Appendix F
Air Quality and Greenhouse Gas Emissions Technical Report

Air Quality Technical Report

Olivenhain Trunk Sewer Improvement Project

City of Encinitas
Engineering Department

Prepared by:

ZMassociates Environmental Corporation
19800 MacArthur Blvd., Suite 300
Irvine, California 92612

Contact: Thomas Miller

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1 GLOSSARY OF TERMS AND ACRONYMS

APCD	Air Pollution Control District
AQMD	Air Quality Management District
BACT	Best Available Control Technology
CAA	Federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CO	Carbon monoxide
CO_2e	Carbon dioxide equivalence
DPM	Diesel particulate matter
DSL	Diesel
EPA	Environmental Protection Agency
HAPs	Hazardous air pollutants
$\mu g/m^3$	Micrograms per cubic meter
MUP	Major Use Permit
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NOx/NO_2	Nitrogen oxides/nitrogen dioxide
O_3	Ozone
O&M	Operations and Maintenance
OEHHA	Office of Environmental Health Hazard Assessment
Pb	Lead
$PM^{2.5}$	Fine particulate matter
PM^{10}	Respirable particulate matter
ppm	Parts per million
RAQS	San Diego County's Regional Air Quality Strategy
SANDAG	San Diego Association of Governments
SCAQMD	South Coast Air Quality Management District

SDAB	San Diego Air Basin
SDAPCD	San Diego County Air Pollution Control District
SIP	State implementation plan
SOx/SO_2	Sulfur oxides/sulfur dioxide
TACs	Toxic air contaminants
T-BACT	Toxics-Best Available Control Technology
VMT	Vehicle miles traveled
VOCs	Volatile organic compounds

2 EXECUTIVE SUMMARY

The proposed sewer improvement project will replace, rehabilitate, and or remove sewer manholes, a one siphon, and reroute 2,800 feet of sewer line. The proposed project area spans approximately 337,590 square feet of land.

A light-footed approach has been proposed to minimize impact to the sensitive habitat and provide long term inspection and maintenance utilizing a much smaller footprint and need for disturbance of habit or the neighboring residences.

The proposed construction project is expected to take between 15 and 18 months to complete. For purpose of this analysis, construction mobilization was assumed to start in May 2015, with project completion estimated for December 2016. With the exception of the initial mobilization and final site restoration phases, the four construction phases are estimated to proceed concurrently. The estimated number of workdays for each phase is listed below (phases 2, 3, 4, and 5 will proceed concurrently):

Phases	Phase Descriptions	Duration (Workdays)
1	Mobilization	20
2	Access Construction	250
3	Manhole Rehabilitation	240
4	Siphon and Manhole Removal	20
5a	"Lone Jack Segment" Realignment and Upsizing - - Sewer Installation	90
5b	"Lone Jack Segment" Realignment and Upsizing - - Repaving Following Completed Sewer Installation	10
6	Site Restoration	40
7	Demobilization	
8	Post Construction – Operations	Weekly & Quarterly Inspections & Maintenance

This air quality impact analysis evaluates the potential for significant adverse impacts to the air quality due to construction and operational emissions resulting from the proposed project.

Construction of the proposed project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks delivering construction materials to the proposed project area. It is estimated that 525,000 cubic feet of excavation material will be excavated and staged near sites of excavation for reuse during the various stages of the proposed project. Additionally, it is

estimated that 381,000 cubic feet of material will be imported during the project. Reuse of excavated materials is important for preservation and enhancement of the current habitat.

This analysis was performed using San Diego County CEQA guidance documents for Air Quality, which include significance thresholds applicable to criteria pollutants, and County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements – Climate Change, November 7, 2013. City of Encinitas CEQA guidance or significance thresholds were not available for this project.

The analysis concludes that the daily construction emissions for the proposed project would not exceed the San Diego County's significance thresholds for criteria pollutants. Air quality impacts resulting from construction would, therefore, be less than significant. Additionally, all operational emissions for criteria pollutants were found to be less than significant. Operational greenhouse gas emission estimates from the proposed project are significantly below the San Diego County "Bright Line Threshold" of 2,500 metric tons of CO2e per year.[1] While operations activities, after the proposed project is completed, are expected to be more significant due to the enhanced access for maintenance, the air emissions increase compared to the current operations will be far below the available significance threshold of 2,500 metric tons.

Based on review of local plans and policies affecting air quality, the proposed project appears consistent with those plans and policies, the proposed project does not include residential development that would contribute to local population growth and associated vehicle miles traveled on local roadways. The project would not result in growth-inducing uses, project development has been accounted for in the Regional Air Quality Strategy, and the project would be consistent with local air quality plans. Impacts would be considered less than significant.

Impacts to sensitive receptors, including odor impacts, would be less than significant as the proposed manhole removal, replacement and improvement, and sewer realignment would not be associated with a land use that would generate objectionable odors, and construction would be considered short, temporary in nature, using very small amounts of off-gassing paints and epoxy for painting or coating of new or renovated manholes and realigned sewer lines. The potential health effects to nearby sensitive receptors were modeled using worst case diesel particulate matter (DPM), emissions and the closest sensitive receptor. Cancer risk and noncancer hazard risk values were found to be below significance thresholds for worst case conservative scenarios. The limited air emissions over a short period of time appear to generate negligible increases to the local airshed and negligible increases over background levels as produced by local and freeway traffic. Operational emissions would increase marginally due to the expanded access created by the proposed project, which is purposed to provide increased inspection and preventative maintenance access for the Olivenhain Trunk sewer lines. Cumulative impacts resulting from the proposed project in combination with other projects within the site vicinity would not be considered cumulative to a degree that would be considered harmful.

Four project designed features (PDFs) are recommended as measures to insure compliance with local and California air quality regulations or requirements, and to protect neighboring sensitive receptors. PDFs are listed in Section 6.0 Summary of Recommended Project Design Features, Impacts, and Mitigation Measures, as PDF AQ-1, PDF AQ-2, PDF AQ-3, and PDF AQ-4, located at page 57.

[1] San Diego County Guidelines for Determining Significance, Climate Change, November 7, 2013.

3 INTRODUCTION AND PROJECT DESCRIPTION

3.1 PURPOSE

This report provides an estimate and evaluation of potential air quality impacts associated with construction and operation of the proposed project. Based on the criteria provided in the *City of San Diego, CEQA Significance Determination Thresholds guidance document (January 2011)*[2].

3.2 PROJECT LOCATION AND DESCRIPTION

The proposed project is described in Chapter 2 of this EIR; recited here for ease of reference:

"The project would involve the portion of the OTS between approximately the I-5/Manchester Avenue crossing and the intersection of Lone Jack Road and Santa Fe Vista Court (see Figure 2-1, of the EIR). The existing OTS is within City utility easements and public rights-of-way, as are connecting (tributary) sewer lines that feed into the OTS. The width of the City's existing OTS easement is typically 7 feet."

"Upstream of MiraCosta College (located at the intersection of Mira Costa College Road and Manchester Avenue), the Project alignment is within or immediately adjacent to the Escondido Creek/San Elijo Lagoon corridor; as such it is largely within wetland and riparian habitat, much of which is managed for conservation by the San Elijo Lagoon Conservancy and County of San Diego. The remainder of the alignment, from approximately MiraCosta College downstream to the Olivenhain Sewer Pump Station at the I-5 overcrossing, is within the paved Manchester Avenue roadway. The lower portion of the Project alignment lies within the Coastal Appeal Zone."

"The majority of the Project alignment is within City limits, and the remainder is in unincorporated San Diego County (Figure 2-1).1 Figure 2-2 shows zoning along the Project alignment, and Figure 2-3 shows corresponding General Plan land use designations for the Project corridor. Portions of San Elijo Lagoon within the City of Encinitas are zoned ER/OS/PK (Ecological Resource/Open Space/Park). Upstream of MiraCosta College, adjacent areas on the Encinitas side of Escondido Creek and San Elijo Lagoon are primarily zoned RRFP (Rural Residential, 0.00–0.25 du/acre, floodplain overlay), with small areas of RR (Rural Residential, 0.26–0.5 du/acre) immediately north of Manchester Avenue, and GC (General Commercial) and GC-PCD (General Commercial/Planned Commercial Development) at the Fifth Avenue intersection. The MiraCosta College campus is zoned P/SP (Public/Semi-Public use). Downstream of MiraCosta College, areas across Manchester Avenue from the Lagoon are zoned RR2 (Rural Residential 2) and, at and immediately adjacent to the site of the Olivenhain Sewer Pump Station, R3 (Residential 3). General Plan land use designations are consistent with zoning."

"Consistent with existing zoning and land use planning, principal land uses neighboring the Project alignment along the north side of the San Elijo Lagoon/Escondido Creek corridor include residential and rural residential development, MiraCosta College, and the Encinitas Country Day School. North of the MiraCosta College campus the character of development becomes semi-rural and is dominated by larger horse properties featuring extensive paddock areas within the Creek and Lagoon floodplain. Commercial development abuts the alignment at South Rancho Santa Fe Road."

[2] California Environmental Quality Act, Significance Determination Thresholds, Development Services Department, January 2011. Specifically Section B – Air Quality and Odor, pages 6 – 18.

"Originally constructed in 1972, the Olivenhain Trunk Sewer (OTS) is a critical wastewater facility that is currently one of the most vulnerable components of the City's wastewater system. A number of manholes along the OTS are deteriorating and experience significant inflow and infiltration (I&I) that increases flow volumes in the line, and maintenance access along much of the line is inadequate or lacking. The potential for a failure or spill associated with the OTS is a significant concern; such an event could interrupt sanitary sewer service to a large number of residences and businesses as well as impacting water quality in some of San Diego County's most valuable and sensitive natural habitat."

"The proposed Project would rehabilitate 50 badly degraded manholes along an approximately 4-mile-long segment of the OTS within Escondido Creek and San Elijo Lagoon, remove a siphon and three manholes that have been evaluated as superfluous, and would provide City maintenance crews with long-term access for ongoing maintenance. In addition, approximately 2,800 linear feet of the upper OTS would be realigned into City streets, away from the Creek and Lagoon. In view of the Project's location within sensitive habitat, the Project approach has been developed in consultation with the San Elijo Lagoon Conservancy (Conservancy) as well as local, state, and federal resource agencies, including the County of San Diego (County), California Department of Fish and Wildlife (DFW), San Diego Regional Water Quality Control Board (RWQCB), California Coastal Commission (Coastal Commission), U.S. Army Corp of Engineers (Corps), and U.S. Fish and Wildlife Service (USFWS)."

The Proposed Project covers or interacts with less than 338,000 square feet of land as described above, making it a small and narrow-footprint infrastructure construction project.

Elements of the proposed project and construction methods which generate air emissions subject to air quality analysis and evaluation, are described in tables below. Each of the 8 project phases is presented in its own table. Estimates provided in the tables serve as the air quality emission sources and activity for this air quality impact analysis.

3.2.1 Project Alternatives

In addition to the Proposed Project, three alternative project approaches are addressed in this impact analysis. Based on design and planning data and information provided by IEC project design engineers, the main difference from an air quality perspective, will be the square footage or acreage which construction activities take place on.

For purpose of this air quality analysis, it is assumed that the same project phases and general project activities will take place for all project alternatives, as in the proposed project. While there may be tasks in alternative projects (I or 2) that would be more limited or some more enhanced; for this analysis it is too difficult to quantify those differences without knowing the contractors exact plans. Additionally, for the same reason stated above it is assumed that the project duration (total number of days) would be the same number of days per phase, for all alternatives, as in the proposed project. The same vehicles and construction equipment would be used, the same vehicle miles traveled (VMT), or equipment operational hours would be the same for all alternatives, as in the proposed project. For this analysis, the size of the project footprint or area of impact is the main driver for impact analysis. This is the most reasonable approach for the proposed project due mainly to the intentional light-impact, limited footprint, and designed low construction intensity design for the project.

For the air quality emission analysis, the difference would be in fugitive dust generation based on the number of acres disturbed during each phase of the project, for all alternatives, and the proposed project.

As such, each alternative will be assumed to emit the same criteria pollutants per day, and GHG per day. The total PM^{10} and $PM^{2.5}$ will be calculated for each alternative based on ratio of project footprint or acres of construction per phase and total, as compared to the proposed project.

Table 3-1 Proposed Project and Alternative Project Area, lists the estimated total project area for the proposed project and all alternatives.

Table 3-1 Proposed Project and Alternative Project Area

Project Type	Area (sq.ft.)	Area (Acres)
Proposed Project:	337,590	7.750
Alternative 1:	419,513	9.631
Alternative 2A:	267,784	6.147
Alternative 2B:	265,493	6.095

Table 3-2 Proposed Project and Alternative Project Areas (Acres) summarizes the total project area for each project (Proposed Project or Alternative) as a total, and by construction phases where grading and excavation and material movement take place. The proposed project ratio factor is 1.0, Alternative 1 ratio factor is 1.243, Alternative 2A ratio factor is 0.7932, and Alternative 2B ratio factor is 0.7864. These factors were derived by dividing the Proposed Project area into the Alternative Projects area. Each construction phase acreage for each Alternative Project were derived by applying the ratio to the Proposed Project phase.

Table 3-2 Proposed Project and Alternative Project Areas (Acres)

Project or Alternative	Total Project Area (acres)	Ratio Factor to Proposed Project	Access Construction Area (acres)	Lone Jack Realignment Area (acres)	Manhole Rehabilitation Area (acres)	Siphon & Manhole Removal Area (acres)
Proposed Project	7.750	1.000	0.4715	0.2043	0.0115	0.0092
Alternative 1	9.631	1.243	0.5861	0.2539	0.0143	0.0114
Alternative 2A	6.147	0.7932	0.3740	0.1621	0.0091	0.0073
Alternative 2B	6.095	0.7864	0.3708	0.1607	0.0090	0.0072

Proposed Project and Alternative Project criteria pollutant emissions and GHG emissions have been estimated for all construction and operation phases, and presented in the applicable sections of this analysis.

GHG emissions are estimated for all phases of the proposed project, and construction and operation phases separately. Available guidance and significance thresholds for GHG analysis requires a comparative analysis for pre-proposed project with post-proposed project. However, the San Diego County guidelines for greenhouse gases Bright Line Threshold offers the cleanest analysis for determining significance for this project, relative to operational emissions.

3.2.2 Phase 1 & 2 - Mobilization and Access Construction

Table 3-3 Phase 1 & 2 Estimated Vehicle Use and Activity, summarizes the estimated activity with the first and second phase of work.

Table 3-3 Phase 1 & 2 Estimated Vehicle Use and Activity

Project Phase	Use Type	Estimated Vehicles & Equipment	Length of Phase (Days)	Number of Round Trips per Vehicle per Phase	Quantity (# of Vehicles, Equipment)	Schedule Estimate (# of days, 5 workdays/ week)	Onroad Daily Use (Miles/Vehicle/ Day)	Offroad Daily Use (Hours//Day)	Motor Size (bhp)	Fuel Type (Gas, DSL)
Mobilization	Onroad Mobile	Semi-Truck Trailer (Equipment Mob Deliv, 100 mi RT)	20	8	1	8	50	0	350	DSL
	Onroad Employee	Crew Trucks (Worker Commute)		20	1	20	75	0	385	DSL
Access Construction	Offroad	Cat 325 excavator	250	250	1	250	20	6	177	DSL
	Offroad	Cat 938 loader		250	1	250	20	6	170	DSL
	Offroad	Skidsteer		250	1	250	20	6	95	DSL
	Onroad Mobile	Water Truck (Onroad truck used offroad, except to fill or stage)		250	1	250	120	8	350	DSL
	Onroad Mobile	Haul Trucks (large 10-wheel dump truck)		250	1	250	100	0	350	DSL
	Onroad Vendor	Semi-Truck Trailer (Vendor Deliveries)		70	1	70	200	0	350	DSL
	Onroad Employee	Pickup Truck (Worker Commute)		250	6	250	50	0	225	Gas
	Onroad Employee	Crew Trucks (Worker Commute)		250	1	250	75	0	385	DSL

3.2.3 Phase 3 & 4 – Manhole Rehabilitation and Siphon and Manhole Removal

Table 3-4 Phase 3 & 4 Estimated Vehicle Use and Activity summarizes the estimated activity with the third and fourth construction phases.

Table 3-4 Phase 3 & 4 Estimated Vehicle Use and Activity

Project Phase	Use Type	Estimated Vehicles & Equipment	Length of Phase (Days)	Number of Round Trips per Vehicle per Phase	Quantity (# of Vehicles, Equipment)	Schedule Estimate (# of days, 5 workdays/ week)	Onroad Daily Use (Miles/Vehicle/ Day)	Offroad Daily Use (Hours//Day)	Motor Size (bhp)	Fuel Type (Gas, DSL)
Manhole Rehabilitation	Offroad	None	235	0	0	0	0	0	0	NA
	Onroad Mobile	Water Truck		235	1	235	120	4	350	DSL
	Onroad Mobile	Truck-mounted Crane (small)		235	1	235	20	4	365	DSL
	Onroad Mobile	Delivery wet-out Truck (mid-sized)		235	1	235	20	8	362	Gas
	Onroad Vendor	Semi-Truck Trailer (Vendor Deliveries)		60	1	60	200	0	350	DSL
	Onroad Employee	Pickup Truck (Worker Commute)		235	6	235	50	0	225	Gas
	Onroad Employee	Crew Trucks (Worker Commute)		235	1	235	75	0	385	DSL
Siphon and Manhole Removal	Offroad	Cat 325 excavator	20	20	1	20	20	6	177	DSL
	Offroad	Cat 314 excavator		20	1	20	20	6	95	DSL
	Offroad	Cat 938 loader		20	1	20	20	6	170	DSL
	Offroad	Skidsteer		20	1	20	20	6	95	DSL
	Onroad Mobile	Water Truck		20	1	20	120	4	350	DSL
	Onroad Mobile	Haul Trucks (large 10-wheel dump truck)		20	1	20	100	6	350	DSL
	Onroad Vendor	Semi-Truck Trailer (Vendor Deliveries)		8	1	8	200	0	350	DSL
	Onroad Employee	Pickup Truck (Worker Commute)		20	6	20	50	0	225	Gas
	Onroad Employee	Crew Trucks (Worker Commute)		20	1	20	75	0	385	DSL

3.2.4 Phase 5 – "Lone Jack Segment" Realignment and Upsizing: Sewer Installation

Table 3-5 Phase 5 Estimated Vehicle Use and Activity summarizes the estimated activity with the fifth construction phase.

Table 3-5 Phase 5 Estimated Vehicle Use and Activity

Project Phase	Use Type	Estimated Vehicles & Equipment	Length of Phase (Days)	Number of Round Trips per Vehicle per Phase	Quantity (# of Vehicles, Equipment)	Schedule Estimate (# of days, 5 workdays/ week)	Onroad Daily Use (Miles/Vehicle/ Day)	Offroad Daily Use (Hours//Day)	Motor Size (bhp)	Fuel Type (Gas, DSL)
"Lone Jack Segment" Realignment and Upsizing -- Sewer Installation	Offroad	Cat 325 excavator	90	90	1	90	20	6	177	DSL
	Offroad	Cat 314 excavator		90	1	90	20	6	95	DSL
	Offroad	Cat 938 loader		90	1	90	20	6	170	DSL
	Offroad	Skidsteer		90	1	90	20	6	95	DSL
	Offroad	Sawcutter - large chain saw driven steel/concrete		90	1	90	20	8	10	Gas
	Onroad Mobile	Water Truck		90	1	90	120	4	350	DSL
	Onroad Mobile	Haul Trucks (large 10-wheel dump truck)		90	1	90	100	4	350	DSL
	Onroad Vendor	Semi-Truck Trailer (Vendor Deliveries)		90	1	60	200	0	350	DSL
	Onroad Employee	Pickup Truck (Worker Commute)		90	6	90	50	0	225	Gas
	Onroad Employee	Crew Trucks (Worker Commute)		90	1	90	75	0	385	DSL

3.2.5 Phase 6 – "Lone Jack Segment" Realignment and Upsizing: Repaving Following Completed Sewer Installation

Table 3-6 Phase 6 Estimated Vehicle Use and Activity summarizes the estimated activity with the sixth construction phase.

Table 3-6 Phase 6 Estimated Vehicle Use and Activity

Project Phase	Use Type	Estimated Vehicles & Equipment	Length of Phase (Days)	Number of Round Trips per Vehicle per Phase	Quantity (# of Vehicles, Equipment)	Schedule Estimate (# of days, 5 workdays/ week)	Onroad Daily Use (Miles/Vehicle/ Day)	Offroad Daily Use (Hours//Day)	Motor Size (bhp)	Fuel Type (Gas, DSL)
"Lone Jack Segment" Realignment and Upsizing -- Repaving Following Completed Sewer Installation	Offroad	John Deere 410 Backhoe	10	10	1	10	20	6	96	DSL
	Offroad	36-inch Smooth Drum Roller		10	1	10	20	6	20	DSL
	Offroad	Small Asphalt Roadway Paving Machine (Cat AP500E)		10	1	10	20	6	142	DSL
	Offroad	Skidsteer		10	1	10	20	9	95	DSL
	Onroad Mobile	Delivery wet-out Truck (mid-sized)		10	1	10	20	8	362	DSL
	Onroad Mobile	Water Truck		10	1	10	120	4	350	DSL
	Onroad Mobile	Haul Trucks (large 10-wheel dump truck)		10	1	10	100	6	350	DSL
	Onroad Vendor	Semi-Truck Trailer (Vendor Deliveries)		10	1	10	200	0	350	DSL
	Onroad Employee	Pickup Truck (Worker Commute)		10	6	10	50	0	225	Gas
	Onroad Employee	Crew Trucks (Worker Commute)		10	1	10	75	0	385	DSL

3.2.6 Phase 7 & 8 – Site Restoration and Demobilization

Table 3-7 Phase 7 & 8 Estimated Vehicle Use and Activity summarizes the estimated activity with the seventh & eighth construction phases.

Table 3-7 Phase 7 & 8 Estimated Vehicle Use and Activity

Project Phase	Use Type	Estimated Vehicles & Equipment	Length of Phase (Days)	Number of Round Trips per Vehicle per Phase	Quantity (# of Vehicles, Equipment)	Schedule Estimate (# of days, 5 workdays / week)	Onroad Daily Use (Miles/Vehicle/ Day)	Offroad Daily Use (Hours// Day)	Motor Size (bhp)	Fuel Type (Gas, DSL)
Site Restoration	Offroad	ATV to carry plants & supplies	40	40	4	40	25	8	55	DSL
	Onroad Vendor	Semi-Truck Trailer (Vendor Deliveries)		20	1	20	120	0	350	DSL
	Onroad Employee	Pickup Truck (Worker Commute)		40	4	40	50	0	225	Gas
	Onroad Employee	Crew Trucks (Worker Commute)		40	1	40	75	0	385	DSL
Demobilization	Onroad Mobile	Semi-Truck Trailer (Equipment Mob Deliv, 100 mi RT)	20	8	1	8	50	0	350	DSL
	Onroad Employee	Crew Trucks (Worker Commute)		20	1	20	75	0	385	DSL

3.2.1 Phase 9 – Operations – Post Construction

Table 3-8 Phase 9 Estimated Vehicle Use and Activity summarizes the estimated activity with the post construction Operation phase.

Table 3-8 Phase 9 Estimated Vehicle Use and Activity

Operations - Post Construction	Onroad City staff, qrtly Inspections	Extended Cab Utility truck F350, 6.2L V8	4 days/year	2	1	4	200	0	385	DSL
	Onroad City staff, video inspections	Extended Cab Utility truck F350, 6.2L V8	1 day/year	2	1	1	200	0	385	DSL
	Onroad City, sewer line cleaning	Extended Cab Utility truck F350, 6.2L V8	14 days/year	4	1	14	400	0	385	DSL
		2-engine Vac-con truck	14 days/year	1	1	14	100	0	275	DSL
		(part of Vac-con) Auxiliary engine	14 days/year		1	14	100	0	135	DSL

3.3 Environmental Setting

3.3.1 Northern San Diego Region

Encinitas, CA climate is warm during summer when temperatures tend to be in the 70's and cool during winter when temperatures tend to be in the 50's.[3]
The warmest month of the year is August with an average maximum temperature of 89.1°F, while the coldest month of the year is December with an average minimum temperature of 41.6°F.
Temperature variations between night and day tend to be moderate during summer with a difference that can reach 27°F, and moderate during winter with an average difference of 25°F.
The annual average precipitation at Encinitas is 15.10 inches. Rainfall is fairly evenly distributed throughout the year. The wettest month of the year is January with an average rainfall of 3.37 inches.

The Weather Channel lists Encinitas, CA highest recorded temperature as 108°F in September 1963, and the lowest recorded temperature was 20°F in January 1963.

The topography in the project region varies greatly, from beaches on the west to mountains and desert on the east. Along with local meteorology, the topography influences the dispersal and movement of pollutants in the basin. The mountains to the east prohibit dispersal of pollutants in that direction and help trap them in inversion layers.

The interaction of ocean, land, and the Pacific High Pressure Zone maintains clear skies for much of the year and influences the direction of prevailing winds (westerly to northwesterly). Local terrain is often the dominant factor inland, and winds in inland mountainous areas tend to blow through the valleys during the day and down the hills and valleys at night.

3.3.2 Project Site

The project is situated roughly situated in or adjacent to wetland, ecological resource areas, open space, and park space. See Appendix A, for the Vicinity Map and Project Overview, for general project location and locations for the key elements of the proposed project. Section 3 above describes the project site and location.

The site and location is rural, wetland, rural residential, and recreation (horse stables and riding trails, and sport parks).

3.3.3 Climate and Meteorology

The project site is located within the San Diego Air Basin (SDAB or basin) and is subject to the San Diego Air Pollution Control District (SDAPCD) guidelines and regulations. The SDAB is one of 15 air basins that geographically divide the State of California. The SDAB is currently classified as a federal nonattainment area for ozone (O_3) and a state nonattainment area for particulate matter less than or equal to 10 microns (PM^{10}), particulate matter less than or equal to 2.5 microns ($PM^{2.5}$), and O_3.

The SDAB lies in the southwest corner of California and comprises the entire San Diego region, covering 4,260 square miles, and is an area of high air pollution potential. The basin experiences warm summers, mild winters, infrequent rainfalls, light winds, and moderate humidity. This usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds.

[3] http://www.idcide.com/weather/ca/encinitas.htm, Escondido No2 Weather Station, 12.47 miles from Encinitas

The SDAB experiences frequent temperature inversions. Subsidence inversions occur during the warmer months as descending air associated with the Pacific High Pressure Zone meets cool marine air. The boundary between the two layers of air creates a temperature inversion that traps pollutants. Another 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 also can trap pollutants. As the pollutants become more concentrated in the atmosphere, photochemical reactions occur that produce O_3, commonly known as smog.

Light daytime winds, predominately from the west, further aggravate the condition by driving air pollutants inland, toward the mountains. During the fall and winter, air quality problems are created due to carbon monoxide (CO) and oxides of nitrogen (NOx) emissions. CO concentrations are generally higher in the morning and late evening. In the morning, CO levels are elevated due to cold temperatures and the large number of motor vehicles traveling. Higher CO levels during the late evenings are a result of stagnant atmospheric conditions trapping CO in the area. Since CO is produced almost entirely from automobiles, the highest CO concentrations in the basin are associated with heavy traffic. Nitrogen dioxide (NO_2) levels are also generally higher during fall and winter days.

Under certain conditions, atmospheric oscillation results in the offshore transport of air from the Los Angeles region to San Diego County. This often produces high O_3 concentrations, as measured at air pollutant monitoring stations within the Northern San Diego County. The transport of air pollutants from Los Angeles to San Diego has also occurred within the stable layer of the elevated subsidence inversion, where high levels of O3 are transported.

Site-Specific Meteorological Conditions

The local climate in the northwestern San Diego County, which is primarily coastal, and especially coastal cities like the City of Encinitas benefits from a mild, Mediterranean climate that is sunny and temperate throughout the year. Since the proposed project site is close and mostly within the city limits, the climate description above summarizes the site climate conditions.

Surprisingly, given its proximity to the beach, the City of Encinitas has almost no humidity. Rainstorms are rare, and the summer months produce hardly any rain at all.

Like most coastal towns in Southern California, the morning fog can be thick, particularly in the months of May and June, but almost always burns off early enough to enjoy the day. Ocean temperature ranges from mid 50s in the winter to approximately 68 degrees in the summer.

3.4 Regulatory Setting

3.4.1 Federal

The federal Clean Air Act, passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. The U.S. Environmental Protection Agency (EPA) is responsible for implementing most aspects of the Clean Air Act, including setting of National Ambient Air Quality Standards, (NAAQS) for major air pollutants, hazardous air pollutant standards, approval of state attainment plans, motor vehicle emission standards, stationary source emission standards and permits, acid rain control measures, stratospheric O_3 protection, and enforcement provisions. NAAQS are established for “criteria pollutants” under the Clean Air Act, which are O_3, CO, NO_2, SO_2, PM^{10}, $PM^{2.5}$, and lead.

The NAAQS describe acceptable air quality conditions designed to protect the health and welfare of the citizens of the nation. The NAAQS (other than for O_3, NO_2, SO_2, PM^{10}, $PM^{2.5}$, and those based on annual

averages or arithmetic mean) are not to be exceeded more than once per year. NAAQS for O_3, NO_2, SO_2, PM^{10}, and $PM^{2.5}$ are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The Clean Air Act requires the EPA to reassess the NAAQS at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed the NAAQS must prepare a State Implementation Plan (SIP) that demonstrates how those areas will attain the standards within mandated time frames.

3.4.2 State

The federal Clean Air Act delegates the regulation of air pollution control and the enforcement of the NAAQS to the states. In California, the task of air quality management and regulation has been legislatively granted to the California Air Resources Board (CARB), with subsidiary responsibilities assigned to air quality management districts (AQMDs) and air pollution control districts (APCDs) at the regional and county levels. CARB, which became part of the California Environmental Protection Agency (CalEPA) in 1991, is responsible for ensuring implementation of the California Clean Air Act of 1988, responding to the federal Clean Air Act, and regulating emissions from motor vehicles and consumer products.

CARB has established California Ambient Air Quality Standards (CAAQS), which are generally more restrictive than the NAAQS. The CAAQS describe adverse conditions; that is, pollution levels must be below these standards before a basin can attain the standard. The CAAQS for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM^{10}, and $PM^{2.5}$ and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded.

The NAAQS and CAAQS are presented in Table 3-9 Ambient Air Quality Standards.

Table 3-9 Ambient Air Quality Standards

		California Standards[1]	National Standards[2]	
Pollutant	Averaging Time	Concentration[3]	Primary[3,4]	Secondary[3,5]
O_3	1hour	0.09 ppm (180 μg/m^3)	—	Same as Primary Standard
	8-hour	0.070 ppm (137 μg/m^3)	0.075 ppm (147 μg/m^3)	
CO	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	—
	8-hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	
NO_2	1-hour	0.18 ppm (339 μg/m^3)	0.100 ppm (188 μg/m^3)	Same as Primary Standard
	Annual Arithmetic Mean	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)	
SO_2	1-hour	0.25 ppm (655 μg/m^3)	0.75 ppm (196 μg/m^3)	—
	3-hour	—	—	0.5 ppm (1300 μg/m^3)
	24-hour	0.04 ppm (105 μg/m^3)	0.14 ppm (for certain areas)[7]	
	Annual Arithmetic Mean	—	0.030 ppm (for certain areas)[7]	—
PM^{10}	24-hour	50 μg/m^3	150 μg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	20 μg/m^3	—	
$PM^{2.5}$	24-hour	—	35 μg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	12 μg/m^3	12.0 μg/m^3	15.0 μg/m^3
Lead[9,10]	30-day Average	1.5 μg/m^3	—	—
	Calendar Quarter	—	1.5 μg/m^3 (for certain areas)[10]	Same as Primary Standard
	Rolling 3-Month Average	—	0.15 μg/m3	
Hydrogen sulfide	1-hour	0.03 ppm (42 μg/m^3)	—	—
Vinyl chloride[9]	24-hour	0.01 ppm (26 μg/m^3)	—	—
Sulfates	24-hour	25 μg/m^3	—	—
Visibility reducing particles[11]	8-hour (10:00 a.m. to 6:00 p.m. PST)	See footnote 11	—	—
ppm= parts per million by volume μg/m^3 = micrograms per cubic meter mg/m^3= milligrams per cubic meter				

Source: CARB 2013b

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, and 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 O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For NO_2 and SO_2, the standard is attained when the 3-year average of the 98th and 99th percentile, respectively, of the daily maximum 1-hour average at each monitor within an area does not exceed 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 $\mu g/m^3$ is equal to or less than one. For $PM^{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

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

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

6. 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 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

7. 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-year average of the annual 99th 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 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

8. On December 14, 2012, the national annual $PM^{2.5}$ primary standard was lowered from 15 $\mu g/m^3$ to 12 $\mu g/m^3$. The existing national 24-hour $PM^{2.5}$ 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 PM^{10} 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. 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.

10. The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 µg/m3 as a quarterly average) remains in effect until 1 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.

11. In 1989, CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-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.

3.4.3 San Diego Air Pollution Control District

While CARB is responsible for the regulation of mobile emission sources within the state, local AQMDs and APCDs are responsible for enforcing standards and regulating stationary sources. The proposed project is located within the SDAB and is subject to SDAPCD guidelines and regulations. In San Diego County, O_3 and particulate matter are the pollutants of main concern, since exceedances of state ambient air quality standards for those pollutants are experienced in most years. For this reason, the SDAB has been designated as a nonattainment area for the state PM^{10}, $PM^{2.5}$, and O_3 standards. The SDAB is also a federal O_3 nonattainment area and a CO maintenance area (western part of the SDAB only); the project area is a CO attainment area.

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 SDAB. The Regional Air Quality Strategy (RAQS) for the SDAB was initially adopted in 1991, and is updated on a triennial basis (most recently in 2009). The RAQS outlines SDAPCD's plans and control measures designed to attain the state air quality standards for O_3. The RAQS relies on information from CARB and SANDAG, including mobile and area source emissions, as well as information regarding projected growth in San Diego County and the cities (including the City of Encinitas), in the County, to project future emissions and then determine from that the strategies necessary for the reduction of emissions through regulatory controls. CARB mobile source emission projections and SANDAG growth projections are based on population, vehicle trends, and land use plans developed by San Diego County and the cities (including the City of Encinitas), in the County as part of the development of their general plans.

The *Eight-Hour Ozone Attainment Plan for San Diego County* indicates that local controls and state programs would allow the region to reach attainment of the federal 8-hour O_3 standard by 2009 (SDAPCD 2007). In this plan, SDAPCD relies on the RAQS to demonstrate how the region will comply with the federal O_3 standard. The RAQS details how the region will manage and reduce O_3 precursors (NOx and volatile organic compounds (VOCs)) by identifying measures and regulations intended to reduce these contaminants. The control measures identified in the RAQS generally focus on stationary sources; however, the emissions inventories and projections in the RAQS address all potential sources, including those under the authority of CARB and the EPA. Incentive programs for reduction of

emissions from heavy-duty diesel vehicles, off-road equipment, and school buses are also established in the RAQS.

In December 2005, SDAPCD prepared a report titled *Measures to Reduce Particulate Matter in San Diego County* to address implementation of Senate Bill (SB) 656 in San Diego County (SB 656 required additional controls to reduce ambient concentrations of PM^{10} and $PM^{2.5}$) (SDAPCD 2005). In the report, SDAPCD evaluates the implementation of source-control measures that would reduce particulate matter emissions associated with residential wood combustion; various construction activities including earthmoving, demolition, and grading; bulk material storage and handling; carry-out and track-out removal and cleanup methods; inactive disturbed land; disturbed open areas; unpaved parking lots/staging areas; unpaved roads; and windblown dust.

As stated above, the SDAPCD is responsible for planning, implementing, and enforcing federal and state ambient standards in the SDAB. The following rules and regulations would apply to the construction of the Proposed Project:

SDAPCD Regulation IV: Prohibitions; Rule 51: Nuisance. Prohibits the discharge, from any source, of such quantities of air contaminants or other materials that cause or have a tendency to cause injury, detriment, nuisance, annoyance to people and/or the public, or damage to any business or property (SDAPCD 1969).

SDAPCD Regulation IV: Prohibitions; Rule 55: Fugitive Dust. Regulates fugitive dust emissions from any commercial construction or demolition activity capable of generating fugitive dust emissions, including active operations, open storage piles, and inactive disturbed areas, as well as track-out and carry-out onto paved roads beyond a project site (SDAPCD 2009).

SDAPCD Regulation IV: Prohibitions; Rule 67.0: Architectural Coatings. Requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories (SDAPCD 2001).

3.4.4 San Diego and Northern San Diego County

During construction of the project, the construction contractor would be required to comply with County Code Section 87.428 and implement appropriate dust control measures, for portions of the project site that crosses or is located within the San Diego County jurisdiction.

County Code Section 87.428, Dust Control Measures. As part of the San Diego County Grading, Clearing, and Watercourses Ordinance, County Code Section 87.428 requires all clearing and grading to be carried out with dust control measures adequate to prevent creation of a nuisance to persons or public or private property. Clearing, grading, or improvement plans shall require that measures such as the following be undertaken to achieve this result: watering, application of surfactants, shrouding, control of vehicle speeds, paving of access areas, or other operational or technological measures to reduce dispersion of dust. These project design measures are to be incorporated into all earth-disturbing activities to minimize the amount of particulate matter emissions from construction (County of San Diego 2004).

3.4.5 Background Air Quality

Pollutants and Effects

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons from illness or discomfort. Pollutants of concern include: O_3, NO_2, CO, sulfur dioxide (SO_2), PM^{10}, $PM^{2.5}$, and lead.

These pollutants are discussed below.[4] In California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants.

Ozone. O_3 is a colorless gas that is formed in the atmosphere when VOCs, sometimes referred to as reactive organic gases (ROGs), and NOx react in the presence of ultraviolet sunlight. O_3 is not a primary pollutant; it is a secondary pollutant formed by complex interactions of two pollutants directly emitted into the atmosphere. The primary sources of VOCs and NOx, the precursors of O_3, are automobile exhaust and industrial sources. Meteorology and terrain play major roles in O_3 formation and ideal conditions occur during summer and early autumn, on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. Short-term exposures (lasting for a few hours) to O_3 at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes.

Nitrogen Dioxide. Most NO_2, like O_3, is not directly emitted into the atmosphere but is formed by an atmospheric chemical reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as NOx and are major contributors to O_3 formation. High concentrations of NO_2 can cause breathing difficulties and result in a brownish-red cast to the atmosphere with reduced visibility. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis and some increase in bronchitis in children (2 and 3 years old) has also been observed at concentrations below 0.3 parts per million by volume (ppm).

Carbon Monoxide. CO is a colorless and odorless gas formed by the incomplete combustion of fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas, such as the project location, automobile exhaust accounts for the majority of CO emissions. CO is a non-reactive air pollutant that dissipates relatively quickly; therefore, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions; primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally

[4] The following descriptions of health effects for each of the criteria air pollutants associated with project construction and operations are based on the EPA's Six Common Air Pollutants (EPA 2010) and the CARB Glossary of Air Pollutant Terms (CARB 2013a) published information.

concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, a typical situation at dusk in urban areas between November and February. The highest levels of CO typically occur during the colder months of the year when inversion conditions are more frequent. In terms of health, CO competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can be dizziness, fatigue, and impairment of central nervous system functions.

Sulfur Dioxide. SO_2 is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Main sources of SO_2 are coal and oil used in power plants and industries; as such, the highest levels of SO_2 are generally found near large industrial complexes. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO_2 and limits on the sulfur content of fuels. SO_2 is an irritant gas that attacks the throat and lungs and can cause acute respiratory symptoms and diminished ventilator function in children. SO_2 can also yellow plant leaves and erode iron and steel.

Particulate Matter. Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter can form when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. $PM_{2.5}$ and PM_{10} represent fractions of particulate matter. Fine particulate matter, or $PM_{2.5}$, is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, $PM^{2.5}$ can be formed in the atmosphere from gases such as sulfur oxides (SOx), NOx, and VOC. Inhalable or coarse particulate matter, or PM^{10}, is about 1/7 the thickness of a human hair. Major sources of PM^{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions.

$PM^{2.5}$ and PM^{10} pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM^{2.5}$ and PM^{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances, such as lead, sulfates, and nitrates, can cause lung damage directly or be absorbed into the blood stream, causing damage elsewhere in the body. Additionally, these substances can transport absorbed gases, such as chlorides or ammonium, into the lungs, also causing injury. Whereas PM^{10} tends to collect in the upper portion of the respiratory system, $PM^{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, as well as produce haze and reduce regional visibility.

Lead. Lead (Pb) in the atmosphere occurs as particulate matter. Sources of lead include leaded gasoline, the manufacturing of batteries, paint, ink, ceramics, and ammunition and secondary lead smelters. Prior to 1978, mobile emissions were the primary source of atmospheric lead. Between 1978 and 1987, the phase-out of leaded gasoline reduced the overall inventory of airborne lead by nearly 95%. With the phase-out of leaded gasoline, secondary lead smelters, battery recycling, and manufacturing facilities are becoming lead-emission sources of greater concern.

Prolonged exposure to atmospheric lead poses a serious threat to human health. Health effects associated with exposure to lead include gastrointestinal disturbances, anemia, kidney disease, and in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low- level lead exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance including intelligence quotient performance, psychomotor performance, reaction time, and growth.

Toxic Air Contaminants. A substance is considered toxic if it has the potential to cause adverse health effects in humans, including increasing the risk of cancer upon exposure, or acute and/or chronic noncancer health effects. A toxic substance released into the air is considered a toxic air contaminant (TAC). Examples include certain aromatic and chlorinated hydrocarbons, certain metals, and asbestos. TACs 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 landfills. Adverse health effects associated with exposure to TACs may include carcinogenic (i.e., cancer-causing) and noncarcinogenic effects. Noncarcinogenic effects typically affect one or more target organ systems and may be experienced either on short-term (acute) or long-term (chronic) exposure to a given TAC. CARB has identified diesel engine exhaust particulate matter as the predominant TAC in California. Diesel particulate matter is emitted into the air by diesel-powered mobile vehicles, including heavy-duty diesel trucks, construction equipment, and passenger vehicles. Certain ROGs may also be designated as TACs.

3.4.6 SDAB Attainment Designation

An area is designated in attainment when it is in compliance with the NAAQS and/or CAAQS. These standards are set by the EPA or CARB for the maximum level of a given air pollutant that can exist in the outdoor air without unacceptable effects on human health or the public welfare.

The criteria pollutants of primary concern that are considered in this air quality assessment include O_3, NO_2, CO, SO_2, PM^{10}, and $PM^{2.5}$. Although there are no ambient standards for VOCs or NOx, they are important as precursors to O_3.

> The SDAB is designated by EPA as an attainment area for the 1997 8-hour NAAQS for O_3 and as a marginal nonattainment area for the 2008 8-hour NAAQS for O_3.The SDAB is designated in attainment for all other criteria pollutants under the NAAQS with the exception of PM^{10}, which was determined to be unclassifiable. The SDAB is currently designated nonattainment for O_3 and particulate matter, PM^{10} and $PM^{2.5}$, under the CAAQS. It is designated attainment for the CAAQS for CO, NO_2, SO_2, lead, and sulfates.

Table 3-10 SDAB Attainment Classification, summarizes the SDAB's federal and state attainment designations for each of the criteria pollutants.

Table 3-10 SDAB Attainment Classification

Pollutant	Federal Designation[a]	State Designation[b]
O_3 (1-hour)	Attainment[1]	Nonattainment
O_3 (8-hour – 1997) (8-hour – 2008)	Attainment (Maintenance) Nonattainment (Marginal)	Nonattainment
CO	Unclassifiable/Attainment[2]	Attainment
PM^{10}	Unclassifiable[3]	Nonattainment
$PM^{2.5}$	Attainment	Nonattainment
NO_2	Unclassifiable/Attainment	Attainment
SO_2	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	(no federal standard)	Attainment
Hydrogen Sulfide	(no federal standard)	Unclassified
Visibility-Reducing Particles	(no federal standard)	Unclassified

Sources: [a]EPA 2013a; [b]CARB 2013c.
Notes: The federal 1-hour standard of 0.12 ppm was in effect from 1979 through June 15, 2005. The revoked standard is referenced here because it was employed for such a long period and because this benchmark is addressed in SIPs. The western and central portions of the SDAB are designated attainment, while the eastern portion is designated unclassifiable/attainment. .At the time of designation, if the available data does not support a designation of attainment or nonattainment, the area is designated as unclassifiable.

3.4.7 Air Quality Monitoring Data

The SDAPCD operates a network of ambient air monitoring stations throughout San Diego County, which measure ambient concentrations of pollutants and determine whether the ambient air quality meets the CAAQS and the NAAQS. The SDAPCD monitors air quality conditions at 10 locations throughout the basin. Due to proximity to the site and similar geographic and climactic characteristics, the Del Mar (DMR), the Kearny Villa Road (KVR), and the San Diego Beardsley (DTN) monitoring sites provide monitoring data that are considered representative for O_3, NO_2, CO, Carbon, VOCs, Total Metals, Carbonyl, PM^{10} and $PM^{2.5}$. Other criteria pollutants are monitored at stations outside of representative locations for the proposed project site.

The Del Mar (DMR) monitoring station monitors only O_3. The Kearny Vila Road (KVR) station monitors O_3, NO_2, PM^{10}, and $PM^{2.5}$, and the San Diego Beardsley station monitors for O_3, NO_2, CO, Carbon, VOCs, Total Metals, Carbonyl, PM^{10} and $PM^{2.5}$.

Ambient concentrations of pollutants for year 2013 are presented in Table 3-11. The number of days exceeding the AAQS, Frequency of Air Quality Standard Violations. The federal and state 8-hour and state 1-hour O_3 standards were exceeded every year from 2008 to 2012. The state 24-hour PM^{10} standard was exceeded in 2009, and the federal 24-hour $PM^{2.5}$ standard was exceeded in 2009 and 2011. Air quality within the project region was in compliance with both CAAQS and NAAQS for NO_2, CO, PM^{10} (NAAQS only), and SO_2 during this monitoring period.

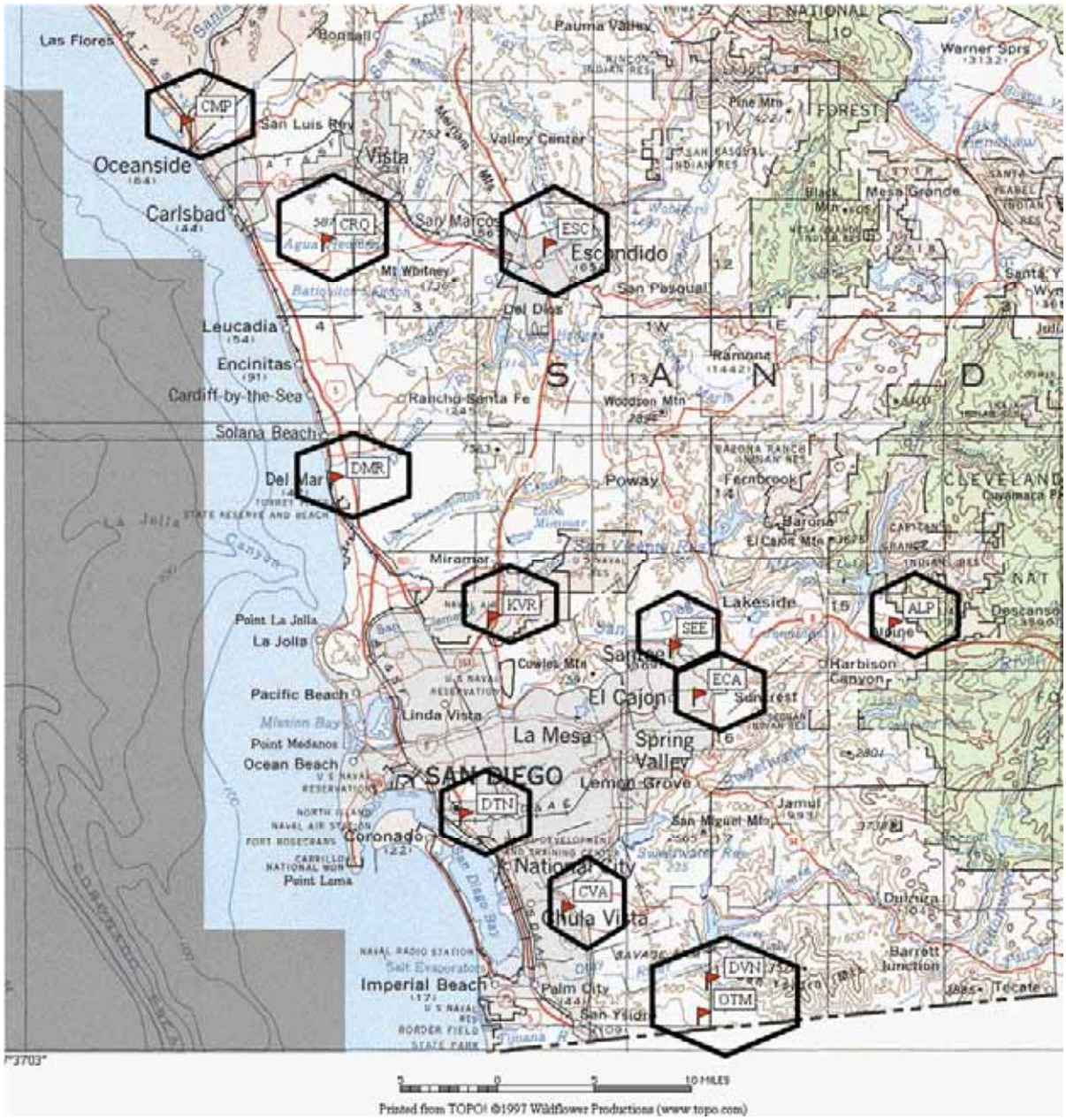
Table 3-11 2013 Ambient Air Quality Data (ppm unless otherwise indicated)[5]

Pollutant	Averaging Time	Del Mar (DMR)	Kearny Villa Road (KVR)	San Diego Beardsley (DTN)	California Ambient Air Quality Standard	National Ambient Air Quality Standard
O_3	8-hour Max	0.069	0.070	0.093	0.070	0.075
	Annual Average	0.035	0.032	0.114	0.090	-
	Days Above Standard	0	0		-	-
PM^{10}	24-hour Max	NA[6]	65.0 µg/m^3	90.0 µg/ m^3	50 µg/ m^3	150 µg/ m^3
	Annual Average	NA	24.9 µg/ m^3	24.9 µg/ m^3	20 µg/ m^3	-
	Days Above Standard	NA	0	0	-	-
PM^{25}	24-hour Max	NA	22.0 µg/ m^3	39.3 µg/ m^3	12 µg/ m^3	35 µg/ m^3
	Annual Average	NA	8.3 µg/ m^3	12.2 µg/ m^3	35 µg/ m^3	15 µg/ m^3
	Days Above Standard	NA	0	1	-	-
NO_2	1-hour Max	NA	0.067	0.006	0.18	100
	Annual Average	NA	0.011	0.040	0.030	0.053
	Days Above Standard	NA	0		-	-
CO	8-hour Max	NA	NA	2.1	9.0	9.0
	1-hour Max	NA	NA	3.0	20	35
	Annual Average	NA	NA	0.5	-	-
	Days Above Standard	NA	NA	0	-	-

[7]

[5] San Diego Air Pollution Control District Annual Network Plan, prepared by the Staff of the Monitoring and Technical Services Division, May 3, 2014 made public.
[6] NA = data not available
[7] Approximate

Figure 3-1 San Diego APCD Air Quality Monitoring Network[8]



[8] Figure 1.1 San Diego APCD Air Quality Monitoring Network, from the "San Diego Air Pollution Control District Annual Network Plan, prepared by the Staff of the Monitoring and Technical Services Division, May 3, 2014 made public."

4 SIGNIFICANCE CRITERIA AND ANALYSIS METHODOLOGIES

The State of California has developed guidelines to address the significance of air quality impacts based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, which provides guidance that a project would have a significant environmental impact by addressing the following questions:

Would the project:

a) Conflict with or obstruct the implementation of the applicable air quality plan;

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for O3 precursors);

d) Expose sensitive receptors to substantial pollutant concentrations; or

e) Create objectionable odors affecting a substantial number of people.

4.1 SAN DIEGO COUNTY AIR QUALITY SIGNIFICANCE DETERMINATION GUIDELINES

As presented in Section 2 Executive Summary, City of Encinitas does not have CEQA Air Quality impact analysis guidance or significance thresholds. The San Diego County CEQA guidance and significance thresholds are assumed the best alternative guidance and significance thresholds for the proposed construction project.

The following significance thresholds for air quality are based on criteria provided in San Diego County's *Guidelines for Determining Significance – Air Quality* (County of San Diego 2007). The County's guidelines were adapted from Appendix G of the State of California CEQA Guidelines listed above. According to the County guidelines, a significant impact would result if any of the following would occur:

- The project would conflict with or obstruct the implementation of the County RAQS and/or applicable portions of the SIP.
- The project would result in emissions that would violate any air quality standard or contribute substantially to an existing or projected air quality violation.
- The project would result in emissions that exceed 250 pounds per day of NOx or 75 pounds per day of VOCs.
- The project would result in emissions of CO that, when totaled with the ambient concentration, would exceed a 1-hour concentration of 20 ppm or an 8-hour average of 9 ppm.
- The project would result in emissions of $PM^{2.5}$ that exceed 55 pounds per day.
- The project would result in emissions of PM^{10} that exceed 100 pounds per day and increase the ambient PM^{10} concentrations by 5 $\mu g/m^3$ or greater at the maximum exposed individual.

- The project would result in a cumulatively considerable net increase of any criteria pollutant for which the SDAB is in nonattainment under an applicable federal or state ambient air quality standard.

4.1.1 The following guidelines for determining significance must be used for determining the cumulatively considerable net increases during the construction phase:

- A project that has a significant direct impact on air quality with regard to emissions of PM^{10}, $PM^{2.5}$, NOx, and/or VOCs would also have a significant cumulatively considerable net increase.
- In the event direct impacts from a proposed project are less than significant, a project may still have a cumulatively considerable impact on air quality if the emissions of concern from the proposed project, in combination with the emissions of concern from other proposed projects or reasonably foreseeable future projects within a proximity relevant to the pollutants of concern, are in excess of the guidelines, including the SDAPCD screening-level thresholds.

4.1.2 The following guidelines for determining significance must be used for determining the cumulatively considerable net increase during the operational phase:

- A project that does not conform to the County's RAQS and/or has a significant direct impact on air quality with regard to operation emissions of PM^{10}, $PM^{2.5}$, NOx, and/or VOCs would also have a significant cumulatively considerable net increase.
- Projects that cause road intersections to operate at or below level of service E (analysis required only when the addition of peak-hour trips from the proposed project and the surrounding projects exceeds 2,000) and create a CO hotspot create a cumulatively considerable net increase of CO.
- The project would expose sensitive receptors to substantial pollutant concentrations:
  - The project places sensitive receptors near CO hotspots or creates CO hotspots near sensitive receptors.
  - Project implementation would result in exposure to TACs, resulting in a maximum incremental cancer risk greater than one in 1 million without application of Toxics-Best Available Control Technology (T-BACT) or a health hazard index greater than one would be deemed as having a potentially significant impact.
- The project, which is not an agricultural, commercial, or an industrial activity subject to SDAPCD standards, as a result of implementation, would either generate objectionable odors or place sensitive receptors next to existing objectionable odors, which would affect a considerable number of persons or the public.

As part of its air quality permitting process, the SDAPCD has established thresholds in Rule 20.2 requiring the preparation of Air Quality Impact Assessments (AQIA) for permitted stationary sources. The SDAPCD sets forth quantitative emission thresholds below which a stationary source would not have a significant impact on ambient air quality. Project-related air quality impacts estimated in this environmental analysis would be considered significant if any of the applicable significance thresholds presented in Table 4-1 SDAPCD Air Quality Significance Thresholds, are exceeded.

For CEQA purposes, these screening criteria can be used as numeric methods to demonstrate that a project's total emissions would not result in a significant impact to air quality.

Table 4-1 SDAPCD Air Quality Significance Thresholds

Construction Emissions			
Pollutant	Total Emissions (Pounds per Day)		
Respirable Particulate Matter (PM^{10})	100		
Fine Particulate Matter ($PM^{2.5}$)	55		
Oxides of Nitrogen (NO_x)	250		
Oxides of Sulfur (SO_x)	250		
Carbon Monoxide (CO)	550		
Volatile Organic Compounds (VOC)	75*		
Operational Emissions			
	Total Emissions		
Pollutant	Pounds per Hour	Pounds per Day	Pounds per Year
Respirable Particulate Matter (PM^{10})	—	100	15
Fine Particulate Matter ($PM^{2.5}$)	—	55	10
Oxides of Nitrogen (NO_x)	25	250	40
Sulfur Oxides (SO_x)	25	250	40
Carbon Monoxide (CO)	100	550	100
Lead and Lead Compounds	—	3.2	0.6
Volatile Organic Compounds (VOC)	—	75*	13.7

Sources: SDAPCD Rules 1501 (SDAPCD 1995a) and 20.2(d)(2) (SDAPCD 1998).

* VOC threshold based on the threshold of significance for VOCs from the South Coast Air Quality Management District for the Coachella Valley as stated in the San Diego County Guidelines for Determining Significance.

The thresholds listed in Table 4-1 SDAPCD Air Quality Significance Thresholds, represent screening-level thresholds that can be used to evaluate whether project-related emissions could cause a significant impact on air quality. Emissions below the screening-level thresholds would not cause a significant impact. In the event that emissions exceed these thresholds, modeling would be required to demonstrate that the project's total air quality impacts result in ground-level concentrations that are below the CAAQS and NAAQS, including appropriate background levels. For nonattainment pollutants, if emissions exceed the thresholds shown in Table 4-1, the project could have the potential to result in a cumulatively considerable net increase in these pollutants and thus could have a significant impact on the ambient air quality.

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

5 PROPOSED PROJECT IMPACT ANALYSIS

The significance criteria described in Section 4.0 were used to evaluate impacts associated with the construction and operation of the Proposed Project. The following summarizes the findings when evaluating each of the significance criteria.

5.1 CONFORMANCE TO THE RAQS

5.1.1 Guideline for the Determination of Significance:

Based on Appendix G of the CEQA Guidelines, and the County Guidelines for Determining Significance – Air Quality, the proposed project would have a significant impact if it would: Conflict with or obstruct the implementation of the RAQS and/or applicable portions of the State Implementation Plan (SIP).

5.1.2 Significance of Impacts Prior to Mitigation

As mentioned in the Section on Regulatory Setting, the SDAPCD and SANDAG are responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the SDAB. The RAQS was initially adopted in 1991 and is updated on a triennial basis (most recently in 2009). The RAQS outlines SDAPCD's plans and control measures designed to attain the state air quality standards for O_3. The RAQS relies on information from CARB and SANDAG, including mobile and area source emissions, as well as information regarding projected growth in San Diego County and the cities in the County, to project future emissions and then determine from that the strategies necessary for the reduction of emissions through regulatory controls. CARB mobile source emission projections and SANDAG growth projections are based on population, vehicle trends, and land use plans developed by San Diego County and the cities in the County as part of the development of their general plans.

The RAQS relies on SANDAG growth projections based on population, vehicle trends, and land use plans developed by the cities and by the County as part of the development of their general plans. As such, projects that propose development that is consistent with the growth anticipated by local plans would be consistent with the RAQS. However, if a project proposes development that is greater than that anticipated in the local plan and SANDAG's growth projections, the project might be in conflict with the RAQS and may contribute to a potentially significant cumulative impact on air quality.

As the Proposed Project would not increase number of residences, contribute to local population growth or substantial employment growth and associated vehicle miles traveled (VMT) on local roadways, the proposed Olivenhain Trunk Sewer Improvement project is considered accounted for in the RAQS, and the project would not conflict with or obstruct the implementation with local air quality plans.

Impacts would be considered less than significant.

5.1.3 Mitigation Measures and Design Considerations

No mitigation measures would be required.

5.1.4 Conclusions

The Proposed Project would be in conformance with the RAQS.

5.2 Conformance to Federal and State Ambient Air Quality Standards: Construction Impacts

5.2.1 Guideline for the Determination of Significance

Based on Appendix G of the CEQA Guidelines, and the San Diego County Guidelines for Determining Significance – Air Quality, the proposed project would have a significant impact if it would: *Violate any air quality standard or contribute substantially to an existing or projected air quality violation.*

5.2.2 Significance of Impacts Prior to Mitigation

Construction of the Proposed Project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance, dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials to the project site. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and for dust, the prevailing weather conditions. Therefore, such emission levels can be approximately estimated only with a corresponding uncertainty in precise ambient air quality impacts. Fugitive dust emissions would primarily result from site preparation and road construction activities. NOx and CO emissions would primarily result from the use of construction equipment and motor vehicles. Individual construction phases were estimated separately, however, since most all phases will likely be performed concurrently (except mobilization and demobilization), daily maximum emissions for criteria pollutants and GHG were derived by adding all phases daily emissions together, as a worst case for purpose of this impact analysis.

Emissions from off-road equipment used during the construction phase of the project were estimated using emission rates derived from CARB's OFFROAD model: OFFROAD2007, available online (http://www.arb.ca.gov/msei/offroad/offroad.htm), for CO and SOx, and the 2011 update ("OFFROAD2011"), available online (http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles), for VOC, NOx, and PM^{10} (CARB 2011a). Both the OFFROAD 2007 model and the OFFROAD 2011 update to the 2007 model were utilized in this analysis because the 2011 update accounts for recent revisions to the Airborne Toxic Control Measure governing off-road vehicle fleets. This regulatory update only estimates VOC, NOx, and PM^{10} emissions. Other pollutants are estimated using OFFROAD2007 as they were not affected by the regulatory update. For some offroad equipment the South Coast Air Basin (SCAB) emission factor database was used for the appropriate equipment, the expected model years, and the applicable expected engine horse power for each equipment type. In all cases the source for emission factors and load factors and method of estimating is documented with the emission calculation tables located in APPENDIX A – Project Maps and Emission Calculations.

The South Coast Air Basin (SCAB) emission factor database was utilized for this analysis as it is the most current, comprehensive, set of emission factors and built in load factors currently available for OFFROAD construction equipment of the type utilized in the proposed project. Additionally, the emission factor/load factor data is viewed as conservative in nature.

Emissions of all pollutants from on-road trucks and passenger vehicles were estimated using emission factors derived using CARB's motor vehicle emission inventory program, EMFAC2011, available online (http://www.arb.ca.gov/msei/ modeling.htm) (CARB 2011b).

The model was run set for the San Diego APCD, assuming estimating construction year 2016, annual seasonal average, and vehicle classes pertinent to the proposed project.

Fugitive dust emissions (during phases where fugitive dust may be generated, e.g. access construction, manhole removals, sewer relocation, and site restoration), were estimated using a combination of resources. Sources for dust and emission estimate factors or methodology are provided in

Table 5-1 through

Table 5-8, along with explanation where appropriate.

As discussed in the proposed project introduction section, alternative projects will be address only for fugitive dust differences based upon project area differences.

Re-entrained dust was estimated using U.S. EPA AP-42 guidance section 13.2.1, Compilation of Air Pollutant Emission Factors (EPA 1995), assuming well-traveled roads, with lower silt loads, as low as 0.01, and fugitive emission factors in the table below.

Table 5-1 Median Vehicle Weight for I-710 Traffic Model Vehicle Classes

Vehicle Class in the I-710 Traffic Model	Average Weight from the EMFAC2007 model (tons)
Automobiles	2.13
Light-Heavy Duty Trucks	5.63
Medium-Heavy Duty Trucks	11.75
Heavy-Heavy Duty Trucks	23.25
Port Trucks	23.25

Table 5-2 Fugitive Emissions Formula

Fugitive Emission Formula from US EPA - AP-42 E = k (sL/2)^0.65 (W/3)^1.5 - C = lb/vmt
K value:
0.016 lb PM^{10}/mile
0.004 lb $PM^{2.5}$/mile
C value:
0.00047 lb PM^{10}/mile
0.00036 lb $PM^{2.5}$/mile
Mean vehicle weight (tons) = 9.17
Road surface silt loading* = 0.06
From Section 13.2.1 in Compilation of Air Pollutant Emission Factors, AP-42, (EPA 1995)
*Assume normal, well-traveled roads, with lower silt loads. May be as low as 0.01. See EPA AP-42, Table 13.2.1-3

Table 5-3 Fugitive Emission Factors

Fugitive Emission factors	
0.008276527	lb PM10/mile
0.001826632	lb PM2.5/mile
E = k (sL/2)^0.65 (W/3)^1.5 - C = lb/vmt	

Table 5-4 Grading Dust Estimation

Dust from Grading Operations		
CALIFORNIA EMISSION INVENTORY AND REPORTING SYSTEM (CEIDARS) – Particulate Matter (PM) Speciation Profiles – – SUMMARY OF OVERALL SIZE FRACTIONS AND REFERENCE DOCUMENTATION 7/28/2009 http://www.arb.ca.gov/ei/speciate/pmsizeprofile07282009.xls		
	FRACTION	FRACTION
PM_PROFILE_NAME	< PM^{10}	< $PM^{2.5}$
PAVED ROAD DUST	0.46	0.08
UNPAVED ROAD DUST	0.61	0.13
CONSTRUCTION DUST	0.4893	0.0489

Table 5-5 Vehicle Assumptions for Re-entrained Dust

Category	EMFAC description	Assumed Weight (tons)	Use in project
LDT2	Light-Duty Trucks (3751-5750 lbs)	2.37525	Pickup Trucks (worker commute)
LHD1-DSL	Light-Heavy-Duty Trucks (10001-14000 lbs)	6.00025	Service Trucks
MDV-DSL	Medium-Duty Trucks (5751-8500 lbs)	3.56275	Flatbed Truck (Vendor Deliveries)
T6 instate construction small-DSL	Medium-Heavy Duty In-state Construction Truck with GVWR<=26000 lbs	10.00025	Lube/Fuel Trucks
T6 instate heavy - DSL	Medium-Heavy Duty Diesel instate Truck with GVWR>26000 lbs	11.75	Concrete Trucks
T6 instate heavy - DSL	Medium-Heavy Duty Diesel instate Truck with GVWR>26000 lbs	11.75	Water Trucks
T6 instate heavy - DSL	Medium-Heavy Duty Diesel instate Truck with GVWR>26000 lbs	11.75	Haul Trucks
T7 tractor construction-DSL	Heavy-Heavy Duty Diesel Tractor Construction Truck	23.25	Semi-Truck & Trailer (Vendor Deliveries)
Vehicle weights were obtained from the EMFAC2007 model in tons, which were obtained from the I-710 Median Vehicle Traffic Model study, performed by CARB. See http://media.metro.net/projects_studies/I710/images/tech_study/AQ_HRA-Appendices.pdf			

Table 5-6 Acres Per Day for Grading Equipment

Equipment Type	Acres/8hr-day
Crawler Tractors, Graders, Rubber Tired Dozers	0.5
Scrapers	1.0
From Table 3.7 Grading Equipment Acres Per Day in the CalEEMod appendix, located at http://www.aqmd.gov/docs/default-source/caleemod/caleemod-appendixd.pdf	

Table 5-7 Fugitive Dust Emission Factors by Particle Size

Total Suspended Particulate	7.3333	lb/acre/day
PM^{10}	3.5882	lb/acre/day
$PM^{2.5}$	0.3586	lb/acre/day
From WRAP Fugitive Dust Handbook September 7, 2006 (0.11 ton/acre/month)		
The construction emission factor is assumed to include the effects of typical control measures such as routine watering. A dust control effectiveness of 50% is assumed from these measures, which is based on the estimated control effectiveness of watering.		

Table 5-8 PM^{10} and $PM^{2.5}$ Fraction of Total PM

PM10 Fraction of Total PM	PM2.5 Fraction of Total PM
0.4893	0.0489
From http://www.arb.ca.gov/ei/speciate/pmsizeprofile07282009.xls	

Vehicle and equipment types, size, quantity of each, expected hours or miles of use, for each project construction phase was provided by the IEC project design engineers, and best engineering judgment. The equipment mix is meant to represent a reasonably conservative estimate of construction activity. To account for dust control measures in the calculations, it was assumed that the active sites would be watered at least three times daily to comply with SDAPCD Rule 55, resulting in an approximately 50% reduction of particulate matter.

Table 5-9, Proposed Project Daily Maximum Construction Emissions, shows the estimated maximum daily construction emissions associated with the construction phases of the Proposed Project. *The maximum daily emissions for each pollutant may occur during different phases of construction. As to be expected, and in the case of this project, the activity and equipment within the phase drive the amount of specific pollutants emitted for that phase. A complete breakdown for each of the eight (8) phases of the construction project, and each piece of equipment and vehicle, offroad and onroad, fugitive dust, and greenhouse gases are presented in* APPENDIX A – Project Maps and Emission Calculations.

Table 5-10, Alternative 1 Project Daily Maximum Construction Emissions, shows the estimated maximum daily construction emissions associated with the construction phases of Alternative 1.

Table 5-11, Alternative 2A Project Daily Maximum Construction Emissions, shows the estimated maximum daily construction emissions associated with the construction phases of Alternative 2A.

Table 5-12, Alternative 2B Project Daily Maximum Construction Emissions, shows the estimated maximum daily construction emissions associated with the construction phases of Alternative 2B.

San Diego County CEQA Daily Maximum Thresholds for significance are presented in the last row below the estimated daily maximum construction emissions for each criteria pollutant.

Table 5-9 Proposed Project Daily Maximum Construction Emissions (lbs/day)

Daily Maximum Emissions	Criteria Emissions (lb/day)					
	VOC	CO	NO_X	SO_X	PM^{10}	$PM^{2.5}$
	11.66	52.27	96.15	0.18	46.84	10.81
Pollutant Threshold	75	550	250	250	100	55
Threshold Exceeded?	No	No	No	No	No	No

Table 5-10 Alternative 1 Project Daily Maximum Construction Emissions (lbs/day)

Daily Maximum Emissions	Criteria Emissions (lb/day)					
	VOC	CO	NO_X	SO_X	PM^{10}	$PM^{2.5}$
	11.66	52.27	96.15	0.18	57.07	12.48
Pollutant Threshold	75	550	250	250	100	55
Threshold Exceeded?	No	No	No	No	No	No

(Using factor 1.243 for PM^{10} and $PM^{2.5}$)

Table 5-11 Alternative 2A Project Daily Maximum Construction Emissions (lbs/day)

Daily Maximum Emissions	Criteria Emissions (lb/day)					
	VOC	CO	NO_X	SO_X	PM^{10}	$PM^{2.5}$
	11.66	52.27	96.15	0.18	38.13	9.40
Pollutant Threshold	75	550	250	250	100	55
Threshold Exceeded?	No	No	No	No	No	No

(Using factor 0.7932 for PM^{10} and $PM^{2.5}$)

Table 5-12 Alternative 2B Project Daily Maximum Construction Emissions (lbs/day)

Daily Maximum Emissions	Criteria Emissions (lb/day)					
	VOC	CO	NO_X	SO_X	PM^{10}	$PM^{2.5}$
	11.66	52.27	96.15	0.18	37.84	9
Pollutant Threshold	75	550	250	250	100	55
Threshold Exceeded?	No	No	No	No	No	No

(Using factor 0.7864 for PM^{10} and $PM^{2.5}$)

5.2.3 Mitigation Measures and Design Considerations

Table 5-9 through Table 5-12 show that daily construction emissions would not exceed the thresholds for VOCs, CO, NOx, SOx, PM^{10}, or $PM^{2.5}$, for the Proposed Project or any of the Alternatives Projects.

Impacts would be considered less than significant, and no mitigation measures would be required, for the Proposed Project or any of the Alternative Projects.

5.2.4 Conclusions

The emissions associated with construction would be temporary, lasting approximately 20 months. As shown in Table 5-9 through Table 5-12 above, daily construction emissions would not exceed the thresholds for VOCs, CO, NOx, SOx, PM^{10}, or $PM^{2.5}$. To ensure PM^{10} emissions remain at a less-than-significant level during site construction activities, project design features (PDFs) have been incorporated as part of the project as described in Summary of Recommended Project Design Features, Impacts, and Mitigation Measures.

Construction of the Proposed Project or any of the Alternative Projects would result in a less-than-significant impact.

5.3 Conformance to Federal and State Ambient Air Quality Standards: Operational Impacts

5.3.1 Guideline for the Determination of Significance

Based on Appendix G of the CEQA Guidelines, and the County Guidelines for Determining Significance – Air Quality, the proposed project would have a significant impact if it would: Violate any air quality standard or contribute substantially to an existing or projected air quality violation.

5.3.2 Significance of Impacts Prior to Mitigation

Operations of the project would produce VOC, NOx, CO, SOx, PM^{10}, and $PM^{2.5}$, as well as GHG emissions associated with on the average, weekly City vehicles performing sewer manhole and sewer line inspections, and performing routine maintenance cleanout using large Vac-Con trucks and video camera inspection of systems. Occasional preventative maintenance or repair would be performed utilizing larger maintenance vehicles to service, clean or repair sewer lines or manholes.

The Proposed Project and all Project Alternatives would have identical operational activities. This analysis compares the estimated current air emissions (criteria and GHG) associated with existing operations with estimated air emissions for the proposed project and alternative projects. For purpose of this analysis, current operations have been limited to weekly inspections utilizing an extended Cab Utility truck. The proposed project and action alternatives 1, 2A, and 2B, would enable the City to expand the current program of weekly inspections, to add quarterly cleaning, and maintenance. Providing additional access to previously inaccessible locations, facilitates enhanced maintenance, inspection, and cleaning operational activities.

The Proposed Project and Alternatives would marginally impact air quality through O&M vehicles frequenting the site during inspection, cleanout, and repair activities throughout the life of the proposed project. EMFAC2011 was utilized to estimate daily emissions from

proposed vehicular sources (see APPENDIX A – Project Maps and Emission Calculations). Trip distances were conservatively estimated for the model inputs for all operations and maintenance vehicles as follows: employee vehicles were assumed to originate from 50 miles away based on local workforce from City of Encinitas facilities.

Table 5-13, Estimated Daily Maximum Operational Emissions, presents the maximum daily emissions associated with the operation of the Proposed Project. The maximum daily emissions assume that all O&M activities associated with the proposed project sewer-line inspections, quarterly video inspections, Vac-Con cleanout, and other maintenance occur on average one day per week for routine inspections, and quarterly for video inspections, Vac-Con cleanout, and other maintenance or repairs.

Table 5-13 Estimated Daily Maximum Operational Emissions (lbs per day)

Activity	Vehicle Type	Criteria Emissions (lb/day)					
		VOC	CO	NO_X	SOx	PM^{10}	$PM^{2.5}$
On-site	Extended Cab Utility truck F350, 6.2L V8	0.020	0.111	0.304	0.002	0.035	0.022
On-site	Extended Cab Utility truck F350, 6.2L V8	0.020	0.111	0.304	0.002	0.035	0.022
On-site	Extended Cab Utility truck F350, 6.2L V8	0.040	0.222	0.609	0.003	0.071	0.045
On-site	2-engine Vac-Con truck	0.056	0.253	2.032	0.004	0.052	0.036
Totals		0.14	0.70	3.25	0.01	0.19	0.12

Table 5-14 Estimated Annual GHG Emissions for Operation Activities (Tons), presents the estimated annual GHG emissions associated with the operation of the proposed project. The annual GHG emission estimates assume that all O&M activities associated with the proposed project sewer-line inspections, occur on average one day per week, and quarterly for video inspections, Vac-Con cleanout, and other maintenance or repairs.

Table 5-14 Estimated Annual GHG Emissions for Operation Activities (Tons)

Activity	Vehicle Type	Total GHG Emissions (tons)			
		CO_2	CH_4	N_2O	CO_2e
On-site	Extended Cab Utility truck F350, 6.2L V8	0.332	0.000	0.000	0.332
On-site	Extended Cab Utility truck F350, 6.2L V8	0.083	0.000	0.000	0.083
On-site	Extended Cab Utility truck F350, 6.2L V8	2.321	0.000	0.000	2.324
On-site	2-engine Vac-Con truck	2.685	0.000	0.000	2.687
Totals		5.42	0.00	0.00	5.43
*San Diego County Guidance GHG Threshold					2,500 metric tons

*The County of San Diego guidelines for determining significance "Bright Line Threshold" can be used to screen out this project.

"A proposed project would have a cumulatively considerable contribution to climate change impacts if it would result in a net increase of operational greenhouse gas emissions, either directly or indirectly, at a level exceeding 2,500 metric tons of CO2e per year".

The County guidelines provide multiple approaches to determine significance and whether mitigation measures are appropriate for a given project. Due to the limited size and nature of this project the proposed project operational phase falls well below the significance threshold.

Table 5-15, presents the maximum daily emissions associated with the current operation of the Olivenhain Trunk sewer line in the vicinity of the proposed project. The maximum daily emissions assume that all operational activities associated with the current operations occur on average one day per week for routine inspections. Access for video inspections, Vac-Con cleanout, and other maintenance and or repairs are not currently available to the City of Encinitas.

Table 5-15 Estimated Daily Maximum Current Operational Emissions (lbs/day)

Activity	Vehicle Type	Criteria Emissions (lb/day)					
		ROG	CO	NO_X	SOx	PM^{10}	$PM^{2.5}$
On-site	Extended Cab Utility truck F350, 6.2L V8	0.010	0.056	0.152	0.001	0.018	0.011
Totals		0.01	0.06	0.15	0.00	0.02	0.01

Table 5-14 Estimated Annual GHG Emissions for Operation Activities (Tons), presents the estimated annual GHG emissions associated with the current operation of the Olivenhain Trunk sewer line in the vicinity of the proposed project. The annual GHG emission estimates assume that all operational activities associated with the current operations occur on average one day per week for routine inspections. Access for video inspections, Vac-Con cleanout, and other maintenance and or repairs are not currently available to the City of Encinitas.

Table 5-16 Estimated Annual GHG Emissions Current Operation Activities (Tons)

Activity	Vehicle Type	Total GHG Emissions (tons)			
		CO_2	CH_4	N_2O	CO_2e
Current On-site	Extended Cab Utility truck F350, 6.2L V8	2.155	0.000	0.000	2.158
Totals		2.16	0.00	0.00	2.16

The net increase from current to proposed project daily maximum operation emissions, for criteria pollutants is presented in Table 17, below.

Table 5-17 Estimated Increase in Daily Maximum Operational Emissions (lbs/day)

Operational Emissions	Criteria Emissions (lb/day)					
	ROG	CO	NO_X	SOx	PM^{10}	$PM^{2.5}$
Current Emissions	0.010	0.056	0.152	0.001	0.018	0.011
Proposed Project Emissions	0.14	0.70	3.25	0.01	0.19	0.12
Net Emissions Increase	0.04	0.64	3.10	0.01	0.17	0.11

The net increase from current to proposed project annual operation emissions, for GHGs is presented in Table 18, below.

Table 5-18 Estimated Annual GHG Emissions Current Operation Activities (Tons)

Operational Emissions	Total GHG Emissions (tons)			
	CO_2	CH_4	N_2O	CO_2e
Current Emissions	2.155	0.000	0.000	2.158
Proposed Project Emissions	5.42	0.00	0.00	5.43
Net Emissions Increase	3.27	0.00	0.00	3.27
San Diego County Guidance GHG Threshold*				2,500 metric tons

5.3.3 Mitigation Measures and Design Considerations

Daily operational emissions would not exceed the thresholds for VOCs, NOx, CO, SOx, PM^{10}, or $PM^{2.5}$. Annual GHG tons are far below San Diego County GHG guidance threshold of 992 tons CO_2e, (900 metric tons).

Impacts would be less than significant and mitigation would not be required.

5.3.4 Conclusions

As shown in Tables 5-17 and 5-18 above, daily operational emissions would not exceed the thresholds for VOCs, NOx, CO, SOx, PM^{10}, or $PM^{2.5}$, and annual GHG tons would not exceed the threshold. While there is a net increase in operational emissions for criteria pollutants and GHG, the net amount of emission from operations is quite small compared to the available guidance threshold.

5.4 Cumulatively Considerable Net Increase of Criteria Pollutants

In analyzing cumulative impacts from a proposed project, the analysis must specifically evaluate a project's contribution to the cumulative increase in pollutants for which the SDAB is listed as nonattainment for the state and federal ambient air quality standards. The proposed project would have a cumulatively considerable impact if project-generated emissions would exceed thresholds for PM^{10}, $PM^{2.5}$, NO_x, and/or VOCs. If the proposed project does not exceed thresholds and is determined to have less-than-significant project-specific impacts, it 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 established thresholds. However, the project would be considered to have a cumulative impact only if the project's contribution accounts for a significant proportion of the cumulative total emissions.

Background ambient air quality, as measured at the monitoring stations maintained and operated by SDAPCD, measures the concentrations of pollutants from existing sources; therefore, past and present project impacts are included in the background ambient air quality data.

5.4.1 Geographic Extent

The geographic extent for the analysis of cumulative impacts related to air quality includes the southwestern corner of the SDAB (Northern San Diego County). The primary air quality impacts of the Proposed Project would occur during construction, since the operational impacts would result from limited weekly vehicle trips for maintenance and inspection, and would be substantially less than construction impacts. Due to the nonattainment status of the SDAB, the primary air pollutants of concern would be NO_x and VOCs, which are ozone precursors, and PM^{10} and $PM^{2.5}$. NO_x and VOC are primarily emitted from motor vehicles and construction equipment, while PM^{10} and $PM^{2.5}$ are emitted primarily as fugitive dust during construction. Because of the nature of ozone as a regional air pollutant, emissions from the entire geographic area for this cumulative impact analysis would tend to be important, although maximum ozone impacts generally occur downwind of the area in which the ozone precursors are released. PM^{10} and $PM^{2.5}$ impacts, on the other hand, would tend to occur locally; thus, projects occurring in the same general area and in the same time period would tend to create cumulative air quality impacts.

5.4.2 Existing Cumulative Conditions

Air quality management in the geographic area for the cumulative impact assessment is the responsibility of the SDAPCD. Existing levels of development in San Diego County have led to the nonattainment status for ozone with respect to the CAAQS and NAAQS, and for PM^{10} and $PM^{2.5}$ with respect to the CAAQS. The nonattainment status is based on ambient air quality monitoring generally conducted in the urban portions of the County. Air quality monitoring stations in the geographic area of the proposed project show air quality well below the CAAQS and NAAQS and no exceedances for 2013. The primary source for NO_x, and VOCs in the geographic area of the proposed project are the freeways and interchanges. The air quality plans prepared by the SDAB and SDAPCD reflect future growth under local development plans but are intended to reduce emissions countywide to levels that would comply with the NAAQS and CAAQS through implementation of new regulations at the local, state, and federal levels.

The separate guidelines of significance discussed below have been developed to respond to the following question from the state CEQA Guidelines Appendix G:

- The project will result in a cumulatively considerable net increase of any criteria pollutant for which the SDAB is nonattainment under an applicable federal or state ambient air quality standard (including emissions that exceed the significance thresholds for O_3 precursors listed in Table 4-1 SDAPCD Air Quality Significance Thresholds.

5.4.3 Construction Impacts

5.4.3.1 Guidelines for the Determination of Significance

Cumulatively considerable net increases during the construction phase would typically occur if two or more projects near each other are simultaneously under construction. The following guidelines for determining significance must be used for determining the cumulatively considerable net increases during the construction phase:

A project that has a significant direct impact on air quality with regard to emissions of PM^{10}, $PM^{2.5}$, NOx, and/or VOCs would also have a significant cumulatively considerable net increase.

In the event direct impacts from a proposed project are less than significant, a project may still have a cumulatively considerable impact on air quality if the emissions of concern from the proposed project, in combination with the emissions of concern from other proposed projects or reasonably foreseeable future projects within a proximity relevant to the pollutants of concern, are in excess of the guidelines identified in the San Diego County Guidelines for Determining Significance – Air Quality.

5.4.3.2 Significance of Impacts Prior to Mitigation

As discussed in the section above, the Proposed Project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials. As shown in Table 5-9 Proposed Project Daily Maximum Construction Emissions (lbs/day), emissions of all criteria pollutants, including PM^{10}, $PM^{2.5}$, NO_x, and/or VOCs, would be below the significance levels. Additionally, construction would be short-term (18 months), during which the majority of pollutants would be emitted and would not result in long-term construction-related emissions. Moreover, emissions of PM^{10}, $PM^{2.5}$, NO_x, and/or VOCs would be localized to the Proposed Project site during construction. Therefore, construction of the Proposed Project would not result in a cumulatively considerable net increase in criteria pollutants.

Similar to the Proposed Project, construction of other projects simultaneously with the Proposed Project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance and hauling activities, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials and worker vehicular trips. Fugitive dust (PM^{10} and $PM^{2.5}$) emissions would primarily result from site preparation activities. NO_x and CO emissions would primarily result from the use of construction equipment and motor vehicles, the latter of which would generally be dispersed over a large area where the vehicles are traveling. The extent to which all reasonably foreseeable cumulative projects and the Proposed Project would result in significant cumulative impacts depends on their proximity and construction time schedules. The Proposed Project would be constructed from 2016 to 2018. Since the City of San Diego has control over issuing permits for construction and approval of projects within their jurisdiction, the likelihood of having another project in the vicinity of the proposed project under construction at the same time is close to zero. Downwind air monitoring stations close to the proposed project site have not exceeded California or federal air quality standards for more than a year.

5.4.3.3 Mitigation Measures and Design Considerations

Proposed Project or Alternative Project impacts would be less than significant and mitigation would not be required.

5.4.3.4 Conclusions

Construction of the Proposed Project or any of the Alternative Projects would not result in a cumulatively considerable net increase of PM^{10}, $PM^{2.5}$, NO_x, or VOCs.

5.4.4 Operational Impacts

5.4.4.1 Guidelines for the Determination of Significance

The guidelines for the consideration of operational cumulatively considerable net increases are treated differently due to the mobile nature of the emissions. The SDAB's RAQS, based on growth projections derived from the allowed general plan densities, are updated every 3 years by SDAPCD and lay out the programs for attaining the CAAQS and NAAQS for O_3 precursors. It is assumed that the San Diego County incorporates the City of Encinitas General Plan, and that a project that conforms to the city of Encinitas General Plan has been incorporated into the County General Plan, and does not have emissions exceeding the screening-level thresholds, will not create a cumulatively considerable net increase to O_3 since the emissions were accounted for in the RAQS.

The following guidelines for determining significance must be used for determining the cumulatively considerable net increases 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}, $PM^{2.5}$, NOx, and/or VOCs would also have a significant cumulatively considerable net increase.
- Projects that cause road intersections to operate at or below a level of service E (analysis only required when the addition of peak-hour trips from the Proposed Project and the surrounding projects exceeds 2,000) and create a CO hotspot create a cumulatively considerable net increase of CO.

5.4.4.2 Significance of Impacts Prior to Mitigation

With regard to cumulative impacts associated with O_3 precursors, in general, if a project is consistent with the City, community and general plans, it has been accounted for in the O_3 attainment demonstration contained within the RAQS. As such, it would not cause a cumulatively significant impact on the ambient air quality for O_3.

The proposed project is consistent with existing zoning by not adding additional dwelling units and only replacing existing infrastructure that already exist within the same zoning areas. No significant area source emissions generated from landscaping or natural gas use are anticipated. No new buildings or structures will be constructed as part of this proposed project.

Therefore, as the Proposed Project does not represent a substantial increase in projected traffic over current conditions, emissions of O_3 precursors (VOCs and NOx) would be well below the screening-level thresholds and would not result in a significant increase of O_3 precursors during operation.

Thus, the Proposed Project would not result in a cumulatively significant impact on O_3 concentrations.

Additionally, consistent with the County's guidelines, analysis of potential CO hotspots would not be required for this project since the project does not propose uses that would significantly contribute to local population or employment growth or congestion on local

roadways. The one pickup truck per week and an occasional maintenance vehicle would not significantly contribute peak-hour trips in the project area or impact roadway intersections. Therefore, the project would not have the potential to create a CO hotspot or a cumulatively considerable net increase of CO.

5.4.4.3 Mitigation Measures and Design Considerations

Mitigation would not be required.

5.4.4.4 Conclusions

Operation of the Proposed Project or any Alternative Project would not result in a cumulatively considerable net increase of PM^{10}, $PM^{2.5}$, NOx, or VOCs nor create a CO hotspot due to cumulative traffic impacts at road intersections.

5.5 Impacts to Sensitive Receptors

Air quality varies as a direct function of the amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. Air quality problems arise when the rate of pollutant emissions exceeds the rate of dispersion. Reduced visibility, eye irritation, and adverse health impacts upon sensitive receptors are the most serious hazards of existing air quality conditions in the area. Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. Air quality regulators typically define sensitive receptors as schools (preschool–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. However, for the purposes of CEQA analysis in the County, the definition of a sensitive receptor also includes residents. The two primary emissions of concern regarding health effects for land development projects are diesel-fired particulates and CO.

5.5.1 Construction Impacts

5.5.1.1 Guidelines for the Determination of Significance

A significant impact would result if:

- Project implementation will result in exposure to Toxic Air Contaminants (TACs) resulting in a maximum incremental cancer risk greater than 1 in 1 million without application of Toxics-Best Available Control Technology (T-BACT) or a health hazard index greater than 1 would be deemed as having a potentially significant impact.

5.5.1.2 Significance of Impacts Prior to Mitigation

Project construction would result in emissions of diesel particulate matter (DPM) from heavy-duty construction equipment and trucks operating on the project site (e.g., excavators, truck-mounted crane, backhoe, skidsteer, water trucks and haul trucks). DPM is characterized as a TAC by CARB. The Office of Environmental Health Hazard Assessment (OEHHA) has identified carcinogenic and chronic noncarcinogenic effects from long-term (chronic) exposure, but it has not identified health effects due to short-term (acute) exposure to DPM. There are several potential sensitive receptor candidates to choose from in the vicinity of the proposed project. At least two schools are near the general footprint of the proposed project. However, for this analysis a senior living center was

selected due to the full time nature of the residents, the concentrated number of residents, the expected average days and hours per year the residents are at resident living center, and the average expected age of the residents. The schools additionally house sensitive receptors, however the length of the school day and days per year the children are at the location for exposure being far less than the senior center, makes the senior living community a stronger candidate for this analysis.

The sensitive receptor selected for this analysis is a senior living center located at 3535 Manchester Ave., Encinitas, CA 92007. The receptor consists of several full-time residents meeting the OEHHA definition for sensitive receptors. The receptor location is approximately 250 meters from the centerline of about ½ acre of construction activities for up to 250 days or more.

Cancer risk is defined as the increase in lifetime probability (chance) of an individual developing cancer due to exposure to a carcinogenic compound, typically expressed as the increased probability in 1 million. The cancer risk from inhalation of a TAC is estimated by calculating the inhalation dose in units of milligrams/kilogram body weight per day based on an ambient concentration in units of micrograms per cubic meter ($\mu g/m^{3)}$, breathing rate, and exposure period, and multiplying the dose by the inhalation cancer potency factor, expressed as (milligrams/kilogram body weight per day). Typically, cancer risks for residential receptors and similar sensitive receptors are estimated based on a lifetime (70 years) of continuous exposure; however, for the purposes of this analysis, a 1-year (250 construction phase workdays) exposure scenario, corresponding to the estimated access construction period, as this project activity is estimated to have the highest PM10 emissions of all the construction phases and many of the access construction areas area located in the vicinity of this receptor. It is important to note this is a worst case scenario, assuming that the rate of access construction emissions take place in a ½ acre volume source only 200 to 300 meters away from this sensitive receptor, for the entire 250 day phase duration. The EPA and California guidance for estimating cancer risk, require calculating maximum hourly exposure concentration and annual average. This provides a single highest expected one hour exposure and an annual average, understanding that the annual average would include days and hours with little to no exposure. EPA provides guidance, based on experience, to represent the annual average concentration to be 1/10 the maximum one hour concentration.

Additionally it is important to note that project-related DPM emissions would cease following construction activities. It should be noted that construction activity would occur over the entire project length or over the entire 7.759 acre Proposed Project area. This analysis focuses on the nearest possible ½ acre area located closest to the sensitive receptor.

See APPENDIX A – Project Maps and Emission Calculations, for maps of the project area and location for the sensitive receptor and ½ acre volume source utilized in this analysis.

The DPM (PM^{10}) emissions for all emission sources, during the 250 workday access construction period were compiled and added together to represent worst-case emission source for DPM. The equipment and vehicles included in this total are:

Offroad vehicles and equipment	0.5540 lbs/day PM^{10}
Onroad-onsite vehicles and equipment	0.1073 lbs/day PM^{10}
Vendors-onsite (Assume 50% onsite)	0.0624 lbs/day PM^{10}
Employee Commute (Assume 50% onsite)	0.0221 lbs/day PM^{10}
Total DPM (PM_{10})	0.7458 lbs/day PM^{10}

Cancer risks are typically calculated for all carcinogenic TACs and summed to calculate the overall increase in cancer risk to an individual. The calculation procedure assumes that cancer risk is proportional to concentrations at any level of exposure and that risks from various TACs are additive. This is generally considered a conservative assumption at low doses and is consistent with the current OEHHA-recommended approach.
Noncancer health impact of an inhaled TAC is measured by the hazard quotient, which is the ratio of the ambient concentration of a TAC in units of $\mu g/m^3$ divided by the reference exposure level (REL), also in units of $\mu g/m^3$. The inhalation REL is the concentration at or below which no adverse health effects are anticipated. The REL is typically based on health effects to a particular target organ system, such as the respiratory system, liver, or central nervous system. Hazard quotients are then summed for each target organ system to obtain a hazard index.
To estimate the ambient concentrations of DPM resulting from construction activities at nearby sensitive receptors, a dispersion modeling analysis was performed using the Lakes Environmental SCREEN-View air quality dispersion model, Version 3.5.0 (Lakes Environmental 2011), which uses the EPA's SCREEN3 model, adding a user friendly interface to allow more flexibility for formatting input and reporting..
The DPM emissions from diesel-powered construction equipment and on-site diesel-powered trucks that would be used during construction are provided in APPENDIX B – Sensitive Receptor Calculations, (the Access Construction phase). The total pounds of DPM emissions (as PM^{10}) from these sources in lbs per day were multiplied by the number of work days in a year (250 work days/year for access construction), to convert to pounds per year. Because the access construction DPM emissions would occur throughout the 7.759 acres project site, a subset of the total construction DPM emissions was calculated for the 0.50 acre volume source located nearest to the sensitive receptor.
Total emissions of access construction-related PM^{10}, as a surrogate for DPM, during the overall construction period were calculated and then converted to grams per second for use in the SCREEN3 model. Fugitive dust emissions were excluded from the PM10 totals. An annualized 1-hour emission rate of 1.727×10^{-4} grams per second (g/s) was calculated as follows:

Total PM^{10} during access construction over 7.759 acres = 0.7458 lbs/day PM^{10}
0.7458 lbs/day x 250 days/year = 186.45 lbs/year PM_{10} during access construction
186.45 lbs/year × 0.50/7.759 × 453.6 g/lb ÷ 8760 hours/year÷ 3600 seconds/hour = 1.727×10^{-4} g/second, (0.0001727 g/second)

The emissions from heavy-duty equipment and trucks are represented by a single volume source, with an area of 0.50 acres, (2,025.29 m^2, or 45.0 meters on a side).
The following parameters were utilized in the SCREEN3 model to represent the sources of DPM emissions on the project site:

- Source type: volume
- Source height: 5.0 meters
- Initial vertical dimension: 1.16 meters (corresponding to a 5-meter release height divided by 4.3 per SCREEN3 guidance)
- Initial lateral dimension: 10.46 meters (corresponding to the side of a 0.50-acre site divided by 4.3 per SCREEN3 guidance)
- Receptor height: 2.0 meters

- Rural setting
- Simple terrain
- Stability Class 5, slightly unstable

The default regulatory mixing height and anemometer height options were selected for the purposes of modeling.

Results of the SCREEN3 modeling are provided in APPENDIX B – Sensitive Receptor Calculations. It should be noted that the maximum modeled concentration occurred under Stability Class E (slightly stable, nighttime condition) and a wind speed of 1.0 meter/second. These conditions are not representative of typical daytime conditions during which construction would occur. Accordingly, using the maximum modeled concentration would result in a conservative (i.e., health protective) estimate of the associated health effects. Per EPA guidance (EPA 1992), the maximum modeled 1-hour concentration was then multiplied by 0.1 to simulate the annual average concentration. The modeled annual average concentration at the maximally exposed individual (located 300 meters from the volume source) is shown in Table 5-15 Summary of Average DPM Concentrations.

Table 5-15 Summary of Average DPM Concentrations

Receptor	Modeled 1-hour Max Concentration	Modeled Annual Concentration
	µg/m^3	µg/m^3
Maximally Exposed Individual – Residential (300 meters west of 0.50 acre volume source)	0.1996	0.01996

Source: SCREEN3 Model results. See Appendix B for complete results.

The cancer risk calculations were performed by multiplying the predicted annual DPM concentrations from SCREEN3 by the appropriate risk values. The exposure and risk equations that are used to calculate the cancer risk at residential receptors are taken from the OEHHA manual for health risk assessments prepared under the Air Toxics Hot Spots program (OEHHA 2003). As noted, while the nearest sensitive receptors are located approximately 300 meters from the volume source, the maximum exposure would occur at 59 meters from the volume source (0.4576 µg/m^3). However, review of the project maps shows no more sensitive receptor than the one selected for this long a duration of exposure.

The potential exposure pathway for DPM includes inhalation only. Cancer risks were evaluated using the inhalation Cancer Potency Factor published by the OEHHA and CARB (CARB 2012). The cancer risks were calculated using the "derived (adjusted)" approach in the OEHHA risk assessment manual. The cancer potency factor for DPM is 1.1 per milligram per kilogram of body weight per day (1.1 (mg/kg-day)-1). The potential exposure through other pathways (e.g., ingestion) requires substance and site-specific data, and the specific parameters for DPM are not known for these pathways.

The following equations were used to calculate the cancer risk due to inhalation using the modeled DPM concentrations:

Risk = Inhalation potency factor * Dose Inhalation (1)

where: Inhalation potency factor = 1.1 (mg/kg-day)-1 for DPM
and:
Dose Inhalation = Cair*DBR*A*EF*ED*10^{-6} / AT (2)
where: Cair = concentration of DPM in µg/m^3
DBR = breathing rate in liter per kilogram of body weight per day
A = inhalation absorption factor (1 for DPM)
EF = exposure frequency in days per year
ED = exposure duration in years
AT = averaging time period over which exposure is averaged in days (25,550 days for 70 years)
For the derived (adjusted) cancer risk calculation, the breathing rate is equal to the 80th percentile or 302 liters per kilogram of body weight per day (L/kg-day) per CARB and OEHHA guidance (CARB and OEHHA 2003).

Table 5-16 Summary of Maximum Modeled Cancer Risks, shows the maximum modeled annual DPM concentration for the maximally exposed individual and the associated cancer risk. The cancer risk at the selected sensitive receptor is less than the County significance threshold of 1 in 1 million for cancer impacts.

Table 5-16 Summary of Maximum Modeled Cancer Risks

Receptor	DPM Annual Concentration	Cancer Risk
	µg/m^3	Number in 1 million
Maximally Exposed Individual – Residential (125 meters south of 0.50 acre volume source)	0.01996	0.4541

Source: SCREEN3 Model results. See Appendix B for complete results.

In addition to the potential cancer risk, DPM has chronic (i.e., long-term) noncarcinogenic health impacts. The chronic hazard index was evaluated using the OEHHA/CARB inhalation RELs (CARB 2012). The chronic noncarcinogenic inhalation hazard index for construction activities was calculated by dividing the modeled annual average concentrations of DPM by its REL, which is 5 µg/m^3.

Table 5-17 Summary of Maximum Chronic Hazard Index, shows the maximum modeled annual DPM concentration for the maximally exposed individual and the associated maximum chronic hazard index. The chronic hazard index at this receptor is less than the County significance threshold of less than 1.0.

Table 5-17 Summary of Maximum Chronic Hazard Index

Receptor	DPM Concentration	Chronic Hazard Index
	µg/m^3	
Maximally Exposed Individual – Residential (300 meters west of 0.50 acre volume source)	0.01996	0.00040

Source: SCREEN3 Model results. See Appendix B for complete results.

In summary, the maximum anticipated cancer risk associated with the project is 0.4541 in 1 million at maximally exposed sensitive receptors, based on a 1-year exposure scenario. The assessment also finds that the chronic hazard index for noncancer health impacts are well below 1.0 (0.00040), at the maximally exposed individual. As such, the exposure of project-related TAC emission impacts to sensitive receptors during construction of the Proposed Project would be less than significant. Additionally, Alternative Projects only affect fugitive dust emissions which are assumed not to include DPM. Therefore, Alternative Projects would be less than significant as well.

5.5.1.3 Mitigation Measures and Design Considerations

Mitigation would not be required, however due to the level of risk calculated is within an order of magnitude from the significance threshold, a mitigation measure PDF-AQ-3 is recommended.

5.5.1.4 Conclusions

Construction of the Proposed Project or any of the Alternative Projects would not result in significant impacts to sensitive receptors.

5.5.2 Operational Impacts

5.5.2.1 Guidelines for the Determination of Significance

A significant impact would result if:

- The project places sensitive receptors near CO "hotspots" or creates CO "hotspots" near sensitive receptors.
- Project implementation will result in exposure to TACs resulting in a maximum incremental cancer risk greater than 1 in 1 million without application of Toxics-Best Available Control Technology (T-BACT) or a health hazard index greater than one would be deemed as having a potentially significant impact.

The potential for the project to create CO hotspots was discussed previously in the section on Impacts to Sensitive Receptors. The project would not result in a significant impact with respect to this threshold.

In addition to impacts from criteria pollutants, project impacts may include emissions of pollutants identified by the state and federal government as TACs or hazardous air pollutants (HAPs). State law has established the framework for California's TAC identification and control program, which is generally more stringent than the federal program and is aimed at HAPs that are a problem in California. The state has formally identified more than 200 substances as TACs, including the federal HAPs, and is adopting appropriate control measures for sources of these TACs. As examples, TACs include acetaldehyde, benzene, 1,3-butadiene, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and DPM. Some of the TACs are groups of compounds that contain many individual substances (for example, copper compounds and polycyclic organic matter).

In San Diego County, APCD Rule 1210 implements the public notification and risk reduction requirements of state law, and requires facilities with high potential health risk levels to reduce health risks below significant risk levels (SDAPCD 1995b). In addition, Rule 1200 establishes acceptable risk levels and emission control requirements for new and modified facilities that may emit additional TACs (SDAPCD 1996). Under Rule 1200, permits to operate may not be issued when emissions of TACs result in an incremental cancer risk greater than 1 in 1 million without application of T-BACT, or an incremental

cancer risk greater than 10 in 1 million with application of T-BACT, or a health hazard index (chronic and acute) greater than one (SDAPCD 1996). The human health risk analysis is based on the time, duration, and exposures expected. T-BACT will be determined on a case-by-case basis; however, examples of T-BACT include diesel particulate filters, catalytic converters, and selective catalytic reduction technology.

5.5.2.2 Significance of Impacts Prior to Mitigation

The nearest sensitive receptors is a senior living center, a couple seasonal schools, and rural homes, located along the neighboring streets adjacent to the full length of the Proposed Project and all Alternative Projects. As the project would consist of construction of sewer manhole replacements, manhole removals, sewer-line relocations and better operations access routes, the Proposed Project or any of the alternative projects, by nature, would not generate TACs in the immediate area. Additionally, the proposed project would increase operational DPM emission with increased inspection, maintenance, and repair access for diesel trucks and equipment during post-construction operations. The net operational emissions analysis show that the net DPM (PM10) emission increase is small. There are no stationary sources of TACs associated with the project that would be subject to Rule 1200. As such, the exposure of project-related TAC emission impacts to sensitive receptors during operation of the Proposed Project or any alternative project would be less than significant.

5.5.2.3 Mitigation Measures and Design Considerations

Mitigation would not be required, however due to the level of risk calculated is within an order of magnitude from the significance threshold, a mitigation measure PDF-AQ-3 is recommended.

5.5.2.4 Conclusions

Operation of the Proposed Project or any Alternative Project would not result in significant impacts to sensitive receptors.

5.6 ODOR IMPACTS

Odors are a form of air pollution that is most obvious to the general public. Odors can present significant problems for both the source and surrounding community. Although offensive odors seldom cause physical harm, they can be annoying and cause concern.

5.6.1.1 Guidelines for the Determination of Significance

Based on Appendix G of the CEQA Guidelines, and the County *Guidelines for Determining Significance – Air Quality*, the proposed project would have a significant impact if:

- The project, which is not an agricultural, commercial, or an industrial activity subject to SDAPCD standards, as a result of implementation, would either generate objectionable odors or place sensitive receptors next to existing objectionable odors, which would affect a considerable number of persons.
- The State of California Health and Safety Code, Division 26, Part 4, Chapter 3, Section 41700 and SDAPCD Rule 51, commonly referred to as public nuisance law, prohibits emissions from any source whatsoever in such quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to the public health or damage to property. The potential for an

operation to result in odor complaints from a "considerable" number of persons in the area will be considered to be a significant, adverse odor impact.

- Projects required to obtain permits from SDAPCD are evaluated by SDAPCD staff for potential odor nuisance, and conditions may be applied (or control equipment required) where necessary to prevent occurrence of public nuisance.
- Odor issues are very subjective by the nature of odors themselves and due to the fact that their measurements are difficult to quantify. As a result, this guideline is qualitative, and each project will be reviewed on an individual basis, focusing on the existing and potential surrounding uses and location of sensitive receptors.

5.6.1.2 Significance of Impacts Prior to Mitigation Construction

Section 6318 of the San Diego County Zoning Ordinance requires that all commercial and industrial uses be operated so as not to emit matter causing unpleasant odors that are perceptible by the average person at or beyond any lot line of the lot containing said uses. Section 6318 goes on to further provide specific dilution standards that must be met "at or beyond any lot line of the lot containing the uses" (County of San Diego 1979). APCD Rule 51 (Public Nuisance) also prohibits emission of any material that causes nuisance to a considerable number of persons or endangers the comfort, health, or safety of any person. A project that proposes a use that would produce objectionable odors would be deemed to have a significant odor impact if it would affect a considerable number of off-site receptors. The nearest sensitive receptors consist of residences surrounding the project site on all sides. The nearest sensitive receptor is located to the south, approximately 410 feet from the proposed limits of disturbance.

5.6.1.3 Construction of Proposed Project

Components would result in the emission of diesel fumes and other odors typically associated with construction activities. These compounds would be emitted in varying amounts on the project site depending on where construction activities are occurring. Sensitive receptors located in the vicinity of the construction site may be affected. Odors are highest near the source and would quickly dissipate off site. Any odors associated with construction activities would be temporary and would cease upon project completion.

5.6.1.4 Operations

Land uses and industrial operations that are associated with odor complaints include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies and fiberglass molding. The proposed manhole and sewer-line replacement project would not be associated with a land use that would generate objectionable odors within the project vicinity. As such, a sewer-line improvement project would not generate objectionable odors off-site, nor would significant odors be generated during inspection and maintenance of the facility. Additionally, the sewer-lines and manholes are being renovated and already exist. These are not new facilities, but existing facilities being improved. Operations would consist of inspection service and personnel vehicles which would visit the site weekly during inspection, and maintenance activities. Thus, the impacts associated with odors would be less than significant.

5.6.1.5 Mitigation Measures and Design Considerations

No mitigation measures or design considerations would be required.

5.6.1.6 Conclusion

Although odor impacts are unlikely, the Proposed Project and any Alternative Project would be required to comply with the County odor policies enforced by SDAPCD, including Rule 51 in the event a nuisance complaint occurs, and County Code Sections 63.401 and 63.402, which prohibit nuisance odors and identify enforcement measures to reduce odor impacts to nearby receptors. Therefore, impacts associated with objectionable odors would be less than significant.

6 SUMMARY OF RECOMMENDED PROJECT DESIGN FEATURES, IMPACTS, AND MITIGATION MEASURES

All impacts identified under the proposed Olivenhain Trunk Improvement project would be less than significant, including all Alternative Project approaches.

The following project design features (PDFs) will be implemented as part of the project during construction activities:

PDF AQ-1 To ensure the construction of the Proposed Project will not result in a significant impact relative to fugitive dust (PM10) and to comply with County Code Section 87.428, the following will be implemented:

- The applicants would apply water as necessary to suppress fugitive dust during grubbing, clearing, grading, trenching, and soil compaction and/or apply a nontoxic soil binding agent to help with soil stabilization during construction. These measures will be applied to all active construction areas, unpaved access roads, parking areas, and staging areas as necessary.
- Sweepers and water trucks will be used to control dust and debris at public street access points.
- Internal construction roadways will be stabilized by paving, chip sealing or non-toxic chemicals after rough grading.
- Exposed stockpiles (e.g., dirt, sand) will be covered and/or watered or stabilized with nontoxic soil binders, tarps, fencing or other suppression methods as needed to control emissions.
- Traffic speeds on unpaved roads will be limited to 15 miles per hour (mph).
- All haul and dump trucks entering or leaving the site with soil or fill material will maintain at least 2 feet of freeboard, or cover loads of all haul and dump trucks securely.
- Disturbed areas should be reseeded with native plant hydroseed mix as soon as possible after disturbance, or covered with a non-toxic soil binding agent (Such as EP&A's Envirotac II and Rhinosnot Dust Control, Erosion Control and Soil Stabilization).

PDF AQ-2 To reduce VOCs emissions associated with construction coating of the new manholes and relocated sewer-lines, the following specifications will be incorporated within the construction bid package:

- Specify low-VOC content paint for touch-up painting of the pipe installations;
- Specify low-VOC content epoxy coating for the new or renovated manholes.

PDF AQ-3 To reduce DPM emissions associated with offroad and onroad vehicles and equipment operating with diesel engines during project construction phases, the following specifications will be incorporated within the construction bid package:

- Specify a minimum of Tier 3 engines for all diesel vehicles and equipment, and;
- If Tier 3 or newer engines for equipment or vehicles are not available, then specify installation and use of diesel particulate filters for all diesel engine exhaust.

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LIST OF PREPARERS

Thomas Miller	President, Lead Scientist
Laura Fulton	Senior Environmental Engineer
Nichola Zaklan	Professional Technical Writer

8 APPENDIX A – PROJECT MAPS AND EMISSION CALCULATIONS

A1 Project Location (IEC)

A2 Project Zoning (IEC)

A3 IEC Equipment and Project Phases Estimate

A4 Construction Emissions by Phase – Criteria and GHG Pollutants

A5 Construction Emissions by Phase – GHG Pollutants

A6 Construction Emissions by Phase – Architectural Coatings

A7 Construction Emissions by Phase – Fugitive Dust

A8 Construction Emissions by Phase - Employee Commute Onroad

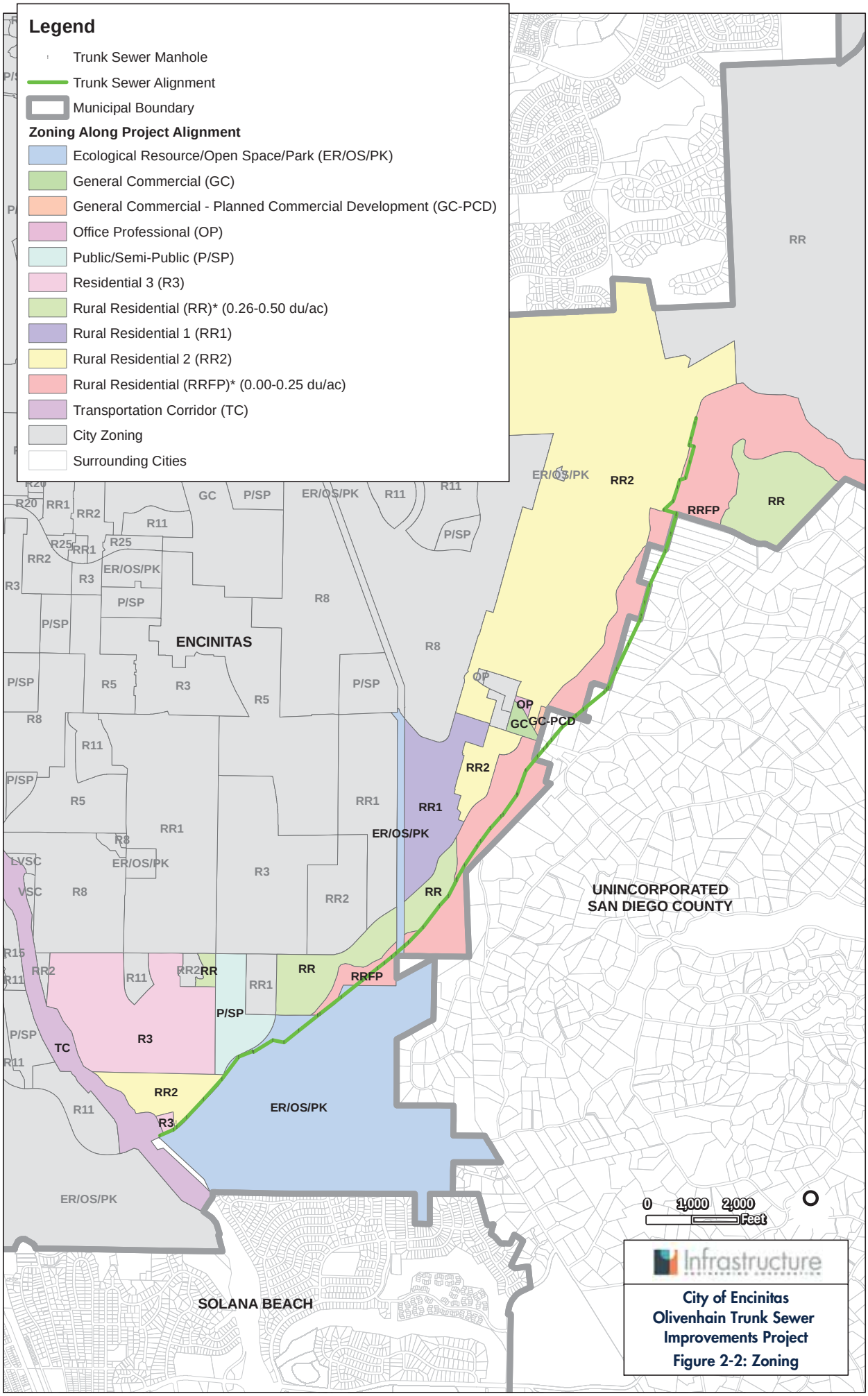
A9 Construction Emissions by Phase - Vendor Offsite Onroad

A10 Construction Emissions by Phase – Offroad Equipment Emissions

A11 Construction Emissions by Phase – Onroad Mobile Emissions

A12 Operation Emissions – GHG & Criteria Pollutants

VISTA
SAN MARCOS
CARLSBAD
ESCONDIDO
ENCINITAS
Project Alignment
SOLANA BEACH
DEL MAR
SAN DIEGO
POWAY
Pacific Ocean
Carlsbad
LONE JACK RD
Escondido Creek
Encinitas
RANCHO SANTA FE RD
Unincorporated San Diego County
MANCHESTER AVE
MANCHESTER AVE
San Elijo Lagoon
Solana Beach
Legend
Project Alignment
Jurisdictional Boundaries
0
2,000
4,000
Feet
Infrastructure
City of Encinitas
Olivenhain Trunk Sewer
Improvements Project
Figure 2-1: Project Location
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community


Legend
Trunk Sewer Manhole
Trunk Sewer Alignment
Municipal Boundary
Zoning Along Project Alignment
Ecological Resource/Open Space/Park (ER/OS/PK)
General Commercial (GC)
General Commercial - Planned Commercial Development (GC-PCD)
Office Professional (OP)
Public/Semi-Public (P/SP)
Residential 3 (R3)
Rural Residential (RR)* (0.26-0.50 du/ac)
Rural Residential 1 (RR1)
Rural Residential 2 (RR2)
Rural Residential (RRFP)* (0.00-0.25 du/ac)
Transportation Corridor (TC)
City Zoning
Surrounding Cities
ENCINITAS
UNINCORPORATED SAN DIEGO COUNTY
SOLANA BEACH
0 1,000 2,000 Feet
Infrastructure
City of Encinitas
Olivenhain Trunk Sewer Improvements Project
Figure 2-2: Zoning

IEC Project Design Engineers ***Vehicle and Equipment Estimates for PROPOSED PROJECT***
Estimated Project Duration: May 2015 - December 2016, approximately 20 months, 585 days

Project Phase	Use Type	Estimated Vehicles & Equipment	Length of Phase (Days)	Number of Round Trips per Vehicle per Phase	Quantity (# of Vehicles, Equipment)	Schedule Estimate (# of days, 5 workdays/ week)	Onroad Daily Use (Miles/Vehicle/ Day)	Offroad Daily Use (Hours//Day)	Motor Size (bhp)	Fuel Type (Gas, DSL)
Mobilization	Onroad Mobile	Semi-Truck Trailer (Equipment Mob Deliv, 100 mi RT)	20	8	1	8	50	0	350	DSL
	Onroad Employee	Crew Trucks (Worker Commute)		20	1	20	75	0	385	DSL
Access Construction	Offroad	Cat 325 excavator	250	250	1	250	20	6	177	DSL
	Offroad	Cat 938 loader		250	1	250	20	6	170	DSL
	Offroad	Skidsteer		250	1	250	20	6	95	DSL
	Onroad Mobile	Water Truck (Onroad truck used offroad, except to fill or stage)		250	1	250	120	8	350	DSL
	Onroad Mobile	Haul Trucks (large 10-wheel dump truck)		250	1	250	100	0	350	DSL
	Onroad Vendor	Semi-Truck Trailer (Vendor Deliveries)		70	1	70	200	0	350	DSL
	Onroad Employee	Pickup Truck (Worker Commute)		250	6	250	50	0	225	Gas
	Onroad Employee	Crew Trucks (Worker Commute)		250	1	250	75	0	385	DSL
Manhole Rehabilitation	Offroad	None	235	0	0	0	0	0	0	NA
	Onroad Mobile	Water Truck		235	1	235	120	4	350	DSL
	Onroad Mobile	Truck-mounted Crane (small)		235	1	235	20	4	365	DSL
	Onroad Mobile	Delivery wet-out Truck (mid-sized)		235	1	235	20	8	362	Gas
	Onroad Vendor	Semi-Truck Trailer (Vendor Deliveries)		60	1	60	200	0	350	DSL
	Onroad Employee	Pickup Truck (Worker Commute)		235	6	235	50	0	225	Gas
	Onroad Employee	Crew Trucks (Worker Commute)		235	1	235	75	0	385	DSL
Siphon and Manhole Removal	Offroad	Cat 325 excavator	20	20	1	20	20	6	177	DSL
	Offroad	Cat 314 excavator		20	1	20	20	6	95	DSL
	Offroad	Cat 938 loader		20	1	20	20	6	170	DSL
	Offroad	Skidsteer		20	1	20	20	6	95	DSL
	Onroad Mobile	Water Truck		20	1	20	120	4	350	DSL
	Onroad Mobile	Haul Trucks (large 10-wheel dump truck)		20	1	20	100	6	350	DSL
	Onroad Vendor	Semi-Truck Trailer (Vendor Deliveries)		8	1	8	200	0	350	DSL
	Onroad Employee	Pickup Truck (Worker Commute)		20	6	20	50	0	225	Gas
	Onroad Employee	Crew Trucks (Worker Commute)		20	1	20	75	0	385	DSL
"Lone Jack Segment" Realignment and Upsizing - - Sewer Installation	Offroad	Cat 325 excavator	90	90	1	90	20	6	177	DSL
	Offroad	Cat 314 excavator		90	1	90	20	6	95	DSL
	Offroad	Cat 938 loader		90	1	90	20	6	170	DSL
	Offroad	Skidsteer		90	1	90	20	6	95	DSL
	Offroad	Sawcutter - large chain saw driven steel/concrete		90	1	90	20	8	10	Gas
	Onroad Mobile	Water Truck		90	1	90	120	4	350	DSL
	Onroad Mobile	Haul Trucks (large 10-wheel dump truck)		90	1	90	100	4	350	DSL
	Onroad Vendor	Semi-Truck Trailer (Vendor Deliveries)		90	1	60	200	0	350	DSL
	Onroad Employee	Pickup Truck (Worker Commute)		90	6	90	50	0	225	Gas
	Onroad Employee	Crew Trucks (Worker Commute)		90	1	90	75	0	385	DSL
"Lone Jack Segment" Realignment and Upsizing - - Repaving Following Completed Sewer Installation	Offroad	John Deere 410 Backhoe	10	10	1	10	20	6	96	DSL
	Offroad	36-inch Smooth Drum Roller		10	1	10	20	6	20	DSL
	Offroad	Small Asphalt Roadway Paving Machine (Cat AP500E)		10	1	10	20	6	142	DSL
	Offroad	Skidsteer		10	1	10	20	9	95	DSL
	Onroad Mobile	Delivery wet-out Truck (mid-sized)		10	1	10	20	8	362	DSL
	Onroad Mobile	Water Truck		10	1	10	120	4	350	DSL
	Onroad Mobile	Haul Trucks (large 10-wheel dump truck)		10	1	10	100	6	350	DSL
	Onroad Vendor	Semi-Truck Trailer (Vendor Deliveries)		10	1	10	200	0	350	DSL
	Onroad Employee	Pickup Truck (Worker Commute)		10	6	10	50	0	225	Gas
	Onroad Employee	Crew Trucks (Worker Commute)		10	1	10	75	0	385	DSL
Site Restoration	Offroad	ATV to carry plants & supplies	40	40	4	40	25	8	55	DSL
	Onroad Vendor	Semi-Truck Trailer (Vendor Deliveries)		20	1	20	120	0	350	DSL
	Onroad Employee	Pickup Truck (Worker Commute)		40	4	40	50	0	225	Gas
	Onroad Employee	Crew Trucks (Worker Commute)		40	1	40	75	0	385	DSL
Demobilization	Onroad Mobile	Semi-Truck Trailer (Equipment Mob Deliv, 100 mi RT)	20	8	1	8	50	0	350	DSL
	Onroad Employee	Crew Trucks (Worker Commute)		20	1	20	75	0	385	DSL
Operations - Post Construction	Onroad City staff, qrtly inspections	Extended Cab Utility truck F350, 6.2L V8	4 days/year	2	1	4	200	0	385	DSL
	Onroad City staff, video inspections	Extended Cab Utility truck F350, 6.2L V8	1 day/year	2	1	1	200	0	385	DSL
	Onroad City, sewer line cleaning	Extended Cab Utility truck F350, 6.2L V8	14 days/year	4	1	14	400	0	385	DSL
		2-engine Vac-con truck	14 days/year	1	1	14	100	0	275	DSL
		(part of Vac-con) Auxiliary engine	14 days/year		1	14	100	0	135	DSL

Proposed Project Emissions Summary by Phase

Phase Activity	Category	Criteria Emissions (lb/day)						GHG Emissions (lb/day)			
		ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Mobilization	Off-road	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-site Mobile	0.04	0.18	1.09	0.00	0.03	0.02	192.10	0.00	0.00	192.28
	Vendors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Employees	0.01	0.04	0.11	0.00	0.01	0.01	62.17	0.00	0.00	62.25
	Fugitive Emissions					0.76	0.16				
	Phase Activity Total	***0.05***	***0.22***	***1.20***	***0.00***	***0.80***	***0.19***	***254.27***	***0.00***	***0.00***	***254.53***
Access Construction	Off-road	1.48	7.25	10.47	0.02	0.55	0.51	1550.81	0.13	0.00	1553.61
	On-site Mobile	0.08	0.27	3.03	0.01	0.11	0.06	581.57	0.00	0.00	582.34
	Vendors	0.16	0.73	4.35	0.01	0.12	0.09	768.40	0.00	0.00	769.10
	Employees	0.03	1.03	0.24	0.00	0.04	0.02	382.13	0.02	0.02	390.18
	Fugitive Emissions					8.87	1.42				
	Phase Activity Total	***1.76***	***9.28***	***18.09***	***0.03***	***9.70***	***2.11***	***3282.91***	***0.16***	***0.03***	***3295.24***
Manhole Rehabilitation	Off-road	0.26	1.17	1.89	0.00	0.11	0.10	243.97	0.02	0.00	244.46
	On-site Mobile	0.07	0.21	2.10	0.00	0.08	0.05	422.57	0.00	0.00	423.14
	Vendors	0.16	0.73	4.35	0.01	0.12	0.09	768.40	0.00	0.00	769.10
	Employees	0.03	1.03	0.24	0.00	0.04	0.02	382.13	0.02	0.02	390.18
	Fugitive Emissions					4.47	0.94				
	Architectural Coatings	0.80									
	Phase Activity Total	***1.32***	***3.14***	***8.58***	***0.02***	***4.83***	***1.20***	***1817.08***	***0.05***	***0.03***	***1826.88***
Siphon and Manhole Removal	Off-road	2.12	10.40	14.92	0.03	0.78	0.72	2268.29	0.19	0.00	2272.30
	On-site Mobile	0.08	0.27	3.03	0.01	0.11	0.06	581.57	0.00	0.00	582.34
	Vendors	0.16	0.73	4.35	0.01	0.12	0.09	768.40	0.00	0.00	769.10
	Employees	0.03	1.03	0.24	0.00	0.04	0.02	382.13	0.02	0.02	390.18
	Fugitive Emissions					10.22	1.55				
	Phase Activity Total	***2.40***	***12.43***	***22.54***	***0.04***	***11.28***	***2.45***	***4000.39***	***0.21***	***0.03***	***4013.93***
"Lone Jack Segment" Realignment and Upsizing - - Sewer Installation	Off-road	2.79	13.58	18.86	0.03	1.08	0.99	2736.00	0.25	0.00	2741.28
	On-site Mobile	0.08	0.27	3.03	0.01	0.11	0.06	581.57	0.00	0.00	582.34
	Vendors	0.16	0.73	4.35	0.01	0.12	0.09	768.40	0.00	0.00	769.10
	Employees	0.03	1.03	0.24	0.00	0.04	0.02	382.13	0.02	0.02	390.18
	Fugitive Emissions					10.22	1.55				
	Phase Activity Total	***3.06***	***15.62***	***26.48***	***0.05***	***11.58***	***2.72***	***4468.10***	***0.28***	***0.03***	***4482.91***
"Lone Jack Segment" Realignment and Upsizing - - Repaving Following Completed Sewer Installation	Off-road	2.04	9.74	12.67	0.02	0.84	0.77	1543.19	0.18	0.00	1547.04
	On-site Mobile	0.10	0.31	3.20	0.01	0.12	0.07	634.05	0.00	0.00	634.90
	Vendors	0.16	0.73	4.35	0.01	0.12	0.09	768.40	0.00	0.00	769.10
	Employees	0.03	1.03	0.24	0.00	0.04	0.02	382.13	0.02	0.02	390.18
	Fugitive Emissions					8.32	1.38				
	Architectural Coatings	0.80									
	Phase Activity Total	***3.13***	***11.81***	***20.46***	***0.04***	***9.45***	***2.34***	***3327.77***	***0.21***	***0.03***	***3341.23***
Site Restoration	Off-road	1.13	7.10	7.03	0.01	0.41	0.38	968.85	0.10	0.00	970.98
	On-site Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendors	0.10	0.44	2.61	0.00	0.07	0.05	461.04	0.00	0.00	461.46
	Employees	0.02	0.70	0.20	0.00	0.03	0.02	275.48	0.01	0.02	280.87
	Fugitive Emissions					3.01	0.63				
	Phase Activity Total	***1.25***	***8.24***	***9.84***	***0.02***	***3.53***	***1.08***	***1705.37***	***0.12***	***0.02***	***1713.32***
Demobilization	Off-road	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	On-site Mobile	0.04	0.18	1.09	0.00	0.03	0.02	192.10	0.00	0.00	192.28
	Vendors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Employees	0.01	0.04	0.11	0.00	0.01	0.01	62.17	0.00	0.00	62.25
	Fugitive Emissions					0.76	0.16				
	Phase Activity Total	***0.05***	***0.22***	***1.20***	***0.00***	***0.80***	***0.19***	***254.27***	***0.00***	***0.00***	***254.53***
Grand Total for OTS Improvement Project*		**11.66**	**52.27**	**96.15**	**0.18**	**46.84**	**10.81**	**16896.26**	**0.90**	**0.15**	**16960.19**
	CEQA Thresholds	**75.00**	**550.00**	**250.00**	**250.00**	**100.00**	**55.00**				

OTS Improvement Proposed Project
Air Quality Emissions Estimates

Emissions Summary by Phase

Phase Activity	Category	GHG Emissions (lb/day)					Total GHG Emissions (tons)			
		CO_2	CH_4	N_2O	CO_2e		CO_2	CH_4	N_2O	CO_2e
Mobilization	Off-road	0.00	0.00	0.00	0.00	#	0.00	0.00	0.00	0.00
	On-site Mobile	192.10	0.00	0.00	192.28	#	0.77	0.00	0.00	0.77
	Vendors	0.00	0.00	0.00	0.00	#	0.00	0.00	0.00	0.00
	Employees	62.17	0.00	0.00	62.25	#	0.62	0.00	0.00	0.62
	Fugitive Emissions									
	Phase Activity Total	***254.27***	***0.00***	***0.00***	***254.53***		***1.39***	***0.00***	***0.00***	***1.39***
Access Construction	Off-road	1550.81	0.13	0.00	1553.61	#	193.85	0.02	0.00	194.20
	On-site Mobile	581.57	0.00	0.00	582.34	#	72.70	0.00	0.00	72.79
	Vendors	768.40	0.00	0.00	769.10	#	26.89	0.00	0.00	26.92
	Employees	382.13	0.02	0.02	390.18	#	47.77	0.00	0.00	48.77
	Fugitive Emissions									
	Phase Activity Total	***3282.91***	***0.16***	***0.03***	***3295.24***		***341.21***	***0.02***	***0.00***	***342.69***
Manhole Rehabilitation	Off-road	243.97	0.02	0.00	244.46	#	28.67	0.00	0.00	28.72
	On-site Mobile	422.57	0.00	0.00	423.14	#	49.65	0.00	0.00	49.72
	Vendors	768.40	0.00	0.00	769.10	#	23.05	0.00	0.00	23.07
	Employees	382.13	0.02	0.02	390.18	#	44.90	0.00	0.00	45.85
	Fugitive Emissions									
	Architectural Coatings									
	Phase Activity Total	***1817.08***	***0.05***	***0.03***	***1826.88***		***146.27***	***0.01***	***0.00***	***147.36***
Siphon and Manhole Removal	Off-road	2268.29	0.19	0.00	2272.30	#	22.68	0.00	0.00	22.72
	On-site Mobile	581.57	0.00	0.00	582.34	#	5.82	0.00	0.00	5.82
	Vendors	768.40	0.00	0.00	769.10	#	3.07	0.00	0.00	3.08
	Employees	382.13	0.02	0.02	390.18	#	3.82	0.00	0.00	3.90
	Fugitive Emissions									
	Phase Activity Total	***4000.39***	***0.21***	***0.03***	***4013.93***		***35.39***	***0.00***	***0.00***	***35.52***
"Lone Jack Segment" Realignment and Upsizing - - Sewer Installation	Off-road	2736.00	0.25	0.00	2741.28	#	123.12	0.01	0.00	123.36
	On-site Mobile	581.57	0.00	0.00	582.34	#	26.17	0.00	0.00	26.21
	Vendors	768.40	0.00	0.00	769.10	#	23.05	0.00	0.00	23.07
	Employees	382.13	0.02	0.02	390.18	#	17.20	0.00	0.00	17.56
	Fugitive Emissions									
	Phase Activity Total	***4468.10***	***0.28***	***0.03***	***4482.91***		***189.54***	***0.01***	***0.00***	***190.19***
"Lone Jack Segment" Realignment and Upsizing - - Repaving Following Completed Sewer Installation	Off-road	1543.19	0.18	0.00	1547.04	#	7.72	0.00	0.00	7.74
	On-site Mobile	634.05	0.00	0.00	634.90	#	3.17	0.00	0.00	3.17
	Vendors	768.40	0.00	0.00	769.10	#	3.84	0.00	0.00	3.85
	Employees	382.13	0.02	0.02	390.18	#	1.91	0.00	0.00	1.95
	Fugitive Emissions									
	Architectural Coatings									
	Phase Activity Total	***3327.77***	***0.21***	***0.03***	***3341.23***		***16.64***	***0.00***	***0.00***	***16.71***
Site Restoration	Off-road	968.85	0.10	0.00	970.98	#	19.38	0.00	0.00	19.42
	On-site Mobile	0.00	0.00	0.00	0.00	#	0.00	0.00	0.00	0.00
	Vendors	461.04	0.00	0.00	461.46	#	4.61	0.00	0.00	4.61
	Employees	275.48	0.01	0.02	280.87	#	5.51	0.00	0.00	5.62
	Fugitive Emissions									
	Phase Activity Total	***1705.37***	***0.12***	***0.02***	***1713.32***		***29.50***	***0.00***	***0.00***	***29.65***
Demobilization	Off-road	0.00	0.00	0.00	0.00	#	0.00	0.00	0.00	0.00
	On-site Mobile	192.10	0.00	0.00	192.28	#	0.77	0.00	0.00	0.77
	Vendors	0.00	0.00	0.00	0.00	#	0.00	0.00	0.00	0.00
	Employees	62.17	0.00	0.00	62.25	#	0.62	0.00	0.00	0.62
	Fugitive Emissions									
	Phase Activity Total	***254.27***	***0.00***	***0.00***	***254.53***		***1.39***	***0.00***	***0.00***	***1.39***
Grand Total for OTS Improvements Project*		**16896.26**	**0.90**	**0.15**	**16960.19**		**761.33**	**0.04**	**0.01**	**764.91**
	CEQA Thresholds									**992.00**

Architectural Coatings

Phase	Structure	Expected product	Manholes per day	Amount applied per manhole (gal)	Quantity of manholes	Total amount applied (gal)	VOC content (lb/gal)	Daily VOCs (lb/day)	Total VOCs (tons)
Manhole Rehabilitation	Manholes	HI-BUILD EPOXOLINE ® II	1	1	50	50.00	0.8	0.80	0.0200
							Activity Phase Total	***0.80***	***0.0200***
"Lone Jack Segment"	Manholes	HI-BUILD EPOXOLINE ® II	1	1	11	11.00	0.8	0.80	0.0044
Realignment and Upsizing - -							***Activity Phase Total***	***0.80***	***0.0044***

Notes:
For purposes of criteria emissions inclusion, VOCs=ROGs
Assuming one gallon per manhole, one manhole per day

Product Name: HI-BUILD EPOXOLINE ® II
Description/Usage: Polyamidoamine Epoxy - A versatile low VOC, factory accelerated epoxy for protection and finishing of steel and concrete.
VOCs: Unthinned: 0.80 lbs/gallon (96 grams/litre)
Theoretical Coverage: 1,059 mil sq ft/gal (26.0 m²/L at 25 microns).

453.6 g/lb
7.48 gal/ft^3

Proposed Project Fugitive Dust from Grading and Vehicle Traffic

Equipment Activity by Project Phase								Criteria Emissions (lbs/d)		Criteria Emissions (tons)	
Project Phase	Estimated Vehicles & Equipment	Length of Phase (days)	Quantity (# of Vehicles, Equip)	Schedule Est (days)	Duration of Use (Mi/Vehicle-d or Hrs/equip-d)	Miles/Day or Hours/Day	Acres Disturbed Per Day*	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Mobilization	Pickup Trucks	20	1	20	75	75		0.456	0.096	0.005	0.001
	Semi-Truck Trailer (Vendor Deliveries)		1	8	50	50		0.304	0.064	0.001	0.000
							Activity Phase Total	***0.761***	***0.160***	***0.006***	***0.001***
Access Construction	Cat 325 excavator	250	1	250	6	6	0.375	1.346	0.134	0.168	0.017
	Cat 938 loader		1	250	6	6	0.375	1.346	0.134	0.168	0.017
	Skidsteer		1	250	6	6	0.375	1.346	0.134	0.168	0.017
	Water Trucks		1	250	120	120		0.730	0.153	0.091	0.019
	Haul Trucks		1	250	100	100		0.608	0.128	0.076	0.016
	Semi-Truck Trailer (Vendor Deliveries)		1	70	200	200		1.217	0.256	0.043	0.009
	Pickup Trucks (Worker Commute)		6	250	50	300		1.825	0.384	0.228	0.048
	Pickup Trucks		1	250	75	75		0.456	0.096	0.057	0.012
							Activity Phase Total	***8.874***	***1.420***	***1.000***	***0.154***
Manhole Rehabilitation	Water Trucks	235	1	235	120	120		0.730	0.153	0.086	0.018
	Truck-mounted Crane (small)		1	235	20	20		0.122	0.026	0.014	0.003
	Delivery wet-out Truck (mid-sized)		1	235	20	20		0.122	0.026	0.014	0.003
	Semi-Truck Trailer (Vendor Deliveries)		1	60	200	200		1.217	0.256	0.037	0.008
	Pickup Trucks (Worker Commute)		6	235	50	300		1.825	0.384	0.214	0.045
	Pickup Trucks		1	235	75	75		0.456	0.096	0.054	0.011
							Activity Phase Total	***4.472***	***0.940***	***0.419***	***0.088***
Siphon and Manhole Removal	Cat 325 excavator	20	1	20	6	6	0.375	1.346	0.134	0.013	0.001
	Cat 314 excavator		1	20	6	6	0.375	1.346	0.134	0.013	0.001
	Cat 938 loader		1	20	6	6	0.375	1.346	0.134	0.013	0.001
	Skidsteer		1	20	6	6	0.375	1.346	0.134	0.013	0.001
	Water Trucks		1	20	120	120		0.730	0.153	0.007	0.002
	Haul Trucks		1	20	100	100		0.608	0.128	0.006	0.001
	Semi-Truck Trailer (Vendor Deliveries)		1	8	200	200		1.217	0.256	0.005	0.001
	Pickup Trucks (Worker Commute)		6	20	50	300		1.825	0.384	0.018	0.004
	Pickup Trucks		1	20	75	75		0.456	0.096	0.005	0.001
							Activity Phase Total	***10.219***	***1.554***	***0.095***	***0.014***

Proposed Project Fugitive Dust from Grading and Vehicle Traffic

Equipment Activity by Project Phase								Criteria Emissions (lbs/d)		Criteria Emissions (tons)	
Project Phase	Estimated Vehicles & Equipment	Length of Phase (days)	Quantity (# of Vehicles, Equip)	Schedule Est (days)	Duration of Use (Mi/Vehicle-d or Hrs/equip-d)	Miles/Day or Hours/Day	Acres Disturbed Per Day*	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
"Lone Jack Segment" Realignment and Upsizing - - Sewer Installation	Cat 325 excavator	90	1	90	6	6	0.375	1.346	0.134	0.061	0.006
	Cat 314 excavator		1	90	6	6	0.375	1.346	0.134	0.061	0.006
	Cat 938 loader		1	90	6	6	0.375	1.346	0.134	0.061	0.006
	Skidsteer		1	90	6	6	0.375	1.346	0.134	0.061	0.006
	Water Trucks		1	90	120	120		0.730	0.153	0.033	0.007
	Haul Trucks		1	90	100	100		0.608	0.128	0.027	0.006
	Semi-Truck Trailer (Vendor Deliveries)		1	60	200	200		1.217	0.256	0.037	0.008
	Pickup Trucks (Worker Commute)		6	90	50	300		1.825	0.384	0.082	0.017
	Pickup Trucks		1	90	75	75		0.456	0.096	0.021	0.004
							Activity Phase Total	***10.219***	***1.554***	***0.442***	***0.066***
"Lone Jack Segment" Realignment and Upsizing - - Repaving Following Completed Sewer Installation	John Deere 410 Backhoe	10	1	10	6	6	0.375	1.346	0.134	0.007	0.001
	Skidsteer		1	10	9	9	0.5625	2.018	0.202	0.010	0.001
	Delivery wet-out Truck (mid-sized)		1	10	20	20		0.122	0.026	0.001	0.000
	Water Trucks		1	10	120	120		0.730	0.153	0.004	0.001
	Haul Trucks		1	10	100	100		0.608	0.128	0.003	0.001
	Semi-Truck Trailer (Vendor Deliveries)		1	10	200	200		1.217	0.256	0.006	0.001
	Pickup Trucks (Worker Commute)		6	10	50	300		1.825	0.384	0.009	0.002
	Pickup Trucks		1	10	75	75		0.456	0.096	0.002	0.000
							Activity Phase Total	***8.323***	***1.378***	***0.042***	***0.007***
Site Restoration	ATV to carry plants & supplies**	40	4	40	25	100		0.608	0.128	0.012	0.003
	Semi-Truck Trailer (Vendor Deliveries)		1	20	120	120		0.730	0.153	0.007	0.002
	Pickup Trucks (Worker Commute)		4	40	50	200		1.217	0.256	0.024	0.005
	Pickup Trucks		1	40	75	75		0.456	0.096	0.009	0.002
							Activity Phase Total	***3.012***	***0.633***	***0.053***	***0.011***
Demobilization	Semi-Truck Trailer (Vendor Deliveries)	20	1	8	50	50		0.304	0.064	0.001	0.000
	Pickup Trucks		1	20	75	75		0.456	0.096	0.005	0.001
							Activity Phase Total	***0.761***	***0.160***	***0.006***	***0.001***
Operations - Post Construction	Extended Cab Utility truck F350, 6.2L V8	4 days/year	1	4	200	200		1.217	0.256	0.002	0.001
	Extended Cab Utility truck F350, 6.2L V8	1 day/year	1	1	200	200		1.217	0.256	0.001	0.000
	Extended Cab Utility truck F350, 6.2L V8	14 days/year	1	14	400	400		2.434	0.511	0.017	0.004
	2-engine Vac-con truck	14 days/yr	1	14	100	100		0.608	0.128	0.004	0.001
							Activity Phase Total	***5.476***	***1.151***	***0.024***	***0.005***
							Project Totals* **	**45.118**	**7.479**	**2.086**	**0.348**

*Acres Disturbed per day based upon equipment usage per day listed in CalEEMod appendix, located at http://www.aqmd.gov/docs/default-source/caleemod/caleemod-appendixd.pdf

** ATV treated as onroad vehicle for purposes of disturbance, as non-disturbance coating is assumed to be applied prior to restoration activities.

*** As many project phases overlap, conservative estimate for maximum daily emissions includes all these phases occurring simultaneously. See IEC Project Estimates Proposed tab for schedule

Project Employee Commute

Employee Vehicle Activity by Project Phase						Criteria Emissions (lb/day)						GHG Emissions (lb/day)			
Project Phase	Onroad Vehicle	# Vehicles	Length of Use (days)	VMT/Day per Vehicle	Total VMT (mi)	ROG	CO	NO_X	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Mobilization	LDT2 - DSL	1	20	75	1,500	0.008	0.042	0.114	0.001	0.013	0.008	62.172	0.000	0.000	62.255
					Activity Phase Total	***0.008***	***0.042***	***0.114***	***0.001***	***0.013***	***0.008***	***62.172***	***0.000***	***0.000***	***62.255***
Access Construction	LDT2 - Gas	6	250	50	75,000	0.024	0.991	0.127	0.003	0.031	0.013	319.962	0.019	0.024	327.929
	LDT2 - DSL	1	250	75	18,750	0.008	0.042	0.114	0.001	0.013	0.008	62.172	0.000	0.000	62.255
					Activity Phase Total	***0.032***	***1.033***	***0.241***	***0.004***	***0.044***	***0.021***	***382.134***	***0.019***	***0.025***	***390.184***
Manhole Rehabilitation	LDT2 - Gas	6	235	50	70,500	0.024	0.991	0.127	0.003	0.031	0.013	319.962	0.019	0.024	327.929
	LDT2 - DSL	1	235	75	17,625	0.008	0.042	0.114	0.001	0.013	0.008	62.172	0.000	0.000	62.255
					Activity Phase Total	***0.032***	***1.033***	***0.241***	***0.004***	***0.044***	***0.021***	***382.134***	***0.019***	***0.025***	***390.184***
Siphon and Manhole Removal	LDT2 - Gas	6	20	50	6,000	0.024	0.991	0.127	0.003	0.031	0.013	319.962	0.019	0.024	327.929
	LDT2 - DSL	1	20	75	1,500	0.008	0.042	0.114	0.001	0.013	0.008	62.172	0.000	0.000	62.255
					Activity Phase Total	***0.032***	***1.033***	***0.241***	***0.004***	***0.044***	***0.021***	***382.134***	***0.019***	***0.025***	***390.184***
"Lone Jack Segment" Realignment and Upsizing - - Sewer Installation	LDT2 - Gas	6	90	50	27,000	0.024	0.991	0.127	0.003	0.031	0.013	319.962	0.019	0.024	327.929
	LDT2 - DSL	1	90	75	6,750	0.008	0.042	0.114	0.001	0.013	0.008	62.172	0.000	0.000	62.255
					Activity Phase Total	***0.032***	***1.033***	***0.241***	***0.004***	***0.044***	***0.021***	***382.134***	***0.019***	***0.025***	***390.184***
"Lone Jack Segment" Realignment and Upsizing - - Repaving Following Completed	LDT2 - Gas	6	10	50	3,000	0.024	0.991	0.127	0.003	0.031	0.013	319.962	0.019	0.024	327.929
	LDT2 - DSL	1	10	75	750	0.008	0.042	0.114	0.001	0.013	0.008	62.172	0.000	0.000	62.255
					Activity Phase Total	***0.032***	***1.033***	***0.241***	***0.004***	***0.044***	***0.021***	***382.134***	***0.019***	***0.025***	***390.184***
Site Restoration	LDT2 - Gas	4	40	50	8,000	0.016	0.661	0.085	0.002	0.021	0.009	213.308	0.013	0.016	218.620
	LDT2 - DSL	1	40	75	3,000	0.008	0.042	0.114	0.001	0.013	0.008	62.172	0.000	0.000	62.255
					Activity Phase Total	***0.024***	***0.702***	***0.199***	***0.003***	***0.034***	***0.017***	***275.480***	***0.013***	***0.017***	***280.874***
Demobilization	LDT2 - DSL	1	20	75	1,500	0.008	0.042	0.114	0.001	0.013	0.008	62.172	0.000	0.000	62.255
					Activity Phase Total	***0.008***	***0.042***	***0.114***	***0.001***	***0.013***	***0.008***	***62.172***	***0.000***	***0.000***	***62.255***
	Project Totals*				**240,875**	**0.160**	**5.163**	**1.205**	**0.019**	**0.220**	**0.106**	**1910.669**	**0.095**	**0.123**	**1950.921**

* As many project phases overlap, conservative estimate for maximum daily emissions includes all these phases occurring simultaneously. See IEC Project Estimates Proposed tab for schedule

Notes: Lbs/day emission estimates assume worst-case of all vehicles operating on the same day traveling

453.6 g/lb

Vendor Off-site Onroad Emissions

Vehicle Activity by Project Phase						Criteria Emissions (lbs/d)						GHG Emissions (lb/day)			
Project Phase	Vendor Vehicle Type (EMFAC2011 - Onroad)	Number of vehicles	Length of Use (days)	VMT per day/veh	Total VMT (mi)	ROG	CO	NO_X	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Mobilization	None This Phase														
			Activity Phase Total	*0*	*0*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
Access Construction	Semi-Truck & Trailer/Delivery (T7 tractor cor	1	70	200	14000	0.162	0.730	4.351	0.007	0.125	0.091	768.401	0.002	0.002	769.105
			Activity Phase Total	*200*	*14,000*	*0.162*	*0.730*	*4.351*	*0.007*	*0.125*	*0.091*	*768.401*	*0.002*	*0.002*	*769.105*
Manhole Rehabilitation	Semi-Truck & Trailer/Delivery (T7 tractor cor	1	60	200	12000	0.162	0.730	4.351	0.007	0.125	0.091	768.401	0.002	0.002	769.105
			Activity Phase Total	*200*	*12,000*	*0.162*	*0.730*	*4.351*	*0.007*	*0.125*	*0.091*	*768.401*	*0.002*	*0.002*	*769.105*
Siphon and Manhole Removal	Semi-Truck & Trailer/Delivery (T7 tractor cor	1	8	200	1600	0.162	0.730	4.351	0.007	0.125	0.091	768.401	0.002	0.002	769.105
			Activity Phase Total	*200*	*1,600*	*0.162*	*0.730*	*4.351*	*0.007*	*0.125*	*0.091*	*768.401*	*0.002*	*0.002*	*769.105*
"Lone Jack Segment" Realignment and Upsizing - -	Semi-Truck & Trailer/Delivery (T7 tractor cor	1	60	200	12000	0.162	0.730	4.351	0.007	0.125	0.091	768.401	0.002	0.002	769.105
			Activity Phase Total	*200*	*12,000*	*0.162*	*0.730*	*4.351*	*0.007*	*0.125*	*0.091*	*768.401*	*0.002*	*0.002*	*769.105*
"Lone Jack Segment" Realignment and Upsizing - - Repaving Following Completed	Semi-Truck & Trailer/Delivery (T7 tractor cor	1	10	200	2000	0.162	0.730	4.351	0.007	0.125	0.091	768.401	0.002	0.002	769.105
			Activity Phase Total	*200*	*2,000*	*0.162*	*0.730*	*4.351*	*0.007*	*0.125*	*0.091*	*768.401*	*0.002*	*0.002*	*769.105*
Site Restoration	Semi-Truck & Trailer/Delivery (T7 tractor cor	1	20	120	2400	0.097	0.438	2.611	0.004	0.075	0.054	461.041	0.001	0.001	461.463
			Activity Phase Total	*120*	*2,400*	*0.097*	*0.438*	*2.611*	*0.004*	*0.075*	*0.054*	*461.041*	*0.001*	*0.001*	*461.463*
Demobilization	None This Phase														
			Activity Phase Total	*0*	*0*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
			Project Totals*		**44,000**	**0.810**	**3.648**	**21.757**	**0.037**	**0.624**	**0.454**	**3842.006**	**0.011**	**0.011**	**3845.523**

* As many project phases overlap, conservative estimate for maximum daily emissions includes all these phases occurring simultaneously. See IEC Project Estimates Proposed tab for schedul

453.6 g/lb

Off Road Equipment Emissions

Equipment Activity by Project Phase						Criteria Emissions (lbs/d)						GHG Emissions (lbs/d)			
Project Phase	Equipment Type	Avg Daily Number	Schedule Estimate (days)	Hrs/ day	Total hours	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Mobilization	None This Phase														
					Activity Phase Total	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.00*	*0.000*	*0.000*	*0.00*
Access Construction	Cat 325 excavator	1	250	6	1,500	0.638	3.149	4.450	0.008	0.227	0.209	717.482	0.058	0.000	718.691
	Cat 938 loader	1	250	6	1,500	0.630	2.769	4.703	0.007	0.250	0.230	651.670	0.057	0.000	652.863
	Skidsteer	1	250	6	1,500	0.211	1.332	1.319	0.002	0.077	0.071	181.659	0.019	0.000	182.059
					Activity Phase Total	*1.479*	*7.249*	*10.471*	*0.017*	*0.554*	*0.510*	*1550.810*	*0.133*	*0.000*	*1553.613*
Manhole Rehabilitation	Aux engine for Truck-mounted Crane (small)	1	235	4	940	0.256	1.165	1.887	0.003	0.107	0.099	243.971	0.023	0.000	244.456
					Activity Phase Total	*0.256*	*1.165*	*1.887*	*0.003*	*0.107*	*0.099*	*243.97*	*0.023*	*0.000*	*244.46*
Siphon and Manhole Removal	Cat 325 excavator	1	20	6	120	0.638	3.149	4.450	0.008	0.227	0.209	717.482	0.058	0.000	718.691
	Cat 314 excavator	1	20	6	120	0.638	3.149	4.450	0.008	0.227	0.209	717.482	0.058	0.000	718.691
	Cat 938 loader	1	20	6	120	0.630	2.769	4.703	0.007	0.250	0.230	651.670	0.057	0.000	652.863
	Skidsteer	1	20	6	120	0.211	1.332	1.319	0.002	0.077	0.071	181.659	0.019	0.000	182.059
					Activity Phase Total	*2.118*	*10.398*	*14.921*	*0.025*	*0.781*	*0.719*	*2268.29*	*0.191*	*0.000*	*2272.30*
"Lone Jack Segment" Realignment and Upsizing - Sewer Installation	Cat 325 excavator	1	90	6	540	0.638	3.149	4.450	0.008	0.227	0.209	717.482	0.058	0.000	718.691
	Cat 314 excavator	1	90	6	540	0.638	3.149	4.450	0.008	0.227	0.209	717.482	0.058	0.000	718.691
	Cat 938 loader	1	90	6	540	0.630	2.769	4.703	0.007	0.250	0.230	651.670	0.057	0.000	652.863
	Skidsteer	1	90	6	540	0.211	1.332	1.319	0.002	0.077	0.071	181.659	0.019	0.000	182.059
	Sawcutter - assume large chain saw driven steel/con	1	90	8	720	0.668	3.186	3.936	0.006	0.300	0.276	467.709	0.060	0.000	468.975
					Activity Phase Total	*2.786*	*13.583*	*18.857*	*0.031*	*1.081*	*0.994*	*2736.00*	*0.251*	*0.000*	*2741.28*
"Lone Jack Segment" Realignment and Upsizing - Repaving Following Completed Sewer Installation	John Deere 410 Backhoe	1	10	6	60	0.400	2.229	2.700	0.005	0.179	0.164	400.794	0.036	0.000	401.552
	36-inch Smooth Drum Roller	1	10	6	60	0.510	2.387	3.424	0.005	0.231	0.213	402.302	0.046	0.000	403.269
	Small Asphalt Roadway Paving Machine (Cat AP500	1	10	6	60	0.808	3.122	4.564	0.005	0.316	0.290	467.602	0.073	0.000	469.134
	Skidsteer	1	10	9	90	0.316	1.998	1.978	0.003	0.115	0.106	272.489	0.029	0.000	273.088
					Activity Phase Total	*2.035*	*9.736*	*12.667*	*0.018*	*0.841*	*0.773*	*1543.187*	*0.184*	*0.000*	*1547.044*
Site Restoration	ATV to carry plants & supplies	4	40	8	1,280	1.125	7.103	7.035	0.012	0.409	0.376	968.848	0.102	0.000	970.981
					Activity Phase Total	*1.125*	*7.103*	*7.035*	*0.012*	*0.409*	*0.376*	*968.85*	*0.102*	*0.000*	*970.98*
Demobilization	None This Phase														
					Activity Phase Total	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.00*	*0.000*	*0.000*	*0.00*
					Project Totals*	**8.674**	**42.132**	**58.803**	**0.094**	**3.364**	**3.095**	**8342.261**	**0.783**	**0.000**	**8358.697**

* As many project phases overlap, conservative estimate for maximum daily emissions includes all these phases occurring simultaneously. See IEC Project Estimates Proposed tab for schedule

Notes

CO2 equivalent (CO_2e) ===>	CO_2 + (CH_4x21)
Offroad Emission Factors (gms/BHP-Hr) ===>	From worksheet "Offroad Equip LFs & EFs"
Offroad Load Factors ===>	From worksheet "Offroad Equip LFs & EFs"

Onroad Mobile Equipment Emissions

Vehicle Activity by Project Phase							Criteria Emissions (lbs/d)						GHG Emissions (lbs/day)			
Project Phase	Vehicle	Type	Avg Number	# Days	VMT per Day/Vehicle	Total VMT	ROG	CO	NO_X	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Mobilization	Semi-Truck Trailer	Heavy-Heavy Duty Diesel	1	8	50	400	0.041	0.182	1.088	0.002	0.031	0.023	192.100	0.001	0.001	192.276
					Activity Phase Total	*400*	*0.041*	*0.182*	*1.088*	*0.002*	*0.031*	*0.023*	*192.100*	*0.001*	*0.001*	*192.276*
Access Construction	Water Trucks	Medium Heavy Duty Diesel	1	250	120	30,000	0.046	0.147	1.651	0.003	0.059	0.035	317.217	0.001	0.001	317.639
	Haul Trucks	Medium Heavy Duty Diesel	1	250	100	25,000	0.038	0.122	1.376	0.003	0.049	0.029	264.348	0.001	0.001	264.700
					Activity Phase Total	*55000*	*0.084*	*0.269*	*3.026*	*0.006*	*0.107*	*0.064*	*581.565*	*0.002*	*0.002*	*582.339*
Manhole Rehabilitation	Water Trucks	Medium Heavy Duty Diesel	1	235	120	28,200	0.046	0.147	1.651	0.003	0.059	0.035	317.217	0.001	0.001	317.639
	Truck-mounted Crane	Medium Heavy Duty Diesel	1	235	20	4,700	0.008	0.024	0.275	0.001	0.010	0.006	52.870	0.000	0.000	52.940
	Delivery wet-out Truck	Medium Heavy Duty Diesel	1	235	20	4,700	0.011	0.038	0.178	0.001	0.013	0.008	52.487	0.000	0.000	52.557
					Activity Phase Total	*37,600*	*0.065*	*0.209*	*2.104*	*0.004*	*0.081*	*0.049*	*422.574*	*0.002*	*0.002*	*423.137*
Siphon and Manhole Removal	Water Trucks	Medium Heavy Duty Diesel	1	20	120	2,400	0.046	0.147	1.651	0.003	0.059	0.035	317.217	0.001	0.001	317.639
	Haul Trucks	Medium Heavy Duty Diesel	1	20	100	2,000	0.038	0.122	1.376	0.003	0.049	0.029	264.348	0.001	0.001	264.700
					Activity Phase Total	*4,400*	*0.084*	*0.269*	*3.026*	*0.006*	*0.107*	*0.064*	*581.565*	*0.002*	*0.002*	*582.339*
"Lone Jack Segment" Realignment and Upsizing - Sewer Installation	Water Trucks	Medium Heavy Duty Diesel	1	90	120	10,800	0.046	0.147	1.651	0.003	0.059	0.035	317.217	0.001	0.001	317.639
	Haul Trucks	Medium Heavy Duty Diesel	1	90	100	9,000	0.038	0.122	1.376	0.003	0.049	0.029	264.348	0.001	0.001	264.700
					Activity Phase Total	*19,800*	*0.084*	*0.269*	*3.026*	*0.006*	*0.107*	*0.064*	*581.565*	*0.002*	*0.002*	*582.339*
"Lone Jack Segment" Realignment and Upsizing - Repaving Following Completed Sewer	Delivery wet-out Truck	Medium Heavy Duty Diesel	1	10	20	200	0.011	0.038	0.178	0.001	0.013	0.008	52.487	0.000	0.000	52.557
	Water Trucks	Medium Heavy Duty Diesel	1	10	120	1,200	0.046	0.147	1.651	0.003	0.059	0.035	317.217	0.001	0.001	317.639
	Haul Trucks	Medium Heavy Duty Diesel	1	10	100	1,000	0.038	0.122	1.376	0.003	0.049	0.029	264.348	0.001	0.001	264.700
					Activity Phase Total	*2,400*	*0.096*	*0.307*	*3.205*	*0.006*	*0.120*	*0.072*	*634.052*	*0.003*	*0.003*	*634.896*
Site Restoration	None this Phase															
					Activity Phase Total	*0*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
Demobilization	Semi-Truck Trailer	Heavy-Heavy Duty Diesel	1	8	50	400	0.041	0.182	1.088	0.002	0.031	0.023	192.100	0.001	0.001	192.276
					Activity Phase Total	*400*	*0.041*	*0.182*	*1.088*	*0.002*	*0.031*	*0.023*	*192.100*	*0.001*	*0.001*	*192.276*
					Project Totals*	**120,000**	**0.413**	**1.325**	**14.388**	**0.027**	**0.523**	**0.313**	**2801.322**	**0.012**	**0.011**	**2805.050**

* As many project phases overlap, conservative estimate for maximum daily emissions includes all these phases occurring simultaneously. See IEC Project Estimates Proposed tab for schedule

453.6 g/lb

Operational Emissions

Vehicle Activity

Activity	Vehicle Type	Number of Veh	Round Trip (mi)	VMT per day	Days/ yr	Annual VMT* (mi)
On-site	Extended Cab Utility truck F350, 6.2L V8	1.00	200	200	4	800
On-site	Extended Cab Utility truck F350, 6.2L V8	1.00	200	200	1	200
On-site	Extended Cab Utility truck F350, 6.2L V8	1.00	400	400	14	5,600
On-site	2-engine Vac-con truck	1.00	100	100	14	1,400
Totals				**200**		**800**

Emissions

Activity	Vehicle Type	Criteria Emissions (lb/day)						GHG Emissions (lb/day)			
		ROG	CO	NO_X	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-site	Extended Cab Utility truck F350, 6.2L V8	0.020	0.111	0.304	0.002	0.035	0.022	165.791	0.000	0.001	166.012
On-site	Extended Cab Utility truck F350, 6.2L V8	0.020	0.111	0.304	0.002	0.035	0.022	165.791	0.000	0.001	166.012
On-site	Extended Cab Utility truck F350, 6.2L V8	0.040	0.222	0.609	0.003	0.071	0.045	331.582	0.001	0.001	332.025
On-site	2-engine Vac-con truck	0.056	0.253	2.032	0.004	0.052	0.036	383.552	0.001	0.001	383.904
Totals		**0.14**	**0.70**	**3.25**	**0.01**	**0.19**	**0.12**	**1046.72**	**0.00**	**0.00**	**1047.95**

Activity	Vehicle Type	Total Criteria Emissions (tons)						Total GHG Emissions (tons)			
		ROG	CO	NO_X	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
On-site	Extended Cab Utility truck F350, 6.2L V8	0.000	0.000	0.001	0.000	0.000	0.000	0.332	0.000	0.000	0.332
On-site	Extended Cab Utility truck F350, 6.2L V8	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.000	0.000	0.083
On-site	Extended Cab Utility truck F350, 6.2L V8	0.000	0.002	0.004	0.000	0.000	0.000	2.321	0.000	0.000	2.324
On-site	2-engine Vac-con truck	0.000	0.002	0.014	0.000	0.000	0.000	2.685	0.000	0.000	2.687
Totals		**0.00**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**	**5.42**	**0.00**	**0.00**	**5.43**

9 APPENDIX B – SENSITIVE RECEPTOR CALCULATIONS

B1 Figure 2-13c OTS Sensitive Receptor Location

B2 OTS Improvement Project Screen3 Model Output 140909

B3 OTS Sensitive Receptor Cancer Calculations page 1

B3 OTS Sensitive Receptor Cancer Calculations page 2

B3 OTS Sensitive Receptor Cancer Calculations page 3

BIRMINGHAM DR
PRIVATE RD
CREST DR
EL CAM CT
S EL CAM REAL
BEL AIR TR
DEV
EUC
CSS-D
ORN
GBS
AM
SWS
CBM
CSS
1294SMANHL
1295SMANHL
1296SMANHL
1297SMANHL
1312SMANHL
1314SMANHL
1305SMANHL
1315SMANHL
1310SMANHL
1309SMANHL
1318SMANHL
1563SMANHL
1493SMANHL
ESTE VISTA CT
BRUGEALA CT
WALES DR
VIA TIEMPO
AVOCET CT
MANCHESTER AV
PRIVATE RD
Construction Access Through Gate
MFS
RUD
CSM-H
CSM-M
AG
OW
VIA POCO
I-5 RA
I-5 SB
I-5 NB
SANTA INEZ
SANTA HIDALGA
SANTA PAULA
SANTA OLIVIA
0 250 500
Feet
Infrastructure
City of Encinitas
Olivenhain Trunk Sewer
Improvements Project
Figure 2-13(c): Alternative 2A
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

```
09/09/14

17:35:57
  ***  SCREEN3 MODEL RUN  ***
  *** VERSION DATED 96043 ***

 C:\Lakes\Screen View\OTSImprovementproject140909.scr

 SIMPLE TERRAIN INPUTS:
    SOURCE TYPE              =       VOLUME
    EMISSION RATE (G/S)      =     0.172700E-03
    SOURCE HEIGHT (M)        =       5.0000
    INIT. LATERAL DIMEN (M)  =      10.4600
    INIT. VERTICAL DIMEN (M) =       1.1600
    RECEPTOR HEIGHT (M)      =       2.0000
    URBAN/RURAL OPTION       =        RURAL

 THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
 THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS
ENTERED.


 BUOY. FLUX =    0.000 M**4/S**3;  MOM. FLUX =    0.000 M**4/S**
2.

 *** STABILITY CLASS  5 ONLY ***

 **********************************
 *** SCREEN AUTOMATED DISTANCES ***
 **********************************

 *** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR
FOLLOWING DISTANCES ***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA
SIGMA
    (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   Y (M)
Z (M)  DWASH
 -------  ----------  ----  -----  -----  ------  ------  ------
  ------  -----
     25.  0.3859        5     1.0    1.0 10000.0    5.00   11.83
2.03    NO
    100.  0.4248        5     1.0    1.0 10000.0    5.00   15.79
4.26    NO
    200.  0.2871        5     1.0    1.0 10000.0    5.00   20.94
6.89    NO
    300.  0.1959        5     1.0    1.0 10000.0    5.00   25.96
9.15    NO

 MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    25. M:
     59.  0.4576        5     1.0    1.0 10000.0    5.00   13.69
```

```
3.13    NO

  DWASH=   MEANS NO CALC MADE (CONC = 0.0)
  DWASH=NO MEANS NO BUILDING DOWNWASH USED
  DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
  DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
  DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

 ********************************
 *** SCREEN DISCRETE DISTANCES ***
 ********************************

 *** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR
FOLLOWING DISTANCES ***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA
SIGMA
    (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   Y (M)
Z (M)  DWASH
 -------  ----------  ----  -----  -----  ------  ------  ------
  ------  -----
    145.  0.3606        5     1.0    1.0 10000.0    5.00   18.12
5.48    NO

  DWASH=   MEANS NO CALC MADE (CONC = 0.0)
  DWASH=NO MEANS NO BUILDING DOWNWASH USED
  DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
  DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
  DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

      ***************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ***************************************

  CALCULATION        MAX CONC    DIST TO   TERRAIN
   PROCEDURE        (UG/M**3)    MAX (M)    HT (M)
 --------------    -----------   -------   -------
 SIMPLE TERRAIN     0.4576           59.        0.


 ****************************************************
 ** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
 ****************************************************
```

Olivenhain Trunk Sewer Improvement Project - Sensitive Receptor Impact Analysis					
DPM (PM10) Cancer Risk Calculations					
			1 Year Exposure	1 Year Exposure	70 - Year Exposure
			Adult	Children	80% Percentile
CPF	Cancer Potency Factor	$(mg/kg\text{-}day)^{-1}$	1.1	1.1	1.1
C_{air}	Concentration	$\mu g/m^3$	0.19959	0.19959	0.19959
DBR	Daily Breathing Rate	L/kg-day	302	581	302
A	Absorption Factor	unitless	1	1	1
EF	Exposure Frequency	days	250	250	250
ED	Exposure Duration	years	1.5	1	70
AT	Averaging Time	days	25550	25550	25550
	Dosage - Inhalation		8.8468E-07	1.13466E-06	4.12851E-05
	Cancer Risk		9.73148E-07	1.24812E-06	4.54136E-05
	Cancer Risk = CPF*Dosage				
	Dose Inhalation = Cair*DBR*A*EF*ED*10^{-6}/AT				

NOTES:

The following equations were used to calculate the cancer risk due to inhalation using the modeled DPM concentrations:

Cancer Risk = Inhalation potency factor * Dose Inhalation (1)

where: Inhalation potency factor = 1.1 (mg/kg-day)-1 for DPM

and:

Dose Inhalation = Cair*DBR*A*EF*ED*10-6 / AT (2)
where: Cair = concentration of DPM in µg/m3 (obtained by running EPA SCREEN3View Model (Lakes Environmental Version 3.5)
DBR = breathing rate in liter per kilogram of body weight per day
A = inhalation absorption factor (1 for DPM)
EF = exposure frequency in days per year
ED = exposure duration in years
AT = averaging time period over which exposure is averaged in days (25,550 days for 70 years)
For the derived (adjusted) cancer risk calculation, the breathing rate is equal to the 80th percentile or 302 liters per kilogram of body weight per day (L/kg-day) per CARB and OEHHA guidance (CARB and OEHHA 2003).

The DPM (PM10) emissions for all emission sources, during the 250 workday Access Construction period were summed. The equipment and vehicles included in this total are:

Offroad vehicles and equipment = 0.5540 lbs/day PM10
Onroad-onsite vehicles and equipment = 0.1073 lbs/day PM10
Vendors-onsite = 0.1248 lbs/day PM10/2 = 0.0624 lbs/day PM10 (used 1/2 assuming 50% onsite & 50% offsite)
Employee Commute & onsite = 0.0441 lbs/day PM10/2 = 0.0221lbs/day PM10 (used 1/2 assuming 50% onsite & 50% offsite)
Total DPM (PM10) = 0.7458 lbs/day PM10

An annualized 1-hour emission rate of 1.727 x 10-4 grams per second (g/s) was calculated as follows:
Total PM10 during access construction = 0.7458 lbs/day PM10
0.7458 lbs/day x 250 work days/year = 186.45 lbs/year PM10 during access construction
186.45 lbs/year × 0.0644 × 453.6 g/lb ÷ 8760 hours/year÷ 3600 seconds/hour =
1.727 x 10-4g/second, (0.0001727 g/second)

The emissions from heavy-duty equipment and trucks are represented by a single volume source with an area of 0.50 acres, (2,025.29 m2, or 45.0 meters on a side)
The entire project is 4 miles long, and is etimated to interact or disturb approximateky 338,000 square feet or 7.759 acres. Therefore 0.50 represents 0.0644 fraction of the project area
The factor 0.0644 will be used to determine the representative portion of the project this 0.50 acre volume source is for the entire project access construction area.

SCREEN3 Model Run Results

Simple Terain Inputs:

EMISSION RATE (G/S) = 0.172700E-03
SOURCE HEIGHT (M) = 5.0000
INIT. LATERAL DIMEN (M) = 10.4600
INIT. VERTICAL DIMEN (M) = 1.1600
RECEPTOR HEIGHT (M) = 2.0000
URBAN/RURAL OPTION = RURAL
THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS
ENTERED.
BUOY. FLUX = 0.000 M**4/S**3; MOM. FLUX = 0.000 M**4/S**
2.
*** STABILITY CLASS 5 ONLY ***FOLLOWING DISTANCES ***

Output Data from SCREEN3 model run

	Sigma Z	Distance	Downwash	Concentration	Stability Class	U10M	USTK	Mix Height	Plume Height	Sigma Y
	(M)	(M)	__	UG/M^3	__	(M/S)	(M/S)	(M)	(M)	(M)
	5.4800	145.0000	No	0.3606	5.0000	1.0000	1.0000	10000.0000	5.0000	18.1200
	2.03	25	No	0.3859	5.0000	1.0000	1.0000	10000.0000	5.0000	11.83
	4.26	100	No	0.4248	5.0000	1.0000	1.0000	10000.0000	5.0000	15.79
Sensitive Receptor Range	6.89	200	No	0.2871	5.0000	1.0000	1.0000	10000.0000	5.0000	20.94
	9.15	300	No	0.19959	5.0000	1.0000	1.0000	10000.0000	5.0000	25.96
Max. 1-hour Concentration	3.13	59	No	0.4576	5.0000	1.0000	1.0000	10000.0000	5.0000	13.69
	Sensitive Receptor located at 3535 Manchester Ave., Encinitas, CA 92007:									
	Belmont Village Senior Living Community									
	Distance range to volume source ranges 200 to 300 meters									