Rd, Suite 200
Folsom, CA 95630
916.782.9911
LEAFengineers.com

ISSUED BY
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

JOBCOPY

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

1124 DEL PASO BLVD

A

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
GREGORY M. LEONARD
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/23/25
2	OWNER CHANGES	5/23/25

CONSTRUCTION DOCUMENT

MECHANICAL CONTROLS

M5.01

COM-2500586

This document is for plan review only

JOBCOPY

1124 DEL PASO BLVD

COM-2500586

PBK

ARCHITECT
PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

MEP Engineering \\ Technology

LEAF ENGINEERS
FOLSOM
1100 Iron Point Rd., Suite 200
Folsom, CA 95630
916.355.9992 p
LEAFengineers.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN
A
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
GAREN M. LENCIONI
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/23/25
2	OWNER CHANGES	5/23/25

CONSTRUCTION DOCUMENT

MECHANICAL DETAILS

M6.01

This document is for plan review only

APPROVED
City of Sacramento Plan Review
STRUCTURAL
By: Vincent Wang
on Jul 01, 2025

01 DUCT CONSTRUCTION STANDARDS N.T.S

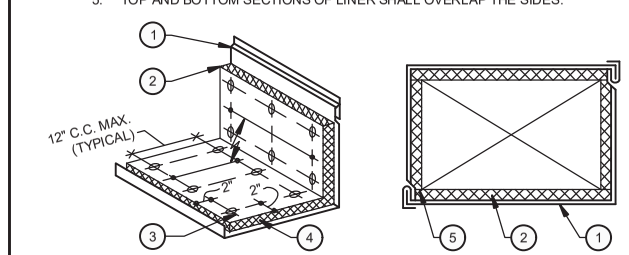
DIMENSION OF LONGEST SIDE, INCHES	SHEET METAL GAGE (ALL FOUR SIDES)	MINIMUM REINFORCING ANGLE SIZE AND MAXIMUM LONGITUDINAL SPACING BETWEEN TRANSVERSE JOINTS &/OR INTERMEDIATE REINFORCING	MIN. HT. IN.	DRIVE SLIP / PLAIN S SLIP RECOMMENDED GAGE	HEMMED S SLIP RECOMMENDED GAGE	ALTER'NT BAR SLIP RECOMMENDED GAGE	REIN-FORCED BAR SLIP RECOMMENDED GAGE
UP THRU 12	26	NONE REQUIRED	1	26	26	24	24
13 - 18	24	NONE REQUIRED	1	24	24	24	24
19 - 30	24	1" x 1" x 1/8" @ 60 IN.	1		24	24	24
31 - 42	22	1" x 1" x 1/8" @ 60 IN.	1			22	22
43 - 60	20	1" x 1" x 1/8" @ 60 IN.	1				20
61 & ABOVE	18	1" x 1" x 1/8" @ 60 IN.	1				18

TRANSVERSE REINFORCING (1) AT JOINTS

(1) TRANSVERSE REINFORCING SIZE IS DETERMINED BY DIMENSION OF SIDE TO WHICH ANGLE IS APPLIED.

02 ACOUSTIC LINED DUCTS N.T.S

1. GALVANIZED SHEET METAL DUCT.
2. ACOUSTIC DUCT LINER, LINER TO BE ADHERED TO DUCT WITH 100% ADHESIVE. (MIRACLE PF96)
3. NOT MORE THAN 2" FROM EDGE OF DUCT LINER.
4. ALL ENDS OF LINER TO BE COATED WITH ADHESIVE. (MIRACLE PF96) ENDS OF LINER SHALL BE BUTTED FIRMLY TOGETHER.
5. TOP AND BOTTOM SECTIONS OF LINER SHALL OVERLAP THE SIDES.

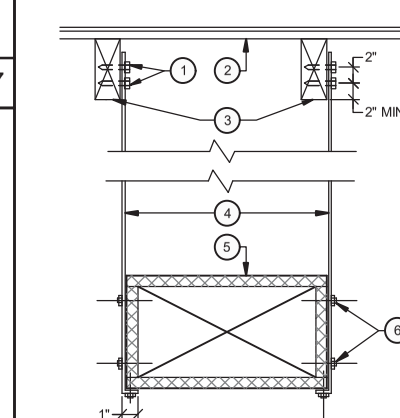


METAL FASTENERS: OMARK INSUL-PINS, DURA DYNE FASTENERS OR GRIP NAILS.

GRIP NAILS SHALL BE INSTALLED BY "GRIP-NAIL AIR HAMMER" OR BY AUTOMATIC FASTENER EQUIPMENT.

03 RECTANGULAR DUCT SUPPORT N.T.S

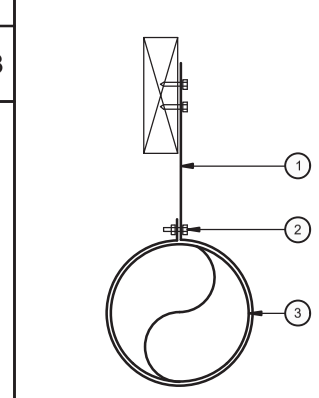
1. #10 CADMIUM PLATED WOOD SCREWS W/ 1-1/2" MIN. PENETRATION. (TYPICAL)
2. ROOF.
3. WOOD FRAMING MEMBER, OR (N) WOOD BLOCKING BETWEEN FRAMING MEMBERS.
4. 1" x 18 GA. GALV. SHEET METAL STRAP @ 8'-0" O.C.
5. ACOUSTIC LINED GALVANIZED SHEET METAL DUCT - SEE MECHANICAL PLAN FOR SIZE.
6. #10 x 3/4" SELF TAPPING CADMIUM PLATED SHEET METAL SCREWS TO ANCHOR STRAPS TO DUCT. ALL STRAPS TO BE TIGHT AGAINST DUCT AND SUPPORT MEMBERS. (TYPICAL).



NOTE: THIS DETAIL IS FOR DUCTS SMALLER THAN 6 SQ. FT. CROSS AREA AND DO NOT REQUIRE LATERAL BRACING PER OPM-0052-13, SECTION 5.0.

04 ROUND DUCT SUPPORT N.T.S

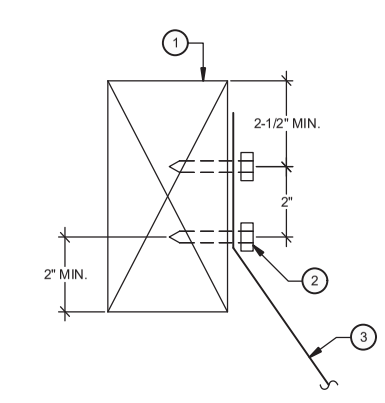
1. 1"x22 GA. GALV. S.M. STRAP, ATTACH TO STRUCTURE WITH (2) #10x1-1/4" CADMIUM PLATED SCREWS.
2. 1/4"Ø THRU BOLT WITH LOCK WASHER AND NUT.
3. ROUND DUCTWORK, SEE PLAN FOR SIZE.



NOTES:
A. DUCT SUPPORTS SHALL BE 10'-0" O.C.
B. ALL DUCTS ARE LESS THAN 33"Ø, WEIGH 10 LBS./FT. OR LESS AND WILL NOT IMPACT OTHER DUCTS OR EQUIPMENT SO THEY DON'T REQUIRE DIAGONAL BRACING PER OPM-0295-13.

05 S/M STRAP ATTACHMENT N.T.S

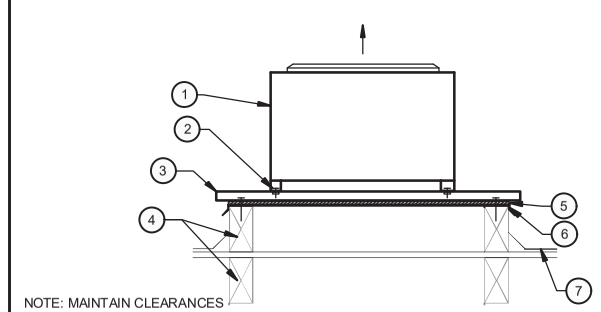
1. WOOD FRAMING MEMBER OR 4x4 BLOCKING.
2. (2) # 10 CADMIUM PLATED SCREWS WITH 1" MIN. PENETRATION.
3. 1" x 18 GA. GALV. S.M. STRAP.



APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: Robert Bottino
on Jun 19, 2025

06 CONDENSING UNIT MOUNTING N.T.S

1. CONDENSING UNIT. SEE OUTDOOR UNIT SCHEDULE.
2. UNIT ATTACHMENT AND ANCHORAGE TO UNISTURT, PER 4/S4.01
3. UNISTRUT C-CHANNEL, LOCATED AT EQUIPMENT FOOTINGS. ATTACH TO EXISTING CURB, PER 4/S4.01.
4. EXISTING CURB PERIMITER AND BLOCKING, TO REMAIN.
5. 1/4" NEOPRENE PAD, ENTIRE LENGTH OF UNISTRUT.
6. (N) 20 GAUGE SHEET METAL COVER, PER 13/M6.01.
7. (E) ROOFING.

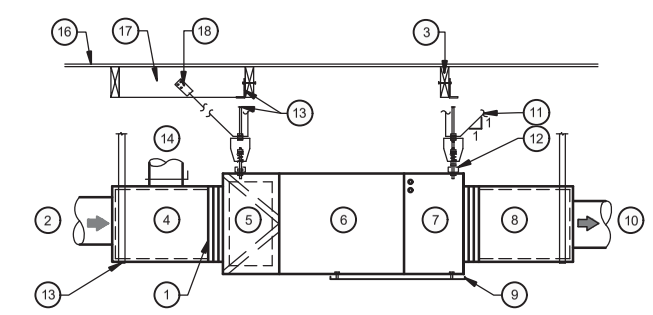


NOTE: MAINTAIN CLEARANCES REQUIRED BY MANUFACTURER.

07 SUSPENDED HORIZONTAL FAN COIL N.T.S

1. FLEX CONNECTION. (TYPICAL)
2. RETURN AIR DUCT. SEE PLAN FOR CONTINUATION AND SIZE.
3. WOOD FRAMING MEMBERS OR BLOCKING, PER STRUCTURAL.
4. GALVANIZED SHEET METAL RETURN AIR PLENUM WITH ACOUSTICAL LINING.
5. FILTER ACCESS PANEL, PROVIDED BY. MFGR.
6. HORIZONTAL FAN COIL - SEE MECH. PLAN.
7. COIL CONNECTION - SEE MECH. PLAN.
8. GALVANIZED SHEET METAL SUPPLY AIR PLENUM WITH ACOUSTICAL LINING.
9. PROVIDE SHEET METAL SUSPENDED DRIP PAN.
10. SUPPLY AIR DUCT. SEE PLAN FOR CONTINUATION AND SIZE.
11. 10 GA. SEISMIC CABLE BRACE, W/ (3) TIGHT TURNS AT STEEP STRAP CONNECTION TO STRUCTURE.
12. PROVIDE FACTORY SPRING ISOLATION SUSPENSION KIT.
13. HANGERS AND UPPER ATTACHMENTS TO STRUCTURE, PER STRUCTURAL DETAIL 5/S4.01.
14. OUTSIDE AIR DUCT WITH DAMPER, SEE PLAN FOR CONTINUATION AND SIZE.
15. DUCT SUPPORT (TYPICAL).
16. (E) ROOF.
17. 2X BLOCKING, PER STRUCTURAL.
18. STEEP STRAP, 2" WIDE X 16GA W/ (4) #8 WS.

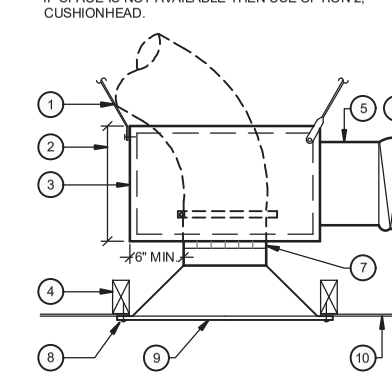
NOTE: REFER TO STRUCTURAL PLANS AND CALCULATIONS FOR UNIT ATTACHMENT DETAILS TO MEET ALL REQUIREMENTS OF ASCE 7-16 13.1.4 AND 13.6.A



08 DIFFUSER INSTALL (SUPPLY OR RETURN) N.T.S

OPTION 1: FLEX DUCT RUN-OUT TO TOP OF GRILLE WITH C OF ELBOW RADIUS MINIMUM 150% OF DUCT DIAMETER. IF SPACE IS NOT AVAILABLE THEN USE OPTION 2, CUSHIONHEAD.

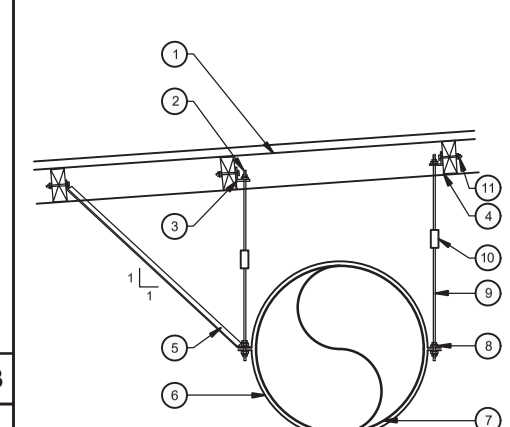
1. SUPPORT WITH (4) 1" x 18 GA. S.M. STRAPS. SECURE STRAPS TO CUSHIONHEAD W/ (2) #10 S.M. SCREWS AND TO STRUCT. PER DET. 05/M6.01.
2. (BRANCH SIZE + 2") x (NECK SIZE +2")
3. CUSHIONHEAD BOX WITH MINIMUM 2" LINING.
4. 2x WOOD BLOCKING OR (E) CEILING FRAMING.
5. METAL SLEEVE OR SPIN-IN FITTING.
6. INSULATED FLEXIBLE AIR DUCT RUN-OUT, SEE MECHANICAL PLAN FOR SIZE.
7. AIR CONTROL GRID SET AT 90° TO AIR STREAM OR PLANE OF ELBOW. (IF APPLICABLE)
8. #10 S.M. SCREW, SECURE PER DIFFUSER MNFG. REQUIREMENTS.
9. TYPICAL SQUARE NECK SUPPLY OR RETURN AIR DIFFUSER.
10. (E) GYP. BD. CEILING.



NOTE: VERIFY CEILING TYPE, PROVIDE APPROPRIATE DIFFUSER FRAME AND INSTALLATION.

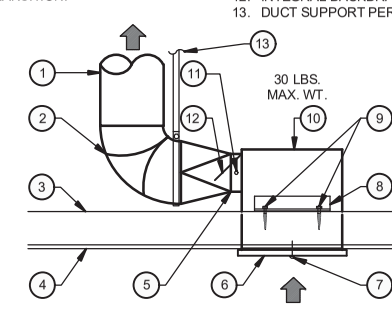
09 EXPOSED DUCT SUPPORT N.T.S

1. (E) 2x ROOF FRAMING @ 24" O.C.
2. LOCK NUT & WASHER, (TYP.)
3. L3"x3"x1/4"x0'-3" WITH 3/8" NUT ON ROD AT EACH SIDE OF ANGLE. (TYP.)
4. 4x BLOCKING WITH U44 JOIST HANGER EACH END. (TYP.)
5. L1"x1"x12 GA. SWAY BRACE IN (2) DIRECTIONS.
6. 1"x18 GA. S.M. STRAP @ 8'-0" O.C. MAX.
7. TYPICAL SPIRAL DUCT (MAX. 28"Ø).
8. NUT, WASHER & LOCK NUT. (TYP.)
9. 3/8"Ø ALL THREAD ROD. TYP. (8'-0" MAX. SPACING).
10. 3/8"Ø ROD COUPLING. (TYP.)
11. 3/8"Ø x 6" THRU BOLT CENTERED IN BLOCKING WITH LOCK WASHER AND NUT. (TYP.)



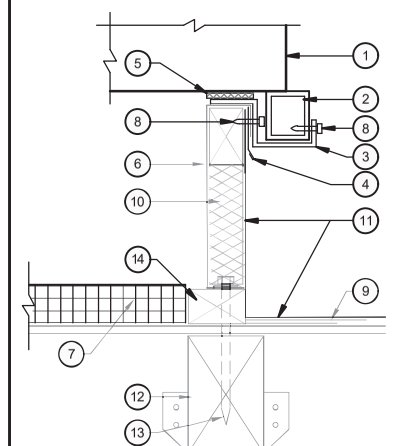
10 EXHAUST FAN CEILING MOUNTING N.T.S

1. ROUND GALVANIZED SHEET METAL DUCT THRU ROOF, SEE MECHANICAL PLAN FOR SIZE.
2. ROUND GALVANIZED SHEET METAL 90° ELBOW.
3. 2x WOOD FRAMING OR 2x BLOCKING WITH U24 EACH END TO FRAMING.
4. GYPSUM BOARD CEILING, SEE ARCH. DRAWINGS.
5. SQUARE TO ROUND GALVANIZED SHEET METAL TRANSITION.
6. MOLDED WHITE PLASTIC GRILLE FURNISHED WITH EXHAUST FAN.
7. GRILLE BUTTON FURNISHED WITH FAN.
8. ADJUSTABLE MOUNTING FLANGE ON EACH SIDE, FURNISHED WITH EXHAUST FAN.
9. 1/4"Ø x 1-1/2" LAG SCREW INTO WOOD FRAMING OR BLOCKING.
10. CEILING MOUNTED EXHAUST FAN.
11. #7 x 1/2"Ø SHEET METAL SCREWS MIN. 4" O.C., TAPE WITH 2" HARDCAST TAPE
12. INTEGRAL BACKDRAFT DAMPER.
13. DUCT SUPPORT PER DETAIL 04/M6.01.



11 HEAT PUMP ON EXISTING CURB N.T.S

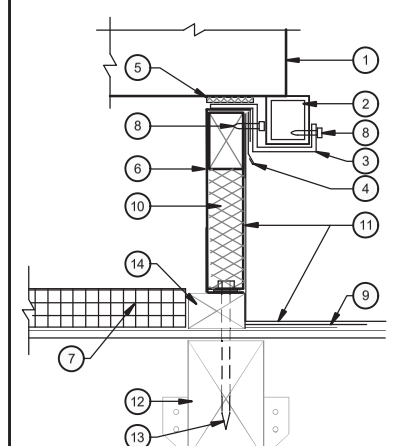
1. AIR CONDITIONING UNIT.
2. UNIT BASE RAIL, SEE MANUFACTURER'S CUT SHEET.
3. MANUFACTURER'S HOLD DOWN S-CLIP. 16 GA. GALVANIZED STEEL. 4 PER LONG SIDE, AT EACH CORNER, 8 TOTAL.
4. GALVANIZED S/M FLASHING.
5. 2"x1/4" CONTINUOUS DENSE NEOPRENE SPONGE GASKET.
6. (E) CURB.
7. MINIMUM R-13 RIGID INSULATION.
8. #10x1/2 TEK SCREWS, 3 PER S-CLIP, 12 TOTAL ON EACH LONG SIDE. AT EACH HOLD DOWN S-CLIP.
9. (E) ROOF
10. 1-1/2" RIGID INSULATION COMPATIBLE WITH ROOFING.
11. FLASHING AND WATERPROOFING, SEE ARCHITECTURAL.
12. (E) BLOCKING OR WOOD FRAMING.
13. (E) ATTACHMENT TO STRUCTURE.
14. (E) WOOD LEVELING BLOCK



NOTE: REFER TO STRUCTURAL PLANS AND CALCULATIONS FOR UNIT ATTACHMENT DETAILS TO MEET ALL REQUIREMENTS OF ASCE 7-16 13.1.4 AND 13.6.A

12 HEAT PUMP ON NEW CURB N.T.S

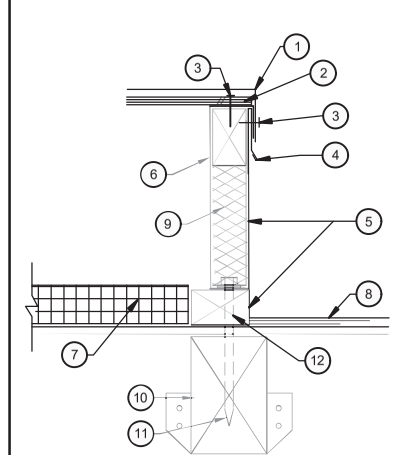
1. AIR CONDITIONING UNIT.
2. UNIT BASE RAIL, SEE MANUFACTURER'S CUT SHEET.
3. MANUFACTURER'S HOLD DOWN S-CLIP. 16 GA. GALVANIZED STEEL. 4 PER LONG SIDE, AT EACH CORNER, 8 TOTAL.
4. GALVANIZED S/M FLASHING.
5. 2"x1/4" CONTINUOUS DENSE NEOPRENE SPONGE GASKET.
6. (N) METAL ROOF CURB, BY FACTORY.
7. MINIMUM R-13 RIGID INSULATION.
8. #10x1/2 TEK SCREWS, 3 PER S-CLIP, 12 TOTAL ON EACH LONG SIDE. AT EACH HOLD DOWN S-CLIP.
9. (E) ROOF
10. 1-1/2" RIGID INSULATION COMPATIBLE WITH ROOFING.
11. FLASHING AND WATERPROOFING, SEE ARCHITECTURAL PLANS.
12. BLOCKING, SEE STRUCTURAL PLANS.
13. 1/2"Ø GALV. LAG SCREW @ 12"O.C.
14. 2X WOOD LEVELING BLOCK, RIP AS NEEDED FOR LEVEL CURB SURFACE.



NOTE: REFER TO STRUCTURAL PLANS AND CALCULATIONS FOR UNIT ATTACHMENT DETAILS TO MEET ALL REQUIREMENTS OF ASCE 7-16 13.1.4 AND 13.6.A

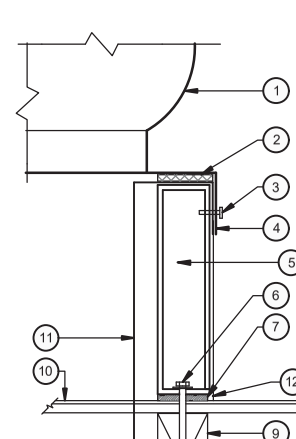
13 ROOF EQUIPMENT PLATFORM ON EXISTING CURB N.T.S

1. 20 GA. GALV. SHT MTL. COVER, LAP, FOLD, & SOLDER ALL HORIZ. JOINTS
2. LEVEL 1-1/8" PLYWOOD PLATFORM
3. #10 GALV. SCREWS. @ 12" O.C. (MIN 1" EMBED). SEAL WATER TIGHT.
4. GALVANIZED S/M FLASHING.
5. FLASHING AND WATERPROOFING, SEE ARCHITECTURAL.
6. (E) CURB.
7. MINIMUM R-13 RIGID INSULATION.
8. (E) ROOF
9. 1-1/2" RIGID INSULATION COMPATIBLE WITH ROOFING.
10. (E) BLOCKING OR WOOD FRAMING.
11. (E) ATTACHMENT TO STRUCTURE.
12. (E) LEVELING BLOCK



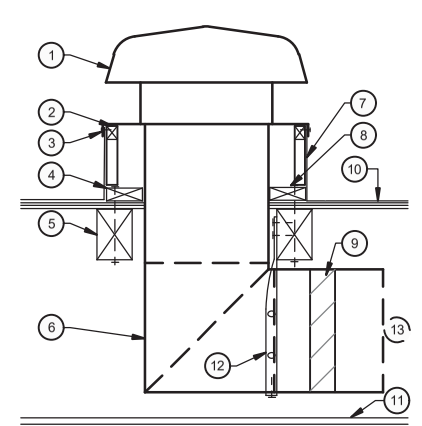
14 ROOF EXHAUST FAN ON NEW CURB N.T.S

1. EXHAUST FAN.
2. 2" x 1/4" CONTINUOUS DENSE NEOPRENE SPONGE GASKET.
3. 1/4" DIA. SHEET METAL SCREW, (2) EACH SIDE.
4. FLASHING.
5. FACTORY CURB.
6. SILICONE SEAL BOLT HEAD.
7. SILICONE SEAL.
8. 3/8" DIA. LAG BOLT WITH 3" PENETRATION. (ONE PER CORNER)
9. STRUCTURAL BLOCKING, SEE STRUCT. DWGS.
10. ROOF - SEE ARCH. DWGS.
11. EXHAUST DUCT.
12. FLASHING AND WATERPROOFING, PER ARCHITECTURAL.



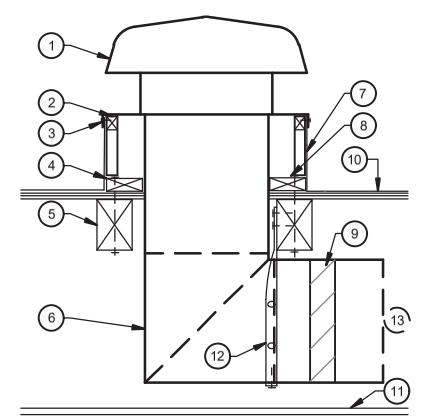
15 EXHAUST ROOF CAP N.T.S

1. EXHAUST HOOD, SEE MECH. PLAN.
2. FACTORY ROOF CURB.
3. #12 SMS LAG SCREW.
4. 2x WOOD LEVELING BLOCK, SHAPED TO MATCH ROOF SLOPE.
5. 4x4 BLKG W/ U HGR SSD EA. END.
6. 22 GA. GALV. SHEET METAL DUCT WITH ELBOW, SEE MECH. PLAN.
7. ROOF FLASHING AND WATER PROOFING (UP CURB FACE AND UNDER CAP). SEE ARCH. DWGS.
8. 1/2"Ø BOLT W/ WASHER & NUT THRU STRUCT. AT 24" O.C.
9. BACKDRAFT DAMPER.
10. FINISHED ROOF, SEE ARCH. DWGS.
11. CEILING, SEE ARCH. DWGS.
12. DUCT STRAP HANGER, PER SMACNA STANDARDS.
13. DUCT CONTINUATION TO EXHAUST FANS



16 INTAKE HOOD ON NEW CURB N.T.S

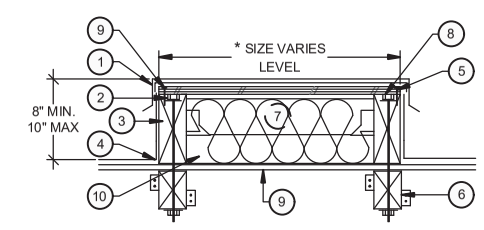
1. RELIEF HOOD, SEE MECH. PLAN.
2. FACTORY ROOF CURB
3. #12 SMS LAG SCREW.
4. 2x WOOD LEVELING BLOCK, SHAPED TO MATCH ROOF SLOPE.
5. 4x4 BLKG W/ U HGR SSD EA. END.
6. 22 GA. GALV. SHEET METAL DUCT WITH ELBOW, SEE MECH. PLAN.
7. ROOF FLASHING AND WATERPROOFING (UP CURB FACE AND UNDER CAP). SEE ARCH. DWGS.
8. 1/2"Ø BOLT W/ WASHER & NUT THRU STRUCT. AT 24" O.C.
9. BACKDRAFT DAMPER.
10. FINISHED ROOF, SEE ARCH. DWGS.
11. CEILING, SEE ARCH. DWGS.
12. DUCT STRAP HANGER, PER SMACNA STANDARDS.
13. DUCT CONTINUATION TO FAN COILS.



17 ROOF EQUIPMENT PLATFORM N.T.S

1. 20 GA. GALV. SHT MTL. COVER, LAP, FOLD, & SOLDER ALL HORIZ. JOINTS.
2. 1/2" DIA. GALV. BLOT, OR 1/2" ALLTHREAD ROD, W/ DOUBLE NUT & WASHER EACH END AT 24" O.C. (MIN. 2 EA. SIDE WITHIN 9" OF EA. END OF RAIL).
3. 4x D.F. SUPPORT RAIL ALL AROUND. SHAPED FOR ROOF SLOPE.
4. ROOF, FLASHING AND WATERPROOFING, SEE ARCHITECTURAL PLANS.
5. LEVEL 1-1/8" PLYWOOD PLATFORM.
6. 4x6 BLOCKING W/ (2) A34 EACH END (STAGGER VERTICALLY).
7. 2x6 CROSS BRACING WITH SIMPSON U26 HANGER BRACKET AT 12" O.C.
8. COUNTERSINK BOLT HEAD AND WASHER.
9. 10d AT 4" O.C. AT EDGES AND FIELD.
10. R-19 BATT INSULATION.

* VERIFY UNIT DIMENSIONS AND COORDINATE PLATFORM SIZE WITH GENERAL CONTRACTOR TO BE BUILT ACCORDINGLY. SHEET METAL COVER SHALL BE BUILT SO RAIN WATER RUNS OFF PLATFORM.



JOBCOPY

1124 DEL PASO BLVD

COM-2500586

CAL GREEN REQUIREMENTS

THE FOLLOWING SHALL BE REQUIRED WHETHER OR NOT SPECIFICALLY SHOWN OR MENTIONED IN DRAWINGS AND/OR SPECIFICATIONS:

5.303.1 METERS: SEPARATE SUBMETERS OR METERING DEVICES SHALL BE INSTALLED FOR USES DESCRIBED IN SECTIONS 5.303.1.1 AND 5.303.1.2.

5.303.1.1 NEW BUILDINGS OR ADDITIONS IN EXCESS OF 50,000 SQUARE FEET:

1. FOR EACH INDIVIDUAL LEASED, RENTED, OR OTHER TENANT SPACE WITHIN THE BUILDING PROJECTED TO CONSUME MORE THAN 100 GAL/DAY, INCLUDING, BUT NOT LIMITED TO, SPACES USED FOR LAUNDRY OR CLEANERS, RESTAURANT OR FOOD SERVICE, MEDICAL OR DENTAL OFFICE, LABORATORY, OR BEAUTY SALON OR BARBER SHOP.
2. WHERE SEPARATE SUBMETERS FOR INDIVIDUAL BUILDING TENANTS ARE UNFEASIBLE, FOR WATER SUPPLIED TO THE FOLLOWING SUBSYSTEMS:
   a. MAKE-UP WATER FOR COOLING TOWERS WHERE FLOW THROUGH IS GREATER THAN 500 GPM.
   b. MAKE-UP WATER FOR EVAPORATIVE COOLERS GREATER THAN 6 GPM.
   c. STEAM AND HOT-WATER BOILERS WITH ENERGY INPUT MORE THAN 500,000 BTU/H.

5.303.1.2 EXCESS CONSUMPTION: A SEPARATE SUBMETER OR METERING DEVICE SHALL BE PROVIDED FOR ANY TENANT WITHIN A NEW BUILDING OR WITHIN AN ADDITION THAT IS PROJECTED TO CONSUME MORE THAN 1,000 GAL/DAY.

5.303.2 RESERVED

5.303.3 WATER CONSERVING PLUMBING FIXTURES AND FITTINGS: PLUMBING FIXTURES (WATER CLOSETS AND URINALS) AND FITTINGS (FAUCETS AND SHOWERHEADS) SHALL COMPLY WITH THE FOLLOWING:

5.303.3.1 WATER CLOSETS: THE EFFECTIVE FLUSH VOLUME OF ALL WATER CLOSETS SHALL NOT EXCEED 1.28 GALLONS PER FLUSH. TANK-TYPE WATER CLOSETS SHALL BE CERTIFIED TO THE PERFORMANCE CRITERIA OF THE U.S. EPA WATERSENSE SPECIFICATION FOR TANK-TYPE TOILETS. NOTE: THE EFFECTIVE FLUSH VOLUME OF DUAL FLUSH TOILETS IS DEFINED AS THE COMPOSITE, AVERAGE FLUSH VOLUME OF TWO REDUCED FLUSHES AND ONE FULL FLUSH.

5.303.3.2 URINALS:

5.303.3.2.1 WALL-MOUNTED URINALS: THE EFFECTIVE FLUSH VOLUME OF WALL-MOUNTED URINALS SHALL NOT EXCEED 0.125 GALLONS PER FLUSH.

5.303.3.2.2 FLOOR-MOUNTED URINALS: THE EFFECTIVE FLUSH VOLUME OF FLOOR-MOUNTED URINALS SHALL NOT EXCEED 0.5 GALLONS PER FLUSH.

5.303.3.3 SHOWERHEADS:

5.303.3.3.1 SINGLE SHOWERHEAD: SHOWERHEADS SHALL HAVE A MAXIMUM FLOW RATE OF NOT MORE THAN 2.0 GALLONS PER MINUTE AT 80 PSI. SHOWERHEADS SHALL BE CERTIFIED TO THE PERFORMANCE CRITERIA OF THE U.S. EPA WATERSENSE SPECIFICATION FOR SHOWERHEADS.

5.303.3.3.2 MULTIPLE SHOWERHEADS SERVING ONE SHOWER: WHEN A SHOWER IS SERVED BY MORE THAN ONE SHOWERHEAD, THE COMBINED FLOW RATE OF ALL SHOWERHEADS AND/OR SHOWER OUTLETS CONTROLLED BY A SINGLE VALVE SHALL NOT EXCEED 2.0 GALLONS PER MINUTE AT 80 PSI, OR THE SHOWER SHALL BE DESIGNED TO ALLOW ONLY ONE SHOWER OUTLET TO BE IN OPERATION AT A TIME. NOTE: A HAND-HELD SHOWER SHALL BE CONSIDERED A SHOWERHEAD.

5.303.3.4 FAUCETS AND FOUNTAINS:

5.303.3.4.1 NONRESIDENTIAL LAVATORY FAUCETS: LAVATORY FAUCETS SHALL HAVE A MAXIMUM FLOW RATE OF NOT MORE THAN 0.5 GALLONS PER MINUTE AT 60 PSI.

5.303.3.4.2 KITCHEN FAUCETS: KITCHEN FAUCETS SHALL HAVE A MAXIMUM FLOW RATE OF NOT MORE THAN 1.8 GALLONS PER MINUTE AT 60 PSI. KITCHEN FAUCETS MAY TEMPORARILY INCREASE FLOW ABOVE THE MAXIMUM RATE, BUT NOT TO EXCEED 2.2 GALLONS PER MINUTE AT 60 PSI, AND MUST DEFAULT TO A MAXIMUM FLOW RATE OF 1.8 GALLONS PER MINUTE AT 60 PSI.

5.303.3.4.3 WASH FOUNTAINS: WASH FOUNTAINS SHALL HAVE A MAXIMUM FLOW RATE OF NOT MORE THAN 1.8 GALLONS PER MINUTE/20 [RIM SPACE (INCHES) AT 60 PSI].

5.303.3.4.4 METERING FAUCETS: METERING FAUCETS SHALL NOT DELIVER MORE THAN 0.20 GALLONS PER CYCLE.

5.303.3.4.5 METERING FAUCETS FOR WASH FOUNTAINS: METERING FAUCETS FOR WASH FOUNTAINS SHALL HAVE A MAXIMUM FLOW RATE OF NOT MORE THAN 0.20 GALLONS PER CYCLE/20 [RIM SPACE (INCHES) AT 60 PSI].
NOTE: WHERE COMPLYING FAUCETS ARE UNAVAILABLE, AERATORS OR OTHER MEANS MAY BE USED TO ACHIEVE REDUCTION.

MEP COMPONENT ANCHORAGE NOTE

ALL MECHANICAL, PLUMBING AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS. THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2022 CBC, SECTIONS 1617A.1.18 THROUGH 1617A.1.26 AND ASCE 7-16 CHAPTER 13, 26 AND 30:

1. ALL PERMANENT EQUIPMENT AND COMPONENTS.
2. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT THAT IS PERMANENTLY ATTACHED (e.g. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRIC, GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/220 VOLT RECEPTACLES HAVING A FLEXIBLE CABLE.
3. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN 400 POUNDS OR HAS A CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT IS REQUIRED TO BE RESTRAINED IN A MANNER APPROVED BY DSA.

THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE BUT NEED NOT DEMONSTRATE DESIGN COMPLIANCE WITH THE REFERENCES NOTED ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTIONS:

A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUND PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

THE ANCHORAGE OF ALL MECHANICAL, ELECTRICAL AND PLUMBING COMPONENTS SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY AND ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH ABOVE REQUIREMENTS.

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-16 SECTION 13.3 AS DEFINED IN ASCE 7-16 SECTION 13.6.5, 13.6.6, 13.6.7, 13.6.8; AND 2022 CBC, SECTION 1617A.1.24, 1617A.1.25, AND 1617A.1.26.

THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW. WHEN BRACING AND ATTACHMENTS ARE BASED ON A PREAPPROVED INSTALLATION GUIDE (E.G., HCAi OPM FOR 2013 CBC OR LATER), COPIES OF THE BRACING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO START OF AND DURING THE HANGING AND BRACING OF DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEMS (E):

MP ☐ MD ☐ PP ☒ E ☐ OPTION 1: DETAILED ON THE APPROVED DRAWINGS WITH PROJECT SPECIFIC NOTES AND DETAILS.

MP ☐ MD ☐ PP ☐ E ☐ OPTION 2: SHALL COMPLY WITH HCAi (OSHPD) PREAPPROVAL (OPM #) #__________ AS INCLUDED IN THESE DRAWINGS WITH PROJECT-SPECIFIC NOTES AND DETAILS.

PLUMBING FIXTURE SCHEDULE

MARK	FIXTURE	S or W	V	CW	HW	DESCRIPTION
WC-1	WATER CLOSET (ACCESS.)	3"	2"	1/2"	--	ZURN Z5561 PRESSURE ASSIST FLOOR MOUNTED TWO-PIECE ELONGATED 17" HIGH FLUSH TANK TOILET WITH Z5955SS-EL SOLID PLASTIC OPEN FRONT SEAT LESS COVER, STAINLESS STEEL HINGE POSTS AND FASTENERS, AND SELF-SUSTAINING HINGES. THE FLUSH HANDLE TO BE MOUNTED ON WIDE SIDE OF STALL. 1.1 GPF. CBC COMPLIANT.
WC-2	WATER CLOSET	3"	2"	1/2"	--	ZURN Z5571 PRESSURE ASSIST FLOOR MOUNTED TWO-PIECE ELONGATED 15-3/8" HIGH FLUSH TANK TOILET WITH Z5955SS-EL SOLID PLASTIC OPEN FRONT SEAT LESS COVER, STAINLESS STEEL HINGE POSTS AND FASTENERS, AND SELF-SUSTAINING HINGES. 1.1 GPF. CBC COMPLIANT.
U-1	URINAL (ACCESS.)	2"	1-1/2"	3/4"	--	ZURN Z5738-U WALL MOUNTED LOW CONSUMPTION URINAL. VITREOUS CHINA. WITH Z6003AV-ULF MANUAL FLUSH VALVE. 0.125 GPF. CONCEALED RETROFIT WALL BRACKET. SEE ARCH. SHEETS FOR MOUNTING HEIGHT. CBC COMPLIANT FOR ACCESS.
L-1	LAVATORY (ACCESS.)	2"	1-1/2"	1/2"	--	ZURN Z5364, WALL-HUNG, 20"X18" VITREOUS CHINA WITH BACKSPLASH & WALL BRACKET, HOLES ON 4" CENTERS. ZURN Z6915XL-TMV-HW6 HARDWIRED SENSOR FAUCET WITH 0.35 GPM FLOW RESTRICTOR ADJUSTED TO STAY OPEN 10 SECONDS. PERFORATED GRID DRAIN, P-TRAP, SPEEDWAY COMPRESSION WALL STOP & SUPPLY TUBING. ZURN Z1253 WALL MOUNT CARRIER WITH CONCEALED ARMS AND 1/2" BOLTS MOUNTED PER DETAIL 08/P7.01. CONTRACTOR SHALL COORDINATE WITH WALL FRAMER TO AVOID CONFLICT WITH CARRIER. IPS LAV SHIELD TO BE MOUNTED BELOW, CONTRACTOR TO INSURE WIRING AND WATER HEATER (IF APPLICABLE TO BE INSTALLED WITHIN THE CONFINES OF THE SHIELD. SEE ARCH. SHEETS FOR MOUNTING HEIGHT. CBC COMPLIANT FOR ACCESS.
L-2	LAVATORY (ACCESS.)	2"	1-1/2"	1/2"	--	ZURN Z5220, UNDERMOUNT LAVATORY, 19"X16"X5", HOLES ON 4" CENTERS, ZURN Z6915XL-TMV-HW6 HARDWIRED SENSOR FAUCET WITH 0.35 GPM FLOW RESTRICTOR ADJUSTED TO STAY OPEN 10 SECONDS. PERFORATED GRID DRAIN, P-TRAP, SPEEDWAY COMPRESSION WALL STOP & SUPPLY TUBING. CBC COMPLIANT.
S-1	SINK	2"	1-1/2"	1/2"	1/2"	JUST SLADA1921A65-J, 19-1/2"X22"X6-1/2", 18 GA STAINLESS STEEL SINGLE COMPARTMENT, 14"X18"X6-1/2, 1-HOLE PUNCH WITH ZURN Z826B1-XL-22F GOOSENECK FAUCET WITH 1.0 GPM FLOW RESTRICTOR WITH ANTI-ROTATION PINS, J-35-FS PERFORATED GRID DRAIN, SPEEDWAY COMPRESSION WALL STOPS & SUPPLY, P-TRAP. CBC COMPLIANT FOR ACCESS.
DF-1	DRINKING FOUNTAIN (ACCESS.)	2"	1-1/2"	1/2"	--	ELKAY MODEL LZWS-EDFP217K W/ BOTTLE FILLER. WALL-HUNG VANDAL RESISTANT HIGH-LOW UNIT, HANGER BRACKET & STAINLESS STEEL RECEPTOR. 1 FLA, 15 WATTS, 115V/ 60 HZ. CBC COMPLIANT FOR ACCESS. STAINLESS STEEL CABINET.
SB-1	SUPPLY BOX	--	--	1/2"	--	SPECIALTY PRODUCTS #OB504 RECESSED METAL WATER SUPPLY BOX WITH SHUT-OFF VALVE.
MS-1	MOP SINK	3"	1-1/2"	3/4"	3/4"	ZURN MS2620-DF1 FLOOR MOUNTED MULTI-PURPOSE SINK WITH DUAL HANDLE DECK FAUCET WITH WALL BRACE, P-TRAP.
FD-1	FLOOR DRAIN	2"	1-1/2"	TP	--	ZURN ZN415B, COATED CAST IRON FLOOR DRAIN WITH 5" ROUND NICKEL BRONZE STRAINER AND NO-HUB OUTLET. TRAP PRIMER CONNECTION.
TP-1	TRAP PRIMER	--	--	1/2"	--	PRECISION PLUMBING PRODUCTS INC. P1-500 TRAP PRIMER VALVE WITH DISTRIBUTION UNIT AND INTEGRAL VACUUM BREAKER. PROVIDE INLET BALL VALVE AND ACCESS PANEL. SEE PLANS FOR NO. OF TRAPS SERVED (MAXIMUM OF 4).
WH-1	WATER HEATER	--	--	3/4"	3/4"	RHEEM EGSP 30 - 30 GALLON STORAGE CAPACITY, 30 GPH RECOVERY RATE AT 80°F TEMP. RISE WITH 6000 WATT ELEMENT, 28.8 AMPS, 208/1 PHASE AND 3/4" T&P RELIEF VALVE. OPERATING WEIGHT 400 LBS. C.E.C. APPROVED. MINIMUM ENERGY FACTOR SHALL BE 0.93.
CP-1	CIRCULATION PUMP	--	--	--	3/4"	GRUNDFOS UPS 15-35-SFC , 5 GPM AT 8 FT. OF HEAD, BRONZE CONSTRUCTION WITH FLANGE CONNECTION, 1/6 HP, 115V/ 1 PH., 2.1 AMPS, 3300 RPM. PROVIDE WITH TC-1 TIMER KIT & AQUASTAT.
IWH-1	INSTANT WATER HEATER	--	--	1/2"	1/2"	CHRONOMITE CM-15L/208, 208 V/ 1 PH, 15 AMPS, 3120 WATTS, 61 DEG RISE AT 0.35 GPM. MOUNT BELOW LAVATORY
IWH-2	INSTANT WATER HEATER	--	--	1/2"	1/2"	CHRONOMITE CM-40L/208, 208 V/ 1 PH, 40 AMPS, 8320 WATTS, 57 DEG RISE AT 1.0 GPM
HB-1	ROOF HYDRANT	--	--	3/4"	--	WOODFORD MODEL SRH-MS, FREEZE PROOF ROOF HYDRANT W/ MODEL 50H-BR DOUBLE CHECK BACKFLOW PREVENTER. PROVIDE WITH MOUNTING SYSTEM COMPLETE WITH UNDER DECK FLANGE AND EPDM BOOT COVER.

NOTES:
1. ALL PLUMBING FIXTURES, FLUSH VALVES, FAUCETS, FLOOR DRAINS, FLOOR SINKS, DRINKING FOUNTAINS, ETC. SHALL BE VANDAL RESISTANT.
2. ALL PLUMBING FIXTURES SHALL COMPLY WITH CAL GREEN FLOW RATES FOR 20 PERCENT FLOW RATE REDUCTION PER TABLE 5.303.2.3.
3. FIXTURES WITH HARD WIRED SENSORS: PLUMBER TO PROVIDE TRANSFORMER AND INSTALL ALL LOW VOLTAGE WIRING. ELECTRICAL TO PROVIDE POWER TO TRANSFORMER. PROVIDE A TRANSFORMER FOR UP TO 8 SENSORS WITH MAXIMUM DISTANCE OF 20 FT FROM TRANSFORMER TO SENSOR. TRANSFORMER TO BE MOUNTED IN A 4"X4" JUNCTION BOX MOUNTED AT +18" A.F.F. WITH A BLANK STAINLESS STEEL COVER PLATE. All WIRE TO BE CONCEALED IN CONDUIT WITHIN WALL. WIRING AT WALL HUNG FIXTURES SHALL BE PROTECTED FROM VANDALISM.
4. PROVIDE SEPARATE STOP VALVES AT SINKS FOR FAUCETS, BUBBLERS, DISHWASHER, EYEWASHES, ETC.
5. PROVIDE WRAP BELOW ALL ADA LAVATORIES AND SINKS. HOT AND COLD-WATER SUPPLY AND DRAIN PIPES SHALL BE INSULATED OR OTHERWISE CONFIGURED TO PROTECT AGAINST CONTACT. THERE SHALL BE NO SHARP OR ABRASIVE SURFACES UNDER LAVS OR SINKS.

SHEET INDEX

P0.00	PLUMBING SHEET INDEX, SCHEDULES, LEGEND & NOTES
P1.01	PLUMBING DEMOLITION FLOOR PLAN
P2.01	PLUMBING FLOOR PLAN
P3.01	PLUMBING ROOF PLAN - DEMOLITION
P3.02	PLUMBING ROOF PLAN - NEW
P6.01	PLUMBING DETAILS

PLUMBING LEGEND

SYMBOL	ITEM	ABBR.
S / 1	FIXTURE DESIGNATION / UNIT ABBREVIATION / NUMBER	
01 / M-1	DETAIL DESIGNATION / DETAIL NUMBER / SHEET NO. WHERE SHOWN	
	DOMESTIC COLD WATER	CW
	DOMESTIC HOT WATER	HW
	DOMESTIC HW RETURN	HWR
	EXISTING PIPING	
	POINT OF CONNECTION	POC
C	CONDENSATE DRAIN	VCD
	SHUT-OFF VALVE IN BOX	SOV
	PIPING RISE	OBD
	PIPING DROP	BDD
S / W	SOIL OR WASTE	S OR W
V	VENT	V
	VENT THRU ROOF	VTR
GW	GREASE WASTE	GW
AW	ACID WASTE	AW
AV	ACID VENT	AV
	ACID VENT THRU ROOF	AVTR
	FLOOR CLEANOUT	FCO
	CLEANOUT TO GRADE	COTG
	WALL CLEANOUT	WCO
	HOSE BIBB	HB
RD	ROOF DRAIN	RD
OD	OVERFLOW DRAIN	OD
	DOWN SPOUT	DS
	UNDERGROUND	UG
TP	TRAP PRIMER	TP
SD	STORM DRAIN	SD
(E)	EXISTING	EXIST.
(N)	NEW	NEW
	UNDERFLOOR	UF
	OVERHEAD	OH
R	RELIEF	
D	DRAIN	
	CONDENSATE DRAIN CLEANOUT	CO
SD	SECONDARY CONDENSATE DRAIN	
FC	FURNACE CONDENSATE	
	GAS SHUT OFF VALVE	GSOV
	SAFETY RELIEF VALVE	
	GATE VALVE	GV
	PLUG VALVE	
	BALL VALVE	
P	PRESSURE GAUGE	PG
	FIRE WALL PENETRATION	
	CONDENSATE DRAIN TRAP	CDT
LPG	LIQUIFIED PETROLEUM GAS	LPG
G	NATURAL GAS	G
	FIRE SPRINKLER RISER	FSR
FSL	FIRE SPRINKLER LINE	FSL
	FIRE DEPARTMENT CONNECTION	FDC
	FINISHED FLOOR	FF
	ABOVE FINISHED FLOOR	AFF
	ABOVE FINISHED GRADE	AFG
	ABOVE CEILING	AB.C.
	CEILING	CLG
	CONTINUATION	CONT.
	DRAWING	DWG
	EACH	EA
	FEET	FT
	HORSEPOWER	HP
	INVERT ELEVATION	IVT
	KILOWATTS	KW
	MECHANICAL	MECH
	SQUARE FEET	SF
	TYPICAL	TYP
TF	TRANSFORMER	TF

H.W. DEMAND

ITEM	QTY.	GPH	TOTAL GPH
LAVATORY	5	5.0	25.0
MOP SINK	1	30.0	30.0
SINK	2	10.0	20.0
DISHWASHER	1	15.0	15.0
TOTAL GPH			90.0
MAXIMUM DEMAND			90.0
MAXIMUM DEMAND FACTOR (%) X MAX. DEMAND (GPH)		30	27.0
MAXIMUM STORAGE FACTOR (%) X		1.0	27.0
WATER HEATER TO MEET GPH @ 80° TEMP RISE			27.0
WATER HEATER(S) STORAGE GALLONS			-

ARCHITECT
PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

MEP Engineering \\ Technology

LEAF ENGINEERS
FOLSOM
1100 Iron Point Rd., Suite 200
Folsom, CA 95630
916.355.9922 p
LEAFengineers.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN
A
PLAN NORTH
TRUE NORTH

Architect / Engineer

REGISTERED PROFESSIONAL ENGINEER
GAREN M. LENCIONI
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/23/25
2	OWNER CHANGES	5/23/25

CONSTRUCTION DOCUMENT

PLUMBING SHEET INDEX, SCHEDULES, LEGEND & NOTES

P0.00

This document is for plan review only

APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: Robert Bottino
on Jun 19, 2025

Z:\Projects\FOL\2022\220389\3-CD\Drawings\Cns\MEPTP
5/21/2025 5:03:41 PM

P0.00 PLUMBING INDEX, NOTES & SCHEDULES
PBKca TBv1.2 2019.10.03

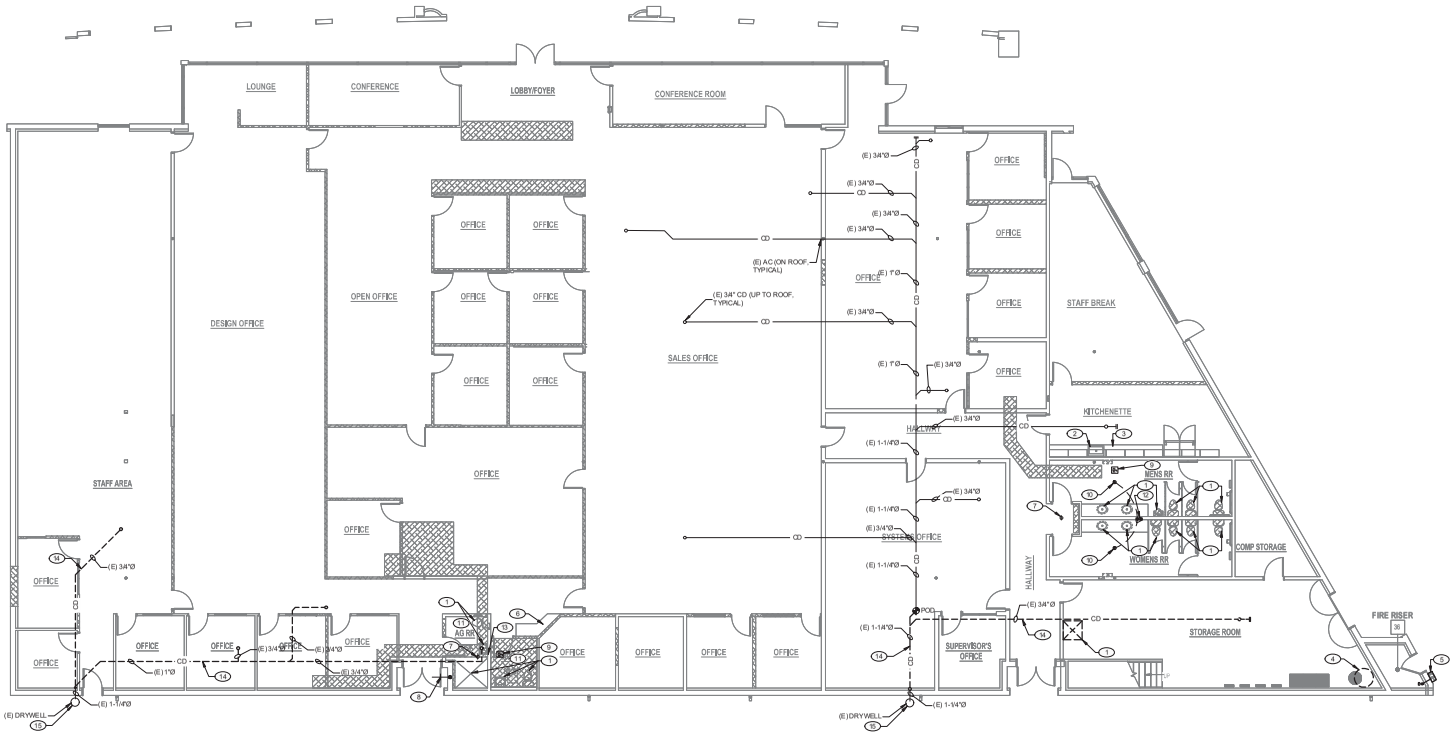
P1.01 PLUMBING DEMOLITION FLOOR PLAN
PBKat TBHJ 2019.0.03

KEYNOTES

1. EXISTING FIXTURE & ROUGH-IN TO BE REMOVED AND REPLACED. EXISTING PLUMBING IN WALL TO REMAIN. SEE REMODEL PLAN FOR CONNECTION.
2. EXISTING SINK TO REMAIN. GARBAGE DISPOSAL TO BE REMOVED.
3. EXISTING DISHWASHER TO REMAIN.
4. EXISTING WATER HEATER, CIRCULATING PUMP AND FLUE TO BE REMOVED. GAS LINE TO BE CAPPED. COLD AND HOT WATER LINES TO REMAIN. SEE REMODEL PLAN FOR CONNECTION.
5. EXISTING GAS PIPE TO BE CAPPED AT GAS METER. CONTRACTOR TO REMOVED THE GAS METER FOR RETURN TO UTILITY. COORDINATE RETURN WITH OWNER.
6. REMOVE FIXTURE & ROUGH-IN. CAP PIPING BEHIND FINISHED SURFACE.
7. EXISTING FLOOR CLEAN OUT TO REMAIN.
8. EXISTING HOSEBIBB TO REMAIN.
9. EXISTING HW BALANCE VALVE AND ACCESS PANEL TO BE REMOVED.
10. EXISTING FLOOR DRAIN TO REMAIN. COVER TO BE REMOVED AND REPLACED.
11. EXISTING FLOOR DRAIN TO BE REMOVED. SEE REMODEL PLAN FOR NEW FLOOR DRAIN CONNECTION.
12. EXISTING TRAP PRIMER TO REMAIN.
13. EXISTING TRAP PRIMER TO BE REMOVED. SEE REMODEL PLAN FOR NEW TRAP PRIMER.
14. DEMOLISH EXISTING CONDENSATE PIPING TO POINT OF DISCONNECT SHOWN. CAP PIPING EXTENDED FROM DRYWELL TO BEHIND FINISHED WALL,CEILING SURFACES. CAP AND ABANDON DRYWELL IN PLACE.
15. CAP CONDENSATE LINE IN WALL AND ABANDON DRYWELL IN PLACE.

NOTE

1. PLUMBING CONTRACTOR TO CAMERA AND RECORD ALL SEWER LINES TO INVESTIGATE ALL SEWER PIPES TO MAIN. CONTRACTOR TO SUBMIT REPORT OF FINDINGS FROM CAMERA RECORDING TO OWNER PRIOR TO PROCEEDING WITH HYDROJECT CLEANING OF LINES. HYDROJET ALL SEWER LINES WITHIN THE BUILDING TO THE MAIN.



1 PLUMBING DEMOLITION FLOOR PLAN
SCALE: 1/8" = 1'-0"

APPROVED
By: Robert Bottino
on Jun 19, 2025

PBK
ARCHITECT PBK, INC.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4515
916-365-9922
MEP Engineering / Technology
LEAF ENGINEERS
TOLLE
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
(916)290-0100
@LeafEngineers.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
GREEN M. LEAF
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/18/2024
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/2025
2	OWNER CHANGES	5/2025

CONSTRUCTION DOCUMENT

PLUMBING DEMOLITION FLOOR PLAN

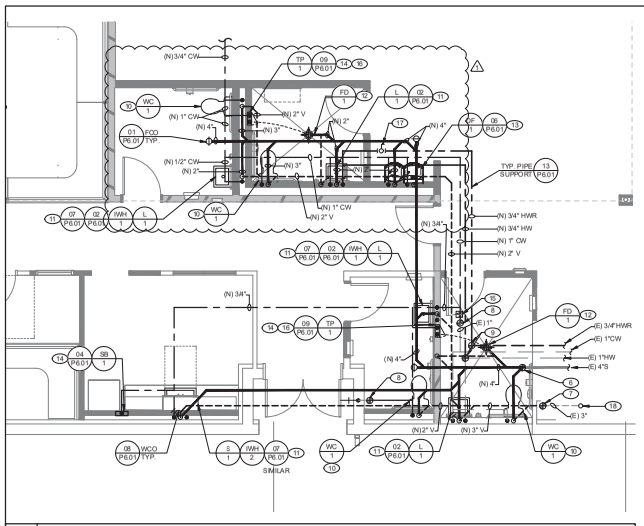
P1.01

This document is for plan review only

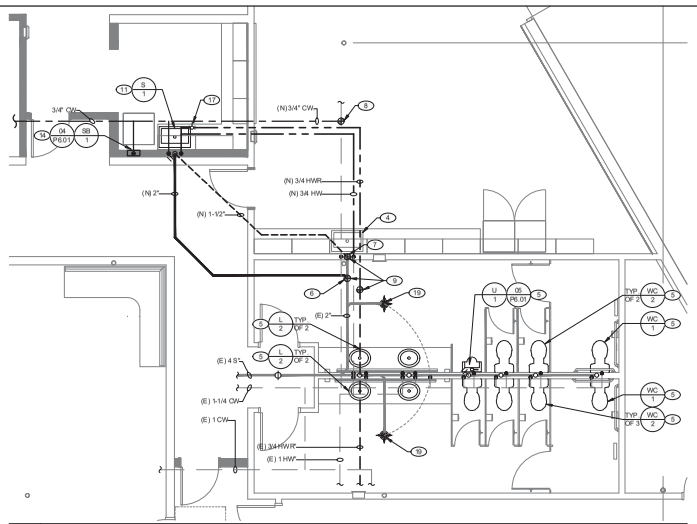
JOBCOPY
1124 DEL PASO BLVD
COM-2500586

Z:\Projects\FOL-2022\220389CAD\drawings\Cad\MEP\P
5/21/2025 5:03:50 PM

P2.01 PLUMBING FLOOR PLAN
PBKca TB-r1.2 2019.10.03



3 ENLARGED PLUMBING FLOOR PLAN
SCALE: 1/4" = 1'-0"



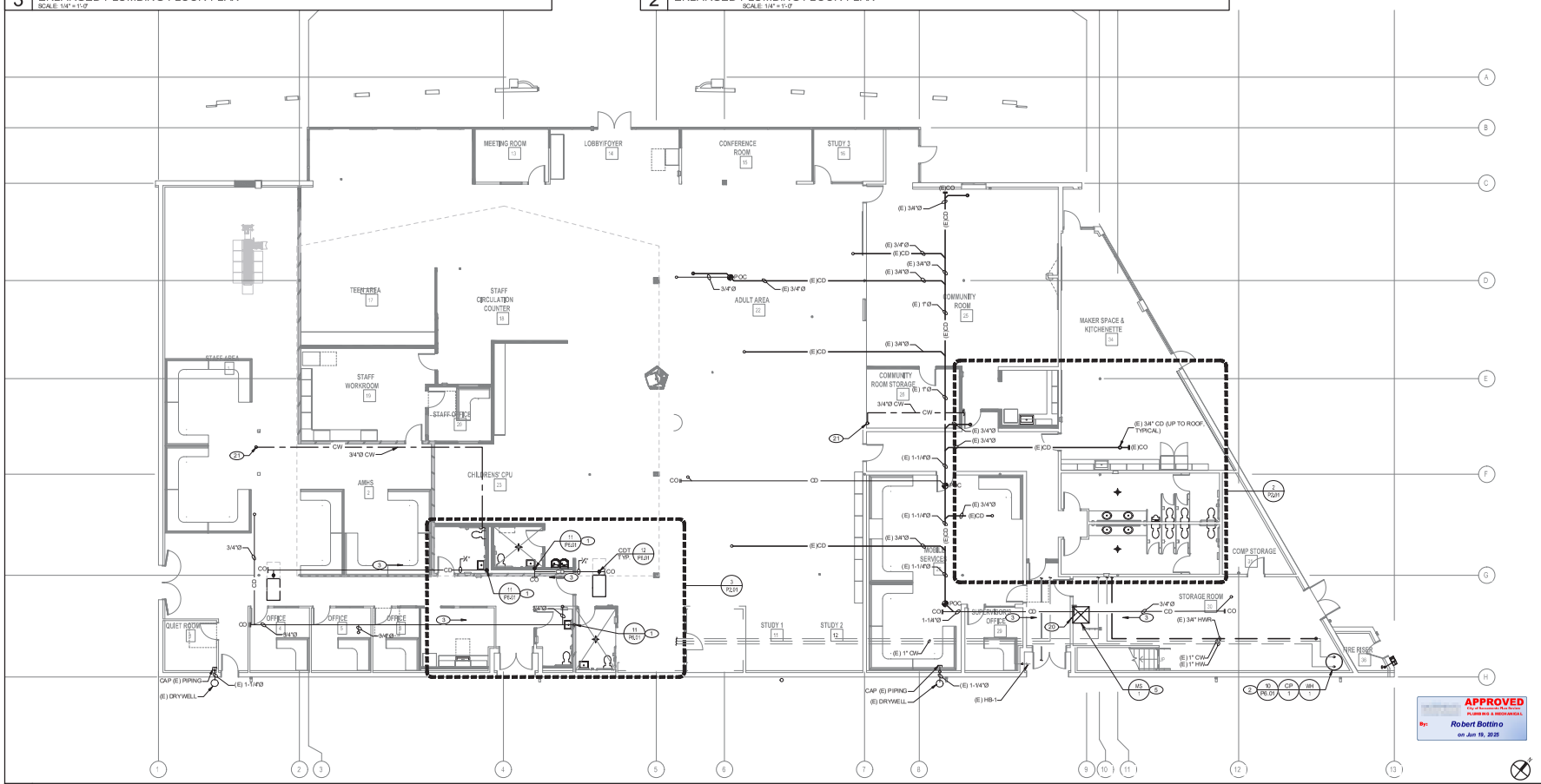
2 ENLARGED PLUMBING FLOOR PLAN
SCALE: 1/4" = 1'-0"

KEYNOTES

1. ROUTE 3/4" CONDENSATE DRAIN DOWN IN WALL, ELBOW OUT AND EXTEND TO TAIL PIECE OF SINK.
2. INSTALL (N) WATER HEATER, EXPANSION TANK AND CIRCULATION PUMP AND CONNECT TO (E) PLUMBING WITH NEW SOV. MODIFY PLUMBING AS REQUIRED TO ACCOMMODATE NEW FIXTURE.
3. SLOPE PIPING 1/8" PER FOOT IN DIRECTION INDICATED.
4. GARBAGE DISPOSAL TO BE REMOVED DURING DEMOLITION. CONNECT EXISTING FIXTURE TO EXISTING PLUMBING SERVICES IN WALL. CASE WORK UNDER SINK BEING REMOVED. SEE ARCHITECTURAL FOR DETAILS. WRAP ALL EXPOSED PIPING BELOW SINK WITH MIN. 2" INSULATION WITH RIGID EXTERIOR.
5. INSTALL (N) FIXTURE, ROUGH-IN AND CONNECT TO (E) PLUMBING. MODIFY PLUMBING AS REQUIRED TO ACCOMMODATE NEW FIXTURE.
6. CONNECT (N) SEWER TO (E) SEWER. FIELD VERIFY SIZE, LOCATION AND CONDITION OF (E) SEWER LINE PRIOR TO THE START OF WORK.
7. CONNECT (N) VENT TO (E) VENT ABOVE CEILING. FIELD VERIFY SIZE, LOCATION AND CONDITION OF (E) VENT LINE PRIOR TO THE START OF WORK.
8. CONNECT (N) CW TO (E) CW ABOVE CEILING. FIELD VERIFY SIZE, LOCATION AND CONDITION OF (E) CW LINE PRIOR TO THE START OF WORK.
9. CONNECT (N) HW TO (E) HW ABOVE CEILING. FIELD VERIFY SIZE, LOCATION AND CONDITION OF (E) VENT LINE PRIOR TO THE START OF WORK.
10. CONNECT 3" S, 2" V AND 1/2" CW FOR WATER CLOSET.
11. CONNECT 2" S, 1-1/2" V, 1/2" CW & HW FOR LAVATORY/SINK.
12. CONNECT 2" S, 1-1/2" V AND 1/2" TRAP PRIMER CONNECTION FOR FLOOR DRAIN.
13. CONNECT 2" S, 1-1/2" V & 1/2" CW FOR EACH DRINKING FOUNTAIN. CONNECT BOTTLE FILLER.
14. ROUTE 1/2" CW DOWN IN WALL TO FIXTURE.
15. SOVS ABOVE CEILING 12"X12" ACCESS PANEL.
16. ROUTE 1/2" LINE BELOW GRADE FROM TRAP PRIMER TO FLOOR DRAIN.
17. NEW HW BALANCE VALVE ABOVE 12"X12" ACCESS PANEL.
18. EXISTING 3" VTR TO REMAIN.
19. PROVIDE NEW COVER FOR EXISTING FLOOR DRAIN.
20. 1-1/4" CONDENSATE DRAIN DOWN IN WALL. TERMINATE WITH ELBOW DOWN ABOVE MOP SINK WITH AIR GAP.
21. ROUTE 3/4" CW UP THRU ROOF TO HOSE BIBB.

NOTE

1. PLUMBING CONTRACTOR TO CAMERA AND RECORD ALL SEWER LINES TO INVESTIGATE ALL SEWER PIPES TO MAIN. CONTRACTOR TO SUBMIT REPORT OF FINDINGS FROM CAMERA RECORDING TO OWNER PRIOR TO PROCEEDING WITH HYDROJET CLEANING OF LINES. HYDROJET ALL SEWER LINES WITHIN THE BUILDING TO THE MAIN.



1 PLUMBING FLOOR PLAN
SCALE: 1/8" = 1'-0"

PBK
ARCHITECT PBK, INC.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4515
916-365-9922
MEP Engineering / Technology
LEAF ENGINEERS
TOLEDO
1100 Ben Point Rd., Suite 200
Folsom, CA 95630
(419)283-0
(567)asleaf.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1132 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
GREEN M. LEAF
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/23/25
2	OWNER CHANGES	5/23/25

CONSTRUCTION DOCUMENT

PLUMBING FLOOR PLAN

P2.01

This document is for plan review only

Z:\Projects\FOL-2022\220389\CAD\drawings\Cris\MEP\P
5/21/2025 5:04:00 PM
JOBCOPY
1124 DEL PASO BLVD
COM-2500586

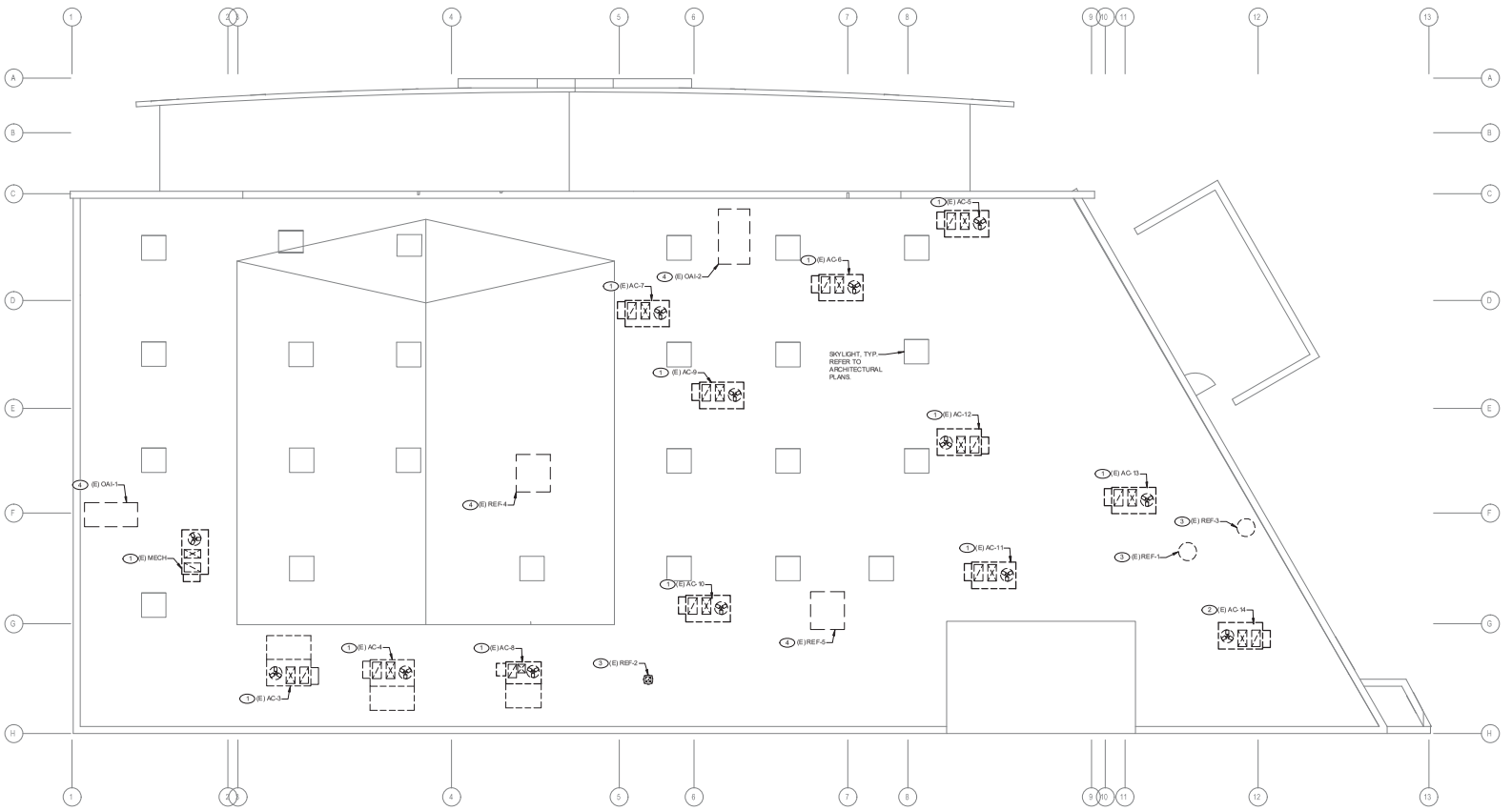
P2_01 DEMORP
PBKrvt 19>r.2 : 2019.1.103

GENERAL NOTES

1. ALL EQUIPMENT SHALL BE REMOVED FROM ROOF TO ACCOMMODATE RE-ROOFING. UNITS SHALL BE STORED IN A SECURE LOCATION, COORDINATED WITH THE OWNER.
2. FIELD VERIFY ALL CONDITIONS. REPORT ANY DISCREPANCIES/ISSUES WITH THE ARCHITECT/ENGINEER PRIOR TO PERFORMING WORK.

KEYNOTES

1. DEMOLISH EXISTING AC UNIT AND CORRESPONDING THERMOSTAT. CURB TO REMAIN. DEMOLISH GAS AND CONDENSATE PIPING TO BELOW ROOF DECK. PREPARE CONDENSATE PIPING FOR REUSE WITH NEW HVAC. CAP, SEAL AND ABANDON GAS PIPING WITHIN BUILDING.
2. DEMOLISH EXISTING AC UNIT, CURB, AND CORRESPONDING THERMOSTAT. DEMOLISH GAS AND CONDENSATE PIPING TO BELOW ROOF DECK. PREPARE CONDENSATE PIPING FOR REUSE WITH NEW HVAC. CAP, SEAL AND ABANDON GAS PIPING WITHIN BUILDING.
3. EXISTING RO OF EXHAUST FAN AND ASSOCIATED CURB. SEE MECH PLANS FOR ADDITIONAL INFORMATION.
4. EXISTING MECHANICAL UNIT. SEE MECH PLANS FOR ADDITIONAL INFORMATION.



APPROVED
PLUMBING & MECHANICAL
By: Robert Bottino
on Jun 19, 2025

1 PLUMBING ROOF PLAN - DEMOLITION
SCALE: 1/8" = 1'-0"

PBK
JOBCOPY

ARCHITECT PBK, INC.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4515
916-365-9922

MEP Engineering / Technology
LEAF ENGINEERS
FOLSOM
1110 Iron Point Rd., Suite 200
Folsom, CA 95630
(916)290-8810
leafengineers.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

SACRAMENTO

A
KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
GREEN M. LEONG
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/18/2024
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/23/25
2	OWNER CHANGES	5/23/25

CONSTRUCTION DOCUMENT

PLUMBING ROOF PLAN - DEMOLITION

P3.01

1124 DEL PASO BLVD

COM-2500586

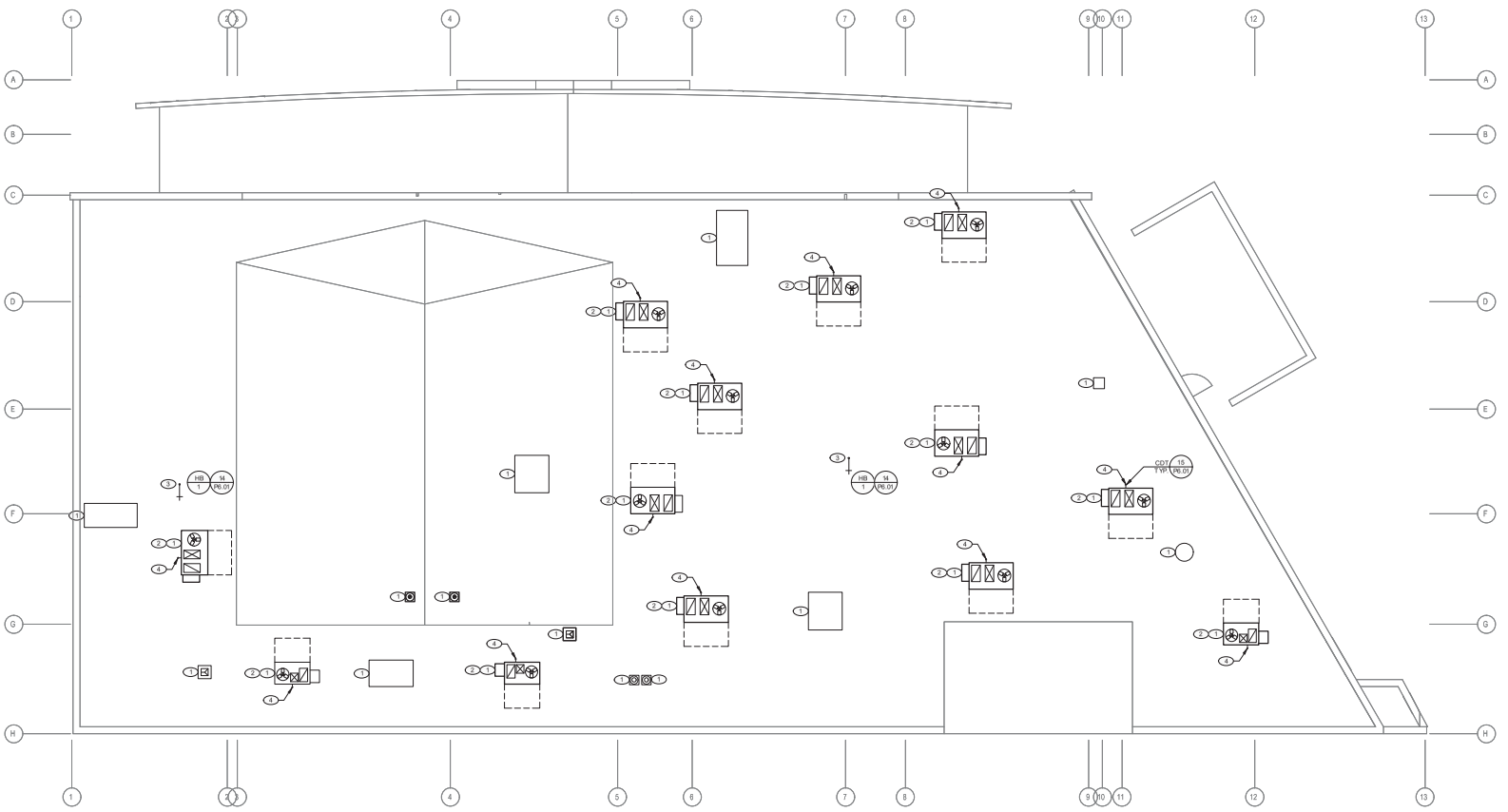
This document is for plan review only

Z:\Projects\FOL-2022\220389\3x-CD\Drawings\Civil\MEP\P
5/21/2025 5:04:15 PM

P3_02 NEWRP
PBKvt TBrv2 - 2019.1.0.13

KEYNOTES

1. MECHANICAL UNIT. SEE MECH PLANS FOR ADDITIONAL INFORMATION.
2. ROUTE CONDENSATE FROM UNIT TO BELOW ROOF. ROUTE NEW CONDENSATE INTO EXISTING CONDENSATE MAIN. CONNECT INTO EXISTING CONDENSATE FROM ABOVE.
3. (N) FREEZE PROOF HOSE BIBB. PROVIDE 3/4" COLD WATER BRANCH LINE FROM MAIN WITHIN BUILDING AND EXTEND TO LOCATION ON ROOF. COORDINATE AND FIELD VERIFY ALL CONDITIONS.
4. 3/4" CONDENSATE PIPING FROM HVAC UNIT TO BELOW. SEE P2.01 FOR CONTINUATION.



APPROVED
City of Sacramento | Dep't Review
PLUMBING & MECHANICAL
By: Robert Bottino
on Jun 19, 2025

1 PLUMBING ROOF PLAN - NEW
SCALE: 1/8" = 1'-0"

PBK
ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4515
916-365-9922
MEP Engineering / Technology
LEAF ENGINEERS
1110 Iron Point Rd, Suite 200
Folsom, CA 95630
(916)290-8810
LEAFengineers.com

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
GREEN M. LEONG
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/18/2024
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/23/25
2	OWNER CHANGES	5/23/25

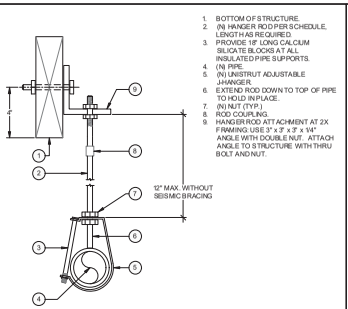
CONSTRUCTION DOCUMENT

PLUMBING
ROOF PLAN - NEW

P3.02

This document is for plan review only

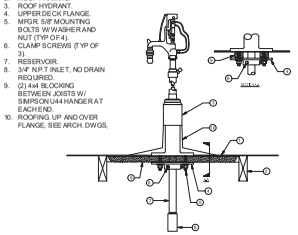
Z:\Projects\FOL-2022\220389\CAD\drawings\Civil\MEP\P
5/21/2025 5:04:26 PM
JOBCOPY
1124 DEL PASO BLVD
COM-2500586



HANGER ROD	MAX. PIPE SIZE	BOLT AND NUT SIZE	MAX. SUPPORT SPACING
3/8"Ø	1Ø"Ø	3/8"Ø	6'-0" O.C.
3/8"Ø	3/4"Ø - 1"Ø	3/8"Ø	8'-0" O.C.
3/8"Ø	1-1/4"Ø - 2"Ø	3/8"Ø	10'-0" O.C.
1/2"Ø	2Ø - 4"Ø	1/2"Ø	10'-0" O.C.

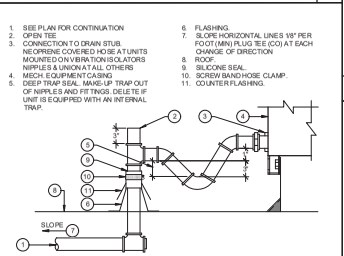
1. BOTTOM OF STRUCTURE.
2. (N) HANGER ROD PER SCHEDULE, LENGTH AS REQUIRED.
3. PROVIDE 18" LONG CALCIUM SILICATE BLOCKS AT ALL INSULATED PIPE SUPPORTS.
4. (N) PIPE.
5. (N) UNISTRUT ADJUSTABLE J-HANGER.
6. EXTEND ROD DOWN TO TOP OF PIPE TO HOLD IN PLACE.
7. (N) NUT (TYP.)
8. ROD COUPLING.
9. HANGER ROD ATTACHMENT AT 2X FRAMING: USE 3" x 3" x 3" x 1/4" ANGLE WITH DOUBLE NUT. ATTACH ANGLE TO STRUCTURE WITH THRU BOLT AND NUT.

PIPE SUPPORT & TABLE N.T.S 13



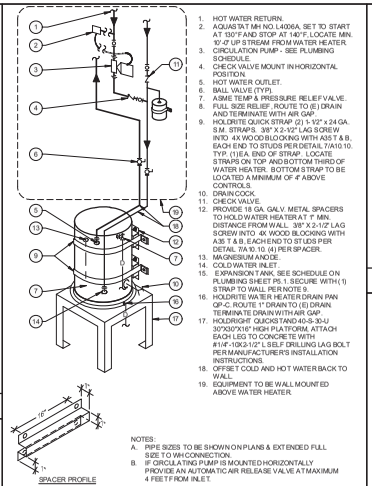
1. ROOF DECKING.
2. ROOF FRAMING.
3. ROOF HYDRANT.
4. UPPER DECK FLANGE.
5. MFGR. 5/8" MOUNTING BOLTS W/ WASHER AND NUT (TYP OF 4).
6. CLAMP SCREWS (TYP OF 3).
7. RESERVOIR.
8. 3/4" N.P.T. INLET, NO DRAIN REQUIRED.
9. (2) 4x4 BLOCKING BETWEEN JOISTS W/ SIMPSON U44 HANGER AT EACH END.
10. ROOFING, UP AND OVER FLANGE, SEE ARCH. DWGS.

ROOF HYDRANT N.T.S 14



1. SEE PLAN FOR CONTINUATION
2. OPEN TEE
3. CONNECTION TO DRAIN STUB. NEOPRENE COVERED HOSE AT UNITS MOUNTED ON VIBRATION ISOLATORS NIPPLES & UNION AT ALL OTHERS
4. MECH. EQUIPMENT CASING
5. DEEP TRAP SEAL. MAKE-UP TRAP OUT OF NIPPLES AND FITTINGS. DELETE IF UNIT IS EQUIPPED WITH AN INTERNAL TRAP.
6. FLASHING.
7. SLOPE HORIZONTAL LINES 1/8" PER FOOT (MIN) PLUG TEE (CO) AT EACH CHANGE OF DIRECTION
8. ROOF.
9. SILICONE SEAL.
10. SCREW BAND HOSE CLAMP.
11. COUNTER FLASHING.

CONDENSATE DRAIN CONNECTION N.T.S 15

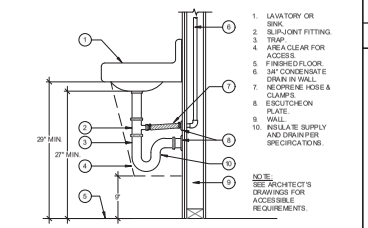


1. HOT WATER RETURN.
2. AQUASTAT MH-NO.L4006A, SET TO START AT 130°F AND STOP AT 140°F. LOCATE MIN. 10"-0" UP S TREAM FROM WATER HEATER.
3. CIRCULATION PUMP - SEE PLUMBING SCHEDULE.
4. CHECK VALVE MOUNT IN HORIZONTAL POSITION.
5. HOT WATER OUTLET.
6. BALL VALVE (TYP).
7. ASME TEMP & PRESSURE RELIEF VALVE.
8. FULL SIZE RELIEF, ROUTE TO (E) DRAIN AND TERMINATE WITH AIR GAP.
9. HOLDRITE QUICK STRAP (2) 1- 1/2" x 24 GA. S.M. STRAPS. 3/8" X 2-1/2" LAG SCREW INTO 4X WOOD BLOCKING WITH A3S T & B, EACH END TO STUDS PER DETAIL 7/A10.10. TYP. (1) EA. END OF STRAP. LOCATE STRAPS ON TOP AND BOTTOM THIRD OF WATER HEATER. BOTTOM STRAP TO BE LOCATED A MINIMUM OF 4" ABOVE CONTROLS.
10. DRAIN COCK.
11. CHECK VALVE.
12. PROVIDE 18 GA. GALV. METAL SPACERS TO HOLD WATER HEATER AT 1" MIN. DISTANCE FROM WALL. 3/8" X 2-1/2" LAG SCREW INTO 4X WOOD BLOCKING WITH A3S T & B, EACH END TO STUDS PER DETAIL 7/A 10.10. (4) PER SPACER.
13. MAGNESIUM ANODE.
14. COLD WATER INLET.
15. EXPANSION TANK, SEE SCHEDULE ON PLUMBING SHEET P5.1, SECURE WITH (1) STRAP TO WALL PER NOTE 9.
16. HOLDRITE WATER HEATER DRAIN PAN QP-C. ROUTE 1" DRAIN TO (E) DRAIN. TERMINATE DRAIN WITH AIR GAP.
17. HOLDRIGHT QUICKSTAND-40-S-30-U 30"X30"X16" HIGH PLATFORM. ATTACH EACH LEG TO CONCRETE WITH #1/4"-10K3-1/2" L SELF DRILLING LAG BOLT PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
18. OFFSET COLD AND HOT WATER BACK TO WALL.
19. EQUIPMENT TO BE WALL MOUNTED ABOVE WATER HEATER.

NOTES:
A. PIPE SIZES TO BE SHOWN ON PLANS & EXTENDED FULL SIZE TO WH CONNECTION.
B. IF CIRCULATING PUMP IS MOUNTED HORIZONTALLY PROVIDE AN AUTOMATIC AIR RELEASE VALVE AT MAXIMUM 4 FEET FROM INLET.

SPACER PROFILE

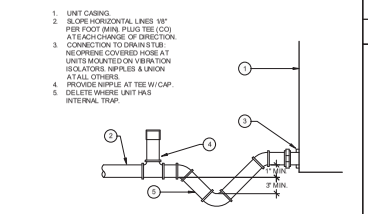
ELECTRIC WATER HEATER DETAIL N.T.S 10



1. LAVATORY OR SINK.
2. SLIP-JOINT FITTING.
3. TRAP.
4. AREA CLEAR FOR ACCESS.
5. FINISHED FLOOR.
6. 3/4" CONDENSATE DRAIN IN WALL.
7. NEOPRENE HOSE & CLAMPS.
8. ESCUTCHEON PLATE.
9. WALL.
10. INSULATE SUPPLY AND DRAIN PER SPECIFICATIONS.

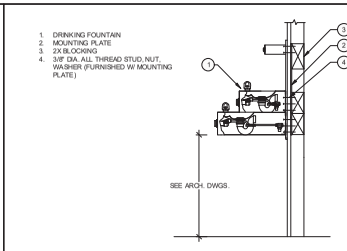
NOTE:
SEE ARCHITECT'S DRAWINGS FOR ACCESSIBLE REQUIREMENTS.

CONDENSATE TO TAILPIECE DETAIL N.T.S 11



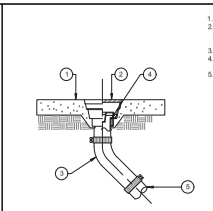
1. UNIT CASING.
2. SLOPE HORIZONTAL LINES 1/8" PER FOOT (MIN). PLUG TEE (CO) AT EACH CHANGE OF DIRECTION.
3. CONNECTION TO DRAIN STUB: NEOPRENE COVERED HOSE AT UNITS MOUNTED ON VIBRATION ISOLATORS. NIPPLES & UNION AT ALL OTHERS.
4. PROVIDE NIPPLE AT TEE W/ CAP.
5. DELETE WHERE UNIT HAS INTERNAL TRAP.

CONDENSATE DRAIN CONNECTION N.T.S 12



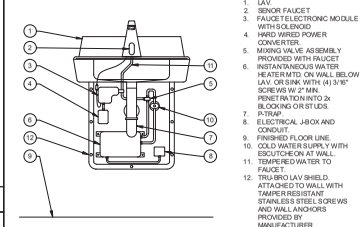
1. DRINKING FOUNTAIN
2. MOUNTING PLATE
3. 2X BLOCKING
4. 3/8" DIA. ALL THREAD STUD, NUT, WASHER (FURNISHED W/ MOUNTING PLATE)

DRINKING FOUNTAIN MOUNTING N.T.S 06



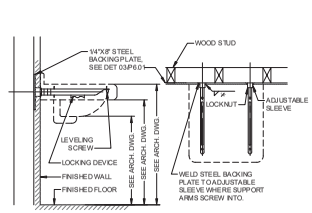
1. TOP OF CONCRETE FLOOR
2. ROUND ADJUSTABLE CAST IRON TOP. TRACTOR COVER. SET TOP FLUSH WITH FINISHED FLOOR.
3. C.I. 1/8 BEND.
4. CAULK JOINT WITH LEAD NO WATER TO STAND ON LIP
5. C.I. DRAIN LINE

FLOOR CLEANOUT (FCO) N.T.S 01

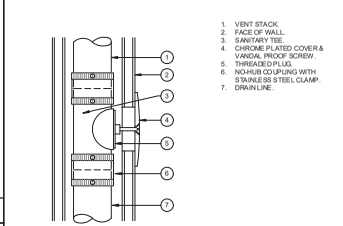


1. LAV.
2. SENOR FAUCET
3. FAUCET ELECTRONIC MODULE WITH SOLENOID
4. HARD WIRED POWER CONVERTER.
5. MIXING VALVE ASSEMBLY PROVIDED WITH FAUCET
6. INSTANTANEOUS WATER HEATER MTD. ON WALL BELOW LAV. OR SINK WITH (4) 3/16" SCREWS W/ 2" MIN. PENETRATION INTO 2x BLOCKING OR STUDS.
7. P-TRAP.
8. ELECTRICAL J-BOX AND CONDUIT.
9. FINISHED FLOOR LINE.
10. COLD WATER SUPPLY WITH ESCUTCHEON AT WALL.
11. TEMPERED WATER TO FAUCET.
12. TRU-BRO LAV SHIELD. ATTACHED TO WALL WITH TAMPER RESISTANT STAINLESS STEEL SCREWS AND WALL ANCHORS PROVIDED BY MANUFACTURER.

INSTANTANEOUS WATER HEATER N.T.S 07

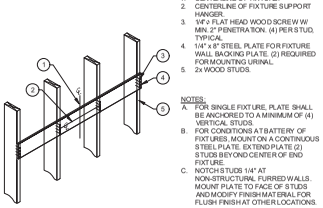


LAVATORY SUPPORT N.T.S 02



1. VENT STACK.
2. FACE OF WALL.
3. SANITARY TEE.
4. CHROME PLATED COVER & VANDAL PROOF SCREW.
5. THREADED PLUG.
6. NO-HUB COUPLING WITH STAINLESS STEEL CLAMP.
7. DRAIN LINE.

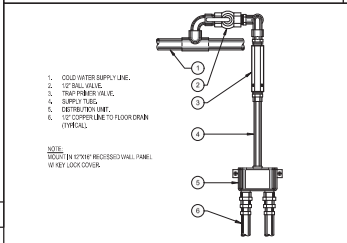
WALL CLEANOUT (WCO) N.T.S 08



1. CENTERLINE OF FIXTURE.
2. CENTERLINE OF FIXTURE SUPPORT HANGER.
3. 1/4" x 8" STEEL PLATE FOR FIXTURE WALL BACKING PLATE. (2) REQUIRED FOR MOUNTING URINAL.
4. 2x WOOD STUDS.

NOTES:
A. FOR SINGLE FIXTURE, PLATE SHALL BE ANCHORED TO A MINIMUM OF (4) VERTICAL STUDS.
B. FOR CONDITIONS AT BATTERY OF FIXTURES, MOUNT ON A CONTINUOUS STEEL PLATE. EXTEND PLATE (2) STUDS BEYOND CENTER OF END FIXTURE.
C. NOTCH 5 STUDS 1/4" AT NON-STRUCTURAL FURRED WALLS. MOUNT PLATE TO FACE OF STUDS AND MODIFY FINISH MATERIAL FOR FLUSH FINISH AT OTHER LOCATIONS.

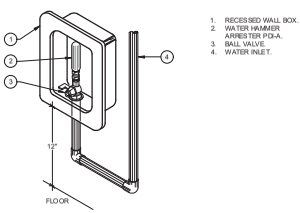
FIXTURE SUPPORT BACKING PLATE N.T.S 03



1. COLD WATER SUPPLY LINE.
2. 1/2" BALL VALVE.
3. TRAP PRIMER VALVE.
4. SUPPLY TUBE.
5. DISTRIBUTION UNIT.
6. 1/2" COPPER LINE TO FLOOR DRAIN (TYPICAL)

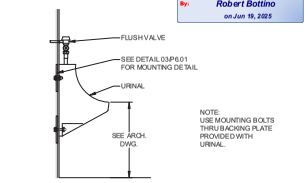
NOTE:
MOUNT IN 10"X16" RECESSED WALL PANEL W/ KEY LOCK COVER.

TRAP PRIMER DETAIL N.T.S 09



1. RECESSED WALL BOX.
2. WATER HAMMER ARRESTER PDI-A.
3. BALL VALVE.
4. WATER INLET.

COLD WATER SUPPLY BOX N.T.S 04



NOTE:
USE MOUNTING BOLTS THRU BACKING PLATE PROVIDED WITH URINAL.

URINAL MOUNTING N.T.S 05

PBK
ARCHITECT
PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4515
916-365-9922
MEP Engineering / Technology
LEAF ENGINEERS
FOLSOM
1100 Iron Point Rd., Suite 200
Folsom, CA 95630
(916)293-0
LEAFengineers.com

ISSUED BY
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
GREEN M. LEONG
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/18/2024
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/23/25
2	OWNER CHANGES	5/23/25

CONSTRUCTION DOCUMENT

PLUMBING DETAILS

P6.01

JOBCOPY

COM-2500586

This document is for plan review only

ELECTRICAL NOTES

EQUIPMENT ANCHORAGE NOTES

MEP COMPONENT ANCHORAGE NOTES

ALL MECHANICAL, PLUMBING AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS. THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DEFLECTION REQUIREMENTS PRESCRIBED IN THE 2019 CBC SECTIONS 1617.3, 1618 THROUGH 1618.7.24 AND ASCE 7-16 CHAPTER 13, 26 AND 30:

1. ALL PERMANENT EQUIPMENT AND COMPONENTS.
2. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT THAT IS PERMANENTLY ATTACHED (e.g., HARD WIRED TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRIC, GAS OR WATER, PERMANENTLY ATTACHED SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/220 VOLT RECEPTACLES HAVING A FLEXIBLE CABLE.
3. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN 400 POUNDS OR HAS A CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT IS REQUIRED TO BE RESTRAINED IN A MANNER APPROVED BY DSA.

THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE BUT NEED NOT DEMONSTRATE DESIGN COMPLIANCE WITH THE REFERENCES NOTED ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTIONS.

1. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
2. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUND PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

THE ANCHORAGE OF ALL MECHANICAL, ELECTRICAL AND PLUMBING COMPONENTS SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY, AND ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH ABOVE REQUIREMENTS.

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS BRACING NOTES

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DEFLECTIONS PRESCRIBED IN ASCE 7-16 SECTION 13.3.1 AS DEFINED IN ASCE 7-16 SECTION 13.6.5, 13.6.6, 13.6.7, 13.6.8, AND 2019 CBC SECTION 1617A.1.24, 1617A.1.25, AND 1617A.1.26.

THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE DISTRIBUTED DISTRIBUTION SYSTEMS ARE AS NOTED BELOW. WHEN BRACING AND ATTACHMENTS ARE BASED ON A PREAPPROVED INSTALLATION GUIDELINES, OSHPD-OPA FOR 2013 CBC OR LATER), COPIES OF THE BRACING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO START OF AND DURING THE HANGING AND BRACING OF DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEMS (E):

MP MD PP E OPTION 1: DETAILED ON THE APPROVED DRAWINGS WITH PROJECT SPECIFIC NOTES AND DETAILS.

☐ ☐ ☐ ☒

MP MD PP E OPTION 2: SHALL COMPLY WITH THE APPLICABLE OSHPD PREAPPROVAL (OPA)#.

☐ ☐ ☐ ☐

LIST OF APPLICABLE CODES

2022 CALIFORNIA ADMINISTRATIVE CODE (CAC)
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 1

2022 CALIFORNIA BUILDING CODE (CBC)
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 2, VOLUME 1 & 2

2022 CALIFORNIA ELECTRICAL CODE (CEC)
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 3

2022 CALIFORNIA ENERGY CODE
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 6

2022 CALIFORNIA FIRE CODE (CFC)
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 9

2022 CALIFORNIA GREEN BUILDING STANDARDS CODE (CGBSC)
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 11

2022 NFPA 72, NATIONAL FIRE ALARM AND SIGNALING CODE
WITH CA AMENDMENTS

DEVICE LOCATION NOTE

THE LOCATION OF ALL ELECTRICAL DEVICES AND EQUIPMENT SHALL BE COORDINATED WITH THE ARCHITECTURAL ELEVATIONS, DETAILS, OR SECTIONS PRIOR TO INSTALLATIONS. ALL ELECTRICAL DEVICES AND EQUIPMENT SHALL BE RECESSED IN WALLS UNLESS OTHERWISE NOTED. OUTLETS NOTED RECESSED ON ARCHITECTURAL ELEVATIONS SHALL BE COORDINATED WITH THE ARCHITECT PRIOR TO ROUGH-IN. UNLESS OTHERWISE NOTED, ELECTRICAL DEVICES SHALL BE MOUNTED PER ACCESSIBLE USE MOUNTING HEIGHT DETAIL.

COORDINATE WITH OTHER TRADES AS TO THE EXACT LOCATION OF THEIR RESPECTIVE EQUIPMENT SUPPLY POWER AND HAVE CONNECTION TO MOTORS AND EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS AS INDICATED ON THE SINGLE LINE DIAGRAM, ELECTRICAL DRAWINGS, AND DRAWINGS OF OTHER TRADES. REVIEW THE DRAWINGS OF OTHER TRADES FOR CONTROL DIAGRAMS, SIZE AND LOCATION OF EQUIPMENT, DISCONNECT SWITCHES, STARTERS, WIRING, CONTROLS, AND CONDUIT FOR MECHANICAL AND PLUMBING OPERATIONS SHALL BE PROVIDED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING MANUFACTURER'S SHOP DRAWINGS PRIOR TO ROUGH-IN ALL CONDUIT TO THIS EQUIPMENT.

UL LISTINGS NOTE

ALL ELECTRICAL MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL BE LISTED BY UNDERWRITER'S LABORATORIES (U.L.) AS DESIGN THEIR LABEL OR LISTED AND CERTIFIED BY A NATIONALLY RECOGNIZED TESTING AUTHORITY.

ALL EQUIPMENT DOES NOT INSTALLED RECESSED IN FIRE RATED CEILINGS OR WALLS SHALL BE ENCLOSED WITH AN APPROVED U.L. LISTED ENCLOSURE CARRYING THE SAME FIRE RATING AS THE CEILING OR WALL.

STRUCTURAL NOTE

UNLESS SPECIFICALLY SHOWN ON THESE PLANS, STRUCTURAL MEMBERS SHALL NOT BE CUT, DRILLED, OR NOTCHED WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE STRUCTURAL ENGINEER AND THE DIVISION OF THE STATE ARCHITECT.

DIAGRAMMATIC NOTE

DRAWINGS ARE DIAGRAMMATIC AND DO NOT INDICATE DETAILED CONDUIT ROUTING OR EXISTING PREPARED FOR COMPLETE INSTALLATION. ROUTING OF RACEWAYS SHALL BE AT THE OPTION OF THE CONTRACTOR BUT SHALL BE IN STRICT COMPLIANCE WITH STRUCTURAL REQUIREMENTS. CONTRACT DOCUMENTS AND SPECIFICATIONS OTHERWISE NOTED, ALL WORK SHALL BE COORDINATED WITH OTHER TRADES. DO NOT SCALE THE ELECTRICAL DRAWINGS FOR LOCATIONS. ANY ELECTRICAL, ARCHITECTURAL, STRUCTURAL AND/OR MECHANICAL DESIGN FEATURES REFER TO ARCHITECTURAL AND STRUCTURAL CONTRACT DOCUMENTS FOR FEATURES. REFER TO ARCHITECTURAL AND STRUCTURAL CONTRACT DOCUMENTS FOR DIMENSIONS.

TITLE 24 NOTES

THE FOLLOWING SHALL BE REQUIRED WHETHER OR NOT SPECIFICALLY SHOWN OR MENTIONED IN DRAWINGS AND/OR SPECIFICATIONS.

ELECTRICAL POWER DISTRIBUTION

A. SERVICE ELECTRICAL METERING
- FOR NEWLY INSTALLED ELECTRICAL SERVICE IN NEWLY CONSTRUCTED BUILDINGS, SERVICE ELECTRICAL METERING IS REQUIRED ACCORDING TO SECTION 130.5(A).
- FOR NEW OR REPLACEMENT ELECTRICAL SERVICE EQUIPMENT IN EXISTING BUILDINGS, SERVICE ELECTRICAL BUILDINGS, SERVICE ELECTRICAL METERING IS REQUIRED ACCORDING TO SECTION 141.0(B)2H.

B. SEPARATION OF ELECTRICAL CIRCUITS FOR ELECTRICAL ENERGY MONITORING
ELECTRICAL POWER DISTRIBUTION SYSTEMS SHALL BE DESIGNED SO THAT MEASUREMENT DEVICES CAN MONITOR THE ELECTRICAL ENERGY USAGE OF LOAD TYPES ACCORDING TO TABLE 130.5-B.

C. VOLTAGE DROP
THE MAXIMUM COMBINED VOLTAGE DROP ON BOTH INSTALLED FEEDER CONDUCTORS AND BRANCH CIRCUIT CONDUCTORS TO THE FARTHEST CONNECTED LOAD OR OUTLET SHALL NOT EXCEED 5 PERCENT.

D. CIRCUIT CONTROLS FOR 120-VOLT RECEPTACLES AND CONTROLLED RECEPTACLES
IN ALL BUILDINGS, BOTH CONTROLLED AND UNCONTROLLED 120 VOLT RECEPTACLES SHALL BE PROVIDED IN OFFICE AREAS, LOBBIES, CONFERENCE ROOMS, KITCHEN AREAS IN OFFICE SPACES, AND COPY ROOMS. ADDITIONALLY, HOTEL/MOTEL GUEST ROOMS SHALL COMPLY WITH SECTION 130.5(D)4.CONTROLLED RECEPTACLES SHALL MEET THE FOLLOWING REQUIREMENTS, AS APPLICABLE:

1. INSTALL A CONTROL CAPABLE OF AUTOMATICALLY SHUTTING OFF THE CONTROLLED RECEPTACLES WHEN THE SPACE IS TYPICALLY UNOCCUPIED, EITHER AT THE RECEPTACLE OR CIRCUIT LEVEL. WHEN AN AUTOMATIC TIME SWITCH CONTROL IS INSTALLED IT SHALL INCORPORATE AN OVERRIDE CONTROL THAT ALLOWS THE CONTROLLED RECEPTACLE TO REMAIN ON FOR NO MORE THAN 2 HOURS WHEN AN OVERRIDE IS INITIATED AND AN AUTOMATIC HOLIDAY "SHUT-OFF" FEATURE THAT TURNS OFF ALL LOADS FOR AT LEAST 24 HOURS AND THEN RESUMES THE NORMALLY SCHEDULED OPERATION. COUNTDOWN TIMER SWITCHES SHALL NOT BE USED TO COMPLY WITH THE AUTOMATIC TIME SWITCH CONTROL REQUIREMENTS; AND
2. INSTALL AT LEAST ONE CONTROLLED RECEPTACLE WITHIN 6 FEET FROM EACH UNCONTROLLED RECEPTACLE, OR INSTALL A SPLIT-WIRED RECEPTACLE WITH AT LEAST ONE CONTROLLED AND ONE UNCONTROLLED RECEPTACLE. WHERE RECEPTACLES ARE INSTALLED IN MODULAR FURNITURE IN OPEN OFFICE AREAS, AT LEAST ONE CONTROLLED RECEPTACLE SHALL BE INSTALLED AT EACH WORKSTATION; AND
3. PROVIDE A PERMANENT AND DURABLE MARKING FOR CONTROLLED RECEPTACLES OR CIRCUITS TO DIFFERENTIATE THEM FROM UNCONTROLLED RECEPTACLES OR CIRCUITS.

MANDATORY INDOOR LIGHTING CONTROLS

A. MANUAL AREA CONTROLS
EACH AREA ENCLOSED BY CEILING-HEIGHT PARTITIONS SHALL PROVIDE LIGHTING CONTROLS THAT ALLOW THE LIGHTING IN THAT AREA TO BE MANUALLY TURNED ON AND OFF. THE MANUAL CONTROL SHALL:
1. BE READILY ACCESSIBLE; AND
2. BE LOCATED IN THE SAME ENCLOSED AREA WITH THE LIGHTING IT CONTROLS.

B. MULTI-LEVEL LIGHTING CONTROLS
THE GENERAL LIGHTING OF ANY ENCLOSED AREA 100 SQUARE FEET OR LARGER WITH A CONNECTED LIGHTING LOAD THAT EXCEEDS 0.5 WATTS PER SQUARE FOOT SHALL PROVIDE MULTI-LEVEL LIGHTING CONTROLS THAT ALLOW THE LEVEL OF LIGHTING TO BE ADJUSTED UP AND DOWN. THE MULTI-LEVEL CONTROLS SHALL PROVIDE THE NUMBER OF CONTROL STEPS AND MEET THE UNIFORMITY REQUIREMENTS SPECIFIED IN TABLE 130.1-A.

C. SHUT-OFF CONTROLS
ALL INSTALLED INDOOR LIGHTING SHALL BE EQUIPPED WITH CONTROLS ABLE TO AUTOMATICALLY REDUCE LIGHTING POWER WHEN THE SPACE IS TYPICALLY UNOCCUPIED.
1. ALL INSTALLED INDOOR LIGHTING SHALL BE EQUIPPED WITH CONTROLS THAT MEET THE FOLLOWING REQUIREMENTS:
   a. SHALL BE CONTROLLED WITH AN OCCUPANT SENSING CONTROL, AUTOMATIC TIME-SWITCH CONTROL, OR OTHER CONTROL CAPABLE OF AUTOMATICALLY SHUTTING OFF ALL OF THE LIGHTING WHEN THE SPACE IS TYPICALLY UNOCCUPIED; AND
   b. SEPARATE CONTROLS FOR THE LIGHTING ON EACH FLOOR, OTHER THAN LIGHTING IN STAIRWELLS; AND
   c. SEPARATE CONTROLS FOR A SPACE ENCLOSED BY CEILING HEIGHT PARTITIONS NOT EXCEEDING 5,000 SQUARE FEET; AND
   d. SEPARATE CONTROLS FOR GENERAL, DISPLAY, ORNAMENTAL, AND DISPLAY CASE LIGHTING; AND
   e. FOR AUTOMATIC TIME-SWITCH CONTROLS, MAY INCLUDE A MANUAL-ON MODE.

D. AUTOMATIC DAYLIGHTING CONTROLS
THE GENERAL LIGHTING IN SKYLIT DAYLIT ZONES AND PRIMARY SIDELIT DAYLIT ZONES, AS WELL AS THE GENERAL LIGHTING IN THE COMBINED PRIMARY AND SECONDARY SIDELIT DAYLIT ZONES IN PARKING GARAGES, SHALL PROVIDE CONTROLS THAT AUTOMATICALLY ADJUST THE POWER OF THE INSTALLED LIGHTING UP AND DOWN TO KEEP THE TOTAL LIGHT LEVEL STABLE AS THE AMOUNT OF INCOMING DAYLIGHT CHANGES. FOR SKYLIGHT LOCATED IN A TRUM, THE SKYLIT DAYLIT ZONE DEFINITION SHALL APPLY TO THE FLOOR AREA DIRECTLY UNDER THE ATRIUM AND THE TOP FLOOR AREA DIRECTLY ADJACENT TO THE ATRIUM.

CONTROLS FOR OUTDOOR LIGHTING
OUTDOOR LIGHTING SHALL BE INDEPENDENTLY CONTROLLED FROM OTHER ELECTRICAL LOADS, AND THE CONTROLS FOR OUTDOOR LIGHTING SHALL MEET THE FOLLOWING FUNCTIONAL REQUIREMENTS:

A. DAYLIGHT AVAILABILITY
ALL INSTALLED OUTDOOR LIGHTING SHALL BE CONTROLLED BY A PHOTO CONTROL, ASTRONOMICAL TIME-SWITCH CONTROL, OR OTHER CONTROL CAPABLE OF AUTOMATICALLY SHUTTING OFF THE OUTDOOR LIGHTING WHEN DAYLIGHT IS AVAILABLE.

B. AUTOMATIC SCHEDULING CONTROLS
1. AUTOMATIC SCHEDULING CONTROLS SHALL BE CAPABLE OF REDUCING THE OUTDOOR LIGHTING POWER BY AT LEAST 50 PERCENT AND NO MORE THAN 90 PERCENT, AND SEPARATELY CAPABLE OF TURNING THE LIGHTING OFF, DURING SCHEDULED UNOCCUPIED PERIODS.
2. AUTOMATIC SCHEDULING CONTROLS SHALL ALLOW SCHEDULING OF A MINIMUM OF TWO NIGHTTIME PERIODS WITH INDEPENDENT LIGHTING LEVELS, AND MAY INCLUDE AN OVERRIDE FUNCTION THAT TURNS LIGHTING ON DURING ITS SCHEDULED TIM OR OF FSTATE FOR NO MORE THAN TWO HOURS WHEN AN OVERRIDE IS INITIATED.
3. AUTOMATIC SCHEDULING CONTROLS SHALL BE INSTALLED FOR ALL OUTDOOR LIGHTING, AND MAY BE INSTALLED IN COMBINATION WITH MOTION SENSING CONTROLS OR OTHER OUTDOOR LIGHTING CONTROLS.

C. MOTION SENSING CONTROLS
1. MOTION SENSING CONTROLS SHALL BE CAPABLE OF REDUCING THE OUTDOOR LIGHTING POWER OF EACH CONTROLLED LUMINAIRE BY AT LEAST 50 PERCENT AND NO MORE THAN 90 PERCENT, AND SEPARATELY CAPABLE OF TURNING THE LUMINAIRE OFF, DURING UNOCCUPIED PERIODS.
2. MOTION SENSING CONTROLS SHALL BE CAPABLE OF REDUCING THE LIGHTING TO ITS DIM OR OFF STATE NO LONGER THAN 15 MINUTES AFTER THE AREA HAS BECOME VACANT, AND OF RE-TURNING THE LIGHTING TO FULL ON STATE WHEN THE AREA BECOMES OCCUPIED.
3. NO MORE THAN 1,500 WATTS OF LIGHTING POWER SHALL BE CONTROLLED BY A SINGLE SENSOR.
4. MOTION SENSING CONTROLS SHALL BE INSTALLED FOR THE FOLLOWING LUMINAIRES, AND MAY BE INSTALLED FOR OTHER OUTDOOR LIGHTING AND IN COMBINATION WITH OTHER OUTDOOR LIGHTING CONTROLS:
   a. OUTDOOR LUMINAIRES OTHER THAN BUILDING FACADE, ORNAMENTAL HARDSCAPE, OUTDOOR DINING, OR OUTDOOR SALES FRONTAGE LIGHTING, WHERE THE BOTTOM OF LUMINAIRE IS MOUNTED 24 FEET OR LESS ABOVE GRADE; AND,
   b. OUTDOOR WALL MOUNTED LUMINAIRES INSTALLED FOR BUILDING FACADE, ORNAMENTAL HARDSCAPE OR OUTDOOR DINING LIGHTING THAT HAVE A BILATERALLY SYMMETRIC DISTRIBUTION AS DESCRIBED IN THE IES HANDBOOK (TYPICALLY REFERRED TO AS "WALL PACKS") MOUNTED 24 FEET ABOVE GRADE OR LOWER.

EXCEPTION 1 TO SECTION 130.2(c)3: LUMINAIRES WITH A MAXIMUM RATED WATTAGE OF 40 WATTS EACH ARE NOT REQUIRED TO HAVE MOTION SENSING CONTROLS.

GENERAL NOTES

1. UNLESS SPECIFICALLY INDICATED ON THE ELECTRICAL DRAWINGS, OUTLETS LOCATED AT COUNTERS AND CABINETS SHALL BE MOUNTED AS SHOWN ON ARCHITECTURAL ELEVATIONS AND ELEVATIONS, OR AS DIRECTED BY ARCHITECT.
2. COORDINATE MOUNTING HEIGHTS AND DETAILS OF ALL OUTLETS (POWER, SIGNAL, ETC.) WITH ARCHITECTURAL CASEWORK DRAWINGS PRIOR TO DIVISION 26 ROUGH-IN. PROVIDE COORDINATION DRAWINGS IN ACCORDANCE WITH DIVISION 26 SPECIFICATIONS WHERE CONFLICTS EXIST. OBTAIN APPROVAL FROM ARCHITECT BEFORE ELECTRICAL ROUGH-IN WHEN CONFLICTS ARISE.
3. REFER TO MECHANICAL DRAWINGS FOR EXACT LOCATION OF ALL HVAC AND PLUMBING EQUIPMENT.
4. CIRCUITING
   A. BRANCH CIRCUITING IS SCHEMATIC IN NATURE AND IS INTENDED TO INDICATE CIRCUIT LOADING AND CONTROL, NOT METHODS OF INSTALLATION. REFER TO SPECIFICATIONS FOR METHODS OF INSTALLATION AND MATERIALS, INCLUDING WHETHER OR NOT BX IS ALLOWED AND WHETHER A "THROUGH-FIXTURE" OR "OCTOPUS" (EMT WITH FLEXIBLE WHIPS) TYPE LIGHTING BRANCH CIRCUITING IS REQUIRED.
   B. WHERE WIRE SIZE AND CONDUIT SIZE IS NOT INDICATED ON THE DRAWINGS AND/OR PANEL SCHEDULES, REFER TO SPECIFICATIONS FOR MINIMUM SIZE REQUIRED.
   C. BRANCH CIRCUITS ON THE DRAWINGS ARE GENERALLY NOT SHOWN GROUPED IN SINGLE RACEWAYS. HOWEVER, GROUPING IS ALLOWED UNDER CERTAIN CONDITIONS. REFER TO DIVISION 26 SPECIFICATIONS UNDER SECTION ENTITLED "ELECTRICAL WIRING" FOR REQUIREMENTS.
   D. THE DRAWINGS GENERALLY INDICATE QUANTITY OF CONDUCTORS ON BRANCH CIRCUIT HOME RUNS ONLY. ELSEWHERE WITHIN CIRCUITS, PROVIDE QUANTITY OF CONDUCTORS AS NEEDED TO ACCOMPLISH CIRCUITING AND SWITCHING REQUIREMENTS SHOWN.
5. WHEN REMOVING EXISTING ELECTRICAL WORK WHERE OTHER ITEMS REMAIN ON THE SAME CIRCUIT, THE CONTRACTOR SHALL TAKE WHATEVER STEPS ARE NECESSARY TO MAINTAIN CIRCUIT CONTINUITY.
6. ALL ITEMS NOTED TO BE REMOVED ARE TO REMAIN THE PROPERTY OF THE OWNER; HOWEVER, CONTRACTOR SHALL REMOVE FROM JOB SITE ALL MATERIAL NOT RETAINED BY OWNER.
7. FIELD VERIFY CONDITION OF, AND MODIFICATIONS AND ADDITIONS TO, ALL EXISTING ELECTRICAL FIXTURES, PANELS, WIRING, ETC.
8. CONTRACTOR SHALL FIELD VERIFY EXISTING BRANCH CIRCUIT LOADING WHEN MAKING MODIFICATIONS AND/OR ADDITIONS TO THAT CIRCUIT. IF NEW WORK WOULD OVERLOAD EXISTING CIRCUIT, CONTRACTOR SHALL LOCATE ANOTHER EXISTING CIRCUIT (THE CLOSEST), WHICH WOULD NOT BE OVERLOADED UPON ADDING NEW LOAD, AND SHALL TIE NEW LOAD INTO THAT CIRCUIT.
9. CONTRACTOR TO REFER TO ARCHITECTURAL PHASING PLANS AND HAVE A GOOD UNDERSTANDING OF SCOPE OF PROJECT PRIOR TO COMMENCEMENT OF WORK.
10. LUMINAIRE SUPPORT IN SUSPENDED CEILINGS
   A. PROVIDE MEANS OF SUPPORT FOR LUMINAIRES PER NEC 410-16. T BAR CLIPS SHALL BE INSTALLED ON THE LUMINAIRE AND SHALL BE FIELD SECURED TO THE INVERTED CEILING TEES SO THAT THE LUMINAIRE IS SECURELY FASTENED TO THE CEILING SYSTEM FRAMING MEMBERS.
   B. CEILING TILES SHALL NOT BEAR THE WEIGHT OF LUMINAIRES. SURFACE MOUNT LUMINAIRES, RECESSED DOWNLIGHTS, LIGHT TRACK, EXIT SIGNS, ETC. SHALL BE SUPPORTED BY PROPER FRAMES OR OTHER ATTACHMENT TO MAIN CEILING SYSTEM GRID OR BUILDING STRUCTURE ABOVE CEILING.
   C. LUMINAIRES SHALL BE CENTERED IN CEILING TILE.
   D. LUMINAIRE SHALL HAVE FLANGE OR TRIM RING FOR CLOSURE OF CEILING CUTOUT OR OPENING.
   E. FIRE-RATED CEILING ASSEMBLY: FOR LUMINAIRES TO BE FLUSH MOUNTED INTO A FIRE-RATED CEILING OR SURFACE MOUNTED TO A FIRE-RATED CEILING, INSTALL WITH INDEPENDENT, SECURE SUPPORT. RACEWAY, CABLE ASSEMBLIES, BOXES AND FITTINGS LOCATED ABOVE A FIRE-RATED FLOOR/CEILING OR ROOF CEILING ASSEMBLY SHALL NOT BE SECURED TO, OR SUPPORTED BY, THE CEILING ASSEMBLY INCLUDING THE CEILING SUPPORT WIRES. PROVIDE AN INDEPENDENT MEANS OF SECURE SUPPORT. INDEPENDENT SUPPORT WIRES SHALL BE DISTINGUISHABLE BY COLOR, TAGGING, OR OTHER EFFECTIVE MEANS FROM THOSE THAT ARE PART OF THE FIRE-RATED CEILING.
11. CONTRACTOR SHALL FIELD VERIFY ANY EXISTING UNDERGROUND PIPING, WIRING OR OTHER FACILITIES PRIOR TO TRENCHING, AND SHALL BE RESPONSIBLE FOR ANY DAMAGE CAUSED BY INSTALLATION OF NEW WORK.
12. THE ELECTRICAL CONTRACTOR SHALL COMPLY WITH ALL AUTHORITIES HAVING JURISDICTION, CEC, ALL STATE AND LOCAL CODES AND AMENDMENT.

ELECTRICAL SYMBOL LEGEND

REMODEL

(E) EQUIPMENT WITH "E" ADJACENT IS EXISTING TO REMAIN.

(R) EXISTING EQUIPMENT WITH "R" ADJACENT IS TO BE COMPLETELY DISCONNECTED AND REMOVED.

(RR) EXISTING EQUIPMENT WITH "RR" ADJACENT IS TO BE DISCONNECTED, REMOVED AND RELOCATED TO NEW LOCATION AND RECONNECTED AS REQUIRED.

(ER) EQUIPMENT WITH "ER" ADJACENT IS RELOCATED EQUIPMENT SHOWN IN NEW LOCATION.

NO TAG INDICATES NEW EQUIPMENT.

(E) P1N1-2KT CIRCUIT DESIGNATION WITH PREFIX "(E)" DENOTES EXISTING CIRCUIT AND EQUIPMENT IS TO REMAIN.

DIAGRAM

BREAKER, LOW VOLTAGE
FUSE
DISTRIBUTION TRANSFORMER
CONTROL POWER TRANSFORMER
DRAW-OUT TYPE EQUIPMENT
MEDIUM VOLTAGE VACUUM CIRCUIT BREAKER
SWITCH, POWER
METER
BATTERY BANK
CURRENT TRANSFORMER

EQUIPMENT

+42" A NOTATION INDICATING THE MOUNTING HEIGHT OF A DEVICE AS MEASURED FROM FINISHED FLOOR OR GRADE TO CENTER LINE OF DEVICE
MOTOR
DISCONNECT SWITCH, FRAME SIZE/FUSE SIZE/POLES AS INDICATED, "NF" INDICATES NON-FUSIBLE, NEMA 1 ENCLOSURE UNLESS OTHERWISE NOTED, PROVIDE FUSED BUSWAY PLUG WHEN SWITCH IS INDICATED ON BUSWAY, ALL DISCONNECT SWITCHES SHALL BE NEMA 3 UNLESS OTHERWISE NOTED
SINGLE CIRCUIT BREAKER IN INDIVIDUAL ENCLOSURE
MAGNETIC MOTOR CONTROLLER, NUMBER INDICATES NEMA SIZE, STARTER NEMA SIZE SHALL BE "NEMA 1" UNLESS OTHERWISE NOTED
COMBINATION DISCONNECT SWITCH / MOTOR CONTROLLER
CONTACTOR
PANELBOARD
SWITCHBOARD / DP
TRANSFORMER
GROUNDING CONNECTION TO GROUNDING ELECTRODE AS DEFINED IN NEC ARTICLE 250
BELL, "VP" INDICATED OUTDOOR RATED
EXHAUST FAN

TELEPHONE/DATA

DATA OUTLET LOCATION(S) INSTALLED ON WALL: ELECTRICAL CONTRACTOR SHALL PROVIDE 1" CONDUIT PATHWAY FROM EACH LOCATION TO THE NEAREST ACCESSIBLE CEILING SPACE TO A 4-GANG BACK BOX. COORDINATE DATA AND POWER LOCATIONS SO THAT DATA AND POWER ARE AT THE SAME HEIGHT AND IN CLOSE PROXIMITY. CONSISTS OF (2) ACTIVE CAT6A JACKS UNLESS OTHERWISE NOTED.
DATA OUTLET(S) INSTALLED IN CEILING: ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL A 4-GANG BACK BOX WITH A 1" CONDUIT PATHWAY FROM BACK BOX TO NEAREST ACCESSIBLE CEILING SPACE.
DATA OUTLET INSTALLED IN CEILING, SIMILAR TO ABOVE, FOR WIRELESS ACCESS POINT.
DATA OUTLET(S) INSTALLED IN FLOOR BOX: ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL A FLOOR BOX. ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL (1) 1" CONDUIT PATHWAY FROM NEAREST ACCESSIBLE CEILING SPACE TO FLOOR BOX LOCATION SHOWN ON PLANS. COORDINATE WITH OTHER DISCIPLINES AND SHARE COMMON FLOOR TRENCH WHERE APPLICABLE.
COMBINED POWER/DATA FLOOR BOX, SEE NOTES FOR FLOOR MOUNTED DATA DEVICE AND FLOOR MOUNTED POWER DEVICE FOR MORE INFORMATION.
360 DEGREE CEILING MOUNTED MOTION DETECTOR.
WALL MOUNTED MOTION DETECTOR MOUNTED AT HEIGHT INDICATED ON DRAWINGS. PROVIDE WIRE GUARD FOR ALL DEVICES MOUNTED IN GYM/MAIN AREAS.
MAGNETIC DOOR CONTACT POSITION SWITCH LOCATED AT ALL EXTERIOR DOORS AND ROOF HATCHES.
INTRUSION DETECTION SYSTEM ARM/DISARM KEYPAD WITH LOCKING VANDAL RESISTANT COVER.
ACCESS CONTROL CARD READER - PROVIDE INFRASTRUCTURE, CONDUIT, SUPPORT AND WIRING, THE DEVICES WILL BE WIRED BY OTHERS.
COMBINED WALL MOUNTED INTERCOM SPEAKER (CABLING CONTRACTOR SHALL PROVIDE (1) CAT6 CABLE ROUTED TO NEAREST MDF/IDF) AND CLOCK (CABLING CONTRACTOR SHALL PROVIDE (1) CAT6 CABLE ROUTED TO NEAREST MDF/IDF)
IP-BASED SURVEILLANCE CAMERA - PROVIDE INFRASTRUCTURE, CONDUIT, SUPPORT AND WIRING, THE DEVICES WILL BE WIRED BY OTHERS.
ALARM CONTROL PANEL - PROVIDE INFRASTRUCTURE, CONDUIT, SUPPORT AND WIRING, THE DEVICES WILL BE WIRED BY OTHERS.

LEGEND NOTES

1. EVERY SYMBOL SHOWN ON LEGEND MAY NOT APPEAR ON DRAWINGS.
2. DASHED ELECTRICAL EQUIPMENT GENERALLY INDICATES EXISTING EQUIPMENT.
3. LONG-SHORT-SHORT-LONG DASHING GENERALLY INDICATES MATCH LINE OR DEFINES AREA FOR SPECIAL NOTE.

CIRCUIT RELATED

LIGHTING OR POWER CIRCUITING, ARROW INDICATES HOME RUN, LONGER TICKS INDICATE NEUTRAL WIRE(S), SHORTER STRAIGHT TICKS INDICATE PHASE WIRE(S), SLANTED SHORTER TICKS INDICATE SWITCH LEG(S), DOTS INDICATE GROUNDING CONDUCTOR(S). DASHED WIRING (LONG-SHORT-ONE DASHES) INDICATES WIRING BELOW SLAB OR GRADE, DASHED WIRING (SERIES OF SHORT DASHES) INDICATES EXISTING WIRING. SLASH THROUGH ARROW INDICATES PARTIAL CIRCUIT. "D" ON HOMERUN ARROW INDICATES DEDICATED CIRCUIT. PROVIDE A SEPARATE NEUTRAL FOR EACH PHASE CONDUCTOR FOR ENTIRE LENGTH OF CIRCUIT FROM PANEL TO OUTLET. COUNT EACH NEUTRAL AS CURRENT-CARRYING AND GROUP A MAXIMUM OF SIX THHN/THWN CONDUCTORS IN A SINGLE RACEWAY. GROUNDING CONDUCTOR IS NOT COUNTED.

NOTE: HOMERUN INDICATES INSTALLATION OF NEW WIRE AND CONDUIT (#12 WIRE, 3/4"C, UNLESS OTHERWISE NOTED) FROM SOURCE PANELBOARD TO LOAD. HOMERUN INDICATES CONNECTION OF NEW LOADS TO EXISTING CIRCUITS IN LIEU OF PANELBOARD WHERE NOTED ON PLANS.

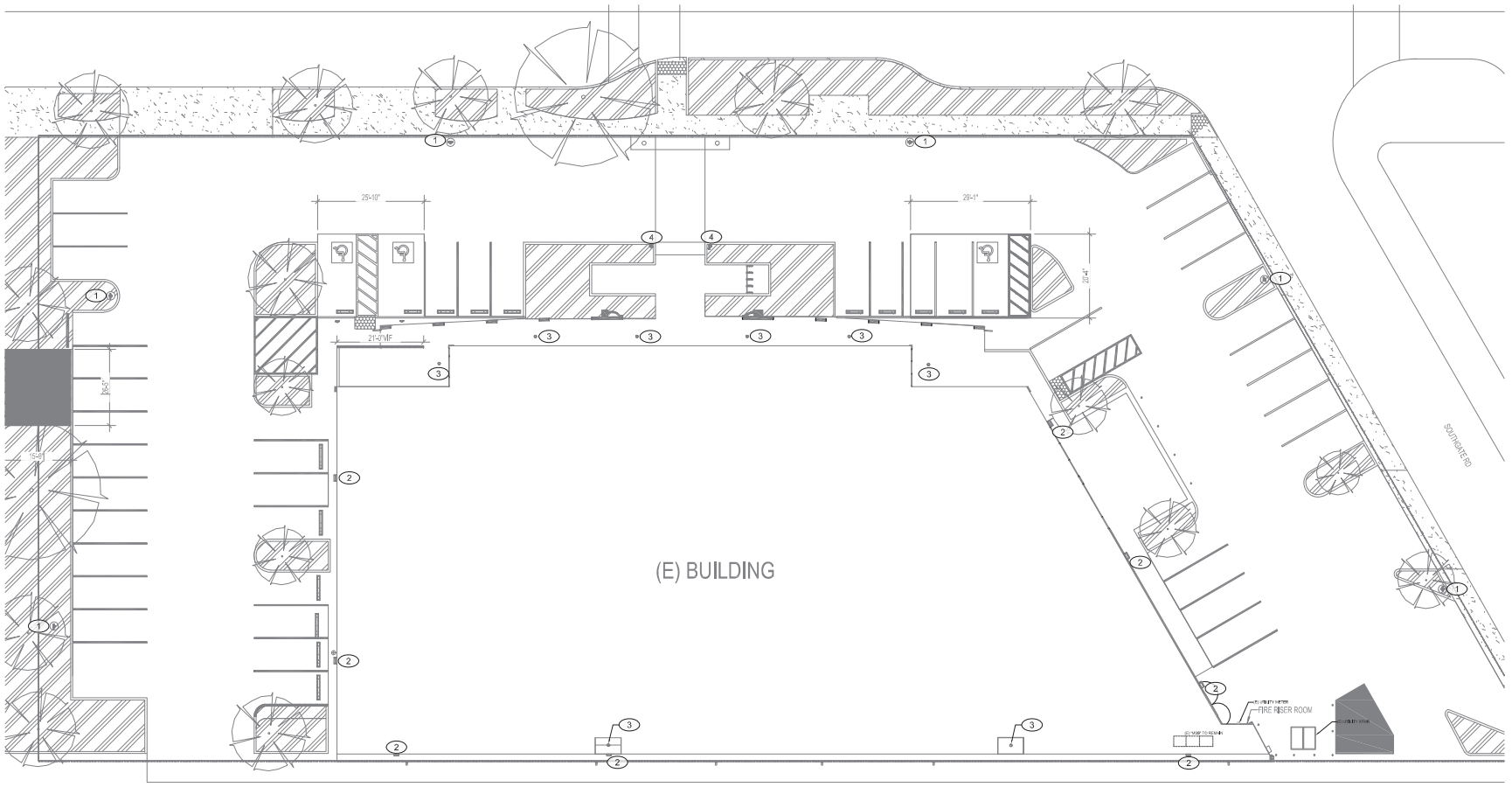
JUNCTION BOX
GROUNDING FIXTURE

LIGHTING FIXTURES

LED LIGHTING FIXTURE, LETTER INDICATES TYPE, SMALL LETTER INDICATES SWITCH CONTROL, NUMBER INDICATES CIRCUIT, CROSS HATCHING INDICATES FIXTURE ON EMERGENCY SYSTEM, FOR SOLID CIRCLE WITHIN FIXTURE REFERENCE APPROPRIATE CATEGORY "A" CIRCUIT RELATED SYMBOL
STRIP TYPE LED LIGHTING FIXTURE, LETTER INDICATES TYPE, SMALL LETTER INDICATES SWITCH CONTROL, NUMBER INDICATES CIRCUIT, FOR SOLID CIRCLE ATTACHED TO FIXTURE REFERENCE APPROPRIATE CATEGORY "A" CIRCUIT RELATED SYMBOL
LED LIGHTING FIXTURE, LETTER INDICATES TYPE, SMALL LETTER INDICATES SWITCH CONTROL, NUMBER INDICATES CIRCUIT, FOR SOLID CIRCLE REFERENCE APPROPRIATE CATEGORY "A" CIRCUIT RELATED SYMBOL
DESIGNATES FIXTURE ON EMERGENCY POWER. RE: LIGHTING PLAN NOTES AND FIXTURE SCHEDULE NOTES FOR ADDITIONAL INFORMATION
WALL OR BRACKET MOUNTED FIXTURE OR DEVICE
EXIT LIGHT FIXTURE, LETTER INDICATES TYPE, NUMBER INDICATES CIRCUIT, NUMBER AND LOCATION OF SHADED TRI

KEYNOTES

1	EXISTING SITE POLE AND POLE BASE TO REMAIN. REMOVE EXISTING LED FIXTURE HEAD AND PRESERVE EXISTING CIRCUIT AT POLE TO POWER NEW FIXTURE ONCE INSTALLED.
2	DEMO EXISTING WALL PACK LIGHTING FIXTURE AND PRESERVE EXISTING CIRCUITRY TO POWER NEW FIXTURE ONCE INSTALLED.
3	DEMO EXISTING DOWNLIGHT FIXTURE AND PRESERVE EXISTING CIRCUITRY TO POWER NEW FIXTURE ONCE INSTALLED.
4	DEMO EXISTING BOLLARD LIGHTING FIXTURE AND PRESERVE EXISTING CIRCUITRY TO POWER NEW FIXTURE ONCE INSTALLED.



1 ELECTRICAL SITE PLAN - NEW
SCALE: 3/32" = 1'-0"

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK

JOBCOPY

ARCHITECT PBK, Inc.
FOLSOM
1100 Iron Point Road, Suite 200
Folsom, CA 95630-4515
916-355-8822
MEP Engineering & Technology
LEAF ENGINEERS

APPROVED
Community Development Department
ELECTRICAL DIVISION
By: Jason Queener
on Jun 19, 2025

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1124 DEL PASO BLVD
SACRAMENTO, CA 95815

65% CONSTRUCTION DOCUMENTS

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
STEVEN C. MUSSER
E-19817
Exp. 6-31-25
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: KG CHKED BY: SM

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK COMM. #2	5/23/25
2	OWNER CHANGES	5/23/25

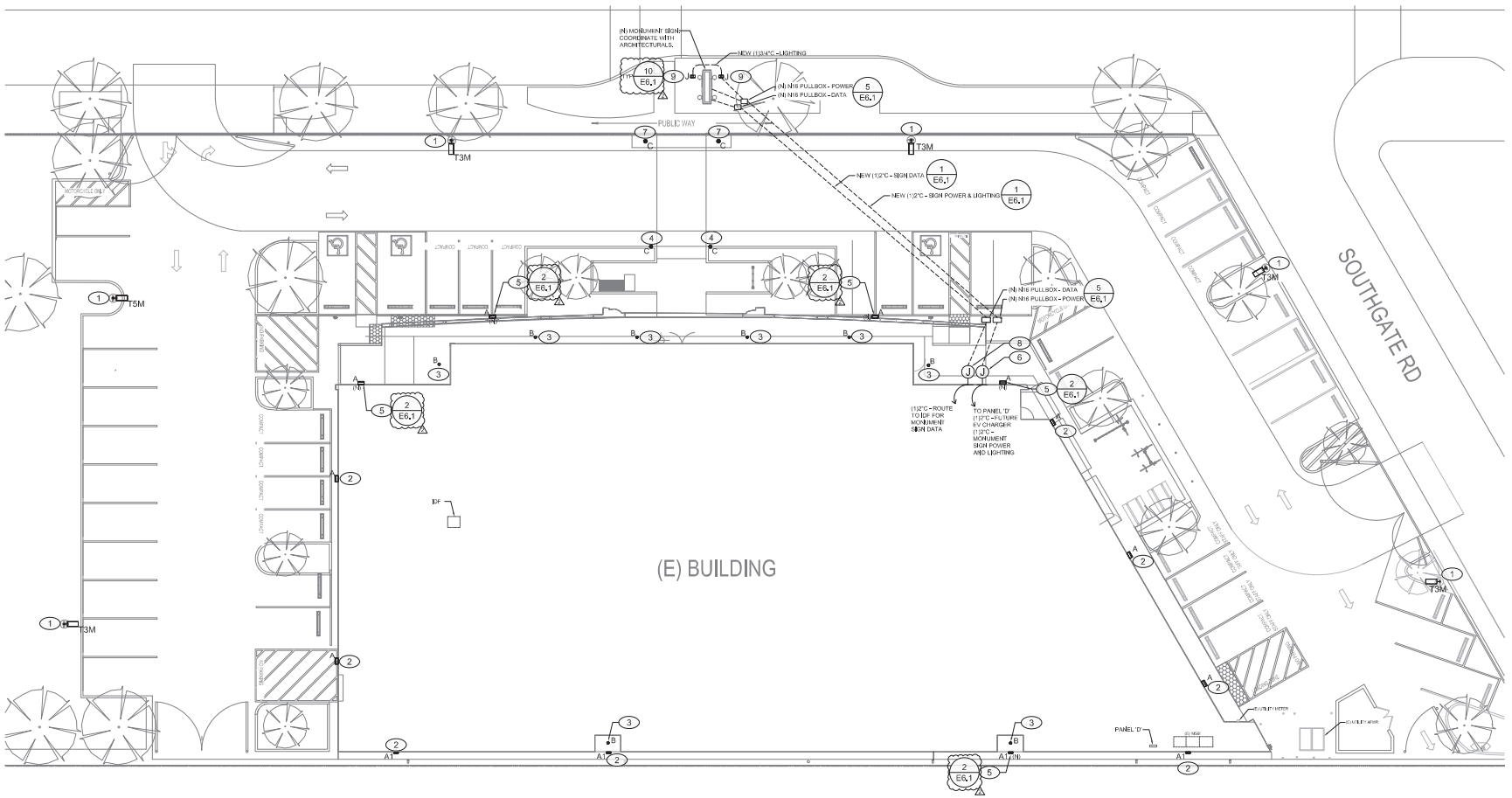
CONSTRUCTION DOCUMENT

ELECTRICAL SITE PLAN - DEMO

ED1.1

This document is for plan review only

COM-2500586



KEYNOTES

1 PROVIDE NEW LED FIXTURE HEAD TO EXISTING SITE POLE AND POWER WITH PRESERVED ELECTRICAL CIRCUIT FROM DEMO PHASE.	7 OLD BOLLARD LIGHTING FIXTURE LOCATION (PREVIOUSLY REMOVED), PROVIDE NEW BOLLARD LED FIXTURE, UTILIZE EXISTING BOLLARD LIGHT CIRCUITRY TO POWER FIXTURE ONCE INSTALLED, PROVIDE MOUNTING EQUIPMENT AS NEEDED. SEE 'E3.1' FOR LIGHTING FIXTURE SCHEDULE.
2 PROVIDE NEW LED WALL PACK AT DEMOED FIXTURE'S MOUNTING HEIGHT (APPROX. 10' AFG). POWER FIXTURE WITH PRESERVED ELECTRICAL CIRCUIT FROM DEMO PHASE. PROVIDE MOUNTING EQUIPMENT AS NEEDED. SEE 'E3.1/S' FOR LIGHTING FIXTURE SCHEDULE.	8 PROVIDE NEMA 3R RATED 12"X12" PULL CAN MOUNTED TO EXTERIOR WALL, MOUNT SO THAT BOTTOM OF BOX IS AT 96" AFF. STUB (12)"C FROM BACK OF BOX AND ROUTE CONDUIT TO IDF FOR DATA TO MONUMENT SIGN.
3 PROVIDE NEW LED DOWNLIGHT FIXTURE AT DEMOED FIXTURE'S MOUNTING HEIGHT (APPROX. 10' AFG). POWER FIXTURE WITH PRESERVED ELECTRICAL CIRCUIT FROM DEMO PHASE. PROVIDE MOUNTING EQUIPMENT AS NEEDED. SEE 'E3.1/S' FOR LIGHTING FIXTURE SCHEDULE.	9 PROVIDE NEW MONUMENT SIGN LIGHT FIXTURE, SEE 'E3.1/S' FOR LIGHTING FIXTURE SCHEDULE.
4 PROVIDE NEW BOLLARD LED FIXTURE. POWER FIXTURE WITH PRESERVED ELECTRICAL CIRCUIT FROM DEMO PHASE. PROVIDE MOUNTING EQUIPMENT AS NEEDED. SEE 'E3.1/S' FOR LIGHTING FIXTURE SCHEDULE.	
5 PROVIDE NEW LED WALL PACK FIXTURE AT NEW LOCATION SHOWN. MOUNT AT 10' AFG. PROVIDE POWER TO FIXTURE FROM EXISTING EXTERIOR LIGHTING CIRCUIT. SEE 'E3.1/S' FOR LIGHTING FIXTURE SCHEDULE.	
6 PROVIDE NEMA 3R RATED 12"X12" PULL CAN MOUNTED TO EXTERIOR WALL. MOUNT SO THAT BOTTOM OF BOX IS AT 96" AFF. STUB (2)"C FROM BACK OF BOX AND ROUTE CONDUIT TO (E) ELECTRICAL PANEL 'D' FOR FUTURE POWER TO EV CHARGERS AND POWER OR MONUMENT SIGN. PROVIDE PULL TAPE IN RACEWAYS ONCE INSTALLED.	

1 ELECTRICAL SITE PLAN - NEW
SCALE: 3/32" = 1'-0"

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

APPROVED
Community Development Department
ELECTRICAL 2019 CODE
By: Jason Queener
on Jun 19, 2025

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

PBK
ARCHITECT PBK, Inc.
FOLSOM
1100 Iron Point Road, Suite 200
Folsom, CA 95630-4513
916-355-8822

MEP Engineering & Technology
LEAF ENGINEERS
1110 Iron Point Rd., Ste 100
Folsom, CA 95630
916.290.9111
leafengineers.com

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
STEVEN C. MUSSER
E-19817
Exp. 3-31-25
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: KG CHKED BY: SM

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	3/23/25
2	OWNER CHANGES	3/23/25

CONSTRUCTION DOCUMENT

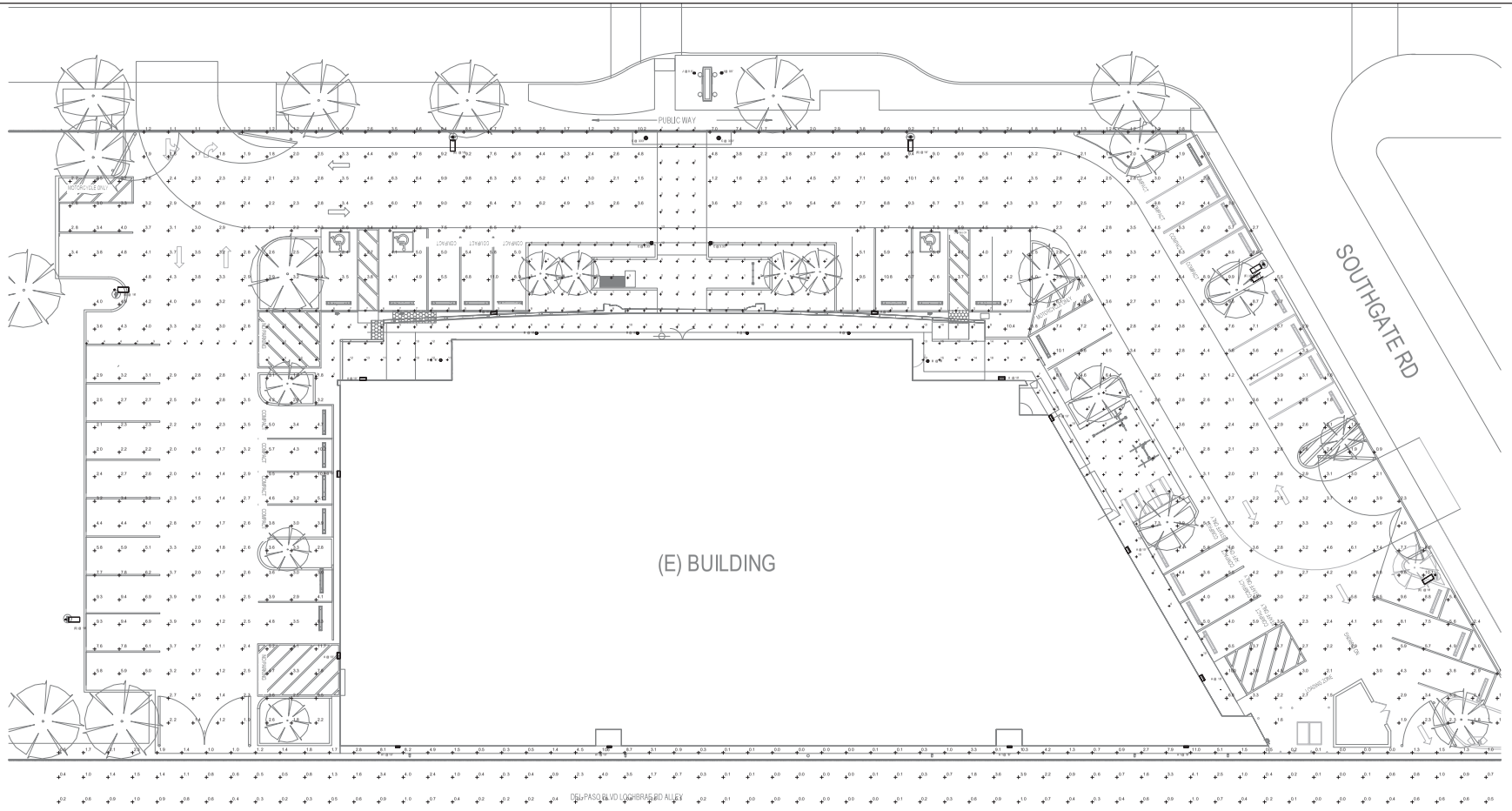
ELECTRICAL SITE PLAN

E1.1

This document is for plan review only

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

E1.1 SITE
PBK v. Tb-v.2 2019.1033
Z:\Projects\FOL\2022\220389\3-CD\Drawings\Cad\MEP\TE_1T
5/21/2025 12:53:08 PM



1 ELECTRICAL SITE PLAN - PHOTOMETRIC
SCALE: 3/32" = 1'-0"

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-395-9922

MEP Engineering & Technology
LEAF ENGINEERS
FOLSOM
1110 Iron Point Rd, Suite 200
Folsom, CA 95630
916.792.9900
LEAFengineering.com

APPROVED
City of Sacramento Plan Review
ELECTRICAL DIVISION
By: Jason Queener
on Jun 19, 2025

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
STEVEN C. MUSSER
E-19817
Exp. 3-31-26
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: KG CHKED BY: SM

REVISIONS

#	DESCRIPTION	DATE
1	PC COMMENTS	03-04-2025
2	OWNER PBK COMMENTS	03-04-2025

CONSTRUCTION DOCUMENT

ELECTRICAL SITE PLAN - PHOTOMETRIC

E1.1P

This document is for plan review only

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

E1.1P SITE - PHOTOM
PBKcaTBvt.2 2019/10/03
Z:\Projects\FOL\2022\2203893-CD\Drawings\Cad\MEPTE_T1
3/4/2025 1:16:30 PM

E2.1 DEMOLIGHTING
PBKv17BIM 2 2019/10/23

GENERAL NOTES

1. DEMOLISH ALL EXISTING LIGHT FIXTURES THROUGHOUT BUILDING. IDENTIFY AND PRESERVE IN PLACE EXISTING CIRCUITRY TO BE UTILIZED FOR NEW FIXTURES TO BE INSTALLED. LABEL JUNCTION BOXES WHERE APPLICABLE AND UPDATE PANEL SCHEDULES.



1 ELECTRICAL LIGHTING PLAN - DEMOLITION
SCALE: 1/8" = 1'-0"

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

This document is for plan review only

PBK
ARCHITECT PBK, Inc. PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-365-9922
MEP Engineering & Technology
LEAF ENGINEERS
1110 Iron Point Rd, Suite 200
Folsom, CA 95630
916.782.8913
LEAFengineers.com

APPROVED
Community Development Department
ELECTRICAL DIVISION
By: Jason Queener
on Jun 18, 2025

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN
A
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
STEVEN C. MOSER
E-19817
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: KG CHKED BY: SM

REVISIONS

#	DESCRIPTION	DATE
1	PC COMMENTS	05-06-2025
2	OWNER/PBK COMMENTS	06-06-2025

CONSTRUCTION DOCUMENT

LIGHTING PLAN - DEMOLITION

E2.1

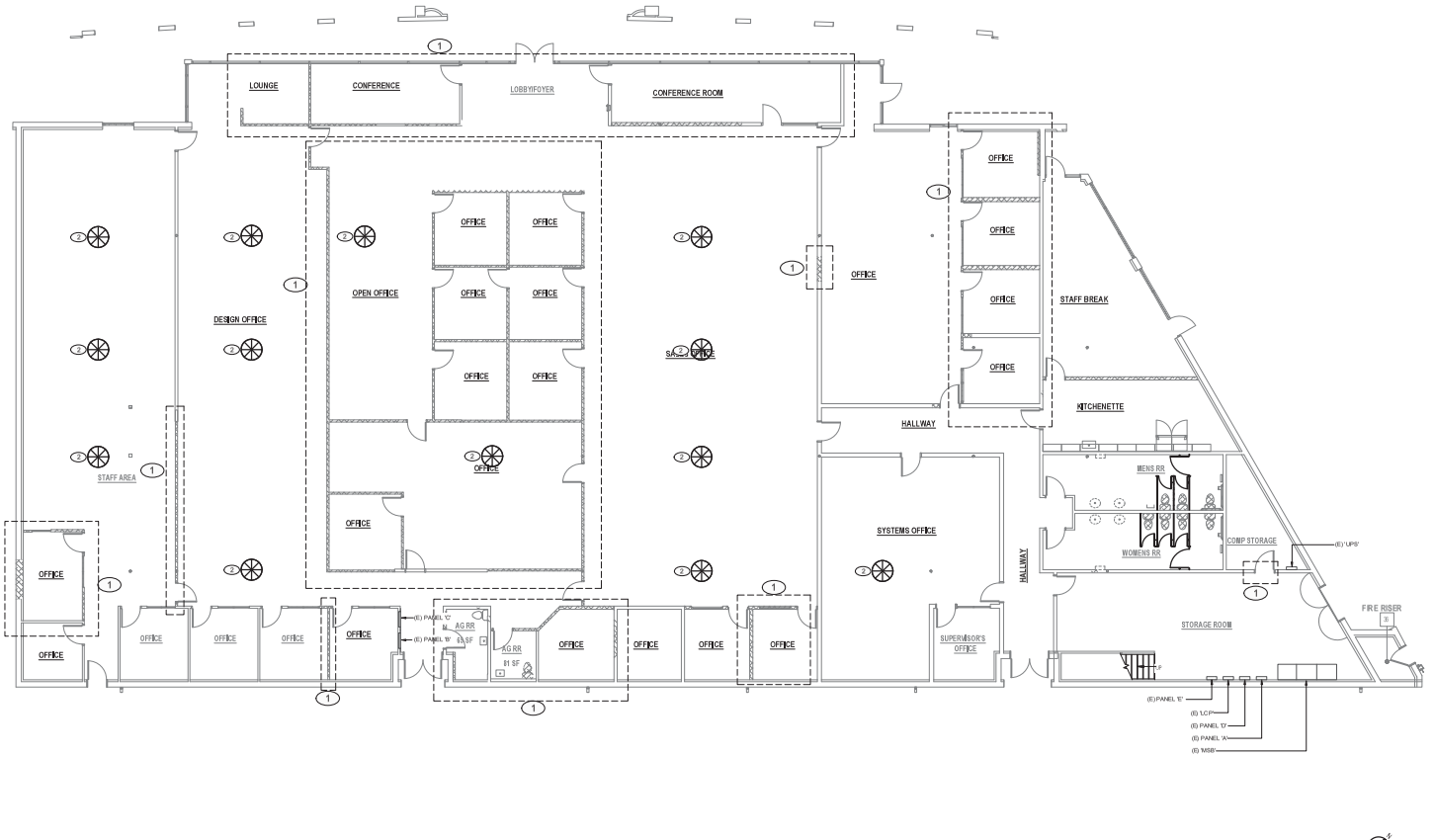
JOBCOPY
1124 DEL PASO BLVD
COM-2500586
Z:\Projects\FOL\2022\220389\5-CDD\drawings\Civil\MEP\TEL_T1
3/4/2025 1:16:31 PM

KEYNOTES

1. WALLS TO BE DEMOLISHED IN THESE AREAS FOR NEW FLOOR PLAN. DEMOLISH EXISTING POWER RECEPTACLES, J-BOXES AND FIRE ALARM DEVICES AND PRESERVE IN PLACE THE EXISTING CIRCUITRY AND CABLING FOR USE IN NEW FLOOR PLAN.
2. DEMOLISH EXISTING FAN. DISCONNECT AND REMOVE EXISTING CIRCUITRY BACK TO NEAREST JUNCTION BOX AT CEILING AND PRESERVE FOR FUTURE USE.

GENERAL NOTES

1. EXISTING POWER RECEPTACLE COVER PLATES THROUGHOUT BUILDING ARE WITHIN SCOPE OF THIS PROJECT REGARDLESS OF THEIR BEING INDICATED ON THESE PLANS AND ARE TO BE REMOVED AND REPLACED WITH NEW STAINLESS STEEL COVER PLATES, FOR INDICATED AREAS, FOLLOW ADDITIONAL REQUIREMENTS SET BY KEYNOTES.



1 ELECTRICAL POWER PLAN - DEMOLITION
SCALE: 1/8" = 1'-0"

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK

ARCHITECT PBK, Inc. PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-365-9922

MEP Engineering & Technology

LEAF ENGINEERS
FOLSOM
1110 Iron Point Rd, Suite 200
Folsom, CA 95630
916.782.8900
LEAFengineers.com

APPROVED
Community Development Department
ELECTRICAL DIVISION
By: Jason Queener
on Jun 19, 2025

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

SACRAMENTO

A

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
STEVEN C. MOSES
E-19817
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: KG CHKED BY: SM

REVISIONS

#	DESCRIPTION	DATE
1	PC COMMENTS	05-06-2025
2	OWNER/PBK COMMENTS	06-06-2025

CONSTRUCTION DOCUMENT

POWER PLAN - DEMOLITION

E2.2

This document is for plan review only

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

E2.2DEMOPWR
PBKv17Rvt 2 2019.1003
Z:\Projects\FOL\2022\220389\3-CDD\drawings\Civil\MEP\TEL_T1
3/4/2025 1:16:31 PM

JOBCOPY

COM-2500586

PBK

ARCHITECT
FOLSOM
Main Point Walk Suite 200
Folsom, CA 95630
916-609-0922

MEP Engineering & Technology
LEAF ENGINEERING
1331 N. California Blvd., Suite 600
Walnut Creek, CA 94596
(925) 900-8090

APPROVED
AS NOTED
AS AMENDED
PLANS APPROVED
By: Jason Quisenberry
on: Jan 18, 2024

"THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO RELIABLE PERMIT BOARD"

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122 DEL PASO BLVD
SACRAMENTO, CA 95815

95% CONSTRUCTION DOCUMENTS

KEY PLAN

A

PLAN NORTH

Armand Engineer
PROFESSIONAL ENGINEER
E-18817
Exp. 06-30-25
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
2303589

DATE	12/18/2024
DRAWN BY	KA
CHKED BY	SJK

#	REVISIONS	DATE
1	AS COMMENTS	02/04/25
2	OWNER REVIEW COMMENTS	03/04/25

CONSTRUCTION DOCUMENT

ELECTRICAL ROOF PLAN - DEMOLITION

E2.3

This document is for plan review only

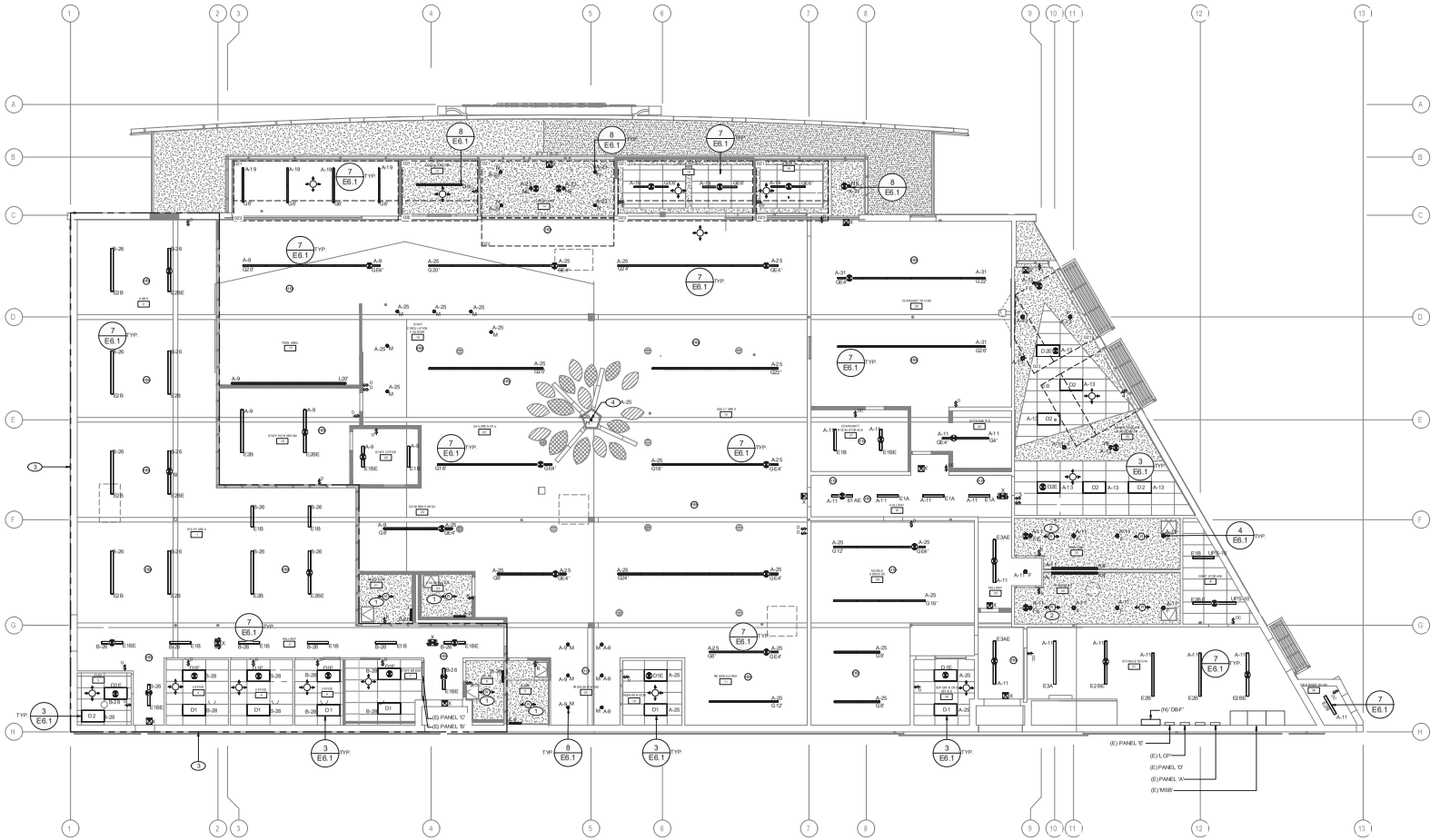
KEYNOTES

1. DISCONNECT AND REMOVE THE SERVICE RECEPTACLES AND RELATED BOXES AND CONDUIT. CAP CONDUIT AT ROOF PENETRATION AND STUB-UP AND PROTECT THE DISCONNECTED LINE SIDE CONDUCTORS
2. EXISTING MACHINE TO BE REMOVED FOR RE-ROOFING AND THEN REPLACED IN THE SAME LOCATION AFTER WARD. DISCONNECT AND REMOVE THE (E) DISCONNECT SWITCH AND TERMINAL CONDUIT/WIRING TO THE MACHINE. PRESERVE THE (E) DISCONNECT SWITCH AND STUB-UP AND PROTECT THE DISCONNECTED LINE SIDE CONDUCTORS. RECONNECT THE EXISTING MACHINE AFTER RE-ROOFING IS COMPLETED.
3. EXISTING MACHINE TO BE REMOVED AND REPLACED WITH A NEW. DISCONNECT AND REMOVE THE (E) DISCONNECT SWITCH AND TERMINAL CONDUIT/WIRING TO THE MACHINE. PRESERVE THE (E) DISCONNECT SWITCH AND STUB-UP AND PROTECT THE DISCONNECTED LINE SIDE CONDUCTORS
4. EXISTING MACHINE TO BE REMOVED. DISCONNECT THE EXISTING DISCONNECT SWITCH AND TERMINAL CONDUIT/WIRING TO THE MACHINE. PRESERVE THE CONDUIT PENETRATION AND JUNCTION BOX BELOW ROOF AND SAFE OFF REMAINING CONDUCTORS.
5. EXISTING MACHINE TO BE REMOVED FOR RE-ROOFING AND THEN REPLACED IN THE SAME LOCATION AFTER WARD. DISCONNECT AND REMOVE THE (E) DISCONNECT SWITCH AND TERMINAL CONDUIT/WIRING TO THE MACHINE. PRESERVE THE CONDUIT PENETRATION AND STUB-UP. REMOVE AND DEMOLISH THE FEEDER CONDUCTORS BACK TO SOURCE PANEL.

1 ELECTRICAL ROOF PLAN - DEMOLITION
SCALE: 1/8" = 1'-0"

ISSUED BY
Saul Moran
on Jul 10, 2025

This set of plans and specifications and/or data recorded or printed therefrom is and shall remain the property of Folsom Boyett Anderson and may not be used in whole or in part for any other project without the written permission of Folsom Boyett Anderson. Visual contact with these documents shall constitute prima facie evidence of acceptance of these restrictions.



1 ELECTRICAL LIGHTING PLAN - NEW
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. LIGHTING CONTROL SYSTEM TO BE BY BLUE RIDGE TECHNOLOGIES: BACNET-BASED LIGHTING CONTROL SYSTEM.
2. SEE LIGHT FIXTURE SCHEDULE ON SHEET 'E3.15' FOR MOUNTING HEIGHTS FOR ALL FIXTURES. COORDINATE WITH MECHANICAL CONTRACTOR PRIOR TO FINAL INSTALLATION TO AVOID UNFORSEEN CONFLICTS WITH DUCTWORK.
3. UTILIZE PRESERVED CIRCUITS SHOWN FROM DEMO PHASE TO POWER NEW LIGHT FIXTURES. REMOVE UNUSED CIRCUIT CONDUCTORS BACK TO SOURCE PANEL AND UPDATE PANEL SCHEDULE TO REFLECT FINAL INSTALLATION.

KEYNOTES

1. INTEGRATE NEW CEILING FAN WITH NEW BATHROOM LIGHTING OCCUPANCY SENSOR.
2. INTEGRATE EXISTING EXHAUST FAN WITH NEW BATHROOM LIGHTING OCCUPANCY SENSOR.
3. ZONE DESIGNATED FOR FUTURE TENANCY. CIRCUITS IN THIS AREA ARE TO BE SUPPLIED FROM PANELS 'B' AND 'C' ONLY.
4. PROVIDE AND INSTALL FIXTURE FOR TREE ALCOVE. COORDINATE WITH CASEWORK CONTRACTOR AND CUSTOMER TO VERIFY FIXTURE'S FINAL LOCATION PRIOR TO INSTALLATION.

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-355-9022

MEP Engineering & Technology
LEAF ENGINEERING
FOLSOM
1110 Iron Point Rd, Suite 200
Folsom, CA 95630
MEP@LEAF.com
LEAFengineering.com

APPROVED
City of Sacramento Plan Review
ELECTRICAL DIVISION
By: Jason Queener
on Jun 19, 2025

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
STEVEN C. MULLER
E-19817
Exp. 3-31-26
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: KG CHKED BY: SM

REVISIONS

#	DESCRIPTION	DATE
1	PC COMMENTS	03-04-2025
2	OWNER PBK COMMENTS	03-04-2025

CONSTRUCTION DOCUMENT

LIGHTING PLAN - NEW

This document is for plan review only

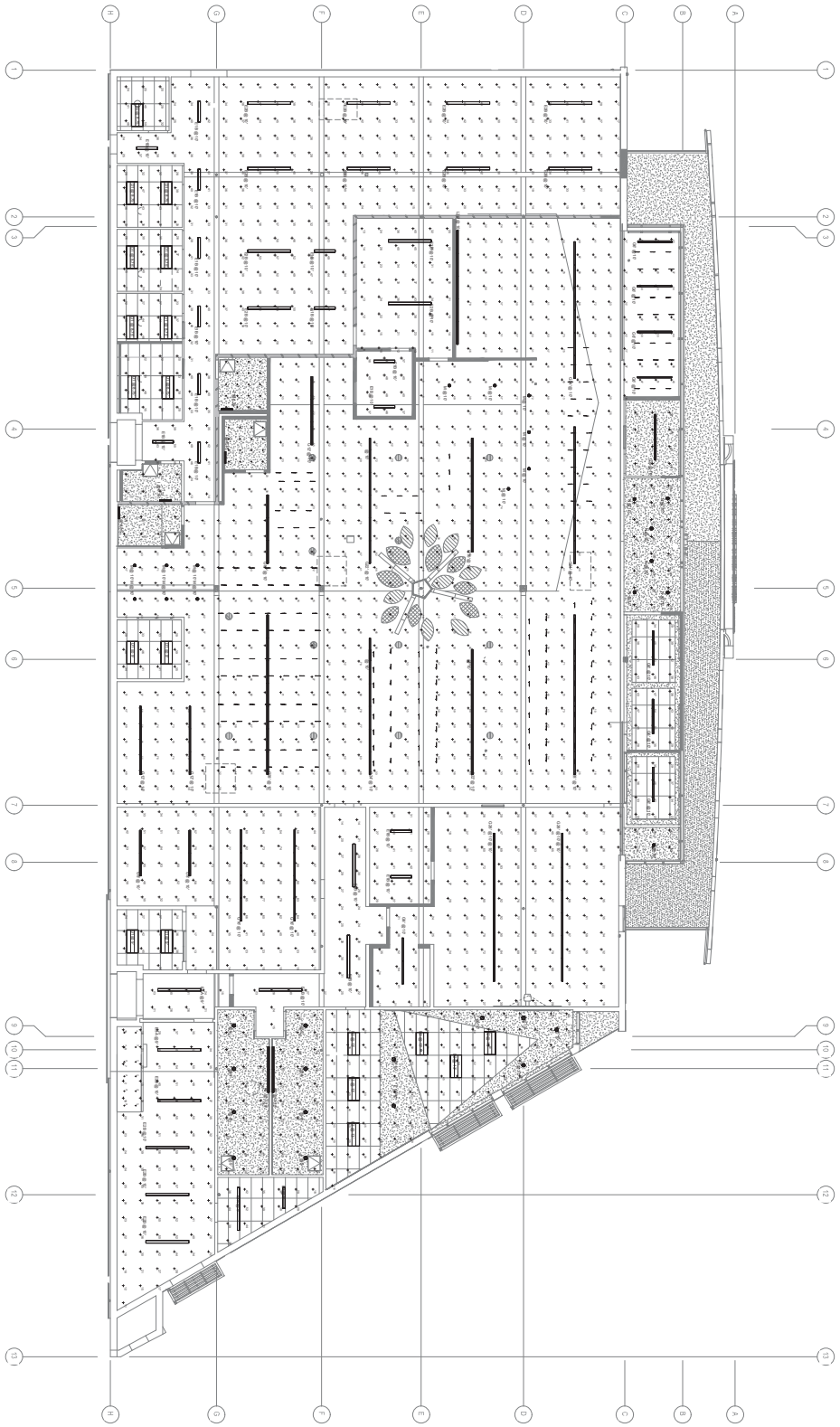
E3.1

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

E3.1 NEW LIGHTING
PBKcs TBvt 2 2019.10.03

Z:\Projects\FOL\2022\2203893-CD\Drawings\Cnsl\MEPTEL_T1
3/4/2025 1:16:33 PM

1 ELECTRICAL LIGHTING PLAN - NEW - PHOTOMETRIC
SCALE: 1/8" = 1'-0"



This set of plans and specifications must be returned on demand at the completion of the job to the Building Department. It is unlawful for any person to use these plans and specifications on any other job. Re-issuance of these plans will require the written consent of the Architect of record.

ISSUED BY
Saul Moran
on Jul 16, 2025

This document is for plan review only

E3.1P

LIGHTING PLAN - NEW - PHOTOMETRIC

CONSTRUCTION DOCUMENT

#	DESCRIPTION	DATE
1	95% CONSTRUCTION DOCUMENTS	06/06/2025

CITY OF SACRAMENTO
PROJECT NUMBER
CAPITAL IMPROVEMENT PROGRAM NO. I21162000
DRAWN BY: NG CHKED BY: SM
PEQ BOOKS

E14987 Exp. 6-30-27 REGISTERED PROFESSIONAL ENGINEER CIVIL STATE OF CALIFORNIA
Architect Signature

KEY PLAN
NOT TO SCALE
TRUE NORTH
PROJECT NORTH

SACRAMENTO

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

"THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTION."

APPROVED
ELECTRICAL DIVISION
By:
Jason Quisenber
on Jun 18, 2025

LEAF SUSTAINABLE BUILDING

ARCHITECT
PBK Architects
1110 Blue Rock Street, Suite 200
Cincinnati, Ohio 45223
513-721-1201
Fax 513-721-2115
Brooks Sanders
Principal
Project Manager
Project Architect

REP Engineering | Technology

PBK

E3.1S NEW LIGHTING - STATISTICS
PBKx TSK1 2 2019.1033

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
AG RR 8 AT 2.5' AFF	+	10 fc	20 fc	4 fc	5.0:1	2.5:1
AG RR 9 AT 2.5' AFF	+	11 fc	34 fc	5 fc	6.8:1	2.2:1
AG RR 21 AT 2.5' AFF	+	11 fc	34 fc	5 fc	6.8:1	2.2:1
AG RR 24 AT 2.5' AFF	+	12 fc	24 fc	7 fc	3.4:1	1.7:1
Calc Zone #22	+	43 fc	79 fc	4 fc	19.8:1	10.8:1
COMMUNITY ROOM & KITCHENETTE 28 AT 2.5' AFF	+	48 fc	92 fc	12 fc	7.7:1	4.0:1
COMMUNITY ROOM STORAGE 27 AT 2.5' AFF	+	31 fc	42 fc	20 fc	2.1:1	1.6:1
CORP STORAGE 37 AT 2.5' AFF	+	36 fc	52 fc	16 fc	3.3:1	2.3:1
FLEX ROOM 3 AT 2.5' AFF	+	35 fc	50 fc	20 fc	2.5:1	1.8:1
FRIENDS ROOM 10 AT 2.5' AFF	+	37 fc	46 fc	29 fc	1.6:1	1.3:1
GENERAL LIBRARY AT 2.5' AFF	+	42 fc	89 fc	5 fc	17.8:1	8.4:1
HALLWAY 00 AT 0' AFF	+	25 fc	31 fc	14 fc	2.2:1	1.8:1
KITCHENETTE 28 COUNTERTOP	+	22 fc	34 fc	15 fc	2.3:1	1.5:1
LOBBY/FOYER 14 AT 0' AFF	+	36 fc	45 fc	26 fc	1.7:1	1.4:1
MAKER SPACE & KITCHENETTE 35 AT 2.5' AFF	+	47 fc	72 fc	16 fc	4.5:1	2.9:1
MEETING ROOM 13 AT 2.5' AFF	+	43 fc	57 fc	31 fc	1.8:1	1.4:1
MOBILE SERVICES 29 AT 2.5' AFF	+	50 fc	95 fc	10 fc	9.5:1	5.0:1
OFFICE 3	+	12 fc	45 fc	24 fc	3.1:1	1.5:1
OFFICE 4	+	34 fc	47 fc	20 fc	2.0:1	1.5:1
OFFICE 6 AT 2.5' AFF	+	36 fc	46 fc	20 fc	2.1:1	1.6:1
STACKS 3' TALL CHILDREN'S CRU	+	16 fc	17 fc	15 fc	1.1:1	1.1:1
STACKS 3' TALL CHILDREN'S CRU	+	18 fc	21 fc	15 fc	1.4:1	1.2:1
STACKS 3' TALL CHILDREN'S CRU	+	19 fc	28 fc	18 fc	1.4:1	1.2:1
STACKS 3' TALL STAFF CIRCULATION	+	24 fc	25 fc	20 fc	1.3:1	1.0:1
STACKS 3' TALL STAFF CIRCULATION	+	26 fc	27 fc	25 fc	1.1:1	1.0:1
STACKS 3.5' TALL STAFF CIRCULATION	+	14 fc	15 fc	13 fc	1.2:1	1.1:1
STACKS 3.5' TALL STAFF CIRCULATION	+	18 fc	19 fc	16 fc	1.2:1	1.1:1
STACKS 3.5' TALL STAFF CIRCULATION	+	25 fc	26 fc	23 fc	1.1:1	1.1:1
STACKS 3.5' TALL STAFF CIRCULATION	+	32 fc	32 fc	30 fc	1.0:1	1.0:1
STACKS 3.5' TALL STAFF CIRCULATION	+	16 fc	16 fc	16 fc	1.0:1	1.0:1
STACKS 3.5' TALL STAFF CIRCULATION	+	15 fc	16 fc	14 fc	1.1:1	1.1:1
STACKS 3.5' TALL STAFF CIRCULATION	+	23 fc	24 fc	21 fc	1.1:1	1.1:1
STACKS 3.5' TALL STAFF CIRCULATION	+	25 fc	26 fc	24 fc	1.1:1	1.0:1
STACKS 4.5' TALL ADULT AREA	+	23 fc	27 fc	17 fc	1.6:1	1.4:1
STACKS 4.5' TALL ADULT AREA	+	18 fc	28 fc	12 fc	1.5:1	1.5:1
STACKS 4.5' TALL ADULT AREA	+	20 fc	28 fc	15 fc	1.5:1	1.3:1
STACKS 4.5' TALL ADULT AREA	+	18 fc	55 fc	5 fc	10.0:1	2.8:1
STACKS 4.5' TALL ADULT AREA	+	35 fc	49 fc	20 fc	1.8:1	1.4:1
STACKS 4.5' TALL ADULT AREA	+	18 fc	54 fc	7 fc	10.0:1	1.4:1
STACKS 4.5' TALL ADULT AREA	+	29 fc	36 fc	20 fc	1.8:1	1.3:1
STACKS 4.5' TALL ADULT AREA	+	11 fc	14 fc	9 fc	1.6:1	1.2:1
STACKS 4.5' TALL CHILDREN'S RR	+	22 fc	34 fc	14 fc	2.4:1	1.6:1
STACKS 4.5' TALL CHILDREN'S RR	+	23 fc	36 fc	15 fc	2.4:1	1.5:1
STACKS 4.5' TALL CHILDREN'S RR	+	20 fc	31 fc	13 fc	2.4:1	1.5:1
STACKS 4.5' TALL CHILDREN'S RR	+	17 fc	22 fc	13 fc	1.7:1	1.3:1
STACKS 4.5' TALL CHILDREN'S RR	+	25 fc	36 fc	19 fc	1.9:1	1.3:1
STACKS 4.5' TALL CHILDREN'S RR	+	22 fc	31 fc	15 fc	2.1:1	1.5:1
STACKS 4.5' TALL CHILDREN'S RR	+	19 fc	26 fc	16 fc	1.6:1	1.3:1
STACKS 4.5' TALL CHILDREN'S RR	+	16 fc	27 fc	13 fc	2.1:1	1.6:1
STACKS 4.5' TALL CHILDREN'S RR	+	18 fc	28 fc	13 fc	1.8:1	1.2:1
STACKS 4.5' TALL CHILDREN'S RR	+	13 fc	19 fc	13 fc	1.5:1	1.1:1
STACKS 4.5' TALL CHILDREN'S RR	+	11 fc	13 fc	8 fc	1.6:1	1.4:1
STACKS 4.5' TALL CHILDREN'S RR	+	15 fc	21 fc	13 fc	2.1:1	1.5:1
STACKS 4.5' TALL CHILDREN'S RR	+	25 fc	37 fc	20 fc	1.9:1	1.3:1
STACKS 4.5' TALL CHILDREN'S RR	+	8 fc	9 fc	7 fc	1.3:1	1.1:1
STACKS 6.25' TALL TEEN AREA	+	25 fc	36 fc	17 fc	2.1:1	1.5:1
STACKS 6.25' TALL TEEN AREA	+	26 fc	37 fc	17 fc	2.2:1	1.5:1
STACKS 6.25' TALL TEEN AREA	+	26 fc	37 fc	17 fc	2.2:1	1.5:1
STACKS 6.25' TALL TEEN AREA	+	26 fc	36 fc	17 fc	2.1:1	1.5:1
STACKS 6.25' TALL TEEN AREA	+	25 fc	33 fc	18 fc	1.8:1	1.4:1
STACKS 6.25' TALL TEEN AREA	+	28 fc	38 fc	19 fc	2.0:1	1.5:1
STACKS 6.25' TALL TEEN AREA	+	28 fc	38 fc	19 fc	2.0:1	1.5:1
STAFF AREA 1 & HALLWAY 00 AT 2.5' AFF	+	33 fc	57 fc	12 fc	4.8:1	2.8:1
STAFF BREAK 7 AT 2.5' AFF	+	33 fc	48 fc	20 fc	2.4:1	1.7:1
STAFF OFFICE 26 AT 2.5' AFF	+	45 fc	48 fc	37 fc	1.3:1	1.1:1
STAFF WORKROOM 10 AT 2.5' AFF	+	34 fc	45 fc	8 fc	5.6:1	3.8:1
STORAGE ROOM 31 AT 2.5' AFF	+	36 fc	59 fc	2 fc	29.5:1	18.0:1
STORAGE ROOM 31 STAIR AT 0' AFF	+	16 fc	27 fc	7 fc	3.9:1	2.3:1
STUDY 2 16 AT 2.5' AFF	+	33 fc	48 fc	20 fc	2.1:1	1.5:1
SUPERVISOR'S OFFICE 30 AT 2.5' AFF	+	34 fc	45 fc	24 fc	1.9:1	1.4:1
WOMENS RR 32 AT 2.5' AFF	+	45 fc	82 fc	3 fc	27.3:1	15.0:1
ADULT SEATING AREA 15 AT 2.5' AFF	+	46 fc	54 fc	28 fc	1.9:1	1.5:1

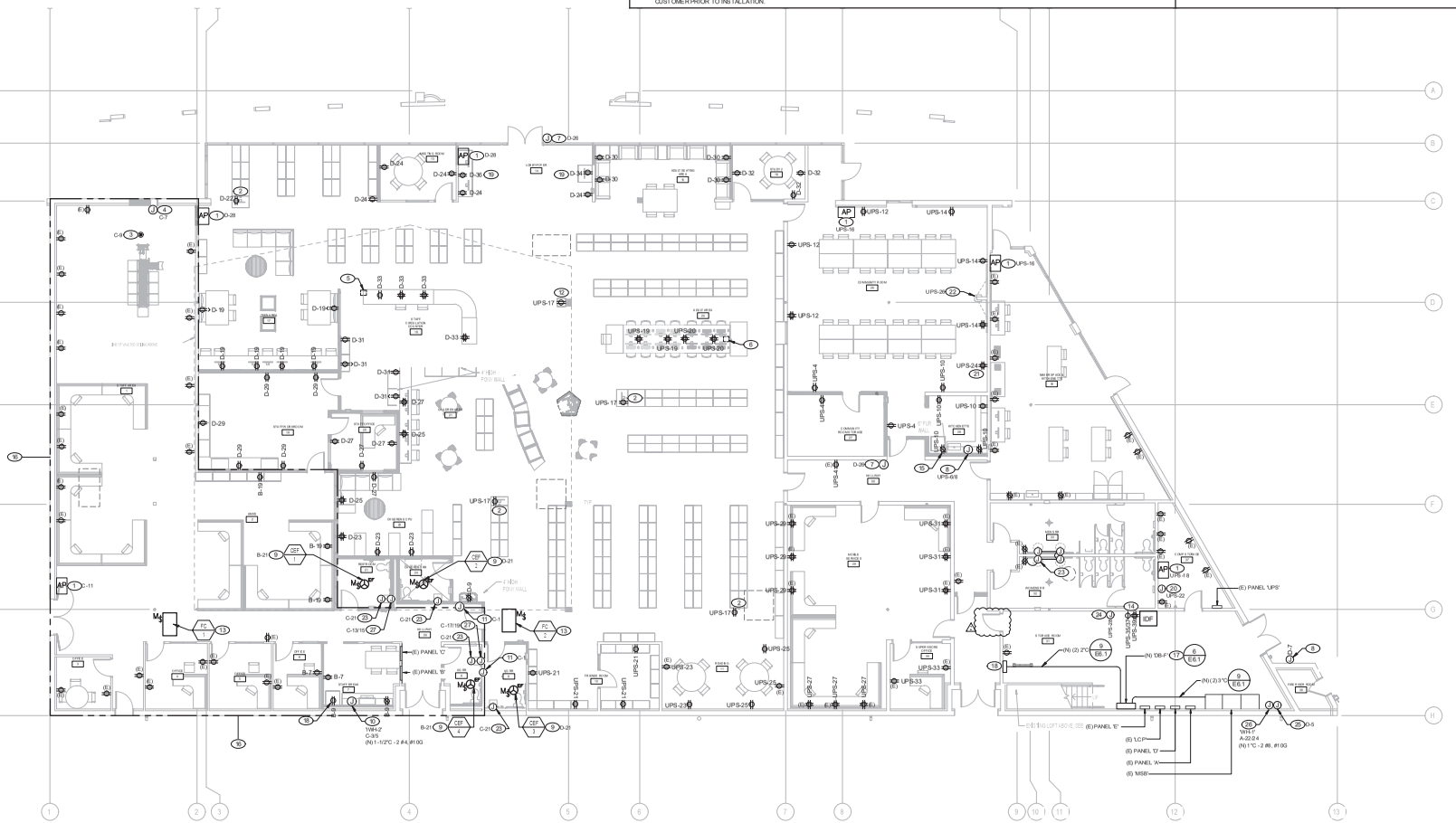
LIGHTING FIXTURE SCHEDULE

KEYNOTES

1. PROVIDE 120V POWER TO ACCESS CONTROL PANEL.
2. PROVIDE POWER-POLE RACEWAY DOWN FROM CEILING TO SUPPLY POWER AND DATA TO 'OPAC' AT ENDCAP OF SHELVING UNIT.
3. PROVIDE DEDICATED 120V CIRCUIT AND CAT6 CABLING TO QUADPLEX/DATA PORT FLOOR RECEPTACLE FOR AMHS 'LYNGSOE' SORTER. VERIFY FINAL LOCATION WITH CUSTOMER PRIOR TO INSTALLATION.
4. PROVIDE DEDICATED 120V CIRCUIT AND CAT6 CABLING TO 'LYNGSOE' BOOK DROP KIOSK. VERIFY FINAL LOCATION WITH OWNER PRIOR TO INSTALLATION.
5. PROVIDE POWER-POLE RACEWAY DOWN FROM CEILING TO SUPPLY POWER AND DATA TO CIRCULATION DESK RECEPTACLES AND DATA PORTS.
6. PROVIDE POWER-POLE RACEWAY DOWN FROM CEILING TO SUPPLY POWER AND DATA TO TABLE RECEPTACLES AND DATA PORTS.
7. PROVIDE 120V POWER TO ADA AUTOMATIC DOOR OPENER AT BUILDING ENTRANCE. COORDINATE WITH ARCHITECTURAL FINAL LOCATION BEFORE INSTALLATION.
8. PROVIDE 120V POWER TO FIRE SPRINKLER BELL.
9. INTEGRATE NEW CEILING FAN WITH BATHROOM LIGHTING OCCUPANCY SENSOR.
10. PROVIDE 60A, 1PH 208V POWER TO INSTANT WATER HEATER.
11. PROVIDE 120V POWER TO NEW FIRE SMOKE DAMPER. VERIFY FINAL LOCATION PRIOR TO INSTALLATION.
12. PROVIDE POWER-POLE RACEWAY DOWN FROM CEILING TO SUPPLY POWER AND DATA TO TABLET CHARGING STATION.
13. PROVIDE POWER TO NEW FAN COIL UNIT FROM NEW CORRESPONDING ODU.
14. PROVIDE DEDICATED QUADPLEX NEMA 5-20 RECEPTACLE AND A DEDICATED NEMA L6-30 RECEPTACLE FOR IDF. CHATSWORTH FIXED RACK WALL MOUNT 11986x24 OPMA196-13. COORDINATE LOCATION AND MOUNTING HEIGHT WITH CUSTOMER PRIOR TO INSTALLATION.
15. PROVIDE 120V POWER WITH GFCI PROTECTION TO REFRIGERATOR.
16. ZONE DESIGNATED FOR FUTURE TENANCY. CIRCUIT S IN THIS AREA ARE TO BE SUPPLIED FROM PANELS 'B' AND 'C' ONLY.
17. PROVIDE NEW METER/MAIN DISTRIBUTION PANEL TO FEED EXISTING PANELS 'B' AND 'C'. SEE ONE LINE FOR FURTHER INFORMATION.
18. PROVIDE NEW 24"X24"X8" PULL CAN TO INTERCEPT EXISTING FEEDER CONDUCTORS TO PANELS 'B' AND 'C' AND SPLICE TO NEW FEEDERS FROM NEW DISTRIBUTION BOARD 'P'. MOUNT PULL CAN SO THAT BOTTOM IS A MINIMUM OF 80" AFF. SEE ONE LINE FOR FURTHER INFORMATION.
19. PROVIDE 120V POWER TO SELF CHECKOUT STATION.
20. PROVIDE 120V POWER TO BMS PANEL.
21. PROVIDE DEDICATED 120V POWER TO QUAD RECEPTACLE FOR EXTRON CABINET. VERIFY FINAL LOCATION AND ELEVATION OF CABINET PRIOR TO INSTALLATION.
22. PROVIDE 120V POWER SHORT THROW PROJECTOR.
23. PROVIDE 120V POWER TO LAV SENSOR LOW VOLTAGE TRANSFORMER FROM EXISTING CIRCUIT POWERING BATHROOM GFCI. CONNECT TO EACH LAV SENSOR WITH 3/4" RACEWAY. (TOTAL OF 4).
24. PROVIDE 120V POWER TO FACP.
25. PROVIDE 120V POWER TO CIRC-PUMP. VERIFY FINAL LOCATION PRIOR TO INSTALL.
26. PROVIDE 40A, 1PH 208V POWER TO WATER HEATER.
27. PROVIDE 20A, 1PH 208V POWER TO INSTANT WATER HEATER.

GENERAL NOTES

1. EXISTING POWER AND DATA RECEPTACLE COVER PLATES THROUGHOUT BUILDING ARE WITHIN SCOPE OF THIS PROJECT REGARDLESS OF THEIR BEING INDICATED ON THESE PLANS AND ARE TO BE REMOVED AND REPLACED WITH NEW STAINLESS STEEL COVER PLATES.
2. ALL DEVICES AND RECEPTACLES SHOWN ON PLANS ARE NEW UNLESS NOTED OTHERWISE.
3. ALL EXISTING RECEPTACLES AND DEVICES NOT SHOWN ON PLANS FALL UNDER THE SCOPE OF THIS PROJECT.
4. EXISTING RECEPTACLES AND DEVICES SHOWN WITHOUT CIRCUITRY TAGS ARE TO REMAIN POWERED BY THEIR EXISTING ELECTRICAL SOURCE. EXISTING RECEPTACLES AND DEVICES SHOWN WITH CIRCUITRY TAGS ARE TO BE RE-FED FROM THE ELECTRICAL SOURCE ANNOTATED.



1 ELECTRICAL POWER PLAN - NEW
SCALE: 1/8" = 1'-0"

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK
JOBCOPY

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-365-9922
MEP Engineering & Technology
LEAF ENGINEERS
1110 Iron Point Rd, Suite 200
Folsom, CA 95630
916.365.9922
LEAFengineers.com

APPROVED
Community Development Department
ELECTRICAL DIVISION
By: Jason Queener
on Jun 18, 2025

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
STEVEN C. MOLLER
E-19817
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: KG CHKED BY: SM

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/31/25
2	OWNER CHANGES	6/23/25

CONSTRUCTION DOCUMENT

POWER FLOOR PLAN - NEW

This document is for plan review only

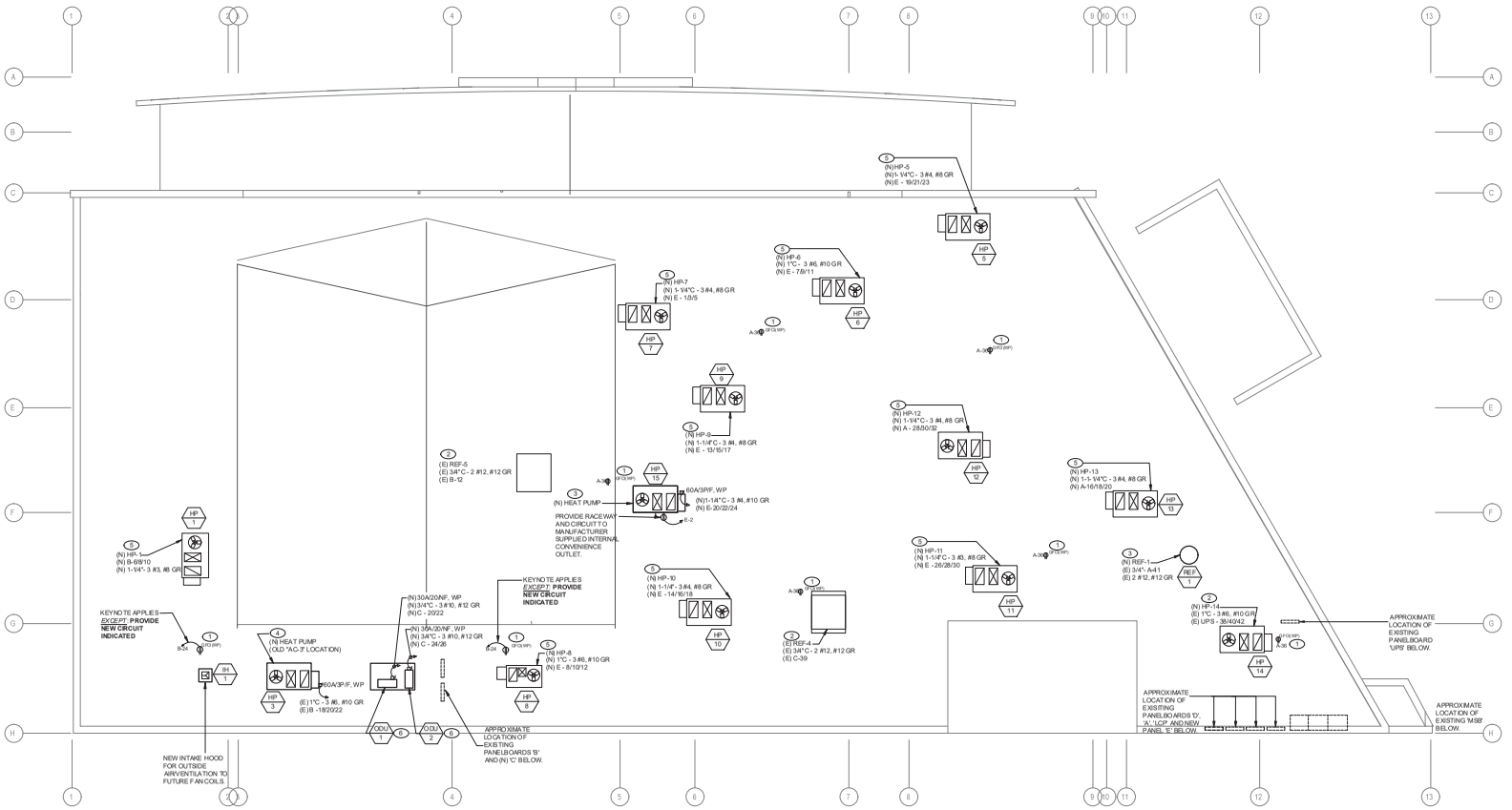
E3.2

COM-2500586

E3.3 NEWEP A.A.
PBKv1.TBK1 2 2019.1033

KEYNOTES

1. INSTALL (N) 20A GFCI SERVICE RECEPTACLE FROM (E) STUB-UP USING (E) CIRCUIT CONDUCTORS. EXTEND CONDUIT AS NEEDED FOR A COMPLETE INSTALLATION.
2. RE-INSTALL (E) DISCONNECT SWITCH AND BRING CONDUCTORS FROM (E) STUB-UP TO DISCONNECT. MAKE ALL LINE AND LOAD TERMINATIONS TO DISCONNECT AND (N) UNIT. EXTEND CONDUIT /CONDUCTORS AS NECESSARY TO COMPLETE INSTALLATION.
3. UTILIZE EXISTING STUB-UP IF AVAILABLE OR COORDINATE WITH MECHANICAL FOR EXACT LOCATION TO PENETRATE ROOF AND INSTALL CONDUIT STUB-UP THROUGH PENETRATION FOR (N) UNIT POWER. BRING (N) CONDUCTORS FROM STUB-UP TO DISCONNECT. MAKE ALL LINE AND LOAD TERMINATIONS TO DISCONNECT AND (N) UNIT. EXTEND CONDUIT/CONDUCTORS AS NECESSARY TO COMPLETE INSTALLATION.
4. INSTALL (N) DISCONNECT SWITCH AND BRING(E) CONDUCTORS FROM (E) STUB-UP TO DISCONNECT. MAKE ALL LINE AND LOAD TERMINATIONS TO DISCONNECT AND (N) UNIT. EXTEND CONDUIT /CONDUCTORS AS NECESSARY TO COMPLETE INSTALLATION.
5. FOR BIDDING PURPOSES, ASSUME TO PROVIDE NEW DISCONNECT AND FUSES PER CEC TO MATCH NEW UNIT'S FEEDER AND CIRCUIT AMPACITY. IF RATING OF (E) DISCONNECT SWITCH AND FUSES IS SUFFICIENT FOR NEW UNIT, RE-INSTALL AND ISSUE CREDIT TO OUST OMER. PROVIDE NEW RACEWAYS AND FEEDER CONDUCTORS TO NEW SOURCE PANEL AND CIRQUITS SHOWN. MAKE LINE AND LOAD CONNECTIONS TO DISCONNECT AND (N) UNIT.
6. PROVIDE POWER TO NEW ODU UNIT.



1 ELECTRICAL ROOF PLAN - NEW
SCALE: 1/8" = 1'-0"

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-365-9922
MEP Engineering & Technology
LEAF ENGINEERS
APPROVED
Community Development Department
ELECTRICAL DIVISION
By: Jason Queener
on Jun 18, 2025
THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1132 DEL PASO BLVD
SACRAMENTO, CA 95815

95% CONSTRUCTION DOCUMENTS

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
STEVEN C. MOSER
E-19817
Exp. 1-31-25
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
20389
DATE 12/16/2024
DRAWN BY: K.C. CHKED BY: S.M.

REVISIONS

#	DESCRIPTION	DATE
1	P/C COMMENTS	05-06-2025
2	OWNER/PBK COMMENTS	05-08-2025

CONSTRUCTION DOCUMENT

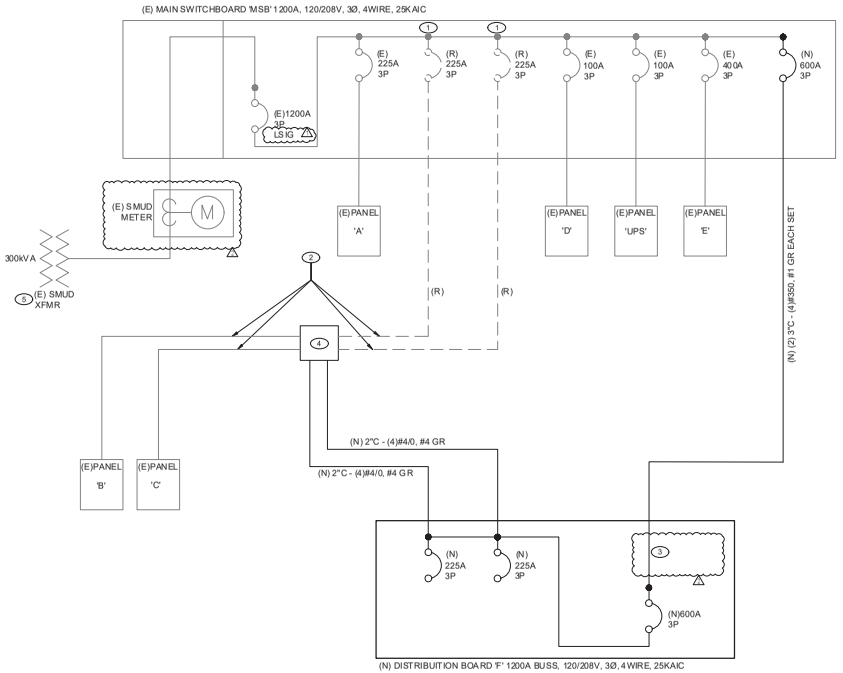
ELECTRICAL
ROOF PLAN - NEW

E3.3

This document is for plan review only
JOBCOPY
1124 DEL PASO BLVD
COM-2500586
Z:\Projects\FOL\2022\20389\3-CDD\drawings\Civil\MEP\TEL_T1
3/4/2025 1:16:39 PM

KEYNOTES

1. REMOVE EXISTING BREAKERS FROM MAIN SWITCHBOARD AND PROVIDE COVER PLATES.
2. INTERCEPT EXISTING FEEDERS AND FEEDER CONDUITS FOR PANELS 'B' AND 'C' FROM 'MSB' AND RECONNECT TO NEW DISTRIBUTION BOARD 'F' VIA NEW 24"X24"X8" PULL CAN. EXTENDING CONDUITS AND CONDUCTORS AS NECESSARY FOR A COMPLETE AND FUNCTIONING INSTALLATION.
3. PROVIDE SPACE IN PANEL FOR FUTURE HOUSE METERING PROVISION.
4. PROVIDE NEW 24"X24"X8" PULL CAN. SPLICE EXISTING FEEDER CONDUCTORS TO NEW FEEDERS FROM DISTRIBUTION BOARD 'F'.
5. CONTRACTOR TO COORDINATE WITH SMUD PRIOR TO PROJECT TO ENSURE EXISTING TRANSFORMER IS ADEQUATE FOR INCREASED LOAD ON THE SERVICE.





1 ONE LINE DIAGRAM
SCALE: NONE

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK
ARCHITECT PBK, INC.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-365-9922
MEP Engineering & Technology
LEAF ENGINEERS
APPROVED
ELECTRICAL DIVISION
By: Jason Queener
on Jun 19, 2025
THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

A
KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
STEVEN C. MOSLEY
E-19817
Exp. 06-30-25
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: KG CHKED BY: SM

REVISIONS

#	DESCRIPTION	DATE
1	PC COMMENTS	05-06-2025
2	OWNER/PBK COMMENTS	05-06-2025

CONSTRUCTION DOCUMENT

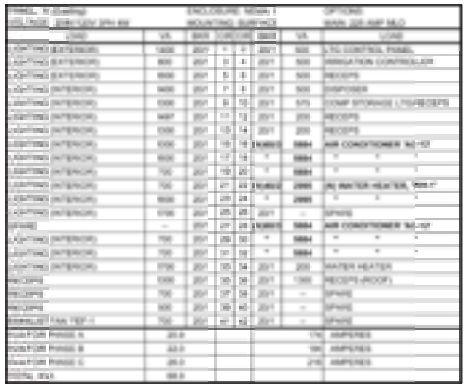
ELECTRICAL SINGLE LINE DIAGRAM

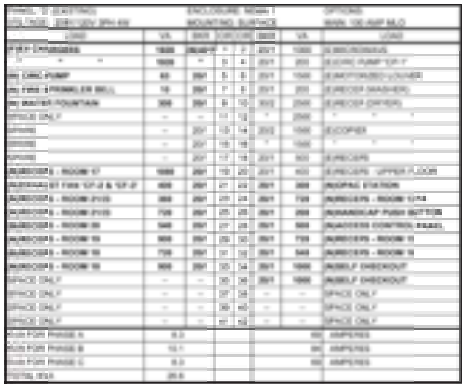
E4.1

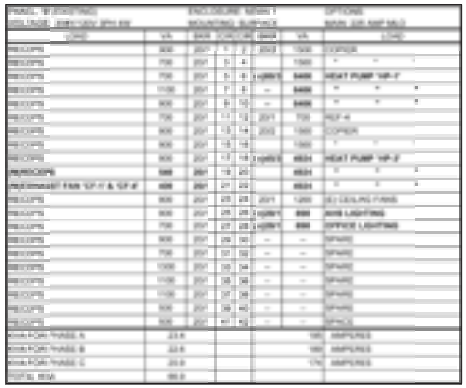
This document is for plan review only

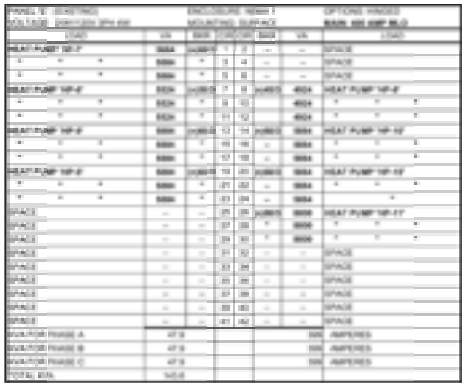
JOBCOPY
1124 DEL PASO BLVD
COM-2500586

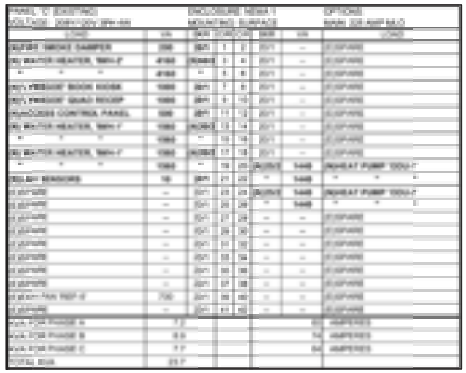
E5.1 SCHEDULES
PBKcaTBvt 2 2019.10.03

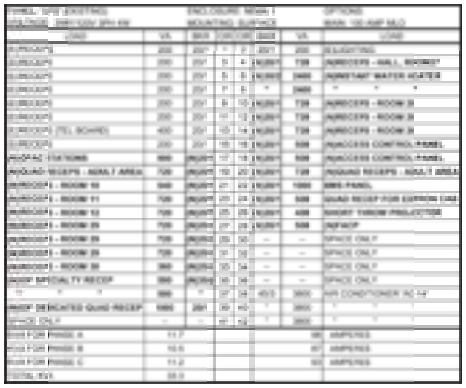












ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK

JOBCOPY

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-355-9922

MEP Engineering & Technology
LEAF ENGINEERS
FOLSOM
1110 Iron Point Rd, Suite 200
Folsom, CA 95630
916.355.9922
LEAF-engineers.com

APPROVED
City of Sacramento Plan Review
ELECTRICAL DIVISION
By: Jason Queener
on Jun 19, 2025

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

SACRAMENTO

1124 DEL PASO BLVD

A

KEY PLAN

PLAN NORTH TRUE NORTH

Architect / Engineer

REGISTERED PROFESSIONAL ENGINEER
STEVEN C. MUSSER
E-19817
Exp. 3-31-26
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO

PROJECT NUMBER
220389

DATE 12/16/2024

DRAWN BY: KG CHKED BY: SM

REVISIONS

#	DESCRIPTION	DATE
1	PC COMMENTS	03-04-2025
2	OWNER PBK COMMENTS	03-04-2025

CONSTRUCTION DOCUMENT

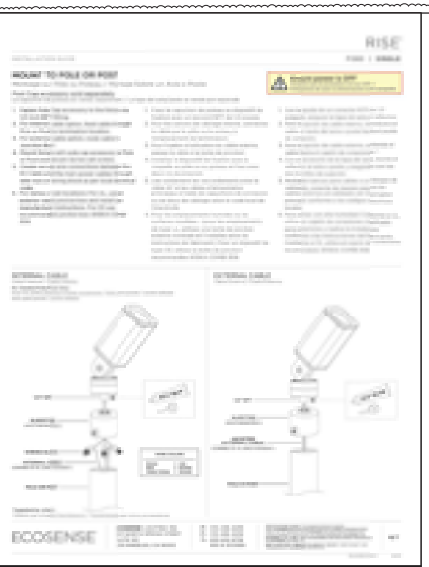
ELECTRICAL PANEL SCHEDULES

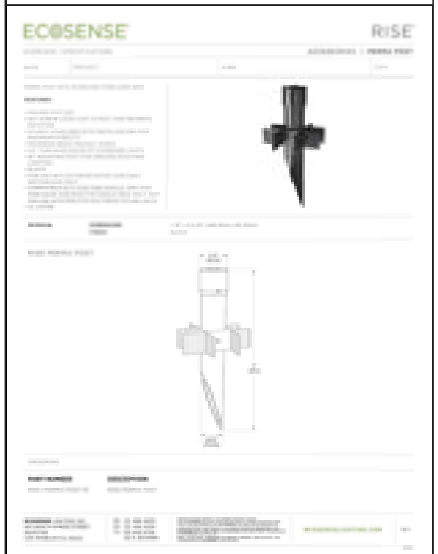
This document is for plan review only

E5.1

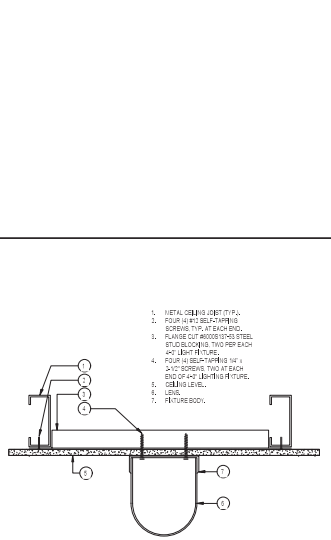
COM-2500586

Z:\Projects\FOL\2022\2203893-CD\Drawings\Cnsl\MEPTE_T1
3/4/2025 1:16:40 PM

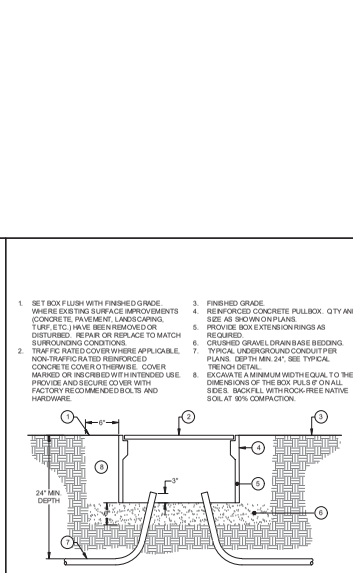




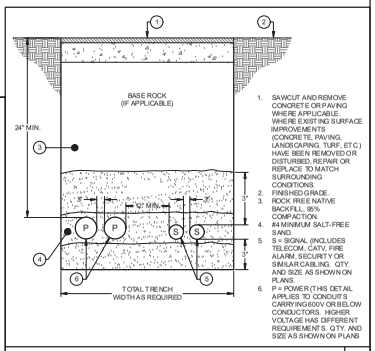
MONUMENT LIGHT FIXTURE MOUNTING DETAIL N.T.S 10



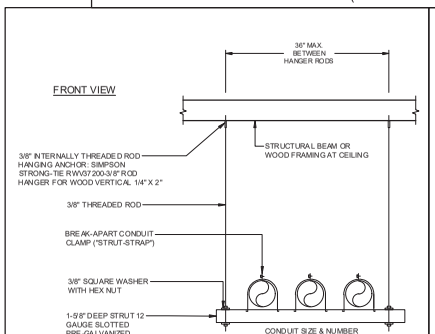
SURFACE MOUNTED CEILING FIXTURE (METAL STUD) N.T.S 8



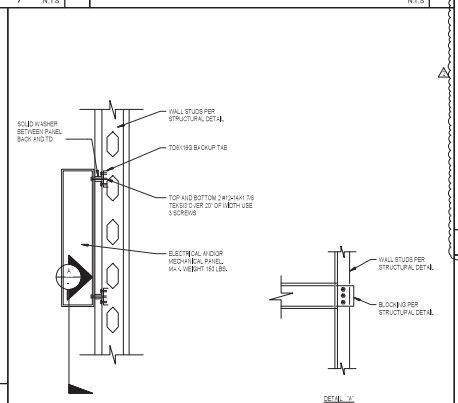
UNDERGROUND PULLBOX DETAIL N.T.S 5



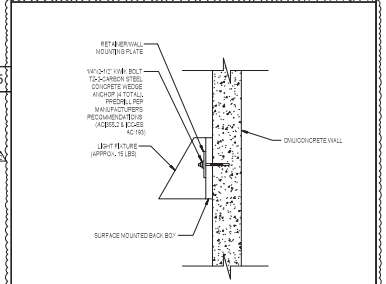
TRENCH DETAIL N.T.S 1



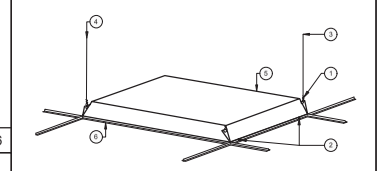
CONDUIT SUPPORT AT CEILING N.T.S 9



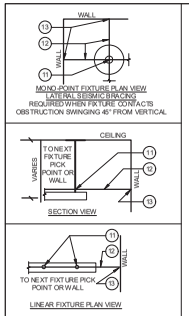
SURFACE MOUNTED PANEL AT METAL FRAMING N.T.S 6

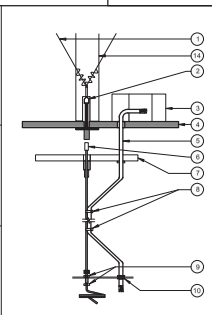


WALL MOUNTED FIXTURE DETAIL N.T.S 2


1. ATTACH WIRE TO FIXTURE (3 TIGHT TURNS MIN. IN 3" MAX.)
2. TEK® SCREW GRID TO FIXTURE @ EACH CORNER ATTACH HANGER.
3. WIRES TO STRUCTURE AS PER ARCHITECTURAL DETAIL.
4. (2) #12 GA. WIRE ATTACHED TO FIXTURE AND STRUCTURE AT TWO CORNERS FOR ATTACHMENT SEE ARCHITECTURAL PLANS.
5. LIGHTING FIXTURE PER DRAWINGS AND SCHEDULE
6. CEILING GRID AS CALLED FOR ON ARCHITECTURAL DRAWINGS.

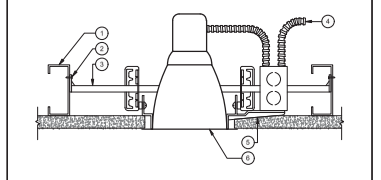
RECESSED LAYING FIXTURE DETAIL N.T.S 3





1. HANGER WIRES:
   - 12GA GALV. HANGER WIRES FROM SUPPORT CLIP TO ROOF STRUCTURE. REFER TO ARCHITECTURAL DETAILS FOR ACCEPTABLE HANGER WIRE CONNECTIONS.
2. SUPPORT CLIP:
   - CADDY "INDEPENDENT SUPPORT CLIP" W/ 1/4-20 STUD. ATTACHES OVER T-BAR RUNNER.
3. J-BOX:
   - LIGHTING CIRCUIT J-BOX (AT POWER FEED END OF FIXTURE ONLY).
4. ACOUSTIC CEILING TILE:
   - INSTALLED INT-BAR GRID SYSTEM. SEE ARCH. PLANS.
5. POWER FEED:
   - WHITE SO CORD, 18/3 OR 18/4, AS REQUIRED.
6. AIRCRAFT CABLE:
   - 3/32" STAINLESS STEEL AIRCRAFT CABLE W/ BARREL TERMINAL AT ONE END.
7. CANOPY:
   - 1/4" INTERNAL THREAD CEILING COUPLER, AND BARREL TERMINAL CAPTURE, BY MANUFACTURER.
8. ZIP TIE:
   - NEATLY ZIP TIE POWER FEED TO AIRCRAFT CABLE AT 6" CENTERS W/ WHITE ZIP TIES.
9. GRIPPER:
   - UL LISTED AIRCRAFT CABLE GRIPPER W/ KNURLED LOCK NUT. 1/4-20" THREADED BODY & NUT ATTACHES TO FIXTURE.
10. STRAIN RELIEF:
    - STRAIN RELIEF BUSHING AT FIXTURE.
11. 2-CABLE CLAMP:
    - SECURE TO EACH HANGER CABLE WITHIN 4" OF FIXTURE ATTACHMENT POINT.
12. LATERAL BRACING CABLE:
    - 3/32" STAINLESS STEEL AIRCRAFT CABLE INSTALLED LONGITUDINALLY ACROSS FIXTURE TO PREVENT SWAYING.
13. WALL ANCHOR:
    - CABLE COUPLER ANCHOR (GRIPLOCK #DG-CC-A/PL T-6AT) SECURED WITH (2) #12 SMS THRU WALL FRAMING/BLOCKING (PER 3/S0-4D) AT EACH END OF FIXTURE.
14. COMPRESSION STRUT:
    - PROVIDE COMPRESSION STRUT AND (4) SPLAY WIRES THROUGH MAIN RUNNER WITHIN 6" OF EACH SUPPORT CLIP. SUPPORT CLIPS TO BE SPACED MAX. 8' O.C. & WITHIN 6" OF EACH END. SEE ARCH. DETAILS FOR INSTALLATION REQUIREMENTS.

PENDANT FIXTURE MOUNTING DETAIL N.T.S 7



DOWNLIGHT IN HARD CEILING N.T.S 4

ISSUED BY
By: Saul Moran
on Jul 10, 2025
This set of plans and specifications must be kept on the job or address and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.
APPROVED
By: Jason Queener
on Jun 19, 2025
THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

PBK
ARCHITECT PBK, INC.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-365-9922
MEP Engineering & Technology
LEAF ENGINEERS
Architect / Engineer

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN
PLAN NORTH
TRUE NORTH

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: KG CHKED BY: SM

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/31/25
2	OWNER CHANGES	6/23/25

CONSTRUCTION DOCUMENT

ELECTRICAL DETAILS

E6.1

This document is for plan review only

T0.01 TECHNOLOGY SHEET INDEX, NOTES & LEGEND
PBKx TSHT 2019.1003

SECURITY SYSTEMS LEGEND

GROUP	SYMBOL	DESCRIPTION
DEVICES		WALL MOUNTED MOTION DETECTOR INSTALLED AT 12' A.F.F. UNLESS OTHERWISE NOTED. PROVIDE SINGLE GANG BACK BOX WITH (1) 3/4" CONDUIT STUBBED OUT ABOVE NEAREST ACCESSIBLE CEILING WITH PULL STRING.
		360 DEGREE CEILING MOUNTED MOTION DETECTOR.
		INTRUSION DETECTION SYSTEM ARM/DISARM KEYPAD WITH LOCKING VANDAL RESISTANT COVER.
	IDSN	INTRUSION DETECTION CONTROL PANELS MOUNTED ON WALL. ELECTRICAL CONTRACTOR TO PROVIDE 120V. POWER TO PANEL. PROVIDE (1) TELEPHONE LINE AND (1) NETWORK CABLE TO PANEL. COORDINATE WITH DISTRICT TECHNOLOGY DEPARTMENT ON ACTIVATING VOICE LINE AND ACQUIRING AN IP ADDRESS.
	ACP	ACCESS CONTROL PANEL
	CR	ACCESS CONTROL PROXIMITY CARD READER. MOUNT AT 42" A.F.F. PROVIDE ALTRONIX LPD FOR EACH CARD READER.
	DC	DOOR CONTACT. PROVIDE SURFACE MOUNT CONTACT ON ROLL-UP DOORS. PROVIDE DOOR CONTACT ON ALL ROOF HATCHES.
		WALL MOUNTED GLASS BREAK DETECTOR. MOUNT AT 12'-0" A.F.F.

NOTE:
1. EVERY SYMBOL SHOWN ON LEGEND MAY NOT APPEAR ON DRAWINGS. REFER TO GENERAL ELECTRICAL NOTES FOR WALL-MOUNTED DEVICE MOUNTING HEIGHTS.
2. REFERENCE SPECIFICATIONS FOR MATERIALS AND METHODS.
3. COMPLETE INSTALLATION OF ALL PRODUCTS SHALL BE IN COMPLIANCE WITH ALL CODES, INDUSTRY STANDARDS, COMMON PRACTICES AND MANUFACTURER'S INSTRUCTIONS.

SECURITY GENERAL NOTES

1. ALL 120V POWER REQUIRED FOR THE FUNCTIONALITY OF THE ACCESS CONTROL, BURGLAR ALARM, AND SECURITY CAMERA SYSTEMS SHALL BE A DEDICATED CIRCUIT AND ON EMERGENCY POWER WHEN AVAILABLE. SECURITY CONTRACTOR SHALL COORDINATE ALL 120V POWER REQUIREMENTS AND LOCATIONS WITH ELECTRICAL CONTRACTOR FOR ALL EQUIPMENT AND REMOTE POWER SUPPLIES (TYPICAL)
2. A DOOR CONTACT POSITION SENSOR IS REQUIRED AT ALL ROOF HATCHES (TYPICAL).
3. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY CONDUIT, SLEEVES, AND PROTECTIVE BUSHINGS REQUIRED TO INSTALL COMPLETE SECURITY SYSTEM. PROVIDE ALL CONDUITS REQUIRED AT EXTERIOR DOORS ANNOTATED WITH DOOR CONTACTS OR CARD READERS TO ALLOW FOR INSTALLATION OF DOOR CONTACT POSITION SENSORS AND CARD READERS.
4. SECURITY CONTRACTOR IS RESPONSIBLE FOR CONNECTING SYSTEM TO DISTRICT'S REMOTE MONITORING SERVICE.
5. ALL EXPOSED SECURITY SYSTEMS WIRING OR WIRING ROUTING ACROSS NON ACCESSIBLE CEILINGS SHALL BE ROUTED IN CONDUIT. SIZE CONDUIT AS REQUIRED TO ROUTE SYSTEMS WITH 40% CABLE FILL RATIO. MINIMUM CONDUIT SIZE SHALL BE 3/4"
6. PROVIDE PROTECTIVE COVER FOR ALL DEVICES IN GYMNASIUM AREAS.
7. ENSURE ALL EXTERIOR WALL PENETRATIONS ARE PROPERLY SEALED TO PREVENT ELEMENTS FROM ENTERING BUILDING.
8. NO CONDUITS OR SEAL-TITE SHALL BE INSTALLED ON THE EXTERIOR OF THE BUILDING.
9. ALL LOW VOLTAGE CABLING SHALL BE INDIVIDUALLY ROUTED TO HEAD END POINT AND SUPPORTED IN PROPER CABLE SUPPORT SYSTEM FOR ENTIRE LENGTH OF RUN.
10. ALL EXTERIOR CAMERAS SHALL BE MOUNTED 12' ABOVE FINISHED GRADE UNLESS OTHERWISE INDICATED.
11. ALL CONDUIT STUB OUTS AND SLEEVES SHALL HAVE PROTECTIVE BUSHINGS TO PREVENT CABLE DAMAGE. BUSHING TO BE INSTALLED PRIOR TO CABLE INSTALLATION. CUTTING BUSHING AND INSTALLING AFTER CABLE IS INSTALLED WILL NOT BE ACCEPTED.
12. CONTRACTOR SHALL CONNECT FREEZER/COOLER SENSORS TO INTRUSION DETECTION HEAD-END FOR EVENT DETECTION. PROVIDE ALL REQUIRED MODULES TO INTERFACE SENSORS.
13. CONTRACTOR SHALL PROVIDE ALL VIDEO SURVEILLANCE CAMERA MOUNTS AND MOUNTING HARDWARE. COORDINATE WITH OWNER FOR FINAL INSTALLATION LOCATION PRIOR TO ROUGH-IN. PROVIDE CAMERA FIELD OF VIEW ADJUSTMENTS. COORDINATE WITH OWNER.
14. CONTRACTOR SHALL INTEGRATE THE INSTRUSION DETECTION SYSTEM WITH THE ACCESS CONTROL SYSTEM TO PROVIDE THE FUNCTIONALITY OF THE BURGLAR ALARM BEING DISARMED ON AN AUTHORIZED CARD SWIPE AT ANY CARD READER.
15. CONTRACTOR SHALL INTEGRATE THE ACCESS CONTROL, INTRUSION DETECTION AND VIDEO SURVEILLANCE SYSTEMS. PROVIDE ALL REQUIRED MODULES, CABLING AND LICENSES.
16. PROVIDE MOUNTING SUPPORT FROM GRID OR BUILDING STRUCTURE FOR ALL DEVICES INSTALLED IN LAY-IN CEILING TILE.
17. ALL 120V POWER FOR THE SYSTEMS SHALL BE INSTALLED WITHIN THE ENCLOSURE OR INSTALLED IN CONDUIT CONNECTED TO THE ENCLOSURE SO THAT NO CABLING IS EXPOSED. MC CABLE, ROMEX, SO CABLES OR OTHER METHODS ARE NOT ACCEPTABLE.

TECHNOLOGY PLAN GENERAL NOTES

1. ALL 120V POWER REQUIRED FOR THE FUNCTIONALITY OF THE TELECOMMUNICATION, NETWORK, AUDIO/VIDEO, SECURITY AND FIRE ALARM EQUIPMENT SHALL BE A DEDICATED CIRCUIT AND ON EMERGENCY POWER WHERE POSSIBLE. CONTRACTOR SHALL COORDINATE AND INSTALL ALL 120V POWER REQUIREMENTS AND LOCATIONS AS REQUIRED FOR ALL EQUIPMENT (TYPICAL).
2. CONTRACTOR SHALL COORDINATE WITH THE TECHNOLOGY CONSULTANT PRIOR TO THE INSTALLATION OF RACKS AND RACK EQUIPMENT. NO RACKS SHALL BE PERMANENTLY INSTALLED WITHOUT WRITTEN APPROVAL OF THE TECHNOLOGY CONSULTANT.
3. THE PROJECT'S ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONDUITS, PULL STRINGS, BACK BOXES AND SLEEVES REQUIRED FOR DEVICES AND PATHWAYS SHOWN ON THE FLOOR PLANS AND DETAIL SHEETS. ANY ADDITIONAL CONDUITS, SLEEVES, AND RACEWAY REQUIREMENTS FOR EACH SYSTEM SHALL BE THE RESPONSIBILITY OF EACH SYSTEM INSTALLER.
4. THE SELECTED, INSTALLING CONTRACTOR MUST BE A CERTIFIED INTEGRATOR/INSTALLER AUTHORIZED BY THE SPECIFIED SYSTEM MANUFACTURER TO INSTALL THE CABLE PLANT AND CONNECTIVITY PRODUCTS. REFER TO SPECIFICATIONS FOR PRODUCT TYPE AND DESCRIPTION.
5. SYSTEM WIRING AND EQUIPMENT INSTALLATION SHALL BE IN ACCORDANCE WITH ENGINEERING BEST PRACTICES AS ESTABLISHED BY ANSI/EIA/TIA, BICSI, AND THE NEC.
6. ALL WIRING SHALL MEET ALL STATE AND LOCAL ELECTRICAL CODES.
7. ALL TELECOMMUNICATIONS SYSTEMS EQUIPMENT AND MOUNTING LOCATIONS SHALL BE IN COMPLIANCE WITH ADA ACCESSIBILITY STANDARDS.
8. ALL DATA CABLES ARE TO BE INSTALLED WITH A MINIMUM OF 12 INCHES OF SEPARATION FROM AC POWER CABLES AND ALL OTHER LOW VOLTAGE CABLING IN ANY PARALLEL OPEN WIRE RUN.
9. ALWAYS CROSS OTHER SYSTEM CABLES AT A 90 DEGREE ANGLE.
10. ALL CABLES AND TERMINATION COMPONENTS SHALL BE MACHINE LABELED AT BOTH ENDS. LABEL ALL CABLES PER THE TECHNOLOGY DRAWINGS AND/OR SPECIFICATIONS. FINAL CABLE/OUTLET IDENTIFICATION LABELS SHALL BE COORDINATED WITH THE OWNER AND CONSULTANT.
11. CONTRACTOR TO PROVIDE LIGHTNING PROTECTION ON ALL COMMUNICATION CABLE BETWEEN BUILDINGS AND EXTERIOR MOUNTED DEVICES.
12. ALL EXPOSED CABLING ROUTED IN PLENUM SHALL BE PLENUM-RATED. ALL NON PLENUM-RATED CABLING INSTALLED IN PLENUM SPACES SHALL BE INSTALLED IN CONDUIT.
13. NO TERMINATION OR SPLICES SHALL BE INSTALLED IN OR ABOVE CEILINGS UNLESS NOTED OTHERWISE.
14. CONTRACTOR SHALL MAINTAIN WALL RATING WITH PROPER FIRE BLOCKING METHODS.
15. CONTRACTOR SHALL ROUTE ALL LOW VOLTAGE CABLING DOWN CORRIDORS AND PERPENDICULAR OR PARALLEL TO BUILDING WALLS. ENTER INTO ALL ROOMS FROM THE CORRIDOR ABOVE THE MAIN DOORWAY.
16. ALL COMMUNICATION CABLE INSTALLED SHALL ROUTE TO THE CENTER OF THE ROOM IN WHICH IT SERVES AND THEN TO THE OUTLET LOCATION IT IS INTENDED FOR. EACH CABLE SHALL HAVE A 10' SERVICE LOOP AT THE CENTER OF EACH ROOM AND A 3' SERVICE LOOP ABOVE EACH OUTLET LOCATION.
17. THE SYSTEM INSTALLER SHALL PROPERLY SUPPORT ALL INSTALLED SYSTEM CABLING FROM A PANDUIT J-MOD CABLE SUPPORT SYSTEM OR OTHER SUPPORT SYSTEM AS DETAILED IN SPECIFICATIONS. NO CABLING SHALL BE ROUTED AND TIED DIRECTLY TO BUILDING STEEL, CEILING GRID SUPPORT, CONDUIT, PIPING, OR DUCTWORK. CABLING SUPPORT SYSTEM SHALL BE DIRECTLY CONNECTED TO THE BUILDING'S STEEL JOIST. IN LOCATIONS WHERE THE BOTTOM OF THE JOIST IS MORE THAN 5' ABOVE THE CEILING, THE SYSTEM INSTALLER SHALL PROVIDE AND INSTALL THREADED ROD AND ALL REQUIRED MATERIALS TO CONNECT THE THREADED ROD TO THE BUILDING STEEL AND THE CABLE SUPPORT SYSTEM TO THE THREADED ROD. CABLE PATHWAY SHALL NOT BE HIGHER THAN 5' ABOVE THE CEILING IN ANY LOCATION.
18. CONTRACTOR SHALL PROVIDE TWO (2) CAT6/6A CABLES ROUTED TO THE FIRE ALARM CONTROL PANEL. CONTRACTOR TO COORDINATE WITH THE SYSTEM INSTALLER FOR EXACT LOCATIONS AND TERMINATION INSTRUCTIONS PRIOR TO INSTALLATION.
19. ALL EXPOSED CABLING OR CABLING ROUTING ACROSS NON-ACCESSIBLE CEILINGS SHALL BE INSTALLED IN CONDUIT. CONDUIT SHALL BE PROPERLY SIZED TO MAINTAIN THE 40% FILL RATIO
20. ALL CONDUIT STUB OUTS AND SLEEVES SHALL HAVE PROTECTIVE BUSHINGS TO PREVENT CABLE DAMAGE. BUSHING TO BE INSTALLED PRIOR TO CABLE INSTALLATION. CUTTING BUSHING AND INSTALLING AFTER CABLE IS INSTALLED WILL NOT BE ACCEPTED. CONTRACTOR TO MAINTAIN A 40% MAXIMUM FILL RATION ON ALL SLEEVES INSTALLED.
21. CONTRACTOR SHALL PROVIDE TWO (2) CAT6/6A CABLES TO THE ACCESS CONTROL HEAD-END. CONTRACTOR TO COORDINATE WITH THE SYSTEM INSTALLER FOR EXACT LOCATIONS AND TERMINATION INSTRUCTIONS PRIOR TO INSTALLATION.
22. CONTRACTOR TO PROVIDE TWO (2) CAT6/6A CABLES TO THE BUILDING AUTOMATION SYSTEM AT EACH BAS HEAD-END LOCATION. CONTRACTOR TO COORDINATE WITH THE SYSTEM INSTALLER FOR EXACT LOCATIONS AND TERMINATION INSTRUCTIONS PRIOR TO INSTALLATION.
23. CONTRACTOR TO PROVIDE TWO (2) CAT6/6A CABLES TO THE AREA OF REFUGE SYSTEM. CONTRACTOR TO COORDINATE WITH THE SYSTEM INSTALLER FOR EXACT LOCATIONS AND TERMINATION INSTRUCTIONS PRIOR TO INSTALLATION.
24. CONTRACTOR SHALL PROVIDE (1) CAT6/6A CABLE FOR EACH IP CAMERA AND IP SPEAKER ROUTED TO NEAREST IDF. COORDINATE WITH OTHER TRADES.
25. CONTRACTOR SHALL PROVIDE (2) CAT6/6A CABLES ROUTED TO THE ELEVATOR FOR THE FIRE-FIGHTER TELEPHONE.
26. CONTRACTOR SHALL PROVIDE (2) CAT6/6A CABLES ROUTED TO THE ELEVATOR FOR THE FIRE-FIGHTER TELEPHONE.
27. CONTRACTOR SHALL PROVIDE (1) CAT6/6A CABLE TO THE INTRUSION DETECTION SYSTEM HEAD-END

AUDIO & VIDEO GENERAL NOTES

1. ALL 120V POWER REQUIRED FOR THE FUNCTIONALITY OF EACH SYSTEM SHALL BE A DEDICATED CIRCUIT. THE INSTALLING CONTRACTOR'S LICENSED ELECTRICAL SUBCONTRACTOR SHALL COORDINATE ELECTRICAL PANEL LOCATIONS AND AVAILABLE DEDICATED FOR THE CONTRACTOR'S SYSTEM REQUIREMENTS (TYPICAL). ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL POWER TO MAIN CONTROL PANELS AND ALL HEAD END EQUIPMENT.
2. THE PROJECT'S ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL IN WALL CONDUITS, BELOW GRADE CONDUITS, BELOW SLAB CONDUITS, CONDUITS ACROSS OPEN AREAS, BACK BOXES, SLEEVES AND PULL STRING REQUIRED FOR DEVICES AND PATHWAYS SHOWN ON THE FLOOR PLANS AND DETAIL SHEETS. ANY ADDITIONAL CONDUITS, SLEEVES, AND RACEWAY REQUIREMENTS FOR EACH SYSTEM SHALL BE THE RESPONSIBILITY OF EACH SYSTEM INSTALLER.
3. ALL EXPOSED WIRING OR WIRING ROUTING ACROSS NON ACCESSIBLE CEILINGS SHALL BE ROUTED IN CONDUIT. SIZE CONDUIT AS REQUIRED TO ROUTE SYSTEMS WITH 40% CABLE FILL RATIO. MINIMUM CONDUIT SIZE SHALL BE 3/4".
4. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING ALL EXTERIOR WALL PENETRATIONS ARE PROPERLY SEALED TO PREVENT ELEMENTS FROM ENTERING BUILDING.
5. NO CONDUITS OR SEAL-TITE SHALL BE INSTALLED ON THE EXTERIOR OF THE BUILDING.
6. ALL CONDUIT STUB OUTS AND SLEEVES SHALL HAVE PROTECTIVE BUSHINGS TO PREVENT CABLE DAMAGE. BUSHING TO BE INSTALLED PRIOR TO CABLE INSTALLATION. CUTTING BUSHING AND INSTALLING AFTER CABLE IS INSTALLED WILL NOT BE ACCEPTED. CONTRACTOR TO MAINTAIN A 40% MAXIMUM FILL RATION ON ALL SLEEVES INSTALLED.
7. ALL CABLE SHALL BE ROUTED DOWN CORRIDORS, PARALLEL AND PERPENDICULAR TO THE BUILDING WALLS AND STRUCTURE. CABLE TO EACH DEVICE SHALL BRANCH OFF OF A MAIN CORRIDOR TRUNK. ROUTING CABLES THROUGH CLASSROOMS, OFFICES, STORAGE ROOMS, RESTROOMS OR ANY TYPE OF ROOM OTHER THAN A CORRIDOR WILL NOT BE ACCEPTED. ENTER ALL ROOMS ABOVE THE ASSOCIATED ROOM DOORWAY.
8. THE SYSTEM INSTALLER SHALL PROPERLY SUPPORT ALL INSTALLED SYSTEM CABLING FROM A PANDUIT J-MOD CABLE SUPPORT SYSTEM OR OTHER SUPPORT SYSTEM AS DETAILED IN SPECIFICATIONS. NO CABLING SHALL BE ROUTED AND TIED DIRECTLY TO BUILDING STEEL, CEILING GRID SUPPORT, CONDUIT, PIPING, OR DUCTWORK. THE CABLE SUPPORT SYSTEM SHALL BE DIRECTLY CONNECTED TO THE BUILDING'S STEEL JOIST, AT LOCATIONS WHERE THE BOTTOM OF THE JOIST IS MORE THAN 5' ABOVE THE CEILING, THE SYSTEM INSTALLER SHALL PROVIDE AND INSTALL THREADED ROD AND ALL REQUIRED MATERIALS TO CONNECT THE THREADED ROD TO THE BUILDING STEEL AND THE CABLE SUPPORT SYSTEM TO THE THREADED ROD. CABLE PATHWAY SHALL NOT BE HIGHER THAN 5' ABOVE THE CEILING AT ANY LOCATIONS.
9. ALL EXTERIOR AND WALL MOUNTED SPEAKERS SHALL BE MOUNTED AT 10'-0" UNLESS OTHERWISE NOTED.
10. EXTERIOR SPEAKERS SHALL BE ON A SEPARATE LOW VOLTAGE CIRCUIT FROM INTERIOR SPEAKERS.
11. A/V CONTRACTOR SHALL COORDINATE ALL MOUNTING LOCATIONS OF ALL A/V DEVICES TO PROVIDE EVEN AND BALANCED AUDIO COVERAGE OF INTENDED LISTENING AREAS AND UNOBSTRUCTED, SQUARE AND PLUMB VIDEO IMAGE DISPLAYS.
12. ALL LAY-IN CEILING MOUNTED SPEAKERS AND DEVICES SHALL BE INSTALLED UTILIZING A TILE BRIDGE SUPPORT SYSTEM. AT NO POINT SHOULD THE WEIGHT OF A CEILING MOUNTED DEVICE BE SUPPORTED BY A CEILING TILE ALONE.
13. A/V CONTRACTOR TO COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL CONDUIT AND BACK BOX REQUIREMENTS.
14. A/V CONTRACTOR TO COORDINATE WITH ALL OTHER TRADES WITH REGARD TO BLOCKING AND PROPER SUPPORT OF ALL A/V DEVICES.
15. PROVIDE MOUNTING SUPPORT FROM GRID OR BUILDING STRUCTURE FOR ALL DEVICES INSTALLED IN LAY-IN CEILING TILE.

TECHNOLOGY LEGEND

GROUP	SYMBOL	DESCRIPTION
DEVICES		INDICATES THE LOCATION OF A NEW TECHNOLOGY OUTLET. CONTRACTOR TO PROVIDE FACEPLATE WITH A MINIMUM OF 4-PORTS AT EACH LOCATION UNLESS OTHERWISE NOTED. PROVIDE BLANK COVERS ON UNUSED PORTS. ELECTRICAL CONTRACTOR TO PROVIDE A DOUBLE GANG BACK BOX WITH A SINGLE GANG REDUCER RING AND A 1" CONDUIT FROM THE BOX TO THE NEAREST ACCESSIBLE CEILING. D# INDICATES NUMBER OF CAT6/6A CABLES INSTALLED AT THIS LOCATION.
		INDICATES THE LOCATION OF A CEILING MOUNTED OUTLET. CONTRACTOR SHALL MOUNT THIS OUTLET AT +12" ABOVE THE CEILING AND COORDINATE ALL FINAL LOCATIONS WITH OTHER TRADES ON THE PROJECT TO VERIFY THAT THE LOCATION OF THE OUTLET MAINTAINS 12" OF CLEARANCE FROM THE FRONT OF THE FACEPLATE FOR OWNER ACCESS. ROUTE (1) 1" CONDUIT FROM THE BUILDING STRUCTURE TO A SINGLE GANG BACK BOX MOUNTED AT 5' OR LESS ABOVE THE FINISHED CEILING. SECURE CONDUIT AND BACK BOX TO INSURE MINIMAL SWAY MOVEMENT. D# INDICATES NUMBER OF CAT6/6A CABLES INSTALLED AT THIS LOCATION.
		INDICATES THE LOCATION OF A FLOOR MOUNTED OUTLET. CONTRACTOR TO PROVIDE AND INSTALL (2) 1-1/2" CONDUITS FROM BOX TO NEAREST ACCESSIBLE CEILING. D# INDICATES NUMBER OF CAT6/6A CABLES INSTALLED AT THIS LOCATION.
	WP	INDICATES WIRELESS ACCESS POINT CONNECTION. CONTRACTOR SHALL PROVIDE AND INSTALL (1) CAT6/6A CABLES ROUTED TO NEAREST IDF. PROVIDE BOX AND CONDUIT AS NOTED FOR CEILING MOUNTED OUTLETS. PROVIDE (1) 15' PLENUM PATCH CABLE FOR EACH LOCATION INSTALLED. PROVIDE 10' SERVICE LOOP UPSTREAM OF TERMINATION POINT. WALL MOUNTED DEVICES SHALL BE INSTALLED AT 10' A.F.F.
		INDICATES INTERCOM SPEAKER, FLUSH MOUNTED IN CEILING. VERIFY WITH INTERCOM CONTRACTOR WHETHER SPEAKERS ARE IP SPEAKERS. IF SO, PROVIDE (1) CAT6/6A DATA CABLE ROUTED TO NEAREST IDF EXCEPT AS NOTED: ALL CORRIDOR, PUBLIC SPACE AND EXTERIOR SPEAKERS ARE CONVENTIONAL 25VOLT AND DO NOT REQUIRE A DATA DROP. COORDINATE WITH INTERCOM CONTRACTOR PRIOR TO CABLING.
		INDICATES WALL MOUNTED INTERCOM SPEAKER. VERIFY WITH INTERCOM CONTRACTOR WHETHER SPEAKERS ARE IP SPEAKERS. IF SO, PROVIDE (1) CA T6/6A DATA CABLE ROUTED TO NEAREST IDF EXCEPT AS NOTED: ALL CORRIDOR, PUBLIC SPACE AND EXTERIOR SPEAKERS ARE CONVENTIONAL 25VOLT AND DO NOT REQUIRE A DATA DROP. COORDINATE WITH INTERCOM CONTRACTOR PRIOR TO CABLING
		INDICATES WALL MOUNTED CLOCK. VERIFY WITH INTERCOM CONTRACTOR WHETHER CLOCKS ARE IP. IF SO, PROVIDE (1) CAT6 DATA CABLE ROUTED TO NEAREST IDF. INCLUDES DOUBLE FACE CLOCKS.
		INDICATES WALL MOUNTED 6.5" SPEAKER. CONTRACTOR SHALL ROUTE A (1) 1" CONDUIT WITH A DEDICATED ELECTRICAL CIRCUIT TO THE WALLVAULT ENCLOSURE.
		INDICATES WALL MOUNTED ASSISTED LISTENING ANTENNA. CONTRACTOR ROUTE A (1) 1" CONDUIT TO THE WALLVAULT ENCLOSURE. CONTRACTOR SHALL INSTALL AT EXISTING SWITCH HEIGHT.
	HDMI	INDICATES WALL MOUNTED WALLVAULT ENCLOSURE. CONTRACTOR SHALL ROUTE A CAT6 CABLE TO THE NEAREST IDF/MDF ROOM.
	HDMI	INDICATES WALL MOUNTED HDMI PLATE. CONTRACTOR SHALL INSTALL AT 18" OR MATCH EXISTING ELECTRICAL OUTLET. CONTRACTOR SHALL ROUTE (1) 1" CONDUIT TO THE WALLVAULT ENCLOSURE
		INDICATES WALL MOUNTED CONTROL PANEL. CONTRACTOR SHALL ROUTE (1) 1" CONDUIT TO THE WALLVAULT ENCLOSURE. CONTRACTOR SHALL INSTALL AT EXISTING SWITCH HEIGHT.
	WAVE	INDICATES WALL MOUNTED WIRELESS VIDEO PROJECTOR. CONTRACTOR SHALL INSTALL A BACK BOX AND ROUTE (1) 1" CONDUIT TO THE WALLVAULT ENCLOSURE.
		INDICATES THE LOCATION OF AN INTERIOR/EXTERIOR VIDEO SURVEILLANCE CAMERA (90 DEGREE LENS). ALL CAMERAS SHALL POE IP BASED CAMERAS UNLESS NOTED OTHERWISE. CABLING CONTRACTOR SHALL PROVIDE AND INSTALL (1) CATEGORY CABLE TO EACH LOCATION SHOWN. WIRED BACK TO THE NEAREST MDF/IDF. ALL CEILING MOUNTED CAMERAS SHALL BE FLUSH MOUNTED.
		INDICATES THE LOCATION OF AN INTERIOR/EXTERIOR VIDEO SURVEILLANCE CAMERA (180 DEGREE LENS). ALL CAMERAS SHALL POE IP BASED CAMERAS UNLESS NOTED OTHERWISE. CABLING CONTRACTOR SHALL PROVIDE AND INSTALL (1) CATEGORY CABLE TO EACH LOCATION SHOWN. WIRED BACK TO THE NEAREST MDF/IDF. ALL CEILING MOUNTED CAMERAS SHALL BE FLUSH MOUNTED.
		PROVIDE OUTDOOR SECURITY CAMERA (OPCI). (360 DEG LENS). PROVIDE AND INSTALL ADATA OUTLET IN A 3S BACKBOX WITH A SINGLE-GANG PLASTER RING. INSTALL A (1) 1" EMT CONDUIT FROM BACKBOX TO ACCESSIBLE CEILING SPACE WITH (1) CAT6A CABLES. THEN RUN CAT6A CABLE IN ACCESSIBLE CEILING SPACE USING J-HOOKS TO THE CABLE TRAY AND THEN TO IDF CABINET SERVING THIS AREA. PROVIDE RJ45 JACK AND PATCH CORD WITH TERMINATION FOR A COMPLETE WORKING SYSTEM. PROVIDE SEALANT TO WALL OPENING/PENETRATION AS REQUIRED TO PREVENT WATER INFILTRATION. ALL OUTDOOR CAMERAS SHALL BE 12'-0" A.F.G. REFER TO SPECIFICATIONS FOR ADDITIONAL DETAILS.

NOTE:
1. EVERY SYMBOL SHOWN ON LEGEND MAY NOT APPEAR ON DRAWINGS. REFER TO GENERAL ELECTRICAL NOTES FOR WALL-MOUNTED DEVICE MOUNTING HEIGHTS.
2. REFERENCE SPECIFICATIONS FOR MATERIALS AND METHODS.
3. COMPLETE INSTALLATION OF ALL PRODUCTS SHALL BE IN COMPLIANCE WITH ALL CODES, INDUSTRY STANDARDS, COMMON PRACTICES AND MANUFACTURER'S INSTRUCTIONS.
4. ALL CONDUIT STUB-OUTS SHALL BE EQUIPPED WITH A PLASTIC PROTECTIVE BUSHING TO PREVENT CABLE DAMAGE.

SHEET INDEX

T0.01	TECHNOLOGY SHEET INDEX, NOTES & LEGEND
T2.01	TECHNOLOGY DEMOLITION FLOOR PLAN
T2.02	TECHNOLOGY NEW FLOOR PLAN
T6.01	TECHNOLOGY DETAILS

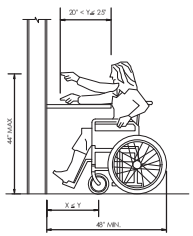
TECHNOLOGY SCOPE OF WORK

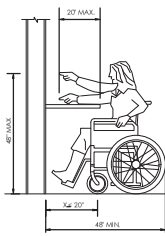
1. PROVIDE COMPLETE TECHNOLOGY SYSTEMS EQUIPMENT WITH INSTALLATION AS REQUIRED FOR A COMPLETE WORKING SYSTEM. PER DESIGN DRAWINGS AND SPECIFICATIONS FOR COMMUNICATIONS ROOM 109, AND OTHER SPACES REQUIRED TECHNOLOGY CONNECTIONS IN FBO BUILDING AND SITE PER THE DESIGN DRAWINGS.
2. PROVIDE NEW CONDUITS, J-HOOKS ABOVE ACCESSIBLE CEILING SPACES TO SUPPORT NEW TECHNOLOGY WIRING AS REQUIRED BETWEEN END DEVICES AND TECHNOLOGY HEADEND EQUIPMENT. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL WIRING WITH TERMINATION AND TESTING AS REQUIRED FOR A COMPLETE WORKING SYSTEM.
3. PROVIDE NEW EMPTY UNDERGROUND CONDUITS CAP IN-PLACE FOR FUTURE USE BETWEEN THE NEW COMMUNICATION ROOM 109 IN FBO BUILDING TO FUTURE TERMINAL EXPANSION, AND HANGAR. REFER TO SITE PLAN T1.01 FOR NUMBER AND SIZE OF UNDERGROUND CONDUITS.
4. PROVIDE COMPLETE INFRASTRUCTURE INCLUDING WIRING TO ALL SECURITY DEVICES PER PLANS.
5. THE CONTRACTOR SHALL PROVIDE CONDUITS, UNDERGROUND PULL BOXES, AND WIRING AS REQUIRED FOR CONNECTIONS TO ALL SITE DEVICES.
6. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE TECHNOLOGY EQUIPMENT/DEVICES MOUNTING AS NOTED PER THE DESIGN DRAWINGS.
7. THE CONTRACTOR SHALL PROVIDE NEW UNDERGROUND CONDUITS FOR NEW UTILITY SERVICE PROVIDER CONNECTION, AND COORDINATE WITH UTILITY SERVICE PROVIDER COMPANY FOR FINAL POINT OF CONNECTION PRIOR TO INSTALLATION.
8. PROVIDE ACCESS CONTROL SYSTEM TO INCLUDE ACCESS CONTROL PANEL POWER SUPPLY AND CARD READERS PER SPECIFICATIONS.
9. PROVIDE VIDEO SURVEILLANCE SYSTEM AND SECURITY CAMERAS WITH REQUIRED LICENSING FOR A COMPLETE WORKING SYSTEM INCLUDING INTEGRATION WITH ACCESS CONTROL SYSTEM.

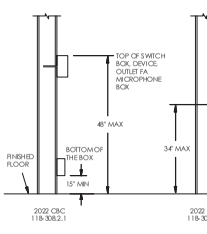
APPLICABLE CODES

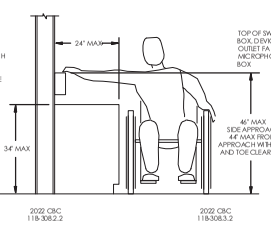
PARTIAL LIST OF APPLICABLE CODES:
2022 CALIFORNIA ADMINISTRATIVE CODE (CAC), PART 1, TITLE 24 CCR
2022 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 CCR
2022 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 CCR
2022 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 CCR
2022 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 CCR
2022 CALIFORNIA ENERGY CODE (CEC), PART 6, TITLE 24 CCR
2022 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 CCR
2022 CALIFORNIA EXISTING BUILDING CODE (CEBC), PART 10, TITLE 24 CCR
2022 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN), PART 11, TITLE 24 CCR
2022 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 CCR
TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS

PARTIAL LIST OF APPLICABLE CODES:
NFPA 72 NATIONAL FIRE ALARM AND SIGNALING CODE (CA AMENDED); 2022 EDITION
NFPA 720 STANDARD FOR THE INSTALLATION OF CARBON MONOXIDE DETECTION AND WARNING EQUIPMENT; 2015 EDITION
NFPA 80 STANDARD FOR FIRE DOORS AND OTHER OPENING PROTECTIVES; 2019 EDITION
UL 464 AUDIBLE SIGNALING DEVICES FOR FIRE ALARM AND SIGNALING SYSTEMS, INCLUDING ACCESSORIES; 2003 EDITION
UL 521 STANDARD FOR HEAT DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS; 1999 EDITION
UL 1971 STANDARD FOR SIGNALING DEVICES FOR THE HEARING IMPAIRED; 2018 EDITION (R2010)
FOR A COMPLETE LIST OF APPLICABLE NFPA STANDARDS REFER TO 2022 CBC (SFM) CHAPTER 35 AND CALIFORNIA FIRE CODE CHAPTER 80.
SEE CALIFORNIA BUILDING CODE, CHAPTER 35, FOR STATE OF CALIFORNIA AMENDMENTS TO THE NFPA STANDARDS









NOTES:
1. THIS DETAIL APPLIES TO MOUNTING OF ANY MECHANICAL AND ELECTRICAL DEVICE WHICH CONTAINS AN OPERABLE PART THAT IS ADJUSTABLE BY THE OCCUPANT. THIS DOES NOT APPLY TO SENSORS OR CONTROLS THAT ARE ONLY ADJUSTABLE THROUGH THE BUILDING AUTOMATION SYSTEM (IE: TEMPERATURE AND HUMIDITY SENSORS).
2. FORWARD OR FRONT APPROACH FOR DEVICES MOUNTED ABOVE COUNTERS ASSUMES THAT DIRECTLY BELOW THE DEVICE, THE COUNTER HAS A 30"WIN. WIDTH x27" HIGH x19" MIN. DEEP CLEAR OPENING. CBC SECTIONS 11B-306 & 11B-308.

PBK
ARCHITECT — PBK, Inc. — PBKcom
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-985-9922
MEP Engineering & Technology
LEAF ENGINEERING
7510 Folsom Blvd, Suite 200
Sacramento, CA 95826
916.379.8910
LEAFengineering.com

APPROVED
ELECTRICAL DIVISION
By: Jason Queener
on Jun 10, 2025
THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONS

T2.01 TECHNOLOGY DEMO FLOOR PLAN
PBKx TBK12 2019.1003

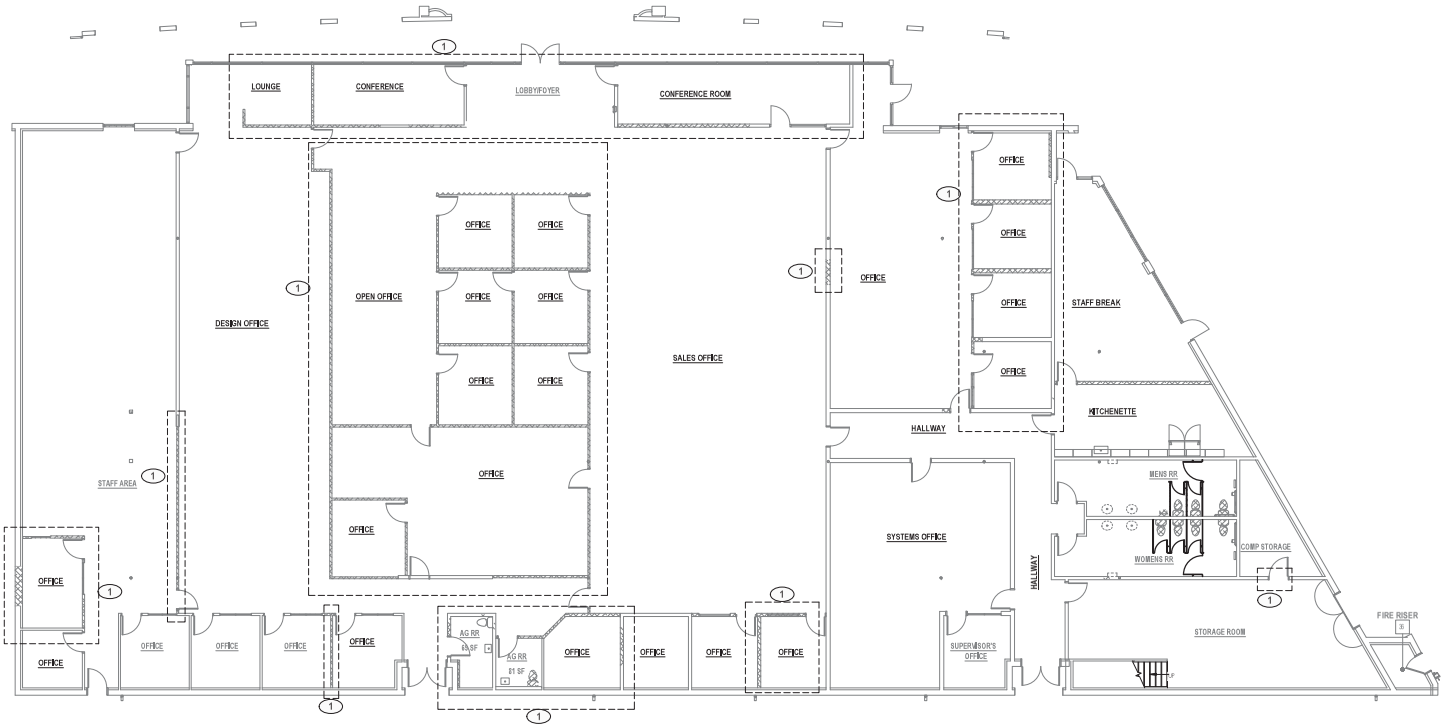
APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

KEYNOTES

1. WALLS TO BE DEMOLISHED IN THESE AREAS FOR NEW FLOOR PLAN. DEMOLISH ALL EXISTING DATA RECEPTACLES AND J-BOXES AND PRESERVE IN PLACE THE EXISTING CABLING FOR USE IN NEW FLOOR PLAN.

GENERAL NOTES

1. EXISTING DATA RECEPTACLE COVER PLATES THROUGHOUT BUILDING ARE WITHIN SCOPE OF THIS PROJECT REGARDLESS OF THEIR BEING INDICATED ON THESE PLANS AND ARE TO BE REMOVED AND REPLACED WITH NEW STAINLESS STEEL COVER PLATES. FOR INDICATED AREAS, FOLLOW ADDITIONAL REQUIREMENTS SET BY KEYNOTES.



1 TECHNOLOGY PLAN - DEMOLITION FLOOR PLAN
SCALE: 1/8" = 1'-0"

ISSUED BY
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK

ARCHITECT PBK, Inc.
FOLSOM
1113 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-985-9822

MEP Engineering & Technology

APPROVED
ELECTRICAL DIVISION
By: Jason Queener
on Jun 18, 2025

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

SACRAMENTO

KEY PLAN
A
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
STEVEN C. MOSER
E-19817
12-31-25
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: KG CHKED BY: SM

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/31/25
2	OWNER CHANGES	6/23/25

CONSTRUCTION DOCUMENT

TECHNOLOGY DEMOLITION FLOOR PLAN

T2.01

This document is for plan review only

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

Z:\Projects\FOL\2022\220389\5-CDD\drawings\Civil\MEP\T1T
5/22/2025 2:46:17 PM

T2.02 TECHNOLOGY NEW FLOOR PLAN
PBKx1 TBx1 2 2019/1033

KEYNOTES

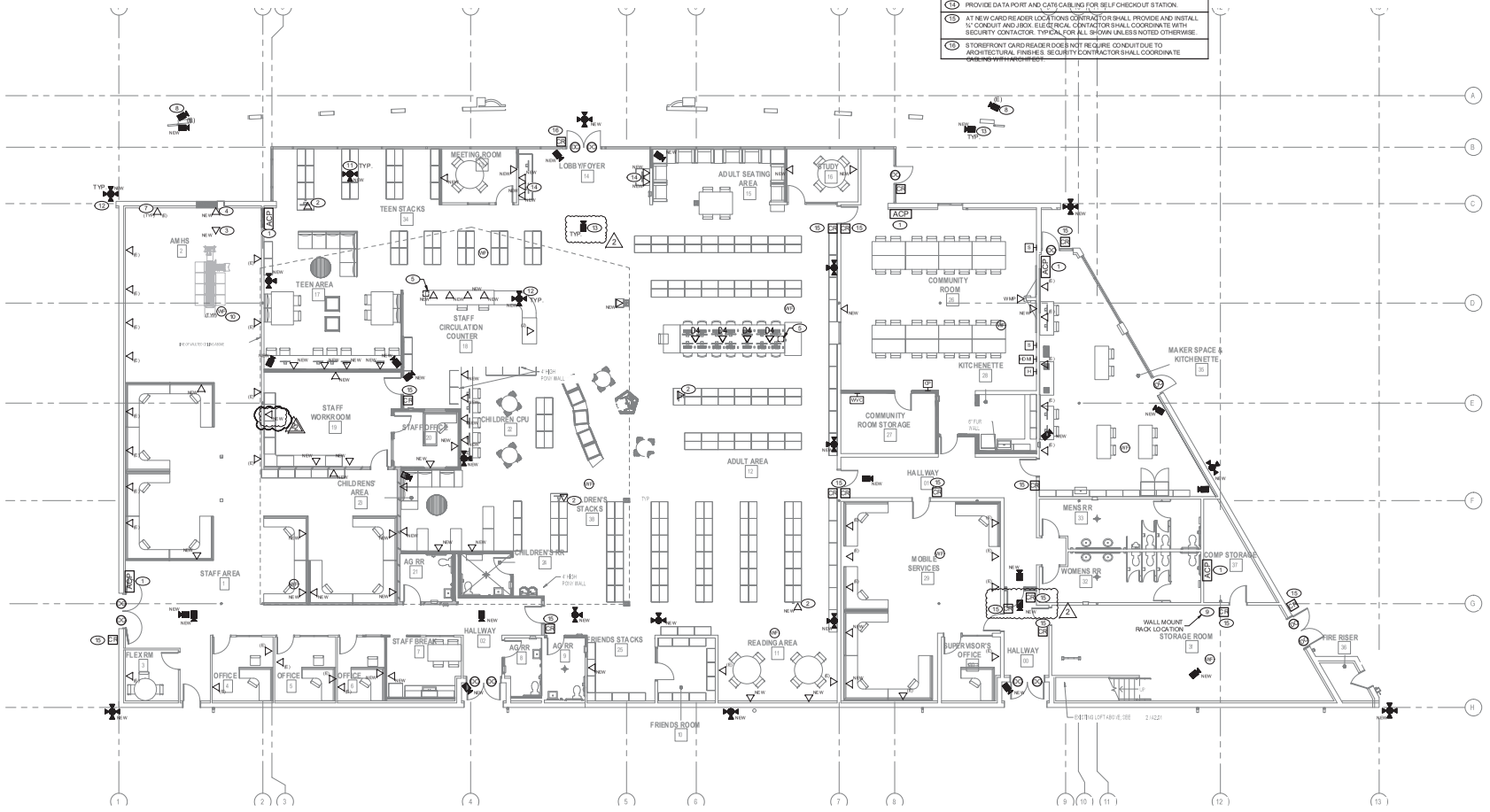
1. PROVIDE 120V POWER TO ACCESS CONTROL PANEL.
2. PROVIDE POWER-POLE RACEWAY DOWN FROM CEILING TO SUPPLY POWER AND DATA TO 'OPAC' AT ENDCAP OF SHELVING UNIT.
3. PROVIDE DEDICATED 120V CIRCUIT AND CAT6 CABLING TO LYNGSOE BOOK DROP KIOSK. VERIFY FINAL LOCATION WITH OWNER PRIOR TO INSTALLATION.
4. PROVIDE DEDICATED 120V CIRCUIT AND CAT6 CABLING TO 'LYNGSOE' BOOK DROP KIOSK. VERIFY FINAL LOCATION WITH OWNER PRIOR TO INSTALLATION.
5. PROVIDE POWER-POLE RACEWAY DOWN FROM CEILING TO SUPPLY POWER AND DATA TO CIRCULATION DESK. RECEPTACLES AND DATA PORTS.
6. PROVIDE POWER-POLE RACEWAY DOWN FROM CEILING TO SUPPLY POWER AND DATA TO TABLE RECEPTACLES AND DATA PORTS.
7. VERIFY EXISTING DATA PORT CONNECTIONS ARE FULLY FUNCTIONAL AND LABELED AND REPLACE WITH NEW AS NECESSARY
8. INTEGRATE EXISTING CAMERAS AT EXTERIOR WITH NEW IDF AND INTERIOR SURVEILLANCE SYSTEM IN STAFF WORKROOM.
9. PROVIDE DEDICATED QUADPLEX NEMA 5-20 RECEPTABLE AND A DEDICATED NEW L6-30 RECEPTACLE F OR IDF. CHATSWORTH FIXED RACK WALL MOUNT 19'96x24 OPM-0196-13. COORDINATE LOCATION AND MOUNTING HEIGHT WITH CUSTOMER PRIOR TO INSTALLATION.
10. WIRELESS ACCESS POINT. CEILING MOUNT. OWNER FURNISHED AND CONTRACTOR INSTALLED 'OFCI. CONTRACTOR TO PROVIDE DATA OULTET FOR WIRELESS ACCESS POINT. (2) CAT6A CABLE. 2 PORT PLENUM RATED SURFACE MOUNT BOX ABOVE CEILING AS INDICATED ON DRAWINGS. USE J-HOOKS TO SUPPORT NEW CABLING ABOVE ACCESSIBLE CEILING SPACE. FOR INACCESSIBLE CEILING SPACE NEW CONDUITS SHALL BE PROVIDED ABOVE CEILING TO THE IDF CABINET SERVING THIS AREA. PROVIDE 20' SLACK CABLE COILS ABOVE CEILING AT OUTLET LOCATION FOR FUTURE RELOCATION.
11. INDICATES THE LOCATION OF AN INTERIOR/EXTERIOR VIDEO SURVEILLANCE CAMERA (180 DEGREE LENS). ALL CAMERAS SHALL POE, IP BASED CAMERAS UNLESS NOTED OTHERWISE. CABLING CONTRACTOR SHALL PROVIDE AND INSTALL (1) CATEGORY CABLE TO EACH LOCATION SHOWN, WIRED BACK TO THE NEAREST MDF/IDF. ALL CEILING MOUNTED CAMERAS SHALL BE FLUSH MOUNTED.
12. PROVIDE SECURITY CAMERA, (360 DEG LENS) PROVIDE AND INSTALL DATA OUTLET IN A SS BACKBOX WITH A SINGLE-GANG PLASTER RING. INSTALL (1) 1" EMT CONDUIT FROM BACKBOX TO ACCESSIBLE CEILING SPACE WITH (1) CAT 6A CABLES. THEN RUN CAT6A CABLE IN ACCESSIBLE CEILING SPACE USING J-HOOKS TO THE CABLE TRAY AND THEN TO IDF CABINET SERVING THIS AREA. PROVIDE RJ-45 JACK AND PATCH CORD WITH TERMINATION FOR A COMPLETE WORKING SYSTEM. PROVIDE SEALANT TO WALL OPENING/PENETRATION AS REQUIRED TO PREVENT WATER INFILTRATION. ALL OUTDOOR CAMERAS SHALL BE 12'-0" A.F.G. REFER TO SPECIFICATIONS FOR ADDITIONAL DETAILS.
13. INDICATES THE LOCATION OF AN INTERIOR/EXTERIOR VIDEO SURVEILLANCE CAMERA (90 DEGREE LENS). ALL CAMERAS SHALL POE, IP BASED CAMERAS UNLESS NOTED OTHERWISE. CABLING CONTRACTOR SHALL PROVIDE AND INSTALL (1) CATEGORY CABLE TO EACH LOCATION SHOWN, WIRED BACK TO THE NEAREST MDF/IDF. ALL CEILING MOUNTED CAMERAS SHALL BE FLUSH MOUNTED.
14. PROVIDE DATA PORT AND CAT6 CABLING FOR SELF CHECKOUT STATION.
15. AT NEW CARD READER LOCATIONS CONTRACTOR SHALL PROVIDE AND INSTALL ¾" CONDUIT AND JBOX. ELECTRICAL CONTACTOR SHALL COORDINATE WITH SECURITY CONTACTOR. TYPICAL FOR ALL SHOWN UNLESS NOTED OTHERWISE.
16. STOREFRONT CARD READER DOES NOT REQUIRE CONDUIT DUE TO ARCHITECTURAL FINISHES. SECURITY CONTRACTOR SHALL COORDINATE CABLING WITH ARCHITECT.

GENERAL NOTES

1. EXISTING DATA OUTLETS SHALL REMAIN AND PROTECTED IN PLACE DURING CONSTRUCTION. SUBTEXT 'VEY' INDICATES EXISTING DEVICE.
2. CONTRACTOR TO FIELD VERIFY AND COORDINATE WITH OWNER EXACT CABLING/ AND CONDUIT ROUTING PRIOR TO START OF ANY WORK.
3. ALL 120V POWER REQUIRED FOR THE FUNCTIONALITY OF THE TELECOMMUNICATION, NETWORK AUDIO/VIDEO, SECURITY AND FIRE ALARM EQUIPMENT SHALL BE DEDICATED CIRCUIT AND ON EMERGENCY POWER WHERE POSSIBLE. CONTRACTOR SHALL COORDINATE AND INSTALL ALL 120V POWER REQUIREMENTS AND LOCATIONS AS REQUIRED FOR ALL EQUIPMENT (TYPICAL).
4. CONTRACTOR SHALL COORDINATE WITH THE TECHNOLOGY CONSULTANT PRIOR TO THE INSTALLATION OF RACK AND RACK EQUIPMENT. NO RACK SHALL BE PERMANENTLY INSTALLED WITH OUT WRITTEN APPROVAL OF THE TECHNOLOGY CONSULTANT.
5. THE PROJECT ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL THE CONDUITS, PULL STRING, BACK BOXES AND SLEEVES REQUIRED FOR DEVICES AND PATHWAYS SHOWN ON THE FLOOR PLANS AND DETAILS SHEETS. ANY ADDITIONAL CONDUITS, SLEEVES AND RACEWAY REQUIREMENTS FOR EACH SYSTEM SHALL BE THE RESPONSIBILITY OF EACH SYSTEM INSTALLER.
6. THE CONTRACTOR SHALL CONFIRM ANY DATA LOCATIONS WITH DISTRICT PRIOR INSTALL.
7. ALL DELTAS INDICATING DATA DROPS SHALL BE EQUIPPED WITH TWO (2) DATA CABLES AND PORTS UNLESS OTHERWISE NOTED.

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.



1 TECHNOLOGY NEW FLOOR PLAN
SCALE: 1/8" = 1'-0"

Z:\Projects\FOL\2022\220389\3-CDD\drawings\Civil\MEP.TIT
5/22/2025 2:46:30 PM

PBK
JOBCOPY

ARCHITECT
PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-365-9922

MEP Engineering & Technology
LEAF ENGINEERS
TELEGRAPH
1100 Iron Point Rd, Suite 200
Folsom, CA 95630
(LEAFengineers.com

APPROVED
Community Development Department
ELECTRICAL DIVISION
By: Jason Queener
on Jun 18, 2025

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
PROFESSIONAL ENGINEER
STEVEN C. MOORE
E-19817
Exp. 06-30-26
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: CR CHKED BY: GG

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/23/25
2	OWNER CHANGES	5/23/25

CONSTRUCTION DOCUMENT

TECHNOLOGY NEW FLOOR PLAN

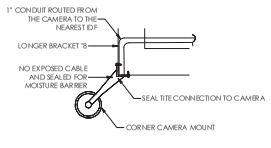
T2.02

This document is for plan review only

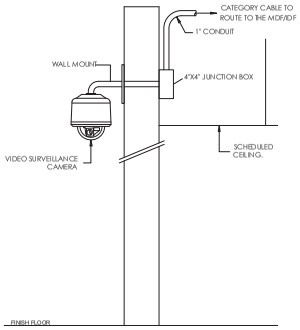
COM-2500586

T6.01 TECHNOLOGY DETAILS
PBKv1 TEMPLATE 2019/10/03

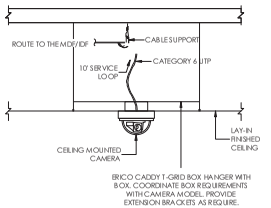
Z:\Projects\FOL\2022\220389\3-CDD\drawings\Civil\MEP\T7
5/22/2025 2:46:41 PM



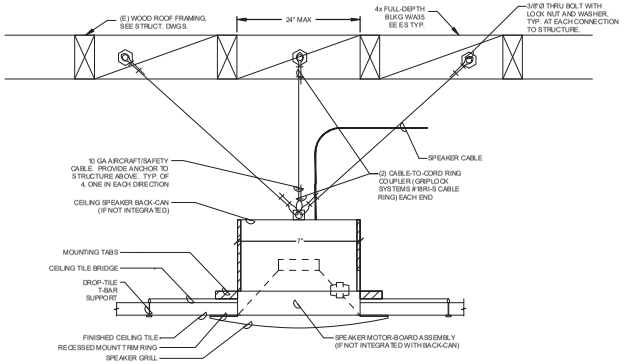
EXTERIOR CAMERA CORNER MOUNT N.T.S 06



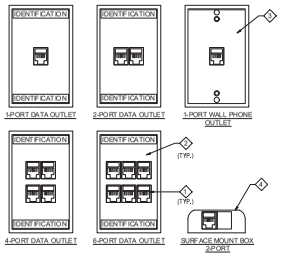
WALL CAMERA MOUNTING N.T.S 08



CEILING CAMERA MOUNTING N.T.S 07



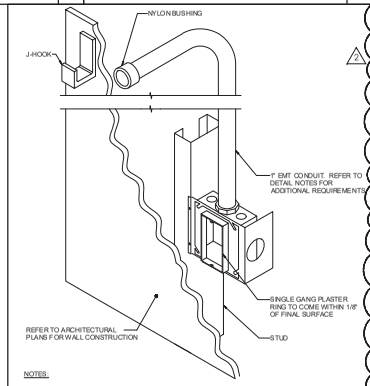
CEILING SPEAKER MOUNTING N.T.S 04



NOTES:
1. REFER TO SPECIFICATION - HORIZONTAL CABLING REQUIREMENTS FOR CATEGORY CABLE PERFORMANCE REQUIREMENTS.
2. REFER TO SPECIFICATION - IDENTIFICATION FOR DATA OUTLET PORT IDENTIFICATION.
3. DATA OUTLET SHALL BE INSTALL IN A 4" SQUARE BACKBOX WITH A SINGLE GANG PLASTER RING..
4. PROVIDE REMOVABLE BLANK INSERTS FOR UNUSED PORTS.
5. USE T568B WIRING SCHEME TO TERMINA TE THE TWISTED-PAIR CABLE ONTO THE CONNECTOR INTERFACE.
6. WHERE APPLIES PER PLANS, PROVIDE AV OUTLET WITH HDMI CONNECTION PER BELOW.
   - PANDUIT COVER PLATE: CBEIWY OR APPROVED EQUAL.
   - PANDUIT JACK,HDMI 2.0 CMHDMWY,OR APPROVED EQUAL.
   - PANDUIT MODULAR INSERT: CHF2IW-X OR APPROVED EQUAL

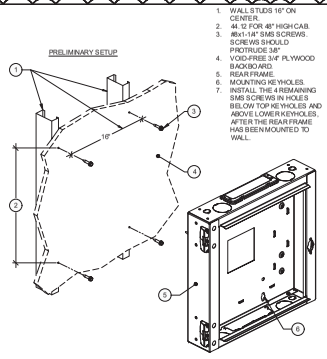
KEYNOTE NOTES:
1. PROVIDE CAT6A RJ-45 JACKS, 8-POSITION, 8-CONTACT (8P8C), COLOR BLUE DATA, WHITE FOR VOICE..
   - PANDUIT PRODUCTS "CJ88ST(BU)Y", COMMSCOPE "MJO-5400-3 1/8" OR APPROVED EQUAL..
2. PROVIDE 1,2,4,6-PORT FACEPLATE AS INDICATED ON DRAWING S..
   - 2-PORT: 42080-2WP.
   - 4-PORT: 42080-4WS.
   - 6-PORT: 42080-6WP.
3. PROVIDE STAILESS STEEL 1-PORT FACE PLATE FOR OUTLETS INDICATED WITH "W" ON DRAWINGS. "W" INDICATEDS WALL PHONE MOUNTED AT +48" AFF FOR WALL HUNG PHONE..
   - 2-PORT: WALL PHONE "w" 42080-2WP.
4. PROVIDE SURFACE MOUNT BOX, PLENUM RATED, MOUNTED ABOVE CEILING FOR CONNECTIONS TO WIRELESS ACCESS POINTS..
   - 2-PORT: 61 10G-RL6 (color blue).
5. PROVIDE 1' PATCH CORDS FOR EACH CAT6. LEVIT ON P.N: 6D460-01L.
6. PROVIDE 1' PATCH CORDS FOR EACH CAT6A. LEVITON P/N: H6A10-1Y.
7. PROVIDE 10' STATION CORDS FOR EACH CAT6. LEVITON P/N 6D460-15L.
8. PROVIDE 10' STATION CORDS FOR EACH CAT6A. LEVITON P/N: H6A10-10Y..

DATA OUTLETS CONFIGURATION DETAIL N.T.S 01



NOTES:
1. 1" EMT CONDUIT SHALL STUB UP TO NEAREST ACCESSIBLE CEILING AND TERMINATE ORIENTED HORIZONTALLY AT THE HEIGHT OF THE ASSOCIATED J-HOOK ROUTE. CONDUIT RUN SHALL NOT CONTAIN MORE THAN 180 DEGREES OF BEND BETWEEN ACCESSIBLE JUNCTION BOXES OR BETWEEN JUNCTION BOX AND END OF CONDUIT..
2. WHERE CONDUIT STUB IS LOCATED IN A ROOM WITH AN ACCESSIBLE CEILING AND IS NOT REQUIRED TO RUN TO CABLE ROUTE LOCATED OUTSIDE THE ROOM, STUB MUST TERMINA TE ABOVE THE ACCESSIBLE CEILING WITH A 90-DEGREE BEND AT THE TOP ORIENTED IN TO THE ROOM AT THE HEIGHT OF THE ASSOCIATED J-HOOK ROUTE IN THE ROOM.
3. ALL STUBS MUST BE FITTED WITH A NYLON BUSHING ON EACH END OF THE CONDUIT. INSTALLING CONTRACTOR SHALL FURNISH AND INSTALL FIRESTOP MATERIALS FOR TECHNOLOGY ROUGH-INS PER PROJECT REQUIREMENTS. REFER TO SPECIFICATIONS FOR FIRESTOP REQUIREMENTS.

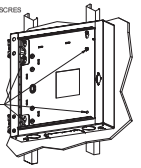
TECHNOLOGY ROUGH-IN MOUNTING DETAIL N.T.S 09



NOTES:
A. THE REAR FRAME MUST BE SECURED TO WALL USING ALL 8 SMS SCREWS PROVIDED. THE SCREWS ARE INTENDED TO GO THROUGH 3/4" PLYWOOD BACK-BOARD AND THEN INTO METAL WALL STUDS. THE INSTALLER MUST PROVIDE APPROPRIATE HARDWARE..
B. MAX WEIGHT 250 LBS.

MOUNTING REAR FRAME TO WALL
WALL SHOULD BE PREPPED WITH VOID-FREE A/C GRADE PLYWOOD. PLYWOOD BACKBOARD MUST BE FIRMLY ATTACHED TO THE FRAMED WALL OR STUDS WITH CONSTRUCTION ADHESIVE AND GALVANIZED, ZINC PLATED, OR STAINLESS STEEL FLATHEAD SMS SCREWS OR MINIMUM Ø.25" (6.3 MM) TOGGLE BOLTS. DRYWALL SCREWS ARE NOT ACCEPTABLE. REFERENCE INFORMATION TECHNOLOGY SYSTEMS INSTALLATION METHODS MANUAL (ITSIMM) FOR STANDARDS.

FINAL STEPS
8 TOTAL LAG SCRES INSTALLED.



STEP 1. INSURE THAT THE WALL OR MOUNTING SURFACE HAS SUFFICIENT S TRENGTH TO SUPPORT THE CABINET AND THE EXPECTED CABINET PAYLOAD. THE MOUNTING SURFACE MUST ALSO BE FLAT AND EXTEND BEYOND THE TOP, BOTTOM, LEFT, AND RIGHT EDGES OF THE REAR PANEL.

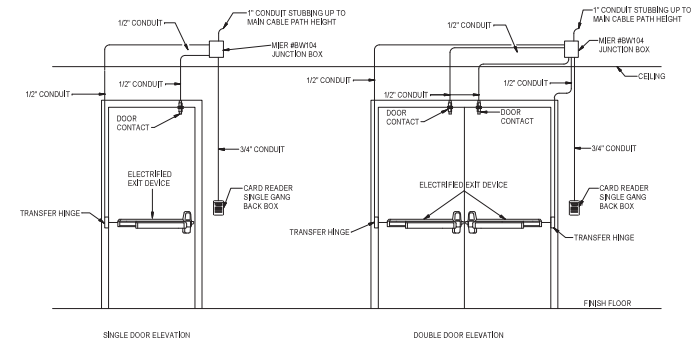
STEP 2. DRILL 5/32" PILOT HOLDES FOR THE FOUR #8x 1-1/4" SMS SCREWS TO THE DIMENSIONS SHOWN ON THE DRAWING. THE SCREWS SHOULD GO DIRECTLY INTO THE WALL STUDS.

STEP 3. INSTALL THE LAG SCREWS INTO THE HOLES. THE SCREW HEAD SHOULD PROTRUDE ABOUT 3/8" FROM THE WALL.

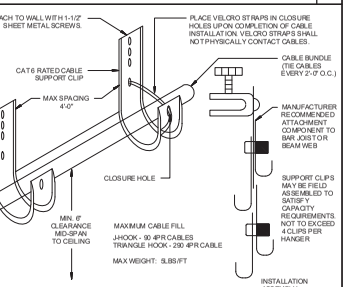
STEP 4. MOUNT THE REAR FRAME TO THE WALL BY HOOKING THE UPPER AND LOWER KEYHOLES OVER THE SCREWS. TIGHTEN THE SCREWS SECURELY.

STEP 5. INSTALL THE REMAINING 4 SMS SCREWS ON THE HOLES BELOW THE TOP TWO KEYHOLES, AND ABOVE LOWER KEYHOLES.

WALL CABINET MOUNTING DETAILS N.T.S 05

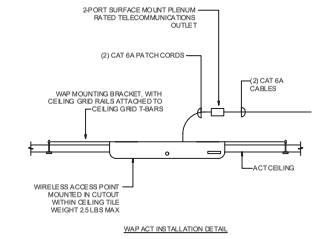


TECHNOLOGY ROUGH-IN MOUNTING DETAIL N.T.S 10



NOTES:
1. SUPPORT CLIPS MUST SPECIFICALLY BE DESIGNED AND RATED FOR USE IN CATEGORY 6 CABLE INSTALLATION.
2. INSTALL APPROPRIATE SIZE AND QUANTITY SUPPORT CLIPS FOR CABLES TO BE SUPPORTED + 30% EXPANSION.
3. USE MANUFACTURERS RECOMMENDED MOUNTING HARDWARE, APPROPRIATE FOR ATTACHING TO WALL OR CEILING STRUCTURES.
4. CEILING TILE TEE GRID, DROP WIRES AND HVAC EQUIPMENT SHALL NOT BE USED AS MOUNTING POINTS.
5. SECURE CABLE IN SUPPORT CLIPS AS PER MANUFACTURERS RECOMMENDATION FOR CAT-6 CABLE. DO NOT EXCEED INDICATED FILL RATIOS.
6. CABLE SUPPORT CLIPS SHALL BE SPACED A MAXIMUM OF 4' APART.
7. INSTALL TRIANGULAR METAL BRACKETS (NOT SHOWN) FOR HIGH STATION CABLE CAPACITY REQUIREMENTS.
8. THIS DETAIL IS FOR REFERENCE ONLY AND DOES NOT REPRESENT ALL CONDITIONS OR J-HOOK INSTALLATION REQUIREMENTS (APPLY THIS DETAIL WHERE OCCURS). REFER TO SPECIFICATION 27 10 00 FOR ADDITIONAL INFORMATION.

TECHNOLOGY J-HOOK PATHWAY DETAIL N.T.S 02



WAP ACT INSTALLATION DETAIL

CEILING WIRELESS ACCESS POINT MOUNTING N.T.S 03

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PBK
ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-985-9922

MEP Engineering & Technology
LEAF ENGINEERS
TELECOM
1100 Iron Point Rd., Suite 200
Folsom, CA 95630
916.290.9910
LEAFengineers.com

APPROVED
CITY OF SACRAMENTO
BUILDING & SAFETY
ELECTRICAL DIVISION
By: Jason Queener
on Jun 19, 2025

THE APPROVAL OF ALL ELECTRICAL WORK IS SUBJECT TO FIELD INSPECTIONS

JOBCOPY

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1124 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
STEVEN C. MOORE
E-19817
Exp. 06-30-25
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: KG CHKED BY: SM
REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/2/25
2	OWNER CHANGES	5/23/25

CONSTRUCTION DOCUMENT

TECHNOLOGY DETAILS

This document is for plan review only

T6.01

COM-2500586

FIRE ALARM MATRIX OF OPERATION

*REFERENCE NFPA 72, FIGURE A.14.6.2.4 (PAGE 75-228)

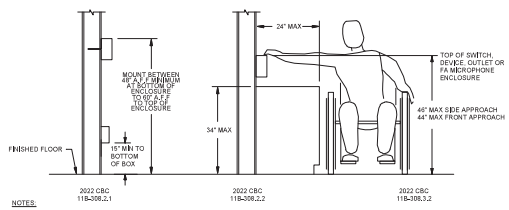
= ACTION

= NO ACTION

FIRE ALARM SYSTEM OUTPUTS

FIRE ALARM SYSTEM INPUTS	A	B	C	D	E	F	G	H	I	J	K
1. MANUAL FIRE ALARM PULL STATION	●	●					●			●	●
2. SMOKE OR HEAT DETECTOR	●	●					●			●	●
3. FIRE SPRINKLER WATER FLOW	●	●					●			●	●
4. DUCT SMOKE DETECTOR			●	●		●		●		●	●
5. TAMPER SWITCH, PIV & OS&Y			●	●			●				
6. FIRE ALARM AC POWER FAILURE					●			●			
7. FIRE ALARM SYSTEM LOW BATTERY					●			●			
8. FIRE ALARM OPEN CIRCUIT					●			●			
9. FIRE ALARM GROUND FAULT					●			●			
10. NAC CIRCUIT SHORT					●			●			
11. CELLULAR COMMUNICATOR FAULT					●			●			

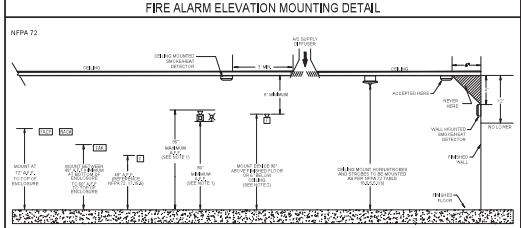
MOUNTING OVER OBSTRUCTION DETAIL



NOTES:

1. THIS DETAIL APPLIES TO MOUNTING OF ANY MECHANICAL AND ELECTRICAL DEVICE WHICH CONTAINS AN OPERABLE PART THAT IS ADJUSTABLE BY THE OCCUPANT. THIS DOES NOT APPLY TO SENSORS OR CONTROLS THAT ARE ONLY ADJUSTABLE THROUGH THE BUILDING AUTOMATION SYSTEM (IE: TEMPERATURE AND HUMIDITY SENSORS).
2. FORWARD OR FRONT APPROACH FOR DEVICES MOUNTED ABOVE COUNTERS ASSUMES THAT DIRECTLY BELOW THE DEVICE, THE COUNTER HAS A 30"MIN. WIDTH X27" HIGH X19" MIN. DEEP CLEAR OPENING. CBC SECTIONS 11B-306 & 11B-308.

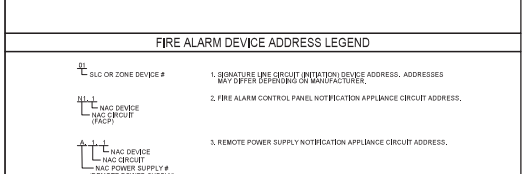
FIRE ALARM ELEVATION MOUNTING DETAIL



NOTES:

1. WALL-MOUNTED APPLIANCES SHALL BE MOUNTED SUCH THAT THE ENTIRE LENS IS NOT LESS THAN 80 IN. (2.03m) AND NOT GREATER THAN 96 IN. (2.44m) ABOVE THE FINISHED FLOOR OR AT THE MOUNTING HEIGHT SPECIFIED USING THE PERFORMANCE-BASED ALTERNATIVE OF 18.5.5.7, (NFPA 72, CHAPTER 18.5.5.1*)
2. WHERE LOW CEILING HEIGHTS DO NOT PERMIT ALL MOUNTING AT A MINIMUM OF 80 IN. (2.03m), WALL MOUNTED VISUAL NOTIFICATION APPLIANCES SHALL BE MOUNTED WITHIN 6 IN. (150mm) OF THE CEILING. (NFPA 72, CHAPTER 18.5.5.2)

FIRE ALARM DEVICE ADDRESS LEGEND



NOTES:

1. DEVICE ADDRESSING VARIES DEPENDING ON THE MANUFACTURER. FIRE ALARM CONTRACTOR TO PROGRAM DEVICES ACCORDING TO THE MANUFACTURER'S OPERATION MANUAL.
2. CORRECT DEVICE ADDRESSING TO BE REFLECTED ON AS-BUILT RECORD DRAWINGS.

FIRE ALARM SYSTEM EQUIPMENT LEGEND AND SYMBOLS

SYM.	MODEL	MFG.	QTY.	DESCRIPTION	MOUNTING	CSFM #
FACP	6700	SILENT KNIGHT	1	FIRE ALARM CONTROL PANEL	WALL MOUNT	7165-0559-0501
FAA	6860	SILENT KNIGHT	1	FIRE ALARM ANNUNCIATOR	4-11/16" SQUARE BOX	7165-0559-0501
FAC	SLE-LTE-V-FIRE	NAPCO	1	FIRE ALARM COMMUNICATOR (CELLULAR)	WALL MOUNT	7300-0992-0144
NAC-1	5495	SILENT KNIGHT	1	NOTIFICATION APPLIANCE DISTRIBUTED POWER SUPPLY	WALL MOUNT	7300-0559-0123
AIM-2	SK-MONITOR-2	SILENT KNIGHT	2	ADDRESSABLE INPUT MODULE (# DENOTES AMOUNT OF INPUTS, 1=SINGLE, 2=DUAL)	4-11/16" SQUARE BOX 3-1/8" MIN. DEPTH	7300-0559-0155
ARM	SK-RELAY	SILENT KNIGHT	13	ADDRESSABLE RELAY MODULE	4-11/16" SQUARE BOX 3-1/8" MIN. DEPTH	7300-0559-0155
S2	SK-PHOTO-4W	SILENT KNIGHT	1	ADDRESSABLE PHOTOELECTRIC SMOKE DETECTOR W/BASE	4-11/16" SQUARE BOX W/ 3 O RING	7272-0559-0149
S	SK-DUCT-W	SILENT KNIGHT	1	ADDRESSABLE DUCT SMOKE DETECTOR HOUSING WITH SMOKE DETECTOR HEAD AND SAMPLE TUBE	DUCT MOUNT AS PER MANUFACTURER	5243-0559-0518
WP S	SK-DUCT-WDNRW	SILENT KNIGHT	11	WATERTIGHT ADDRESSABLE DUCT SMOKE DETECTOR HOUSING WITH SMOKE DETECTOR HEAD AND SAMPLE TUBE	AS PER MANUFACTURER	5243-0559-0518
M	SK-PULL-SA	SILENT KNIGHT	1	MANUAL FIRE ALARM BOX / PULL STATION	4-11/16" SQUARE BOX W/ SNGL. GANG RING	7150-0559-0181
	P2RL	SYSTEM SENSOR	18	MULTI CANDELA HORN STROBE (WALL MOUNT)	4-11/16" SQUARE BOX	7135-1653.0503
	SRL	SYSTEM SENSOR	18	MULTI CANDELA STROBE (WALL MOUNT)	4-11/16" SQUARE BOX	7125-1653.0504
DOC	SSU00672	S.A.E.	1	FIRE ALARM DOCUMENT CABINET	WALL MOUNT	UL LISTED
	#	#	1	FIRE SPRINKLER RISER BELL (BY OTHERS)	TBD	
JB	#	#	TBD	ELECTRICAL JUNCTION BOX	TBD	
NO SYMBOL	PS-12120	POWER SONIC	2	12VDC, 12AH SEALED LEAD ACID BATTERY	INSTALL IN FACP ENCLOSURE	UL LISTED
NO SYMBOL	PS-1270	POWER SONIC	2	12VDC, 7AH SEALED LEAD ACID BATTERY	INSTALL IN POWER SUPPLY ENCLOSURE	UL LISTED
S	----	----	2	FIRE SMOKE DAMPER	PROVIDED/INSTALLED BY OTHERS	UL LISTED

APPROVED
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

ISSUED BY
Current Set for Agency Approval
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

FIRE ALARM WIRE SCHEDULE

TAG	COND.	TYPE	AWG	DESCRIPTION	USE
A	2	SOLID	18	#18SC RED JACKET, FPLP	SIGNALLINE CIRCUIT (SLC)
Au	2	STRANDED	18	#18SC RED JACKET FIRE (UNDERGROUND RATED)	SIGNALLINE CIRCUIT (SLC) - UNDERGROUND
B	4	SOLID	18	#18M, RED JACKET, FPLP	SBUS
Bu	4	STRANDED	18	#18 TWVN RED+1 BLACK+1 JACKET FIRE (UNDERGROUND RATED)	SBUS - UNDERGROUND
H	2	SOLID	18	#18SC RED JACKET, FPLP	INDICATING CIRCUIT (IDC)
Hu	2	STRANDED	18	#18 TWVN RED+1 BLACK+1 JACKET FIRE (UNDERGROUND RATED)	INDICATING CIRCUIT (IDC) - UNDERGROUND
N	2	SOLID	14	#14SC, RED JACKET, FPLP	NOTIFICATION APPLIANCE CIRCUIT
	2	STRANDED		#14, TWVN, RED (+) BLACK (-) WIRES LISTED IN CONDUIT	
Nu	2	STRANDED	14	#12 TWVN, THWN RED (+) BLACK (-) FIRE (UNDERGROUND RATED)	NOTIFICATION APPLIANCE CKT.-UNDERGROUND
S	2	STRANDED	16	#16SC-2Y EIFALL SHIELDED CLASS C CABLE	SPEAKER CIRCUIT
Su	2	STRANDED	16	#16SC-2Y EIFALL SHIELDED C CABLE (UNDERGROUND RATE)	SPEAKER CIRCUIT - UNDERGROUND

NOTES:

1. ALL FIRE ALARM CIRCUITS ARE TO BE CLASS B, STYLE Y.

FIRE ALARM SCOPE OF WORK

1. FURNISH AND INSTALL A NEW MANUAL FIRE ALARM SYSTEM IN ACCORDANCE WITH NFPA 72, CFC §907.2.1 & §907.2.2, §907.5, CBC §907.2.1 & §907.2.2, CMC §609.1, AND ALL APPLICABLE CODES & REGULATIONS AND THE AUTHORITY HAVING JURISDICTION.

FIRE ALARM SYSTEM CODES AND STANDARDS

2022 CALIFORNIA ADMINISTRATIVE CODE (CAC), PART 1, TITLE 24 CCR
2022 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 CCR
2022 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 CCR
2022 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 CCR
2022 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 CCR
2022 CALIFORNIA ENERGY CODE (CEC), PART 6, TITLE 24 CCR
2022 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 CCR
2022 CALIFORNIA EXISTING BUILDING CODE (CEBC), PART 10, TITLE 24 CCR
2022 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN), PART 11, TITLE 24 CCR
2022 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 CCR
TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS
NFPA 13 STANDARD FOR INSTALLATION OF SPRINKLER SYSTEMS (CA AMENDED) 2022 EDITION.
NFPA 14 STANDARD FOR INSTALLATION OF STANDPIP AND HOSE SYSTEMS (CA AMENDED) 2019 EDITION.
NFPA 17 STANDARD FOR DRY CHEMICAL EXTINGUISHING SYSTEMS 2024 EDITION.
NFPA 17A STANDARD FOR WET CHEMICAL EXTINGUISHING SYSTEMS 2024 EDITION.
NFPA 20 STANDARD FOR INSTALLATION OF STATIONARY PUMPS FOR FIRE PROTECTION 2022 EDITION.
NFPA 22 STANDARD FOR WATER TANKS FOR PRIVATE FIRE PROTECTION 2023 EDITION.
NFPA 24 STANDARD FOR INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES (CA AMENDED) 2022 EDITION.
NFPA 72 NATIONAL FIRE ALARM AND SIGNALING CODE (CA AMENDED) 2022 EDITION
NFPA 80 STANDARD FOR FIRE DOORS AND OTHER OPENING PROTECTIVES, (CA AMENDED) 2019 EDITION.
NFPA 170 STANDARD FOR FIRE SAFETY AND EMERGENCY SYMBOLS, (CA AMENDED) 2018 EDITION.
NFPA 2001 STANDARD FOR CLEAN AGENT FIRE EXTINGUISHING SYSTEMS (CA AMENDED) 2018 EDITION.
UL300 STANDARD FOR FIRE TESTING OF FIRE EXTINGUISHING SYSTEMS FOR PROTECTION OF COMMERCIAL COOKING EQUIPMENT 2004 REVISED EDITION.
UL464 AUDIBLE SIGNALING DEVICES FOR FIRE ALARM AND SIGNALING SYSTEMS INCLUDING ACCESSORIES (CA AMENDED) 2003 EDITION.
UL 521 STANDARD FOR HEAT DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS. (CA AMENDED) 1999 EDITION.
UL1971 STANDARD FOR SIGNALING DEVICES FOR HEARING IMPAIRED 2024 REVISED EDITION.
ICC300 STANDARD FOR BLEACHERS, FOLDING AND TELESCOPIC SEATING AND GRANDSTANDS 2023 EDITION.

FOR A COMPLETE LIST OF APPLICABLE NFPA STANDARDS REFER TO 2022 CBC (SFM) CHAPTER 35 AND CALIFORNIA FIRE CODE CHAPTER 80.

SEE CALIFORNIA BUILDING CODE, CHAPTER 35, FOR STATE OF CALIFORNIA AMENDMENTS TO THE NFPA STANDARDS.

FIRE ALARM REQUIREMENTS

THE CONTRACTOR SHALL PROVIDE AND SUBMIT THE FIRE ALARM SHOP DRAWINGS AND AS BUILT DRAWINGS TO THE ARCHITECT FOR REVIEW AND APPROVAL PRIOR TO AND AFTER INSTALLATION AND ACCEPTANCE OF THE FIRE ALARM SYSTEM. SUBMITTALS SHALL CONTAIN THE FOLLOWING:

A. SHOP DRAWINGS: COMPLETE 1/8" MINIMUM SCALE FLOOR PLANS SHOWING ALL DEVICES, APPLIANCES, COMPONENTS, CONDUIT AND WIRING INDICATING A COMPLETE AND OPERABLE SYSTEM AS DESIGNED AND SPECIFIED. REPRODUCED COPIES OF THE BID SET OF FIRE ALARM PLANS ARE NOT ACCEPTABLE AS SHOP DRAWINGS. SHOP DRAWINGS MUST ALSO INDICATE DEVICE QUANTITIES; DEVICE MOUNTING HEIGHTS, ROOM NAMES & NUMBER AND LOCATIONS OF ALL FIRE RATED WALLS.
B. SHOP DRAWINGS SHALL INCLUDE ELECTRICAL CONTRACTOR'S AND/OR FIRE ALARM SYSTEMS INSTALLING COMPANY NAME, ADDRESS, PHONE NUMBER AND C-10 LICENSE NUMBER IN THEIR TITLE BLOCK STAMPED.
C. LIST OF SYSTEM COMPONENTS, EQUIPMENT AND DEVICES, INCLUDING MANUFACTURE'S MODEL NUMBER(S) AND CALIFORNIA STATE FIRE MARSHALL LISTING NUMBER(S).
D. SHOP DRAWINGS TO USE ALL NFPA-170 SYMBOLS, NO EXCEPTIONS.
E. ORIGINAL COPIES OF MANUFACTURES SPECIFICATION SHEETS FOR ALL EQUIPMENT AND DEVICES AS INDICATED.
F. AS BUILT DRAWINGS SHALL BE COMPLETE AND REFLECT THE FIRE ALARM SYSTEM AS ACTUALLY INSTALLED WITH ALL OF THE CONTROL PANELS, DEVICES AND APPLIANCES SHOWN, ADDRESSED ACCORDING TO THE MANUFACTURE'S OPERATION MANUAL. ALL CONDUCTORS ARE COLOR CODED AND REFLECT ALL REQUIREMENTS AS STATED FOR SHOP DRAWINGS.
G. UPON COMPLETION AND ACCEPTANCE OF THE THE PROJECT, A REPRODUCIBLE SET OF AS BUILT FIRE ALARM SYSTEM OR AREAS WORKED UPON SHALL BE PROVIDED IN PDF AND ELECTRONIC DESIGN PROGRAM (CURRENT AUTODESK AUTOCAD MINIMUM) FORM TO THE ARCHITECT/ENGINEER OF RECORD FOR REVIEW.
H. VOLTAGE DROP CALCULATIONS TO INCLUDE THE FOLLOWING:

(a) POINT-TO-POINT OR OHMS LAW CALCULATIONS
(b) IDENTIFICATION OF THE ZONE OR CIRCUIT IN CALCULATIONS
(c) VOLTAGE DROP PERCENTAGE (NOT TO EXCEED THE LISTED MANUFACTURE'S OPERATING VOLTAGE RANGE)
(d) NOTE OF CIRCUIT NUMBER FOR WORST CASE CALCULATION

I. BATTERY TYPE(S), AMP HOURS AND CALCULATIONS. INCLUDE THE FOLLOWING:

1. NORMAL OPERATION: 100% OF APPLICABLE DEVICES FOR 24 HOURS = CONTROL PANEL AMPS PLUS LIST OF AMPS PER DEVICE WHICH DRAW POWER FROM THE PANEL DURING STANDBY, (I.E.: ZONE MODULES, DETECTORS AND OTHER IDENTIFIED DEVICES.
2. ALARM CONDITION: 100% OF THE APPLICABLE DEVICES FOR 15 MINUTES = CONTROL PANEL AMPS PLUS LIST OF AMPS PER DEVICE WHICH DRAW POWER FROM THE PANEL DURING ALARM (I.E.: ZONE MODULES, SIGNAL MODULES, DETECTORS, SIGNAL DEVICES, ANNUNCIATORS, AMPLIFIERS AND OTHER IDENTIFIED DEVICES).
3. NORMAL OPERATION + ALARM OPERATION
a. TOTAL AMP HOURS REQUIRED.
b. TOTAL AMP HOURS PROVIDED.

FIRE WATCH NOTE

A FIRE PREVENTION AND SAFETY PLAN SHALL BE THE RESPONSIBILITY OF THE OWNER OR OWNER'S AUTHORIZED AGENT FOR FIRE SAFETY DURING DEMOLITION AND CONSTRUCTION OF ALL PHASES OF THIS PROJECT FROM START TO ACCEPTANCE. (REFERENCE CFC §3301.1 THRU §3303.10) THE FIRE CODE OFFICIAL OR THE LOCAL AUTHORITY HAVING JURISDICTION SHALL BE NOTIFIED IMMEDIATELY WHENEVER THE FIRE PROTECTION / ALARM SYSTEM IS OUT OF SERVICE. A FIRE WATCH SHALL BE PROVIDED WITH NO LESS THAN ONE (1) MEANS FOR NOTIFICATION OF THE FIRE DEPARTMENT AND PERFORM CONSTANT PATROLS OF THE PROTECTED PREMISES IN ACCORDANCE WITH DSA IR F-2 AND CFC §901.7.

FIRE ALARM SYSTEM ABBREVIATIONS

*NOT ALL ABBREVIATIONS WILL APPLY.

ABBREVIATION	DESCRIPTION
AFF	ABOVE FINISHED FLOOR
AIC	AMPERES INTERRUPTING CAPACITY
ARCH.	ARCHITECT, ARCHITECTURAL
AWG	AMERICAN WIRE GAUGE
C	CEILING
CFC	CALIFORNIA FIRE CODE
CKT	CIRCUIT
C.O.	CONDUIT ONLY WITH PULL WIRE
CU	COPPER
DWG	DRAWING
(E)	EXISTING
EMT	ELECTRICAL METALLIC TUBING
FA	FIRE ALARM
FLR	FLOOR
FT	FEET
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
(N)	NEW
NIC	NOT IN CONTRACT
PNL	PANEL
(R)	REMOVE, REPLACE or RELOCATE
REQ'D	REQUIRED
SF	SQUARE FEET
SHT	SHEET
SW	SWITCH
TYP	TYPICAL
UG	UNDERGROUND
U.O.N.	UNLESS OTHERWISE NOTED
W	WATT
WP	WEATHERPROOF

FIRE ALARM SHEET INDEX

SHEET #	SHEET DESCRIPTION
FA0.0	FIRE ALARM LEGEND, NOTES & INDEX
FA1.0	FIRE ALARM FLOOR PLAN
FA1.1	FIRE ALARM ROOF PLAN
FA2.0	FIRE ALARM DETAILS
FA3.0	FIRE ALARM CALCULATIONS & RISER DIAGRAM

FIRE ALARM GENERAL NOTES

*NOT ALL NOTES WILL APPLY

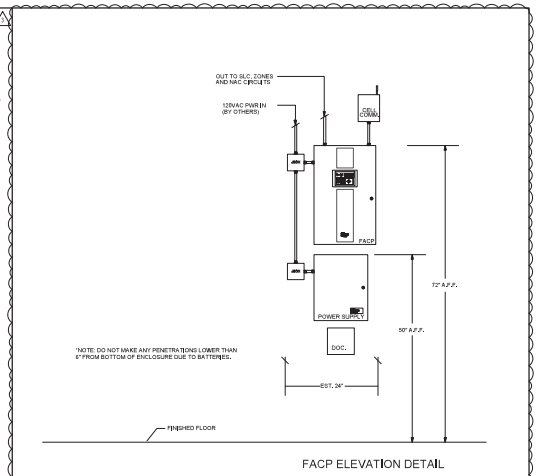
1. APPLICABLE STANDARD NFPA 72, AS ADOPTED AND AMENDED IN CBC CHAPTER 35.
2. INSTALLATION OF THE SYSTEMS SHALL NOT BE STARTED UNTIL DETAILED DESIGN DOCUMENTS AND SPECIFICATION, INCLUDING STATE FIRE MARSHAL LISTING NUMBERS FOR EACH COMPONENT OF THE SYSTEM, HAS BEEN APPROVED BY DSA.
3. UPON COMPLETION OF SYSTEM INSTALLATION, A SATISFACTORY TEST OF THE ENTIRE SYSTEM SHALL BE MADE IN THE PRESENCE OF A DSA PROJECT INSPECTOR.
4. A STAMPED SET OF APPROVED FIRE ALARM DESIGN DOCUMENTS SHALL BE ON THE JOB SITE AND USED FOR INSTALLATION.
5. ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE CODE OR RECOGNIZED STANDARDS SHALL BE BROUGHT TO THE ATTENTION OF DSA AND THE ARCHITECT/ENGINEER OF THE PROJECT.
6. DSA, ARCHITECT/ENGINEER AND OWNER SHALL BE NOTIFIED A MINIMUM OF 48 HOURS PRIOR TO THE FINAL INSPECTION AND/OR TESTING.
7. ALL PENETRATIONS THROUGH RATED ASSEMBLIES REQUIRING OPENING PROTECTION SHALL BE PROVIDED WITH A PENETRATION FIRE STOP SYSTEM AS IDENTIFIED IN CBC CHAPTER 7. UL OR OTHER APPROVED LABELED FIRE STOPPING SYSTEMS, APPROVED TYPES OF MATERIALS SHALL BE IDENTIFIED WITHIN THE PROJECT SPECIFICATIONS WITHIN THE FIRE ALARM SECTION.
8. WALL MOUNTED VISIBLE NOTIFICATION DEVICES SHALL HAVE THEIR BOTTOMS MOUNTED AT 80" MINIMUM AND 96" MAXIMUM FROM THE FINISHED FLOOR.
9. WALL MOUNTED AUDIBLE NOTIFICATION DEVICES SHALL HAVE THEIR TOPS MOUNTED AT 90" MINIMUM AND 100" MAXIMUM FROM FINISHED FLOOR AND NO CLOSER THAN 6" TO A HORIZONTAL STRUCTURE.
10. AUDIBLE DEVICES SHALL PROVIDE A SOUND PRESSURE LEVEL OF 15 DECIBELS (dBA) ABOVE THE AVERAGE AMBIENT SOUND LEVEL OR 5 dBA ABOVE THE MAXIMUM SOUND LEVEL HAVING A DURATION OF AT LEAST 60 SECONDS, WHICHEVER IS GREATER, IN EVERY OCCUPIABLE SPACE WITHIN THE BUILDING.
11. AUDIBLE DEVICES SHALL BE SYNCHRONIZED TEMPORAL CODE 3 PATTERN.
12. THE CONTRACTOR SHALL ADJUST/INSTALL ALL DEVICES TO MAXIMIZE PERFORMANCE AND TO MINIMIZE FALSE ALARMS.
13. VISIBLE DEVICES SHOULD NOT EXCEED TWO FLASHES PER SECOND AND SHOULD NOT BE SLOWER THAN ONE FLASH EVERY SECOND. THE DEVICE SHALL HAVE A PULSING LIGHT SOURCE NOT LESS THAN 15 CANDELLA. VISIBLE DEVICES WITHIN THE SAME VIEW OF EACH OTHER SHALL BE SYNCHRONIZED.
14. UNDERGROUND AND EXTERIOR CONDUITS TO HAVE WATER TIGHT FITTINGS AND WIRE TO BE APPROVED FOR WET LOCATIONS.
15. ALL FIRE ALARM WIRING SHALL BE FPLR OR FPLP (FIRE POWER LIMITED OR FIRE POWER LIMITED PLENUM) AS REQUIRED FOR APPLICATION. WIRING IN CONDUIT ABOVE GROUND MAY BE TYPE THHN OR THWN.
16. PER CEC STANDARDS, ALL WIRING IS TO BE PULLED THROUGH EACH JUNCTION BOX AND CONNECTED DIRECTLY TO EACH FIRE DEVICE, DO NOT SPLICE THE WIRE. ALL BOXES TO BE SIZED PER CEC.
17. SMOKE DETECTORS SHALL NOT BE ANY CLOSER THAN 1' FROM FIRE SPRINKLERS OR 3' FROM ANY SUPPLY DIFFUSER, IN AREA OF CONSTRUCTION OR POSSIBLE DAMAGE/CONTAMINATION ON NEWLY INSTALLED FIRE ALARM, DEVICES SHALL BE COVERED UNTIL THAT AREA IS READY TO BE TURNED OVER TO THE OWNER.
18. ALL FIRE ALARM CIRCUITS SHALL BE IN CONDUIT. SURFACE RACEWAY OR OPEN RUN ABOVE CEILINGS, UNDER FLOORS AND IN WALLS IN A NEAT AND PROTECTED MANOR AS INDICATED ON DESIGN DOCUMENTS. EXPOSED CIRCUITS ARE ONLY PERMITTED WHEN NOTED AS EXPOSED ON DESIGN DOCUMENTS.
19. FIRE ALARM PANEL, REMOTES, AND COMPONENTS SHALL BE SECURED TO MOUNTING SURFACES PER MANUFACTURERS' SPECIFICATIONS, NO SINGLE DEVICE SHALL EXCEED 20 LBS, WITHOUT SPECIAL MOUNTING DETAILS.
20. A DEDICATED BRANCH CIRCUIT SHALL BE PROVIDED FOR FIRE ALARM EQUIPMENT, THIS CIRCUIT SHALL BE ENERGIZED FROM THE COMMON USE AREA PANEL AND SHALL HAVE NO OTHER OUTLETS, THE BREAKER SHALL HAVE A RED LOCKING DEVICE TO BLOCK THE HANDLE IN THE "ON" POSITION. THE CIRCUIT BREAKER SHALL BE LABELED "FIRE ALARM CIRCUIT CONTROL." CIRCUIT TO TO BE LABELED AT FIRE PANEL/EXTENDERS.
21. THE INSTALLING CONTRACTOR SHALL PROVIDE A COMPLETED "SYSTEM RECORD OF COMPLETION" PER NFPA 72, FIGURE 7.8.2(a).
22. FIRE ALARM CONTROL PANELS AND REMOTE ANNUNCIATORS SHALL BE INSTALLED WITH THEIR BOTTOMS MOUNTED AT 48" ABOVE THE FINISHED FLOOR.
23. MICROPHONES ASSOCIATED WITH EMERGENCY VOICE ALARM COMMUNICATION SYSTEMS (EVAC) SHALL BE ACCESSIBLE FOR USE, INSTALLED IN COMPLIANCE WITH CBC SECTIONS 11B-305 AND 11B-308.
24. THE INSTALLING CONTRACTOR SHALL PROVIDE SYSTEM PROGRAMMING FOR SUPERVISORY MONITORING PER CBC SECTION 907.6.6.
25. SUPERVISORY MONITORING SHALL BE TESTED AND VERIFIED AS SENDING CORRECT SIGNALS IN CONJUNCTION WITH FINAL ACCEPTANCE TEST.
26. OWNER SHALL BE RESPONSIBLE FOR ESTABLISHING A FIRE SYSTEM MONITORING CONTRACT OR PROVISIONS.
27. THE AUDIBLE CARBON MONOXIDE ALARM SIGNAL SHALL BE A FOUR-PULSE TEMPORAL PATTERN AND COMPLY WITH THE FOLLOWING:
(1) SIGNALS SHALL BE A PATTERN CONSISTING OF FOUR CYCLES OF 100 MILLISECONDS +/- 10 PERCENT "ON" AND 100 MILLISECONDS +/- 10 PERCENT "OFF".
(2) AFTER THE INITIAL 4 MINUTES OF ALARM THE 1-SECOND "OFF" TIME SHALL BE PERMITTED TO BE CHANGED TO 60 SECONDS +/- 10 PERCENT.
(3) THE ALARM SIGNAL SHALL BE REPEATED IN COMPLIANCE WITH NFPA 72 18.4.3.2(1)(2)(3)(4) UNTIL THE ALARM RESETS OR THE ALARM SIGNAL IS MANUALLY SILENCED.
28. A CARBON MONOXIDE ALARM SIGNAL SHALL TAKE PRECEDENCE OVER SUPERVISORY OR TROUBLE SIGNALS. (NFPA 72 29.2.4.1) THE ACTUATION OF A CARBON MONOXIDE DETECTOR OR SENSOR SHALL BE DISTINCTIVELY INDICATED AS A CARBON MONOXIDE ALARM SIGNAL. (NFPA 72, 29.2.4.1.2)
29. ALL EQUIPMENT SHALL BE NEW UNDERWRITERS LABORATORY AND CALIFORNIA STATE FIRE MARSHAL LISTED.
30. ELECTRICAL CONTRACTOR SHALL FURNISH ACCESS PANELS TO AREAS THAT REQUIRE SERVICING, TROUBLESHOOTING, ETC.
31. DO NOT DEMOLITE FROM CONDUIT RUNS AS SHOWN ON FLOOR PLANS WITHOUT PRIOR APPROVAL FROM SYSTEM SUPPLIER, FACTORS SUCH AS EXCESSIVE VOLTAGE DROP, ADDITIONAL PARTS, ENGINEERING, ETC., THAT ARE A RESULT OF CONDUIT RUN DEVIATIONS SHALL BE THE SOLE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
32. ALL FAN SHUTDOWN FUNCTIONS, DAMPER CLOSURES, AND ASSOCIATED MECHANICAL SYSTEM FIRE ALARM SIGNALING SHALL BE BY MECHANICAL CONTRACTOR IN ACCORDANCE WITH CMC §608.
33. ALL DUCT SMOKE DETECTORS SHALL BE MOUNTED BY THE MECHANICAL CONTRACTOR, DUCT SMOKE DETECTORS SHALL BE EXPOSED TO THE AIRSTREAM SHALL BE WEATHER PROTECTED BY THE MECHANICAL CONTRACTOR, ALL AIR VELOCITY TESTING SHALL BE PERFORMED BY THE MECHANICAL CONTRACTOR.
34. ALL 120VAC POWER REQUIREMENTS FOR THE FIRE ALARM SYSTEM SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR AND SHALL MEET ALL REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION.
35. ALL FIRE ALARM DEVICE BACKBOXES, FIRE ALARM TERMINAL CABINETS, GUTTERS, JUNCTION BOXES, AND ASSOCIATED CONDUITS SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR UNLESS OTHERWISE NOTED, REFER TO FIRE ALARM SYMBOL LIST AND/OR MOUNTING DETAILS FOR ADDITIONAL INFORMATION. SYSTEM SUPPLIER PROVIDED BACKBOXES SHALL BE INSTALLED BY ELECTRICAL CONTRACTOR UNLESS OTHERWISE NOTED.
36. SMOKE DETECTOR TESTING SHALL BE ACCOMPLISHED PER THE MANUFACTURER'S INSTRUCTIONS.
37. NO WIRING INITIATING DEVICES AND ANNUNCIATOR PANEL SHALL BE SUPERVISED TO THE PRINCIPAL POINT OF ANNUNCIATION. THE FIRE ALARM CONTROL PANEL TO SUPERVISE THE ANNUNCIATOR PANEL, ALL INITIATING AND INDICATING CIRCUITS.
38. ALL WIRING SHALL BE CUT FOR IN AND OUT-WIRING SHALL NOT BE LOOPED THROUGH DEVICES.
39. POINT, COMMON ANNUNCIATION, AND T-TAPPING ARE PROHIBITED.
40. PROVIDE 3/4" CONDUIT FROM FIRE ALARM CONTROL PANEL TO TELEPHONE BACKBOARD FOR OWNER PROVIDED CENTRAL STATION MONITORING.
41. ALL CONDUIT SHALL BE 3/4" MINIMUM, UNLESS OTHERWISE NOTED.
42. ALL FIRE SPRINKLER WATER FLOW SWITCHES SHALL BE 2 WIRE WITH NON-ELECTRONIC RETARD TYPE.
43. ALL DEVICES IN THE ALARM SYSTEM SHALL BE COMPATIBLE AND INSTALLED PER MANUFACTURER'S SPECIFICATIONS.
44. FIRE ALARM SYSTEM SHALL BE UL LISTED (UUUS).
45. CBC 907.6.6.4 GROUP E SCHOOLS: AUTOMATIC FIRE ALARM SYSTEMS SHALL BE MONITORED AND SHALL TRANSMIT THE ALARM, SUPERVISORY AND TROUBLE SIGNALS TO AN APPROVED SUPERVISING STATION IN ACCORDANCE WITH NFPA 72. THE SUPERVISING STATION SHALL BE LISTED AS EITHER UUFX (CENTRAL STATION) OR UUJS (REMOTE & PROPRIETARY) BY THE UNDERWRITERS LABORATORY INC. (UL) OR OTHER APPROVED LISTING AND TESTING LABORATORY OR SHALL COMPLY WITH THE REQUIREMENTS OF NFPA STANDARD, FM 3011. TERMINATION OF MONITORING SERVICES SHALL BE IN ACCORDANCE WITH SECTION 907.6.6.2.
46. SUBSTITUTION OF SYSTEM COMPONENTS OR MANUFACTURER WILL REQUIRE THE CONTRACTOR TO SEPARATELY OBTAIN APPROVAL WITH THE CSFM AT CONTRACTOR'S EXPENSE AND SHALL MEET ALL REQUIREMENTS OF THE SYSTEM AS DESIGNED AND PRE-APPROVED. ALL PROPOSED SUBSTITUTIONS SHALL BE REVIEWED WITH THE PROJECT FROM START TO

FIRE ALARM SHEET NOTES

1. INSTALL DUAL INPUT MODULES TO MONITOR FIRE SPRINKLER WATER FLOW AND EXTERIOR SUPERVISORY TAMPER SWITCHES. REFERENCE FIRE SPRINKLER AND CIVIL PLANS FOR LOCATIONS OF EXTERIOR SWITCHES.
2. EXTERIOR FIRE SPRINKLER BELL SHOWN FOR REFERENCE ONLY. TO BE PROVIDED, INSTALLED AND POWERED BY OTHERS.
3. INSTALL NEW FIRE ALARM CONTROL PANEL, NAC POWER SUPPLY, CELLULAR COMMUNICATOR AND FIA DOCUMENT BOX IN THIS LOCATION. SEE ELEVATION DETAIL ON THIS SHEET FOR MOUNTING DIMENSIONS.
4. RISER UP TO ROOF HVAC UNIT(S). FOLLOW HVAC MECHANICAL CHASE AS MUCH AS POSSIBLE. FIELD VERIFY LOCATION(S) OF RISERS PRIOR TO ROUGH IN.
5. INSTALL FIRE ALARM ANNUNCIATOR, PULL STATION AND HORN STROBE IN LOBBY/FOYER AREA. MOUNT PULL STATION AS PER NFPA 72.
6. INSTALL DUCT SMOKE DETECTOR IN HVAC DUCT FOR FSD ACTIVATION IN ACCORDANCE WITH NFPA 72 §17.7.6.4.1.
7. INSTALL ADDRESSABLE RELAY MODULE FOR CONTROL OF FIRE SMOKE DAMPERS. FIRE SMOKE DAMPERS ARE TO BE INSTALLED IN A "DAISY CHAIN" MANNER FOR ACTIVATION OF BOTH UPON SMOKE DETECTION. FIRE SMOKE DAMPERS ARE PROVIDED, INSTALLED AND POWERED BY OTHERS.

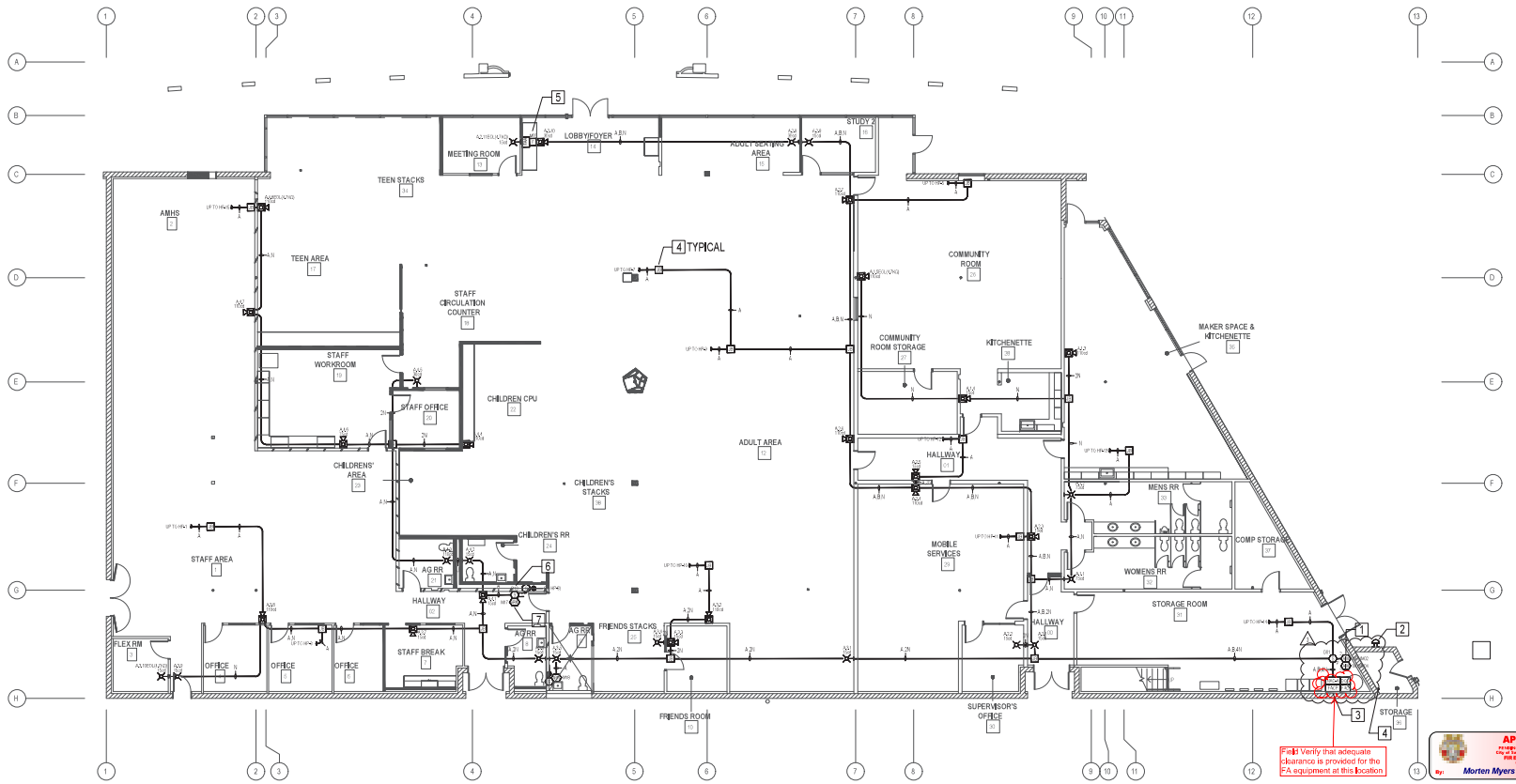
ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.



FACP ELEVATION DETAIL

2 FACP ELEVATION DETAIL
SCALE: AS SHOWN



1 FIRE ALARM FLOOR PLAN
SCALE: 1/8" = 1'-0"

PBK

ARCHITECT PBK Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-8922

MEP Engineering & Technology
LEAF ENGINEERS
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630
916.355.8922
LEAF Engineers.com

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN

PLAN NORTH / TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
STEVEN C. MOSSER
E-19817
Exp. 3-31-25
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: C.Y. CHKED BY:

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5/25/25
2	OWNER CHANGES	5/25/25
3	REVISIONS	6/12/25

CONSTRUCTION DOCUMENT

FIRE ALARM FLOOR PLAN

This document is for plan review only

FA1.0

220389_NSHL T1_FA_DELTA 3_6-12-2025
PBKIa TBV.2 2019.10.03

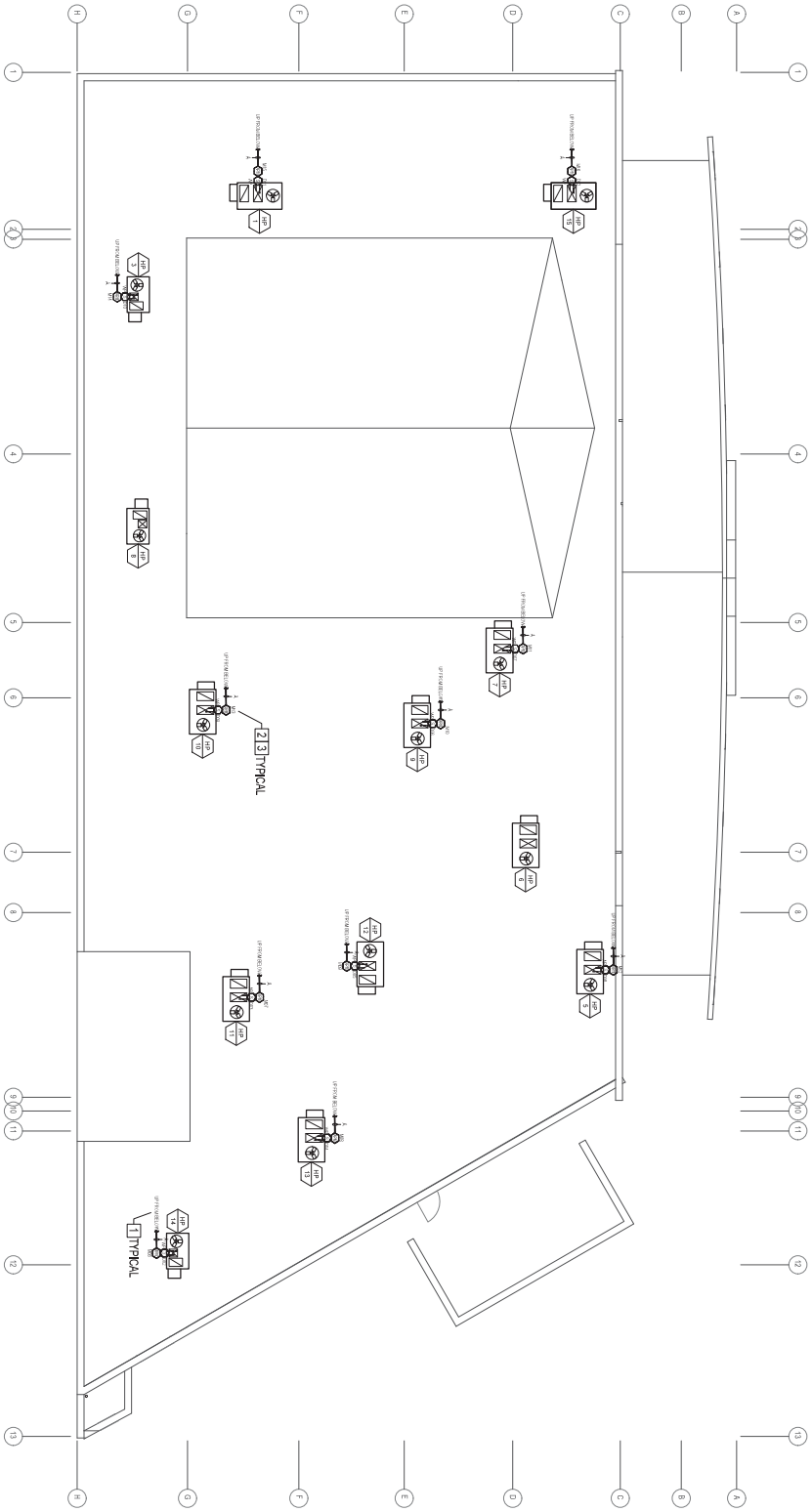
\\pbkdfs\PBKInc\Projects\FOL\2022\220389-3-CD\Drawings\Cns\MEP\FA
6/17/2025 2:34:47 PM

JOBCOPY

1124 DEL PASO BLVD

COM-2500586

1 FIRE ALARM ROOF PLAN
SCALE: 1/16"=1'-0"



FIRE ALARM SHEET NOTES

1. REFER UP FROM BELOW, FOLLOW HVAC/MECH/ARCH. CHASE AS MUCH AS POSSIBLE. FIELD VERIFY LOCATION(S) OF RISERS PRIOR TO ROUGH-IN.
2. INSTALL SMOKE DETECTOR IN RETURN AIR PATH BEFORE THE SUPPLY DUCT OF HVAC UNIT IN ACCORDANCE WITH NFPA 72 AND CMC 606.
3. INSTALL ADDRESSABLE RELAY MODULE FOR HVAC UNIT FAN SHUT DOWN ON SMOKE DETECTION.

ISSUED BY
Saul Moran
on: Jul 15, 2025

This set of plans and specifications and the ideas, designs and arrangements indicated thereon are and shall remain the property of LEAF Architecture and shall not be used in whole or part without written permission from the Architect. Visual contact with these plans shall constitute prima facie evidence of the acceptance of these restrictions. The reproduction of these plans and specifications for any purpose whatsoever without the express written permission of LEAF Architecture is forbidden and any infringement upon the rights of LEAF Architecture will be prosecuted to the full extent of the law. Unauthorized use of these plans and specifications without the express written permission and approval of LEAF Architecture shall be at the user's sole risk and without liability to LEAF Architecture and the user shall indemnify and hold harmless LEAF Architecture from all claims, damages, losses, expenses, including attorney's fees arising out of or resulting therefrom. Visual contact with these plans shall constitute prima facie evidence of the acceptance of these restrictions. Unauthorized use of these plans and specifications shall be at the user's sole risk and without liability to the Architect and the user shall indemnify and hold harmless the Architect from all claims, damages, losses, expenses, including attorney's fees arising out of or resulting therefrom.

APPROVED
Morten Myers
07:42:14 PM 2025

This document is for plan review only

FA1.1
FIRE ALARM ROOF PLAN
CONSTRUCTION DOCUMENT

NO.	DESCRIPTION	DATE
1	SCHEMATIC DESIGN	3/15/24
2	DESIGN DEVELOPMENT	5/31/24
3	50% CONSTRUCTION DOCUMENTS	8/30/24
4	95% CONSTRUCTION DOCUMENTS	12/19/24

PBRA
CITY OF SACRAMENTO
PROJECT NUMBER
2220389
DATE 12/19/2024
DRAWN BY C.Y.
CHKED BY
REVISIONS

REGISTERED PROFESSIONAL ENGINEER
Andrew Eggerer
No. E-28817
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

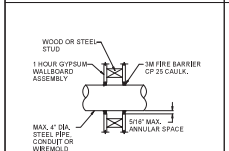
KEY PLAN
A
PBK
NORTH

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

ARCHITECT
LEAF Architecture
1110 Point Pleasant Blvd, Ste 100
Mt. Pleasant, SC 29464
843.216.0321
MEP Engineering & Transmittal by
PBK Architects

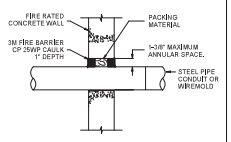
220389_NSHL TI_FA_DELTA 2_2-21-2025
Plotted: 12/19/2024 - 2:09:16 PM

GYPSUM BOARD WALL PENETRATION



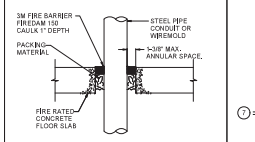
UL #WL1001
JUNE 15, 2005

CONCRETE WALL PENETRATION



UL #CAJ1044
MARCH 15, 2007

CONCRETE FLOOR PENETRATION



UL #CAJ1017
MARCH 14, 2023

ITEM 1

WALL ASSEMBLY - THE 1, 2, 3 OR 4 HOUR FIRE RATED GYPSUM WALL BOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER DESCRIBED IN THE INDIVIDUAL U300 OR U400 SERIES WALL PARTITION DESIGN IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:

A. STUDS - WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS (MAX. 2 HR. RATED ASSEMBLIES) OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOMINAL 2" X 4" LUMBER SPACED IN 16" ON CENTER WITH NOMINAL 2" X 4" LUMBER AND PLATES AND CROSS BRACES. STEEL STUDS TO BE MINIMUM 3-5/8" WIDE BY 1-3/8" DEEP CHANNELS SPACED MAXIMUM 24" ON CENTER.
B. WALLBOARD/GYPSUM - NOMINAL 5/8" THICK, 4' WIDE SQUARE OR TAPERED EDGES, THE GYPSUM WALLBOARDS IN'PS, THICKNESS, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE SPECIFIED IN THE INDIVIDUAL U300 OR U400 DESIGN IN THE UL FIRE RESISTANCE DIRECTORY.

MAXIMUM DIAMETER OF OPENINGS IS 1'-1/2".

APPROVED
CITY OF SACRAMENTO
LIFE SAFETY
By: Chad Aleck
on Jul 01, 2025

SYSTEM NUMBER: WL1001 (FORMERLY SYSTEM NUMBER 147)
F RATINGS: 1, 2, 3 AND 4 HOUR (SEE ITEMS 2 AND 3)
T RATINGS: 0, 1, 2, 3 AND 4 HOUR (SEE ITEM 3)
L RATING AT AMBIENT: LESS THAN 1 CFM/SQ FT (SEE ITEM 3)

ITEM 2

PIPE OR CONDUIT - NOMINAL 12" IN DIAMETER (OR SMALLER) SCHEDULE 10 (OR HEAVIER), STEEL PIPE NOMINAL 6" IN DIAMETER (OR SMALLER); STEEL CONDUIT NOMINAL 4" IN DIAMETER (OR SMALLER); STEEL ELECTRICAL METALLIC TUBING OR TYPE L (OR HEAVIER), COPPER TUBING NOMINAL 1" IN DIAMETER (OR SMALLER); FLEXIBLE STEEL CONDUIT. WHEN COPPER PIPE OR FLEXIBLE STEEL CONDUIT IS USED, MAXIMUM F RATING OF FIRESTOP SYSTEM (ITEM CONSTRUCTED USING STEEL CHANNEL STUDS). A MAXIMUM OF ONE (1) PIPE OR CONDUIT IS PERMITTED IN THE FIRESTOP SYSTEM. PIPE OR CONDUIT TO BE INSTALLED NEAR CENTER OF STUD CAVITY WIDTH AND TO BE RIGIDLY SUPPORTED IN BOTH SIDES OF WALL ASSEMBLY.

ITEM 3

FILL, VOID OR CAVITY MATERIAL, CAULK - CAULK FILL MATERIAL INSTALLED TO COMPLETELY FILL ANNULAR SPACE BETWEEN PIPE OR CONDUIT AND GYPSUM WALLBOARD AND WITH A MINIMUM OF 2" IN DIAMETER BOARD OF CAULK APPLIED TO PERIMETER OF PIPE OR CONDUIT AT ITS EGRESS FROM THE WALL. CAULK INSTALLED SYMMETRICALLY ON BOTH SIDES OF WALL ASSEMBLY. THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS DEPENDENT UPON THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED, AS SHOWN IN THE FOLLOWING TABLE. IN THE HOURLY T RATING OF THE FIRESTOP SYSTEM IS DEPENDENT UPON THE TYPE OR SIZE OF THE PIPE OR CONDUIT AND THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED AS TABULATED BELOW:

MAX PIPE OR CONDUIT DIA. (INCHES)	ANNULAR SPACE (INCHES)	F RATING (HOURS)	T RATING (HOURS)
1	0 TO 3/16	1 OR 2	0 + 1 OR 2
1	1/4 TO 1/2	3 OR 4	3 OR 4
4	0 TO 1/4	1 OR 2	0
6	1/4 TO 1/2	3 OR 4	0
12	3/16 TO 3/8	1 OR 2	0

•WHEN COPPER PIPE IS USED, T RATING IS 0 NOMINAL
MINNESOTA MINING & MFG. CO. - TYPES CP-23 S/L, CP-25 WB, CP-25 WS, CP-25 WS + (NOTE: L RATINGS APPLY WHEN THE TYPE CP-25WS+CAULK IS USED)

THROUGH WALL & FIRE STOP PENETRATION DETAILS 01

ALL WORK SHALL BE IN CONFORMANCE WITH TITLE 24, 2022 CALIFORNIA CODE OF REGULATIONS (CCR), 2022 CALIFORNIA BUILDING CODE, PART 2, TITLE 24 CCR, 2022 CALIFORNIA ELECTRICAL CODE, PART 3, TITLE 24 CCR

CUTTING, BORING, SAWCUTTING OR DRILLING THROUGH THE NEW OR EXISTING STRUCTURAL ELEMENTS TO BE DONE ONLY WHEN SO DETAILED IN THE DRAWINGS OR ACCEPTED BY THE ARCHITECT AND STRUCTURAL ENGINEER WITH THE APPROVAL OF DSA REPRESENTATIVE.

MEP COMPONENT ANCHORAGE NOTE

ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS.

THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2022 CBC SECTIONS 1617A.1.18 THROUGH 1617A.1.26 AND ASCE 7-16 CHAPTERS 13, 26 AND 30:
1. ALL PERMANENT EQUIPMENT AND COMPONENTS.
2. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT THAT IS PERMANENTLY ATTACHED (E.G. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/220 VOLT RECEPTACLES HAVING A FLEXIBLE CABLE.
3. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN 400 POUNDS OR HAS A CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT IS REQUIRED TO BE RESTRAINED IN A MANNER APPROVED BY DSA.

THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE BUT NEED NOT DEMONSTRATE DESIGN COMPLIANCE WITH THE REFERENCES NOTED ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING AND CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTIONS:
A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

THE ANCHORAGE OF ALL MECHANICAL, ELECTRICAL AND PLUMBING COMPONENTS SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY AND ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH ABOVE REQUIREMENTS.

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE

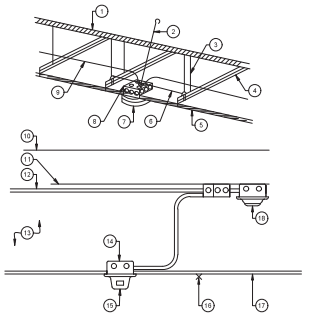
PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-16 SECTION 13.3 AS DEFINED IN ASCE 7-16 SECTIONS 13.6.5, 13.6.6, 13.6.7, 13.6.8, AND 2022 CBC SECTIONS 1617A.1.24, 1617A.1.25 AND 1617A.1.26.

THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW, WHEN BRACING AND ATTACHMENTS ARE BASED ON A PREAPPROVED INSTALLATION GUIDE (E.G., HCAI OPM FOR 2013 CBC OR LATER), COPIES OF THE BRACING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF AND DURING THE HANGING AND BRACING OF THE DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

MECHANICAL/PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEMS (E):

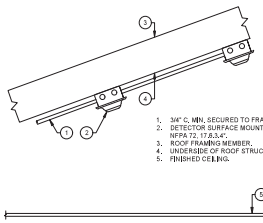
MP [ ] MD [ ] PP [ ] E [X] OPTION 1: DETAILED ON THE APPROVED DRAWINGS WITH PROJECT SPECIFIC NOTES AND DETAILS.
MP [ ] MD [ ] PP [ ] E [ ] OPTION 2: SHALL COMPLY WITH THE APPLICABLE HCAI PRE-APPROVAL (OPM #) #_____

1. PERMANENT CEILING.
2. SEISMIC HANGER.
3. HANGERS
4. T-BAR
5. DROP CEILING TILE.
6. T-BAR BOX SUPPORT BRACKET.
7. SMOKE DETECTOR
8. 4" Sq. BOX.
9. 3/4" MINIMUM METALLIC CONDUIT.
10. UNDERSIDE OF ROOF STRUCTURE.
11. ROOF FRAMING MEMBER.
12. 3/4" MINIMUM CONDUIT, CONCEAL IN ATTIC SPACE.
13. CEILING SPACE.
14. JUNCTION BOX MOUNTED IN CEILING (SEE NOTE).
15. SMOKE DETECTOR.
16. "PERMANENT MARKER" INDICATES THE LOCATION OF THE HEAT DETECTOR IN THE ATTIC SPACE. RED LETTER ON WHITE BACKGROUND SHALL BE 3/4" HIGH.
17. FINISH CEILING.
18. HEAT DETECTOR.



REFERENCE NFPA 72, CHAPTER 17

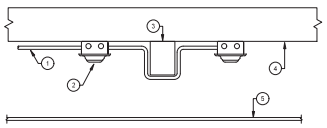
ANCHORAGE AND BRACING NOTES 02



1. 3/4" C. MIN, SECURED TO FRAME/CEILING.
2. DETECTOR SURFACE MOUNT SLOPED AS PER NFPA 72, 17.6.3.4*.
3. ROOF FRAMING MEMBER.
4. UNDERSIDE OF ROOF STRUCTURE.
5. FINISHED CEILING.

REFERENCE NFPA 72, CHAPTER 17.6.3*

CEILING & ABOVE CEILING DETECTOR MOUNTING DETAIL 04

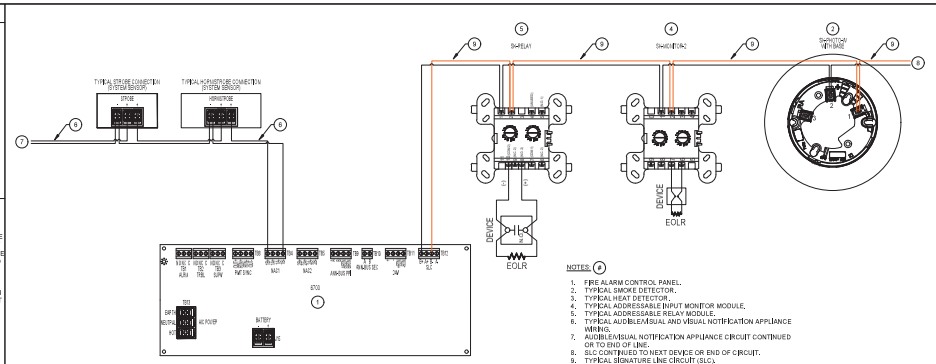


1. 3/4" MIN. CONDUIT SECURED TO FRAME/CEILING.
2. DETECTOR SURFACE MOUNTED IN ACCORDANCE WITH NFPA 72, 17.6.3.3.1.2.
3. ROOF FRAMING MEMBER/JOIST/BEAM PROJECTED MORE THAN 4 IN. (100mm) BELOW STRUCTURE.
4. UNDERSIDE OF ROOF STRUCTURE.
5. FINISHED CEILING.

REFERENCE NFPA 72, CHAPTER 17.6.3.3.1

ABOVE CEILING SLOPED DETECTOR MOUNTING DETAIL 03

PORTABLE ABOVE CEILING DETECTOR MOUNTING DETAIL 05



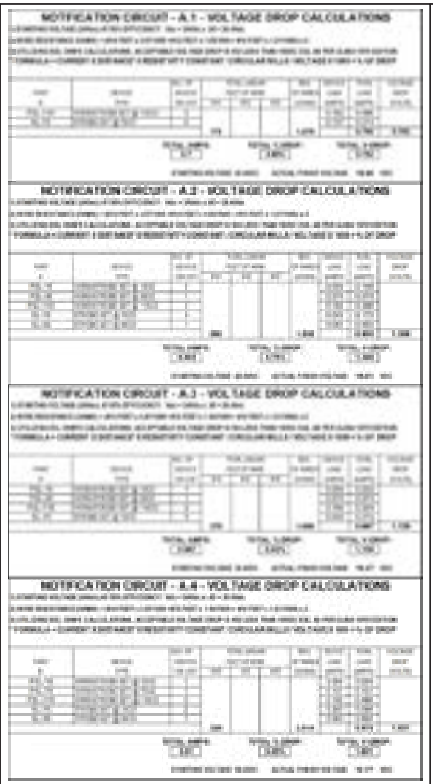
220389, NSHL TI, FA_DELTA 2_5-21-2025
Plotted: 5/21/2025 12:00:40 PM
\\pbkdfs\PBKInc\Projects\FOL\2022\220389\3-CD\Drawings\Cities\MEP\FFA



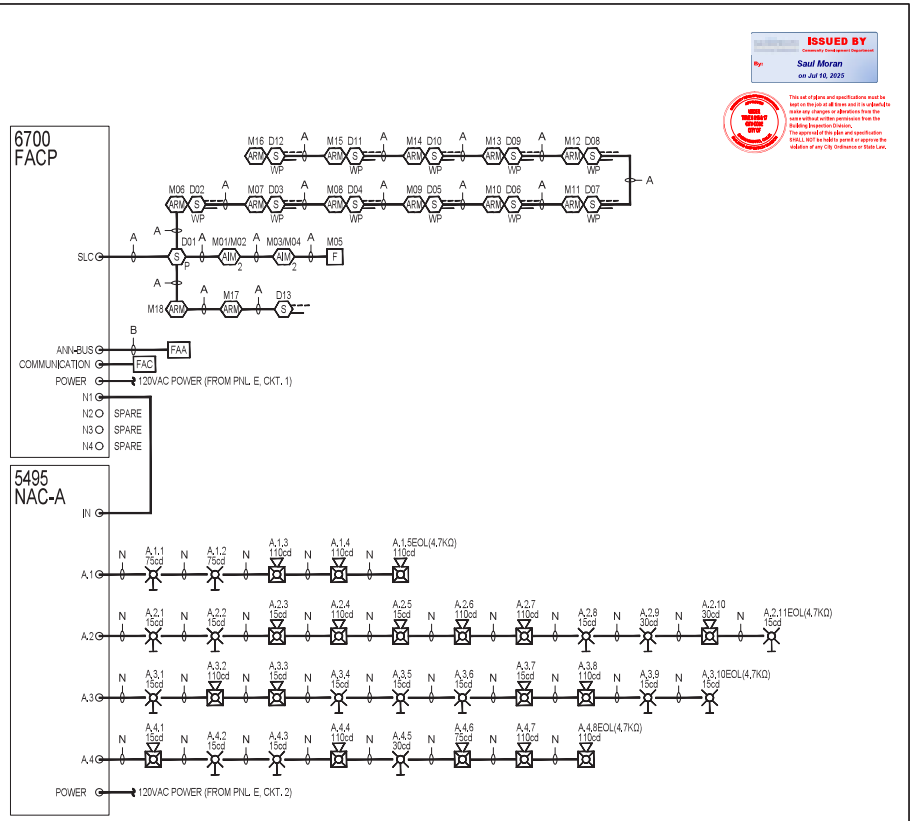
NOTES:

1. INSTALL TWO 12VDC, 12AH BATTERIES IN FACP ENCLOSURE.
2. INSTALL TWO 12VDC, 7AH BATTERIES IN POWER SUPPLY ENCLOSURE.

FIRE ALARM BATTERY CALCULATIONS | 01



FIRE ALARM VOLTAGE DROP CALCULATIONS | 02



FIRE ALARM RISER DIAGRAM | 03

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

FIRE ALARM FUNDAMENTAL OF DESIGN: CALCULATIONS

AS STATED IN NFPA 72, CHAPTER 10.3.3: EQUIPMENT SHALL BE DESIGNED SO THAT IT IS CAPABLE OF PERFORMING ITS INTENDED FUNCTIONS UNDER THE FOLLOWING CONDITIONS:

(1) *AT 85 PERCENT AND AT 110 PERCENT OF THE NAMEPLATE PRIMARY (MAIN) AND SECONDARY (STANDBY) INPUT VOLTAGE(S)
(2) AT AMBIENT TEMPERATURES OF 32°F (0°C) AND 120°F (49°C)
(3) AT A RELATIVE HUMIDITY OF 85 PERCENT AND AN AMBIENT TEMPERATURE OF 86°F (30°C)

AS PER THE MANUFACTURE, THE FIRE ALARM CONTROL PANEL'S LISTED VOLTAGE IS 24VDC. THE OPERATING VOLTAGE RANGES FROM 20.4VDC TO 28.4VDC.

WHERE BACK-UP BATTERIES ARE USED, THE BATTERY CALCULATIONS ARE BASED ON A BACK-UP POWER (BATTERY) THAT DERATED BY 20%.

EXAMPLE:

BATTERY POWER (24VDC) X 85% = DERATING FACTOR (STARTING VOLTAGE)

24VDC X .85 = 20.4VDC

AS PER UL864, 10TH EDITION, THE NOTIFICATION APPLIANCES MUST OPERATE BETWEEN 16VDC AND 33VDC AND STATES THAT THE END OF LINE VOLTAGE FOR A NOTIFICATION APPLIANCE CIRCUIT MUST BE NOT LESS THAN 16VDC (MANUFACTURES UL LISTED OPERATING VOLTAGE). THUS ALL NOTIFICATION APPLIANCE CIRCUITS ARE CALCULATED WITH A 20% DERATED FACTOR AND THE STARTING VOLTAGE IN 20.4VDC. ALTHOUGH THE PERCENTAGE OF VOLTAGE DROP MAY VARY, ALL NOTIFICATION APPLIANCE CIRCUITS AND BATTERY CALCULATIONS MUST AND WILL CONFORM TO THIS STANDARD.

APPROVED
FIRE/LIFE/SAFETY INSPECTION
Approved as noted on plan
By: Morten Myers on Jun 19, 2025

ARCHITECT
PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4718
916-355-8922
MEP Engineering & Technology
LEAF Engineers
1180 Iron Point Rd., Suite 250
Folsom, CA 95630
916.293.4913
LEAFengineers.com

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER C. MCGOWAN
E-19617
5-31-26
ELECTRICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/19/2024
DRAWN BY: C.Y. CHKED BY:

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	5.23.25
3	OWNER CHANGES	5.23.25

CONSTRUCTION DOCUMENT

FIRE ALARM CALCULATIONS & RISER DIAGRAM

FA3.0

This document is for plan review only

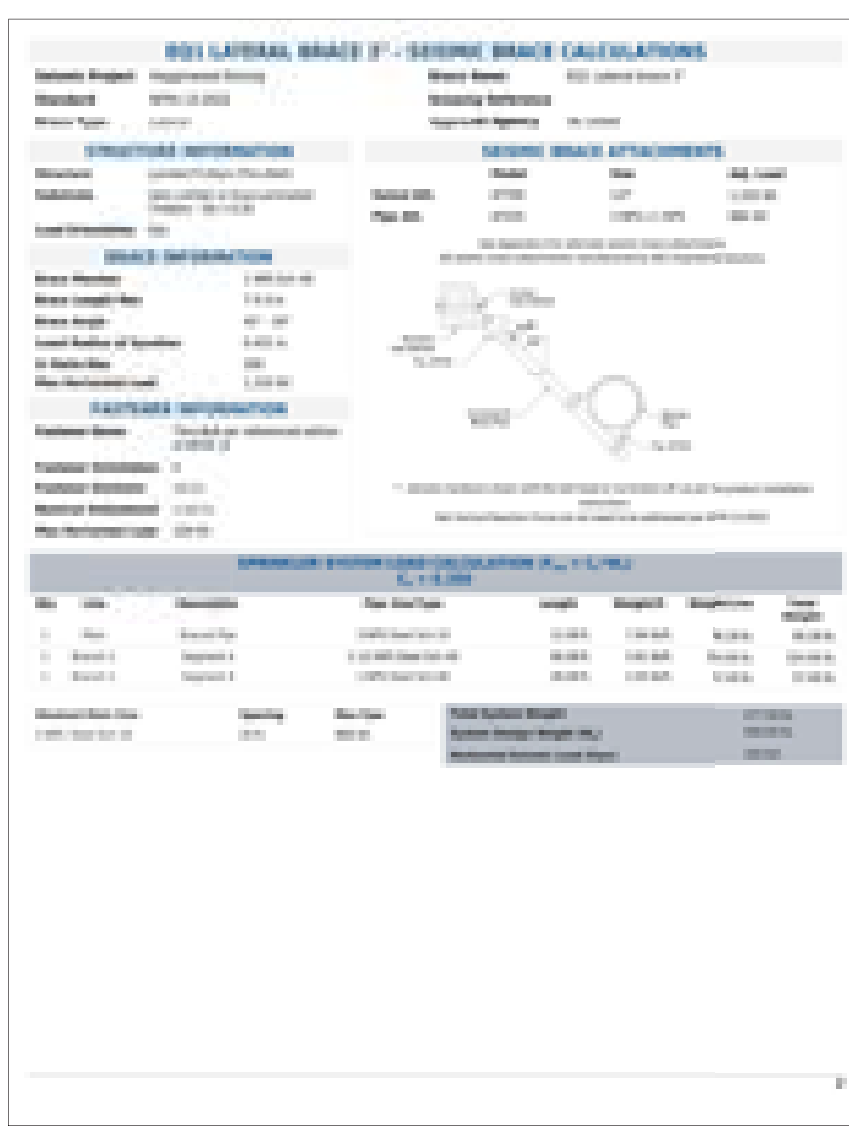
JOBCOPY
1124 DEL PASO BLVD
COM-2500586

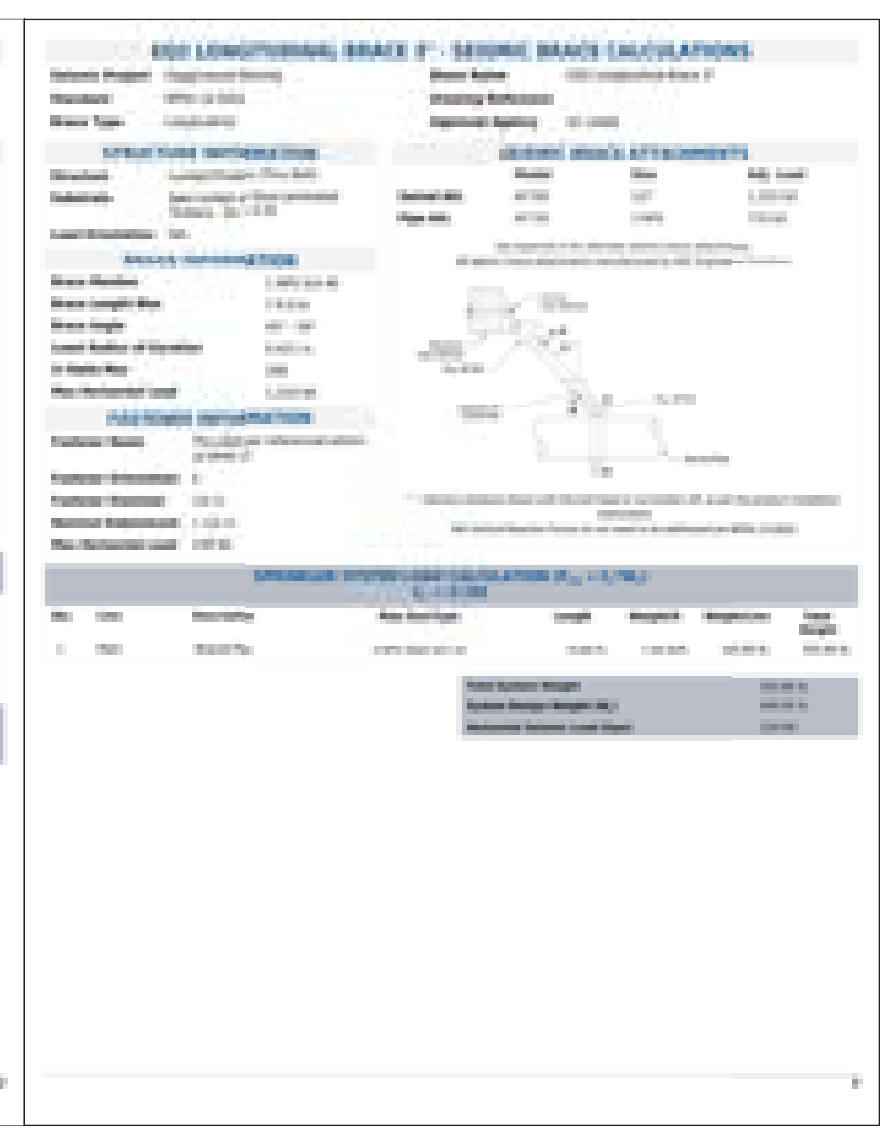
PBKca TBv1.2 2019.10.03

SCOPE OF WORK

FURNISH NEW WET-PIPE FIRE SPRINKLER SYSTEM PER NFPA-13, 2022 EDITION, THE CITY OF SACRAMENTO WATER AND THE CITY OF SACRAMENTO FIRE DEPARTMENT AT THE EXISTING NORTH SACRAMENTO HAGGINWOOD LIBRARY TENANT IMPROVEMENT.







FIRE PROTECTION NOTES

1. ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS AMENDED AND ADOPTED BY THE INSPECTION AUTHORITY. NOTHING IN THESE PLANS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THIS PROJECT.
   A. CALIFORNIA FIRE CODE, 2022
   B. NFPA-13, 2022,
   C. CITY OF SACRAMENTO FIRE DEPARTMENT STANDARDS
   D. CALIFORNIA BUILDING CODE - 2022
   E. CALIFORNIA MECHANICAL CODE - 2022
   F. CALIFORNIA PLUMBING CODE - 2022
   G. CALIFORNIA ELECTRICAL CODE - 2022
   H. STATE OF CALIFORNIA ENERGY CONSERVATION REGULATIONS, TITLE 24 - 2022
   I. NATIONAL FIRE PROTECTION ASSOCIATION
   J. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
2. SEISMIC RESTRAINT: HANGERS AND BRACING ARE REQUIRED TO COMPLY WITH 2022 CBC SECTION 1613 OR ASCE 10.
3. THE CONTRACTOR SHALL SURVEY EXISTING FIELD CONDITIONS PRIOR TO BIDDING.
4. ANY DAMAGE TO NEW BUILDING ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL SYSTEMS THAT OCCURS DURING THE WORK SHALL BE RESTORED TO THE ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE. IF LANDSCAPED AREAS INCLUDING NATURAL SPACES MUST BE USED FOR BUILDING ACCESS, THE LANDSCAPING SHALL BE RETURNED TO ITS ORIGINAL CONDITION. THE CONTRACTOR SHALL INCLUDE COSTS IN THE BID FOR THIS WORK IF THIS APPROACH IS USED. THE OWNER WILL NOT PAY ANY ADDITIONAL COSTS TO COVER DAMAGE TO THE BUILDING SYSTEMS, LANDSCAPING OR DRIVE AREAS.
5. COORDINATE THE FOLLOWING WITH ARCHITECTURAL, STRUCTURAL, MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS AND ELEMENTS AS INSTALLED, INCLUDING EXISTING BUILDING SYSTEMS:
   A. EXACT LOCATION OF ALL EQUIPMENT.
   B. ALL PENETRATIONS THRU ROOF, WALLS AND FLOORS.
   C. EXACT SIZE AND ROUTING OF PIPING.
6. DRAWINGS INDICATE DIAGRAMMATICALLY THE ARRANGEMENT OF PRINCIPAL APPARATUS, PIPING, AND OTHER MATERIAL. FOLLOW DRAWING AS CLOSELY AS POSSIBLE, IN ORDER TO ACHIEVE A NEAT ARRANGEMENT OF PIPING AND EQUIPMENT WHILE STILL OVERCOMING OBSTRUCTIONS.
7. INSTALLATION OF THE SPRINKLER SYSTEM SHALL NOT BE STARTED UNTIL COMPLETE PLANS AND SPECIFICATIONS, INCLUDING WATER SUPPLY INFORMATION, HAVE BEEN APPROVED BY THE CITY OF SACRAMENTO. AT VARIOUS STAGES AND UPON COMPLETION, THE SYSTEM MUST BE TESTED IN THE PRESENCE OF THE AUTHORITY HAVING JURISDICTION (IOR).
8. ALL EXISTING FIRE PROTECTION SYSTEMS SHALL REMAIN IN OPERATION DURING ALL PHASES OF CONSTRUCTION. NO SYSTEMS ARE TO BE SHUTDOWN WITHOUT AUTHORIZATION FROM THE OWNER AND LOCAL FIRE DISTRICT.
9. THE LOCATION OF FIRE SPRINKLER HEADS SHALL BE COORDINATED WITH THE NEW CEILING LAYOUTS AND ALL OTHER TRADES FOR COMPLETE FIRE PROTECTION COVERAGE OF ALL AREAS. PROVIDE DETAILED PLANS FOR APPROVAL PRIOR TO INSTALLATION.
10. HEADS SHALL BE SYMMETRICALLY LOCATED IN CENTER OR QUARTER POINT OF CEILING PANELS, COORDINATE LAYOUT WITH CEILING OR SOFFIT LIGHT FIXTURES, AND HVAC DIFFUSERS, RETURNS, ETC. PROVIDE PENDENT AND/OR UPRIGHT TYPE SPRINKLER HEAD WHERE REQUIRED.
11. WORKMANSHIP:
    ALL WORK SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER ACCORDING TO THE BEST TRADE PRACTICE BY THOSE SKILLED IN THE PARTICULAR TRADE. PIPES, EQUIPMENT, ETC., TO BE INSTALLED LEVEL, SQUARE OR CENTERED, ETC., TO GIVE A NEAT AND PLEASING APPEARANCE. ALL EQUIPMENT IS TO BE INSTALLED STRICTLY PER MANUFACTURER'S RECOMMENDATIONS. COORDINATE ALL WORK WITH OTHER TRADES.
12. THE ANNULAR SPACE BETWEEN PIPE SLEEVES AND THE PIPE THROUGH ALL RATED WALLS AND FLOORS SHALL BE FIRESTOPPED, FIRESTOPPING OF ALL PIPE PENETRATIONS SHALL COMPLY WITH U.L. REQUIREMENTS, MANUFACTURER PREAPPROVED UL PENETRATION FOR PIPE MATERIAL AND SURFACE PENETRATED SHALL BE USED, PENETRATIONS SHALL BE 3M, PROSET, OR APPROVED EQUAL. SUBMIT SHOP DRAWINGS.
13. BY OTHERS:
    A. ELECTRICAL CONTRACTOR: ALL POWER AND ALARM WIRING, CONDUITS, DISCONNECTS, AND FINAL CONNECTIONS, NO FIELD SUPPLIED ELECTRICAL DEVICE SHALL BE MOUNTED ON PIPING AND NO RIGID ELECTRICAL CONNECTIONS SHALL BE MADE.
    B. GENERAL CONTRACTOR: CUTTING, FRAMING, PATCHING, FURRING, AND PAINTING.
14. WARRANTY:
    ALL MATERIALS AND EQUIPMENT INSTALLED UNDER THIS CONTRACT SHALL BE GUARANTEED FREE FROM ALL FIRE PROTECTION, ELECTRICAL AND WORKMANSHIP DEFECTS FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGES TO THE PREMISES CAUSED BY LEAKS AND/OR BREAKS IN PIPES AND FIXTURES INSTALLED UNDER THIS CONTRACT.
15. IT IS THE INTENTION OF THE PLANS AND SPECIFICATIONS TO COVER ALL THINGS REQUIRED TO PROVIDE COMPLETE AND OPERATIVE SYSTEMS. THE CONTRACTOR IS TO FURNISH ALL LABOR, MATERIALS, TRANSPORTATION, EQUIPMENT, MISCELLANEOUS SERVICES, ETC., REQUIRED TO ACCOMPLISH THIS RESULT, ANYTHING WHICH MAY BE REASONABLY CONSTRUED AS A NECESSARY PART OF THE INSTALLATION IS TO BE INCLUDED, WHETHER SPECIFICALLY SHOWN OR MENTIONED, THE ENGINEER WILL GIVE ANY INTERPRETATIONS NECESSARY FOR THE CONTRACTOR TO PROPERLY ESTIMATE THE JOB.
16. FIRE SPRINKLER CONTRACTOR IS RESPONSIBLE FOR FABRICATION AND INSTALLATION DRAWINGS. AUTOCAD DRAWINGS WILL NOT BE PROVIDED.
17. LICENSED C-16 CONTRACTOR SHALL BE IDENTIFIED PRIOR TO INSTALLATION.

GENERAL NOTES

1. THE SYSTEM DESIGN AND INSTALLATION SHALL COMPLY WITH NFPA 13, 2022 EDITION.
2. ALL PIPE 2" AND SMALLER SHALL BE SCHEDULE 40, BLACK STEEL ANSI/ASTM A135.
3. ALL GROOVED AND WELDED PIPE 2-1/2" - 6" SHALL BE SCHEDULE 10, BLACK STEEL ANSI/ASTM A795.
4. THREADED FITTINGS SHALL BE CLASS 125 THREADED CAST IRON ANSI B16.4.
5. ALL THREADED PIPE AND FITTINGS SHALL HAVE THREADS CUT TO ANSI/ASME STANDARD B1.20.1.
6. ALL PIPE WELDING SHALL BE IN COMPLIANCE WITH THE REQUIREMENTS OF AWS D10.9 (STANDARD FOR BUILDING SERVICE PIPING), LEVEL AR-3.
7. ALL PIPE SHALL BE EARTHQUAKE BRACED AS OUTLINED IN NFPA 13, 2022 EDITION, SECTION 18.1, AND AS MODIFIED BY THE 2022 CBC.
8. ALL HANGER COMPONENTS AND INSTALLATION SHALL BE IN ACCORDANCE WITH NFPA 13, 2022 EDITION, SECTION 17.1 AND 17.2, AND AS MODIFIED BY THE 2022 CBC.
9. ELECTRICAL WIRING AND ANY PAINTING OF THE PIPE THAT MAY BE REQUIRED SHALL BE BY OTHERS.
10. ALL NEW PIPING IS TO BE HYDROSTATICALLY TESTED TO CODE FOR A PERIOD NOT LESS THAN TWO HOURS.
11. FLOW AND TAMPER SWITCHES ARE TO BE PROVIDED ON THE FIRE SPRINKLER SYSTEM. ALL ELECTRICAL WIRING TO BE PROVIDED "BY ELECTRICAL CONTRACTOR."
12. FIRE SPRINKLER SUPPLY AND STUB OUT SHALL BE INSTALLED AND TESTED PER NFPA 24.
13. MAIN FIRE PANEL, VALVE MONITORING, WATER FLOW ALARM AND TROUBLE SIGNALS SHALL BE DISTINCTLY DIFFERENT AND SHALL BE AUTOMATICALLY TRANSMITTED TO AN APPROVED CENTRAL STATION MONITORING COMPANY.

OVERHEAD FIRE SPRINKLER SYSTEM NOTES

1. NFPA 13 (2022) SEC. 6.10.2.1 UNDERGROUND MAINS AND LEAD-IN CONNECTIONS TO SYSTEM RISERS SHALL BE COMPLETELY FLUSHED BEFORE CONNECTION IS MADE TO THE OVERHEAD FIRE SPRINKLER PIPING SYSTEM. (WITNESSED BY THE INSPECTOR OF RECORD)
2. NFPA 13 (2022) SEC. 18.4.2 CLEARANCE SHALL BE PROVIDED AROUND ALL PIPING EXTENDING THROUGH WALLS, FLOORS, PLATFORMS AND FOUNDATIONS INCLUDING DRAINS SUCH THAT THE DIAMETER OF THE HOLES IS 2 INCHES LARGER THAN THE PIPE FOR 1 INCH TO 3 $\frac{1}{2}$ INCH NOMINAL AND 4 INCHES LARGER THAN THE PIPE FOR PIPE 4 INCH NOMINAL AND LARGER.
3. NFPA 13 (2022) SEC. 28.2.1 ALL INTERIOR PIPING AND APPURTENANCES SUBJECTED TO SYSTEM WORKING PRESSURE SHALL BE HYDROSTATICALLY TESTED AT 200 PSI AND SHALL MAINTAIN THAT PRESSURE WITHOUT LOSS FOR 2 HOURS. (WITNESSED BY THE INSPECTOR OF RECORD)
4. NFPA 13 (2022) SEC. 16.2.7.5 PROVIDE SPARE SPRINKLER HEAD CABINET, WRENCH, AND NO FEWER THAN A TOTAL OF 6 SPARE SPRINKLER HEADS MATCHING THE TYPES AND TEMPERATURE RATINGS IN EACH PROTECTED BUILDING FOR SYSTEMS WITH LESS THAN 300 SPRINKLERS AND 12 SPARE SPRINKLERS FOR SYSTEMS WITH 300-1000 SPRINKLERS.
5. NFPA 13 (2022) SEC. 18.6 PROVIDE RESTRAINT OF BRANCH LINES BY USING ONE OF THE FOLLOWING:
   A. LISTED SWAY BRACE ASSEMBLY
   B. WRAPAROUND U-HOOK SATISFYING THE REQUIREMENTS OF 6-4.5.3, EXCEPTION NO. 3
   C. NO. 12, 440-LB WIRE INSTALLED AT LEAST 45 DEGREES FROM THE VERTICAL PANE AND ANCHORED ON BOTH SIDE OF THE PIPE.
   D. HANGER NO LESS THAN 45 DEGREES FROM VERTICAL INSTALLED WITHIN 6 INCHES OF THE VERTICAL HANGER ARRANGED FOR RESTRAINT AGAINST UPWARD MOVEMENT, PROVIDED IT IS UTILIZED SUCH THAT L/R DOES NOT EXCEED 300, WHERE THE ROD SHALL EXTEND TO THE PIPE OR HAVE A SURGE CLIP INSTALLED.
6. NFPA 72 (2022) SEC. 5-10.2 SPRINKLER FLOW SWITCHES SHALL BE TESTED BY IOR TO CONFIRM THAT WHEN THE INSPECTORS' TEST VALVE IS ACTIVATED AND ALARM WILL SOUND IN NO LESS THAN 20 SECONDS AND NOT MORE THAN 90 SECONDS.
7. CBC (2022) SEC. 903.4.1 MAIN FIRE ALARM PANEL MONITORING AND WATER FLOW ALARM AND TROUBLE SIGNALS SHALL BE DISTINCTLY DIFFERENT AND SHALL BE AUTOMATICALLY TRANSMITTED TO AN APPROVED CENTRAL STATION MONITORING COMPANY.
8. NFPA 13 (2022) SEC. 16.11, FLOW SWITCHES SHALL BE CONNECTED TO A 10 INCH OUTSIDE ALARM BELL AT EACH RISER, AN APPROVED IDENTIFICATION SIGN SHALL BE PROVIDED FOR THE OUTSIDE ALARM BELL, THE SIGN IS TO READ "SPRINKLER FIRE ALARM-WHEN BELL RINGS CALL 911/FIRE DEPARTMENT"
9. NFPA 13 (2022) SEC. 28.5 HYDRAULIC CALCULATION DESIGN DATA PLACARD IS TO BE ATTACHED TO THE FIRE SPRINKLER SYSTEM RISER.
10. NFPA 13 (2022) SEC. 28.1 THE FIRE SPRINKLER CONTRACTOR (C-16) SHALL COMPLETE AND SIGN THE CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR THE OVERHEAD FIRE SPRINKLER SYSTEM USING THE FORM IN FIGURE 28.1. THIS FORM SHALL BE GIVEN TO THE INSECTOR OF RECORD WHO WILL TURN IT IN FOR AHJ RECORDS.
11. NFPA 13 (2022) SEC. 28.2.3.4 THE MAIN DRAIN VALVE SHALL BE OPENED AND REMAIN OPEN UNTIL THE SYSTEM PRESSURE STABILIZES. THE STATIC AND RESIDUAL PRESSURES SHALL BE RECORDED ON THE CONTRACTOR'S MATERIAL AND TEST CERTIFICATE. THE TEST IS TO BE WITNESSED BY THE INSPECTOR OF RECORD - IOR.
12. SPRINKLER UPRIGHTS OVER 4 FEET LONG SHALL BE RESTRAINED TO PREVENT DAMAGE TO PIPING OR TO AND FROM ADJACENT BUILDING ELEMENTS.
13. TITLE 19 ARTICLE 906(A) A LABEL OF THE SELF-ADHESIVE TYPE SHALL BE PLACED ON THE FIRE DEPARTMENT CONNECTION OR ON THE RISER FOR FIRE SPRINKLER SYSTEM WITH THE DATE OF SERVICE AND/OR DATE INSTALLATION WAS PERFORMED AND LICENSE NUMBER OF PERSON PERFORMING SERVICE WORK.
14. BRANCH LINES TO BE HUNG FROM STEEL BEAMS WITH RODS LESS THAN 6" TO COMPLY WITH NFPA-13 (2022), SECTION 18.6.5 PER NFPA-13 (2022), SECTION 18.6.5, BRANCH LINES SUPPORTED BY RODS LESS THAN 6" LONG MEASURED BETWEEN THE TOP OF THE PIPE AND THE POINT OF ATTACHMENT TO THE BUILDING STRUCTURE, THE REQUIREMENTS OF SECTIONS 18.6.1 THROUGH 18.6.4 SHALL NOT APPLY AND ANY ADDITIONAL RESTRAINT SHALL NOT BE REQUIRED FOR BRANCH LINES.

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

SHEET INDEX

FS0.01	FIRE SPRINKLER SHEET INDEX, LEGEND, SYMBOLS & NOTES
FS0.02	FIRE SPRINKLER REFERENCE SITE PLAN
FS2.01	FIRE SPRINKLER FLOOR PLAN
FS3.01	FIRE SPRINKLER REFLECTED CEILING PLAN
FS6.01	FIRE SPRINKLER DETAILS
FS6.02	FIRE SPRINKLER SECTIONS

FIRE PROTECTION LEGEND

SYMBOL	DESCRIPTION
1 / FP1	DETAIL DESIGNATION DETAIL NUMBER SHEET NO. WHERE SHOWN
01	HYDRAULIC CALCULATION REFERENCE NODE
EQ 1	LATERAL EARTHQUAKE BRACE - EQ_1 (05/FS6.01)
EQ 2	LONGITUDINAL EARTHQUAKE BRACE - EQ_2 (06/FS6.01)
EQ 3	4-WAY EARTHQUAKE BRACE - EQ_3 (16/FS6.01)
	FIRE SPRINKLER RISER (01/FS6.01)
	GROOVED COUPLING
	HANGER DESIGNATION
	HANGER DESIGNATION
	CHANGE IN ELEVATION
	CAP
	PLUG
	VALVE
	GROOVED COUPLING
	END OF LINE RESTRAINT (13/FS6.01)

U.S. SEISMIC DESIGN

S_s: 0.541
C_p: 0.35

BUILDING CODE ANALYSIS

EXISTING BUILDING

TOTAL FLOOR SQUARE FOOTAGE:	19,120 SF
CONSTRUCTION TYPE:	VB
OCCUPANCY TYPE:	A-3, B

ANY SUBSTITUTION OF "FLEXIBLE" TYPE PIPING IN LIEU OF "RIGID" PIPE OR ANY CHANGES TO SIZE, MANUFACTURER OR LENGTHS OF "FLEXIBLE" TYPE PIPING REQUIRE RESUBMITTAL OF PIPING PLANS, PRODUCT DATA SHEETS AND HYDRAULIC CALCULATIONS TO THE CITY OF SACRAMENTO FOR REVIEW AND APPROVAL. CONTRACTOR SHALL REIMBURSE OWNER FOR COST IF ADDITIONAL PLAN CHECK IS REQUIRED.

ANY CHANGES TO THE FIRE SPRINKLER SUPPORT, INCLUDING THE ADDITION OF SWAY BRACING, TO THE APPROVED FIRE SPRINKLER CONSTRUCTION SET WILL RESULT IN A CHANGE TO THE CONSTRUCTION DOCUMENTS (CCD) AND WILL NEED TO FOLLOW STANDARD PROCEDURES FOR CCD. CONTRACTOR SHALL REIMBURSE OWNER FOR COST IF ADDITIONAL PLAN CHECK IS REQUIRED.

PROTECTION AREAS AND MAXIMUM SPACING OF HYDRAULICALLY CALCULATED STANDARD PENDENT AND UPRIGHT SPRAY SPRINKLERS

CONSTRUCTION TYPE	OCCUPANCY TYPE	MAXIMUM SPRINKLER SPACING (ft^2)
COMBUSTIBLE OBSTRUCTED WITH EXPOSED MEMBERS 3FT OR MORE ON CENTER	LIGHT HAZARD	168
COMBUSTIBLE OBSTRUCTED OR UNOBSTRUCTED WITH EXPOSED MEMBERS LESS THAN 3FT ON CENTER	LIGHT HAZARD	130
COMBUSTIBLE UNOBSTRUCTED WITH NO EXPOSED MEMBERS OR MEMBERS 3FT OR MORE ON CENTER	LIGHT HAZARD	225
	ORDINARY HAZARD	130

SPRINKLER SYSTEM - GENERAL INFORMATION

FOR	HAGGINWOOD LIBRARY, 1124 Del Paso Blvd.					
DATE	11/01/2023					
FLOW TEST DATA:						
STATIC:	41	PSI	RESID:	35		PSI
FLOW:	1900	GPM	PITOT:			PSI
		LOCATION	HYD 204, HYD 202			
LOCATION OF AUX/LOW POINT DRAINS:			SECONDARY MAIN AT SOUTHWEST CORNER OF BUILDING. (OFFICE ROOM 3)			
ORIGINAL MAIN DRAIN TEST RESULTS: N/A						
STATIC	N/A	PSI	RESID:	N/A	PSI	
HIGH PILED:	-	YES	X	NO		
RACK STORAGE:	-	YES	X	NO		
COMMODITY CLASS						
MAXIMUM STORAGE	XX	FT				
AISLE WIDTH (MIN.)	XX	FT				
ENCAPSULATION:	-	YES	X	NO		
SOLID SHELVING:	-	YES	X	NO		
FLAMMABLE / COMBUSTIBLE LIQUIDS	-	YES	X	NO		
OTHER STORAGE:	-	YES	X	NO		
HAZARDOUS MATERIAL	-	YES	X	NO		
IDLE PALLETS	-	YES	X	NO		
ANTIFREEZE SYSTEMS	-	YES	X	NO		
DRY OR AUX SYS	-	YES	X	NO		
LOCATION						
NAME OF CONTRACTOR OR DESIGNER:		LEAF ENGINEERS				
ADDRESS & PHONE:	895 W. Ashlan Ave. Suite 101, Clovis, CA 93612				559-223-9600	

JOBCOPY

PBK
ARCHITECT — PBK, Inc. PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

MEP Engineering \\ Technology
LEAF ENGINEERS
SACRAMENTO
2520 Venture Oaks Way, Suite 440
Sacramento, CA 95833
916-921-3333 P
916-665-3990 F

APPROVED
PENDING FIELD INSPECTION
City of Sacramento Plan Review
FIRE DEPARTMENT
CONSULTANT
By: Morten Myers on Jun 18, 2025

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH   TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER GAREN M. LENCIONI NO. 1901 FIRE PROTECTION STATE OF CALIFORNIA

CLIENT	CITY OF SACRAMENTO		
PROJECT NUMBER	220389		
DATE	03/03/2025		
DRAWN BY:	RC	CHKED BY:	TC

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	05-23-2025

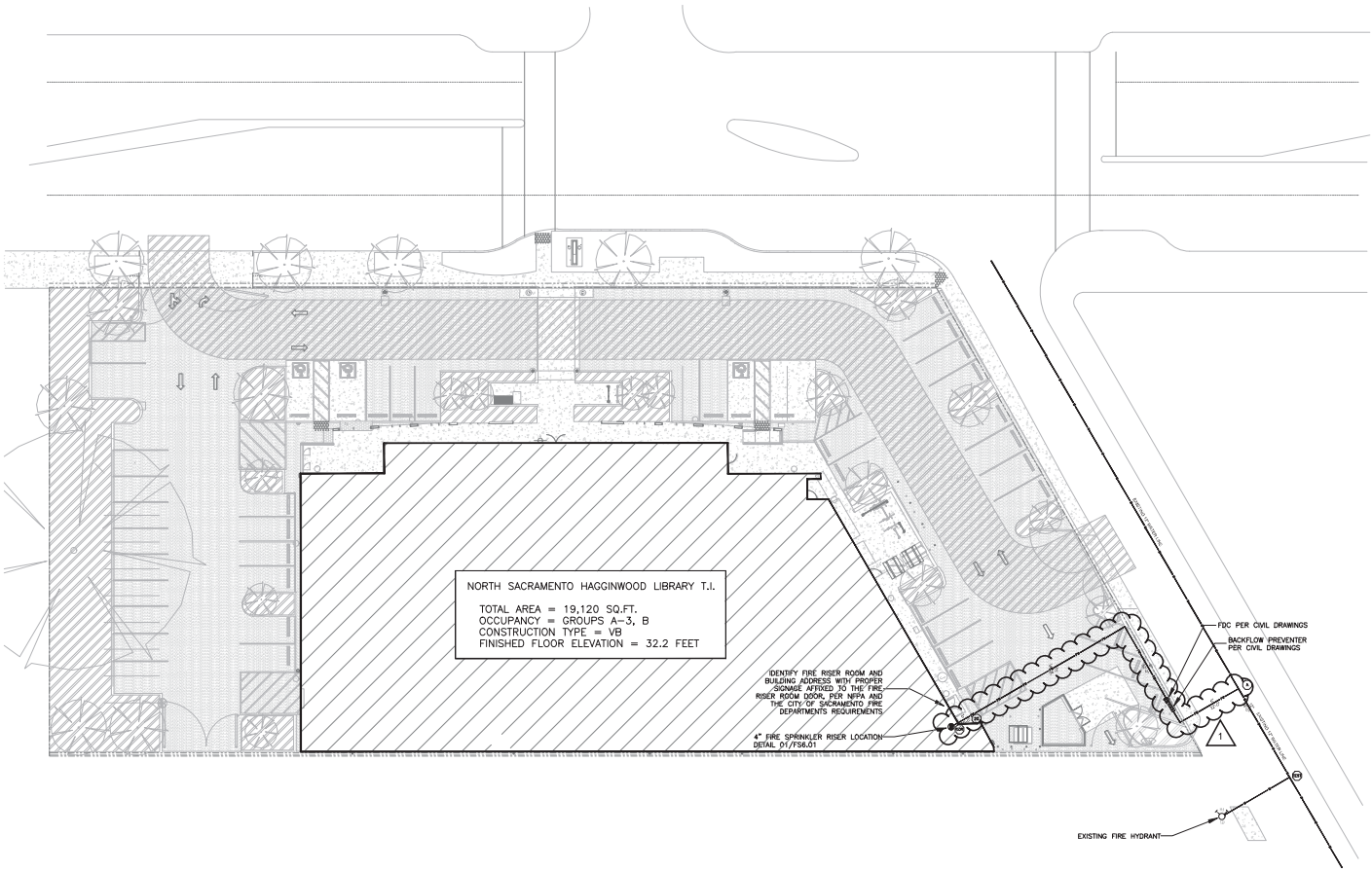
This document is for plan review only

CONSTRUCTION DOCUMENT

FIRE SPRINKLER SHEET INDEX, LEGEND, SYMBOLS & NOTES

FS0.01

COM-2500586



1 FIRE SPRINKLER SITE PLAN
SCALE: 1/16" = 1'-0"

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

APPROVED
PENDING FIELD INSPECTION
City of Sacramento Fire Review
FIRE DEPARTMENT
CONSULTANT
By: Morten Myers
on Jun 18, 2025

PBK

ARCHITECT PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-355-9922

MEP Engineering & Technology

LEAF ENGINEERS
SACRAMENTO
3500 Ventura Drive, Suite 100
Sacramento, CA 95833
916-455-2000 P
916-455-2001 F

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
MARTIN M. LENGERT
NO. 1901
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 03/03/2025
DRAWN BY: RC CHKED BY: TC

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	05-23-2025

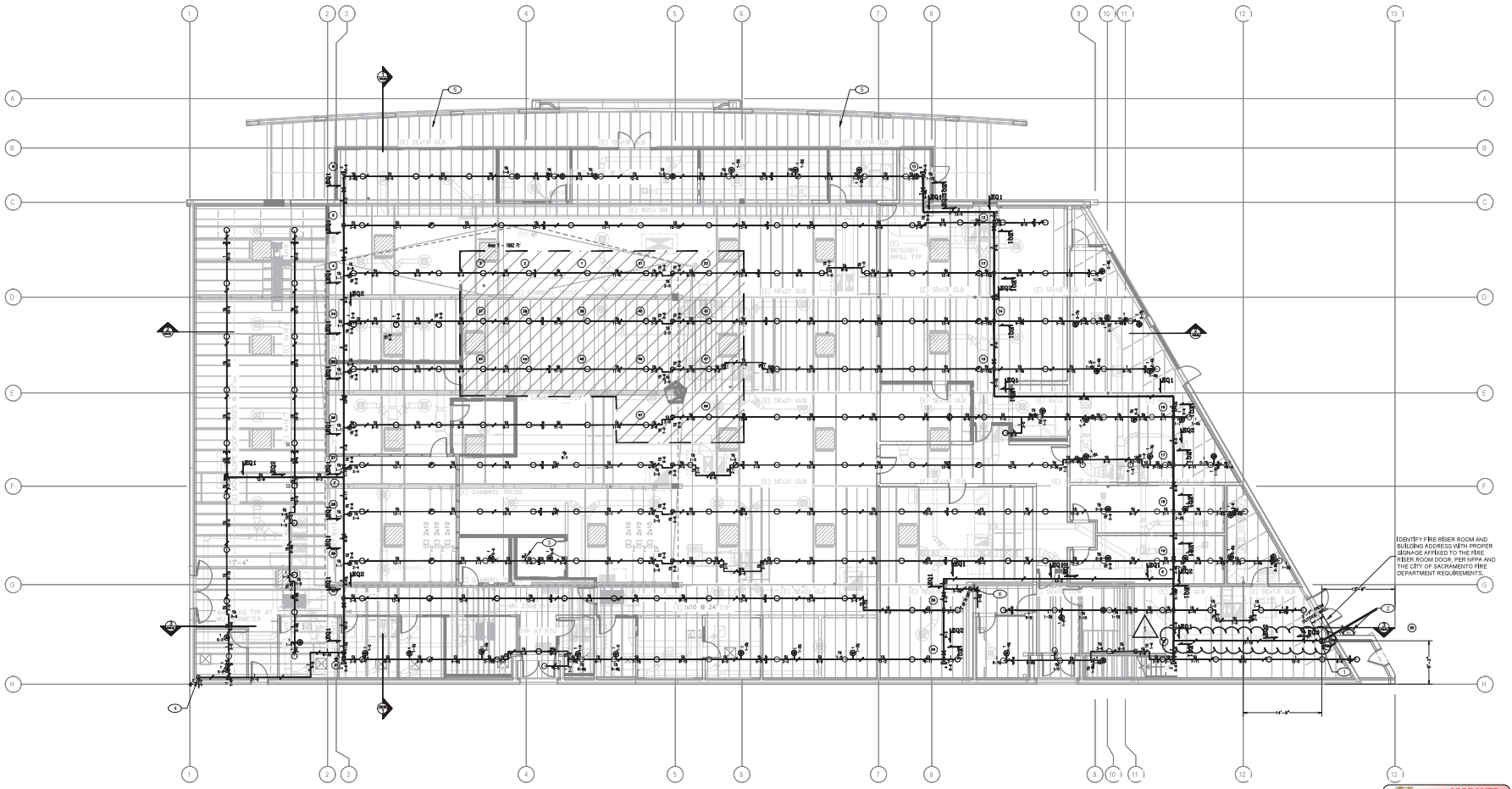
CONSTRUCTION DOCUMENT

FIRE SPRINKLER REFERENCE SITE PLAN

FS0.02

This document is for plan review only

JOBCOPY
1124 DEL PASO BLVD
COM-2500586



FIRE SPRINKLER LEGEND										
QTY.	SYM.	FINISH	MAKE/MODEL	ORIENTATION	SIN	K FACTOR	TEMP	RESPONSE	ESCUTCHEON	ESCUTCHEON FINISH
204	◯	BRASS	VIKING	UPRIGHT	VK300	5.6	155°	QR	N/A	N/A
90	◉	WHITE	VIKING	PENDENT	VK302	5.6	155°	QR	SEMI-RECESSED	WHITE
294	TOTAL SPRINKLERS THIS SHEET									

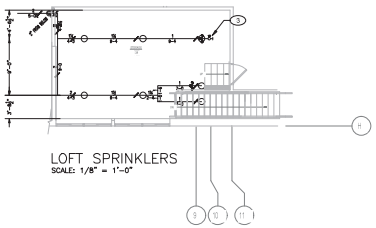
HYDRAULIC SYSTEM
Building is protected by a Hydraulically Designed Automatic Sprinkler System

Location: LIBRARY MAIN ROOM

Sprinkler Information
- NUMBER OF FLOWING SPRINKLERS: 17
- MANUFACTURE: VIKING
- MODEL: VK300
- SSU: QUICK RESP
- UPZ ORIF: 5.6 K

Basis of Design
- STANDARD: NFPA 13, 2022 EDIT
- HAZARD GROUP: LIGHT HAZARD
- DENSITY: .1 GPM/SQ FT
- DESIGNED AREA OF OPERATION: 1662 SQ FT
- PROTECTION ALLOWANCE IN LOS: 130 SQ FT

System Demand
- DEMAND AT THE BASE OF THE RISER: 274.66 GPM
- RESIDUAL PRESSURE AT THE WATER SUPPLY SOURCE: 27.84 PSI
- DEMAND AT THE WATER SUPPLY SOURCE: 374.66 GPM
- RESIDUAL PRESSURE AT THE WATER SUPPLY SOURCE: 31.96 PSI
- HOSE STREAM ALLOWANCE: 0 GPM INSIDE; 100 GPM OUTSIDE; 100 GPM TOTAL
- REMOTE SPRINKLER FLOW: 14.82 GPM @ 7.0 PSI
- SAFETY PRESSURE: 8.74 PSI



KEYNOTES

1. FIRE SPRINKLER RISER LOCATION
2. 10" ELECTRIC BELL LOCATION
3. AUTOMATIC AIR VENTING VALVE LOCATION
4. AUXILIARY 1" DRAIN VALVE LOCATION
5. ENTRANCE CANOPY - EXISTING CEMENT PLASTER TO BOTTOM OF JOIST
6. 2" SPRINKLER LINE FEEDING LOFT

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

PIPING NOTES

1. SPRINKLER DEFLECTOR SHALL BE BETWEEN 1" AND 12" BELOW THE FLOOR OR ROOF DECK WHEN INSTALLED IN UNOBSTRUCTED CONSTRUCTION.
2. SPRINKLERS INSTALLED UNDER OBSTRUCTED CONSTRUCTION SHALL BE LOCATED AS FOLLOWS:
   A. INSTALL WITH DEFLECTORS WITHIN THE HORIZONTAL PLANES OF 1 IN. TO 6 IN. BELOW THE STRUCTURAL MEMBERS AND A MAXIMUM DISTANCE OF 22 IN. BELOW THE CEILING/ROOF DECK.
   B. INSTALLED WITH THE DEFLECTORS AT OR ABOVE THE BOTTOM OF THE STRUCTURAL MEMBER TO A MAXIMUM OF 22 IN. BELOW THE CEILING/ROOF DECK WHERE THE SPRINKLER IS INSTALLED IN CONFORMANCE WITH NFPA 13, 10.2.7.1.2.
   C. INSTALLED IN EACH BAY OF OBSTRUCTED CONSTRUCTION, WITH THE DEFLECTORS LOCATED A MINIMUM OF 1 IN. AND A MAXIMUM OF 12 IN. BELOW THE CEILING.
3. BRANCHLINE AND MAIN HANGERS SHALL BE BLOCKING WITH THROUGH BOLTS TO THE EXISTING TRUSSES, SAMMY SWIVEL TO JOIST, OR THROUGH BOLT AT JOISTS. (FPN.01 –02, 03, 11, 12, 15, 17)
4. MAIN PIPING SHALL BE SCHEDULE 10 BLACK STEEL AND SHALL BE ROLL GROOVED PER NFPA 13.
5. BRANCHLINE PIPING SHALL BE SCHEDULE 40, BLACK STEEL, THREADED WITH THREADED FITTING OR ROLL GROOVED PER NFPA 13.
6. MECHANICAL TEES ARE NOT PERMITTED ON NEW FIRE SPRINKLER PIPING
7. HANG BRANCHLINES +4.5" CENTERLINE BELOW JOISTS WHERE POSSIBLE. WHEN BRANCH LINES ARE HUNG WITH HANGERS THAT ARE <8" FROM TOP OF PIPE TO POINT OF CONNECTION TO STRUCTURE, NO BRANCHLINE RESTRAINT OR END OF LINE RESTRAINT IS REQUIRED.

GENERAL NOTES

1. REFER TO ARCHITECTURAL, MECHANICAL AND PLUMBING SHEETS. FIRE PROTECTION SPECIFICATIONS, AS WELL AS OTHER PORTIONS OF THE CONTRACT DOCUMENTS FOR ADDITIONAL COORDINATION REQUIREMENTS.
2. THE LAYOUT REQUIREMENTS DESCRIBED IN THESE PLANS SHALL BE ADHERED TO AS CLOSELY AS POSSIBLE BUT SHALL NOT SUPERSEDED CODE CONSTRAINTS AND/OR REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION (AHJS). WHERE CODE OR AHJ REQUIREMENTS SUPERSEDE ITEMS SHOWN ON THIS PLAN, CONTRACTOR SHALL INCLUDE ALL ASSOCIATED PROVISIONS IN THE BID, AND SHALL MAKE THEM AT NO ADDITIONAL COST TO OWNER. PROPOSED DEVIATIONS FROM THIS PLAN SHALL BE SUBJECT TO ARCHITECTS, ENGINEERS, AND THE CITY OF SACRAMENTO REVIEW AND APPROVAL PRIOR TO IMPLEMENTATION.
3. ALL AREAS OF THE BUILDING SHALL BE FULLY SPRINKLERED IN ACCORDANCE WITH SPECIFICATIONS AND CODE REQUIREMENTS.
4. WHERE PLAN INDICATES EXPOSED FIRE SPRINKLER PIPING DIRECTION OF LAYOUT. ASSOCIATED CONNECTED FIRE SPRINKLER PIPING RUNNING IN PERPENDICULAR DIRECTIONS SHALL BE INSTALLED ONLY IN CONCEALED LOCATIONS UNLESS INDICATED OTHERWISE.
5. SEE STRUCTURAL PLANS FOR EXACT LOCATIONS AND CHARACTERISTICS OF ALL STRUCTURAL MEMBERS.
6. EXPOSED FIRE SPRINKLER SYSTEM PIPING SHALL BE RUN STRAIGHT AND TIGHT TO UNDERSIDE OF STRUCTURAL MEMBERS.
7. CONTRACTOR IS TO PREPARE SHOP DRAWINGS AND FABRICATION DRAWINGS. ALL PLANS ARE TO BE SUBMITTED TO LEAF ENGINEERS, INC. FOR REVIEW PRIOR TO FABRICATION OR INSTALLATION OF FIRE SPRINKLER SYSTEM

SCALE: 1/8"=1'-0"

APPROVED
Fire Sprinkler Shop Drawing Plans
Fire Alarm Shop Drawing Plans
FIRE & EXPERT ABILITY CONSULTANT
By: Morton Myers on Jun 18, 2025

1 FIRE SPRINKLER FLOOR PLAN
SCALE: 1/8" = 1'-0"

PBK
ARCHITECT: PBK, Inc. PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-365-9922
MEP Engineering & Technology
LEAF ENGINEERS
SACRAMENTO
3520 Watt Ave Suite 160
Sacramento, CA 95821
916-520-5319
leafeng.com

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
PLAN NORTH / TRUE NORTH

Architect / Engineer
STEPHEN M. LEACH NO. 19014 REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
230389
DATE 03/03/2025
DRAWN BY: RC CHKED BY: TC

REVISIONS		
#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	05-30-2025

CONSTRUCTION DOCUMENT

FIRE SPRINKLER FLOOR PLAN

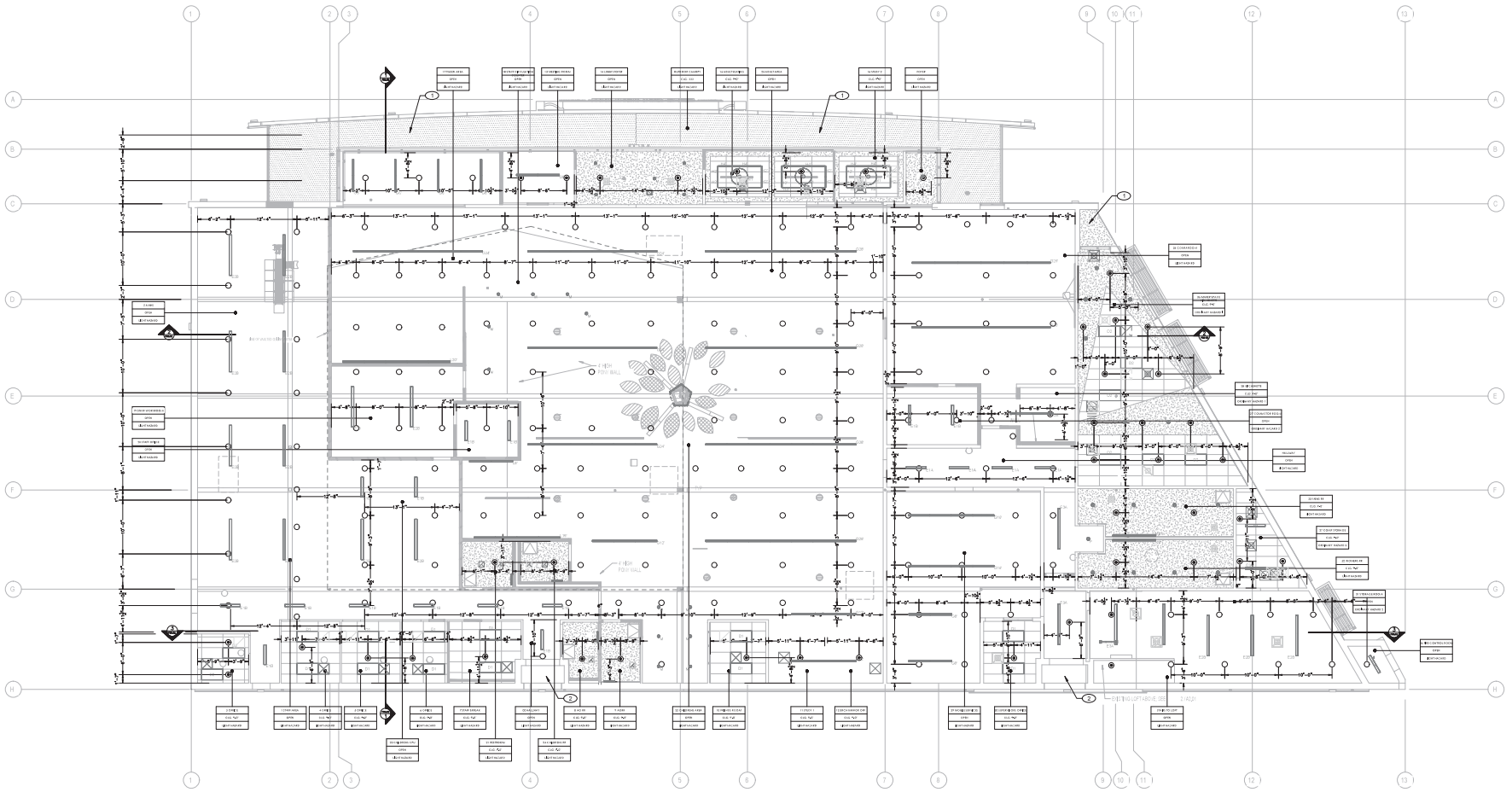
FS2.01

JOBCOPY

COM-2500586

This document is for plan review only

PBKx TB+1.2 2019/10/03



ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be liable to permit or approve the violation of any City Ordinance or State Law.

APPROVED
Plumbing / Mechanical / Fire Protection Department
FOR PLANNING PURPOSES ONLY
FOR PERMIT PURPOSES ONLY
By: Morten Myers on Jul 10, 2025

FIRE SPRINKLER LEGEND

QTY.	SYM.	FINISH	MAKE/MODEL	ORIENTATION	SI #	K FACTOR	TEMP	RESPONSE	ESCUTCHEON	ESCUTCHEON FINISH
204	○	BRASS	VIKING	UPRIGHT	VK300	5.6	155°	QR	N/A	N/A
90	◉	WHITE	VIKING	PENDENT	VK302	5.6	155°	QR	SEMI-RECESSED	WHITE
294	TOTAL SPRINKLERS THIS SHEET									

KEYNOTES

1. ENTRANCE CANOPY - EXISTING CEMENT PLASTER TO BOTTOM OF JOIST
2. OUTSIDE NON-COMBUSTIBLE CANOPY

1 FIRE SPRINKLER REFLECTED CEILING PLAN
SCALE: 1/8" = 1'-0"

PBR
ARCHITECT PBK, INC. PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-365-9922
MEP Engineering & Technology
LEAF ENGINEERS
SACRAMENTO
3520 Venture Drive Ste. 160
Antelo, CA 95691
916-520-2019
leafeng.com

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

KEY PLAN
PLAN NORTH / TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
MORTEN M. MYERS
NO. 19014
Exp. 12/31/26
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
230389
DATE 03/03/2025
DRAWN BY: RC CHKED BY: TC

REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	05/30/2025

CONSTRUCTION DOCUMENT

FIRE SPRINKLER REFLECTED CEILING PLAN

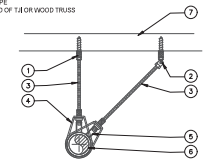
FS3.01

This document is for plan review only

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

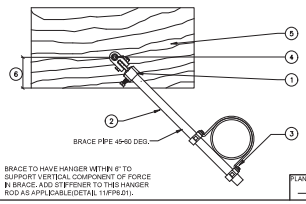
1. SAMMY GST-20 HANGER ATTACHMENT
2. SAMMY SH-GST/CST SWIVEL HANGER ATTACHMENT
3. 3/8" ALL THREAD ROD
4. HANGER RING
5. SURGE RESRAINT OR RODS TIGHT TO PIPE
6. BRANCHLINE PIPE
7. BOTTOM CHORD OF TJI OR WOOD TRUSS



PLAN SYMBOL:

SAMMY BRANCHLINE RESTRAINT DETAIL 13

1. ANVIL FIG. AF700 SWIVEL SWAY BRACE ATTACHMENT
2. BRACE PIPE - 1" SCH. 40
3. ANVIL FIG. AF030 BRACE CLAM
4. 3/4" THROUGH BOLT W/NUT AND WASHER - SIZE PER SEISMIC BRACE CALCULATIONS
5. EXISTING 2 X 14 JOIST @ 2'-0" ON-CENTER
6. MINIMUM 1/2 DEPTH OF BEAM, BUT NOT LESS THAN 3" FOR WOOD BEAM.

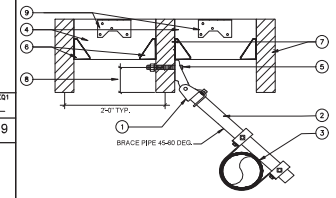


BRACE TO HAVE HANGER WITHIN 6" TO SUPPORT VERTICAL COMPONENT OF FORCE IN BRACE. ADD STIFFENER TO THIS HANGER ROD AS APPLICABLE(DETAIL 11/FP9.01).

PLAN SYMBOL: JO1

LATERAL SWAY BRACE AT WOOD JOIST N.T.S 09

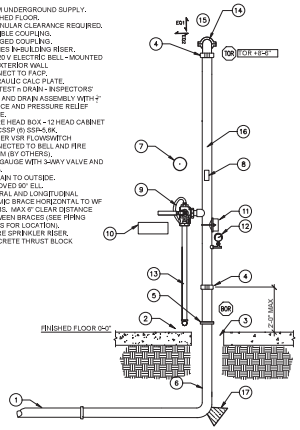
1. ANVIL FIG. AF700 SWIVEL SWAY BRACE ATTACHMENT
2. BRACE PIPE - 1" SCH. 40
3. ANVIL FIG. AF030 BRACE CLAMP
4. 4 X 6 BLOCKING ADJACENT TO BRACE ATTACHMENT (BOTH SIDES)
5. 3/4" THROUGH BOLT W/NUT AND WASHER - SIZE PER SEISMIC BRACE CALCULATIONS
6. SIMPSON STRONG TIE U410 OR EQUIV. W/ 16D NAILS
7. EXISTING 2 X 14 JOIST @ 2'-0" ON-CENTER
8. MINIMUM 1/2 DEPTH OF BEAM, BUT NOT LESS THAN 3" FOR WOOD BEAM.
9. SIMPSON ASS BRACKET TO BOTH SIDES OF BLOCKING w/ 8D NAILS TO THE BLOCK AND #6 x 1/2" PAN HEAD WOOD SCREW TO PLYWOOD.



PLAN SYMBOL: JO1

LATERAL SWAY BRACE AT WOOD JOIST N.T.S 05

1. FROM UNDERGROUND SUPPLY.
2. FINISHED FLOOR.
3. 2" ANNULAR CLEARANCE REQUIRED.
4. FLEXIBLE COUPLING.
5. FLANGED COUPLING.
6. 6" AMES IN-BUILDING RISER.
7. 10" 120 V ELECTRIC BELL - MOUNTED ON EXTERIOR WALL. CONNECT TO FACP.
8. HYDRAULIC CALC PLATE.
9. AGF TEST or DRAIN - INSPECTORS' TEST AND DRAIN ASSEMBLY WITH 2" ORIFICE AND PRESSURE RELIEF VALVE.
10. SPARE HEAD BOX - 12 HEAD CABINET (6) ECSSP (6) SSR-5.6K.
11. POTTER VSR FLOWSWITCH CONNECTED TO BELL AND FIRE ALARM (BY OTHERS).
12. 300# GAUGE WITH 3-WAY VALVE AND PLUG.
13. 2" DRAIN TO OUTSIDE.
14. GROOVED 90° ELL.
15. LATERAL AND LONGITUDINAL SEISMIC BRACE HORIZONTAL TO WF BEAMS. MAX 6" CLEAR DISTANCE BETWEEN BRACES (SEE PIPING PLANS FOR LOCATION).
16. 4" FIRE SPRINKLER RISER.
17. CONCRETE THRUST BLOCK



PLAN SYMBOL:

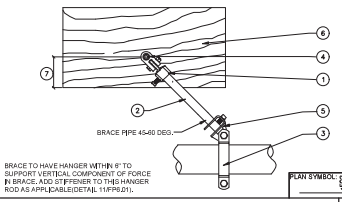
FIRE SPRINKLER RISER DETAIL N.T.S 01

1" AGF 7000AAV PURGEVENT AUTOMATICE AIR VENTING VALVE

PLAN SYMBOL:

AUTOMATIC AIR VENTING VALVE 14

1. ANVIL FIG. AF700 SWIVEL SWAY BRACE ATTACHMENT
2. BRACE PIPE - 1" SCH. 40
3. ANVIL FIG. AF720 LONGITUDINAL SEISMIC BRACE CLAMP
4. 3/4" THROUGH BOLT W/NUT AND WASHER - SIZE PER SEISMIC BRACE CALCULATIONS
5. ANVIL FIG. AF720 LONGITUDINAL SEISMIC BRACE CLAMP
6. EXISTING 2 X 14 JOIST @ 2'-0" ON-CENTER
7. MINIMUM 1/2 DEPTH OF BEAM, BUT NOT LESS THAN 3" FOR WOOD BEAM.

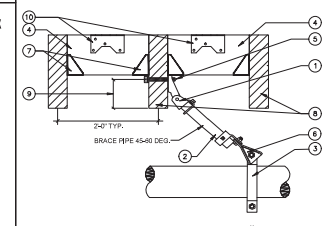


BRACE TO HAVE HANGER WITHIN 6" TO SUPPORT VERTICAL COMPONENT OF FORCE IN BRACE. ADD STIFFENER TO THIS HANGER ROD AS APPLICABLE(DETAIL 11/FP9.01).

PLAN SYMBOL: JO3

LONGITUDINAL SWAY BRACE AT WOOD JOIST N.T.S 10

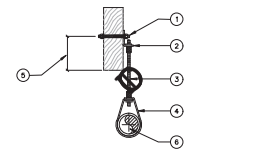
1. ANVIL FIG. AF700 SWIVEL SWAY BRACE ATTACHMENT
2. BRACE PIPE - 1" SCH. 40
3. ANVIL FIG. AF720 LONGITUDINAL SEISMIC BRACE CLAMP
4. 4 X 6 BLOCKING ADJACENT TO BRACE ATTACHMENT (BOTH SIDES)
5. 3/4" THROUGH BOLT W/NUT AND WASHER - SIZE PER SEISMIC BRACE CALCULATIONS
6. ANVIL FIG. AF720 LONGITUDINAL SEISMIC BRACE CLAMP
7. SIMPSON STRONG TIE U410 OR EQUIV. w/ 16D NAILS
8. EXISTING 2 X 14 JOIST @ 2'-0" ON-CENTER
9. MINIMUM 1/2 DEPTH OF BEAM, BUT NOT LESS THAN 3" FOR WOOD BEAM.
10. SIMPSON ASS BRACKET TO BOTH SIDES OF BLOCKING W/ 8D NAILS TO THE BLOCK AND #6 x 1/2" PAN HEAD WOOD SCREWS TO PLYWOOD.



PLAN SYMBOL: JO2

LONGITUDINAL SWAY BRACE AT WOOD JOIST N.T.S 06

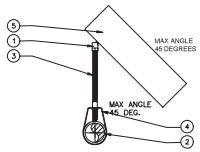
1. THROUGH BOLT (SEE HANGER AND FASTENER CHART FOR SIZES 07/FP9.01)
2. THREADED SIDE BEAM BRACKET - AFCON 551
3. ALL THREAD ROD
4. ADJUSTABLE RING HANGER ANVIL #69.
5. MIN. 2-1/2" FOR 2-1/2" AND SMALLER PIPE AND 3" FOR 3" AND LARGER PIPE.
6. 3" PIPE MAXIMUM. 3" SPRINKLER MAIN HANGER 10'-0" O.C. MAXIMUM.



PLAN SYMBOL:

MAIN AND BRANCH LINE HANGER AT WOOD JOIST 02

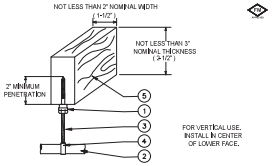
1. SAMMY SH-GST/CST-20 SWIVEL HANGER ATTACHMENT
2. SPRINKLER PIPE. 3" SCH 10 MAX OR 3-1/2" SCH 40 MAXIMUM
3. 3/8" ALL THREAD ROD
4. HANGER RING
5. WOOD JOIST/RAFTER/TRUSS



PLAN SYMBOL:

SAMMY SH-GST/CST-20 SWIVEL HEAD HANGER 15

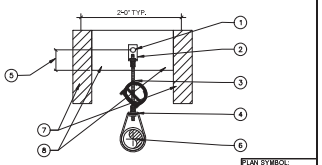
1. SAMMY GST-20 HANGER ATTACHMENT
2. SPRINKLER PIPE. 3" SCH 10 MAX OR 3-1/2" SCH 40 MAX.
3. 3/8" ALL THREAD ROD
4. HANGER RING
5. WOOD JOIST



PLAN SYMBOL:

SAMMY GST-20 PIPE HANGER FOR WOOD 11

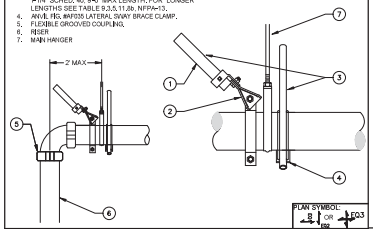
1. THROUGH BOLT (SEE HANGER AND FASTENER CHART FOR SIZES 07/FP9.01)
2. THREADED SIDE BEAM BRACKET - AFCON 551
3. ALL THREAD ROD
4. ADJUSTABLE RING HANGER ANVIL #69.
5. MIN. 2-1/2" FOR 2-1/2" AND SMALLER PIPE AND 3" FOR 3" AND LARGER PIPE.
6. 3" PIPE MAXIMUM. 3" SPRINKLER MAIN HANGER 10'-0" O.C. MAXIMUM.
7. EXISTING 2 X 14 JOIST, @ 2'-0" ON-CENTER
8. 4 X 6 BLOCKING W/ 4 - 16D NAILS EACH SIDE STAGGERED



PLAN SYMBOL:

TRAPEZE HANGER DETAIL N.T.S 03

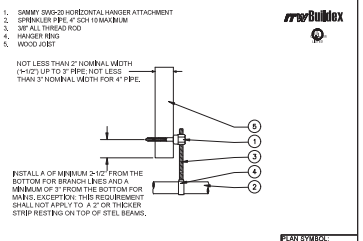
1. BRACE PIPE AT 45-60 DEG.
2. ANVIL FIG. AF730 LONGITUDINAL SWAY BRACE CLAMP.
3. BRACE PIPE - 1" SCHED. 40, 7'-0" MAX LENGTH, 1-1/4" SCHED. 40, 9'-0" MAX LENGTH, FOR LONGER LENGTHS SEE TABLE 9.3.5.11.2B, NFPA-13.
4. ANVIL FIG. AF720 LATERAL SWAY BRACE CLAMP.
5. FLEXIBLE GROOVED COUPLING.
6. RISER
7. MAIN HANGER



PLAN SYMBOL: OR

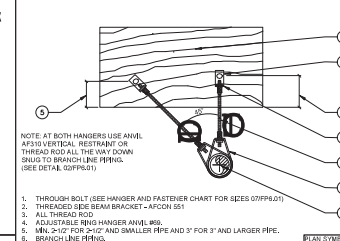
4-WAY RISER EARTHQUAKE BRACE 16

1. SAMMY SWG-20 HORIZONTAL HANGER ATTACHMENT
2. SPRINKLER PIPE. 4" SCH 10 MAXIMUM
3. 3/8" ALL THREAD ROD
4. HANGER RING
5. WOOD JOIST



PLAN SYMBOL:

SAMMY SWG-20 PIPE HANGER FOR WOOD 12



1. THROUGH BOLT (SEE HANGER AND FASTENER CHART FOR SIZES 07/FP9.01)
2. THREADED SIDE BEAM BRACKET - AFCON 551
3. ALL THREAD ROD
4. ADJUSTABLE RING HANGER ANVIL #69.
5. MIN. 2-1/2" FOR 2-1/2" AND SMALLER PIPE AND 3" FOR 3" AND LARGER PIPE.
6. BRANCH LINE PIPING.
7. EXISTING 2 X 14 JOIST, @ 2'-0" ON-CENTER
8. ANGLED RESTRAINT HANGER SHALL BE WITHIN 6" OF VERTICAL HANGER.

PLAN SYMBOL:

BRANCHLINE RESTRAINT DETAIL N.T.S 07

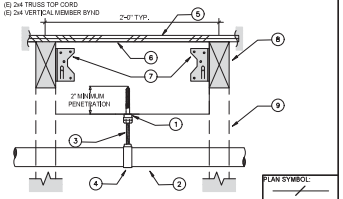
1. THROUGH BOLT (SEE HANGER AND FASTENER CHART FOR SIZES 07/FP9.01)
2. THREADED SIDE BEAM BRACKET - AFCON 551
3. ALL THREAD ROD
4. ADJUSTABLE RING HANGER ANVIL #69.
5. MIN. 2-1/2" FOR 2-1/2" AND SMALLER PIPE AND 3" FOR 3" AND LARGER PIPE.
6. 3" PIPE MAXIMUM. 3" SPRINKLER MAIN HANGER 10'-0" O.C. MAXIMUM.
7. EXISTING 2 X 14 JOIST, @ 2'-0" ON-CENTER
8. 4 X 6 BLOCKING W/ 4 - 16D NAILS EACH SIDE STAGGERED

PLAN SYMBOL:

TRAPEZE HANGER DETAIL N.T.S 03

1. SAMMY GST-20 HANGER ATTACHMENT
2. SPRINKLER PIPE. 3" SCH 10 MAX, OR 3-1/2" SCH 40 MAX.
3. 3/8" ALL THREAD ROD
4. HANGER RING
5. WOOD JOIST
6. 4x6 BLOCKING
7. A34 CLIP ES
8. (E) 2x4 TRUSS TOP CORD
9. (E) 2x4 VERTICAL MEMBER SYND

CENTERLINE OF 4 X 6 BLOCKING SHALL BE 12" MAXIMUM FROM CENTERLINE OF VERTICAL TRUSS MEMBER.



PLAN SYMBOL:

TRAPEZE HANGER DETAIL N.T.S 17

MAXIMUM DIST. BETWEEN HANGERS

NOMINAL PIPE SIZE (in.)	3/4"	1"	1-1/4"	1-1/2"	2	2-1/2"	3"	3-1/2"	4"	5"	6"
STEEL PIPE EXCEPT THREADED LIGHTWALL	N/A	12'-0	15'-0	15'-0	15'-0	15'-0	15'-0	15'-0	15'-0	15'-0	15'-0
THREADED LIGHTWALL STEEL PIPE	N/A	12'-0	12'-0	12'-0	12'-0	12'-0	N/A	N/A	N/A	N/A	N/A

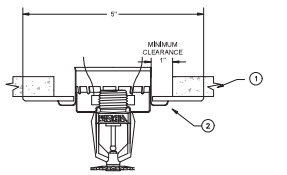
HANGER ROD SIZES

NOMINAL PIPE SIZE (in.)	3/4"	1"	1-1/4"	1-1/2"	2	2-1/2"	3"	3-1/2"	4"	5"	6"
STEEL PIPE EXCEPT THREADED LIGHTWALL	N/A	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"
THREADED LIGHTWALL STEEL PIPE	N/A	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	N/A	N/A

NOTE:
HANGER RODS TO BE INSTALLED TIGHT TO PIPE TO PREVENT UPWARD MOVEMENT (APPLIES TO 3/4" - 2" PIPE)

APPROVED
Permitted Uses Subject to Plan
City of Sacramento, Fire Marshal
FIRE DEPARTMENT
CONSULTANT
By: Morten Myers
01-JUL-10, 2025

1. T-BAR CEILING
2. EXPANSION PLATE



PENDENT SPRINKLER IN T-BAR CEILING N.T.S 04

PBK Rev 13 v1.2 2019.10.03

PBK
ARCHITECT PBK, Inc. PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-365-9922
MEP Engineering & Technology
LEAF ENGINEERS
SACRAMENTO
3520 Venture Drive, Suite 160
Riocklin, CA 95765
916-251-0019
leafengineers.com

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

A
KEY PLAN
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
STEVEN M. LEVICK
NO. 19261
Exp. 12-31-26
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 03/03/2025
DRAWN BY: R.C. CHKED BY: T.C.
REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	05-30-2025

CONSTRUCTION DOCUMENT

FIRE SPRINKLER DETAILS

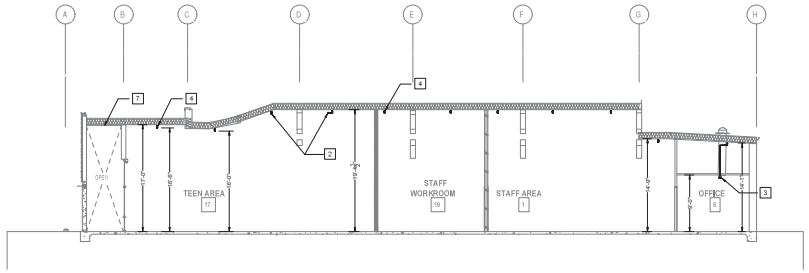
FS6.01

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

This document is for plan review only

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

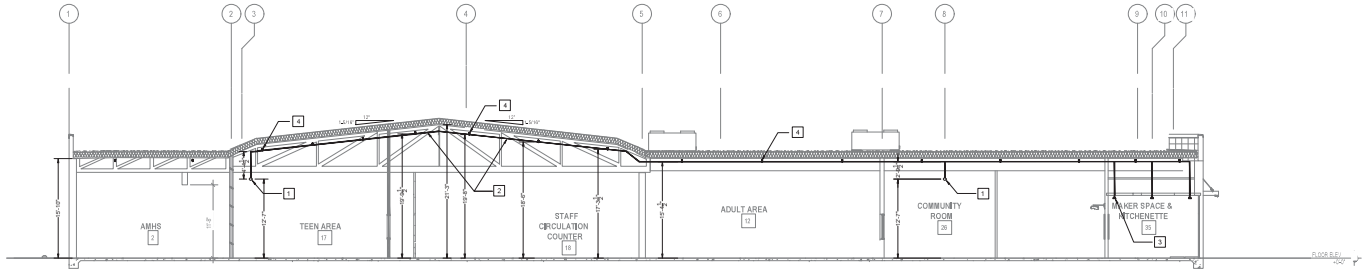
This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be liable to permit or approve the violation of any City Ordinance or State Law.



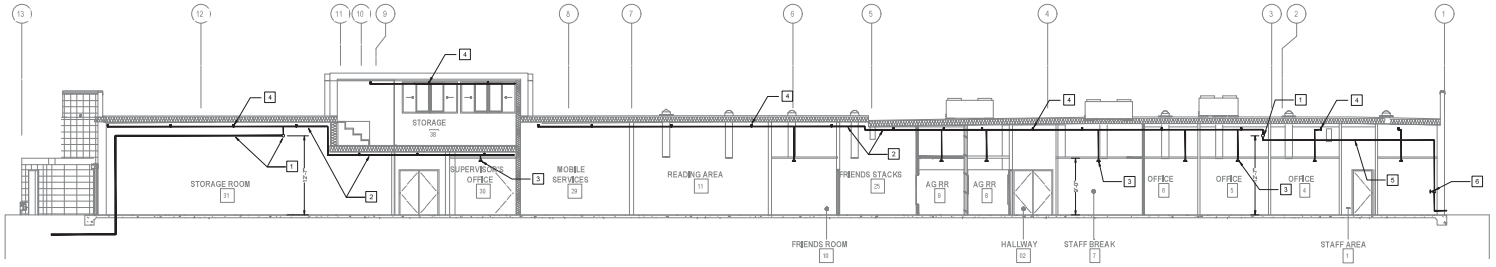
1 SECTION
1/8" = 1'-0"

KEY NOTES

1. FIRE SPRINKLER MAIN
2. FIRE SPRINKLER LINE
3. PENDENT SPRINKLER HEAD
4. UPRIGHT SPRINKLER HEAD
5. AUXILIARY DRAIN LINE
6. AUXILIARY DRAIN VALVE
7. EXISTING CEMENT PLASTER TO BOTTOM OF JOISTS



2 SECTION
1/8" = 1'-0"



APPROVED
FIRE/LIFE SAFETY DIVISION
City of Sacramento
FIRE DEPARTMENT
CONSULTANT
By: Morten Myers 07/JUN/16, 2025

3 SECTION
1/8" = 1'-0"

ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-365-9922
MEP Engineering & Technology
LEAF ENGINEERS
SACRAMENTO
3520 Ventura Drive Way, Suite 400
Sacramento, CA 95815
916-212-0019
leafeng.com

JOBCOPY

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1123-1124 DEL PASO BLVD
SACRAMENTO, CA 95815
CONSTRUCTION DOCUMENT

1124 DEL PASO BLVD

KEY PLAN
A
PLAN NORTH
TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
JASON M. LEDOUX
NO. 19914
Exp. 12/31/25
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 03/03/2025
DRAWN BY: R.C. CHKED BY: T.C.
REVISIONS

#	DESCRIPTION	DATE
1	PLAN CHECK CYCLE #2	05-30-2025

CONSTRUCTION DOCUMENT

FIRE SPRINKLER SECTIONS

FS6.02

COM-2500586

This document is for plan review only

MECHANICAL TITLE 24 NOTES

THE FOLLOWING SHALL BE REQUIRED WHETHER OR NOT SPECIFICALLY SHOWN OR MENTIONED IN DRAWINGS AND/OR SPECIFICATIONS:

1. EQUIPMENT SHALL MEET EFFICIENCY REQUIREMENTS OF TABLES 110.2-A THROUGH 110.2-N.
2. ALL AIR-COOLED, UNITARY, DX UNITS (PACKAGED, SPLIT-SYSTEM, HEAT PUMPS AND VRF) WITH COOLING CAPACITY GREATER THAN 33,000 BTU/HR AND ECONOMIZERS SHALL BE EQUIPPED WITH FAULT DETECTION AND DIAGNOSTICS SYSTEMS.
3. PIPE INSULATION FOR SPACE CONDITIONING AND SERVICE WATER-HEATING WITH FLUID TEMPERATURES LISTED IN TABLE 120.3-A SHALL HAVE INSULATION LEVELS AS SPECIFIED IN SUBSECTION (A) AND (B).
4. MECHANICAL HEATING AND COOLING EQUIPMENT SHALL BE THE SMALLEST SIZE, WITHIN THE AVAILABLE OPTIONS OF THE DESIRED EQUIPMENT LINE, NECESSARY TO MEET THE DESIGN HEATING AND COOLING LOADS OF THE BUILDING, AS CALCULATED ACCORDING TO THE REQUIREMENTS OF SECTION 140.4(A)1.
5. HVAC MOTORS FOR FANS THAT ARE LESS THAN 1 HP AND 1/12 HP OR GREATER SHALL BE ECM OR HAVE A MINIMUM MOTOR EFFICIENCY OF 70%. MOTORS SHALL ALSO HAVE MEANS TO ADJUST MOTOR SPEED FOR BALANCING OR REMOTE CONTROL AS SPECIFIED IN SECTION 140.4(C).
6. ELECTRIC RESISTANCE HEATING SYSTEMS ARE NOT PROVIDED FOR SPACE HEATING.
7. ZONE EACH AIR HANDLER TO SERVE ONLY AREAS WITH COMMON LOADS TO ALLOW MORE AGGRESSIVE CONTROL STRATEGIES AND IMPROVE COMFORT. HAVE DIFFERENT AHU'S SERVING CORE VS. PERIMETER AREAS.
8. THE DESIGN ACCOMMODATES PARTIAL OCCUPANCY ENERGY SAVINGS WHEN THE OWNER'S REQUIREMENTS OR NARRATIVE DESCRIBE ANY POSSIBILITY OF PARTIAL OCCUPANCY, BY ZONING AIR HANDLERS BY FLOOR OR BY PART OF A FLOOR, OR BY INCORPORATING CONTROLLED FLOOR DAMPERS, OR VAV AIR TERMINALS GOING TOTALLY SHUT WHEN NOT OCCUPIED, ETC.
9. EACH ZONE IS CONTROLLED BY AN INDIVIDUAL THERMOSTATIC CONTROL. CONTROLS SHALL BE CAPABLE OF SETTING TEMPERATURES TO 55°F FOR HEATING AND 85°F FOR COOLING AND PROVIDE A TEMPERATURE DEADBAND OF AT LEAST 5°F IF CONTROLLING BOTH HEATING AND COOLING PER SECTION 120.2 (A), (B) AND (C).
10. EACH SPACE CONDITIONING SYSTEM SHALL BE EQUIPPED WITH CONTROLS TO SHUT THE SYSTEM OFF DURING PERIODS OF NONUSE AND WILL TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN SETBACK AND SETUP TEMPERATURES WHILE KEEPING VENTILATION DAMPERS CLOSED.
11. DCV IS REQUIRED FOR USE ON SYSTEMS THAT HAVE AN OUTDOOR AIR ECONOMIZER, AND SERVE A SPACE WITH DESIGN OCCUPANT DENSITY (OR MAXIMUM OCCUPANT LOAD FACTOR FOR EGRESS PURPOSES) GREATER THAN OR EQUAL TO 25 PEOPLE PER 1000 SQ FT (40 SQ FT PER PERSON), ACCORDING TO §120.1(c)3 DCV IS ALSO ALLOWED AS AN EXCEPTIONS THE CONCEPT IN WHICH THE AMOUNT OF OUTDOOR AIR USED TO PURGE ONE OR MORE OFFENDING POLLUTANTS FROM A BUILDING TO FUNCTION IS A FUNCTION OF THE MEASURED LEVEL OF THE POLLUTANT(S).
12. OUTDOOR AIR SUPPLY AND EXHAUST EQUIPMENT SHALL BE INSTALLED WITH DAMPERS THAT AUTOMATICALLY CLOSE UPON FAN SHUTDOWN.
13. HVAC SYSTEMS WITH DDC TO THE ZONE LEVEL SHALL BE PROGRAMMED TO ALLOW CENTRALIZED DEMAND SHED FOR NON-CRITICAL ZONES PER §110.12.
14. ZONE CONTROLS PREVENT REHEATING, RECOOLING OR SIMULTANEOUS HEATING AND COOLING IN COMPUTER ROOMS PER §120.6(J)1.
15. EACH WALL MOUNTED THERMOSTAT SHALL BE LOCATED AWAY FROM POTENTIAL SOURCES THAT WOULD ADVERSELY AFFECT THE READING (CLOSE TO COPIERS, DIRECT SUNLIGHT, BELOW OR ABOVE A SUPPLY AIR DIFFUSER OR CONVECTOR, ETC.). ANY THERMOSTATS MOUNTED ON EXTERIOR WALLS SHALL BE INSTALLED IN SEALED AND INSULATED JUNCTION BOXES.
16. CORNER OFFICE SHALL ALWAYS HAVE THEIR OWN THERMOSTATS, AIR TERMINAL BOXES OR FIN-TUBE RADIATORS.
17. CONTROL SEQUENCES SHALL BE LISTED FOR EQUIPMENT OPERATED BY STAND-ALONE PACKAGED CONTROLS. UNOCCUPIED SEQUENCES SHALL BE INCLUDED.
18. CONTROL SEQUENCES SHALL BE PROVIDED FOR EACH PIECE OF EQUIPMENT LISTED IN THE EQUIPMENT SCHEDULE THAT IS MONITORED OR CONTROLLED BY THE BUILDING AUTOMATION SYSTEM (BAS). UNOCCUPIED SEQUENCES SHALL BE INCLUDED.
19. OUTSIDE AIR TEMPERATURE SENSORS SHALL BE IN A COMMERCIALLY DESIGNED SOLAR SHIELD LOCATED ON A NORTH WALL OR SOME OTHER LOCATION OUT OF DIRECT SUNLIGHT AND AWAY FROM BUILDING EXHAUST OR HEAT REJECTION EQUIPMENT.
20. THE OUTDOOR AIR-VENTILATION RATE AND AIR-DISTRIBUTION ASSUMPTIONS MADE IN THE DESIGN OF THE VENTILATING SYSTEM ARE CLEARLY IDENTIFIED ON THE PLANS.
21. EACH SPACE IS DESIGNED TO HAVE NATURAL VENTILATION OR MECHANICAL VENTILATION THAT IS NO LESS THAN THE LARGER OF CONDITIONED FLOOR AREA TIMES THE REQUIREMENTS IN TABLE 120.1-A OR 15 CFM TIMES THE EXPECTED NUMBER OF OCCUPANTS.
22. THE MINIMUM AND MAXIMUM OUTDOOR AIR RATES FOR EACH AIR HANDLER ARE LISTED ON THE EQUIPMENT SCHEDULES.
23. THE OUTDOOR AIR-VENTILATION RATES ARE BASED ON PLANNED OWNER OCCUPANCY AS DEFINED IN OWNER'S DESIGN INTENT AND ARE NOT BASED ON MAXIMUM EGRESS OCCUPANCY RATES.
24. HVAC SYSTEMS THAT HAVE AN ECONOMIZER, SERVE A SPACE WITH A DESIGN OCCUPANT DENSITY GREATER THAN OR EQUAL TO 25 PEOPLE PER 1000 SF, AND ARE EITHER A SINGLE ZONE SYSTEM WITH ANY CONTROLS OR MULTIPLE ZONE SYSTEM WITH DDC CONTROLS TO THE ZONE LEVEL MUST HAVE DEMAND CONTROL VENTILATION CONTROLS. THE FOLLOWING MUST BE MET:
   A. CO2 SENSORS INSTALLED IN EACH ROOM SERVED BY SYSTEMS WITH DCV CONTROLS.
   B. CO2 SENSORS ARE LOCATED BETWEEN 3 FT AND 6 FT ABOVE THE FLOOR.
   C. CO2 CONCENTRATIONS MAINTAINED AT LESS THAN OR EQUAL TO 600 PPM PLUS OUTDOOR PPM.
   D. DURING HOURS OF EXPECTED OCCUPANCY, CONTROLS MAINTAIN MORE THAN THE MINIMUM VENTILATION RATE REQUIRED BY §120.1(c)3.
   E. THE SYSTEM SHALL ALWAYS PROVIDE A MINIMUM VENTILATION OF THE SUM OF THE MINIMUM AIR RATE FOR DCV WITH DCV AND THE MINIMUM AIR RATE FOR ALL OTHER SPACES SERVED BY THE SYSTEM.
   F. THE CO2 SENSORS SHALL BE FACTORY-CERTIFIED TO HAVE AN ACCURACY WITHIN PLUS OR MINUS 75 PPM AT 600 AND 1000 PPM CONCENTRATION WHEN MEASURED AT SEA LEVEL.
   G. WHEN A SENSOR FAILURE IS DETECTED, THE SYSTEM MUST PROVIDE A SIGNAL TO RESET THE SYSTEM TO PROVIDE THE MINIMUM QUANTITY OF OUTSIDE AIR LEVELS REQUIRED BY §120.1(C)3 TO THE ZONES SERVED BY THE SENSOR AT ALL TIMES THAT THE ZONE IS OCCUPIED.
   H. FOR SYSTEMS WITH EQUIPPED WITH DDC TO THE ZONE LEVEL, THE CO2 SENSOR(S) READING FOR EACH ZONE MUST BE DISPLAYED CONTINUOUSLY AND RECORDED.
25. EACH COOLING FAN SYSTEM THAT HAS A DESIGN MECHANICAL COOLING CAPACITY OVER 33,000 BTU/H SHALL HAVE AN AIR ECONOMIZER OR A WATER ECONOMIZER. AIR ECONOMIZERS MUST COMPLY WITH THE HIGH LIMIT SHUTOFF CONTROLS SHOWN IN TABLE 140.4-G.
26. INTEGRATED ECONOMIZER CONTROLS SHALL BE SET UP SUCH THAT PARTIAL COOLING IS PROVIDED BY THE ECONOMIZER EVEN WHEN ADDITIONAL MECHANICAL COOLING IS REQUIRED.
27. ECONOMIZER DAMPERS SHALL BE DRIVEN BY DIRECT DRIVE ACTUATORS RATHER THAN ROD LINKAGES, WHICH CAN BE A MAJOR CAUSE OF ECONOMIZER MALFUNCTION.
28. BAROMETRIC RELIEF IS USED, IF POSSIBLE. IF NOT, RELIEF FANS (RATHER THAN RETURN FANS) SHALL BE USED IN MOST CASES.
29. OUTDOOR AND RETURN AIR SENSORS SHALL BE PROPERLY SELECTED, PROPERLY LOCATED TO PROVIDE ACCURATE AND REPEATABLE MEASUREMENTS FOR CONTROLLING ECONOMIZER OPERATION. AVERAGING SENSORS COVER THE ENTIRE DUCT OR COIL FACE AREAS.
30. ALL AIR DISTRIBUTION SYSTEM DUCTS AND PLENUMS MUST BE INSTALLED, SEALED AND INSULATED AS REQUIRED BY §120.4(A) AND §160.3(C)2B.
31. DUCT SEALING SHALL COMPLY WITH SUBSECTION A OR B BELOW:
   A. NEW DUCT SYSTEMS THAT MEET THE CRITERIA IN SUBSECTIONS A,B, C, AND D BELOW SHALL BE SEALED TO A LEAKAGE RATE NOT TO EXCEED 6 PERCENT OF THE NOMINAL AIR HANDLER AIR FLOW RATE AS CONFIRMED THROUGH HERS FIELD VERIFICATION AND DIAGNOSTIC TESTING, IN ACCORDANCE WITH REFERENCE NONRESIDENTIAL APPENDIX NA7.5.3;
      a. THE DUCT SYSTEM DOES NOT SERVE A HEALTH CARE FACILITY; AND
      b. THE DUCT SYSTEM PROVIDES CONDITIONED AIR TO AN OCCIPITAL SPACE FOR A CONSTANT VOLUME, SINGLE ZONE, SPACE CONDITIONING SYSTEM; AND
      c. THE SPACE CONDITIONING SYSTEM SERVES LESS THAN 5,000 SQUARE FEET OF CONDITIONED FLOOR AREA; AND
      d. THE COMBINED SURFACE AREA OF THE DUCTS LOCATED OUTDOORS OR IN UNCONDITIONED SPACE IS MORE THAN 25 PERCENT OF THE TOTAL SURFACE AREA OF THE ENTIRE DUCT SYSTEM.
   B. NEW DUCT SYSTEMS THAT ARE NOT SUBJECT TO TESTING UNDER SECTION 120.4(G)1 SHALL INSTEAD MEET THE DUCT LEAKAGE TESTING REQUIREMENTS OF CMC SECTION 603.10.
32. NEW DUCT SYSTEMS HAVE NEW TESTING REQUIREMENTS WHICH MUST EITHER:
   A. BE TESTED PER REFERENCE NONRESIDENTIAL APPENDIX NAT.5.3 TO VERIFY THAT THERE IS NO MORE THAN 6% LEAKAGE OF THE NOMINAL AIR HANDLER AIR FLOR RATES OF A CONSTANT VOLUME, SINGLE ZONE SYSTEM THAT SERVES < 5,000 FT2 AND HAS MORE THAN 25% OF THE DUCT SURFACE OUTSIDE OF THE CONDITIONED SPACE AND IS NOT SERVING A HEALTH CARE FACILITY; OR
   B. MEET THE CALIFORNIA MECHANICAL CODE REQUIREMENTS OF §603.9.2 IF THEY CANNOT MEET THE REQUIREMENTS ABOVE.
33. DUCTS SHALL UTILIZE LOW STATIC PRESSURE DESIGN. IDENTIFY THE MOST RESTRICTIVE BRANCH FROM THE FAN TO THE LAST AIR TERMINAL UNIT. IDENTIFY POSSIBLE MEANS OF SIGNIFICANTLY REDUCING THE PRESSURE DROP. BRANCH DUCT SYSTEMS SHALL DESIGNED FOR EQUAL PRESSURE DROP, WHEN POSSIBLE.
34. DUCT BRANCHES WITH SIGNIFICANTLY DIFFERING STATIC PRESSURE REQUIREMENTS SHALL HAVE VOLUME CONTROL STRATEGICALLY PLACED TO AID IN TAB WORK.
35. FANS SHALL DISCHARGE INTO DUCT SECTIONS THAT REMAIN STRAIGHT FOR AS LONG AS POSSIBLE (IDEALLY 10 DUCT DIAMETERS) TO REDUCE FAN INEFFICIENCIES FROM SYSTEM EFFECTS.
36. DUCT VELOCITIES SHALL GENERALLY BE BELOW 2,000 FPM FOR DUCTS IN CEILING PLENUMS, 1500 FPM FOR EXPOSED DUCTS AND 3500 FPM IN MECHANICAL ROOMS AND NON-NOISE SENSITIVE SHAFTS AND DO NOT REDUCE ANY DUCT SIZES LISTED ON PLANS.
37. DUCT FRICTION RATES SHALL GENERALLY BE LESS THAN 0.25" WC PER 100 LINEAL FEET NEARER THE FAN, 0.15 TO 0.20" IN THE MAIN DUCTS AND 0.08 TO 0.12" WC/100' NEARER THE END OF THE SYSTEM. DESIGNS OVER THESE RATES SHALL BE QUESTIONED. VERY ENERGY EFFICIENT DESIGN CAN LOWER THESE VALUES BY UP TO 40%.
38. CONTRACTOR SHOP DRAWINGS SHALL BE SUFFICIENTLY DETAILED TO ENSURE THAT DISTRIBUTION SYSTEM DESIGN INTENT IS ADEQUATELY CONVEYED TO MATCH PLANS. IF SUFFICIENT DETAIL IS NOT INCLUDED IN DRAWINGS, INSTALLATIONS MAY RESULT IN SIGNIFICANTLY HIGHER PRESSURE DROPS AND HENCE HIGHER ENERGY CONSUMPTION AND OTHER OPERATING ISSUES.
39. ACCEPTANCE REQUIREMENTS ARE CLEARLY IDENTIFIED IN CONSTRUCTION DOCUMENTS.
40. COMMISSIONING MEASURES OR REQUIREMENTS ARE REFLECTED IN THE CONSTRUCTION DOCUMENTS.
41. REQUIREMENTS FOR FUNCTIONAL PERFORMANCE TESTS ARE REFLECTED IN THE CONSTRUCTION DOCUMENTS.
42. COOLING SYSTEMS IDENTIFIED IN TABLE 140.4-D SHALL HAVE FAN CONTROLS TO VARY THE INDOOR FAN AIRFLOW AS A FUNCTION OF LOAD:
   A. DX AND CHILLED WATER COOLING SYSTEMS THAT CONTROL CAPACITY BASED ON OCCUPIED SPACE TEMPERATURE SHALL HAVE A MINIMUM OF 2 STAGES OF CONTROL.
   B. SYSTEMS THAT CONTROL SPACE TEMPERATURE BY MODULATING AIRFLOW TO THE SPACE SHALL HAVE PROPORTIONAL FAN CONTROL.
   C. SYSTEMS WITH AIR SIDE ECONOMIZER SHALL HAVE A MINIMUM OF 2 SPEEDS OF FAN CONTROL DURING ECONOMIZER OPERATION.
42. FAN CABINET ENCLOSURE AND INTERNAL COMPONENTS SHALL BE SELECTED TO MINIMIZE PRESSURE DROP, E.G. FACE VELOCITY IS LESS THAN 500 FPM, LOW PRESSURE DROP COILS, FILTERS, ETC.
43. FAN WHEEL SHALL BE SELECTED FOR EFFICIENT OPERATION, E.G. LARGER DIAMETER ROTATING AT LOWER SPEED.
44. SYSTEMS THAT SERVE MULTIPLE ZONES SHALL HAVE CONTROLS THAT AUTOMATICALLY RESET SUPPLY AIR TEMPERATURE. ZONES WITH HIGH INTERNAL LOADS WITH NEAR CONSTANT AIRFLOW SHALL BE DESIGNED FOR THE ELEVATED RESET SUPPLY AIR TEMPERATURE. RESET CONTROLS SHALL BE IN RESPONSE TO BUILDING LOADS OR TO OUTDOOR AIR TEMPERATURE AND SHALL BE AT LEAST 25% OF THE DIFFERENCE BETWEEN SUPPLY AIR AND DESIGN ROOM AIR TEMPERATURE. CONTROL SEQUENCES ARE IDENTIFIED IN CONSTRUCTION DOCUMENTS.
45. SAT RESET SHALL BE ESTABLISHED WITH AN AGGRESSIVE RESET SCHEDULE OF 10F, E.G. 55F DURING WARM WEATHER AND 65F DURING COOL WEATHER.

SHEET INDEX

EC0.01	ENERGY COMPLIANCE DOCUMENTATION SHEET INDEX & NOTES
EC1.01	ENERGY COMPLIANCE DOCUMENTATION
EC1.02	ENERGY COMPLIANCE DOCUMENTATION
EC1.03	ENERGY COMPLIANCE DOCUMENTATION
EC1.04	ENERGY COMPLIANCE DOCUMENTATION
EC1.05	ENERGY COMPLIANCE DOCUMENTATION

ACCEPTANCE TESTING NOTES

THE CALIFORNIA ENERGY CODE SECTION 10-103 REQUIRES ACCEPTANCE TESTING ON ALL NEWLY INSTALLED LIGHTING CONTROLS, MECHANICAL SYSTEMS, ENVELOPES AND PROCESS EQUIPMENT AFTER INSTALLATION AND BEFORE PROJECT COMPLETION. AN ACCEPTANCE TEST IS A FUNCTIONAL PERFORMANCE TEST TO HELP ENSURE THAT NEWLY INSTALLED EQUIPMENT IS OPERATING AND IN COMPLIANCE WITH THE ENERGY CODE.

LIGHTING CONTROLS ACCEPTANCE TESTS MUST BE PERFORMED BY A CERTIFIED LIGHTING CONTROLS ACCEPTANCE TEST TECHNICIAN (ATT).

MECHANICAL SYSTEM ACCEPTANCE TESTS MUST BE PERFORMED BY A CERTIFIED MECHANICAL ATT FOR PROJECTS SUBMITTED ON OR AFTER OCTOBER 1, 2021

ENVELOPE AND PROCESS EQUIPMENT ACCEPTANCE TESTS SHALL BE PERFORMED BY THE INSTALLING CONTRACTOR, ENGINEER/ARCHITECT OF RECORD OR THE OWNER'S AGENT.

A LISTING OF CERTIFIED ATT CAN BE FOUND AT:
https://www.energy.ca.gov/programs-and-topics/programs/acceptance-test-technician-certification-provider-program/acceptance.

THE ACCEPTANCE TESTING PROCEDURES MUST BE REPEATED, AND DEFICIENCIES MUST BE CORRECTED BY THE BUILDER OR INSTALLING CONTRACTOR UNTIL THE CONSTRUCTION/ INSTALLATION OF THE SPECIFIED SYSTEMS CONFORM AND PASS THE REQUIRED ACCEPTANCE CRITERIA.

PROJECT INSPECTORS WILL COLLECT THE FORMS TO CONFIRM THAT THE REQUIRED ACCEPTANCE TESTS HAVE BEEN COMPLETED.

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: Robert Bottino
on Jun 19, 2025

JOBCOPY
1124 DEL PASO BLVD
COM-2500586

ARCHITECT
PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9922

MEP Engineering \\ Technology
LEAF ENGINEERS
FOLSOM
1100 Iron Point Rd., Suite 200
Folsom, CA 95630
916.355.9922 p
LEAFengineers.com

NORTH SACRAMENTO HAGGINWOOD LIBRARY
CITY OF SACRAMENTO
1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

KEY PLAN
A
PLAN NORTH | TRUE NORTH

Architect / Engineer
REGISTERED PROFESSIONAL ENGINEER
GAREN M. LENCIONI
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389

DATE	12/16/2024	
DRAWN BY: FM	CHKED BY: RT	
REVISIONS		
#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT
ENERGY COMPLIANCE DOCUMENTATION SHEET INDEX & NOTES

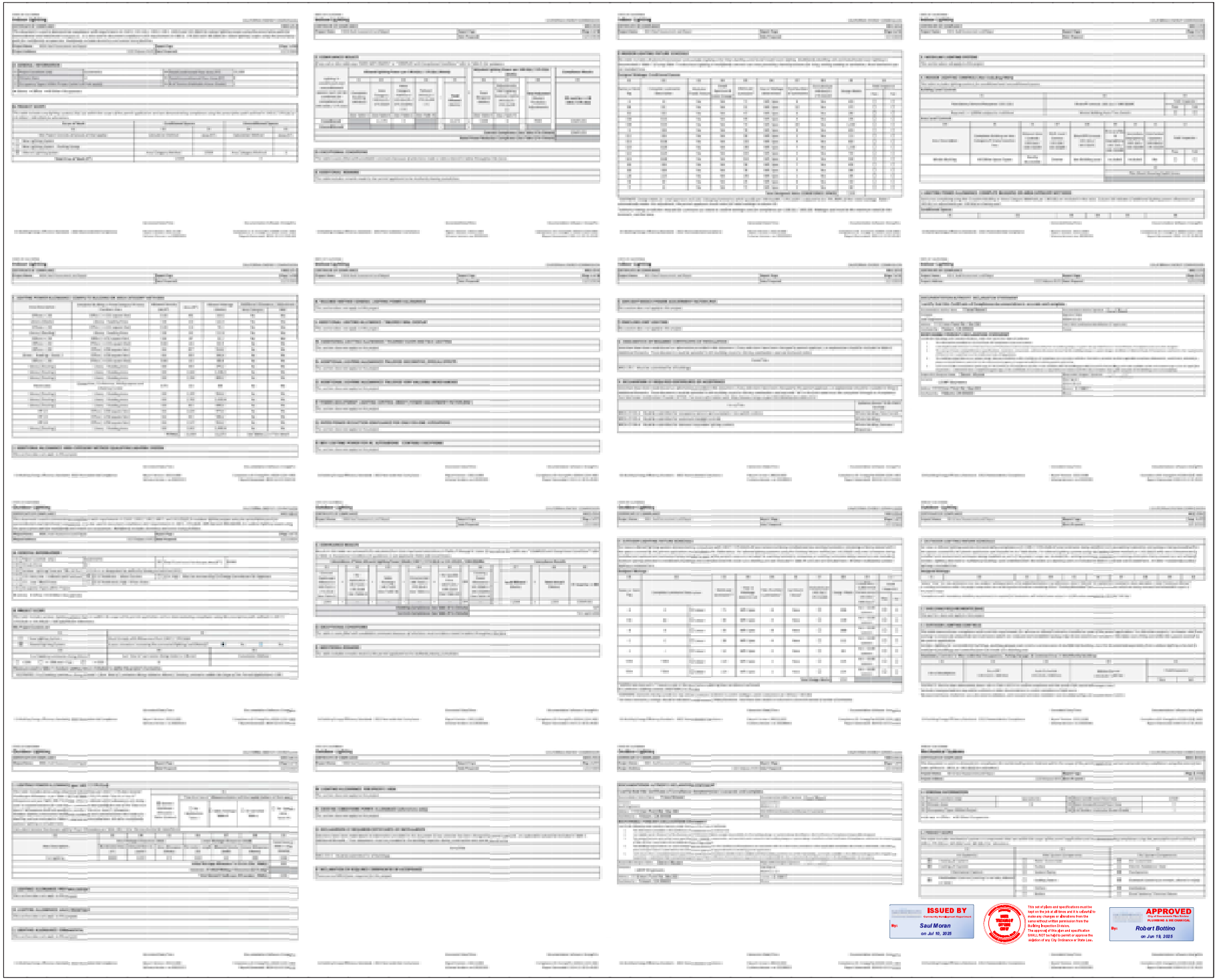
EC0.01

This document is for plan review only

220389 NSHL_TI ENERGY COMPLIANCE SHEETS
PBKcaTBn1.2 2019.10.03

Z:\Projects\FOL\2022\2203893-CD\Drawings\Cnst\MEPT\EC

12/13/2024 4:09:01 PM



ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: Robert Bottino
on Jun 19, 2025

PBK

ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-355-9022

MEP Engineering & Technology
LEAF ENGINEERS
FOLSOM
1110 Iron Point Rd, Suite 200
Folsom, CA 95630
916.355.9022
LEAFengineers.com

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

SACRAMENTO

KEY PLAN

PLAN NORTH
TRUE NORTH

Architect / Engineer

REGISTERED PROFESSIONAL ENGINEER
JUREN M. LEACOCK
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: FM CHKED BY: RT
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

ENERGY COMPLIANCE DOCUMENTATION

This document is for plan review only

EC1.01

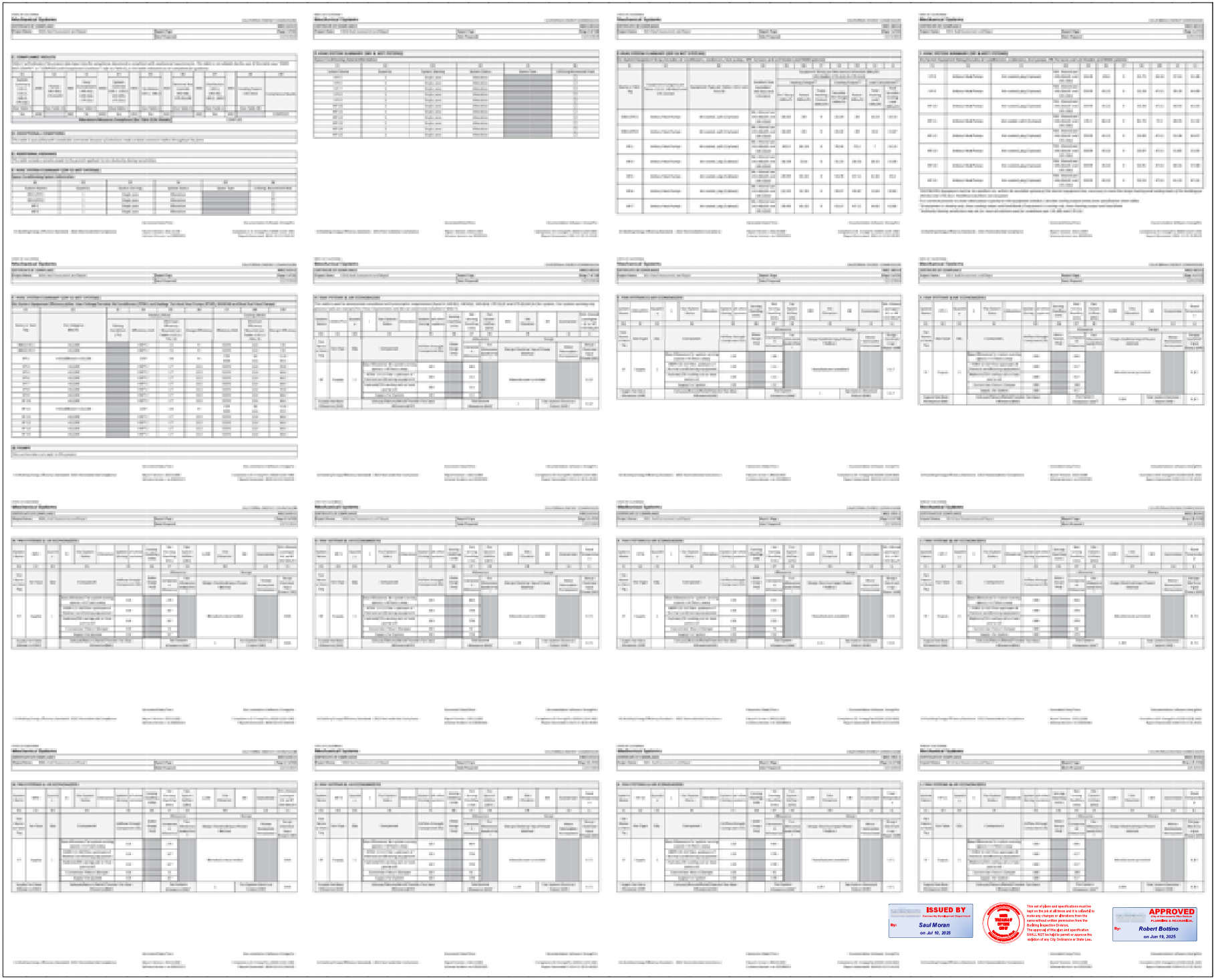
JOBCOPY

1124 DEL PASO BLVD

COM-2500586

220389 NSHL_TI ENERGY COMPLIANCE SHEETS
PBKcaTBv1.2 2019.10.03

Z:\Projects\FOL\2022\2203893-CD\Drawings\Cnsl\MEPT\EC
12/13/2024 4:09:11 PM



ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: Robert Bottino
on Jun 19, 2025

PBK

ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-355-9022

MEP Engineering & Technology
LEAF ENGINEERS
FOLSOM
1110 Iron Point Rd, Suite 200
Folsom, CA 95630
ATLANTA, CA
LEAFengineering.com

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

SACRAMENTO

KEY PLAN

PLAN NORTH
TRUE NORTH

Architect / Engineer

REGISTERED PROFESSIONAL ENGINEER
JAREN M. LEACOCK
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
220389
DATE 12/16/2024
DRAWN BY: FM CHKED BY: RT
REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

ENERGY COMPLIANCE DOCUMENTATION

This document is for plan review only

EC1.02

JOBCOPY

1124 DEL PASO BLVD

COM-2500586

220389 NSHL_T1 ENERGY COMPLIANCE SHEETS
PBKcaTBv1.2 2019.10.03

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

APPROVED
City of Sacramento, San Antonio
PLANNING & MECHANICAL
By: Robert Bottino
on Jun 19, 2025

PBK

JOBCOPY

ARCHITECT PBK, Inc.
PBK.com
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-8315
916-365-9022

MEP Engineering & Technology
LEAF ENGINEERS
FOLSOM
1110 Iron Point Rd, Suite 200
Folsom, CA 95630
MEP.ENG.PRO
LEAFengineers.com

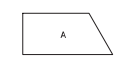
NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

SACRAMENTO

1124 DEL PASO BLVD



KEY PLAN

PLAN NORTH TRUE NORTH

Architect / Engineer

REGISTERED PROFESSIONAL ENGINEER
LAREN M. LEACOMBE
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO

PROJECT NUMBER
220389

DATE 12/16/2024

DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

ENERGY COMPLIANCE DOCUMENTATION

This document is for plan review only

EC1.03

COM-2500586

Z:\Projects\FOL\2022\220389\3-CD\Drawings\Cnsl\MEP\TEC
12/13/2024 4:09:21 PM

220389 NSHL_TI ENERGY COMPLIANCE SHEETS
PBKcaTBv1.2 2019.10.03

Z:\Projects\FOL\2022\220389\3-CD\Drawings\Cnsl\MEPT\EC

12/13/2024 4:09:31 PM

ISSUED BY
Community Development Department
By: Saul Moran
on Jul 10, 2025

This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.
The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.

APPROVED
City of Sacramento Plan Review
PLUMBING & MECHANICAL
By: Robert Bottino
on Jun 19, 2025

PBK

JOBCOPY

ARCHITECT
PBK, Inc.
FOLSOM
1110 Iron Point Road, Suite 200
Folsom, CA 95630-4315
916-355-9922

MEP Engineering / Technology
LEAF ENGINEERS
FOLSOM
1110 Iron Point Rd, Suite 200
Folsom, CA 95630
916.355.9922
LEAFengineers.com

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122 DEL PASO BLVD
SACRAMENTO, CA 95815
95% CONSTRUCTION DOCUMENTS

SACRAMENTO

1124 DEL PASO BLVD

KEY PLAN

PLAN NORTH
TRUE NORTH

Architect / Engineer

REGISTERED PROFESSIONAL ENGINEER
JAREN M. LEACOCK
NO. 33380
MECHANICAL
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO

PROJECT NUMBER
220389

DATE 12/16/2024

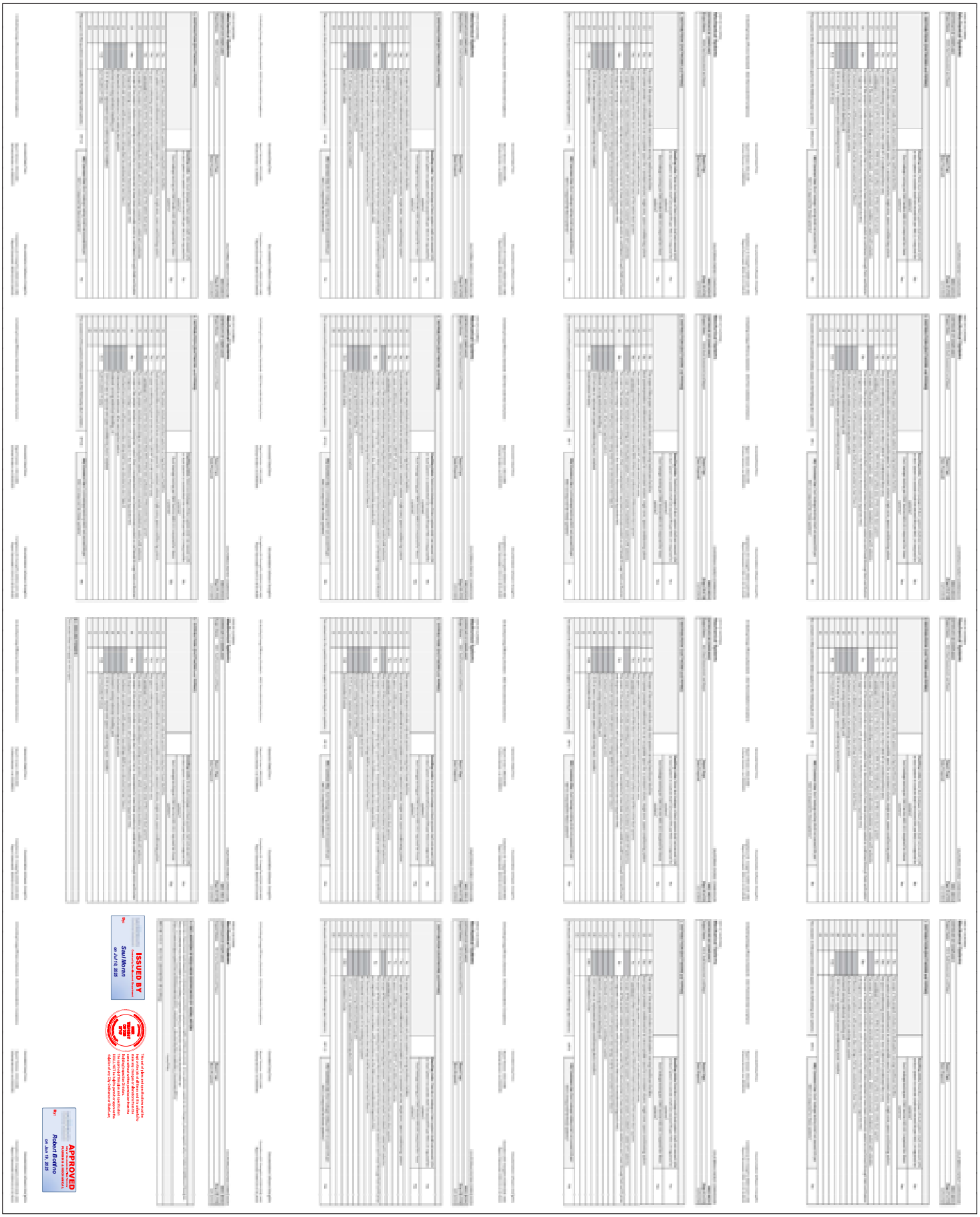
DRAWN BY: FM CHKED BY: RT

REVISIONS

#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENT

ENERGY COMPLIANCE DOCUMENTATION



This document is for plan review only

EC1.04

COM-2500586

JOBCOPY

1124 DEL PASO BLVD

COM-2500586

PBK

ARCHITECT
PBK Inc.
FOLSOM
1 Upper Pointe Blvd., Suite 200
Folsom, CA 95630
916-569-0922
Mason

MEP Engineering / Technology
LEAF
Sacramento, CA
Phone: (916) 520-5320
Contact: Jim Hoffman
jim@leafengineers.com

NORTH SACRAMENTO HAGGINWOOD LIBRARY

CITY OF SACRAMENTO

1122 DEL PASO BLVD
SACRAMENTO, CA 95815

95% CONSTRUCTION DOCUMENTS

SACRAMENTO

KEY PLAN

A

PLAN NORTH / TRUE NORTH

Architect Engineer
DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE
No. 33939
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

CLIENT
CITY OF SACRAMENTO
PROJECT NUMBER
2203589

DATE	12/16/2024
DRAWN BY: FM	CHKED BY: RT

#	DESCRIPTION	DATE
	REVISIONS	

CONSTRUCTION DOCUMENT

ENERGY COMPLIANCE DOCUMENTATION

EC1.05

This document is for plan review only

CONTRACT AMENDMENT

CHANGE IN SCOPE AND NOT-TO-EXCEED AMOUNT

Project Title and Job Number: : On Call Professional Services-Architectural Design Date: 12/16/2019
Purchase Order #: 0000067735 Contract Amendment No.: 2

The City of Sacramento ("City") and PBK Architects ("Contractor"), as parties to that certain contract designated as Contract Number 2019-1843 , including any and all prior amendments modifying the contract (the contract and all amendments are hereafter collectively referred to as the "Contract"), hereby amend the Contract as follows:

1. The scope set forth in Exhibit A of the Contract is amended as follows:

   Additional Tasks required for the completion of Design and Construction of the North Sacramento Hagginwood Library (NSHL). Bidding Assistance and Construction Administration for the duration of the project at such time this contract will be finalized, which shall be billed hourly not-to-exceed (NTE) in the amounts shown. See Attachment 2 to Exhibit A

2. The maximum not-to-exceed amount that is specified in the Contract for payment of Contractor's fees and expenses is **increased** by $$98,730.00, and the Contract's maximum not-to-exceed amount is amended as follows:

Contract's original not-to-exceed amount:	$750,000.00
Net change by previous amendments:	.00
Not-to-exceed amount prior to this amendment:	$750,000.00
Increase by this amendment:	$ 98,730.00
New not-to exceed amount including all amendments:	$ 848,730.00

3. Contractor agrees that the amount specified in section 2 above shall fully compensate Contractor under the Contract, as modified by this amendment, including any and all direct and indirect costs that may be incurred by Contractor in connection with such additional and/or revised services, and costs associated with any changes and/or delays in schedules or in the delivery of other services by Contractor.

4. Contractor warrants and represents that the person or persons executing this contract amendment on behalf of Contractor is duly authorized by Contractor to sign this amendment and bind Contractor to the terms hereof.

5. Except as specifically revised herein, all terms and conditions of the Contract shall remain in full force and effect, and Contractor shall perform as required under the Contract, as modified by this amendment.

SUPPLEMENTAL CONTRACT

Approval Recommended By:

Project Manager

Approved As To Form By:

City Attorney

Approved By:

Contractor

Attest:

City Clerk

Approved By:

Ryan Moore, Assistant City Manager
City of Sacramento

Attachment 2 - PBK Architects- Architectural Services
C2019-1843- Amendment #2

All changes to the scope are noted below and described further in the Scope Letter.

Task	Status	Description	Submitted to City	Reason	City Accepted Amount	Calendar Days Added
6	**Accepted***	Bidding Services for NSHL. Billed at actual hours used with a Not-to-Exceed (NTE) amount.	1/18/2024	**Client Initiated**	**$ 16,530.00**	0
7	**Accepted***	Construction Administration Services for NSHL. Billed at actual hours used with a Not-to-Exceed (NTE) amount.	1/18/2024	**Client Initiated**	**$ 143,120.00**	0

2 Items	Total Needed to Complete Ongoing NSHL Project	**$ 159,650.00**	0
	Amount Remaining in Existing Contract C2019-1843	$ (60,830.00)	Days
	Amount Added to Contract	**$ 98,820.00**	
	Original Contract Amount	$ 750,000.00	
	Previous Amendments	$ -	
	Amendment #2 Amount	$ 98,820.00	
	Total Contract Amount:	**$ 848,820.00**	

* This Task compensates the vendor, billed monthly at hourly rates for actual hours used for this task and with a not-to-exceed (NTE) amount. Final invoices shall not exceed these amounts as outlined without prior authorization by City Staff.