Air Quality Technical Study Report

Draft Air Quality Technical Study for the Harvard Avenue and Michelson Drive Intersection Improvement Project Irvine, California

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Abbreviations

AB	Assembly Bill
CAAQS	California Ambient Air Quality Standards
CAA	Clean Air Act
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CPUC	California Public Utility Commission
DPM	Executive order Diesel Particulate Matter
EO	
EPA	United States Environmental Protection Agency
GHG	Greenhouse gas
GWP	Global warming potential
LCFS	Low carbon fuel standard
NAAQS	National Ambient Air Quality Standards
NO_2, NOx	Nitrogen dioxide, oxides of nitrogen
O_3	Ozone
Pb	Lead
PM_{10}, and $PM_{2.5}$	Respirable particulate matter, and fine particulate matter
ppb, ppm	parts per billion, parts per million
RPS	Renewable Portfolio Standard
ROG	Reactive organic gases
SB	Senate bill
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SIP	State Implementation Plan
SO_2, and SOx	Sulfur dioxide and sulfur oxides
TAC	Toxic air contaminants
VOC	Volatile organic compounds

1.0 INTRODUCTION

The project area is within the South Coast Air Basin (SCAB) and is under the jurisdiction of South Coast Air Quality Management District (SCAQMD). This air quality technical study report provides assessment of the potential impacts to local and regional air quality that are related to the proposed Harvard Avenue and Michelson Drive Intersection Improvement Project (Project). The proposed Project is located in Orange County in the City of Irvine (see Figure 1). The proposed Project is one of the mitigations identified in both 2010 and 2015 Irvine Business Complex (IBC) Vision Plan Traffic Studies and will improve circulation in the western portion of the City of Irvine.

The proposed roadway layout and associated improvements, including revised geometries for the Harvard Avenue and Michelson Drive intersection are summarized below. Each location describes the approach to the intersection and for the purpose of this description, Harvard Avenue is considered going north/south and Michelson Drive going east/west.

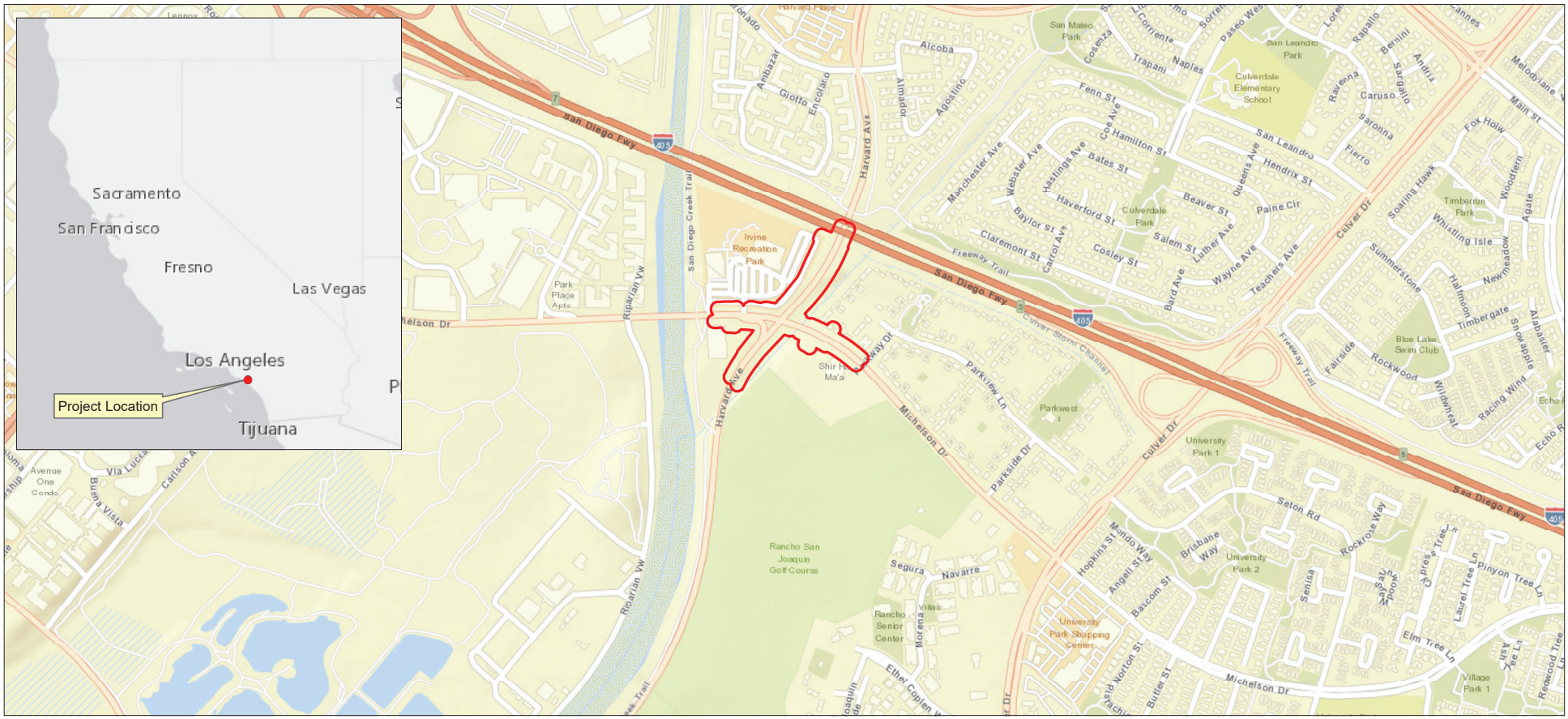
- Northbound Harvard Avenue:
  - Existing – One left-turn lane, two through lanes, and a Class II on-street bike lane;
  - Proposed – Re-stripe to lengthen left-turn lane, maintain two through lanes, and restripe to provide a de facto right turn lane.

- Southbound Harvard Avenue:
  - Existing – one left-turn lane, two through lanes, and one right-turn lane;
  - Proposed – Add one left turn lane for a total of two left-turn lanes, maintain two through lanes and one right turn lane, provide a Class II on-street bike lane towards intersection stop line, add 10-foot off-street shared use path for bikes and pedestrians;

- Eastbound Michelson Drive:
  - Existing – Two left-turn lanes, two through lanes and one non-standard free right-turn lane;
  - Proposed – Maintain two left-turn lanes, two through lanes and remove non-standard free right-turn lane and replace with designated right-turn lane, add a 10-foot off-street shared use path for bikes and pedestrians; narrow west end of existing median

- Westbound Michelson Drive:
  - Existing – One left-turn lane and two through lanes.
  - Proposed – Maintain one left-turn lane, two through lanes, restripe to provide a Class II on-street bike lane towards intersection stop line.

In order to accommodate the new roadway design and ensure its safe operation, widening of the southwest and northwest quadrants of Harvard Avenue would be needed. The existing “Pork Chop” along the northeast quadrant of Harvard Avenue will be eliminated in order to improve the intersection’s operational characteristics. Additional project components include a shared use path to accommodate the heavy pedestrian and bike traffic, Class II on-street bike lane, reconstructed storm drain/catchment basin, reconstructed and landscaped slope, and other related roadway improvements (e.g., lane restriping, relocation of street lights).



Study Area

0 170 340 metres
(At original document size of 11x17)
1:9,000

N

Notes
1. Coordinate System: NAD 1983 2011 StatePlane California VI FIPS 0406 Ft US
2. Data Sources:
3. Background: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Stantec

Project Location
Irvine, California

Prepared by DL on 2019-09-10
TR by RB on 2019-09-10
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Client/Project
2042557300
Harvard Avenue and Michelson Drive Intersection Improvement Project

Figure No.
1

Title
Project Location

1.1 EXISTING SETTING

1.1.1 Climate and Meteorology

As noted above, the proposed Project is located in the SCAB which includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. Its terrain and geographical location determine the distinctive climate of the air basin, as the Basin is a coastal plain with connecting broad valleys and low hills.

The southern California region lies in a semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. Warm, dry summers, low precipitation, and mild winters characterize the overall climate in the SCAB. In the Project area, the average daily winter temperature is 54.5 degrees Fahrenheit (°F) and the average daily summer temperature is 73 °F. More than two-thirds of the annual rainfall occurs from December through March. The mean annual precipitation in the area is 14.4 inches. In nearly all months of the year, evaporation exceeds precipitation. Winds in the area are usually driven by the dominant land/sea breeze circulation system. Regional wind patterns are dominated by daytime onshore sea breezes from southwest. Average wind speed in the Project area is 5.4 miles per hour (mph). Occasionally during autumn and winter, “Santa Ana” conditions develop from a high-pressure zone to the east to bring dry, high-velocity winds from the deserts over Cajon Pass to the coastal region. These winds, gusting to more than 80 mph, can reduce relative humidity to less than 10 percent. Meteorological characteristics such as wind, sunlight, temperature, humidity, rainfall, and topography all impact the accumulation and/or dispersion of air pollutants throughout the Basin.

Criteria Air Pollutants

Criteria pollutants are defined by state and federal law as a risk to the health and welfare of the general public. In general, criteria air pollutants include the following compounds:

Ozone. Ozone is considered a photochemical oxidant, which is a chemical that is formed when volatile organic compounds (VOCs) and nitrogen oxides (NOx), both by-products of fuel combustion, react in the presence of ultraviolet light. Ozone is considered a respiratory irritant and prolonged exposure can reduce lung function, aggravate asthma, and increase susceptibility to respiratory infections. Children and those with existing respiratory diseases are at greatest risk from exposure to ozone.

Reactive Organic Gases. ROGs (also known as VOCs) are compounds composed primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicle usage is the major source of ROGs. Other sources of ROGs include evaporative emissions from paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. Adverse effects on human health are not caused directly by ROGs, but rather by reactions of ROGs to form secondary pollutants such as ozone.

Carbon Monoxide. CO is a by-product of fuel combustion. CO is an odorless, colorless gas. CO affects red blood cells in the body by binding to hemoglobin and reducing the amount of oxygen that can be

carried to the body's organs and tissues. CO can cause health effects to those with cardiovascular disease and can also affect mental alertness and vision.

Nitrogen Dioxide. NO2 is also a by-product of fuel combustion and is formed both directly as a product of combustion and in the atmosphere through the reaction of nitrogen oxide (NO) with oxygen. NO2 is a respiratory irritant and may affect those with existing respiratory illness, including asthma. NO2 can also increase the risk of respiratory illness.

Respirable Particulate Matter and Fine Particulate Matter. Respirable particulate matter, or PM10, refers to particulate matter with an aerodynamic diameter of 10 microns or less. Fine particulate matter, or PM2.5, refers to particulate matter with an aerodynamic diameter of 2.5 microns or less. Particulate matter in these size ranges have been determined to have the potential to lodge in the lungs and contribute to respiratory problems. PM10 and PM2.5 arise from a variety of sources, including road dust, diesel exhaust, fuel combustion, tire and brake wear, construction operations, and windblown dust. PM10 and PM2.5 can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases such as asthma and chronic bronchitis. PM2.5 is considered to have the potential to lodge deeper in the lungs. Diesel particulate matter is classified a carcinogen by the California Air Resources Board (CARB).

Sulfur dioxide. SO2 is a colorless, reactive gas that is produced from the burning of sulfur-containing fuels such as coal and oil and by other industrial processes. Generally, the highest concentrations of SO2 are found near large industrial sources. SO2 is a respiratory irritant that can cause narrowing of the airways leading to wheezing and shortness of breath. Long-term exposure to SO2 can cause respiratory illness and aggravate existing cardiovascular disease.

Lead. Lead in the atmosphere occurs as particulate matter. With the phase-out of leaded gasoline, large manufacturing facilities are the sources of the largest amounts of lead emissions. Lead has the potential to cause gastrointestinal, central nervous system, kidney, and blood diseases upon prolonged exposure. Lead is also classified as a probable human carcinogen. Because emissions of lead are found only in projects that are permitted by the local air district, lead is not an air quality of concern for the proposed project.

1.1.2 Regulatory Setting

Regulatory oversight authority regarding air quality rests at the federal, state, and local levels with the, U.S. Environmental Protection Agency (USEPA), CARB, and South Coast Air Quality Management District (SCAQMD), respectively. Plans, policies, and regulations that are relevant to the proposed project are discussed in the following sections.

Federal

The federal Clean Air Act (CAA), which was passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. The CAA delegates primary responsibility for clean air to the U.S. Environmental Protection Agency (EPA). The EPA develops rules and regulations to preserve and improve air quality and delegates specific responsibilities to state and local agencies. Under the act, the EPA has established the National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants

that are pervasive in urban environments and for which state and national health-based ambient air quality standards have been established. Ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and particulate matter (PM_{10} – respirable particles less than 10 microns in diameter, and $PM_{2.5}$ – fine particles less than 2.5 microns in diameter) are the six criteria air pollutants. Ozone is a secondary pollutant, Nitrogen oxides (NO_X) and volatile organic compounds (VOCs) are of particular interest as they are precursors to ozone formation. The NAAQS are divided into primary and secondary standards; the primary standards are set to protect human health within an adequate margin of safety, and the secondary standards are set to protect environmental values, such as plant and animal life. The standards for all criteria pollutants are presented in Table AQ-1.

The CAA requires EPA to designate areas as attainment, nonattainment, or maintenance (previously nonattainment and currently attainment) for each criteria pollutant based on whether the NAAQS have been achieved. The act also mandates that the state submit and implement a State Implementation Plan (SIP) for areas not meeting the NAAQS. These plans must include pollution control measures that demonstrate how the standards will be met.

State

The State of California began to set its ambient air quality standards (i.e., CAAQS) in 1969 under the mandate of the Mulford-Carrell Act. The California Clean Air Act (CCAA) was adopted by the CARB in 1988. The CCAA requires all air district of the state to achieve and maintain the CAAQS by the earliest practical date. Table AQ-1 shows the CAAQS currently in effect for each of the criteria pollutants, as well as the other pollutants recognized by the state. As shown in Table AQ-1, the CAAQS are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles.

The CARB and local air districts are responsible for achieving CAAQS, which are to be achieved through district-level air quality management plans (AQMPs) that would be incorporated into the SIP. In California, the EPA has delegated authority to prepare SIPs to CARB, which in turn, has delegated that authority to individual air districts. Other CARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air districts) and setting emissions standards for new motor vehicles and for other emission sources, such as consumer products and certain off-road equipment.

Table 1. National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	National Standards	
			Primary	Secondary
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m³)	--	Same as Primary
	8 Hour	0.070 ppm (137 µg/m³)	0.070 ppm (137 µg/m³)	
Respirable Particulate Matter (PM_{10})	24 Hour	50 µg/m³	150 µg/m³	Same as Primary
	Annual Mean	20 µg/m³	--	
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	--	35 µg/m³	Same as Primary
	Annual Mean	12 µg/m³	12.0 µg/m³	15 µg/m³

Table 1. National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	National Standards	
			Primary	Secondary
Carbon Monoxide (CO)	1 Hour	20 ppm (23 µg/m³)	35 ppm (40 mg/m³)	--
	8 Hour	9.0 ppm (10 mg/m³)	9 ppm (10 mg/m³)	--
Nitrogen Dioxide (NO2)	1 Hour	0.18 ppm (339 µg/m³)	100 ppb (188 µg/m³)	--
	Annual Mean	0.030 ppm (57 µg/m³)	0.053 ppm (100 µg/m³)	Same as Primary
Sulfur Dioxide (SO2)	1 Hour	0.25 ppm (655 µg/m³)	75 ppb (196 µg/m³)	--
	3 Hour	--	--	0.5 ppm (1300 µg/m³)
	24 Hour	0.04 ppm (105 µg/m³)	0.14 ppm	--
	Annual Mean	--	0.030 ppm	--
Lead (Pb)	30 Day Average	1.5 µg/m³	--	--
	Calendar Quarter	--	1.5 µg/m³	Same as Primary
	Rolling 3-Month Avg	--	0.15 µg/m³	Same as Primary
Visibility reducing particles	8 Hour	10-mile visibility standard, extinction of 0.23 per kilometer	No National Standards	
Sulfates	24 Hour	25 µg/m³		
Hydrogen sulfide (H2S)	1 Hour	0.03 ppm (42 µg/m³)		
Vinyl chloride	24 Hour	0.01 ppm (265 µg/m³)		

Notes:

ppm = parts per million; ppb = parts per billion; µg/m³ = micrograms per cubic meter; "--" = no standard.

Source: CARB Ambient Air Quality Standards Chart, CARB 2016

Attainment Status

Depending on whether or not the applicable ambient air quality standards (AAQS) are met or exceeded, the air basin is classified as being in “attainment” or “nonattainment”. The USEPA and CARB determine the air quality attainment status of designated areas by comparing ambient air quality measurements from state or local ambient air monitoring stations with the NAAQS and CAAQS. These designations are determined on a pollutant-by-pollutant basis. Consistent with federal requirements, an unclassifiable/ unclassified designation is treated as an attainment designation. Table AQ-2 presents the federal and state attainment status for the Project area, which is in Orange County. As shown in the Table AQ-2, the Project is in an area designated non-attainment for O_3 and $PM_{2.5}$ based on both the federal and State standards, and for PM_{10}, based on the State standard. Because the Orange County (within SCAB) currently exceeds these State and federal ambient air quality standards, the SCAQMD is required to implement strategies to reduce pollutant levels to recognized acceptable standards.

Table 2. Attainment Status of Orange County within South Coast Air Basin

Pollutant	Federal Designation	State Designation
Ozone (O_3)	Non-Attainment (Extreme)	Non-Attainment
Particulate Matter (PM_{10})	Attainment/Maintenance	Non-Attainment
Particulate Matter ($PM_{2.5}$)	Non-Attainment (Moderate)	Non-Attainment
Carbon Monoxide (CO)	Attainment/Maintenance	Attainment
Nitrogen Dioxide (NO_2)	Attainment/Maintenance	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Lead (Pb)	Attainment	Attainment
Hydrogen Sulfide (H_2S)	*	Unclassified
Sulfates	*	Attainment
Visibility Reducing Particles	*	Unclassified

Source: SCAQMD, 2017a, and EPA, 2019 https://www3.epa.gov/airquality/greenbook (area designation for criteria pollutants [Green Book])

Notes: (*) = Not Applicable/ No Federal Standards.

Toxic Air Contaminants Regulation. California regulates toxic air containments (TACs) primarily through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588 – Connelly). In the early 1980s, the CARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. In August 1998, CARB identified diesel particulate matter (DPM) emissions from diesel-fueled engines as a TAC. In September 2000, CARB approved a comprehensive diesel risk reduction plan to reduce emissions from both new and existing diesel fueled engines and vehicles (CARB 2000). The goal of the plan is to reduce diesel PM_{10} (inhalable particulate matter) emissions and the associated health risk by 75% in 2010 and by 85% by 2020.

Local

Applicable Air Quality Plans. The SCAQMD in conjunction with the Southern California Association of Governments (SCAG), CARB, and USEPA prepares air quality management plans (AQMP) to lead the SCAB into attainment with federal and state standards, and to ensure that future emissions will be within these standards. The SCAQMD updates its plans on a regular basis. The most recent plan is the 2016 AQMP (SCAQMD, 2017b). It provides a comprehensive and integrated program to lead the SCAB into compliance with the federal ozone and particulate matter standards.

The 2016 AQMP accounts for projected population growth, predicted future emissions in energy and transportation demand, and determined control strategies for the eventual achievement of NAAQS attainment designation. These control strategies are either organized into the SCAQMD rules and regulations, or otherwise set forth as formal SCAQMD recommendations to other agencies. The 2016 AQMP includes policies that are consistent with the SCAQMD and specify review according to the recommendations of SCAQMD guidelines. Other policies are aimed at reducing transportation emissions and emissions from major stationary sources. The Project would be subject to the following general

SCAQMD rules and regulations, and the Orange County Grading and Excavation Codes prior to issuance of grading permit:

Regulatory IV – Prohibitions

- Rule 401 – Visible Emissions: prohibits discharges of visible air contaminants that occlude the air beyond certain thresholds;
- Rule 402 – Nuisance: prohibits discharges of air contaminants that cause "injury, detriment, nuisance, or annoyance" to the public; and
- Rule 403 – Fugitive Dust: prohibits discharges of fugitive dust that exceed certain thresholds.
- Rule 1113 – Architectural Coating: limits the amount of VOCs from paving, asphalt, concrete curing, and cement coatings operations.

1.1.3 Sensitive Receptors

Some population groups are considered more sensitive to air pollution than the others. The degree of the greater sensitivity depends on several factors including pre-existing health problems, proximity to the emissions source, or duration of exposure to the air pollutants. For the purposes of a California Environmental Quality Act (CEQA) analysis, the SCAQMD considers a sensitive receptor to be a receptor such as a residence, school, hospital, or convalescent facility where people stay in extended amount of time during the day. Commercial and industrial facilities are not included in the definition of sensitive receptor, because employees typically are present for shorter periods of time, such as eight hours per day.

The surrounding land uses of the Project (Harvard-Michelson intersection) include the Boomers Recreation Complex to the northwest, University Synagogue to the southwest, Rancho San Joaquin Golf Course to the southeast and Park West apartment homes to the northeast. The nearest sensitive receptors to the Project site are the residences of the Park West apartment homes to the northeast of the intersection. The closest residence is located about 50 feet from the edge of Harvard Avenue northeast of the intersection across San Joaquin Channel, and the closest school/day care center is the Michelson KinderCare located at 3663 Michelson Drive, approximately 590 feet east of the intersection.

1.1.4 Thresholds of Significance

In addition to the significance criteria in Appendix G of CEQA Guidelines, the SCAQMD has adopted regional and localized significance thresholds to determine the significance of a project's potential air quality impacts. Separate thresholds of significance have been adopted for the construction and operation phases of projects.

The localized significance thresholds (LSTs) were developed by the SCAQMD to assist lead agencies in analyzing localized air quality impacts from projects. LSTs look-up tables for one-, two-, and five-acre proposed projects emitting CO, NOx, PM2.5 or PM10 were prepared for easy reference according to source receptor area. The LSTs methodology and associated mass rates are not applicable to mobile

sources travelling over the roadways. Localized Significance Thresholds (LSTs) for a pollutant are based on the ambient concentrations of that pollutant within the Project Source Receptor Area (SRA) and the distance to the nearest sensitive receptor. This project is within SRA 20. For the proposed Project, the localized significance thresholds are applicable for construction activities only. Table AQ-3 presents the regional thresholds as well as LSTs applicable to the proposed Project construction activities.

Based on the proposed Project estimated construction schedule (anticipated to last some seven to eight months), the maximum area of disturbance at both sides of the intersection is 0.956 acres, with the larger area on the southbound Harvard Avenue (widening within the right-of-way). As determined through SCAQMD guidelines, a one-acre site size was used for project calculations. These LSTs are based on the one-acre project site with a 50-meter (165 feet) receptor distance (approximate distance of the nearest residences located northeast of the intersection, across San Joaquin Channel).

Table 3. SCAQMD Significance Thresholds for Mass Daily Emissions of Criteria Air Pollutants

Component/ emission source	Emissions Threshold (lbs/day)					
	VOC	NO_X	SO_X	CO	PM_{10}	$PM_{2.5}$
Regional Thresholds						
Construction	75	100	150	550	150	55
Operation	55	55	150	550	150	55
Localized Thresholds - Construction						
Park West apartments (50 meters nearest home)	n/a	93	n/a	738	13	5
Receptors within 100 meters*	n/a	108	n/a	1,090	27	9
Localized Thresholds - Operation						
Park West apartments (50 meters nearest home)	n/a	93	n/a	738	4	2
Receptors within 100 meters*	n/a	108	n/a	1,090	7	3

Source: SCAQMD Air Quality Significance (Mass Daily) Thresholds, 2015
SCAQMD Mass Rate LST Lookup Tables, Appendix C, 2008

Notes: Lbs/day = pounds per day

* Localized significance thresholds are from the SCAQMD lookup tables for Source Receptor Area (SRA) 20 assuming a one-acre project site and a distance to the nearest sensitive receptor of 50 meters. It should be noted the 50 meter is the distance from the edge of Harvard Avenue to the nearest residences along the northbound of Harvard Avenue (across San Joaquin Channel), however, construction activities occur within the southbound where the distance from the nearest residence is more than 80 meters (within 100 meters)

2.0 IMPACT ANALYSIS

IMPACT AQ-a) ***Would the Project conflict with or obstruct implementation of the applicable air quality plan?***

Less Than Significant Impact. A project is conforming with applicable adopted plans if it complies with the applicable local air district (SCAQMD) rules and regulations and emission control strategies as identified in the current air quality plan (2016 AQMP). The proposed Project is not a capacity-increasing transportation project and would not generate additional traffic volumes compared with the no-project scenario/alternative. The Project would comply with the applicable rules, including the use of standard mitigation measures for construction equipment and fugitive dust (SCAQMD Rules 401, 402 and 403).

Furthermore, the thresholds of significance, adopted by the air district (SCAQMD), determine compliance with the goals of attainment plans in the region. As such, emissions below the SCAQMD regional mass daily emissions thresholds presented in Table AQ-3 would not conflict with or obstruct implementation of the applicable air quality plans. As described below, the proposed project would not generate emissions that exceed SCAQMD's thresholds. Therefore, the proposed project is consistent with the goals and control strategies of the regional AQMP, and impacts would be less than significant and no mitigation measures are required.

Estimation of Emissions: Emissions associated with the Project implementation would be short term, construction emissions and long-term operational. These are analyzed below.

Construction Impact

Air pollutant emissions associated with construction activities include air pollutant emissions generated by operation of on-site construction equipment; fugitive dust emissions related to grading, trenching and earthwork activities; and off-site emissions from construction worker vehicles trips and haul/delivery truck trips. Emissions will vary from day to day, depending on the number of construction equipment operating on site, the type of construction activity occurring, and, for fugitive dust, prevailing weather conditions. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Construction emissions were estimated for the proposed Project using the Road Construction Emissions Model version 8.1.0 (Roadmod) that was developed by the Sacramento Metro Air Quality Management District (SMAQMD). Use of the model is consistent with SCAQMD and the City of Irvine CEQA guidance manual recommendations for linear construction projects. The proposed Project construction is anticipated to take approximately 7 to 8 months to complete. The construction phasing and activities with estimated duration of each phase include: clear and grub and site preparation (2 months); demolition of the existing sidewalks and curbs, and grading (3 months); trenching and construction of curbs and roadway subgrade (4 months); paving, landscaping, and roadway restriping (2 months). The maximum disturbance area at any one time would be 0.956 acres and at the northwest quadrant along southbound Harvard Avenue during widening the roadway. For the Project-specific data that are not available at this time, default assumptions (e.g., construction fleet activities) from Roadmod were used. Construction-

related regional and localized emissions are presented in Tables AQ-4 and AQ-5, respectively. Calculations and Roadmod output are provided in Appendix A.

As shown in Tables AQ-4 and AQ-5, unmitigated construction emissions would not exceed the SCAQMD maximum daily emissions or localized emissions significance thresholds. Furthermore, the Project would comply with the SCAQMD applicable rules and regulations as stated above (Rules 401, 402, 403, and Rule 1113). Therefore, impacts would be less than significant and no mitigation measures are required.

Table 4. Project Construction Emissions in Comparison with SCAQMD Regional Significance Thresholds

Emissions Source/Component	Pollutant Emissions (lbs/day)					
	VOC	NOx	SOx	CO	PM_{10} Total	$PM_{2.5}$ Total
Clear and Grub	0.75	8.68	0.01	5.44	9.37	2.20
Excavation/Grading	2.19	22.58	0.04	17.55	10.12	2.86
Trenching and construction of subgrade	2.0	17.81	0.03	19.63	10.02	2.81
Paving and restriping	1.0	9.29	0.02	11.36	0.56	0.50
Maximum Daily Construction Emissions	2.2	22.6	0.04	19.6	10.1	2.9
SCAQMD Significance Threshold (lbs/day)	**75**	**100**	**150**	**550**	**150**	**55**
Exceed Threshold?	No	No	No	No	No	No

Notes:

Emissions estimated using Road Construction Emissions Model version 8.1.0 (SMAQMD, 2016). Model output is provided in Appendix A.

Table 5. Project Construction Emissions in Comparison with SCAQMD Localized Significance Thresholds

Onsite Emissions Sources	Pollutant Emissions (lbs/day)				
	VOC	NOx	CO	PM_{10}	$PM_{2.5}$
Clear and Grub	0.72	8.63	4.95	9.35	2.19
Excavation/Grading	2.08	22.39	15.6	10.04	2.83
Trenching and construction of subgrade	1.92	17.68	18.26	9.96	2.78
Paving and restriping	0.95	9.19	10.42	0.52	0.48
Maximum Daily Onsite Construction Emissions	2.1	22.4	18.3	10.0	2.8
SCAQMD LST at 50 meters distance (lbs/day)	n/a	**93**	**738**	**13**	**5**

Table 5. Project Construction Emissions in Comparison with SCAQMD Localized Significance Thresholds

Onsite Emissions Sources	Pollutant Emissions (lbs/day)				
	VOC	NOx	CO	PM_{10}	$PM_{2.5}$
Exceed Threshold?	n/a	No	No	No	No

Notes: n/a = not applicable, no threshold is set.

Localized significance thresholds are from the SCAQMD lookup tables for Source Receptor Area (SRA) 20 assuming a one-acre project site and a distance to the nearest sensitive receptor of 50 meters. It should be noted the 50 meter is the distance from the edge of Harvard Avenue to the nearest residences along the northbound of Harvard Avenue (across San Joaquin Channel), however, construction activities occur within the southbound where the distance from the nearest residence is more than 80 meters.

It is assumed that the maximum disturbance of 0.956 acres would occurs per day of construction, which provides the most conservative estimate of fugitive dust emissions per day.

Operational Emissions Impact

The proposed Project would improve the existing intersection of Harvard Avenue and Michelson Drive operations by widening the southbound approach Harvard Avenue to: 1) add a second southbound left turn lane, and 2) provide a Class II on-street bike lane and a 10-foot off-street shared path for bikes and pedestrians. Further improvement include removal of existing “pork-chop” splitter island on southwest corner to provide conventional dedicated eastbound right-turn lane on Michelson Drive. Upon completion of construction activities, the Project would not result in an increase in vehicle trips, as demonstrated in the proposed Project’s Traffic Analysis Memorandum (Stantec, 2020) and discussed below.

Based on the proposed Project’s traffic analysis, with the proposed improvements, the level of service (LOS) and intersection capacity utilization (ICU) would be improved during PM peak hours, and the LOS would maintain at the acceptable level (D or better), as summarized in Table AQ-6. Furthermore, based on the traffic analysis, traffic volumes and fleet mix along the Harvard Avenue or Michelson Drive would not change compared to the no-build scenario. Therefore, the proposed Project would not result in an increase in long-term operational emissions of air pollutants compared to the no build alternative and would not result in an increase in regional operational emissions. In addition, with intersection LOS improvement, the localized emissions, primarily CO emissions would be lower than the no build alternative. As such, both regional and localized operational impacts from criteria pollutants would be less than significant, and no mitigation is required.

Table 6. Comparison of Peak Hour Traffic Conditions at the Harvard Avenue/Michelson Drive No-Build and Build Scenarios

Analysis Year and Scenario	AM Peak Hour		PM Peak Hour	
	LOS	ICU	LOS	ICU
Existing Year				
No-Build	B	0.63	D	0.85
Build	B	0.63	C	0.74
Interim Year				

Table 6. Comparison of Peak Hour Traffic Conditions at the Harvard Avenue/Michelson Drive No-Build and Build Scenarios

Analysis Year and Scenario	AM Peak Hour		PM Peak Hour	
	LOS	ICU	LOS	ICU
No-Build	C	0.75	E	0.92
Build	C	0.75	D	0.81
Buildout Year				
No-Build	D	0.81	F	1.02
Build	D	0.81	D	0.88

Notes: LOS = level of service; ICU = intersection capacity utilization

Source: Traffic Analysis Memorandum for the Harvard Avenue / Michelson Drive Improvement Project (Stantec, 2020)

Toxic Air Contaminants. Proposed Project operational emissions would not change due to proposed improvements. The greatest potential for TAC emissions would be related to diesel particulate emissions from the exhaust of heavy-duty off-road equipment during proposed Project construction activities. According to SCAQMD methodology, health effects from carcinogenic TACs are usually described in terms of individual cancer risk, which is based on 30 to 70 years exposure to TACs. Given the construction schedule of 7-8 months and considering that operation of off-road heavy-duty diesel equipment would occur intermittently during different construction phases, the proposed Project would not result in a long-term substantial source of TAC emissions, with no residual emissions after construction and corresponding individual cancer risk. As such, potential impacts related to TAC emissions would be less than significant and no mitigation measures are required.

IMPACT AQ-b) ***Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the Project region in non-attainment under and applicable federal or state ambient air quality standard?***

Less Than Significant Impact. The Project region is a federal and/or State nonattainment area for ozone, PM_{10}, and $PM_{2.5}$. The proposed Project would contribute particulates and the ozone precursors VOC and NOx to the area during short-term Project construction. As discussed in response to checklist AQ (a) and AQ (b), the proposed Project would be consistent with the AQMP, which is intended to bring the SCAB into attainment with air quality standards for all criteria pollutants. In addition, estimated proposed Project emissions are below the applicable SCAQMD regional and localized mass emissions thresholds of significance. Therefore, proposed Project emissions would have a less than significant impact to non-attainment pollutants in the SCAB. As such, increases in pollutants for which the region is in nonattainment would not be cumulatively considerable and impacts would be less than significant and no mitigation measures are required.

IMPACT AQ-c) ***Would the Project expose sensitive receptors to substantial pollutant concentrations?***

Less Than Significant Impact. As discussed in response to checklist AQ (b) above, the proposed Project would improve intersection operations and it would not generate additional operational emissions that would affect nearby sensitive receptors. The proposed Project would not result in any substantial local concentrations of criteria pollutants. Emissions of diesel particulate matter (DPM) from construction equipment exhaust would not be substantial and would last only 8 months. As such, the proposed Project would not expose sensitive receptors to substantial pollutant concentrations and the impact would be less than significant and no mitigation measures are required.

IMPACT AQ-d) ***Would the Project result in other emissions such as those leading to odors adversely affecting a substantial number of people?***

Less Than Significant Impact. Land uses associated with odor complaints, as identified by SCAQMD, typically include agricultural uses (farming and livestock), wastewater treatment plants, food processing plants, chemical plants, composting operations, refineries, landfills, and dairies. The proposed Project does not contain land uses associated with emitting objectionable odors.

During proposed Project construction, potential sources of objectionable odors would be related to the operation of diesel-powered equipment and to off-gas emissions during activities such as paving and asphalting. Such odors, however, would be short-term and limited to the area where the specific activity is occurring. The perception of these odors is dependent upon climatic conditions such as temperature, humidity, wind speed, and wind direction. Furthermore, SCAQMD Rules 402 (nuisance) and 1113 (Architectural Coatings) limits the VOC emissions from paving, asphalt, concrete curing, and cement coatings operations. Due to the short-term nature of construction odors, controlled access, and distance to the nearest receptors, odors are not likely to affect a substantial number of people. Impacts would be less than significant, and no mitigation is required.

2.1 AVOIDANCE, MINIMIZATION OR MITIGATION MEASURES

As described above, the proposed Project would not result in significant impacts during construction or operation and therefore, would not require mitigation measures. In addition, the proposed Project construction activities would also comply with all applicable rules and regulations including those established by the SCAQMD. A summary of the measures included in the applicable Rules are listed below.

MM AQ-1 **SCAQMD Rule 403 (Fugitive Dust)**. During clearing, grading, earthmoving, or excavation operations, fugitive dust emissions shall be controlled by using water, chemical stabilizers, or other dust preventive measures using the following procedures, as specified in the South Coast Air Quality Management District (SCAQMD) Rule 403 Table 1.

- All material excavated or graded will be sufficiently watered to prevent excessive amounts of dust. Watering shall occur with sufficient frequency for complete coverage.
- All material transported on- or off-site will be either sufficiently watered or securely covered to prevent excessive fugitive dust emission

MM AQ-2 The following measures would further reduce VOCs (ROGs) during Project construction.

- All construction equipment will be properly tuned and maintained in accordance with manufacturer's specifications.
- The construction equipment on construction site shall operate such that exhaust emissions are minimized. For example, idling shall be limited to 10 minutes or engines shall be turned off while in queues or while loading/unloading.
- Compliance with SCAQMD Rule 1113 on the use of architectural coatings (during paving and restriping) shall be implemented. Emissions associated with architectural coatings would be reduced by implementing such measures as low-VOC paint and asphalt material.

MM AQ-3 **SCAQMD Rule 402 (Nuisance)**. Project-related construction activities shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

3.0 REFERENCES

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South Coast Air Quality Management District, 2017b. Final 2016 Air Quality Management Plan, available at http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf?sfvrsn=15.

South Coast Air Quality Management District, 2008. Final Localized Significance Threshold Methodology, available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf?sfvrsn=2.

South Coast Air Quality Management District, 2008. Air Quality Significance Thresholds. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf.

Stantec, 2020. Traffic Analysis Memorandum for the Harvard Avenue / Michelson Drive Intersection Improvement Project. March 2020.

Appendix A AIR POLLUTANTS AND GHG EMISSIONS

- **Emissions Calculation Summary**
- **Road Construction Emissions Model (RoadMod) Output**

Construction Emissions Calculations Summary

Daily Emission Estimates for -> Harvard-Michelson Intersection

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.75	5.44	8.68	9.37	0.37	9.00	2.20	0.32	1.87	0.01	1,431.11	0.37	0.02	1,445.38
Grading/Excavation	2.19	17.55	22.58	10.12	1.12	9.00	2.86	0.99	1.87	0.04	3,722.62	0.97	0.04	3,758.45
Drainage/Utilities/Sub-Grade	2.00	19.63	17.81	10.02	1.02	9.00	2.81	0.94	1.87	0.03	3,345.50	0.50	0.03	3,367.71
Paving	1.00	11.36	9.29	0.56	0.56	0.00	0.50	0.50	0.00	0.02	1,947.98	0.43	0.02	1,965.15
Maximum (pounds/day)	2.19	19.63	22.58	10.12	1.12	9.00	2.86	0.99	1.87	0.04	3,722.62	0.97	0.04	3,758.45
Total (tons/construction project)	0.13	1.22	1.28	0.66	0.07	0.59	0.19	0.06	0.12	0.00	229.47	0.05	0.00	231.34

209.924 MT CO2e

Off-site Emissions - from Data Entry sheet

Grubbing/Land Clearing	0.03	0.49	0.05	0.02			0.01			0.00	160.55	0.00	0.00	161.25
Grading/Excavation	0.12	1.95	0.19	0.08			0.03			0.01	642.21	0.01	0.01	644.98
Drainage/Utilities/Sub-Grade	0.08	1.36	0.14	0.06			0.02			0.00	449.55	0.01	0.01	451.49
Paving	0.06	0.94	0.09	0.04			0.02			0.00	316.49	0.01	0.00	317.82

Onsite emissions

Grubbing/Land Clearing	0.72	4.95	8.63	9.35			2.19			0.01	1,270.56	0.37	0.01	1,284.13
Grading/Excavation	2.08	15.60	22.39	10.04			2.83			0.03	3080.41	0.95	0.03	3113.47
Drainage/Utilities/Sub-Grade	1.92	18.26	17.68	9.96			2.78			0.03	2895.95	0.49	0.03	2916.22
Paving	0.95	10.42	9.19	0.52			0.48			0.02	1631.49	0.42	0.02	1647.33
Maximum (pounds/day)	2.08	18.26	22.39	10.04			2.83			0.03	3080.41	0.95	0.03	3113.47

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Harvard-Michelson Intersection				Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust					
Project Phases (Pounds)	**ROG (lbs/day)**	**CO (lbs/day)**	**NOx (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	**PM2.5 (lbs/day)**	**PM2.5 (lbs/day)**	**PM2.5 (lbs/day)**	**SOx (lbs/day)**	**CO2 (lbs/day)**	**CH4 (lbs/day)**	**N2O (lbs/day)**	**CO2e (lbs/day)**
Grubbing/Land Clearing	0.75	5.44	8.68	9.37	0.37	9.00	2.20	0.32	1.87	0.01	1,431.11	0.37	0.02	1,445.38
Grading/Excavation	2.19	17.55	22.58	10.12	1.12	9.00	2.86	0.99	1.87	0.04	3,722.62	0.97	0.04	3,758.45
Drainage/Utilities/Sub-Grade	2.00	19.63	17.81	10.02	1.02	9.00	2.81	0.94	1.87	0.03	3,345.50	0.50	0.03	3,367.71
Paving	1.00	11.36	9.29	0.56	0.56	0.00	0.50	0.50	0.00	0.02	1,947.98	0.43	0.02	1,965.15
Maximum (pounds/day)	2.19	19.63	22.58	10.12	1.12	9.00	2.86	0.99	1.87	0.04	3,722.62	0.97	0.04	3,758.45
Total (tons/construction project)	0.13	1.22	1.28	0.66	0.07	0.59	0.19	0.06	0.12	0.00	229.47	0.05	0.00	231.34

Notes:

Project Start Year ->	2021
Project Length (months) ->	7
Total Project Area (acres) ->	1
Maximum Area Disturbed/Day (acres) ->	1
Water Truck Used? ->	Yes

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	200	40
Grading/Excavation	0	0	0	0	800	40
Drainage/Utilities/Sub-Grade	0	0	0	0	560	40
Paving	0	0	0	0	400	40

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Harvard-Michelson Intersection				Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust					
Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	**ROG (tons/phase)**	**CO (tons/phase)**	**NOx (tons/phase)**	**PM10 (tons/phase)**	**PM10 (tons/phase)**	**PM10 (tons/phase)**	**PM2.5 (tons/phase)**	**PM2.5 (tons/phase)**	**PM2.5 (tons/phase)**	**SOx (tons/phase)**	**CO2 (tons/phase)**	**CH4 (tons/phase)**	**N2O (tons/phase)**	**CO2e (MT/phase)**
Grubbing/Land Clearing	0.01	0.06	0.10	0.10	0.00	0.10	0.02	0.00	0.02	0.00	15.74	0.00	0.00	14.42
Grading/Excavation	0.05	0.39	0.50	0.22	0.02	0.20	0.06	0.02	0.04	0.00	81.90	0.02	0.00	75.01
Drainage/Utilities/Sub-Grade	0.07	0.65	0.59	0.33	0.03	0.30	0.09	0.03	0.06	0.00	110.40	0.02	0.00	100.82
Paving	0.01	0.12	0.10	0.01	0.01	0.00	0.01	0.01	0.00	0.00	21.43	0.00	0.00	19.61
Maximum (tons/phase)	0.07	0.65	0.59	0.33	0.03	0.30	0.09	0.03	0.06	0.00	110.40	0.02	0.00	100.82
Total (tons/construction project)	0.13	1.22	1.28	0.66	0.07	0.59	0.19	0.06	0.12	0.00	229.47	0.05	0.00	209.87

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model

Version 8.1.0

Data Entry Worksheet

Note: Required data input sections have a yellow background.

Optional data input sections have a blue background. Only areas with a

yellow or blue background can be modified. Program defaults have a white background.

The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.

Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Harvard-Michelson Intersection	
Construction Start Year	2021	Enter a Year between 2014 and 2025 (inclusive)
Project Type	2	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more sit 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some difi 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee constructi
Project Construction Time	7.00	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Ranch
Project Length	0.20	miles
Total Project Area	0.98	acres
Maximum Area Disturbed/Day	0.90	acres
Water Trucks Used?	1	1. Yes 2. No

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
Grubbing/Land Clearing	1.00	0.70	6/1/2021	1/1/2021
Grading/Excavation	2.00	3.15	7/2/2021	2/1/2021
Drainage/Utilities/Sub-Grade	3.00	2.10	9/8/2021	4/3/2021
Paving	1.00	1.05	12/14/2021	7/4/2021