SECTION 4.2
Air Quality

This section addresses the potential impacts of construction and operation of the proposed projects on ambient air quality and the potential for exposure of people (especially sensitive individuals who consist of children, the elderly, acutely ill, and chronically ill) to unhealthful pollutant concentrations, and where significant impacts are disclosed, identifies feasible mitigation measures. Air pollutants of concern in the Sacramento region include ozone (O_3), carbon monoxide (CO), and particulate matter (PM) in size fractions of 10 microns or less in diameter (PM_{10}) and 2.5 microns or less in diameter ($PM_{2.5}$). In addition, the potential for exposure to odors, toxic air contaminants is addressed, as well as the effects of tall buildings on ground-level wind accelerations.

Comments on the NOP (see Appendix B) included a letter from the Sacramento Metropolitan Air Quality Management District (SMAQMD) that requested assessment of air quality impacts for construction and operation of the proposed projects. In addition to requesting that the SEIR include estimates of short-term and long-term air pollutant emissions, it asked that the Air Quality Mitigation Plan (AQMP) that was prepared for the 2007 RSP be assessed for effectiveness and amended as necessary to maintain effectiveness. The letter requested disclosure of potential impacts from Toxic Air Contaminants (TACs), especially related to receptors in close proximity to existing and future sources of emissions (like Interstate 5). These issues are addressed in this section.

The letter noted the presence of the proposed MLS Stadium and suggested that features that facilitate use of sustainable modes of transportation be addressed in a transportation management plan. This issue is addressed in section 4.12, Transportation and Circulation. The letter also requested assessment of greenhouse gas emissions based on the SMAQMD's CEQA Guide to Air Quality Assessment, and consideration of the project's consistency with greenhouse gas reduction plans, such as SACOG's Metropolitan Transportation Plan/Sustainable Communities Strategy, and the City's Climate Action Plan. These issues are addressed in section 4.7, Global Climate Change.

The analysis included in this section is based on a set of project-specific construction and operational features, and data provided in the *2007 Railyards Specific Plan Draft Environmental Impact Report,*[1] the *City of Sacramento 2035 General Plan,*[2] the *City of Sacramento 2035*

[1] PBS&J/EIP, 2007. *Railyards Specific Plan Draft Environmental Impact Report (SCH No. 2006032058).* August 2007.

[2] City of Sacramento, 2015. *City of Sacramento 2035 General Plan.* Adopted March 3, 2015.

General Plan Master Environmental Impact Report,[3] traffic information provided by Fehr & Peers Associates,[4] and SMAQMD's *CEQA Guide to Air Quality Assessment.*[5]

Issues Addressed in the 2007 RSP EIR

The 2007 Railyards Specific Plan (RSP) EIR focused on the nature and magnitude of the change in the air quality, odors and wind environment due to construction and operation of the 2007 RSP. Development details of the 2007 RSP are discussed in Chapter 3.4.2 of the *2007 Railyards Specific Plan*. Those issues are still applicable to RSPU and other proposed projects in the RSP Area, and are discussed in this section.

4.2.1 Environmental Setting

The 2007 RSP EIR described the air quality setting of the RSP Area on pages 6.1.1 through 6.1-10. The environmental setting discussion in this section is consistent with the discussion in the 2007 RSP EIR but the existing ambient air quality conditions and citations are updated. SMAQMD is the primary local agency with respect to air quality for all of Sacramento County. The City of Sacramento is within the Sacramento Valley Air Basin (SVAB), which also includes all of Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba Counties, the western portion of Placer County, and the eastern portion of Solano County.

Physical Setting

Climate and Topography

The climate and topography in the vicinity of the RSP Area has not changed since the certification of the 2007 RSP EIR. Air quality is affected by the rate, amount, and location of pollutant emissions and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions (for example, wind speed, wind direction, and air temperature) in combination with local surface topography (for example, geographic features such as mountains and valleys), determine how air pollutant emissions affect local air quality.

The climate of the SVAB is Mediterranean in character, with mild, rainy winter weather from November through March and warm to hot, dry weather from May through September. Sacramento Valley temperatures range from 20 to 115 degrees Fahrenheit and the average annual rainfall is 20 inches. The topographic features giving shape to the SVAB are the Coast Range to the west, the Sierra Nevada to the east, and the Cascade Range to the north. These mountain ranges channel winds through the SVAB, but also inhibit the dispersion of pollutant emissions.

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3 City of Sacramento, 2015. *City of Sacramento 2035 General Plan Master Environmental Impact Report* (SCH No. 2012122006). Certified March 3, 2015.

4 Fehr and Peers, 2016. Railyards Traffic Impact Study.

5 Sacramento Metropolitan Air Quality Management District, 2009. Guide to Air Quality Assessment. Available: http://www.airquality.org/ceqa/ceqaguideupdate.shtml. December 2009.

The predominant annual and summer wind pattern in the Sacramento Valley is the full sea breeze, commonly referred to as Delta breezes. These cool winds originate from the Pacific Ocean and flow through a sea-level gap in the Coast Range called the Carquinez Straits. In the winter (December to February), northerly winds predominate. Wind directions in the Sacramento Valley are influenced by the predominant wind flow pattern associated with each season. During about half the days from July through September, however, a phenomenon called the "Schultz Eddy," which is a large isotropic vertical-axis eddy on the north side of the Carquinez Straits that prevents the Delta breezes from transporting pollutants north and out of the Sacramento Valley and causes the wind pattern to circle back south, which tends to keep air pollutants in the Sacramento Valley. This phenomenon's effect exacerbates the pollution levels in and increases the likelihood of area to violate state and/or federal air quality standards.

The vertical and horizontal movement of air is an important atmospheric component involved in the dispersion and subsequent dilution of air pollutants. Without movement, air pollutants can collect and concentrate in a single area, increasing the associated health hazards. For instance, in the winter, persistent inversions occur frequently in the SVAB, especially during autumn and early winter, and restrict the vertical dispersion of pollutants released near ground level.

Criteria Air Pollutants

Criteria air pollutants are a group of pollutants for which federal or state regulatory agencies have adopted ambient air quality standards. Criteria air pollutants include O_3, CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), PM_{10}, $PM_{2.5}$ and lead. **Table 4.2-1** lists the health effects associated with these pollutants. Most of the criteria pollutants are directly emitted. Ozone, however, is a secondary pollutant that is formed in the atmosphere by chemical reactions between nitrogen oxides (NOx) and reactive organic gases (ROG).

Criteria air pollutants are classified in each air basin, county, or in some cases, within a specific urbanized area. The classification is determined by comparing actual monitoring data with State and federal standards. If a pollutant concentration is lower than the standard, the area is classified as "attainment" for that pollutant. If an area exceeds the standard, the area is classified as "nonattainment" for that pollutant. If there are not enough data available to determine whether the standard is exceeded in an area, the area is designated "unclassified". The ambient state and national air quality standards can be found in **Table 4.2-2**. The County's attainment status for the criteria pollutants are summarized in **Table 4.2-3** and are compared to those presented in the 2007 RSP EIR.

On page 6.1-5, the 2007 RSP EIR presented air quality data from the California Air Resources Board (CARB) regional air quality monitoring network T Street Station for years ranging 2004 to 2006. Currently, the monitoring stations that include data representative of the proposed project sites are located in Sacramento on T Street (monitors ozone, PM_{10}, and $PM_{2.5}$) approximately 1.1 miles southeast of the proposed project and at El Camino and Watt (this station is at a busy intersection where CO is monitored) approximately 5.9 miles northeast of the project site. **Table 4.2-4** presents

a five-year summary of air pollutant concentration data collected at these monitoring stations for ozone, PM_{10}, $PM_{2.5}$ and CO, as well as the number of days the applicable standards were exceeded during the given year. As shown in Table 4.2-4, since the publication of the 2007 RSP EIR, the attainment status of PM_{10} and $PM_{2.5}$ has been updated to attained and not designated, respectively.

TABLE 4.2-1.
HEALTH EFFECTS OF MAIN CRITERIA AIR POLLUTANTS

Pollutant	Adverse Effects
Ozone	• Ozone can irritate lung airways and cause inflammation. Other symptoms include wheezing, coughing, and breathing difficulties during exercise or outdoor activities. People with respiratory problems are most vulnerable, but even healthy people that are active outdoors can be affected when O3 levels are high. • Repeated exposure to O3 pollution for several months may cause permanent lung damage. • Even at very low levels, ground-level O3 triggers a variety of health problems including aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis. • Ground-level O3 interferes with the ability of plants to produce and store food, which makes them more susceptible to disease, insects, Other pollutants, and harsh weather. • Ozone reduces crop and forest yields and increases plant vulnerability to disease, pests, and weather.
Carbon Monoxide	• The health threat from lower levels of CO is most serious for those who suffer from heart disease. For a person with heart disease, a single exposure to CO at low levels may cause chest pain and reduce that person's ability to exercise; repeated exposures may contribute to other cardiovascular effects. • Healthy people can be affected by high levels of CO as well. People who breathe high levels of CO can develop vision problems, reduced ability to work or learn, reduced manual dexterity, and difficulty performing complex tasks. At extremely high levels, CO is poisonous and can cause death • CO contributes to the formation of ground-level O3, which can trigger serious respiratory problems.
Particulate Matter	• Particle pollution, especially fine particles, contains microscopic solids or liquid droplets that are so small that they can get deep into the lungs and cause serious health problems. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including: increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; decreased lung function, aggravated asthma, development of chronic bronchitis; irregular heartbeat, nonfatal heart attacks; and premature death. • Particles can be carried over long distances by wind and then settle on ground or water. The effects of this settling include: making lakes and streams acidic; changing the nutrient balance in coastal waters and large river basins; depleting the nutrients in soil; damaging sensitive forests and farm crops; and affecting the diversity of ecosystems.
Nitrogen Dioxide	• One of the main constituent involved in the formation of ground-level O3, which can trigger serious respiratory problems. • Reacts to form nitrate particles, acid aerosols, as well as NO2, which also cause respiratory problems. • Contributes to formation of acid rain; to nutrient overload that deteriorates water quality; and to atmospheric particles that cause visibility impairment. • Reacts to form toxic chemicals.

SOURCE: Environmental Protection Agency, 2006. https://www3.epa.gov/airtrends/aqtrnd95/sixpoll.html.

TABLE 4.2-2.
STATE AND NATIONAL CRITERIA AIR POLLUTANT STANDARDS, EFFECTS, AND SOURCES

Pollutant	Averaging Time	State Standard	National Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone	1 hour	0.09 ppm	---	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when reactive organic gases (ROG) and nitrogen oxides (NO_X) react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial / industrial mobile equipment.
	8 hours	0.070 ppm	0.070 ppm		
Carbon Monoxide	1 hour	20 ppm	35 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm		
Nitrogen Dioxide	1 hour	0.18 ppm	100 ppb	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
	Annual Avg.	0.030 ppm	0.053 ppm		
Sulfur Dioxide	1 hour	0.25 ppm	75 ppb	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	3 hours	---	0.5 ppm		
	24 hours	0.04 ppm	0.14 ppm		
	Annual Avg.	---	0.030 ppm		
Respirable Particulate Matter (PM_{10})	24 hours	50 ug/m^3	150 ug/m^3	May irritate eyes and respiratory tract, decreases in lung capacity, cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	Annual Avg.	20 ug/m^3	---		
Fine Particulate Matter ($PM_{2.5}$)	24 hours	---	35 ug/m^3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NO_X, sulfur oxides, and organics.
	Annual Avg.	12 ug/m^3	12.0 ug/m^3		
Lead	Monthly Ave.	1.5 ug/m^3	---	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurological dysfunction.	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	---	1.5 ug/m^3		
Hydrogen Sulfide	1 hour	0.03 ppm	No National Standard	Nuisance odor (rotten egg smell), headache and breathing difficulties (higher concentrations)	Geothermal Power Plants, Petroleum Production and refining
Sulfates	24 hour	25 ug/m^3	No National Standard	Breathing difficulties, aggravates asthma, reduced visibility	Produced by the reaction in the air of SO_2.
Visibility Reducing Particles	8 hour	Extinction of 0.23/km; visibility of 10 miles or more	No National Standard	Reduces visibility, reduced airport safety, lower real estate value, discourages tourism.	See $PM_{2.5}$.

NOTE:

ppb = parts per billion; ppm = parts per million; ug/m^3 = micrograms per cubic meter.

SOURCE: California Air Resources Board, 2015. *Ambient Air Quality Standards*. Available: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf. Standards last updated October 1, 2015; California Air Resources Board, 2009. *ARB Fact Sheet: Air Pollution Sources, Effects and Control*. Available: http://www.arb.ca.gov/research/health/fs/fs2/fs2.htm. Page last reviewed by ARB December 2009.

TABLE 4.2-3.
SACRAMENTO COUNTY ATTAINMENT STATUS

Pollutant	2007 RSP EIR Designation/Classification		2016 Designation/Classification	
	State Standards	Federal Standards	State Standards	Federal Standards
Ozone	Nonattainment/Serious	Nonattainment/Severe	Nonattainment/Serious	Nonattainment/Severe
Carbon Monoxide	Attainment	Attainment	Attainment	Unclassified/Attainment
Nitrogen Dioxide	Attainment	Attainment	Attainment	Unclassified/Attainment
Sulfur Dioxide	Attainment	Attainment	Attainment	Unclassified
Fine Particulate Matter (PM_{10})	Nonattainment	Nonattainment	Nonattainment	Attainment*
Fine Particulate Matter ($PM_{2.5}$)	Not Designated	Not Designated	Nonattainment	Nonattainment/Moderate

NOTE:

* Effective October 28, 2013, the U.S. EPA formally re-designated Sacramento County as attainment for the federal PM_{10} standard.

SOURCES: City of Sacramento, 2007. Railyards Specific Plan Draft Environmental Impact Report. August 2007; California Air Resources Board, 2014. *Area Designation Maps*. Available: http://www.arb.ca.gov/desig/adm/adm.htm. Accessed December 4, 2015; U.S. Environmental Protection Agency, 2015. *U.S. EPA Fact Sheet – California Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants.* October 1, 2015.

TABLE 4.2-4.
SUMMARY OF AIR QUALITY MONITORING DATA (2012–2014)

Pollutant	Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured[a]		
		2012/2004	2013/2005	2014/2006
Ozone – T Street Station				
Days 1-hour State Std. Exceeded	>0.09 ppm[b]	1/1	4	6
Max. 1-hour Conc. (ppm)		**0.104/0.105**	0.091/0.108	0.085/0.106
Days 8-hour National Std. Exceeded[e]	>0.070 ppm[c]	4/0	0/1	0/3
Days 8-hour State Std. Exceeded[e]	>0.070 ppm[b]	9/NA	0/NA	4/NA
Max. 8-hour Conc. (ppm)		**0.093/0.075**	0.068/0.087	**0.072/0.090**
Nitrogen Dioxide (NO_2) – T Street Station				
Days 1-hour State Std. Exceeded	> 0.18 ppm	0/0	0/0	0/0
Days 1-hour National Std. Exceeded	>0.10 ppm	0/0	0/0	0/0
Max. 1-hour Conc. (ppm)		0.062/0.072	0.059/0.071	0.064/0.077
Annual Average Conc. (ppm)		12/NA	12/NA	11/NA
Suspended Particulates (PM_{10}) – T Street Station				
Estimated Days Over 24-hour National Std.[d]	>150 µg/m^3 [c]	0/1	NA/0	0/0
Estimated Days Over 24-hour State Std.[d]	>50 µg/m^3 [b]	0/0	NA/0	NA/8
Max. 24-hour Conc. National/State (µg/m^3)		36.2/36.7/58/**58**	53.1/**92.3**/53/**55**	105.7/**106.4/109/111**
State Annual Average (µg/m^3)	>20 µg/m^3 [b]	17.8/NA	NA/NA	NA/NA
Suspended Particulates ($PM_{2.5}$) – T Street Station				
Estimated Days Over 24-hour National Std.[d]	>35 µg/m^3 [c]	0/0	6.1/0	0/0
Max. 24-hour Conc. National (µg/m^3)		27.1/**46**	**39.2/59**	26.3/**54**
National Annual Average (µg/m^3)	>12.0 µg/m^3 [b]	8.3/NA	10.0/NA	8.0/NA
Carbon Monoxide (CO) – El Camino & Watt Station				
Days 8-hour State Std. Exceeded	>9.0 ppm[b]	0	0	0
Max. 8-hour Conc. (ppm)		2.1/2.96	NA/3.64	NA/NA
Days 1-hour State Std. Exceeded	>20 ppm[b]	0/0	0/0	0/0
Max. 1-hour Conc. (ppm)		2.7/NA	3/NA	2.5/NA

NOTES:

Bold values are in excess of applicable standard. "NA" indicates that data is not available.
conc. = concentration; ppm = parts per million; ppb = parts per billion; µg/m^3 = micrograms per cubic meter; ND = No data or insufficient data.

a. Number of days exceeded is for all days in a given year, except for particulate matter. PM_{10} and $PM_{2.5}$ are monitored every six days.
b. State standard, not to be exceeded.
c. National standard, not to be exceeded.
d. Particulate matter sampling schedule of one out of every six days, for a total of approximately 60 samples per year. Estimated days exceeded mathematically estimates of how many days concentrations would have been greater than the level of the standard had each day been monitored.
e. The CARB and U.S. EPA use different methods to calculate the emissions for comparisons to the state and national standards.

SOURCE: California Air Resources Board, 2015. *Summaries of Air Quality Data, 2012-2014*. Available: http://www.arb.ca.gov/adam/index.html. Accessed December 4, 2015.

While the data gathered at these monitoring stations may not necessarily reflect the unique meteorological environment of the RSP Area, nor the proximity of site-specific stationary and mobile sources, they do present the nearest available benchmark and provide the reader with a reference point to what the pollutants of greatest concern are in the region and the degree to which the area is classified as non-attainment with respect to specific air quality standards.

Existing Ambient Air Quality

The criteria air pollutants most relevant to air quality planning and regulation in the SVAB include O_3, CO, PM_{10} and $PM_{2.5}$. Each of the relevant criteria pollutants is briefly described below in the context of the County's attainment status and compared to those presented in the 2007 RSP EIR.

Ozone (O_3)

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG, also sometimes referred to as volatile organic compounds or VOC by some regulating agencies) and nitrogen oxides (NOx). The main sources of ROG and NOx, often referred to as ozone precursors, are combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. Ozone is referred to as a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process. Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

As described in Table 4.2-4, ozone levels in the project vicinity have resulted in numerous violations of ambient air quality standards between 2012 and 2014. Emissions in the project vicinity exceeded the 1-hour state standard twice, and exceeded the 8-hour state and national standards 8 and 1 times, respectively, during the 3-year study period.

As discussed on page 6.1-5 and shown in Table 6.1-3 of the 2007 RSP EIR, emissions in the project vicinity in years 2004 through 2006 exceeded the 1-hour state standard eleven times, and exceeded the 8-hour national standards four times, during the 3-year study period. Prior to the publication of the 2007 RSP EIR, there was no state 8-hour standard.

According to the American Lung Association, healthy adults and children are harmed by air pollution; most at risk are children, the elderly, those with heart and lung disease, diabetes, or who live in proximity to major sources of pollution, like ports, rail yards, or busy roadways.[6] For these vulnerable populations, particle pollution increases the risk of asthma attacks and respiratory distress, heart attacks, stroke, and premature death. The World Health Organization concluded in 2013 that breathing particle pollution causes lung cancer. Ground-level ozone triggers asthma attacks, increases the risk of hospital admissions and emergency room visits and even increases the risk of premature death.

6 American Lung Association, 2015. State of the Air 2015: Sacramento Regional Summary.

Carbon Monoxide (CO)

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicle engines; the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Exposure of humans to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue, impaired central nervous system function, and angina (chest pain) in persons with serious heart disease. Very high concentrations of CO can be fatal.

As described in Table 4.2-4, there have been no recorded exceedances of the 1-hour or 8-hour state standards for CO in the project vicinity during the 5-year study period. As discussed on page 6.1-5 and shown in Table 6.1-3 of the 2007 RSP EIR, there have been no exceedances of the 1-hour or 8-hour state or national standards for CO in the project vicinity in years 2004 through 2006.

Fine Particulate Matter (PM_{10} and $PM_{2.5}$)

PM_{10} and $PM_{2.5}$ consist of fine particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively (a micron is one-millionth of a meter). PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into air passages and the lungs and can cause adverse health effects. Some sources of fine particulate matter, such as wood burning in fireplaces, demolition, and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility.

Large dust particles (diameter greater than 10 microns) settle out rapidly and are easily filtered by human breathing passages. This large dust is of more concern as a soiling nuisance rather than a health hazard. The remaining fine particulate matter, PM_{10} and $PM_{2.5}$, are a health concern particularly at levels above the federal and state ambient air quality standards. $PM_{2.5}$ (including diesel exhaust particles) has greater effects on health because these particles are small enough to be able to penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems including asthma, bronchitis, and acute and chronic respiratory symptoms, such as shortness of breath and painful breathing. Recent studies have shown an association between morbidity and mortality and daily concentrations of particulate matter in the air. Children are more susceptible to the health risks of PM_{10} and $PM_{2.5}$ because their immune and respiratory systems are still developing.

Mortality studies since the 1990s have shown a statistically significant direct association between mortality (premature deaths) and daily concentrations of particulate matter in the air. Despite important gaps in scientific knowledge and continued reasons for some skepticism, a

comprehensive evaluation of the research findings provides persuasive evidence that exposure to fine particulate air pollution has adverse effects on cardiopulmonary health.[7]

Table 4.2-4 presents the ambient air quality monitoring data for PM_{10} and $PM_{2.5}$ in the project vicinity during the period of 2012 through 2014. It appears that the 24-hour standard was also exceeded at least once in 2013 and at least once in 2014; however, the number of exceedance days is not available for those years. Regarding $PM_{2.5}$, the study area was estimated to have exceeded the 24-hour national standard approximately six (6) times in 2013. There were no exceedances of the annual average standards for PM_{10} or $PM_{2.5}$ recorded during the 3-year study period.

As discussed on page 6.1-5 and shown in Table 6.1-3 of the 2007 RSP EIR, between years 2004 to 2006 there have been 13 exceedances of the state PM_{10} standards. In regards to $PM_{2.5}$, there have been no exceedances of the 24-hour $PM_{2.5}$ national standards; prior to the publication of the 2007 RSP EIR, there were no state 24-hour $PM_{2.5}$ standards.

According to the SMAQMD, exposure to PM pollution can cause coughing, wheezing, and decreased lung function even in otherwise healthy children and adults. EPA estimates that thousands of elderly people die prematurely each year from exposure to fine particles. CARB has estimated both the public health and economic impacts caused by exposure to $PM_{2.5}$. For the Sacramento Metropolitan Area, CARB estimates that: 90 people die prematurely; 20 people are admitted to hospitals; 1,200 asthma and lower respiratory symptoms cases; 1110 acute bronchitis cases; 7,900 lost work days; 42,000 minor restricted activity days; and total economic impact of PM is over $700 million per year.[8]

Nitrogen Dioxide (NO_2)

NO_2 is a reddish brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, NO_2 can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component on high pollution days, especially in conjunction with high ozone levels.

Table 4.2-4 presents the ambient air quality monitoring data for NO_2 in the project vicinity during the period of 2010 through 2014. Emissions of NO_2 were found to not exceed either the state or national standards, which is consistent with the finds presented in the 2007 RSP EIR. As discussed on page 6.1-5 and shown in Table 6.1-3 of the 2007 RSP EIR, between years 2004 to 2006 there have been violations of the state or national air quality standards.

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7 Dockery, D. W. and C.A. Pope, III, 2006. *Health Effects of Fine Particulate Air Pollution: Lines that Connect*. Journal Air & Waste Management Association. pp. 709–742.

8 Sacramento Metropolitan Air Quality Management District, 2016. Particulate Matter ($PM_{2.5}$) and Planning. Available: http://www.airquality.org/plans/federal/pm/PM2.5/index.shtml. Accessed April 8, 2016.

Sulfur Dioxide (SO_2)

SO_2 is a combustion product of sulfur or sulfur-containing fuels such as coal and diesel. SO_2 is also a precursor to the formation of particulate matter, atmospheric sulfate, and atmospheric sulfuric acid formation that could precipitate downwind as acid rain. The maximum SO_2 concentrations recorded in the project vicinity are well below federal and state standards. Accordingly, the region is currently designated as attainment with both the national and state SO_2 standards. The attainment status of SO_2 in the vicinity of the proposed project areas has not changed since the publication of the 2007 RSP EIR.

Lead

Leaded gasoline (phased out in the United States beginning in 1973), lead based paint (on older houses and cars), smelters (metal refineries), and manufacture of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has a range of adverse neurotoxic health effects, which puts children at special risk. Some lead-containing chemicals cause cancer in animals. Lead levels in the air have decreased substantially since leaded gasoline was eliminated. Ambient lead concentrations are only monitored on an as-warranted, site-specific basis in California. Accordingly, the region is currently designated as attainment with both the national and state lead standards. The attainment status of lead in the vicinity of the proposed project areas has not changed since the publication of the 2007 RSP EIR.

Toxic Air Contaminants

Since the certification of the 2007 RSP EIR, the RSP Area has undergone extensive soil and building remediation. The remediation within the RSP Area includes both soil and groundwater contamination and the removal of lead paint and asbestos from existing buildings. Most of the remediation activities are completed or in their final states. Details of the past remediation activities can be found in Section 4.8, Hazards.

TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, diesel engines, dry cleaners, industrial operations, and painting operations.

CARB has identified diesel particulate matter (DPM) as a TAC in 1998, primarily based on evidence demonstrating cancer effects in humans. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and concentrations of DPM are higher near heavily traveled highways and rail lines with diesel locomotive operations. The risk from DPM as determined by the CARB declined from 750 in one million in 1990 to 570 in one million in 1995; by 2000, CARB estimated that the average

statewide cancer risk from DPM was 540 in one million.[9] These calculated cancer risk values from ambient air exposure generated by mobile sources can be compared against the lifetime probability of being diagnosed with cancer in the United States, from all causes, which is more than 40 percent (based on a sampling of 17 regions nationwide), or greater than 400,000 in one million, according to the National Cancer Institute.[10]

Asbestos is also a TAC of concern due to the demolition of buildings and structures as part of the project. Asbestos is a fibrous mineral, which is both naturally occurring in ultramafic rock (a rock type commonly found in California) and used as a processed component of building materials. Because asbestos has been proven to cause serious adverse health effects, including asbestosis and lung cancer, it is strictly regulated based on its natural widespread occurrence and its use as a building material.

Odorous Emissions

Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The ability to detect odors varies considerably among the population and overall is quite subjective. People may have different reactions to the same odor. An odor that is offensive to one person may be perfectly acceptable to another (e.g., coffee roaster). An unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. Known as odor fatigue, a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors. Odor impacts should be considered for any proposed new odor sources located near existing receptors, as well as any new sensitive receptors located near existing odor sources.

Sensitive Receptors

Air quality does not affect every individual or group in the population in the same way, and some groups are more sensitive to adverse health effects caused by exposure to air pollutants than others. Population subgroups sensitive to the health effects of air pollutants include the elderly and the young, those with higher rates of respiratory disease such as asthma and chronic obstructive pulmonary disease, and with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases.

Land uses such as schools, children's day care centers, hospitals, and nursing and convalescent homes are considered to be the most sensitive to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Parks and

9 California Air Resources Board, 2009. *California Almanac of Emissions and Air Quality - 2009 Edition.* Table 5-44 and Figure 5-12.

10 National Cancer Institute, 2012. *Lifetime Risk (Percent) of Being Diagnosed with Cancer by Site and Race/ Ethnicity, Both Sexes: 18 SEER Areas, 2007-2009 (Table 1.14).* Available: http://seer.cancer.gov/csr/1975_2009_ pops09/results_merged/topic_lifetime_risk_diagnosis.pdf. Accessed June 27, 2013.

playgrounds are considered moderately sensitive to poor air quality because persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality; however, exposure times are generally far shorter in parks and playgrounds than in residential locations and schools, which typically reduces the overall health risk associated with exposure to pollutants. Residential areas are considered more sensitive to air quality conditions compared to commercial and industrial areas because people generally spend longer periods of time at their residences, with associated greater exposure to ambient air quality conditions. Workers are not considered sensitive receptors because all employers are required to follow regulations set forth by the Occupation Safety and Health Administration (OSHA) to ensure the health and well-being of their employees. Descriptions of the existing sensitive receptors in the vicinity of the various sites associated with the proposed project are presented below.

The nearest sensitive receptors to the RSP Area are residents of homes near the intersection of Water, Bannon, and North B streets (adjacent to the northern boundary of the RSP Area); residents of homes located in the Alkali Flat neighborhood near the intersection of D and 8th streets (approximately 200 feet east of the RSP Area); residents of the Globe Mills multi-family residential development near 11th and B streets; future residents of the Creamery project, near 10th and D streets; and residents of the Ping Yuen Apartments, near 5th and I streets, across I Street from the southern boundary of the RSP Area.

The nearest sensitive receptors to the proposed KP Medical Center are the residences noted above, located near the intersection of Water, Bannon, and North B streets (approximately 560 feet north-east of the proposed KP Medical Center).

The nearest sensitive receptors to the proposed Stadium are residents of homes located in the Alkali Flat neighborhood near the intersection of D and 8th streets (approximately 200 feet east of the RSP Area); residents of the Globe Mills multi-family residential development near 11th and B streets; and the future residents of the Creamery project, near 10th and D streets.

The nearest residences to the proposed Stormwater Outfall would be located near the intersection of Kiline Street and 3rd Street (approximately 1,600 feet to the west, across the Sacramento River).

Wind and Microclimate

Background

Effect of Wind Speed on Pedestrian Comfort and Pedestrian Safety[11]

The comfort of pedestrians varies under different conditions of sun exposure, temperature, clothing, and wind speed. Winds up to four miles per hour (mph) have no noticeable effect on pedestrian comfort. With speeds from 4 to 8 mph, wind is felt on the face. Winds from 8 to 13 mph will disturb hair, cause clothing to flap, and extend a light flag mounted on a pole. Winds

[11] Lawson, T.V. and A.D. Penwarden, 1976. "The Effects of Wind on People in the Vicinity of Buildings," Proceedings of the Fourth International Conference on Wind Effects on Buildings and Structures, London, 1975, Cambridge University Press, Cambridge, U.K., 605-622.

from 13 to 19 mph will raise loose paper, dust, and dry soil, and will disarrange hair. For winds from 19 to 26 mph, the force of the wind will be felt on the body. With 26 to 34 mph winds, umbrellas are used with difficulty, hair is blown straight, there is difficulty in walking steadily, and wind noise is unpleasant. Winds over 34 mph increase difficulty with balance and gusts can blow people over. Higher-speed winds and gusts can cause safety hazards for pedestrians.[12]

Effects of Buildings on Wind Speed and Turbulence

Tall and/or massive buildings and exposed structures can strongly affect the wind environment for pedestrians. A building that stands alone or is much taller than the surrounding buildings can intercept and redirect winds that might otherwise flow overhead, and bring them down the vertical face of the building to ground level, where they create ground-level wind and turbulence. These redirected winds can be relatively strong and turbulent, and incompatible with the intended uses of nearby ground-level spaces. Furthermore, building designs that present tall flat surfaces square to strong winds can create ground-level winds that can be hazardous to pedestrians. A building with a height that is similar to the heights of surrounding buildings typically would cause little or no additional ground-level wind acceleration and turbulence. In addition to the localized effects from individual buildings, larger groups of individual buildings interact with and tend to slow the approaching winds, due to the friction and drag created by the many individual structures. This slowing is typically greatest near ground level.

The strong and turbulent winds that tall buildings can cause at ground-level can lead to unsafe conditions for pedestrians, such as high speed gusts as mentioned in the previous section. Wind-tunnel tests of tall buildings proposed in cities such as San Francisco and Sacramento have shown evidence of unsafe ground-level wind speeds created by buildings of substantial size and height. Due to these known effects large buildings can have on the wind conditions at ground level, it is necessary to carefully evaluate developments of substantial size or height to ensure safety for pedestrians.

Existing Wind Conditions

Existing Climate and Wind Conditions in Sacramento

Sacramento's climate is typical of inland valleys in California. Summers are hot, with maximum temperatures frequently approaching or exceeding 100 degrees Fahrenheit. Winters are cool and wet. Rainfall averages near 20 inches per year, with almost all rainfall occurring between November and March.

Southwesterly winds predominate and are strongest on average due to the north-south orientation of the Sacramento Valley. During winter, when the sea breezes diminish, northerly winds of some

[12] For example, San Francisco has adopted comfort and safety criteria for pedestrian-level winds that are included in the *San Francisco Planning Code* and enforced by City Planning in the project environmental review process.

strength occur more frequently but southerly winds still predominate. **Table 4.2-5** summarizes prevailing wind directions and corresponding speeds in Sacramento.[13]

TABLE 4.2-5.
AVERAGE WIND SPEED AND PREVAILING DIRECTION BY MONTH,
AND FASTEST MILE BY MONTH, DATE AND YEAR OF OCCURRENCE

Month	Average Speed	Prevailing Direction	Fastest Mile	Direction	Date	Year
January	7.2	Southeast	58	Southeast	4	2008
February	7.4	S-Southeast	58	Southeast	9	1938
March	8.5	Southwest	66	South	14	1952
April	8.6	Southwest	45	Southwest	25	1955
May	9.1	Southwest	40	Southeast	6	1912
June	9.7	Southwest	47	Southwest	23	1950
July	8.9	S- Southwest	36	Southwest	12	1956
August	8.5	Southwest	38	Southwest	19	1954
September	7.4	Southwest	42	Northwest	16	1965
October	6.4	Southwest	68	Southeast	26	1950
November	6.0	N-Northwest	70	Southeast	13	1953
December	6.6	S-Southeast	70	Southeast	7	1952
Annual	7.8	Southwest				

* Averages based on Climatological Normals 1971-2000

Sacramento's climate includes several wind regimes that have the greatest potential for adversely affecting outdoor comfort. The predominant wind direction is generally southwest, reflecting the orientation of the Sacramento Valley and the effect of marine breezes reaching Sacramento through the Carquinez Straits, a sea level gap in the Coast Range. Southwest winds are dominant in the spring and in the summer they have a profound positive effect on pedestrian comfort outdoors. In contrast, the Fastest Mile wind speeds, which relate to the highest speed component of these spring and summer winds, are relatively low, compared to fall and winter winds (see Table 4.2-5). These data indicate that southwest winds are the winds that most affect pedestrians' outdoor comfort, but their low speeds limits the potential of these spring and summer winds to result in wind hazards for pedestrians.

The highest speed winds measured in Sacramento occur from October through March, with the Fastest Mile wind speeds recorded up to 70 mph. These high winds are likely contributed from storms that occur in late fall and early spring. The highest wind speeds, which come from the south and south-southeast, are high enough to result in hazardous winds at pedestrian levels.

13 National Weather Service, 2010. *Climate of Sacramento, California*. August 2010.

Another wind regime that affects outdoor comfort includes strong, dry winds from the north, north-northeast or north-northwest. These winds typically occur in the fall and winter months, and are associated with cold temperatures and low humidity. Strong winds from these directions are not particularly frequent, so they do not strongly affect the pedestrian wind environment, although in certain circumstances, speeds high enough to be hazardous can occur.

Existing Setting and Wind Conditions at the Railyard Specific Plan Update Area

Currently, the RSP Area is vacant, open space, with the exception of the southern boundary, which contains the Sacramento Valley Station (including the historic depot building and the associated rail platforms), the Steve Cohn Passageway, Sacramento Regional Transit light rail station, and associated walkways, and parking lots; office and retail uses in the adjacent Railway Express Annex (REA) building, and parking lots that front on 7th Street between F and H streets. Because the Railyards contain no development of substantial height or bulk to interact with and slow approaching winds, wind speeds over most of the existing Railyards site is expected to be higher than occurs in many other Sacramento neighborhoods, but is also expected to be similar to winds measured at Sacramento Executive Airport, where long-term weather and wind measurements have been made.

Winds in Downtown Sacramento

Previously, ESA conducted wind tunnel tests to characterize the wind conditions that would result upon construction of some buildings proposed in downtown Sacramento. The wind test data were calibrated to the full-scale wind speeds and annual frequency of occurrence using long term wind data recorded at Sacramento Executive Airport.

These previous wind tests showed that the pedestrian-level wind environment in and around downtown Sacramento is moderate, with pedestrian level wind speeds[14] exceeding the City's established comfort criterion of 13 mph in some locations as well as exceeding the City's established hazard criterion of 36 mph for a full hour during the year. The tests showed that these comfort and hazard criterion typically were exceeded for projects greater than 200-feet in height, that were located in areas surrounded by mid- to high-rise buildings. Overall, these test results found that wind speeds of less than 9 to 13 mph typically would occur 90% of the time at representative pedestrian-use locations in public areas downtown.

We conclude that these wind tests provide a sufficient basis upon which to make informed and reasonable estimates of the wind speeds that occur on sidewalks within the mix of low-, mid- and high-rise building development that comprise downtown Sacramento.

[14] For the purpose of defining the comfort and hazard criterion for wind, the term "wind speed" refers to an equivalent wind speed-a mean wind speed adjusted to incorporate the effects of gustiness or turbulence-that is not exceeded more than 10% of the time.

4.2.2 Regulatory Setting

On pages 6.1-10 through 6.1-14, the 2007 RSP EIR disclosed the federal, state, and local regulatory framework for air quality as it related to the RSP, including laws, ordinances, regulations, policies, and standards. Since the certification of the 2007 RSP EIR, there have been updates to the City of Sacramento 2035 General Plan and SMAQMD CEQA Guidance. The City's updated policies and SMAQMD regulations are discussed below. All other regulatory framework discussion in this section is consistent with those discussed in the 2007 RSP EIR. State and federal regulations related to global climate change are discussed and evaluated in Section 4.7, Global Climate Change.

Federal

Criteria Pollutants

The 1970 FCAA (last amended in 1990) required that regional planning and air pollution control agencies prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants will be controlled in order to achieve all national ambient standards by the deadlines specified in the FCAA. These ambient air quality standards are intended to protect public health and welfare, and they specify the concentration of pollutants (with an adequate margin of safety) to which the public can be exposed without adverse health effects. They are designed to protect those segments of the public most susceptible to respiratory distress, including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels that are somewhat above ambient air quality standards before adverse health effects are observed.[15]

Table 4.2-2 presents current national and state ambient air quality standards and provides a brief discussion of the related health effects and principal sources for each pollutant. Pursuant to the 1990 Federal Clean Air Act Amendments (FCAAA), the U.S. EPA classifies air basins (or portions thereof) as "attainment" or "nonattainment" for each criteria air pollutant, based on whether or not the National Ambient Air Quality Standards (NAAQS) had been achieved. "Unclassified" is defined by the FCAAA as any area that cannot be classified, on the basis of available information, as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant. Table 4.2-3 shows a comparison between the current and 2007 attainment status of NAAQS in the project vicinity. In summary, Sacramento County is classified as severe nonattainment for the 8-hour national ozone standard and moderate nonattainment for the 24-hour national $PM_{2.5}$ standard. Sacramento County is either classified as attainment or unclassified for the remaining NAAQS, which is consistent with what was presented in the 2007 RSP EIR.

[15] U.S. Environmental Protection Agency., 2006. Available: https://www3.epa.gov/airtrends/aqtrnd95/sixpoll.html.

The FCAA required each state to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The FCAAA added requirements for states containing areas that violate the NAAQS to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is a living document that is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The U.S. EPA has responsibility to review all state SIPs to determine if they conform to the mandates of the FCAAA and will achieve air quality goals when implemented. If the U.S. EPA determines a SIP to be inadequate, it may prepare a Federal Implementation Plan (FIP) for the nonattainment area and may impose additional control measures. Failure to submit an approvable SIP or to implement the plan within mandated timeframes can result in sanctions being applied to transportation funding and stationary air pollution sources in the air basin.

Toxic Air Contaminants

TACs are regulated under both state and federal laws. Federal laws use the term "Hazardous Air Pollutants" (HAPs) to refer to the same types of compounds that are referred to as TACs under State law. Both terms encompass essentially the same compounds. The 1977 FCAAA required the U.S. EPA to identify National Emission Standards for Hazardous Air Pollutants (NESHAPs) to protect public health and welfare. These substances include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. Under the 1990 FCAAA, 189 substances are regulated as HAPs.

State

Criteria Pollutants

Although the FCAA established the NAAQS, individual states retain the option to adopt more stringent standards and to include other pollutants. California had already adopted its own air quality standards when federal standards were established, and because of the unique meteorology in California, there is considerable diversity between some of the state standards and NAAQS, as shown in Table 4.2-2. Most of the California ambient standards tend to be at least as protective as NAAQS and are often more stringent.

In 1988, California passed the California Clean Air Act (CCAA) (California Health and Safety Code Sections 39600 et seq.), which, like its federal counterpart, called for the designation of areas as attainment or nonattainment, but based on state ambient air quality standards rather than the federal standards. As previously discussed, Sacramento County is located within the SMAQMD. The CCAA requires each air district in which state air quality standards are exceeded to prepare a plan that documents reasonable progress towards attainment. A 3-year update is required. If an air district exceeds the California Air Quality Standards for a particular criteria pollutant, they are considered to be nonattainment of that criteria pollutant until the district can demonstrate compliance. As indicated in Table 4.2-3, Sacramento County is classified as

nonattainment and serious nonattainment for the 8-hour and 1-hour state ozone standards, respectively, and is nonattainment of the 24-hour state PM_{10} standard. The attainment status shown in Table 4.2-3 is consistent with what was reported in the 2007 RSP EIR.

Toxic Air Contaminants

The California Health and Safety Code defines TACs as air pollutants which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health. The State Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807 (Tanner). A total of 243 substances have been designated TACs under California law; they include the 189 (federal) HAPs adopted in accordance with AB 2728. The number substances designated as TACs under California Law has not changed since the certification of the 2007 RSP EIR. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; however, AB 2588 does not regulate air toxics emissions. Toxic air contaminant emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment and, if specific thresholds are violated, are required to communicate the results to the public in the form of notices and public meetings.

In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. The regulation is anticipated to result in an 80 percent decrease in statewide diesel health risk in 2020 as compared with the diesel risk in 2000. Additional regulations apply to new trucks and diesel fuel. Subsequent regulations of diesel emissions by the CARB include the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Offroad Diesel Vehicle Regulation, and the New Offroad Compression Ignition Diesel Engines and Equipment Program. All of these regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel powered equipment.

Despite these reduction efforts, CARB recommends that proximity to sources of DPM emissions be considered in the siting of new sensitive land uses. In April 2005, the CARB published *Air Quality and Land Use Handbook: a Community Health Perspective*. This handbook is intended to give guidance to local governments in the siting of sensitive land uses near sources of air pollution. Recent studies have shown that public exposure to air pollution can be substantially elevated near freeways and certain other facilities such as ports, rail yards, and distribution centers. Specifically, the document focuses on risks from emissions of DPM, a known carcinogen, and establishes recommended siting distances of sensitive receptors. With respect to freeways, the a recommendation of the report is to: "Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with more than 100,000 vehicles per day, or rural roads with 50,000 vehicles/day."[16] CARB notes that these recommendations are advisory and should not be interpreted as defined "buffer zones," and that local agencies must balance other considerations,

[16] California Air Resources Board, 2005. *Air Quality and Land Use Handbook: A Community Health Perspective.* April 2005. p. 4.

including transportation needs, the benefits of urban infill, community economic development priorities, and other quality of life issues. CARB's position is that with careful evaluation of exposure, health risks, and affirmative steps to reduce risk where necessary, infill development, mixed use, higher density, transit-oriented development, and other concepts that benefit regional air quality can be compatible with protecting the health of individuals at the neighborhood level.

Local

Sacramento Metropolitan Air Quality Management District

The SMAQMD is the regional agency responsible for air quality regulation within the SVAB. The SMAQMD regulates air quality through its planning and review activities and has permit authority over most types of stationary emission sources and can require operators of stationary sources to obtain permits, can impose emission limits, set fuel or material specifications, and establish operational limits to reduce air emissions. The SMAQMD regulates new or modified stationary sources of TACs.

For state air quality planning purposes, Sacramento County is classified as a severe non-attainment area for ozone. The "severe" classification triggers various plan submittal requirements and transportation performance standards. In order to demonstrate the District's ability to eventually meet the federal ozone standards, the SMAQMD, along with the other air districts in the nonattainment area, maintains the region's portion of the SIP for ozone. The Sacramento Air Basin's part of the SIP is a compilation of regulations that govern how the region and State will comply with the FCAA requirements to attain and maintain the federal ozone standard. The compilation of rules that comprises the Sacramento Nonattainment Area's portion of the SIP is contained in the Sacramento Area Regional Ozone Attainment Plan. Prior to the certification of the 2007 RSP EIR, the latest update SIP was adopted by the SMAQMD on January 26, 2006. Since then, the SMAQMD has made numerous SIP revisions. The latest revisions made to the SIP include the *Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan (2013 SIP Revisions)*,[17] which addresses attainment of the federal 8-hour ozone standard, as well as the *2009 Triennial Report and Plan Revision*,[18] which addresses attainment of the state ozone standard, are the latest plans issued by the SMAQMD.

These attainment plans depend heavily on the SMAQMD's permit authority, which is exercised through SMAQMD's rules and regulations. With respect to the construction phase of the Proposed Project, the applicable SMAQMD regulations would relate to construction and stationary equipment, particulate matter generation, architectural coatings, and paving materials. Equipment used during Proposed Project construction would be subject to the requirements of SMAQMD Regulation 2 (Permits), Rule 201 (General Permit Requirements); Regulation 4 (Prohibitory Rules), Rule 401 (Ringelmann Chart/Opacity), Rule 402 (Nuisance), Rule 403 (Fugitive Dust),

[17] Sacramento Metropolitan Air Quality Management District, 2013. *Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan (2013 SIP Revisions)*. September 26, 2013.

[18] Sacramento Metropolitan Air Quality Management District, 2009. *2009 Triennial Report and Plan Revision*. December 2009.

Rule 404 (Particulate Matter), Rule 405 (Dust and Condensed Fumes), Rule 411 (Boiler NOx), Rule 420 (Sulfur Content of Fuels), Rule 442 (Architectural Coatings), and Rule 453 (Cutback and Emulsified Asphalt Paving Materials).

City of Sacramento 2035 General Plan

The 2007 RSP EIR referred to the 1988 City of Sacramento General Plan (see page 6.1-14 of the 2007 RSP EIR), which at the time did not contain any goals or policies related to air quality. Since the publication of the 2007 RSP EIR, the City of Sacramento has updated its general plan to include goals and policies to minimize air quality impacts. The following goals and policies from the *2035 General Plan*[19] are relevant to air quality.

Goal ER 6.1 Improved Air Quality. Improve the health and sustainability of the community through improved regional air quality and reduced greenhouse gas emissions that contribute to climate change.

Policies

ER 6.1.1 **Maintain Ambient Air Quality Standards.** The City shall work with the CARB and the SMAQMD to meet State and Federal ambient air quality standards.

ER 6.1.2 **New Development.** The City shall review proposed development projects to ensure projects incorporate feasible measures that reduce construction and operational emissions for reactive organic gases, nitrogen oxides and particulate matter (PM_{10} and $PM_{2.5}$) through project design.

ER 6.1.3 **Emissions Reduction.** The City shall require development projects that exceed SMAQMD ROG and NOx operational thresholds to incorporate design or operational features that reduce emissions equal to 15 percent from the level that would be produced by an unmitigated project.

ER 6.1.4 **Sensitive Uses.** The City shall coordinate with SMAQMD in evaluating exposure of sensitive receptors to toxic air contaminants, and will impose appropriate conditions on projects to protect public health and safety.

ER 6.1.10 **Coordination with SMAQMD.** The City shall coordinate with SMAQMD to ensure projects incorporate feasible mitigation measures if not already provided for through project design.

ER 6.1.13 **Zero-Emission and Low-Emission Vehicle Use.** The City shall encourage the use of zero-emission vehicles, low-emission vehicles, bicycles and other non-motorized vehicles, and car-sharing programs by requiring sufficient and convenient infrastructure and parking facilities in residential developments and employment centers to accommodate these vehicles.

All proposed projects would be consistent with policies ER 6.1.1, ER 6.1.2, and ER 6.1.3 because each would implement all recommended SMAQMD mitigation measures during construction and operational, and comply with the SMAQMD's 15 percent emission reduction/mitigation guideline through the preparation of the Air quality Mitigation Plan. Also, the proposed projects would include residential units and/or other mixed-use development that would have access to transit and would not need to rely solely on automobile travel. All of the proposed projects would be energy efficient by exceeding Title 24 energy standards and would encourage the use of zero-emission and low emission vehicle use such as non-motorized vehicles or car-sharing programs, therefore all proposed projects would be consistent with policy ER6.1.13.

[19] City of Sacramento, 2009. *City of Sacramento 2030 General Plan.* Adopted March 3, 2009.

Sacramento Central City Community Plan

The City's *Central City Community Plan*[20] does not contain goals and policies specific to air quality.

4.2.3 Analysis, Impacts, and Mitigation

Significance Criteria

For purposes of this SEIR, impacts related to air quality may be considered significant if the proposed project would result in the following:

- Result in short-term (construction) emissions of NOx above 85 pounds per day;
- Result in short-term (construction) emissions of PM_{10} above zero pounds per day without implementation of all best management practices and above 80 pounds per day or 14.6 tons per year after implementation of all best management practices;
- Result in short-term (construction) emissions of $PM_{2.5}$ above 0 pounds per day without implementation of all best management practices and above 82 pounds per day or 15.0 tons per year after implementation of all best management practices;
- Result in long-term (operational) emissions of NOx or ROG above 65 pounds per day;
- Result in long-term (operational) emissions of PM_{10} above 0 pounds per day without implementation of all best management practices and above 80 pounds per day or 14.6 tons per year after implementation of all best management practices;
- Result in long-term (operational) emissions of $PM_{2.5}$ above 0 pounds per day without implementation of all best management practices and above 82 pounds per day or 15.0 tons per year after implementation of all best management practices;
- Result in CO concentrations that exceed the 1-hour state ambient air quality standard (i.e., 20.0 ppm) or the 8-hour state ambient standard (i.e., 9.0 ppm);
- Create objectionable odors affecting a substantial number of people;
- TAC exposures create a lifetime cancer risk exceeding 10 in 1 million for stationary sources, or substantially increase the lifetime cancer risk as a result of increased exposure to TACs from mobile sources.
- The project could cause substantial ground-level winds, resulting in hazardous conditions for pedestrians.

[20] City of Sacramento, 2015. *Central City Community Plan*. Adopted March 3, 2015.

The proposed project's significance criteria, listed above, are consistent with those assessed under the 2007 RSP with the exception of the SMAQMD's recently established PM_{10} and $PM_{2.5}$ operation and construction thresholds. In June 2015, the SMAQMD updated its CEQA Guidance with new PM_{10} and $PM_{2.5}$ thresholds, which were not evaluated in the 2007 RSP EIR.

Development that causes a hazardous wind environment for pedestrians in public areas of substantial pedestrian use would be considered to cause a significant adverse environmental impact. A hazardous wind environment is defined as a pedestrian-level wind speed – a mean speed adjusted to include the adverse effects of wind turbulence – that exceeds 36 mph for more than one hour per year. If a proposed development has the potential to create a hazardous wind environment, the recommended preventive and mitigation measures shall be implemented to prevent or reduce the severity of the significant impact.

Methodology and Assumptions

Air quality emissions from construction and operation of the RSPU and other proposed projects in the RSP Area could result in significant impacts. Construction emissions would affect local particulate and ozone (ROG and NOx) concentrations, primarily due to fugitive dust sources and diesel exhaust. Project operations would increase emissions from motor vehicle trips and on-site stationary sources such as emergency backup generators and boilers. Other operational sources include fuel combustion associated with landscaping activities, space and water heating in buildings, and the use of consumer products. The air quality section individually analyzes the air impacts from the RSPU, RSPU Land Use Variant, KP Medical Center, MLS Stadium, and Stormwater Outfall.

Much of the methodology and assumptions described in this section are similar to those used in the previous 2007 RSP EIR. However, this section evaluates land uses designations that were not evaluated under the previous 2007 RSP EIR. These include the KP Medical Center, the MLS Stadium, and the Stormwater Outfall. The 2007 RSP used the Urban Emissions Model (URBEMIS) 2002 version to estimate emissions. SMAQMD now recommends that CalEEMod be used to estimate project emissions. Consequently, the latest CalEEMod version 2013.2.2 was used to estimate construction and operational emissions for the projects analyzed in this SEIR.

Construction Impacts

The proposed RSPU would allow for construction of 6,000 – 10,000 residential units, 3,857,027sf of office uses, 510,000 sf of medical office uses, 718,003 sf of hospital facilities, 514,270 sf retail uses, 771,405 flexible mix uses, a 25,000-capacity MLS Stadium, a 1,100-room hotel, 485,390 sf of historic and cultural uses, and 30 acres of open space. The only existing structures onsite are the Central Shops structures, the historic Depot, and the train platforms. These structures will remain. Several of the surface streets within the RSP Area have already been completed, which includes 7th Street, 6th Street and 5th Street south of Railyards Boulevard, and Railyards Boulevard west of 7th Street.

CalEEMod was used to determine if emissions of criteria air pollutants would exceed SMAQMD's applicable regional significance thresholds. Modeling was based on project-specific construction estimates for the KP Medical Center, MLS Stadium, and Stormwater Outfall. For this analysis, it is conservatively assumed that the construction of the KP Medical Center, MLS Stadium and developments proposed under the RSPU would overlap. Project-specific information was not available for construction of the full RSPU or Land Use Variant. Consequently, reasonable assumptions and default CalEEMod settings were used to estimate criteria air pollutant and ozone precursor emissions. The CalEEMod default values used in this analysis are found in Appendix A and B of the CalEEMod user guide, which include quantity, horsepower, and load factors of off-road equipment, and typical construction phasing.[21]

Railyards Specific Plan Update and Land Use Variant

For modeling purposes, construction of the proposed RSPU and the Land Use Variant is assumed to occur in five phases commensurate with phases assumed in the CalEEMod model: site preparation, grading, building construction, paving, and architectural coating (i.e., application of paint and other finishes). The only structures onsite are the existing railyard buildings and there would be no demolition required. Construction was assumed to occur over 19 years starting in 2016. However, construction of residential units and commercial buildings would be built incrementally as warranted by market conditions. Appendix C.1 of this SEIR includes the CalEEMod input and output files used for this analysis.

Approximately 750,000 cubic yards (cy) of earth would be imported to the project site, an average of 2,055 cy per day for 365 days. Assuming haul trucks would be filled to full capacity and can hold 14 cy of soil per round trip, the import of clean soil to the project site for grading would equate to 294 round trips per day. Employee trips and vendor round trips are based on CalEEMod default assumptions.

KP Medical Center

The proposed KP Medical Center is assumed to be constructed in two separate phases. The first phase would include construction of a 658,000 sf in-patient hospital building, an adjacent 210,000 sf hospital support building (HSB), and a 1,500 space parking structure. This first phase also includes a 60,000 sf Central Utility Plant (CUP) and a helistop pad. Phase 1 is anticipated to begin construction in 2018 and be open to the public in 2022.

The second phase would include construction of two 150,000 sf medical office buildings, a 1,500 space parking garage, and minor changes to the interior of the CUP in order to provide energy to the phase two buildings. Phase 2 is expected to be initiated no sooner than ten years after completion of Phase 1. There would be no expansion in overall space at the CUP and no change to the footprint of the structure. Phases one and two would be constructed over a period of approximately 2.5 and 1.5 years, respectively. **Table 4.2-6** shows the assumed construction

[21] ENVIRON International Corporation and the California Air Districts, 2013. CalEEMod User's Guide. Available: http://www.caleemod.com/. Accessed March 15, 2016.

phasing for the KP Medical Center. CalEEMod was used to estimate construction-related emissions from construction of the KP Medical Center. Appendix C.1 includes the CalEEMod input and output files.

TABLE 4.2-6.
KP MEDICAL CENTER
CONSTRUCTION PHASING AND DURATION

Phasing	Duration (days)
Phase 1	
Site Preparation	25
Grading	75
Building Construction	750
Paving	50
Architectural Coating	50
Phase 2	
Site Preparation	10
Grading	30
Building Construction	300
Paving	20
Architectural Coating	20

SOURCE: Kaiser Permanente, 2015. Kaiser Dublin Construction Assumptions

MLS Stadium

Construction of the proposed MLS Stadium would take 1.5 years. Construction would start once a soccer team has been awarded to Sacramento by Major League Soccer. Depending on the timing of this event, construction could start as early as fall 2016 and would conclude in early 2018. **Table 4.2-7** shows the assumed construction phasing and duration of the Stadium. CalEEMod was used to determine whether construction-related emissions of criteria air pollutants associated with the construction of the proposed MLS Stadium would exceed SMAQMD's applicable regional significance thresholds. Appendix C.1 includes CalEEMod modeling input and output files for the Stadium.

TABLE 4.2-7.
SACRAMENTO MLS STADIUM
CONSTRUCTION PHASING AND DURATION

Phasing	Duration
Grading	15 days
Dewatering	1 month
Foundations/Footings	2months
Building Construction	11 months
Sitework/Landscaping/paving	15 days

SOURCE: Legends, 2015

Stormwater Outfall

The proposed Stormwater Outfall would result in a brief construction duration and minimal ground disturbance. Although the timing of construction of the Stormwater Outfall is unknown at this time, it was assumed that construction would occur in 2017 and last thirty days. The proposed Stormwater Outfall structure would be 135 feet long and 40 feet wide, most of which would be located underground and located under the I-5 viaduct immediately south of Railyards Boulevard. The CalEEMod software was used to estimate the maximum daily NOx, PM_{10} and $PM_{2.5}$ emissions associated with Stormwater Outfall construction and model output data and assumptions are included in Appendix C.1.

Operational Impacts

In a change since the certification of the 2007 RSP EIR, the California Supreme Court recently found that "agencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future users or residents." In *California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal. 4th 369, the Supreme Court explained that an agency is only required to analyze the potential impact of such hazards on future residents if the project would exacerbate those existing environmental hazards or conditions. CEQA analysis is therefore concerned with a project's impact on the environment, rather than with the environment's impact on a project and its users or residents. Thus, because the projects would not substantially increase or otherwise affect the number of vehicle trips along I-5 or affect any nearby facilities that could emit objectionable odors, the City is not required to consider the effects of bringing a new population into an area where such TAC and odor emissions exist. Nonetheless, in order to provide a complete picture of how the effects of the proposed projects compare to the effects that were disclosed in the 2007 RSP EIR, these impacts are addressed below (see specifically Impact 4.2-5 and Impact 4.2-11).

Operation of the proposed projects would increase emissions of ozone precursors (ROG and NOx), PM_{10} and $PM_{2.5}$ from vehicle trips, area sources (landscape maintenance, consumer products such as hairsprays, deodorants, and cleaning products), and energy sources (e.g., natural gas combustion for space and water heating, natural gas combustion in boilers, and diesel fuel combustion in backup generators).

CalEEMod was used to estimate vehicle, area and energy use emissions associated with the RSPU, RSPU Land Use Variant, KP Medical Center, MLS Stadium and Stormwater Outfall. For on-road vehicles, emissions were calculated using CalEEMod default trip rates and trip lengths. A separate CalEEMod run was used to adjust CalEEMod's default vehicle miles travelled (VMT) to match the VMT data provided by Fehr & Peers (presented in section 4.12, Transportation). The operational emissions were estimated for 2035, the year assumed for buildout in this analysis.

Stationary sources include one backup diesel generator for the Stormwater Outfall, five diesel generators at the KP Medical Center, and one generator at the MLS Stadium. The KP Medical Center will also operate four boilers to generate steam and hot water. They also include four boilers

for the hospital. Generator and boiler emissions were estimated using emission factors found in AP-42 and power outputs (e.g., horse power, BTU's) from the project applicants.

The Aviation Environmental Design Tool (AEDT), Version 2B, was used to quantify helicopter pollutant emissions from the proposed helistop at the KP Medical Center. The AEDT is the FAA-approved noise model for quantifying aircraft criteria pollutant emissions. To estimate emissions, the model requires information specific to the helistop, including the total number of helicopter operations, the flight paths that would be used to access and depart the helistop, the specific helicopter types, and the time of day at which the operations would occur. The characteristics of the KP Medical Center helistop operations were obtained from the *Initial Assessment of Helicopter Flight-Track for Kaiser Permanente's Scope of Work.*[22]

Appendix C.1 includes additional information and modeling results.

Localized CO Concentrations

CO concentration levels are highest near crowded or congested intersections where traffic is slow or idling. The proposed projects would increase traffic volumes on surrounding roadways, degrading the existing level of service (LOS) and increasing CO concentrations at nearby intersections. According to the SMAQMD, a project would not result in a significant CO impact if one of following tiers is met:[23]

First Tier

The proposed projects would result in a less-than-significant impact to air quality for local CO if:

- Traffic generated by the proposed project will not result in deterioration of intersection level of service (LOS) or LOS E or F; and

- The project will not contribute additional traffic to an intersection that already operates at LOS E or F.

Second Tier

If all of the following criteria are met, the proposed projects would result in a less-than-significant impact to air quality for local CO.

- The projects would not result in an affected intersection experiencing more than 31,600 vehicles per day;

[22] Flight Safety Institute, 2015. *Initial Assessment of Helicopter Flight-Track for Kaiser Permanente's Scope of Work.* August 28, 2015.

[23] South Coast Air Quality Management District, 2015. *The CEQA Guidance.* Available: http://www.airquality.org/ceqa/ceqaguideupdate.shtml. December 2009.

- The projects would not contribute traffic to a tunnel, parking garage, bridge underpass, urban street canyon, or below-grade roadway; or other locations where horizontal or vertical mixing of air will be substantially limited; and

- The mix of vehicle types at the intersection is not anticipated to be substantially different from the County average (as identified by the EMFAC or CalEEMod models).

The CALINE4 dispersion model is the preferred method of estimating CO pollutant concentrations at sensitive land uses near congested roadways and intersections. For each intersection analyzed, CALINE4 uses traffic volumes, CO emission rates, and receptor locations to estimate peak hour CO concentrations. For this analysis, CO concentrations were calculated based on a simplified CALINE4 screening procedure and CO emissions rates for Sacramento County from the California Air Resources Board's Emissions Factors (EMFAC) 2014 model. The model is used to identify potential CO hotspots. The modeling methodology assumed worst-case conditions to provide a maximum, worst-case CO concentration. To ensure that an adequate margin of safety was used, the highest 1-hour and 8- hour CO readings from Sacramento County were used as the background concentration. Year 2016 and 2035 was selected for the baseline and cumulative analysis, respectively, in order to generate conservative emission factors and emission estimates. Appendix C.1 contains the CO modeling results.

Air Quality Mitigation Plan

SMAQMD has developed guidance to mitigate operational emissions for projects subject to the California Environmental Quality Act.[24] SMAQMD's guidance recommends that project applicants prepare an Air Quality Mitigation Plan (AQMP) for all projects that exceed SMAQMD's operational significance thresholds of 65 pounds per day for ROG and/or 65 pounds per day for NO_x.

If a project exceeds these thresholds, mitigation must be identified to reduce on-road mobile source emissions by 15 percent if the project is within the current State Implementation Plan (SIP), or by 35 percent if not within the SIP. Since the proposed projects are included within the SIP, the 15 percent reduction applies to these projects.

The following steps were used to determine if the proposed project meets the 15 percent reduction goal. The first step involves estimating total unmitigated ROG and NOx emissions using CalEEMod default values. Since this project includes a traffic analysis, the second step involves estimating mitigated ROG and NOx emissions using CalEEMod but adjusted for the VMT estimates included in Section 4.12, Transportation. Then, the decrease in ROG and NO_x mobile source emissions between unmitigated and mitigated is calculated, and the difference is converted to NO_x equivalents or NO_xe. NO_xe is the sum of NO_x reductions plus one-third of ROG

[24] Sacramento Metropolitan Air Quality Management District. *Recommended Guidance for Land Use Emission Reductions, Version 3.2 (for Operational Emissions)*. Available: http://www.airquality.org/ceqa/RecommendedGuidanceLandUseEmissionReductions.pdf. Accessed April 14, 2015.

reductions. If the project meets the 15 percent NO_xe reduction goal, it is considered consistent with the SIP and other resent SMAQMD air quality management plans. Appendix C.2 includes additional information and modeling results.

Toxic Air Contaminants and Health Risk Assessment

A health risk assessment (HRA) was conducted to evaluate the cancer risks and non-cancer related health effects associated with exposure to TACs emitted by the proposed projects (see also Appendix C.3). Health risks from TACs are a function of the concentration of emissions and the duration of exposure. Cancer risks are evaluated based on 30-year exposure, whereas non-cancer health risks include adverse health effects from both acute (highest 1-hour and/or 8-hour concentration, depending on the TAC) and chronic (average annual) exposure. The HRA methods are designed to estimate the highest possible, or "upper bound" risks to the most sensitive members of the population (i.e., children, elderly, infirm), as well as those that are potentially exposed to TACs on a routine and prolonged basis (i.e., residents). The HRA was conducted in accordance with technical guidelines developed by federal, state, and regional agencies, including the Sacramento Metropolitan Air Quality Management District, California Environmental Protection Agency (CalEPA) and the California Office of Environmental Health Hazard Assessment (OEHHA) *Air Toxics Hot Spots Program Guidance*.[25,26]

The primary TACs during construction would be DPM from construction equipment exhaust. DPM exhaust is a complex mixture of thousands of gases and fine particles commonly known as soot. Although construction activities within the proposed project sites could be ongoing incrementally for several years, construction within the RSP Area would be intermittent and occur in different areas for varying durations. TAC emissions would be spread out geographically over time, reducing exposure at any individual sensitive receptor. Based on guidance from the SMAQMD, the health risk resulting from exposure to DPM emissions from construction equipment was evaluated qualitatively.[27]

A health risk evaluation was conducted to evaluate the operational effects of area and stationary sources. Area sources include chemicals used by the hospital for various functions including sterilization, medication preparation, and surgical procedures. Stationary sources include emergency diesel backup generators and onsite boilers. Diesel backup generators would be located at the Stormwater Outfall, the KP Medical Center, and at the MLS Stadium. The KP Medical Center would also operate natural gas-fired boilers. For the area sources, the chemicals used in the hospital are evaluated qualitatively. For the stationary sources, air dispersion modeling was conducted using the American Meteorological Society/Environmental Protection

25 Sacramento Metropolitan Air Quality Management District, 2011. *Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways.* March 2011.

26 California Office of Environmental Health Hazard Assessment, 2015. *Air Toxics Hot Spots Program Guidance*, February 2015.

27 Philley, Paul, Huss, Karen, Dubose, Rachel, 2015. Meeting with Paul Philley, Karen Huss, Rachel Dubose with SMAQMD and Brian Boxer, Tim Rimpo, Matt Fagundes and Stan Armstrong to discuss the Air Quality Section of the Railyards SEIR. November 30, 2015.

Agency Regulator Model (AERMOD). AERMOD is a steady-state, multiple-source, Gaussian dispersion model. AERMOD is the U.S. EPA's regulatory dispersion model specified in the Guideline for Air Quality Methods (Code of Federal Regulations, Title 40, Part 51, Appendix W).

In addition to the stationary sources described above, SMAQMD's roadway protocol was used to evaluate the potential health risks from diesel vehicles traveling on I-5.[28] Due to the high traffic volumes on I-5 and locations of future residences to be located near I-5, a detailed site-specific analysis was conducted using AERMOD. Based on recommendations from SMAQMD, DPM from trains was not included in the analysis.

The AERMOD model was used to estimate the highest hourly and annual concentrations of toxic air contaminants (TACs) at future residential locations. These concentrations were then converted to acute, chronic, and carcinogenic health risks using the most recent guidance issued by the California Office of Environmental Health Hazard Assessment (OEHHA). The health risk results should not be interpreted as actual expected rates of cancer or other potential health effects, but rather as estimates of potential risk or likelihood of adverse effects based on current knowledge, under a number of highly conservative assumptions and the best assessment tools currently available.[29]

Odors

An odor analysis typically evaluates the potential for a project to generate odors and for the project to be affected by odors from nearby sources of odors. General land uses to be developed under the proposed RSPU are not generally considered sources of substantial odors. Consequently, the focus of the odor analysis is on the potential for existing sources of odors to affect future occupants.

Potential odor impacts were evaluated by examining the distances from existing odor sources to residential receptors in the RSP Area. The analysis also considers existing odor complaints, prevailing wind direction, and policies designed to minimize odor impacts. Odor sources typically include industrial land uses, such as fiberglass manufacturing, coating operations, foundries, refineries, sewage treatment plants, landfills, and recycling facilities.

Wind and Microclimate

Previous Wind Tests

The assessment of wind effects for the proposed projects was based on prior wind tunnel testing that has been conducted on buildings in downtown Sacramento. The wind-tunnel tests performed to assess the wind effects of development in Sacramento include: the R Street Corridor wind test for the Capitol Center Golden State Tower, the Environmental Protection Agency (EPA) building

[28] Sacramento Metropolitan Air Quality Management District, 2009. Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways Version 2.1. January 2009.

[29] Office of Environmental Health Hazard Assessment, 2015. Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments. February 2015.

on I and 10th streets, a proposed mixed-use building on J and 8th streets, and a proposed mixed-use building on 14th and L streets. Pedestrian-level wind speeds were measured at selected points for the proposed project sites as they existed, and then with the project to quantify resulting pedestrian-level winds in nearby public spaces at each stage of development.

The results from these wind tests, and the physical similarities to other areas downtown, provide a resource for characterizing the wind environment downtown and also provide understanding of the wind environment expected at the RSP Area.

All four projects listed above were tested at the Atmospheric Boundary Layer Wind Tunnel at the University of California, Davis, under the direction of Bruce White, PhD. These wind tests, however, were performed independent of the University. Scaled models of each project were wind-tunnel tested for the major wind regimes judged likely to result in the worst case with respect to pedestrian level effects. The results of the measurements taken during the wind-tunnel tests were analyzed using the comfort and hazard criterion for pedestrians established, discussed below.

A wind test was conducted for the R Street Corridor / California Capitol Center / Golden State Tower EIR, an analysis of the 24-block corridor infrastructure and the two projects that proposed constructing three high-rise towers that ranged 29- to 39-stories along Q and R streets, between 3rd and 5th streets, as well as a 20-story tower at Q and 7th streets. The R Street Corridor wind test measured wind speeds at locations in or near the 24-block corridor under the existing setting and the proposed project setting for two wind directions – northwest and west-southwest. Unlike the subsequent wind tests discussed here, these two wind directions were chosen for this test because they are at right angles to each other and move nearly diagonally to the R Street Corridor street grid. Therefore, the northwest and southwest winds were expected to reveal more about any adverse wind effects of the structures.[30] The results showed that for the west southwest winds, wind speeds would not increase from existing to project any higher than a moderate speed of 13 to 18 mph wind speed exceeded 10% of the time. For the northwest winds, the existing wind speeds increased from the previously moderate speeds to moderately high speeds above 18 mph wind speed exceeded 10% of the time. Because these results are based on data for predominant wind directions, these results apply to considerations of wind comfort, but they may not be able to identify wind hazard locations that may have existed in some of these test scenarios.

The mixed-use project on J and 8th streets was the tallest among the projects that were previously wind-tunnel tested. The project was tested in 2003 and was a proposed 33-story, 435-ft. tall building at a site approximately four blocks southeast of the RSPU Area. The results from the wind-tunnel test showed locations where winds up to 3 mph greater than the establish 13 mph comfort criteria were exceeded, with an average wind speed of 12.4 mph with the 33-story project

[30] Subsequent analyses and wind tests showed that other wind directions with high wind speed components needed to be included in wind tests for Sacramento buildings to obtain an accurate estimate of the occurrence of wind hazards at pedestrian levels.

in place. The results also showed locations where the wind hazard criteria were exceeded. Similar results were seen for the 1997 EPA project, which is an approximately 350- to 400-foot building. The established wind comfort criterion was exceeded at some pedestrian locations and the overall average wind speed was 11.1 mph with the EPA building in place. The wind test also showed locations where the hazard criterion was exceeded. The project tested at 14th and L streets was a 15-story building and was wind-tunnel tested in 2002. The wind speeds for this project were fairly calm, and were below the 13 mph comfort criterion.

Test Models and Wind Testing Protocols

A 1 inch equals 50 feet scale model of the project and surrounding several blocks was constructed in order to simulate the project and its existing context. The scale model was then tested in a Boundary Layer wind tunnel at the University of California, Davis, under the direction of Dr. Bruce White. These tests, however, were performed independent of the University.

Wind-tunnel testing of the project simulated winds from the north-northeast (NNE), northwest (NW), south-southwest (SSW) and south-southeast (SSE) wind directions. These directions were selected for testing because they represent the major wind regimes, or are relatively frequent or particularly strong, or were judged likely to result in the worst case with respect to pedestrian level effects for this project.

Wind Evaluation and Acceptance Criteria

The City of Sacramento has not established criteria for determining the acceptability of wind conditions that might exist. The City of San Francisco, however, has established such criteria. The San Francisco Planning Code establishes wind comfort criteria: 7 mph equivalent wind speeds for public seating areas and 11 mph equivalent wind speeds for areas of substantial pedestrian use. These levels may be exceeded no more than 10 percent of the time. In addition, San Francisco established a wind hazard criterion, which also is used there as an indicator of significant adverse environmental impact. In the San Francisco Planning Code, an average speed of 26 mph for a full hour is defined to be a wind hazard condition. Given the differences in the ways their criteria are defined, the hazard criterion is equal to a 36-mph wind when restated to the same basis as the 7-mph and 11 mph comfort criteria. The San Francisco wind comfort criteria should not be applied directly to Sacramento conditions, primarily because the climates of the two cities are quite different. Sacramento's hot and sunny summer weather makes some wind desirable, and discomfort due to no wind is probably more frequent than discomfort due to too much wind. The San Francisco hazard criterion, however, can be used as an indicator of pedestrian safety, so is useful here. The evaluation criteria have been considered separately here in defining impacts for each wind direction. For each wind direction, a wind speed of 13 mph, not exceeded more than 10 percent of the time, is considered a pedestrian comfort criterion. A wind speed exceeding the 13-mph pedestrian comfort criterion is considered to be a significant impact. In addition, those winds that would cause a hazard condition are considered to be a significant adverse impact.

Southwest (SW) winds are most frequent and strongest on average in the summer when temperatures are warm. Although soft winds can be pleasant in the heat of the summer, even these winds begin to become uncomfortable when the velocity exceeds 13 mph. A wind speed of 13 mph, not exceeded more that 10% of the time, is the threshold of pedestrian comfort for SW winds.

Discomfort due to north-northeast (NNE) winds would occur in winter, since it is the cold air that causes discomfort a more stringent wind criterion is appropriate. However, winter is not a time of the year that individuals would usually consider sitting outside. For that reason, the same criterion, a wind speed of 13 mph, not exceeded more than 10% of the time, is the threshold of pedestrian comfort for NNE winds.

The third important wind direction in Sacramento is south-southeast (SSE). This is a winter storm wind direction. Since winds from this direction often occur with clouds and rain outdoor, comfort is unlikely to be determined by wind, since all outdoor areas would be already uncomfortable due to rain and/or cold.

For all directions, the threshold of pedestrian comfort has been set at winds exceeding 13 mph exceeded more than 10% of the time and the significance for wind hazards has been set at winds exceeding 36 mph, which is considered a potentially wind hazard speed, for effectively more than one hour per year. These criteria apply only to winds that occur in areas that are accessible to the public.

Impacts and Mitigation Measures

Impact 4.2-1: The proposed projects could conflict with or obstruct implementation of an applicable air quality plan.

Railyards Specific Plan Update

The *Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan (2013 SIP Revisions),*[31] which addresses attainment of the federal 8-hour ozone standard, and the *2015 Triennial Report and Plan Revision,*[32] are the latest plans issued by the SMAQMD, which incorporate land use assumptions and travel demand modeling from the Sacramento Area Council of Governments (SACOG). To determine compliance with the applicable air quality plan, the SMAQMD recommends comparing the project to the SACOG growth projections included in the *Metropolitan Transportation Plan/Sustainable Communities Strategy* (MTP/SCS),[33] a comparison of the project's projected vehicle-miles travelled (VMT) and population growth rate.

[31] Sacramento Metropolitan Air Quality Management District, 2013. *Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan (2013 SIP Revisions).* September 26, 2013.

[32] Sacramento Metropolitan Air Quality Management District, 2009. *2009 Triennial Report and Plan Revision*. December 2009.

[33] Sacramento Area Council of Governments, 2016. *Metropolitan Transportation Plan/Sustainable Communities Strategy*. Adopted February 18, 2016.

The 2016 MTP/SCS assumes 9,900 housing units and 6,500 jobs in the Railyards development by 2036.[34]

Development of the RSPU would result in between 6,000 to 10,000 multi-family residential dwelling units, and up to approximately 22,903 jobs as a result of the non-residential development, which would consist of 15,142 office jobs, 2,263 retail jobs, 120 historic and cultural museum jobs, 1,100 hotel jobs, and 4,247 jobs at the proposed KP Medical Center, and 30 permanent jobs at the proposed MLS Stadium. While SACOG will make the final determination of consistency with the SCS, the land uses provided for in the proposed RSPU would be consistent with the growth forecast assumptions of the MTP/SCS, and are consistent with the general land use, density, and intensity of the Center and Corridor Community type identified in the MTP/SCS.

Although the RSPU would be consistent with the SACOG 2016 MTP/SCS, as discussed in Impact 4.2-3 below (see Tables 4.2-20 and 4.2-21), after full-buildout of the RSPU unmitigated operational emissions would generate ROG and NOx emissions that would exceed the threshold of 65 pounds per day and would be considered significant for CEQA purposes. If not mitigated, the pollutant emissions generated during future operations of the RSPU could conflict with or obstruct implementation of applicable air quality plans.

Mitigation Measure 6.1-3 (on page 6.1-24 of the 2007 RSP DEIR) required the applicant to develop an Air Quality Mitigation Plan (AQMP) demonstrating that the project can reduce onsite ozone emissions (ROG and NOx) by 15 percent or more, subject to the approval of the SMAQMD. The Railyards Final Air Quality Mitigation Plan achieved the required reduction through identification and commitment to a series of mitigation measures, each of which is assigned a point value representing the approximate percentage reduction in emissions.[35] The emission reduction measures are organized into the following categories:

- Bicycle, Pedestrian and Transit;
- Parking;
- Commercial Building Design;
- Residential Development;
- Mixed Use;
- Building Components; and
- Transportation Demand Management (TDM) measures.

[34] Lizon, Kacey, Planning Manager, Sacramento Area Council of Governments. Telephone communication with Christina Erwin of ESA. April 8, 2016.

[35] Thomas Enterprises, The Railyards-Final Air Quality Mitigation Plan, prepared by Jones & Stokes, November 9, 2007.

The AQMP identified the measures shown in **Table 4.2-8** to achieve the 15 percent onsite emission reducing required by SMAQMD.

TABLE 4.2-8.
2007 AQMP APPLICABILITY TO RSPU

2007 AQMD Measure	Applicability to the Proposed RSPU and RSPU Land Use Variant
1. Bike Parking	This measure is included as part of the proposed RSPU and is also required by the CAP.
4. Proximity to Bike Path/Bike Lanes	This measure is included as part of the proposed RSPU and is also required by the CAP.
5. Pedestrian Network	This measure is included as part of the proposed RSPU and is also required by the CAP.
6. Pedestrian Barriers Minimized	This measure is included as part of the proposed RSPU and is also required by the CAP.
7. Bus and Transit Service	This measure is included as part of the proposed RSPU and is also required by the CAP.
9. Traffic Calming	This measure is included as part of the proposed RSPU and is also required by the CAP.
10a. Employee and/or Customer Parking	Most parking for non-employees/residents would be charged at a rate at least equal to the cost of a Sacramento Regional Transit pass plus 20%.
14. Off Street Parking	Most parking structures would wrapped by other uses or screened from ground level views. Parking structures on parcels under I-5 and adjacent to the elevated portions of 5th and 6th streets may be exceptions.
18. Residential Density	This measures is included as part of the proposed RSPU and is also required by the CAP
19. Street Grid	The proposed RSPU meets the street grid requirements of the 2007 AQMP.
21. Affordable Housing Component	The proposed RSPU would comply with the Mixed Housing Ordinance for the City of Sacramento and is required to include approximately 267 deed restricted affordable housing units.
22. Urban Mixed-Use	The proposed RSPU would be consistent with the urban mixed-use requirements required in the 2007 AQMP.
25. No Fireplaces	The proposed RSPU would include no fireplaces or woodstoves and is consistent with the 2007 AQMP.
27. Energy Star Roof	All roofing materials used in the RSPU would comply with CALGreen energy efficiency standards. Following 2019 it is expected that requirements will be for zero net energy demand.
30. Solar Orientation	The proposed RSPU would be consistent with the requirement that at least 75% of buildings will be laid out in a north south grid that does not vary by more than 30% from N/S.

Source: ESA, 2016.

The proposed RSPU incorporates most of the measures that were included in the 2007 AQMP. In addition, changes in policies, regulations, and building standards have reduced direct and indirect emissions of new development (e.g., CALGreen, Title 24). Table 4.2-8, below, summarizes the measures from the 2007 AQMP and describes how they are being applied to the proposed RSPU.

The SMAQMD recommends that lead agencies require projects exceeding their daily thresholds of ROG and/or NOx reduce their ozone precursor emissions from transportation sources by 15 percent. This percentage is based on the project location within the Sacramento Urban Core, which is part of the Sacramento Area Ozone Implementation Plan (SIP). SMAQMD calculates this 15 percent using NO_{xe}, which is calculated by adding the mitigated ROG emissions (divided

by 3) to mitigated NOx emissions. Using the SMAQMD Recommended Guidance for Land Use Emission Reduction,[36] the percent reduction of NO_{xe} after mitigation for each proposed project that exceeds the SMAQMD significance threshold for ROG and NO_X are presented in **Table 4.2-9**.

TABLE 4.2-9.
PERCENT REDUCTION OF MOBILE EMISSIONS OF NO_Xe AFTER MITIGATION[1]

Alternative	Unmitigated Emissions (ppd)			Mitigated Emissions (ppd)			Percent Reduction	Exceed 15%?
	ROG	NO_X	NO_{Xe}[2]	ROG	NO_X	NO_{Xe}[2]		
RSPU (without MLS Match)	346	531	646	322	426	533	17%	Yes
RSPU (with MLS Match)	394	629	760	371	526	650	15%	Yes
RSPU Land Use Variant	358	535	654	336	439	551	16%	Yes

NOTES:

1. Operational emissions estimates for summertime conditions were made using CalEEMod 2013.2.2. See Appendix C.1 for details.
2. NOxe as defined by the SMAQMD is the reduction in ROG divided by 3 plus the reduction in NOX.

SOURCE: ESA, 2016

Because the proposed RSPU would facilitate the development of a high-density, mixed-use, transit-oriented development, combined with the effects of regular updates to Title 24 and the California Building Codes (including CALGreen), much of the reduction would be achieved by project design. Most of the selected measures listed above would not require monitoring beyond completion of project design and construction.

As shown in Table 4.2-9, the RSPU without an MLS match and the RSPU Land Use Variant would result in a 17 and 16 percent reduction in NO_{xe} emissions by simply implementing the design features proposed under the Railyards Specific Plan.[37] The RSPU with MLS match operation would result in a 15 percent reduction in NO_{xe} emissions after mitigation, respectively. All proposed projects would exceed the 15 percent emission reduction/mitigation guideline established by the SMAQMD.

Because the proposed RSPU would incorporate a majority of emission reduction measures that were proposed under the 2007 RSP AQMP, it would as proposed achieve the minimum 15 percent reduction in operational mobile source emissions estimated using the latest SMAQMD guidance. Since the proposed RSPU would be designed as a high-density, mixed-use, transit-oriented development, much of the reduction would be achieved by project design and location within the Sacramento urban core with access to a variety of transportation options. Thus, the proposed RSPU would be consistent with the land use parameters established for the RSP Area in the SACOG MTP/SCS and would incorporate provisions, similar to the 2007 AQMP, that would

[36] NOxe as defined by the SMAQMD is the reduction in ROG divided by 3 plus the reduction in NOx.

[37] NOxe as defined by the SMAQMD is the reduction in ROG divided by 3 plus the reduction in NOx.

reduce unmitigated emissions by at least 15 percent, this impact is considered **less than significant**.

Railyards Specific Plan Update Land Use Variant

The RSPU Variant would result in similar impacts as those discussed under the RSPU. Under the RSPU Land Use Variant, the KP Medical Center would be replaced with office land uses and the MLS Stadium would be replaced with residential units. Development of the RSPU Variant would result in between 7,000 to 10,000 multi-family residential dwelling units, and up to approximately 22,578 jobs, which would consist of 18,673 office jobs, 2,686 retail jobs, 120 historic and cultural museum jobs, and 1,100 hotel jobs. While SACOG will make the final determination of consistency with the SCS, the proposed RSPU Land Use Variant would be consistent with the growth forecast assumptions of the MTP/SCS, and are consistent with the general land use, density, and intensity of the Center and Corridor Community type identified in the MTP/SCS.

Although the RSPU Land Use Variant would be consistent with the SACOG 2016 MTP/SCS, as discussed in Impact 4.2-3 below (see Table 4.2-22), after full-buildout of the RSPU Land Use Variant, unmitigated operational emissions would generate ROG and NOx emissions that would exceed the threshold of 65 pounds per day and would be considered significant for CEQA purposes Because the Land Use Variant would incorporate a majority of emission reduction measures that were proposed under the 2007 RSP AQMP, it would as proposed achieve the minimum 15 percent reduction in operational mobile source emissions estimated using the latest SMAQMD guidance. Since the proposed RSPU would be designed as a high-density, mixed-use, transit-oriented development, much of the reduction would be achieved by project design and location within the Sacramento urban core with access to a variety of transportation options. Thus, the proposed RSPU would be consistent with the land use parameters established for the RSP Area in the SACOG MTP/SCS and would incorporate provisions, similar to the 2007 AQMP, that would reduce unmitigated emissions by at least 15 percent, this impact is considered **less than significant**.

KP Medical Center

The KP Medical Center includes a hospital facility, medical support office, clinic, and an energy center (central utility plant). At full buildout, the KP Medical Center would generate 4,247 jobs, which is based on information from other recently constructed Kaiser Permanente medical centers in northern California. While SACOG will make the final determination of consistency with the SCS, as part of the proposed RSPU the proposed KP Medical Center would be consistent with the growth forecast assumptions of the MTP/SCS, and would be consistent with the general land use, density, and intensity of the Center and Corridor Community type identified in the MTP/SCS.

Although the KP Medical Center would be consistent with the SACOG 2016 MTP/SCS, as discussed in Impact 4.2-3 below (see Table 4.2-23), after full-buildout of the KP Medical Center, unmitigated operational emissions would generate ROG and NOx emissions that would exceed the threshold of 65 pounds per day and would be considered significant for CEQA purposes

Because the proposed RSPU would incorporate a majority of emission reduction measures that were proposed under the 2007 RSP AQMP, it would as proposed achieve the minimum 15 percent reduction in operational mobile source emissions estimated using the latest SMAQMD guidance. Since the proposed KP Medical Center would be designed as a high-density, mixed-use, transit-oriented development, much of the reduction would be achieved by project design and location within the Sacramento urban core with access to a variety of transportation options. Thus, the KP Medical Center would be consistent with the land use parameters established for the RSP Area in the SACOG MTP/SCS and would incorporate provisions, similar to the 2007 AQMP, that would reduce unmitigated emissions by at least 15 percent, this impact is considered **less than significant**.

MLS Stadium

The proposed MLS Stadium would include a 25,000-capacity outdoor stadium on the north eastern side of the project site. The MLS Stadium would generate 30 permanent jobs onsite, including security, maintenance, grounds keeping, and ticket sales. In addition, the MLS Stadium would employ up to 280 temporary employees for a typical soccer match, and would additionally require an assortment of different staff, including ushers, food service employees, ticketing staff, security, and janitorial staff. For larger events, such as Tier I concerts, temporary event-related employment is estimated to be about 330. For medium-sized events, including MLS special games, CONCACAF/Cup matches, other soccer events, or Tier II concerts, temporary event-related employment would range from 200 to 225 jobs. For smaller community-scale events, about 70 temporary event jobs would be generated. While SACOG will make the final determination of consistency with the SCS, as part of the proposed RSPU the proposed MLS Stadium would be consistent with the growth forecast assumptions of the MTP/SCS, and would be consistent with the general land use, density, and intensity of the Center and Corridor Community type identified in the MTP/SCS.

Although the MLS Stadium would be consistent with the SACOG 2016 MTP/SCS, as discussed in Impact 4.2-3 below (see Tables 4.2-24 and 4.2-25), after full-buildout of the MLS Stadium unmitigated operational emissions would generate ROG and NOx emissions that would exceed the threshold of 65 pounds per day and would be considered significant for CEQA purposes. Because the proposed RSPU would incorporate a majority of emission reduction measures that were proposed under the 2007 RSP AQMP, it would as proposed achieve the minimum 15 percent reduction in operational mobile source emissions estimated using the latest SMAQMD guidance. Since the proposed MLS Stadium would be designed as a high-density, mixed-use, transit-oriented development, much of the reduction would be achieved by project design and location within the Sacramento urban core with access to a variety of transportation options. Thus, the proposed MLS Stadium would be consistent with the land use parameters established for the RSP Area in the SACOG MTP/SCS and would incorporate provisions, similar to the 2007 AQMP, that would reduce unmitigated emissions by at least 15 percent, this impact is considered **less than significant**.

Stormwater Outfall

There would be no employment, housing units, or population generated by the proposed Stormwater Outfall. Other than trips associated with maintenance and operation, the Stormwater Outfall would not increase daily VMT. As discussed in Impact 4.2-3 below, unmitigated operational emissions would generate ROG and NOx emissions that would not exceed the 65 pounds or more of NOx or 65 pounds or more of ROG per day and would be considered consistent with the latest air quality management plan issued by the SMAQMD. Therefore, the proposed Stormwater Outfall would not conflict with or obstruct implementation of applicable air quality plans and would result in **no impact**.

Summary

The RSPU, RSPU Land Use Variant, MLS Stadium and KP Medical Center would be consistent with the SACOG growth projections for the Railyards area. However, all of the proposed projects, with the exception of the Stormwater Outfall, would generate unmitigated operational emissions of ROG and NOx that would exceed the 65 pounds or more of NOx or 65 pounds or more of ROG per day and would be considered operationally significant for CEQA purposes Because the proposed projects would incorporate a majority of emission reduction measures that were proposed under the 2007 RSP AQMP, it would as proposed achieve the minimum 15 percent reduction in operational mobile source emissions estimated using the latest SMAQMD guidance. Since the proposed projects would be designed as a high-density, mixed-use, transit-oriented development, much of the reduction would be achieved by project design and location within the Sacramento urban core with access to a variety of transportation options. Thus, the proposed projects would be consistent with the land use parameters established for the RSP Area in the SACOG MTP/SCS and would incorporate provisions, similar to the 2007 AQMP, that would reduce unmitigated emissions by at least 15 percent, this impact is considered **less than significant**.

Mitigation Measure

None required.

Impact 4.2-2: Construction of the proposed projects could result in short-term emissions of NOx, PM_{10} and $PM_{2.5}$.

The 2007 RSP EIR discussed project-related construction air quality impacts under Impacts 6.1-1 and 6.1-1, on pages 6.1-20 through 6.1-23. Under Impact 6.1-2, the 2007 RSP EIR found that as long as the RSP maximum acreage per day falls into one of the acreage ranges under the SMAQMD's Guide to Air Quality Assessment in Sacramento County, and the appropriate mitigation measures are applied, the RSP would be considered to have a less-than-significant impact for particulate matter. Since these mitigation measures were not included as design

features in the 2007 RSP, the 2007 RSP EIR found this impact to result in a significant impact without mitigation.

As described under Impact 6.1-2 of the 2007 RSP EIR, construction of the 2007 RSP was estimated to take 20 years and consist of site grading, excavation for infrastructure and building foundations, building construction, and paving and landscaping installation. The results of the construction emissions analysis found that the construction-related emissions of NOx would exceed the SMAQMD's 85 pounds per day significance threshold during every year of construction. This impact was found to result in a significant impact under the 2007 RSP EIR. Details and assumptions uses to estimate the construction emissions from the 2007 RSP can be found in Appendix D of the 2007 RSP EIR.

Since the publication of the 2007 RSP EIR, the SMAQMD has updated its CEQA Guidance with new PM_{10} and $PM_{2.5}$ construction emission thresholds, which were not evaluated under the 2007 RSP EIR. The proposed projects construction-related PM_{10} and $PM_{2.5}$ emissions are evaluated below and compared to the SMAQMD's latest significance thresholds.

Railyards Specific Plan Update

Construction pursuant to the proposed RSPU, like the 2007 RSP, would consist of site grading, excavation for infrastructure and building foundations, building construction, and paving and landscaping installation. Unlike the 2007 RSP, the proposed RSPU would include the construction of a major medical center and a sports and entertainment stadium. Construction pursuant to the RSPU is anticipated to begin in late 2016 and, assuming completion by 2035, would last approximately 19 years. Construction of individual residences and commercial buildings under the RSPU would occur sequentially as dictated by market conditions. For this analysis, it is conservatively assumed that the construction of the KP Medical Center, MLS Stadium and developments proposed under the RSPU would overlap.

Construction emissions were estimated for the RSPU using the methods contained in SMAQMD's *Guide to Air Quality Assessment in Sacramento County*.[38] The CalEEMod model was used to quantify construction NO_X, PM_{10}, and $PM_{2.5}$ emissions from off-road equipment, haul trucks associated with demolition and imported soils, on-road worker vehicle emissions, and vendor delivery trips. The unmitigated and mitigated construction emissions for the worst-case day for each construction year can be found in Tables 4.2-10 and Table 4.2-11, respectively. Those tables compare emissions to SMAQMD's NO_X, PM_{10}, and $PM_{2.5}$ construction thresholds.

As shown in **Table 4.2-10**, maximum daily construction NO_X, PM_{10}, and $PM_{2.5}$ emissions would exceed the SMAQMD significance thresholds for each construction year. The predominant construction activity associated with these emissions would be off-road diesel equipment and on-road haul trucks during construction of the RSPU. PM_{10} and $PM_{2.5}$, in the form of fugitive

[38] Sacramento Metropolitan Air Quality Management District, 2009. *Guide 80 to Air Quality Assessment*. Adopted December 2009 and last updated October 2013. pp. 3-1 - 3-11.

dust, would be emitted during the transport of off- and on-road vehicles on unpaved surfaces. Overall, the RSPU would have a **significant impact** related to construction emissions. This impact conclusion is consistent with the 2007 RSP EIR.

TABLE 4.2-10.
UNMITIGATED RSPU CONSTRUCTION EMISSIONS

Construction Year	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2016	**408**	**101**	**35**	**5**	**2**
2017	**454**	**164**	**51**	**19**	**6**
2018	**408**	**163**	**49**	**14**	**4**
2019	**372**	**163**	**49**	**21**	**6**
2020	**327**	**162**	**48**	**21**	**6**
2021	**280**	**161**	**48**	**16**	**5**
2022	**126**	**80**	**24**	**10**	**3**
2023	**115**	**80**	**23**	**10**	**3**
2024	**112**	**80**	**23**	**10**	**3**
2025	**110**	**80**	**23**	**10**	**3**
2026	**108**	**80**	**23**	**10**	**3**
2027	**107**	**80**	**23**	**10**	**3**
2028	**106**	**80**	**23**	**10**	**3**
2029	**105**	**80**	**23**	**10**	**3**
2030	**100**	**80**	**23**	**10**	**3**
2031	**99**	**80**	**23**	**10**	**3**
2032	**197**	**159**	**46**	**13**	**4**
2033	**105**	**80**	**23**	**6**	**2**
2034	3	**13**	**3**	**2**	**<1**
SMAQMD Thresholds[3]	85	0	0	0	0
Maximum	**454**	**164**	**51**	**21**	**6**
Significant (Yes or No)?	Yes	Yes	Yes	Yes	Yes

NOTES:

1. Project construction emissions estimates were made using CalEEMod version 2013.2.2. See Appendix C.1 for model outputs and more detailed assumptions
2. Values in bold are in excess of the applicable SMAQMD significance threshold.
3. SMAQMD has established a zero emissions threshold for PM_{10} and $PM_{2.5}$ when project do not implement their Best Available Practices (BMP).

SOURCE: ESA, 2016

Implementation of the emission reduction portion of Mitigation 4.2-2 would reduce RSPU construction emissions to levels shown in **Table 4.2-11**. PM_{10} and $PM_{2.5}$ emissions would be reduced to levels below their respective thresholds. Emissions of NO_X would remain in excess of the thresholds.

TABLE 4.2-11.
MITIGATED RSPU CONSTRUCTION EMISSIONS

Construction Year	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2016	**326**	47	16	2	1
2017	**363**	77	24	9	3
2018	**326**	76	24	7	2
2019	**298**	75	23	10	3
2020	**262**	75	23	10	3
2021	**224**	75	22	7	2
2022	**101**	37	11	5	1
2023	**92**	37	11	5	1
2024	**90**	37	11	5	1
2025	**88**	37	11	5	1
2026	**86**	37	11	5	1
2027	**86**	37	11	5	1
2028	85	37	11	5	1
2029	84	37	11	5	1
2030	80	37	11	5	1
2031	79	37	11	5	1
2032	**158**	74	22	6	2
2033	84	37	11	3	1
2034	2	6	2	1	<1
SMAQMD Thresholds	85	80	82	14.6	15
Maximum	**363**	77	24	10	3
Significant (Yes or No)?	Yes	No	No	No	No

NOTES:

1. Project construction emissions estimates were made using CalEEMod version 2013.2.2. See Appendix C.1 for model outputs and more detailed assumptions.
2. Values in bold are in excess of the applicable SMAQMD significance threshold.

SOURCE: ESA, 2016

Railyards Specific Plan Update Land Use Variant

Under the Land Use Variant, the KP Medical Center would be replaced with office land uses and the Stadium would be replaced with residential units. Unlike the proposed RSPU (discussed above), the Land Use Variant would not include pollutant emissions generated during the construction of the MLS Stadium (between years 2016 and 2018) or the KP Medical Center (between 2016 and 2035). Since the RSPU Land use Variant would not include Phase 2 construction activities associated with the KP Medical Center, construction would be expected to be completed within the year 2034. Since the Land Use Variant would not include the construction of the MLS Stadium and KP Medical Center, there would be no overlapping construction activities, and as a result, there would be lower construction-related emissions as

compared to the RSPU. Predicted unmitigated and mitigated construction emissions for the worst-case day for each of the construction years are presented in **Table 4.2-12** and **Table 4.2-1-13**, respectively, and compared to the SMAQMD threshold. Model output data and assumptions are included in Appendix C.1.

TABLE 4.2-12.
UNMITIGATED RSPU LAND USE VARIANT CONSTRUCTION EMISSIONS MAXIMUM CONSTRUCTION EMISSIONS

Construction Year	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2016	**153**	**92**	**10**	**3**	**1**
2017	**225**	**84**	**26**	**11**	**3**
2018	**202**	**84**	**25**	**11**	**3**
2019	**184**	**83**	**25**	**11**	**3**
2020	**162**	**83**	**25**	**10**	**3**
2021	**139**	**82**	**24**	**10**	**3**
2022	**125**	**82**	**24**	**10**	**3**
2023	**114**	**82**	**24**	**10**	**3**
2024	**111**	**82**	**24**	**10**	**3**
2025	**109**	**82**	**24**	**10**	**3**
2026	**107**	**82**	**24**	**10**	**3**
2027	**106**	**82**	**24**	**10**	**3**
2028	**105**	**82**	**24**	**10**	**3**
2029	**104**	**82**	**24**	**10**	**3**
2030	**99**	**82**	**23**	**10**	**3**
2031	**98**	**82**	**23**	**10**	**3**
2032	**97**	**82**	**23**	**7**	**2**
2033	7	**13**	**4**	**<1**	**<1**
2034	3	**13**	**4**	**2**	**<1**
SMAQMD Thresholds[3]	85	0	0	0	0
Maximum	**225**	**92**	**26**	**11**	**3**
Significant (Yes or No)?	Yes	Yes	Yes	Yes	Yes

NOTES:

1. Project construction emissions estimates were made using CalEEMod version 2013.2.2. See Appendix C.1 for model outputs and more detailed assumptions.
2. Values in bold are in excess of the applicable SMAQMD significance threshold.
3. SMAQMD has established a zero emissions threshold for PM_{10} and $PM_{2.5}$ when project do not implement their Best Available Practices (BMP).

SOURCE: ESA, 2016

Implementation of the emission reduction portion of Mitigation 4.2-2 would reduce RSPU Variant construction emissions to levels shown in Table 4.2-13. PM_{10} and $PM_{2.5}$ emissions would be reduced to levels below the $PM_{2.5}$ thresholds. Emissions of NO_X would still exceed the thresholds.

TABLE 4.2-13.
MITIGATED RSPU VARIANT CONSTRUCTION EMISSIONS

Construction Year	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2016	**122**	9	5	1	1
2017	**180**	39	12	5	2
2018	**162**	39	12	5	2
2019	**147**	39	12	5	2
2020	**130**	38	12	5	1
2021	**111**	38	11	5	1
2022	**100**	38	11	5	1
2023	**91**	38	11	5	1
2024	**89**	38	11	5	1
2025	**87**	38	11	5	1
2026	**86**	38	11	5	1
2027	85	38	11	5	1
2028	84	38	11	5	1
2029	83	38	11	5	1
2030	79	38	11	5	1
2031	78	38	11	5	1
2032	78	38	11	3	1
2033	6	6	2	<1	<1
2034	2	6	2	1	<1
SMAQMD (lbs/day)	85	80	82	14.6	15
Maximum	**180**	39	12	5	2
Significant (Yes or No)?	Yes	No	No	No	No

NOTES:

1. Project construction emissions estimates were made using CalEEMod version 2013.2.2. See Appendix C.1 for model outputs and more detailed assumptions.
2. Values in bold are in excess of the applicable SMAQMD significance threshold.

SOURCE: ESA, 2016

As shown in Table 4.2-12 and Table 4.2-13, from 2016 through 2034 the maximum daily construction NO_X emissions would exceed the SMAQMD significance threshold. Overall, the RSPU Land use Variant would have a **significant impact** related to construction emissions. This impact conclusion is consistent with the 2007 RSP EIR.

KP Medical Center

The proposed KP Medical Center is assumed to be constructed in two phases. Phase 1 construction is anticipated to begin in 2018 and be open to the public in 2022. Phase 2 is expected to be initiated no sooner than approximately 10 years after completion of Phase One. Although Phase 1 and Phase 2 would involve the construction of difference facilities and structures, both phases would have similar construction schedules and phasing. The CalEEMod software was

used to estimate the maximum daily NO_X, PM_{10} and $PM_{2.5}$ emissions associated with KP Medical Center construction and model output data and assumptions are included in Appendix C.1. Predicted unmitigated and mitigated construction emissions for the worst-case day for each of the construction years are presented in **Table 4.2-14** and **Table 4.2-15** and compared to the SMAQMD threshold.

TABLE 4.2-14.
UNMITIGATED KP MEDICAL CENTER CONSTRUCTION EMISSIONS

Construction Year	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2018	60	**21**	**12**	**1**	**1**
2019	43	**9**	**4**	**1**	**<1**
2020	38	**9**	**3**	**1**	**<1**
2021	34	**9**	**3**	**1**	**<1**
2032	32	**29**	**11**	**3**	**1**
2033	32	**29**	**8**	**2**	**1**
SMAQMD Thresholds[3]	85	0	0	0	0
Maximum	60	**29**	**12**	**3**	**1**
Significant (Yes or No)?	No	Yes	Yes	Yes	Yes

NOTES:

1. Project construction emissions estimates were made using CalEEMod version 2013.2.2. See Appendix C.1 for model outputs and more detailed assumptions.
2. Values in bold are in excess of the applicable SMAQMD significance threshold.
3. SMAQMD has established a zero emissions threshold for PM_{10} and $PM_{2.5}$ when project do not implement their Best Available Practices (BMP).

SOURCE: ESA, 2016

TABLE 4.2-15.
MITIGATED KP MEDICAL CENTER CONSTRUCTION EMISSIONS MAXIMUM DAILY CONSTRUCTION EMISSIONS

Construction Year	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2018	48	10	6	1	<1
2019	34	14	2	1	<1
2020	30	4	2	1	<1
2021	27	4	2	<1	<1
2032	26	14	5	1	<1
2033	26	14	4	1	<1
SMAQMD Threshold	85	80	82	14.6	15
Maximum	48	14	6	1	<1
Significant (Yes or No)?	No	No	No	No	No

NOTES:

1. Project construction emissions estimates were made using CalEEMod version 2013.2.2. See Appendix C.1 for model outputs and more detailed assumptions.
2. Values in bold are in excess of the applicable SMAQMD significance threshold.

SOURCE: ESA, 2016

As shown in Table 4.2-14, maximum daily and annual construction PM_{10}, and $PM_{2.5}$ emissions would exceed the SMAQMD significance thresholds for each construction year. The predominant construction activity associated with these emissions would be exhaust and fugitive dust from off-road diesel equipment and on-road haul trucks. Overall, the KP Medical Center would have a **significant impact** related to construction emissions.

Implementation of the emission reduction portion of Mitigation Measure 4.2-2 would reduce KP Medical Center construction emissions to levels shown in Table 4.2-15. NOx, PM_{10} and $PM_{2.5}$ emissions would be reduced to levels below their respective SMAQMD significance thresholds.

MLS Stadium

The construction of the MLS Stadium and related entry plaza and open spaces would occur over an approximately 18-month period. Since the expected start date of the MLS Stadium is unknown at this time, it is conservatively assumed for this analysis that construction would begin in late 2016. Predicted unmitigated and mitigated construction emissions for the worst-case day for each of the construction years are presented in **Table 4.2-16** and **Table 4.2-17**, respectively, and compared to the SMAQMD threshold. Model output data and assumptions are included in Appendix C.1.

TABLE 4.2-16.
UNMITIGATED MLS STADIUM CONSTRUCTION EMISSIONS MAXIMUM DAILY CONSTRUCTION EMISSIONS (PPD)

Construction Year	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2016	75	**12**	**7**	**<1**	**<1**
2017	32	**4**	**2**	**<1**	**<1**
2018	17	**1**	**1**	**<1**	**<1**
SMAQMD Threshold[3]	85	0	0	0	0
Maximum	75	**12**	**7**	**<1**	**<1**
Significant (Yes or No)?	No	Yes	Yes	Yes	Yes

NOTES:

1. Project construction emissions estimates were made using CalEEMod version 2013.2.2. See Appendix C.1 for model outputs and more detailed assumptions.
2. Values in bold are in excess of the applicable SMAQMD significance threshold.
3. SMAQMD has established a zero emissions threshold for PM_{10} and $PM_{2.5}$ when project do not implement their Best Available Practices (BMP).

SOURCE: ESA, 2016

As shown in Table 4.2-16, maximum daily and annual construction PM_{10}, and $PM_{2.5}$ emissions would exceed the SMAQMD significance thresholds for each construction year. The predominant construction activity associated with these emissions would be off-road diesel equipment and on-road haul trucks during construction of the MLS Stadium. PM_{10} and $PM_{2.5}$, in the form of fugitive dust, would be emitted by off- and on-road vehicle travel on unpaved surfaces. Overall, the MLS Stadium would have a **significant impact** related to construction emissions.

TABLE 4.2-17.
MITIGATED MLS STADIUM CONSTRUCTION EMISSIONS MAXIMUM DAILY CONSTRUCTION NOX EMISSIONS (PPD)

Construction Year	NOx (ppd)	PM_{10} (ppd)	PM2.5 (ppd)	PM_{10} (tpy)	PM2.5 (tpy)
2016	60	6	3	<1	<1
2017	26	2	1	<1	<1
2018	14	1	0	<1	<1
SMAQMD Threshold	85	80	82	14.6	15
Maximum	60	6	3	<	<
Significant (Yes or No)?	No	No	No	No	No

NOTES:

1. Project construction emissions estimates were made using CalEEMod version 2013.2.2. See Appendix C.1 for model outputs and more detailed assumptions.
2. Values in bold are in excess of the applicable SMAQMD significance threshold.

SOURCE: ESA, 2016

Implementation of the emission reduction portion of Mitigation 4.2-2 would reduce MLS Stadium construction emissions to levels shown in Table 4.2-17. PM_{10} and $PM_{2.5}$ emissions would be reduced to levels below their respective SMAQMD significance thresholds.

Stormwater Outfall

Construction of the proposed Stormwater Outfall could begin as early as 2016 and last approximately one mouth. The CalEEMod software was used to estimate the maximum daily NOx, PM_{10} and $PM_{2.5}$ emissions associated with Outfall construction and model output data and assumptions are included in Appendix C.1. Predicted unmitigated and mitigated construction emissions for the worst-case day for each of the construction years are presented in **Table 4.2-18** and **Table 4.2-19** and compared to the SMAQMD threshold.

TABLE 4.2-18.
UNMITIGATED STORMWATER OUTFALL MAXIMUM DAILY CONSTRUCTION EMISSIONS (PPD)

Construction Year	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2016	14	**2**	**1**	**<1**	**<1**
SMAQMD Threshold[3]	85	0	0	0	0
Maximum	14	**2**	**1**	**<1**	**<1**
Significant (Yes or No)?	No	**Yes**	**Yes**	**Yes**	**Yes**

NOTES:

1. Project construction emissions estimates were made using CalEEMod version 2013.2.2. See Appendix C.1 for model outputs and more detailed assumptions.
2. Values in bold are in excess of the applicable SMAQMD significance threshold.
3. SMAQMD has established a zero emissions threshold for PM_{10} and $PM_{2.5}$ when project do not implement their Best Available Practices (BMP).

SOURCE: ESA, 2016

TABLE 4.2-19.
MITIGATED STORMWATER OUTFALL CONSTRUCTION EMISSIONS MAXIMUM DAILY CONSTRUCTION EMISSIONS (PPD)

Construction Year	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2016	11	1	1	<1	<1
SMAQMD NOx Threshold (ppd)	85	80	82	14.6	15
Maximum	11	1	1	<1	<1
Significant (Yes or No)?	No	No	No	No	No

NOTES:

1. Project construction emissions estimates were made using CalEEMod version 2013.2.2. See Appendix C.1 for model outputs and more detailed assumptions.
2. Values in bold are in excess of the applicable SMAQMD significance threshold.

SOURCE: ESA, 2016

As shown in Table 4.2-18, maximum daily and annual construction PM_{10}, and $PM_{2.5}$ emissions would exceed the SMAQMD significance thresholds for each construction year. The predominant construction activity associated with these emissions would be off-road diesel equipment during construction of the Stormwater Outfall. PM_{10} and $PM_{2.5}$, in the form of fugitive dust, would be emitted during off- and on-road vehicle travel on unpaved surfaces. Overall, the proposed Stormwater Outfall would have a **significant impact** related to construction emissions.

Implementation of Mitigation 4.2-2 would reduce Stormwater Outfall construction emissions to levels shown in Table 4.2-19. PM_{10} and $PM_{2.5}$ emissions would be reduced to levels below their respective SMAQMD significance thresholds.

Summary

Construction of the proposed RSPU, including the RSPU Land Use Variant, as well as the KP Medical Center, MLS Stadium, and Stormwater Outfall projects would result in emissions of PM_{10} and $PM_{2.5}$ that would exceed the SMAQMD significance thresholds. This is because SMAQMD has established a zero emissions threshold for PM_{10} and $PM_{2.5}$. All construction projects are required to implement the SMAQMD's Basic Construction Emission Control Practices to control PM_{10} and $PM_{2.5}$. If BMPs are implemented, then SMAQMD uses different thresholds to determine significance as listed in the above tables.

Also, buildout of the RSPU, including the RSPU Land Use Variant, would generate unmitigated NOx emissions that would exceed SMAQMD's thresholds. Consequently, construction of any of the land uses would result in a **significant impact**.

Mitigation Measure

Since the publication of the 2007 RSP EIR, the SMAQMD has updated its Basic Construction Emission Control Practices. Mitigation Measure 4.2-2 described below reflects the latest

SMAQMD Basic Construction Emission Control Practices, which are different than those identified in Mitigation Measures 6.1-1 and Mitigation Measure 6.1-2 on pages 6.1-20 through 6.1-23 of the 2007 RSP EIR.

Mitigation Measure 4.2-2(a) (RSPU, KPMC, MLS, SO)

City approval of any grading or improvement plans shall include the following SMAQMD Basic Construction Emission Control Practices:

- *All exposed surfaces shall be watered two times daily. Exposed surfaces include, but are not limited to soil piles, graded areas, unpaved parking areas, staging areas, and access roads.*
- *Cover or maintain at least two feet of free board space on haul trucks transporting soil, sand, or other loose material on the site. Any haul trucks that would be traveling along freeways or major roadways shall be covered.*
- *Use wet power vacuum street sweepers to remove any visible trackout mud or dirt onto adjacent public roads at least once a day. Use of dry power sweeping is prohibited.*
- *Limit vehicle speeds on unpaved roads to 15 miles per hour.*
- *All roadways, driveways, sidewalks, parking lots shall be paved as soon as possible. In addition, building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.*
- *Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, Section 2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site.*
- *Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment shall be checked by a certified mechanic and determine to be running in proper condition before it is operated.*

Mitigation Measure 4.2-2(b) (RSPU, KPMC, MLS, SO)

City approval of any grading or improvement plans shall include the following SMAQMD Enhanced Exhaust Control Practices:

- *Provide a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that will be used an aggregate of 40 or more hours during any portion of the proposed project to the City and the SMAQMD. The inventory shall include the horsepower rating, engine model year, and projected hours of use for each piece of equipment. The construction contractor shall provide*

the anticipated construction timeline including start date, and name and phone number of the project manager and on-site foreman. This information shall be submitted at least 4 business days prior to the use of subject heavy-duty off-road equipment. The inventory shall be updated and submitted monthly throughout the duration of the proposed projects, except that an inventory shall not be required for any 30-day period in which no construction activity occurs.

- *Provide a plan in conjunction with the equipment inventory, approved by the SMAQMD, demonstrating that the heavy-duty (50 horsepower or more) off-road vehicles to be used in the construction project, including owned, leased, and subcontractor vehicles, will achieve a project wide fleet-average 20% NOx reduction and 45% particulate reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available.*

- *Emissions from all off-road diesel powered equipment used on the project site shall not exceed 40% opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately, and the City and SMAQMD shall be notified within 48 hours of identification of non-compliant equipment. A visual survey of all in-operation equipment shall be made at least weekly, and a monthly summary of the visual survey results shall be submitted throughout the duration of the project, except that the monthly summary shall not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed as well as the dates of each survey. The SMAQMD and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this measure shall supersede other SMAQMD or state rules or regulations.*

- *If at the time of granting of each building permit, the SMAQMD has adopted a regulation applicable to construction emissions, compliance with the regulation may completely or partially replace this mitigation. Consultation with the SMAQMD prior to construction will be necessary to make this determination.*

Mitigation Measure 4.2-2(c) (RSPU, KPMC, MLS, SO)

City approval of any grading or improvement plans shall include the following SMAQMD Fugitive Dust Control Practices:

- *Water exposed soil with adequate frequency for continued moist soil.*

- *Suspend excavation, grading, and/or demolition activity when wind speeds exceed 20 mph.*

- *Install wind breaks (e.g., plant trees, solid fencing) on windward side(s) of construction areas.*
- *Plant vegetative ground cover (fast-germinating native grass seed) in disturbed areas as soon as possible. Water appropriately until vegetation is established.*
- *Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site.*
- *Treat site accesses to a distance of 100 feet from the paved road with a 6 to 12-inch layer of wood chips, mulch, or gravel to reduce generation of road dust and road dust carryout onto public roads.*
- *Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The phone number of the District shall also be visible to ensure compliance.*

Mitigation Measure 4.2-2(d) (RSPU)

The project applicants shall pay into the SMAQMD's construction mitigation fund to offset construction-generated emissions of NOx that exceed SMAQMD's daily emission threshold of 85 lbs/day. The project applicants shall coordinate with the SMAQMD for payment of fees into the Heavy-Duty Low-Emission Vehicle Program designed to reduce construction related emissions within the region. Fees shall be paid based upon the applicable current SMAQMD Fee. The applicants shall keep track of actual equipment use and their NOx emissions so that mitigation fees can be adjusted accordingly for payment to the SMAQMD.

Impact Significance After Mitigation: With implementation of the above mitigation measures, fugitive dust would be controlled, exhaust emissions would be reduced on-site, and mitigation fees would be provided to SMAQMD for project NOx emissions that exceed the SMAQMD significance threshold. SMAQMD uses the fees to fund off-site projects and programs that would offset the project's NOx emissions. These measures would reduce project-related construction emissions of NOx to **less than significant**.

Impact 4.2-3: The proposed projects could result in long-term (operational) emissions of NO_X ROG, PM_{10}, and $PM_{2.5}$.

The 2007 RSP EIR evaluated operational ozone precursor and particulate matter emissions under impact 6.1-3 (on pages 6.1-23 through 6.1-26), and concluded that implementation of the RSP would result in ROG and NOx emissions that would exceed the SMAQMD significance thresholds. This impact was found to be significant under the 2007 RSP EIR. Details and

assumptions uses to estimate the construction emissions from the 2007 RSP can be found in Appendix D of the 2007 RSP EIR.

As described above under Impact 4.2-1, 2007 RSP EIR Mitigation Measure 6.1-3 (on page 6.1-24 of the 2007 RSP DEIR) required the applicant to develop an Air Quality Mitigation Plan (AQMP) demonstrating that the project can reduce onsite ozone emissions (ROG and NOx) by 15 percent or more, subject to the approval of the SMAQMD. The 2007 Railyards Final Air Quality Mitigation Plan achieved the required reduction through identification and commitment to a series of mitigation measures, each of which is assigned a point value representing the approximate percentage reduction in emissions.[39] The 2007AQMP identified the measures shown in Table 4.2-8 to achieve the 15 percent onsite emission reducing required by SMAQMD.

With implementation of the emissions reducing measures described above, the 2007 RSP AQMP concluded that the project would achieve an emissions reduction of 21.55 percent. This exceeded the 15 percent emissions reduction/mitigation guideline established by the SMAQMD. Because the proposed RSPU would facilitate the development of a high-density, mixed-use, transit-oriented development, combined with the effects of regular updates to Title 24 and the California Building Codes (including CALGreen), much of the reduction would be achieved by project design. Most of the selected measures listed above would not require monitoring beyond completion of project design and construction.

The 2007 RSP EIR concluded that since onsite operational emissions of NO_x and ROG would still exceed the SMAQD threshold of 85 pounds per day, even after implementation of the 2007 RSP AQMP, the 2007 RSP would result in a significant and unavoidable impact.

Railyards Specific Plan Update

Over the long-term, the proposed RSPU would increase emissions from motor vehicle trips and onsite area and energy sources (e.g., natural gas combustion for space and water heating, landscape maintenance, use of consumer products such as hairsprays, deodorants, cleaning products). Because the significance thresholds for ozone precursors, PM_{10} and $PM_{2.5}$ are daily measures, and because events would occur at the MLS Stadium on only approximately 37 days each year, the evaluation below includes an analysis of ROG, NOx, PM_{10}, and $PM_{2.5}$ emissions on event days and non-event days.

CalEEMod was used to estimate operational emissions for build-out year 2035 for an event day (assuming a full capacity MLS game) (**Table 4.2-20**) and for a non-event day (**Table 4.2-21**). These two scenarios were developed to show the daily incremental increase of the RSPU, including MLS Stadium, for the greatest attendance events, as well as the daily incremental increase of the RSPU without operation of the MLS Stadium.

[39] Thomas Enterprises, The Railyards-Final Air Quality Mitigation Plan, prepared by Jones & Stokes, November 9, 2007.

TABLE 4.2-20.
RSPU OPERATIONAL UNMITIGATED EMISSIONS – MLS MATCH

		RSPU Year 2035 Build-out Operation Emissions[1,2,3,4]						
Pollutant	SMAQMD Thresholds	Area Sources	Generator/ Boiler Sources	Energy Sources	Aircraft Sources	Mobile Sources	Total Emissions	Significant (Yes or No)?
ROG (ppd)	65 (ppd)	442	61	7	<1	371	881	**Yes**
NOx (ppd)	65 (ppd)	6	11	60	1	526	604	**Yes**
PM_{10} (ppd)	0 (ppd)	3	5	5	<1	894	907	**Yes**
$PM_{2.5}$ (ppd)	0 (ppd)	3	5	5	<1	248	261	**Yes**
PM_{10} (tpy)[5]	0 (tpy)	<1	<1	<1	<1	126	126	**Yes**
$PM_{2.5}$ (tpy)[5]	0 (tpy)	<1	<1	<1	<1	35	35	**Yes**

NOTES:

1. RSPU operational emissions estimates for summertime conditions were made using CalEEMod 2013.2.2. See Appendix C.1 for details.
2. Several adjustments were made to the CalEEMod default assumptions that were not considered mitigation. The default trip rates and lengths were adjusted to match the traffic data provided by Fehr & Peers. In addition, the Title 24 electricity and natural gas energy intensity factors were updated to account for the 2013 Title 24 standards.
3. Aircraft emissions at the proposed helistop were estimated using the AEDT model. See Appendix C.1 for details.
4. Emission fact`ors for the emergency generators and boilers were obtain from the Offroad2011 Model (Tier 4 Engines) and the Natural Gas Boilers Emission Factors (AP-42, Table 1.4-1), respectively. See Appendix C.1 for details.
5. The annual tons per year of PM_{10} and $PM_{2.5}$ were estimated based on the combined emissions during event and non-event days.

SOURCE: ESA, 2016

TABLE 4.2-21.
RSPU OPERATIONAL UNMITIGATED EMISSIONS – NON MLS MATCH

		RSPU Year 2035 Build-out Operation Emissions [1,2,3,4]						
Pollutant	SMAQMD Thresholds	Area Sources	Generator/ Boiler Sources	Energy Sources	Aircraft Sources	Mobile Sources	Total Emissions	Significant (Yes or No)?
ROG (ppd)	65 (ppd)	442	61	7	<1	322	832	**Yes**
NOx (ppd)	65 (ppd)	6	11	60	1	426	504	**Yes**
PM_{10} (ppd)	0 (ppd)	3	5	5	<1	684	697	**Yes**
$PM_{2.5}$ (ppd)	0 (ppd)	3	5	5	<1	193	206	**Yes**
PM_{10} (tpy)[5]	0 (tpy)	<1	<1	<1	<1	125	125	**Yes**
$PM_{2.5}$ (tpy)[5]	0 (tpy)	<1	<1	<1	<1	35	35	**Yes**

NOTES:

1. RSPU operational emissions estimates for summertime conditions were made using CalEEMod 2013.2.2. See Appendix C.1 for details.
2. Several adjustments were made to the CalEEMod default assumptions that were not considered mitigation. The default trip rates and lengths were adjusted to match the traffic data provided by Fehr & Peers. In addition, the Title 24 electricity and natural gas energy intensity factors were updated to account for the 2013 Title 24 standards.
3. Aircraft emissions at the proposed helistop were estimated using the AEDT model. See Appendix C.1 for details.
4. Emission factors for the emergency generators and boilers were obtain from the Offroad2011 Model (Tier 4 Engines) and the Natural Gas Boilers Emission Factors (AP-42, Table 1.4-1), respectively. See Appendix C.1 for details.
5. The annual tons per year of PM_{10} and $PM_{2.5}$ were estimated based on the combined emissions during event and non-event days.

SOURCE: ESA, 2016

RSPU with Event Day Analysis

Table 4.2-20 shows operational emissions for an event day. Based on the estimates shown in Table 4.2-20, for MLS game days, the RSPU's ROG NOx, PM_{10} and $PM_{2.5}$ emissions would exceed SMAQMD's significance thresholds. Thus, the emissions impact of a major event at the proposed MLS Stadium combined with emissions from full operation of the RSPU at buildout would be **significant**.

RSPU with Non-Event Day Analysis

Table 4.2-21 shows operational emissions for a non-event day. For non-event days, the incremental ROG NO_X, PM_{10} and $PM_{2.5}$ emissions attributable to the RSPU would exceed the significance thresholds specified by the SMAQMD. This impact would be **significant**.

Railyards Specific Plan Update Land Use Variant

Under the Land Use Variant, the major medical center and stadium uses would be replaced with office and residential land uses. Generally, the operational emissions of the Land Use Variant would be less than the RSPU on event days, but somewhat less than the non-event day emissions. Since the RSPU Land Use Variant would not include a major medical center, there would be no pollutant emissions generated by helicopter trips. Operational emissions after full build-out of the RSPU Land Use Variant are presented in **Table 4.2-22**. The RSPU Land Use Variant's criteria pollutant contribution to regional air quality would be above the significance thresholds for ROG NO_X, PM_{10} and $PM_{2.5}$. This would be considered a **significant impact**. This impact conclusion is consistent with the 2007 RSP EIR.

TABLE 4.2-22.
RSPU VARIANT OPERATIONAL UNMITIGATED EMISSIONS

		RSPU Variant Year 2035 Build-out Operation Emissions [1,2,3,4]						
Pollutant	SMAQMD Thresholds	Area Sources	Generator/ Boiler Sources	Energy Sources	Aircraft Sources	Mobile Sources	Total Emissions	Significant (Yes or No)?
ROG (ppd)	65 (ppd)	445	<1	5	0	336	341	**Yes**
NO_X (ppd)	65 (ppd)	7	<1	45	0	439	491	**Yes**
PM_{10} (ppd)	0 (ppd)	3	<1	4	0	711	718	**Yes**
$PM_{2.5}$ (ppd)	0 (ppd)	3	<1	4	0	197	204	**Yes**
PM_{10} (tpy)	0 (tpy)	<1	<1	<1	0	123	123	**Yes**
$PM_{2.5}$ (tpy)	0 (tpy)	<1	<1	<1	0	34	34	**Yes**

NOTES:

1. Specific Plan operational emissions estimates for summertime conditions were made using CalEEMod 2013.2.2. See Appendix C.1 for details.
2. Several adjustments were made to the CalEEMod default assumptions that were not considered mitigation. The default trip rates and lengths were adjusted to match the traffic data provided by Fehr & Peers. In addition, the Title 24 electricity and natural gas energy intensity factors were updated to account for the 2013 Title 24 standards.
3. Aircraft emissions at the proposed helistop were estimated using the AEDT model. See Appendix C.1 for details.
4. Emission factors for the emergency generators and boilers were obtain from the Offroad 2011 Model (Tier 4 Engines) and the Natural Gas Boilers Emission Factors (AP-42, Table 1.4-1), respectively. See Appendix C.1 for details.

SOURCE: ESA, 2016

KP Medical Center

As previously discussed, the KP Medical Center would be constructed on the north-west portion of the proposed project site, north of Railyards Boulevard. The primary sources of pollutant emissions during the operation of the KP Medical Center would be from project-related motor vehicle trips, occasional helicopter trips, and onsite area and energy sources (e.g., natural gas combustion for space and water heating and landscape maintenance). Onsite operational emissions from motor vehicle trips, stationary and energy sources were quantified using CalEEMod 2013.2.2. Aircraft emissions at the helistop were estimated using the AEDT model. Emissions would be identical irrespective of the location of the helistop. Operational emissions for the full build-out year (2035) are presented in **Table 4.2-23** below. Based on the estimates shown in Table 4.2-23, the KP Medical Center's criteria pollutant contribution to regional air quality would be above the significance thresholds specified by the SMAQMD for ROG, NOX and PM_{10} would be considered a **significant impact**.

TABLE 4.2-23.
KP MEDICAL CENTER OPERATIONAL UNMITIGATED EMISSIONS

		KP Medical Center Variant Year 2035 Build-out Operation Emissions [1,2,3,4]						
Pollutant	SMAQMD Thresholds (lbs/day)	Area Sources	Generator/ Boiler Sources	Energy Sources	Aircraft Sources	Mobile Sources	Total Emissions	Significant (Yes or No)?
ROG (ppd)	65 (ppd)	53	61	2	<1	61	177	**Yes**
NOx (ppd)	65 (ppd)	<1	9	18	1	92	119	**Yes**
PM_{10} (ppd)	0 (ppd)	<1	5	1	<1	162	167	**Yes**
$PM_{2.5}$ (ppd)	0 (ppd)	<1	5	1	<1	45	51	**Yes**
PM_{10} (tpy)	0 (tpy)	<1	<1	<1	<1	28	28	**Yes**
$PM_{2.5}$ (tpy)	0 (tpy)	<1	<1	<1	<1	8	8	**Yes**

NOTES:

1. Specific Plan operational emissions estimates for summertime conditions were made using CalEEMod 2013.2.2. See Appendix C.1 for details.
2. Several adjustments were made to the CalEEMod default assumptions that were not considered mitigation. The default trip rates and lengths were adjusted to match the traffic data provided by Fehr & Peers. In addition, the Title 24 electricity and natural gas energy intensity factors were updated to account for the 2013 Title 24 standards.
3. Aircraft emissions at the proposed helistop were estimated using the AEDT model. See Appendix C.1 for details.
4. Emission factors for the emergency generators and boilers were obtain from the Offroad2011 Model (Tier 4 Engines) and the Natural Gas Boilers Emission Factors (AP-42, Table 1.4-1), respectively. See Appendix C.1 for details.

SOURCE: ESA, 2016

MLS Stadium

The MLS Stadium would increase emissions due to motor vehicle trips and onsite area and energy sources (e.g., natural gas combustion for space and water heating and landscape maintenance). Events at the MLS Stadium would only occur 33 days per year. Since the significance thresholds are a daily measure, the operational pollutant emissions during an event day and non-event day were modeled to represent worst-case emissions. Operational emissions of ROG, NO_X, PM_{10} and $PM_{2.5}$ for year 2018 of the MLS Stadium have been estimated for an event day (assuming a full

capacity MLS game) (**Table 4.2-24**) and for a non-event day (**Table 4.2-25**).[40] These two scenarios were developed to show the daily incremental increase of the MLS Stadium for the greatest attendance events, as well as when the Stadium is not in use.

TABLE 4.2-24.
MLS STADIUM OPERATIONAL UNMITIGATED EMISSIONS – MLS MATCH

Pollutant	SMAQMD Thresholds	MLS Stadium Variant Year 2018 Build-out Operation Emissions [1,2,3]						Significant
		Area Sources	Generator/ Boiler Sources	Energy Sources	Aircraft Sources	Mobile Sources	Total Emissions	(Yes or No)?
ROG (ppd)	65 (ppd)	11	<1	<1	0	73	84	**Yes**
NO_X (ppd)	65 (ppd)	<1	1	3	0	177	181	**Yes**
PM_{10} (ppd)	0 (ppd)	<1	<1	<1	0	197		**Yes**
$PM_{2.5}$ (ppd)	0 (ppd)	<1	<1	<1	0	56	56	**Yes**
PM_{10} (tpy)[4]	0 (tpy)	<1	<1	<1	0	4	4	**Yes**
$PM_{2.5}$ (tpy)[4]	0 (tpy)	<1	<1	<1	0	1	1	**Yes**

NOTES:

1. MLS Stadium operational emissions estimates for summertime conditions were made using CalEEMod 2013.2.2. See Appendix C.1 for details.
2. Several adjustments were made to the CalEEMod default assumptions that were not considered mitigation. The default trip rates and lengths were adjusted to match the traffic data provided by Fehr & Peers. In addition, the Title 24 electricity and natural gas energy intensity factors were updated to account for the 2013 Title 24 standards.
3. Emission factors for the emergency generators and boilers were obtain from the Offroad2011 Model (Tier 4 Engines) and the Natural Gas Boilers Emission Factors (AP-42, Table 1.4-1), respectively. See Appendix C.1 for details.
4. The annual tons per year of PM_{10} and $PM_{2.5}$ were estimated based on the combined emissions during event and non-event days.

SOURCE: ESA, 2016

TABLE 4.2-25.
MLS STADIUM OPERATIONAL EMISSIONS – NON MLS MATCH

Pollutant	SMAQMD Thresholds	MLS Stadium Year 2018 Build-out Operation Emissions [1,2,3]						Significant
		Area Sources	Generator/ Boiler Sources	Energy Sources	Aircraft Sources	Mobile Sources	Total Emissions	(Yes or No)?
ROG (ppd)	65 (ppd)	11	<1	<1	0	<1	11	No
NO_X (ppd)	65 (ppd)	<1	1	3	0	1	5	No
PM_{10} (ppd)	0 (ppd)	<1	<1	<1	0	<1	<1	**Yes**
$PM_{2.5}$ (ppd)	0 (ppd)	<1	<1	<1	0	<1	<1	**Yes**
PM_{10} (tpy)[4]	0 (tpy)	<1	<1	<1	0	3	3	**Yes**
$PM_{2.5}$ (tpy)[4]	0 (tpy)	<1	<1	<1	0	1	1	**Yes**

NOTES:

1. RSPU operational emissions estimates for summertime conditions were made using CalEEMod 2013.2.2. See Appendix C.1 for details.
2. Several adjustments were made to the CalEEMod default assumptions that were not considered mitigation. The default trip rates and lengths were adjusted to match the traffic data provided by Fehr & Peers. In addition, the Title 24 electricity and natural gas energy intensity factors were updated to account for the 2013 Title 24 standards.
3. Emission factors for the emergency generators and boilers were obtain from the Offroad 2011 Model (Tier 4 Engines) and the Natural Gas Boilers Emission Factors (AP-42, Table 1.4-1), respectively. See Appendix C.1 for details.
4. The annual tons per year of PM_{10} and $PM_{2.5}$ were estimated based on the combined emissions during event and non-event days.

SOURCE: ESA, 2016

[40] Year 2018 represents the earliest possible year for operations of the proposed MLS Stadium. In the event that the proposed Stadium does not open until later years, emissions in the first year of operation would be decreased due to lower emission factors that take into account expected improvements in the emissions of the vehicle fleet.

Event Day Analysis

Table 4.2-24 shows operational emissions for an event day. Based on the estimates shown above in Table 4.2-24, during an event day the MLS Stadium's incremental ROG, NOX, $PM_{2.5}$ and PM_{10} would contribution to regional air quality and would exceed the significance thresholds specified by the SMAQMD. Thus, the impact of operational emissions from the MLS Stadium on an event day would be **significant**.

Non-Event Day Analysis

Table 4.2-25 shows operational emissions for a non-event day. During a non-event day, the MLS Stadium's emissions would exceed the significance thresholds specified by the SMAQMD for $PM_{2.5}$ and PM_{10}. Thus, the impact of operational emissions from the MLS Stadium during a non-event day would be **significant**.

Stormwater Outfall

Since construction of the proposed Stormwater Outfall would likely be completed in the first year of construction, it is likely be operational in the year 2017. Although the Stormwater Outfall would not generate any criteria air pollutants during its normal daily operations, it could generate criteria pollutant emissions through the use of an onsite emergency backup generator. The emergency backup generator would be used to supply the Stormwater Outfall with power during power outages. Emissions generated by the emergency backup generator were calculated using emission factors found ARB's Offroad2011 model. Unmitigated emissions generated by the emergency backup generator assuming 24 hours of operation were found to be approximately less than 1 pound of ROG per day, less than 1 pound of NOx per day, less than 1 pound of PM_{10} and less than 1 pound of $PM_{2.5}$ per day, less than 1 ton of PM_{10} per year and less than 1 ton of $PM_{2.5}$ per year, which are all below the SMAQMD significance threshold. This would result in a **less-than-significant impact**.

Summary

The incremental build-out of the RSPU, RSPU Land Use Variant, and KP Medical Center, MLS Stadium (during both an event day non-event day) would result in emissions of ROG and NOx that would exceed the significance thresholds specified by the SMAQMD. The operation of the Stormwater Outfall would not emit a substantial amount of criteria pollutant emissions during its operation; however, the combined operation emissions of all the proposed projects would result in ROG and NOx emissions that would exceed SMAQMD significance threshold, creating a **significant impact**.

As is described under Impact 4.2-1, the SMAQMD recommends that lead agencies require projects creating emissions that would exceed the District's daily thresholds of ROG and/or NOx reduce their ozone precursor emissions from transportation sources by 15 percent. This percentage is based on the project location within the Sacramento Urban Core, which is part of the Sacramento Area Ozone Implementation Plan (SIP). SMAQMD calculates this 15 percent using NO_{xe}, which is calculated by adding the mitigated ROG emissions (divided by 3) to

mitigated NOx emissions. As described under Impact 4.2-1, and presented in the Draft RSPU AQMP in Appendix C.2, using the SMAQMD Recommended Guidance for Land Use Emission Reduction,[41] the percent reduction of NO_{xe} after mitigation for each proposed project that exceeds the SMAQMD significance threshold for ROG and NO_X are presented in Table 4.2-9.

As shown in Table 4.2-9, the RSPU without an MLS match and the RSPU Land Use Variant would result in a 17 and 16 percent reduction in NO_{xe} emissions by simply implementing the design features proposed under the Railyards Specific Plan.[42] The RSPU with MLS match operation would result in a 15 percent reduction in NO_{xe} emissions after mitigation, respectively. All proposed projects would meet or exceed the 15 percent emission reduction/mitigation guideline established by the SMAQMD.

Even with achievement of the SMAQMD-required 15 percent reduction in operational mobile source emissions, NOx and ROG emissions associated with RSPU and RSPU Land Use Variant would exceed the SMAQMD threshold of 65 pounds per day. Thus, this impact would remain **significant and unavoidable**. This impact conclusion is consistent with the 2007 RSP EIR.

Mitigation Measure

Consistent with the direction of the SMAQMD, no further mitigation required.

Impact 4.2-4: The proposed projects could increase CO concentrations.

The 2007 RSP EIR discussed operational CO impacts from project-related traffic under Impact 6.1-4 on page 6.1-26, which concluded that CO concentrations at the intersection affected by the RSP would not exceed the 1- and 8-hour CO concentration threshold under the NAAQS or CAAQS. As described in the methodology section of the 2007 RSP EIR (page 6.1-15), all intersections affected by the RSP were modeled using the CALINE4 dispersion model. These included at intersections where LOS would be "D" or worse under future near-term (2013) or long-term (2030) conditions during a.m. or p.m. peak hours. Results of the CO modeling can be found in Table 6.1-7 of the 2007 RSP EIR. Details and assumptions uses to estimate the CO concentrations provided in Table 6.1 can be found in Appendix D of the 2007 RSP EIR. The 2007 RSP EIR found this impact to result in a less-than-significant impact.

Railyards Specific Plan Update

CO is a localized pollutant of concern. Due to the temporary operation of equipment in any one area, construction of individual development or infrastructure projects pursuant to the proposed RSPU would not emit CO in quantities that could pose health concerns. For RSPU operation, traffic was analyzed to determine its potential to affect CO concentrations near surface streets and intersections in and around the RSP Area. The analysis presented in section 4.12, Transportation

41 NOxe as defined by the SMAQMD is the reduction in ROG divided by 3 plus the reduction in NOx.

42 NOxe as defined by the SMAQMD is the reduction in ROG divided by 3 plus the reduction in NOx.

and Circulation, shows that twelve intersections would result in a LOS below E during the AM, PM, or pre-event peak hours. CO modeling was conducted for these intersections using CALINE4.

Table 4.1-26 shows the CO results. Conservative assumptions were used to estimate worst-case CO concentrations. Those assumptions included the use of worst case meteorology, the inclusion of the highest 1-hour and 8-hour background CO concentrations recorded in Sacramento during the past five years, the use of baseline plus project (2016) traffic volumes, and the use of 2016 CO emission rates.

TABLE 4.2-26.
CARBON MONOXIDE CONCENTRATIONS AT AFFECTED INTERSECTIONS
PROPOSED RSPU

Intersection	CO Concentrations	
	1-hour (ppm)	8-hour (ppm)
Richards Blvd / I-5 SB Ramps	6.3	5.26
Richards Blvd / Bercut Dr	7.2	5.98
Richards Blvd / N 7th St	6.2	5.18
Richards Blvd / N 12th St / 16th St	10.6	8.7
Bannon St / Bercut Dr	5.7	4.78
N B St / N 7th St	5.6	4.7
N B St / N 12th St	5.4	4.54
J St / 3rd St / I-5 Off-Ramps	6.3	5.26
J St / 5th St	6.2	5.18
South Park St / Bercut Dr	5.5	4.62
Railyards Blvd / 7th St	6.5	5.42
Railyards Blvd / 8th St	5.6	4.7
Threshold	**20**	**9**
Exceed Threshold?	No	No

NOTES:

CO concentrations include a worst case 1-hour CO background concentration of 2.1 ppm and a worst case 8-hour background concentration of 1.9 ppm. The modeled 1-hour concentrations were converted to 8-hour concentrations using a persistence factor of 0.80. CALINE4 modeling results and additional assumptions are included in Appendix C.1.

SOURCE: ESA, 2016

As shown in Table 4.2-26, the analysis finds that no exceedances of the CO 1- hour or 8-hour standard would occur at any of the twelve intersections. Thus, the RSPU would have a less-than-significant impact on local CO concentrations. This impact conclusion is consistent with the 2007 RSP EIR.

Railyards Specific Plan Update Land Use Variant

Under the RSPU Land Use Variant, the potential for adverse intersection impacts would be similar to those discussed above for the proposed RSPU. This is because the RSPU Land Use

Variant would generate an equivalent amount of AM peak hour traffic, but 14 percent more PM peak hour traffic when compared to the RSPU. In addition, the RSPU Land Use Variant would not include a stadium, which would result in no pre-event peak hour traffic. Since the RSPU Land Use Variant would have nearly identical AM peak hour traffic as the RSPU and would only increase PM peak hour traffic by 14 percent, CO concentration increases at intersection effected by the project would be very similar to those shown in Table 4.2-26. Thus, the RSPU Land Use Variant would be expected to result a **less-than-significant** impact on local CO concentrations. This impact conclusion is consistent with the 2007 RSP EIR.

KP Medical Center

A review of the traffic data under the KP Medical Center shows that eleven intersections would result in a LOS below E during the AM and PM peak hours. CO modeling was conducted for these intersections using CALINE4. **Table 4.2-27** shows that there would be no exceedances of the CO 1-hour or 8-hour standard at any of the receptor locations. Thus, the proposed KP Medical Center would have a **less-than-significant impact** on local CO concentrations.

TABLE 4.2-27.
CARBON MONOXIDE CONCENTRATIONS AT AFFECTED INTERSECTIONS
PROPOSED KP MEDICAL CENTER

Intersection	CO Concentrations	
	1-hour (ppm)	8-hour (ppm)
Richards Boulevard/I-5 SB Ramps	6.4	5.3
Richards Boulevard/Bercut Drive	7.4	6.1
Bannon Street/Bercut Drive	5.6	4.7
South Park Street/Bercut Drive	5.4	4.5
N. B Street/7th Street	6.1	5.1
J Street/3rd Street/I-5 NB Off-Ramp	6.0	5.0
Railyards Boulevard/Jibboom Street	6.0	5.0
Railyards Boulevard/Bercut Drive	5.1	4.3
Railyards Boulevard/HSB Entry / Stanford St	5.4	4.5
Railyards Boulevard/5th Street	6.0	5.0
Railyards Boulevard/7th Street	6.5	5.4
Threshold	**20**	**9**
Exceed Threshold?	No	No

NOTES:

CO concentrations include a worst case 1-hour CO background concentration of 2.1 ppm and a worst case 8-hour background concentration of 1.9 ppm. The modeled 1-hour concentrations were converted to 8-hour concentrations using a persistence factor of 0.70. CALINE4 modeling results and additional assumptions are included in Appendix C.1.

SOURCE: ESA, 2016

MLS Stadium

A review of the traffic data associated with the MLS shows that five intersections would result in a LOS below E during the pre-event peak hour. CO modeling was conducted for these intersections using CALINE4. As shown in **Table 4.2-28**, the analysis finds that no exceedances of the CO 1- hour or 8-hour standard would occur at any of the receptor locations. Thus, the proposed MLS Stadium would have a **less-than-significant** impact on local CO concentrations.

TABLE 4.2-28.
CARBON MONOXIDE CONCENTRATIONS AT AFFECTED INTERSECTIONS
PROPOSED MLS STADIUM

Intersection	CO Concentrations	
	1-hour (ppm)	8-hour (ppm)
Richards Blvd / N 7th St	6.4	5.3
J St / 3rd St / I-5 Off-Ramps	6.0	5.0
Railyards Blvd / 5th St	5.9	4.9
Railyards Blvd / 6th St	5.4	4.5
Railyards Blvd / 7th St	5.6	4.7
Threshold	20	9
Exceed Threshold?	No	No

NOTES:

CO concentrations include a worst case 1-hour CO background concentration of 2.1 ppm and a worst case 8-hour background concentration of 1.9 ppm. The modeled 1-hour concentrations were converted to 8-hour concentrations using a persistence factor of 0.70. CALINE4 modeling results and additional assumptions are included in Appendix C.1.

SOURCE: ESA, 2016

Stormwater Outfall

The operation of the Stormwater Outfall would not result in added traffic to any of the intersection effect by the proposed projects. There would be **no impact**.

Summary

As shown in Tables 4.2-26 through 4.2-28, none of the intersections resulting in an LOS below E during the AM, PM, or pre-event peak hours affected by the proposed projects would result in significant CO concentrations. This impact would be **less than significant**.

Mitigation Measure

None required.

Impact 4.2-5: Implementation of the proposed projects could result in short-term and long-term exposure to Toxic Air Contaminants (TACs).

The 2007 RSP EIR evaluated health risks that focused on potential exposure from four sources of DPM: the use of off-road diesel equipment during construction, diesel trucks operating on the site and along I-5, diesel powered trains that use the UPRR tracks that traverse the RSP Area, and diesel emissions from vehicles that would use the proposed Sacramento Intermodal Transportation Facility. The 2007 RSP EIR found that DPM emissions generated during construction or after full-build out of the RSP would not result in a significant health risk within the RSP Area or at the nearest existing residential receptor. Results of the health risk assessment can be found in Appendix O of the 2007 RSP EIR. The 2007 RSP EIR concluded that the project health risks would be **less than significant**.

Railyards Specific Plan Update

Construction activities would produce diesel DPM emissions due to combustion equipment such as loaders, backhoes, and cranes, as well as haul trucks. DPM represents the primary TAC of concern from construction activities. Exposure of sensitive receptors - both existing residences near the RSPU site and future new residences on the project site - is the primary factor used to determine health risk. Exposure is a function of the concentration of a substance or substances in the environment and the extent of exposure. A longer exposure period would result in a higher exposure level. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time.

According to the OEHHA, health risk assessments should be based on a 30-year exposure period. However, such assessments should be limited to the period/duration of activities associated with the project. Thus, the duration of the proposed construction activities under the RSPU would only constitute a small percentage of the total 30-year exposure period. Due to this relatively short period of exposure, TACs generated during construction would not be expected to result in concentrations causing significant health risks. Construction of the proposed RSPU would result in **less-than-significant** construction-related health risks. In addition, DPM exhaust emissions from construction equipment would be reduced by 45% as compared to the state fleetwide average, based on Mitigation Measure 4.2-2(b). Therefore, this mitigation measure, if implemented, would further reduce exposure to the TACs that would be emitted during the construction period. Health risks associated with construction of the RSPU would be **less than significant**.

Operational DPM emissions were evaluated through the preparation of an HRA assuming full RSPU buildout conditions. The HRA was prepared based on guidance provided by the CARB and SMAQMD, and is presented in its entirety in Appendix C.3. The HRA evaluation considered the combined health risks from operation of the diesel generators at the proposed Stormwater Outfall, KP Medical Center, and MLS Stadium, the operation of emergency generators and boilers located in the Central Utility Plant at the KP Medical Center, the use of hazardous chemicals at the KP Medical Center, and from diesel truck traffic on I-5. The analysis examines pollutant concentrations on future proposed residences nearest to the KP Medical Center in Block 6. The RSPU would result in a maximum cancer risk of 5.0 per million and a chronic health

hazard of 0.002, which is below the significance thresholds of 10 in a million for cancer risks and 1.0 for chronic health hazards. The maximum concentration and associated health risk occurs at a future proposed residence in Block 35 located south of the hospital generators and just south of Railyards Boulevard. Health risks associated with buildout operation of the RSPU would be **less than significant**.

Railyards Specific Plan Update Land Use Variant

As previously discussed above under the RSPU, health risks are based on a 30-year exposure period. Since the construction duration of the RSPU Land Use Variant would only constitute a small percentage of the total 30-year exposure period, TACs generated during construction would not be expected to result in concentrations causing significant health risks. Construction of the proposed RSPU Variant would result in **less-than-significant** construction-related health risks. In addition, DPM exhaust emissions from construction equipment will be reduced by 45% as compared to the state fleetwide average, based on Mitigation Measure 4.2-2(b). Therefore, this mitigation measure, if implemented, would further reduce exposure to the TACs that would be emitted during the construction period. Health risks associated with construction of the RSPU would be **less than significant**.

For the RSPU Land Use Variant, the health risk evaluation found in Appendix C.3 examined the combined health risks from operation of the Stormwater Outfall diesel generator and I-5 on future residents and on residents bordering the site. The health risks from the KP Medical Center and MLS Stadium stationary sources are not evaluated in this assessment because they are not part of the Variant. The RSPU Variant would result in a cancer risk of 4.4 per million and a chronic health hazard of 0.0013, which is substantially below the significance thresholds of 10 in a million for cancer risks and 1.0 for chronic health hazards. The maximum concentration and associated health risks is located at a potential future residence located just east of I-5 near the northwestern corner of the RSP Area on Block 35. This represents the health risk increase from operation of the backup diesel generator at the proposed Stormwater Outfall and from I-5 traffic. This impact would be **less than significant**.

KP Medical Center

As previously discussed, health risks are based on a 30-year exposure period. Since the construction duration of the KP Medical Center would only constitute a small percentage of the total 30-year exposure period, TACs generated during construction would not be expected to result in concentrations causing significant health risks. Construction of the proposed KP Medical Center would result in less-than-significant construction-related health risks. In addition, DPM exhaust emissions from construction equipment would be reduced by 45% as compared to the state fleetwide average, based on Mitigation Measure 4.2-2(b). Therefore, this mitigation measure, if implemented, would further reduce exposure to the TACs that would be emitted during the construction period. Health risks associated with construction of the KP Medical Center would be **less than significant**.

Operation of the KP Medical Center would emit TACs from area and stationary sources. Area source emissions would be generated from chemicals used for sterilization, to prepare medications, and for surgical procedures. Several chemicals to be used at the hospital and medical offices pose acute, chronic, and/or carcinogenic health risks. These chemicals include methanol, formaldehyde, isopropyl alcohol, sodium hydroxide, and isopropanol.[43] These chemicals are used in small quantities, resulting in only minor amounts being vented. The health risks associated with venting these hazardous chemicals is expected to have negligible health risks to sensitive receptors near the hospital because of the small quantities of chemicals that would be used, the large airflow typical of hospital HVAC systems (and therefore low concentrations of vented TACs), and the distances between the hospital and the closest sensitive receptors.

All stationary KP Medical Center sources - the backup generators and boilers - were evaluated for their health risks. The hospital would be powered by a combination of natural gas fired boilers and electricity. Five diesel-powered backup generators would provide emergency backup power in the case of an electrical outage. Four natural-gas fired boilers would be used to provide steam and heat for daily hospital operation. Although natural gas combustion produces TACs, the amount of those TACs are extremely low, and the health risks associated with those TACs pose substantially lower risks than DPM produced by diesel fuel combustion. The cancer health risks and chronic and acute health hazard from natural gas combustion were found to be negligible (see also Appendix C.3). The KP Medical Center's cancer risk from the backup generators combined with the risks from I-5 freeway traffic emissions equals 3.2 per million for sensitive receptors at the hospital, to be located east of the CUP combustion sources. The chronic health index equals 0.001. Both cancer risk and the chronic health index are below the significance thresholds of 10 in a million for cancer risks and 1.0 for chronic health hazards. This impact is **less than significant**.

MLS Stadium

Construction of the MLS Stadium would take approximately three years to complete. Due to the relatively short period of exposure that construction would pose, TACs generated during construction would not be expected to result in concentrations causing significant health risks. Construction of the proposed MLS Stadium would result in less-than-significant construction-related health risks. In addition, DPM exhaust emissions from construction equipment will be reduced by 45% as compared to the state construction equipment fleetwide average, based on Mitigation Measure 4.2-2(b). Therefore, this mitigation measure, if implemented, would further reduce exposure to the TACs that would be emitted during the construction period. Health risks associated with construction of the MLS Stadium would be **less than significant**.

Operation of the MLS Stadium would be powered primarily by electricity. However, in the event of an electrical outage, a diesel powered generator would be used to provide backup electrical power. Operation of this generator would result in a small health risk equivalent to a cancer risk

[43] Kaiser Permanente, 2016. Hazardous materials in use at the Westside HMIS Hospital (Levels 1, 2, and 3).

of 0.5 per million and a chronic health hazard of 0.0002, which is substantially below the significance thresholds of 10 in a million for cancer risks and 1.0 for chronic health hazards. This represents the health risk increase only from operation of the backup diesel generator at the MLS Stadium. This impact would be **less than significant**.

Stormwater Outfall

Construction of the Stormwater Outfall would take less than one year to complete. Due to this relatively short period of exposure, TACs generated during construction would not be expected to result in concentrations causing significant health risks. Construction of the proposed Stormwater Outfall would result in less–than-significant construction-related health risks. In addition, DPM exhaust emissions from construction equipment will be reduced by 45% as compared to the state fleetwide average, based on Mitigation Measure 4.2-2(b). Therefore, this mitigation measure, if implemented, would further reduce exposure to the TACs that would be emitted during the construction period. Health risks associated with construction of the Stormwater Outfall would be **less than significant**.

Operation of the Stormwater Outfall would be powered by electrically powered pumps. However, in the event of an electrical outage, a diesel powered generator would be used to power the pumps. Operation of this generator would result in a small health risk equivalent to a cancer risk of 0.5 per million and a chronic health risk of 0.0002, which is substantially below the significance thresholds of 10 in a million for cancer and 1.0 for chronic health risks. This represents the health risk increase only from operation of the backup diesel generator at the MLS Stadium. This impact would be **less than significant**.

Summary

In summary, construction durations for each of the proposed projects would constitute a small percentage of the total 30-year exposure period used for health risk evaluations. Since construction of the proposed projects would only represent between 3 to 63 percent of the 30-year evaluation period, and because DPM exhaust emissions from construction equipment will be reduced by 45% as compared to the state fleet average (based on Mitigation Measure 4.2-2 (b)), TACs generated during construction would not be expected to result in concentrations causing significant health risks. Also, operation of the proposed projects would result in less-than-significant health risks. This impact is **less than significant**.

For operations, all of the land use options would result in cancer risks below the SMAQMD's threshold of 10 per million and acute and chronic health hazards below SMAQMD's threshold of 1.0. Consequently, the operational health risks for all options would be **less than significant**.

Mitigation Measure

None required.

Impact 4.2-6: Implementation of the proposed projects could create objectionable odors.

The 2007 RSP EIR discussed odor impacts under Impact 6.1-6 on pages 6.1-30 through 6.1-31. The 2007 RSP EIR identified the nearest existing odor source near the RSP to be the Sacramento River Water Treatment Plant (SRWTP), located adjacent to the RSP site's northwestern boundary. The 2007 RSP EIR concluded that uses proposed within the RSP adjacent to the SRWTP would not be odor-sensitive and would provide a buffer of several hundred feet between the SRWTP and the nearest onsite odor-sensitive use. The 2007 RSP EIR found this impact to result in a **less-than-significant impact**.

Railyards Specific Plan Update

The SMAQMD has identified typical odor sources in its *CEQA Guide to Air Quality Assessment.* These include wastewater treatment plants, sanitary landfills, composting and green waste facilities, recycling facilities, petroleum refineries, chemical manufacturing plants, painting and coating operations, rendering plants, and food packaging plants.[44] The proposed RSPU would not include uses that have been identified by SMAQMD as potential sources of objectionable odors. In addition, the RSPU would not be located within one mile of any facilities or uses known to generate objectionable odors. The RSPU would include a major medical center, a sports and entertainment stadium, and mixed use development. Restaurants and other food and drinking places could produce some odors, but these types of uses already exist in the project vicinity and are not generally considered sources of objectionable odors. Diesel equipment used during construction can produce odorous exhaust, but equipment use in any one area of the project site would be temporary and potential odors would not affect a substantial number of people. The RSPU would include land uses located near the SRWTP, but the operations at the water treatment plant would not include in any activities that would result in objectionable odors. This impact would be **less than significant**. This impact conclusion is consistent with the 2007 RSP EIR.

Railyards Specific Plan Update Land Use Variant

The RSPU Land Use Variant would result in similar odor impacts as discussed under the RSPU. Under the Land Use Variant, the KP Medical Center and the MLS Stadium would be replaced with office and residential land uses. Proposed restaurants and other food and drinking places within the RSPU Land Use Variant site would not result in objectionable odors, since these types of uses already exist in the project vicinity and are not considered significant sources of odor. Construction the RSPU Land Use Variant could produce odorous exhaust, but equipment use in any one construction site in the RSP Area would be temporary and potential odors would not affect a substantial number of people. Much like the proposed RSPU, the RSPU Land Use Variant would include land uses near the SRWTP, but the operations at the water treatment plant would not include in any activities that would result in objectionable odors. This impact would be **less than significant**. This impact conclusion is consistent with the 2007 RSP EIR.

[44] Sacramento Metropolitan Air Quality Management District, 2009. *Guide to Air Quality Assessment*. Adopted December 2009 and last updated October 2013. pp. 7-2.

KP Medical Center

None of the activities associated with the KP Medical Center would have the potential to expose nearby sensitive receptors (e.g., residential areas, schools, nursing homes) to objectionable odors. Since the proposed KP Medical Center would not be a source of objectionable odors, and would not be exposed to odors from surrounding land uses, this impact would result in a **less-than-significant** impact.

MLS Stadium

Operation of the MLS Stadium would not add any new odor sources, and any odors generated would be similar to existing odors associated with land uses in the area. The MLS Stadium would generate large quantities of solid waste during MLS Matches. However, there would be onsite staff available to quickly dispose of trash and recycle material, which would eliminate the potential for odors to be generated at the MLS Stadium site. The MLS Stadium would not be located near any facilities or uses known to generate objectionable odors. As a result, the MLS Stadium's construction and operational activities would not create objectionable odors affecting a substantial number of people. The impact would be **less than significant.**

Stormwater Outfall

The Stormwater Outfall would result in a very brief period of construction and would not generate any odorous emissions during operations. This impact would be **less than significant**.

Summary

In summary, none of the proposed activities or uses proposed within any of the proposed project sites would be classified by the SMAQMD as typical odor sources. Although odors could be generated by diesel exhaust from off-road equipment during the construction of the proposed projects, these odors would be temporary and would not affect a substantial number of people. The proposed projects could place sensitive land uses adjacent to the existing SRWTP, located north-west of the proposed project site. However, operation of the SRWTP would not involve any activities that would produce odorous emissions. Therefore, this impact would result in **less–than-significant** impact. No additional mitigation is recommended.

Mitigation Measure

None required.

Impact 4.2-7: Implementation of the proposed projects could alter wind speed at ground level (pedestrian level).

The 2007 RSP EIR discussed wind impacts under Impact 6.1-7 on page 6.1-31. The 2007 RSP EIR discussed the potential for development pursuant to the 2007 RSP to create a new microclimate, especially for buildings over 100 feet in height. The 2007 RSP EIR concluded that

the RSP Area could experience strong southwest winds which could exacerbate wind risks. The 2007 RSP EIR found this impact to be **significant**.

Railyards Specific Plan Update

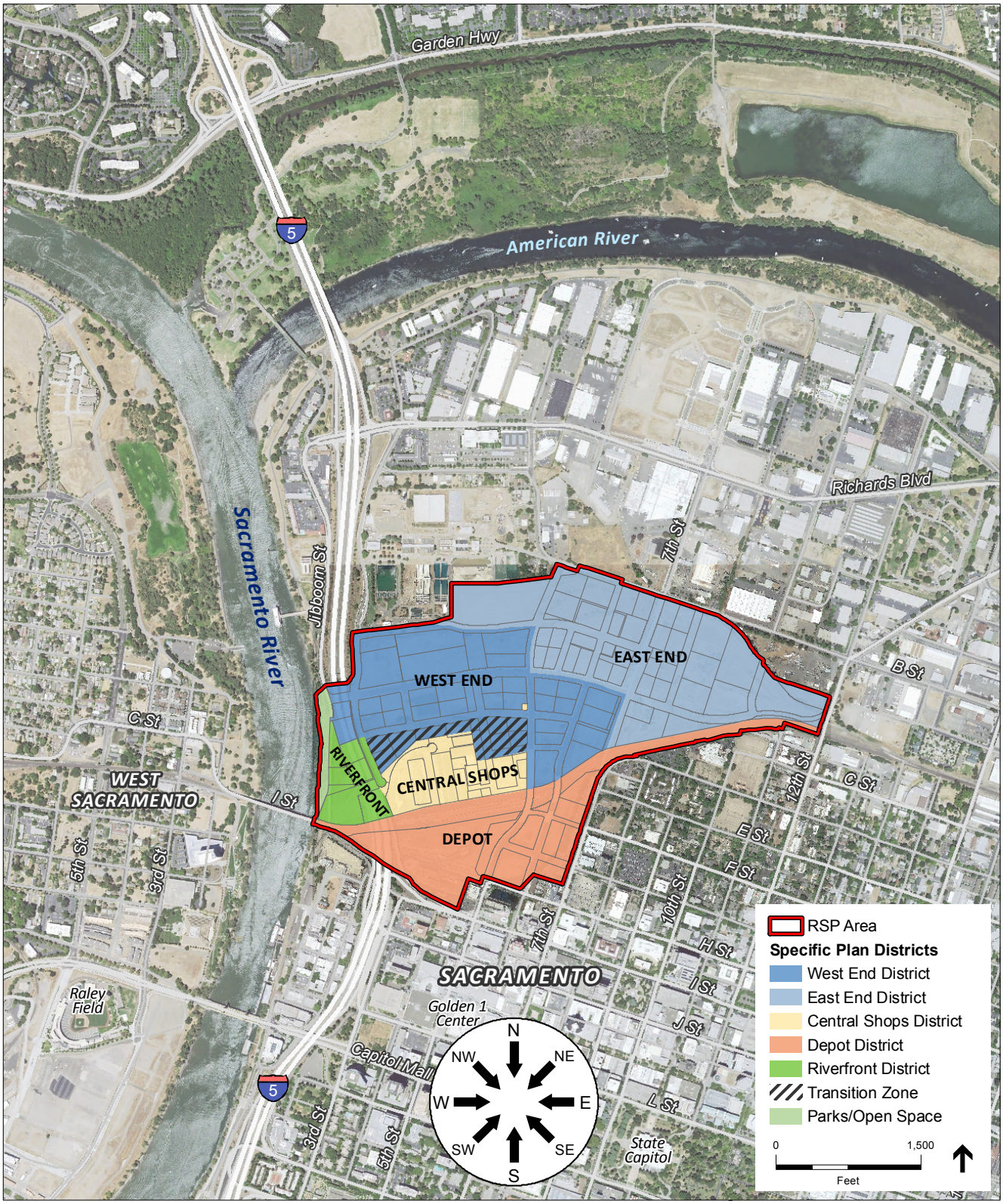
As discussed in the Existing Wind Conditions section, the most frequent winds are the southwest winds. Less frequent but stronger winds that could create hazardous wind conditions are the north, northwest, south, and southeast winds. Previous wind-tunnel tests conducted for buildings in downtown Sacramento show that constructing a mid- to high-rise building could be expected to result in increased ground-level wind speeds, and may also result in a wind hazard. The RSP Area is located northwest from the Sacramento downtown area, where the sites of the previously wind-tunnel tested buildings are located. The RSP Area is fairly exposed to approaching wind in comparison to the locations of these previously wind-tested buildings. With the exception of downtown Sacramento to the southeast, there is not much development of substantial size to slow down wind approaching the RSP Area.

These wind directions are the focus in the following discussion of wind expected from the proposed RSPU. **Figure 4.2-1** shows the view of the RSP Area and wind directions. In the following discussions, the effects are considered for each important wind direction; the prevailing southwest winds are important because they affect pedestrian comfort, but have little effect on wind hazard, while the other directions are important because they have the potential to result in a wind hazard in pedestrian areas if buildings bring these strong winds down to street level.

Southwest Winds

To the southwest of the RSP Area is Old Sacramento, which consist of low-rise buildings with a few mid-rise buildings, and the Sacramento River. With the exception of the Ziggurat and the CalSTRS Headquarters Building in West Sacramento, development along the Sacramento River is primarily a mix of low- to mid-rise residential and industrial development. The lack of taller buildings to the southwest of the RSP Area allows for wind to approach mostly unobstructed. Development along the western edge of the RSP Area – the West End District and the Riverfront District – would be fully exposed to southwest winds.

The high-rise and bulky buildings that are fully exposed to southwest winds have the potential to create turbulent winds at the ground level around the buildings. Future buildings at the northern edge of the West End and East End Districts in the RSP Area are most exposed to winds from the northeast through northwest. In the West End District, especially north of Railyards Boulevard, If they are fully exposed to exceptionally strong winds during a high-wind event, buildings taller than 85-feet have the potential for creating hazardous ground level winds, which, have the potential to be unsafe for pedestrians during a high-wind event. If no other structures are present in the immediate vicinity upwind to the north of future buildings, the development and its context should be carefully evaluated as with mid- to high-rise residential buildings (see **Figure 4.2-2**).



SOURCE: ESRI, 2012; City of Sacramento, 2015; Kimley-Horn, 2016; ESA, 2016

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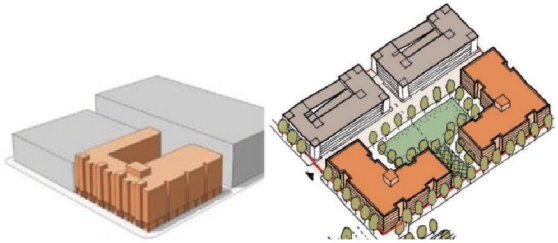
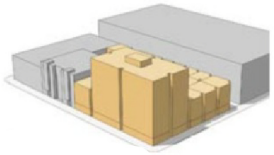
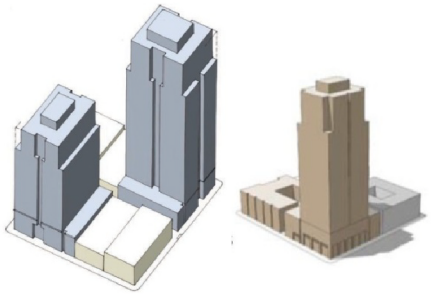
Figure 4.2-1
Wind Direction

Design Guidelines Development Type	Design Guidelines Example	Expected Effect on Winds at Pedestrian Level	Mitigation or Preventive Measure
Residential Low-Rise (Up to 50-feet) Commercial Low/Mid-Rise (Up to 85-feet)		Adverse pedestrian-level wind effects could occur. A wind hazard would be unlikely.	No wind evaluation necessary
Residential Mid-Rise (50-feet to 100-feet)		Adverse pedestrian-level wind effects could occur. A wind hazard could occur for some building configurations.	Final design and vicinity context shall be evaluated by wind expert to determine if a wind hazard would be likely to occur. If the available evidence is insufficient to support a conclusion that no wind hazard would result, a wind test may be required.
Residential High-Rise (>100-feet) Commercial High-Rise (250-feet to 500-feet)		Adverse pedestrian-level wind effects likely. A wind hazard may occur. for some building configurations. Adverse pedestrian-level wind effects likely. A wind hazard is likely to occur.	

SOURCE: ESA 2015

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Figure 4.2-2

Effect of Development on Wind Environment

Development in the West End District south of Railyards Boulevard has the potential to redirect and slow down approaching winds as well, depending on the bulk and size of the development. Low-rise development, as defined in Figure 4.2-2, would have only a small effect in slowing down southwest approaching winds, as the wind would easily move across low-rise development, whereas mid- to high-rise buildings would help in slowing down southwest winds.

In the East End District, development that includes 200-ft high-rise buildings would have the potential to cause wind hazards for pedestrians, depending upon the building configurations proposed. The East End District also would contain the proposed MLS Stadium at the eastern edge. The site of the proposed MLS Stadium would be protected from the southwest winds by the development in the West End and East End Districts, depending of the height and density of the completed development. In the intervening open space and over the MLS Stadium site, the ground-level speed of southwest winds would be expected to increase, but not substantially. The MLS Stadium and site would be relatively open and not affect the wind speed, except in near the Stadium structure, where it would offer shelter to people on site.

The Riverfront District is at the southwest edge of the RSP Area. High-rise development proposed in this fully exposed area would have a strong potential to increase pedestrian level wind speeds. Prevailing winds redirected to ground level by high-rise buildings could adversely affect wind comfort in the area, but there is only a small potential to result in wind hazards due to southwest winds. Furthermore, although they would typically not result from southwest winds, wind hazards may result due to strong winds from other directions.

The Depot District and the Central Shops District are anticipated to have development similar size and bulk to the existing buildings and structures on the Railyards site and the surrounding neighborhoods. This development is not anticipated to increase winds and may rather decrease existing wind speeds at ground level by adding buildings of similar height in the area.

North to Northwest Winds

Winds generally from the north, but ranging from the northeast to northwest, of the RSP Area approach the site mostly unimpeded. North of the RSP Area is low-rise development in the River District that, in turn, is bordered on the north by the American River, which runs east to west. North of the River, Discovery Park is a large, open recreational area with low-rise residential of South Natomas farther upwind.

Future development at the northern edge of the West and East End Districts are most exposed to winds from the northeast through northwest. Buildings 85-feet to 100-feet tall have the potential for creating hazardous ground level winds if they are fully exposed to exceptionally strong winds. Other development in the West and East End Districts could include high-rise towers to a maximum height of 200 feet or more. Such buildings would be of sufficient height to potentially cause hazardous winds at ground levels under certain conditions. Strong winds at ground levels could occur where these high-rise towers are at the corners of blocks or otherwise have direct exposure to northerly winds.

South to Southeast Winds

The winds approaching the RSP Area from the south to southeast will have been slowed somewhat by the mass of mid- to high-rise buildings that are present in downtown Sacramento. Regardless, the potential for unsafe wind conditions caused by high-rise buildings would remain, as seen in the previous wind-studies of buildings in the downtown area, but such events would be expected to occur less frequently when winds are coming from the south and southeast directions.

Future development of mid- and high-rise buildings, especially in the western and northern portions of the RSP Area, has the potential to create hazardous ground-level wind conditions. This is considered a **potentially significant impact**.

Railyards Specific Plan Update Land Use Variant

Wind effects of the RSPU Land Use Variant would be essentially the same as those under the proposed RSPU. As a result of replacing the proposed MLS Stadium with mixed-use development, higher buildings could be built on Blocks 52 through 55, but the wind effects of high-rise development in this area is similar to those described for high-rise development in other parts of the East End District under the proposed RSPU. The effect of potential wind hazards under the RSPU Land Use Variant is considered a **potentially significant impact**.

KP Medical Center

The project applicant has prepared illustrative site plans for the proposed KP Medical Center. These illustrative site plans would be revised and refined as part of the final design process, and would be reviewed by the City as part of the Site Plan and Design Review permit process. The following analysis of potential wind effects of the KP Medical Center is based on the illustrative site plans presented in Chapter 2, Project Description.

Southwest Winds

The proposed KP Medical Center would be located at the northwest corner of the West End District, and would contain buildings up to 230-feet tall. Depending on final designs, the heights and bulks of the proposed buildings in an area that is fully exposed to southwest winds have the potential to create turbulent winds at the ground level around the buildings. These winds have potential to be unsafe for pedestrians during a high-wind event.

Based on the illustrative site plans, the six-story Phase 1 Parking Garage at the west boundary of the KP Medical Center site would be most exposed to the southwest wind, and would redirect some of the wind around the structure and some wind down to the ground, but an open-sided structure, as is expected of a parking structure, also would allow wind to enter the substantial openings at every floor and dissipate within the parking decks. This would substantially reduce the amount of wind that would be directed downward to ground level from the six-story structure.

Southwest winds would then approach the hospital tower; lower-level winds would have been slowed by the garage, while winds above the garage level would not be slowed. While the height

of the proposed hospital indicates a strong potential for winds to be brought down to ground level, the presence of the 3- to 4-story building base (and the HSB) would likely intercept and dissipate these tower "downwash" winds before they reach pedestrian level in public areas. By the time southwest winds reach the Phase 2 medical office buildings, they should be slowed. The medical office buildings would be too short to create a wind hazard and the Phase 2 Parking Structure, approximately 85-ft in height, would not likely create a wind hazard, because it would be sheltered from southwest winds by the adjacent 85 to 90-foot medical office buildings which would likely intercept and dissipate these tower "downwash" winds before they reach pedestrian level in public areas.

North to Northwest Winds

Northerly winds would approach the proposed KP Medical Center and cross the site at its most narrow dimension. Based on the illustrative site plans, an approximately 230-foot hospital, located near the center of the KP Medical Center site, would have the potential for increased wind speeds at pedestrian level. Depending on final design features, winds from the north could strike the side of the tower. Northerly winds are of concern because they have a higher-speed component that occurs just often enough to result in wind hazards if redirected downward by high-rise buildings. Even buildings 85-feet to 100-feet tall have the potential for creating hazardous ground level winds if they are fully exposed to exceptionally strong winds. If a proposed development has no other structures in the immediate vicinity upwind to the north, the potential exists for significant wind hazards to be created. Because the hospital tower could be of sufficient height to create pedestrian level wind hazards, this is considered a **potentially significant** impact.

MLS Stadium

The proposed MLS Stadium site would be located at the eastern edge of the East End District. As presented in Chapter 2, the height of the Stadium ranges 70 to 90 feet, with a canopy roof raised up to 5-feet above the height of the seating bowl. This is not a tall structure compared to high-rise buildings known to cause hazardous wind environments; however, the Stadium bowl would be a large structure and due to its exposure to winds from the north, could have a potential to increase existing pedestrian-level wind speeds. The rounded shape, open air canopy, and the permeable design of the Stadium façade would help redirect and reduce any potentially high or unsafe winds. Due to the relatively low height of the proposed MLS Stadium, this is considered a **less-than-significant** impact.

Stormwater Outfall

The Stormwater Outfall would be largely below grade and would have a profile so low as to avoid any material redirection of wind. This impact is considered **less than significant**.

Summary

In summary, buildings and other structures of approximately 85 feet or less would be unlikely to result in adverse pedestrian-level wind effects. Buildings over that height, especially if located on

the western or northern edges of the West End District or the northern edge of the East End District, could create pedestrian-level wind hazards. Therefore, this impact would result in a **potentially significant** impact.

Mitigation Measure

Mitigation Measure 4.2-7 described below is an update of Mitigation Measure 6.1-7 on page 6.1-31 of the 2007 RSP EIR.

Mitigation Measure 4.2-7 (RSPU, KPMC)

The following measures are recommended to assure that future buildings developed in the RSP Area do not cause hazardous wind conditions for pedestrians in areas of substantial public use:

1) *New buildings with heights of more than 85-feet shall be evaluated by a qualified wind expert to determine the potential to cause a new wind hazard or aggravate an existing wind hazard for pedestrians in areas of substantial public use. Based on a review of wind conditions, other development in the vicinity, and the project design, the evaluator may have sufficient evidence to form a professional opinion about the potential for the project to cause a hazardous wind environment. If sufficient evidence is available to conclude that no wind hazards will be created, no further mitigation is required. If sufficient evidence to establish safe pedestrian conditions is not available, the City shall require wind-tunnel testing to provide the evidence that a wind hazard would not result in public areas.*

2) *If required wind tunnel testing identifies wind hazards, the qualified wind expert shall work with the City and/or project proponent to develop corrective measures such as building design changes, protective structures, or landscaping modifications to help reduce pedestrian-level wind speeds to acceptable levels. The City shall require implementation of such corrective measures as a condition of the building permit.*

Cumulative Impacts

The geographic context for changes in the air quality environment due to development of the proposed projects would be both regional and local. Ozone and $PM_{2.5}$ would be the primary pollutants of regional concern, meaning that the cumulative context would include the SVAB.

Particulates (fugitive dust and fine particulate matter, including DPM) and TACs could result in localized impacts in close proximity to pollutant sources. In addition to the proposed projects, the other active cumulative construction projects in the immediate vicinity are the I Street Bridge Replacement project and the Powerhouse Science Center, Vanir Tower (6^{th}/J Street), Township 9 (later phases), other potential future ESC development and the High Speed Train.

As described above in Impact 4.2-1, the proposed projects would not conflict with or obstruct implementation of applicable air quality plans based on SACOG's future growth projections for the region, and thus, this impact is not discussed further in the cumulative analysis. Finally, as described above in Impact 4.2-6, the project would not include uses that have been identified by SMAQMD as potential sources of objectionable odors, nor would the proposed projects result in odor sensitive-receptors being located in close proximity to substantial sources of odor. This impact would not be affected by cumulative development.

Impact 4.2-8: The proposed projects could contribute to cumulative increases in short-term (construction) emissions.

NOx, PM_{10}, and $PM_{2.5}$ are the pollutants that SMAQMD has identified as the primary concerns from construction. The project plus other concurrent construction activities in the SVAB could contribute to cumulative construction-related NO_X, PM_{10} and $PM_{2.5}$ emissions. Construction of the proposed projects would result in significant emissions of NO_X, PM_{10} and $PM_{2.5}$, which could combine with emissions generated by other existing and future development within the SVAB to contribute to an air quality impact in the region. Since the proposed projects exceed the SMAQMD project level thresholds, they would also be considered significant contributors to cumulative emissions. Consequently, without mitigation, the proposed projects would have a cumulatively considerable contribution to a significant cumulative impact.

Mitigation Measures

Mitigation Measure 4.2-8 described below is the same as Mitigation Measures 6.1-1 on pages 6.8-20 through 6.8-21 of the 2007 RSP EIR, respectively.

Mitigation Measure 4.2-8 (RSPU)

Implement Mitigation Measure 4.2-2.

Impact Significance After Mitigation: With implementation of the above mitigation measures for the proposed project, exhaust emissions would be reduced onsite and mitigation fees would be provided to SMAQMD to offset project NOx emissions that exceed the SMAQMD significance threshold. SMAQMD uses these fees to fund off-site projects that would offset the project's NOx emissions. Although cumulative NO_X emissions in the SVAB would be significant due to existing violations in the region, with implementation of Mitigation Measure 4.2-2 the proposed projects' contributions would be reduced to a level that would result in a less than considerable contribution to the significant cumulative impact. Thus, this impact would be mitigated to **less than significant**.

Impact 4.2-9: The proposed projects could contribute to cumulative increases in long-term (operational) emissions of NOx ROG, PM_{10} and $PM_{2.5}$.

ROG and NOx are ozone precursors and are primarily of regional concern. Thus, all other mobile, area, and energy sources in the SVAB that would operate concurrently with the proposed project would contribute to cumulative operational-related ROG and NO_X emissions. As described in Impact 4.2-3, under non-event day conditions, the proposed project would result in substantial emissions of ROG and NO_X, which would combine with emissions generated by other existing and future development within the SVAB to contribute to an air quality violation in the region. Also, the proposed projects exceedance of the thresholds during non-event day conditions indicates that its contribution to such a violation would be considerable. Consequently, without mitigation, the proposed project's contribution to ozone precursor emissions would be cumulatively considerable, resulting in a **significant cumulative impact**.

As is also described under Impact 4.2-3, the RSPU would result in a 15 to 17 percent reduction in NO_{xe} emissions by implementing the design features proposed under the RSPU, Design Guidelines, and SPD, and would meet or exceed the 15 percent emission reduction/mitigation guideline established by the SMAQMD. Nevertheless, even with achievement of the SMAQMD-required 15 percent reduction in operational mobile source emissions, NOx and ROG emissions associated with RSPU would exceed the SMAQMD threshold of 65 pounds per day, contributing to significant cumulative air emissions. Consequently, this cumulative impact would remain **significant**.

Mitigation Measures

Consistent with the direction of the SMAQMD, no further mitigation required.

Impact Significance After Mitigation: As is described under Impact 4.2-3, above, the traffic reduction variables and other emission reductions built into the design and locality of the proposed projects would exceed 15 percent reduction in NO_xe emissions after mitigation.[45] Since the proposed RSPU would be designed as a high-density, mixed-use, transit-oriented development, much of the reduction would be achieved by project design and location within the Sacramento urban core with access to a variety of transportation options. Nonetheless, even with the inclusion of the above-mentioned design features, NO_X and ROG emissions associated with either of the project scenarios would still exceed the SMAQMD threshold of 85 lbs/day. Thus, operational emissions of ozone precursors would be **significant and unavoidable**.

Impact 4.2-10: The proposed projects could contribute to cumulative increases in CO concentrations.

Cumulative traffic was analyzed to determine its potential to affect CO concentrations along surface streets near sensitive receptors in the vicinity of the proposed project. A review of the traffic data shows that twenty five intersections would result in a LOS below E during the AM,

[45] NOxe as defined by the SMAQMD is the reduction in ROG divided by 3 plus the reduction in NOx.

PM, or pre-event peak hours during cumulative year 2035. **Table 4.2-29** shows the results of the cumulative CO modeling. As shown in Table 4.2-29, there would be no exceedances of the CO 1-hour or 8-hour standard at any of the twenty five intersections. Thus, the proposed project would rest in a **less-than-significant** cumulative impact on local CO concentrations.

TABLE 4.2-29.
CARBON MONOXIDE CONCENTRATIONS AT AFFECTED INTERSECTIONS UNDER CUMULATIVE PLUS PROJECT CONDITIONS

	CO Concentrations	
Intersection	**1-hour (ppm)**	**8-hour (ppm)**
Richards Blvd / I-5 SB Ramps	5.3	4.46
Richards Blvd / Sequoia Pacific Blvd	5.4	4.54
Richards Blvd / N 7th St	5.3	4.46
N B St / N 7th St	5.4	4.54
F St / 7th St	5.3	4.46
H St / 5th St	5.1	4.3
I St / 6th St	5.4	4.54
J St / 3rd St / I 5 NB Off-Ramp	5.2	4.38
C St / 5th St	5.3	4.46
C St / 3rd St	5.4	4.54
South Park St / Bercut Dr	4.8	4.06
South Park St / 5th St	5.9	4.94
South Park St / 6th St	4.8	4.06
Railyards Blvd / Jibboom St	5.6	4.7
Railyards Blvd / Bercut Dr	5.6	4.7
Railyards Blvd / Huntington St	5.1	4.3
Railyards Blvd / 5th St	5.2	4.38
Railyards Blvd / Judah St	4.9	4.14
Railyards Blvd / 6th St	5.2	4.38
Railyards Blvd / 7th St	5.5	4.62
Railyards Blvd / 8th St	4.8	4.06
Camille Ln / Bercut Dr	4.8	4.06
Camille Ln / Huntington St	4.8	4.06
Camille Ln / Stanford St	4.8	4.06
Camille Ln / 6th St	4.8	4.06
Threshold	**20**	**9**
Exceed Threshold?	No	No

NOTES:

CO concentrations include a worst case 1-hour CO background concentration of 2.1 ppm and a worst case 8-hour background concentration of 1.9 ppm. The modeled 1-hour concentrations were converted to 8-hour concentrations using a persistence factor of 0.80. CALINE4 modeling results and additional assumptions are included in Appendix C.1.

SOURCE: ESA, 2016

Mitigation Measure

None required.

Impact 4.2-11: The proposed projects could contribute to cumulative increases in short- and long-term exposures to Toxic Air Contaminants.

The evaluation of health risks from TAC represents a local rather than regional analysis. The analysis described in Impact 4.2-5 and in Appendix C.3 shows that TACs and resulting health risks produced during construction and full-buildout of the proposed projects would result in less-than-significant impacts. Impact 4.2-5 also includes an evaluation of the toxic air contaminants generated by I-5 on future residents and other sensitive receptors. The SMAQMD considers the project-level threshold of significance for evaluating TACs generated by a project as also applicable to a project's contribution to cumulative TACs. Therefore, since the project would not have a significant project-specific health risk, it would also not cause or contribute to a significant cumulative health risk. This impact is **less than significant.**

Mitigation Measure

None required.

Impact 4.2-12: The proposed projects could contribute to cumulative changes in wind levels in downtown Sacramento.

Development proposed near the RSP Area would not have a significant effect on wind approaching the Area unless that development is of substantial height and/or bulk. As discussed, the southwest winds and north to northwest winds are the most influential wind directions at the RSP Area. The existing development upwind in these wind directions are either low to mid-rise residential or commercial or open spaces. Generally, any new development in open areas would decrease wind speeds in the downwind direction, however, because there is already low rise development upwind of the RSP Area, development would need to be similar to the height and bulk of downtown Sacramento to effectively reduce approaching wind speeds. Therefore, taller development upwind of the RSP Area would mostly benefit the site; else wind conditions would be expected to be the same as existing conditions. As such, the proposed projects would not contribute to a cumulative increase in wind levels in downtown Sacramento. This is considered a **less-than-significant cumulative impact**.

Mitigation Measure

None required.