HELIX
Environmental Planning

Torrey Meadows Drive Overcrossing at State Route 56

Air Quality and Greenhouse Gas Emissions Technical Report

July 2014

Prepared for:
City of San Diego
Development Services Department
1222 1st Avenue
San Diego, CA 92101

Prepared by:
HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard, Suite 200
La Mesa, CA 91942

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LIST OF ACRONYMS

$\mu g/m^3$	micrograms per cubic meter
AAQS	ambient air quality standard
AB	Assembly Bill
ADT	average daily trip
API	American Petroleum Institute
AQIA	air quality impact analysis
BAU	business as usual
BMP	best management practices
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCAA	California Clean Air Act
CalEEMod	California Emission Estimator Model
CalEPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	methane
City	City of San Diego
CO	carbon monoxide
CO_2	carbon dioxide
EPIC	Energy Policy Initiative Center
GHG	greenhouse gases
HAPS	Hazardous Air Pollutants
HFC	hydrofluorocarbons
IPCC	International Panel on Climate Change
LOS	level of service
MT	metric tons
MMT	million metric tons
MMT CO2e	million metric tons of carbon dioxide equivalent
NAAQS	National Ambient Air Quality Standards
NHTSA	National Highway Traffic Safety Administration
NO	nitrogen oxide
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
N_2O	nitrous oxide

LIST OF ACRONYMS (cont.)

O_3	ozone
Pb	lead
PFCs	perfluorocarbons
PM	particulate matter
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns
ppb	parts per billion
ppm	parts per million
Project	Torrey Meadows Drive Overcrossing at State Route 56
RAQS	Regional Air Quality Standards
ROG	reactive organic gases
RTIP	Regional Transportation Improvement Plan
RTP	Regional Transportation Plan
SANDAG	San Diego Association of Governments
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SF_6	sulfur hexafluoride
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	sulfur dioxide
SO_x	sulfur oxides
TACs	toxic air contaminants
TCEs	Temporary Construction Easements
USEPA	United States Environmental Protection Agency
VMT	vehicle miles traveled
VOC	volatile organic compounds

EXECUTIVE SUMMARY

This report presents an assessment of potential air quality and greenhouse gas (GHG) emission impacts associated with the proposed Torrey Meadows Drive Overcrossing at State Route (SR-) 56 (Project). The evaluation addresses the potential for criteria air pollutant and GHG emission impacts during the construction and operation of the Project.

The Project would result in emissions of criteria air pollutants and GHGs primarily during the construction phase of the Project. Sources of construction emissions include fugitive dust, heavy construction equipment, and workers commuting to and from the site. Construction activities are assumed to begin January 2015 and finish in mid-2016. Control measures to lower emissions during construction include, but are not limited to, utilizing water trucks during ground disturbing activities. Impacts associated with criteria air pollutant and GHG emissions during Project construction are less than significant.

The main operational emissions associated with the Project would include pollutants associated with vehicular traffic; however, the Project would redistribute projected vehicle traffic and would not generate new vehicle trips. Impacts associated with criteria air pollutant and GHG emissions during Project operations are, therefore, less than significant.

Both construction and operation impacts were found to be less than significant. The potential for the formation of CO hot spots at congested intersections would be less than significant. An evaluation of potential odors from Project operations and construction indicated that associated impacts would be less than significant.

The Project would be consistent with the City's land use designation for the site and would not impede the implementation of the Regional Air Quality Strategy (RAQS). All project-level and cumulative impacts associated with criteria pollutants and GHG emissions were determined to be less than significant and no mitigation is required.

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1.0 PROJECT DESCRIPTION

1.1 PROJECT LOCATION

The proposed overcrossing would be located over SR-56 at Post Mile 5.6, in the Torrey Highlands community of the City of San Diego (City) (see Figure 1, *Regional Location Map,* and Figure 2*, Project Location Map*, below). The proposed overcrossing would connect the two portions of Torrey Meadows Drive.

1.2 EXISTING SITE CONDITIONS

Torrey Meadows Drive is a two-lane collector street that runs in a southwest to northeast direction. Currently, it is divided by SR-56, creating a cul-de-sac on each side of the highway. The proposed overcrossing would connect the two portions of Torrey Meadows Drive, thereby providing a second access and a better connection to the larger region, including the communities of Torrey Highlands, Rancho Peñasquitos and Santaluz. The surrounding area is developed primarily with residential uses.

1.3 PROJECT DESCRIPTION

The City, in collaboration with the California Department of Transportation (Caltrans), proposes to construct a bridge over SR-56 at Post Mile 5.6. The overcrossing would consist of a two-lane bridge and related roadway approaches from the current termini of Torrey Meadows Drive.

The overcrossing would be a two-span, cast-in-place concrete structure supported by two columns in the SR-56 median. It would have a width of 54 feet and a length of 337 feet. The overcrossing would include a sidewalk in each direction. A concrete barrier with chain link fence would be located on the edges of the overcrossing. The approaches from Torrey Meadows Drive would be two-lane asphalt roadways with a sidewalk on each side.

The overcrossing would include a 16-inch water main that would connect to two existing 16-inch water mains in Torrey Meadows Drive on the north side of the bridge and the existing 8-inch water main on the south side of the bridge at the intersection of Torrey Meadows Drive and Primrose Lane. Construction of the bridge and approaches could require removal and/or replacement of one or more of the existing utility facilities (sewer, water, and storm drain) present on Torrey Meadows Drive (north and south of SR-56), and along SR-56.

Grading associated with the proposed overcrossing and roadway approaches is expected to be limited to 1.5 acres within the roadway right-of-way.

Right-of-way has been dedicated on either side of SR-56 to accommodate the construction of an overcrossing; no permanent right-of-way acquisitions would be necessary to complete this project, but Temporary Construction Easements (TCEs) would likely be required to accommodate temporary impacts to SR-56, including impacts to a drainage ditch in the median and landscaping bordering the highway.

The primary purpose of the proposed overcrossing project is to improve traffic circulation in the community of Torrey Highlands, which is currently divided by SR-56. The overcrossing is also intended to relieve existing and future traffic congestion at the Camino del Sur/SR-56 interchange by giving traffic a second option for traveling north and south of SR-56.

1.4 PROJECT DESIGN FEATURES

The Project would incorporate best management practices (BMPs) during construction to reduce emissions of fugitive dust. San Diego Air Pollution Control District (SDAPCD) Rule 55 requires the following:

Track-Out/Carry-Out: Visible roadway dust as a result of active operations, spillage from transport trucks, erosion, or track-out/carry-out shall:

(i) be minimized by the use of any of the following or equally effective track-out/ carry-out and erosion control measures that apply to the Project or operation:

(a) track-out grates or gravel beds at each egress point;

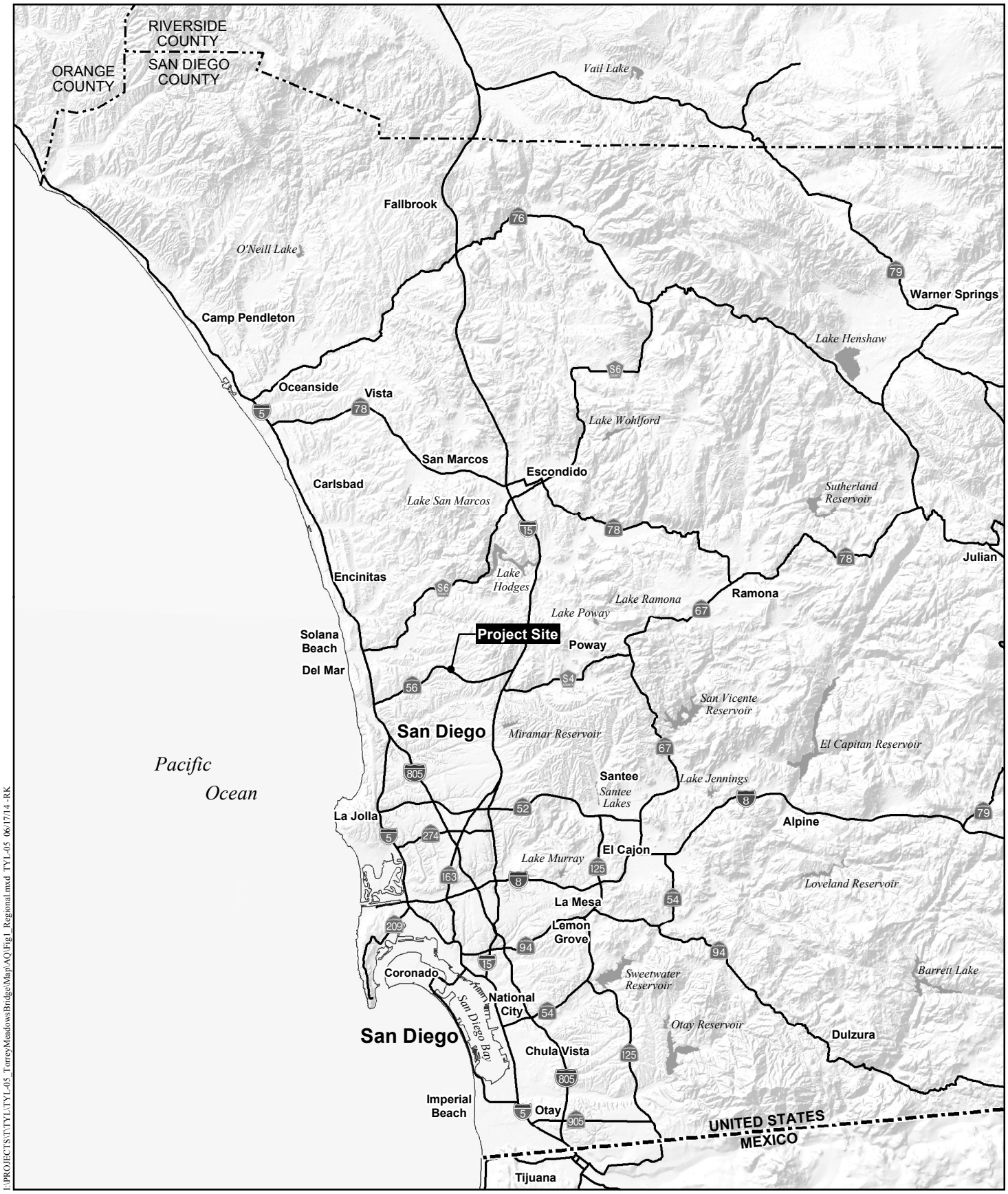
(b) wheel-washing at each egress during muddy conditions, soil binders, chemical soil stabilizers, geotextiles, mulching, or seeding; and for outbound transport trucks;

(c) using secured tarps or cargo covering, watering, or treating of transported material; and

(ii) be removed at the conclusion of each work day when active operations cease, or every 24 hours for continuous operations. If a street sweeper is used to remove any track-out/carry-out, only PM_{10}-efficient street sweepers certified to meet the most current South Coast Air Quality Management District (SCAQMD) Rule 1186 requirements shall be used. The use of blowers for removal of track-out/ carry-out is prohibited under any circumstances.

The control measures listed below are the BMPs that the Project would incorporate for dust control as well as minimizing pollutant emissions from diesel equipment:

- Compliance with Caltrans' Standard Specifications in Section 14.
    - Section 14-9.01 specifically requires compliance by the contractor with all applicable laws and regulations related to air quality, including air pollution control district and air quality management district regulations and local ordinances.
    - Section 14-9.02 is directed at controlling dust. If dust palliative materials other than water are to be used, material specifications are contained in Section 18.
- A minimum of two applications of water during grading between dozer/scraper passes.
- Termination of grading if winds exceed 25 mph.
- Stabilization of dirt storage piles by chemical binders, tarps, fencing or other erosion control (if applicable).
- The Project will require the construction fleet to use any combination of diesel catalytic converters, diesel oxidation catalysts, diesel particulate filters and/or utilize California Air Resources Board/U.S. Environmental Protection Agency (CARB/USEPA) Engine Certification Tier 2, or other equivalent methods approved by the CARB.



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Regional Location Map

TORREY MEADOWS BRIDGE PROJECT

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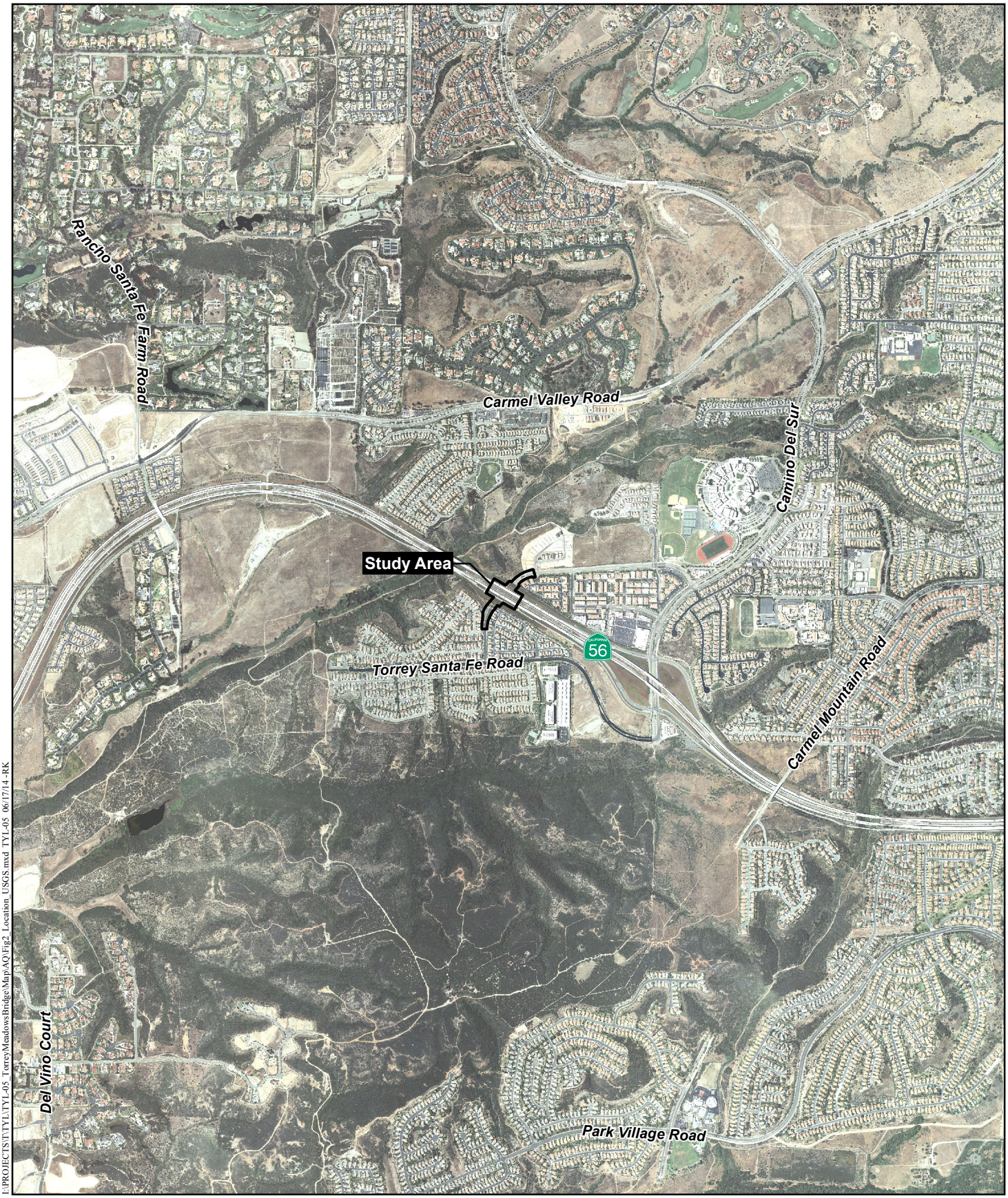
N 0 8 Miles

Figure 1



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Project Location Map

TORREY MEADOWS BRIDGE PROJECT

HELIX Environmental Planning

N 0 2,000 Feet

Figure 2

2.0 ENVIRONMENTAL SETTING

2.1 CLIMATE AND METEOROLOGY

The climate of the proposed Project site, and all of San Diego, is dominated by a semi-permanent high pressure cell over the Pacific Ocean. This cell influences the direction of prevailing winds (westerly to northwesterly) and maintains clear skies for much of the year. The high pressure cell also creates two types of temperature inversions that may act to degrade local air quality.

Subsidence inversions occur during the warmer months as descending air associated with the Pacific high pressure cell comes into contact with cool marine air. The boundary between the two layers of air creates a temperature inversion that traps pollutants. The other type of inversion, a radiation inversion, develops on winter nights when air near the ground cools by heat radiation and air aloft remains warm. The shallow inversion layer formed between these two air masses can also trap pollutants. As the pollutants become more concentrated in the atmosphere, photochemical reactions occur that produce ozone, commonly known as smog.

Climate Change Effects

Many researchers studying California's climate believe that changes in the earth's climate have already affected California, and will continue to do so in the future. Projected future climate change may affect California in a variety of ways. Public health may suffer due to greater temperature extremes and more frequent extreme weather events, increases in transmission of infectious disease, and increases in air pollution. Agriculture is especially vulnerable to altered temperature and rainfall patterns and related pest problems. Forest ecosystems would face increased fire hazards and would be more susceptible to pests and diseases. The Sierra snowpack that functions as the state's largest reservoir could shrink by a third by the year 2060, and to half its historic size by the year 2090. Runoff that fills reservoirs is expected to start in midwinter, not spring, and rain falling on snow is expected to trigger more flooding. The California coast is likely to face a rise in sea level that could threaten the shorelines. Sea-level rise and storm surges could lead to flooding of low-lying property, loss of coastal wetlands, erosion of cliffs and beaches, saltwater contamination of drinking water, and damage to roads, causeways, and bridges.

2.2 AIR POLLUTANTS OF CONCERN

This section provides an introduction to the air pollution of concern, with more details regarding each category provided in Sections 2.3 through 2.5.

2.2.1 Criteria Pollutants

Federal and state laws regulate the air pollutants emitted into the ambient air by stationary and mobile sources. These regulated air pollutants are known as "criteria pollutants" and are categorized as primary and secondary pollutants. Primary air pollutants are those that are emitted directly from sources: carbon monoxide (CO), reactive organic gases (ROG), nitrogen oxides (NO_X), sulfur dioxide (SO_2), and most inhalable particulate matter (PM_{10}, $PM_{2.5}$), including lead (Pb) and fugitive dust, are primary air pollutants. Of these, CO, SO_2, PM_{10}, and

$PM_{2.5}$ are criteria pollutants. ROG and NO_X are criteria pollutant precursors, and go on to form secondary criteria pollutants through chemical and photochemical reactions in the atmosphere. Ozone and NO_2 are the principal secondary pollutants.

2.2.2 Toxic Air Contaminants

The public's exposure to toxic air contaminants (TACs) is a significant environmental health issue in California. In 1983, the California Legislature enacted a program to identify the health effects of TACs, and to reduce exposure to these contaminants to protect the public health. The Health and Safety Code defines a TAC as "an air pollutant 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." A substance that is listed as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the Federal Clean Air Act (42 USC Sec. 7412[b]) is a TAC. Under State law, the California Environmental Protection Agency (CalEPA), acting through the CARB, is authorized to identify a substance as a TAC if it determines the substance is an air pollutant that may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health.

2.2.3 Greenhouse Gases

Parts of the Earth's atmosphere act as an insulating blanket of just the right thickness, trapping sufficient solar energy to keep the global average temperature in a suitable range. The "blanket" is a collection of atmospheric gases called "greenhouse gases" (GHGs) based on the idea that the gases also 'trap' heat like the glass wall of a greenhouse. These gases, mainly water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone, and hydrofluorocarbons (HFCs), all act effective global insulators, reflecting back to earth heat and infrared radiation. Without these natural GHGs, Earth's temperature would be about 61ºF cooler. Human activities such as producing electricity with fossil fuels and driving vehicles have contributed to the elevated concentration of these gases in the atmosphere. This in turn, is causing the Earth's temperature to rise. A warmer Earth may lead to changes in rainfall patterns, much smaller polar ice caps, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans (CalEPA 2006).

2.3 CRITERIA POLLUTANTS

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

- Ozone ($O_{3)}$
- Carbon Monoxide (CO)
- Nitrogen Dioxide (NO_2)
- Respirable Particulate Matter and Fine Particulate Matter (PM_{10} and $PM_{2.5}$)
- Sulfur dioxide ($SO_{2)}$
- Lead (Pb)

The following specific descriptions of health effects for each of these air pollutants associated with project construction and operations are based on the USEPA (2012a) and CARB (2010a).

Ozone. O_3 is considered a photochemical oxidant, which is a chemical that is formed when VOCs and NO_x, both by-products of fuel combustion, react in the presence of ultraviolet light. O_3 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 O_3.

Carbon Monoxide. CO is a product of fuel combustion, and the main source of CO in the SDAB is from motor vehicle exhaust. 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. NO_2 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. NO_2 is a respiratory irritant and may affect those with existing respiratory illness, including asthma. NO_2 can also increase the risk of respiratory illness.

Respirable Particulate Matter and Fine Particulate Matter. Respirable particulate matter, or PM_{10}, refers to particulate matter with an aerodynamic diameter of 10 microns or less. Fine particulate matter, or $PM_{2.5}$, 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. PM_{10} and $PM_{2.5}$ arise from a variety of sources, including road dust, diesel exhaust, fuel combustion, tire and brake wear, construction operations and windblown dust. PM_{10} and $PM_{2.5}$ can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases such as asthma and chronic bronchitis. $PM_{2.5}$ is considered to have the potential to lodge deeper in the lungs.

Sulfur dioxide. SO_2 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 SO_2 are found near large industrial sources. SO_2 is a respiratory irritant that can cause narrowing of the airways leading to wheezing and shortness of breath. Long-term exposure to SO_2 can cause respiratory illness and aggravate existing cardiovascular disease.

Lead. Pb in the atmosphere occurs as particulate matter. Pb has historically been emitted from vehicles combusting leaded gasoline, as well as from industrial sources. With the phase-out of leaded gasoline, large manufacturing facilities are the sources of the largest amounts of lead emissions. Pb has the potential to cause gastrointestinal, central nervous system, kidney and blood diseases upon prolonged exposure. Pb is also classified as a probable human carcinogen.

2.4 TOXIC AIR CONTAMINANTS

Toxic air contaminants (TACs) are a category of air pollutants that have been shown to have an impact on human health but are not classified as criteria pollutants. Examples include certain aromatic and chlorinated hydrocarbons, certain metals, and asbestos. Air toxics are generated by a number of sources, including stationary sources such as dry cleaners, gas stations, combustion

sources, and laboratories; mobile sources such as automobiles; and area sources such as farms, landfills, construction sites, and residential areas. Adverse health effects of toxic air contaminants can be carcinogenic (cancer-causing), short-term (acute) noncarcinogenic, and long-term (chronic) noncarcinogenic.

2.5 GREENHOUSE GASES

2.5.1 Greenhouse Gas Background

Global climate change refers to changes in average climatic conditions on Earth, as a whole, including temperature, wind patterns, precipitation, and storms. Global temperatures are moderated by naturally occurring atmospheric gases that include water vapor, CO_2, CH_4 and N_2O. In addition to the naturally occurring gases, human-made compounds also act as greenhouse gases; common examples include HFCs, perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These compounds are the result of a number of activities including vehicular use, energy consumption/production, manufacturing, and cattle farming. These man-made compounds increase the natural concentration of GHGs in the atmosphere and are commonly believed to result in a phenomenon referred to as "global warming" or "global climate change." A summary of the types of GHGs that would most likely be emitted by the project are provided below.

Carbon Dioxide. CO_2 is an odorless, colorless GHG. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic (human-caused) sources of CO_2 include burning fuels, such as coal, oil, natural gas, and wood. The International Panel on Climate Change's (IPCC's) Fifth Assessment Report (2013) released an update of the global carbon budget for the year 2011. The atmospheric CO_2 concentration in 2011 was 391 ppm, 39 percent above the concentration at the start of the Industrial Revolution (about 280 ppm in 1750). The 2011 growth rate of atmospheric CO_2 of 2.36 ppm was one of the largest growth rates in the past decade (2000-2009), which has had an average growth rate of 1.9 ppm per year. Some scientists say that concentrations may increase to between 700 to 1,500 CO_2e ppm by the year 2100 as a direct result of anthropogenic sources (IPCC 2013). Some predict that this will result in an increase of global mean surface temperatures projected to likely be in the ranges between 2° to 8°Fahrenheit (IPCC 2013). Greenhouse gases have varying global warming potential (GWP). The GWP is the potential of a gas or aerosol to trap heat in the atmosphere, and is defined as the "cumulative radiative forcing effect of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas" (USEPA 2006). The reference gas for GWP is CO_2; therefore, CO_2 has a GWP factor of 1. The other main greenhouse gases that have been attributed to human activity include CH_4, which has a GWP factor of 21, and N_2O, which has a GWP factor of 310.

Methane. CH_4 is a gas and is the main component of natural gas used in homes. A natural source of methane is from the decay of organic matter. Geological deposits known as natural gas fields contain methane, which is extracted for fuel. Other sources are from decay of organic material in landfills, fermentation of manure, and cattle digestion.

Nitrous Oxide. N_2O, also known as laughing gas, is a colorless gas. N_2O is produced by microbial processes in soil and water, including reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (nylon production, nitric acid production) also emit N_2O. It is used in rocket engines, as an aerosol spray propellant, and in race cars. During combustion, NO_X (NO_X is a generic term for mono-nitrogen oxides, NO and NO_2) is produced as a criteria pollutant and is not the same as N_2O. Very small quantities of N_2O may be formed during fuel combustion by nitrogen and oxygen (American Petroleum Institute [API] 2009).

3.0 REGULATORY FRAMEWORK

3.1 CRITERIA POLLUTANTS

Federal

Clean Air Act

The Clean Air Act (CAA) of 1970 and the CAA Amendments of 1971 required the USEPA to establish National Ambient Air Quality Standards (NAAQS). States retain the option to adopt more stringent standards or to include other specific pollutants. On April 2, 2007, the Supreme Court found that carbon dioxide is an air pollutant covered by the CAA; however, no NAAQS have been established for carbon dioxide. Current NAAQS are listed in Table 1.

Table 1
AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone	1-Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	-	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM_{10})	24-Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		-		
Fine Particulate Matter ($PM_{2.5}$)[8]	24-Hour	-	-	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12 µg/m^3		
Carbon Monoxide (CO)	1-Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3	-	Non-Dispersive Infrared Photometry (NDIR) -
	8-Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	-	
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		-	-	
Nitrogen Dioxide (NO_2)[9]	1-Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	0.100 ppm (188 µg/m^3)	-	Gas Phase Chemilumi-nescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[10]	1-Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	-	Ultraviolet Fluorescence; Spectro-photometry (Pararo-saniline Method
	3-Hour	-		-	0.5 ppm (1300 µg/m^3)	
	24-Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3) (for certain areas)[9]	-	
	Annual Arithmetic Mean	-		0.030 ppm (80 µg/m^3) (for certain areas)[9]	-	
Lead[11,12]	30-Day Average	1.5 µg/m^3	Atomic Absorption	-	-	- High Volume Sampler and Atomic Absorption
	Calendar Quarter	-		1.5 µg/m^3	Same as Primary Standard	
	Rolling 3-Month Average	-		0.15 µg/m^3		
Visibility Reducing Particles[13]	8-Hour	See footnote 12	Beta Attenuation and Transmittance through Filter Tape	**No Federal Standards**		
Sulfates	24-Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[11]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Notes for Table 1:

[1] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM_{10}, $PM_{2.5}$, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[2] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact USEPA for further clarification and current federal policies.

[3] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] Any equivalent procedure which can be shown to the satisfaction of the CARB to give equivalent results at or near the level of the air quality standard may be used.

[5] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[6] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[7] Reference method as described by the USEPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the USEPA.

[8] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

[9] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national standards are in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standards of 53 ppb and 100 ppb are identical to 0.053 and 0.100 ppm, respectively.

[10] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-hour average of the annual 99^{th} percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971standards remain in effect until implementation plans to attain or maintain the 2010 standards have are approved.

[11] The CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[12] The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[13] In 1989, the CARB converted both the general statewide 10-mile visibility standards and the Lake Tahoe 20-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter;
mg/m^3 = milligrams per cubic meter
Source: CARB June 4, 2013

The federal standards are the levels of air quality considered safe, with an adequate margin of safety, to protect the public health and welfare. They are designed to protect those "sensitive receptors" most susceptible to further respiratory distress such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed.

The USEPA has classified air basins (or portions thereof) as being in "attainment," "nonattainment," or "unclassified" for each criteria air pollutant, based on whether or not the NAAQS have been achieved. If an area is designated unclassified, it is because inadequate air quality data were available as a basis for a nonattainment or attainment designation. Table 2 lists the federal attainment status of the SDAB for the criteria pollutants. The USEPA classifies the SDAB as in attainment for CO, $PM_{2.5}$, NO_2, SO_2, and lead, and unclassifiable for PM_{10} with respect to federal air quality standards.

Table 2
SAN DIEGO AIR BASIN ATTAINMENT STATUS

Criteria Pollutant	Federal Designation	State Designation
O_3 (1-hour)	(No federal standard)	Nonattainment
O_3 (8-hour)	Nonattainment	Nonattainment
CO	Maintenance	Attainment
PM_{10}	Unclassifiable	Nonattainment
$PM_{2.5}$	Attainment	Nonattainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
Lead	Attainment	Attainment

Source: SDAPCD 2010 and USEPA 2012b

The CAA (and its subsequent amendments) requires each state to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The CAA Amendments dictate that states containing areas violating the NAAQS revise their SIPs to include extra control measures to reduce air pollution. The SIP includes strategies and control measures to attain the NAAQS by deadlines established by the CAA. The SIP is periodically modified to reflect the latest emissions inventories, plans, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The USEPA has the responsibility to review all SIPs to determine if they conform to the requirements of the CAA.

State

California Clean Air Act

The California Clean Air Act (CCAA) allows states to adopt ambient air quality standards and other regulations provided that they are at least as stringent as federal standards. The CARB, a part of the CalEPA (CalEPA) is responsible for the coordination and administration of both federal and state air pollution control programs within California, including setting the CAAQS. The CARB also conducts research, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. The CARB establishes emissions standards for motor vehicles sold in California, consumer products (such as hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions. The CARB also has primary responsibility

for the development of California's SIP, for which it works closely with the federal government and the local air districts.

In addition to primary and secondary ambient air quality standards, the state has established a set of episode criteria for ozone, CO, nitrogen dioxide, sulfur dioxide, and particulate matter. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. Table 2 lists the state attainment status of San Diego County for the criteria pollutants.

Local

San Diego County Regional Air Quality Strategy

The SDAPCD is the local agency responsible for the administration and enforcement of air quality regulations for San Diego County, including the downtown San Diego area. Additionally, the SDAPCD, along with the CARB, maintains and operates ambient air quality monitoring stations at numerous locations throughout San Diego County. These stations are used to measure and monitor criteria and toxic air pollutant levels in the ambient air.

The SDAPCD and the San Diego Association of Governments (SANDAG) are responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the San Diego Air Basin (SDAB). The San Diego County Regional Air Quality Strategy (RAQS) was initially adopted in 1991, and is updated on a triennial basis. The RAQS was updated in 1995, 1998, 2001, 2004, and most recently in April 2009. The RAQS outlines the SDAPCD's plans and control measures designed to attain the state air quality standards for ozone. The SDAPCD has also developed the SDAB's input to the SIP, which is required under the Federal CAA for pollutants that are designated as being in non-attainment of national air quality standards for the basin.

The RAQS relies on information from CARB and the SANDAG, including mobile and area source emissions, as well as information regarding projected growth in the county, to project future emissions and then establish the strategies necessary for the reduction of emissions through regulatory controls. The CARB mobile source emission projections and SANDAG growth projections are based on population and vehicle trends and land use plans developed by the cities and by the County of San Diego as part of the development of the County's General Plan. .

The SIP relies on the same information from SANDAG to develop emission inventories and emission reduction strategies that are included in the attainment demonstration for the air basin. The SIP also includes rules and regulations that have been adopted by the SDAPCD to control emissions from stationary sources. These SIP-approved rules may be used as a guideline to determine whether a project's emissions would have the potential to conflict with the SIP and thereby hinder attainment of the NAAQS for ozone.

SDAPCD Particulate Matter Reduction Measures

In addition to the RAQS and SIP, the SDAPCD adopted the "Measures to Reduce Particulate Matter in San Diego County" report in December 2005. This report is based on particulate matter reduction measures adopted by CARB. The SDAPCD evaluated CARB's list of measures

and found that the majority were already being implemented in San Diego County. As a result of the evaluation, SDAPCD proposed measures for further evaluation to reduce PM emissions from fugitive dust from construction sites and unpaved roads. The SDAPCD requires that construction activities implement the measures listed in Rule 55 to minimize fugitive dust emissions.

Air Quality Monitoring Data

The SDAPCD operates a network of ambient air monitoring stations throughout San Diego County. The purpose of the monitoring stations is to measure ambient concentrations of air pollutants and determine whether the ambient air quality meets the NAAQS and the California Ambient Air Quality Standards (CAAQS). The closest ambient monitoring station to the Project site is the Del Mar station; however, this station only monitors ozone. Because many stations only monitor certain pollutants, data from multiple nearby stations are utilized to gather the closest available ambient concentrations of each criteria pollutant. The second closest station is the Kearny Mesa station, which monitors all criteria pollutants except CO and SO_2; the San Diego (Beardsley Street) station is utilized for CO and SO_2. Table 3 presents a summary of the ambient pollutant concentrations monitored at these stations (with the closest available data shown) during the last three available years (2011 through 2013). The corresponding NAAQS and CAAQS are presented in Table 1. The SDAB is currently designated as a nonattainment area for the state standards for PM_{10}, $PM_{2.5}$, 1-hour ozone, and 8-hour ozone, and the federal 8-hour standard for ozone.

As shown in Table 3, the 8-hour ozone concentration exceeded the state standard once in 2011 and twice in 2012. The federal standard was also exceeded twice in 2012. Neither the state nor federal standards for PM_{10}, $PM_{2.5}$, or NO_2 were exceeded at any time during the years 2012 and 2013; insufficient data was available to determine exceedances in 2011. State and federal standards for CO were not exceeded during 2011 and 2012; however, insufficient data was available to determine exceedances in 2013. State and federal standards for SO_2 were not exceeded during the year 2011; however, insufficient data was available to determine exceedances in 2012 and 2013.

Table 3
AMBIENT BACKGROUND CONCENTRATIONS AT THE CLOSEST APPLICABLE MONITORING STATION

Air Pollutant	2011	2012	2013
Ozone			
Max 1-hour (ppm)	0.091	0.088	0.076
Days > CAAQS (0.09 ppm)	0	0	0
Max 8-hour (ppm)	0.075	0.079	0.070
Days > NAAQS (0.075 ppm)	0	2	0
Days > CAAQS (0.070 ppm)	1	2	0
Particulate Matter (PM_{10})			
Max Daily ($\mu g/m^3$)	*	35.0	39.0
Days > NAAQS (150 $\mu g/m^3$)	0	0	0
Days > CAAQS (50 $\mu g/m^3$)	0	0	0
Particulate Matter ($PM_{2.5}$)			
Max Daily ($\mu g/m^3$)	*	20.1	22.0
Days > NAAQS (35 $\mu g/m^3$)	0	0	0
Nitrogen Dioxide (NO_2)			
Max 1-hour (ppm)	*	0.057	0.067
Days > NAAQS (0.10 ppm)	0	0	0
Days > CAAQS (0.18 ppm)	0	0	0
Carbon Monoxide (CO)			
Max 8-hour (ppm)	2.44	1.81	*
Days > NAAQS or CAAQS (9.0 ppm)	0	0	0
Sulfur Dioxide (SO_2)			
Max Daily Measurement (ppm)	0.003	*	*
Days > CAAQS (0.04 ppm)	0	0	0

Sources: CARB (2014a), current as of May 30, 2014 (Ozone data was obtained from the Del Mar Station; PM_{10}, $PM_{2.5}$, and NO_2 data were obtained from the Kearny Mesa Station; and CO and SO_2 data were obtained from the San Diego Station.)

Notes: ppm = parts per million $\mu g/m^3$ = micrograms per cubic meter

* Insufficient data available

3.2 GREENHOUSE GAS REGULATIONS

Federal

Federal Clean Air Act

The U.S. Supreme Court ruled on April 2, 2007, in *Massachusetts v. U.S. Environmental Protection Agency* that CO_2 is an air pollutant, as defined under the CAA, and that the USEPA has the authority to regulate emissions of GHGs. The USEPA announced that GHGs (including CO_2, CH_4, N_2O, HFC, PFC, and SF_6) threaten the public health and welfare of the American people. This action was a prerequisite to finalizing the USEPA's proposed GHG emissions standards for light-duty vehicles, which were jointly proposed by the USEPA and the United States Department of Transportation's National Highway Traffic Safety Administration (NHTSA) on September 15, 2009.

State

Assembly Bill 32 – Global Warming Solution Act of 2006

The California Global Warming Solutions Act of 2006, widely known as Assembly Bill (AB) 32, requires the CARB to develop and enforce regulations for the reporting and verification of statewide GHG emissions. CARB is directed to set a GHG emission limit, based on 1990 levels, to be achieved by 2020. The bill sets a timeline for adopting a scoping plan for achieving GHG reductions in a technologically and economically feasible manner.

The heart of the bill is the requirement that statewide GHG emissions must be reduced to 1990 levels by the year 2020; this goal was identified in December of 2007, and the reporting and verification requirements concerning GHG emissions were adopted on January 1, 2008. The bill requires the CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions. As of October 31, 2011, 18 of 30 CARB regulations had been approved, including nine discrete early actions, as required by AB 32.

California Air Resources Board: Scoping Plan

On December 11, 2008, the CARB adopted the Scoping Plan (CARB 2008) as directed by AB 32. The Scoping Plan proposes a set of actions designed to reduce overall GHG emissions in California to the levels required by AB 32. Measures applicable to development projects include those related to the following: energy-efficiency building and appliance standards, the use of renewable sources for electricity generation, regional transportation targets, and green building strategy. Relative to transportation, the Scoping Plan includes nine measures or recommended actions. One of these is measure T-3, Regional Transportation-related Greenhouse Gas Targets, which relies on Senate Bill (SB) 375 implementation to reduce GHG emissions from passenger vehicles through reducing vehicle miles traveled. The other measures are related to vehicle GHGs, fuel and efficiency measures, and would be implemented statewide rather than on a project-by-project basis.

CARB recently updated its Scoping Plan to reflect the availability of updated information from development of measure-specific regulations and to adjust projections in consideration of the economic recession. The CARB updated the projected 2020 statewide emissions from 596 million metric tons of carbon dioxide equivalent (MMT CO_2e) to 545 MMT CO_2e, and released a discussion draft of the revised Scoping Plan in October 2013. On February 10, 2014, CARB released a revised version that reflects comments received during circulation of the discussion draft (CARB 2014b). This revised version was then approved by the CARB Board on May 22, 2014.

Local

City of San Diego General Plan

The City of San Diego General Plan includes several climate change-related policies aimed at reducing GHG emissions from future development and City operations. For example, Conservation Element policy CE-A.2 aims to reduce the City's carbon footprint and to develop

and adopt new or amended regulations, programs, and incentives as appropriate to implement the goals and policies set forth related to climate change (City of San Diego 2008). The Land Use and Community Planning Element; the Mobility Element; the Urban Design Element; and the Public Facilities, Services and Safety Element also identify GHG reduction and climate change adaptation goals. These elements contain policy language related to sustainable land use patterns, alternative modes of transportation, energy efficiency, water conservation, waste reduction, and greater landfill efficiency. The overall intent of these policies is to support climate protection actions, while retaining flexibility in the design of implementation measures, which could be influenced by new scientific research, technological advances, environmental conditions, or state and federal legislation. The 2008 General Plan was adopted in 2009, and amended in 2010 and 2012.

City of San Diego Climate Action Plan

On October 2010, the City Council established the Environmental and Economic Sustainability Task Force as an independent advisory body to work with City staff on the development of a plan for both city operations and the community to reduce GHG emissions and to begin to evaluate vulnerabilities in the community and outline adaptation strategies. The City of San Diego prepared a draft Climate Action Plan that was released in February 2014 for public review and comment (City of San Diego 2014).

Existing Greenhouse Gas Levels

Global, National, State and Local GHG Emissions

In the year 2004, total GHG emissions worldwide were estimated at 20,135 MMT CO_2e (United Nations Framework Convention on Climate Change 2006). The United States contributed the largest portion of GHG emissions at 35 percent of global emissions. In California, according to the California Energy Commission (CEC 2006), CO_2 accounts for approximately 84 percent of statewide GHG emissions, with CH_4 accounting for approximately 5.7 percent, and N_2O accounting for 6.8 percent. Other pollutants account for approximately 2.9 percent of GHG emissions in California. The transportation sector is the single largest category of California's GHG emissions, accounting for 41 percent of emissions statewide. CARB estimates that the year 1990 statewide MMT CO_2e level was 427 (CARB 2007). In the year 2008, California produced a total of 478 MMT CO_2e (CARB 2010b). The total U.S. GHGs were 6,640 MMT CO_2e in 2009 (USEPA 2011). On a national level, approximately 33 percent of GHG emissions were associated with transportation and about 41 percent were associated with electricity generation.

According to the San Diego County GHG Inventory that was prepared by the School of Law Energy Policy Initiative Center (EPIC) at the University of San Diego in 2013, San Diego County emitted 33 MMT CO_2e in 2010. The largest contributor of GHG in San Diego County was the on-road transportation category, which comprised 42 percent (14 MMT CO_2e) of the total amount. The second highest contributor was the electricity category, which contributed 8 MMT CO2e, or 24 percent of the total. Together the on-road transportation and electricity categories comprised 69 percent of the total GHG emissions for the County. The remaining amount was contributed by natural gas consumption, civil aviation, industrial processes, off-road

equipment, waste, agriculture, rail, water-borne navigation, and other fuels. By the year 2020, under the business as usual (BAU) scenario[1], regional GHG emissions are expected to be 37 MMT CO_2e, which is lower than the originally anticipated 2020 BAU emissions level that was predicted in 2008 (43 MMT CO_2e).

4.0 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.1 METHODOLOGY

Construction Emissions. Emissions from the construction phase of the Project are assessed using the Road Construction Emissions Model (Roadway Model) Version, 7.1.2, developed by Sacramento Metropolitan Air Quality Management District (SMAQMD). The construction analysis included modeling of the projected construction equipment that would be used during each construction activity. The analysis assessed maximum daily emissions from individual construction activities. Construction activities, equipment, and approximate timing of total construction were provided by T.Y. Lin International. Total construction is anticipated to last 18 months, starting in the beginning of 2015 and projected to end mid-2016. The roadway improvements on either side of the bridge were assumed to take three months and would occur simultaneously with the last three months of bridge construction. Additional information not provided by T.Y. Lin International, including worker trip lengths and duration of individual construction activities, is based on the default assumptions in the Roadway Model. Table 4 details the duration of each construction activity. A complete listing of the assumptions used in the analysis, and model output is provided in Appendix A of this report.

Although it was assumed that all of the dust control measures listed in Section 1.4 of this report would be implemented, the model only included the utilization of watering once per day during ground disturbing activities to reduce fugitive dust generation.

[1] Given a BAU trajectory, defined as no change in current trends or policies, GHG emissions from San Diego County will be approximately 43 MMT CO_2e in 2020, a 26% increase over 2006 levels and a 48% increase over 1990 levels (EPIC 2006).

Table 4 ANTICIPATED CONSTRUCTION DURATION		
Component	**Construction Activity**	**Duration (months)**
Bridge	Abutment & Bent Foundations	1.8
	Bent Columns & Abutment Stems	8.1
	Bridge Super-structure	5.4
	Bridge Approach Slabs & Barriers	2.7
	TOTAL BRIDGE CONSTRUCTION DURATION	**18**
Roadway	Grading & Drainage	0.3
	Curb, Gutter, Sidewalk	1.35
	Base & Paving	0.9
	Striping	0.45
	TOTAL ROADWAY CONSTRUCTION DURATION	**3**

Operation Emissions. The proposed Project would not generate new trips, and instead is anticipated to redistribute future traffic volumes. Because new trips are not anticipated, operational impacts are evaluated qualitatively.

TAC Impacts to Sensitive Receptors. Potential impacts related to the emission of TAC are evaluated using the siting distances in the CARB's Air Quality and Land Use Handbook. The Handbook lists common sources of TAC emission, and recommends minimum distances for siting sensitive receptors away from each source. Localized CO concentrations are evaluated in accordance with the guidance provided in the City's Significance Thresholds for Air Quality and the Caltrans Transportation Project-Level Carbon Monoxide Protocol (Caltrans 1998).

Odors. Potential odor impacts are evaluated by conducting a qualitative screening-level analysis in accordance with the guidance provided in the City of San Diego's Significance Thresholds for Odor, consisting of reviewing the proposed Project's site plan and description to identify any new or modified odor sources.

4.2 SIGNIFICANCE CRITERIA

In accordance with the City of San Diego's Significance Determination Thresholds (City of San Diego 2011), the City has set forth Significance Criteria Thresholds to assess the potential for a project to cause a significant impact on the ambient air quality. The City has established both general thresholds (consistent with California Environmental Quality Act [CEQA] guidance for significant impacts) and specific emission thresholds that are derived from the SDAPCD's regulations. According to the City's guidelines, a project may have a significant air quality environmental impact if it could:

1. Conflict with or obstruct implementation of the applicable air quality plan;
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

3. Result in cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including release emissions which exceed quantitative thresholds for ozone precursors);
4. Expose sensitive receptors (i.e., day care centers, schools, retirement homes, and hospitals or medical patients in residential homes which could be impacted by air pollutants) to substantial pollutant concentrations, including air toxins such as diesel particulates;
5. Create objectionable odors affecting a substantial number of people; or
6. Release substantial quantities of air contaminants beyond the boundaries of the premises upon which the stationary source emitting the contaminants is located.

The City's emission-specific thresholds are derived from the SDAPCD's Regulation II, Rule 20.2, Table 20-2-1, Air Quality Impact Analysis (AQIA) Trigger Levels. These thresholds (shown in Table 5) are applicable as a screening criterion for potential significance. The thresholds for ROG and $PM_{2.5}$ are based on significance criteria from the SCAQMD (1993).

Table 5
SDAPCD AIR POLLUTANT THRESHOLDS

Pollutant	Pounds/day	Tons/year
Carbon Monoxide (CO)	550	100
Nitrogen Oxides (NO_x)	250	40
Particulate Matter (PM_{10})	100	15
Fine Particulate Matter ($PM_{2.5}$)	55	10
Sulfur Oxides (SO_x)	250	40
Lead and Lead Compounds	3.2	0.6
Volatile Organic Compounds (VOC)	137[a]	15[a]

Source: City of San Diego 2011.
[a] Based on VOC threshold from SCAQMD.

With regard to evaluating whether a project would have a significant impact on sensitive receptors, air quality regulators typically define sensitive receptors as residents, schools (preschool through 12th grade), hospitals, resident care facilities, day-care centers, or other facilities that may house individuals with health conditions that would be adversely impacted by changes in air quality.

In addition to impacts from criteria pollutants, project impacts may include emissions of pollutants identified by the state and federal government as toxic air contaminants (TACs) or Hazardous Air Pollutants (HAPs). In San Diego County, SDAPCD Regulation XII establishes acceptable risk levels and emission control requirements for new and modified facilities that may emit additional TACs. Under Rule 1210, emissions of TACs that result in a cancer risk of more than 10 in 1 million, or a health hazard index of more than one are considered a significant impact.

SDAPCD Rule 51 (Public Nuisance) prohibits emission of any material which causes nuisance to a considerable number of persons or endangers the comfort, health or safety of any person. A project that proposes a use which would produce objectionable odors would be deemed to have a significant odor impact if it would affect a considerable number of off-site receptors.

Cumulatively considerable net increases of criteria pollutants are discussed in Section 6.0, Cumulative Impacts.

Greenhouse Gases

Given the relatively small levels of emissions generated by a typical project in relationship to the total amount of GHG emissions generated on a national or global basis, individual projects are not expected to result in significant, direct impacts with respect to climate change. However, given the magnitude of the impact of GHG emissions on the global climate, GHG emissions from a new project could result in significant, cumulative impacts with respect to climate change. Thus, the potential for a significant GHG impact is limited to cumulative impacts.

According to Appendix G of the CEQA Guidelines, the following criteria may be considered in establishing the significance of GHG emissions:

Would the project:

1. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

The City of San Diego, in its memorandum entitled "Addressing GHG Emissions from Projects Subject to CEQA" (City of San Diego 2010) utilizes a screening-level emission level of 900 metric tons (MT) of CO_2e per year to evaluate whether a project must conduct further analysis. This screening threshold is based on a report by the California Air Pollution Control Officers Association (CAPCOA) entitled "CEQA & Climate Change," dated January 2008. The 900 MT of CO_2e per year screening threshold was developed by analyzing the capture of 90 percent or more of future discretionary development for residential and commercial projects. City guidance also recommends including construction emissions (amortized over a typical duration of 30 years) in the screening threshold.

If a project generates more than 900 MT CO_2e per year, the significance of the GHG emissions are evaluated against the reductions from the "BAU" condition. The BAU scenario represents the emissions that would be expected to occur in the absence of any project or government-mandated GHG reduction measures after 2008. The City has proposed a threshold of 28.3 percent below BAU to evaluate the significance of GHG emissions attributable to a project.

5.0 PROJECT IMPACTS

This section evaluates potential direct impacts of the proposed Project related to the air pollutant emissions.

5.1 CONSISTENCY WITH AIR QUALITY PLANS

The air quality plans relevant to this discussion are the State Implementation Plan (SIP) and Regional Air Quality Strategy (RAQS) because these are the planning documents for the SDAB. In addition, as a transportation project, the SANDAG Regional Transportation Plan (RTP) and Regional Transportation Improvement Plan (RTIP) are applicable to the Project.

Regional Air Quality Plans

The RAQS outlines SDAPCD's plans and control measures designed to attain the State air quality standards for ozone. In addition, the SDAPCD has developed its input to the SIP, which includes the SDAPCD's plans and control measures for attaining the 8-hour ozone NAAQS. These plans accommodate emissions from all sources, including natural sources, through implementation of control measures, where feasible, on stationary sources to attain the standards. Mobile sources are regulated by the USEPA and the CARB, and the emissions and reduction strategies related to mobile sources are considered in the RAQS and SIP (County of San Diego 2007).

The RAQS relies on information from CARB and SANDAG, including projected growth in the County, mobile, area and all other source emissions in order to project future emissions and determine from that the strategies necessary for the reduction of stationary source emissions through regulatory controls. The CARB mobile source emission projections and SANDAG growth projections are based on population and vehicle trends, and land use plans developed by the cities and by the County. As such, projects that propose development that is consistent with the growth anticipated by the general plans would be consistent with the RAQS. In the event that a project would propose development which is less dense than anticipated within the general plan, the project would likewise be consistent with the RAQS.

The proposed Project does not include any components that would induce population growth. The Project is identified in the Torrey Highlands Public Facilities Financing Plan FY 2013 as Project T-9 (City of San Diego 2013). The overcrossing would also be built to Caltrans Bridge Design Standards. Further, the Project would not generate significant amounts of air pollutant emissions during construction or operation (see Section 5.2) and would implement standard dust control measures required by the SDAPCD. Therefore, the proposed Project is consistent with applicable local planning documents and would not conflict with the RAQS or the SIP.

Transportation Plans

In October 2011, SANDAG adopted its 2050 RTP (SANDAG 2011). The RTP is a multi-year program of proposed projects for major highway, arterial, transit, and bikeway projects. The 2012 RTP was adopted in September 2012 covers five fiscal years, and incrementally implements the RTP. The RTP was evaluated with regard to its effect on air quality, and the conformity of the RTP with the SIP that is in place for the maintenance of the NAAQS for

carbon monoxide and the attainment of the NAAQS for ozone. The air quality conformity analysis (Appendix B to the RTP) concluded that the projected emissions associated with the RTP are within the emissions budget of the SIP.

The Project is not required to be included in the RTIP because it is not federally funded, regionally significant, would not result in unplanned population growth, and is not capacity increasing. Additionally, the Torrey Meadows overcrossing would comply with the Torrey Highlands Subarea Plan, and would be consistent with planned improvements to the SR-56 corridor between Interstate (I)-5 and I-15, as specified in the SANDAG 2050 RTP. As a result, the Project would be consistent with the RTP and RTP air quality conformity analysis, and no project level conformity analysis is required. Impacts associated with consistency with regional air quality plans are less than significant.

5.2 CONFORMANCE TO FEDERAL AND STATE AIR QUALITY STANDARDS

5.2.1 Construction

Construction of the proposed Project is anticipated to occur over 18 months. For the purposes of this analysis, construction activities are assumed to occur sequentially, with road construction occurring simultaneously with the last three months of bridge construction. It is assumed that the Project would be operational by mid-2016.

Table 6 presents a summary of the assumed equipment that would be involved in construction.

Table 6 CONSTRUCTION STAGES AND EQUIPMENT REQUIREMENTS									
Off-road Equipment Type	**Horsepower**	**Bridge Construction**				**Road Construction**			
		Abutment & Bent Foundations	**Bent Columns & Abutment Stems**	**Bridge Super-structure**	**Bridge Approach Slabs & Barriers**	**Grading & Drainage**	**Curb, Gutter, Sidewalk**	**Base & Paving**	**Striping**
		Number of Equipment							
Aerial Lift	63		1	2					
Air Compressors	106	2	2	2	1				
Bore/Drill Rigs	206	1							
Bull Dozer[1]	-					1		1	
Cement and Mortar Mixers	10		1	1	1		1		
Concrete/Industrial Saws	64	2	2	2	2	1			
Cranes	226	1	1	1					
Curb Form Machine[1]	-						1		
Excavators	163	1				1			
Forklifts	89	1	1	1	1				
Generator Sets	66	2	2	2	2	2			
Graders	175					1		1	
Mini Excavator[1]	-					1			
Other Material Handling Equipment	167								
Pavers	126							1	
Plate Compactors	8	1	1	1	1	1	1		
Pumps	53	1							

Table 6 (cont.) CONSTRUCTION STAGES AND EQUIPMENT REQUIREMENTS									
Off-road Equipment Type	**Horsepower**	**Bridge Construction**				**Road Construction**			
		Abutment & Bent Foundations	**Bent Columns & Abutment Stems**	**Bridge Super-structure**	**Bridge Approach Slabs & Barriers**	**Grading & Drainage**	**Curb, Gutter, Sidewalk**	**Base & Paving**	**Striping**
		Number of Equipment							
Rollers	81			1	1	1		3	
Rough Terrain Forklifts	100	1	1	1					
Rubber Tired Dozers	255								
Rubber Tired Loaders	200	1			1				
Signal Boards	20	1	2	2	1				
Skid Steer Loaders	65	1	1	1	1	1			
Skip Loader[1]	-					2	1	2	
Sweepers/Scrubbers	64					1	1	1	1
Tractors/Loaders/Backhoes	98	1	1	1	1				
Welders	45		1	1					
On-road Equipment Type[2]									
Water Trucks	-	1	1	1	1	1	1	1	
Concrete Trucks	-	30	25	135	25	5	15		
Concrete Pump Trucks	-	1	1	2	1				
Striping Truck	-								1
Work Trucks	-					2	2	2	2
Dump Trucks	-					4		65	

Source: T.Y. Lin International 2014.

[1] Equipment type was not an available choice in the modeling software. Associated number of equipment was allocated to the closest available equipment choice (Skip Loader → Rubber Tired Loader; Mini Excavator → Excavator; Bull Dozer → Rubber Tired Dozer; and Curb Form Machine → Other Material Handling Equipment).

[2] On-road equipment is not broken out by equipment type in the modeling software; therefore, on-road equipment was added to the model as water trucks.

Heavy equipment emissions and fugitive dust emissions were estimated using the Roadway Model. Tables 7 and 8 present summaries of the maximum construction emissions during each Project phase for the construction of the bridge and roadway, respectively. As discussed in Section 4.1, the only BMP included in the model was watering once per day during ground disturbing activities; this results in a conservative analysis of fugitive dust generation.

Table 7
MAXIMUM DAILY CONSTRUCTION EMISSIONS – BRIDGE

Project Phases	Pollutant Emissions (pounds per day)				
	ROG	NO_x	CO	PM_{10}	$PM_{2.5}$
Abutment & Bent Foundations	8.8	101.1	46.5	5.0	4.4
Bent Columns & Abutment Stems	8.3	81.0	42.8	4.4	3.8
Bridge Super-structure	10.0	166.1	50.4	6.2	5.0
Bridge Approach Slabs & Barriers	4.9	37.9	27.1	2.6	2.3
Significance Thresholds	137	250	550	100	55
Significant Impact?	***No***	***No***	***No***	***No***	***No***

Source: Roadway Model (output data is provided in Appendix A)

Table 8
MAXIMUM DAILY CONSTRUCTION EMISSIONS – ROAD

Project Phases	Pollutant Emissions (pounds per day)				
	ROG	NO_x	CO	PM_{10}	$PM_{2.5}$
Grading & Drainage	6.9	75.1	35.0	4.0	3.4
Curb, Gutter, Sidewalk	2.2	30.8	13.0	1.5	1.0
Base & Paving	6.4	104.6	29.7	4.2	3.3
Striping	0.6	3.5	3.3	0.3	0.3
Significance Thresholds	137	250	550	100	55
Significant Impact?	***No***	***No***	***No***	***No***	***No***

Source: Roadway Model (output data is provided in Appendix A)

As discussed in Section 4.1, roadway construction would overlap with the last three months of bridge construction. Based on the anticipated construction schedule, the maximum daily construction emissions would occur during the grading and drainage phase of road construction and the super-structure phase of the bridge construction. Table 9 compares the maximum daily construction emissions to the daily emission thresholds to determine significance.

Table 9 MAXIMUM DAILY CONSTRUCTION EMISSIONS					
Overlapping Construction Phases	**Pollutant Emissions (pounds per day)**				
	ROG	**NO_x**	**CO**	**PM_{10}**	**$PM_{2.5}$**
Road (Grading & Drainage)	6.9	75.1	35.0	4.0	3.4
Bridge (Super-structure)	10.0	166.1	50.4	6.2	5.0
TOTAL	**16.9**	**241.2**	**85.5**	**10.2**	**8.4**
Significance Thresholds	137	250	550	100	55
Significant Impact?	***No***	***No***	***No***	***No***	***No***

Source: Roadway Model (output data is provided in Appendix A)

As illustrated in Table 9, emissions of all criteria pollutants related to Project construction would be below the City of San Diego's significance thresholds. Furthermore, due to the fact that the construction is short-term in nature, construction would not result in emissions that would violate any air quality standard or contribute substantially to an existing or projected air quality violation. Thus, direct impacts from criteria pollutants generated during construction would not be significant and no mitigation would be required.

5.2.2 Operation

Following construction, operation of the bridge would not result in any sources of criteria air pollutant emissions other than emissions from vehicles on the bridge. The proposed bridge by itself would not create new vehicle trips; instead, it would redistribute vehicle traffic. Based on the *Torrey Meadows Drive Bridge Traffic Impact Analysis* (Urban System Associates 2014), the completion of the bridge would reduce vehicle delay (congestion) at four out of the seven analyzed intersections during the PM peak hour when comparing conditions with and without the Project in 2035. The Project is also anticipated to reduce vehicle miles traveled (VMT) for local residents by providing a more direct route across SR-56 than existing conditions. Reductions in congestion and VMT would result in lower vehicle-related emissions; therefore a quantitative analysis is not necessary and no impacts from Project operations would occur.

5.3 IMPACTS TO SENSITIVE RECEPTORS

CARB describes sensitive receptors as residences, schools, day care centers, playgrounds, medical facilities, or other facilities that may house individuals with health conditions (medical patients or elderly persons/athletes/students/children) that may be adversely affected by changes in air quality. The two primary pollutants of concern regarding health effects for land development are CO and diesel particulates. An analysis of the Project's potential to expose sensitive receptors to these pollutants is described below.

Carbon Monoxide Hot Spots

Areas with high vehicle density, such as congested intersections and parking garages, have the potential to create high concentrations of CO, known as CO "hot spots." A project's localized air quality impact is considered significant if CO emissions create a hot spot where either the

California one-hour standard of 20 ppm or the federal and State eight-hour standard of 9.0 ppm is exceeded. This typically occurs at severely congested intersections (level of service [LOS] E or worse). Based on the *Torrey Meadows Drive Bridge Traffic Impact Analysis* (Urban System Associates 2014), the Project would not adversely impact any intersection or roadway segment in the near- or long-term, and all analyzed intersections would remain at LOS D or better. Four out of the seven intersections would result in reduced congestion during the PM peak hour in the year 2025 with the Project. Therefore, the Project would not result in the creation of a CO hot spot. Potential impacts from CO emissions are considered less than significant and no mitigation is required.

Diesel Particulates

Exposure to diesel particulate matter generated by traffic on roadways is a concern identified in the CARB Air Quality and Land Use Handbook. The CARB guidelines indicate that siting new sensitive land uses within 500 feet of a freeway or highly traveled urban roads (greater than 100,000 vehicles per day) should be avoided. The proposed Project is a transportation project and would not develop new sensitive land uses.

Diesel particulate matter would be emitted from construction equipment. As shown in Tables 7 through 9, emissions of particulate matter during construction (which includes equipment emissions) would be below significance thresholds. Further, because diesel particulates are considered to have long-term health effects and construction would be a short-term event, emissions would not result in a significant long-term health risk to surrounding receptors. Therefore, potential impacts from diesel particulate matter are considered less than significant and no mitigation is required.

5.4 ODORS

Project construction could result in minor amounts of odor compounds associated with diesel heavy equipment exhaust; however, because the construction equipment would be operating at various locations throughout the construction site, and because any operations near existing receptors would be temporary, impacts associated with odors during construction are not considered significant.

The Project involves extending Torrey Meadows Road across SR-56. Roads are not identified as major sources of odor emissions according to the CARB Air Quality and Land Use Handbook. Operation of the Project would therefore not be a source of nuisance odors. Odor impacts would be less than significant and no mitigation measures are required.

5.5 RELEASE SUBSTANTIAL QUANTITIES OF AIR CONTAMINANTS

Air contaminant emissions from stationary sources are regulated by the SDAPCD and by the San Diego Municipal Code, Chapter 14, Article 2, Division 7, "Off-site Development Impact Regulations" paragraph 142.0710, "Air contaminant regulations." The primary source of air contaminant emissions from the proposed Project would be from mobile sources; no emissions from stationary sources are anticipated. As illustrated in Tables 7 through 9, the proposed Project is anticipated to have a relatively low increase in air pollutants, and is well below the significance thresholds for criteria pollutants. Further, the Project would not result in significant

emissions of toxic air contaminants. Therefore, it is unlikely that the Project would release substantial quantities of air contaminants beyond the boundaries of the premises upon which the source emissions of the contaminants is located. Impacts would be less than significant and no mitigation measures are required.

5.6 GREENHOUSE GAS EMISSIONS

5.6.1 Construction

GHG emissions would be associated with the construction phases of the Project through use of heavy equipment and by the construction vehicle trips (see Table 6 for construction phases and anticipated equipment). Emissions of GHGs related to the construction of the Project would be temporary. As shown in Table 10, based on emission estimates from the Roadway Model, total GHG emissions associated with construction are estimated at 3,413 MT CO_2e for the duration of construction.

Table 10
ESTIMATED CONSTRUCTION GHG EMISSIONS

Source	Emissions (MT CO_2e)
Bridge	3,153.26
Roadway	260.27
TOTAL[1]	3,413.53
Amortized Construction Emissions[2]	**113.78**
Screening Threshold	900
Significant Impact?	***No***

Source: Roadway Model (output data is provided in Appendix A)
1 The total presented is the sum of the unrounded values.
2 Construction emissions are amortized over 30 years in accordance with City guidance.

The interim City guidance recommends that the emissions be amortized over 30 years. The proposed construction activities would therefore contribute 113.78 MT CO_2e emissions per year. As compared to the City's screening threshold of 900 MT CO_2e per year, construction of the proposed Project would result in a less than significant impact and no mitigation would be required.

5.6.2 Operation

Operational sources of GHG emissions associated with the Project would include: (1) energy use (lighting) and (2) vehicle use. The overcrossing would likely have street lights; however, emissions from this source would be negligible. As discussed above, the proposed Project would not create new vehicle trips, and would instead redistribute vehicle traffic, reduce vehicle delay (congestion) at four out of the seven analyzed intersections during the PM peak hour in 2035,

and reduce VMT for local residents. Therefore, operational GHG emissions associated with the proposed Project would be less than significant and no mitigation would be required.

5.6.3 Consistency with Local Plans Adopted for the Purpose of Reducing GHG Emissions

The City of San Diego has adopted several plans and programs for reducing GHG emissions. As discussed in Section 2.3, Regulatory Framework, these plans establish goals and policies for City planning and operations. The Project would support the applicable policies included in the City of San Diego's General Plan; consistency with these policies is analyzed in Table 11.

Table 11
CITY GENERAL PLAN IMPLEMENTATION STRATEGIES

Policy	Project Consistency
ME-C.1. Identify the general location and extent of streets, sidewalks, trails, and other transportation facilities and services needed to enhance mobility in community plans.	*Consistent*. The Project would comply with the Torrey Highlands Subarea Plan and is consistent with planned improvements to the SR-56 corridor between I-5 and I-15, as specified in the 2050 RTP. The Project would improve community connectivity between the two residential communities currently separated by SR-56.
ME-C.2. Provide adequate capacity and reduce congestion for all modes of transportation on the street and freeway system.	*Consistent*. The Project would provide an alternative, more direct route across SR-56 for local residents and would provide adequate street segment capacity and generally alleviate roadway congestion in the area. The Project would include sidewalks and bicycle lanes to provide connectivity across SR-56 between the residential communities.
ME-C.3. Design an interconnected street network within and between communities, which includes pedestrian and bicycle access, while minimizing landform and community character impacts.	*Consistent*. The Project would connect the communities currently divided by SR-56 and would be built to Caltrans Specifications, which includes sidewalks for pedestrians and bike lanes for bicycle access.

6.0 CUMULATIVE IMPACTS

6.1 CRITERIA POLLUTANTS

In analyzing cumulative impacts from a project, the analysis must specifically evaluate a project's contribution to the cumulative increase in pollutants for which the SDAB is listed as "non-attainment" for the state and federal AAQS. The City of San Diego Significance Thresholds does not include specific criteria for determining the significance of cumulative air quality impacts. The County of San Diego Guidelines for Determining Significance for Air Quality (2007) provides the following guidance for construction and operation phases. A project that has a significant impact on air quality with regard to emissions of $PM_{2.5}$, PM_{10}, NO_x and/or VOCs, as determined by the screening criteria, would have a significant cumulatively considerable net increase. In the event direct impacts from a project are less than significant, a project may still have a cumulatively considerable impact on air quality if the emissions from the project, in combination with the emissions from other proposed, or reasonably foreseeable future projects are in excess of screening levels identified above.

During the operational phase, a project that does not conform to the RAQS and/or has a significant direct impact on air quality with regard to operational emissions of PM_{10}, $PM_{2.5}$, NO_x, and/or VOCs, would also have a significant cumulatively considerable net increase. Projects that cause road intersections to operate at or below an LOS E and create a CO hot spot create a cumulatively considerable net increase of CO.

PM_{10} emissions associated with construction generally result in near-field impacts. As shown in the Project construction emissions evaluation, the emissions of PM_{10} would be below the significance levels. It is unlikely that all construction for the Project and other cumulative projects would be occurring at the same time; therefore, Project construction is not anticipated to result in a cumulatively significant impact on air quality.

With regard to cumulative impacts associated with ozone precursors, in general, if a project is consistent with the community and general plans, it has been accounted for in the ozone attainment demonstration contained within the SIP and would not cause a cumulatively significant impact on the ambient air quality for ozone.

The discussion for Section 5.1 concludes that the Project conforms to the RAQS. Section 5.2 concludes that the Project would not result in a direct impact to air quality during operation. As discussed in Section 5.3, the Project would not reduce the LOS of any local street intersection during construction or operation. Therefore, operation of the Project would not result in a cumulatively considerable contribution to a significant air quality impact pertaining to ozone precursors or CO.

6.2 GREENHOUSE GAS EMISSIONS

GHG emissions are considered to be largely a cumulative impact, because no single project is sufficient in size to, by itself, generate enough GHG emissions to noticeably affect climate change. Instead the combination of GHG emissions from past, present, and future projects contribute substantially to the phenomenon of global climate change and its associated

environmental impacts. Climate change impacts may include an increase in extreme heat days, higher concentrations of air pollutants, sea level rise, impacts to water supply and water quality, public health impacts, impacts to ecosystems, impacts to agriculture, and other environmental impacts.

The approach used to develop significance thresholds for GHG emissions is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions needed to move us toward climate stabilization. If a project would generate GHG emissions above the threshold level, it would be considered to contribute substantially to a cumulative impact and would be considered significant. Therefore, based on the analysis in Section 5.6, the Project would not contribute to a cumulatively considerable impact.

Amortized construction emissions from the proposed Project would be approximately 114 MT CO_2e per year, and operational emissions associated with the Project would be negligible. As this amount of GHG emissions does not exceed the City's screening threshold of 900 MT CO_2e per year, the GHG emissions related to the proposed Project would not have a significant cumulative impact with respect to climate change.

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Attachment A

AIR QUALITY DATA

Road Construction Emissions Model, Version 7.1.5.1

Emission Estimates for -> #N/A Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
Abutment & Bent Foundations	8.8	46.5	101.1	5.0	5.0	0.0	4.4	4.4	0.0	13,708.1
Bent Columns & Abutment Stems	8.3	42.8	81.0	4.4	4.4	0.0	3.8	3.8	0.0	11,873.2
Bridge Super-structure	10.0	50.4	166.1	6.2	6.2	0.0	5.0	4.9	0.0	28,392.5
Bridge Approach Slabs & Barriers	4.9	27.1	37.9	2.6	2.6	-	2.3	2.3	-	4,626.8
Maximum (pounds/day)	10.0	50.4	166.1	6.2	6.2	0.0	5.0	4.9	0.0	28,392.5
Total (tons/construction project)	1.7	8.5	20.2	0.9	0.9	0.0	0.8	0.8	0.0	3,153.3

Notes:		
	Project Start Year ->	2015
	Project Length (months) ->	18
	Total Project Area (acres) ->	0
	Maximum Area Disturbed/Day (acres) ->	0
	Total Soil Imported/Exported (yd^3/day)->	0

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

Emission Estimates for -> #N/A Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
Abutment & Bent Foundations	4.0	21.1	46.0	2.3	2.3	0.0	2.0	2.0	0.0	6,231.0
Bent Columns & Abutment Stems	3.8	19.4	36.8	2.0	2.0	0.0	1.7	1.7	0.0	5,396.9
Bridge Super-structure	4.5	22.9	75.5	2.8	2.8	0.0	2.3	2.2	0.0	12,905.7
Bridge Approach Slabs & Barriers	2.2	12.3	17.2	1.2	1.2	-	1.1	1.1	-	2,103.1
Maximum (kilograms/day)	4.5	22.9	75.5	2.8	2.8	0.0	2.3	2.2	0.0	12,905.7
Total (megagrams/construction project)	1.5	7.7	18.3	0.8	0.8	0.0	0.7	0.7	0.0	2,860.1

Notes:		
	Project Start Year ->	2015
	Project Length (months) ->	18
	Total Project Area (hectares) ->	0
	Maximum Area Disturbed/Day (hectares) ->	0
	Total Soil Imported/Exported ($meters^3$/day)->	0

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 H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates and Data Entry tabs were copied over from the Road Construction Emissions Model, Version 7.1.5.1. The names of the construction phases were changed to reflect phase names provided by client.

Construction equipment list was provided by client; however, four listed pieces of equipment were not available choices in the model, so the closest available choice was selected (Skip Loader = Rubber Tired Loader, Mini Excavator = Excavator, Bull Dozer = Rubber Tired Dozer, Curb Form Machine = Other Material Handling Equipment).

Road Construction Emissions Model

Version 7.1.5.1

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 C10 through C25.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

Input Type

Project Name	Torrey Meadows	
Construction Start Year	2015	Enter a Year between 2009 and 2025 (inclusive)
Project Type	3	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	18.00	months
Predominant Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length	0.06	miles
Total Project Area	0.42	acres
Maximum Area Disturbed/Day	0.00	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	0.00	yd^3/day
Soil Exported	0.00	yd^3/day
Average Truck Capacity	20	yd^3 (assume 20 if unknown)

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of Construction Months	Program Calculated Months	2005	%	2006	%	2007	%
Abutment & Bent Foundations		1.80	0.00	0.00	0.00	0.00	0.00	0.00
Bent Columns & Abutment Stems		8.10	0.00	0.00	0.00	0.00	0.00	0.00
Bridge Super-structure		5.40	0.00	0.00	0.00	0.00	0.00	0.00
Bridge Approach Slabs & Barriers		2.70	0.00	0.00	0.00	0.00	0.00	0.00
Totals	0.00	18.00						

NOTE: soil hauling emissions are included in the Grading/Excavation Construction Period Phase, therefore the Construction Period for Grading/Excavation cannot be zero if hauling is part of the project.

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions	User Override of Soil Hauling Defaults	Default Values
User Input		
Miles/round trip		30

Round trips/day		0
Vehicle miles traveled/day (calculated)		0

Hauling Emissions	**ROG**	**NOx**	**CO**	**PM10**	**PM2.5**	**CO2**
Emission rate (grams/mile)	0.25	9.41	1.09	0.22	0.15	1694.67
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day	0.00	0.00	0.00	0.00	0.00	0.00
Tons per contruction period	0.00	0.00	0.00	0.00	0.00	0.00

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions	User Override of Worker Commute Default Values	Default Values
Miles/ one-way trip		20
One-way trips/day		2
No. of employees: Abutment & Bent Foundations		5
No. of employees: Bent Columns & Abutment Stems		28
No. of employees: Bridge Super-structure		18
No. of employees: Bridge Approach Slabs & Barriers		8

	ROG	**NOx**	**CO**	**PM10**	**PM2.5**	**CO2**
Emission rate - Abutment & Bent Foundations (grams/mile)	0.164	0.219	1.956	0.047	0.020	443.518
Emission rate - Bent Columns & Abutment Stems (grams/mile)	0.164	0.219	1.956	0.047	0.020	443.518
Emission rate - Bridge Super-structure (gr/mile)	0.154	0.204	1.826	0.047	0.020	443.599
Emission rate - Bridge Approach Slabs & Barriers (grams/mile)	0.147	0.194	1.744	0.047	0.020	443.650
Emission rate - Abutment & Bent Foundations (grams/trip)	0.558	0.363	4.666	0.004	0.003	95.528
Emission rate - Bent Columns & Abutment Stems (grams/trip)	0.558	0.363	4.666	0.004	0.003	95.528
Emission rate - Bridge Super-structure (gr/trip)	0.526	0.338	4.381	0.004	0.003	95.567
Emission rate - Bridge Approach Slabs & Barriers (grams/trip)	0.505	0.323	4.200	0.004	0.003	95.592
Pounds per day - Abutment & Bent Foundations	0.084	0.105	0.965	0.021	0.009	197.486
Tons per const. Period - Abutment & Bent Foundations	0.002	0.002	0.019	0.000	0.000	3.910
Pounds per day - Bent Columns & Abutment Stems	0.464	0.575	5.305	0.114	0.049	1086.176
Tons per const. Period - Bent Columns & Abutment Stems	0.041	0.051	0.473	0.010	0.004	96.778
Pounds per day - Bridge Super-structure	0.278	0.340	3.154	0.073	0.031	691.330
Tons per const. Period - Bridge Super-structure	0.016	0.020	0.187	0.004	0.002	41.065
Pounds per day - Bridge Approach Slabs & Barriers	0.114	0.139	1.291	0.031	0.013	296.319
Tons per const. Period - Bridge Approach Slabs & Barriers	0.003	0.004	0.038	0.001	0.000	8.801
tons per construction period	0.063	0.078	0.717	0.016	0.007	150.554

Water truck default values can be overriden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Day	Default Values Miles Traveled/Day
Abutment & Bent Foundations - Exhaust	41.00	1		40
Bent Columns & Abutment Stems - Exhaust	36.00	1		40

Bridge Super-structure	147.00	1		40		

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Abutment & Bent Foundations (grams/mile)	0.25	9.41	1.09	0.22	0.15	1694.67
Emission rate - Bent Columns & Abutment Stems (grams/mile)	0.25	9.41	1.09	0.22	0.15	1694.67
Emission rate - Bridge Super-structure (gr/mile)	0.19	8.70	0.85	0.19	0.12	1685.62
Pounds per day - Abutment & Bent Foundations	0.89	33.97	3.93	0.81	0.55	6121.73
Tons per const. Period - Abutment & Bent Foundations	0.02	0.67	0.08	0.02	0.01	121.21
Pound per day - Bent Columns & Abutment Stems	0.78	29.83	3.45	0.71	0.48	5375.18
Tons per const. Period - Bent Columns & Abutment Stems	0.07	2.66	0.31	0.06	0.04	478.93
Pound per day - Bridge Super-structure	2.48	112.68	11.02	2.45	1.55	21831.36
Tons per const. Period - Bridge Super-structure	0.15	6.69	0.65	0.15	0.09	1296.78

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Abutment & Bent Foundations		0.001	0.0	0.0	0.0	0.0
Fugitive Dust - Bent Columns & Abutment Stems		0.001	0.0	0.0	0.0	0.0
Fugitive Dust - Bridge Super-structure		0.001	0.0	0.0	0.0	0.0

Off-Road Equipment Emissions

Abutment & Bent Foundations Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
2.00		Air Compressors	1.47	6.86	9.27	0.80	0.73	1015.89
1.00		Bore/Drill Rigs	0.41	3.79	6.06	0.18	0.17	944.07
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
2.00		Concrete/Industrial Saws	1.13	6.00	7.88	0.61	0.57	934.28
1.00		Cranes	0.77	3.01	8.75	0.40	0.37	601.78
0.00	1	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
1.00	2	Excavators	0.44	2.79	4.90	0.24	0.22	572.80
1.00		Forklifts	0.25	0.90	2.09	0.18	0.16	165.47
2.00		Generator Sets	1.11	6.00	8.16	0.59	0.55	974.13
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00

1.00		Plate Compactors	0.04	0.21	0.25	0.01	0.01	34.45
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Pumps	0.47	2.48	3.37	0.25	0.23	396.14
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Rough Terrain Forklifts	0.25	2.03	3.05	0.18	0.16	372.57
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Rubber Tired Loaders	0.54	3.12	6.84	0.23	0.21	662.67
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	1	Signal Boards	0.41	1.41	1.37	0.11	0.10	157.43
1.00		Skid Steer Loaders	0.13	1.41	1.61	0.09	0.09	220.81
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Tractors/Loaders/Backhoes	0.38	1.58	3.45	0.27	0.25	336.39
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing	pounds per day	7.8	41.6	67.0	4.1	3.8	7388.9
	Grubbing/Land Clearing	tons per phase	0.2	0.8	1.3	0.1	0.1	146.3

Bent Columns & Abutment Stems	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
1.00		Aerial Lifts	0.07	0.86	1.06	0.05	0.04	178.61
2.00		Air Compressors	1.47	6.86	9.27	0.80	0.73	1015.89
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Cement and Mortar Mixers	0.07	0.35	0.42	0.02	0.02	57.88
2.00		Concrete/Industrial Saws	1.13	6.00	7.88	0.61	0.57	934.28
	1	Cranes	0.77	3.01	8.75	0.40	0.37	601.78
0.00	2	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	4	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Forklifts	0.25	0.90	2.09	0.18	0.16	165.47
2.00		Generator Sets	1.11	6.00	8.16	0.59	0.55	974.13
0.00	2	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Plate Compactors	0.04	0.21	0.25	0.01	0.01	34.45
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Rough Terrain Forklifts	0.25	2.03	3.05	0.18	0.16	372.57
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00

0.00	3	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	4	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
2.00	1	Signal Boards	0.81	2.81	2.74	0.21	0.20	314.87
1.00		Skid Steer Loaders	0.13	1.41	1.61	0.09	0.09	220.81
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
1.00	2	Tractors/Loaders/Backhoes	0.38	1.58	3.45	0.27	0.25	336.39
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Welders	0.61	2.00	1.84	0.15	0.14	204.74
	Bent Columns & Abutment Ste	pounds per day	7.1	34.0	50.6	3.6	3.3	5411.9
	Grading	tons per phase	0.6	3.0	4.5	0.3	0.3	482.2

Bridge Super-structure	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*		pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
2.00		Aerial Lifts	0.13	1.72	1.96	0.08	0.08	357.23
2.00	1	Air Compressors	1.41	6.85	8.96	0.76	0.70	1015.89
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Cement and Mortar Mixers	0.07	0.35	0.42	0.02	0.02	57.88
2.00		Concrete/Industrial Saws	1.06	5.97	7.52	0.58	0.53	934.28
1.00		Cranes	0.76	3.00	8.58	0.39	0.36	601.76
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Forklifts	0.25	0.90	2.02	0.17	0.16	165.47
2.00	1	Generator Sets	1.06	5.98	7.90	0.57	0.52	974.13
0.00	2	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
	1	Plate Compactors	0.04	0.21	0.25	0.01	0.01	34.45
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Pumps	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Rollers	0.36	1.51	3.19	0.24	0.22	279.54
	1	Rough Terrain Forklifts	0.24	2.03	2.85	0.16	0.15	372.68
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	4	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
2.00	1	Signal Boards	0.76	2.76	2.68	0.20	0.18	314.87
1.00		Skid Steer Loaders	0.12	1.41	1.54	0.09	0.08	220.80
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00

1.00	2	Tractors/Loaders/Backhoes	0.37	1.57	3.34	0.26	0.24	336.11
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Welders	0.59	1.98	1.82	0.15	0.14	204.74
	Drainage	pounds per day	7.2	36.3	53.0	3.7	3.4	5869.8
	Drainage	tons per phase	0.4	2.2	3.2	0.2	0.2	348.7

Bridge Approach Slabs & Barriers	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Air Compressors	0.68	3.42	4.38	0.37	0.34	507.95
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Cement and Mortar Mixers	0.07	0.35	0.42	0.02	0.02	57.88
2.00		Concrete/Industrial Saws	1.02	5.95	7.30	0.55	0.51	934.28
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Forklifts	0.24	0.90	1.97	0.16	0.15	165.47
2.00		Generator Sets	1.03	5.97	7.73	0.55	0.50	974.13
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Pavers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Plate Compactors	0.04	0.21	0.25	0.01	0.01	34.45
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
	1	Rollers	0.35	1.51	3.09	0.23	0.21	279.53
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Rubber Tired Loaders	0.52	3.12	6.51	0.22	0.20	662.62
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	1	Signal Boards	0.36	1.36	1.32	0.10	0.09	157.43
1.00		Skid Steer Loaders	0.12	1.41	1.49	0.08	0.08	220.79
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
1.00	2	Tractors/Loaders/Backhoes	0.36	1.57	3.27	0.25	0.23	335.92
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Paving	pounds per day	4.8	25.8	37.7	2.5	2.3	4330.5
	Paving	tons per phase	0.1	0.8	1.1	0.1	0.1	128.6

Total Emissions all Phases (tons per construction period) =>	1.4	6.8	10.1	0.7	0.6	1105.8

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

Equipment		Default Values Horsepower		Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		106		8
Bore/Drill Rigs		206		8
Cement and Mortar Mixers		10		8
Concrete/Industrial Saws		64		8
Cranes		226		8
Crawler Tractors		208		8
Crushing/Proc. Equipment		142		8
Excavators		163		8
Forklifts		89		8
Generator Sets		66		8
Graders		175		8
Off-Highway Tractors		123		8
Off-Highway Trucks		400		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		167		8
Pavers		126		8
Paving Equipment		131		8
Plate Compactors		8		8
Pressure Washers		26		8
Pumps		53		8
Rollers		81		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		255		8
Rubber Tired Loaders		200		8
Scrapers		362		8
Signal Boards		20		8
Skid Steer Loaders		65		8
Surfacing Equipment		254		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		98		8
Trenchers		81		8
Welders		45		8

0

END OF DATA ENTRY SHEET

Road Construction Emissions Model, Version 7.1.5.1

Emission Estimates for -> Torrey Meadows Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
Grading & Drainage	6.9	35.0	75.1	4.0	3.8	0.2	3.4	3.4	0.0	8,453.4
Curb, Gutter, Sidewalk	2.2	13.0	30.8	1.5	1.2	0.2	1.0	1.0	0.0	5,235.9
Base & Paving	6.4	29.7	104.6	4.2	3.9	0.2	3.3	3.3	0.0	15,285.9
Striping	0.6	3.3	3.5	0.3	0.3	-	0.3	0.3	-	665.2
Maximum (pounds/day)	6.9	35.0	104.6	4.2	3.9	0.2	3.4	3.4	0.0	15,285.9
Total (tons/construction project)	0.1	0.6	1.8	0.1	0.1	0.0	0.1	0.1	0.0	260.3

Notes:		
	Project Start Year ->	2016
	Project Length (months) ->	3
	Total Project Area (acres) ->	2
	Maximum Area Disturbed/Day (acres) ->	0
	Total Soil Imported/Exported (yd^3/day)->	0

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

Emission Estimates for -> Torrey Meadows Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
Grading & Drainage	3.2	15.9	34.2	1.8	1.7	0.1	1.6	1.5	0.0	3,842.5
Curb, Gutter, Sidewalk	1.0	5.9	14.0	0.7	0.6	0.1	0.5	0.5	0.0	2,380.0
Base & Paving	2.9	13.5	47.6	1.9	1.8	0.1	1.5	1.5	0.0	6,948.1
Striping	0.3	1.5	1.6	0.2	0.2	-	0.1	0.1	-	302.4
Maximum (kilograms/day)	3.2	15.9	47.6	1.9	1.8	0.1	1.6	1.5	0.0	6,948.1
Total (megagrams/construction project)	0.1	0.6	1.6	0.1	0.1	0.0	0.1	0.1	0.0	236.1

Notes:		
	Project Start Year ->	2016
	Project Length (months) ->	3
	Total Project Area (hectares) ->	1
	Maximum Area Disturbed/Day (hectares) ->	0
	Total Soil Imported/Exported ($meters^3$/day)->	0

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 H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates and Data Entry tabs were copied over from the Road Construction Emissions Model, Version 7.1.5.1. The names of the construction phases were changed to reflect phase names provided by client.

Construction equipment list was provided by client; however, four listed pieces of equipment were not available choices in the model, so the closest available choice was selected (Skip Loader = Rubber Tired Loader, Mini Excavator = Excavator, Bull Dozer = Rubber Tired Dozer, Curb Form Machine = Other Material Handling Equipment).

Road Construction Emissions Model

Version 7.1.5.1

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 C10 through C25.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

Input Type

Project Name	Torrey Meadows	
Construction Start Year	2016	Enter a Year between 2009 and 2025 (inclusive)
Project Type	2	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	3.00	months
Predominant Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length	0.17	miles
Total Project Area	1.50	acres
Maximum Area Disturbed/Day	0.02	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	0.00	yd^3/day
Soil Exported	0.00	yd^3/day
Average Truck Capacity	20	yd^3 (assume 20 if unknown)

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of Construction Months	Program Calculated Months
Grading & Drainage		0.30
Curb, Gutter, Sidewalk		1.35
Base & Paving		0.90
Striping		0.45
Totals	0.00	3.00

2005	%	2006	%	2007	%
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00

NOTE: soil hauling emissions are included in the Grading/Excavation Construction Period Phase, therefore the Construction Period for Grading/Excavation cannot be zero if hauling is part of the project.

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions	User Override of Soil Hauling Defaults	Default Values
User Input		
Miles/round trip		30

Round trips/day		0
Vehicle miles traveled/day (calculated)		0

Hauling Emissions	**ROG**	**NOx**	**CO**	**PM10**	**PM2.5**	**CO2**
Emission rate (grams/mile)	0.16	8.25	0.70	0.17	0.10	1679.86
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day	0.00	0.00	0.00	0.00	0.00	0.00
Tons per contruction period	0.00	0.00	0.00	0.00	0.00	0.00

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions	User Override of Worker Commute Default Values	Default Values
Miles/ one-way trip		20
One-way trips/day		2
No. of employees: Grading & Drainage		5
No. of employees: Curb, Gutter, Sidewalk		20
No. of employees: Base & Paving		14
No. of employees: Striping		10

	ROG	**NOx**	**CO**	**PM10**	**PM2.5**	**CO2**
Emission rate - Grading & Drainage (grams/mile)	0.147	0.194	1.744	0.047	0.020	443.650
Emission rate - Curb, Gutter, Sidewalk (grams/mile)	0.147	0.194	1.744	0.047	0.020	443.650
Emission rate - Base & Paving (gr/mile)	0.147	0.194	1.744	0.047	0.020	443.650
Emission rate - Striping (grams/mile)	0.147	0.194	1.744	0.047	0.020	443.650
Emission rate - Grading & Drainage (grams/trip)	0.505	0.323	4.200	0.004	0.003	95.592
Emission rate - Curb, Gutter, Sidewalk (grams/trip)	0.505	0.323	4.200	0.004	0.003	95.592
Emission rate - Base & Paving (gr/trip)	0.505	0.323	4.200	0.004	0.003	95.592
Emission rate - Striping (grams/trip)	0.505	0.323	4.200	0.004	0.003	95.592
Pounds per day - Grading & Drainage	0.076	0.093	0.861	0.021	0.009	197.546
Tons per const. Period - Grading & Drainage	0.000	0.000	0.003	0.000	0.000	0.652
Pounds per day - Curb, Gutter, Sidewalk	0.304	0.371	3.443	0.083	0.035	790.185
Tons per const. Period - Curb, Gutter, Sidewalk	0.005	0.006	0.051	0.001	0.001	11.734
Pounds per day - Base & Paving	0.209	0.255	2.367	0.057	0.024	543.252
Tons per const. Period - Base & Paving	0.002	0.003	0.023	0.001	0.000	5.378
Pounds per day - Striping	0.152	0.185	1.721	0.042	0.018	395.092
Tons per const. Period - Striping	0.001	0.001	0.009	0.000	0.000	1.956
tons per construction period	0.008	0.009	0.086	0.002	0.001	19.720

Water truck default values can be overriden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Day	Default Values Miles Traveled/Day
Grading & Drainage - Exhaust	13.00	1		40
Curb, Gutter, Sidewalk - Exhaust	19.00	1		40

Base & Paving	69.00	1		40

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grading & Drainage (grams/mile)	0.16	8.25	0.70	0.17	0.10	1679.86
Emission rate - Curb, Gutter, Sidewalk (grams/mile)	0.16	8.25	0.70	0.17	0.10	1679.86
Emission rate - Base & Paving (gr/mile)	0.16	8.25	0.70	0.17	0.10	1679.86
Pounds per day - Grading & Drainage	0.18	9.45	0.80	0.19	0.11	1924.06
Tons per const. Period - Grading & Drainage	0.00	0.03	0.00	0.00	0.00	6.35
Pound per day - Curb, Gutter, Sidewalk	0.26	13.81	1.17	0.28	0.17	2812.09
Tons per const. Period - Curb, Gutter, Sidewalk	0.00	0.21	0.02	0.00	0.00	41.76
Pound per day - Base & Paving	0.95	50.17	4.26	1.02	0.60	10212.34
Tons per const. Period - Base & Paving	0.01	0.50	0.04	0.01	0.01	101.10

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grading & Drainage		0.023	0.2	0.0	0.0	0.0
Fugitive Dust - Curb, Gutter, Sidewalk		0.023	0.2	0.0	0.0	0.0
Fugitive Dust - Base & Paving		0.023	0.2	0.0	0.0	0.0

Off-Road Equipment Emissions

Grading & Drainage Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Concrete/Industrial Saws	0.51	2.98	3.65	0.28	0.25	467.14
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
	2	Excavators	0.82	5.58	8.93	0.44	0.40	1145.73
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
2.00		Generator Sets	1.03	5.97	7.73	0.55	0.50	974.13
1.00		Graders	1.07	3.48	10.38	0.58	0.54	671.02
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00

1.00		Plate Compactors	0.04	0.21	0.25	0.01	0.01	34.45
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Rollers	0.35	1.51	3.09	0.23	0.21	279.53
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Rubber Tired Dozers	1.28	4.41	13.72	0.64	0.59	943.69
2.00		Rubber Tired Loaders	1.05	6.23	13.03	0.44	0.41	1325.24
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Skid Steer Loaders	0.12	1.41	1.49	0.08	0.08	220.79
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Sweepers/Scrubbers	0.42	1.57	3.32	0.29	0.27	270.09
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing	pounds per day	6.7	33.4	65.6	3.5	3.3	6331.8
	Grubbing/Land Clearing	tons per phase	0.0	0.1	0.2	0.0	0.0	20.9

Curb, Gutter, Sidewalk	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Cement and Mortar Mixers	0.07	0.35	0.42	0.02	0.02	57.88
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Other Material Handling Equipment	0.60	3.17	6.06	0.33	0.30	608.60
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Plate Compactors	0.04	0.21	0.25	0.01	0.01	34.45
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00

	1	Rubber Tired Loaders	0.52	3.12	6.51	0.22	0.20	662.62
0.00	2	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Sweepers/Scrubbers	0.42	1.57	3.32	0.29	0.27	270.09
0.00	4	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Curb, Gutter, Sidewalk	pounds per day	1.6	8.4	16.6	0.9	0.8	1633.6
	Grading	tons per phase	0.0	0.1	0.2	0.0	0.0	24.3

Base & Paving	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*		pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
	1	Graders	1.07	3.48	10.38	0.58	0.54	671.02
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Pavers	0.42	2.84	4.49	0.22	0.21	481.68
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Pumps	0.00	0.00	0.00	0.00	0.00	0.00
3.00		Rollers	1.05	4.53	9.27	0.68	0.63	838.60
0.00	1	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Rubber Tired Dozers	1.28	4.41	13.72	0.64	0.59	943.69
2.00		Rubber Tired Loaders	1.05	6.23	13.03	0.44	0.41	1325.24
0.00	1	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Sweepers/Scrubbers	0.42	1.57	3.32	0.29	0.27	270.09

0.00	3	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Drainage	pounds per day	5.3	23.1	54.2	2.9	2.6	4530.3
	Drainage	tons per phase	0.1	0.2	0.5	0.0	0.0	44.9

Striping	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Pavers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Sweepers/Scrubbers	0.42	1.57	3.32	0.29	0.27	270.09
0.00	3	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Paving	pounds per day	0.4	1.6	3.3	0.3	0.3	270.1
	Paving	tons per phase	0.0	0.0	0.0	0.0	0.0	1.3

Total Emissions all Phases (tons per construction period) =>	0.1	0.5	1.0	0.1	0.1	91.3

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

Equipment		Default Values Horsepower		Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		106		8
Bore/Drill Rigs		206		8
Cement and Mortar Mixers		10		8
Concrete/Industrial Saws		64		8
Cranes		226		8
Crawler Tractors		208		8
Crushing/Proc. Equipment		142		8
Excavators		163		8
Forklifts		89		8
Generator Sets		66		8
Graders		175		8
Off-Highway Tractors		123		8
Off-Highway Trucks		400		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		167		8
Pavers		126		8
Paving Equipment		131		8
Plate Compactors		8		8
Pressure Washers		26		8
Pumps		53		8
Rollers		81		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		255		8
Rubber Tired Loaders		200		8
Scrapers		362		8
Signal Boards		20		8
Skid Steer Loaders		65		8
Surfacing Equipment		254		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		98		8
Trenchers		81		8
Welders		45		8

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END OF DATA ENTRY SHEET