

APPENDIX J
ENVIRONMENTAL NOISE AND VIBRATION ASSESSMENT



Environmental Noise & Vibration Assessment

7-Eleven Northgate Blvd & Rosin Ct

Sacramento, California

BAC Job #2025-070

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April 30, 2026



Introduction

The proposed 7-Eleven (project) is located west of Northgate Boulevard and north of Rosin Court in the City of Sacramento, California (APN: 250-0010-115). The project proposes the construction of a 4,761 square foot convenience store (c-store) building, fueling station, and parking stalls. The project property and adjacent parcels are commercially zoned (Highway Commercial – HC-R). The project area with aerial imagery is shown in Figure 1. The proposed project site plan is presented in Figure 2.

The purposes of this assessment are to quantify the existing noise and vibration environments, identify potential noise and vibration impacts resulting from the project, identify appropriate mitigation measures, and provide a quantitative and qualitative analysis of impacts associated with the project. Specifically, impacts are identified if project-related activities would cause a substantial increase in ambient noise levels at existing sensitive uses in the project vicinity, or if traffic or project-generated noise or vibration levels would exceed applicable federal, state, or City of Sacramento standards at nearby sensitive uses.

Noise and Vibration Fundamentals

Noise

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are designated as sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or Hertz (Hz). Definitions of acoustical terminology are provided in Appendix A.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals of pressure) as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in decibel levels correspond closely to human perception of relative loudness. Noise levels associated with common noise sources are provided in Figure 3.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by filtering the frequency response of a sound level meter by means of the standardized A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}). The L_{eq} is the foundation of the day-night average noise descriptor, DNL (or L_{dn}), and shows very good correlation with community response to noise. The Day-Night Average sound level (DNL) is based upon the average noise level over a 24-hour day, with a +10-decibel weighting applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because DNL represents a 24-hour average, it tends to disguise short-term variations in the noise environment. DNL-based noise standards are commonly used to assess noise impacts associated with traffic, railroad, and aircraft noise sources.

Vibration

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, while vibration is usually associated with transmission through the ground or structures. As with noise, vibration consists of amplitude and frequency. A person's response to vibration will depend on their individual sensitivity as well as the amplitude and frequency of the source.

Vibration can be described in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration in terms of velocity in inches per second peak particle velocity (IPS, PPV) or root-mean-square (VdB, RMS). Standards pertaining to perception as well as damage to structures have been developed for vibration in terms of peak particle velocity as well as RMS velocities. As vibrations travel outward from the source, they excite the particles of rock and soil through which they pass and cause them to oscillate. Differences in subsurface geologic conditions and distance from the source of vibration will result in different vibration levels characterized by different frequencies and intensities. In all cases, vibration amplitudes will decrease with increasing distance. The maximum rate, or velocity of particle movement, is the commonly accepted descriptor of the vibration "strength".

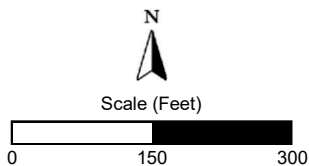
Human response to vibration is difficult to quantify. Vibration can be felt or heard well below the levels that produce any damage to structures. The duration of the event influences human response, as does frequency. Generally, as duration and vibration frequency increase, the potential for adverse human response increases.

According to the Transportation and Construction-Induced Vibration Guidance Manual (Caltrans, June 2004), operation of construction equipment and construction techniques generate ground vibration. Traffic traveling on roadways can also be a source of such vibration. At high enough amplitudes, ground vibration has the potential to damage structures and/or cause cosmetic damage. Ground vibration can also be a source of annoyance to individuals who live or work close to vibration-generating activities. However, traffic rarely generates vibration amplitudes high enough to cause structural or cosmetic damage.



Legend

- Project Area (Approximate Location)
- Long-Term Ambient Noise Survey Site



7-Eleven Northgate Blvd & Rosin Ct
Sacramento, California

Project Area

Figure 1





Dated: 3/12/26

Legend

- Parking Stalls
- C-Store Building
- Underground Fuel Storage Tanks
- Air/Water Unit

7-Eleven Northgate Blvd & Rosin Ct
Sacramento, California

Conceptual Site Plan

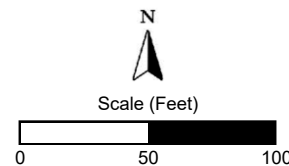
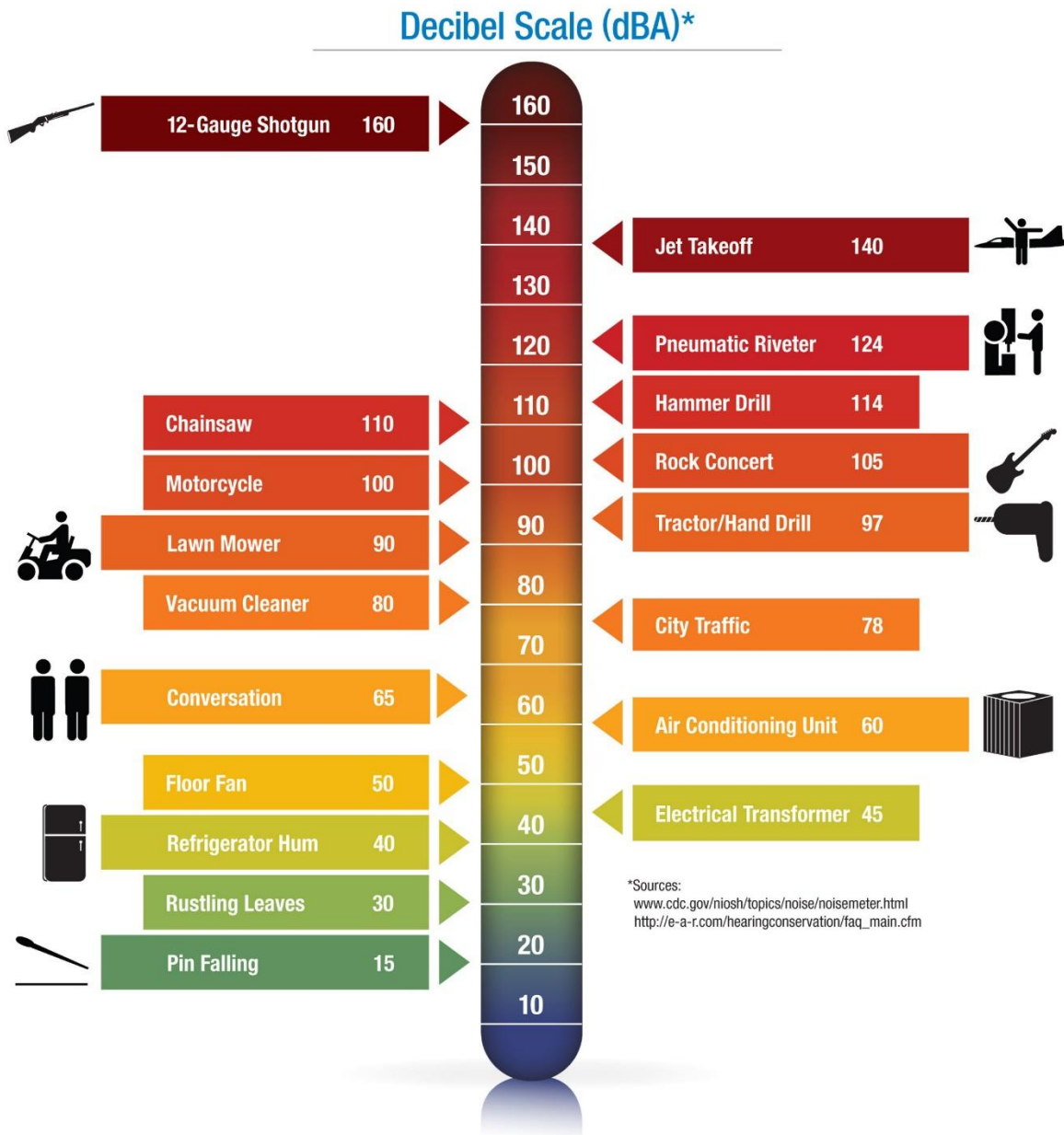


Figure 2

**Figure 3
Noise Levels Associated with Common Noise Sources**



Environmental Setting – Existing Ambient Noise and Vibration Environment

Existing Noise-Sensitive Land Uses in the Project Vicinity

Noise-sensitive land uses are generally defined as locations where people reside or where the presence of unwanted sound could adversely affect the primary intended use of the land. Places where people live, sleep, recreate, worship, and study are generally considered to be sensitive to noise because intrusive noise can be disruptive to these activities. The closest existing noise-sensitive uses to the project area have been identified as single-family residences located to the south. Commercially zoned land uses are located within the project vicinity, but such uses are typically not considered to be noise-sensitive (rather noise-generating). The project area and nearby land use zoning are shown in Figure 1.

Existing Overall Ambient Noise Environment within the Project Vicinity

The existing ambient noise environment within the project vicinity is defined primarily by noise from traffic on Northgate Boulevard and I-80, and to a lesser extent by nearby commercial operations. To generally quantify existing ambient noise environment within the project vicinity, BAC conducted a long-term (72-hour) ambient noise level survey August 1-3, 2025, at the location shown in Figure 1. Photographs of the noise survey location are provided in Appendix B. The ambient noise measurement site was specifically selected to be representative of the existing ambient noise level environment at the closest existing noise-sensitive receptors to the project, identified as single-family residences to the south.

A Larson Davis Laboratories (LDL) precision (Type 1) integrating sound level meter was used to complete the noise level measurements. The meter was calibrated immediately before use with an LDL Model CA200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all specifications of the American National Standards Institute requirements for Type 1 sound level meters (ANSI S1.4). The results of the long-term ambient noise survey are shown in Table 1.

Table 1
Summary of Long-Term Ambient Noise Survey Results – August 1-3, 2025¹

Noise Survey Site Description ²	Date	DNL (dB)	Average Measured Hourly Noise Levels (dB)			
			Daytime ³		Nighttime ⁴	
			L ₅₀	L _{max}	L ₅₀	L _{max}
South of project area adjacent to residences	Friday, August 1	58	49	69	47	69
	Saturday, August 2	57	48	69	46	67
	Sunday, August 3	57	48	70	46	66

¹ Detailed summaries of the noise monitoring results are provided in Appendices C and D.
² Long-term noise survey location is shown in Figure 1.
³ Daytime hours: 7:00 a.m. to 10:00 p.m.
⁴ Nighttime hours: 10:00 p.m. to 7:00 a.m.

Source: BAC 2025

As indicated in Table 1, measured existing day-night average (DNL) and average hourly (L_{50} and L_{max}) noise levels were consistent during the 72-hour monitoring period (i.e., relatively small range of measured values).

Existing Ambient Vibration Environment within the Project Vicinity

During site visits on July 31st and August 4th, 2025, existing vibration levels within the project area and immediate project vicinity were imperceptible by BAC field staff and were assumed to be below the threshold of human perception (generally considered to be 65 VdB). Therefore, the existing vibration environment in the project area and immediate project vicinity is considered to be negligible.

Regulatory Setting

Standards for acceptable noise and vibration exposure in the City of Sacramento are contained within the City's General Plan and /or within the City's Municipal Code. The criteria which were applied to this project are reproduced below.

Federal

Federal Transit Administration (FTA)

Although no standardized criteria have been developed for assessing construction noise impacts, The Federal Transit Administration's *Transit Noise and Vibration Impact Assessment Manual* contains guidance for use in assessing potential noise associated with project construction.

Where local noise ordinances provide guidance with respect to construction noise, they typically relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. The following guidelines can be considered reasonable criteria for assessment: construction noise levels of 90 dBA L_{eq} and 80 dBA L_{eq}^1 at residential land uses during daytime and nighttime hours, respectively. If these criteria are exceeded, there may be adverse community reaction.

Federal Interagency Commission on Noise (FICON)

The City of Sacramento does not currently have adopted policies for assessing the potential for noise impacts associated with increases in ambient noise levels from project-generated off-site traffic. As a result, criteria developed by the Federal Interagency Commission on Noise (FICON) was utilized in this assessment. Specifically, FICON has developed a graduated scale for use in the assessment of project-related noise level increases. The criteria shown in Table 2 were developed by FICON as a means of developing thresholds for impact identification for project-related noise level increases. The FICON standards have been used extensively in the

¹ Table 7-2 of the *Transit Noise and Vibration Impact Assessment Manual* (FTA Report No. 0123, September 2018)

preparation of the noise sections of Environmental Impact Reports that have been certified in many California cities and counties, including the City of Sacramento.

The use of the FICON standards is considered conservative relative to thresholds used by other agencies in the State of California. For example, the California Department of Transportation (Caltrans) requires a project-related traffic noise level increase of 12 dB for a finding of significance, and the California Energy Commission (CEC) considers project-related noise level increases between 5 to 10 dB significant, depending on local factors. Therefore, the use of the FICON standards, which set the threshold for finding of significant noise impacts as low as 1.5 dB, provides a very conservative approach to impact assessment for this project.

Table 2
Significance of Changes in Cumulative Noise Exposure

Ambient Noise Level (DNL) Without Project	Change in Ambient Noise Level (DNL) Due to Project
<60 dB	+5.0 dB or more
60 to 65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

Source: Federal Interagency Committee on Noise (FICON)

Based on the FICON research, as shown in Table 2, a 5 dB DNL increase in noise levels due to a project is required for a finding of significant noise impact where ambient noise levels without the project are less than 60 dB DNL. Where pre-project ambient conditions are between 60 dB DNL and 65 dB DNL, a 3 dB DNL increase is applied as the standard of significance (Table 2). Finally, in areas already exposed to higher noise levels, specifically pre-project noise levels in excess of 65 dB DNL, a 1.5 dB DNL increase is considered by FICON as the threshold of significance (Table 2).

Federal Transit Administration (FTA)

Policy ERC-10.5 of the Sacramento 2040 General Plan requires construction projects to comply with applicable vibration criteria for residential and commercial uses developed by the Federal Transit Administration (FTA). The FTA criteria applicable to damage and annoyance from vibration typically associated with construction activities are presented in Tables 3 and 4.

Table 3
FTA Criteria for Assessing Vibration Damage to Structures

Building Category	Level (VdB) ¹
I. Reinforced-concrete, steel or timber (no plaster)	102
II. Engineered concrete and masonry (no plaster)	98
III. Non-engineered timber and masonry buildings	94
IV. Buildings extremely susceptible to vibration damage	90
¹ RMS velocity in decibels (VdB) re 1 micro-inch/second	

Source: 2018 Federal Transit Administration Noise and Vibration Manual, Table 12-3

**Table 4
Groundborne Vibration Impact Criteria for General Assessment**

Land Use Category	Impact Levels (VdB)		
	Frequent Events ^a	Occasional Events ^b	Infrequent Events ^c
Category 1: Buildings where vibration would interfere with interior ops.	65	65	65
Category 2: Residences and buildings where people normally sleep	72	75	80
Category 3: Institutional land uses with primarily daytime uses	75	78	83
a. "Frequent Events" is defined as more than 70 vibration events of the same source per day. b. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. c. "Infrequent Events" is defined as fewer than 30 vibration events of the same source per day.			

Source: 2018 Federal Transit Administration, *Transit Noise Impact and Vibration Assessment*

State of California

California Environmental Quality Act (CEQA)

The State of California has established regulatory criteria that are applicable to this assessment. Specifically, Appendix G of the State of California Environmental Quality Act (CEQA) Guidelines are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. According to Appendix G of the CEQA guidelines, the project would result in a significant noise or vibration impact if the following occur:

- A. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or other applicable standards of other agencies.
- B. Generation of excessive groundborne vibration or groundborne noise levels.
- C. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, the project would expose people residing or working in the project area to excessive noise levels.

It should be noted that audibility is not a test of significance according to CEQA. If this were the case, any project which added any audible amount of noise to the environment would be considered significant according to CEQA. Because every physical process creates noise, the use of audibility alone as significance criteria would be unworkable. CEQA requires a substantial increase in noise levels before noise impacts are identified, not simply an audible change.

Finally, the closest airports to the project area have been identified as Rio Linda Airport (located approximately three miles away), Sacramento McClellan Airport (located approximately four miles away), and Sacramento International Airport (located approximately six miles away). Because the project area is not within the vicinity of a private airstrip, an airport land use plan, or within two miles of a public airport, the last threshold listed above (criterion C) is not relevant and is not

discussed further as there would be no potential for airport-related impacts associated with the project.

Local

Sacramento 2040 General Plan

The Environmental Resources and Constraints Element of the Sacramento 2040 General Plan contains the City's noise- and vibration-related policies. Specific policies of relevance to this assessment are reproduced below.

ERC-10.4 Interior Noise Review for Multiple, Loud, Short-Term Events. In cases where new development is proposed in areas subject to frequent, high-noise events (such as aircraft overflights, or train and truck passbys), the City shall evaluate interior noise impacts at proposed sensitive receptors. The evaluation shall incorporate measures necessary to meet the 45 dBA DNL standard.

ERC-10.5 Interior Vibration Standards. The City shall require construction projects that are anticipated to generate significant vibration levels to use appropriate methods (i.e., type of equipment, low-impact tools, modifying operations, increasing setback distance, vibration monitoring) to ensure acceptable interior vibration levels at nearby residential and commercial uses based on the current City or Federal Transit Administration (FTA) criteria.

ERC-10.9 Construction Noise Controls. The City shall limit the potential noise impacts of construction activities on surrounding land uses through noise regulations in the City Code that address permitted days and hours of construction equipment, and sound attenuation devices.

Sacramento Municipal Code

The provisions of the Sacramento Municipal Code of relevance to this assessment are reproduced below.

8.68.060 Exterior noise standards.

- A. The following noise standards unless otherwise specifically indicated in this article shall apply to all agricultural and residential properties.
 1. From 7:00 a.m. to 10:00 p.m. the exterior noise standard shall be 55 dBA.
 2. From 10:00 p.m. to 7:00 a.m. the exterior noise standard shall be 50 dBA.
- B. It is unlawful for any person at any location to create any noise which causes noise levels when measured on agricultural or residential property to exceed for the duration of time set forth following, the specified exterior noise standards in any one hour by:

Cumulative Duration of Sound	Noise Level Descriptor*	Allowance Decibels
Cumulative period of 30 minutes per hour	L ₅₀	0
Cumulative period of 15 minutes per hour	L ₂₅	+5
Cumulative period of 5 minutes per hour	L ₈	+10
Cumulative period of 1 minutes per hour	L ₂	+15
Level not to be exceeded for any time per hour	L _{max}	+20
*Added column by BAC		

- C. Each of the noise limits specified in subsection B of this section shall be reduced by 5 dBA for impulsive or simple tone noises, or for noises consisting of speech or music.
- D. If the ambient noise level exceeds that permitted by any of the first four noise limit categories specified in subsection B of this section, the allowable noise limit shall be increased in 5 dBA increments in each category to encompass the ambient noise level. If the ambient noise level exceeds the fifth noise limit category, the maximum ambient noise level shall be the noise limit for that category.

8.68.080 Exemptions.

The following activities shall be exempted from the provisions of this chapter:

- A. Noise sources due to the erection (including excavation), demolition, alteration or repair of any building or structure between the hours of 7:00 a.m. and 6:00 p.m. on Monday, Tuesday, Wednesday, Thursday, Friday and Saturday, and between 9:00 a.m. to 6:00 p.m. on Sunday; provided, however, that the operation of an internal combustion engine shall not be exempt pursuant to this subsection if such engine is not equipped with suitable exhaust and intake silencers which are in good working order. The director of building inspections may permit work to be done during the hours not exempted by this subsection in the case of urgent necessity and in the interest of public health and welfare for a period not to exceed three days. Application for this exemption may be made in conjunction with the application for the work permit or during progress of the work.

Municipal Code Exterior Noise Level Limits Applied to Project On-Site Operations

As mentioned previously, the closest existing noise-sensitive uses have been identified as single-family residences located to the south of the project (shown in Figure 1). Section 8.68.060 of the Sacramento Municipal Code contains exterior noise limits for residential uses, which would be applicable to project on-site operations noise. Pursuant to Municipal Code Section 8.68.060.D, if ambient noise levels exceed permissible standards within the first four categories (L₅₀, L₂₅, L₈, L₂), the allowable noise exposure limits shall be increased in five (5) increments to encompass the ambient noise level. If ambient noise levels exceed the permissible standard within the fifth category (L_{max}), the allowable noise exposure limit shall be the ambient noise level. However, comparison of ambient noise level data contained in Table 1 and Municipal Code Section 8.68.060 noise level standards revealed that the City’s criteria are not being exceeded at the BAC measurement site, which is believed to be representative of the ambient noise level environments

at the closest residences to the south. As a result, no adjustments for ambient conditions were applied to the City's exterior noise level standards in this assessment.

Impact Analysis

Thresholds of Significance

Based on CEQA guidelines and adopted City of Sacramento General Plan and Municipal Code noise standards, noise and vibration impacts at sensitive areas of existing uses in the project vicinity are considered significant if the following were to result from the project:

- Increases in exterior ambient noise levels resulting from project-generated off-site traffic of 5 dBA DNL or more where baseline (no project) ambient conditions at existing sensitive receptor locations are less than 60 dBA DNL (Table 2 FICON criteria).
- Increases in exterior ambient noise levels resulting from project-generated off-site traffic of 3 dBA DNL or more where baseline (no project) ambient conditions at existing sensitive receptor locations are between 60 dBA DNL and 65 dB DNL (Table 2 FICON criteria).
- Increases in exterior ambient noise levels resulting from project-generated off-site traffic of 1.5 dBA DNL or more where baseline (no project) ambient conditions at existing sensitive receptor locations exceed 65 dB DNL (Table 2 FICON criteria).
- In terms of determining the temporary noise increase due to project on-site operations (i.e., non-transportation noise sources) at existing sensitive receptors in the vicinity, an impact would occur if those activities would noticeably increase ambient noise levels above background levels at those locations. The threshold of perception of the human ear is approximately 3 to 5 dB – a 5 dB change is considered to be clearly noticeable. For the analysis of project on-site operations noise level increases at existing sensitive receptors, a noticeable increase in ambient noise levels is assumed to occur where those activities would result in an increase by 5 dB or more over existing ambient noise levels.
- Construction noise levels exceeding the FTA reasonable noise impact assessment criterion of 90 dBA L_{eq} during daytime hours and 80 dBA L_{eq} during nighttime hours.
- Vibration levels associated with project construction exceeding established FTA criteria for assessing vibration damage to structures (Table 3) or general assessment (Table 4).
- On-site operations noise levels exceeding Municipal Code Section 8.68.060 exterior noise level limits.

Noise Impacts Associated with Project-Generated Increases in Off-Site Traffic

Impact 1: Increases in Existing Traffic Noise Levels due to the Project

Operation of the project would result in increased traffic on the local roadway network. BAC utilized the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-

77-108) with project trip generation estimates based on trip generation rates for the project's land use categories using data from the *Trip Generation Manual, 10th Edition, Institute of Transportation Engineers 2017*, provided by the project's transportation consultant (DKS) to determine whether traffic noise impacts would result from implementation of the project. The project trip generation data utilized in this analysis was obtained from the transportation analysis prepared for the project by DKS (*Transportation Analysis Retail at Northgate and Rosin Court, August 28, 2018*).

The FHWA Traffic Noise Model (FHWA-RD-77-108) was used to quantify increases in existing traffic noise levels at the existing noise-sensitive land uses within the project area roadway network. The FHWA Model predicts hourly L_{eq} values for free-flowing traffic conditions. Estimates of the hourly distribution of traffic for a typical 24-hour period were used to develop DNL values from L_{eq} values. To calculate a day-night average noise level (DNL), average daily traffic (ADT) volume data is manipulated based on the assumed day/night distribution of traffic.

According to the provided site plan, off-site access to the project area will be from Rosin Court on the west side of the project parcel via two points (shown in Figure 2). As a result, the greatest potential for noise impacts from project-generated off-site traffic is expected to be along Rosin Court. The nearest existing noise sensitive receptors to Rosin Court have been identified as single-family residences to the south, as shown in Figure 1. The nearest residential outdoor area of those properties (i.e., backyard) is located approximately 470 feet from the centerline of Rosin Court.

Table 1 of this report contains a summary of the results from the BAC ambient noise survey, which is believed to be representative of the existing ambient noise level environment at the closest residences to the project area. Based on the results from the BAC ambient noise survey, measured day-night average noise levels ranged from 57 dB DNL to 58 dB DNL (calculated average of 57 dB DNL).

According to trip generation estimates contained in the project transportation analysis, the project (Lot 6 – ITE category 945) is estimated to generate 2,061 daily (weekday) trips. Given 2,061 daily vehicle trips, and conservatively assuming a day/night trip distribution of 50%/50%, project-generated day-night average noise level exposure computes to approximately 44 dB DNL at the closest residential backyard located approximately 470 feet from the centerline of Rosin Court.

Based on the FICON criteria shown in Table 2, a 5 dB DNL increase in noise levels due to a project is required for a finding of significant noise impact where ambient noise levels without the project are less than 60 dB DNL. Given a measured existing (no project) ambient noise level of 57 dB DNL, and a calculated project-generated off-site traffic noise level of 44 dB DNL, the project-related increase in noise levels is calculated to be approximately 0.2 dB DNL at outdoor area of the closest residential property to the south. Because increases in ambient noise levels did not exceed the 5 B DNL, a significant noise impact was not identified.

Off-Site Noise Impacts Associated with On-Site Operational Noise Sources

The project proposes the construction of a 4,761 square foot convenience store (c-store) building, fueling station, and parking stalls. It is the understanding of BAC that the project proposes 24-operations.

The primary on-site operations noise sources associated with the project have been identified as passenger vehicle circulation, delivery truck circulation, truck delivery activities, an air/water unit, and building rooftop mechanical equipment. Noise generated by those operations were quantified through a combination of reference noise level data and application of accepted noise modeling techniques. This section includes impact discussions for each of the above-identified on-site project noise sources, presented as Impacts 2 through 6, then followed by Impact 7 which presents predicted combined noise levels associated with the combination of each of the project's various noise sources.

Sacramento Municipal Code Section 8.68.060 exterior noise level limits were applied to project on-site operations and assessed at the closest residential property. Compliance with the City's noise level standards at the closest residence would ensure compliance at more distant residences. In terms of determining the ambient noise increases due to project on-site operations, an impact would occur if those activities were to substantially increase ambient noise levels above background levels at existing sensitive receptors. As mentioned previously, the threshold of perception of the human ear is approximately 3 to 5 dB – a 5 dB change is considered to be clearly noticeable. For the analysis of increases in ambient noise levels associated with project on-site operations, a substantial increase in ambient noise levels is assumed to occur where those activities would result in an increase by 5 dB or more over existing ambient noise levels at nearby residential properties. Satisfaction with the 5 dB increase threshold at the closest residence would ensure satisfaction at residences located farther away.

Impact 2: On-Site Passenger Vehicle Circulation Noise Generation

To quantify project-generated on-site traffic circulation noise level exposure, BAC utilized specific automobile passby noise level measurements conducted by BAC with trip generation estimates contained in the project transportation analysis prepared by DKS. The BAC vehicle passby measurements included a series of individual noise measurements of multiple vehicle types arriving and departing a parking area. The results of those measurements revealed that individual vehicle passbys generated mean noise levels of approximately 70 dB SEL at a reference distance of 50 feet.

Because project on-site passenger vehicle circulation is reasonably expected to occur throughout the duration of a given hour (i.e., 30 minutes or more), this noise source was assessed relative to the City's L₅₀ noise level metric. To assess project on-site passenger vehicle circulation noise relative to the City's L₅₀ noise level metric, it is necessary to identify the number of vehicle movements occurring during a typical busy hour of operations. According to the trip generation data prepared by DKS, the project is estimated to generate 131 AM peak hour trips and 168 PM peak hour trips. For this analysis, worst-case estimated peak hour trips (168) were conservatively assumed to occur during a given daytime or nighttime hour.

Based on the BAC measurement data, DKS peak hour trip generation estimates, and BAC operations assumptions above, project on-site passenger vehicle circulation noise exposure was calculated at the property line of the nearest residence to the south, and the results of those calculations are presented in Table 5.

**Table 5
Predicted Project On-Site Passenger Vehicle Noise Levels at Nearest Residence**

Sensitive Receptor ¹	Distance (ft) ²	Predicted Noise Level, L ₅₀ (dB) ^{3,4}	City Noise Standard, L ₅₀ (dB)	
			Daytime	Nighttime
Residence – South	585	41	55	50

¹ Location of closest residences are shown in Figure 1.
² Distance scaled from closest on-site passenger circulation route to residence property line using provided site plans.
³ Predicted worst-case noise levels based on passenger vehicle trip generation estimates contained in DKS traffic analysis.
⁴ Predicted noise levels from worst-case estimated peak hour trips during a given daytime or nighttime hour.

Source: BAC 2025

As shown in Table 5, worst-case project on-site passenger vehicle circulation noise level exposure is predicted to satisfy the Sacramento Municipal Code daytime and nighttime L₅₀ noise level standards at the property line of the closest residential use.

As mentioned previously, a significant increase is assumed to occur where on-site project activities would result in an increase of 5 dB or more over ambient noise levels at existing nearby residential properties. Table 1 of this report contains the results from the BAC long-term ambient noise survey, which are considered to be representative of the existing ambient noise level environment at the closest residential use to the south. Using the lowest average measured hourly daytime and nighttime noise levels during the long-term (72-hour) BAC ambient noise monitoring period, ambient plus project on-site passenger vehicle circulation noise level increases were calculated at the closest residential use to the south. The results of those calculations are presented in Table 6.

**Table 6
Increases in Ambient L₅₀ Noise Levels at Nearest Residence – On-Site Vehicle Circulation**

Measured Ambient Noise Level, L ₅₀ (dB) ¹		Predicted Noise Level, L ₅₀ (dB) ²			Increase in Ambient Noise Level, L ₅₀ (dB) ⁴	
Day	Night	Day/Night	Day	Night	Day	Night
48	46	40.6	48.7	47.1	0.7	1.1

¹ Lowest average measured hourly L₅₀ noise level during BAC noise survey (Table 1).
² Predicted noise level from Table 5.
³ Logarithmic sum of measured ambient noise level and predicted noise level.
⁴ Associated project-generated increase in ambient noise level.

Source: BAC 2025

The calculated increases in ambient noise levels shown in Table 6 would be well below 5 dB. Thus, this aspect of the project would not result in noise levels exceeding the City’s exterior noise level thresholds nor would it result in increases in ambient noise levels exceeding 5 dB at the closest existing noise-sensitive receptor.

Impact 3: On-Site Truck Circulation Noise Generation

It is the experience of BAC that deliveries of products to c-stores such as the one proposed by the project typically occur at the front or sides of the store building with medium-duty vendor trucks/vans. However, the fueling station will also receive deliveries from heavy fueling trucks for the purpose of refilling the underground storage tanks. The locations of the c-store and underground fuel storage tanks are shown in Figure 2.

To predict noise levels generated by on-site truck circulation, BAC utilized file data obtained from measurements conducted by BAC of heavy and medium duty truck passbys. According to BAC file data, single-event heavy truck passby noise levels are approximately 74 dB L_{max} and 83 dB SEL at a reference distance of 50 feet. BAC file data also indicate that single-event medium truck passby noise levels are approximately 66 dB L_{max} and 76 SEL at a reference distance of 50 feet. Because project delivery truck arrivals/departures and on-site circulation will be infrequent, occur at low speeds, and be relatively brief, this noise source was assessed relative to the City’s L_{max} noise level metric.

Based on the BAC measurement data provided above, project on-site truck circulation noise exposure was calculated at the property line of the nearest residence to the south, and the results of those calculations are presented in Table 7.

**Table 7
Predicted Project On-Site Truck Circulation Noise Levels at Nearest Residence**

Sensitive Receptor ¹	Distance (ft) ²	Predicted Noise Level, L _{max} (dB) ³	City Noise Standard, L _{max} (dB)	
			Daytime	Nighttime
Residence – South	620	52	75	70

¹ Location of closest residences are shown in Figure 1.
² Distance scaled from closest on-site truck circulation route to residence property line using provided site plans.
³ Predicted noise levels based on BAC measurement data.

Source: BAC 2025

Table 7 data indicate that project truck circulation noise level exposure is predicted to satisfy the Sacramento Municipal Code daytime and nighttime L_{max} noise level standards at the property line of the closest residential use.

A significant increase is assumed to occur where on-site project activities would result in an increase of 5 dB or more over ambient noise levels at existing nearby residential properties. Using the lowest average measured hourly daytime and nighttime noise levels during the long-term (72-hour) BAC ambient noise monitoring period, ambient plus project on-site truck circulation noise level increases were calculated at the closest residential use to the south and the results of those calculations are summarized in Table 8.

**Table 8
Increases in Ambient L_{max} Noise Levels at Nearest Residence – On-Site Truck Circulation**

Measured Ambient Noise Level, L _{max} (dB) ¹		Predicted Noise Level, L _{max} (dB) ²	Ambient + Project, L _{max} (dB) ³		Increase in Ambient Noise Level, L _{max} (dB) ⁴	
Day	Night	Day/Night	Day	Night	Day	Night
69	66	52	69.1	66.2	0.1	0.2
¹ Lowest average measured hourly L _{max} noise level during BAC noise survey (Table 1). ² Predicted noise level from Table 7. ³ Logarithmic sum of measured ambient noise level and predicted noise level. ⁴ Associated project-generated increase in ambient noise level.						

Source: BAC 2025

The calculated increases in ambient noise levels shown in Table 8 would be well below 5 dB. Thus, this aspect of the project would not result in noise levels exceeding the City’s exterior noise level thresholds nor would it result in increases in ambient noise levels exceeding 5 dB at the closest existing noise-sensitive receptor.

Impact 4: Truck Delivery Activity Noise Generation

As mentioned previously, it is the experience of BAC that deliveries of products to c-stores such as the one proposed by the project typically occur at the front or sides of the store building with medium-duty vendor trucks/vans. The primary noise sources associated with delivery activities are trucks stopping (air brakes), trucks backing into position (back-up alarms), and pulling away from the loading/unloading area (engines).

Because project truck delivery activities could reasonably occur throughout the duration of a given hour (i.e., 30 minutes or more), this noise source was assessed relative to the City’s L₅₀ noise level metric. For a conservative assessment of daily truck delivery noise levels at the proposed c-store, it was assumed that four medium duty trucks/vans could deliver products to the store on a typical busy day. To predict noise levels for comparison against the City’s L₅₀ noise descriptor standard, it was reasonably assumed that two medium duty trucks could have store deliveries during the same worst-case busy hour.

BAC file data indicates that noise levels associated with medium-duty truck delivery activities (including side-step vans) are approximately 76 dB SEL at 100 feet. Given two medium duty truck deliveries during any given hour and an SEL of 76 dB, the noise level computes to 43 dB L₅₀ at a reference distance of 100 feet. Based on the reference noise level data and operations assumptions cited above, project truck delivery activity noise exposure was calculated at the property line of the nearest residence to the south, and the results of those calculations are presented in Table 9.

**Table 9
Predicted Project Truck Delivery Activity Noise Levels at Nearest Residence**

Sensitive Receptor ¹	Distance (ft) ²	Predicted Noise Level, L ₅₀ (dB) ³	City Noise Standard, L ₅₀ (dB)	
			Daytime	Nighttime
Residence – South	580	28	55	50

¹ Location of closest residences are shown in Figure 1.
² Distance scaled from closest potential delivery area at c-store building to residence property line using provided site plans.
³ Predicted L₅₀ noise level based on two medium truck deliveries during a given hour.

Source: BAC 2025

As indicated in Table 9, project truck delivery noise level exposure is predicted to satisfy the Sacramento Municipal Code daytime and nighttime L₅₀ noise level standards at the property line of the closest residential use.

A significant increase is assumed to occur where on-site project activities would result in an increase of 5 dB or more over ambient noise levels at existing nearby residential properties. Using the lowest average measured hourly daytime and nighttime noise levels during the long-term (72-hour) BAC ambient noise monitoring period, ambient plus project truck delivery activity noise level increases were calculated at the closest residential use to the south and the results of those calculations are summarized in Table 10.

**Table 10
Increases in Ambient L₅₀ Noise Levels at Nearest Residence – Truck Delivery Activities**

Measured Ambient Noise Level, L ₅₀ (dB) ¹		Predicted Noise Level, L ₅₀ (dB) ²	Ambient + Project, L ₅₀ (dB) ³		Increase in Ambient Noise Level, L ₅₀ (dB) ⁴	
Day	Night	Day/Night	Day	Night	Day	Night
48	46	28	48.0	46.1	<0.1	0.1

¹ Lowest average measured hourly L₅₀ noise level during BAC noise survey (Table 1).
² Predicted noise level from Table 9.
³ Logarithmic sum of measured ambient noise level and predicted noise level.
⁴ Associated project-generated increase in ambient noise level.

Source: BAC 2025

The calculated increases in ambient noise levels shown in Table 10 would be well below 5 dB. Thus, this aspect of the project would not result in noise levels exceeding the City’s exterior noise level thresholds nor would it result in increases in ambient noise levels exceeding 5 dB at the closest existing noise-sensitive receptor.

Impact 5: Air/Water Unit Noise Generation

The project proposes the installation of an air/water unit for patron usage. The proposed location of the air/water unit is shown in Figure 2.

To quantify project air/water unit noise for the purpose of this analysis, noise measurements conducted by BAC in recent years of fueling station air/water units within the greater Sacramento

Area were utilized. The results of the BAC measurements indicate that the air/water unit noise was measured to have a maximum noise level of approximately 65 dB L_{max} at distance of 10 feet from the equipment. Assuming 30 minutes of air/water unit operation during a given busy daytime or nighttime hour, the resulting L_{50} noise level is calculated to be approximately 3 dB less than the BAC-measured maximum (L_{max}) noise level.

Based on the reference noise level data and operations assumptions cited above, project air/water unit noise exposure was calculated at the property line of the nearest residence to the south, and the results of those calculations are presented in Table 11.

Table 11
Predicted Project Air/Water Unit Noise Levels at Nearest Residence

Sensitive Receptor ¹	Distance (ft) ²	Predicted Noise Level, L_{50} (dB) ³	City Noise Standard, L_{50} (dB)	
			Daytime	Nighttime
Residence – South	570	27	55	50

¹ Location of closest residences are shown in Figure 1.
² Distance scaled from air/water unit location to residence property line using provided site plans.
³ Predicted L_{50} noise level based on 30 minutes of unit operations during a given hour.

Source: BAC 2025

Table 11 data indicate that project air/water unit noise level exposure is predicted to satisfy the Sacramento Municipal Code daytime and nighttime L_{50} noise level standards at the property line of the closest residential use.

A significant increase is assumed to occur where on-site project activities would result in an increase of 5 dB or more over ambient noise levels at existing nearby residential properties. Using the lowest average measured hourly daytime and nighttime noise levels during the long-term (72-hour) BAC ambient noise monitoring period, ambient plus project air/water unit noise level increases were calculated at the closest residential use to the south and the results of those calculations are summarized in Table 12.

Table 12
Increases in Ambient L_{50} Noise Levels at Nearest Residence – Air/Water Unit

Measured Ambient Noise Level, L_{50} (dB) ¹		Predicted Noise Level, L_{50} (dB) ²	Ambient + Project, L_{50} (dB) ³		Increase in Ambient Noise Level, L_{50} (dB) ⁴	
Day	Night	Day/Night	Day	Night	Day	Night
48	46	26.9	48.0	46.1	<0.1	0.1

¹ Lowest average measured hourly L_{50} noise level during BAC noise survey (Table 1).
² Predicted noise level from Table 11.
³ Logarithmic sum of measured ambient noise level and predicted noise level.
⁴ Associated project-generated increase in ambient noise level.

Source: BAC 2025

The calculated increases in ambient noise levels shown in Table 12 would be well below 5 dB. Thus, this aspect of the project would not result in noise levels exceeding the City's exterior noise level thresholds nor would it result in increases in ambient noise levels exceeding 5 dB at the closest existing noise-sensitive receptor.

Impact 6: Rooftop Mechanical Equipment (HVAC) Noise Generation

Rooftop mechanical plans for the proposed c-store building were not available at the time of preparing this assessment. To quantify noise exposure from project c-store rooftop mechanical equipment, BAC utilized equipment specifications from a recent environmental noise assessment prepared by BAC for a comparable (similarly-sized) 7-Eleven facility in Northern California. Brief descriptions of the referenced rooftop mechanical equipment are provided below.

Rooftop Units

Referenced rooftop units include two models manufactured by Carrier (Models 48GCSN09 and 48GCSN12). According to equipment manufacturer specification documentation, provided in Appendix E-1 of this report, reference sound power levels for the proposed rooftop unit models range from 82 dB to 87 dB.

Condensing Units

Referenced condensers include 10 air-handling units (10 different models) consisting of three manufacturers (FBD, Hoshizaki and Bohn). The specific models and associated reference sound power levels are as follows:

- FBD Model FBD-DRC: 77 dB
- FBD Model FBD-SRC: 77 dB
- Hoshizaki Model URC-5F: 77 dB
- Bohn Model BCH0005MBACZC0329: 73 dB
- Bohn Model BCH0008LBACZ: 77 dB
- Bohn Model BCH0008MBAXZA0900: 77 dB
- Bohn Model BCH0020MBACZA0000: 73 dB
- Bohn Model BCH0030MCACZA0900: 73 dB
- Bohn Model BCH0022LCACZA0900: 77 dB
- Bohn Model BCH0060MCACZA0900: 73 dB

Exhaust Fans

Referenced equipment includes two exhaust fans (one model) manufactured by Greenheck (Model G-070-E). According to equipment manufacturer specification documentation, provided in Appendix E-2 of this report, the reference sound pressure level for the exhaust fan model is approximately 1.5 sones.

Gravity Ventilator

Referenced equipment includes one gravity ventilator manufactured by Greenheck (Model GRSR). According to equipment manufacturer specification documentation, provided in Appendix

E-3 of this report, the reference sound pressure level for the exhaust fan model is approximately 6 sones.

For this analysis, it was conservatively assumed that all identified rooftop-mounted mechanical equipment would be in operation concurrently (believed to be worst-case noise exposure). Based on this operations assumption, the provided rooftop mechanical plans/mechanical schedule, and using the cited equipment manufacturer reference sound level data above, combined project rooftop-mounted mechanical equipment noise exposure at the property line of the nearest residence to the south, and the results of those calculations are presented in Table 13.

Table 13
Predicted Project Rooftop Mechanical Equipment Noise Levels at Nearest Residence

Sensitive Receptor ¹	Distance (ft) ²	Predicted Noise Level, L ₅₀ (dB) ³	City Noise Standard, L ₅₀ (dB)	
			Daytime	Nighttime
Residence – South	600	35	55	50

¹ Location of closest residences are shown in Figure 1.
² Distance scaled from c-store building rooftop to residence property line using provided site plans.
³ Predicted combined L50 noise level based on continuous (and concurrent) equipment operations during a given hour.

Source: BAC 2025

As shown in Table 13, project rooftop mechanical equipment noise level exposure is predicted to satisfy the Sacramento Municipal Code daytime and nighttime L₅₀ noise level standards at the property line of the closest residential use.

A significant increase is assumed to occur where on-site project activities would result in an increase of 5 dB or more over ambient noise levels at existing nearby residential properties. Using the lowest average measured hourly daytime and nighttime noise levels during the long-term (72-hour) BAC ambient noise monitoring period, ambient plus project rooftop mechanical equipment noise level increases were calculated at the closest residential use to the south and the results of those calculations are summarized in Table 14.

Table 14
Increases in Ambient L₅₀ Noise Levels at Nearest Residence – Rooftop Mechanical Equipment

Measured Ambient Noise Level, L ₅₀ (dB) ¹		Predicted Noise Level, L ₅₀ (dB) ²	Ambient + Project, L ₅₀ (dB) ³		Increase in Ambient Noise Level, L ₅₀ (dB) ⁴	
Day	Night	Day/Night	Day	Night	Day	Night
48	46	35	48.2	46.3	0.2	0.3

¹ Lowest average measured hourly L50 noise level during BAC noise survey (Table 1).
² Predicted noise level from Table 13.
³ Logarithmic sum of measured ambient noise level and predicted noise level.
⁴ Associated project-generated increase in ambient noise level.

Source: BAC 2025

The calculated increases in ambient noise levels shown in Table 14 would be well below 5 dB. Thus, based on the analysis provided above, which utilizes reference sound level data for a similarly sized 7-Eleven facility, it is expected that this aspect of the project would not result in noise levels exceeding the City’s exterior noise level thresholds, nor is it expected to result in increases in ambient noise levels exceeding 5 dB at the closest existing noise-sensitive receptor.

Impact 7: Combined On-Site Operations Noise Generation

Calculated combined noise levels from analyzed on-site operations at the property line of the nearest residence to the south are presented in Table 15. It should be noted that due to the logarithmic nature of the decibel scale, the sum of two noise values which differ by 10 dB equates to an overall increase in noise levels of 0.4 dB. When the noise sources are equivalent, the sum would result in an overall increase in noise levels of 3 dB.

**Table 15
Calculated Combined On-Site Operations Noise Levels at Nearest Residence**

Receptor	Predicted On-Site Operations Noise Levels, L ₅₀ (dB) ¹					Combined, L ₅₀ (dB) ²
	Passenger Vehicle Circ.	Delivery Truck Circ.	Truck Deliveries	Air/Water Unit	Rooftop Equipment	
Residence – South	40	--	28	27	35	42
						City Daytime Noise Level Standard, L ₅₀ (dB)
						55
						City Nighttime Noise Level Standard, L ₅₀ (dB)
						50

¹ Predicted L₅₀ noise levels presented in Impacts 2 and 4-6.
² Calculated combined L₅₀ noise level exposure from analyzed on-site operations noise sources.

Source: BAC 2025

Table 15 data indicate that combined project on-site operations noise level exposure is calculated to satisfy the Sacramento Municipal Code daytime and nighttime L₅₀ noise level standards at the property line of the closest residential use. Additionally, the highest maximum (L_{max}) noise level from analyzed on-site operations is predicted to be 52 dB L_{max} (on-site truck circulation, Table 6), which would satisfy the Municipal Code daytime and nighttime L_{max} noise level standards of 75 dB L_{max} and 70 dB L_{max} (respectively) at the property line of the closest residential use.

A significant increase is assumed to occur where on-site project activities would result in an increase of 5 dB or more over ambient noise levels at existing nearby residential properties. Using the lowest average measured hourly daytime and nighttime noise levels during the long-term (72-hour) BAC ambient noise monitoring period, ambient plus combined project on-site operations noise level increases were calculated at the closest residential use to the south, and the results of those calculations are summarized in Tables 16 and 17.

Table 16
Increases in Ambient L₅₀ Noise Levels at Nearest Residence – On-Site Operations

Measured Ambient Noise Level, L ₅₀ (dB) ¹		Combined Noise Level, L ₅₀ (dB) ²	Ambient + Project, L ₅₀ (dB) ³		Increase in Ambient Noise Level, L ₅₀ (dB) ⁴	
Day	Night	Day/Night	Day	Night	Day	Night
48	46	42.0	49.0	47.5	1.0	1.5
¹ Lowest average measured hourly L50 noise level during BAC noise survey (Table 1). ² Calculated combined on-site operations noise level (L50) from Table 15. ³ Logarithmic sum of measured ambient noise level and combined operations noise level (L50). ⁴ Associated project-generated increase in ambient noise level from combined operations.						

Source: BAC 2025

Table 17
Increases in Ambient L_{max} Noise Levels at Nearest Residence – On-Site Operations

Measured Ambient Noise Level, L _{max} (dB) ¹		Highest Predicted Noise Level, L _{max} (dB) ²	Ambient + Project, L _{max} (dB) ³		Increase in Ambient Noise Level, L _{max} (dB) ⁴	
Day	Night	Day/Night	Day	Night	Day	Night
69	66	52.1	69.1	66.2	0.1	0.2
¹ Lowest average measured hourly maximum (Lmax) noise level during BAC noise survey (Table 1). ² Highest predicted (maximum) noise level from on-site operations. ³ Logarithmic sum of measured ambient noise level and highest predicted operations noise level. ⁴ Associated project-generated increase in ambient maximum noise level from on-site operations.						

Source: BAC 2025

The calculated increases in ambient noise levels shown in Tables 16 and 17 would be well below 5 dB. Thus, combined project on-site operations would not result in noise levels exceeding the City’s exterior noise level thresholds nor would it result in increases in ambient noise levels exceeding 5 dB at the closest existing noise-sensitive receptor.

Noise Impacts Associated with Project Construction Activities

Impact 8: Project Construction Activities/Operations Noise Generation

During project construction, heavy equipment would be used for demolition of existing structures, grading, excavation, paving, and building construction. These activities would increase ambient noise levels in the immediate project vicinity. Construction noise levels generated at the project site would vary depending on the type and amount of equipment in use at any time, the location where that equipment is operating, and how well the equipment is maintained. Noise exposure at existing sensitive receptors would also vary depending on the proximity of equipment activities to the receptor, the degree of shielding present between the construction equipment and receptor (i.e., soundwalls, intervening topography, etc.).

Table 18 provides the range of maximum noise levels for equipment commonly used in general construction projects at full-power operation at distance of 50 feet. It should be noted that not all of these construction activities would be required of this project.

Table 18
Maximum Reference Noise Levels for Common Construction Equipment

Equipment Description	Maximum Noise Level at 50 Feet (dBA)
Air Compressor	80
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Mobile	83
Dozer	85
Generator	82
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	80
Paver	85
Pneumatic Tool	85
Pump	77
Rail Saw	90
Saw	76
Scarifier	83
Scraper	85
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Inserter	85
Truck	84

Source: 2018 Federal Transit Administration Noise and Vibration Impact Assessment Manual, Table 7-1

The nearest off-site existing sensitive receptors to potential construction activities within the project area are single-family residences to the south, located approximately 500 feet away (shown in Figure 1). The distance from these residences to the most significant sources of on-site construction would vary depending on the phase of construction. For a general assessment of potential construction noise impacts, the FTA recommends utilizing the noise emission levels shown in Table 11, adjusting those levels for the percentage of the hour the equipment would be operating, correcting for distance by assuming mobile equipment operates at the center of the project, and considering ground effects where appropriate.

For this project, there will be periods of time when the construction equipment is located closer to existing residences than the effective center of the project site, so calculating construction noise from the center of the site is not considered appropriate for this evaluation. However, because the noisiest construction equipment tends to be mobile (i.e. earthmoving equipment), calculating construction noise levels using the closest point of construction activity to existing residences is also not considered appropriate. For this evaluation, a distance of 600 feet was conservatively assumed for the construction noise evaluation distance. After correction for usage and multiple equipment operating concurrently, project construction noise was calculated using the Federal Highway Administration’s Roadway Construction Noise Model (RCNM), to be approximately 63 dBA Leq/L50 at a distance of 600 feet. The RCNM analysis conservatively assumed concurrent

(combined) operation of a dozer, front loader, compactor, backhoe, and grader at a distance of 600 feet.

As outlined in the Regulatory Setting of this assessment, the FTA establishes noise level limits of 90 dB L_{eq} during daytime hours and 80 dB L_{eq} during nighttime hours for residential uses affected by construction projects. The estimated construction noise level of 63 dBA L_{eq}/L_{50} at 600 feet would be considered satisfactory relative to FTA noise standards during both daytime and nighttime hours. It should be noted that Section 8.68.080 of the Sacramento Municipal Code exempts construction activities from compliance with applicable City noise standards provided those activities occur between the hours of 7:00 a.m. and 6:00 p.m., Monday through Saturday, and between 9:00 a.m. and 6:00 p.m. on Sunday.

Based on the analysis above, project on-site construction activities are not expected to result in a noise impact (i.e., adverse community reaction) at the closest existing noise-sensitive receptors as defined by federal criteria (FTA). Nonetheless, to reduce the potential for annoyance at nearby existing noise-sensitive uses, the following measures should be incorporated into project on-site construction operations:

- All on-site project construction activities shall occur pursuant to the hours and days exempted by Sacramento Municipal Code Section 8.68.080, and/or hours and days required by the City of Sacramento.
- The project should utilize temporary construction noise control measures including the use of temporary noise barriers, or other appropriate measures as mitigation for noise generated during construction of projects.
- All noise-producing project equipment and vehicles using internal-combustion engines should be equipped with manufacturers-recommended mufflers and be maintained in good working condition.
- All mobile or fixed noise-producing equipment used on the project site that are regulated for noise output by a federal, state, or local agency should comply with such regulations while in the course of project activity.
- Electrically powered equipment should be used instead of pneumatic or internal-combustion-powered equipment, where feasible.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas should be located as far as practicable from noise-sensitive receptors.
- Project area and site access road speed limits should be established and enforced during the construction period.

Vibration Impacts Associated with Project Activities

Impact 9: Vibration Generated by On-Site Project Construction & Operations

During project construction, heavy equipment would be used for grading, excavation, paving, and building construction, which would generate localized vibration in the immediate vicinity of the construction. The closest existing commercial structure to the project area has been identified as

a quick serve restaurant with drive-through services (KFC) located approximately 60 feet to the north. The closest existing residential structure to the project area has been identified as a single-family residence located approximately 550 feet to the south.

Table 19 includes the range of vibration levels for equipment commonly used in general residential construction projects at 25 feet. Table 19 data also include projected equipment vibration levels at the nearest existing commercial and residential structures to the project area, as outlined above.

Table 19
Reference and Projected Vibration Source Amplitudes for Construction Equipment

Equipment	Reference Maximum Vibration Level at 25 feet, VdB (rms)	Projected Maximum Vibration Level, VdB (rms) ¹	
		Commercial (KFC – North)	Residential (Residence – South)
Vibratory Roller	94	82	58
Hoe Ram	87	72	57
Large bulldozer	87	72	57
Caisson drilling	87	72	57
Loaded trucks	86	70	<55
Jackhammer	79	62	<55
Small bulldozer	58	57	<55

¹ RMS velocity in decibels (VdB) re 1 micro-inch/second.

Source: 2018 FTA Transit Noise and Vibration Impact Assessment Manual and BAC calculations

Policy ERC-10.5 of the Sacramento 2040 General Plan requires construction projects to comply with applicable Federal Transit Administration (FTA) vibration impact criteria. Figures 3 and 4 of this report contain FTA criteria for assessing groundborne vibration impacts.

Based on the data presented in Table 19, vibration levels generated from project on-site construction activities are predicted to be below the FTA threshold for damage to engineered structures (98 VdB, Table 3) at 25 feet from those activities. Additionally, apart from the vibratory roller, construction-related vibration levels at the closest commercial building to the north (KFC) are projected to be below FTA thresholds applicable to land uses with primary daytime uses (i.e., commercial uses) shown in Table 4 (Table 19). Finally, Table 19 data indicate that construction-related vibration levels at the closest residence to the south are projected to be below FTA thresholds applicable to residences shown in Table 4.

During site visits on July 31st and August 4th, 2025, existing vibration levels within the project area and immediate project vicinity were imperceptible by BAC field staff and were assumed to be below the threshold of human perception (generally considered to be 65 VdB). Therefore, it is expected that the project would not result in the exposure of people to excessive groundborne vibration levels at proposed uses of the development.

Finally, the project proposes the construction of commercial uses (i.e., c-store and fueling station). While traffic/trucks traveling on roadways are a source of vibration, these sources rarely generate vibration amplitudes high enough to cause structural or cosmetic damage. Further, vibration levels

generated by project on-site traffic/truck passbys will be at low speed and are expected to dissipate rapidly with distance. Based on the information above, project on-site operations are not expected to generate appreciable vibration.

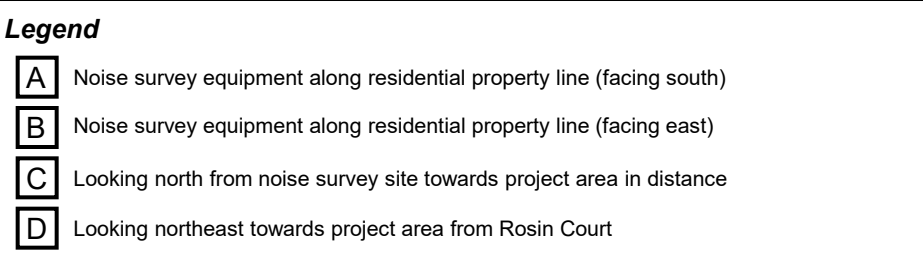
As shown in Table 19 modeling projections, vibration level exposure associated with a vibratory roller has the potential to exceed applicable FTA thresholds applicable to land uses with primary daytime uses (Category 3) at the commercial building north of the project (KFC). To reduce the potential for an exceedance of the applicable FTA thresholds, the following specific vibration control measure should be implemented by the project construction contractor:

1. **Vibration-Generating Equipment:** Use of heavy vibration-generating construction equipment, such as impact compactors and vibratory rollers, should not be used within 75 feet of adjacent commercial buildings. The project contractor should use smaller vibratory rollers when compacting materials within the 75 foot setback distance.

This concludes BAC's noise and vibration assessment of the 7-Eleven Northgate Blvd & Rosin Court project in Sacramento, California. Please contact BAC at (530) 537-2328 or darioq@bacnoise.com if you have any comments or questions regarding this report.

Appendix A Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound. A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
IIC	Impact Insulation Class (IIC): A single-number representation of a floor/ceiling partition's impact generated noise insulation performance. The field-measured version of this number is the FIIC.
L_{dn}	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
L_{max}	The highest root-mean-square (RMS) sound level measured over a given period of time.
Loudness	A subjective term for the sensation of the magnitude of sound.
Masking	The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.
Noise	Unwanted sound.
Peak Noise	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the "Maximum" level, which is the highest RMS level.
RT₆₀	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
STC	Sound Transmission Class (STC): A single-number representation of a partition's noise insulation performance. This number is based on laboratory-measured, 16-band (1/3-octave) transmission loss (TL) data of the subject partition. The field-measured version of this number is the FSTC.



Legend

- A** Noise survey equipment along residential property line (facing south)
- B** Noise survey equipment along residential property line (facing east)
- C** Looking north from noise survey site towards project area in distance
- D** Looking northeast towards project area from Rosin Court

7-Eleven Northgate Blvd & Rosin Ct
 Sacramento, California

Noise Survey Photographs

Appendix B



Appendix C-1
Long-Term Ambient Noise Monitoring Results
7-Eleven Northgate Blvd & Rosin Ct - Sacramento, California
Friday, August 1, 2025

Hour	Leq	Lmax	L50	L90
12:00 AM	51	71	46	44
1:00 AM	48	71	44	42
2:00 AM	48	71	44	42
3:00 AM	45	66	44	42
4:00 AM	48	57	47	44
5:00 AM	53	70	50	47
6:00 AM	54	73	51	48
7:00 AM	52	68	50	48
8:00 AM	54	70	50	47
9:00 AM	52	70	50	47
10:00 AM	51	67	49	46
11:00 AM	51	74	47	45
12:00 PM	53	70	48	45
1:00 PM	53	72	48	46
2:00 PM	52	71	49	47
3:00 PM	51	70	48	47
4:00 PM	50	65	49	47
5:00 PM	51	67	48	45
6:00 PM	51	68	49	46
7:00 PM	51	63	49	46
8:00 PM	52	67	49	47
9:00 PM	52	71	50	48
10:00 PM	51	64	49	47
11:00 PM	52	74	48	46

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	54	50	52	54	45	51
Lmax (Maximum)	74	63	69	74	57	69
L50 (Median)	50	47	49	51	44	47
L90 (Background)	48	45	46	48	42	45

Computed DNL, dB	58
% Daytime Energy	67%
% Nighttime Energy	33%

GPS Coordinates	
38°38'05.38"N	
121°28'36.86"W	

Appendix C-2
Long-Term Ambient Noise Monitoring Results
7-Eleven Northgate Blvd & Rosin Ct - Sacramento, California
Saturday, August 2, 2025

Hour	Leq	Lmax	L50	L90
12:00 AM	52	71	47	45
1:00 AM	50	71	45	44
2:00 AM	45	52	44	43
3:00 AM	45	58	44	43
4:00 AM	46	67	44	42
5:00 AM	52	73	46	43
6:00 AM	53	71	48	45
7:00 AM	52	71	49	46
8:00 AM	53	72	48	46
9:00 AM	52	70	48	45
10:00 AM	50	67	47	45
11:00 AM	51	70	47	45
12:00 PM	52	71	47	45
1:00 PM	52	72	48	46
2:00 PM	53	71	48	46
3:00 PM	49	70	48	46
4:00 PM	49	68	48	46
5:00 PM	50	67	48	46
6:00 PM	50	64	48	47
7:00 PM	51	69	48	47
8:00 PM	50	62	49	47
9:00 PM	51	72	49	47
10:00 PM	50	67	49	47
11:00 PM	53	72	48	46

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	53	49	51	53	45	50
Lmax (Maximum)	72	62	69	73	52	67
L50 (Median)	49	47	48	49	44	46
L90 (Background)	47	45	46	47	42	44

Computed DNL, dB	57
% Daytime Energy	66%
% Nighttime Energy	34%

GPS Coordinates
38°38'05.38"N
121°28'36.86"W

Appendix C-3
Long-Term Ambient Noise Monitoring Results
7-Eleven Northgate Blvd & Rosin Ct - Sacramento, California
Sunday, August 3, 2025

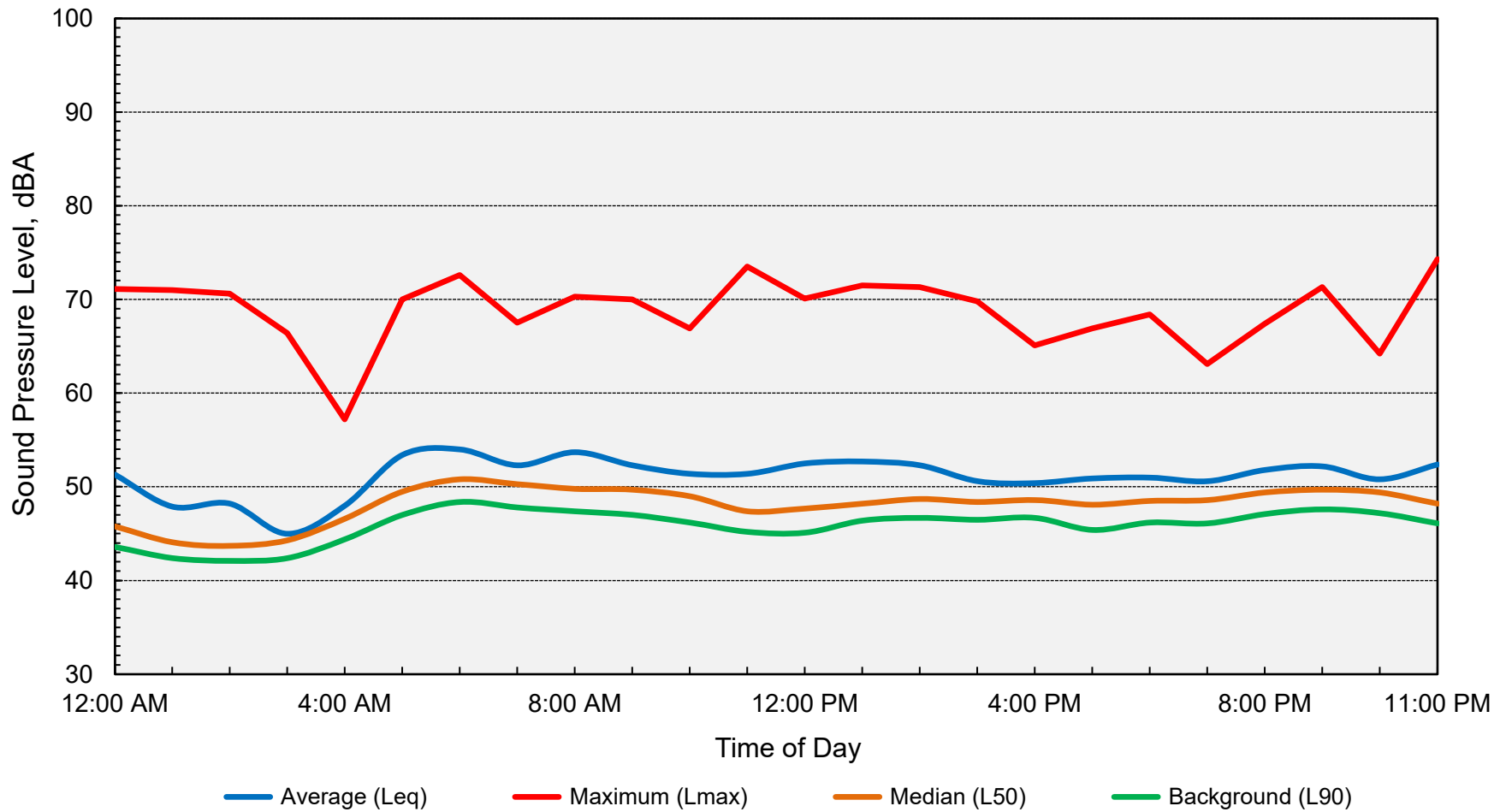
Hour	Leq	Lmax	L50	L90
12:00 AM	53	75	48	45
1:00 AM	46	58	45	43
2:00 AM	46	70	45	43
3:00 AM	45	55	44	42
4:00 AM	44	54	44	42
5:00 AM	52	71	44	42
6:00 AM	52	71	46	43
7:00 AM	53	74	47	44
8:00 AM	52	70	47	44
9:00 AM	54	71	47	45
10:00 AM	51	69	48	45
11:00 AM	53	75	47	44
12:00 PM	52	71	47	44
1:00 PM	52	71	48	45
2:00 PM	52	71	48	46
3:00 PM	53	71	48	46
4:00 PM	51	68	48	46
5:00 PM	51	68	49	47
6:00 PM	52	67	48	46
7:00 PM	52	70	48	45
8:00 PM	52	66	50	47
9:00 PM	51	70	49	47
10:00 PM	52	72	48	46
11:00 PM	50	70	47	44

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	54	51	52	53	44	50
Lmax (Maximum)	75	66	70	75	54	66
L50 (Median)	50	47	48	48	44	46
L90 (Background)	47	44	45	46	42	43

Computed DNL, dB	57
% Daytime Energy	72%
% Nighttime Energy	28%

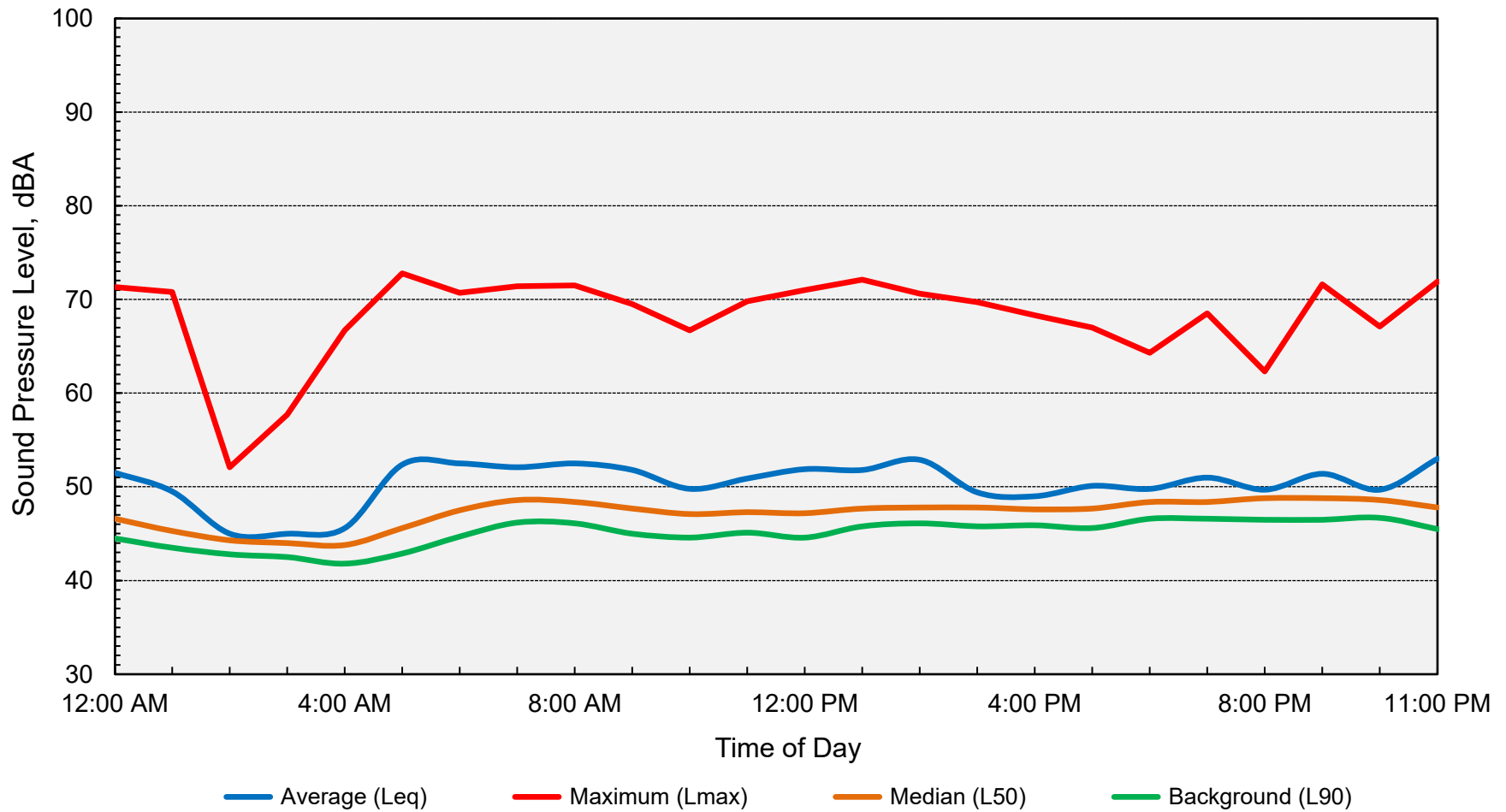
GPS Coordinates
38°38'05.38"N
121°28'36.86"W

Appendix D-1
Long-Term Ambient Noise Monitoring Results
7-Eleven Northgate Blvd & Rosin Ct - Sacramento, California
Friday, August 1, 2025



Computed DNL = 58 dB

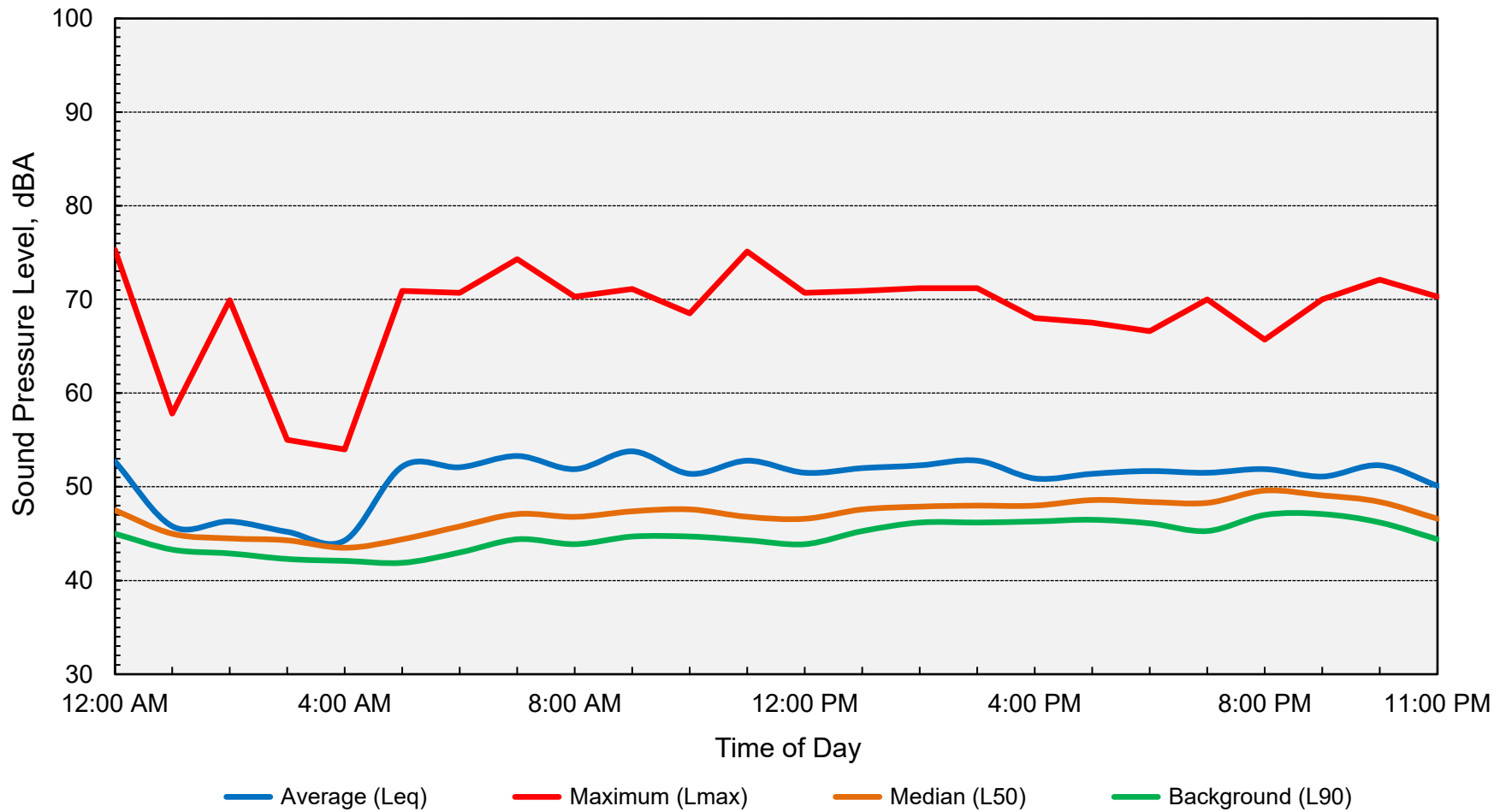
Appendix D-2
Long-Term Ambient Noise Monitoring Results
7-Eleven Northgate Blvd & Rosin Ct - Sacramento, California
Saturday, August 2, 2025



Computed DNL = 57 dB



Appendix D-3
Long-Term Ambient Noise Monitoring Results
7-Eleven Northgate Blvd & Rosin Ct - Sacramento, California
Sunday, August 3, 2025



Computed DNL = 57 dB

Appendix E-1 Rooftop Unit Specification Sheet

Performance Summary For RTU-1

Project: 7-Eleven Site 1056100
Prepared By:

01/02/2025
03:32PM

Combustion Fan Motor FLA (ea): 0.48
 Power Supply MCA: 52
 Power Supply MOCP (Fuse or HACR): 60
 Disconnect Size FLA: 54
 Disconnect Size LRA: 235
 Electrical Convenience Outlet: None
 Outdoor Fan [Qty / FLA (ea)]: 1 / 7.4

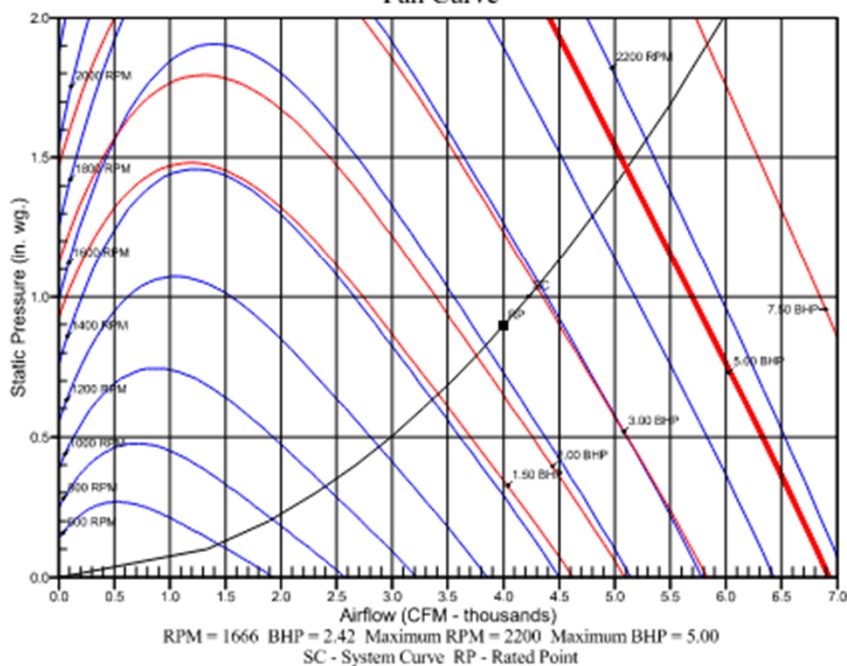
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	92.4	86.7	85.9
125 Hz	86.0	81.4	87.9
250 Hz	81.2	74.6	85.6
500 Hz	78.6	71.1	84.4
1000 Hz	79.6	69.9	82.8
2000 Hz	76.1	64.6	78.5
4000 Hz	70.6	55.4	74.9
8000 Hz	62.7	48.7	72.5
A-Weighted	83.6	74.6	87.0

Fan Curve



Appendix E-1 cont. Rooftop Unit Specification Sheet

Performance Summary For RTU-2

Project: 7-Eleven Site 1056100
Prepared By:

01/02/2025
03:32PM

Indoor Fan Motor FLA (Total):.....	6.4
Combustion Fan Motor FLA (ea):.....	0.48
Power Supply MCA:.....	43
Power Supply MOCP (Fuse or HACR):.....	50
Disconnect Size FLA:.....	45
Disconnect Size LRA:.....	215
Electrical Convenience Outlet:.....	None
Outdoor Fan [Qty / FLA (ea)]:.....	2 / 1.5

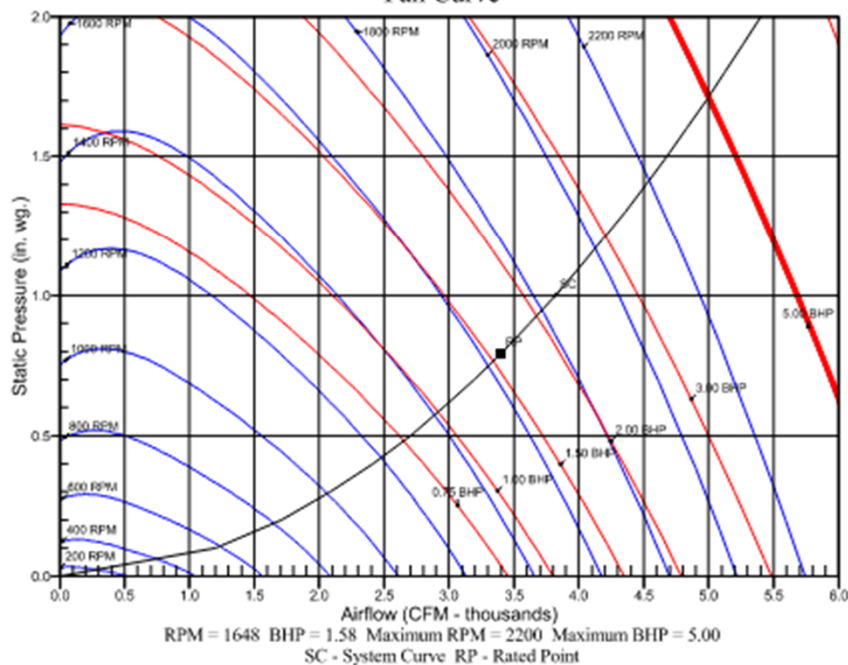
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	87.2	83.1	88.6
125 Hz	82.9	78.0	85.0
250 Hz	77.6	71.3	81.6
500 Hz	74.4	67.0	79.5
1000 Hz	75.7	67.3	77.4
2000 Hz	71.8	61.1	74.1
4000 Hz	67.3	53.8	71.0
8000 Hz	58.2	48.0	66.3
A-Weighted	79.6	71.4	82.0

Fan Curve



Appendix E-2 Exhaust Fan Specification Sheet

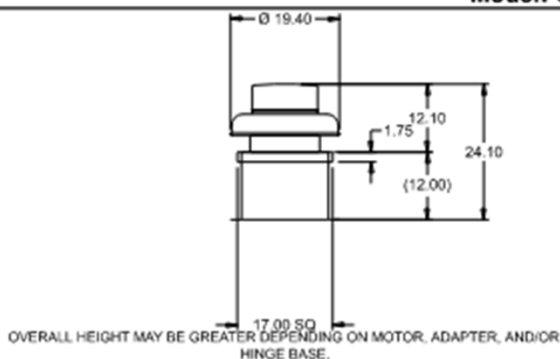


Printed Date: 01/14/2025
Job: 7-Eleven Site #1056100
Mark: EF-2
Model: G-070-E

Model: G-070-E

Direct Drive Centrifugal Roof Exhaust Fan

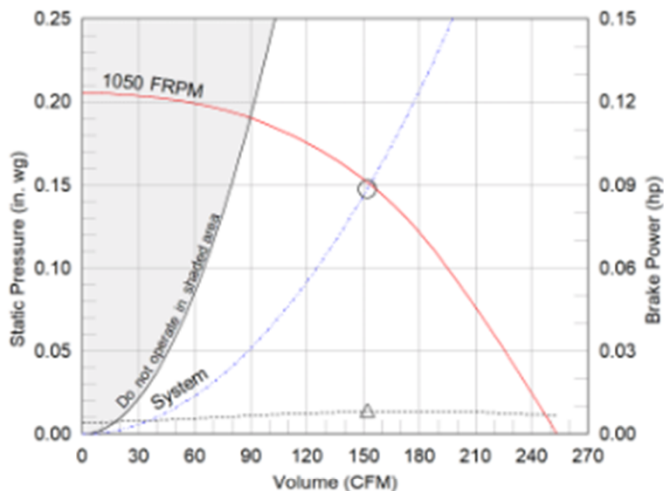
Dimensional	
Quantity	1
Weight w/o Acc's (lb)	17
Weight w/ Acc's (lb)	23
Weight w/ Acc's and Curb (lb)	37
Standard Curb Cap Size (in.)	17 x 17
Optional Damper (in.)	8 x 8
Roof Opening (in.)	13.5 x 13.5



Performance	
Requested Volume (CFM)	140
Actual Volume (CFM)	152
Total External SP (in. wg)	0.147
Fan RPM	1050
Operating Power (hp)	0.01
Elevation (ft)	489
Airstream Temp. (F)	70
Air Density (lb/ft ³)	0.074
Tip Speed (ft/min)	2,233
Static Eff. (%)	45

Misc Fan Data	
Fan Energy Index (FEI)	-
Outlet Velocity (ft/min)	390

Motor	
Motor Mounted	Yes
Size (hp)	1/100 (or greater)
Voltage/Cycle/Phase	115/60/1
Enclosure	ODP
Motor RPM	1050
Efficiency Rating	Standard
Windings	1



Static Pressure Calculations	
External SP	0.125 in. wg
Direct Drive RPM Adjustment	0.022 in. wg
Total External SP	0.147 in. wg

Notes:

All dimensions shown are in units of in.
*Please consult factory for actual motor amp draw
LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighted sound pressure level, based on 11.5 dB
attenuation per octave band at 5 ft - dBA levels are not licensed
by AMCA International
Sones - calculated using ANSI/AMCA 901 at 5 ft

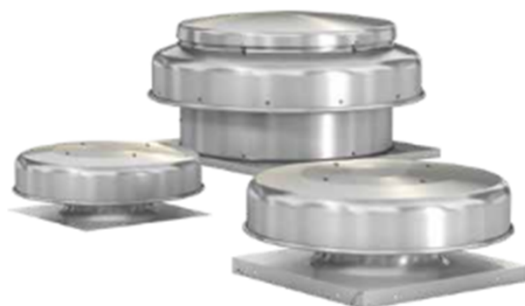
Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	62	58	49	39	35	32	24	23	46	35	1.5



Appendix E-3 Gravity Ventilator Specification Sheet

Spun Aluminum Model GRSI/GRSR/GRSF



Construction Features

When you buy a Greenheck gravity ventilator, you receive a ventilator with the industry's best performance and durability for intake (model GRSI) or relief (model GRSR) for natural gravity or positive pressure systems. Exceptional low silhouette design and construction features make this unit a rugged, efficient, and economical air inlet or outlet.

- Broadest performance in the industry, up to 18,400 cfm (31,300 m³/hr)
- Most advanced weather protection of any ventilator in its class
- Greenheck subjects these products to extensive life testing, ensuring the ventilator will provide years of reliable performance

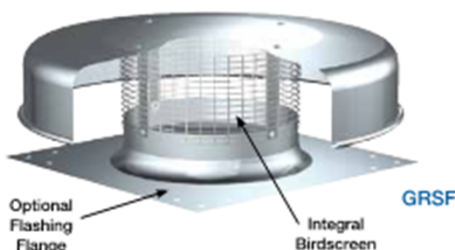
- All aluminum exterior for corrosion-resistant construction
- Integral birdscreen to prevent the entry of birds and/or small objects
- Built-in curb cap with prepunched holes for easy attachment to roof curbs
- Optional built-in flashing flange (model GRSF) with prepunched holes for quick and easy installations without a roof curb.

Use the GRS with the following accessories:

Gravity or motorized dampers to ensure weather tightness.

Prefab curbs to reduce installation time.

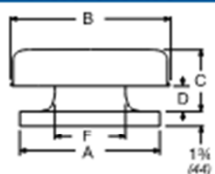
Protective coatings to extend the life of the unit or blend its color with other equipment.



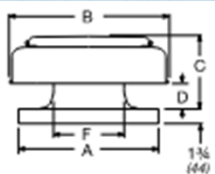
Dimensions										
Model Size	A	B	C	D	E	F	Damper Size	Curb Thickness	Shroud Thickness	Unit Weight
8	19 (483)	20 1/2 (521)	7 1/4 (184)	1 1/8 (38)	20 1/4 (514)	8 1/4 (210)	8 x 8 (203 x 203)	0.051 (1.3)	0.051 (1.3)	7 (3)
10	19 (483)	20 1/2 (521)	7 1/4 (187)	2 (51)	20 1/4 (514)	10 1/4 (260)	10 x 10 (254 x 254)	0.051 (1.3)	0.051 (1.3)	8 (4)
12	22 (559)	29 (737)	10 (254)	3 1/2 (89)	23 1/4 (591)	12 1/4 (311)	12 x 12 (305 x 305)	0.064 (1.6)	0.064 (1.6)	10 (5)
15	22 (559)	29 (737)	10 (254)	3 1/2 (89)	23 1/4 (591)	14 1/4 (362)	16 x 16 (406 x 406)	0.064 (1.6)	0.064 (1.6)	13 (6)
16	26 (660)	29 (737)	11 (279)	4 1/4 (108)	27 1/4 (692)	16 1/4 (413)	16 x 16 (406 x 406)	0.064 (1.6)	0.064 (1.6)	16 (7)
18	30 (762)	35 1/2 (902)	9 1/4 (248)	1 1/2 (44)	31 1/4 (794)	20 1/4 (514)	18 x 18 (457 x 457)	0.064 (1.6)	0.064 (1.6)	19 (9)
20	30 (762)	35 1/2 (902)	11 1/4 (286)	3 1/4 (95)	31 1/4 (794)	20 1/4 (514)	18 x 18 (457 x 457)	0.064 (1.6)	0.064 (1.6)	24 (11)
24	34 (864)	38 1/2 (972)	11 (279)	4 (102)	35 1/4 (895)	24 1/2 (622)	24 x 24 (610 x 610)	0.064 (1.6)	0.064 (1.6)	29 (13)
30	40 (1016)	48 (1219)	18 1/2 (470)	5 1/4 (138)	-	30 1/2 (775)	30 x 30 (762 x 762)	0.064 (1.6)	0.064 (1.6)	35 (16)
36	46 (1168)	56 1/2 (1441)	21 1/2 (540)	10 (254)	-	36 1/2 (927)	36 x 36 (914 x 914)	0.064 (1.6)	0.064 (1.6)	45 (20)
42	52 (1321)	63 1/2 (1607)	24 1/2 (616)	11 1/4 (286)	-	42 1/2 (1089)	42 x 42 (1067 x 1067)	0.064 (1.6)	0.080 (2.0)	60 (27)
48	58 (1473)	72 (1829)	26 1/2 (667)	11 1/4 (286)	-	48 1/2 (1232)	48 x 48 (1219 x 1219)	0.064 (1.6)	0.080 (2.0)	80 (36)

All dimensions are in inches (millimeters) and the weight in pounds (kilograms). NOTE: Sizes GRS-8 through 24 have a one-piece cover and shroud. Access is gained through the removal of screws. Sizes GRS-30 through 48 have a removable cover, separate from the shroud, to facilitate maintenance and servicing of dampers.

GRSI/GRSR Sizes 8 - 24



GRSI/GRSR - Sizes 30 - 48



GRSF - Sizes 8 - 24
with Optional Flashing Flange

