Air Quality, Greenhouse Gas, and Health Risk Assessment Report World Logistics Center City of Moreno Valley, California

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ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
AAF	Age-specific adjustment factors for estimating cancer risk
AB	Assembly Bill
ACES	Advanced Collaborative Emission Study
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
ASF	Age sensitivity factor
C/R	concentration/response function
CalEEMod	California Emissions Estimator Model
CALINE4	California Line Source Model
CEQA	California Environmental Quality Act
CO	carbon monoxide
CO_2	carbon dioxide (a greenhouse gas)
CO_2e	carbon dioxide equivalent
CPR	Cancer potency factor
DBR	Daily breathing rate
diesel PM	diesel particulate matter
ED	Exposure duration
EF	Exposure frequency
EMFAC	ARB Emission Factor Model
EPA	United States Environmental Protection Agency
HEI	Health Effects Institute
LOS	Level of Service
LST	Localized Significance Threshold
MATES	Multiple Air Toxics Exposure Study
$MMTCO_2e$	million metric tons of carbon dioxide equivalent
$MTCO_2e$	metric tons of carbon dioxide equivalent
N_2O	nitrous oxide (a greenhouse gas)
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NTDE	New technology diesel engine
OEHHA	California Office of Environmental Health and Hazards Assessment
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ppm	parts per million
ppt	parts per trillion

REL	reference exposure level
ROG	reactive organic gases
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SO_x	sulfur oxides
TAC	toxic air contaminant
TAH	time at home factor
TDE	Traditional diesel engine
TOG	total organic gases
VOC	volatile organic compounds
WLC	World Logistics Center

EXECUTIVE SUMMARY

Project Summary

A new Specific Plan is proposed to govern development of the 2,610-acre World Logistics Center (WLC) project located in the City of Moreno Valley in Riverside County, California. The WLC Specific Plan proposes a master-planned logistics campus to include up to 40.4 million square feet (sq ft) of high-cube logistics warehousing, up to 200,000 sq ft of light logistics uses, a site for logistics support uses, and 74.3 acres of Open Space in the southwest corner of the project site adjacent to Mount Russell and the Lake Perris Recreational area. The total development is 40.6 million sq ft. The logistics support (i.e., alternative fueling station) is included within the high-cube logistics development area. No development is proposed in the open space area within the Specific Plan.

Air Quality Improvement in the South Coast Air Basin

The project is located within the South Coast Air Basin (air basin). The air quality in the air basin has been steadily improving over the last couple of decades as measured in air pollutant concentrations by the South Coast Air Quality Management District (SCAQMD). A concentration of a pollutant is a measure of the amount of a pollutant in the air. Some pollutants are measured in parts per million (ppm) and some are measured in micrograms per cubic meter ($\mu g/m^3$).

When sensitive people such as children, pregnant women, and the elderly, breathe in air pollutants, they can experience health effects. These health effects differ based on the type of pollutant, the length of time someone is exposed, any pre-existing health condition, and the concentration of the pollutant. In general, health effects can include coughing, sore throat, chest pain, difficulty breathing, reduced lung function, asthma aggravation, chronic lung diseases, cancer, and lung damage.

Federal, state, and local agencies enact rules and regulations to reduce air pollutant emissions to protect the health of sensitive individuals. The United States Environmental Protection Agency (EPA) sets federal ambient air quality standards and the California Air Resources Board (ARB) sets state ambient air quality standards to protect public health and welfare. When concentrations of pollutants exceed the standards, sensitive individuals may experience health effects.

Ozone is a pollutant formed in the air when emissions of volatile organic compounds (VOC) and nitrogen oxides (NO_x) combine in the presence of sunlight. Ozone is a pollutant of concern in the air basin because ozone levels exceed the ozone standards. As shown in Exhibit 1, ozone concentrations in the basin have generally decreased over the past twenty years for 1-hour and 8-hour averaging time periods as defined by the State and/or federal ambient air quality standards. The 1-hour and 8-hour concentration refers to the average of the air concentration over a 1-hour and 8-hour exposure time period, respectively.

As shown in Exhibit 1, the main source of NO_x and VOC emissions in the basin are from on-road motor vehicles, not from the operation of buildings. Although vehicle miles traveled in the basin continue to increase, ozone concentrations are decreasing because of the mandated controls on new motor vehicles and the replacement of older polluting vehicles with cleaner and lower-emitting vehicles. VOC and NO_x are ozone precursors; therefore, if those emissions decrease, it follows that ozone concentrations would also decrease. Emissions of NO_x in the air basin are expected to decrease in the future, as shown in Exhibit 1.

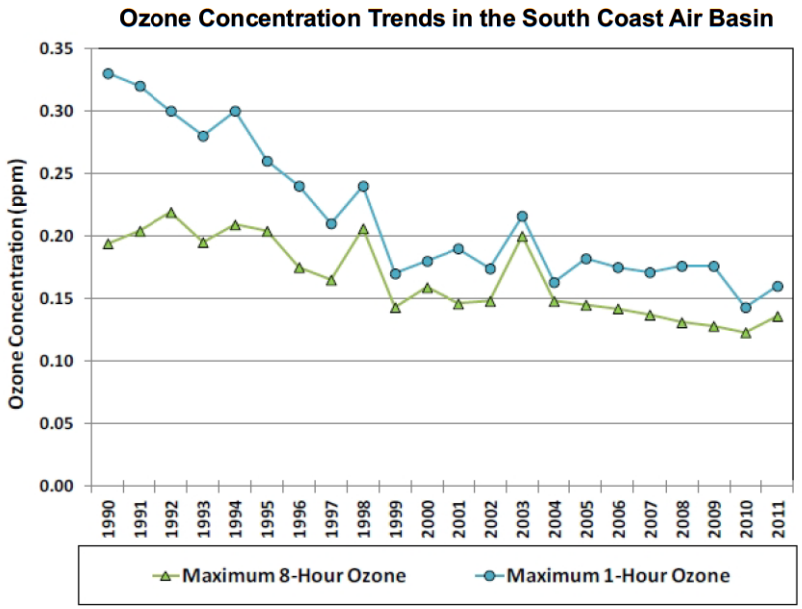
Another pollutant of concern is particulate matter (PM). PM is a mixture of small particles and liquid droplets suspended in the air. It is made up of components such as chemicals, metals, soil, or dust particles. The size of these particulates is linked to their potential for causing health problems. Ultrafine particles are less than 0.1 in micron in diameter, fine particles are less than 2.5 microns in diameter ($PM_{2.5}$), and coarse particles are larger than 2.5 microns and smaller than 10 microns in diameter (PM_{10})[1]. The ARB and EPA have established standards for $PM_{2.5}$ and PM_{10} but not for ultrafine particles. $PM_{2.5}$ and PM_{10} are a concern in the air basin because sometimes their concentrations exceed the standards. $PM_{2.5}$ is often used as a marker for toxic air pollutants such as diesel PM.

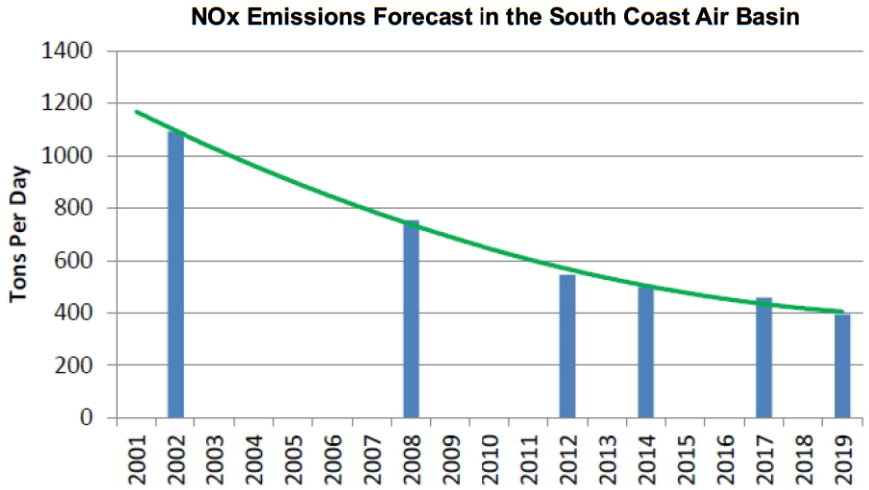
As shown in Exhibit 2 in the graph, *Particulate Matter Concentration Trends in the South Coast Air Basin*, PM_{10} and $PM_{2.5}$ annual concentrations have continued to decrease since 1990 within the air basin as a whole. Additionally, as shown in the chart, $PM_{2.5}$ *Emissions Forecast in the South Coast Air Basin,* emissions are expected to decrease and then level out after the year 2014.

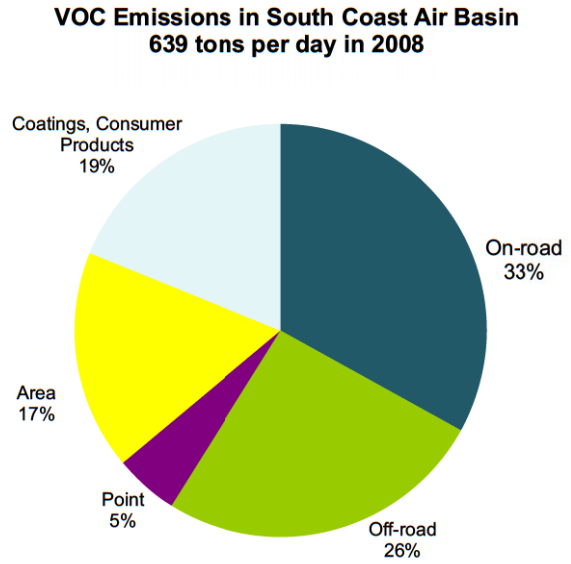
Exhibit 2 provides an additional view of $PM_{2.5}$ trends specifically in the Inland Empire. As shown, there is a marked decreasing trend in $PM_{2.5}$ concentrations in Riverside-Rubidoux, Fontana, and San Bernardino from 2001 to 2012 and at Mira Loma from 2006 to 2012. The relevance of these trends is that $PM_{2.5}$ levels have displayed a decreasing trend in the Inland Empire despite increases in urban development including the development of large warehouse complexes since 2001.

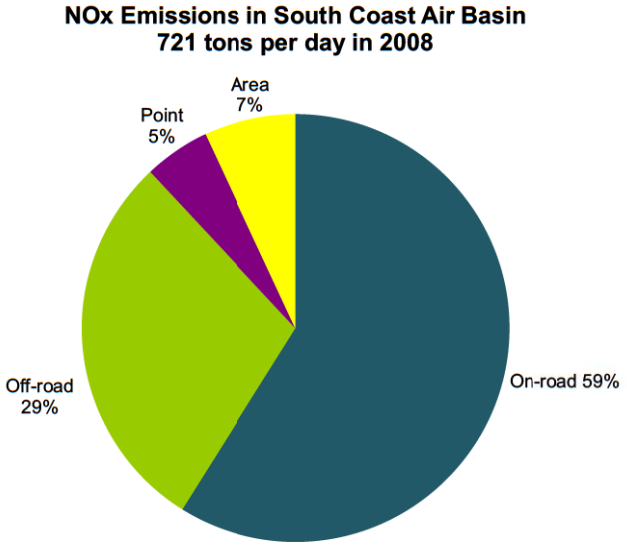
Part of the success in the decreasing NO_x and PM emissions are standards placed on motor vehicles by the ARB and the EPA. The figure below demonstrates the historical changes in U.S. heavy duty diesel emission standards for NO_x and PM. The project would incorporate mitigation that would require that the heavy duty trucks accessing the project to incorporate model year 2010 emissions standards, the most stringent emission standards adopted for these vehicles. As shown below, the model year 2010 standards are only a fraction of the older standards, at 0.2 grams per horsepower hour (g/HP-hr) of NO_x and 0.01 g/HP-hr of PM. The text in blue represents the off-road construction standards; 2011 is Tier 4 Interim and 2014 is Tier 4 Final. As part of the project's mitigation, the project's construction off-road equipment greater than 50 horsepower must meet Tier 4 engine standards for off-road equipment.

[1] One micron is equal to 0.00004 inches









Source: South Coast Air Quality Management District 2012 (Air Quality Management Plan).

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Exhibit 1
Ozone Trends and Ozone Precursor Emissions in South Coast Air Basin

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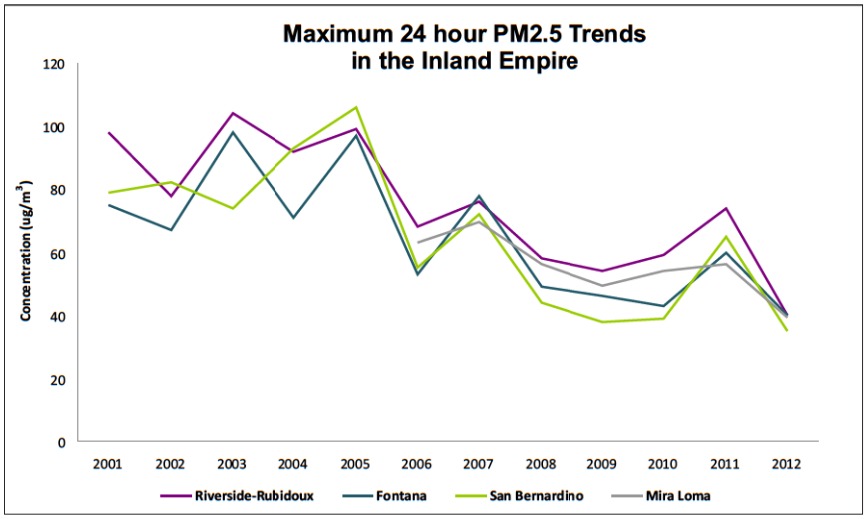

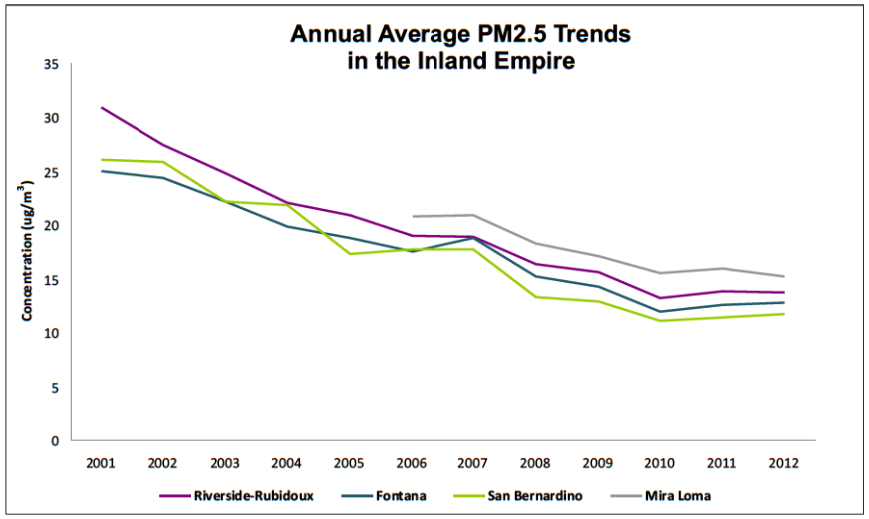

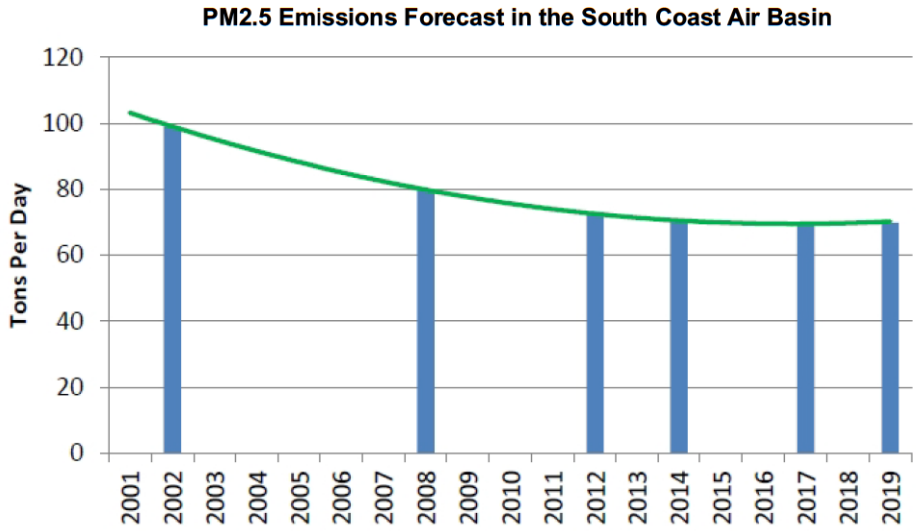

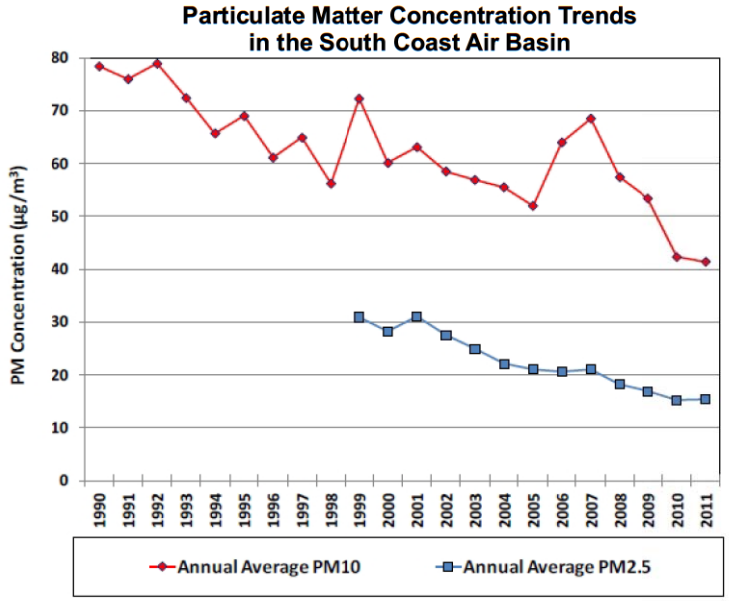

Source of PM2.5 Trends in the Inland Empire: Created by FirstCarbon Solutions using data from the California Air Resources Board, Top 4 Summary, 2013.
Source of PM2.5 Emissions Forecast and Particulate Matter Trends: South Coast Air Quality Management District, 2012 Air Quality Management Plan.

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Exhibit 2
Particulate Matter Trends and Emissions Forecast

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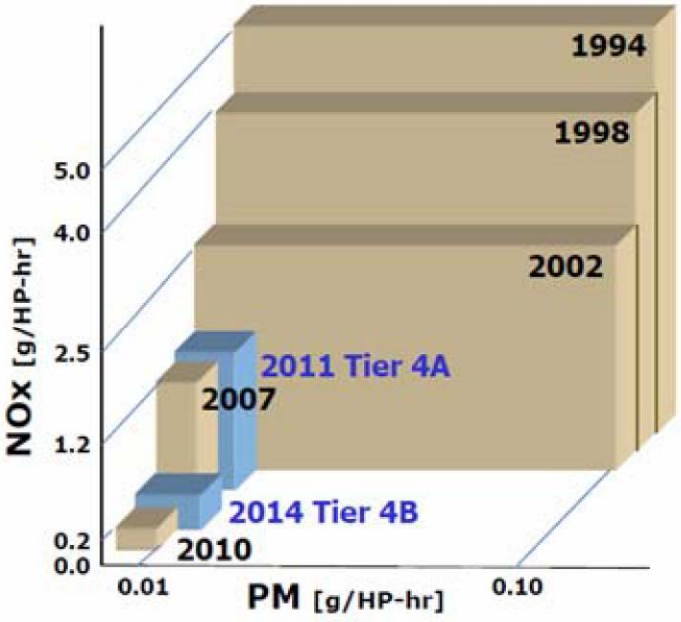
Changes in U.S. Heavy Duty Diesel NO_x and PM Emission Standards



Source: Wall and McDonald 2012

Regional Air Pollutant Emissions from Project

The construction and operation of the project would generate various sources of air pollutant emissions. During construction, there would be exhaust and dust emissions from the onsite construction equipment, worker vehicles, and haul trucks. During operation, there would be exhaust emissions from the heavy-duty trucks that would bring goods and materials to and from the warehouses, as well as worker vehicles, and onsite equipment. There would also be dust emissions from travel on paved roads.

After mitigation, the construction-related regional emissions of VOC, NO_x, CO, and PM_{10} as estimated in the revised analysis are still significant. However, after mitigation, $PM_{2.5}$ emissions have decreased to less than significant. Mitigated average daily emissions of VOC, NO_x, CO, and $PM_{2.5}$ have decreased by approximately 100, 600, 500, and 25 pounds per day, respectively from the levels shown in the DEIR. The average PM_{10} emissions increased slightly by approximately 35 pounds per day, primarily because of the inclusion of unpaved road dust in the emissions estimates.

These construction emission changes resulted primarily because:

1. The construction period for the project has increased from 10 years to 15 years resulting in decreased construction activity levels (if market conditions further slow project development, impacts would be no greater than described in this analysis),
2. Tier 4 equipment is now applied as mitigation; and

3. A newer version of the CalEEMod land use emissions model was used to estimate construction emissions.

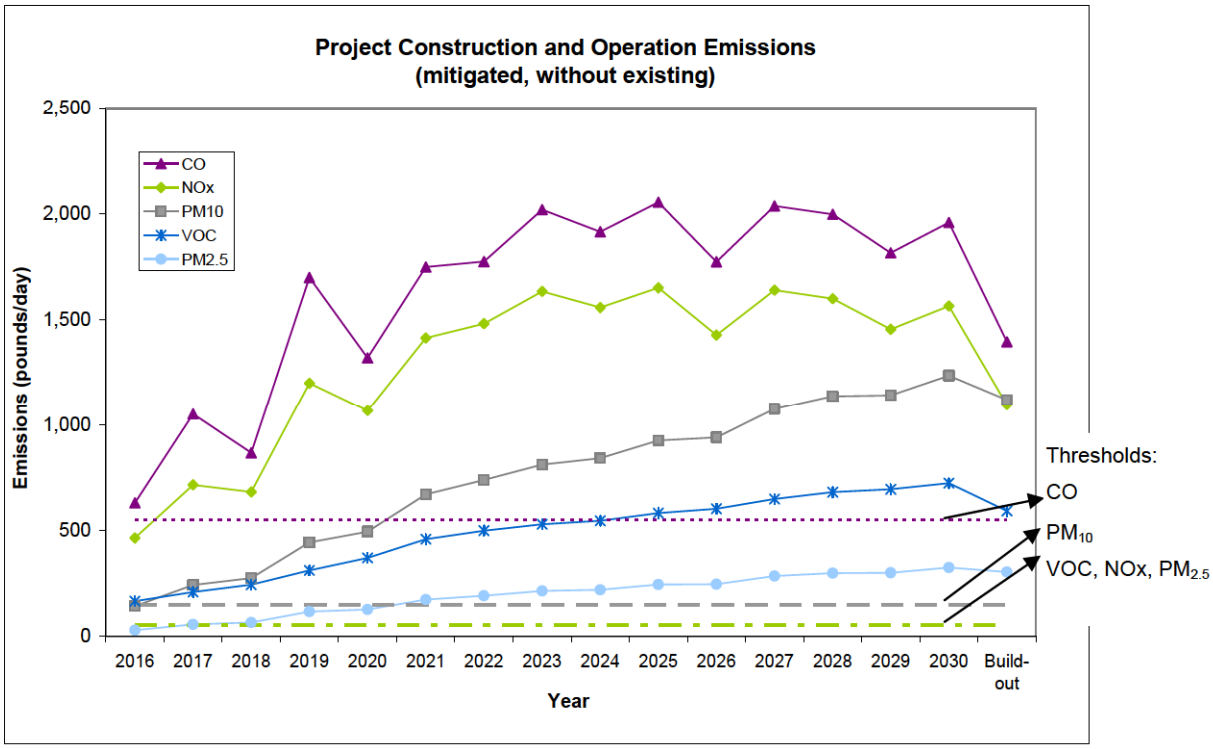
Mobile sources constitute a major portion of the emissions from operation of the project. In the DEIR, the emissions from the project's mobile sources were estimated using the CalEEMod2011model (which uses emission factors from EMFAC2007). On December 30, 2014, the ARB released the EMFAC2014 mobile source emission factor. EMFAC2014 represents ARB's current understanding of motor vehicles arrived at from extensive vehicle testing, emission control testing, and implementation of mandated mobile source emission regulations. This revised assessment applied the EMFAC2014 emission model to estimate mobile source emissions from the project's motor vehicles.

Operational emissions at buildout for the revised analysis as compared with the estimates in the Draft EIR are as follows:

1. For the unmitigated emissions, VOC, NO_x, CO, and PM_{10} in the revised analysis are about 140, 1,800, 2,200, and 600 pounds per day lower than in the Draft EIR, respectively.
2. Mitigation reduces NOx by approximately 200 pounds per day at buildout. Mitigated operational emissions of VOC, NOx, CO, and PM10 are approximately 140, 2000, 2000, and 600 pounds per day lower than in the Draft EIR, respectively.
3. Emissions of $PM_{2.5}$ in the revised analysis have increased by approximately 150 pounds per day in both unmitigated and mitigated scenarios because of the use of updated ARB mobile source emission factors.

The revised operational emissions of VOC, NOx, CO, and PM_{10} are lower because of the following: a reduction in the project size (from 41.6 million sq ft to 40.6 million sq ft); the emission factors for the mobile trucks and vehicles have been updated to the ARB's newest emission factors; and the project's vehicle miles traveled (VMT) decreased. In the Draft EIR, the VMT at buildout for heavy duty trucks was 730,100 miles per day and in the revised analysis, the VMT for diesel vehicles is 420,400 miles per day; therefore, the VMT for diesel vehicles decreased by approximately 309,700 miles per day. The VMT decreased because the analysis in the Draft EIR assumed a conservative but arbitrary average of 50 miles per trip for all heavy duty trucks, while the revised analysis computed the VMT using forecast traffic volumes from a detailed regional transportation model for nearly 500 freeway and roadway segments represented in detail in the Traffic Impact Analysis. The VMT for light duty vehicles increased by approximately 64,600 miles: in the Draft EIR, the VMT for light duty vehicles was 549,700 miles per day and in the revised analysis, the VMT for gasoline vehicles is 614,300 miles per day. To put the revised VMT in terms of an average trip rate, it would be 14.9 miles per trip (1,034,750 miles/day divided by 69,549 trips/day) on average, which includes all vehicle types. An average trip rate for the diesel vehicles would be approximately 35.3 miles per trip (420,440 miles/day divided by 11,908 trips/day). An average trip rate for the light duty vehicles would be approximately 10.7 miles per trip (614,310 miles/day divided by 57,641 trips/day).

The mitigated combined construction and operational emissions (without the existing project site emissions subtracted) are shown in the chart below. All emissions (with the exception of sulfur oxides, which are negligible) would exceed the SCAQMD's regional significance thresholds. (Also, PM2.5 during construction only would be less than significant.) The combined operational and construction CO, NOx, PM_{10}, VOC, and $PM_{2.5}$ emissions (except sulfur oxides) would exceed the thresholds.



Localized Air Quality Analysis

The analysis of localized air quality impacts determines the potential of the project to violate any air quality standard, contribute substantially to an existing or projected air quality violation, or expose nearby sensitive receptors to substantial pollutant concentrations. This analysis is commonly referred to as a Localized Significance Threshold (LST) analysis and considers the emissions that are generated locally from all construction and operational activities while within or along the boundaries of the project. Based on estimates of project local emissions and their corresponding air quality impacts, the following is a summary of the project's localized impact analysis:

- The highest localized air quality impacts would occur at the existing residences within the project boundaries.
- After application of mitigation, the project impacts would not exceed any SCAQMD localized significance threshold at any residential or sensitive receptor located outside of the project

boundaries for any of the localized air quality assessments evaluated in this report for the assessment years 2012, 2021, 2027, and long term planning year 2035.

- After application of mitigation, project impacts would exceed the SCAQMD localized significance thresholds for PM_{10} during operation under the Project Phase 1 (2012) condition at the existing residences located within the project boundaries, assuming Phase 1 of the Project would be fully in operation in the existing year 2012.
- After application of mitigation, project impacts would exceed the SCAQMD localized significance for PM_{10} during operation under the Project Phase 1 and Phase 2 Full Buildout (2012) condition at the existing residences located within the project boundaries, assuming that the project would be fully operational in the existing year 2012.
- After application of mitigation, project impacts would exceed the SCAQMD localized significance thresholds for PM_{10} concentrations at the existing residences located within the project boundaries during the year 2021 when the project construction would take place at the western portion of the project adjacent to the existing residences across Redlands Boulevard; the significance thresholds would not be exceeded at any sensitive receptor located outside of the project boundary
- After application of mitigation, project impacts would exceed the SCAQMD localized significance thresholds for PM_{10} at the existing residences located within the project boundaries in 2027, when construction activities would take place along the east portion of the project adjacent to the existing residences across Gilman Springs Road; the significance thresholds would not be exceeded at any sensitive receptor located outside of the project boundary
- During the long term planning year with the project fully operational in 2035, project impacts would exceed the SCAQMD localized significance thresholds for PM_{10} concentrations at the existing residences located within the project boundaries during operations under the proposed development schedule; the significance thresholds would not be exceeded at any sensitive receptor located outside of the project boundary

Cancer Risk from Project

Diesel particulate matter (diesel PM) is the primary pollutant of concern regarding the emissions of toxic air contaminants (TAC) from the project. A TAC is a chemical that is present in the atmosphere in small quantities but, nonetheless, can result in cancer health risks and non-cancer health hazards. The ARB, after a 10-year research investigation identified diesel PM as a carcinogenic substance. Diesel PM is a complex mixture of perhaps a few hundred chemical components. Even though diesel PM is comprised of numerous compounds, cancer risk from the inhalation of the diesel PM as a whole will outweigh the cancer risk associated with the individual chemical components (ARB 2005b).

In January 2015, the results of a 5½-year study, led by the Health Effects Institute (HEI 2015; see Appendix H for the study), were published regarding the health effects and cancer risk of new technology diesel exhaust. The HEI study distinguished between older traditional diesel engines (exhaust from engines that are older than model year 2007) and new technology diesel exhaust (exhaust from engines that are model year 2007 or newer). New technology diesel is 90 to 99 percent cleaner than traditional diesel exhaust. The principal implication of the HEI study to the project is that project mitigation requiring the application of Model Year 2010 engines as well as the use of Tier 4-compliant off-road construction equipment are not expected to result in emissions that would be associated with the formation of cancer in exposed individuals and thus result in a less than significant health risk impact.

HEI is an independent, non-profit research institute funded by the EPA and industry, and supported by the ARB, the U.S. Federal Highway Administration, the U.S. Department of Energy, Engine Manufacturers Association, American Petroleum Institute and the Coordinating Research Council. The purpose of the HEI is to provide credible, high quality science on air pollution and health.

The Draft EIR contained a health risk assessment prepared before the release of the HEI study. As a result, the Draft EIR analysis assumed that any diesel exhaust, including that from new technology, could cause cancer. For comparison to the Draft EIR, this revised assessment analyzed the health risks that would occur assuming the new technology could cause cancer, which, as noted above, it does not. This revised assessment applied the most current guidance from the California Office of Environmental Health Hazards Assessment (OEHHA) that recommends a 30-year exposure duration and the incorporation of age-sensitivity factors to account for the increased sensitivity of young children to exposures to toxics air contaminants. The most current guidance from the OEHHA is referred to in this revised assessment as the "Current OEHHA Guidance." This revised assessment is provided only for informational purposes but does not reflect the health risks associated with the World Logistics Center project, since the most recent science associated with cancer risk (the HEI study) indicates that new diesel technology does not result in cancer.

During construction, the diesel powered vehicles and equipment would emit diesel PM. During operation, the diesel trucks that would access the project site would also emit diesel PM. In addition, diesel PM would also be emitted by standby emergency generators and yard service trucks in the unmitigated case (diesel prohibited with mitigation). Gasoline fueled vehicles emit organic gases, some of which are classified as TACs. This analysis determined the cancer risk and non-cancer hazards from exposure to those air toxics at sensitive/residential receptors, worker receptors, and school sites in the area. In the Draft EIR, only impacts from diesel PM were assessed; for the revised analysis, total organic gases were also included to analyze acute non-cancer hazards from diesel and gasoline powered vehicles.

It should be noted further that the geographical scope of the health risk analysis originally examined in the Draft EIR was expanded in this revised analysis to cover an area of approximately 3,500 square

miles that extended from Palm Springs to the ports of Los Angeles and Long Beach. The geographical scope contained in this revised analysis is about 40 percent greater than the area encompassed in the Draft EIR and was required to analyze project impacts all the way from the project site to the ports of Los Angeles and Long Beach.

Based on the magnitude of diesel PM emissions from the construction and operation of the project, after mitigation the SCAQMD cancer risk significance threshold of 10 in one million would be exceeded at 3 of the existing residences located within the boundary of the project but not exceeded at any receptor located outside of the project boundary. Even so, this revised health risk assessment is being provided to document the cancer-related impacts of the proposed project in the assumption that new technology diesel exhaust causes cancer, contrary to what was found by the HEI study, as discussed in more detail below in Appendix H. Through mitigation, new technology diesel engines are required for the project. The revised mitigation requires that all diesel trucks accessing the project during operation be model year 2010 or newer and that all on-site construction equipment be Tier 4. Although this means that there will be no cancer risk resulting from diesel exhaust, the preceding air quality analysis applies the updated OEHHA health risk methodology for informational purposes to analyze the health risks that would occur if diesel exhaust could cause cancer.

Cancer risks were also assessed for worker receptors and school-age children located at nearby schools with the application of the "Current OEHHA Guidance" with the assumption that new technology diesel exhaust causes cancer, contrary to the results from the HEI health study. After application of mitigation, the SCAQMD cancer risk significance threshold would not be exceeded for any worker located inside of outside of the project boundary and for any school-age child located at nearby schools.

Note further that after application of mitigation, the cancer risk burden is estimated at 0.10 based on the "Current OEHHA Guidance" which is less than the SCAQMD cancer burden significance threshold of 0.5, based on the assumption that diesel exhaust can cause cancer. Therefore, the project would not exceed the SCAQMD's cancer burden significance threshold.

In addition, the construction and operation of the project would not exceed the SCAQMD significance threshold for chronic and acute non-cancer hazards at any receptor location within or surrounding the project site.

Finally, because the project level of significance for health risks is not significant on its own, the project would also not result in a cumulatively considerable impact.

Greenhouse Gas Emissions from Project

Greenhouse gas emissions are of concern because the accumulation of these gases in the atmosphere can contribute to climate change. California's Assembly Bill (AB) 32 requires that the State reduce its greenhouse gas emissions to 1990 levels by the year 2020. One of the ways California will reduce these emissions is through the California Cap-and-Trade Program. This program places an emission cap on certain sectors (e.g., electricity generation, petroleum refining, cement production). The cap provides regulatory certainty of future emissions since regulated entities will not be permitted to emit greenhouse gas emissions that exceed the cap. The WLC project emissions sources covered by the Cap-and-Trade Program include fuel combustion sources (motor vehicle and truck exhaust, construction exhaust, natural gas, onsite equipment) and electricity generation. The project emissions sources not covered by the Cap-and-Trade Program include waste decomposition in landfills, land use change, and refrigerant leakage.

The analysis in the Draft EIR did not divide the greenhouse gas emissions into AB 32 capped and uncapped emissions. The Draft EIR compared the total project emissions to the SCAQMD draft industrial threshold for greenhouse gas emissions of 10,000 metric tons of carbon dioxide equivalents ($MTCO_2e$) per year and found the emissions to be significant and unavoidable even after mitigation. However, the revised analysis divides the greenhouse gas emissions into capped and uncapped and compares the uncapped emissions with the SCAQMD's significance threshold.

The SCAQMD has recognized that the greenhouse gas emissions associated with capped sources should not be counted for the purpose of determining what the greenhouse gas emissions are for facilities that will use electricity generated elsewhere. See the following negative declarations adopted by the SCAQMD:

- Ultramar Inc., Wilmington Refinery Proposed Cogeneration Project, SCH No. 2012041014 (SCAQMD 2014)
- Phillips 66 Los Angeles Refinery Carson Plant - Crude Oil Storage Capacity Project, SCH No. 2013091029 (SCAQMD 2014).

A summary of the greenhouse gas emissions as estimated in the Draft EIR and the FEIR is shown in Table 1. The analysis in the FEIR divides the AB 32 capped and uncapped emissions and compares the uncapped emissions to the SCAQMD significance threshold. As shown in the table, after mitigation, the AB 32 uncapped emissions do not exceed the SCAQMD's threshold of 10,000 $MTCO_2e$.

Table 1: Summary of Greenhouse Gas Emissions Results

Year at Buildout	Source of Operation Emissions*	Greenhouse Gas Emissions ($MTCO_2e$/year)			
		Unmitigated		Mitigated	
		DEIR	FEIR	DEIR	FEIR
2012	Worst-Case Total	751,787[(a)]	509,247[(c)]	not estimated	not estimated
2022 for DEIR 2035 for FEIR	Total	721,034[(b)]	415,991**	665,321[(e)]	385,599**
	AB 32 Capped	**	396,754[(d)]	**	379,824[(f)]
	AB 32 Uncapped	**	19,237[(d)]	**	5,775[(f)]

Notes:
DEIR = World Logistics Center Project Draft Environmental Impact Report (February 2013)
FEIR = This report was prepared for the World Logistics Center Project Final Environmental Impact Report
* = The emissions are operational emissions and include the construction emissions averaged over 30 years.
** = The total emissions are not applicable for the FEIR because the emissions are divided into AB 32 capped and uncapped emissions. A division of the capped and uncapped emissions was not done in the DEIR.
Sources:
[(a)] DEIR Table 4.7.F
[(b)] DEIR Table 4.7.G
[(c)] Table 74 of this report
[(d)] Table 75 of this report
[(e)] DEIR Table 4.7.I
[(f)] Table 79 of this report

The emissions as estimated in the Final EIR are lower mainly because of the following reasons:

1. Motor vehicle emissions were reduced by about 163,000 $MTCO_2e$/year (433,300 to 270,400, mitigated) because of the reasons as specified above for the operational regional emissions analysis regarding updated emission factors and vehicle miles traveled.
2. Operational waste emissions were reduced by approximately 135,900 $MTCO_2e$/year unmitigated (153,300 to 17,400) and 95,400 MTCO2e/year mitigated (99,700 to 4,300) because the new version of CalEEMod (2013) lowered its operational waste generation rates for warehouse development.

SECTION 1: INTRODUCTION

1.1 - Purpose and Methods of Analysis

The following air quality, greenhouse gas, and health risk analysis was prepared to evaluate the estimated criteria air pollutant, greenhouse gas, and toxic air contaminant emissions generated from the World Logistics Center (project) and the level of impact to air resources in the project area those emissions would cause. This assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.). The methodology follows South Coast Air Quality Management District (SCAQMD) and other appropriate agency recommendations for quantification of emissions and evaluation of potential impacts to air resources. This analysis also addresses the recommendations in the SCAQMD's comment letter in response to the Notice of Preparation for this project.

1.2 - Revisions to Report

In response to comments received on the Draft Environmental Impact Report (EIR) and other relevant methodological updates, the following revisions have been made to the January 2013 Air Quality, Greenhouse Gas, and Health Risk Assessment report that was submitted with the Draft EIR for this project. The changes are summarized as follows.

1.2.1 - General

- Mitigation measures were refined and new measures were added in response to comments.
- A discussion of ultrafine particles was added to the report in response to comments; however, emissions were not estimated in either the Draft EIR or the Final EIR. This is because there are no ambient air quality standards or thresholds for ultrafine particles, the EPA and the SCAQMD both indicate that more research is needed before that occurs, and there are no accepted quantification methods at this time.

1.2.2 - Construction Emissions

- **New Version of CalEEMod.**[2] The construction emissions in the Draft EIR were estimated with the approved model at the time, CalEEMod version 2011.1.1, which uses emission factors from the outdated OFFROAD2007[3] and EMFAC2007[4] emission models. Since publication of the Draft EIR, a new version of CalEEMod was released, version 2013.2, which uses construction emission factors from OFFROAD2011 and mobile source emissions from

[2] CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas emissions associated with both construction and operations from a variety of land use projects. The model quantifies direct emissions from construction and operations (including vehicle and off-road equipment use), as well as indirect emissions, such as greenhouse gas emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use. (Excerpt from www.caleemod.com)

[3] OFFROAD is a model developed by the California Air Resources Board to estimate emissions from off-road sources.

[4] The EMFAC series of models are the California Air Resources Board's tool for providing emission factors.

EMFAC2011. The new version of CalEEMod has lower construction equipment load factors,[5] which are also used in this revised analysis.

- **Extended Construction Period.** In the Draft EIR, construction was assumed to occur over 10 years; in this revised analysis, construction is assumed to occur over 15 years.
- **Refined Building Phasing.** The Draft EIR had all building construction activities lumped together. For better understanding and clarification and to more accurately describe construction, construction activity was subdivided in this revised analysis into the following sub-phases: building-concrete; building-wet utilities; building-electrical; and building-landscaping.
- **Mass Grading Duration.** In the Draft EIR, grading covered 12 months (for the unmitigated version) and 24 months (for the mitigated version). For this revised analysis, each planning area comprising the project is graded separately over a total of approximately 58 months to reflect more realistic product absorption rates and construction timelines. This results in overall project phasing extending to 2030.
- **Onsite On-road Vehicle Emissions.** Onsite travel and idling emissions from concrete trucks, haul trucks, service/support trucks, and delivery trucks were not included in the Draft EIR but are included for this revised analysis.
- **Equipment for Grading.** The construction equipment and haul truck deliveries for the mass excavation and fine grading phases now vary by planning area (since there are varying sizes of each planning area), whereas in the Draft EIR, one equipment fleet was assumed for the mass grading and finish grading phases. In general, more equipment and vehicles are assumed for larger planning areas. In addition, because the grading duration has been extended and due to variations in the grading fleet based on the size of the planning area, less equipment is required. The overall construction equipment horsepower-hours per day have decreased in this revised analysis.
- **Onsite Equipment Fleet for Non-Grading Phases.** The duration for construction has been extended; therefore, the peak number of equipment has decreased.
- **Onsite Equipment Hours per Day.** This revised analysis assumes that the onsite equipment is in the on position for 10 hours per day as a project design feature. The analysis in the Draft EIR assumed 15 hours per day for the unmitigated version and 10 hours per day for the mitigated version. Because construction has been spread out over more time (15 years as opposed to 10 years), there is no need for the equipment to operate 15 hours per day; therefore, the equipment hours per day has been added as a project design feature that sets the maximum hours per day is 10 hours per day for the onsite equipment. This means that each piece of

[5] The load factor is the average power of a given piece of equipment while in operation compared with its maximum rated horsepower. A load factor of 1.0 indicates that a piece of equipment continually operates at its maximum operating capacity.

construction equipment is assumed to be on for 10 hours per day. This would also apply to the onsite equipment used during concrete pouring, which would most likely occur during the night (this is the same assumption that was used in the Draft EIR). The assumption that equipment would operate for 10 hours per day is conservative as the CalEEMod default data assumes construction equipment would be on for 6 to 8 hours per day. This is used to calculate maximum daily emissions for the regional and local analyses, because project emissions can occur on any day of the week.

- **Onsite Equipment Days per Week.** The analysis in the Draft EIR assumed that the maximum number of construction equipment operating for 10 hours per day would occur six days per week. Using six days per week for the given calendar, durations would extend construction longer than necessary. Upon additional review, it was determined that construction could be completed in either a shorter calendar duration (less months) or a less intensive work week (five days instead of six). A shorter work week (five days per week) was selected as the more realistic representation. However, the selection of either would result in the same annual average emissions.
- **Tier 4 Equipment.** The analysis in the Draft EIR assumed the CalEEMod default construction equipment tier levels for the unmitigated version and for the mitigated version, assumed Tier 3 engines for years prior to 2017, and Tier 3 with diesel particulate matter filters for years after 2017. This revised analysis also assumes the CalEEMod default for unmitigated emissions. However, the mitigated emissions in the revised analysis assume that all equipment over 50 horsepower are Tier 4 throughout the entire construction schedule (see Mitigation Measure 4.3.6.2A).
- **VOC Emissions from Striping Pavement.** The Draft EIR did not include these emissions because these emissions have been recently integrated within CalEEMod.
- **Addition of Black Carbon Emissions Estimation.** The analysis in the Draft EIR did not estimate black carbon emissions, which may contribute to climate change. This analysis includes an estimate of black carbon emissions.

1.2.3 - Operational Emissions

- **Trip Lengths for Motor Vehicle Emissions.** Forecasted traffic volumes contained in the revised Traffic Impact Analysis were used to estimate the project's regional motor vehicle emissions instead of the assumption of a conservative but arbitrary 50 miles per truck trip and the CalEEMod default trip lengths for local trips used in the Draft EIR. The traffic model provided estimates of project traffic volumes for nearly 500 individual freeway and surface street roadway segments segregated by vehicle class as passenger cars, light heavy duty trucks, medium heavy duty trucks, and heavy-heavy duty trucks. This revised methodology provides a much more accurate estimate of the project's operational mobile source vehicle miles traveled and resulting emissions.

- **Updated Emission Factors for Motor Vehicles.** In the Draft EIR, regional motor vehicle emissions were estimated by CalEEMod2011[6] and the localized and health risk analysis used EMFAC2011. On December 30, 2014, the ARB released an updated version of its emission factor model, EMFAC2014. The EMFAC2014 mobile source emission model was applied to all vehicle classes in the revised analysis.
- **Decrease in Operational Square Footage.** The number of vehicle trips was revised to reflect a reduction of the project size from 41.6 million sq ft to 40.6 million sq ft and the redistribution of land use building square footage between the high cube logistics warehouse and light logistics land uses. In addition, a fire station land use was also added.
- **Additional Onsite Emissions Sources.** Additional sources of operational emissions were also accounted for in this revised analysis including standby diesel generators, fork lifts, and yard trucks.
- **Onsite Existing Emissions Estimated.** The existing agricultural emissions were estimated in the revised analysis; they were not estimated in the Draft EIR.
- **New Waste Generation Factors.** The new version of CalEEMod has revised operational waste generation factors, which results in less estimated waste generated during operation and less greenhouse gas emissions.
- **Addition of Black Carbon Emissions Estimation.** The analysis in the Draft EIR did not estimate black carbon emissions, which may contribute to climate change. This analysis includes an estimate of black carbon emissions.

1.2.4 - Localized Significance Threshold (LST) Analysis

- **Revisions to the Traffic Volumes.** The operational assessment of localized impacts reflects the changes in traffic volumes associated with the reduction of project size and realignment of roadway segments that are within and along the project's boundaries.
- **Changes in Construction Schedule.** The analysis in the Draft EIR assumed a construction schedule of 10 years, whereas the revised assessment is based on a 15-year construction schedule. The changes in construction schedule by both year and location within the project were accounted for under the revised, extended project development schedule for estimating the emissions subject to the localized analysis.
- **Emission Source Configuration.** The analysis in the Draft EIR of the off-road construction equipment exhaust was represented in the air dispersion model as a large area source that covered the entire construction area. The revised analysis represents the off-road construction

[6] CalEEMod2011 used EMFAC2007 factors; in the analysis in the Draft EIR, EMFAC2011 factors were manually inserted for medium and heavy duty diesel trucks.

exhaust emission source as a series of contiguous volume sources, which is consistent with the SCAQMD methodology for localized analyses.

- **Operational Truck Idling.** The analysis in the Draft EIR assumed that each heavy-duty truck that accessed the site during operation idled for a total of 15 minutes per day. In this revised analysis, each truck was assumed to idle for 5 minutes per day (for the unmitigated scenario) consistent with the California Air Resources Board's Air Toxic Control Measure that limits such idling to 5 minutes and requirements as specified in the World Logistics Center Specific Plan. For the mitigated version for the health risk assessment, each truck was assumed to idle for 3 minutes per day.

1.2.5 - Health Risk Assessment

- **Revisions to the Construction Emissions**. This revised analysis reflected the numerous changes in construction equipment, load factors, schedule, and sequencing of construction by location within the project and enhanced mitigation measures as discussed above.
- **Revisions to Traffic Volumes**. This revised analysis made use of the revised traffic volume forecasts along nearly 500 individual roadway segments.
- **Expanded Model Extent.** The geographic extent of the air dispersion model domain was expanded to include freeway segments to the ports of Los Angeles and Long Beach.
- **Organic Gas Emissions Included.** The assessment of acute non-cancer hazards was expanded to examine the impacts of the toxic components of the project's total organic gas emissions from gasoline and diesel vehicles. The analysis in the Draft EIR focused on diesel PM to derive health impacts from the project.
- **Calculated Cancer Population Burden.** The health risk assessment was extended to include the computation of cancer population burden attributed to the project's diesel PM emissions.
- **Maximum Exposure Duration for Sensitive/Residential Receptors.** The analysis contained in the Draft EIR assumed a cancer risk exposure time period of 70 years for sensitive/residential receptors as representative of the "Former OEHHA Guidance." This revised assessment applied the cancer risk methodology recommended by the California Office of Environmental Health Hazards Assessment referred to in this assessment as the "Current OEHHA Guidance." This guidance incorporates the importance of early in-life exposures to toxics air contaminants through the use of age-specific sensitivity factors (i.e., weighting the effects of exposure more heavily for infants and teenagers than for adults) and considers an exposure duration of 30 years.
- **Maximum Exposure Duration for Worker Receptors.** This revised assessment examined a 25-year exposure duration for both onsite and offsite workers as recommended in the "Current OEHHA Guidance."

- **Include School Receptors.** The assessment of cancer risks at local school receptors is included in the revised analysis applying the "Current OEHHA Guidance."
- **Buffer Analysis.** The analysis compares the assessment of cancer risks with a buffer area of 250 feet (the current project design) and a buffer area of 1,000 feet between the project's operational emissions and the centerlines of Redlands Boulevard, Gilman Springs Road, Bay Avenue, and Merwin Street. This assessment is included as a response to comments on the Draft EIR
- **New Cancer Risk Study.** Inclusion of the results from the Health Effects Institute (HEI 2015) regarding the reduced impact of new technology diesel exhaust on cancer risk.

1.3 - Summary of Analysis Results

This expanded and revised analysis concurs with the determinations reached in the January 2013 report for the Draft EIR that the project's regional construction and operational air quality emissions, local air quality impacts, and health risk impacts are above the thresholds and remain significant and unavoidable after mitigation.

Less than Significant Impacts

Impact 4.3.5.1: The project would not create objectionable odors affecting a substantial number of people. **Less than significant impact.**

Impact 4.3.5.2: The project would not violate an air quality standard for carbon monoxide or contribute substantially to an existing or projected air violation for carbon monoxide. **Less than significant impact.**

Impact AIR-4b: The project would not expose sensitive receptors or workers to substantial toxic air pollutants that could result in health risk impacts or result in a cumulatively considerable health risk impact. **Less than significant after impact (EIR impacts 4.3.6.5 and 4.3.7.4).**

Impact 4.7.5.1: The project would generate direct and indirect greenhouse gas emissions; however, these emissions would not result in a significant impact on the environment. **Less than significant impact.**

Impact 4.7.5.2: The project would not conflict with an applicable plan, policy or regulation of an agency adopted to reduce the emissions of greenhouse gases. **Less than significant impact.**

Significant Impacts

Impact AIR-1: The project would conflict with or obstruct implementation of the applicable air quality plan. **Significant and unavoidable impact (EIR impact 4.3.6.1).**

Impact AIR-2: The project would violate air quality standards or contribute substantially to an existing or projected criteria pollutant air quality violation. **Significant and unavoidable impact (EIR impact 4.3.6.3).**

Impact AIR-3: The project would result in a cumulatively considerable net increase of criteria pollutants for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors). **Significant and unavoidable impact (EIR impacts 4.3.6.2, 4.3.6.4, 4.3.7.1, 4.3.7.3).**

Impact AIR-4a: The project would expose sensitive receptors to substantial criteria pollutant concentrations. **Significant and unavoidable impact (EIR impacts 4.3.6.3 and 4.3.6.5).**

1.4 - Mitigation Measures Applied to the Project

4.3.6.2A Construction equipment maintenance records (including the emission control tier of the equipment) shall be kept on site during construction and shall be available for inspection by the City of Moreno Valley.

a) Off-road diesel-powered construction equipment greater than 50 horsepower shall meet United States Environmental Protection Agency Tier 4 off-road emissions standards. A copy of each unit's certified tier specification shall be available for inspection by the City at the time of mobilization of each applicable unit of equipment.
b) During all construction activities, off-road diesel-powered equipment may be in the "on" position not more than 10 hours per day.
c) Construction equipment shall be properly maintained according to manufacturer specifications.
d) All diesel powered construction equipment, delivery vehicles, and delivery trucks shall be turned off when not in use. On-site idling shall be limited to three minutes in any one hour.
e) Electrical hook ups to the power grid shall be provided for electric construction tools including saws, drills and compressors, where feasible, to reduce the need for diesel-powered electric generators. Where feasible and available, electric tools shall be used

f) The project shall demonstrate compliance with South Coast Air Quality Management District Rule 403 concerning fugitive dust and provide appropriate documentation to the City of Moreno Valley.
g) All construction contractors shall be provided information on the South Coast Air Quality Management District Surplus Offroad Opt-In "SOON" funds which provides funds to accelerate cleanup of off-road diesel vehicles.
h) Construction on-road haul trucks shall be model year 2007 or newer.
i) Information on ridesharing programs shall be made available to construction employees.
j) During construction, lunch options shall be provided onsite.
k) A publicly visible sign shall be posted with the telephone number and person to contact regarding dust complaints per AQMD Standards.
l) Only non-diesel material handling equipment may be used in any logistics building in the WLC.
m) Off-site construction shall be limited to the hours between 6 a.m. to 8 p.m. on weekdays only. Construction during City holidays shall not be permitted.

4.3.6.2B Prior to issuance of any grading permits, a traffic control plan shall be submitted to and approved by the City of Moreno Valley that describes in detail the location of equipment staging areas, stockpiling/storage areas, construction parking areas, safe detours around the project construction site, as well as provide temporary traffic control (e.g., flag person) during construction-related truck hauling activities. Construction trucks shall be rerouted away from sensitive receptor areas. Trucks shall use State Route 60 using Theodore Street, Redlands Boulevard (north of Eucalyptus Avenue), and Gilman Springs Road. In addition to its traffic safety purpose, the traffic control plan can minimize traffic congestion and delays that increase idling emissions. A copy of the approved Traffic Control Plan shall be retained on site in the construction trailer.

4.3.6.2C The following measures shall be applied to during construction of the project to reduce volatile organic compounds (VOC):

a) Non-VOC containing paints, sealants, adhesives, solvents, asphalt primer, and architectural coatings (where used), or pre-fabricated architectural panels shall be used in the construction of the project to the maximum extent practicable. If such products are not commercially available, products with a VOC content of 100 grams per Liter or lower for both interior and exterior surfaces shall be used.
b) Leftover paint shall be taken to a designated hazardous waste center.
c) Paint containers shall be closed when not in use

d) Low VOC cleaning solvents shall be used to clean paint application equipment.
e) Paint and solvent-laden rags shall be kept in sealed containers.

4.3.6.2D No grading shall occur on days with an Air Quality Index forecast greater than 150 for particulates or ozone as forecasted for the project area (Source-Receptor Area 24).

4.3.6.3A Prior to issuance of a Certificate of Occupancy, vehicles must be able to access the building using paved roads and parking lots.

4.3.6.3B The following shall be implemented as indicated:

Prior to Issuance of a Certificate of Occupancy

a) Signs shall be prominently displayed informing truck drivers about the California Air Resources Board diesel idling regulations and the prohibition of parking in residential areas.
b) Signs shall be prominently displayed in all dock and delivery areas advising of the following: engines shall be turned off when not in use; trucks shall not idle for more than three consecutive minutes; telephone numbers of the building facilities manager and the California Air Resources Board to report air quality violations.
c) Signs shall be installed at each exit driveway providing directional information to the City's truck route. Text on the sign shall read "To Truck Route" with a directional arrow. Truck routes shall be clearly marked per the City Municipal Code.

On an Ongoing Basis

d) Tenants shall maintain records on fleet equipment and vehicle engine maintenance to ensure that equipment and vehicles are maintained pursuant to manufacturer's specifications. The records shall be maintained on site and be made available for inspection by the City.
e) Tenant's staff in charge of keeping vehicle records shall be trained/certified in diesel technologies, by attending California Air Resources Board approved courses (such as the free, one-day Course #512). Documentation of said training shall be maintained on-site and be available for inspection by the City.
f) Tenants shall be encouraged to become a SmartWay Partner.
g) Tenants shall be encouraged to utilize SmartWay 1.0 or greater carriers.
h) Tenants' fleets shall be in compliance with all current air quality regulations for on-road trucks including but not limited to California Air Resources

Board's Heavy-Duty Greenhouse Gas Regulation and Truck and Bus Regulation.

i) Information shall be posted in a prominent location available to truck drivers regarding alternative fueling technologies and the availability of such fuels in the immediate area of the World Logistics Center.

j) Tenants shall be encouraged to apply for incentive funding (such as the Voucher Incentive Program [VIP], Carl Moyer, etc.) to upgrade their fleet.

k) All yard trucks (yard dogs/yard goats/yard jockeys/yard hostlers) shall be powered by electricity, natural gas, propane, or an equivalent non-diesel fuel. Any off-road engines in the yard trucks shall have emissions standards equal to Tier 4 Interim or greater. Any on-road engines in the yard trucks shall have emissions standards that meet or exceed 2010 engine emission standards specified in California Code of Regulations Title 13, Article 4.5, Chapter 1, Section 2025.

l) All medium and heavy duty diesel trucks entering logistics sites shall meet or exceed 2010 engine emission standards specified in California Code of Regulations Title 13, Article 4.5, Chapter 1, Section 2025 or be powered by natural gas, electricity, or other diesel alternative. Facility operators shall maintain a log of all trucks entering the facility to document that the truck usage meets these emission standards. This log shall be available for inspection by City staff at any time.

m) All standby emergency generators shall be fueled by natural gas, propane, or any non-diesel fuel.

n) Truck and vehicle idling shall be limited to three (3) minutes.

4.3.6.3C Prior to the issuance of building permits for more than 25 million square feet of logistics warehousing within the Specific Plan area, a publically accessible fueling station shall be operational within the Specific Plan area offering alternative fuels (natural gas, electricity, etc.) for purchase by the motoring public. Any fueling station shall be placed a minimum of 300 feet from any off-site sensitive receptors or off-site zoned sensitive uses. This facility may be established in connection with the convenience store required in Mitigation Measure 4.3.6.3D.

4.3.6.3D Prior to the issuance of building permits for more than 25 million square feet of logistics warehousing within the Specific Plan area a site shall be operational within the Specific Plan area offering food and convenience items for purchase by the motoring public. This facility may be established in connection with the fueling station required in Mitigation Measure 4.3.6.3C.

4.3.6.3E Refrigerated warehouse space is prohibited unless it can be demonstrated that the environmental impacts resulting from the inclusion of refrigerated space and its associated facilities, including, but not limited to, refrigeration units in vehicles serving the logistics warehouse, do not exceed any environmental impact for the entire World Logistics Center identified in the program Environmental Impact Report. Such environmental analysis shall be provided in connection with an application for plot plan approval for any warehouse which proposes to include refrigerated space. Any such proposal shall include electrical hookups at dock doors to provide power for vehicles equipped with Transportation Refrigeration Units (TRUs).

4.3.6.4A The following measures shall be incorporated as conditions to any Plot Plan approval within the Specific Plan:

a) All tenants shall be required to participate in Riverside County's Rideshare Program.
b) Storage lockers shall be provided in each building for a minimum of three percent of the full-time equivalent employees based on a ratio of 0.50 employees per 1,000 square feet of building area. Lockers shall be located in proximity to required bicycle storage facilities.
c) Class II bike lanes shall be incorporated into the design for all project streets.
d) The project shall incorporate pedestrian pathways between on-site uses.
e) Site design and building placement shall provide pedestrian connections between internal and external facilities.
f) The project shall provide pedestrian connections to residential uses within 0.25 mile from the project site.
g) A minimum of two electric vehicle-charging stations for automobiles or light-duty trucks shall be provided at each building. In addition, parking facilities with 100 parking spaces or more shall be designed and constructed so that at least three percent of the total parking spaces are capable of supporting future electric vehicle supply equipment (EVSE) charging locations. Only sufficient sizing of conduit and service capacity to install Level 2 Electric Vehicle Supply Equipment (EVSE) or greater are required to be installed at the time of construction.
h) Each building shall provide indoor and/or outdoor - bicycle storage space consistent with the City Municipal Code and the California Green Building Standards Code. Each building shall provide a minimum of two shower and changing facilities for employees.
i) Each building shall provide preferred and designated parking for any combination of low-emitting, fuel-efficient, and carpool/vanpool vehicles

equivalent to the number identified in California Green Building Standards Code Section 5.106.5.2 or the Moreno Valley Municipal Code whichever requires the higher number of carpool/vanpool stalls.

j) The following information shall be provided to tenants: onsite electric vehicle charging locations and instructions, bicycle parking, shower facilities, transit availability and the schedules, telecommunicating benefits, alternative work schedule benefits, and energy efficiency.

4.7.5.1A The project shall implement the following requirements to reduce solid waste and greenhouse gas emissions from construction and operation of project development:

a) Prior to January 1, 2020, divert a minimum of 50 percent of landfill waste generated by operation of the project. After January 1, 2020, development shall divert a minimum of 75 percent of landfill waste. In January of each calendar year after project approval the developer and/or Property Owners Association shall certify the percentage of landfill waste diverted on an annual basis.

b) Prior to January 1, 2020, recycle and/or salvage at least 50 percent of non-hazardous construction and demolition debris. After January 1, 2020, recycle and/or salvage at least 75 percent of non-hazardous construction and demolition debris. In January of each calendar year after project approval the developer and/or Property Owners Association shall certify the percentage of landfill waste diverted on an annual basis.
Develop and implement a construction waste management plan that, at a minimum, identifies the materials to be diverted from disposal and whether the materials will be sorted on-site or co-mingled. Calculations can be done by weight or volume, but must be consistent throughout.

c) The applicant shall submit a Recyclables Collection and Loading Area Plan for construction related materials prior to issuance of a building permit with the Building Division and for operational aspects of the project prior to the issuance of the occupancy permit to the Public Works Department. The plan shall conform to the Riverside County Waste Management Department's Design Guidelines for Recyclable Collection and Loading Areas.

d) Prior to issuance of certificate of occupancy, the recyclables collection and loading area shall be constructed in compliance with the Recyclables Collection and Loading Area plan.

e) Prior to issuance of certificate of occupancy, documentation shall be provided to the City confirming that recycling is available for each building.

f) Within six months after occupancy of a building, the City shall confirm that all tenants have recycling procedures set in place to recycle all items that are

recyclable, including but not limited to paper, cardboard, glass, plastics, and metals.

g) The property owner shall advise all tenants of the availability of community recycling and composting services.

h) Existing onsite street material shall be recycled for new project streets to the extent feasible.

Note Regarding MM 4.3.6.2D

Mitigation Measure 4.3.6.2D would reduce impacts during mass grading by ensuring that activities would not occur on days where the background air pollutant concentration levels in the project area exceeds a specified Air Quality Index value. The Air Quality Index is an index developed by the United States Environmental Protection Agency for reporting daily air quality. It indicates how clean or polluted the air is and what associated health effects might be a concern. The Air Quality Index focuses on health effects that may be experienced within a few hours or days after breathing polluted air. The Air Quality Index is calculated for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. The Air Quality Index for the highest pollutant is reported. The higher the value, the greater the level of air pollution.

Descriptions for the various levels in the Air Quality Index are shown in Table 2. For comparison purposes, the ozone concentration for the Air Quality Index is shown in the table; the low concentration compares with the low Air Quality Index value. Therefore, an Air Quality Index of 51 would equate to an 8-hour ozone concentration of 60 parts per billion. The concentrations for the other pollutants measured with the Air Quality Index differ based on the pollutant.

Table 2: Air Quality Index Descriptions

Air Quality Index Levels of Health Concern	Air Quality Index Numerical Range	Ozone Concentration for Air Quality Index (ppb)		Meaning
		8-Hour	1-Hour	
Good	Low: 0 High: 50	—	—	Air quality is considered satisfactory, and air pollution poses little or no risk.
Moderate	Low: 51 Std: 84* High: 100	Low: 60 Std: 70*	Low: 85	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	Low: 101 High: 150	Low: 76 (also the federal standard)	Low: 125	Members of sensitive groups may experience health effects. The general public is not likely to be affected. People with heart or lung disease, children, and older adults are considered sensitive and are at greater risk. For ozone, people who are active outdoors are also considered sensitive.

Table 2 (cont.): Air Quality Index Descriptions

Air Quality Index Levels of Health Concern	Air Quality Index Numerical Range	Ozone Concentration for Air Quality Index (ppb)		Meaning
		8-Hour	1-Hour	
Unhealthy	Low: 151 High: 200	Low: 96	Low: 165	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	Low: 201 High: 300	Low: 116	Low: 205	This would trigger a health alert signifying that everyone may experience more serious health effects.
Hazardous	Low: 301 High: 500	Low: 374	Low: 405	Health warnings of emergency conditions. The entire population is more likely to be affected.

Notes:
ppb = parts per billion (a measure of concentration)
* Std = 8-hour California ozone ambient air quality standard
Source of Meaning: U.S. Environmental Protection Agency 2009c.
Source of ozone concentrations: U.S. Environmental Protection Agency 2012.

The federal 8-hour ambient air quality standard for ozone is 75 ppb and the California standard is 70 ppb. The California 1-hour standard for ozone is 90 ppb (there is no federal 1-hour standard). As shown in the table, to achieve the federal ambient air quality standard for ozone, the Air Quality Index would need to be below 101. To achieve the state 8-hour ambient air quality standard for ozone, the Air Quality Index would need to be below 84.

In the Moreno Valley area in 2010 and 2011, the air quality index was greater than 150 for one day for each year (source: SCAQMD Air Quality Specialist, Mark Bassett, personal communication May 22, 2012). That means the air was unhealthy for one day in 2010 and one day in 2011. If the future years follow that trend, then one day during each of the construction years would cease construction activities.

Summary of Mitigation Measures in Other Impact Areas

The following is an abbreviated summary of the mitigation measures in other impact sections of the EIR that would also reduce air pollutant and/or greenhouse gas emissions; refer to the EIR for exact wording of the mitigation measures:

- **MM 4.1.6.1A.** A minimum 250-foot setback shall be verified from closest residential property line along Redlands Boulevard, Bay Avenue, and Merwin Street to any truck access area of the WLC project.
- **MM 4.16.1.6.1A.** Future development will submit landscape plans consistent with the Specific Plan, State of California Model Water Efficient Landscape Ordinance, and Conservation in

Landscaping Act in terms of water conservation. The plans will include automated control systems to minimize irrigation water use.

- **MM 4.16.1.6.1B.** Future development will install water conserving appliances and improvements including low flow toilets, urinals, faucets, and motion sensor water fixtures and drinking fountains, etc.
- **MM 4.16.1.6.1C.** Future development will provide separate irrigation lines for recycled water if it becomes available in the future.
- **MM 4.16.4.6.1A.** Future development will document estimated energy consumption using California Energy Efficiency Standards procedures. Among other items, future development will install cool roofs, cool pavements, and energy efficient appliances.
- **MM 4.16.4.6.1B.** The developer shall submit energy calculations used to demonstrate compliance with the California Energy Efficiency Standards.
- **MM 4.16.4.6.1C.** Each building shall:
    1) Install solar panels with a capacity equal to the peak daily demand for the office uses in each warehouse building.
    2) Increase efficiency for buildings constructed at the WLC by implementing the stricter of either 10 percent over the 2008 Title 24's energy saving requirements or the Title 24 requirements in place at the time the building permit is approved.
    3) Obtain the equivalent of LEED certification for the buildings constructed at the WLC.

1.5 - Project Summary

The following project description is abbreviated from the World Logistics Center Environmental Impact Report (EIR) for the proposed project, with sections pertaining to the air quality and greenhouse gas analysis included herein. The project description for the EIR is hereby included herein as reference.

1.5.1 - Project Location

The project is located in Rancho Belago, the eastern portion of the City of Moreno Valley, in northwestern Riverside County. The project site is immediately south of SR-60, between Redlands Boulevard and Gilman Springs Road (the easterly city limit), extending to the southerly city limit. The major roads that currently provide access to the project site are Redlands Boulevard, Theodore Street, Alessandro Boulevard, and Gilman Springs Road.

Exhibit 3 depicts the location of the proposed project within the region and the City of Moreno Valley.

1.5.2 - Project Setting

The project site slopes gently (approximately 2 percent) from north to south, with elevations ranging from approximately 1,760 feet above mean sea level (amsl) at the northeast corner to 1,480 feet amsl at the southeast corner. Soils within the proposed project consist of disturbed top soil and natural soils, with a mixture of various silty clays, sandy silts, silty sands, and sands.

Exhibit 4 displays the topographical map of the project area and Exhibit 5 displays the aerial photograph of the project area.

Onsite Land Uses

The project area is largely vacant undeveloped marginal agricultural land, with seven occupied single-family homes and associated ranch/farm buildings in various locations on the property. In the 1920s, several farm buildings and related houses were constructed, and in the 1940s, a stock farm operated on a portion of the site, which was later expanded into a commercial horse farm and training facility that operated until the mid-1990s. The site has been farmed since the early 1900s and supported dry (non-irrigated) farming, livestock grazing, and limited citrus groves. Much of the site continues to be used for dry farming.

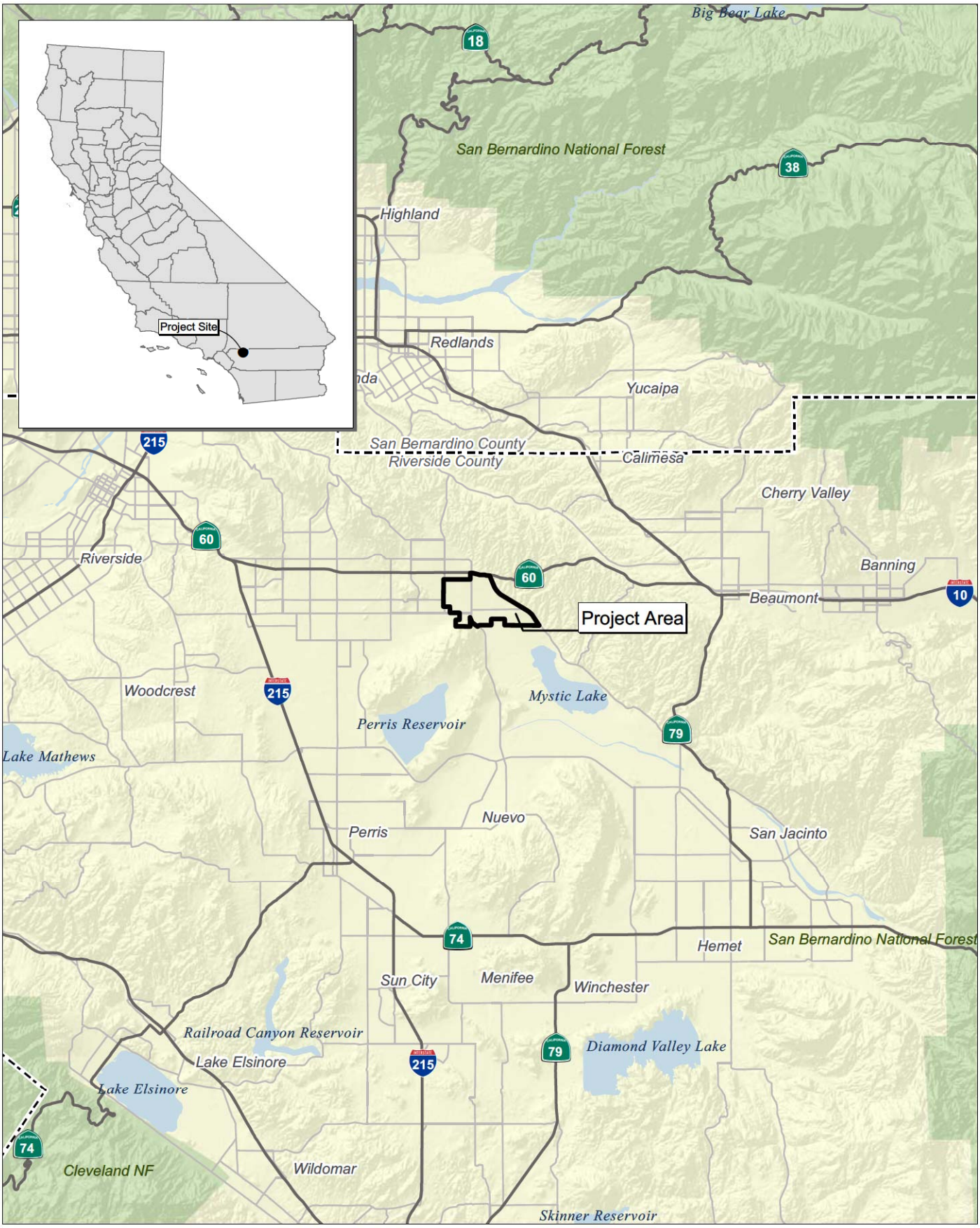
Sempra Energy operates a natural gas compressor plant, known as the Moreno Compressor Station, on 19 acres in the south-central portion of the site. Sempra Energy also operates a metering and pipe cleaning station on two separate parcels in the south-central portion of the site south of Alessandro Boulevard along existing Virginia Street. The site contains a variety of overhead and underground utility lines associated with oil, natural gas, and electrical service.

At present, the project site contains a number of drainage features or channels from natural erosion, but it does not contain any improved flood control facilities.

Surrounding Land Uses

Developed properties in the vicinity include a logistics building to the northwest (Skechers) and several residential neighborhoods along Redlands Boulevard along the western boundary of the project site. Scattered residences and areas zoned for residential development are also located across Gilman Springs Road on the eastern side of the project site.

Near the southwest boundary of the project site is an existing residential neighborhood at the intersection of Redlands Boulevard and Alessandro Boulevard; a small market and a Post Office are located near this intersection. This area is referred to as "Old Moreno." The Moreno Valley Ranch and Golf Club residential community is approximately one mile southwest of the project area.



Source: Census 2000 Data, The CaSIL, FirstCarbon Solutions GIS 2014.

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Exhibit 3
Regional Location Map

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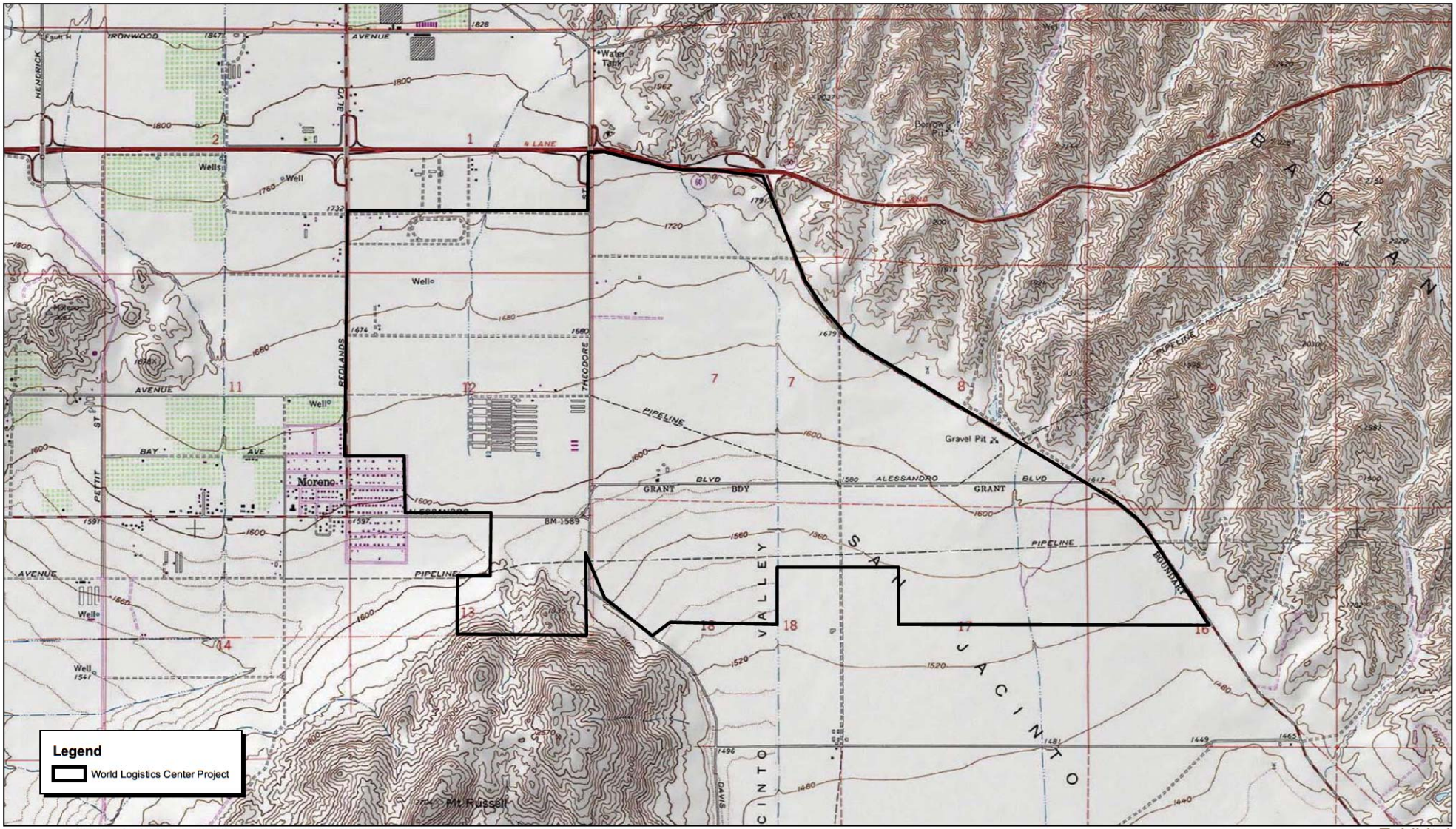

Exhibit 4
Local Vicinity Map
Topographic Base

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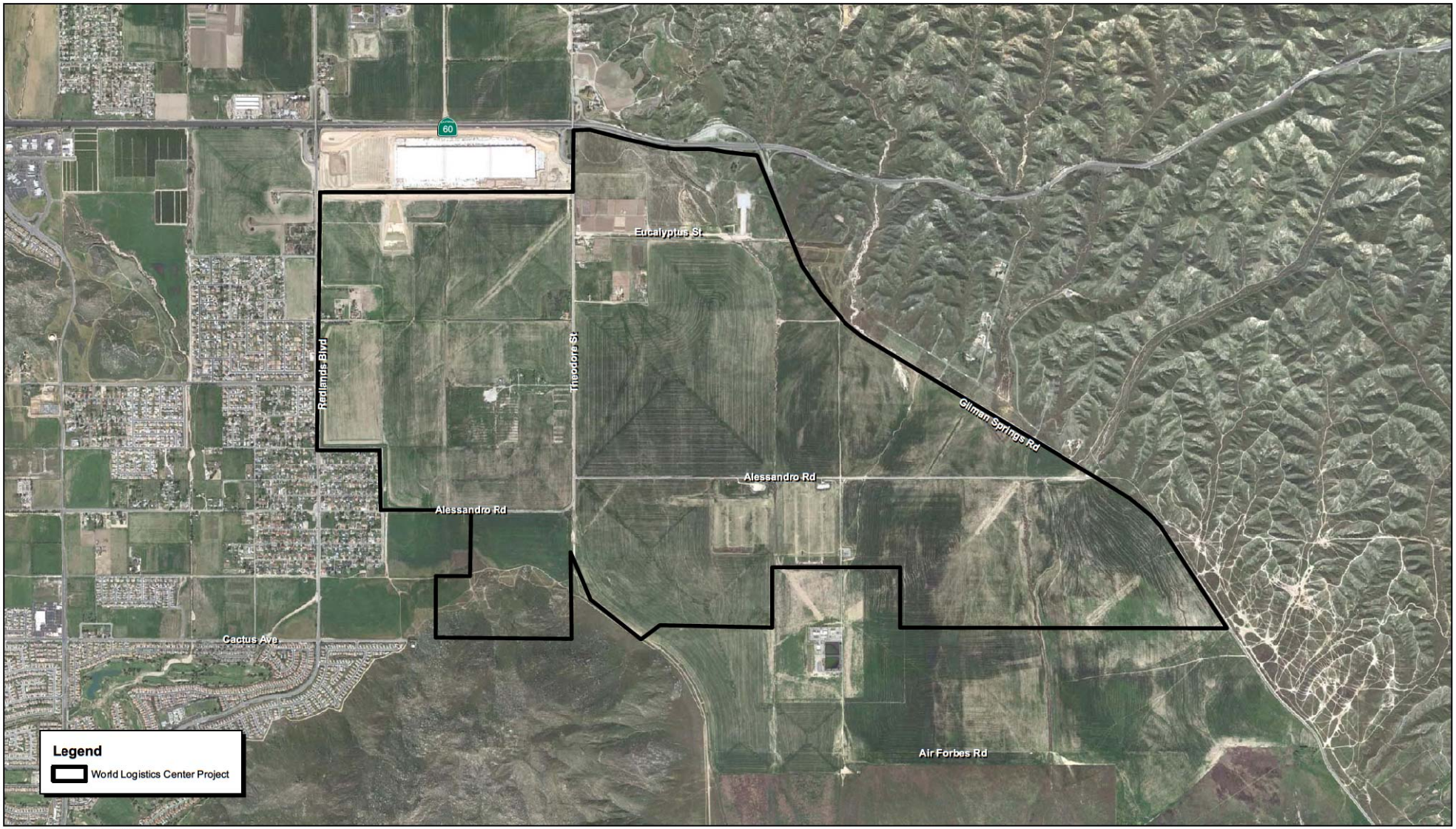

Source: Google Earth March 2011

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2,000 1,000 0 2,000 Feet

Exhibit 5
Local Vicinity Map
Aerial Base

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The major roadways that currently provide access to the project area are SR-60 to the north, Redlands Boulevard to the west, Alessandro Boulevard, Gilman Springs Road to the east, and Theodore Street. Redlands Boulevard and Theodore Street are north-south collector roadways that intersect with SR-60. Alessandro Boulevard is an east-west thoroughfare that runs through Moreno Valley from Interstate (I) 215 on the west to Gilman Springs Road on the east. Gilman Springs Road runs in a northwesterly-southeasterly direction connecting SR-60 to the Hemet-San Jacinto area.

The Highland Fairview Corporate Park is located north of the project area between Redlands Boulevard and Theodore Street. It is currently under development and the first phase was completed in late 2011 (i.e., the Skechers logistics warehouse). The area immediately north of SR-60 is largely undeveloped with clusters of low density residential development.

There is little development adjacent to the east and south boundaries of the project area. The area east of the project site across Gilman Springs Road is commonly referred to as the Badlands, a rugged area that separates the City of Moreno Valley from San Timoteo Canyon, and the City of Beaumont. Because of its steep slopes and canyons, the Badlands area has experienced little development; however, there are approximately ten single-family homes in the area east of Gilman Springs Road outside of the project site boundary. The Badlands Sanitary Landfill, operated by the County of Riverside Waste Management Department, is located approximately 1.5 miles northeast of the project area.

Immediately south of the proposed project is the San Jacinto Wildlife Area, which includes an "Upland Game Hunting Area," Mystic Lake, and the Lake Perris State Recreation Area. These lands are state-owned and access to these areas is restricted. The San Jacinto Wildlife Area is owned and operated by the California Department of Fish and Wildlife and contains approximately 20,000 acres of restored wetland and ponds. The Lake Perris State Recreation Area is owned and operated by the California State Parks Department and contains approximately 6,000 acres of open space land, which is used both for recreation and preservation of the natural southern California landscape.

The closest large-scale commercial development is located on the south side of SR-60 at Moreno Beach Drive, approximately 1.25 miles to the west of the proposed project. This shopping complex includes a Walmart store and a Target store along with restaurants and ancillary commercial and service uses, as well as the Moreno Valley Auto Center. The central core of Moreno Valley, which includes residential neighborhoods and more extensive commercial activity, is located approximately three miles west of the project area. The homes along Bay Avenue, Merwin Street, and Redlands Boulevard constitute the closest offsite sensitive receptors on the western boundary of the project. In addition, there are a small number of scattered residences along Gilman Springs Road along the project's eastern boundary. The locations of the sensitive receptors are shown in Exhibit 20 (page 179) and Exhibit 22 (page 201) in this report.

1.5.3 - General Plan and Zoning Designations

Designations on the Project Site

The Community Development Element of the City's General Plan currently designates the project area as a mix of residential, commercial, business park, and open space land uses. The currently approved 3,038-acre Moreno Highlands Specific Plan (MHSP) proposes a master planned, mixed-use community consisting of up to 7,763 residential dwelling units on approximately 2,435 acres and approximately 603 acres of business, retail, institutional, and other uses. The existing designations for the Moreno Highlands Specific Plan are shown in Table 3. A comparison of the land use designations in Table 3 with those that are proposed below (Table 4 on page 40) indicate that the project does not use the current land use designations and the project makes this specific plan obsolete.

Table 3: Moreno Highlands Specific Plan (Current Land Use Designations)

Category	Land Use	Acreage
Residential Community	Residential (7,763 dwelling units)	1,359
	Parks and open space	702
	Neighborhood commercial	10
	Cemetery	16
	Public facilities	348
Planned Business Center	Business park	361
	Mixed use	80
	Community commercial	16
	Parks and open space	78
	Public facilities	67
Total		**3,038**
Source: Adopted by City Council March 17, 1992.		

1.5.4 - Project Characteristics

The WLC Specific Plan covers 2,610 acres and proposes a maximum of 40.4 million sq ft of "high-cube logistics" warehouse distribution uses classified as "Logistics Development" (LD) and 200,000 sq ft of warehousing-related uses classified as "Light Logistics" (LL). The lands within the WLC Specific Plan that are designated LL are existing rural lots, some containing residential uses, that may be considered "non-conforming uses" once the WLC Specific Plan is approved. The components of the proposed project are discussed below.

Project Terms

The following terms and areas are defined here for the purposes of this analysis.

World Logistics Center Project: The term refers to all related development and planning activities currently proposed in the Rancho Belago area of the eastern end of the City of Moreno Valley. The WLC property is located south of the SR-60 Freeway, east of Redlands Boulevard, west of Gilman Springs Road, and north of Mystic Lake and the San Jacinto Wildlife Area.

The WLC property is shown in Exhibit 6. As shown in the exhibit, most of the site is designated as logistics development. The Specific Plan land use plan is divided into sixteen (16) Planning Areas (PA) based on traffic impact zones, which allows for more accurate estimates of potential traffic and air quality impacts of the WLC Project. PA 1-12 are designated as Logistic Development (LD), PA 20-22 are designated as Light Logistics (LL), PA 22 has been specified as an alternative fueling station, and PA 30 is Open Space.

Project Site or Project Area: This term refers to the entire 3,818-acre area covered by the EIR encompassed by: (a) the Specific Plan Area (2,610 acres); (b) the California Department of Fish and Wildlife Conservation Buffer Area (910 acres); (c) the Public Facilities Lands area (20 acres); (d) the open space area (174 acres); and (e) the Offsite Improvement Areas (104 acres).

California Department of Fish and Wildlife Conservation Buffer Area: This term refers to a 910-acre parcel owned by the State of California as part of the San Jacinto Wildlife Area. This property is not within the proposed WLC Specific Plan but a large part of the "Other Project Areas" described herein.

Other Project Areas: Sempra Energy owns a total of 194 acres of land immediately south of the Specific Plan site. These properties are included in the proposed General Plan Amendment and the Zone Change to designate them for Open Space and Public Facilities uses. These designations are consistent with present uses. These properties are not within the proposed WLC Specific Plan. Approximately 174 acres of the land owned by Sempra Energy will be designated as Open Space. Twenty acres of Sempra Energy land will be designated as Public Facilities.

Offsite Improvement Areas: Development under the WLC Specific Plan will require construction of a number of offsite infrastructure improvements covering approximately 304 acres of land adjacent to the Specific Plan including, but not limited to the following facilities:

- Debris Basins easterly of Gilman Springs Road
- Water reservoirs and access roads located northeast, north, and west of the project site
- SR-60 interchange improvements
- Roadway, water, sewer, drainage, and utility improvements extending north and west from the project

Specific Plan Site: Approximately 2,610 acres of the project area are included in the proposed WLC Specific Plan, located generally south of the SR-60 Freeway, east of Redlands Boulevard, west of Gilman Springs Road, and north of the San Jacinto Wildlife Area.

WLC Specific Plan: The WLC Specific Plan proposes a master-planned logistics campus to include up to 40.4 million sq ft of high-cube logistics warehousing, up to 200,000 sq ft of light logistics uses, a site for logistics support uses, and 75 acres of Open Space in the southwest corner of the site. The Specific Plan includes extensive development standards, design guidelines, and review procedures for all development within the project. See below for more specifics.

Moreno Highlands Specific Plan: This term refers to the currently approved Specific Plan that covers 3,038 acres of the project area. This Specific Plan permits the development of a master planned, mixed-use community consisting of up to 7,763 residential dwelling units and approximately 603 acres of business, retail, institutional, and other uses. This development will be replaced with the World Logistics Center Specific Plan and 1,104 acres of Open Space and Public Facilities uses.

World Logistics Center Specific Plan

A summary of the uses in the Specific Plan is shown in Table 4. The analysis in this report addresses construction and operation of the WLC as well as construction of the offsite improvement areas.

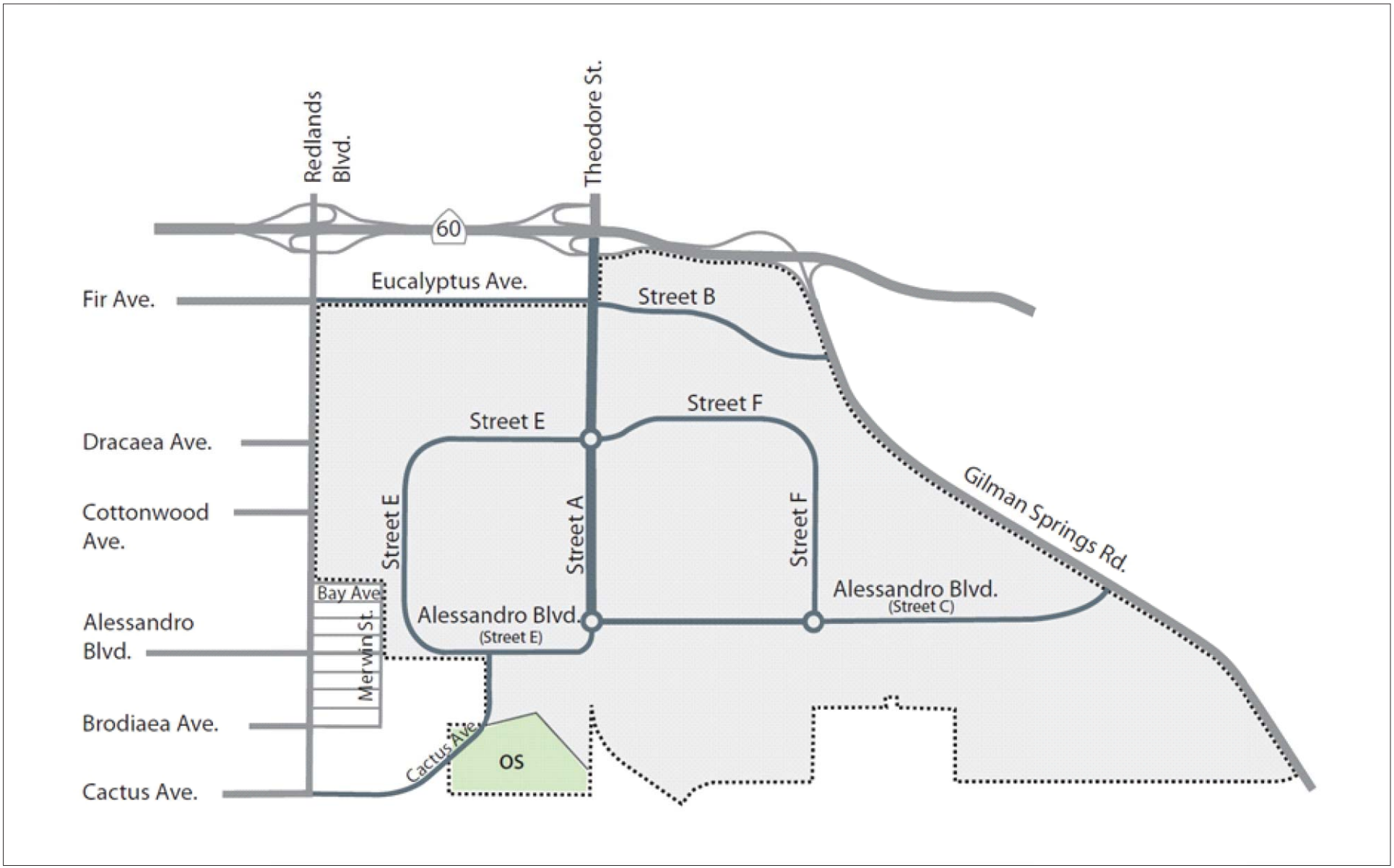
Table 4: World Logistics Center Specific Plan Summary

Land Use	Acres	Square Feet
High cube logistics development (includes 3,000 sq ft of logistics support, including a convenience store and fueling station)	2,382.8	40,400,000
Light logistics	37.1	200,000
Open space	74.3	0
Right of way	115.8	*0*
Specific Plan Subtotal	*2,610.0*	*40,600,000*
Source: World Logistics Center Final EIR Project Description, 2013.		

Land Use Plan

The WLC Specific Plan is a master plan for the development of up to 40.6 million sq ft of development emphasizing modern high-cube logistics distribution facilities.

High Cube-Logistics Development (LD). The WLC Specific Plan project proposes to develop approximately 2,383 acres with up to 40.4 million sq ft of high cube logistics warehouse space. Land uses allowed under this classification include high cube logistics warehouse buildings of 500,000 sq ft or greater. High cube logistics warehouses are characterized by a high level of automated material handling systems and typical truck activities outside of the peak hour. High cube logistics warehouses are generally used for the storage and consolidation of manufactured goods prior to their distribution to retail outlets. Warehouses permitted in the WLC would be no smaller than 500,000 sq ft, with a maximum height of 80 feet. The Specific Plan requires that the buildings over 60 feet in height be prohibited at the periphery of the site.



Source: Highland Fairview, 2015.

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Exhibit 6
World Logistics Center

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Warehousing and logistics activities consistent with the storage and processing of manufactured goods and materials prior to their distribution to other facilities and retail outlets will be permitted throughout the Specific Plan. Office and maintenance space is included along with the outdoor storage of trucks, trailers, and shipping containers. Logistics Development land uses provide a location for businesses to sort, organize, and transfer products from one shipping process to another.

Refrigerated warehouse space is prohibited within the Specific Plan area (WLCSP Section 12.2).

Alternative Fueling. The WLC Specific Plan encourages the development of warehousing that uses trucks powered by non-diesel fuels such as liquefied natural gas (LNG). The Specific Plan requires that smaller onsite service vehicles (yard goats, service vehicles, etc.) associated with these same buildings use non-diesel fuels such as compressed natural gas (CNG) as their vehicular fuel. The use of non-diesel fuel will substantially reduce vehicular emissions from the WLC project, eliminating diesel particulate matter (diesel PM) and reducing other air pollutants. An on-site fueling station will be included in the project that will provide CNG and LNG fuels to serve the trucks serving the project area. A specific site within the WLC has not yet been selected for this facility.

Logistics Support Uses (LS). An LNG/CNG Fueling Station is proposed in the Specific Plan area; however, a specific site for this facility has not been selected. This facility will include approximately 3,000 sq ft of building area in addition to fueling areas.

Light Logistics Uses (LL). This category provides general warehouse, self-storage, or vehicle storage uses, and would include related office and/or maintenance areas. The WLC Specific Plan applies this designation to 37 acres of existing lots that cannot accommodate development under the standards of the LD category. Buildout of these areas could support up to 200,000 sq ft or 0.5 percent of the planned development of the site. Some of these lots are currently improved with residential uses and/or agricultural uses. Under the Specific Plan, the residential and agricultural uses would become legal, non-conforming uses.

Open Space (OS). Approximately 75 acres in the southwest corner of the project area is designated for open space use in the Specific Plan. This property includes a portion of Mount Russell and is adjacent to the Lake Perris State Recreational Area.

Fire Station. A 1.5-acre site for a future fire station is located in the easterly portion of the Specific Plan. The exact location and configuration of the facility will be established in connection with the design and development of adjacent properties. The timing of the need for a fire station in the Specific Plan area will be determined by several factors, including the phasing of WLC development, the construction of other planned fire stations, and the location and size of WLC buildings.

Circulation System

Four key roadways will provide access to the proposed project: Theodore Street, Eucalyptus Avenue (between Redlands Boulevard and Gilman Springs Road), Gilman Springs Road, and Alessandro

Boulevard (between Gilman Springs and the proposed extension to Cactus Avenue). Primary vehicular access to the project would be from SR-60 at Theodore Street and interchange improvements are planned to accommodate the increase in traffic volumes.

Mobility. Section 3.4, Non-Vehicular Circulation, of the Specific Plan indicates that the intent of the mobility, transit, and pedestrian movement section is to ensure that people are able to move from one destination to another with minimal delays, either by walking or by using other means of non-motorized travel. This means separating vehicles from pedestrian pathways and incorporating shared modes of travel such as trucks, autos, and bikes in the same right-of-way area where feasible. As bicycles are considered vehicles, they would be able to use the street right-of-way throughout the project area. The Specific Plan states that project site development will support alternative transportation options for employees through implementation of on-site bicycle storage, preferred/designated parking for low-emitting and fuel-efficient cars, carpool high-occupancy vehicles, and access to public transit.

The project will provide Class II (on-street) bicycle access along all project roadways.

The Specific Plan requires sidewalks along all project streets. Pedestrian movement relies on sidewalks providing direct access from the street to entry points for properties and buildings. Sidewalks are required to be shown on project-specific plot plans submitted for review by the City.

Local bus service to the area is provided by the Riverside Transit Agency (RTA). Local bus routes will be extended into the project area when adequate demand is generated as determined by RTA. All roadways within the WLC area will be designed to accommodate bus access. The need for bus stops, turnouts, etc. will be determined by the RTA during the review of subsequent project-specific applications. Specific Plan Section 3.3.5 indicates that facilities to support future bus service to the project pursuant to RTA's "Design Guidelines for Bus Transit" will be incorporated, as needed, into street design in connection with site-specific development proposals. Covered shelters shall be provided at all active bus stops. A standard design for shelters shall be reviewed and approved by RTA and the City prior to installation of the first shelter.

In addition to public sidewalks provided adjacent to project streets, the Specific Plan provides for a trail system within the WLC that will include a trail between the Redlands/Cottonwood intersection and the existing Cactus Avenue trail connection to the Lake Perris Recreational Area. This trail will connect to the San Jacinto Wildlife Area at the former Davis Road alignment. Engineering details of the new trail will be provided with project-specific development applications in this portion of the project area.

Solid Waste

The Specific Plan encourages recycling and reducing waste generation. Examples of the recycling processes identified by the Specific Plan include:

- **Section 5.1.6, Trash and Recyclable Materials:** all development within the World Logistics Center shall provide enclosures (or compactors) for collection of trash and recyclable materials subject to water quality standards and best management practices.
- **Section 1.3.2, Green Building:** use recycled building materials to the extent feasible; use local sources of building materials to the extent feasible.
- **Section 6.0, Sustainability:** employ a recycling program; divert construction waste from landfills; incorporate recycled materials where feasible.

Sustainability

Site and building design within the Specific Plan area will incorporate many sustainability and green building concepts. Green building is the practice of increasing building efficiency through site planning, water and energy management, material use, control of indoor air quality, and the use of innovative design concepts. These practices help to improve building operational efficiency, conserve water, reduce waste, and lessen the heat island effect of development.

All buildings in the WLC shall be designed to meet or exceed LEED Certified status in accordance with LEED standards and criteria in effect as of the date of approval of the Specific Plan (Section 12.8 of the WLC Specific Plan).

All buildings within the project will comply with the Title 24 California Building Code. Adopted in 1978 in response to the energy crisis of the 1970s and updated every five years by the California Energy Commission, California's Title 24 contains the strictest and most energy efficient building code in the nation. The Title 24 Building Codes are called California's "Green Building" codes because they create energy efficiencies of up to 30 percent in some categories above and beyond the energy efficiencies achieved under the previous versions of Title 24.

The 2013 version of the standards went into effect January 1, 2014. The California Energy Commission adopted the changes to the Building Energy Efficiency Standards (Standards) for a number of reasons as follows:

1. To provide California with an adequate, reasonably priced, and environmentally sound supply of energy.
2. To respond to Assembly Bill 32, the Global Warming Solutions Act of 2006, which mandates that California reduce its greenhouse gas emissions to 1990 levels by 2020.
3. To pursue California policy that energy efficiency is the resource of first choice for meeting California's energy needs.
4. To act on California's Integrated Energy Policy Report findings that the Standards are the most cost effective means to achieve energy efficiency, that the Building Energy Efficiency Standards will continue to be upgraded over time to reduce electricity and peak demand, and

that the Standards will play a role in reducing energy related to meeting California's water needs and in reducing greenhouse gas emissions.

5. To meet the Executive Order in the Green Building Initiative to improve the energy efficiency of nonresidential buildings through aggressive standards.

The Specific Plan requires sustainable development standards so that new development within the project area minimizes energy consumption, conserves water, and uses recycled or sustainable building materials, where feasible. It provides developers with a specific framework for identifying and implementing a variety of practicable and measurable green building design, construction, operations, and maintenance.

The sustainability guidelines for the WLC serve the following functions to:

- Assist in meeting California's greenhouse gas reduction targets as set forth through Executive Order S-3-05 and Assembly Bill 32 (also known as the Global Warming Solutions Act of 2006);
- Assist in the region's development of a sustainable communities strategy pursuant to Senate Bill 375;
- Assist in meeting other state and local goals and requirements, including Assembly Bill 1385, the Complete Streets Act;
- Establish practical and innovative solutions for the developer and tenants to improve resource efficiency and reduce consumption of energy, water, and raw materials; and
- Support waste management reduction identified in AB 341.

The Specific Plan requires construction techniques that will provide pollution prevention and control impacts such as noise, air quality, erosion, and sediment controls. Both site planning and future building design will require best practices for use of recycled materials and products, such as recycled steel, crushed concrete, and pavement materials.

Low-emitting volatile organic compound (VOC) building materials will be required to be used on site. Project design and construction techniques will be required to reduce the heat island effect and create thermal gradient differences between developed and undeveloped areas impacting the micro-climate. Such techniques will include the use of materials that have a low solar reflectance index, such as white roofs and light colored pavements.

All development within the Specific Plan will require the preparation of a waste management plan requiring the diversion of at least 50 percent of waste from landfill. This goal will be achieved through a comprehensive recycling and management program including storage and collection of recyclables, building and material reuse, and careful construction waste management.

Electrical power sources will be provided both indoors and outdoors to accommodate the use of electric property maintenance equipment (section 12.5 of the WLCSP).

Design Features to Reduce Diesel Emissions

According to Section 12.4 in the WLCSP, all service yard trucks (hostlers, yard goats, etc.), pallet jacks, forklifts, and other onsite equipment used during operation shall be powered by a non-diesel fuel (e.g., electricity, natural gas, and/or propane). Electrical power sources shall be provided for service equipment.

1.6 - Standard Conditions

During construction and operation, the project must comply with applicable rules and regulations. The following are rules the project may be required to comply with, either directly, or indirectly.

1.6.1 - South Coast Air Quality Management District Rules

SCAQMD Rule 402 prohibits a person from discharging from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

SCAQMD Rule 403 governs emissions of fugitive dust during construction and operation activities. Compliance with this rule is achieved through application of standard Best Management Practices, such as application of water or chemical stabilizers to disturbed soils, covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 miles per hour (mph), sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph, and establishing a permanent ground cover on finished sites.

Rule 403 requires that fugitive dust be controlled with best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 403 requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance offsite. Applicable dust suppression techniques from Rule 403 are summarized below. Implementation of these dust suppression techniques can reduce the fugitive dust generation (and thus the PM_{10} component). Compliance with these rules would reduce impacts on nearby sensitive receptors.

Rule 403 measures may include but are not limited to the following:

- Apply nontoxic chemical soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for 10 days or more).

- Water active sites at least three times daily. (Locations where grading is to occur will be thoroughly watered prior to earthmoving.)
- Cover all trucks hauling dirt, sand, soil, or other loose materials, or maintain at least 0.6 meters (2 feet) of freeboard (vertical space between the top of the load and top of the trailer) in accordance with the requirements of California Vehicle Code section 23114.
- Reduce traffic speeds on all unpaved roads to 15 mph or less.
- Suspension of all grading activities when wind speeds (including instantaneous wind gusts) exceed 25 mph.
- Bumper strips or similar best management practices shall be provided where vehicles enter and exit the construction site onto paved roads or wash off trucks and any equipment leaving the site each trip.
- Replanting disturbed areas as soon as practical.
- If applicable, follow procedures and additional dust control measures for a "large operation" shown in Rule 403. A large operation is defined in Rule 403 as: "1) any active operations on property that contains 50 or more acres of disturbed surface area; or 2) any earth-moving operation with a daily earth-moving or throughput volume of 5,000 cubic yards or more three times during the most recent 365-day period."
- During all construction activities, construction contractors shall sweep onsite and offsite streets if silt is carried to adjacent public thoroughfares, to reduce the amount of particulate matter on public streets. All sweepers shall be compliant with SCAQMD Rule 1186.1, Less Polluting Sweepers.

SCAQMD Rule 481 applies to all spray painting and spray coating operations and equipment. The rule states that a person shall not use or operate any spray painting or spray coating equipment unless one of the following conditions is met:

1. The spray coating equipment is operated inside a control enclosure, which is approved by the Executive Officer.
2. Coatings are applied with high-volume low-pressure, electrostatic, and/or airless spray equipment.
3. An alternative method of coating application or control is used which has effectiveness equal to or greater than the equipment specified in the rule.

SCAQMD Rule 1108 governs the sale, use, and manufacturing of asphalt and limits the volatile organic compound (VOC) content in asphalt used in the South Coast Air Basin. This rule would regulate the VOC content of asphalt used during construction. Therefore, all asphalt used during construction of the project must comply with SCAQMD Rule 1108.

SCAQMD Rule 1110.2 applies to all stationary and portable gaseous- and liquid-fueled engines over 50 rated brake horsepower and sets emission standards for oxides of nitrogen, volatile organic compound, and carbon monoxide emissions. This rule would apply to emergency standby generators as required for the project.

SCAQMD Rule 1113 governs the sale, use, and manufacturing of architectural coating and limits the VOC content in paints and paint solvents. This rule regulates the VOC content of paints available during construction. Therefore, all paints and solvents used during construction and operation of the project must comply with SCAQMD Rule 1113.

SCAQMD Rule 1143 governs the manufacture, sale, and use of paint thinners and solvents used in thinning of coating materials, cleaning of coating application equipment, and other solvent cleaning operations, by limiting their VOC content. This rule regulates the VOC content of solvents used during construction. Solvents used during the construction phase must comply with this rule.

SCAQMD Rule 1186 limits the presence of fugitive dust on paved and unpaved roads and sets certification protocols and requirements for street sweepers that are under contract to provide sweeping services to any federal, state, county, agency, or special district such as water, air, sanitation, transit, or school district.

SCAQMD Rule 1303 governs the permitting of re-located or new major emission sources, requiring Best Available Control Measures and setting significance limits for PM_{10}, among other pollutants.

SCAQMD Rule 1401, New Source Review of Toxic Air Contaminants, specifies limits for maximum individual cancer risk, cancer burden, and non-cancer acute and chronic hazard index from new permit units, relocations, or modifications to existing permit units, which emit toxic air contaminants. This rule would apply to equipment requiring operating permits from the SCAQMD such as emergency standby generators, as required for the project.

SCAQMD Rule 1415, Reduction of Refrigerant Emissions from Stationary Air Conditioning Systems. The SCAQMD originally adopted Rule 1415 to reduce ozone-depleting refrigerant emissions from stationary, non-residential air conditioning (comfort cooling) and refrigeration systems with full charge capacity of greater than 50 pounds, and using Class I and Class II refrigerants. Recently, the SCAQMD amended Rule 1415 to include high-global warming potential refrigerants. Further, the rule now applies only to air conditioning systems with full charge capacity of greater than 50 pounds of refrigerant.

SCAQMD Rule 1470 applies to any person who owns or operates a compression ignition engine with a rated brake horsepower greater than 50 horsepower except as provide in the rule. This rule sets particulate matter emission rates and hours of operation.

SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options, is to provide employers with a menu of options to reduce mobile source emissions generated from employee commutes, to comply with federal and state Clean Air Act requirements, Health & Safety Code Section 40458, and Section 182(d)(1)(B) of the federal Clean Air Act. It applies to any employer who employs 250 or more employees on a full or part-time basis at a worksite for a consecutive six-month period calculated as a monthly average. This rule is currently active and the SCAQMD maintains a monthly activity report.[7] There are also guidelines published that outline the program elements, implementation, special procedures, and commute reduction strategies.[8]

1.6.2 - Title 24 and CALGreen

The project is required to comply with Title 24 of the California Code of Regulations established by the Energy Commission regarding energy conservation standards. There are two parts in particular that address energy efficiency: Part 6 and Part 11.

California Code of Regulations Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. All buildings for which an application for a building permit is submitted on or after July 1, 2014 must follow the 2013 standards. Energy efficient buildings require less electricity, which reduces fossil fuel consumption and greenhouse gas emissions.

The California Green Building Standards Code (CALGreen) went into effect on January 1, 2011. It is Part 11 of the Title 24 California Code of Regulations. CALGreen is a comprehensive and uniform regulatory code for all residential, commercial and school buildings. CALGreen does not prevent a local jurisdiction from adopting a more stringent code as state law provides methods for local enhancements.

CALGreen (code section in parentheses) requires:

- **Short-term bicycle parking.** If the new project or an addition or alteration is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of new visitor motorized vehicle parking spaces being added, with a minimum of one two-bike capacity rack (5.106.4.1).
- **Finish material pollution control.** Low-pollutant emitting interior finish materials such as adhesives, paints, carpet, and flooring (5.504.4).

[7] South Coast Air Quality Management District. Rule 2202 - Activity Report. Website: www.aqmd.gov/trans/doc/activity.html. Accessed December 21, 2012.

[8] South Coast Air Quality Management District. 2011. Rule 2202 – On-Road Motor Vehicle Mitigation Options Employee Commute Reduction Program Guidelines. Website: www.aqmd.gov/trans/doc/r2202_ecrp_guide.pdf. Accessed December 21, 2012.

- **Long-term bicycle parking.** For buildings with over 10 tenant-occupants[9] or alterations that add 10 or more tenant vehicular parking spaces, provide secure bicycle parking for 5 percent of tenant vehicular parking spaces being added, with a minimum of one space. Acceptable parking facilities shall be convenient from the street and shall meet the following: 1. Covered, lockable enclosures with permanently anchored racks for bicycles; 2. Lockable bicycle rooms with permanently anchored racks; or 3. Lockable, permanently anchored bicycle lockers (5.106.4.2).
- **Designated parking.** For new projects or additions or alterations that add 10 or more vehicular parking spaces, provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles [201 spaces and over require at least 8 percent] (5.106.5.2).
- **Recycling by Occupants.** Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of non-hazardous materials for recycling (5.410.1, 5.713.10).
- **Construction waste.** Recycle and/or salvage for reuse a minimum 50 percent of the nonhazardous construction and demolition waste . . .(5.408.1). 100 percent of trees, stumps, rocks and associated vegetation and soils resulting from land clearing shall be reused or recycled (5.408.3).
- **Wastewater reduction.** Each building shall reduce by 20 percent wastewater by one of the following methods:
    1. The installation of water-conserving fixtures or
    2. Use of non-potable water systems (5.303.4).
- **Water use savings.** 20-percent mandatory reduction in indoor water use with voluntary goal standards for 30, 35, and 40-percent reductions (5.303.2).
- **Water meters.** Separate water meters for buildings in excess of 50,000 sq ft or buildings projected to consume more than 1,000 gallons per day (5.303.1).
- **Irrigation design.** Automatic irrigation system controllers installed at the time of final inspection shall be weather- or soil moisture-based controllers that adjust irrigation in response to changes in plant needs; weather-based controllers (5.304.3).
- **Commissioning.** For new buildings 10,000 square feet and over, building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's or owner representative's project requirements (5.410.2).

[9] TENANT-OCCUPANTS. Building occupants who inhabit a building during its normal hours of operation as permanent occupants, such as employees, as distinguished from customers and other transient visitors. (Section 5.102)

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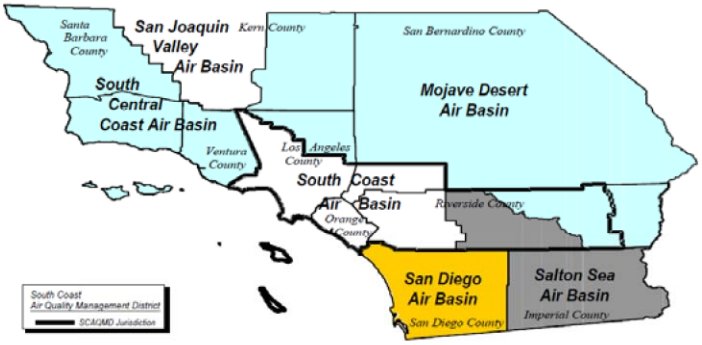
SECTION 2: LOCAL AND REGIONAL ENVIRONMENTAL SETTING

2.1 - Existing Physical Setting

2.1.1 - Local Climate

The project is located in the Rancho Belago area of the City of Moreno Valley in Riverside County and is within the South Coast Air Basin (basin). To the west of the basin is the Pacific Ocean and the Los Padres National Forest. To the north and east of the basin are the San Gabriel, San Bernardino, and San Jacinto mountains, while the southern limit of the basin is the San Diego County line. The basin consists of Orange County, all of Los Angeles County except for the Antelope Valley, and the non-desert portions of western San Bernardino County and Riverside County (see illustration at right, SCAQMD 2012). The SCAQMD also has jurisdiction over the Riverside County portion of the Salton Sea Air Basin and Mojave Desert Air Basin; however, those basins are not within the South Coast Air Basin. The air quality in the basin is impacted by dominant airflows, topography, atmospheric inversions, location, season, and time of day.



Temperature inversions limit the vertical depth through which pollution can be mixed. Among the most common temperature inversions in the basin are radiation inversions, which form on clear winter nights when cold air off mountains sink to the valley floor while the air aloft over the valley remains warm. These inversions, in conjunction with calm winds, trap pollutants near the source. Other types of temperature inversions that affect the basin include marine, subsidence, and high-pressure inversions.

Summers often have periods of hazy visibility and occasionally unhealthful air, while air quality impacts in the winter tend to be localized. Higher temperatures and sunshine can contribute to air pollutant formation, particularly ozone. Impacts of ozone are discussed in the impact sections of this analysis. The annual average temperature varies little throughout much of the basin, ranging from the low to middle 60s to the upper 80s (degrees Fahrenheit), as shown in Exhibit 7. As shown in the exhibit, the majority of the annual rainfall in the area occurs between December and March.

Dominant airflows provide the driving mechanism for transport and dispersion of air pollution. The mountains surrounding the region form natural horizontal barriers to the dispersion of air contaminants. Air pollution created in the coastal areas and around the Los Angeles area is transported inland until it reaches the mountains where the combination of mountains and inversion

layers generally prevent further dispersion. Air stagnation may occur during the early evening and early morning periods of transition between day and nighttime flows. The region also experiences periods of hot, dry winds from the desert, known as the Santa Ana winds. If the Santa Ana winds are strong, they can surpass the sea breeze, which blows from the ocean to the land, and carry the suspended dust and pollutants out to the ocean. If the winds are weak, they are opposed by the sea breeze and cause stagnation, resulting in high pollution events. The primary wind direction near the project site is from the northwest to the southeast.

2.1.2 - Local Air Quality

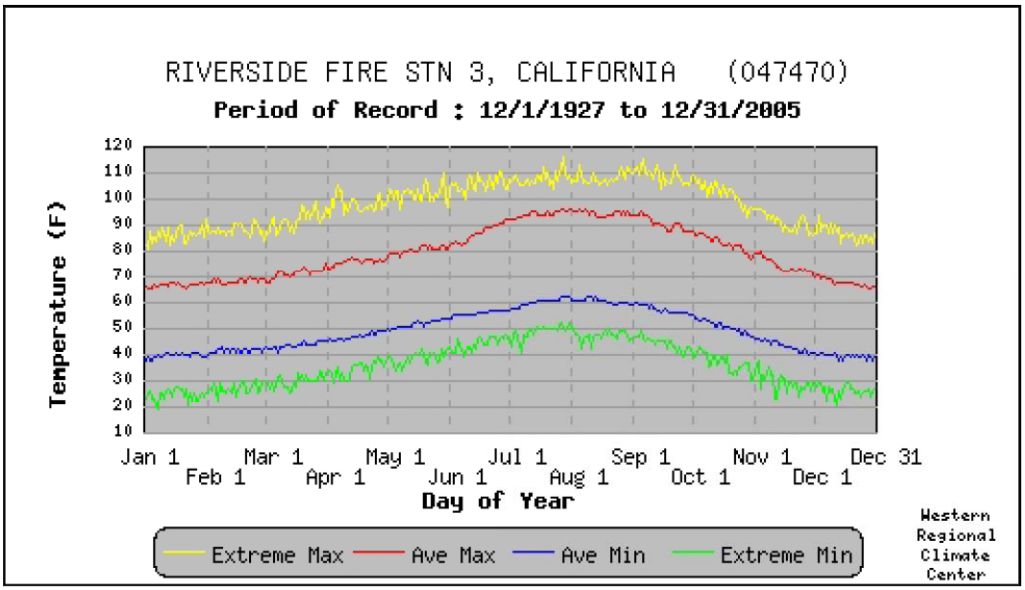
The local air quality can be evaluated by reviewing relevant air pollution concentrations near the project area. For evaluation purposes, the SCAQMD has divided the basin into 36 Source Receptor Areas within the Basin operating monitoring stations in most of the areas. These Source Receptor Areas provide a general representation of the local meteorological, terrain, and air quality conditions within the particular geographical area. The project is in the northern part of Source Receptor Areas 24 and 28.

Table 5 summarizes 2009 through 2012 published monitoring data for the Basin monitoring stations in Rubidoux and Magnolia Avenue. The data shows that during the past few years, the project area has exceeded the ozone, PM_{10}, and $PM_{2.5}$ standards. In addition, the number of days exceeding the ozone standards has been increasing over the last few years.

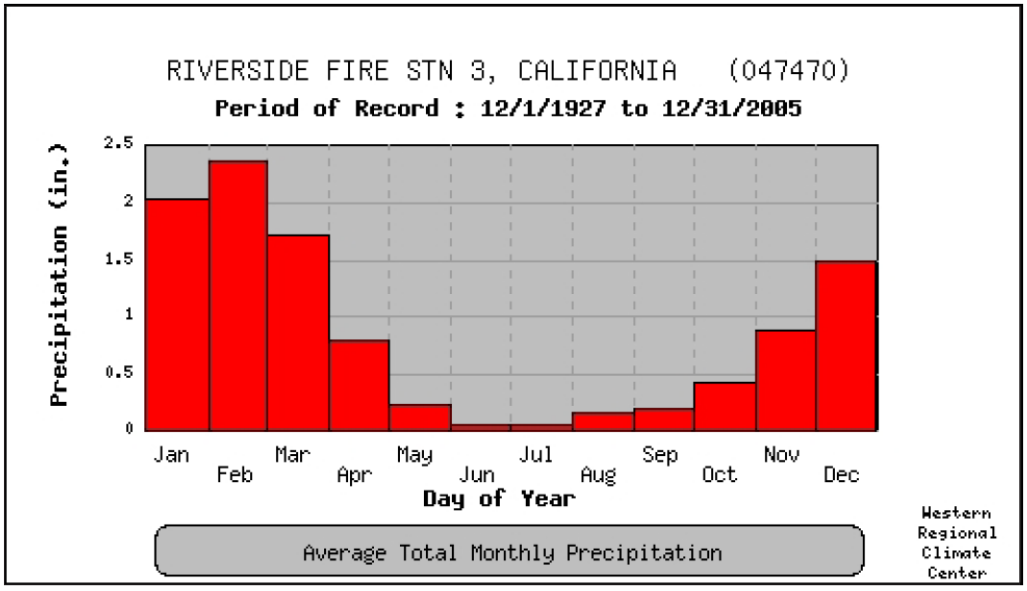
2.1.3 - Regional Air Quality Improvements

The 2012 Air Quality Management Plan states, “The remarkable historical improvement in air quality since the 1970s is the direct result of Southern California’s comprehensive, multiyear strategy of reducing air pollution from all sources as outlined in its AQMPs” (South Coast Air Quality Management District 2012). Substantial improvements in regional air quality have occurred in the past three decades as shown previously in the Executive Summary.

Daily Temperature Averages and Extremes



Monthly Average Total Precipitation



Source: Western Regional Climate Center 2012.

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Exhibit 7
Temperature and Precipitation in Riverside Area

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Table 5: Air Quality Monitoring Summary

Air Pollutant	Averaging Time	Item	2009	2010	2011	2012
Ozone	1 Hour	Max 1 Hour (ppm)	0.116	0.128	0.128	0.126
		Days > State Standard (0.09 ppm)	25	31	52	27
	8 Hour	Max 8 Hour (ppm)	0.101	0.099	0.115	0.102
		Days > State Standard (0.07 ppm)	57	74	92	70
		Days > National Standard (0.075 ppm)	36	47	67	47
Carbon monoxide	1 IIour**	Max 1 Hour (ppm)	2.64	2.63	ND	ND
		Days > State Standard (20 ppm)	0	0	ND	ND
		Days > National Standard (35 ppm)	0	0	ND	ND
	8 Hour	Max 8 Hour (ppm)	1.85	1.84	1.35	1.59
		Days > State Standard (9.0 ppm)	0	0	0	0
		Days > National Standard (9 ppm)	0	0	0	0
Nitrogen dioxide	Annual*	Annual Average (ppm)	0.017	0.017	0.0166	0.0155
	1 Hour*	98th percentile (ppm)	0.06	0.057	0.0565	0.0546
	1 Hour	Max 1 Hour (ppm)	0.078	0.0645	0.0633	0.0617
		Days > State Standard (0.18 ppm)	0	0	0	0
Sulfur dioxide	Annual	Annual Average (ppm)	0.001	0.001	<0.001	ID
	24 Hour	Max 24 Hour (ppm)	0.003	0.005	0.001	ID
		Days > State Standard (0.04 ppm)	0	0	0	ID
	1 Hour*	Max 1 Hour (ppm)	0.01	0.0176	0.0513	0.043
		Days > State Standard (0.25 ppm)	0	0	0	0
		Days > National Standard (0.075 ppm)	0	0	0	0
Inhalable coarse particles (PM_{10})	Annual	Annual Average (µg/m^3)	41.9	33.8	32.5	33.4
	24 hour	24 Hour (µg/m^3)	86.8	75.0	82.7	82.6
		Est. Days > State Standard (50 µg/m^3)	120	43	30	52
		Days > National Standard (150 µg/m^3)	0	0	0	0
Fine particulate matter ($PM_{2.5}$)	Annual	Annual Average (µg/m^3)	17.1	13.9	13.8	13.6
	24 Hour	24 Hour (µg/m^3)	62.0	58.5	73.7	39.9
		Days > National Standard (35 µg/m^3)	15	4	5	7

Notes and Abbreviations:
> = exceed ppm = parts per million µg/m^3 = micrograms per cubic meter
ND = no data max = maximum Est. = estimated ID = insufficient data
State Standard = California Ambient Air Quality Standard National Standard = National Ambient Air Quality Standard
Sources: California Air Resources Board 2012a, from station Riverside-Rubidoux.
* South Coast Air Quality Management District 2012a, from Metropolitan Riverside County #1
** The 1-hour CO concentration is not reported; therefore, it is derived from the 8-hour concentration by dividing by 0.7.

2.1.4 - Attainment Status

The EPA and the ARB designate air basins where ambient air quality standards are exceeded as "nonattainment" areas. If standards are met, the area is designated as an "attainment" area. If there is inadequate or inconclusive data to make a definitive attainment designation, they are considered "unclassified." National nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards. When an area is in "maintenance" it was designated in nonattainment for one of the national standards but later met the standard and was re-designated to attainment. To ensure the area continues to meet the national standard, it is required to develop a maintenance plan.

Each standard has a different definition, or 'form' of what constitutes attainment, based on specific air quality statistics. For example, the Federal 8-hour CO standard is not to be exceeded more than once per year; therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring values exceeds the threshold per year. In contrast, the Federal annual $PM_{2.5}$ standard is met if the three-year average of the annual average $PM_{2.5}$ concentration is less than or equal to the standard.

The current attainment designations for the Basin are shown in Table 6. The Basin is designated as nonattainment for the state and federal ozone, PM_{10}, and $PM_{2.5}$, standards. The Los Angeles County portion of the Basin is in nonattainment for lead; however, the project area is in attainment for lead.

Table 6: South Coast Air Basin Attainment Status

Pollutant	State Status	National Status
Ozone	Nonattainment	Nonattainment - extreme
Carbon monoxide	Attainment	Maintenance – serious
Nitrogen dioxide (annual)	Attainment	Attainment
Nitrogen dioxide (1-hour)	Attainment	Maintenance
Sulfur dioxide	Attainment	Attainment
PM_{10}	Nonattainment	Maintenance – serious (San Bernardino County is in nonattainment)
$PM_{2.5}$	Nonattainment	Nonattainment
Lead (Los Angeles County)	Nonattainment	Nonattainment
Lead (other parts of Basin, including the project area)	Attainment	Attainment
Source of State status: California Air Resources Board 2015. Source of National status: U.S. Environmental Protection Agency 2013.		

2.2 - Regulatory Setting

Air pollutants are regulated at the national, state, and air basin level; each agency has a different level of regulatory responsibility. The EPA regulates at the national level. The California Air Resources Board (ARB) regulates at the state level. The South Coast Air Quality Management District (SCAQMD) regulates at the air basin level.

2.2.1 - National and State

The EPA is responsible for national and interstate air pollution issues and policies. The EPA sets national vehicle and stationary source emission standards, oversees approval of all State Implementation Plans, provides research and guidance for air pollution programs, and sets National Ambient Air Quality Standards, also known as federal standards. There are federal standards for six common air pollutants, called criteria air pollutants, which were identified from provisions of the Clean Air Act of 1970. The criteria pollutants are:

- Ozone
- Nitrogen dioxide
- Lead
- Particulate matter (PM_{10} and $PM_{2.5}$)
- Carbon monoxide (CO)
- Sulfur dioxide

The federal standards were set to protect public health, including that of sensitive individuals; thus, the standards continue to change as more medical research is available regarding the health effects of the criteria pollutants. Primary federal standards are the levels of air quality necessary, with an adequate margin of safety, to protect the public health (California Air Resources Board 2012).

A State Implementation Plan is a document prepared by each state describing existing air quality conditions and measures that will be followed to attain and maintain federal standards. The State Implementation Plan for the State of California is administered by the ARB, which has overall responsibility for statewide air quality maintenance and air pollution prevention. California's State Implementation Plan incorporates individual federal attainment plans for regional air districts—air districts prepare federal attainment plans, which are sent to ARB to be approved and incorporated into the California State Implementation Plan. Federal attainment plans include the technical foundation for understanding air quality (e.g., emission inventories and air quality monitoring), control measures and strategies, and enforcement mechanisms.

The ARB also administers California Ambient Air Quality Standards (state standards) for the 10 air pollutants designated in the California Clean Air Act. The 10 state air pollutants are the six federal standards listed above as well as visibility-reducing particulates, hydrogen sulfide, sulfates, and vinyl chloride. The federal and State ambient air quality standards, relevant effects, properties, and sources of the pollutants are summarized in Table 7. For additional health effects, please refer to Appendix C, Air Pollutant Health Effects Information, an excerpt from the SCAQMD's 2012 Air Quality Management Plan.

Table 7: Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Ozone	1 Hour	0.09 ppm	—	Irritate respiratory system; reduce lung function; breathing pattern changes; reduction of breathing capacity; inflame and damage cells that line the lungs; make lungs more susceptible to infection; aggravate asthma; aggravate other chronic lung diseases; cause permanent lung damage; some immunological changes; increased mortality risk; vegetation and property damage.	Ozone is a photochemical pollutant as it is not emitted directly into the atmosphere, but is formed by a complex series of chemical reactions between volatile organic compounds (VOC), NO_X, and sunlight. Ozone is a regional pollutant that is generated over a large area and is transported and spread by the wind.	Ozone is a secondary pollutant; thus, it is not emitted directly into the lower level of the atmosphere. The primary sources of ozone precursors (VOC and NO_X) are mobile sources (on-road and off-road vehicle exhaust).
	8 Hour	0.070 ppm	0.075 ppm			
Carbon monoxide (CO)	1 Hour	20 ppm	35 ppm	Ranges depending on exposure: slight headaches; nausea; aggravation of angina pectoris (chest pain) and other aspects of coronary heart disease; decreased exercise tolerance in persons with peripheral vascular disease and lung disease; impairment of central nervous system functions; possible increased risk to fetuses; death.	CO is a colorless, odorless, toxic gas. CO is somewhat soluble in water; therefore, rainfall and fog can suppress CO conditions. CO enters the body through the lungs, dissolves in the blood, replaces oxygen as an attachment to hemoglobin, and reduces available oxygen in the blood.	CO is produced by incomplete combustion of carbon-containing fuels (e.g., gasoline, diesel fuel, and biomass). Sources include motor vehicle exhaust, industrial processes (metals processing and chemical manufacturing), residential wood burning, and natural sources.
	8 Hour	9.0 ppm	9 ppm			
Nitrogen dioxide [b] (NO_2)	1 Hour	0.18 ppm	0.100 ppm	Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; contribution to atmospheric discoloration; increased visits to hospital for respiratory illnesses.	During combustion of fossil fuels, oxygen reacts with nitrogen to produce nitrogen oxides - NO_X (NO, NO_2, NO_3, N_2O, N_2O_3, N_2O_4, and N_2O_5). NO_X is a precursor to ozone, PM_{10}, and $PM_{2.5}$ formation. NO_X can react with compounds to form nitric acid and related small particles and result in PM related health effects.	NO_X is produced in motor vehicle internal combustion engines and fossil fuel-fired electric utility and industrial boilers. NO_2 concentrations near major roads can be 30 to 100 percent higher than those at monitoring stations.
	Annual	0.030 ppm	0.053 ppm			

Table 7 (cont.): Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Sulfur dioxide [c] (SO_2)	1 Hour	0.25 ppm	0.075 ppm	Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma. Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient sulfur dioxide levels. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.	Sulfur dioxide is a colorless, pungent gas. At levels greater than 0.5 ppm, the gas has a strong odor, similar to rotten eggs. Sulfur oxides (SO_X) include sulfur dioxide and sulfur trioxide. Sulfuric acid is formed from sulfur dioxide, which can lead to acid deposition and can harm natural resources and materials. Although sulfur dioxide concentrations have been reduced to levels well below state and federal standards, further reductions are desirable because sulfur dioxide is a precursor to sulfate and PM_{10}.	Human caused sources include fossil-fuel combustion, mineral ore processing, and chemical manufacturing. Volcanic emissions are a natural source of sulfur dioxide. The gas can also be produced in the air by dimethylsulfide and hydrogen sulfide. Sulfur dioxide is removed from the air by dissolution in water, chemical reactions, and transfer to soils and ice caps. The sulfur dioxide levels in the State are well below the maximum standards.
	3 Hour	—	0.5 ppm			
	24 Hour	0.04 ppm	0.14 (for certain areas)			
	Annual	—	0.030 ppm (for certain areas)			
Particulate matter (PM_{10})	24 hour	50 µg/m^3	150 µg/m^3	- Short-term exposure (hours/days): irritation of the eyes, nose, throat; coughing; phlegm; chest tightness; shortness of breath; aggravate existing lung disease, causing asthma attacks and acute bronchitis; those with heart disease can suffer heart attacks and arrhythmias. - Long-term exposure: reduced lung function; chronic bronchitis; changes in lung morphology; death.	Suspended particulate matter is a mixture of small particles that consist of dry solid fragments, droplets of water, or solid cores with liquid coatings. The particles vary in shape, size, and composition. PM_{10} refers to particulate matter that is between 2.5 and 10 microns in diameter, (1 micron is one-millionth of a meter). $PM_{2.5}$ refers to particulate matter that is 2.5 microns or less in diameter.	Stationary sources include fuel combustion for electrical utilities, residential space heating, and industrial processes; construction and demolition; metals, minerals, and petrochemicals; wood products processing; mills and elevators used in agriculture; erosion from tilled lands; waste disposal, and recycling. Mobile or transportation-related sources are from vehicle exhaust and road dust.
	Mean	20 µg/m^3	—			
Particulate matter ($PM_{2.5}$)	24 Hour	—	35 µg/m^3			
	Annual	12 µg/m^3	12 µg/m^3			
Visibility reducing particles	8 Hour	See note below [d]				

Table 7 (cont.): Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Sulfates	24 Hour	25 µg/m^3	—	Decrease in ventilatory function; aggravation of asthmatic symptoms; aggravation of cardio-pulmonary disease; vegetation damage; degradation of visibility; property damage.	The sulfate ion is a polyatomic anion with the empirical formula SO_4^{2-}. Sulfates occur in combination with metal and/or hydrogen ions. Many sulfates are soluble in water.	Sulfates are particulates formed through the photochemical oxidation of sulfur dioxide. In California, the main source of sulfur compounds is combustion of gasoline and diesel fuel.
Lead [e]	30-day	1.5 µg/m^3	—	Lead accumulates in bones, soft tissue, and blood and can affect the kidneys, liver, and nervous system. It can cause impairment of blood formation and nerve conduction, behavior disorders, mental retardation, neurological impairment, learning deficiencies, and low IQs.	Lead is a solid heavy metal that can exist in air pollution as an aerosol particle component. Leaded gasoline was used in motor vehicles until around 1970. Lead concentrations have not exceeded state or federal standards at any monitoring station since 1982.	Lead ore crushing, lead-ore smelting, and battery manufacturing are currently the largest sources of lead in the atmosphere in the United States. Other sources include dust from soils contaminated with lead-based paint, solid waste disposal, and crustal physical weathering.
	Quarter	—	1.5 µg/m^3			
	Rolling 3-month average	—	0.15 µg/m^3			
Vinyl chloride [e]	24 Hour	0.01 ppm	—	Short-term exposure to high levels of vinyl chloride in the air causes central nervous system effects, such as dizziness, drowsiness, and headaches. Epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of a rare cancer (liver angiosarcoma) and have suggested a relationship between exposure and lung and brain cancers.	Vinyl chloride, or chloroethene, is a chlorinated hydrocarbon and a colorless gas with a mild, sweet odor. In 1990, ARB identified vinyl chloride as a toxic air contaminant and estimated a cancer unit risk factor.	Most vinyl chloride is used to make polyvinyl chloride plastic and vinyl products, including pipes, wire and cable coatings, and packaging materials. It can be formed when plastics containing these substances are left to decompose in solid waste landfills. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites.
Hydrogen sulfide	1 Hour	0.03 ppm	—	High levels of hydrogen sulfide can cause immediate respiratory arrest. It can irritate the eyes and respiratory tract and cause headache, nausea, vomiting, and cough. Long exposure can cause pulmonary edema.	Hydrogen sulfide (H_2S) is a flammable, colorless, poisonous gas that smells like rotten eggs.	Manure, storage tanks, ponds, anaerobic lagoons, and land application sites are the primary sources of hydrogen sulfide. Anthropogenic sources include the combustion of sulfur containing fuels (oil and coal).

Table 7 (cont.): Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Volatile organic compounds (VOC)		There is no State or federal standards for VOCs because they are not classified as criteria pollutants.		Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations from interference with oxygen uptake. In general, concentrations of VOCs are suspected to cause eye, nose, and throat irritation; headaches; loss of coordination; nausea; and damage to the liver, the kidneys, and the central nervous system. Many VOCs have been classified as toxic air contaminants.	Reactive organic gases (ROGs) and VOCs are defined as any compound of carbon—excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate—that participates in atmospheric photochemical reactions. Although there are slight differences in the definition of ROGs and VOCs, the two terms are often used interchangeably.	Indoor sources of VOCs include paints, solvents, aerosol sprays, cleansers, tobacco smoke, etc. Outdoor sources of VOCs are from combustion and fuel evaporation. A reduction in VOC emissions reduces certain chemical reactions that contribute to the formulation of ozone. VOCs are transformed into organic aerosols in the atmosphere, which contribute to higher PM_{10} and lower visibility.
Benzene		There are no ambient air quality standards for benzene.		Short-term (acute) exposure of high doses from inhalation of benzene may cause dizziness, drowsiness, headaches, eye irritation, skin irritation, and respiratory tract irritation, and at higher levels, loss of consciousness can occur. Long-term (chronic) occupational exposure of high doses has caused blood disorders, leukemia, and lymphatic cancer.	Benzene is a VOC. It is a clear or colorless light-yellow, volatile, highly flammable liquid with a gasoline-like odor. The EPA has classified benzene as a known human (Group A) carcinogen.	Benzene is emitted into the air from fuel evaporation, motor vehicle exhaust, tobacco smoke, and from burning oil and coal. Benzene is used as a solvent for paints, inks, oils, waxes, plastic, and rubber. Benzene occurs naturally in gasoline at 1 to 2 percent by volume. The primary route of human exposure is through inhalation.
Diesel particulate matter (diesel PM)		There are no ambient air quality standards for diesel PM.		Some short-term (acute) effects of diesel PM exposure include eye, nose, throat, and lung irritation, coughs, headaches, light-headedness, and nausea. Studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature	Diesel PM is a source of $PM_{2.5}$—diesel particles are typically 2.5 microns and smaller. Diesel exhaust is a complex mixture of thousands of particles and gases that is produced when an engine burns diesel fuel. Organic compounds account for 80 percent of the total particulate matter mass, which	Diesel exhaust is a major source of ambient particulate matter pollution in urban environments. Typically, the main source of diesel PM is from combustion of diesel fuel in diesel-powered engines. Such engines are in on-road vehicles such as diesel trucks, off-road construction vehicles,

Table 7 (cont.): Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
				deaths among those suffering from respiratory problems. Human studies on the carcinogenicity of diesel PM demonstrate an increased risk of lung cancer, although the increased risk cannot be clearly attributed to diesel exhaust exposure.	consists of compounds such as hydrocarbons and their derivatives, and polycyclic aromatic hydrocarbons and their derivatives. Fifteen polycyclic aromatic hydrocarbons are confirmed carcinogens, a number of which are found in diesel exhaust.	diesel electrical generators, and various pieces of stationary construction equipment.

Notes:
ppm = parts per million (concentration) $\mu g/m^3$ = micrograms per cubic meter Annual = Annual Arithmetic Mean 30-day = 30-day average Quarter = Calendar quarter

[a] Federal standard refers to the primary national ambient air quality standard, or the levels of air quality necessary, with an adequate margin of safety to protect the public health. All standards listed are primary standards except for 3 Hour SO_2, which is a secondary standard. A secondary standard is the level of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[b] 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 (0.100 ppm).

[c] 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 one 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.

[d] Visibility reducing particles: In 1989, the ARB 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.

[e] The ARB 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.

Source of effects: South Coast Air Quality Management District 2003 and 2007b; California Environmental Protection Agency 2002; California Air Resources Board 2009; U.S. Environmental Protection Agency 2009a, 2010, and 2012; National Toxicology Program, 2011a.
Source of standards: California Air Resources Board, 2012.
Source of properties and sources: U.S. Environmental Protection Agency 2009a; U.S. Environmental Protection Agency 2003; U.S. Environmental Protection Agency 2011a; U.S. Environmental Protection Agency 2009b; National Toxicology Program, 2011b.

Several pollutants listed in Table 7 (see the previous pages) are not addressed in this analysis. Analysis of lead is not included in this report because the project (or the cars/trucks coming to the project) is not anticipated to emit lead. The project would not generate vinyl chloride because proposed project uses do not utilize the chemical processes that create this pollutant and there are no such uses in the project vicinity. The proposed project is not expected to cause exposure to hydrogen sulfide because it would not generate hydrogen sulfide in any substantial quantity; thus, analysis of hydrogen sulfide is omitted in the report.

Visibility-reducing particles are suspended particulate matter, and vary in shape, size, and chemical composition. The state standard for visibility-reducing particles is intended to limit the frequency and severity of visibility impairment due to regional haze. $PM_{2.5}$ is the main cause of reduced visibility (EPA 2013). These particles are not explicitly addressed in this analysis because particulate matter is addressed.

Children and Air Pollution

While Table 7 provides a summary discussion of the health effects of several air pollutants, numerous other studies have shown strong links between air pollution exposures and a range of health outcomes. One particularly relevant study was carried out over a 10-year experimental time period by the University of Southern California (Gauderman, W. James; McConnell Rob; et al, 2000). This study is referred to as the Children's Health Study. The Children's Health Study, which began in 1992, is a large, long-term study of the effects of chronic air pollution exposures on the health of children living in Southern California. Children may be more strongly affected by air pollution because their lungs and their bodies are still developing. Children are also exposed to more air pollution than adults since they breathe faster and spend more time outdoors in strenuous activities. About 5,500 children in twelve communities were enrolled in the study; two-thirds of them were enrolled as fourth-graders. Data on the children's health, their exposures to air pollution, and many factors that affected their responses to air pollution were gathered annually until they graduated from high school.

Concentrations of the pollutants ozone, nitrogen dioxide, acid vapor, and particulate matter (PM_{10} and $PM_{2.5}$) were continuously measured in each community throughout the study and for brief periods in schools and some homes. In addition, each child's lung function was tested every spring. Annual questionnaires asked about the children's respiratory symptoms and diseases, such as chronic cough and asthma; level of physical activity; time spent outdoors; and many other factors known to influence children's responses to air pollution, such as parental smoking, mold, and pets in the household.

The major conclusions reached in the University of Southern California's Children's Health Study were:

- Children exposed to higher levels of particulate matter, nitrogen dioxide, acid vapor and elemental carbon, had significantly lower lung function at age 18, an age when the lungs are nearly mature and lung function deficits are unlikely to be reversed.
- Children who were exposed to current levels of air pollution had significantly reduced lung growth and development when exposed to higher levels of acid vapor, ozone, nitrogen dioxide, and particulate matter, which is made up of very small particles that can be breathed deeply into the lungs.
- Children living in communities with higher concentrations of nitrogen dioxide, particulate matter, and acid vapor had lungs that both developed and grew more slowly and were less able to move air through them. This decreased lung development may have permanent adverse effects in adulthood.
- Children who moved away from study communities had increased lung development if the new communities had lower particulate matter levels, and had decreased lung development if the new communities had higher particulate matter levels.
- Days with higher ozone levels resulted in significantly higher school absences due to respiratory illness. Children with asthma who were exposed to higher concentrations of particulate matter were much more likely to develop bronchitis (Gauderman, W. James; McConnell Rob; et al, 2000).

It is important, however, to put into context, that the conclusions indicated above were developed based the level of pollutants measured during the 1990s and early 2000s when air pollutant levels were substantially higher than today's air quality levels as shown previously in Exhibit 1 and Exhibit 2 above and as noted below in this section prior to the development and deployment of new technology diesel vehicles. As noted previously, air quality levels have improved by 50 to 60 percent from the early 2000's today and even more so since the early 1990's. In addition, emission controls already adopted by the ARB and EPA will continue to see further emission reductions and resulting lower air quality levels into the future. Finally, it is important to point out several potential factors that may confound the relationship between diesel PM exposures and health effects. These factors include the effects of co-pollutants, that is, the effects other pollutants such as gaseous pollutants that confound the relationships, differences in biological responses when extrapolating from animals to human exposures, extrapolations of high occupational exposures to lower environmental exposures, lack of knowledge of worker exposure histories, and factors such as smoking and diet.

In the most recent update to the Children's Health Study (Gauderman, et. al. 2015), researchers discovered that improvements in regional air quality contributed to the following:

- Improved children's lung function. Specifically, combined exposure to two harmful pollutants, nitrogen dioxide (NO2) and fine particulate matter, fell approximately 40 percent for children in the third study group (2007-2011) compared to the first study group (1994-98). The study followed children from Long Beach, Mira Loma, Riverside, San Dimas and Upland.
- Children's lungs grew faster as air quality improved. Lung growth from age 11 to 15 was more than 10 percent greater for children breathing the lower levels of NO2 from 2007 to 2011 compared to those breathing higher levels from 1994 to 1998.
- The percentage of children in the study with abnormally low lung function at age 15 dropped from nearly 8 percent for the 1994-98 group, to 6.3 percent in 1997-2001, to just 3.6 percent for children followed between 2007 and 2011.

Asbestos

Asbestos is listed as a toxic air contaminant by ARB and as a Hazardous Air Pollutant by the EPA. Asbestos occurs naturally in surface deposits of several types of rock formations. Asbestos most commonly occurs in ultramafic rock that has undergone partial or complete alteration to serpentine rock (serpentinite) and often contains chrysotile asbestos. In addition, another form of asbestos, tremolite, can be found associated with ultramafic rock, particularly near faults. Crushing or breaking these rocks, through construction or other means, can release asbestos fibers into the air. Asbestos emissions can result from the sale or use of asbestos-containing materials, road surfacing with such materials, grading activities, and surface mining. The risk of disease is dependent upon the intensity and duration of exposure. When inhaled, asbestos fibers may remain in the lungs and with time may be linked to such diseases as asbestosis, lung cancer, and mesothelioma.

There is no asbestos in the project area (U.S. Geological Survey 2011). Asbestos will not be present during either construction or operation of the project.

Toxic Air Contaminants

Background

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminants (TACs) are a group of substances known or suspected to cause cancer, serious illness, birth defects, or death. For this discussion, HAPs and TACs are used interchangeably. HAPs are regulated by the EPA under the federal Clean Air Act. TACs is the term used under the California Clean Air Act to regulate the same hazardous pollutants. These contaminants tend to be localized and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects if exposure to low concentrations occurs for periods of several years. Many of these contaminants originate from human activities, such as fuel combustion and solvent use. Mobile Source Air Toxics (MSATs) are a subset of the 188 HAPs. Of the 21 HAPs identified by EPA as MSATs, a priority list of six priority HAPs were identified that include: diesel exhaust, benzene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene. These six compounds comprise most of the risk from HAP emissions.

In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts are not expected to occur. This contrasts with the criteria pollutants carbon dioxide, nitrogen dioxide, particulate matter, and ozone for which acceptable levels of exposure can be determined and for which the State and federal governments have set ambient air quality standards. For this reason, thresholds for TAC impacts for regulatory purposes and for CEQA thresholds have been set based on the increase in risk of cancer of a specific amount at sensitive receptors located near the source of TAC emissions.

The California Almanac of Emissions and Air Quality (California Air Resources Board 2009) presents the relevant concentration and cancer risk data for the ten TACs that pose the most substantial health risk in California based on available data. These TACs are as follows: acetaldehyde, benzene, 1,3-butadiene, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and diesel PM.

TAC measurements, available at the SCAQMD Riverside Rubidoux monitoring station (14 miles northeast of the project) can be used to characterize the "background" health risks from regional TAC emission sources. Table 8 provides this summary of TAC levels in the project area and health risk information. This table lists the air concentration levels and associated health cancer risks for eight of the nine TACs reported by the ARB in its Almanac as measured at the Riverside-Rubidoux air monitoring station. Note that since diesel PM is not measured directly, the table does not provide estimates of either measured diesel PM or the cancer risk associated with diesel PM.

Past studies have indicated that diesel PM poses the greatest health risk among the TACs listed in Table 8. The principal concern regarding exposures to diesel PM lies in its small size and thus its ability to penetrate deep into lung tissues when inhaled. Diesel exhaust has been found to cause health effects from short-term or acute exposures and from long-term chronic exposures, such as repeated occupational exposures. The type and severity of health effects depends upon several factors including the amount of chemical you are exposed to and the length of time you are exposed. Individuals also react differently to different levels of exposure. There is limited information on exposure to just diesel PM but there is enough evidence to indicate that inhalation exposure to diesel exhaust causes acute and chronic health effects.

A 10-year research program (California Air Resources Board 1998) demonstrated that diesel PM from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to diesel PM poses a chronic health risk. In addition to increasing the risk of lung cancer, exposure to diesel exhaust can have other health effects. Diesel exhaust can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. Diesel exhaust has been a major source of fine particulate pollution as well, and studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems.

Table 8: Toxic Air Contaminant Concentration Levels and Associated Health Effects (Riverside, California)

TAC	Concentration*/ Health Risk**	2007	2008	2009	Health Effects
Acetaldehyde	Mean ($\mu g/m^3$)	1.08	0.99	1.22	Acetaldehyde is a carcinogen that also causes chronic non-cancer toxicity in the respiratory system. Symptoms of chronic intoxication of acetaldehyde in humans resemble those of alcoholism. The primary acute effect of inhalation exposure to acetaldehyde is irritation of the eyes, skin, and respiratory tract in humans. At higher exposure levels, erythema, coughing, pulmonary edema, and necrosis may also occur. Acute inhalation of acetaldehyde resulted in a depressed respiratory rate and elevated blood pressure in experimental animals.
	Health Risk (risk per million)	5	5	6	
Benzene	Mean ($\mu g/m^3$)	0.40	0.33	ID	Benzene is highly carcinogenic and occurs throughout California. Benzene also has non-cancer health effects. Brief inhalation exposure to high concentrations can cause central nervous system depression. Acute effects include central nervous system symptoms of nausea, tremors, drowsiness, dizziness, headache, intoxication, and unconsciousness. Neurological symptoms of inhalation exposure to benzene include drowsiness, dizziness, headaches, and unconsciousness in humans. Ingestion of large amounts of benzene may result in vomiting, dizziness, and convulsions in humans. Exposure to liquid and vapor may irritate the skin, eyes, and upper respiratory tract in humans. Redness and blisters may result from dermal exposure to benzene. Chronic inhalation of certain levels of benzene causes disorders in the blood in humans. Benzene specifically affects bone marrow (the tissues that produce blood cells). Aplastic anemia, excessive bleeding, and damage to the immune system (by changes in blood levels of antibodies and loss of white blood cells) may develop. Increased incidence of leukemia (cancer of the tissues that form white blood cells) has been observed in humans occupationally exposed to benzene.
	Health Risk (risk per million)	37	30	ID	
Hexavalent Chromium, Chromium (VI)	Mean ($\mu g/m^3$)	0.35	ID	ID	In California, hexavalent chromium has been identified as a carcinogen. There is epidemiological evidence that exposure to inhaled hexavalent chromium may result in lung cancer. The principal acute effects are renal toxicity, gastrointestinal hemorrhage, and intravascular hemolysis. The respiratory tract is the major target organ for chromium (VI) following inhalation exposure in humans. Other effects noted from acute inhalation exposure to very high concentrations of chromium (VI) include gastrointestinal and neurological effects, while dermal exposure causes skin burns in humans. Chronic inhalation exposure to chromium (VI) in humans results in effects on the respiratory tract, with perforations and ulcerations of the septum, bronchitis, decreased pulmonary function, pneumonia, asthma, and nasal itching and soreness reported. Chronic human exposure to high levels of chromium (VI) by inhalation or oral exposure may produce effects on the liver, kidneys, gastrointestinal and immune systems, and possibly the blood.
	Health Risk (risk per million)	52	ID	ID	

Table 8 (cont.): Toxic Air Contaminant Concentration Levels and Associated Health Effects (Riverside, California)

TAC	Concentration*/ Health Risk**	2007	2008	2009	Health Effects
Para-Dichlorobenzene	Mean ($\mu g/m^3$)	ID	ID	ID	In California, para-dichlorobenzene has been identified as a carcinogen. Acute exposure to 1,4-dichlorobenzene via inhalation results in irritation to the eyes, skin, and throat in humans. In addition, long-term inhalation exposure may affect the liver, skin, and central nervous system in humans (e.g., cerebellar ataxia, dysarthria, weakness in limbs, and hyporeflexia).
	Health Risk	ID	ID	ID	
Formaldehyde	Mean ($\mu g/m^3$)	2.88	2.88	3.12	The major toxic effects caused by acute formaldehyde exposure via inhalation are eye, nose, and throat irritation and effects on the nasal cavity. Other effects seen from exposure to high levels of formaldehyde in humans are coughing, wheezing, chest pains, and bronchitis. Chronic exposure to formaldehyde by inhalation in humans has been associated with respiratory symptoms and eye, nose, and throat irritation. Animal studies have reported effects on the nasal respiratory epithelium and lesions in the respiratory system from chronic inhalation exposure to formaldehyde. Occupational studies have noted statistically significant associations between exposure to formaldehyde and increased incidence of lung and nasopharyngeal cancer. This evidence is considered "limited" rather than "sufficient" due to possible exposure to other agents that may have contributed to the excess cancers. EPA considers formaldehyde to be a probable human carcinogen (cancer-causing agent) . In California, formaldehyde has been identified as a carcinogen.
	Health Risk (risk per million)	21	21	23	
Methylene Chloride	Mean ($\mu g/m^3$)	0.19	0.2	ID	Case studies of methylene chloride poisoning during paint-stripping operations have demonstrated that inhalation exposure to extremely high levels can be fatal to humans. Acute inhalation exposure to high levels of methylene chloride in humans has resulted in effects on the central nervous system, including decreased visual, auditory, and psychomotor functions, but these effects are reversible once exposure ceases. Methylene chloride also irritates the nose and throat at high concentrations. The major effects from chronic inhalation exposure to methylene chloride in humans are effects on the central nervous system, such as headaches, dizziness, nausea, and memory loss. In addition, chronic exposure can lead to bone marrow, hepatic, and renal toxicity. EPA considers methylene chloride to be a probable human carcinogen and has ranked it in EPA's Group B2. California considers methylene chloride to be carcinogenic.
	Health Risk (risk per million)	0.7	0.7	ID	
Perchloroethylene	Mean ($\mu g/m^3$)	0.035	0.024	ID	In California, perchloroethylene has been identified as a carcinogen. Perchloroethylene vapors are irritating to the eyes and respiratory tract. Following chronic exposure, workers have shown signs of liver toxicity, as well as kidney dysfunction and neurological disorders.
	Health Risk (risk per million)	1	1	ID	

Table 8 (cont.): Toxic Air Contaminant Concentration Levels and Associated Health Effects (Riverside, California)

TAC	Concentration*/ Health Risk**	2007	2008	2009	Health Effects
Diesel PM	Mean ($\mu g/m^3$)	No monitoring data available			In its comprehensive assessment of diesel exhaust, OEHHA analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, railroad workers, and equipment operators. The studies showed these workers were more likely to develop lung cancer than workers who were not exposed to diesel emissions. These studies provided strong evidence that long-term occupational exposure to diesel exhaust increases the risk of lung cancer. Exposure to diesel exhaust can have immediate health effects. Diesel exhaust can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. This research was based on studies prior to the advent of modern diesel engines with high efficiency emissions controls. Since then the Health Effects Institute study clearly demonstrates that the application of new emissions control technology to diesel engines have virtually eliminated the health impacts of diesel exhaust.
	Health Risk (risk per million)	No monitoring data available			

Notes:
ID = insufficient data
* Concentrations for Hexavalent Chromium are expressed as ng/m^3, and concentrations for Diesel PM are expressed as $\mu g/m^3$. Concentrations for all other TACs are expressed as ppb.
** Health Risk represents the number of excess cancer cases per million people based on a lifetime (70-year) exposure to the annual average concentration. Total Health Risk represents only those compounds listed in this table and only those with data for the year. There may be other significant compounds for which monitoring and/or health risk information are not available
Source: California Air Resources Board 2011b for the SCAQMD Riverside Rubidoux air monitoring station.

Long-term (chronic) exposure to diesel exhaust is likely to occur when a person works in a field where diesel is used regularly or experiences repeated exposure to diesel fumes over a long period of time. Human health studies demonstrate a correlation between exposure to diesel exhaust and increased lung cancer rates in occupational settings. Experimental animal inhalation studies of chronic exposure to diesel exhaust have shown that a range of doses causes varying levels of inflammation and cellular changes in the lungs. Human and laboratory studies have also provided considerable evidence that diesel exhaust is a likely carcinogen.

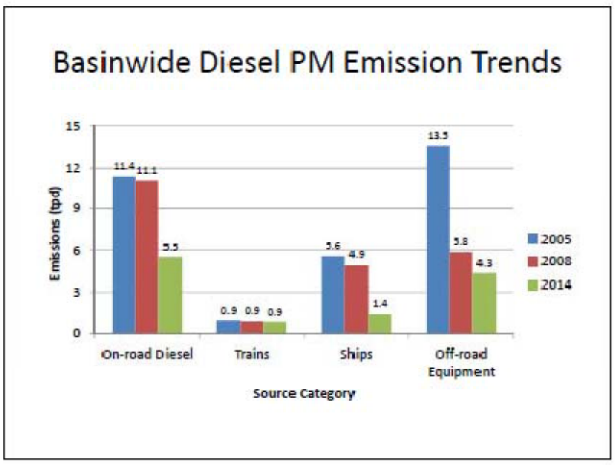
Several studies have occupational and ambient studies have documented the health effects due to exposure to diesel PM. The California Office of Environmental Health Hazards Assessment (OEHHA), in its role in assessing risk from environmental factors reviews such studies and makes recommendations on the way environmental risk should be evaluated through programs like the AB2588 Hot Spot Program. In its comprehensive assessment of diesel exhaust, OEHHA analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, 1950s era railroad workers, and equipment operators. The studies showed these workers were more likely to develop lung cancer than workers who were not exposed to diesel emissions. These studies provide strong evidence that long-term occupational exposure to diesel exhaust increases the risk of lung cancer (OEHHA, undated fact sheet). However, all of these studies were based on exposure to exhaust from traditional diesel engines and prior to the advent of highly efficient emissions controls like the diesel particulate filter. Based on these studies, the ARB identified diesel exhaust a toxic air contaminant in 1998.

Previous human studies on the carcinogenicity of diesel particulate matter descriptive of traditional diesel emissions (pre-model year 2007 compliant diesel trucks) demonstrated an increased risk of lung cancer, although the increased risk cannot be clearly attributed to diesel exhaust exposure (NTP 2005b). Several occupational and ambient studies have documented the health effects due to exposure to diesel PM. The California Office of Environmental Health Hazards Assessment (OEHHA), in its role in assessing risk from environmental factors reviews such studies and makes recommendations on the way environmental risk should be evaluated through programs like the AB2588 Hot Spot Program. In its comprehensive assessment of diesel exhaust, OEHHA analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, 1950's era railroad workers, and equipment operators. The studies showed these workers were more likely to develop lung cancer than workers who were not exposed to diesel emissions. These studies provided strong evidence that long-term occupational exposure to diesel exhaust increases the risk of lung cancer. However, all of these studies were based on exposure to exhaust from traditional diesel engines and prior to the advent of highly efficient emissions controls like the diesel particulate filter. Based on these studies, the ARB identified diesel exhaust a toxic air contaminant in 1998.

The identification of diesel PM as a carcinogenic substance set into motion the development and adoption of the ARB's Diesel Risk Reduction Plan (California Air Resources Board 2000). This plan recommends many control measures to reduce the risks associated with diesel PM and to achieve a

goal of 75 percent reduction by 2010 and 85 percent reduction by 2020 from the risks estimated in the year 2000. These control measures include reductions on both on-road and off-road vehicles, off-road construction equipment, stationary and portable diesel engines, marine engines, railroad locomotive engines, and transportation refrigeration units. Based on these control measures, diesel PM emissions have declined since 2000 and are expected to decline even further into the future.

A representation of this declining trend is shown below, which shows the trend in basin wide diesel PM emissions from several emission source categories (SCAQMD 2012b). As noted therein, decreases in diesel PM emissions of 52 percent are shown for on-road diesel emissions, 75 percent for ships, and 68 percent for off-road equipment from 2005 to 2014. Diesel PM emissions from rail locomotives show no change in levels during the period.



SCAQMD MATES Studies

The SCAQMD has conducted several extensive TAC measurement and air dispersion modeling campaigns known as the Multiple Air Toxics Exposure Study over the past decade; the most recent is MATES-IV (SCAQMD 2015). MATES-IV included a monitoring program, an updated emissions inventory of toxic air contaminants for the year 2012, and a modeling effort to characterize risk across the Basin. It focused on the carcinogenic risk from exposure to air toxics but does not estimate mortality or other health effects from particulate exposures. An additional focus of MATES-IV is the inclusion of measurements of ultrafine particle concentrations.

A key conclusion reached in MATES-IV was that the population weighted cancer risk in the Basin decreased by 57 percent compared with the MATES-III report (year 2005) indicating that overall, cancer risks are declining in the Basin as a result of the implementation of emission controls principally on large diesel trucks.

MATES-IV also concluded that diesel PM contributed 68 percent to the total cancer risk in the Basin with benzene and 1.3 Butadiene also making important contributions to cancer risk as shown in Exhibit 8 below.

The population-weighted cancer risk basin wide to exposures to toxic air contaminants was estimated at 367 in a million based on average risks estimated at ten fixed monitoring sites deployed across the air basin as part of the MATES-IV research program. This level of risk means that on average an estimated 367 individuals in the basin out of a population of one million individuals could contract cancer from exposure to all sources of toxic air contaminants over a lifetime of 70 years. A comprehensive air dispersion model and a detailed air toxics emission inventory were then used to estimate cancer risks at other locations where no monitoring sites were deployed. For reference, MATES-II (SCAQMD 2000) published in 2000 estimated the Basin population-weighted cancer risk at 931 in a million and 853 in a million in MATES-III (SCAQMD 2008). MATES-II reported using a TAC emission inventory in the 1998 to 1999 time period while MATES-III employed an emission inventory from 2005. Overall, the Basin population-weighted cancer risk has declined by about 60 percent during the time period from 1999 to 2012.

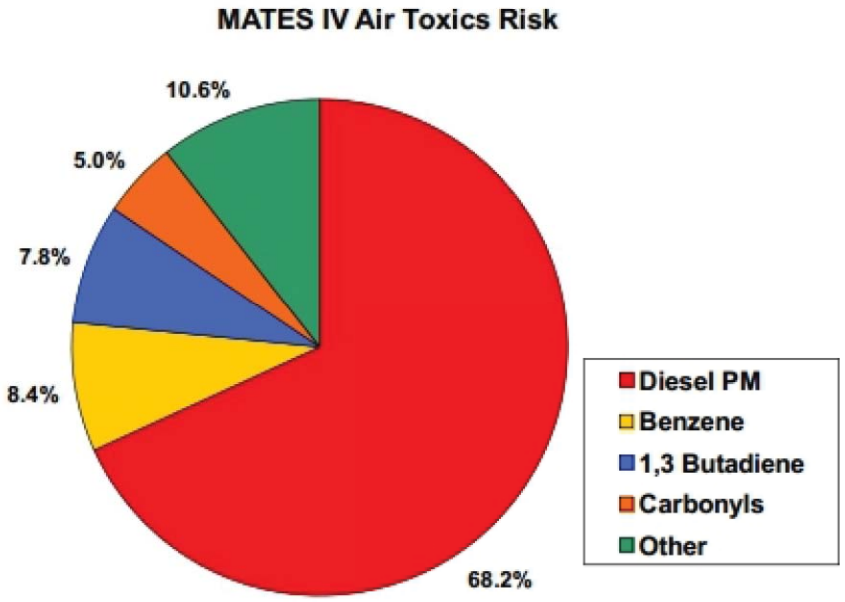
Exhibit 9 shows the change in estimated cancer risk between 2005 and 2012 as derived from the MATES-IV Study. As shown in Exhibit 9, nearly all areas of the Basin experienced decreases in cancer risk during the time period from MATES-III time period of 2005 to the MATES-IV time period of 2012. The project area also experienced a decrease in cancer risk of between 100 and 400 in one million from the years 2005 to 2012.

The average cancer risk in the project area is estimated to be 213 in a million based on the MATES-IV and ranges from 198 in a million at the southeast corner of the project to 239 in a million in the northern portion of the project as shown in Exhibit 10.

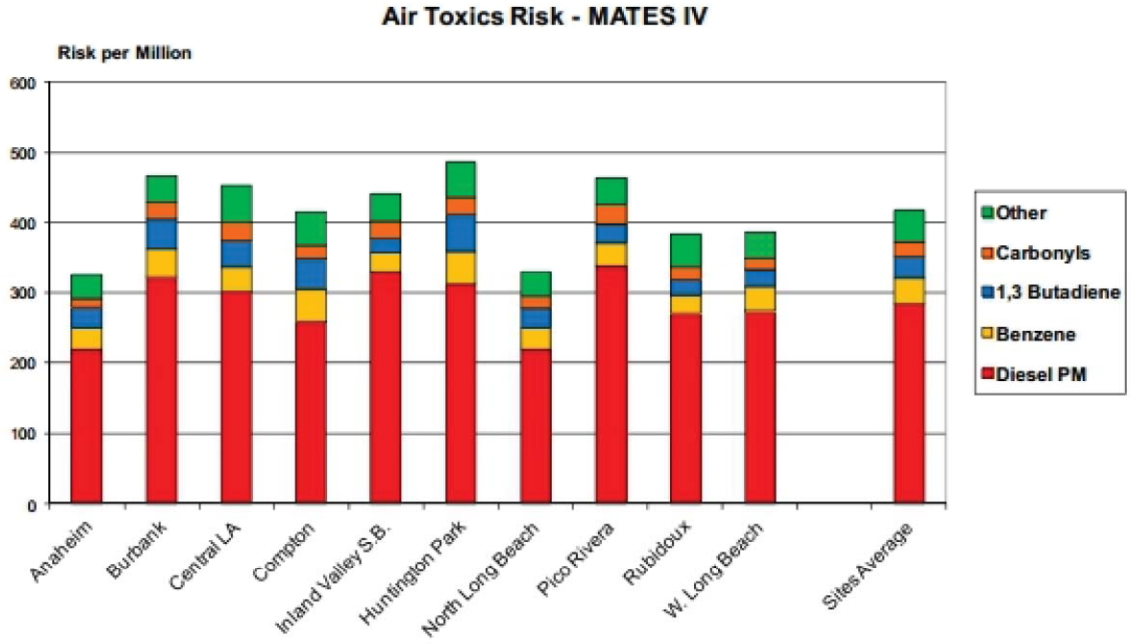
Exhibit 8 to Exhibit 10 depict the cancer risk estimates as a "snapshot in time." That is, the cancer risks are derived from air dispersion models and are based on the emissions of various TACs during the years 2005 and 2012 and most likely include diesel PM emissions from traditional diesel engines. The basic tenet used to estimate cancer risk assumes that the public will be exposed to these TAC emissions during an entire 70-year lifetime of continuous exposure. However, the SCAQMD, the ARB, and the EPA have adopted numerous regulations that have resulted in significant reductions in pollutant emissions with the attendant reductions in prevailing air quality levels since 2005 and 2012 as noted earlier. The benefits of substantial additional emission reductions derived from the adoption and application of SCAQMD, the ARB, and EPA regulations are not reflected in the estimates of cancer risks referred to in these exhibits.

Heath Effects Institute Heath Effects Study

More recently, in January 2015, a major new study published by the Health Effects Institute (HEI) evaluated the health impacts of "new technology diesel exhaust" (NTDE). Appendix H contains the HEI Research Report 184, which is also discussed herein. Beginning in 2001, EPA and the ARB begin issuing a series of regulations that require new diesel-powered vehicles and equipment to use the latest emissions control technology. This technology relies on two components.



Basinwide Risk: 418 per million
Based on Average of 10 Fixed Monitoring sites



Sources: SCAQMD MATES IV Report, 2014.

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Exhibit 8
Summary of SCAQMD MATES IV Cancer Risks

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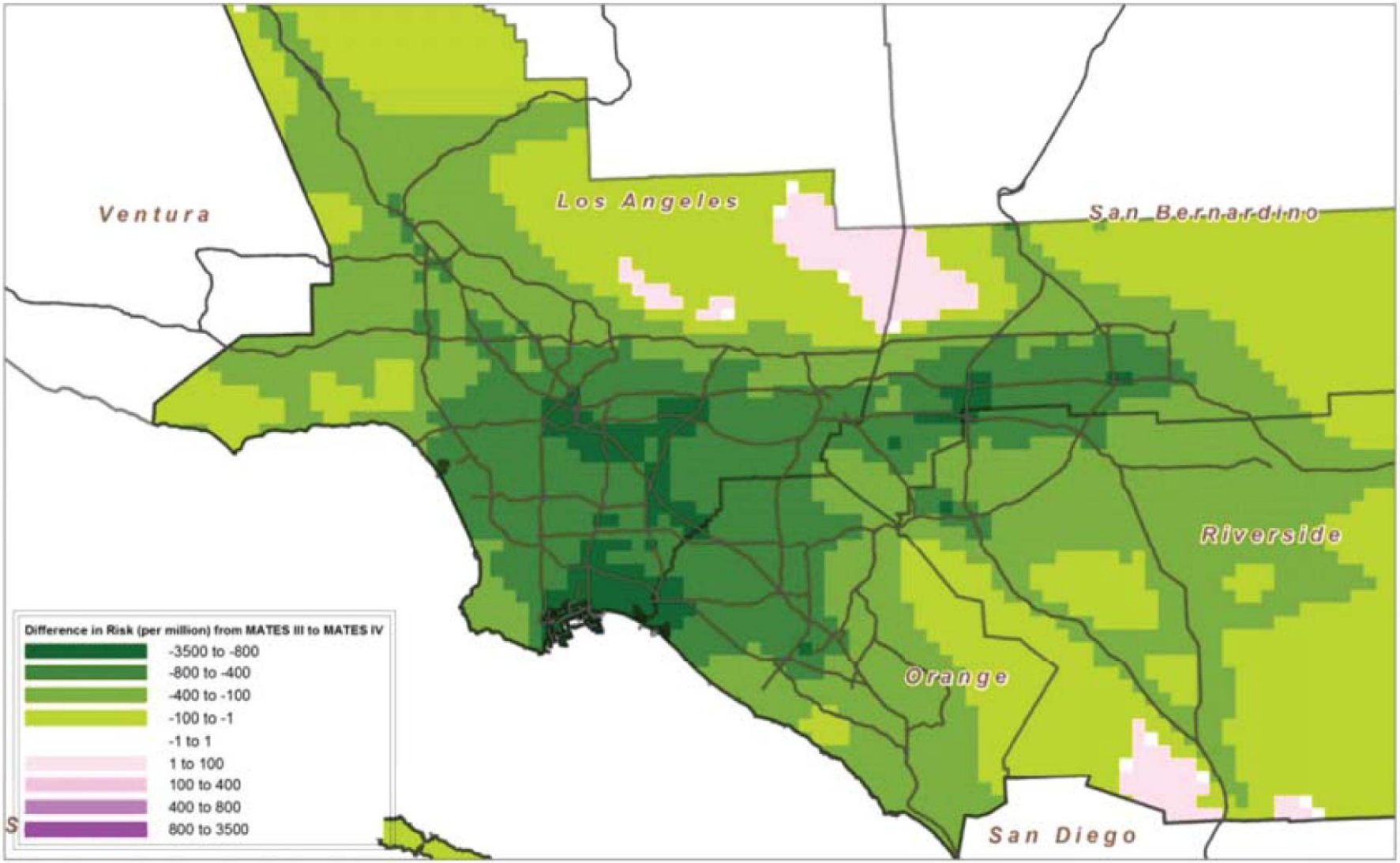

Source: South Coast Air Quality Management District MATES IV Report, 2014.

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Exhibit 9
Change in MATES IV Cancer Risks Between 2005 and 2012

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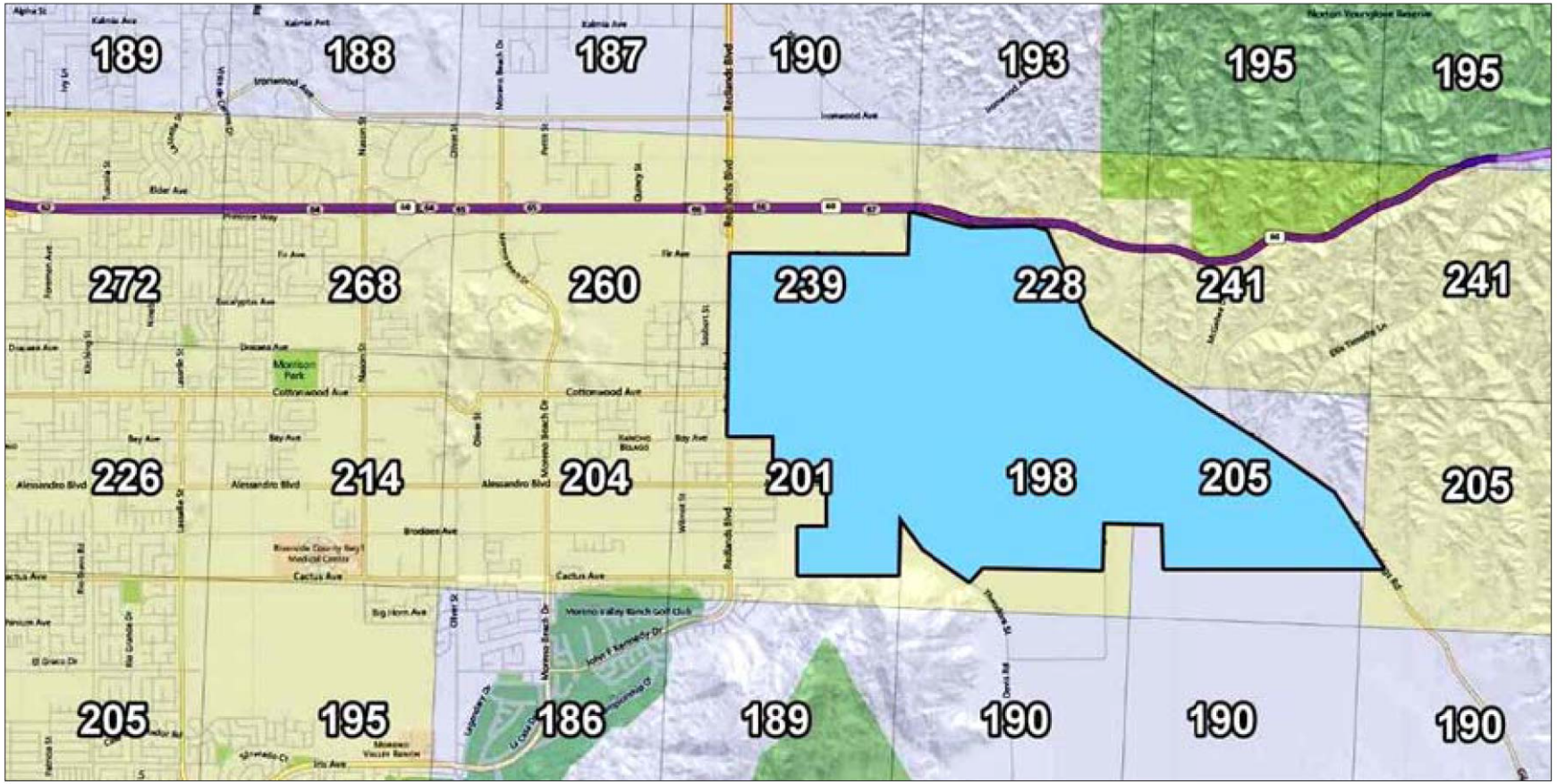

Numbers are estimated cancer risk per million individuals.

Source: South Coast Air Quality Management District MATES IV Report, 2014.

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Exhibit 10
Cancer Risks in Project Area - MATES IV

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The first emission control technology component is a diesel particulate filter, which is capable of reducing particulate matter emissions by over 90 percent (required for new engines beginning in 2007). The second technology is selective catalytic reduction, which reduces emissions of nitrogen oxides by over 90 percent (required for new engines beginning in 2010). Diesel emissions from engines equipped with this technology are referred to as new technology diesel exhaust. As a result of the advances in emission control technology, EPA, ARB, and other government and industry stakeholders commissioned a series of studies called the Advanced Collaborative Emissions Study (ACES). ACES has been guided by an ACES Steering Committee consisting of representatives of HEI and the Coordinating Research Council, [10] along with the U.S. Department of Energy, EPA, engine manufacturers, the petroleum industry, ARB, emission control manufacturers, the National Resources Defense Council, and others. The HEI, funded in part by the EPA, was selected to oversee Phase 3 of ACES.

Phase 3 of ACES evaluated whether emissions from new technology diesel engines cause cancer or other health effects. Specifically, it evaluated the health impacts of an 2007-compliant engine equipped with a diesel particulate filter. HEI found chronic exposure to new technology diesel exhaust did not induce tumors or pre-cancerous changes in the lung and did not increase tumors that were considered to be related to the exhaust in any other tissue in laboratory rats. Rats are the most sensitive laboratory animal species for evaluation of older technology diesel engines (pre-model year 2007), because of their sensitivity to high concentrations of particles (present in older technology diesel engines), compared with other species (including humans). The study also confirmed that the concentrations of particulate matter and toxic air pollutants emitted from new technology diesel are more than 90 percent lower than emissions from traditional older diesel engine. The primary conclusions research in the HEI study are as follows:

- "Lifetime inhalation exposure of rats exposed to one of three levels of NTDE [new technology diesel exhaust] from a 2007-compliant engine, for 16 hours per day, 5 days a week, with use of a strenuous operating cycle that more accurately reflected the real-world operation of a modern engine than cycles used in previous studies, did not induce tumors or pre-cancerous changes in the lung and did not increase tumors that were considered to be related to NTDE in any other tissue. A few mild changes were seen in the lungs, consistent with long-term exposure to NO2, a major component of NTDE, which is being further substantially reduced in 2010-compliant engines" (page 1).

- "Using appropriate statistical approaches to analyze the data from more than 100 endpoints in the broad areas of histology, serum chemistry, systemic and lung inflammation, and respiratory function, the investigators confirmed the a priori hypothesis, namely, that NTDE would not

[10] The Coordinating Research Council is a nonprofit organization that directs engineering and environmental studies on the interaction between automotive or other mobility equipment and petroleum products.

cause an increase in tumor formation or substantial toxic health effects in rats, although some biologic effects might occur" (page 3).

- "The overall conclusion was that chronic exposure of rats to NTDE did not produce tumors in the lung, in marked contrast to the effects of chronic exposure to TDE [traditional diesel exhaust] observed in multiple previous rat studies, in which lung tumors, as well as inflammation and the deposition of soot in the lung, were observed. Rather, the effects of NTDE in the lung more closely resembled changes noted after long-term exposures to gaseous oxidant pollutants, in particular NO2, and to TDE from which particles have been filtered out. It is possible that components of NTDE other than NO2 may have contributed to the effects reported, but the low levels of other components suggest that they would not be primarily responsible" (page 3).
- "Some mild histologic changes were found in the lung; however, these were not pre-cancerous lesions, previously described in long-term exposure studies of rats to TDE. Rather, the histologic changes — periacinar epithelial hyperplasia, bronchiolization, accumulation of macrophages, and periacinar interstitial fibrosis — were confined to a small region, the centriacinus, which is involved in gas exchange" (page 3)
- "The histologic changes in the lungs were consistent with previous findings in rats after long-term exposure to NO2 — a major component of the exposure atmosphere, which is being substantially further reduced in 2010-compliant engines" (page 4).
- "The primary motivation for this study was to investigate the potential for NTDE to cause pre-neoplastic lung lesions or primary lung neoplasia similar to those observed in previous studies of TDE. The literature suggests that the rat is the most sensitive laboratory animal species for evaluation of TDE, because of its sensitivity to high concentrations of particles (present in TDE), compared with other species (including humans)" (page 39).
- "The present findings strongly support the premise that advances in engine, fuel, and combustion technologies have substantially reduced the potential health impacts of DE [diesel exhaust] and that estimates of hazard and risk based on laboratory or epidemiologic studies of the health impacts of TDE exposures most likely do not reflect either the hazards or the risks from NTDE" (page 40).
- "As shown, the ACES Phase I study (Khalek et al. 2009) found that emissions from 2007-compliant engines were reduced more than 90% compared with those from a 2004 engine; emissions of hydrocarbons and other air toxics by 2007-compliant engines were also lower by more than 80% than those of older engines" (page 154).
- "Regarding the question of whether the toxicity per unit mass of the PM emitted from the 2007-compliant engines was changed compared with older engines, the Panel pointed out that ACES was not designed to investigate this question. Consequently, the most straightforward inference would be that the steep drop in particle mass and levels of organic components in

> NTDE significantly decreased the overall toxicity of NTDE compared with the toxicity of TDE" (page 155).

The HEI study clearly demonstrates that the application of new emissions control technology to diesel engines have virtually eliminated the health impacts of diesel exhaust.

Non-Cancer Health Effects

Some short-term (acute) effects of diesel exhaust include eye, nose, throat, and lung irritation, and can cause coughs, headaches, light-headedness, and nausea. Diesel exhaust is a major source of ambient particulate matter pollution as well, and numerous studies have linked elevated particle levels in the air to increase hospital admission, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems (OEHHA 2002).

Conservative Nature of Health Risk Assessments

The current methodological protocols ("Current OEHHA Guidance") recommended by the OEHHA when studying the health risk posed by diesel PM assume the following: (1) 24-hour constant exposure; (2) 350 days a year (the OEHHA assumption that allows for a 2-week period away from home each year); (3) for a continuous period lasting 30 years. These are extremely conservative assumptions that are not replicated in reality. Most people are indoors for 18 to 20 hours a day (at their place of employment, school or home) and most people do not live in the same location for a 30-year period. The application of the "Current OEHHA Guidance" incorporates additional levels of conservatism by focusing on the increased sensitivity of very young children to exposures to TACs.

However, as noted earlier, the recent Health Effects Institute health effects study (see Appendix H) concluded that the diesel emissions from new technology diesel engines did not cause cancer in laboratory animals.

Alternate Views on Diesel PM Risk

Some health effects researchers, such as Dr. James E. Enstrom with the University of California, Los Angeles, believe that the risk from diesel PM is exaggerated. Dr. Enstrom calls into question some of the basic research on the declaration of diesel exhaust as a toxic air contaminant. In particular, Dr. Enstrom states the following:

> . . . There is substantial new epidemiologic evidence relevant to the health effects of diesel exhaust that was not considered when the 1998 toxic air contaminant declaration was made. For instance, the 2007 paper by Francine Laden et al. measured death rates during 1985-2000 among 54,000 members of the unionized U.S. trucking industry…This cohort, which included 36,000 diesel truck drivers, had death rates from all causes and all cancer that were substantially below the rates among US males. Furthermore, unlike earlier evidence that was used in the TAC declaration, this cohort did not have a substantially elevated lung cancer death rate (Enstrom 2008, page 2).

Dr. Enstrom also indicates that the premature mortality calculation in the report, "Quantification of the Health Impacts and Economic Valuation of Air Pollution from Ports and Goods Movement in California," is exaggerated. Dr. Enstrom's analysis "found no relationship between $PM_{2.5}$ and mortality in elderly Californians during 1983-2002 . . ." (Enstrom 2008, page 2).

State of California

Emission Reduction Funding

Carl Moyer Memorial Air Quality Standards Attainment Program. Since 1998, the Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) has provided funding to encourage the voluntary purchase of cleaner engines, equipment, and emission reduction technologies. The Carl Moyer Program plays a complementary role to California's regulatory program by funding emission reductions that are surplus, i.e., early and/or in excess of what is required by regulation. The Carl Moyer Program accelerates the turnover of old highly polluting engines, speeds the commercialization of advanced emission controls, and reduces air pollution impacts on environmental justice communities. Emission reductions achieved through the Carl Moyer Program are an important component of the California State Implementation Plan.

Regulation for Construction-Related Equipment

Airborne Toxic Control Measure for Diesel Particulate Matter from Portable Engines Rated at 50 horsepower and Greater. The purpose of this measure is to reduce diesel particulate matter emissions from portable diesel-fueled engines with a horsepower of 50 or greater. Each fleet is required to comply with weighted reduced particulate matter emission fleet averages by compliance dates listed in 17 California Code of Regulations Section 93116. Portable equipment includes but is not limited to air compressors, generators, concrete pumps, tub grinders, wood chippers, water pumps, drill rigs, pile drivers, rock drills, abrasive blasters, aggregate screening and crushing plants, concrete batch plants, and welders.

ARB Regulation for In-Use Off-Road Diesel Vehicles (Off-Road Regulation), Title 13, Article 4.8, Chapter 9, Section 2449 in the California Code of Regulations. On July 26, 2007, the ARB adopted a regulation to reduce particulate matter and NO_X emissions from in-use (existing) off-road heavy-duty diesel vehicles in California. All self-propelled off-road diesel vehicles over 25 horsepower (hp) used in California and most two-engine vehicles (except on-road two-engine sweepers) are subject to this regulation. This includes vehicles that are rented or leased (rental or leased fleets). Such vehicles are used in construction, mining, and industrial operations. The Off-Road regulation:

- Imposes limits on idling (no more than five consecutive minutes) and requires a written idling policy;
- Requires a disclosure when selling vehicles;

- Requires all vehicles to be reported to ARB (using the Diesel Off-Road Online Reporting System, DOORS) and labeled;
- Restricts adding older equipment into fleets; and
- Requires fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies (i.e., exhaust retrofits).

Regulations for Heavy-Duty Vehicles/Trucks

ARB Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling adopts new section 2485 within Chapter 10, Article 1, Division 3, title 13 in the California Code of Regulations. The measure limits the idling of diesel vehicles (i.e., commercial trucks over 10,000 pounds) to reduce emissions of toxics and criteria pollutants. The driver of any vehicle subject to this section: (1) shall not idle the vehicle's primary diesel engine for greater than five minutes at any location; and (2) shall not idle a diesel-fueled auxiliary power system for more than five minutes to power a heater, air conditioner, or any ancillary equipment on the vehicle if it has a sleeper berth and the truck is located within 100 feet of a restricted area (homes and schools).

ARB Requirements to Reduce Idling Emissions from New and In-Use Trucks. Amendments were made to Title 13 in California Code of Regulations in Sections 1956.8, 2404, 2424, 2425, and 2485. The amendment states: "all new 2008 and subsequent model-year heavy-duty diesel engines shall be equipped with an engine shutdown system that automatically shuts down the engine after 300 seconds of continuous idling operation once the vehicle is stopped, the transmission is set to 'neutral' or 'park,' and the parking brake is engaged. If the parking brake is not engaged, then the engine shutdown system shall shut down the engine after 900 seconds of continuous idling operation once the vehicle is stopped and the transmission is set to 'neutral' or 'park.'" There are a few conditions where the engine shutdown system can be overridden to prevent engine damage. Any project trucks manufactured after 2008 would be consistent with this rule, which would ultimately reduce air emissions.

Statewide Truck and Bus Regulation (Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants, from In-Use Heavy-Duty Diesel-Fueled Vehicles, Title 13, California Code of Regulations, Section 2025). On December 12, 2008, the ARB approved this regulation to reduce emissions from existing on-road diesel trucks and buses operating in California. This regulation applies to all on-road heavy-duty diesel-fueled vehicles with a gross vehicle weight rating greater than 14,000 pounds, agricultural yard trucks with off-road certified engines, and certain diesel fueled shuttle vehicles of any gross vehicle weight rating. Out-of-state trucks and buses that operate in California are also subject. Under the regulation, older, heavier trucks (i.e. those with pre-2000 year engines and a gross vehicle weight rating greater than 26,000 pounds), are required to have installed a particulate matter filter and must be replaced with a 2010 engine between 2015 and 2020, depending on the model year. By 2015, all heavier pre-1994 trucks must be upgraded to 2010 engines and newer trucks are thereafter required to be replaced over the

next eight years. Older, more polluting trucks are required to be replaced first, while trucks that already have relatively clean 2007-2009 engines are not required to be replaced until 2023. Lighter trucks (14,001-26,000 pounds) must adhere to a similar schedule. Furthermore, nearly all trucks that are not required under the Truck and Bus Regulation to be replaced by 2015 are required to be upgraded with a particulate matter filter by that date.

2.2.2 - South Coast Air Quality Management District

The agency for air pollution control for the South Coast Air Basin (basin) is the South Coast Air Quality Management District (SCAQMD). The SCAQMD is responsible for controlling emissions primarily from stationary sources. The SCAQMD maintains air quality monitoring stations throughout the basin.

The SCAQMD also creates and enforces rules and regulations. The rules and regulations that apply to this project include, but are not limited to, those in Section 1.6, Standard Conditions (see page 47 of this report).

Air Quality Management Plans

SCAQMD, in coordination with the Southern California Association of Governments, is also responsible for developing, updating, and implementing the Air Quality Management Plan (AQMP) for the basin. An AQMP is a plan prepared and implemented by an air pollution district for a county or region designated as nonattainment of the federal and/or California ambient air quality standards. The term "nonattainment" is used to refer to an air basin where one or more ambient air quality standards are exceeded.

2003 AQMP

One of the purposes of the 2003 AQMP is to lead the basin and portions of the Salton Sea Air Basin under SCAQMD jurisdiction into compliance with the 1-hour ozone and PM_{10} federal standards (South Coast Air Quality Management District 2003).

The 2003 AQMP also replaced the 1997 attainment demonstration for the federal CO standard, provided a basis for a maintenance plan for CO for the future, and updated the maintenance plan for the federal nitrogen dioxide standard that the South Coast Air Basin has met since 1992 (2003 AQMP, page 1-1).

The 2003 AQMP also incorporated new scientific data in the form of updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools. The ARB approved the 2003 AQMP on August 1, 2003. The EPA's adequacy finding on the emissions budgets for conformity determination in the basin was published in the Federal Register (69 FR 15325-15326).

2007 AQMP

The 2007 AQMP was adopted by the SCAQMD on June 1, 2007 (South Coast Air Quality Management District 2007b). The SCAQMD Board adopted the 2007 Final AQMP Transportation Conformity Budgets and directed the Executive Officer to forward them to ARB for its approval and subsequent submittal to the EPA. On September 27, 2007, ARB adopted the State Strategy for the 2007 State Implementation Plan and the 2007 AQMP as part of the State Implementation Plan.

One of the purposes of the 2007 AQMP is to lead the basin into compliance of the federal 8-hour ozone and $PM_{2.5}$ standards. The 2007 AQMP outlines a detailed strategy for meeting the federal health-based standards for $PM_{2.5}$ by 2015 and 8-hour ozone by 2024 while accounting for and accommodating future expected growth. The 2007 AQMP incorporates significant new emissions inventories, ambient measurements, scientific data, control strategies, and air quality modeling. Most of the reductions would be from mobile sources, which were then responsible for about 75 percent of all smog and particulate forming emissions. The 2007 AQMP includes 37 control measures proposed for adoption by the SCAQMD, including measures to reduce emissions from new commercial and residential developments, more reductions from industrial facilities, and reductions from wood burning fireplaces and restaurant charbroilers.

2012 AQMP

The 2012 AQMP was adopted December 7, 2012 (South Coast Air Quality Management District 2012c). The purpose of the 2012 AQMP for the Basin is to set forth a program that will lead the Basin into compliance with the federal 24-hour $PM_{2.5}$ air quality standard, and to provide an update of the Basin's projections in meeting the federal 8-hour ozone standards. The AQMP was adopted by the SCAQMD Governing Board; therefore, it was submitted to the EPA as the State Implementation Plan (SIP) for the federal 2006 24-hour $PM_{2.5}$ standard. In addition, the AQMP will update specific elements of the previously approved 8-hour ozone SIP: 1) an updated emissions inventory and, 2) new control measures and commitments for emissions reductions to help fulfill the Section 182(e)(5) portion of the 8-hour ozone SIP.

The 2012 AQMP states, "The remarkable historical improvement in air quality since the 1970's is the direct result of Southern California's comprehensive, multiyear strategy of reducing air pollution from all sources as outlined in its AQMPs" (SCAQMD 2012, page ES-1).

The 2012 AQMP proposes Basin-wide $PM_{2.5}$ measures that will be implemented by the 2014 attainment date, episodic control measures to achieve air quality improvements (would only apply during high $PM_{2.5}$ days), Section 182(e)(5) implementation measures (to maintain progress towards meeting the 2023 8-hour ozone national standard), and transportation control measures. Most of the control measures focus on incentives, outreach, and education.

Proposed $PM_{2.5}$ reduction measures in the 2012 AQMP include the following:

- Further NO_X reductions from the SCAQMD's REgional CLean Air Incentives Market (RECLAIM) program. The RECLAIM program was adopted by the SCAQMD in October 1993 and set an emissions cap and declining balance for many of the largest facilities emitting NO_x and SOx in the South Coast Air Basin. RECLAIM includes over 350 participants in its NO_x market and about 40 participants in its SOx market. RECLAIM has the longest history and practical experience of any locally designed and implemented air emissions cap and trade program. RECLAIM allows participating facilities to trade air pollution while meeting clean air goals.
- Further reductions from residential wood burning devices.
- Further reductions from open burning.
- Emission reductions from under-fired charbroilers.
- Further ammonia reductions from livestock waste.
- Backstop measures for indirect sources of emissions from ports and port-related sources.
- Further criteria pollutant reductions from education, outreach and incentives.

There are multiple VOC and NO_X reductions in the 2012 AQMP to attempt to reduce ozone formation, including further VOC reductions from architectural coatings, miscellaneous coatings, adhesives, solvents, lubricants, and mold release products.

The 2012 also contains proposed mobile source implementation measures for the deployment of zero- and near-zero emission on-road heavy-duty vehicles, locomotives, and cargo handling equipment. There are measures for the deployment of cleaner commercial harborcraft, cleaner ocean-going marine vessels, cleaner off-road equipment, and cleaner aircraft engines.

The 2012 AQMP proposes the following on-road mobile source implementation measures:

- Accelerated penetration of partial zero-emission and zero-emission vehicles. This measure proposes to continue incentives for the purchase of zero-emission vehicles and hybrid vehicles with a portion of their operation in an all-electric range mode. The state Clean Vehicle Rebate Pilot program is proposed to continue from 2015 to 2023 with a proposed funding for up to $5,000 per vehicle. The measure seeks to provide funding assistance for up to 1,000 zero-emission or partial-zero emission vehicles per year.
- Accelerated penetration of partial zero-emission and zero-emission light-heavy and medium-heavy duty vehicles through funding assistance for purchasing the vehicles. The objective of the proposed action is to accelerate the introduction of advanced hybrid and zero-emission technologies for Class 4 through 6 heavy-duty vehicles. The state is currently implementing a

Hybrid Vehicle Incentives Project program to promote zero-emission and hybrid heavy-duty vehicles. The proposed measure seeks to continue the program from 2015 to 2023 to deploy up to 1,000 zero- and partial-zero emission vehicles per year with up to $25,000 funding assistance per vehicle. Zero-emission vehicles and hybrid vehicles with a portion of their operation in an all-electric range mode would be given the highest priority.

- Accelerated retirement of older light-, medium-, and heavy-duty vehicles through funding incentives.
- Further emission reductions from heavy-duty vehicles serving near-dock rail yards. This proposed control measure calls for a requirement that any cargo container moved between the ports of Los Angeles and Long Beach to the nearby rail yards be with zero-emission technologies. The measure would be fully implemented by 2020 through the deployment of zero-emission trucks or any alternative zero-emission container movement system such as a fixed guideway system. The measure calls for the ARB to either adopt a new regulation or amend an existing regulation to require such deployment by 2020.

The 2012 AQMP proposes the following off-road mobile source implementation measures:

- Extension of the SOON[11] provision for construction/industrial equipment, which provides funding to re-power or replace older Tier 0 and Tier 1 equipment.
- Further emission reductions from freight and passenger locomotives, which calls for an accelerated use of Tier 4 locomotives in the Basin.
- Further emission reductions from ocean-going marine vessels while at berth
- Emission reductions from ocean-going marine vessels.

The 2012 AQMP also relies upon the Southern California Association of Governments regional transportation strategy, which is in its adopted 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and 2011 Federal Transportation Improvement Program, which contains the following sections:

1. Linking regional transportation planning to air quality planning: making sure that the regional transportation plan supports the goals and objectives of the AQMP/SIP.
2. Regional transportation strategy and transportation control measures: the RTP/SCS contains improvements to the regional multimodal transportation system including the following: active transportation (non-motorized transportation - biking and walking); transportation

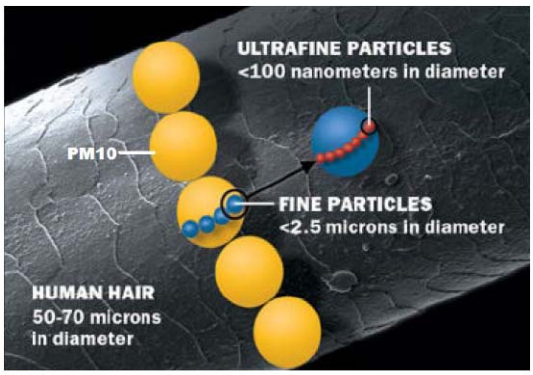
[11] The SCAQMD's Surplus Off-Road Opt-In for NOx (SOON) Program provides funding assistance to applicable fleets for the purchase of commercially available low-emission heavy-duty engines to achieve near-term reduction of NOx emissions from in-use off-road diesel vehicles. In 2008, the SCAQMD Board approved setting aside funding for this purpose. The SCAQMD is currently seeking off-road engine repower or vehicle replacement projects under the SOON Program.

demand management; transportation system management; transit; passenger and high-speed rail; goods movement; aviation and airport ground access; highways; arterials; and operations and maintenance.

3. Reasonably available control measure analysis.

2.2.3 - Ultrafine Particles

Ultrafine particles are particulate matter (PM) that exists in the ambient air and are less than 0.1 micrometer (µm or microns) in diameter. Ultrafine particles (UFP or $PM_{0.1}$) are included in the group called $PM_{2.5}$, particulate matter less than 2.5 micrometers in diameter.



The picture to the right (source: Levin 2012) displays the relative size of the particles compared with a human hair, with PM_{10} (particulate matter less than 10 micrometers in diameter) indicated as yellow circles, $PM_{2.5}$ shown as blue circles, and ultrafine particles shown as red circles.

The ARB or the EPA have not set an ambient air quality standard for ultrafine particles because health effect evidence and measurements are currently limited. In its recent revisions to the national ambient air quality standards for particulate matter, the EPA states, "In considering both the currently available health effects evidence and the air quality data, the Policy Assessment concluded that this information was still too limited to provide support for consideration of a distinct PM standard for ultrafine particles" (EPA 2013, page 3122).

The EPA indicates that evidence and research regarding health effects from short-term and long-term exposure to ultrafine particles are still too limited to establish a standard for ultrafine particles. In addition, the EPA reports that the studies that do exist have reported inconsistent and mixed results. The following is an excerpt from the Federal Register illustrating this point:

> New evidence, primarily from controlled human exposure and toxicological studies, expands our understanding of cardiovascular and respiratory effects related to short-term ultrafine particle exposures. However, the Policy Assessment concluded that this evidence was still very limited and largely focused on exposure to diesel exhaust, for which the Integrated Science Assessment concluded it was unclear whether the effects observed are due to ultrafine particles, larger particles within the $PM_{2.5}$ mixture, or the gaseous components of diesel exhaust. In addition, the Integrated Science Assessment noted uncertainties associated with the controlled human exposure studies using concentrated ambient particle systems, which have been shown to modify the composition of ultrafine particles.

> The Policy Assessment recognized that there are relatively few epidemiological studies that have examined potential cardiovascular and respiratory effects associated with short-term exposures to ultrafine particles. These studies have reported inconsistent and mixed results.
>
> Collectively, in considering the body of scientific evidence available in this review, the Integrated Science Assessment concluded that the currently available evidence was suggestive of a causal relationship between short-term exposures to ultrafine particles and cardiovascular and respiratory effects. Furthermore, the Integrated Science Assessment concluded that evidence was inadequate to infer a causal relationship between short-term exposure to ultrafine particles and mortality as well as long-term exposure to ultrafine particles and all outcomes evaluated (EPA 2013, page 3121).

The Integrated Science Assessment for Particulate Matter (EPA 2009d) concluded that evidence is inadequate to determine a causal relationship between short-term exposures of ultrafine particles to mortality or central nervous system effects, but that the evidence is suggestive of short-term (24-hour) exposures causing cardiovascular and respiratory effects. The assessment also concluded that there is inadequate evidence linking long-term exposure (typically measured in terms of an annual concentration) of ultrafine particles to health effects, including respiratory, developmental, cancer, and mortality. Overall, epidemiological studies of atmospheric PM suggest that cardiovascular effects are associated with smaller particles, but there are few reports that make a clear link between ultrafine particle exposures and increased mortality.

In January 2015, a study on the relationship of mortality to long-term exposure to fine and ultra-fine particles was released (Ostro et al 2015). The study found there was a relationship between mortality and both fine and ultrafine particles exposure.

In its Quantitative Health Risk Assessment for Particulate Matter, the EPA did not assess ultrafine particles, stating ". . . that there was insufficient data to support a quantitative risk assessment for other size fractions (e.g., ultrafine particles)" (EPA 2010, page 2-4).

The availability of measurements of ultrafine particles to support health studies is also limited, as shown in the following excerpt:

> With respect to our understanding of ambient ultrafine particle concentrations, at present, there is no national network of ultrafine particle samplers; thus, only episodic and/or site-specific data sets exist. Therefore, the Policy Assessment recognized a national characterization of concentrations, temporal and spatial patterns, and trends was not possible at this time, and the availability of ambient ultrafine measurements to support health studies was extremely limited. In general, measurements of ultrafine particles are highly dependent on monitor location and, therefore, more subject to exposure error than accumulation mode particles.

> Furthermore, the number of ultrafine particles generally decreases sharply downwind from sources, as ultrafine particles may grow into the accumulation mode by coagulation or condensation. Limited studies of ambient ultrafine particle measurements have suggested that these particles exhibit a high degree of spatial and temporal heterogeneity driven primarily by differences in nearby source characteristics. Internal combustion engines and, therefore, roadways are a notable source of ultrafine particles, so concentrations of these particles near roadways are generally expected to be elevated. Concentrations of ultrafine particles have been reported to drop off much more quickly with distance from roadways than fine particles (EPA 2013, page 3121).

In addition, it was hypothesized that chemical composition of PM may be a better predictor of health effects than particle size, as shown in the following excerpt:

> In addressing the issue of particle composition, the Integrated Science Assessment concluded that, '[f]rom a mechanistic perspective, it is highly plausible that the chemical composition of PM would be a better predictor of health effects than particle size.' Heterogeneity of ambient concentrations of $PM_{2.5}$ constituents (e.g., elemental carbon, organic carbon, sulfates, nitrates) observed in different geographical regions as well as regional heterogeneity in $PM_{2.5}$-related health effects reported in a number of epidemiological studies are consistent with this hypothesis (EPA 2013, page 3122).

The SCAQMD's Multiple Air Toxics Exposure Study (MATES-IV) states, "the health impact caused by exposure to UFPs [ultrafine particles] is still not well-understood" (SCAQMD 2015). MATES-IV presents measurements of black carbon and ultrafine particles at 10 fixed sites within the Basin. The results indicate that the highest black carbon levels were at more urban sites located near major roadways. Black carbon was not measured in the previous MATES-III; however, elemental carbon levels decreased about 35 percent during from 2005 to 2012. Black carbon is a term used for elemental and graphitic components of soot.

The SCAQMD's 2012 Air Quality Management Plan (AQMP) contains a detailed chapter on near roadway exposure and ultrafine particles. The AQMP summarizes current health effect research on ultrafine particles. The potential health effects from ultrafine particle exposure are similar to those of $PM_{2.5}$ and PM_{10}: adverse cardio-respiratory responses including elevated blood pressure, and mild inflammatory and prothrombotic (obstruction of circulation) responses.

The AQMP indicated that future research and assessment is needed in the following areas:

- **Chemical Composition.** Chemical composition of ultrafine particles depends on many factors, including vehicle technology, fuel, and atmospheric chemical reactions after being

emitted. Particle composition may be a factor determining particle toxicity; therefore, knowledge regarding the chemistry is important.

- **Formation.** More research is needed regarding the processes leading to ultrafine particle formation.
- **Standardized Measurement Methods and Procedures.** Currently, there is no standard method for conducting size-classified or particle-number measurements. Characteristics measured in ambient and emission-testing studies are highly dependent on the measurement instrument/protocol used and its setting.
- **Measurements at Hot Spot Locations.** More measurements should be taken at "hot spots" where large numbers of vehicles are operated.
- **Emissions Inventories.** Vehicle emission factors for different particle size ranges and for particle numbers are highly uncertain, and there are no emission inventories for ultrafine particles from motor vehicles. New estimations of ultrafine particle levels should not be derived solely from vehicle emission factors (i.e., EMFAC), but have to include predictions for formation near the tailpipe and in the atmosphere.
- **Air Quality Modeling.** Modeling tools will need to be developed to simulate the formation and transport over a wide range of atmospheric conditions and emissions scenarios. The dispersion near the first few hundred meters of the roadway needs to be better understood.
- **Health Effects.** New toxicological and epidemiological studies targeting exposure to controlled and uncontrolled emissions from gasoline and diesel vehicles are needed to better characterize the exposure-response relationships to ultrafine particles and to help develop health guidelines and potential regulations. The health effects of inorganic ultrafine particle emissions from vehicles are only now starting to receive significant attention.
- **Other Sources.** More work is needed to better understand size, composition, and health impact of particles near stationary sources and other processes (rather than just motor vehicles).

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SECTION 3: CLIMATE CHANGE SETTING

3.1 - Climate Change

Climate change is a change in the average weather of the earth that is measured by alterations in wind patterns, storms, precipitation, and temperature. These changes are assessed using historical records of temperature changes occurring in the past, such as during previous ice ages. Many of the concerns regarding climate change use this data to extrapolate a level of statistical significance specifically focusing on temperature records from the last 150 years (the Industrial Age) that differ from previous climate changes in rate and magnitude.

The United Nations Intergovernmental Panel on Climate Change (IPCC) constructed several emission trajectories of greenhouse gases needed to stabilize global temperatures and climate change impacts. In its Fourth Assessment Report, the IPCC predicted that the global mean temperature change from 1990 to 2100, given six scenarios, could range from 1.1 degrees Celsius (°C) to 6.4°C. Regardless of analytical methodology, global average temperatures and sea levels are expected to rise under all scenarios (Intergovernmental Panel on Climate Change 2007a). The report also concluded that "[w]arming of the climate system is unequivocal,[12] as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level" (IPCC 2007a, page 30) and that, "[m]ost of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations" (IPCC 2007a, page 39).

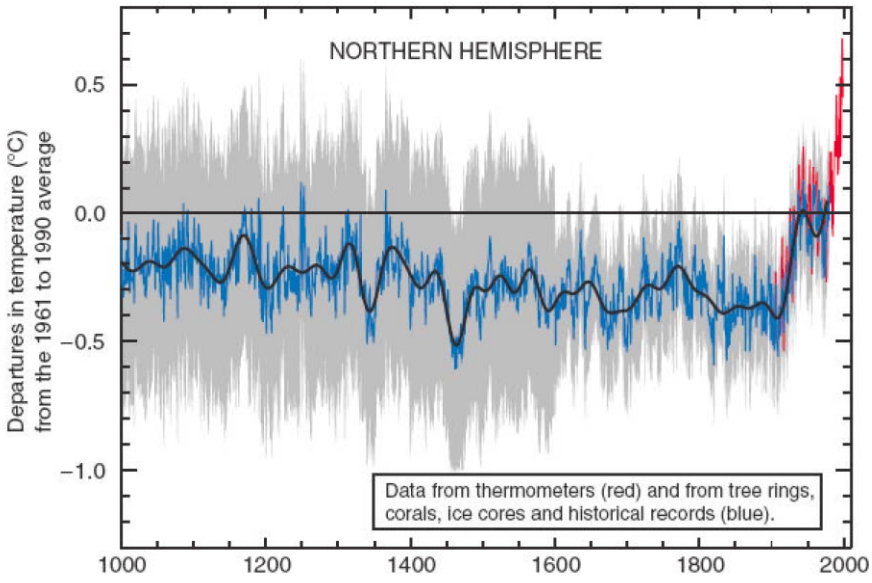
The IPCC published its Fifth Assessment Report, which states something similar: "Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased" (IPCC 2013, page 2). In addition, "Human influence on the climate system is clear. This is evident from the increasing greenhouse gas concentrations in the atmosphere, positive radiative forcing, observed warming, and understanding of the climate system" (IPCC 2013, page 13).

However, some scientists disagree with the conclusions in the IPCC report. Some question the validity of the temperature graph used by the IPCC in some form in the Third and Fourth Assessment Reports. The graph is shown in the figure below (source IPCC 2001). The figure shows that temperatures are relatively stable until 1900, when the temperature increases rapidly. Some scientists that have had trouble duplicating the data used for the graph (McIntyre and McKitrick 2003) indicated when the data is correctly handled, it "shows the 20th century climate to be unexceptional compared to earlier centuries" (McKitrick 2005, page 13). Hans von Storch, a German climate

[12] The definition of unequivocal: leaving no doubt.

scientist, claimed that the methods used by Mann et al. probably underestimated the temperature fluctuations in the past by a factor of two or more (Von Storch et al. 2004).

Historical Temperature Changes



Source: Intergovernmental Panel on Climate Change, 2001.

Consequences of Climate Change in California

In California, climate change may result in consequences such as the following (from California Climate Change Center 2006 and Moser et al. 2009).

- **A reduction in the supply of water from the Sierra snowpack.** If greenhouse gas emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent. This can lead to challenges in securing adequate water supplies. It can also lead to a potential reduction in hydropower.
- **Increased risk of large wildfires.** Precipitation, winds, temperature, and vegetation influence wildfire risk; therefore, wildfire risk is not uniform throughout the state. Changes in current precipitation patterns could influence that risk. As an example, in *southern* California, if rain increases as temperatures rise, wildfires in the grasslands and chaparral ecosystems are estimated to increase by approximately 30 percent toward the end of the 21st century because more winter rain will stimulate the growth of more plant "fuel" available to burn in the fall. In *northern* California, a drier climate could promote up to 90 percent more fires by drying out and increasing the flammability of forest vegetation.
- **Reductions in the quality and quantity of certain agricultural products.** The crops and products likely to be adversely affected include wine grapes, fruit, nuts, and milk.

- **Exacerbation of air quality problems.** If temperatures rise to the medium warming range, there could be 75 to 85 percent more days of weather conducive to ozone formation in Los Angeles and the San Joaquin Valley, relative to today's conditions. This increase in air quality problems could result in an increase in asthma and other health-related problems.
- **A rise in sea levels resulting in the displacement of coastal businesses and residences.** During the past century, sea levels along California's coast have risen about seven inches. If emissions continue unabated and temperatures rise into the higher anticipated warming range, sea level is expected to rise an additional 22 to 35 inches by the end of the century. Elevations of this magnitude would inundate coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats.
- **An increase in temperature and extreme weather events.** Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in California. More heat waves can exacerbate chronic disease or heat-related illness.
- **A decrease in the health and productivity of California's forests.** Climate change can cause an increase in wildfires, an enhanced insect population, and establishment of non-native species.

Air Quality

Although some studies indicate that air quality will get worse with climate change, the IPCC's most recent report indicates that the range in projections of air quality (ozone and PM2.5 in near-surface air) is driven primarily by emissions, rather than by physical climate change (IPCC 2013). In addition, the report indicates that there is high confidence that globally, warming decreases background surface ozone. However, locally higher surface temperatures in polluted regions can trigger regional feedbacks to increase levels of ozone and PM2.5 (IPCC 2013).

Wildfires

Climate change could result in increased wildfires, as discussed as follows:

> In recent years, wildfires have increased in frequency, duration, and size. The forested area burned in the western United States from 1987 to 2003 is 6.7 times the area burned from 1970 to 1986. A century of fire suppression has led to increased forest densities and accumulation of fuel wood that can result in more severe fires when this excess buildup of fuel is ignited. However, warmer temperatures and longer dry seasons are the main reasons for the increasing trend in forest wildfire risk. Reduced winter precipitation and early spring snowmelt deplete the moisture in soils and vegetation, leading to longer growing seasons and drought. These increasingly dry conditions provide more favorable conditions for ignition. In addition, higher temperatures increase evaporative water loss from vegetation, increasing the risk of rapidly spreading and large fires. In the last three decades the

> wildfire season in the western United States has increased by 78 days, and burn durations of fires greater than 1,000 hectare in area have increased from 7.5 to 37.1 days, in response to a spring-summer warming…Forests at mid-elevations are at a greater risk for wildfire than lower or higher elevational bands. At high elevations, the conditions are less favorable for wildfires because even if the dry season is longer, it is still relatively short and is more protected from the drying effects of the higher temperatures (Moser et al. 2009, page 23).
>
> Fire is an important ecosystem disturbance. It promotes vegetation and wildlife diversity, releases nutrients into the soil, and eliminates heavy accumulation of underbrush that can fuel catastrophic fires. However, if temperatures rise into the predicted medium warming range, the risk of large wildfires in California could increase by as much as 55 percent, which is almost twice the increase expected if temperatures stay in the lower warming range. Because wildfire risk is determined by a combination of factors including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state. In many regions, wildfire activity will depend critically on future precipitation patterns (California Climate Change Center 2006, page 10).

Wildfire occurrence in California was modeled by climate change scientists under a range of future climate and development scenarios:

> Substantial increases in wildfire are anticipated for most scenarios, although the range of outcomes is large and increases with time. The increase in wildfire area burned associated with the higher emissions pathway (SRES A2) is substantial, with increases statewide ranging from 57 percent to 169 percent by 2085, and increases exceeding 100 percent in most of the forest areas of Northern California in every SRES A2 scenario by 2085 (Westerling et al. 2009, page ix).

According to the California Department of Forestry and Fire Protection (2010), in 2009, there were 8,291 fires in California with 93,296 acres burned. In 2008, there were 5,744 fires with 390,615 acres burned. Climate change is predicted to increase the threat of wildfires in the project area.

Water Supply

A vast network of man-made reservoirs and aqueducts captures and transports water throughout the state from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada snowpack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages.

One of the major impacts of climate change is a loss of natural snowpack, particularly the Sierra Nevada snowpack. Snowmelt provides an annual average of 15 million acre-feet of water, released

between April and July each year (Department of Water Resources 2008). The California Department of Water Resources projects that the Sierra snowpack will experience a 25 to 40 percent reduction from its historic average by 2050. Climate change is also anticipated to bring warmer storms that result in less snowfall at lower elevations, reducing the total snowpack.

Flooding

As precipitation falls in the form of rain rather than snow with greater storm intensity, high frequency flood events are projected to increase. Changes in soil moisture and watershed vegetation will change runoff and recharge patterns. Increased impermeable surfaces (i.e., pavement, which does not allow water to sink down into the soil and groundwater) also contribute to more floods. Potential increases in wildfires due to climate change would increase floods following fire. This is because wildfires alter the terrain and leave the ground charred, barren, and unable to absorb water (FEMA 2012). As California's hydrology changes, what is currently considered a 100-year flood[13] may strike more often, leaving many communities at greater risk. The California Department of Water Resources (2008) encourages planners to factor a new level of safety into the design, operation, and regulation of flood protection facilities such as dams, floodways, bypasses and levees, as well as the design of local sewers and storm drains.

The California Department of Water Resources (2008) recommends the following to adapt to increases in flooding:

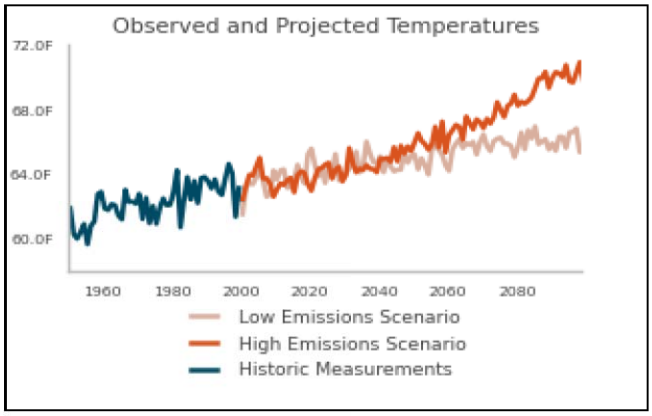
- Local land use agencies should update General Plans to address increased flood risks posed by climate change.
- Local governments should site new development outside of undeveloped floodplains unless the floodplain has at least a sustainable, 200-year level of flood protection.[14]
- Local governments should use low-impact development techniques to infiltrate and store runoff.
- Local governments should include flood-resistant design requirements in local building codes. State, federal, and local agencies should develop conjunctive use management plans that integrate floodplain management, groundwater banking, and surface storage. Such plans could help facilitate system re-operation and provide a framework for the development of local projects that are beneficial across regions.
- Local land use agencies should adopt ordinances that protect the natural functioning of groundwater recharge areas.

[13] For the purposes of federal flood insurance, the Federal Emergency Management Agency has traditionally used the 100-year flood event, which is a flood event that has a one-percent chance of being exceeded in any given year. It is also referred to a flood that occurs once in 100 years.

[14] The 200-year flood is caused by a rain event that would happen once in every 200 years (it is a bigger flood than a 100-year flood event).

Consequences of Climate Change in Moreno Valley

The figure below displays a chart of measured historical and projected annual average temperatures in the Moreno Valley area. As shown in the figure, temperatures are expected to rise in the low and high greenhouse gas emissions scenarios.



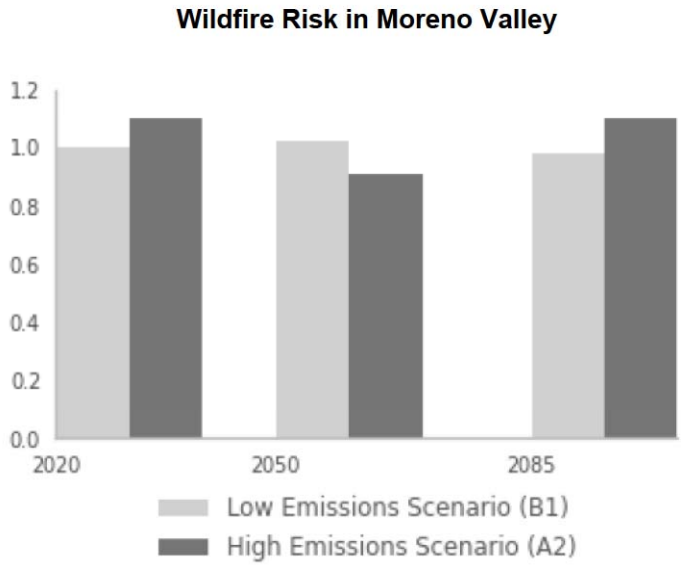
Note: Data is for Moreno Valley
Source: CalAdapt 2012, using data from Maurer et al. 2002 and California Energy Commission, 2008

Water Supply

Water for the project would be provided by the Eastern Municipal Water Department (EMWD). The EMWD 2010 Urban Water Management Plan considered the impact of climate change on water supplies as part of its long term strategic planning. One of the outcomes of climate change could be more frequent limitations on imported supplies. To limit the impact of climate change, EMWD's long term planning focuses on the development of reliable local recourses and the implementation of water use efficiency. This includes the full utilization of recycled water and the recharge of local groundwater basins to increase supply reliability during periods of water shortage. EMWD is also focused on reducing demand for water supplies, especially outdoors. Increasing the use of local resource and reducing the need for imported water has the dual benefit of not only improving water quality reliability, but reducing the energy required to import water to EMWD's service area.

Wildfires

The figure below displays the fire risk in Moreno Valley relative to 2010 levels. The figure displays the projected increase in potential area burned given three different 30-year averaging period ending in 2020, 2050, and 2085 and two different scenarios (A2, B1). The data is modeled solely on climate projections and do not take landscape and fuel sources into account (there is very little combustible material in the project area). The data modeled the ratio of additional fire risk for an area as compared to the expected burned area. The data is shown in the figure below and indicates that under the low emission scenario, the additional wildfire risk is about 1, which means that wildfire risk is expected to remain about the same. Under the high emission scenario, additional risk is variable with a slight increase. Other areas in California, such as the area near the border with Oregon, are projected to have a 9-fold increase in potential area burned.



Note: The data is for Moreno Valley
Source: CalAdapt 2014, using data from Westerling and Bryant 2008.

Sea Level Rise

The project is not located near the coastal area and is of sufficient elevation to not be impacted by rising sea levels.

3.2 - Greenhouse Gases

Gases that trap heat in the atmosphere are referred to as greenhouse gases. The effect is analogous to the way a greenhouse retains heat, which is by allowing sunlight to pass through the greenhouse and trapping and warming the air inside. Common greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxides, chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, ozone, and aerosols. Natural processes and human activities emit greenhouse gases. The presence of greenhouse gases in the atmosphere affects the earth's temperature. Many scientists believe that emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations.

Climate change is driven by radiative forcings and feedbacks. Radiative forcing is the difference between the incoming energy and outgoing energy in the climate system. In other terms, radiative forcing is the energy absorbed by the greenhouse gas that would otherwise be lost to space. Positive forcing tends to warm the surface while negative forcing tends to cool it. Radiative forcing values are typically expressed in watts per square meter. A feedback is a climate process that can strengthen or weaken a forcing. For example, when ice or snow melts, it reveals darker land underneath which absorbs more radiation and causes more warming.

The global warming potential is the potential of a gas or aerosol to trap heat in the atmosphere compared to the reference gas, carbon dioxide, and is essentially a measurement of the radiative forcing of a greenhouse gas. As discussed above, there are positive (warming) and negative (cooling) forcings.

In order to attempt to quantify the impact of greenhouse gases, the gases are assigned global warming potentials. Individual greenhouse gas compounds have varying global warming potential and atmospheric lifetimes. Carbon dioxide, the reference gas for global warming potential, has a global warming potential of one. The global warming potential of a greenhouse gas is a measure of how much a given mass of a greenhouse gas is estimated to contribute to global warming. To describe how much global warming a given type and amount of greenhouse gas may cause, the carbon dioxide equivalent is used. The calculation of the carbon dioxide equivalent is a consistent methodology for comparing greenhouse gas emissions since it normalizes various greenhouse gas emissions to a consistent reference gas, carbon dioxide. Carbon dioxide as a molecule has a certain potential for warming; other molecules have a different potential. For example, methane's warming potential of 21 indicates that methane has 21 times greater warming affect than carbon dioxide on a molecule per molecule basis. A carbon dioxide equivalent is the mass emissions of an individual greenhouse gas multiplied by its global warming potential.

Greenhouse gases as defined by Assembly Bill (AB) 32 (see the Climate Change Regulatory Environment section for a description), include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. These greenhouse gases are described in Table 9.

Table 9: Description of Greenhouse Gases

Greenhouse Gas	Description and Physical Properties	Sources
Carbon dioxide	Carbon dioxide (CO_2) is an odorless, colorless greenhouse gas. Carbon dioxide's global warming potential is 1. The concentration in 2005 was 379 parts per million (ppm), which is an increase of about 1.4 ppm per year since 1960.	Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Man-made sources are from burning coal, oil, natural gas, and wood.
Methane	Methane is a flammable gas and is the main component of natural gas. It has a lifetime of 12 years. Its global warming potential is 21.	Methane is extracted from geological deposits (natural gas fields). Other sources are landfills, fermentation of manure, and decay of organic matter.
Nitrous oxide	Nitrous oxide (laughing gas) is a colorless greenhouse gas. It has a lifetime of 114 years. Its global warming potential is 310.	Microbial processes in soil and water, fuel combustion, and industrial processes.

Table 9 (cont.): Description of Greenhouse Gases

Greenhouse Gas	Description and Physical Properties	Sources
Hydrofluorocarbons	Hydrofluorocarbons are a group of greenhouse gases containing carbon, chlorine, and at least one hydrogen atom. Global warming potentials range from 140 to 11,700.	Hydrofluorocarbons are synthetic manmade chemicals used as a substitute for chlorofluorocarbons in applications such as automobile air conditioners and refrigerants.
Chlorofluorocarbons	These are gases formed synthetically. They are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). Global warming potentials range from 3,800 to 8,100.	Chlorofluorocarbons were synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric (the second layer of the atmosphere, above the troposphere) ozone. The Montreal Protocol on Substances that Deplete the Ozone Layer prohibited their production in 1987; their replacement is through hydro-fluorocarbons. They should have been completely phased out by 2010, though there has been some smuggling into developing countries.
Perfluorocarbons	Perfluorocarbons have stable molecular structures and only break down by ultraviolet rays about 60 kilometers above Earth's surface. Because of this, they have long lifetimes, between 10,000 and 50,000 years. Global warming potentials range from 6,500 to 9,200.	Two main sources of perfluorocarbons are primary aluminum production and semiconductor manufacturing.
Sulfur hexafluoride	Sulfur hexafluoride is an inorganic, odorless, colorless, and nontoxic, nonflammable gas. It has a lifetime of 3,200 years. It has a high global warming potential, 23,900.	This gas is manmade and used for insulation in electric power transmission equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas.
Sources: Compiled from a variety of sources, primarily Intergovernmental Panel on Climate Change 2007a and Intergovernmental Panel on Climate Change 2007b.		

Water vapor is an important component of our climate system and accounts for the largest percentage of the greenhouse effect. However, water vapor is not currently regulated as a greenhouse gas by any regulatory body.

Tropospheric ozone is a short-lived greenhouse gas, as it remains in the atmosphere for hours to 22 days. It is produced by chemical reactions of precursor species in the atmosphere and with large spatial and temporal variability (IPCC 2007a).

Aerosols are short-lived greenhouse gases that can remain suspended in the atmosphere for about a week and can warm the atmosphere by absorbing heat and cool the atmosphere by reflecting light.

Black carbon is a type of aerosol that can also cause warming from deposition on snow; the particulates are deposited on the snow and since many are a darker color, they can absorb sunlight and reduce the ability of the snow to reflect sunlight.

Black Carbon

Black carbon is a light absorbing component of particulate matter and is formed by the incomplete combustion of fossil fuels, biofuels, and biomass. The following is additional information on black carbon (EPA 2012):

- Black carbon is emitted directly into the atmosphere in the form of fine particles ($PM_{2.5}$).
- Black carbon contributes to the adverse impacts on human health, ecosystems, and visibility associated with $PM_{2.5}$.
- Black carbon influences climate by: 1) directly absorbing light, 2) reducing the reflectivity ("albedo") of snow and ice through deposition, and 3) interacting with clouds.
- The direct and snow/ice albedo effects of black carbon are widely understood to lead to climate warming. However, the globally averaged net climate effect of black carbon also includes the effects associated with cloud interactions, which are not well quantified and may cause either warming or cooling. Therefore, though most estimates indicate that black carbon has a net warming influence, a net cooling effect cannot be ruled out.
- Sensitive regions such as the Arctic and the Himalayas are particularly vulnerable to the warming and melting effects of black carbon.
- Black carbon is emitted with other particles and gases, many of which exert a cooling influence on climate. Therefore, estimates of the net effect of black carbon emissions sources on climate should include the offsetting effects of these co-emitted pollutants. This is particularly important for evaluating mitigation options.
- Black carbon's short atmospheric lifetime (days to weeks), combined with its strong warming potential, means that targeted strategies to reduce black carbon emissions can be expected to provide climate benefits within the next several decades.
- The different climate attributes of black carbon and long-lived greenhouse gases make it difficult to interpret comparisons of their relative climate impacts based on common metrics.
- Based on recent emissions inventories, the majority of global black carbon emissions come from Asia, Latin America, and Africa. Emissions patterns and trends across regions, countries and sources vary significantly.
- Control technologies are available to reduce black carbon emissions from a number of source categories.
- Black carbon mitigation strategies, which lead to reductions in $PM_{2.5}$, can provide substantial public health and environmental benefits.

As discussed in the following excerpt, the procedures to quantify these changes have not been widely accepted or thoroughly researched. The project would emit black carbon through emissions of diesel PM during construction and operation. Although there is uncertainty in the emissions estimation, for this analysis, black carbon emissions are estimated in this analysis.

> Black carbon is formed by incomplete combustion of fossil fuels, biofuels, and biomass. Sources of black carbon within a jurisdiction may include exhaust from diesel trucks, vehicles, and equipment, as well as smoke from biogenic combustion. Biogenic combustion sources of black carbon include the burning of biofuels used for transportation, the burning of biomass for electricity generation and heating, prescribed burning of agricultural residue, and natural and unnatural wildfires. Black carbon is not a gas but an aerosol—particles or liquid droplets suspended in air. Black carbon only remains in the atmosphere for days to weeks, as opposed to other greenhouse gases that can remain in the atmosphere for years. Black carbon can be deposited on snow, where it absorbs sunlight, reduces sunlight reflectivity, and hastens snowmelt. Direct effects include absorbing incoming and outgoing radiation; indirectly, black carbon can also affect cloud reflectivity, precipitation, and surface dimming (cooling).
>
> Most greenhouse gases have an assigned global warming potential, or a measure of how much a given mass of a greenhouse gas is estimated to contribute to global warming. Carbon dioxide, the reference gas for global warming potential, has a global warming potential of 1. Methane's global warming potential of 21 indicates that it has 21 times greater warming effect than carbon dioxide. However, black carbon as of yet does not have consensus global warming potential. As a result, few GHG inventories have included black carbon to date, and the US EPA has not included black carbon in its most recent GHG inventory.
>
> The overall uncertainty of the net radiative forcing (warming influence) by black carbon is largely due to physical complexity and the changes in cloud properties that may offset the positive forcing. A wealth of recent scientific research has been conducted on black carbon, as summarized in the Integrated Assessment of Black Carbon and Tropospheric Ozone, which found a wide range of global warming potential estimates for black carbon (between 200 and 1,500) measured over 100 years and higher levels over shorter periods. Globally averaged net forcing of black carbon is likely to be positive, with some estimates that it could approach 30 to 40 percent of that of carbon dioxide. Research on black carbon in the United States has picked up speed within the last year. As a result of legislation requiring the EPA to conduct an analysis of black carbon, the EPA prepared a draft report, and the Advisory Council on Clean Air Compliance Analysis submitted a review of the report. The EPA awarded $6.6 million in grants to eight universities for black carbon

research, specifically for an "increased understanding of the impact black carbon has on climate change."

The EPA is planning to reduce black carbon emissions in the Arctic by assessing sources, developing an emissions inventory, implementing projects to reduce black carbon from diesel, and establishing policy recommendations and financing options for reducing black carbon diesel sources. Some bodies, such as the American National Standards Institute, have called for updating inventory protocols to include black carbon. Locally in California, the three largest regional air pollution control agencies have not developed policies or programs for addressing black carbon. The South Coast Air Quality Management District does not currently recommend analyzing the effects of black carbon in California Environmental Quality Act documents based on limited data availability. The San Joaquin Valley Unified Air Pollution Control District does not currently have recommendations. The Bay Area Air Quality Management District does not identify aerosols or black carbon as a GHG of concern in its guidelines (Wilson and Walter 2012, page 10-1).

Health Effects

Although there could be health effects resulting from changes in the climate and the consequences it can bring about, inhalation of greenhouse gases at levels currently in the atmosphere would not result in adverse health effects, with the exception of ozone and aerosols (particulate matter and black carbon). The potential health effects of ozone and particulate matter are discussed in criteria pollutant analyses. At very high indoor concentrations (not at levels existing outside), carbon dioxide, methane, sulfur hexafluoride, and some chlorofluorocarbons can cause suffocation as the gases can substitute oxygen available for breathing (Centers for Disease Control and Prevention 2010, Occupational Safety and Health Administration 2003).

There are health effects from black carbon, since black carbon is a portion of $PM_{2.5}$ and diesel PM. The health effects of those pollutants are discussed in Section 2.2.1 - National and State Regulatory Information.

3.3 - Emissions Inventories

Emissions worldwide were approximately 47,183 million metric tons of carbon dioxide equivalents ($MMTCO_2e$) in 2010.[15]

The most recent inventory of greenhouse gas emissions in California was in 2012, which indicated that emissions were 459 million $MTCO_2e$ (California Air Resources Board 2014). The state with the highest greenhouse gas emissions is Texas, with California in second. However, from a per capita point of view, California has the 45th lowest emissions. As shown in Exhibit 10, the trend of

[15] World Resources Institute, CAIT 2.0. 2013. Climate Analysis Indicators Tool: WRI's Climate Data Explorer. Washington, DC. Available at http://cait2.wri.org. Accessed February 11, 2014.

emissions in California is similar to the emissions in the United States, with exception of 2010 to 2012. The total emissions in 2012 increased by 5.9 percent from 1990 (431 million MTCO2e). The emissions decreased by 5.9 percent from 2008 to 2009, perhaps because of the economic recession that began in late 2007.

From 2011 to 2012, there was a 1.7 percent increase in emissions and the first emissions increase since 2007. This increase was driven primarily by strong economic growth, the unexpected closure of the San Onofre Nuclear Generating Station, and drought conditions that limited instate hydropower generation. Since 2000, emissions have decreased by 1.6 percent (from 466 to 459 million MTCO2e) after reaching a peak of 493 million MTCO2e in 2004. The top contributor of emissions in 2012 was transportation, which contributed 37 percent of the emissions. The second highest sector was industrial (22 percent), which includes sources from refineries, general fuel use, oil and gas extraction, and cement plants. ARB staff has projected statewide emissions for the year 2020 to be 509.4 million $MTCO_2e$.

Exhibit 11 (the bottom graph) displays the main sources of greenhouse gas emissions in California between the year 2000 and 2012. As shown, the top contributor of emissions was transportation. The second highest sector was industrial, which includes sources from refineries, general fuel use, oil and gas extraction, and cement plants.

It is important to note that the methodology in the State inventory to estimate the greenhouse gas emissions from transportation differs from that for the project. The California inventory is based on fuel sales in California (California Air Resources Board 2013), while the project inventory is based on trip generation rates provided by the Traffic Impact Analysis for the project and are conservative.

Methane from cows is responsible for fewer greenhouse gas emissions compared with those from transportation. Enteric fermentation[16] from domestic livestock was the second highest source of methane in the United States in 2011 at 196.3 $MMTCO_2e$ (EPA 2013). Carbon dioxide emissions from transportation in 2011 was 1745 $MMTCO_2e$ (EPA 2013). Clearly, the transportation source has greater emissions in the United States.

The City of Moreno Valley estimated emissions for 2007 and 2010 and projected emissions for 2020 are shown in Table 10. The emissions shown are not actual emissions but are estimated using calculations. The emissions represent emissions from the community of Moreno Valley (rather than the city government operations). Only select years were estimated based on data available. As shown in the table, the reduced 2020 emissions are below the reduction target.

[16] Enteric fermentation is fermentation in the digestive systems of animals; methane is produced by bacteria as a by-product of this process.

Table 10: City of Moreno Valley Projected Greenhouse Gas Emissions

Source Category	Moreno Valley Greenhouse Gas Emissions ($MTCO_2e$ per year)			
	2007	2010	BAU 2020	Reduced 2020
Transportation	517,098	513,581	788,267	421,561
Energy	287,261	277,230	356,192	251,372
Area	69,390	69,437	84,665	73,046
Water and Wastewater	21,595	16,831	20,216	14,158
Solid Waste	44,294	43,633	49,203	38,000
Total	**939,638**	**920,712**	**1,298,543**	**798,137**
Reduction Target	—	—	**798,693**	**798,693**

Notes:
$MTCO_2e$ = metric tons of carbon dioxide equivalents BAU = business as usual
Source: City of Moreno Valley Greenhouse Gas Analysis, 2012.

3.4 - Regulatory Environment

3.4.1 - International

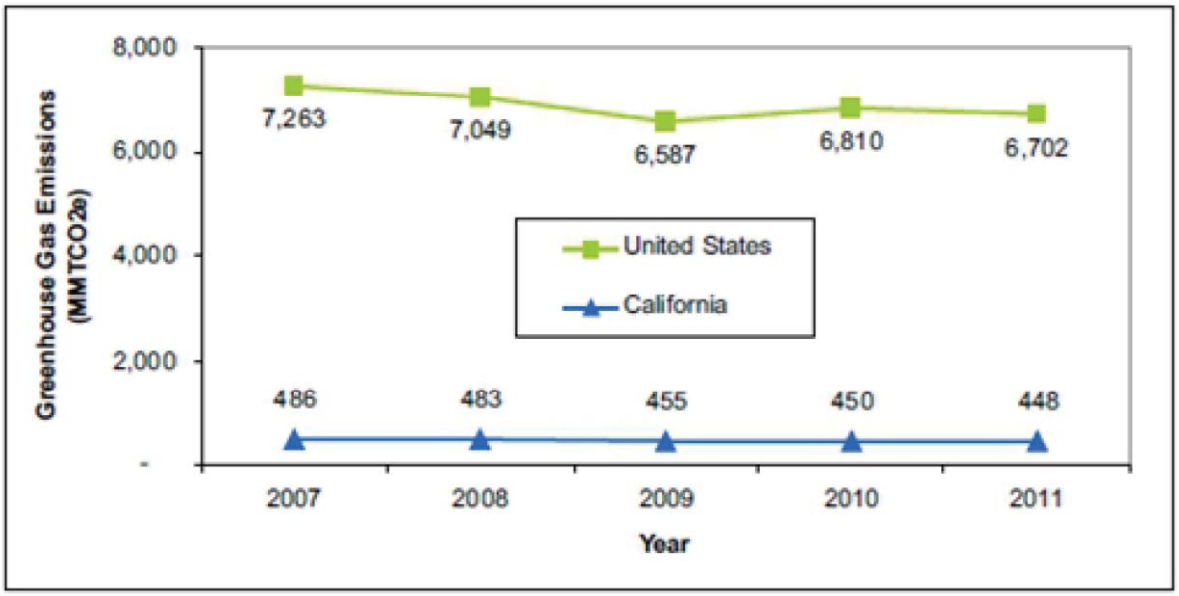
Climate change is a global issue involving greenhouse gas emissions from all around the world; therefore, countries such as the ones discussed below have made an effort to reduce greenhouse gases.

Intergovernmental Panel on Climate Change. In 1988, the United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change to assess the scientific, technical, and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation.

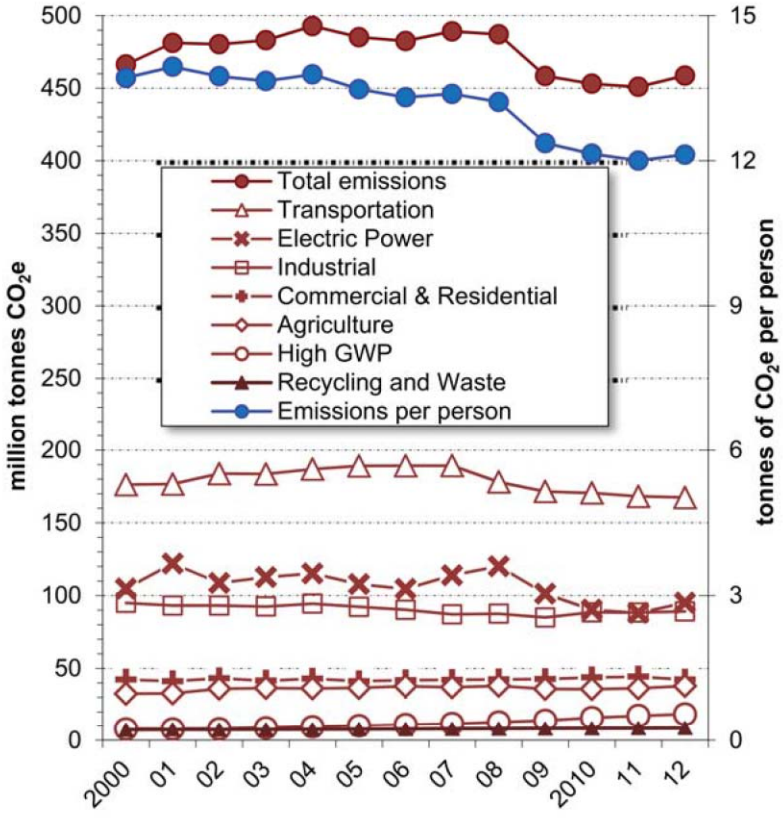
United Nations Framework Convention on Climate Change. On March 21, 1994, the United States joined a number of countries around the world in signing the United Nations Framework Convention on Climate Change (Convention). Under the Convention, governments gather and share information on greenhouse gas emissions, national policies, and best practices; launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

Kyoto Protocol. The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas emissions at an average of five percent against 1990 levels over the five-year period between 2008 and 2012.

Greenhouse Gas Emissions Trends in the United States and California



Greenhouse Gas Emissions Trends by Sector in California



Source for Greenhouse Gas Emissions Trends in the United States and California: Prepared by FirstCarbon Solutions using data from U.S. Environmental Protection Agency 2013 and California Resources Board, 2013.
Source for Greenhouse Gas Emissions Trends by Sector in California: California Air Resources Board, 2013.

FirstCarbon SOLUTIONS

Exhibit 11
Greenhouse Gas Emission Trends

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The Convention (discussed above) encouraged industrialized countries to stabilize emissions; however, the Protocol commits them to do so. Developed countries have contributed more emissions over the last 150 years; therefore, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

The United States has not entered into the Kyoto Protocol. However, other countries have entered, such as Australia, Canada, China, the European Union (Belgium, Denmark, Germany, the Hellenic Republic, Spain, France, Ireland, Italy, Luxembourg, Netherlands, Austria, Portugal, Finland, Sweden, Great Britain, and Northern Ireland), Japan, Mexico, and New Zealand.

3.4.2 - National

Prior to the last decade, there have been no concrete federal regulations of greenhouse gases or major planning for climate change adaptation. The following are actions regarding the federal government, greenhouse gases, and fuel efficiency.

Greenhouse Gas Endangerment. *Massachusetts v. EPA* (Supreme Court Case 05-1120) was argued before the United States Supreme Court on November 29, 2006, in which it was petitioned that the EPA regulate four greenhouse gases, including carbon dioxide, under Section 202(a)(1) of the Clean Air Act. A decision was made on April 2, 2007, in which the Supreme Court found that greenhouse gases are air pollutants covered by the Clean Air Act. The Court held that the EPA Administrator must determine whether emissions of greenhouse gases from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. On December 7, 2009, the EPA Administrator signed two distinct findings regarding greenhouse gases under section 202(a) of the Clean Air Act:

- Endangerment Finding: The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or Contribute Finding: The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution, which threatens public health and welfare.

These findings do not impose requirements on industry or other entities. However, this was a prerequisite for implementing greenhouse gas emissions standards for vehicles, as discussed in the section "Clean Vehicles" below.

In September 2011, the EPA Office of Inspector General evaluated the EPA's compliance with established policy and procedures in the development of the endangerment finding, including processes for ensuring information quality. The evaluation concluded that the technical support document should have had more rigorous EPA peer review.

In June 2012, a federal appeals court rejected a lawsuit against the EPA. The suit alleged that the EPA violated the law by relying almost exclusively on data from the United Nations Intergovernmental Panel on Climate Change rather than doing its own research or testing data according to federal standards. The U.S. Chamber of Commerce and the National Association of Manufacturers (with others) filed petitions to the U.S. Court of Appeals – D.C. Circuit to rehear the case. The EPA and Department of Justice provided a response on October 12, 2012.

Clean Vehicles. Congress first passed the Corporate Average Fuel Economy law in 1975 to increase the fuel economy of cars and light duty trucks. The law has become more stringent over time. On May 19, 2009, President Obama put in motion a new national policy to increase fuel economy for all new cars and trucks sold in the United States. On April 1, 2010, the EPA and the Department of Transportation's National Highway Safety Administration announced a joint final rule establishing a national program that would reduce greenhouse gas emissions and improve fuel economy for new cars and trucks sold in the United States.

The first phase of the national program would apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The vehicles must meet an estimated combined average emissions level of 250 grams of carbon dioxide per mile, equivalent to 35.5 miles per gallon if the automobile industry were to meet this carbon dioxide level solely through fuel economy improvements. Together, these standards would cut carbon dioxide emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016). The EPA and the National Highway Safety Administration are working on a second-phase rule to establish national standards for light-duty vehicles for model years 2017 and beyond.

On October 25, 2010, the EPA and the U.S. Department of Transportation proposed the first national standards to reduce greenhouse gas emissions and improve fuel efficiency of heavy-duty trucks and buses. For combination tractors, the agencies are proposing engine and vehicle standards that begin in the 2014 model year and achieve up to a 20 percent reduction in carbon dioxide emissions and fuel consumption by the 2018 model year. For heavy-duty pickup trucks and vans, the agencies are proposing separate gasoline and diesel truck standards, which phase in starting in the 2014 model year and achieve up to a 10 percent reduction for gasoline vehicles and up to a 15 percent reduction for diesel vehicles by 2018 model year (12 and 17 percent respectively if accounting for air conditioning leakage). Lastly, for vocational vehicles (include other vehicles like buses, refuse trucks, concrete mixers – everything except for combination tractors and heavy-duty pickups and vans), the agencies are proposing engine and vehicle standards starting in the 2014 model year, which would achieve up to a 10 percent reduction in fuel consumption and carbon dioxide emissions by 2018 model year.

Mandatory Reporting of Greenhouse Gases. The Consolidated Appropriations Act of 2008, passed in December 2007, requires the establishment of mandatory greenhouse gas reporting requirements. On September 22, 2009, the EPA issued the Final Mandatory Reporting of Greenhouse

Gases rule. The rule requires reporting of greenhouse gas emissions from large sources and suppliers in the United States, and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial greenhouse gases, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of greenhouse gas emissions, are required to submit annual reports to the EPA.

This rule does not apply to high cube logistics developers within the WLC project because although the project would emit more than 25,000 $MTCO_2e$ per year of greenhouse gases, the rule only applies to the following categories: fossil fuel suppliers and industrial gas suppliers, direct greenhouse gas emitters, and manufacturers of heavy-duty and off-road vehicles and engines. The EPA's Applicability Tool[17] was used to determine if the project developer would need to report the greenhouse gas emissions. The source categories that are required to report their greenhouse gas emissions (i.e., production, manufacturing, electricity generation, industrial waste landfills, etc.) did not apply to the project.

New Source Review Prevention of Significant Deterioration (GHG Tailoring Rule). The EPA issued a final rule on May 13, 2010 that establishes thresholds for greenhouse gases that define when permits under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities. Operating permits are legally enforceable documents that permitting authorities issue to air pollution sources after the source has begun to operate. Title V Operating Permits are required from Title V of the Clean Air Act. This final rule "tailors" the requirements of these Clean Air Act permitting programs to limit which facilities will be required to obtain Prevention of Significant Deterioration and Title V permits.

In the preamble to the revisions to the federal code of regulations, the EPA states:

> This rulemaking is necessary because without it the Prevention of Significant Deterioration and Title V requirements would apply, as of January 2, 2011, at the 100 or 250 tons per year levels provided under the Clean Air Act, greatly increasing the number of required permits, imposing undue costs on small sources, overwhelming the resources of permitting authorities, and severely impairing the functioning of the programs. EPA is relieving these resource burdens by phasing in the applicability of these programs to greenhouse gas sources, starting with the largest greenhouse gas emitters. This rule establishes two initial steps of the phase-in. The rule also commits the agency to take certain actions on future steps addressing smaller sources, but excludes certain smaller sources from Prevention of Significant Deterioration and Title V permitting for greenhouse gas emissions until at least April 30, 2016 (EPA 2010, Federal Register page 31514).

The EPA estimates that facilities responsible for nearly 70 percent of the national greenhouse gas emissions from stationary sources will be subject to permitting requirements under this rule. This

[17] United States Environmental Protection Agency. Greenhouse Gas Reporting Program, Applicability Tool. Website: http://www.epa.gov/ghgreporting/help/tool/index.html. Accessed November 19, 2013.

includes the nation's largest greenhouse gas emitters—power plants, refineries, and cement production facilities.

On December 23, 2010, the EPA issued a series of rules that put the necessary regulatory framework in place to ensure that 1) industrial facilities can get Clean Air Act permits covering their greenhouse gas emissions when needed and 2) facilities emitting greenhouse gases at levels below those established in the Tailoring Rule do not need to obtain Clean Air Act permits.

Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units. As required by a settlement agreement, the EPA proposed new performance standards for emissions of carbon dioxide for new affected fossil fuel-fired electric utility generating units on March 27, 2012. New sources greater than 25 megawatt would be required to meet an output based standard of 1,000 pounds of carbon dioxide per megawatt-hour.

SmartWay Program. The SmartWay Program is public-private initiative between EPA, large and small trucking companies, rail carriers, logistics companies, commercial manufacturers, retailers, and other federal and state agencies. Its purpose is to improve fuel efficiency and the environmental performance (reduction of both greenhouse gas emissions and air pollution) of the goods movement supply chains. SmartWay is comprised of four components (EPA 2014a):

1. SmartWay Transport Partnership: A partnership in which freight carriers and shippers commit to benchmark operations, track fuel consumption and improve performance annually.
2. SmartWay Technology Program: A testing, verification, and designation program to help freight companies identify equipment, technologies and strategies that save fuel and lower emissions.
3. SmartWay Vehicles: A program that ranks light-duty cars and small trucks and identifies superior environmental performers with the SmartWay logo.
4. SmartWay International Interests: Guidance and resources for countries seeking to develop freight sustainability programs modeled after SmartWay.

SmartWay effectively refers to requirements geared toward reducing fuel consumption. Most large trucking fleets driving newer vehicles are compliant with SmartWay design requirements. Moreover, over time, all heavy-duty trucks will have to comply with the ARB Greenhouse Gas Regulation that is designed with the SmartWay Program in mind to reduce greenhouse gas emissions by making them more fuel efficient. For instance, all 2010 and older model year tractors that pull 53-foot or longer box type trailers must use SmartWay verified low rolling resistance tires beginning January 1, 2013.

Through the SmartWay Technology Program, the EPA has evaluated the fuel saving benefits of various devices through grants, cooperative agreements, emissions and fuel economy testing, demonstration projects and technical literature review. As a result, EPA has determined the following types of technologies provide fuel saving and/or emission reducing benefits when used properly in their designed applications and has verified certain products:

- Idle reduction technologies – less idling of the engine when it is not needed would reduce fuel consumption.
- Aerodynamic technologies minimize drag and improve air flow over the entire tractor-trailer vehicle. Aerodynamic technologies include gap fairings that reduce turbulence between the tractor and trailer, side skirts that minimize wind under the trailer, and rear fairings that reduce turbulence and pressure drop at the rear of the trailer.
- Low rolling resistance tires can roll longer without slowing down, thereby reducing the amount of fuel used. Rolling resistance (or rolling friction or rolling drag) is the force resisting the motion when a tire rolls on a surface. The wheel will eventually slow down because of this resistance.
- Retrofit technologies include things such as diesel particulate filters, emissions upgrades (to a higher tier), etc., which would reduce emissions.
- Federal excise tax exemptions.

3.4.3 - California

The following standards and regulation enacted in California would help to reduce greenhouse gases.

Title 24 and California Green Building Standards. Although these regulations are not specifically enacted to reduce greenhouse gases, they increase energy efficiency for new buildings, thus indirectly reducing greenhouse gas emissions. For a description, refer to Section 1.6, Standard Conditions, in this report.

Pavley Regulations and Fuel Efficiency Standards. California AB 1493, enacted on July 22, 2002, required the ARB to develop and adopt regulations that reduce greenhouse gases emitted by passenger vehicles and light duty trucks. The regulation was stalled by automaker lawsuits and by the EPA's denial of an implementation waiver. On January 21, 2009, the ARB requested that the EPA reconsider its previous waiver denial. On January 26, 2009, President Obama directed the EPA to assess whether the denial of the waiver was appropriate. On June 30, 2009, the EPA granted the waiver request. On September 8, 2009, the U.S. Chamber of Commerce and the National Automobile Dealers Association sued EPA to challenge its granting of the waiver to California for its standards. California assisted EPA in defending the waiver decision. The U.S. District Court for the District of Columbia denied the Chamber's petition on April 29, 2011.

The standards phase in during the 2009 through 2016 model years. When fully phased in, the near term (2009-2012) standards will result in about a 22 percent reduction compared with the 2002 fleet, and the mid-term (2013-2016) standards will result in about a 30 percent reduction.

Executive Order S-3-05. Former California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following reduction targets for greenhouse gas emissions:

- By 2010, reduce greenhouse gas emissions to 2000 levels.
- By 2020, reduce greenhouse gas emissions to 1990 levels.
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels.

The 2050 reduction goal represents what scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be an aggressive, but achievable, mid-term target. Because this is an executive order, the goals are not legally enforceable for local governments or the private sector.

Low Carbon Fuel Standard - Executive Order S-01-07. The Governor signed Executive Order S-01-07 on January 18, 2007. The order mandates that a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In particular, the executive order established a Low Carbon Fuel Standard and directed the Secretary for Environmental Protection to coordinate the actions of the California Energy Commission, the ARB, the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. This analysis supporting development of the protocols was included in the State Implementation Plan for alternative fuels (State Alternative Fuels Plan was adopted by the California Energy Commission on December 24, 2007) and was submitted to ARB for consideration as an "early action" item under AB 32. The ARB adopted the Low Carbon Fuel Standard on April 23, 2009. The Low Carbon Fuel Standard was challenged in the United States District Court in Fresno in 2011. The court's ruling issued on December 29, 2011 included a preliminary injunction against ARB's implementation of the rule. The Ninth Circuit Court of Appeals stayed the injunction on April 23, 2012 pending final ruling on appeal, allowing the ARB to continue to implement and enforce the regulation and vacated the injunction on September 18, 2013 and remanded the case to the district court for further consideration.

SB 1368. In 2006, the State Legislature adopted Senate Bill (SB) 1368, which was subsequently signed into law by the Governor. SB 1368 directs the California Public Utilities Commission to adopt a performance standard for greenhouse gas emissions for the future power purchases of California utilities. SB 1368 seeks to limit carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements for energy longer than five years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. Because of the carbon content of its fuel source, a coal-fired plant cannot meet this standard because such plants emit roughly twice as much carbon as combined cycle natural gas power plants. Accordingly, the new law will effectively prevent California's utilities from investing in, financially supporting, or purchasing power from new coal plants located in or out of the State. The California Public Utilities Commission adopted the regulations required by SB 1368 on August 29, 2007.

SB 97 and the CEQA Guidelines Update. Passed in August 2007, SB 97 added Section 21083.05 to the Public Resources Code. The code states that "(a) On or before July 1, 2009, the Office of Planning and Research shall prepare, develop, and transmit to the Resources Agency guidelines for

the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions as required by this division, including, but not limited to, effects associated with transportation or energy consumption. (b) On or before January 1, 2010, the Resources Agency shall certify and adopt guidelines prepared and developed by the Office of Planning and Research pursuant to subdivision (a)." Section 21097 was also added to the Public Resources Code. It provided CEQA protection until January 1, 2010 for transportation projects funded by the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 or projects funded by the Disaster Preparedness and Flood Prevention Bond Act of 2006, stating that the failure to analyze adequately the effects of greenhouse gases would not violate CEQA.

On April 13, 2009, the Office of Planning and Research submitted to the Secretary for Natural Resources its recommended amendments to the CEQA Guidelines for addressing greenhouse gas emissions. On July 3, 2009, the Natural Resources Agency commenced the Administrative Procedure Act rulemaking process for certifying and adopting these amendments pursuant to Public Resources Code section 21083.05. Following a 55-day public comment period and two public hearings, the Natural Resources Agency proposed revisions to the text of the proposed guidelines amendments. The Natural Resources Agency transmitted the adopted amendments and the entire rulemaking file to the Office of Administrative Law on December 31, 2009. On February 16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010.

The CEQA Amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of greenhouse gas emissions in CEQA documents. The CEQA Amendments fit within the existing CEQA framework by amending existing CEQA Guidelines so that they reference climate change.

A new section, CEQA Guidelines Section 15064.4, was added to assist agencies in determining the significance of greenhouse gas emissions. The new section allows agencies the discretion to determine whether a quantitative or qualitative analysis is best for a particular project. However, the CEQA Guidelines offer little guidance on the crucial next step in this assessment process—how to determine whether the project's estimated greenhouse gas emissions are significant or cumulatively considerable.

Also amended were CEQA Guidelines Sections 15126.4 and 15130, which address mitigation measures and cumulative impacts respectively. Greenhouse gas mitigation measures are referenced in general terms, but no specific measures are championed. The revision to the cumulative impact discussion requirement (Section 15130) simply directs agencies to analyze greenhouse gas emissions in an EIR when a project's incremental contribution of emissions may be cumulatively considerable, but it does not answer the question of how to determine whether emissions are cumulatively considerable.

Section 15183.5 permits programmatic greenhouse gas analysis and later project-specific tiering. A tiered project is a project that was addressed in a certified program document, such as an EIR or Mitigated Negative Declaration. The CEQA Guidelines state the following:

> Lead agencies may analyze and mitigate the significant effects of greenhouse gas emissions at a programmatic level, such as in a general plan, a long range development plan, or a separate plan to reduce greenhouse gas emissions. Later project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review. Project-specific environmental documents may rely on an EIR containing a programmatic analysis of greenhouse gas emissions . . . (Section 15183.5(a)).

Project compliance with plans for the reduction of greenhouse gas emissions can support a determination that a project's cumulative effect is not cumulatively considerable, according to Section 15183.5(b).

In addition, the Amendments revised Appendix F of the CEQA Guidelines, which focuses on Energy Conservation. The sample environmental checklist in the CEQA Guideline's Appendix G was amended to include greenhouse gas questions.

AB 32. The California State Legislature enacted AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires that greenhouse gases emitted in California be reduced to 1990 levels by the year 2020. The original 1990 level/2020 emissions limit was 427 million $MTCO_2e$; the current limit is 431 million $MTCO_2e$.

"Greenhouse gases" as defined under AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. ARB is the state agency charged with monitoring and regulating sources of greenhouse gases. AB 32 states the following:

> Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

The ARB's Climate Change Scoping Plan (Scoping Plan) contains measures designed to reduce the State's emissions to 1990 levels by the year 2020 (California Air Resources Board 2008b). The First Update to the Scoping Plan was approved in 2014. It builds upon the initial Scoping Plan with new strategies and recommendations. The Update identifies opportunities to leverage existing and new funds to further drive emission reductions through strategic planning and targeted low carbon

investments. The Update defines ARB's climate change priorities for the next five years and sets the groundwork to reach California's post-2020 climate goals set forth in Executive Orders S-3-05 and B-16-2012. The Update highlights California's progress toward meeting the near-term 2020 GHG emission reduction goals defined in the initial Scoping Plan.

The Scoping Plan identifies recommended measures for multiple greenhouse gas emission sectors and the associated emission reductions needed to achieve the year 2020 emissions target—each sector has a different emission reduction target. Most of the measures target the transportation and electricity sectors, probably since those sectors have the greatest greenhouse gas emissions. As stated in the Scoping Plan, the key elements of the strategy for achieving the 2020 greenhouse gas target include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide energy mix that has at least 33 percent renewable energy;
- Developing a California cap-and-trade program;
- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation (ARB 2008, page ES-3).

In addition, the Scoping Plan differentiates between "capped" and "uncapped" strategies. "Capped" strategies are subject to the proposed cap-and-trade program. The Scoping Plan states that the inclusion of these emissions within the cap-and trade program will help ensure that the year 2020 emission targets are met despite some degree of uncertainty in the emission reduction estimates for any individual measure. Implementation of the capped strategies is calculated to achieve a sufficient amount of reductions by 2020 to achieve the emission target contained in AB 32. "Uncapped" strategies that will not be subject to the cap-and-trade emissions caps and requirements are provided as a margin of safety by accounting for additional greenhouse gas emission reductions.

SB 375. Passed by the Senate on August 30, 2008, SB 375 was then signed by the Governor on September 30, 2008. According to SB 375, the transportation sector is the largest contributor of greenhouse gas emissions and emits over 40 percent of the total greenhouse gas emissions in California. SB 375 states, "Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." SB 375 does the following: (1) requires metropolitan planning organizations to include sustainable community strategies in their regional transportation

plans for reducing greenhouse gas emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies.

Executive Order S-13-08. Executive Order S-13-08 indicates that "climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California's economy, to the health and welfare of its population and to its natural resources." Pursuant to the requirements in the order, the 2009 California Climate Adaptation Strategy (California Natural Resources Agency 2009) was adopted, which is the " . . . first statewide, multi-sector, region-specific, and information-based climate change adaptation strategy in the United States." Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

Renewable Electricity Standards. There have been several renewable electricity senate bills in California. On September 12, 2002, Governor Gray Davis signed SB 1078 requiring California to generate 20 percent of its electricity from renewable energy by 2017. SB 107 changed the due date to 2010 instead of 2017. On November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order S-14-08, which established a Renewable Portfolio Standard target for California requiring that all retail sellers of electricity have 33 percent renewable energy in their energy mix by the year 2020. Governor Schwarzenegger also directed the ARB (Executive Order S-21-09) to adopt a regulation by July 31, 2010, requiring the state's load serving entities[18] to meet a 33 percent renewable energy target by 2020. The ARB Board approved the Renewable Electricity Standard on September 23, 2010 by Resolution 10-23.

Tractor-Trailer Greenhouse Gas Regulation. The tractors and trailers subject to this regulation must either use EPA SmartWay certified tractors and trailers, or retrofit their existing fleet with SmartWay verified technologies. The regulation applies primarily to owners of 53-foot or longer box-type trailers, including both dry-van and refrigerated-van trailers, and owners of the heavy-duty tractors that pull them on California highways. These owners are responsible for replacing or retrofitting their affected vehicles with compliant aerodynamic technologies and low rolling resistance tires. Sleeper cab tractors model year 2011 and later must be SmartWay certified. All other tractors must use SmartWay verified low rolling resistance tires. There are also requirements for trailers to have low rolling resistance tires and aerodynamic devices.

3.4.4 - Regional

South Coast Air Quality Management District

The project is within the South Coast Air Basin, which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). SCAQMD Regulation XXVII currently includes three rules:

[18] Load-serving entities provide electric service to end-users and wholesale customers. California is currently served by about 75 load-serving entities. Southern California Edison and Moreno Valley Utility are both load-serving entities.

- The purpose of Rule 2700 is to define terms and global warming potentials.
- The purpose of Rule 2701, SoCal Climate Solutions Exchange, is to "establish a voluntary program to encourage, quantify, and certify voluntary, high quality certified greenhouse gas emission reductions in the [South Coast Air Quality Management] District" (page 2701-1 of Rule 2701).
- Rule 2702, Greenhouse Gas Reduction Program, was adopted on February 6, 2009. The purpose of this rule is to create a Greenhouse Gas Reduction Program for greenhouse gas emission reductions in the SCAQMD. The SCAQMD will fund projects through contracts in response to requests for proposals or purchase reductions from other parties.

The ARB adopted a resolution regarding the adoption of greenhouse gas accounting protocols that distinguishes between the offset certification programs that were developed for the voluntary market, and the program that must be developed to certify offsets to be used under ARB's cap-and-trade rule. This resolution withdrew ARB approval of voluntary protocols but would not impact the use of these protocols for voluntary purposes. Protocols in Rules 2701 and 2702 are voluntary protocols which no longer have ARB's approval (SCAQMD 2010).

3.4.5 - City of Moreno Valley

The City of Moreno Valley released an Energy Efficiency and Climate Action Strategy as well as a Greenhouse Gas Analysis for public review on May 8, 2012. The documents were adopted by the City Council on October 9, 2012. The documents are discussed in more detail in Section 6.2, under the heading, Greenhouse Gas Reduction Plans (Impact 4.7.5.2).

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SECTION 4: MODELING PARAMETERS AND ASSUMPTIONS

4.1 - Model Selection

The estimation of air quality impacts requires the application of several mathematical models that are used to estimate the amount of air emissions and their subsequent transport and dispersion in the atmosphere. Air pollutant emissions can be estimated by using emission factors and a level of activity. Emission factors represent the rate of pollutant emission produced by the activity over time or distance; for example, grams of NO_X per horsepower hour or grams of NO_X per mile traveled. The ARB has published emission factors for on-road mobile vehicles/trucks in the EMFAC mobile source emissions model and emission factors for off-road equipment and vehicles in the OFFROAD emissions model.

The California Emissions Estimator Model (CalEEMod) version 2013.2 was developed in cooperation with the SCAQMD and other air districts throughout the state. CalEEMod is designed as a uniform platform for government agencies, land use planners and environmental professionals to quantify potential criteria pollutant and greenhouse gas emissions associated with construction and operation from a variety of land uses. CalEEMod version 2013.2 estimates emissions using emission factors from EMFAC2011 and OFFROAD2011, the most recent versions of the ARB emission factor models contained within the CalEEMod model. Note that the ARB publically released the EMFAC2014 mobile source emission model on December 2014 and has not yet been integrated into the current CalEEMod model. However, the EMFAC2014 emission model was used to estimate local air quality impacts and regional operational emissions from mobile sources from the project.

For the assessment of localized air quality and health risk impacts, project emissions are incorporated into an air dispersion model along with representative meteorological data to derive estimates of air quality and health risk impacts at receptor locations near the project. The resulting project impacts can then be compared to the requisite air quality and health risk significance thresholds recommended by the SCAQMD to determine the significance of those impacts for purposes of assessing CEQA requirements.

The assessment models used in this analysis are summarized as follows:

- Construction emissions: CalEEMod, version 2013.2.2.
- Operational regional and localized emissions: ARB EMFAC2014 mobile source emission model and project traffic volumes as forecasted by the project traffic impact assessment and methods described below for mobile source emissions and CalEEMod model for estimating all other operational emissions.
- Construction and operational air quality and health risk impacts: EPA AERMOD air dispersion model.

4.2 - SCAQMD Significance Thresholds

Within the context of CEQA, the SCAQMD recommends two types of significance thresholds that a Lead Agency can apply when assessing the air quality significance of new projects. These two types of thresholds are: 1) regional - based on a project's daily mass air emissions; and 2) localized - based on the project's incremental air quality concentration impacts to local air quality. The regional thresholds apply to all aspects of the project including construction and operation and are used to apply significance to a project's regional impacts. The mass emission-based regional thresholds were established because a project's emissions could potentially contribute to the basin's regional emission burden and affect air quality many miles away from a project location. The concentration-based localized thresholds serve to determine the project's incremental impacts on the local environment in the vicinity of a project and apply to both construction and operation.

Because of the air quality challenges facing the South Coast Air Basin, the thresholds that have been established by SCAQMD are very low resulting in projects easily exceeding thresholds.

The various SCAQMD significance thresholds are shown in Table 11.

Table 11: South Coast Air Quality Management District Significance Thresholds

Mass Daily Thresholds[a]		
Pollutant	**Construction[b]**	**Operation[c]**
NO_X	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM_{10}	150 lbs/day	150 lbs/day
$PM_{2.5}$	55 lbs/day	55 lbs/day
SO_X	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
Toxic Air Contaminants (TACs), Odor, and GHG Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic & Acute Hazard Index ≥ 1.0 (project increment)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
Greenhouse Gases (GHG)	10,000 MT/yr CO_2eq for industrial facilities	
NO_2 1-hour average annual arithmetic mean	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (state) and 0.10 ppm (federal 95th percentile) 0.03 ppm (state) and 0.0534 ppm (federal)	

Table 11 (cont.): South Coast Air Quality Management District Significance Thresholds

Ambient Air Quality Standards for Criteria Pollutants[d]	
PM_{10} 24-hour average annual average	10.4 µg/m^3 (construction)[e] & 2.5 µg/m^3 (operation) 1.0 µg/m^3
$PM_{2.5}$ 24-hour average	10.4 µg/m^3 (construction)[e] $PM_{2.5}$ µg/m^3 (operation)
SO_2 1-hour average 24-hour average	0.25 ppm (state) & 0.075 ppm (federal - 99th percentile) 0.04 ppm (state)
Sulfate 24-hour average	25 µg/m^3 (state)
CO 1-hour average 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)
Lead 30-day Average Rolling 3-month average	1.5 µg/m^3 (state) 0.15 µg/m^3 (federal)

Key:
lbs/day = pounds per day
µg/m^3 = microgram per cubic meter
MT/yr CO_2eq = metric tons per year of CO_2 equivalents
ppm = parts per million
≥ = greater than or equal to
> = greater than

Notes:
[a] Source: SCAQMD CEQA Handbook (SCAQMD, 1993).
[b] Construction thresholds apply to both the South Coast Air Basin and Coachella Valley (Salton Sea and Mojave Desert Air Basins).
[c] For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.
[d] Ambient air quality thresholds for criteria pollutants based in Table A-2 of SCAQMD Rule 1303 unless otherwise stated.
[e] Ambient air quality threshold based on SCAQMD Rule 403.
Source: South Coast Air Quality Management District 2015.

4.3 - Construction Emissions Assumptions

Construction-related emissions are expected from various activities associated with the construction of the project. Depending on the level of activity, the specific type of operation, and weather conditions, construction emissions can vary substantially from day to day. Onsite emissions principally consist of exhaust emissions from the activity levels of heavy-duty construction equipment, motor vehicle operation, and fugitive dust from disturbed soil. Paving and application of architectural coatings would release VOC emissions. Offsite emissions are caused by exhaust from delivery, haul, and worker vehicles and entrained road dust as vehicles travel to and from the construction area. Section 1.2 outlined the various changes in assumptions from the Draft EIR and are also summarized in Table 12 below.

Table 12: Summary of Construction Assumption Changes

Item	Draft EIR	Final EIR
Version of CalEEMod	CalEEMod, version 2011.1.1	CalEEMod, version 2013.2.2
Construction Period	10 years	15 years
Building Phasing	One phase for building	Building divided into subphases (concrete, wet utilities, electrical, and landscaping)
Mass Grading Duration	Entire site mass graded over a period of 12 months (unmitigated); or 24 months mitigated, since mitigation extended the grading period to reduce daily impacts)	Each planning area graded separately; approximately 58 months of mass excavation
Onsite On-Road Vehicle Emissions and Unpaved Road Dust	Not included	Included
Onsite Equipment Fleet for Grading Phases (Mass Excavation and Fine Grading)	Did not vary by planning area	Varies by planning area
	IIorsepower-hours/day:* 366,400 (unmitigated) 146,800 (mitigated)	IIorsepower-hours/day (unmitigated and mitigated):* 67,000 (average) 32,500 (minimum) 148,400 (maximum)
Onsite Equipment Fleet for Non-Grading Phases	Horsepower- hours/day:* 215,100 (unmitigated) 153,400 (mitigated)	Horsepower- hours/day:* 86,000
Onsite Equipment Hours per Day (maximum)	15 hours/day (unmitigated) 10 hours/day (mitigated)	10 hours/day
Engine Tier for Onsite Equipment	Unmitigated: CalEEMod default Mitigated: Tier 3 until year 2017 then Tier 3 with diesel particulate matter filters after	Unmitigated: CalEEMod default Mitigated: Tier 4 for all off-road equipment over 50 HP
VOC from Striping Pavement	Not included	Included
Black Carbon	Not estimated	Estimated

Notes:
* Horsepower-hours/day = horsepower-hours per day is a measurement to describe the overall equipment usage per day and is the number of equipment multiplied by the equipment horsepower multiplied by the hours per day in operation multiplied by the load factor. The load factor is the average power of a given piece of equipment while in operation compared with its maximum rated horsepower. A load factor of 1.0 indicates that a piece of equipment continually operates at its maximum operating capacity. A greater horsepower-hours per day could result in more emissions, since the emissions for each piece of equipment are calculated by multiplying the emission factor by the horsepower-hours per day. Numbers are rounded to the nearest hundred. In the Draft EIR, it was assumed that construction activity did not vary, hence, HP hours/day did not change.

The assumptions that follow in this section are for the criteria pollutant analysis and the greenhouse gas analysis. This section describes the assumptions used in the model to estimate the emissions using the CalEEMod model. The criteria pollutants estimated by CalEEMod for construction are as

follows: VOC, NO_x, CO, SO_x, PM_{10}, and $PM_{2.5}$. In addition, CalEEMod also estimated construction emissions for methane, nitrous oxide, carbon dioxide, and $MTCO_2e$ for use in the greenhouse gas impact assessment.

The various activities during construction are described as follows:

- Mass excavation: As stated in the Draft EIR project description, "approximately 42 million cubic yards (cy) of cut and fill will be required to rough/mass grade the entire project site, including remedial grading and over-excavation. Earthwork will balance (be spread out) on site within the Specific Plan, eliminating the need to import or export dirt for the project. See Figure 3.18 [in the Draft EIR] for the conceptual grading plan" (DEIR page 3-61).
- Finish grading: This activity is to fine tune the drainage patterns on the site.
- Building: This activity involves construction of the buildings on the project site. The sub-activities include bringing concrete to the site, tilting up the concrete walls, constructing the wet utilities, installing the electrical, and installing the landscaping around the buildings.
- Utilities: Grading and trenching for electrical, natural gas, etc.
- Interchange: Construction related to the SR-60 interchange improvements.
- Curbing/drive approaches: Constructing curbs and driveways.
- Coatings: The exterior of the buildings and the interior of the office space would be painted. CalEEMod assumes that a high quantity of painting would occur, even though the project consists of warehouses and would require minimal painting. VOC from painting is estimated separately as shown in the spreadsheets in Appendix A.2 and A.3 of this report.
- Paving: The acreage to be paved is unknown at this time; it was assumed for worst-case purposes that one-third of each planning area would be paved. The VOC emissions from paving were estimated manually using the calculations presented in the CalEEMod manual based on the acreage of each planning area.
- Landscaping: This involves landscaping the area outside the immediate proximity of the buildings.

Off-road Equipment

The off-road equipment refers to the equipment that would operate onsite (and in the adjacent offsite areas, for offsite improvements) to move dirt and materials around, and include equipment such as scrapers, graders, loaders, pavers, excavators, and dozers. This equipment operates during all subphases of construction of the project. An example of a piece of off-road equipment (a scraper) is shown below.

Example of Onsite Construction Equipment (Scraper)

Source: Caterpillar 2013.

The emission levels for off-road equipment are based on the emission factors, horsepower, load factor, and activity level of the equipment. The emission factors are generally described as an emission rate per horsepower and time of operation and depend on the type of equipment, horsepower and model year of the equipment. In general, the horsepower is the power of an engine - the greater the horsepower, the greater the power to be able to move dirt and materials around. In general, a greater horsepower also results in greater emissions. The load factor is the average power of a given piece of equipment while in operation compared with its maximum rated horsepower. A load factor of 1.0 indicates that a piece of equipment continually operates at its maximum operating capacity. The activity level is generally represented by the number of hours the equipment is in operation during a time period such as a day. An air emissions model (or calculator, such as CalEEMod) combines the emission factors, horsepower, load factor, and activity level and outputs the emissions for the various pieces of equipment and air pollutants.

The onsite construction equipment assumptions, including the horsepower, load factor, and number, are included in Appendix A.1 of this report and are used in the emission model to estimate construction emissions.

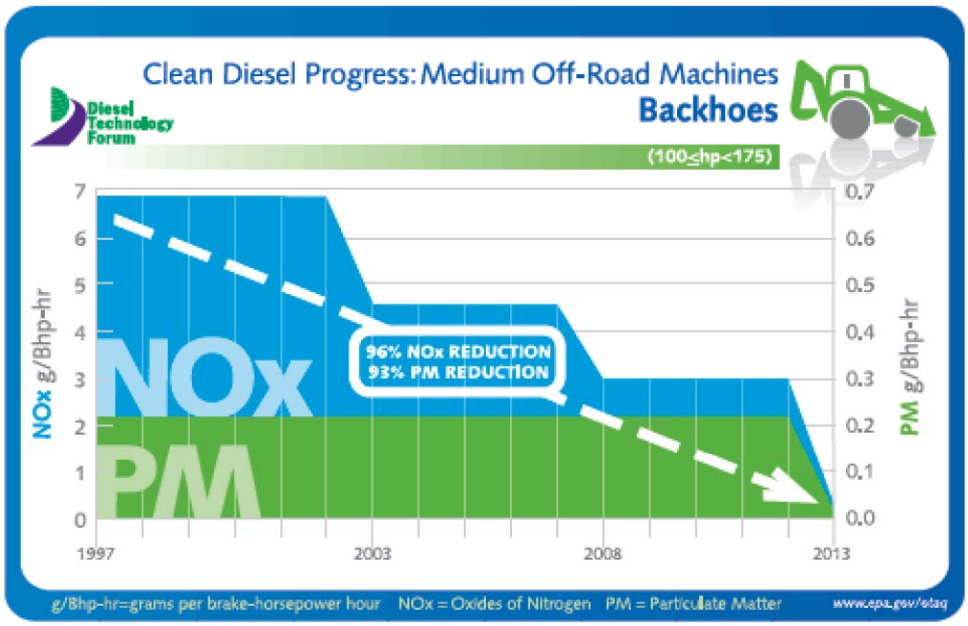
Equipment *tiers* refer to the adoption of emission standards established by the EPA and ARB that apply to diesel engines in off-road equipment. The "tier" of an engine depends on the model year and horsepower rating; generally, the newer a piece of equipment is, the greater the tier it is likely to have. Beginning in the year 2011, new off-road mobile engines sold that are equal to or greater than 175 horsepower (hp) and non-emergency stationary engines less than 10 liters per cylinder and equal to or greater than 175 hp are required to meet Tier 4 Interim standards (40 Code of Federal Regulations, part 1039). Tier 4 Final for engines greater than 130 hp will not be required until the year 2014.

For portable engines, the following are approximate manufacture years:

- Tier 1 engines manufactured between 1996 and 2003;
- Tier 2 engines manufactured between 2001 and 2007;
- Tier 3 engines manufactured between 2006 and 2011; and

- Tier 4 Interim engines 51 to 74 horsepower manufactured beginning in 2008, 75-174 horsepower manufactured after 2012, and 175-750 horsepower manufactured after 2011.[19]

The figure below demonstrates the decrease in NO_x and PM for medium off-road machines (backhoes as an example) with the year of the equipment.



Source: Diesel Technology Forum 2013.

The CalEEMod emission model contains a default inventory of construction equipment for various land uses that incorporates estimates of the number of equipment, their age, their horsepower, and equipment tier from which rates of emissions are developed. For the unmitigated emissions estimates, all equipment is assumed to be the CalEEMod default. For the mitigated emissions estimates, the off-road equipment (those over 50 horsepower) are assumed to be Tier 4.

There is a software flaw in CalEEMod2013 that displays Tier 4 CO emissions as higher than the CalEEMod default. CO emissions would be significant in both scenarios; however, the unmitigated CO emissions are shown for the mitigated emissions to be more accurate.

It was assumed that the onsite equipment would be running for 10 hours per day and five days per week. This means that each piece of onsite construction equipment is assumed to be in the on position for 10 hours per day. For purposes of flexibility, construction may occur for six days per week, but the emissions estimates represent the total amount of work needed to complete construction. The maximum number of equipment would not be operating for 10 hours per day six days per week. Therefore, for annual averaging and maximum daily purposes, it is assumed that

[19] South Coast Air Quality Management District 2011; note that the ranges cited exclude engines greater than 750 horsepower because they have a longer phase in period.

construction would be five days per week. The concrete pouring during the building phase would most likely occur at night. The emissions estimation assumes that most phases of construction overlap, to present a worst-case scenario. It is a worst-case scenario because the emissions are added together to result in the maximum daily emissions. The maximum daily emissions are compared with the SCAQMD significance threshold.

Construction Trips

Construction trips refer to the number of trips to the project site from offsite locations and include the following groups:

- Workers: These are trips from construction workers from their residence to the project site. The CalEEMod default worker trip length of 14.7 miles was increased to 25 miles, to account for a potentially longer commute distance for construction workers. The CalEEMod default vehicle fleet (LD Mix) was used for employee trips.
- Vendors: These trips include water trucks and service/support trucks bringing smaller materials to the project site. The vendor trip length was increased from the default of 6.9 miles to 25 miles, to account for any additional trips and to account for deliveries from the greater Los Angeles area. The CalEEMod default vehicle fleet (Heavy Duty Truck Mix) was used for vendor trips.
- Haul Trucks: Dump truck trips, support haul trucks, concrete trucks, and material delivery trips were represented as haul trips, with a mileage of 25 miles per trip (increased from the default of 20 miles). The CalEEMod default vehicle type (Heavy Heavy Duty Truck) was used for haul trips.

A summary of the construction offsite trips is shown in Table 13. The trips are one-way trips. It was assumed that all trips occur on the same day, since most of the phases overlap. The construction haul trips are shown in Table 14 (below). As shown in the table, some of the phases (such as landscaping) would not have heavy-heavy truck duty haul trips; however, those phases would have vendor trips, which would bring materials such as trees and plants.

As an example, for the mass excavation phase during the year 2022, there would be 50 worker trips, six vendor trips, and seven haul trips per day. During mass excavation and finish grading, the number of vendor trips and haul trips varies because it is assumed that the area to be graded varies on the basis of the construction year.

Table 13: Construction Offsite Worker and Vendor Trips

Activity	Trips per day	
	Worker	Vendor
Mass excavation	50	6*
Finish grading	15	4*
Building – concrete	25	2
Building – wet utilities	25	15
Building – electrical	15	6
Building – landscaping	10	7
Utilities	40	25
Interchange	25	4
Landscaping	10	6
Curbing/drive approaches	10	4
Paving	25	6
Total	**250**	**85**

Note:
* Vendor trips during mass excavation and finish grading vary by planning area; therefore, year 2022 are presented in the table.
Source of worker trips: Project Traffic Impact Analysis Report (PB 2014).
Source of vendor trips: Highland Fairview, September 11, 2013.

Table 14: Construction Haul Trips

Activity	Haul Trips on Maximum Day	Days per year	Haul Trips per year
Mass excavation (Year 2022*)	7	155	1085
Finish grading (Year 2022*)	0	52	0
Building – concrete	24	313	7512
Building – wet utilities	7	313	2191
Building – electrical	16	313	5008
Building – landscaping	0	313	0
Utilities	20	313	6260
Interchange	9	313	2817
Landscaping	0	313	0
Curbing/drive approaches	6	104	624
Paving	11	48	528
Total	**100**	**—**	**26,025**

Table 14 (cont.): Construction Haul Trips

Activity	Haul Trips on Maximum Day	Days per year	Haul Trips per year
Note: * The excavation and grading trips vary by planning area; year 2022 trips are presented in the table. For the trips per year, refer to Appendix A.1. Source of haul trips and days per year: Highland Fairview, September 11, 2013.			

The vendor and haul trips were also included in the onsite construction equipment by assigning hours per day per trip to account for onsite travel and any idling onsite. The CalEEMod default horsepower and load factors were used for each equipment as specified below:

- Water trucks and service support trucks: other material handling equipment, 1 hour per day per trip
- Concrete trucks: cement and mortar mixers, 1 hour per day per trip
- Delivery trucks, dump trucks, and support haul trucks: off-highway trucks, 0.3 hours per day per trip

Fugitive Dust Estimates

Off-road Equipment

Approximately 42 million cubic yards (cy) of cut and fill will be required to rough/mass grade the entire project site, including remedial grading and over-excavation. Grading is required to make the land level before the building foundations are laid. Earthwork will balance on-site within the Specific Plan, eliminating the need to import or export dirt for the project.

During grading activities, fugitive dust can be generated from the movement of dirt on the project site. CalEEMod estimates dust from dozers moving dirt around, dust from graders or scrapers leveling the land, and loading or unloading dirt into haul trucks. Each of those activities is calculated differently in CalEEMod based on the number of acres traversed by the grading equipment.

Only some pieces of equipment generate fugitive dust within CalEEMod during grading activities. However, there could be construction emissions occurring over the entire planning area because some equipment do not generate fugitive dust. As an example, the building forklifts lifting materials up would not generate fugitive dust. In addition, there could be groups of graders and scrapers working at different ends of the planning area. The dispersion modeling assessment assumes that emissions would occur over the entire planning area.

According to CalEEMod, only several types of onsite off-road construction equipment generate fugitive dust. These include scrapers, crawler tractors, graders, and rubber tired dozers. For a conservative approach, for this assessment, it was assumed that compactors, excavators, and backhoes also generated fugitive dust. The scrapers are assumed to impact 1 acre over an 8-hour day and the other equipment mentioned above would impact ½ acre over an 8-hour day. Calculations for the

grading areas based on the assumed equipment list are shown in the spreadsheet, "Construction Acreage Disturbed from Equipment" in Appendix A.1.

SCAQMD Rule 403 requires fugitive dust generating activities to follow best available control measures to reduce emissions of fugitive dust. In particular, the project would need to comply with the requirements of a "Large Operation," which requires more dust suppressant methods. Rule 403 states that for large operations, during earth moving, the soil moisture content must be at least 12 percent or water to prevent visible dust emissions from exceeding 100 feet in any direction. According to the SCAQMD's Mitigation Measure Examples: Fugitive Dust from Construction & Demolition (SCAQMD 2007c), maintaining a 12 percent soil moisture would reduce fugitive dust by 69 percent. Therefore, for the unmitigated and mitigated emissions estimates, dust emissions from earth moving are reduced by 69 percent. These measures are Rule 403 is accounted for in CalEEMod as "mitigation" because they reduce emissions, even though they are technically not mitigation but are required to comply with the rule. Rule 403 is accounted for in CalEEMod by watering three times per day, which would result in a 61 percent reduction in fugitive dust.

Unpaved Road Dust

There could be fugitive dust generated on unpaved roads from the employee vehicles, vendor vehicles, and haul trucks during construction. The emissions estimates for this dust were estimated using CalEEMod in its "Onroad Fugitive Dust" tab using a separate CalEEMod file to estimate this dust. The mean vehicle speed was reduced from 40 miles per hour to 20 miles per hour. The percent paved was changed to zero percent. Construction parking would likely be near the paved roads; therefore, the onsite distance is an average of 0.5 mile per trip on unpaved roads. The average vehicle weight was increased from the CalEEMod default of 2.4 tons to 5 tons. All other CalEEMod defaults were used.

SCAQMD Rule 403 requires dust control measures on unpaved roads. Best available control measure 15-1 requires that all off-road traffic and parking areas be stabilized (gravel/paving). Best available control measure 15-2 requires that all haul routes be stabilized (gravel/paving) and measure 15-3 requires that construction traffic be directed over established haul routes. In addition, large operations must choose one of the following to reduce dust from unpaved roads:

(4a): Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; OR

(4b): Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR

(4c): Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.

The fugitive dust reductions from the above control measures is quantified as follows; the smallest percent reduction is used in this analysis, which is from control measure 4a (60 percent reduction):

(4a): According to the SCAQMD mitigation measure examples for Fugitive Dust from Construction and Demolition (SCAQMD 2007c), applying water every three hours results in a 61 percent decrease in PM10. Applying a 50 percent moisture content for unpaved roads in CalEEMod's "mitigation" module results in a 60 percent reduction in fugitive dust.

(4b): CalEEMod's watering twice per day would result in a 55 percent reduction in fugitive dust. A 55 percent reduction in unpaved road dust occurs when the soil moisture level is 34 percent. Applying a speed limit reduction of 15 miles per hour and watering twice per day reduces fugitive dust by 64.7 percent reduction, according to CalEEMod calculations.

(4c): According to the SCAQMD mitigation measure examples for Fugitive Dust from Unpaved Roads (SCAQMD 2007c), applying chemical dust suppressants results in an 84 percent reduction.

Water Usage

There would be water used during construction to be compliant with SCAQMD Rule 403. Approximately 30 to 50 gallons of water are needed to compact each cubic yard of soil (personal communication with Highland Fairview, 2013). If there would be 42 million cubic yards of cut and fill x 50 gallons = 2,100 million gallons of water. The greenhouse gas emissions associated with water transport are calculated using CalEEMod in its operation module.

Construction Waste

Greenhouse gas emissions associated with construction waste were estimated using the EPA's Waste Reduction Model (WARM). The quantity of waste was estimated based on the waste per square foot for the Skechers building. The waste percentages were unknown for the Skechers building; therefore, were estimated based on one construction waste case study and the 2008 California waste characterization study. See Appendix A5 for more information.

4.4 - Existing Emissions

The project site is currently dry farmed, which produces fugitive dust and some exhaust emissions from tractors. These existing emissions are used in the regional emissions analysis. These are conservative estimates; actual emissions may be higher.

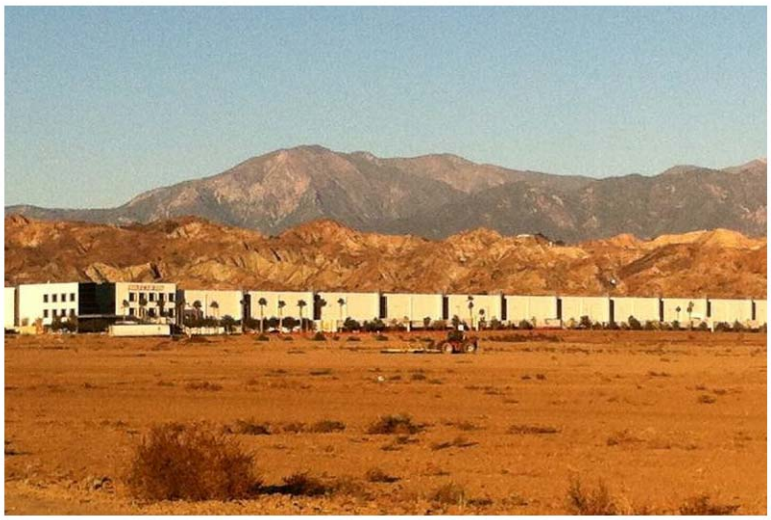
Agricultural operations follow the applicable requirements in SCAQMD Rule 403. The photograph below shows a tractor farming on or near the project site, taken from near the Skechers building looking southeast.

Photograph of Existing Fugitive Dust at the Project Site

Existing fugitive dust emissions were estimating using ARB emission factors and procedures for agricultural operations, as discussed in Appendix E.1, "Existing Emissions, Agriculture." Daily emissions were estimated for unpaved road dust, agricultural land preparation, and harvest operations. Land preparation and harvest operations would not occur on the same day. Therefore, the maximum emissions (during harvest operations) was used in this analysis, in combination with the unpaved road dust to result in the maximum daily emissions.

There would also be emissions from the tractors and any vehicles traveling on the project site related to the agricultural operations. The following photograph shows a close up of the tractor pictured above looking to the northwest towards the Skechers building. The emissions from the tractor were estimated using CalEEMod, assuming 1 tractor per 8 hour day, using the default horsepower and load factors. It was assumed that the property would be disked twice a year for 2 weeks each, 4 weeks total. Planting and harvesting would occur for another 6 weeks. Total tractor use would therefore be 10 weeks per year.

Photograph of Tractor at the Project Site



4.5 - Operational Emissions Assumptions

Operational emissions occur once the project commences operation. The major sources of these emissions are summarized below.

To estimate some of the emissions on a year-by-year basis, the conceptual occupancy schedule for purposes of this analysis is shown in Table 15 based on the best current information. This schedule may vary in the future based on market demand factors associated with regional goods movement.

Table 15: Conceptual Operational Occupancy Schedule

Year	Annual Addition (Millions of Square Feet)	Cumulative Total (Millions of Square Feet)
2015	0.00	0.00
2016	2.10	2.10
2017	2.10	4.20
2018	2.80	7.00
2019	2.80	9.80
2020	5.20	15.00
2021	5.20	20.30
2022	2.75	22.95
2023	1.10	24.05
2024	2.20	26.25
2025	2.35	28.60

Table 15 (cont.): Conceptual Operational Occupancy Schedule

Year	Annual Addition (Millions of Square Feet)	Cumulative Total (Millions of Square Feet)
2026	2.67	31.27
2027	2.67	33.93
2028	2.67	36.60
2029	1.75	38.35
2030	1.75	40.10
Buildout	0.50	40.60

Note:
The square footage includes all land use types (logistics development, light logistics, fueling station, fire station, and convenience store).
Source: Highland Fairview (personal communication, October 2013).

4.5.1 - Motor Vehicle Emissions

Motor vehicle emissions refer to exhaust and road dust emissions from the automobiles and delivery trucks that would travel to and from the project site each day. The following procedures were used to estimate the mobile source criteria regional operational emissions, localized onsite emissions, and greenhouse gas emissions based on emission factors from ARB EMFAC2014 mobile source emission model and emission information from the EPA dealing with paved road dust (see below for specifics).

To quantify mobile source operational emissions, the following information is required:

- Trip generation - the number of vehicles that are expected to move to and from the project site each day.
- Vehicle fleet mix - the mix of vehicle types (i.e., automobiles, trucks, gasoline or diesel-fueled, etc.).
- Trip lengths - the distance each vehicle travels during each trip.
- Emission factors - the amount of emissions generated as a function of vehicle type, vehicle speed, calendar year, and vehicle model year for a given amount of vehicle idling time or distance traveled.

Trip Generation Rates

Trip generation quantifies the number of trips that a project generates each day during all facets of its operations. The trip generation is determined by multiplying an appropriate trip generation rate for a particular land use descriptive of the project by the quantity of that land use. Trip generation rates are determined for daily traffic, morning peak hour inbound and outbound traffic, and the evening peak hour inbound and outbound traffic for the proposed land use. The trip generation rates used for this

project were derived from the traffic impact study prepared by Parsons and Brinckerhoff (PB 2014) and are based on the trip generation rates contained in the Institute of Transportation Engineers Trip Generation Manual, 9th Edition and the City of Fontana Truck Trip Generation Study.

The trip generation rates applied in this assessment are shown in Table 16.

Table 16: Trip Generation Rates

Land Use	Units	Daily Trip Rate (trips/unit)	Peak Hour Trip Rate[1] (trips/unit)
High Cube Logistics Center	KSF	1.68	0.12
Light Logistics	KSF	3.56	0.32
Existing Utilities Servicing Station	KSF	8.00	0.76
Gas Station with Convenience Store	Fuel Pumps	162.78	13.51
Convenience Store	KSF	737.99	52.41
Fire Station	Number	137	29

Notes:
KSF = thousands of square feet
(1) Peak Hour Trip Rate displayed is for the afternoon peak since the trip generation estimates indicate that the afternoon peak hour trip rate is greater than the morning peak hour trip rate.
Source: Project Traffic Impact Analysis (PB 2014).

Appendix E of the CalEEMod Manual states the following regarding trip rates for large warehouses and distribution centers, which demonstrates that the trip rate is appropriate for the project, since the project is a Specific Plan containing more than 10 warehouse buildings:

> In the case that air quality is evaluated for multiple warehouses (>10), such as in an analysis for a general plan, the average rate of 1.44 trips per [thousand square feet of land use space] KSF from the ITE 8th Edition Trip Generation manual is acceptable. This lower value may be more appropriate as on average, a small portion of warehouses can be expected to operate at varying levels of service, including some warehouses experiencing temporary partial or complete vacancy. (South Coast Air Quality Management District 2013, CalEEMod, pages 14-15).

Additionally, the SCAQMD is currently working with the Institute of Transportation Engineers to provide enhanced information and guidance regarding vehicle trips associated with warehouse operations (SCAQMD 2015). SCAQMD staff is recommending truck trip rates from the Institute of Transportation Engineers for high cube warehouse projects located in SCAQMD. Consistent with CEQA Guidelines, the SCAQMD states that an EIR may use a non-default trip rate if there is substantial evidence indicating another rate is more appropriate for the air quality analysis. The trip generation rate used in this assessment for the high cube logistics warehouses (1.68 trips per KSF) is greater than the rate of 1.44 trips per KSF recommended in the CalEEMod manual. Using the higher

number of 1.68, which is 116 percent of the CalEEMod recommended rate, provides for a more conservative estimate of vehicle trips (i.e., larger number of trips), and hence a higher estimate of air quality and greenhouse gas impacts.

Vehicle Fleet Mix

The vehicle fleet mix is defined as the mix of motor vehicle classes active during the operation of the project. Exhibit 12 displays sample vehicle classes that were assumed in this assessment.

Emission factors are assigned to the expected vehicle mix as a function of calendar year, vehicle class, speed, and fuel use (gasoline and diesel-powered vehicles). The vehicle fleet mix for the project is based on the assumptions contained in the project traffic impact report (PB 2014). The traffic report provided a vehicle fleet mix for passenger cars, light heavy duty trucks, medium heavy duty trucks, and heavy-heavy duty trucks. For purposes of this assessment, the EMFAC2014 mobile source model was used to derive a complete mix of vehicles consisting of the following vehicle classes (some vehicle classes such as LDT and LHDT have been separated into subclasses based on vehicle weight):

- Passenger Cars: light duty automobiles (LDA), light duty trucks (LDT1 and LDT2), and medium duty trucks (MDT) - identified as passenger cars in the project traffic impact report;
- Light heavy duty trucks: light heavy duty trucks (LHDT1 and LHDT2) with a gross weight of between 8,501 pounds and 14,000 pounds (these were separated into two groups consistent with the default vehicle miles traveled by each vehicle class within the EMFAC model) - identified in the project traffic impact report as light trucks;
- Medium heavy duty trucks (MHDT) with a gross weight of between 14,001 pounds and 33,000 pounds - identified as medium trucks in the project traffic impact report; and
- Heavy-heavy duty trucks (HHDT) with a gross weight in excess of 33,000 pounds - identified as heavy trucks in the project traffic impact report.

The EMFAC2014 model was also used to subdivide each vehicle class by gasoline and diesel vehicles for each analysis year.

Separate vehicle trips and fleet mixes were prepared for the years of 2012, 2021, 2022, 2027,and 2035 as necessary for use in the localized air quality and health risk impact assessments as described below.

Two types of vehicle fleet mixes were estimated for this assessment:

- Daily average: The daily vehicle fleet mix is representative of daily operations and is characterized by the total amount of vehicle trips and their distribution by vehicle type during an operational day. The daily vehicle trips and fleet mix are used to estimate the daily regional emissions from the operation of the project as the project's vehicles travel to and from the project

site throughout the South Coast Air Basin. The daily vehicle trips and fleet mix are also used to estimate local daily and annual air quality impacts to the areas surrounding the project site.

- Peak hour: The peak hour vehicle fleet vehicle mix represents the number and mix of vehicles that would access the project during the peak hour of traffic. The peak hour information is used to estimate 1-hour and 8-hour local air pollutant impacts as well as for the estimation of acute non-cancer hazards.

The daily average vehicle trips and fleet mix at the final buildout are provided in Table 17, consistent with the trip estimates contained in the project traffic impact report.

Table 17: Daily Trips and Fleet Mix - Full Project Buildout

Vehicle Class	Fleet Mix (%)	Daily Trips	Non-Diesel Daily Trips	Diesel Daily Trips
Light Duty Auto (LDA)	45.6	31,725	31,630	95
Light Duty Truck 1 (LDT1)	5.3	3,715	3,711	4
Light Duty Truck 2 (LDT2)	15.8	11,019	11,014	4
Medium Duty Truck (MDT)	12.6	8,744	8,735	9
Subtotal	*79.4*	*55,203*	*55,090*	*113*
Light Heavy Duty Truck 1 (LHDT1)	3.0	2,088	1,595	493
Light Heavy Duty Truck 2 (LHDT2)	0.5	336	135	201
Medium Heavy Duty Truck (MHDT)	4.6	3,233	629	2,604
Heavy Heavy Duty Truck (HHDT)	12.5	8,689	192	8,497
Subtotal	*20.6*	*14,346*	*2,551*	*11,795*
Grand Total	*100.0*	*69,549*	*57,641*	*11,908*

Note:
Totals may not total completely due to rounding differences.
Source: PB 2014 and FirstCarbon Solutions (Appendix F, Localized Spreadsheets and AERMOD Output).

The peak hour vehicle trips and fleet mix are provided for the full buildout in Table 18, consistent with the trip estimates provided by the project traffic consultant. The information provided in this table is for the afternoon peak hour since the afternoon peak hours from the project Traffic Impact Analysis (PB 2014) have a higher number of trips than during the morning peak hour.

In terms of a vehicle trip breakdown by phase, Phase 1 area generates approximately 56 percent of the total trips and Phase 2 area the remaining 44 percent.

Automobile
(i.e., Ford Focus)

Light Duty Truck
(i.e., Toyota Tacoma)

Medium Duty Vehicle
(i.e., Ford Excursion)

Light-Heavy Duty Truck
(i.e., Ford F-450)

Medium-Heavy Duty Truck
(i.e., Dump Truck)

Heavy-Heavy Duty Truck

Sources: Wikipedia http://en.wikipedia.org/wiki/Truck_classification, www.ford.com, www.autoblog.com/photos/review-2011-ford-f-450-lariat/#photo-3363366, www.toyota.com, www.peterbilt.com

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Exhibit 12
Vehicle Classifications

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Table 18: Peak Hour Trips and Fleet Mix

Vehicle Class	Fleet Mix (%)	Peak Hour Trips	Non-Diesel Peak Hour Trips	Diesel Peak Hour Trips
Light Duty Auto (LDA)	37.1	1,859	1,854	6
Light Duty Truck 1 (LDT1)	4.3	218	217	0
Light Duty Truck 2 (LDT2)	12.9	646	645	0
Medium Duty Truck (MDT)	10.2	512	512	1
Subtotal	*64.6*	*3,235*	*3,228*	*7*
Light Heavy Duty Truck 1 (LHDT1)	5.2	259	198	61
Light Heavy Duty Truck 2 (LHDT2)	0.8	42	17	25
Medium Heavy Duty Truck (MHDT)	8.0	401	78	323
Heavy Heavy Duty Truck (HHDT)	21.4	1,074	24	1,050
Subtotal	*35.4*	*1,776*	*317*	*1,459*
Grand Total	*100.00*	*5,011*	*3,545*	*1,466*
Source: PB 2014 and FirstCarbon Solutions (Appendix F, Localized Spreadsheets and AERMOD Output).				

Once the number of vehicle trips and their fleet mixes have been estimated, the various vehicle trips are then distributed onto the roadway network using regional traffic models (see the project traffic impact report on the details of the traffic distribution modeling, PB 2014). The traffic model is composed of a series of traffic segments that represent the flow of traffic from one geographic point to another. The project's motor vehicle traffic volumes were estimated using the number of daily and peak hour vehicles forecasted by the regional traffic model along nearly 500 individual roadway segments spanning the region from Beaumont to the ports of Los Angeles and Long Beach. The output of the traffic model is in the form of two-way traffic flows for each traffic segment. For each roadway segment, the total number of vehicles was forecasted. The number of vehicles was then broken down into several vehicle types. These types included passenger cars, light heavy duty trucks, medium heavy duty trucks, and heavy-heavy duty trucks. Average vehicle speeds were assigned to each roadway segment based on posted speed limits and estimates of average vehicle speeds contained in the Southern California Association of Governments 2012 Regional Transportation Plan (SCAG 2012).

Motor vehicle emissions were then estimated for each roadway segment as illustrated below by using the travel volumes extracted from the traffic model forecasts, the length of the roadway segment, and the emission factors from the ARB EMFAC2014 mobile source emission model. As an example for one segment:

Freeway Roadway Segment 34: State Route 60, Redlands Boulevard to Theodore Street in 2035 and the full project buildout

Total daily project vehicles (both directions): 24,290 vehicles broken down as
Passenger cars: 12,650 vehicles per day
Light heavy duty trucks: 690 vehicles per day
Medium heavy duty trucks: 2,030 vehicles per day
Heavy-heavy duty trucks: 8,920 vehicles per day

Roadway segment length: 1.04 miles
Total Vehicle Miles Traveled (VMT) over the roadway segment: 25,262 miles/day (24,290 vehicles per day x Segment Length of 1.04 miles)

$$\text{Emissions} = \sum_{I=1}^{n} (\text{Emission Factor}_{i,s} \times \text{VMT}_i)$$

Where:

Emissions = total daily emissions summed over all vehicle types (lb/day)
Emission Factor$_i$ = amount of emissions per mile traveled (lb/mile) for vehicle type,and vehicle speeds
VMT = number vehicle miles traveled (miles/day) for vehicle class, i
i = vehicle class
n = total number of vehicle classes

For the above example, the total daily project CO emissions were estimated along this freeway segment in 2035 as 27.8 pounds per day after applying the emission factors for each vehicle class and vehicle speed. This process is repeated for all of the roadway segments to arrive at the total emission rate for all project vehicles.

The vehicle traffic volumes were then separated into two portions: local travel for purposes of analyzing local air quality impacts and regional travel for purposes of analyzing health risk impacts.

Local Travel

The automobile and truck traffic generated by the project would travel along several local roadways within and bordering the area of the project including Redlands Boulevard, Theodore Street, Gilman Springs Road, Alessandro Boulevard, and Eucalyptus Avenue. As the project traffic travels along the roadway network, this traffic would generate air emissions. To examine the local air quality impacts from the project vehicles during operation along the local roadway network, a number of roadway segments were identified for analysis as described in the traffic impact report.

The local roadway segments analyzed in this assessment are identified in Exhibit 11. Both daily and peak hour project traffic project volumes were estimated as part of the traffic impact report along

each of these roadway segments for passenger cars, and light, medium, and heavy duty trucks during the years 2012 (existing), 2022 (Phase 1 buildout), and 2035 (long term planning year). Additional inventories were created for the tears 2021 and 2027 to assess the local impacts of construction emissions on nearby sensitive receptors. The daily and peak hour traffic volumes along these roadway segments are provided in Appendix F of this report.

The localized air quality analysis also addressed vehicle travel and idling within the truck yards of each phase of the project site. The exact physical locations and sizes of the various buildings that would comprise the project are unknown at this time. However, average trip lengths within the truck yards for the project's two phases and individual land uses was estimated based on a review of the location of transportation analysis zones located within the project boundaries and the placement of the existing and planned local roadway network that would comprise the project. For this purpose, an average truck trip length of 1,080 feet was assigned to the high cube development truck yard areas, 574 feet for the light logistics land uses truck yards, 330 feet for the gas utility land use, and 160 feet for the fueling station/convenience store and fire station land uses.

Regional Travel

The project's motor vehicles would also travel along numerous regional roadways outside of the project boundaries including local surface streets and freeways. Exhibit 13 shows the local surface street roadway network analyzed while Exhibit 14 shows surface segments analyzed. Exhibit 15 shows the freeway segments analyzed while Exhibit 16 shows the additional freeway segments added to analyze project truck traffic trips to the ports of Los Angeles and Long Beach.

Emission Factors

There are emission factors available through EMFAC for VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$, CO_2, and CH_4. There are no emission factors available from EMFAC for black carbon or ultrafine particles. Black carbon emissions are estimated as discussed on page 171.

Emissions from motor vehicles can be characterized as follows:

- Combustion Emissions (grams/mile traveled or grams/hour for idling): Combustion emissions (i.e., exhaust emissions) result from the combustion of fuel and are the main source of emissions for all pollutants from the project. The ARB EMFAC2014 mobile source emission model has the capability to provide emission rates for user defined vehicle speeds, fuel type, vehicle class, and model year out to the calendar year 2035.
- Running Loss (grams/mile): Running loss emissions are defined as evaporative hydrocarbons that are emitted from hoses, fittings or canisters, while the vehicle is in operation. This occurs either because fuel heating has caused the vapor generation rate to exceed the vehicle's capacity to control the vapors, or through permeation and leakage. (VOC only)

- Tire Wear (grams/mile) and Brake Wear (grams/mile): EMFAC has the capability to provide particulate emissions from tires and brakes that occur from operational wear. (PM_{10} and $PM_{2.5}$ only)
- Road Dust (grams/mile) is generated from re-suspension of loose particulate material from the surface of the road as a result of movement of vehicles and wind flow. Road dust emissions are primarily a factor of the amount of re-suspendable particulate matter available on the road surface and the traffic flow volume on the road. The estimation of road dust emissions was based on the methodology presented by the EPA in its assessment of road dust emissions from paved roads. (PM_{10} and $PM_{2.5}$ only)

The exhaust and running loss emissions are calculated as follows:

$$Emissions_{total} = \sum_{i=1}^{n} \{ VMT_i [EF_i + RL_i] + [EF_{idling-1} \times IdVOL_i \times T_i] \}$$

Where:

$Emissions_{total}$ = total running exhaust and idling emissions summed over all vehicle classes
EF_i = running exhaust emission factor for each vehicle type at a specific vehicle speed (g/mi)
EF_{idling} = idling emission factor for each vehicle class (g/hour)
VMT_i = total number of vehicle trips by vehicle class
$IdVOL_i$ = number of idling vehicles by vehicle class
RL_i = VOC evaporative running loss for each vehicle class (g/mi)
T_i = idling hours for each vehicle class (hours)
n = number of vehicle classes
$_I$ = vehicle class

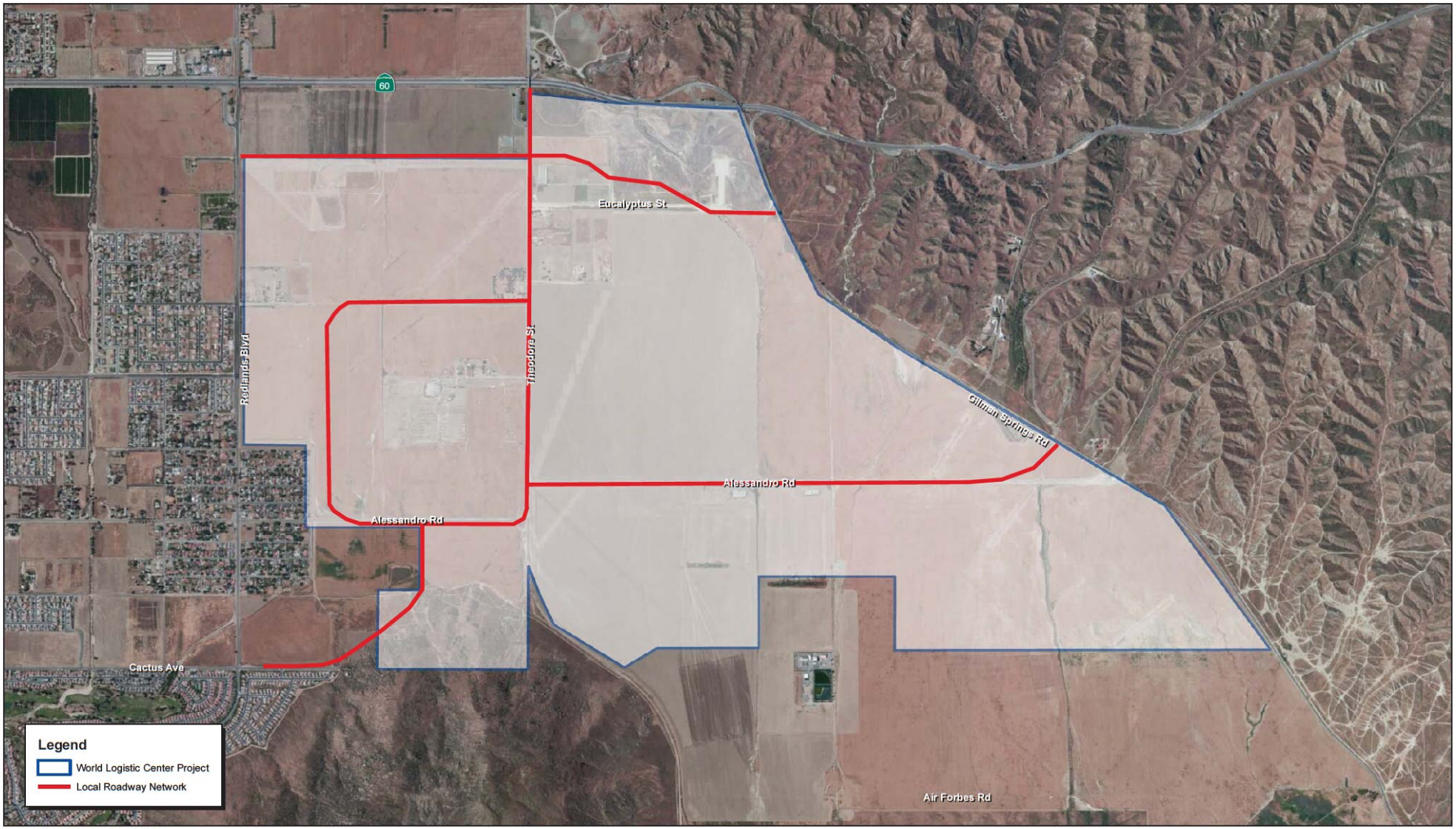
Particulate matter emissions result from not only vehicle travel and idling but also from tire wear, brake wear, and road dust. The total particulate matter emission factor then includes the following:

$$EF_{PM} = PM_r + PM_t + PM_b + PM_{dust}$$

Where:

EF_{PM} = Particulate matter emission factor (g/mi)
PM_r = Running exhaust emission factor (g/mi)
PM_t = Tire wear emission factor (g/mi)
PM_b = Brake wear emission factor (g/mi)
PM_{dust} = particulate matter entrained road dust (g/mi)

The tire wear and brake wear emission factors are derived from the EMFAC2014 emission model for both PM_{10} and $PM_{2.5}$ emissions.



Source: Google Earth March 2011

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2,000 1,000 0 2,000 Feet

Exhibit 13

Local Roadway Network Analyzed in the Local Air Quality and Health Risk Assessment

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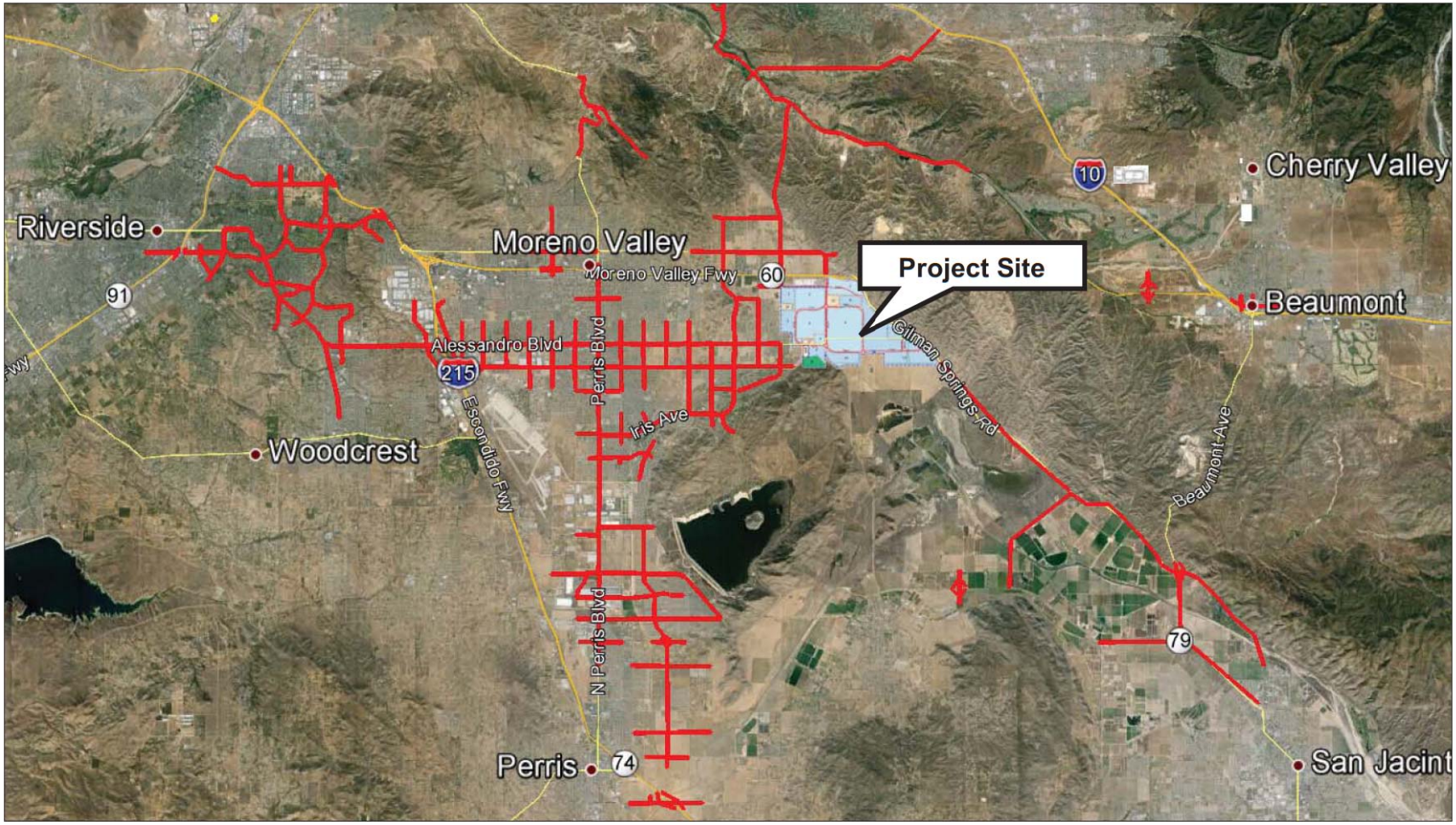

Source: FirstCarbon Solutions 2013.

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Exhibit 14
Surface Street Network Analyzed in the Health Risk Assessment

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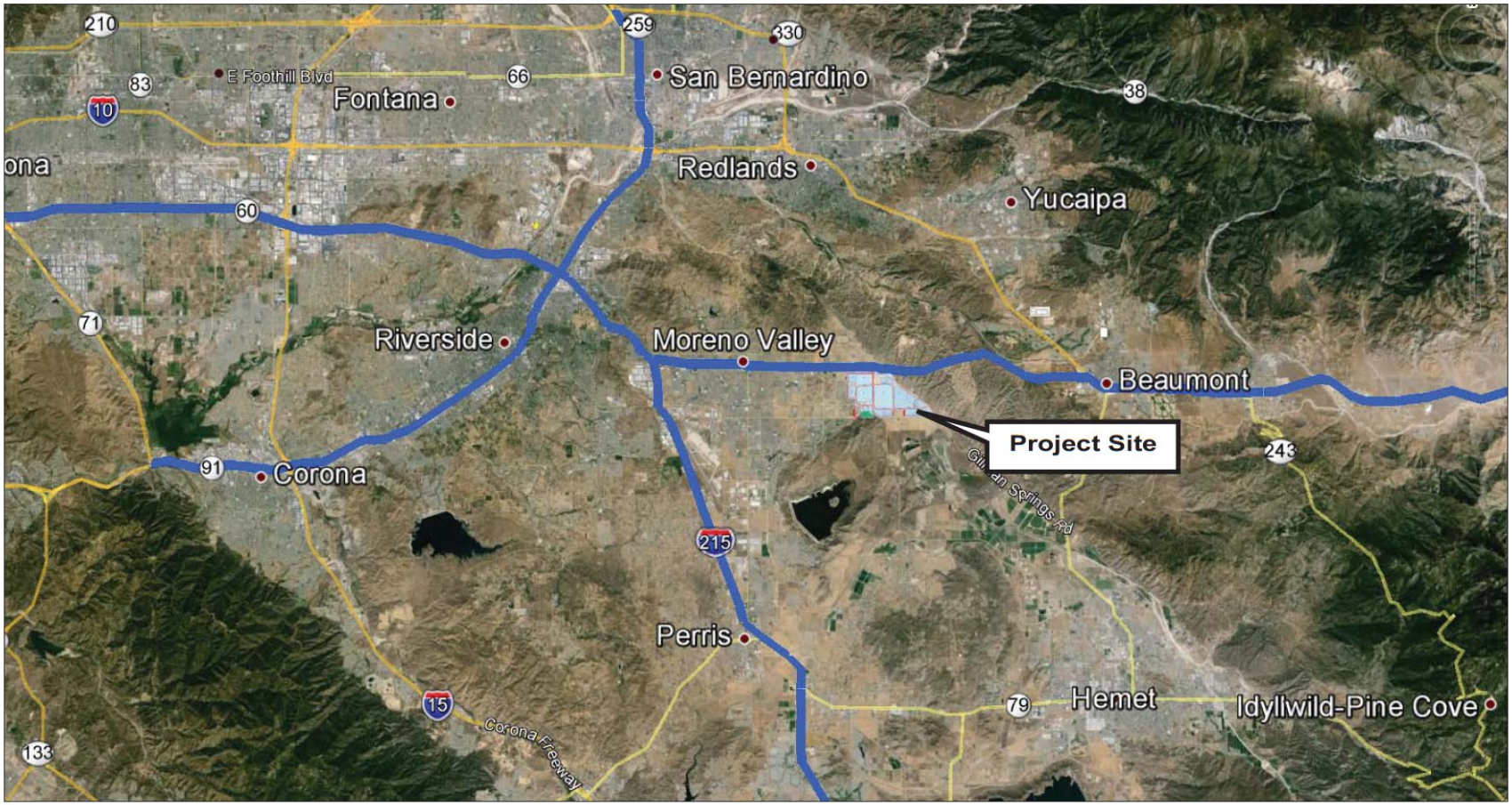

Source: Parsons Brinckerhoff 2014.

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Exhibit 15
Freeway Network Analyzed in the Health Risk Assessment

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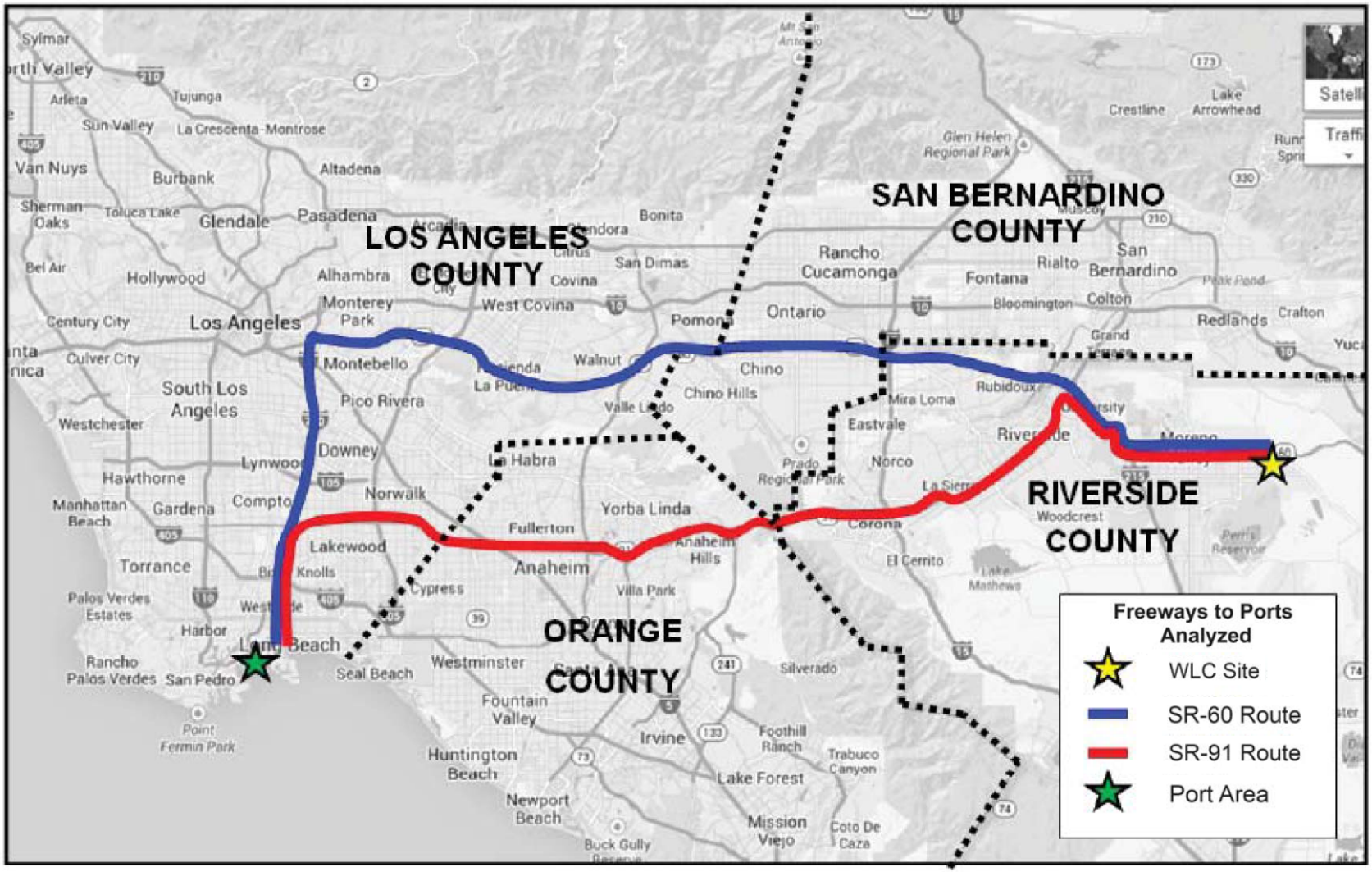

Source: Parsons Brinkerhoff November 2013.

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Exhibit 16
Freeway Segments to the Ports Analyzed in the Health Risk Assessment

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The relevant expression for estimating road dust emissions on paved roads was taken from the EPA AP-42 methodology as follows:

$$PM_{dust} = EF_{rd} \times VMT$$

Where:

PM_{dust} = Particulate emissions from re-suspended road dust.

VMT = Vehicle miles traveled by all vehicles along the road (mi/day).

EF_{rd} = paved road dust emission factor calculated as:

$$EF_{rd} = k \times (sL)^{0.91} \times (W)^{1.02}$$

Where:

k = particle size multiplier for the particulate size of interest (lbs/VMT)

sL = silt loading (g/m^2)

W = average weight of all vehicles along the road (tons)

The EMFAC2014 emissions factors were developed for the South Coast Air Basin on an annual basis. To derive the basin-wide emission factors, the emission factors were developed as a weighted average of the county emission factors from the four counties that comprise the South Coast Air Basin, weighted by the vehicle miles traveled in each county.

The data sources required to apply the above expressions are discussed in Appendix F, Localized Spreadsheets and AERMOD Output.

Motor vehicle emissions for each category of emissions were estimated for vehicle travel within the project's truck yards, along adjacent and internal roadways, and truck idling within the project's truck yards. Emission factors for the criteria air pollutants were developed for the years 2012, 2021, 2022, 2027, and 2035.

Truck idling emissions assumed that each heavy duty truck would idle for 5 minutes per day prior to mitigation, pursuant to the ARB Air Toxic Control Measure limiting the idling time for heavy duty diesel trucks (ARB 2005a) and the World Logistics Specific Plan.

A Note About Operational Heavy-Duty Truck Emissions

The majority of the project's operational emissions are from on-road mobile sources, more particularly, heavy-duty trucks that contribute a disproportionate amount of emissions compared to passenger vehicles. Emissions from on-road mobile sources are regulated at the state and federal levels and, therefore, are outside of the control of local agencies such as the City and the SCAQMD. For example, the ARB is working closely with the EPA, engine, and vehicle manufacturers, and other interested parties to identify programs that will reduce emissions from heavy-duty diesel vehicles in California. In its "Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles," the ARB presented a blueprint for achieving a 75 percent reduction in diesel

particulates by 2010 and an 85 percent reduction by 2020 from the 2000 baseline (California Air Resources Board 2000). The emission reductions would arise from a combination of measures including the use of ultra-low sulfur diesel fuel, new emission standards for large diesel engines, restrictions on diesel engine idling, addition of post-combustion filter and catalyst equipment, and retrofits for business and government diesel truck fleets. The implementation of these emission reductions will also result in reductions of other pollutants such as NO_X, VOC, and CO. As these emission reduction programs are implemented and there is a turnover in the use of older vehicles with newer and cleaner vehicles, the project's operational emissions are expected to decline significantly in the future.

Emission controls on mobile source vehicles already adopted by the ARB particularly dealing with NO_X and PM_{10} controls on heavy duty trucks will reduce truck emissions significantly over the next 10 years. Today's vehicle fleet (assumed to be 2012) is comprised of vehicles as old as 25 years and generates substantially more emissions than the vehicles that would replace them in the future.

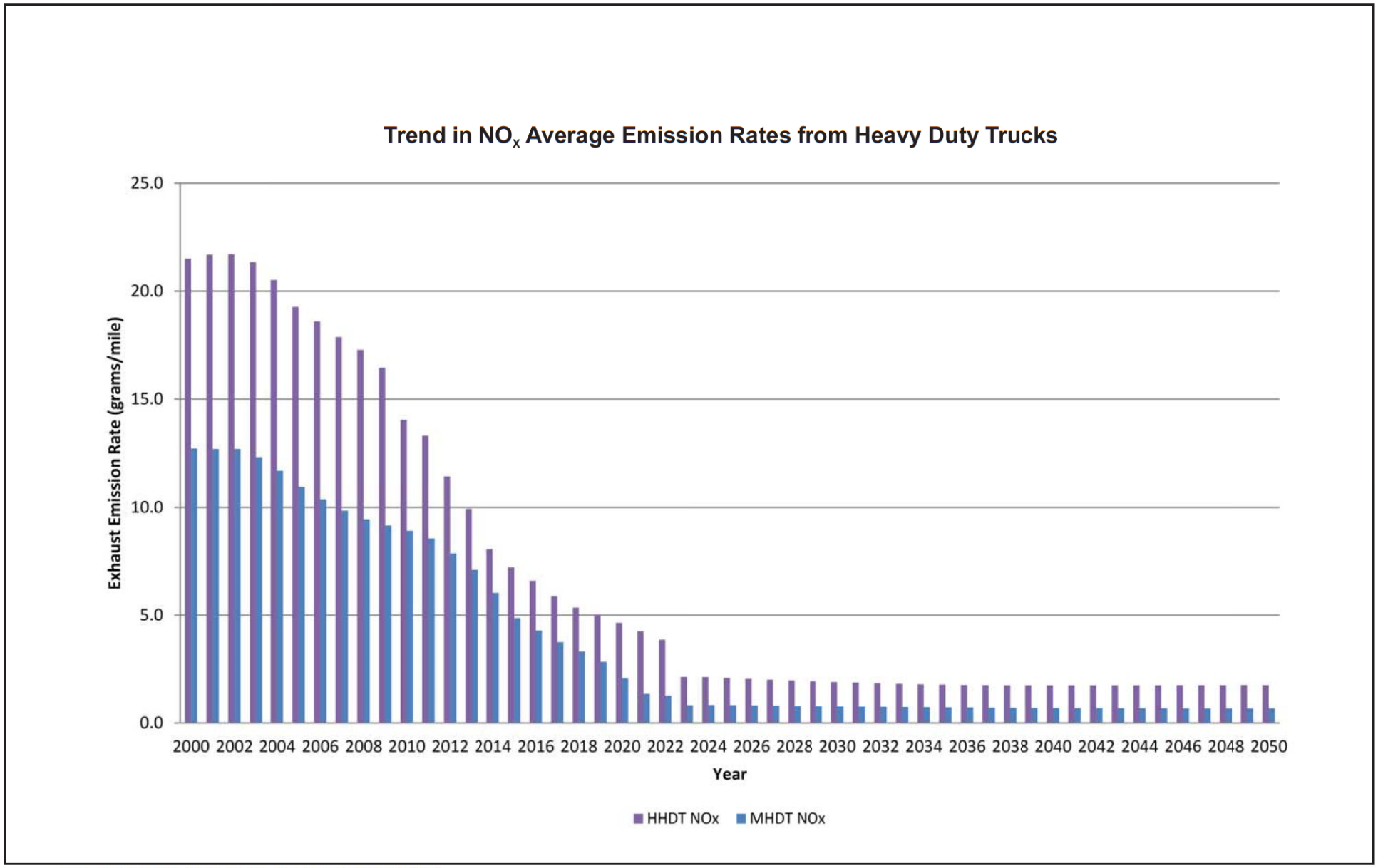
Exhibit 17 and Exhibit 18 show the trends in NO_x and diesel PM emission rates, respectively for the largest diesel trucks from 2012 to 2035 as derived from the ARB EMFAC2014 mobile source emission model. NO_x and diesel PM emissions are expected to decline by about 80 to 90 percent from 2012 to 2035. The largest reductions are expected to occur between 2012 and 2023 for NO_x and 2012 to 2017 for diesel PM.

Greenhouse Gases

EMFAC2014 has emission factors for the greenhouse gases carbon dioxide and methane. Greenhouse gas emissions from mobile vehicles were estimated using the same procedures as shown above for carbon dioxide and methane. The emissions were estimated in tons per year and were converted to $MTCO_2e$ by multiplying the greenhouse gas by its global warming potential (1 for carbon dioxide and 21 for methane) and then multiplying it by 0.9072 (a conversion from tons to metric tons). The emission factors from EMFAC2014 include reductions from the following regulations:

- Regulation - Pavley (AB 1493): Clean car standards to reduce greenhouse gas emissions from new passenger vehicles (LDA-MDV) from 2009 to 2016.
- Regulation - Low Carbon Fuel Standard (Executive Order S-01-07): The low carbon fuel standard would reduce carbon intensity in fuels. Carbon intensity is a measure of the greenhouse gas emissions associated with production and use of a fuel. Fuels like natural gas from landfills, dairy biogas, and biodiesel have lower carbon intensity than gasoline or diesel.

Black carbon emissions were estimated based on the diesel $PM_{2.5}$ emissions as discussed in Section 4.5.3 - Black Carbon on page 171. N_2O emission factors are from the EPA (2014b).



Source: Data are presented for Los Angeles County EMFAC2014.

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Exhibit 17
Trend in Average NO_x Emission Rates for Heavy Duty Diesel Trucks

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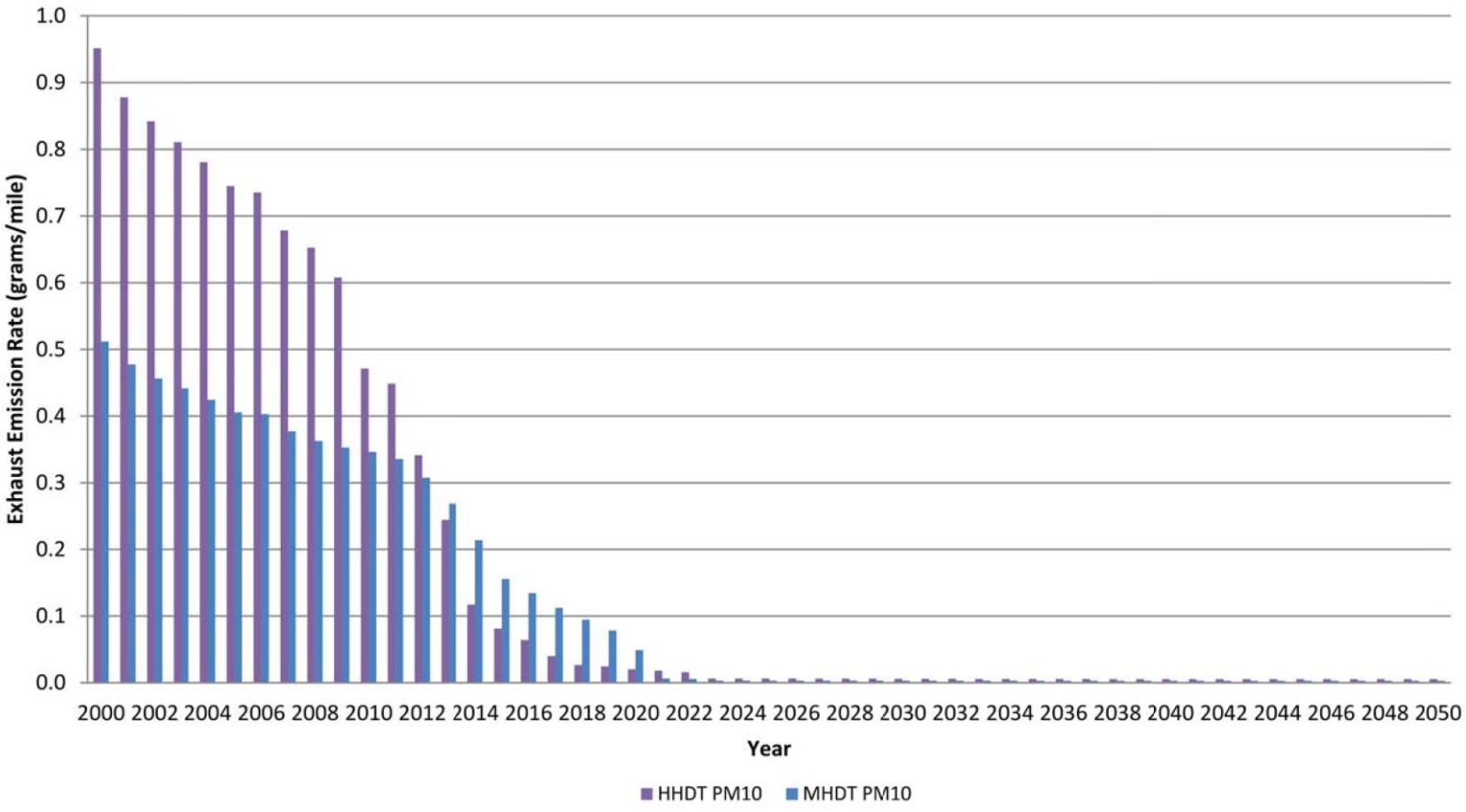

Source: Data are presented for Los Angeles County EMFAC2014.

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Exhibit 18
Trend in Average PM10 Emission Rates for Heavy Duty Diesel Trucks

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4.5.2 - Other Emission Sources

There are other emission sources besides mobile vehicles during operation of the project. VOC emissions would be emitted during the occasional repainting of buildings and from consumer products. Criteria pollutants and greenhouse gases would be emitted from landscaping, natural gas usage, onsite yard trucks, onsite forklifts, and onsite emergency generators. Greenhouse gases would be emitted from electricity, water and wastewater, refrigerants, and solid waste generation. There would also be some sequestration from the onsite trees that would be planted on the project site as a result of the project. These emission sources are discussed below.

For the other sources, the project is divided into the categories shown in Table 19 to more accurately assess the emissions, since these emission sources depend on the following types of land uses.

Table 19: Project Land Uses for Other Sources

Land Use	Size at Buildout	Percent of Total
Logistics Development and Light Logistics	39,379,000 sf	97%
Office (percentage of 40,600,000 sf within the logistics space)	1,218,000 sf	3%
Convenience store/fueling station	3,000 sf	<1%
Fire station	1.5 acres	N/A
Total	**40,600,000**	**100%**

Notes:
sf = square feet N/A = not applicable because the fire station square footage is not determined at this time.
Source: Highland Fairview 2013.

Architectural Coatings (Painting)

Paints release VOC emissions. The buildings in the project would be repainted on occasion. Painting emissions were estimated by CalEEMod using default assumptions for buildout and estimated for the previous years based on square footage shown in Table 15 (page 136).

Consumer Products

Consumer products are various solvents used in non-industrial applications that emit VOCs during their product use. "Consumer Product" means a chemically formulated product used by household and institutional consumers including, but not limited to, detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products; home, lawn, and garden products; disinfectants; sanitizers; aerosol paints; and automotive specialty products; but does not include other paint products, furniture coatings, or architectural coatings (California Air Resources Board 2011).

The default emission factor developed for CalEEMod of 0.0000204 pounds VOC per day per square foot is based on a statewide factor and is not applicable to the project. The entire project would not use consumer products as specified above. The warehouses may have small kitchen areas and

bathrooms that would use cleaning products. The majority of the square footage for the project would be used for warehousing/distribution. Negligible quantities of personal care products, home, lawn, and garden products, disinfectants, sanitizers, polishes, cosmetics, and floor finishes would be used. In addition, the buildings in the project would be LEED certified; LEED has a variety of credits available for use of low emitting materials. Therefore, to estimate VOC emissions from the project, the emission factor is reduced to 25 percent of its original value, to 0.0000051 (5.1E-6) pounds VOC per day per square foot.

Landscape Equipment

Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers. CalEEMod estimated the landscaping equipment using the default assumptions in the model. Emissions were estimated for buildout and interpolated for the previous years based on square footage in Table 15 (page 136).

Electricity

There would be emissions from the power plants that would generate electricity to be used by the project (for lighting, etc.). Emissions were estimated for buildout and interpolated for the previous years based on square footage in Table 15. Emissions were estimated using CalEEMod; CalEEMod reports the annual emissions in carbon dioxide (tons), methane (tons), nitrous oxide (tons), and the total ($MTCO_2e$).

The Moreno Valley Electric Utility would provide electricity for the project. Electricity greenhouse gas emission factors for the Moreno Valley Electric Utility were not available through EPA's eGRID, the California Public Utilities Commission, or through another readily available source. Emission factors are available in CalEEMod for Southern California Edison, the utility that provides electricity to the surrounding area. Therefore, emission factors for Southern California Edison are used in this analysis.

The Draft EIR used emission factors embedded in CalEEMod version 2011. The default CalEEMod (version 2013) emission factors for Southern California Edison (from the year 2007) are used in this analysis as currently accepted through CalEEMod, and are slightly lower than those in the Draft EIR. The factors are as follows:

- Carbon dioxide: 630.89 pound per megawatt hour (lb/MWh)
- Methane: 0.029 lb/MWh
- Nitrous oxide: 0.00617 lb/MWh

In the year 2007, Southern California Edison had 15.5 percent renewable energy in its portfolio (California Public Utilities Commission 2011). The California renewable energy regulations require that electricity providers contain a minimum of 33 percent renewable energy in their energy mix by the year 2020. Reductions from the Renewable Portfolio Standards are not accounted for in the analysis.

CalEEMod has three categories for electricity consumption: electricity that is impacted by Title-24 regulations, non-Title-24 electricity, and lighting. The Title 24 uses are defined as the major building envelope systems covered by California's Building Code Title 24 Part 6, such as space heating, space cooling, water heating, and ventilation. Lighting is separate since it can be both part and not part of Title-24. Non-Title 24 includes everything else such as appliances and electronics.

The project would consume approximately 376,426,310 KWh/year of electricity. To properly allocate the total electricity consumption into the three categories, the percentage for each category is determined by using percentages derived from the CalEEMod default electricity intensity, which are shown in Table 20. Use of the percentages in Table 20 are applied to the project's electricity consumption to result in the values used in the analysis shown in Table 21.

Table 20: CalEEMod Default Electricity Intensity

Land Use	Units	Total	Title-24	Non-Title-24	Lighting
Unrefrigerated warehouse (no rail)	KWh/sf/year	3.1	0.5	0.8	1.8
	% of total	*100.0*	*16.1*	*25.8*	*58.1*
Office park	KWh/sf/year	11.2	3.8	2.6	4.8
	% of total	*100.0*	*33.9*	*23.2*	*42.9*
Convenience market with gas pumps	KWh/sf/year	15.6	5.6	2.4	7.6
	% of total	*100.0*	*35.9*	*15.4*	*48.7*

Note:
KWh/sf/year = kilowatt hours per square foot per year.
Source of electricity intensity: Table 8.1 in Appendix D of the 2013 CalEEMod Manual for Climate Zone 10.

Table 21: Project Electricity Intensity

Land Use	Electricity Intensity (KWh/sf/year)			
	Total	Title-24	Non-Title-24	Lighting
Warehouse	9.27	1.49	2.39	5.39
Office	9.27	3.14	2.15	3.98
Convenience store	9.27	3.33	1.43	4.52

Source of total intensity: electrical consumption for the project is 376,426,310 KWh/year (from Utility Specialists, Technical Memorandum – Dry Utilities, October 24, 2013). This divided by the total square feet in the project (40,600,000 sf) results in 9.272 KWh/sf/year.
Source of other intensity: calculated as a percentage of the total using the percentages by land use shown in Table 20. As an example, the Title-24 intensity for the warehouse uses is 1.49 (9.272 x 16.1/100).

Natural Gas

There would be emissions from the combustion of natural gas used for the project (water heaters, heat, etc.). CalEEMod has two categories for natural gas consumption: Title-24 and non-Title-24. For an office park, approximately 100 percent of the natural gas consumption is impacted by Title-24 regulations.[20] The project's natural gas consumption is shown in Table 22. The estimates at project buildout were made by CalEEMod and were applied to earlier years as a percentage of the square feet. CalEEMod reports the annual emissions in carbon dioxide (tons), methane (tons), nitrous oxide (tons), and the total ($MTCO_2e$).

Table 22: Project Natural Gas Consumption

Land Use	Consumption (cf/year)	Consumption (cf/sq ft/year)	Consumption (kBtu/sq ft/year)
Unrefrigerated warehouse, logistics, and support	0	0	0.000
Office space	14,616,000	12	12.348
Total	**14,616,000**	**12**	**12.348**

Notes:
sq ft = square feet; cf = cubic feet
KBtu = one thousand British thermal units, which is converted from cf by multiplying by 1.029. It was converted to kBtu/sq ft by dividing by 1,218,000 sq ft (CalEEMod input is in kBtu).
Source: Utility Specialists, Technical Memorandum – Dry Utilities, October 24, 2013.

Wastewater

Depending on the type of wastewater treatment plant, there could be emissions from treatment of wastewater. However, the project's wastewater would be transferred to the Eastern Municipal Water District's Moreno Valley Regional Water Reclamation Facility. The facility was recently upgraded with fuel cell cogeneration. A digester gas-fueled fuel cell system provides power and heat to the plant while using all available digester gas.[21]

Water

There would be greenhouse gas emissions from the use of electricity to pump water to the project. The applicant conducted a water usage analysis; therefore, CalEEMod default water usage is not used. A summary of the project's water consumption is shown in Table 23. Emissions for buildout are estimated by CalEEMod and are calculated for prior years based on the square footage anticipated in those years. CalEEMod reports the annual emissions in carbon dioxide (tons), methane (tons), nitrous oxide (tons), and the total ($MTCO_2e$).

[20] South Coast Air Quality Management District 2013. CalEEMod Manual, Appendix D, Table 8.1, Office park, Zone 10
[21] Carollo Engineers. Moreno Valley Regional Water Reclamation Facility Fuel Cell Cogeneration Design/Construction. Website: www.carollo.com/MorenoValley-RWRFFuelCellCogeneration. Accessed February 13, 2014.

Table 23: Project Water Consumption during Operation

Units	Building Area (SF)	Water Use		
		Total	Indoor	Outdoor
Gallons per year	40,600,000	643,860,000	148,190,000	495,670,000
Acre feet per year	40,600,000	1,982	460	1,522

Note:
SF = square feet.
Source of indoor water use: The World Logistics Center Water Demands and Waste Water Generation for Buildings (CH2M Hill 2013) indicates a water demand factor of 0.01 gallons per day per square feet for the project. The project proposes 40.6 million square feet of development; therefore, water usage would be 406,000 gallons per day, or 148,190,000 gallons per year (460 acre feet per year).
Source of outdoor water use: The Recycled Water Analysis for the project (CH2M Hill 2012) indicates that the project would have an average irrigation water demand of 1,358,000 gallons per day, which was multiplied by 365 days/year.

Refrigerants

Refrigerants may be used in air conditioning for the office component of the warehouses. Refrigerants are hydrofluorocarbons and have a relatively high global warming potential around the range 1,000 to 3,000. The emissions take into account reductions from SCAQMD's Rule 1415, which require registration, refrigerant leak inspections, and refrigerant leak repairs (SCAQMD 2010). Procedures and assumptions for estimating the emissions are shown in Appendix E.1. The emissions are estimated in tons of hydrofluorocarbons and are converted to $MTCO_2e$ by multiplying by the global warming potential (1500) and converting to metric tons (multiply by 0.9072).

Solid Waste: Operation

Greenhouse gas emissions would be generated from the decomposition of solid waste generated by the project. CalEEMod was used to estimate the greenhouse gas emissions from this source. CalEEMod reports the annual emissions in carbon dioxide (tons), methane (tons), and the total ($MTCO_2e$).

Operational waste from the project would initially be delivered to the Badlands Sanitary Landfill, which installed a landfill gas energy capture recovery system in 2011 (Riverside County Waste Management Department 2010).

The greenhouse gas emissions in California in 2020 are estimated to be 7.7 million $MTCO_2e$ for the waste sector. The Landfill Methane Control Measure (California Air Resources Board 2010) requires owners and operators of certain uncontrolled landfills to install gas collection and control systems, and requires existing and newly installed gas and control systems to operate in an optimal manner. These standards are expected to reduce emissions by 1.8 million $MTCO_2e$ (California Air Resources Board 2014). However, reductions attributed to this regulation are not included in this analysis.

The amount of methane emitted depends on characteristics of the landfill, and therefore the default percentage is based on the types of landfills assumed by ARB in its greenhouse gas emission

inventories. Methane gas is generated by waste decomposition; however, some landfills flare/burn off the methane gas and some capture the methane gas and use it to generate electricity. The defaults for the gas capture (e.g., no capture, flaring, energy recovery) are used in the analysis and are statewide averages and are as follows:

- Landfill with no gas capture: 6 percent
- Landfill with capture gas flare: 94 percent
- Landfill with capture gas energy recovery: 0 percent

The solid waste generation from the project is shown in Table 24. The emissions at buildout are estimated by CalEEMod and are applied to earlier years based on a percentage of the square footage shown in Table 15 (page 136). These waste generation rates are from the most recent version of CalEEMod, 2013.2.2. These new rates are substantially lower than those in the Draft EIR, which were from CalEEMod 2011.

Table 24: Waste Generation during Operation

Land Use	Size at buildout	Disposal Rate (tons/size/year)	Waste at buildout (tons/year)
Unrefrigerated warehouse	39,379 KSF	0.94	37,016
General office building (within the warehouses)	1,218 KSF	0.93	1,133
Convenience store	3 KSF	3.01	9
Fueling station	12 fuel pumps	0.54	6
Total	—	—	38,165

Notes:
KSF = thousand square feet
The fire station waste is allocated within the unrefrigerated warehouse space
Source of disposal rate: Appendix D of the 2013 CalEEMod manual (Table 10.1).

Yard Trucks

The ARB states the following regarding yard trucks:

> Yard trucks, which can also be called yard dogs, yard goats, yard jockeys, yard tractors, hostlers, stevedoring tractors, utility tractor rigs (UTRs), or port tractors, are trucks used in moving trailers and containers short distances around freight terminals, port facilities, warehouses, and other facilities…Regulation governing each yard truck is determined by the engine installed in the yard truck (on- or off-road engine), as well as where and how the yard truck is used (California Air Resources Board 2012b, page 1).

According to a project design feature, the yard trucks could be powered by natural gas, propane, or electricity. Therefore, diesel is not assumed for the yard trucks. For the Port of Los Angeles activities, the most common fuel for yard trucks besides diesel is propane (Table 5.1 in Port of Los Angeles 2012b). Therefore, emissions are based on assuming that the yard trucks are powered by propane. It is assumed for purposes of this analysis that there would be two yard trucks at each facility in the on position for seven hours per day based on discussions with the applicant. The emissions are estimated as shown in Appendix E.1.

Emergency Generators

Emissions from emergency generators would result during testing and maintenance. It is assumed that there would be one generator per 1.5 million sq ft based on the current equipment in operation at the Skechers warehouse to the north of the project. The generators were assumed to operate for a total 50 hours per year per generator for routine testing and maintenance purposes, with all generators operating for one hour on the same day to estimate the maximum daily emissions. For the unmitigated emissions, the generator is assumed to be Tier 3 diesel generator. For the mitigated emissions, it is assumed that the generators would be fueled by natural gas.

Forklifts

It is assumed that there would be five natural gas forklifts per light logistic planning area, and assuming three light logistics areas (see Exhibit 6), there would be a total of 15 natural gas forklifts based on discussions with the applicant. It is assumed that the warehouses would have electric forklifts, as they would primarily operate inside.

Land Use Change

The project would change the land use from pervious surfaces to impervious (buildings, asphalt, concrete) thereby reducing potential carbon sequestration from the existing farmland. CalEEMod has default accumulation for "cropland" of 6.2 tons CO_2/acre/year. However, since the project site is dry farmed and therefore would have less carbon accumulation, a different method was chosen to estimate these emissions. These emissions are included in the operational greenhouse gas emissions. The assumptions are shown in Table 25.

Table 25: Land Use Change

Vegetation Land Use Type	Vegetation Land Use Subtype	Initial Acres	Final Acres	Carbon Sequestration ($MTCO_2e$/acre/year)
Cropland	Cropland	2,610	45	0.45

Source of acres: Project description
Source of carbon sequestration: Brown and Huggins 2010; Table 1 in the article presents a range of carbon sequestration for dryland agriculture; the highest of the range was selected (0.90 Mg C ha^{-1} yr^{-1}) and was converted by multiplying by 1.24 (the conversion of Mg to $MTCO_2e$) and dividing by 2.47 (conversion of ha to acres).

Carbon Sequestration (New Trees)

The project would plant trees and integrate landscape into the project design, thereby increasing carbon sequestration. Carbon sequestration is the process of capture and storage of carbon dioxide; trees and vegetation store carbon in their tissues and wood. There is no estimate of the number of trees to be planted in the Specific Plan or in the EIR project description. The Specific Plan indicates the following regarding trees:

- Streetscapes: Specific Plan section 4.2.3 (Streetscapes) indicates that trees are required along all street frontages.
- Parking area: Specific Plan measure 5.4.3 (Landscape Criteria) requires that landscaping in parking areas comply with the standards contained in the Municipal Code.
- Tree size: Specific Plan measure 5.3.4 (On-Site Landscape Planting) specifies that all trees are to be a minimum of 15 gallons.
- Building perimeters: Specific Plan measure 5.3.5 (Minimum Landscape Setbacks at Buildings) indicates that trees along building and site perimeters are required at a minimum average spacing of 1 tree per 30 linear feet of perimeter.

The number of trees is estimated as shown in Table 26. This inventory does not represent actual future plantings, which would be refined later during individual building plans. There would also be trees in the project entryways, the roundabouts, the open space areas, and the detention areas; however, those were not included to be conservative.

Table 26: Estimated Tree Inventory

Project Location	Tree Inventory Calculation Details[4]	Tree Species[3]	Trees
Automobile parking	1 tree/6 stalls x 10,981 stalls[1]	Average [2]	1,830
Building perimeters	Assuming an average of 1,500,000 sq. ft. per building; taking the square root and multiplying by 4 yields the building perimeter (4,900 feet x 27.8 buildings = 136,220 feet); 1 tree per 60 feet	Average [2]	2,270
Redlands Boulevard, Bay Street	Length = 6642 feet/40 feet (1 side of road)	Pine	55
		Blue Palo Verde	55
		Sweet Acacia	55
Gilman Springs Road	Length = 12257 feet/40 feet (1 side of road)	Afghan Pine	306
60 freeway	Length = 4684 feet/40 feet (1 side only)	Afghan Pine	59
		Date Palm (25' trunk height)	59

Table 26 (cont.): Estimated Tree Inventory

Project Location	Tree Inventory Calculation Details[4]	Tree Species[3]	Trees
Street A	Length = 8656 feet/40 feet x 2 sides of street	Chilean Mesquite/ Algarrobo	216
		Mexican Fan Palm (30' trunk height)	216
Eucalyptus Street	Length = 5350 feet/40 feet (1 side of road)	Brisbane Box	45
		Afghan Pine	45
		Date Palm (30' trunk height)	45
Street B	Length = 4418 feet/40 feet x 3 (two sides of street and median)	Brisbane Box	330
Streets C, D, E, F, G, H	Length = 38363 feet/40 feet x 2 sides of street	Chilean Mesquite/ Algarrobo	1,918
Total			**7,504**

Notes:
[1] Table 9.11.040C-12 in Moreno Valley Code states that warehouse and distribution uses are required to have 1/1,000 sq. ft. of gross floor area for the first 20,000 sq. ft.; 1/2,000 sq. ft. of gross floor area for the second 20,000 sq. ft.; 1/4,000 sq. ft. of gross floor area for areas in excess of the initial 40,000 sq. ft. Assuming 27.8 buildings each 1,500,000 sq. ft. in size yields 10,981 stalls
[2] The tree types are not specified in Specific Plan; therefore, the carbon sequestration rate for the average was used.
[3] If more than one species is listed for a project location, the species are distributed evenly.
[4] Calculations assume one tree per 40 feet of distances listed, as an average.
Source: World Logistics Center Specific Plan and FirstCarbon Solutions.

Although CalEEMod does have calculations to estimate carbon sequestration from new trees, the carbon sequestration rates from the Center for Urban Forest Research (CUFR) Tree Carbon Calculator provide specific species information. As a comparison, CalEEMod has a sequestration rate of 0.0354 metric tons per miscellaneous tree per year. Table 27 displays the carbon dioxide sequestration rates per tree from the CUFR Tree Carbon Calculator for tree species at 5 years and 10 years old. As shown in the table, generally, the older the tree is, the higher the sequestration rate. Therefore, for purposes of this analysis, the rate at five years is used because it assumes less carbon sequestration.

Table 27: Tree Carbon Sequestration Rates (Age of Tree)

Tree Species	Code	CO_2 sequestration (lb/tree/year)	
		5 years	10 years
Afghan pine	PIBR2	47.3	161.0
Blue palo verde	CEFL	14.6	53.3
Brisbane box	TRCO	40.1	36.8

Table 27 (cont.): Tree Carbon Sequestration Rates (Age of Tree)

Tree Species	Code	CO_2 sequestration (lb/tree/year)	
		5 years	10 years
Chilean mesquite/Algarrobo	PRCH	36.1	100.3
Crape myrtle sp.	LAIN	2.0	3.6
Desert willow	CHLI	4.9	15.1
Sweet acacia	ACFA	17.0	38.0
Sycamore	PLRA	41.7	109.5
Average	—	24.0	55.4

Notes:
The rate at five years is used in this analysis; 10 years is shown for informational purposes, to demonstrate that the trees will increase sequestration rates over time. The Codes for the trees are listed in the event the reader wants to duplicate the modeling; the code makes it easier to conduct the modeling.
Source: CUFR Tree Carbon Calculator (2012) - the model does not provide model output

Table 28 displays the carbon sequestration rates for the height of the tree, which is used as surrogate for two tree types that do not have data for the age of the tree. The lower tree height (25 feet) is used in this analysis.

Table 28: Tree Carbon Sequestration Rates (Height of Tree)

Tree Species	Code	CO_2 Sequestration (lb/tree/year)	
		25 feet	30 feet
Date Palm	PHDA4	14.8	15.0
Mexican Fan Palm	WARO	26.9	26.4

Source: CUFR Tree Carbon Calculator (2012) - the model does not provide model output.

Table 29 displays the carbon sequestration estimates for the new trees that would be planted on the project site. As shown in the table, the trees would absorb 111 tons per year.

Table 29: Tree Carbon Sequestration Estimates

Type of Tree	Trees	CO_2 Sequestration (lb/tree/year)	CO_2 Sequestration (tons/year)
Average	4,100	24.0	49
Afghan pine	465	47.3	11
Blue Palo Verde	55	14.6	<1
Sweet Acacia	55	17.0	<1

Table 29 (cont.): Tree Carbon Sequestration Estimates

Type of Tree	Trees	CO_2 Sequestration (lb/tree/year)	CO_2 Sequestration (tons/year)
Date Palm	104	14.8	1
Chilean Mesquite/Algarrobo	2134	36.1	39
Mexican Fan Palm (30' trunk height)	216	26.4	3
Brisbane Box	375	40.1	8
Total	**7,504**	—	**111**
Source: Calculated by FirstCarbon Solutions using the data in prior tables.			

4.5.3 - Black Carbon

As discussed above, there is substantial uncertainty in estimating greenhouse gas impacts from black carbon emissions at this time. In addition, black carbon is not considered a "greenhouse gas" according to AB 32. Nevertheless, black carbon emissions from construction and operation are estimated.

Emissions Methodology

The methodology used in estimating black carbon emissions is from the EPA's Report to Congress on Black Carbon (EPA 2012). Essentially, $PM_{2.5}$ emissions are converted to black carbon emissions by application of speciation factors. The equation:

$PM_{2.5}$ Emissions (in tons) x fraction of $PM_{2.5}$ that is black carbon = black carbon emissions

The speciation factors of black carbon as a percentage of $PM_{2.5}$ are from Table A1-5 and associated text in the EPA's Report to Congress on Black Carbon (EPA 2012). The only sources in this greenhouse gas analysis that assume a portion of black carbon emissions are as follows:

- **Construction.** 77 percent of the $PM_{2.5}$ exhaust emitted during construction is assumed to be black carbon.[22] $PM_{2.5}$ exhaust was estimated using CalEEMod, which is converted to black carbon emissions.
- **Operational mobile – heavy duty.** The EPA's report identifies diesel heavy-heavy duty trucks (HHDT) may have 77 percent black carbon out of the $PM_{2.5}$ exhaust emissions. Therefore, this percentage is applied to the following vehicle classes: diesel light-heavy duty trucks (LHDT1 and LHDT2), diesel medium-heavy duty trucks (MHDT), and HHDT. The black carbon emissions are estimated in the $PM_{2.5}$ spreadsheets in Appendix E of this report.

[22] For construction equipment equipped with diesel particulate matter filters, the BC component is 10 percent of $PM_{2.5}$; however, this percentage is not applied. The construction equipment will be Tier 3 or higher; however, the BC component for Tier 3 equipment is currently not available so a worst-case assessment is provided.

- **Operational mobile – light duty.** The EPA report indicates that 64 percent of $PM_{2.5}$ exhaust emissions for light duty diesel vehicles may be black carbon.[23] Therefore, this percentage is applied to the following vehicle classes: diesel light duty trucks (LDT1 and LDT2) and medium duty trucks (MDT).
- **Natural gas.** 38 percent of the $PM_{2.5}$ emissions from natural gas usage is assumed to be black carbon.

This is a conservative estimate of black carbon, as discussed in the following excerpt from the EPA's report:

> For the 2007 vehicle (engine) model year, stringent [EPA] emission standards of 0.01 g/BHP-hr (grams per brake horsepower/hour – a standard unit for emissions from heavy-duty mobile source engines) became effective for heavy-duty diesel engines, which represents over 99% control [or reduction] from a pre-control diesel engine in the 1970 time frame. As a result of these standards, BC [black carbon] emissions have been dramatically or even preferentially reduced as the major PM constituent. To meet these stringent PM standards, virtually all new on-highway diesel trucks in the United States, beginning with the 2007 model year, have been equipped with diesel particulate filters (DPFs). DPFs typically eliminate more than 90% of diesel PM and can reduce BC by as much as 99% (EPA 2012, page 180).

Global Warming Potential

In the EPA's "Report to Congress on Black Carbon," black carbon emissions are estimated for the United States and globally but are not converted to a metric (such as $MTCO_2e$) using a global warming potential. The report discusses the global warming potential (GWP) of BC:

> [Black carbon] BC influences the climate differently than the warming effects of GHGs. These differences have important implications for identifying appropriate metrics to compare climate impacts (and reductions thereof) . . . . While a GWP can be calculated for BC, there are reasons that GWPs may be less applicable for this purpose due to the different nature of BC compared to GHGs, in terms of various physical properties and the fact that unlike GHGs, BC is not well mixed in the atmosphere. However, because GWPs are the most commonly used, and only official, metric in climate policy discussions, many studies have calculated GWPs for BC. One-hundred-year GWPs for BC in the literature range from 330 to 2,240. That is to say, 330 to 2,240 tons of CO_2 would be required to produce the same integrated radiative effect over 100 years as one ton of BC. Some of the factors that account for the range in these estimates include the use of different and uncertain indirect and

[23] The percentage of BC for the light duty diesel vehicle group varies from 31% to 64%; therefore, the worst-case scenario is used in this analysis.

> snow/ice albedo effects[24] estimates, use of a different CO_2 lifetime for the baseline, and recognition of the dependence of a GWP for BC on emissions location . . .
>
> . . . There is currently no single metric widely accepted by the research and policy community for comparing BC and long-lived GHGs. In fact, some question whether and when such comparisons are useful. For example, there are concerns that some such comparisons may not capture the different weights placed on near-term and long-term climate change (EPA 2012, pages 61 and 64).

In its comment letter on the Draft EIR, the Center for Biological Diversity indicated that 760 should be used as a GWP for black carbon (Reddy and Boucher 2007). Therefore, to provide one estimate, the GWP for black carbon for this analysis is 760.

- Black carbon emissions (metric tons) x GWP = Emissions ($MTCO_2e$)
- Black carbon emissions (metric tons) x 760 = Emissions ($MTCO_2e$)

4.6 - Local Significance Threshold Analysis

4.6.1 - Localized Analysis Methodology

SCAQMD has developed the Localized Significance Threshold (also known as "LST") methodology and recommends that this methodology be used in determining whether a project may generate significant adverse localized air quality impacts and substantially affect sensitive receptors. The evaluation of localized air quality impacts determines the potential of the project to violate any air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations.

According to the SCAQMD LST assessment methodology, the assessment of localized impacts addresses only those emissions that are generated "onsite," that is for the purposes of this project, emissions generated from within or along the boundaries of the project. Therefore, for this localized analysis, only the onsite emissions are examined. Freeway trips including trips to the ports as well as trips along the surface street network away from the project were only included in the health risk assessment prepared for this project.

To evaluate localized impacts for construction and operation, an air dispersion model (EPA model, AERMOD) was used to simulate the movement of project related air pollutants through the air and output air concentrations of those pollutants at numerous receptor locations surrounding the project. The estimated concentrations provide conservative estimates (in terms of likely over-predictions) and may not represent actual occurrences. The methodology follows SCAQMD modeling guidance for AERMOD, where applicable (South Coast Air Quality Management District 2013). Table 30 lists the general model assumptions used in the localized significance threshold assessment. The assumptions

[24] The albedo is the reflecting power of a surface.

shown therein were the same for the assessment contained in the Draft EIR and this revised air quality assessment.

Table 30: General Air Dispersion Modeling Assumptions – Localized Air Quality Assessment

Feature	Assumption
Terrain processing	Complex terrain; elevations were obtained for the project site using the EPA AERMAP terrain data pre-processor
Emission source configuration	See Table 31and Table 32
Land Use	Urban: County of Riverside population provided by the SCAQMD (population: 2,100,516)
Coordinate System	Universal Transverse Mercator
Meteorological Data	SCAQMD Riverside Meteorological Data for 2005-2007 (SCAQMD 2013)
NO_2 Assessment Methodology	Ozone Limiting Method and Ambient Ratio Method Version 2 using ozone data from the SCAQMD Riverside air monitoring station for 2005-2007
Receptor Height	0 meters, as recommended by SCAQMD LST methodology
Receptor Location	Receptor locations were defined both within and outside of the project boundaries.

Each of the emission sources that are included in the AERMOD air dispersion model consists of a particular emission source representation. The following definitions are used in defining the emission source representations referred to in Table 31 and Table 32.

- Point source: a single identifiable local source of emissions; it is approximated in the AERMOD air dispersion model as a mathematical point in the modeling region with a location and emission characteristics such as height of release, temperature, etc. (example: a stack from a standby generator or a stack from a motor vehicle such as a truck);
- Volume source: a three dimensional source of pollutants release (example: exhaust emissions from construction equipment);
- Line source: a series of volume sources along a path (example: vehicular traffic along a street or freeway); and
- Area source: a large area where the emissions are assumed to be uniformly distributed in the horizontal and vertical directions (example: a parking lot).

Construction Modeling Assumptions – Local Air Quality Assessment

Table 31 summarizes the emission source characteristics during construction. For the unmitigated scenario, it is assumed that construction equipment would be in the on position for 10 hours per day (6am to 4pm) for all construction activities. In addition, during building construction, additional

hours from midnight to 6am were also included to account for the concrete pouring of the tilt-up building walls that would most likely take place at night. The construction was assumed to take place five days per week.

Table 31: Project Localized Analysis Construction Emission Source Assumptions

Emission Source Type	Air Dispersion Model Emission Source Description	Relevant Assumptions
Onsite: Off-road Construction Equipment	Volume Source	• Stack release height: 16.4 feet • Emissions derived from the CalEEMod land use emission model • Volume sources were used to characterize the construction equipment with a volume source dimension of 328 feet on a side to cover the construction area; the number of volume sources used is dependent on the size of the construction area
Onsite: Fugitive Dust	Area Source	• Release height: 3.3 feet • Emissions derived from the CalEEMod land use emission model • Area sources were used to characterize the fugitive dust generated from the construction equipment
Source: FirstCarbon Solutions | Michael Brandman Associates.		

Operation Model Assumptions – Local Air Quality Assessment

The characterization of the project's operational emission sources as required by the AERMOD air dispersion model is provided in Table 32. It is assumed for this analysis that facility operations would occur for 24 hours per day, 7 days per week, 365 days per year.

Table 32: Project Localized Analysis Operational Emission Source Assumptions

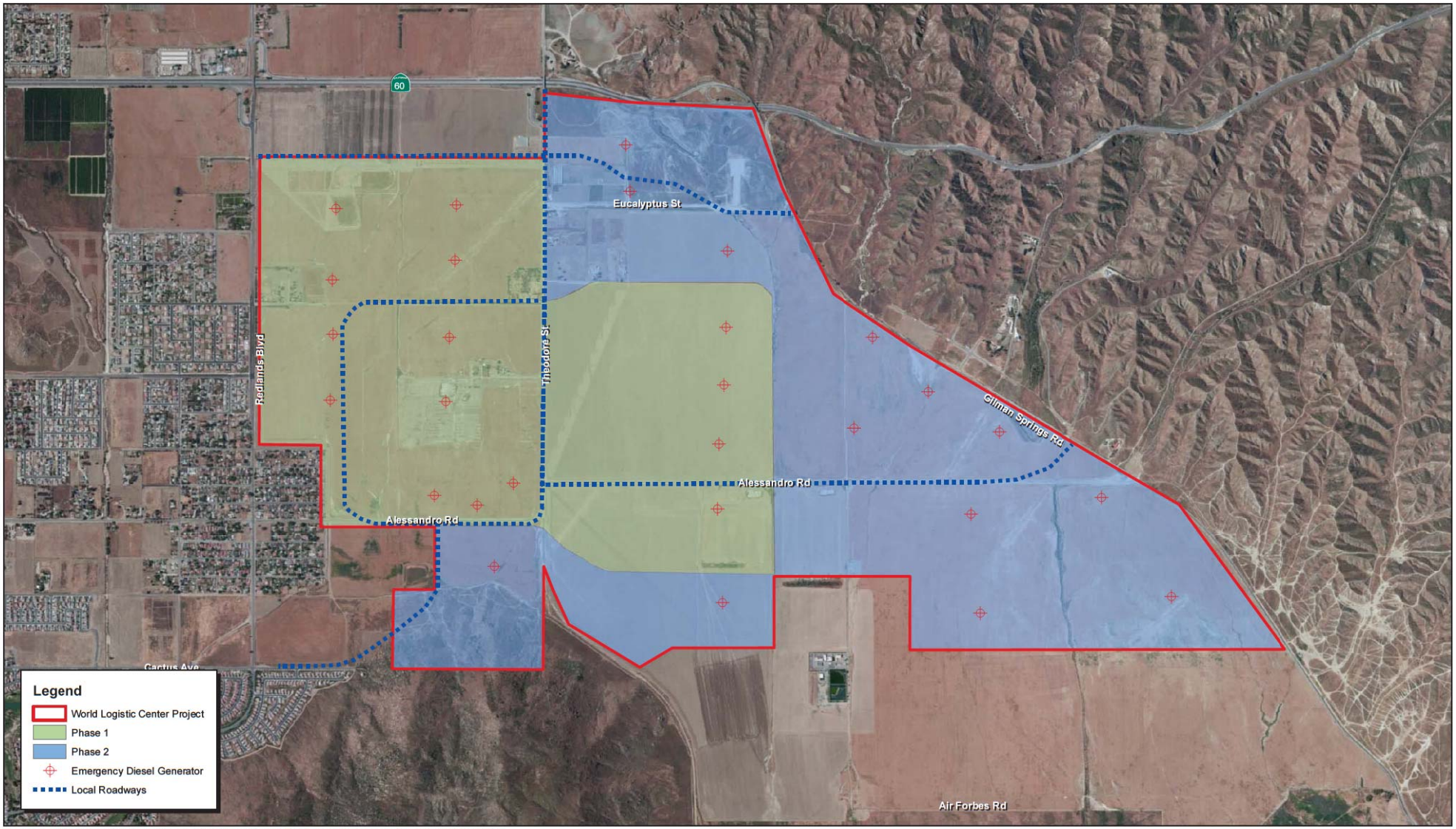
Emission Source Type	Description	Relevant Assumptions
Onsite vehicle traffic within the truck yards	Area Source	• Stack release height: 6 feet for all vehicles • Vehicle Speed: 15 mph • Vehicle trip length based on a review of the layout of the project development phases in relation to the local roadway network - High cube warehouse:1,080 feet - Light logistics: 570 feet; gas compressor utility: 330 feet; all other land uses 160 feet • Vehicle types: passenger cars and heavy duty delivery trucks • Emission factor: ARB EMFAC2014 model
Onsite diesel truck idling within the truck yards	Area Source	• Stack release height: 6 feet • Idle time: 5 minutes per truck per day (unmitigated) Vehicle type: heavy duty delivery trucks • Emission factor: ARB EMFAC2014 model

Table 32 (cont.): Project Localized Analysis Operational Emission Source Assumptions

Emission Source Type	Description	Relevant Assumptions
Local Roadway Vehicle Travel	Line Sources	• Line source width equal to the width of the roadway plus 3 meters on both sides • Vehicle speeds: - Heavy duty trucks: 25 mph on local roadways - All other vehicles: 35 mph on local roadways • See Appendix F, Localized Spreadsheets and AERMOD Output, for the local roadway traffic volumes
Standby Diesel Electric Generators	Point Sources	• The project was assumed to contain 27 emergency standby diesel generators distributed within the project boundary at full buildout (1 generator per 1.5 million square feet of space) • Rated at 315 kilowatts electrical output • Projected testing and maintenance assumed to be 1 hour per day and 50 hours per year • Height of emission release assumed to be 9 feet based on estimates of the generator's temperature, gas flow rate, and influence of building downwash on plume rise • Emissions based on EPA Tier 3 emission standards for natural gas
Support Equipment	Area Sources	• Fork lifts using liquid petroleum gas as fuel • Yard trucks using liquid petroleum gas as fuel
Source: FirstCarbon Solutions | Michael Brandman Associates		

A graphical representation of the AERMOD air dispersion model local operational sources is shown in Exhibit 19. The AERMOD model also requires the placement of a network of receptors which represent the geographic locations where the impacts from the project's emissions are calculated.

Exhibit 20 shows the receptor network used in the localized significance threshold analysis. Of particular importance is the dense location of receptors in the residential areas adjacent and to the west of the project across Redlands Boulevard and scattered residences across Gilman Springs Road as well as locations of other sensitive receptors such as schools.



Source: Locations from the dispersion modeling conducted by FirstCarbon Solutions using ISC-AERMOD View.

FirstCarbon SOLUTIONS

2,000 1,000 0 2,000 Feet

Exhibit 19
Localized Analysis Operational Emission Sources

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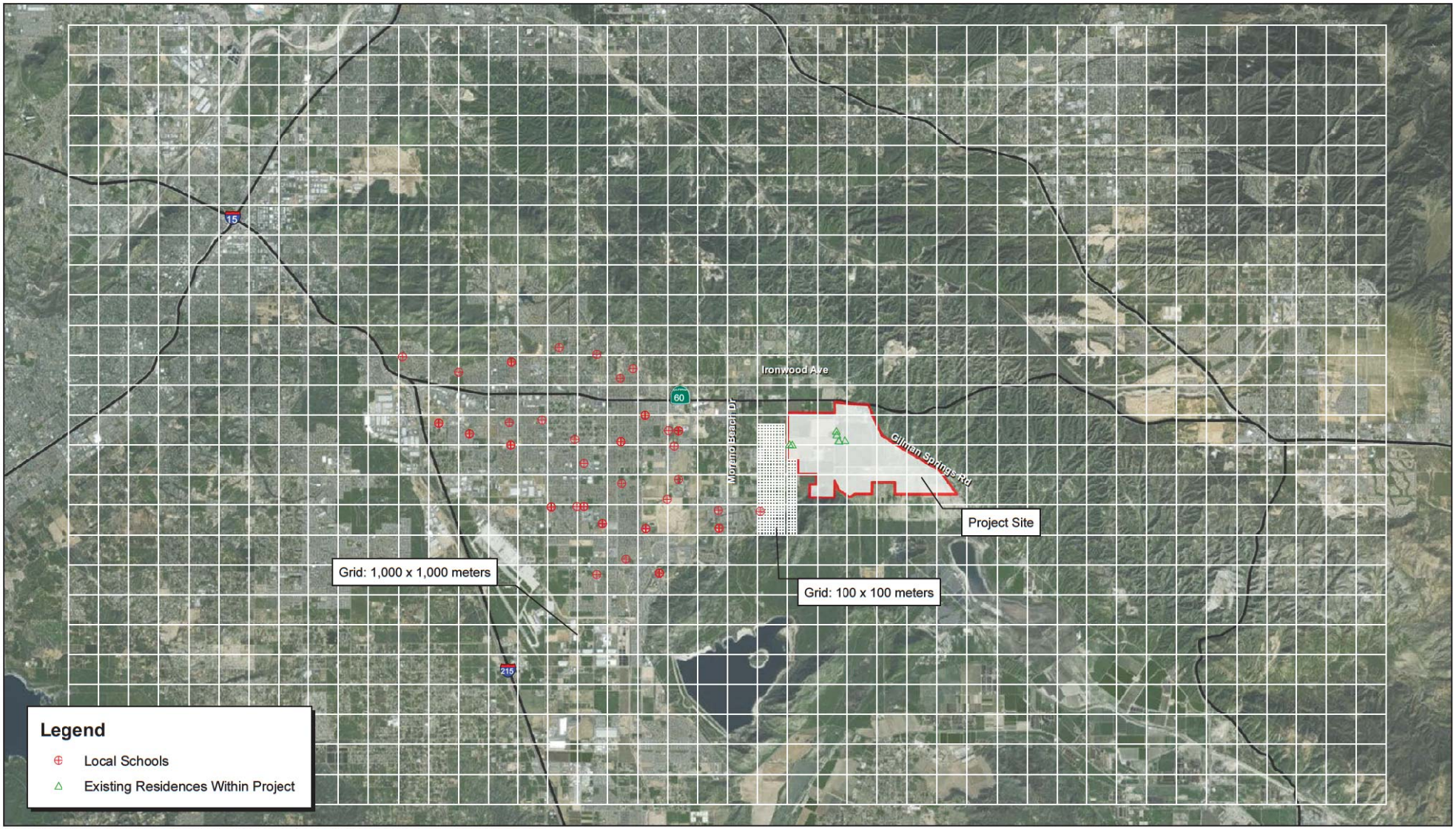

Source: Receptor locations from the dispersion modeling conducted by FirstCarbon Solutions using ISC-AERMOD View.

FirstCarbon SOLUTIONS

2 1 0 2 Miles

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Exhibit 20
Air Dispersion Model Receptors for the Localized Analysis

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4.6.2 - Localized Significance Threshold Analysis

The localized significance threshold analysis evaluated three assessment conditions:

- Project Phase 1 (2012): assumes that operation Phase 1 of the project (slightly more than one half of the entire project) is fully built out and operational in the baseline year of 2012, the year that the Notice of Preparation for the project was published and also assumes motor vehicle emission factors for the calendar year 2012.
- Project Phase 1 and Phase 2 Full Buildout (2012): assumes that the operation of the entire project is fully built out in the baseline year 2012, the year that the Notice of Preparation for the project was published and also assumes motor vehicle emission factors for the calendar year 2012.
- Proposed Project Development: examines project impacts resulting from the proposed. construction and operation of the project; three analysis years were examined for potential localized air quality impacts: 2021, the year when the projected construction schedule would result in construction activities in western portion of the project adjacent to and across from the existing residential areas along Redlands Boulevard and during which time virtually all of Phase I operations would occur; 2027, the year when the project emissions from both project construction and operation are at their highest combined levels for most pollutants and the construction activities occur on the eastern side of the project adjacent to the existing residences along Gilman Springs Road; and the year2035[25] when the project is fully operational.

Project Phase 1 (2012) represents an interim step during which Phase 1 of the project (approximately 56 percent of the total size of the project) is completely built out in 2012. This condition represents a case where Phase 1 of the project could not be built in 2012 and does not take account of the fact that future emissions from motor vehicles are expected to decline in the future. This analysis simply looks at the situation of what would happen if Phase 1 of the project were built in its entirety with no reductions in emissions that would occur in the future. This assessment also provides consistency with the project traffic impact analysis and noise reports which examine the Project Phase 1 (2012) condition. These results are compared to the existing air quality levels in 2012 and only considers the project's operational emissions and not construction emissions.

Project Phase 1 and Phase 2 Full Buildout (2012) represents a worst case since the project could not be physically built out in its entirety in a single year and does not reflect the fact that the project would be expected to be developed over a time period of at least 15 years depending on market demands for warehouse space. This condition also provides consistency with the project traffic

[25] In some circumstances, references are made to the year 2031. The year 2031 is the proposed first year the project is fully built out. However, detailed traffic volumes were provided by the project traffic consultant for the long term planning year 2035. For purposes of this assessment, project traffic volumes in 2031 were assumed to be the same as the forecast volumes in 2035.

impact analysis and noise reports which examine the Project Phase 1 and Phase 2 Full Buildout (2012) condition. This assumption, however, does not account for the fact that emissions from mobile sources, particularly from heavy duty diesel trucks, are expected to decline significantly over the next 10 to 15 years as a result of emission controls already mandated by the ARB specifically for these vehicles. These results are compared to the existing air quality levels in 2012.[26] The impact comparison considers only the operational emissions from the project (not construction emissions).

The Proposed Project Development condition represents the proposed project development schedule including the localized impacts during construction and operation over the time period of 2015 to 2035. These results are compared to the existing air quality levels in 2012.

4.7 - Health Risk Assessment Methodology

4.7.1 - About Health Risk Assessments

A Health Risk Assessment (HRA) is a guide that helps to determine whether current or future exposures to a chemical or substance in the environment could affect the health of a population. In general, risk depends on the following factors:

- How much of a chemical is present in an environmental medium (e.g., air);
- How much contact (exposure) a person has with the contaminated environmental medium; and
- The inherent toxicity of the chemical.

This HRA builds and expands upon the methodology described above in the localized air quality assessment by examining the regional effects of the project's potential health risk impacts. The HRA methodology applies a risk characterization model to the results from the air dispersion model to estimate potential health risks at each sensitive receptor location. However, unlike the localized assessment of the criteria pollutants (e.g., carbon monoxide, oxides of nitrogen, and particulate matter), which looks at impacts from exposure times of one hour to a year within a specific year, the HRA examines the impacts over an exposure time period from one hour to an extended exposure time period of many years.

In January 2015, the results of a 5½-year study, led by the Health Effects Institute (HEI), were published regarding the health effects of new technology diesel exhaust and particularly the risk of cancer from exposure to diesel exhaust. The study found that new technology diesel exhaust does not cause cancer. The Draft EIR contained an air quality analysis prepared before the release of the HEI study. As a result, the Draft EIR analysis assumed that any diesel exhaust, including new technology diesel exhaust, could cause cancer. For comparison to the DEIR, the following discussion analyzes the health risks which would occur if new technology diesel exhaust could cause cancer, which, as noted above, it does not.

[26] The existing air quality levels in 2012 are actually represented by the highest monitored levels at the SCAQMD Riverside air monitoring station during the past three years (2010, 2011, and 2012).

This cancer risk assessment is provided only for informational purposes and does not reflect the health risks associated with the World Logistics Center project since the most recent science associated with cancer risk (the HEI study) indicates that new diesel technology does not result in cancer.

4.7.2 - Health Risk Impacts Assessed

The health risk assessment estimated the incremental health impacts attributable to the project's construction and operations, based on the assumption that diesel exhaust can cause cancer, for the following condition:

> Proposed Project Development: examines project impacts resulting from the proposed construction and operation of the project from the commencement of construction in 2015 for 30 years for sensitive/residential receptors, 25 years for worker receptors, and 9-year exposure time periods for school-site student receptors. Two buffer area scenarios including the current 250 feet and alternative 1,000 feet between the project's operational emissions and the centerline of Redlands Boulevard, Gilman Springs Road, Bay Avenue, and Merwin Street were also evaluated.

The project's incremental diesel PM emissions and annual average impacts were based on detailed estimates of construction emissions for the years 2015 to 2030 and traffic volume information provided by the project traffic impact analysis for the years 2022 (the proposed completion date for Phase 1), and 2035 (the long-term planning year when the project would be fully built out).

The operational diesel PM emissions were derived for assessment years 2022 and 2035 using the diesel PM emission factors from the EMFAC2014 mobile source emission model appropriate to these years. The diesel PM emission factors for the years beyond 2035 were set to the 2035 levels. Traffic volumes for time periods beyond 2035 were also assumed to remain constant at the 2035 levels.

Annual average diesel PM emissions and impacts were calculated for each year starting from 2015 (the start of construction) for the length of the exposure time period for the type of receptor of interest. Specifically, annual average diesel PM concentrations were estimated from the diesel PM construction emissions for each individual year of construction from 2015 to 2030 according to the construction schedule and equipment usage projected for that year. Annual average diesel PM emissions and impacts during operation were estimated for the years 2022 and 2035 years for which detailed traffic information was available from the traffic impact report. The project's operational emissions were assumed to be zero in 2015, the start of construction. The annual average operational diesel PM impacts were then interpolated between the 2015, 2022, and 2035 calculation years based on the amount of square-footage of buildings brought online each year as shown in Table 15 (page 136).

During years when both construction and operations occur simultaneously (2016 to 2030), the annual diesel PM concentrations from construction were added to the annual diesel PM concentrations from operations to provide a total impact assessment due to all diesel PM emissions from the project at all receptor locations. The average diesel PM concentrations were then inserted in Equation 2 below (page 188) to estimate cancer risk for the various exposure durations analyzed in this assessment.

4.7.3 - Risk Assessment Methodology

The HRA process involves four main steps: hazard identification, dose-response assessment, exposure assessment, and risk characterization as described below.

Hazard Identification

Hazard identification is the process by which contaminants of concern are selected for investigation in the risk assessment, and includes a review of the chemicals that are potentially released to the atmosphere from the equipment of concern. This assessment is responsive to the emissions of various toxic air contaminants from the construction and operation of the project. The main toxic air contaminants associated with the project include diesel PM from diesel-fueled equipment and total organic gases (TOG)[27] from both gasoline and diesel vehicles. Toxicity values for the chemicals evaluated in this analysis and the target organs[28] that each contaminant affects in a toxic exposure are summarized in Table 33 (page 185).

TOG is comprised of several chemical compounds that may result in health impacts. It is necessary, therefore, to separate out the individual TOG compounds in order to estimate the acute non-cancer hazards, a type of health impact due to TOG. The ARB has simplified the process for estimating chronic non-cancer impacts by specifying a reference exposure level for diesel PM which provides a hazard level that is greater than would occur when estimating the chronic non-cancer risk by specifying the individual TOG compounds. The above is the accepted methodology for estimating non-cancer risks.

Dose-Response

The dose-response assessment develops relationships between exposures to a given chemical and the corresponding potential health effects associated with exposure to that chemical. In general, data are limited regarding adverse effects associated with direct exposure to humans of a particular chemical. Therefore, animal experiments have often been performed to assess a chemical's toxicity. These experiments are conducted to determine the organs that are adversely affected by a toxic chemical and the amount of the chemical needed to produce an adverse effect on the organ.

[27] Total Organic Gases (TOG) means compounds of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid; metallic carbides or carbonares, and ammonium carbonate; also includes all organic gas compounds emitted to the atmosphere including low reactivity or exempt compounds such as methane, ethane, etc.

[28] A target organ is an organ or bodily system that is most affected by exposure to a specific toxic air contaminant.

Table 33: Toxicity Values

Toxic Air Contaminant	CAS Number	Inhalation Cancer Potency Factor $[mg/kg\text{-}day]^{-1}$	Chronic Reference Exposure Level $\mu g/m^3$	Target Organ for Chronic Exposure	Acute Reference Exposure Level $\mu g/m^3$	Target Organ for Acute Exposure
Diesel PM*	9901	1.1	5	I	ND	ND
Acetaldehyde	75070	*	*	I	470	D,I
Acrolein	107028	*	*	I	2.5	D,I
Benzene	71432	*	*	I	1300	C,E,F,H
Formaldehyde	50000	*	*	I	55	D,F,I
Methanol	67561	*	*	I	28,000	G
MEK	78933	*	*	I	13,000	D,I
Styrene	100425	*	*	I	21,000	D,I
Toluene	108883	*	*	I	37,000	C,D,G,H,I
M-Xylene	108383	*	*	I	22,000	D,G,I
O-Xylene	95476	*	*	I	22,000	D,G,I
P-Xylene	106423	*	*	I	22,000	D,G,I
1-3 Butadiene	106990	*	*	I	660	H

Notes:
* Only diesel PM emissions were evaluated for cancer risk and chronic hazard indices because diesel PM is a surrogate for the combined health effects associated with exposure to diesel exhaust emissions (ARB 2005b). For the acute hazard indices, diesel PM was not evaluated since no acute non-cancer REL has been defined for diesel PM; rather, emissions of the other toxic air contaminants were evaluated for all emission sources in estimating acute non-cancer hazards.
Key to non-cancer and chronic exposure target organs:
C. Developmental System; D. Eye; E. Hematologic System; F. Immune System; G. Nervous System
H. Reproductive System; I. Respiratory System
ND = not defined as the California Office of Environmental Health Hazard Assessments has not defined an acute reference exposure level for diesel PM.
Source: California Air Resources Board 2013

Two types of adverse health effects are generally considered in health risk assessments: carcinogenic and non-carcinogenic. Carcinogenic compounds are not considered to have threshold levels (i.e., dose levels below which there are no risks). Any exposure, therefore, will have some associated risk. Chemicals that potentially produce carcinogenic effects have been shown or are suspected to produce tumors in animals or humans.

Non-carcinogenic effects, such as liver or kidney damage, may be either reversible or permanent. In these situations, it is assumed that there is a level of exposure at which these chemicals produce no adverse effects in the human body. In other words, exposure to these chemicals in amounts less than a threshold level will result in no adverse health effects. The toxicity assessment characterizes the

relationship between the magnitude of exposure and the nature and magnitude of adverse health effects that may result from such exposure.

Exposure Assessment

The exposure assessment identifies potential exposure pathways, estimates chemical concentrations at potential exposure points, and calculates expected doses of emitted substances. An exposure pathway is defined as the means by which an individual or a population is exposed to contaminants that originate from a source. Each pathway represents a different mechanism for exposure.

Four elements must be present in order for a potential human exposure pathway to exist.

1. A source and mechanism of substance release to the environment
2. An environmental transport medium (e.g., air, water, soil)
3. An exposure point, or point of potential contact with the contaminated medium
4. A receiver (i.e., human) with a route of entry (e.g., inhaling air, drinking water) at the point of contact

The current risk assessment only considers toxic air contaminants that are released into the air and inhaled. The levels of atmospheric contaminants resulting from emissions of toxic air contaminants are calculated using mathematical air dispersion models, which use emission rates and exposure duration, design features specific to the emissions sources, and meteorological data. The air modeling results include annual average and maximum hourly ambient air concentrations of the modeled substances at various receptor locations. In order to evaluate human exposure, a human receiver with a route of exposure to the affected medium is required, such as a person inhaling air in a potentially affected area. Therefore, potential health risks are only evaluated for developed areas where humans typically are present. A quantitative estimate of potential human exposure is developed for the inhalation pathway in this study.

The cancer risk and chronic non-cancer hazard indices are based on diesel PM concentrations from diesel equipment and vehicles. Diesel exhaust, a complex mixture that includes hundreds of individual constituents, is identified by the State of California as a known carcinogen. Under California regulatory guidelines (ARB 2005b), diesel PM is used as a surrogate measure of carcinogen exposure for the mixture of chemicals that make up diesel exhaust as a whole. The California Environmental Protection Agency and other proponents of using the surrogate approach to quantifying cancer risks associated with the diesel mixture indicate that this method is preferable to use of a component-based approach. A component-based approach involves estimating risks for each of the individual components of a mixture. Critics of the component-based approach believe it will underestimate the risks associated with diesel as a whole mixture because the identity of all chemicals in the mixture may not be known, and/or exposure and health effect information for all chemicals identified within the mixture may not be available.

Gasoline combustion can also release chemicals that are carcinogenic. A preliminary comparison of the relative toxicity of gasoline-borne toxics compared to diesel PM concluded that the potential cancer risks associated with the TACs from gasoline combustion emissions from the project's gasoline vehicles are substantially less than the potential cancer risks from the project's diesel PM emissions. Less than 2 percent of the total cancer risk from the project's vehicles can be attributed to the gasoline TACs with the remaining 98 percent attributable to toxics from diesel PM. Therefore, TACs from gasoline-fueled vehicle emissions were not included in this assessment for cancer risk or chronic non-cancer hazards assessments.

The acute non-cancer indices are based on total organic gases (TOG) concentrations from both diesel and gasoline vehicles. To estimate acute non-cancer hazard indices, specific chemical concentrations that comprise the TOG emissions must be calculated in a process called speciation[29] discussed in relation to Table 35 (page 192).

Risk Characterization

Risk characterization is the process of combining dose-response information with the estimates of human exposure in order to derive a quantitative estimate of the likelihood that humans will experience any adverse health effects for the given exposure assumptions. As mentioned, two general types of health effects are generally considered: potential carcinogenic risks after chronic (long-term) exposure and potential non-carcinogenic health impacts following chronic (long-term) and acute (short-term) exposure. Each of these health effects were evaluated in this report.

Estimation of Cancer Risks

Excess cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens over a specified exposure duration. The estimated risk is expressed as a unitless probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor (CPF). A risk level of 1 in a million implies a likelihood that up to one person, out of one million equally exposed people would contract cancer if exposed continuously (24 hours per day) to the levels of toxic air contaminants over a specified duration of time. This risk would be an excess cancer risk that is in addition to any cancer risk borne by a person not exposed to these air toxics.

As noted above, diesel PM is used as a surrogate measure of carcinogenic exposure for the mixture of chemicals that make up diesel exhaust as a whole. Cancer risks were estimated in accordance with the recently published guidance from the OEHHA (OEHHA 2015). This guidance termed in this report as the "Current OEHHA Guidance" assumes a lifetime exposure of 30 years with the inclusion

[29] Total organic compounds are comprised of many types of individual chemical compounds. Speciation is the process of breaking a total organic compound into its individual compounds. From this information, speciation profiles are devised for many emission sources to provide the makeup of that sources total organic emissions. Speciation profiles are used to estimate emissions of the individual compounds from the emission source which, in turn, are used to estimate the health effects of the emission sources and their total organic compound emissions.

of early-in-life sensitivity factors for sensitive receptors, a 25-year exposure for worker receptors, and a 9-year exposure duration for school-site student receptors.

The cancer risk from diesel PM is calculated by multiplying an average diesel PM concentration calculated using the AERMOD air dispersion model and an inhalation exposure factor as shown in Equation 1 below.

Cancer Risk = Inhalation cancer potency factor (CPF) x Dose-inhalation (EQ-1)

Where:

Cancer Risk = Total individual lifetime excess cancer risk defined as the cancer risk a hypothetical individual faces if exposed to carcinogenic emissions from a particular facility; this risk is defined as an excess risk because it is the risk above and beyond the background cancer risk to the population contributed by causes not related to the project; cancer risk is expressed in terms of risk per million exposed individuals.

Inhalation cancer potency factor (CPF) = 1.1 (milligrams per kilogram per day)$^{-1}$ for diesel PM;

$$\text{Dose-inhalation} = C_{air} \times (EF \times ED \times 10^{-6} \div AT \times AAF) \quad \text{(EQ-2)}$$

Where:

C_{air} is the average diesel PM concentrations calculated from the AERMOD model in µg/m^3;

EF is the exposure frequency (days per year);

ED is the exposure duration (years); and

AT is the time period over which the exposure is calculated (days)

AAF are a set of age-specific adjustment factors that include age sensitivity factors (ASF), daily breathing rates (DBR), and time at home factors (TAH).

Cancer Risk Age-Specific Adjustment Factors

The California OEHHA has recommended a set of assumptions that incorporate early-in-life cancer risk adjustment factors that account for anticipated sensitivity to carcinogens of infants and young children. These risk adjustment factors are incorporated as part of the "Current OEHHA Guidance" that was applied in this assessment for estimating the project's cancer risks. These adjustment factors include age-sensitivity weighting factors, age-specific daily breathing rates, and age-specific time-at-home factors.

The OEHHA has recommended values for the various cancer risk parameters shown in Equation 2. These parameters are based on the receptor as shown in Table 34 for the "Current OEHHA Guidance."

Table 34: Exposure Assumptions for Cancer Risk – "Current OEHHA Guidance"

Receptor Type	Exposure Frequency		Exposure Duration (years)	Age Sensitivity Factors (ASF)	Time at Home Factor (TAH) (%)	Daily Breathing Rate[(1)] (DBR) (L/kg-day)
	Hours/ day	Days/year				
Sensitive/Residential[(2)]						
3rd Trimester	24	350	.25	10	85	361
0-2 years	24	350	2	10	85	1,090
3-16 years	24	350	14	3	72	745
Older than 16 years	24	350	14	1	73	290
Student School Site	8	180	9	3	100	745
Worker	8	250	25	1	NA	230

Notes:
(1) The daily breathing rates shown for the "Current OEHHA Guidance" are the 95th percentile rate for sensitive/residential receptors and students as recommended by the OEHHA.
NA = these parameters are not applicable in the "Current SCAQMD Guidance"
(L/kg-day) = liters per kilogram body weight per day
Source of Current OEHHA Guidance: OEHHA 2015.

The underlying factors used in the analysis exemplify the conservative nature of utilizing the exposure scenarios and the underlying assumptions:

- The residential cancer risk calculation assumes that each sensitive/residential receptor will be exposed to diesel particulate matter (diesel PM) and organic gases for 24 hours a day for 350 days a year at the location of his or her home throughout the entire 30-year residential exposure period.
- The worker cancer risk calculation assumes that workers are exposed to diesel PM for 8 hours a day for 250 days a year, next to, but outside of the buildings in which they work for up to 25 years.
- The atmospheric dispersion model and traffic model that are used to estimate risks generally provide impact estimates that are over-estimates based on the use of conservative model assumptions.

Other Factors that Influence Health Risk Estimates: Conservative Trip Estimates

The project's traffic analysis used a conservative estimate of the number of truck trips after the project begins operation. This is important because diesel PM emissions are directly related to both the number of trucks and the vehicle miles traveled.

The traffic analysis used the traffic generation rate for high-cube warehouses suggested by the Institute of Traffic Engineers (ITE) which is based on traffic counts from a number of large warehouses located in California and elsewhere in the United States. This rate was also compared to the trip generation rate actually resulting from the Skechers warehouse immediately adjacent to the

project. The Skechers warehouse is representative of the warehouses planned for the project. The ITE trip generation rate is three times greater than the Skechers warehouse traffic counts (see revised EIR). Because the project analysis used a higher trip generation rate, the vehicle miles traveled are also higher. The combination of the conservative forecasts of traffic and of the miles traveled means that the calculation of the cancer risk in the EIR overstates the extent of that risk regardless of the exposure period used.

Cancer Burden

Whereas cancer risk represents the probability of an individual to develop cancer, cancer burden multiplies the cancer risk by the exposed population to estimate the number of individuals that could be expected to contract cancer from the impact of the project's emissions. The exposed population is defined as the number of persons within a facility's zone of impact, which is typically the area exposed to a cancer risk of 1 in a million from the project. Consistent with this definition, cancer burden was calculated by first identifying all population census tracts[30] located within the project's zone of impact, multiplying the estimated incremental project cancer risk impact at the census tract centroid location by the population of the census tract and then summing all of products of population times estimated cancer risk in the zone of impact. Note that each census tract contributes to the cancer burden in proportion to its population and risk. If a census tract has a very high estimated cancer risk, but no people living there, it will not contribute to the estimation of the cancer burden. The cancer burden from the project was estimated based on the "Current OEHHA Guidance" that recommends the use of early-in-life sensitivity factors and, in the case of cancer burden, a 70-year exposure duration.

Estimation of Non-cancer Health Effects

An evaluation of the potential non-cancer effects of chronic (long-term) and acute (short-term) chemical exposures was also conducted. For chemicals that cause non-cancer health effects, risks are typically characterized using a measure called the hazard index. Adverse non-cancer health effects are evaluated by comparing the concentration of each TAC with the a reference concentration level below which an adverse health effect will not occur as determined by health professionals. This reference concentration level is referred to as the Reference Exposure Level (REL). The State of California has published a database of RELs for numerous toxic air contaminants. Toxic air contaminants may have a unique chronic and/or acute REL. A significant risk is defined by the SCAQMD as an hazard index (HI) of 1 or greater, and indicates that the source of TAC emissions has a potential to cause adverse non-cancer health effects.

[30] A census tract is a geographic region defined for the purpose of taking a census. Usually these regions coincide with the limits of cities, towns, or other administrative areas. Each tract has a unique numeric code and averages about 4,000 inhabitants. The census tract centroid is the geographic center of the tract based on a weighted distribution of the population within the tract using the census blocks that comprise the tract. A census block is the smallest geographic unit used to tabulate population and each tract can be comprised of several blocks.

Chronic Non-cancer Impacts

Exposures to TACs such as diesel PM can cause chronic (long-term) related non-cancer illnesses such as reproductive effects, respiratory effects, eye sensitivity, immune effects, kidney effects, blood effects, central nervous system, birth defects, or other adverse environmental effects. Risk characterization for chronic non-cancer health risks from diesel PM is expressed as a hazard index (HI). The HI is a ratio of the predicted concentration of a project's emissions to its REL.

When evaluating chronic non-cancer effects due to TAC exposures, a hazard quotient (HQ) is established for each individual TAC as follows and for each target organ[31] affected by the individual TAC:

$$HQ_i = C_{air}/REL_i \quad \text{(EQ-3)}$$

Where:

HQi = chronic hazard quotient for each TAC, i
Cair = Annual average concentration of each TAC, i (□g/m3)
RELi = Chronic Reference Exposure Level for TAC, i (□g/m3)
i = toxic air contaminant of interest

To evaluate the potential for adverse non-cancer health effects from simultaneous exposure to multiple TACs, the HQs for all TACs that affect the same target organ are summed yielding a HI as follows:

$$HI_{to} = \Sigma HQ_{tac} \quad \text{(EQ-4)}$$

Where:

HI_{to} = sum of the hazard quotients for all TACs affecting the same target organ
HQ_{tac} = hazard quotient for TAC and target organ

Chronic health effects were calculated based on maximum annual average diesel PM concentrations from the construction and operation of the project since diesel PM is the most important TAC considered in this assessment. The California OEHHA has assigned a chronic non-cancer REL of 5 $\mu g/m^3$ for diesel PM (OEHHA 2013) for diesel PM. Diesel PM has effects on the respiratory system, which accounts for essentially all of the potential chronic non-cancer hazards from diesel PM. Therefore, the only HI calculated was for the respiratory system.

[31] A target organ is a biological organ(s) most adversely affected by exposure to a chemical substance and includes the respiratory system, cardiovascular system, eyes, nervous system, hematological system, immune system, reproductive system, developmental system, skin, and endocrine system.

Acute Non-cancer Impacts

The OEHHA has not defined an acute non-cancer REL for diesel PM. Therefore, the focus of this assessment was on potential acute non-cancer hazards associated with the various toxic air contaminant components of the Total Organic Gas (TOG) exhaust emissions from diesel and gasoline vehicles that have been found to cause acute non-cancer hazards.

The ARB maintains and updates estimates of the chemical composition and hazard levels of TOGs for a variety of emission source categories. These estimates are contained in what are referred to as speciation profiles. Speciation profiles provide estimates of the toxic air contaminant composition of TOG emissions, and are used in the development of emission inventories and air quality models. Speciation profiles based on those developed by the ARB were used in this study (ARB 2013) to derive estimates of the pollutant levels of the TOG components and their acute non-cancer hazards for TOGs from both gasoline exhaust and diesel exhaust.

Table 35 presents the speciation profiles that were used to convert TOG combustion source emissions into individual TAC emissions. The identified chemicals were those that have a defined acute non-cancer reference exposure level. The estimated total TOG emissions are multiplied by the profile percentage for a particular toxic to obtain the emissions of that particular toxic.

Table 35: Speciation Profiles for Diesel and Gas Fuel Combustion Sources

Toxic Air Contaminant	CAS Number	Gasoline TOG Profile 2108[(1)] (%TOG)	Diesel TOG Profile (818)[(2)] (%TOG)
Acetaldehyde	75070	0.28	7.35
Acrolein	107028	0.13	Not Reported
Benzene	71432	2.47	2.00
Formaldehyde	50000	1.53	14.71
Methanol	67561	0.12	0.03
MEK	78933	0.02	1.48
Styrene	100425	0.12	0.06
Toluene	108883	5.58	1.47
M-Xylene	108383	3.45	0.61
O-Xylene	95476	1.20	0.34
P-Xylene	106423	Not Reported	0.10
1-3 Butadiene	106990	0.53	0.19

Notes:
(1) TOG speciation profile 2108 is from the ARB SPECIATE database; this profile is used to characterize TOG emissions from gasoline-fueled vehicles
(2) TOG speciation profile 818 is from the ARB SPECIATE database; this profile was used to characterize TOG emissions from diesel-fueled vehicles
Source: California Air Resources Board 2013.

The PM_{10} emissions would also contribute their own particular TAC components, mainly in the form of metals including copper, nickel, arsenic, mercury, and vanadium that may cause non-cancer hazards. However, in an initial investigation, the toxic components of the TOG emissions as shown in Table 33 and Table 35 contributed over 90 percent of the acute non-cancer hazard index compared to the toxic metal components of the PM_{10}. Therefore, the focus of this assessment was on quantifying the acute-non-cancer hazards in terms of the project's TOG emissions from gasoline and diesel vehicles.

The methodology used to estimate acute non-cancer hazards follows a similar basic methodology used to estimate chronic non-cancer hazards with two important differences: the toxic air contaminant concentration, C_{air} in Equation 3 is based on the predicted maximum one-hour concentration of the toxic air contaminant, and the REL used is specific to the acute impacts from the contaminant.

Quantifying Morbidity and Mortality

Mortality is a measure of the number of deaths in a population, scaled to the size of that population, per unit time. Morbidity refers to the number of individuals who have contracted a disease during a given time period (the incidence rate) or the number who currently have that disease (the prevalence rate), scaled to the size of the population. These terms differ from the cancer risk because the cancer risk is the risk of developing cancer over a lifetime Please refer to Appendix G9 for more information on mortality and morbidity calculations.

Respirable particulate matter is a public health concern as it is known to impact both the respiratory and cardiovascular systems. Respirable particulate matter deposition in the lungs and penetration into the bloodstream (for the smallest particles) triggers a range of inflammation responses and exacerbates health problems such as asthma and chronic bronchitis. Individuals susceptible to higher health risks from exposure to airborne particulate matter (PM_{10} and $PM_{2.5}$) include children, the elderly, smokers, and people of all ages with low pulmonary/cardiovascular function. The ARB reviewed and summarized the non-toxic health effects (i.e., mortality and morbidity) of PM exposure and presented a health effect model attempting to quantify these impacts based on concentration-response functions (ARB 2002). Concentration-response (C-R) functions are equations that relate the change in the number of adverse health effect incidences in a population to a change in pollutant concentration experienced by that population. This ARB model has been used, for example, to estimate the number of cases of disease and premature deaths linked to PM and ozone exposure from ports and goods movement in California (ARB 2006).

Although the ARB model has also been used to quantitatively assess project-specific incremental levels of public mortality and morbidity, such calculations are subject to significant uncertainty. Sources of uncertainty include emission estimates, population exposure estimates, concentration-response functions, baseline rates of mortality and morbidity that are entered into concentration response functions (C-R functions), and occurrence of additional not-quantified adverse health effects. It should be noted that the nature of PM as a complex mixture of various pollutants, as well as the confounding

health effects of pollutants such as sulfur dioxide, NO_2, CO, and ozone that tend to co-occur with PM in ambient air, greatly increase the complexity of deriving accurate PM concentration-response functions. Health risk estimates derived in the presence of significant uncertainty tend to rely on very conservative assumptions that may greatly overestimate the potential adverse health effects. As stated by ARB in a study of diesel PM exposure from ports and goods movement in California: "Risk assessment has various uncertainties in the methodology and is therefore deliberately designed so that risks are not under predicted. Risk assessment is thus best understood as a tool for comparing risks from various sources, usually for purposes of prioritizing risk reduction, and not as literal prediction of the community incidence of disease from exposure" (ARB 2006, page 4).

However, perhaps the most compelling use limitation of C-R functions for site-specific projects is the consideration of whether it is valid to apply the C-R functions to changes in PM concentrations that are far below the ambient concentration. For example, the ARB/OEHHA analysis applied a threshold of 18 $\mu g/m^3$ for PM_{10} and 9 $\mu g/m^3$ for $PM_{2.5}$ for the long-term mortality C-R function, representing the lowest concentration level observed in the long-term mortality studies evaluated. In other words, ARB/OEHHA assumed that the C-R functions were continuous and differentiable down to threshold levels. In the case of trying to quantify Project-specific impacts, it may not be appropriate to use C-R functions that were developed with a threshold significantly higher than the change in PM due to the Project.

Nonetheless, despite these uncertainties in the analysis methodology, the potential increase in long-term mortality was calculated for the project. The most common forms of the C-R function are represented in the log-linear form as discussed in the Health Risk Assessment of the Port of Long Beach Middle Harbor Project (Port of Long Beach 2009, page A-3-22). For estimates of long-term mortality impacts, the following C-R function is used:

$$\Delta y = y_o \, (e^{\beta \Delta PM10} - 1) \times \text{population}$$

Where:

Δy = changes in the incidence of a health endpoint (in this case changes in mortality) corresponding to a particular change in diesel PM (assumed to be $PM_{2.5}$)

y_0 = baseline all-cause annual death rate per person for the South Coast Air Basin (= 0.001768)

β = coefficient (diesel PM: 0.005827); this coefficient is based on the relative risk that is associated with a particular concentration and varies from one study to another; and

ΔPM_{10} = change in annual diesel PM concentration ($\mu g/m^3$)

Population = population subgroup of the impacted area

Similar C-R functions are used to estimate daily changes in morbidity effects from diesel PM including incidences of chronic bronchitis, hospital admissions for pulmonary disease, pneumonia, cardiovascular disease, and asthma

The parameters in the functions differ depending on the study. Some studies of the relationship between ambient PM concentrations and mortality excluded accidental deaths from their mortality counts; others included all deaths. Some studies considered only members of a particular subgroup of the population, e.g., individuals 65 and older, while other studies considered the entire population in the study location. When using a C-R function from an epidemiological study to estimate changes in the incidence of a health endpoint corresponding to a particular change in PM in a location, it is important to use the appropriate value of parameters for the C-R function. That is, the measure of PM, the type of population, and the characterization of the health endpoint should be the same as or as close as possible to those used in the study that estimated the C-R function.

This form of the concentration-response function was used to predict the effect of changes in ambient PM concentrations on health effects such as premature deaths, cardiac and respiratory hospitalizations, asthma and other lower respiratory symptoms, lost work/school days, etc.

Buffer Analysis

In response to comments received during the review of the Draft EIR, an analysis was made to compare the cancer risks from the current design of a 250-foot buffer area from the project emission sources and the centerlines of Redlands Boulevard, Bay Street, Merwin Street, and Gilman Springs Road with a 1,000 foot buffer area from the centerlines of the streets. To assess the impact of a 1,000-foot buffer, additional dispersion modeling was conducted to examine the 1,000-foot buffer area.

Exhibit 21 displays the location of the current 250-foot buffer design and the 1,000-foot buffer design. For the current design, onsite emissions are emitted from both the blue and white areas as shown in the exhibit. For the 1,000-foot buffer design, the emissions are only emitted from the white areas. The offsite sources remain the same for both designs.

The assessment of the 1,000-foot buffer design was based on the following assumptions:

1) The total diesel PM emissions during construction and operation for the 1,000-foot buffer design calculation are the same as the total diesel PM emissions for the current design;
2) The size for the 1,000-foot buffer design source area representing the building yard truck emissions in Phase 1 is based on the conceptual drawing provided by the project applicant;
3) The size of the current design emission source area representing the building yard truck emissions in Phase 2 was resized by adding a 1,000-foot buffer area along the entirely of Gilman Springs Road; and

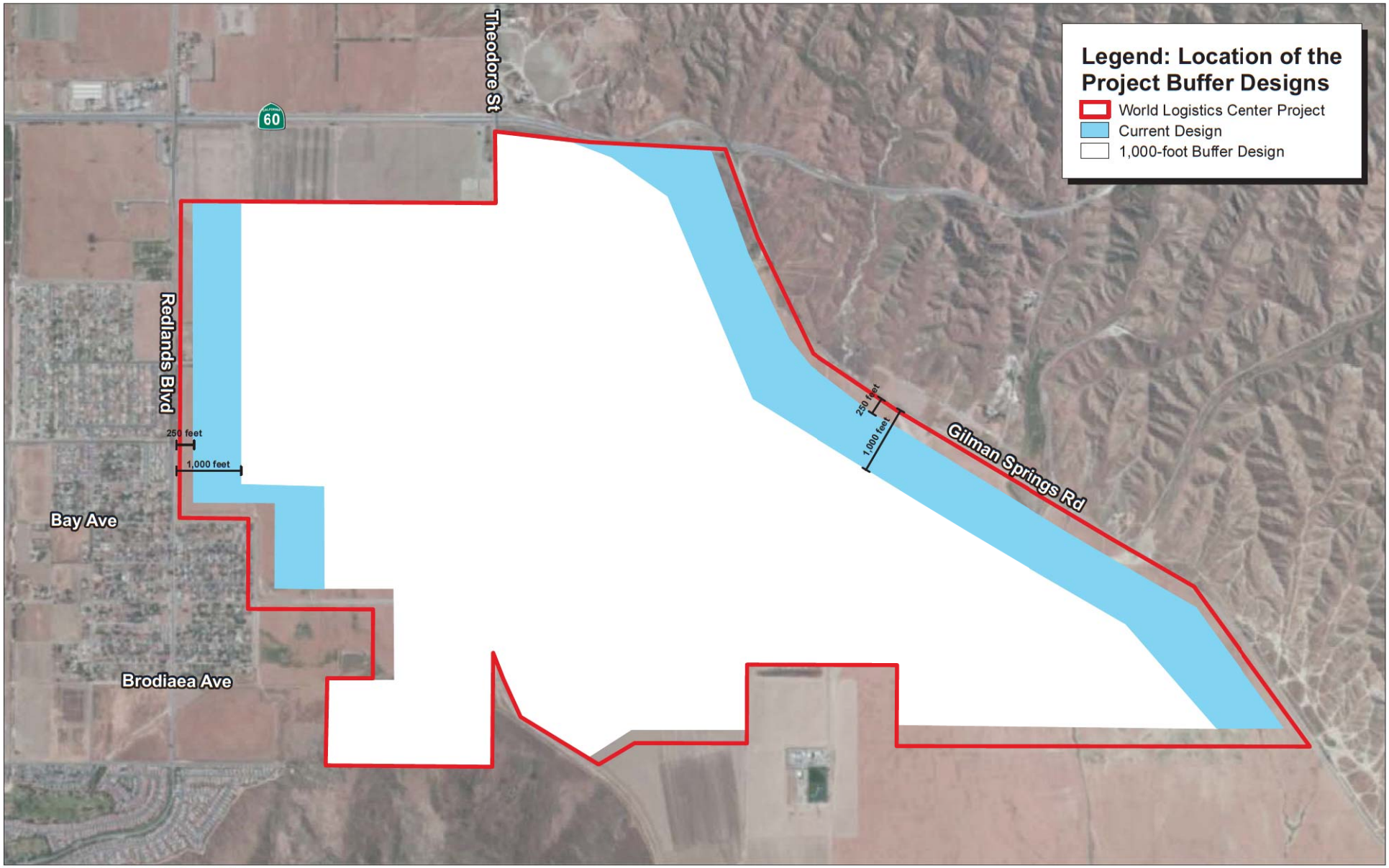
4) The location of Street E, the loop road within the western portion of the project, was moved in accordance with the conceptual design plot provided by the project applicant that reflects the location of the 1,000-foot buffer area.

Geographic Scope of the Health Risk Assessment

The HRA is characterized by two important differences from the localized significance threshold assessment for criteria pollutants. According to the SCAQMD localized significance threshold assessment methodology, the assessment of localized impacts addresses only those emissions that are generated "onsite," that is for the purposes of this project, emissions generated from within or along the boundaries of the specific plan. However, for the HRA, both the universe of the project's emission sources and air dispersion model receptors were greatly expanded to assess the regional impact of the project's emissions of toxics. For this purpose, the project's toxics emission sources included over 500 individual arterial road and freeway mainline segments in the region that extended from Beaumont to Long Beach in the east-west direction and from Rancho Cucamonga to Hemet/San Jacinto in the north-south direction, roughly an area of 3,500 square miles. The study area for the arterial roads covered all intersections in the City of Moreno Valley of a collector or higher classification[32] streets with another collector street or higher classification street at which the project would add 50 or more peak hour trips. The study area also included the main arterial routes between the project and neighboring communities of Riverside, Perris, Beaumont, San Jacinto, and Redlands. The analysis of the arterial routes extended west from the project to the SR-91 and as far south as the I-215 ramps at Redlands Avenue in Perris. The surface street arterial roadways included in the HRA were shown earlier in Exhibit 14.

The study area for freeways was selected to cover the freeway routes radiating from the project site to the north, south, east, and west and included major portions of Interstate 10, 215, and 710 and State Routes 60 and 91. The freeway segments included in the HRA were shown earlier in Exhibit 15 and Exhibit 16. These limits represent the extreme range of the transportation impact model used in the project's traffic impact assessment, the Riverside County Traffic Analysis Model, in the transportation model's capacity to predict real differences in traffic impacts between with- and without-project (see the Parsons-Brinkerhoff transportation impact study prepared for the project in 2014). Beyond these limits, project traffic would be so small in absolute terms or as a percentage of background traffic that it would no longer be discernable from random error in the model or the normal daily variation in traffic, and routing of the small amounts of remaining traffic would be influenced by minor local factors (e.g. stop signs, lane widths) that cannot practicably be represented in a regional transportation model.

[32] The City of Moreno Valley has defined standard street sections and designs as part of the City of Moreno Valley Standard Plans. Arterial and collector street classifications are part of the city's street sections and designs which specify such things as travel lanes, roadway width, parkway width, level of service capacity.



Source: FirstCarbon Solutions 2014.

FirstCarbon SOLUTIONS

2,500 1,250 0 2,500
Feet

Exhibit 21
Location of the Project Current 250-ft Buffer Design and the 1,000-ft Buffer Design

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The generation of emissions from traffic traveling along the various arterial and freeway mainline roadway segments requires information on traffic volumes, length of segment, and emission factors. The emission factors, in turn, depend on vehicle type, speed, calendar year, and fuel type. Estimates of daily vehicle volumes and types (passenger cars, light heavy duty trucks, medium heavy duty trucks, and heavy-heavy duty trucks) were provided by the traffic consultant for each roadway segment analyzed. The physical length and width of each roadway segment were estimated using the segment location as provided by the traffic consultant and aerial photographs available from Google Earth. Vehicle speeds for each roadway segment and vehicle type were estimated based on posted speed limits and peak morning and afternoon average speeds taken from the 2012 Regional Transportation Plan for the years 2008 and 2035 (Southern California Association of Governments 2012). Segment speeds were adjusted to account for stop signs and traffic lights and other stoppages by reducing the prevailing vehicle speeds by 5 to 10 mph. The various roadway parameters are provided in Appendix G, Health Risk Assessment Spreadsheets and AERMOD Output.

The expanded geographic scope of the assessment also necessitated an expansion in the locations of the receptors where the project's impacts were calculated. This expanded network included locations of individual schools within the Moreno Valley School District and over 2,300 census tract centroid locations. Exhibit 22 shows the expanded census tract and school receptors used in the HRA.

Finally, it is recognized that because of the large geographical extent of the region covered in this HRA, meteorological conditions differ for different portions of the study region. As shown in Exhibit 23, a wind rose[33] at the SCAQMD Riverside air monitoring station, the most frequent wind directions in the immediate project region are from the northwest direction in the Riverside and Moreno Valley areas. In contrast, as shown in for the SCAQMD Anaheim air monitoring station, the most frequent wind directions along the SR-60 and SR-91 west of SR-71 in the La Habra and Anaheim areas are generally from the southwest. Because of these wind differences, it was necessary to separate the air dispersion modeling into two separate pieces as follows.

Those emission sources located east of SR-71 were assumed to be influenced by the meteorological conditions represented by the Riverside meteorological data. Those emission sources located west of SR-71 were assumed to be influenced by the meteorological conditions represented by the Anaheim meteorological data. The air dispersion modeling was done separately for the region east of SR-71 and for the region west of SR-71. The air pollutant concentrations at each receptor location were then comprised as the sum of the emission impacts from those sources located east of SR-71 and west of SR-71 as influenced by their respective meteorological conditions.

[33] A wind rose is a graphical tool which provides a view of how wind speed and direction are typically distributed at a particular location.

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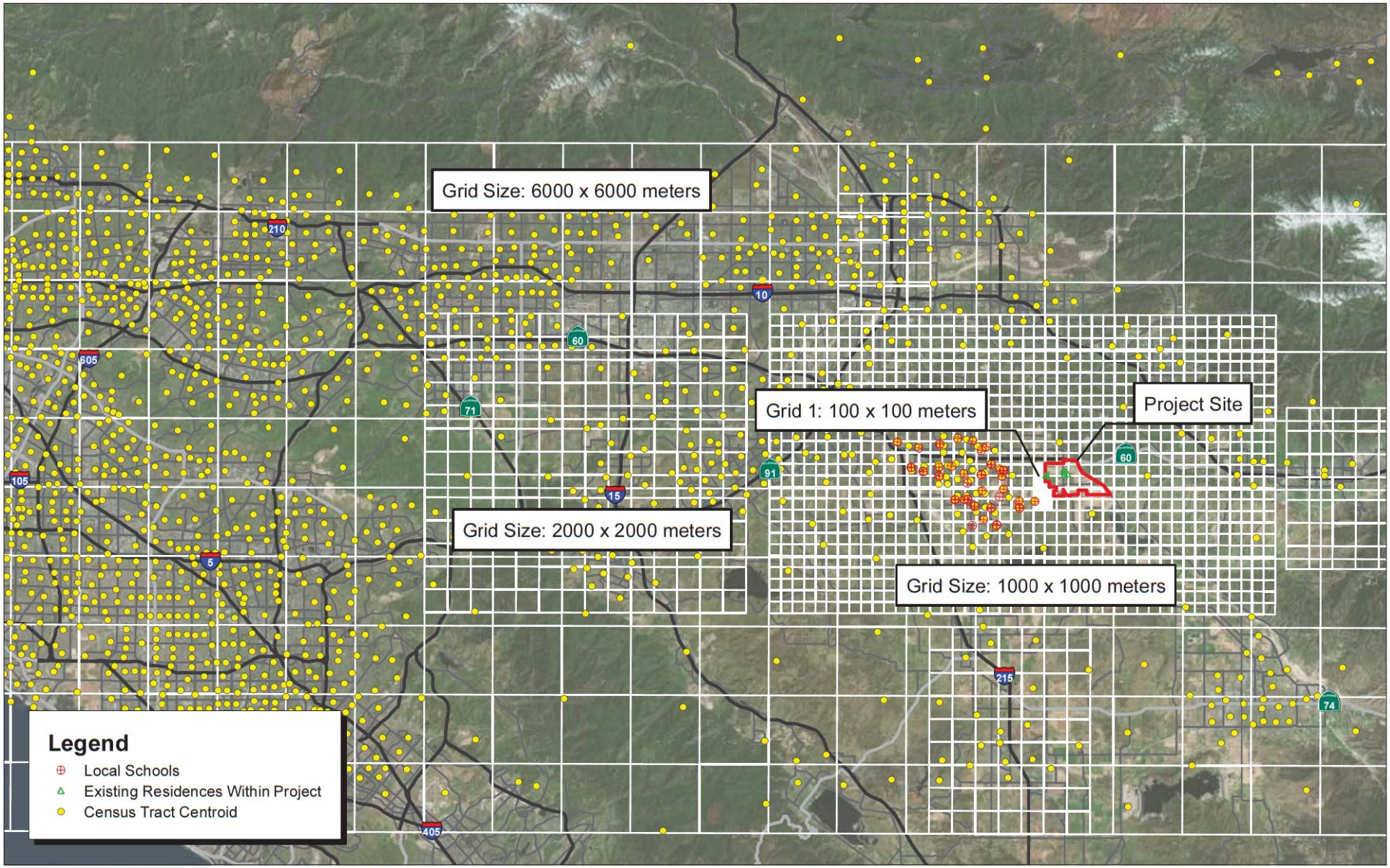

Source: Dispersion modeling conducted by FirstCarbon Solutions using the ISC AERMOD View program; ESRI Aerial Imagery 2012.

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Exhibit 22
Expanded Health Risk Assessment Receptor Network

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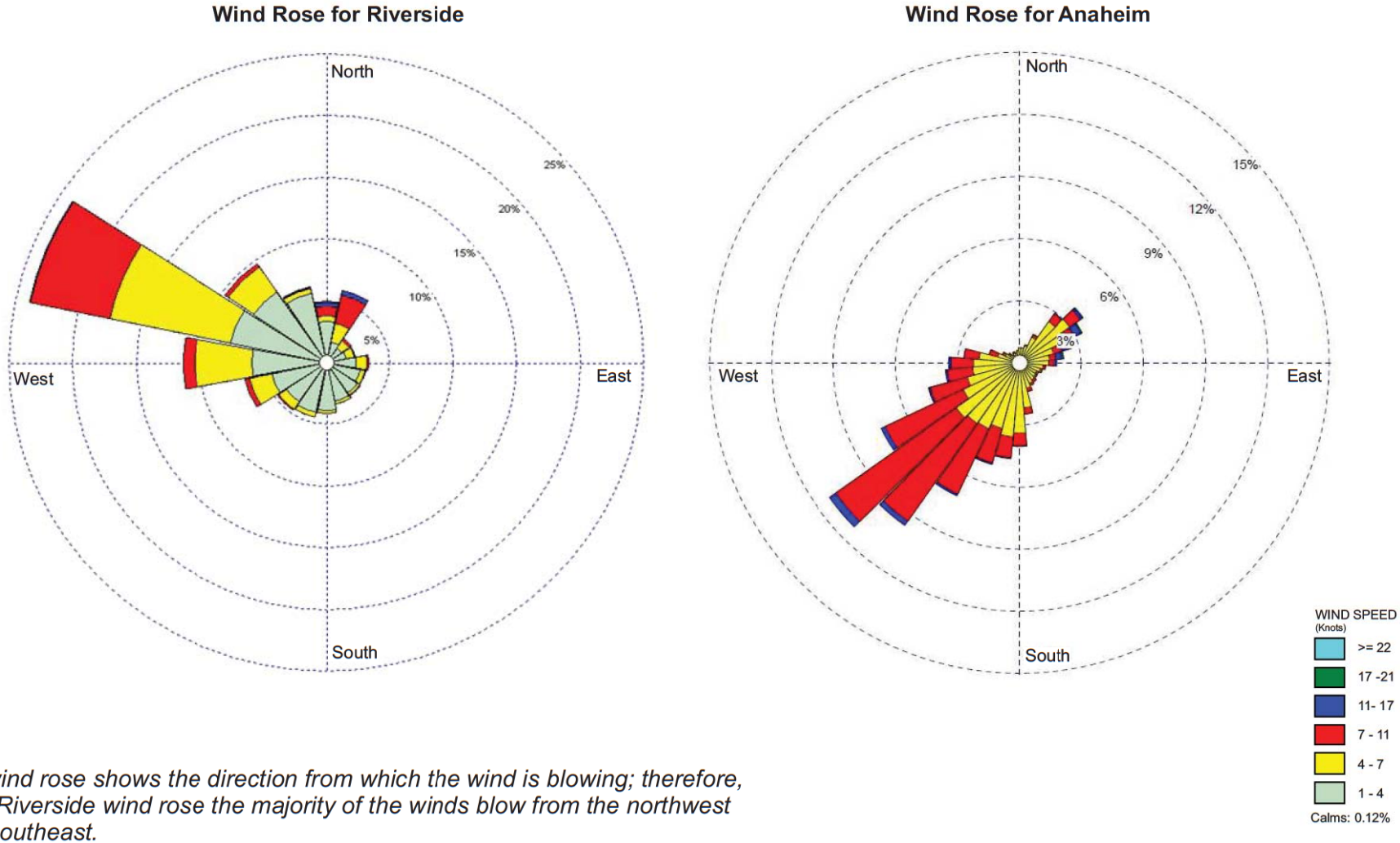

Notes:
- The wind rose shows the direction from which the wind is blowing; therefore, for the Riverside wind rose the majority of the winds blow from the northwest to the southeast.

Source: Data from South Coast Air Quality Management District (Anaheim Station and Riverside Station).

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Exhibit 23
Wind Rose for the Anaheim and Riverside Monitoring Stations

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SECTION 5: AIR QUALITY IMPACT ANALYSIS

This section calculates the estimated emissions and resulting air quality impacts from construction and operation of the project within the context of assessing the regulatory significance of project emissions on a regional and localized level under CEQA Guidelines.

5.1 - CEQA Guidelines

The CEQA Guidelines define a significant effect on the environment as "a substantial, or potentially substantial, adverse change in the environment." To determine if a project would have a significant impact on air quality, the type, level, and impact of emissions generated by the project must be evaluated.

The following air quality significance thresholds are contained in Appendix G of the CEQA Guidelines. A significant impact would occur if the project would:

a) Conflict with or obstruct 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 nonattainment under an applicable national or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);

d) Expose sensitive receptors to substantial pollutant concentrations; or

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

While the final determination of whether a project is significant is within the purview of the Lead Agency pursuant to Section 15064(b) of the CEQA Guidelines, SCAQMD recommends that its quantitative air pollution thresholds be used to determine the significance of project emissions. If the Lead Agency finds that the project has the potential to exceed these air pollution thresholds, the project should be considered to have significant air quality impacts.

The applicable SCAQMD thresholds are contained under each impact statement below.

5.2 - Impact Analysis

Objectionable Odors

Impact 4.3.5.1: The project would not create objectionable odors affecting a substantial number of people.

Impact Analysis

Background Information

Odors can cause a variety of responses. The impact of an odor results from interacting factors such as frequency (how often), intensity (strength), duration (in time), offensiveness (unpleasantness), location, and sensory perception. Odor can be a warning system that prevents animals and humans from consuming spoiled food or toxic materials. Odor-related symptoms reported in a number of studies include nervousness, headache, sleeplessness, fatigue, dizziness, nausea, loss of appetite, stomach ache, sinus congestion, eye irritation, nose irritation, runny nose, sore throat, cough, and asthma exacerbation (South Coast Air Quality Management District 2007a).

The SCAQMD's role is to protect the public's health from air pollution by overseeing and enforcing regulations (South Coast Air Quality Management District 2007a). The SCAQMD's resolution activity for odor compliance is mandated under California Health & Safety Code Section 41700, and falls under SCAQMD Rule 402. This rule on Public Nuisance Regulation states: "A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. The provisions of this rule shall not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals."

The SCAQMD indicates that the number of overall complaints have been declining. Between 2003 and 2007, odor complaints made up 50 to 55 percent of the total nuisance complaints. Over the past decade, odors from paint and coating operations have decreased from 27 to 7 percent and odors from refuse collection stations have increased from 9 to 34 percent (South Coast Air Quality Management District 2007a).

Project Analysis

The SCAQMD recommends that odor impacts be addressed in a qualitative manner. Such an analysis shall determine whether the project would result in excessive nuisance odors, as defined under the California Code of Regulations and Section 41700 of the California Health and Safety Code, and thus would constitute a public nuisance related to air quality.

Land uses typically considered associated with odors include wastewater treatment facilities, waste-disposal facilities, or agricultural operations. The project does not contain land uses typically associated with emitting objectionable odors.

With the exception of short-term construction-related odors (e.g., equipment exhaust, paint, and asphalt odors), the proposed uses that would be developed on the proposed site do not include uses that are generally considered to generate offensive odors (e.g., agricultural uses, wastewater treatment plants, or landfills). While the application of architectural coatings and installation of asphalt may generate odors, these odors are temporary and not likely to be noticeable beyond the project boundaries. SCAQMD Rules 1108 and 1113 identify standards regarding the application of asphalt and architectural coatings, respectively.

SCAQMD Rule 1108 sets limitations on VOC content in asphalt. This rule is applicable to any person who supplies, sells, offers for sale, or manufactures any asphalt materials for use in the Basin. SCAQMD Rule 1113 deals with the selling and application of architectural coatings. Rule 1113 sets limits on the amount of VOC emissions allowed for all types of architectural coatings, along with a time table for tightening the emissions standards in the future. Compliance with Rule 1113 means that architectural coatings used during construction would have VOC emissions that comply with these limits. In addition, pursuant to mitigation, the project would be required to use low VOC paints.

Diesel exhaust and VOCs would be emitted during construction of the project, which are objectionable to some; however, emissions would disperse rapidly from the project site and therefore should not reach an objectionable level. Diesel would also be emitted during operation of the project from the long-haul trucks that would visit the project site. However, the concentrations would not be at a level to result in a negative odor response at nearby sensitive receptors. In addition, modern emission control systems on diesel vehicles since 2007 virtually eliminate diesel's characteristic odor.

During blow-down maintenance activities, natural gas odors will be present around the SDG&E Compressor Plant located on the project site. When this portion of the WLC Specific Plan is developed, these odors will occasionally be detectable from the industrial warehouse properties adjacent to the SDG&E facility. These odors will be infrequent and odorized natural gas will not be present in high concentrations. Therefore, potential odor impacts from on-site natural gas operations are considered to be less than significant and do not require mitigation.

Adherence to applicable provisions of these rules is standard for all development within the Basin. In addition, conditions for the design of waste storage areas on the proposed site would be established through the permit process to ensure enclosures are appropriately designed and maintained to prevent the proliferation of odors. Solid waste generated by the proposed on-site uses will be collected by a contracted waste hauler, ensuring that any odors resulting from on-site uses would be adequately managed. Therefore, impacts associated with this issue would be less than significant and no mitigation is required.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant impact.

Long-Term Microscale (CO Hotspot) Analysis

Impact 4.3.5.2: **The project would not violate an air quality standard for carbon monoxide or contribute substantially to an existing or projected air violation for carbon monoxide.**

Impact Analysis

Vehicular trips associated with the development of the proposed project could contribute to congestion at intersections and along roadway segments in the project vicinity resulting in potential local CO "hot spot" impacts. The primary mobile source pollutant of local concern is CO, which is a direct result of vehicle travel speeds and idling time and, thus, traffic flow conditions. CO transport is extremely limited; it disperses rapidly with distance from the source under normal meteorological conditions, which means that the concentration is highest nearest to the source (vehicles) and decreases as the distance from the source increases. However, under certain extreme meteorological conditions, CO concentrations next to a congested roadway or intersection may reach unhealthy levels affecting local sensitive receptors (residents, schoolchildren, etc.). High CO concentrations are typically associated with roadways or intersections operating at unacceptable levels of service or with very high traffic volumes. In areas with high ambient background CO concentrations, modeling is recommended to determine a project's effect on local CO levels.

Carbon monoxide (CO) "hot spot" thresholds ensure that emissions of CO associated with traffic impacts from a project in combination with CO emissions from existing and forecasted regional traffic do not exceed state or federal standards for CO at any traffic intersection impacted by the project. Project concentrations may be considered significant if a CO hot spot intersection analysis determines that project generated CO concentrations cause a localized violation of the state CO 1-hour standard of 20 ppm, state CO 8-hour standard of 9 ppm, federal CO 1-hour standard of 35 ppm, or federal CO 8-hour standard of 9 ppm.

A carbon monoxide (CO) hot spot is a localized concentration of CO that is above the state or federal 1-hour or 8-hour CO ambient air standards. Localized high levels of CO are associated with traffic congestion and idling or slow-moving vehicles. To provide a worst-case scenario, CO concentrations are estimated at project-impacted intersections, where the concentrations would be the greatest.

This analysis follows guidelines recommended by the CO Protocol (University of California, Davis 1997). According to the CO Protocol, intersections with Level of Service (LOS) E or F require detailed analysis. The LOS for intersections is determined in the project Traffic Impact Analysis (PB 2014). In addition, intersections that operate under LOS D conditions in areas that experience meteorological conditions favorable to CO accumulation require a detailed analysis. The SCAQMD recommends that a local CO hot spot analysis be conducted if the intersection meets one of the following criteria: 1) the intersection is at LOS D or worse *and* where the project increases the volume to capacity ratio by 2 percent, or 2) the project decreases LOS at an intersection from C to D.

A decrease in LOS, i.e., from C to D, means that there is more traffic and more delay at the intersection.

For this project analysis, the top five intersections with highest traffic volumes and the LOS E or F before mitigation were identified for 2022 using information from the table in the traffic study "Intersection LOS under 2022 Plus Phase 1 Conditions." The five intersections with the greatest LOS before mitigation were also identified for 2035 using information from the table in the traffic study "Intersection LOS under 2035 Plus Build-out Conditions."

The CO concentrations were estimated using the CALINE4 model using 2012 emission factors. The emission factors are for "all" vehicle classes and are not adjusted for a project specific fleet to provide a worst-case scenario. In addition, the emission factors do not take into account the project design feature reductions from requiring that medium-heavy duty trucks and heavy-heavy duty diesel trucks are model year 2010 or newer.

Estimated CO concentrations in the year 2022 traffic conditions are shown in Table 36. The estimated CO concentrations at year 2035 (buildout) are shown in Table 37. As shown in the tables, the estimated 1-hour and 8-hour average CO concentrations from project generated and cumulative traffic plus the background concentrations are below the state and federal standards. No CO hot spots are anticipated because of traffic-generated emissions by the project in combination with other anticipated development in the area. Therefore, the mobile emissions of CO from the project are not anticipated to contribute substantially to an existing or projected air quality violation of CO. Therefore, according to this criterion, air pollutant emissions during operation would result in a less than significant impact.

Table 36: Carbon Monoxide Concentrations at Intersections - 2022

Intersection	Peak Hour	CO Concentration (ppm)		Significant Impact?
		1 Hour	8 Hour	
Cactus Avenue at Graham Street	PM	5.2	3.4	No
Cactus Avenue at Elsworth Street	PM	4.9	3.2	No
Alessandro Blvd at Sycamore Canyon Road	PM	4.8	3.1	No
Alessandro Blvd at Chicago Avenue	AM	5.2	3.4	No
Alessandro Blvd at Chicago Avenue	PM	5.4	3.5	No

Notes: ppm = parts per million.
The traffic volumes are from the figure in the project Traffic Impact Analysis (PB 2014), "Turning Movement Volumes under 2022 Plus Phase 1 Conditions."
The concentrations are derived from the CALINE4 model using emission factors for the year 2012.
The 1 hour concentration is from the CALINE4 output (see Appendix B for model output) and includes the 1 hour background concentration of 3 ppm (from Table 5).
The 8 hour project increment was calculated by multiplying the 1 hour CALINE4 value by 0.7 (persistence factor) and adding a background concentration of 1.84 ppm.
The existing background concentrations are appropriate because CO emissions in the future are expected to decrease.
A significant impact would occur if the estimated CO concentration is over the 1 hour state standard of 20 ppm or the 8 hour state/federal standard of 9 ppm.

Table 37: Carbon Monoxide Concentrations at Intersections - 2035

Intersection	Peak Hour	CO Concentration (ppm)		Significant Impact?
		1 Hour	8 Hour	
Alessandro Blvd at Mission Grove Pkwy	PM	5.1	3.3	No
Alessandro Blvd at Chicago Avenue	AM	5.3	3.5	No
Alessandro Blvd at Chicago Avenue	PM	5.4	3.5	No
Alessandro Blvd at Canyon Crest Drive	AM	5.4	3.5	No
Alessandro Blvd at Canyon Crest Drive	PM	5.6	3.7	No

Notes: ppm = parts per million
The traffic volumes are from the figure in the Traffic Impact Analysis (PB 2014), "Turning Movement Volumes under 2035 Plus Project Conditions."
The concentrations are derived from the CALINE4 model using emission factors for the year 2012.
The 1 hour concentration is from the CALINE4 output (see Appendix B for model output) and includes the 1 hour background concentration of 3 ppm (from Table 5).
The 8 hour project increment was calculated by multiplying the 1 hour CALINE4 value by 0.7 (persistence factor) and adding a background concentration of 1.84 ppm.
The existing background concentrations are appropriate because CO emissions in the future are expected to decrease.
A significant impact would occur if the estimated CO concentration is over the 1 hour state standard of 20 ppm or the 8 hour state/federal standard of 9 ppm.

It is anticipated that CO emissions in the future will decrease with advances in technology. As previously identified, background concentrations in future years are anticipated to continue to decrease as the concerted effort to improve regional air quality progresses. Therefore, CO concentrations in the future years would generally be lower than existing conditions. Based on the analysis, because no CO hot spot impacts would occur, it is reasonable to assume that a less than significant cumulative CO impact would occur.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant impact.

Consistency with Air Quality Management Plan

Impact AIR-1: The project would conflict with or obstruct implementation of the applicable air quality plan [EIR Section 4.3.6.1].

Impact Analysis

According to the 1993 SCAQMD Handbook, there are two key indicators of consistency with the air quality management plan (AQMP):

1. Indicator: Whether the project would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.
2. Indicator: A project would conflict with the AQMP if it would exceed the assumptions in the AQMP in 2010 or increments based on the year of project buildout and phase. The Handbook indicates that key assumptions to use in this analysis are population number and location and a regional housing needs assessment. The parcel-based land use and growth assumptions and inputs used in the Regional Transportation Model run by the Southern California Association of Governments that generated the mobile inventory used by the SCAQMD for AQMP are not available.

Considering the recommended criteria in the SCAQMD's 1993 Handbook, this analysis utilizes the following criteria to address this potential impact:

- Project's contribution to air quality violations (SCAQMD's indicator 1 as listed above).
- Assumptions in AQMP (SCAQMD's indicator 2 as listed above).
- Compliance with applicable emission control measures in the AQMPs.

Project's Contribution to Air Quality Violations

According to the SCAQMD, the project is consistent with the AQMP if the project would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP (South Coast Air Quality Management District 1993, page 12-3).

As shown in Impact AIR-2 (the localized significance analysis), the project could violate an air quality standard and therefore could contribute substantially to an existing or projected air quality violation.

The applicable significance thresholds that are violated before mitigation during the following conditions include:

- Project Phase 1 (2012), within project boundary: nitrogen dioxide (NO_2) 1-hour national, PM_{10} 24-hour, PM_{10} annual; outside of the project boundary: PM_{10} annual

- Project Phase 1 and Phase 2 Full Buildout (2012), within project boundary: NO_2 1-hour national, PM_{10} 24-hour, PM_{10} annual, $PM_{2.5}$ 24-hour; outside project boundary: NO_2 1-hour national and PM_{10} annual
- Project Development 2021, within project boundary: NO_2 annual, PM_{10} 24-hour, PM_{10} annual, $PM_{2.5}$ 24-hour; outside project boundary: NO_2 annual, and PM_{10} 24-hour
- Project Development 2027, within project boundary: PM_{10} 24-hour and PM_{10} annual; outside of the boundary: no thresholds exceeded.
- Project Development Buildout, within project boundary: PM_{10} 24-hour and PM_{10} annual; outside of the boundary: no thresholds exceeded

If a project's emissions exceed the SCAQMD regional thresholds for NO_X, VOC, PM_{10}, or $PM_{2.5}$, it follows that the emissions could cumulatively contribute to an exceedance of a pollutant for which the basin is in nonattainment (ozone, PM_{10}, $PM_{2.5}$) at a monitoring station in the basin. The thresholds are criteria for determining environmental significance and are discussed in the SCAQMD's 1993 Handbook for Air Quality Analysis.[34] An exceedance of a nonattainment pollutant at a monitoring station would not be consistent with the goals of the AQMP—to achieve attainment of pollutants.

As discussed in Impact AIR-3, the project would exceed the regional emission significance thresholds for VOC, NO_X, CO, PM_{10}, and $PM_{2.5}$. This means that project emissions of VOC and NO_X could combine with other regional emission sources and could result in an ozone, PM_{10}, or $PM_{2.5}$ exceedance at a nearby monitoring station. The Basin in which the project is located is in nonattainment for these pollutants; therefore, according to this criterion, the project would not be consistent with the AQMP.

Assumptions in AQMP

The analyses in the AQMP use demographic growth forecasts for various socioeconomic categories (e.g., population, housing, employment by industry), developed by SCAG for its Regional Transportation Plan. It is uncertain what assumptions were used to generate the emissions modeling in the AQMPs.

For purposes of this analysis, it is assumed that the AQMPs use the assumptions from the existing project site, which include the agricultural farming operations. The existing emissions are compared with the project emissions; the net increase in emissions would exceed the SCAQMD's operational regional significance thresholds. The existing agricultural emissions and net project emissions are shown in Table 38.

[34] The most recent SCAQMD significance thresholds are located at the following website: www.aqmd.gov/ceqa/handbook/signthres.pdf.

Table 38: Existing Agricultural Emissions and Net Emissions

Source	Type	Emissions (pounds/day)				
		VOC	NO_X	CO	PM_{10}	$PM_{2.5}$
Existing	Road dust	—	—	—	101	21
	Harvest operations dust	—	—	—	251	56
	Tractor operation	<1	5	3	<1	<1
	Maximum daily emissions	**<1**	**5**	3	**352**	**77**
Project (buildout, unmitigated)		**594**	**1,280**	**1,379**	**1,123**	**306**
Net increase in emissions with project		**594**	**1,275**	**1,376**	**771**	**229**
Significance threshold		55	55	550	150	55
Significant impact?		**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

Notes:
VOC = volatile organic compounds NO_x = nitrogen oxides CO = carbon monoxide
PM_{10} and $PM_{2.5}$ = particulate matter
Source of existing: Appendix E.1
Source of project: Table 58 at buildout (page 241)
Source of net increase: Project emissions at buildout minus the existing

Compliance with Emission Control Measures

The second indicator of whether the project could conflict with or obstruct implementation of the air quality plan is by assessing the project's compliance with the control measures in the AQMPs and the State Implementation Plan (SIP).

2003 AQMP. The 2003 AQMP contains a number of land use and transportation control measures including the following: the SCAQMD's Stationary and Mobile Source Control Measures; State Control Measures proposed by ARB; and Transportation Control Measures provided by Southern California Association of Governments. ARB's strategy for reducing mobile source emissions include the following approaches: new engine standards, reduce emissions from in-use fleet, require clean fuels, support alternative fuels and reduce petroleum dependency, work with EPA to reduce emissions from national and state sources, and pursue long-term advanced technology measures (AQMP 2003, page 4-25). Transportation control measures provided by Southern California Association of Governments include those contained in the Regional Transportation Plans, the most current version of which is the 2008 Regional Transportation Plan. The Regional Transportation Plan has control measures to reduce emissions from on-road sources by incorporating strategies such as high occupancy vehicle interventions, more transit, and information-based technology interventions (AQMP 2003, page 4-19). The project would comply with applicable measures and regulation set by ARB and Southern California Association of Governments.

2007 AQMP. The focus of the 2007 AQMP is to demonstrate attainment of the federal $PM_{2.5}$ ambient air quality standard by 2015 and the federal 8-hour ozone standard by 2024, while making expeditious progress toward attainment of state standards. This is to be accomplished by building

upon improvements from the previous plans and incorporating all feasible control measures while balancing costs and socioeconomic impacts. The 2007 AQMP indicates that $PM_{2.5}$ is formed mainly by secondary reactions or sources.[35] Therefore, instead of reducing fugitive dust (a primary source), the strategy for reducing $PM_{2.5}$ focuses on reducing precursor emissions of SO_X, directly emitted $PM_{2.5}$, NO_X, and VOC.

The 2007 AQMP control measures consist of four components. The first component is SCAQMD's Stationary and Mobile Source Control Measures. The Final 2007 AQMP includes 30 short-term and mid-term stationary and seven mobile source control measures for SCAQMD implementation. A complete listing of the measures is in the 2007 AQMP and includes measures such as VOC reductions from gasoline transfer and dispensing facilities, further NO_X reductions from space heaters, localized control program for PM emission hot spots, urban heat island, energy efficiency and conservation, etc. Some of the measures will become new rules and some will be amendments to existing rules. When the rules pass, the owner-operator will follow the applicable rules.

The second component is ARB's Proposed State Strategy, which includes short- and mid-term control measures aimed at reducing emissions from sources that are primarily under state jurisdiction, including on-road and off-road mobile sources, and consumer products. These measures are required in order to achieve the remaining emission reductions necessary for $PM_{2.5}$ attainment. ARB's strategy includes measures such as improvements to California's Smog Check Program, expanded passenger vehicle retirement, cleaner in-use heavy-duty trucks, reductions from port related sources, cleaner off-road equipment, evaporative and exhaust strategies, pesticide strategies, etc. When these measures are implemented by the ARB, the project would be required to follow them.

The third component is SCAQMD Staff's Proposed Policy Options to Supplement ARB's Control Strategy. SCAQMD staff believe that a combination of regulatory actions and public funding is the most effective means of achieving emission reductions. As such, the 2007 Final AQMP proposes three policy options for the decision makers to consider in achieving additional reductions. The first option is to incorporate the SCAQMD proposed additional control measures as a menu of selections further reducing emissions from sources primarily under state and national jurisdiction. The second option is to have the State fulfill its NO_X emission reduction obligations under the 2003 AQMP by 2010 for its short-term defined control measures plus additional reductions needed to meet the NO_X emission target between 2010 and 2014. The third option is based on the same rate of progress under the first option discussed above, but it relies heavily on public funding assistance to achieve the needed NO_X reductions via accelerated fleet turnover to post-2010 on-road emission standards or the cleanest off-road engine standards in effect today or after 2010. This third component, the ARB's Control Strategy does not directly apply to the project. However, Mitigation Measure 4.3.6.3B

[35] $PM_{2.5}$ and PM_{10} in the atmosphere result from two sources: primary and secondary. Primary $PM_{2.5}$ and PM_{10} are directly emitted into the atmosphere. Examples of directly emitted particulates include fugitive dust from construction and agricultural activities, forest fires, and undeveloped fields. Particulate matter can also be formed in the atmosphere through complex atmospheric chemical reactions involving oxides of sulfur, oxides of nitrogen, and volatile organic compounds. These latter particulates are called secondary particulates.

requires that the heavy-duty trucks that would access the project during operation be model year 2010 or newer, which is consistent with the third option under ARB's Strategy.

The fourth component consists of Regional Transportation Strategy and Control Measures provided by Southern California Association of Governments. Transportation plans within the basin are statutorily required to conform to air quality plans in the region, as established by the 1990 Federal Clean Air Act and reinforced by other Acts. The region must demonstrate that its transportation plans and programs conform to the mandate to meet the federal ambient air quality standards in a timely manner. The Regional Transportation Plan, prepared by the Southern California Association of Governments, is developed every four years with a 20-year planning horizon to meet the long-term transportation planning requirements for emission reductions from on-road mobile sources within the basin. The Regional Transportation Improvement Program requires that the short-term implementation requirements of the Transportation Conformity Rule be met by Southern California Association of Governments. Transportation Control Measures are those projects that provide emission reductions from on-road mobile sources, based on changes in the patterns and modes by which the regional transportation system is used. Strategies are grouped into three categories: high occupancy vehicle strategy, transit and systems management, and information-based technology (traveling during a less congested time of day). Southern California Association of Governments approved the transportation measures in the Regional Transportation Plan, which have been included in the region's air quality plans. The Transportation Control Measures will be implemented by the appropriate agencies and will subsequently reduce emissions in the basin.

2012 AQMP. The 2012 AQMP was adopted in December 2012. The purpose of the 2012 AQMP for the Basin is to set forth a comprehensive and integrated program that will lead the Basin into compliance with the federal 24-hour $PM_{2.5}$ air quality standard, and to provide an update of the Basin's projections in meeting the federal 8-hour ozone standards. The 2012 AQMP states, "The remarkable historical improvement in air quality since the 1970's is the direct result of Southern California's comprehensive, multiyear strategy of reducing air pollution from all sources as outlined in its AQMPs" (SCAQMD 2012, page ES-1).

Similarly to the prior AQMPs, the project would comply with all applicable rules and regulations enacted as part of the AQMP. In addition, as discussed in this report in Section 2.2.2 - 2012 AQMP, the AQMP relies upon the Southern California Association of Governments regional transportation strategy, which is in its adopted 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and 2011 Federal Transportation Improvement Program. Included in the RTP/SCS are transportation control measures including the following: active transportation (non-motorized transportation - biking and walking); transportation demand management; transportation system management; transit; passenger and high-speed rail; goods movement; aviation and airport ground access; highways; arterials; and operations and maintenance. The project would be involved in goods movement. The heavy-duty trucks would access local highways and arterials.

SIPs. Geographical areas in the state that exceed the federal air quality standards are called nonattainment areas. The project area is in nonattainment for ozone, PM_{10}, and $PM_{2.5}$. SIPs show how each area will attain the federal standards. To do this, the SIPs identify the amount of pollutant emissions that must be reduced in each area to meet the standard and the emission controls needed to reduce the necessary emissions. On September 27, 2007, ARB adopted its State Strategy for the 2007 SIP. In 2009, the SIP was revised to account for emissions reductions from regulations adopted in 2007 and 2008. Additional recent revisions to the SIP are as follows:

- In 2008, the EPA revised the lead (a chemical element; a heavy metal) national ambient air quality standard by reducing it to 0.15 $\mu g/m^3$. On December 31, 2010, the Los Angeles County portion of the South Coast Air Basin was designated as nonattainment for the 2008 lead national standard due to exceedances measured near a large lead-acid battery recycling facility. The 2012 Lead SIP for Los Angeles County was prepared by the SCAQMD and addresses the recent revision to the lead national standard, and outlines the strategy and pollution control activities that demonstrate attainment of the lead national standard before December 31, 2015. The 2012 Lead SIP was approved May 4, 2012.
- A SIP revision for the federal nitrogen dioxide standard was prepared in 2012, to address the new 1-hour federal ambient air quality standard for nitrogen dioxide.
- The proposed California Infrastructure SIP revision was considered by the ARB on January 23, 2014. The proposed Infrastructure SIP revision is administrative in nature and covers the National Ambient Air Quality Standards (federal standards) for ozone (1997 and 2008), fine particulate matter (PM2.5; 1997, 2006, and 2012), lead (2008), nitrogen dioxide (2010), and sulfur dioxide (2010). The proposed revision describes the infrastructure (authorities, resources, and programs) California has in place to implement, maintain, and enforce these federal standards. It does not contain any proposals for emission control measures.

The SIP takes into account ARB rules and regulations. The project will comply with applicable rules and regulations.

The project would comply with all applicable rules and regulations as identified in the AQMPs and SIPs. Therefore, the project complies with this criterion.

Summary

Although the project would be consistent with the policies, rules, and regulations in the AQMPs and SIPs, the project must meet all the criteria listed above in order to be consistent with the AQMPs. The project could impede AQMP attainment because its construction and operational emissions exceed the SCAQMD regional significance thresholds (see Impact AIR-3).

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

Mitigation Measures 4.3.6.2A, 4.3.6.2B, 4.3.6.2C, 4.3.6.2D, 4.3.6.3A, 4.3.6.3B, 4.3.6.3C, 4.3.6.3D, and 4.3.6.4A are required (see Section 1.4 - Mitigation Measures Applied to the Project, page 21).

Level of Significance After Mitigation

Significant and unavoidable.

Localized Construction and Operational Impact Analysis

Impact AIR-2: **The project would violate any air quality standard or contribute substantially to an existing or projected air quality violation [EIR Section 4.3.6.3].**

Impact Analysis

Localized Significance Thresholds

The evaluation of localized impacts determines the potential of the project to violate any air quality standard, contribute substantially to an existing or projected air quality violation, or expose nearby sensitive receptors to substantial pollutant concentrations. This analysis is also commonly referred to as a Localized Significance Threshold (LST) analysis. The SCAQMD developed Localized Significance Thresholds in response to the SCAQMD Governing Board's environmental justice initiatives in recognition of the fact that criteria pollutants such as CO, NO_2, PM_{10}, and $PM_{2.5}$ in particular, can have local impacts as well as regional impacts. There are no localized thresholds for VOC, since there are no ambient air quality standards for VOCs; VOC was estimated in the regional analysis because VOC is an ozone precursor and the SCAQMD has established a regional emission significance threshold for VOC. In addition, nitrogen dioxide (NO_2) is assessed for the localized analysis instead of NO_x because there are ambient air quality standards for NO_2; NO_2 is a component of NO_x.

Localized significance thresholds represent the maximum emissions or air concentrations from a project that would not cause or contribute to an exceedance of the most stringent applicable federal or State ambient air quality standard at any nearby sensitive or worker receptor. The localized significance thresholds are defined separately for construction and operational activities and were shown earlier in Table 11 (page 124).

As noted in Section 4.6.2 above, the localized analysis focused on the following assessments:

- Project Phase 1 (2012) which shows what effects the project's emissions would have if Phase 1 of the project (roughly 56 percent of the entire project) were built in 2012[36] and no other changes occurred to land uses or the roadway system,
- Project Phase 1 and Phase 2 Full Buildout (2012), which shows what effect the project's emissions would have if the project were built-out in full in 2012 and no other changes occurred to land uses or the roadway system, and

[36] 2012 is the CEQA baseline for this project.

- Proposed Project Development Schedule that evaluates the project's construction and operational impacts as a 2-phase development with the build out years of 2022 for Phase 1 and the long term planning year of 2035. Within this assessment, a localized assessment was done for three assessment years: 2021 when construction would occur along the western portion of the project across from the existing residences along Redlands Boulevard and a large portion of Phase 1 would be in operation, 2027, when the project's total construction and operational emissions would be the highest for several pollutants, and 2035, the long term planning your when the project would be fully operational.

Localized Analysis: Project Phase 1 (2012)

Emissions from the development of Phase 1 of the project were estimated for the year 2012, the date of publication of the Notice of Preparation, assuming the build out of Phase 1 of the project in 2012 (approximately 56 percent of the total project). Emission factors for the project's emissions were derived from the EMFAC2014 mobile source emission model for the calendar year 2012. Pursuant to the SCAQMD's LST methodology, only emissions generated from within and along the project boundaries were included in the LST assessment. All the trucks and vehicles accessing the project would consist of the calendar fleet of 2012 vehicles instead of the fleet of the future vehicles that would actually service the project.

Table 39 shows the project's local onsite emissions for the build out of Phase 1 of the project in 2012 for those pollutants covered by the SCAQMD LST assessment methodology prior to mitigation. The project's emissions result from onsite motor vehicles and other support equipment such as yard trucks, forklifts, and emergency standby generators associated with the build out of Phase 1.

Table 39: Project Phase 1 (2012) Local Onsite Emissions – Without Mitigation

Pollutant	Onsite Emissions from Phase 1 of the Project (pounds/day)
NOx	667
CO	558
PM_{10}	74
$PM_{2.5}$	32
Source: FirstCarbon Solutions (Appendix F)	

The project's emissions then served as input into the AERMOD air dispersion model to derive estimate of the project's incremental localized air quality impacts for the Project Phase 1 (2012) condition. These results are shown in Table 40 for the sensitive receptors located within the project boundaries with a comparison to the SCAQMD's localized significance thresholds prior to the application of mitigation. Table 41 provides the highest impacts for any sensitive receptor located outside of the boundaries of the project prior to the application of mitigation. These latter impacts

were found within the residential areas located near the southwest corner of the project or along Redlands Boulevard to the west of the project.

As noted from Table 40, for the Project Phase 1 (2012) condition, without mitigation the project would exceed the SCAQMD's localized significance thresholds within the project's boundaries for nitrogen dioxide and PM_{10} for the existing receptors located within the project boundaries, realizing again, that this condition reflects an impossible situation that assumes that the Phase 1 is built out in its entirety in 2012. In Table 41, the SCAQMD significance thresholds are not exceeded at any receptor located outside of the project boundaries except for the annual PM_{10} project impact.

Table 40: Localized Assessment of Project Phase 1 (2012)
Maximum Impacts Within the Project Boundaries – Without Mitigation

Pollutant	Averaging Time, units	Air Concentration			Standard/ Threshold	Total Impact Exceeds Threshold
		Existing Background[(1)]	Project Local Impact[(2)]	Total (Background + Project)		
Carbon monoxide	1 hour, ppm	2.64	0.14	2.78	20	No
	8 hour, ppm	1.84	0.04	1.88	9.0	No
Nitrogen dioxide	State 1 hour, ppm	0.078	0.068	0.146	0.18	No
	National 1 hour, ppm	0.058	0.055	0.119	0.100	Yes
	Annual, ppm	0.017	0.012	0.029	0.030	No
PM_{10}	24 hour, $\mu g/m^3$	NA	5.4	5.4	2.5	Yes
	Annual, $\mu g/m^3$	NA	3.4	3.4	1.0	Yes
$PM_{2.5}$	24 hour, $\mu g/m^3$	NA	2.2	2.3	2.5	No

Notes:
ppm = parts per million $\mu g/m^3$ = micrograms per cubic meter (a concentration unit)
NA = Not Applicable, the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$
(1) Background data for CO and NO_2 derived as the highest air quality measured data during the 3-year time period of 2010 to 2012 (see Table 5 above).
(2) Source of project local impact: Dispersion modeling conducted by FirstCarbon Solutions (Appendix F). Highest impacts generally occur at the existing residences within the project boundaries.

Table 41: Localized Assessment of Project Phase 1 (2012)
Maximum Impacts Outside of the Project Boundaries – Without Mitigation

Pollutant	Averaging Time, units	Air Concentration			Standard/ Threshold	Total Impact Exceeds Threshold?
		Existing Background[1]	Project Local Impact[2]	Total (Background + Project)		
Carbon monoxide	1 hour, ppm	2.64	0.07	2.71	20	No
	8 hour, ppm	1.84	0.02	1.86	9.0	No
Nitrogen dioxide	State 1 hour, ppm	0.078	0.038	0.116	0.18	No
	National 1 hour, ppm	0.058	0.031	0.089	0.100	No
	Annual, ppm	0.017	0.004	0.021	0.030	No
PM_{10}	24 hour, $\mu g/m^3$	NA	2.1	2.1	2.5	No
	Annual, $\mu g/m^3$	NA	1.1	1.1	1.0	Yes
$PM_{2.5}$	24 hour, $\mu g/m^3$	NA	0.8	0.8	2.5	No

Notes:
ppm = parts per million $\mu g/m^3$ = micrograms per cubic meter (a concentration unit)
NA = Not Applicable, the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$
(1) Background data for CO and NO_2 derived as the highest air quality measured data during the 3-year time period of 2010 to 2012 (see Table 5 above).
(2) Source of project local impact: Dispersion modeling conducted by FirstCarbon Solutions (Appendix F). Highest impacts generally occur at the existing residences along Redlands Boulevard to the west of the project.

Localized Analysis: Project Phase 1 and Phase 2 Buildout (2012)

Emissions from the project were estimated for the year 2012, the date of publication of the Notice of Preparation, assuming the full build out of the project would have occurred in 2012. Emission factors for the project's emissions were derived from the EMFAC2011 mobile source emission model for the calendar year 2012. Pursuant to the SCAQMD's LST methodology, only emissions generated from within and along the project boundaries are included in the LST assessment. Information from the project traffic analysis was used to derive estimates of vehicle trips from within the project's building yards and from the local roadways that are within and along the project's boundaries. This is a worst-case assumption because it assumes that all the trucks and vehicles accessing the project would consist of the calendar 2012 vehicle fleet and their attendant emissions instead of the fleet of the future vehicles that will be substantially cleaner than the calendar 2012 vehicles that would actually service the project. The project's emissions also included emissions from various support equipment such as yard trucks, forklifts, and emergency standby generators. Table 42 shows the project's local emissions assuming the worst case assuming a full build out in 2012 (Phase 1 and Phase 2) for those emissions covered under the SCAQMD LST methodology prior to mitigation.

Table 42: Project Phase 1 and Phase 2 Full Buildout (2012) Local Onsite Emissions – Without Mitigation

Pollutant	Onsite Emissions from the Project Phase 1 and Phase 2 Only Emissions (pounds/day)
NOx	1,139
CO	994
PM_{10}	141
$PM_{2.5}$	59
Source: FirstCarbon Solutions | Michael Brandman Associates (Appendix F)	

The project's emissions then served as input into the AERMOD air dispersion model to derive estimate of the project's localized air quality impacts for the Project Phase 1 and Phase 2 Full Buildout (2012) condition. These results are shown in Table 43 for the sensitive receptors located within the boundaries of the project prior to the application of mitigation along with the SCAQMD's localized significance thresholds. Table 44 provides the highest impacts for any sensitive receptor located outside of the project's boundaries prior to the application of mitigation. These latter impacts were found within the residential areas located near the southwest corner of the project or along Redlands Boulevard.

Table 43: Localized Assessment of Project Phase 1 and Phase 2 Full Buildout (2012) Maximum Impacts Within the Project Boundaries - Without Mitigation

Pollutant	Averaging Time, units	Air Concentration			Standard/ Threshold	Total Impact Exceeds Threshold
		Existing Background[(1)]	Project Local Impact[(2)]	Total (Background + Project)		
Carbon monoxide	1 hour, ppm	2.64	0.18	2.82	20	No
	8 hour, ppm	1.84	0.05	1.89	9.0	No
Nitrogen dioxide	State 1 hour, ppm	0.078	0.093	0.171	0.18	No
	National 1 hour, ppm	0.058	0.075	0.133	0.100	Yes
	Annual, ppm	0.017	0.012	0.029	0.030	No
PM_{10}	24 hour, $\mu g/m^3$	NA	7.2	7.2	2.5	Yes
	Annual, $\mu g/m^3$	NA	4.9	4.9	1.0	Yes
$PM_{2.5}$	24 hour, $\mu g/m^3$	NA	2.9	2.9	2.5	Yes

Notes:
ppm = parts per million $\mu g/m^3$ = micrograms per cubic meter (a concentration unit)
NA = Not Applicable, the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$
(1) Background data for CO and NO_2 derived as the highest air quality measured data during the 3-year time period of 2010 to 2012 (see Table 5 above)
(2) Source of project local impact: Dispersion modeling conducted by FirstCarbon Solutions (Appendix F). Highest impacts generally occur at the existing residences within the project boundaries

Table 44: Localized Assessment Project Phase 1 and Phase 2 Full Buildout (2012) Maximum Impacts Outside of the Project Boundaries – Without Mitigation

Pollutant	Averaging Time, units	Air Concentration			Standard/ Threshold	Total Impact Exceeds Threshold ?
		Existing Background[(1)]	Project Local Impact[(2)]	Total (Background + Project)		
Carbon monoxide	1 hour, ppm	2.64	0.09	2.73	20	No
	8 hour, ppm	1.84	0.02	1.86	9.0	No
Nitrogen dioxide	State 1 hour, ppm	0.078	0.054	0.132	0.18	No
	National 1 hour, ppm	0.058	0.045	0.103	0.100	Yes
	Annual, ppm	0.017	0.004	0.021	0.030	No
PM_{10}	24 hour, $\mu g/m^3$	NA	2.3	2.3	2.5	No
	Annual, $\mu g/m^3$	NA	1.2	1.2	1.0	Yes
$PM_{2.5}$	24 hour, $\mu g/m^3$	NA	0.9	0.9	2.5	No

Notes:
ppm = parts per million $\mu g/m^3$ = micrograms per cubic meter (a concentration unit)
NA = Not Applicable, the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$
(1) Background data for CO and NO_2 derived as the highest air quality measured data during the 3-year time period of 2010 to 2012 (see Table 5 above).
(2) Source of project local impact: Dispersion modeling conducted by FirstCarbon Solutions (Appendix F). Highest impacts generally occur at the existing residences along Redlands Boulevard to the west of the project.

As noted from Table 43 above, for the worst-case condition of the Project Phase 1 and Phase 2 Full Buildout (2012), the project would exceed the SCAQMD's localized significance thresholds within the project's boundaries for nitrogen dioxide, PM_{10}, and $PM_{2.5}$ realizing again, that this condition reflects an impossible situation that assumes that the project was built out in its entirety in 2012 and is prior to application of mitigation. The exceedances of the PM_{10} and $PM_{2.5}$ thresholds are due exclusively to the inclusion of road dust from vehicular travel on paved roads into the estimate of the project's mobile source PM_{10} and $PM_{2.5}$ emissions. The PM_{10} and $PM_{2.5}$ thresholds would not be exceeded if only the exhaust, brake, and tire wear PM_{10} and $PM_{2.5}$ emissions were accounted for in the assessment.

In Table 44, the significance thresholds are not exceeded at any receptor location located outside of the project boundaries except for the federal/national 1-hour NO_2 standard and annual PM_{10}. The results from Table 43 and Table 44 do not show any new impacts from the results shown in the Draft EIR that indicate that the project under this condition would result in a significant local impact.

Localized Analysis: Proposed Project Development Schedule

This localized analysis examined potential local project impacts with the proposed construction and build out schedule of the project over a time period of 15 years. The localized analysis examines the potential air quality impacts from emissions that are generated from sources located "onsite" (within or bordering the project) as per the SCAQMD LST methodology (SCAQMD 2008). To develop this

analysis, it was first necessary to quantify the project's onsite construction and operational emissions during the development period to determine the total emissions during each year of project development commencing with the first construction year in 2015 to the long -term planning year when the project would be fully operational in 2035. To estimate onsite construction emissions, the CalEEMod land use emissions model was used to estimate the construction emissions for all construction activities in accordance with the conceptual construction schedule provided by the Highland Fairview Operating Company for the years 2015 to 2030. The conceptual construction schedule provided a listing of construction activities, durations, construction equipment inventory, and geographic locations where the construction is scheduled to occur.

The project's onsite operational emissions, principally from the project's mobile sources, were derived from detailed traffic volume data provided by the project's traffic impact analysis. The traffic impact analysis applied a comprehensive regional transportation model to develop daily and peak hour traffic volumes for 2022 and 2035 from the project's mobile sources. Peak hour and daily project traffic volumes were developed for each year from 2015 to 2035 for roadway segments within and along the boundaries of the project using the following assumptions:

- Project operational traffic volumes were assumed to be zero in 2015, the year that project construction would commence.
- Traffic volumes for the years 2016 to 2022(the completion year for Phase 1 operations) were interpolated from 2015 to 2022 by applying the annual project occupancy schedule shown in Table 15 (page 136) to the 2022 traffic volumes.
- Traffic volumes for the years 2023 to 2035 were interpolated from the traffic volumes in 2022 and 2035 by applying the annual project occupancy schedule shown in Table 15 (page 136).

The project's operational emissions also included emissions from various support equipment including fork lifts, yard trucks, and emergency standby generators.

Using the construction and operational information derived above, estimates were made of the onsite construction and operational emissions generated on the project site as shown in Table 45 on page 224. Presented therein are the emissions for NO_x, CO, PM_{10}, and $PM_{2.5}$, the pollutants covered under the localized analysis methodology. From the information provided in the table, three analysis years were selected for the LST analysis, as follows:

- Year 2021: represents the year when construction activities would take place, according to the conceptual construction schedule, in the portion of the project adjacent to the populated areas across Redlands Boulevard; the intent of this analysis year was to examine the project's potential impacts to the existing sensitive receptors located in these populated areas.
- Year 2027: selected for detailed localized analysis to examine construction activities that would also take place along Gilman Springs Road during this year.
- Year 2035: long term planning year associated with full operation (Phase 1 and Phase 2).

Table 45: Annual Local Onsite Project Construction and Operational Emissions – Without Mitigation

Year	Annual Emissions from Onsite Emission Sources (Unmitigated) (tons/year)											
	NO_x			CO			PM_{10}			$PM_{2.5}$		
	Construction	Operations	Total	Construction	Operations	Total	Construction	Operations	Total	Construction	Operations	Total
2015	97.8	0	97.8	53.6	0	53.6	6.7	0	6.7	4.6	0	4.6
2016	87.1	5.0	92.1	51.6	3.9	55.5	4.9	0.9	5.8	4.5	0.3	4.8
2017	124.4	9.9	134.3	71.4	7.8	79.2	8.5	1.9	10.4	6.3	0.5	6.8
2018	87.1	16.6	103.7	51.6	12.9	64.5	4.9	3.1	8.0	4.5	0.8	5.3
2019	167.5	23.2	190.7	94.9	18.1	113.0	12.5	4.4	16.9	8.6	1.2	9.8
2020	102.7	35.5	138.2	60.2	27.7	87.9	6.3	6.7	12.9	5.4	1.8	7.2
2021	113.5	47.8	161.3	66.7	37.3	104.0	8.0	9.0	17.0	5.9	2.4	8.3
2022	95.1	54.3	149.4	56.5	42.4	98.9	6.2	10.2	16.5	5.0	2.8	7.8
2023	107.7	55.8	163.5	64.7	43.7	108.4	7.6	11.3	18.9	5.7	3.1	8.8
2024	99.6	57.3	156.9	59.8	45.1	104.9	6.8	12.5	19.3	5.3	3.4	8.7
2025	103.9	59.4	163.3	63.5	47.1	110.6	7.4	14.1	21.6	5.6	3.9	9.5
2026	87.1	61.8	148.9	51.6	49.4	101.0	4.9	15.9	20.9	4.5	4.4	8.9
2027	54.5	64.2	118.7	62.7	51.7	114.4	5.1	17.8	22.8	2.7	5.0	7.7
2028	47.0	66.6	113.6	57.7	53.9	111.6	4.1	19.6	23.7	2.2	5.5	7.7
2029	28.7	68.1	96.8	44.9	55.4	100.3	1.2	20.8	22.0	1.1	5.8	6.9
2030	34.9	69.7	104.6	51.5	56.9	108.4	3.5	22.0	25.5	1.8	5.7	7.5
2035	0.0	70.1	70.1	0.0	57.3	57.3	0.0	22.4	22.4	0.0	6.3	6.3

Source: FirstCarbon Solutions | Michael Brandman Associates (see Appendix F)

The project's total combined localized air quality impacts from construction and operation in 2021 prior to the application of mitigation are shown in Table 46 for the existing sensitive receptors located within the boundaries of the project and in Table 47 for the existing sensitive receptors located outside of the project boundaries along with the SCAQMD recommended significance thresholds.

Table 46: Localized Air Quality Impacts of Construction and Operation Year 2021 Maximum Impacts Within the Project Boundaries – Without Mitigation

Pollutant	Averaging Time, Units	Air Concentration			Standard/ Threshold	Total Impact Exceeds Threshold?
		Existing Background[1]	Project Local Impact[2]	Total (Background + Project)		
Carbon monoxide	1 hour, ppm	2.64	0.34	2.98	20	No
	8 hour, ppm	1.84	0.08	1.92	9.0	No
Nitrogen dioxide	State 1 hour, ppm	0.078	0.086	0.164	0.18	No
	Annual, ppm	0.017	0.016	0.033	0.030	Yes
PM_{10}	24 hour, $\mu g/m^3$	NA	8.9	8.9	2.5[3]	Yes
	Annual, $\mu g/m^3$	NA	2.7	2.7	1.0	Yes
$PM_{2.5}$	24 hour, $\mu g/m^3$	NA	3.7	3.7	2.5[3]	Yes

Notes:
$\mu g/m^3$ = micrograms per cubic meter (a concentration unit); ppm = parts per million (a concentration unit)
NA = Not Applicable as the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$
(1) Source of background concentrations: Table 5. The background concentrations in 2021 are assumed to be the same as the maximum concentrations observed at the SCAQMD Riverside monitoring station during the 2010 to 2012 period
(2) Source of project local impact: Dispersion modeling conducted by FirstCarbon Solutions (Appendix F). Highest impacts generally occur at the existing residences within the project boundaries.
(3) During periods when both construction and operation overlap the SCAQMD recommends the operational significance thresholds for PM_{10} and $PM_{2.5}$ as opposed to the construction thresholds which are 10.4 $\mu g/m^3$ for PM_{10} and $PM_{2.5}$. This provides a very conservative threshold for determining the significance of project impacts.

Table 47: Localized Air Quality Impacts of Construction and Operation Year 2021 Maximum Impacts Outside the Project Boundaries – Without Mitigation

Pollutant	Averaging Time, Units	Air Concentration			Standard/ Threshold	Total Impact Exceeds Threshold?
		Existing Background[1]	Project Local Impact[2]	Total (Background + Project)		
Carbon monoxide	1 hour, ppm	2.64	0.32	2.96	20	No
	8 hour, ppm	1.84	0.08	1.92	9.0	No
Nitrogen dioxide	State 1 hour, ppm	0.078	0.083	0.161	0.18	No
	Annual, ppm	0.017	0.015	0.032	0.030	Yes
PM_{10}	24 hour, $\mu g/m^3$	NA	3.5	3.5	2.5[3]	Yes
	Annual, $\mu g/m^3$	NA	0.9	0.9	1.0	No

Table 47 (cont.): Localized Air Quality Impacts of Construction and Operation Year 2021 Maximum Impacts Outside the Project Boundaries – Without Mitigation

Pollutant	Averaging Time, Units	Air Concentration			Standard/ Threshold	Total Impact Exceeds Threshold?
		Existing Background[1]	Project Local Impact[2]	Total (Background + Project)		
$PM_{2.5}$	24 hour, $\mu g/m^3$	NA	2.4	2.4	2.5[3]	No

Notes:
$\mu g/m^3$ = micrograms per cubic meter (a concentration unit); ppm = parts per million (a concentration unit)
NA = Not Applicable as the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$
(1) Source of background concentrations: Table 5. The background concentrations in 2027 are assumed to be the same as the maximum concentrations observed at the SCAQMD Riverside monitoring station during the 2010 to 2012 period
(2) Source of project local impact: Dispersion modeling conducted by FirstCarbon Solutions (Appendix F); highest impacts at any receptor located outside of the boundaries of the project generally occur in the residential areas to the west of the project across Redlands Boulevard.
(3) During periods when both construction and operation overlap, the SCAQMD recommends the operational significance thresholds for PM_{10} and $PM_{2.5}$ as opposed to the construction thresholds which are 10.4 $\mu g/m^3$ for PM_{10} and $PM_{2.5}$. This provides a very conservative threshold for determining the significance of project impacts.

As noted from the above tables, prior to application of mitigation, the SCAQMD's significance thresholds for PM_{10} and annual NO_2 would be exceeded at sensitive receptors located both within and outside of the project boundaries while the significance threshold for $PM_{2.5}$ would be exceeded at the existing sensitive receptors located within the project boundaries.

The project's total combined localized air quality impacts from construction and operations during 2027 prior to the application of mitigation are shown in Table 48 for the existing sensitive receptors located within the project boundaries and in Table 49 for the sensitive receptors located outside of the project boundaries along with the SCAQMD-recommended significance thresholds.[37] As shown in Table 48, the project would exceed the SCAQMD's significance thresholds for PM_{10} at the existing residences within the project boundaries. As shown in Table 49, the project would not exceed any significance threshold outside of the project boundaries.

[37] Note that even though construction would occur during the 2021 and 2027 assessment years, the SCAQMD recommends the application of the operational significance thresholds, which allows a significantly lower level of particulate matter levels (2.5 $\mu g/m^3$) than do the construction significance thresholds (10.4 $\mu g/m^3$).

Table 48: Localized Air Quality Impacts of Construction and Operation Year 2027 Maximum Impacts Within the Project Boundaries – Without Mitigation

Pollutant	Averaging Time, Units	Air Concentration			Standard/ Threshold	Total Impact Exceeds Threshold?
		Existing Background[1]	Project Local Impact[2]	Total (Background + Project)		
Carbon monoxide	1 hour, ppm	2.64	0.21	2.85	20	No
	8 hour, ppm	1.84	0.05	1.89	9.0	No
Nitrogen dioxide	State 1 hour, ppm	0.078	0.072	0.150	0.18	No
	Annual, ppm	0.017	0.008	0.025	0.030	No
PM_{10}	24 hour, $\mu g/m^3$	NA	5.5	5.5	2.5[3]	Yes
	Annual, $\mu g/m^3$	NA	3.3	3.3	1.0	Yes
$PM_{2.5}$	24 hour, $\mu g/m^3$	NA	1.6	1.6	2.5[3]	No

Notes:
$\mu g/m^3$ = micrograms per cubic meter (a concentration unit); ppm = parts per million (a concentration unit)
NA = Not Applicable as the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$
Sources:
(1) Source of background concentrations: Table 5. The background concentrations in 2027 are assumed to be the same as the maximum concentrations observed at the SCAQMD Riverside monitoring station during the 2010 to 2012 period
(2) Source of project local impact: Dispersion modeling conducted by FirstCarbon Solutions (Appendix F)
(3) During periods when both construction and operation overlap the SCAQMD recommends the operational significance thresholds for PM_{10} and $PM_{2.5}$ as opposed to the construction thresholds which are 10.4 $\mu g/m^3$ for PM_{10} and $PM_{2.5}$. This provides a very conservative threshold for determining the significance of project impacts.

Table 49: Localized Air Quality Impacts of Construction and Operation Year 2027 Maximum Impacts Outside the Project Boundaries – Without Mitigation

Pollutant	Averaging Time, Units	Air Concentration			Standard/ Threshold	Total Impact Exceeds Threshold?
		Existing Background[1]	Project Local Impact[2]	Total (Background + Project)		
Carbon monoxide	1 hour, ppm	2.64	0.18	2.82	20	No
	8 hour, ppm	1.84	0.05	1.89	9.0	No
Nitrogen dioxide	State 1 hour, ppm	0.078	0.071	0.149	0.18	No
	Annual, ppm	0.017	0.003	0.020	0.030	No
PM_{10}	24 hour, $\mu g/m^3$	NA	2.2	2.2	2.5[3]	No
	Annual, $\mu g/m^3$	NA	0.8	0.8	1.0	No
$PM_{2.5}$	24 hour, $\mu g/m^3$	NA	1.1	1.1	2.5[3]	No

Table 49 (cont.): Localized Air Quality Impacts of Construction and Operation Year 2027 Maximum Impacts Outside the Project Boundaries – Without Mitigation

Pollutant	Averaging Time, Units	Air Concentration			Standard/ Threshold	Total Impact Exceeds Threshold?
		Existing Background[1]	Project Local Impact[2]	Total (Background + Project)		

Notes:
$\mu g/m^3$ = micrograms per cubic meter (a concentration unit); ppm = parts per million (a concentration unit)
NA = Not Applicable as the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$
Sources:
(1) Source of background concentrations: Table 5. The background concentrations in 2027 are assumed to be the same as the maximum concentrations observed at the SCAQMD Riverside monitoring station during the 2010 to 2012 period
(2) Source of project local impact: Dispersion modeling conducted by FirstCarbon Solutions (Appendix F); highest impacts at any receptor located outside of the boundaries of the project generally occur in the residential areas to the east of the project across Gilman Springs Road.
(3) During periods when both construction and operation overlap, the SCAQMD recommends the operational significance thresholds for PM_{10} and $PM_{2.5}$ as opposed to the construction thresholds which are 10.4 $\mu g/m^3$ for PM_{10} and $PM_{2.5}$. This provides a very conservative threshold for determining the significance of project impacts.

Localized Analysis: Project Phase 1 and Phase 2 Full Buildout

The buildout year (assumed to be 2035 for this purpose) represents the time period when both phases of the project would be fully constructed and in operation. Operational emissions during 2035 were estimated based on the project's trip generation and project-related travel along the local roadway network within and along the project boundaries.

The results of the localized air quality analysis for 2035 are shown in Table 50 for the existing sensitive receptors located within the project boundaries and in Table 51 for the sensitive receptors located outside the project boundaries prior to application of mitigation measures relative to the background air quality levels in 2012. As shown in Table 50, the concentrations of PM_{10} exceed the SCAQMD's significance thresholds for the receptors located within the project boundaries. From Table 51, the operation of the project would not exceed any SCAQMD significance threshold for locations outside of the project boundaries.

Table 50: Localized Air Quality Impacts – Project Full Buildout Maximum Impacts Within the Project Boundaries – Without Mitigation

Pollutant	Averaging Time, units	Air Concentration			Standard/ Threshold	Total Impact Exceeds Threshold?
		Existing Background[1]	Project Local Impact[2]	Total (Background + Project)		
Carbon monoxide	1 hour, ppm	2.64	0.06	2.70	20	No
	8 hour, ppm	1.84	0.02	1.86	9.0	No
Nitrogen dioxide	State 1 hour, ppm	0.078	0.036	0.114	0.180	No
	National 1 hour, ppm	0.058	0.031	0.089	0.100	No
	Annual, ppm	0.017	0.006	0.023	0.030	No

Table 50 (cont.): Localized Air Quality Impacts – Project Full Buildout
Maximum Impacts Within the Project Boundaries – Without Mitigation

Pollutant	Averaging Time, units	Air Concentration			Standard/ Threshold	Total Impact Exceeds Threshold?
		Existing Background[1]	Project Local Impact[2]	Total (Background + Project)		
PM_{10}	24 hour, µg/m^3	NA	5.5	5.5	2.5	Yes
	Annual, µg/m^3	NA	3.7	3.7	1.0	Yes
$PM_{2.5}$	24 hour, µg/m^3	NA	1.5	1.5	2.5	No

Notes:
[1]The background concentrations at build out are assumed to be the same as the maximum concentrations observed at the SCAQMD Riverside monitoring station during the 2010 to 2012 time period, see Table 5
[2] Source of project local impact: Dispersion modeling conducted by FirstCarbon Solutions (Appendix F); highest impacts occur at the existing residences located within the boundaries of the project.
µg/m^3 = micrograms per cubic meter (a concentration unit); ppm = parts per million (a concentration unit)
NA = Not Applicable as the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$

Table 51: Localized Air Quality Impacts – Project Buildout
Maximum Impacts Outside the Project Boundaries – Without Mitigation

Pollutant	Averaging Time, units	Air Concentration			Standard/ Threshold	Total Impact Exceeds Threshold?
		Existing Background[1]	Project Local Impact[2]	Total (Background + Project)		
Carbon monoxide	1 hour, ppm	2.64	0.04	2.68	20	No
	8 hour, ppm	1.84	0.01	1.85	9.0	No
Nitrogen dioxide	State 1 hour, ppm	0.078	0.027	0.105	0.18	No
	National 1 hour, ppm	0.058	0.022	0.080	0.100	No
	Annual, ppm	0.017	0.002	0.019	0.030	No
PM_{10}	24 hour, µg/m^3	NA	2.4	2.4	2.5	No
	Annual, µg/m^3	NA	0.9	0.9	1.0	No
$PM_{2.5}$	24 hour, µg/m^3	NA	0.7	0.7	2.5	No

Notes:
[1] The background concentrations at build out are assumed to be the same as the maximum concentrations observed at the SCAQMD Riverside monitoring station during the 2010 to 2012 time period; see Table 5
[2] Source of project local impact: Dispersion modeling conducted by FirstCarbon Solutions (Appendix F); highest impacts at any receptor located outside of the boundaries of the project generally occur in the residential areas to the west of the project across Redlands Boulevard.
µg/m^3 = micrograms per cubic meter (a concentration unit) ppm = parts per million (a concentration unit)
NA = Not Applicable as the SCAQMD threshold methodology does not require a background for PM_{10} or $PM_{2.5}$

Summary of the Localized Significance Threshold Assessment

The localized significance analysis demonstrates that without mitigation, the project would exceed the localized significance thresholds for NO_2, PM_{10} or $PM_{2.5}$ for one or more of the years analyzed under

this revised assessment. Therefore, according to this criterion, the air pollutant emissions would result in a significant impact and could exceed or contribute to an exceedance of the ambient air quality standards for NO_2, PM_{10} or $PM_{2.5}$. This conclusion is consistent with the conclusions reached in the Draft EIR related to the assessment of localized air quality impacts.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

Mitigation Measures 4.3.6.2A, 4.3.6.2B, 4.3.6.2D, 4.3.6.3A, 4.3.6.3B, 4.3.6.3C, 4.3.6.3D, and 4.3.6.3E are required (see Section 1.4 - Mitigation Measures Applied to the Project, page 21).

Level of Significance After Mitigation

Significant and unavoidable impact.

Table 52 compares the project impacts before and after mitigation for those assessment conditions and pollutants that indicated a significant impact before mitigation. After application of mitigation, the project would continue to exceed the localized significance thresholds for PM_{10} (24-hour and annual) at one or more of the existing residences located within the Project boundaries during all assessment conditions. The project's localized impacts would not exceed any significance thresholds for receptors located outside of the project boundaries after application of mitigation.

Table 53 provides a summary of the mitigated annual emissions during construction and operation.

In summary, those residents inside the project boundaries could be exposed to significant short-term and long-term PM_{10} concentrations on an ongoing basis during certain construction/operation conditions. The health effects from particulate matter were discussed earlier and could include the following:

- Particulate matter (PM_{10}) can cause the following health effects from short-term (24-hour) exposure: irritation of the eyes, nose, throat; coughing; phlegm; chest tightness; shortness of breath; aggravate existing lung disease, causing asthma attacks and acute bronchitis; and/or those with heart disease can suffer heart attacks and arrhythmias.
- Particulate matter can cause the following health effects from long-term exposure (annual): reduced lung function; chronic bronchitis; changes in lung morphology; and/or death.

Table 52: Comparison of Local Project Air Quality Impacts Before and After Mitigation

Assessment Condition	Location	Pollutant, Averaging Time, Units	Total Impact Before Mitigation[1]	Total Impact After Mitigation[1]	Significance Threshold	Exceeds Threshold After Mitigation?
Project Phase 1 (2012)	Inside Project Boundaries	National NO_2 1-hour, ppm	0.113	0.089	0.100	No
		—	—	—	—	—
		PM_{10} 24 hour, µg/m^3	5.4	4.4	2.5	Yes
		PM_{10}, Annual, µg/m^3	3.4	2.8	1.0	Yes
	Outside Project Boundaries	PM_{10}, Annual, µg/m^3	1.1	0.9	1.0	No
Project Phase 1 and Phase 2 Full Buildout (2012)	Inside Project Boundaries	National NO_2 1-hour, ppm	0.133	0.094	0.100	No
		—	—	—	—	—
		PM_{10} 24-hour, µg/m^3	7.2	6.9	2.5	Yes
		PM_{10}, Annual, µg/m^3	4.8	4.6	1.0	Yes
		$PM_{2.5}$ 24 hour, µg/m^3	2.9	1.6	2.5	No
	Outside Project Boundaries	National NO_2 1-hour, ppm	0.103	0.076	0.100	No
		PM10 Annual, µg/m^3	1.2	0.8	1.0	No
Project Development Schedule Year 2021	Inside Project Boundaries	NO_2, Annual, ppm	0.033	0.027	0.030	No
		PM_{10} 24-hour, µg/m^3	8.9	7.6	2.5	Yes
		PM_{10}, Annual, µg/m^3	2.9	2.5	1.0	Yes
		$PM_{2.5}$ 24 hour, µg/m^3	3.7	1.4	2.5	No
	Outside Project Boundaries	NO_2, Annual, ppm	0.032	0.026	0.030	No
		PM_{10} 24-hour, µg/m^3	3.5	2.3	2.5	No
		—	—	—	—	—

Table 52 (cont.): Comparison of Local Project Air Quality Impacts Before and After Mitigation

Assessment Condition	Location	Pollutant, Averaging Time, Units	Total Impact Before Mitigation[(1)]	Total Impact After Mitigation[(1)]	Significance Threshold	Exceeds Threshold After Mitigation?
Project Development Schedule Year 2027	Inside Project Boundaries	PM_{10} 24-hour, µg/m^3	5.5	5.4	2.5	Yes
		PM_{10} Annual, µg/m^3	3.3	1.9	1.0	Yes
		—	—	—	—	—
Project Development Schedule Year 2035 Buildout	Inside Project Boundaries	PM_{10} 24 hour, µg/m^3	5.5	5.5	2.5	Yes
		PM_{10} Annual, µg/m^3	3.7	3.7	1.0	Yes

Notes:
µg/m^3 = micrograms per cubic meter (a unit of concentration); ppm = parts per million (a unit of concentration)
(1) Total Impacts = incremental impacts from the project + background; see Tables 40, 41, 43, 44, and 46–51for unmitigated.
Source: Dispersion modeling by FirstCarbon Solutions (Appendix F).

Table 53: Annual Local Onsite Project Construction and Operational Emissions – with Mitigation

Year	Annual Emissions from Onsite Emission Sources (Unmitigated) (tons/year)											
	NO_x			CO			PM_{10}			$PM_{2.5}$		
	Construction	Operations	Total	Construction	Operations	Total	Construction	Operations	Total	Construction	Operations	Total
2015	33.1	0	33.1	53.6	0	53.6	2.5	0	2.5	0.8	0	0.8
2016	36.3	3.4	39.7	51.6	3.8	55.4	0.5	0.9	1.4	0.4	0.8	1.2
2017	45.9	6.9	52.8	71.4	7.7	79.0	2.7	1.8	4.5	1.0	1.6	2.6
2018	36.3	11.4	47.7	51.6	12.8	64.4	0.5	3.0	3.4	0.4	2.7	3.1
2019	60.4	16.0	76.4	94.9	17.9	112.8	5.2	4.2	9.3	1.8	3.7	5.6
2020	40.1	24.5	64.6	60.2	27.4	87.6	1.1	6.4	7.5	0.7	5.7	6.4
2021	45.2	33.0	78.2	66.7	36.8	103.5	2.5	8.6	11.1	0.9	7.7	8.6
2022	39.5	37.5	77.0	56.5	41.8	98.3	1.5	9.7	11.3	0.7	8.8	9.4
2023	44.9	38.1	83.0	64.7	43.3	107.9	2.4	10.9	13.3	1.0	9.8	10.8
2024	41.9	38.7	80.6	59.8	44.7	104.5	1.9	12.1	14.0	0.8	10.9	11.7
2025	44.9	39.6	84.5	63.5	46.7	110.2	2.4	13.8	16.2	1.0	12.4	13.4
2026	36.2	40.6	76.8	51.6	49.0	100.6	0.5	15.7	16.2	0.4	14.1	14.6
2027	48.4	41.7	90.1	62.7	51.3	114.0	3.3	17.6	20.9	1.2	15.9	17.0
2028	45.3	42.7	88.0	57.7	53.6	111.3	2.6	19.5	22.2	0.9	17.6	18.5
2029	35.9	43.3	79.2	44.9	55.1	100.0	0.4	20.8	21.2	0.4	18.7	19.1
2030	42.1	44.0	86.1	51.5	56.6	108.1	2.5	22.0	24.5	0.9	5.7	6.6
2035	0.0	44.2	44.2	0.0	57.0	57.0	0.0	22.4	22.4	0.0	20.2	20.2

Source: FirstCarbon Solutions | Michael Brandman Associates (see Appendix F)

Cumulative Criteria Air Pollutant Impacts

Impact AIR-3: **The project would result in a cumulatively considerable net increase of criteria pollutants for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors) [EIR Sections 4.3.6.2, 4.3.6.4, 4.3.7.1, and 4.3.7.3].**

Impact Analysis

To result in a less than significant impact, all three of the following criteria must be true:

1. Regional analysis: emissions of nonattainment pollutants must be below the regional significance thresholds. This is an approach recommended by the SCAQMD in its comment letters.
2. Summary of projections: the project must be consistent with current air quality attainment plans including control measures and regulations. This is an approach consistent with Section 15130(b) of the CEQA Guidelines.
3. Cumulative health impacts: the project must result in less than significant cumulative health effects from the nonattainment pollutants.

The voluntary approaches in the SCAQMD's 1993 Handbook are not used in this analysis for the following reasons. The first approach in the 1993 Handbook is a 1-percent-per-year reduction (or 18 percent over 18 years to the year 2010) in project emissions of VOC, NO_X, CO, PM_{10}, and SO_x. This approach is not straightforward and operational reductions are not easy to quantify. The second approach is not applicable because it relies on SCAQMD Regulation XV, which was repealed in 1995 and therefore is not applicable. The third approach is to reduce the rate of growth in vehicle miles traveled and trips. In this approach, the rate of growth in vehicle miles traveled and trips "should be held to the rate of population or household growth." Data that was used by Southern California Association of Governments in the AQMP should be used in this approach; however, that data is not available. Therefore, the approaches in the 1993 SCAQMD Handbook pertaining to cumulative impacts are not used.

Criterion 1: Regional Analysis

A nonattainment area is an area considered to have air quality worse than the ambient air quality standard. It follows that if a project exceeds the regional threshold for that nonattainment pollutant, then it would result in a cumulatively considerable net increase of that pollutant and result in a significant cumulative impact.

The South Coast Air Basin is in nonattainment for PM_{10}, $PM_{2.5}$, and ozone. Therefore, if the project exceeds the regional thresholds for PM_{10} or $PM_{2.5}$, then it contributes to a cumulatively considerable impact for those pollutants. If the project exceeds the regional threshold for NO_X or VOC, then it follows that the project would contribute to a cumulatively considerable impact for ozone.

Thresholds

Regional emissions include those generated from all onsite and offsite activities. Regional significance thresholds have been established by the SCAQMD because emissions from projects in the Basin can potentially contribute to the existing emission burden and possibly affect the attainment and maintenance of ambient air quality standards. Projects within the South Coast Air Basin region with regional emissions in excess of any of the thresholds presented in Table 54 are considered to have a significant regional air quality impact. The SCAQMD recommends the application of the operational regional thresholds for projects that experience overlapping time periods during which both construction and operations occur simultaneously.

Table 54: Regional Significance Air Pollutant Thresholds

Pollutant	Threshold (pounds per day)	
	Construction	Operation
Oxides of Nitrogen (NO_X)	100	55
Volatile Organic Compounds (VOC)*	75	55
Particulate Matter (PM_{10})	150	150
Particulate Matter ($PM_{2.5}$)	55	55
Oxides of Sulfur (SO_x)	150	150
Carbon Monoxide (CO)	550	550

Note:
* For purposes of this analysis, reactive organic gases (ROG) and VOCs are assumed to be the same.
Source: South Coast Air Quality Management District 2015.

According to Section 6.2 in the SCAQMD 1993 Handbook, the thresholds were based in part on Section 182 of the federal Clean Air Act, which identifies ten tons a year of VOC as the significance level for stationary sources of emissions in extreme non-attainment areas for ozone. The threshold was converted to a pounds-per-day threshold. The Basin is defined as a distinct geographic area with a critical air pollution problem for which ambient air quality standards have been identified to protect public health. As such, the SCAQMD believes that the thresholds can be established based on scientific and factual data that is contained in the federal and state Clean Air Acts.

Effective April 12, 2010, the EPA promulgated a new federal ambient air quality standard for nitrogen dioxide. The current SCAQMD significance thresholds do not take into account this new standard. The SCAQMD may update its significance thresholds for NO_X and nitrogen dioxide; however, there is no indication regarding what the new thresholds will be. The new federal standard of 0.100 ppm is based on the 3-year average of the 98th percentile of the daily maximum 1-hour average. The state standard is 0.18 ppm, which is not to be exceeded at all. Therefore, the two cannot be easily compared. This analysis uses the current SCAQMD NO_X threshold to determine significance for nitrogen dioxide and NO_X.

Operational sulfur oxides emissions were not estimated in this revised analysis. In the Draft EIR, the emissions were estimated to be approximately 21 pounds per day (15 for long-haul + 6 for local) at buildout for the worst-case scenario, substantially below the threshold of 150 pounds per day.

This analysis assumes that each building will have paved access; mitigation ensures this to be the case. There may be minor emissions of evaporative VOC from the fueling station, depending on what type of fuel is distributed. However, details regarding the fueling station are currently unknown so the emission source is not estimated.

Construction Regional Emissions

Table 55 summarizes regional construction-related emissions (without mitigation). The emissions represent the total emissions for all the phases during each construction year. For the assumptions used in generating the emissions, please refer to Section 4.3 of this report. The values in **bold** font exceed the SCAQMD regional thresholds. The information shown in Table 55 indicates that the SCAQMD regional emission thresholds would be exceeded for all pollutants shown in the table for all years of construction (except for 7 years for PM_{10}, 7 years for $PM_{2.5}$, and 1 year for CO). According to SCAQMD guidance, there would be a significant impact if the emissions exceed the thresholds.

The project would emit minor emissions of sulfur oxides (SOx) from construction equipment exhaust, which are not shown in Table 55, as the maximum emissions (2.5 pounds per day) are less than significant and are far below the threshold of 150 pounds per day. The emissions relate to the construction schedule in that the greatest emissions are when the higher quantity of square feet is added (see Table 15 for the occupancy schedule). For example, in the year 2020, 5.2 million sq ft is added to operation. Therefore, in the 2019, the emissions would be greater.

In summary, without mitigation, the short-term construction emissions are considered to have a significant regional impact.

Table 55: Construction Regional Air Pollutant Emissions (unmitigated)

Year	Emissions (pounds/day)								
	VOC	NO_X	CO	PM_{10} dust	PM_{10} exhaust	PM_{10} Total	$PM_{2.5}$ dust	$PM_{2.5}$ exhaust	$PM_{2.5}$ Total
2015	**128**	**1,463**	**871**	124	69	**193**	20	64	**84**
2016	**267**	**841**	**530**	82	44	126	9	41	50
2017	**314**	**1,432**	**849**	125	68	**193**	20	62	**82**
2018	**267**	**841**	**530**	82	44	126	9	41	50
2019	**371**	**2,116**	**1,226**	173	93	**266**	38	86	**124**
2020	**277**	**961**	**596**	86	50	136	11	46	**57**
2021	**303**	**1,259**	**774**	122	62	**184**	19	57	**76**
2022	**286**	**1,057**	**668**	116	53	**169**	17	49	**66**
2023	**317**	**1,389**	**885**	141	66	**207**	26	61	**87**
2024	**298**	**1,174**	**754**	125	57	**182**	20	53	**73**
2025	**311**	**1,289**	**854**	141	62	**203**	26	57	**83**
2026	**267**	**841**	**530**	82	44	126	9	41	50
2027	**263**	**729**	**750**	140	28	**168**	26	26	52
2028	**252**	**607**	**667**	126	23	149	20	21	41
2029	**223**	**318**	456	82	12	94	9	11	20
2030	**245**	**420**	**571**	124	16	140	20	15	35
Significance Threshold	75	100	550	None	None	150	None	None	55
Significant Impact?	Yes	Yes	Yes	—	—	Yes	—	—	Yes

Notes:

Totals may not be exact because of rounding. Exceedances of the threshold are shown in **bold** font. Sulfur oxide (SOx) emissions are contained in the CalEEMod output in Appendix A.4; the maximum emissions would be 2.5 pounds per day, substantially under the threshold of 150 pounds per day. The emissions assume all construction activities (mass excavation, finish grading, building, utilities, curbing, landscaping, painting, paving, and/or interchange) occur on the same day, depending on the year in which the activity occurs. Dust emissions assume compliance with SCAQMD Rule 403. VOC = volatile organic compounds; NO_X = nitrogen oxides; CO = carbon monoxide; PM_{10} and $PM_{2.5}$ = particulate matter

Source of emissions: Appendix A: CalEEMod Output and spreadsheet summaries prepared by FirstCarbon Solutions | Michael Brandman Associates.

Source of significance thresholds: South Coast Air Quality Management District 2015.

Operational Regional Emissions: Worst-Case 2012 Analysis

Operational emissions from emission sources generated both onsite and offsite are shown in Table 56 (page 239). The vehicle emissions represent emissions from travel within the South Coast Air Basin. As shown in Table 56, the project's emissions of VOC, NO_X, CO, PM_{10}, and $PM_{2.5}$ exceed the SCAQMD's regional thresholds are considered significant.

This is a worst-case analysis because it assumes that the entire project would be built-out in 2012. The motor vehicle and truck emission factors are from 2012, which assumes a "dirtier" fleet than would be the case in later years. In addition, no reductions are taken for the model year 2010 and later trucks that would be accessing the project pursuant to project design features and mitigation.

Operational Regional Emissions

Operational emissions from emission sources generated both onsite and offsite are shown in Table 57 (page 240) for Phase 1 (2022) and buildout. The vehicle emissions represent emissions from travel within the South Coast Air Basin. These emissions are estimated with future year emission factors (year 2022 for Phase 1 and 2035 for Phase 2). The unmitigated emissions do not assume that all heavy-duty trucks would be model year 2010 or newer, but use the emission factor defaults. As shown in the table, the project's emissions of VOC, NO_X, CO, PM_{10}, and $PM_{2.5}$ exceed the SCAQMD's regional thresholds during both phases and are considered significant. Emissions of SOx are less than significant. For a discussion of how the emissions in the table differ from the emissions in the Draft EIR, please refer to the Executive Summary.

Table 56: Operational Regional Air Pollutant Emissions (Worst-Case 2012 Analysis, unmitigated)

Phase	Source	Worst-Case Emissions (pounds/day)								
		VOC	NO_X	CO	PM_{10} Dust	PM_{10} Exh.	PM_{10} Total	$PM_{2.5}$ Dust	$PM_{2.5}$ Exh.	$PM_{2.5}$ Total
Phase 1, 2012 emission factors	Mobile	377	5,141	3,144	585	161	746	157	154	311
	Architectural Coatings	146	0	0	0	0	0	0	0	0
	Consumer Products	117	0	0	0	0	0	0	0	0
	Natural Gas	<1	2	2	0	<1	<1	0	<1	<1
	Onsite equipment	5	138	51	0	1	1	0	1	1
	Total	**645**	**5,281**	**3,197**	**585**	**162**	**747**	**157**	**155**	**312**
Buildout, 2012 emission factors	Mobile	666	9,057	5,531	1,024	284	1,308	276	272	547
	Architectural Coatings	258	0	0	0	0	0	0	0	0
	Consumer Products	207	0	0	0	0	0	0	0	0
	Natural Gas	<1	4	3	0	<1	0	0	<1	<1
	Onsite equipment	9	245	90	0	2	2	0	2	2
	Total	**1,140**	**9,306**	**5,624**	**1,024**	**286**	**1,310**	**276**	**274**	**549**
Significance Threshold		55	55	550	None	None	150	None	None	55
Significant Impact?		Yes	Yes	Yes	—	—	Yes	—	—	Yes

Notes:
VOC = volatile organic compounds NO_X = nitrogen oxides CO = carbon monoxide PM_{10} and $PM_{2.5}$ = particulate matter exh. = exhaust <1 = less than one
Source of mobile emissions for Phase 1: FirstCarbon Solutions | Michael Brandman Associates (Appendix E.3), using 2012 emission factors.
Source of mobile emissions for buildout (Phases 1 and 2): FirstCarbon Solutions | Michael Brandman Associates (Appendix E.4), using 2012 emission factors.
Source of other emissions: non-mobile sources in Table 57. Onsite equipment includes forklifts, yard trucks, and emergency generator.
Source of significance thresholds: South Coast Air Quality Management District 2015.

Table 57: Operational Regional Air Pollutant Emissions (Detail, Unmitigated)

Phase	Source	Emissions (pounds/day)								
		VOC	NO_X	CO	PM_{10} Dust	PM_{10} Exh.	PM_{10} Total	$PM_{2.5}$ Dust	$PM_{2.5}$ Exh.	$PM_{2.5}$ Total
Existing	Tractor, dust	<1	5	3	352	<1	**352**	77	<1	**77**
Phase 1	Mobile	106	1,591	1,068	612	9	620	164	8	172
	Architectural Coatings	146	0	0	0	0	0	0	0	0
	Consumer Products	117	0	0	0	0	0	0	0	0
	Natural Gas	<1	2	2	0	<1	<1	0	<1	0
	Onsite Equipment	5	138	51	0	1	1	0	1	1
	Total	**374**	**1,731**	**1,121**	612	10	**621**	164	9	**173**
Buildout	Mobile	120	1,031	1,286	1,114	6	1,120	298	6	303
	Architectural Coatings	258	0	0	0	0	0	0	0	0
	Consumer Products	207	0	0	0	0	0	0	0	0
	Natural Gas	<1	4	3	0	<1	<1	0	<1	<1
	Onsite Equipment	9	245	90	0	2	2	0	2	2
	Total	**594**	**1,280**	**1,379**	1,114	8	**1,122**	298	8	**305**
	Net increase	594	1,275	1,376	762	8	770	221	8	228
Significance Threshold		55	55	550	None	None	150	None	None	55
Significant Impact?		Yes	Yes	Yes	—	—	Yes	—	—	Yes

Notes:
VOC = volatile organic compounds NO_X = nitrogen oxides CO = carbon monoxide PM_{10} and $PM_{2.5}$ = particulate matter Exh. = exhaust <1 = less than 1
Emissions in **bold** font exceed the significance thresholds.
Source of mobile emissions for Phase 1 (year 2022): FirstCarbon Solutions | Michael Brandman Associates (Appendix E.5)
Source of mobile emissions for buildout (Phases 1 and 2, year 2035): FirstCarbon Solutions | Michael Brandman Associates (Appendix E.7)
Source of other emissions: FirstCarbon Solutions | Michael Brandman Associates (Appendix E.1); onsite equipment includes forklifts, emergency generator, and yard trucks.
Net increase is the total emissions minus the existing emissions.
Source of significance thresholds: South Coast Air Quality Management District 2015.

Operational Emissions Year by Year

Operational emissions year by year are shown in Table 58. Emissions that exceed the threshold are shown in **bold** font; emissions exceed the thresholds in most years.

Table 58: Operational Regional Air Pollutant Emissions (Year by Year, unmitigated)

Year	Emissions (pounds/day)				
	VOC	NO_X	CO	PM_{10}	$PM_{2.5}$
2016	34	**159**	103	57	16
2017	**69**	**317**	205	114	32
2018	**114**	**528**	342	**190**	53
2019	**160**	**740**	479	**266**	**74**
2020	**245**	**1,132**	**733**	**407**	**114**
2021	**330**	**1,525**	**987**	**547**	**153**
2022	**374**	**1,732**	**1,121**	**622**	**174**
2023	**395**	**1,690**	**1,145**	**669**	**186**
2024	**415**	**1,647**	**1,169**	**715**	**199**
2025	**445**	**1,587**	**1,203**	**782**	**216**
2026	**478**	**1,519**	**1,242**	**858**	**236**
2027	**511**	**1,450**	**1,281**	**934**	**256**
2028	**544**	**1,382**	**1,321**	**1,010**	**276**
2029	**566**	**1,337**	**1,346**	**1,059**	**289**
2030	**588**	**1,292**	**1,372**	**1,109**	**302**
Buildout	**594**	**1,280**	**1,379**	**1,123**	**306**
Threshold	55	55	550	150	55
Significant?	Yes	Yes	Yes	Yes	Yes

Notes:
Emissions shown in **bold** font exceed the significance threshold.
Emissions do not include a reduction from the existing onsite emissions. Emissions are from local vehicles, trucks, natural gas, emergency generators, forklifts, yard trucks, painting, and consumer products. PM_{10} and $PM_{2.5}$ emissions include exhaust and road dust. Landscaping emissions are negligible. Emissions for Phase 1 are years 2016–2022. Emissions for Phase 2 are year 2023-buildout; operational emissions are assumed to be zero in 2015 when project construction commences.
Sulfur dioxide emissions as estimated in the Draft EIR were substantially less than the threshold of 150 pounds per day. Thus, emissions reflecting decreased vehicle miles traveled would also be less than significant.
VOC = volatile organic compounds NO_X = nitrogen oxides
CO = carbon monoxide PM_{10} and $PM_{2.5}$ = particulate matter
Source of emissions: FirstCarbon Solutions | Michael Brandman Associates (Appendix E).
Source of significance thresholds: South Coast Air Quality Management District 2015.

Overlapping Construction and Operational Emissions

During several development years, there would be overlapping of construction and operational emissions. The operational emissions (Table 58, page 241) are added to the construction emissions (Table 55, page 237) and are shown in Table 59 below. As shown in the table, all pollutants for all years exceed the thresholds, with the exception of SOx emissions, which are not shown as they are far below the significance threshold of 150 pounds per day.

Table 59: Combined Construction and Operation Regional Air Pollutant Emissions (unmitigated)

Year	Maximum Daily Emissions (pounds per day)				
	VOC	NO_X	CO	PM_{10}	$PM_{2.5}$
2015	**128**	**1,463**	**871**	**193**	**84**
2016	**301**	**1,000**	**633**	**183**	**66**
2017	**382**	**1,749**	**1,054**	**306**	**114**
2018	**381**	**1,369**	**872**	**316**	**103**
2019	**531**	**2,855**	**1,705**	**532**	**198**
2020	**522**	**2,093**	**1,329**	**543**	**171**
2021	**633**	**2,784**	**1,761**	**731**	**229**
2022	**661**	**2,789**	**1,789**	**791**	**240**
2023	**712**	**3,079**	**2,030**	**876**	**273**
2024	**713**	**2,822**	**1,923**	**898**	**272**
2025	**756**	**2,876**	**2,057**	**986**	**299**
2026	**744**	**2,360**	**1,772**	**984**	**286**
2027	**774**	**2,179**	**2,031**	**1,102**	**308**
2028	**796**	**1,989**	**1,987**	**1,159**	**318**
2029	**789**	**1,655**	**1,803**	**1,153**	**309**
2030	**833**	**1,712**	**1,942**	**1,249**	**337**
Buildout (operation only)	**594**	**1,280**	**1,379**	**1,123**	**306**
Significance Threshold	55	55	550	150	55
Significant Impact?	Yes	Yes	Yes	Yes	Yes

Notes:
Emissions in **bold** font exceed the significance threshold.
Emissions do not include a reduction from the existing onsite emissions.
Sulfur oxide (SOx) emissions are substantially under the threshold of 150 pounds per day
VOC = volatile organic compounds NO_X = nitrogen oxides CO = carbon monoxide
PM_{10} and $PM_{2.5}$ = particulate matter
Source of emissions: Sum of emissions in Table 55 (construction) and Table 58 (operation).
Source of significance thresholds: South Coast Air Quality Management District 2015.

Criterion 3: Plan Approach

Section 15130(b) of the CEQA Guidelines states the following:

> The following elements are necessary to an adequate discussion of significant cumulative impacts: 1) Either: (A) A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or (B) A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact.

In accordance with CEQA Guidelines 15130(b), this analysis of cumulative impacts is based on a summary of projections (option B). This analysis is based on the 2003 and 2007 AQMPs. The South Coast Air Basin is in nonattainment for ozone, PM_{10}, and $PM_{2.5}$, which means that concentrations of those pollutants currently exceed the ambient air quality standards for those pollutants. When concentrations of ozone, PM_{10}, or $PM_{2.5}$ exceed the ambient air quality standard, then those sensitive to air pollution (i.e., children, elderly, sick) could experience health effects such as a decrease of pulmonary function and localized lung edema in humans and animals, increased mortality risk, and risk to public health implied by altered connective tissue metabolism and lung changes in animals after long-term exposures and pulmonary (lung) function in chronically exposed humans.

Under the CEQA Guidelines identified above, cumulative impacts may be analyzed using other plans that evaluate relevant cumulative effects. The AQMPs describe and evaluate the future projected emissions sources in the South Coast Air Basin and sets forth a strategy to meet both state and federal Clean Air Act planning requirements and federal ambient air quality standards. Therefore, the AQMPs are relevant plans for a CEQA cumulative impacts analysis. The 2003 AQMP updates the attainment demonstration for the federal standards for ozone and PM_{10}; replaces the 1997 attainment demonstration for the federal CO standard and provides a basis for a maintenance plan for CO for the future; and updates the maintenance plan for the federal nitrogen dioxide standard that the South Coast Air Basin has met since 1992. The 2007 AQMP focuses on ozone and $PM_{2.5}$. The AQMP also incorporates significant new scientific data, emission inventories, ambient measurements, control strategies, and air quality modeling.

The geographic scope for cumulative criteria pollution from air quality impacts is the South Coast Air Basin, because that is the area in which the air pollutants generated by the sources within the basin circulate and dispersed. The SCAQMD is required to prepare and maintain an AQMP and a State Implementation Plan to document the strategies and measures to be undertaken to reach attainment of ambient air quality standards. While the SCAQMD does not have direct authority over land use decisions, it is recognized that changes in land use and circulation planning are necessary to maintain clean air. The SCAQMD evaluated the entire Basin when it developed the AQMP.

In accordance with CEQA Guidelines section 15064, subdivision (h)(3), a lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements in a previously approved plan or mitigation program. As identified in Impact AIR-1, the project complies with the control measures in the 2003 and the 2007 AQMP and all of the SCAQMD's applicable rules and regulations. However, because the project exceeds the SCAQMD's CEQA significance thresholds, the analysis contained in Impact AIR-1 (page 206) demonstrates that the project is not consistent with the most recent AQMP and State Implementation Plan without mitigation. Therefore, the project presents a significant impact according to this criterion.

Criterion 4: Cumulative Criteria Air Pollutant Health Impacts

The Basin is in nonattainment for ozone, PM_{10}, and $PM_{2.5}$, which means that the background concentrations of those pollutants are at times higher than the ambient air quality standards, even without the project. Refer to Table 5, page 57, for a summary of the recent maximum background concentrations in the project area. The air quality standards were set to protect public health, including the health of sensitive individuals (such as the elderly, children, and the sick). Therefore, when the concentration of those pollutants exceeds the standard, it is likely that some sensitive individuals in the population would experience health effects that were described in Table 7 (see page 60); the health effects differ by pollutant and some are identified below. However, the health effects are a factor of the dose-response curve. Concentration of the pollutant in the air (dose), the length of time exposed, and the response of the individual are factors involved in the severity and nature of health impacts. If a significant health impact results from project emissions, it does not mean that 100 percent of the population would experience health effects.

The regional analysis indicates that without mitigation, the project would exceed the SCAQMD regional significance thresholds for VOC and NO_X (ozone precursors). Because ozone is a secondary pollutant (it is not emitted directly but formed by chemical reactions in the air), it can be formed miles downwind of the project site. Project emissions of VOC and NO_X may contribute to the background concentration of ozone and cumulatively cause health effects. Health effects may include the following: irritation to respiratory system; reduce lung function; breathing pattern changes; reduction of breathing capacity; inflamed and damaged cells that line the lungs; lungs could be more susceptible to infection; aggravated asthma; other chronic lung diseases could be aggravated; permanent lung damage; some immunological changes; and/or increased mortality risk. Vegetation and property damage could also occur. Children who live in high ozone communities and who participate in multiple sports have been observed to have a higher asthma risk. This is a significant cumulative health impact associated with ground-level ozone concentrations.

Additionally, the project could result in a significant cumulative contribution to $PM_{2.5}$ and PM_{10}. Sensitive individuals may experience health impacts when concentrations of those pollutants exceed the ambient air quality standards.

Health impacts from particulate matter may include the following:

- For short-term exposure (hours/days): irritation of the eyes, nose, throat; coughing; phlegm; chest tightness; shortness of breath; aggravation of existing lung disease, asthma attacks and acute bronchitis; those with heart disease can suffer heart attacks and arrhythmias.
- For long-term exposure: reduced lung function; chronic bronchitis; death.

Although CO would exceed the regional significance thresholds during operation, there would not be significant health effects because the main source of CO is from motor vehicles. CO can accumulate at project impacted intersections. However, according to the CO hot spot analysis shown in Impact 4.3.5.2, the project would not result in an exceedance of the CO ambient air quality standard at project impacted intersections. The background concentrations of CO are far below the ambient air quality standards. The standards are set to protect the health of sensitive individuals. Therefore, the project would not result in health effects from CO exposure.

Level of Significance Before Mitigation

Potentially significant impact.

As shown in the analysis above, construction and operational emissions of VOC, NO_X, CO, PM_{10}, and $PM_{2.5}$ exceed the SCAQMD's regional significance thresholds. Resulting cumulative health impacts from ozone, PM_{10}, and $PM_{2.5}$ could be experienced in the South Coast Air Basin.

Mitigation Measures

Mitigation Measures 4.3.6.2A, 4.3.6.2B, 4.3.6.2C, 4.3.6.2D, 4.3.6.3A, 4.3.6.3B, 4.3.6.3C, 4.3.6.3D, 4.3.6.3E, and 4.3.6.4A are required (see Section 1.4 -Mitigation Measures Applied to the Project, page 21).

Level of Significance After Mitigation

Construction: Project-Specific and Cumulative

Significant and unavoidable impact.

There are several methods to reduce construction emissions, including the following:

- Mitigation Measure 4.3.6.2.A requires Tier 4 off-road equipment, which was estimated in CalEEMod.
- Mitigation Measure 4.3.6.2A requires that construction haul trucks be 2007 model year or greater. CalEEMod does not have a mitigation measure embedded in the model to quantify the reduction from this measure. Therefore, this reduction quantification was not provided.
- Mitigation Measure 4.3.6.2C would reduce emissions of VOC from paints. The reduction in total VOC varies by an average of 31 percent per year.

The reductions from the mitigation are shown in Table 60. As shown in the table, mitigation reduces VOC, NO_x, PM_{10}, and $PM_{2.5}$. The current CalEEMod modeling has a software flaw in the mitigated CO calculations and demonstrates that mitigation increases CO concentrations; therefore, the CO reductions from mitigation are not shown.[38] In addition, NO_x increases in the last two years of construction because default CalEEMod calculations assumes a greater number of Tier 4 Final equipment pieces than is accounted for in mitigation (mitigation accounts for Tier 4 Interim or Final).

Table 60: Regional Construction Emissions Reductions

Year	Emission Reductions from Mitigation (pounds per day)			
	VOC	NO_X	PM_{10}	$PM_{2.5}$
2015	-97	-940	-63	-58
2016	-133	-470	-40	-36
2017	-171	-903	-63	-56
2018	-133	-470	-40	-36
2019	-213	-1,352	-85	-79
2020	-142	-560	-45	-41
2021	-161	-744	-56	-51
2022	-146	-597	-47	-43
2023	-169	-784	-60	-55
2024	-155	-652	-51	-47
2025	-163	-684	-55	-51
2026	-133	-470	-40	-36
2027	-118	-158	-22	-21
2028	-110	-88	-18	-16
2029	-91	+50	-8	-7
2030	-106	+50	-11	-10

Notes:
VOC = volatile organic compounds NO_X = nitrogen oxides
CO = carbon monoxide PM_{10} and $PM_{2.5}$ = particulate matter
Source: Mitigated construction (Table 61) minus unmitigated construction (Table 55)

[38] The emission factors for CO for the tier mitigation equipment are higher in some instances than the CalEEMod defaults. The OFFROAD emission factors embedded in CalEEMod are based on actual source testing of the equipment emissions. If the equipment is operating at a percentage below the emissions standards when they do the testing, ARB will apply that same percentage to future years. The emission factors for the tier equipment used in CalEEMod are based on regulation, not from actual testing. The SCAQMD is aware of this issue and is taking steps to provide a work around (Personal communication with Dan Garcia, SCAQMD, January 30, 2014). However, the work around was not available as of the date of this report.

Table 61 displays the construction emissions after mitigation. As shown in the table, emissions of VOC, NOx, CO, and PM_{10} are still over the thresholds and therefore are significant after mitigation. PM_{10} emissions are reduced in all years except for year 2019, which still has emissions over the threshold. However, mitigation reduces emissions of $PM_{2.5}$ to below the significance threshold.

Table 61: Regional Construction Emissions (Mitigated)

Year	Emissions (pounds per day)				
	VOC	NO_X	CO	PM_{10}	$PM_{2.5}$
2015	31	523	871	130	26
2016	134	371	530	86	14
2017	143	529	849	130	26
2018	134	371	530	86	14
2019	158	764	1226	181	45
2020	135	401	596	91	16
2021	142	515	774	128	25
2022	140	460	668	122	22
2023	148	605	885	147	32
2024	143	522	754	131	26
2025	148	605	854	148	32
2026	134	371	530	86	14
2027	145	571	750	146	31
2028	142	519	667	131	25
2029	132	368	456	86	13
2030	139	470	571	129	25
Average (for informational purposes)	134	498	719	122	24
Significance threshold	75	100	550	150	55
Significant impact?	Yes	Yes	Yes	Yes	No

Notes:
VOC = volatile organic compounds NO_X = nitrogen oxides
CO = carbon monoxide PM_{10} and $PM_{2.5}$ = particulate matter
Source: FirstCarbon Solutions | Michael Brandman Associates (see Appendix A).

The results from the regional construction emissions analysis indicate that on a regional basis, people in the South Coast Air Basin could experience health effects from increased ozone and PM_{10} concentrations because background levels of those pollutants are high. The health effects were discussed earlier in this section (Criterion 4: Cumulative Criteria Air Pollutant Health Impacts, page 244) and summarized as follows:

- Ozone can cause the following health effects: Irritate respiratory system; reduce lung function; breathing pattern changes; reduction of breathing capacity; inflame and damage cells that line the lungs; make lungs more susceptible to infection; aggravate asthma; aggravate other chronic lung diseases; cause permanent lung damage; some immunological changes; and/or increased mortality risk.
- Particulate matter can cause the following health effects from short-term (hours/days) exposure: irritation of the eyes, nose, throat; coughing; phlegm; chest tightness; shortness of breath; aggravate existing lung disease, causing asthma attacks and acute bronchitis; and/or those with heart disease can suffer heart attacks and arrhythmias.
- Particulate matter can cause the following health effects from long-term exposure: reduced lung function; chronic bronchitis; changes in lung morphology; and/or death.

Because the background concentration of CO is low and because the localized analysis of CO concentrations near the site was also less than significant, less than significant health impacts from CO would be expected.

The implementation of the project would contribute criteria pollutants to the area during project construction. A number of individual projects in the area may be under construction simultaneously with the proposed project. Depending on construction schedules and actual implementation of projects in the area, generation of fugitive dust and pollutant emissions during construction would result in substantial short-term increases in air pollutants. Each project would be required to comply with the SCAQMD's standard construction measures; however, despite adherence to SCAQMD's standard construction measures and Mitigation Measures 4.3.6.2A through 4.3.6.2D identified previously, project-related emissions would still exceed applicable SCAQMD thresholds for VOC, NOx, CO, and PM_{10}. Therefore, cumulative impacts associated with short-term air quality impacts would be significant and unavoidable.

Operation: Project-Specific and Cumulative
Significant and unavoidable.

Table 62 displays the operational reductions from Mitigation Measure 4.3.6.3B (implementation of model year 2010 medium-heavy and heavy-heavy duty trucks and less polluting yard trucks). As shown in the table, reductions are greatest in the year 2022. This is because the unmitigated motor vehicle emissions for Phase 1 are based on the 2022 emission factor, which assumes a fleet with

fewer emissions controls than compared with Phase 2. Phase 2 motor vehicle emissions (year 2023-buildout) use emission factors from the year 2035, which assume cleaner vehicles and trucks. Thus, the emissions from Phase 2 are lower and there are not as many reductions as there are in Phase 1 with the higher emissions from the "dirtier" fleet.

Table 62: Regional Operation Mitigation Reductions

Year	Emissions Reductions (pounds per day)				
	VOC	NO_X	CO	Exhaust PM_{10}	Exhaust $PM_{2.5}$
2016	1	65	1	0.4	0.4
2017	3	130	3	0.8	0.8
2018	4	217	4	1.4	1.3
2019	6	303	6	1.9	1.9
2020	9	465	9	3.0	2.9
2021	13	626	13	4.0	3.9
2022	14	711	14	4.5	4.4
2023	13	661	11	4.3	4.2
2024	12	612	9	4.1	3.9
2025	10	542	4	3.7	3.6
2026	8	462	<1	3.3	3.2
2027	6	382	<1	2.9	2.9
2028	4	302	<1	2.5	2.5
2029	3	250	<1	2.3	2.3
2030	2	198	<1	2.0	2.0
Buildout	1	183	<1	1.9	1.9

Notes:
VOC = volatile organic compounds NO_X = nitrogen oxides
CO = carbon monoxide PM_{10} and $PM_{2.5}$ = particulate matter
<1 = less than one
Source: Unmitigated operational emissions (Table 58) minus mitigated operational emissions (Appendix E).

Mitigated operational emissions for Phase 1 (year 2022) and full buildout are shown in Table 63. However, even with mitigation, emissions are still significant (with the exception of sulfur oxides). Therefore, there could be cumulative health effects from ozone, PM_{10}, and $PM_{2.5}$, as described earlier. (For the unmitigated emissions, please refer to Table 57 on page 240).

Table 63: Operational Regional Air Pollutant Emissions (Mitigated)

Phase	Source	Emissions (pounds per day)				
		VOC	NO_X	CO	PM_{10}	$PM_{2.5}$
Phase 1	Mobile	93	968	1,044	617	169
	Architectural Coatings	146	0	0	0	0
	Consumer Products	117	0	0	0	0
	Natural Gas	<1	2	2	<1	<1
	Onsite Equipment	4	52	60	<1	<1
	Subtotal	*360*	*1,022*	*1,106*	*617*	*169*
	Existing emissions	*<1*	*5*	*3*	*352*	*77*
	Net increase in emissions	**360**	**1,017**	**1,103**	**265**	**92**
Buildout	Mobile	119	1,001	1,286	1,120	303
	Architectural Coatings	258	0	0	0	0
	Consumer Products	207	0	0	0	0
	Natural Gas	<1	4	3	<1	<1
	Onsite Equipment	8	91	107	<1	<1
	Subtotal	*592*	*1,096*	*1,396*	*1,120*	*303*
	Existing emissions	*<1*	*5*	*3*	*352*	*77*
	Net increase in emissions	**592**	**1,091**	**1,393**	**768**	**226**
	Significance Threshold	55	55	550	150	55
	Significant Impact?	Yes	Yes	Yes	Yes	Yes

Notes:
The net increase is calculated by subtracting the existing emissions from the subtotal.
PM_{10} and $PM_{2.5}$ emissions include exhaust and road dust.
The Draft EIR estimated 21 pounds per day of sulfur oxides with higher emission factors and greater average daily traffic; therefore, emissions are anticipated to be less than the significance threshold of 150 pounds per day.
Onsite equipment is from yard trucks, forklifts, and emergency generators
VOC = volatile organic compounds NO_X = nitrogen oxides CO = carbon monoxide
PM_{10} and $PM_{2.5}$ = particulate matter <1 = less than one
Source of emissions: FirstCarbon Solutions | Michael Brandman Associates (Appendix E).
Source of significance thresholds: South Coast Air Quality Management District 2015.

As shown in the tables above, emissions of VOC, NOx, CO, PM_{10}, and $PM_{2.5}$ are still over the thresholds and therefore are significant after mitigation. This means that on a regional basis, people in the South Coast Air Basin could experience health effects from increased ozone, PM_{10}, and $PM_{2.5}$ concentrations because background levels of those pollutants are high. The health effects were discussed earlier in this section (Criterion 4: Cumulative Health Impacts, page 244) and summarized below:

- Ozone can cause the following health effects: irritate respiratory system; reduce lung function; breathing pattern changes; reduce breathing capacity; inflame and damage cells that line the lungs; make lungs more susceptible to infection; aggravate asthma; aggravate other chronic

lung diseases; cause permanent lung damage; some immunological changes; and/or increase mortality risk.

- Particulate matter (PM_{10} and $PM_{2.5}$) can cause the following health effects from short-term (hours/days) exposure: irritation of the eyes, nose, throat; coughing; phlegm; chest tightness; shortness of breath; aggravate existing lung disease, causing asthma attacks and acute bronchitis; and/or those with heart disease can suffer heart attacks and arrhythmias.
- Particulate matter can cause the following health effects from long-term exposure: reduced lung function; chronic bronchitis; changes in lung morphology; and/or death.

Because the background concentration of CO is low and because the localized analysis of CO concentrations near the site was also less than significant, less than significant health impacts from CO would be expected.

Long-term operation and the combined construction and operational emissions of the project would contribute to long-term regional air pollutants despite implementation of mitigation measures. The Basin is in nonattainment for ozone, $PM_{10,}$ and $PM_{2.5}$ at the present time; therefore, the operation of the proposed project would exacerbate nonattainment of air quality standards within the Basin and contribute to adverse cumulative air quality impacts. Implementation of the proposed project would unavoidably contribute to significant long-term cumulative air quality impacts.

Overlapping Construction and Operation: Project-Specific and Cumulative
Significant and unavoidable.

During overlap of construction and operation, VOC, NO_X, CO, PM_{10}, and $PM_{2.5}$ would continue to exceed SCAQMD significance thresholds after mitigation, as shown in Table 64. The existing onsite emissions are not included.

Table 64: Combined Construction and Operation Regional Air Pollutant Emissions (Mitigated)

Year	Combined Construction and Operation Maximum Daily Emissions (pounds per day)				
	VOC	NO_X	CO	PM_{10}	$PM_{2.5}$
2015	31	523	871	130	26
2016	167	465	631	143	29
2017	209	716	1,052	243	57
2018	243	683	868	275	65
2019	311	1,200	1,699	444	117
2020	371	1,069	1,319	495	127
2021	459	1,414	1,748	671	174

Table 64 (cont.): Combined Construction and Operation Regional Air Pollutant Emissions (Mitigated)

Year	Combined Construction and Operation Maximum Daily Emissions (pounds per day)				
	VOC	NO_X	CO	PM_{10}	$PM_{2.5}$
2022	500	1,482	1,774	739	192
2023	530	1,633	2,018	812	214
2024	547	1,558	1,914	843	220
2025	583	1,651	2,053	926	245
2026	603	1,428	1,773	941	247
2027	650	1,639	2,036	1,077	285
2028	682	1,599	1,997	1,138	299
2029	695	1,455	1,815	1,143	300
2030	725	1,565	1,958	1,236	325
Buildout	593	1,097	1,396	1,121	304
Significance Threshold	55	55	550	150	55
Significant Impact?	Yes	Yes	Yes	Yes	Yes

Notes:
Sulfur oxide (SO_X) emissions are less than significant before and after mitigation
2015 contains construction sources only; buildout contains operation sources only.
VOC = volatile organic compounds NO_X = nitrogen oxides CO = carbon monoxide
PM_{10} and $PM_{2.5}$ = particulate matter
Source of emissions: FirstCarbon Solutions | Michael Brandman Associates (Appendix E).
Source of significance thresholds: South Coast Air Quality Management District 2015.

Sensitive Receptors: Criteria Pollutants

Impact AIR-4a: **The project would expose sensitive receptors to substantial criteria air pollutant concentrations [EIR Sections 4.3.6.3 and 4.3.6.5].**

Impact Analysis

Definition of Sensitive Receptors

Those individuals who are sensitive to air pollution include children, the elderly, and persons with preexisting respiratory or cardiovascular illness. For purposes of CEQA, the SCAQMD considers a sensitive receptor to be a location where a sensitive individual could remain for at least 24 hours, such as residences, hospitals, or convalescent facilities (South Coast Air Quality Management District 2008, page 3-2). Commercial and industrial facilities are not included in the definition because employees do not typically remain onsite for 24 hours. However, when assessing the impact of pollutants with 1-hour or 8-hour standards (such as nitrogen dioxide and carbon monoxide), commercial and/or industrial facilities would be considered sensitive receptors for those purposes,

according to the SCAQMD localized significance threshold guidance (South Coast Air Quality Management District 2008, page 3-2). Nearby school sites were also included in the assessment.

The closest sensitive receptors are existing residences located within the boundaries of the project at the intersection of Redlands Boulevard and Dracaea Avenue, near the intersection of Theodore Street and Eucalyptus Street, and near the intersection of Theodore Street and Dracaea Avenue. These residences may remain after the project is constructed. Additional residences are located to the west of the project's western boundary across Redlands Boulevard and scattered residences along the project's eastern border across Gilman Springs Road.

The closest school is the Ridge Crest Elementary School, located approximately 1.1 miles southwest of the project. Valley View Elementary School and Valley View High School are located approximately 2 miles west of the project. Approximately 35 schools are located within a radius of 8 miles from the project (see Exhibit 20).

Localized Significance Threshold Analysis

The localized significance threshold analysis uses thresholds that represent the maximum emissions for a project that would not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard (South Coast Air Quality Management District 2008, page 1-1). The thresholds are developed based on the ambient concentrations of that pollutant for each source receptor area and on the location of the sensitive receptors. If the project results in emissions under those thresholds, it follows that the project would not cause or contribute to an exceedance of the standard. The standards are set to protect the health of sensitive individuals. If the standards are not exceeded at the sensitive receptor locations, it follows that the receptors would not be exposed to substantial pollutant concentrations.

As identified in Impact AIR-2, the localized impact analysis demonstrated that prior to the application of mitigation, the project would exceed the localized significance thresholds for the pollutants shown in Table 65.

Table 65: Summary of Unmitigated Localized Findings

Condition	Significant Finding for These Pollutants	
	Within Project Boundary	Outside Project Boundary
Phase 1 (2012 worst-case condition)	NO_2 (1-hour and annual) PM_{10} (24-hour and annual)	PM_{10} (annual)
Phase 1 and Phase 2 (2012 worst-case condition)	NO_2 (1-hour) PM_{10} (24-hour and annual) $PM_{2.5}$ (24-hour)	NO_2 (1-hour) PM_{10} (annual)

Table 65 (cont.): Summary of Unmitigated Localized Findings

Condition	Significant Finding for These Pollutants	
	Within Project Boundary	Outside Project Boundary
2021	NO_2 (annual) PM_{10} (24-hour and annual) $PM_{2.5}$ (24-hour)	NO_2 (annual) PM_{10} (24-hour)
2027	PM_{10} (24-hour and annual)	No exceedances
Full buildout	PM_{10} (24-hour and annual)	No exceedances
Source: Summarized from Tables 40, 41, 43, 44, and 46–51.		

Level of Significance Before Mitigation

Potentially significant localized impacts from NO_2, PM_{10}, and $PM_{2.5}$ concentrations.

Mitigation Measures

Mitigation Measures 4.3.6.2A, 4.3.6.2B, 4.3.6.2D, 4.3.6.3A, 4.3.6.3B, 4.3.6.3C, 4.3.6.3D, and 4.3.6.3E are required (see Section 1.4 - Mitigation Measures Applied to the Project, page 21).

Level of Significance After Mitigation

Significant and unavoidable impact for receptors within project boundaries for PM_{10} and less than significant for receptors outside project boundaries. Mitigation reduces $PM_{2.5}$ and NO_2 impacts to less than significant at all receptors.

As noted in Table 52 (page 231), after mitigation, the project's localized emissions would exceed the SCAQMD's localized significance thresholds at receptor locations within the project boundaries for 24-hour and annual PM_{10} during all assessment conditions. The SCAQMD significance thresholds would not be exceeded at any sensitive receptor located outside of the project boundaries.

The results mean that residences inside the project boundaries could experience health effects from particulate matter. Health effects from particulate matter (PM_{10}) can include the following: (a) exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) declines in pulmonary function growth in children; and/or (c) increased risk of premature death from heart or lung diseases in the elderly. Daily fluctuations in $PM_{2.5}$ levels have been related to hospital admissions for acute respiratory conditions, school absences, and increased medication use in children and adults with asthma.

Sensitive Receptors: Toxic Air Pollutants

Impact AIR-4b: **The project would not expose sensitive receptors or workers to substantial toxic air pollutant concentrations that could result in health risk impacts or result in a cumulatively considerable health risk impact [EIR Section 4.3.6.5 and 4.3.7.4].**

Impact Analysis

Significance Thresholds

The SCAQMD has defined health risk thresholds as follows (SCAQMD 2011a):

- Maximum Incremental Cancer Risk: 10 in 1 million at the maximally impacted sensitive receptor;
- Cancer Burden > 0.5 excess cancer cases in the population (in areas with a cancer risk of ≥ 1 in 1 million)[39]

Non-cancer Hazard Index (project increment)[40] 1.0 or greater.

Cancer Risks

Cancer risk represents the probability (in terms of risk per million individuals) that an individual would contract cancer resulting from exposure to TACs continuously over a specified period for sensitive receptors. Thus, an individual located in an area with a cancer risk of one would experience a one chance in one million of developing cancer assuming that individual lives in that area continuously for the entire exposure period. As noted in Section 4.7.3 - Risk Assessment Methodology, the cancer risk assessment examined the project's potential cancer risks through application of the "Current OEHHA Guidance" which applied the cancer risk methodology recommended by the OEHHA that examines cancer risks to sensitive/residential receptors over a 30-year duration with the inclusion of early-in-life age sensitivity factors and an offsite worker exposure duration of 25 years.

The following health risk assessment using the current OEHHA guidance is provided for informational purposes only. As discussed previously, the results of a new study (HEI 2015, see Appendix H) demonstrates that new technology diesel exhaust does not cause cancer. This project assessment is to document the cancer-related impacts of the project given the assumption that new technology diesel exhaust causes cancer, which is contrary to the results in the HEI study. The unmitigated results that follow assume old technology diesel exhaust. The mitigated results assume new technology diesel. However, because the HEI study is so new, OEHHA has not updated its cancer risk methodology to account for this new research that shows that new technology diesel does not result in cancer.

[39] Cancer burden is a theoretical estimate of the increased number of cancer cases in a population exposed to a risk of greater than or equal to one in a million. The cancer burden for a given population is the product of the number of persons in the population and the estimated individual risk from TACs.

[40] The Non-Cancer Hazard Index is the ratio of a TAC concentration divided by its Reference Exposure Level, or safe exposure level for chronic (long-term) and acute (short-term) exposures. When the Non-Cancer Hazard Index exceeds 1.0, people are exposed to levels of toxics that may pose noncancer health illnesses including reproductive effects, respiratory effects, eye sensitivity, immune effects, kidney effects, blood effects, central nervous system, birth defects.

Cancer Risk for Sensitive/Residential Receptors

For informational purposes, Table 66 presents the results of the health risk assessment in the prior analysis in the Draft EIR using the guidance recommended by the OEHHA in 2003 with EMFAC2011 for diesel PM emissions at several locations within and surrounding the project. As noted in Table 66, based on the assumptions applied in the Draft EIR, the project's incremental cancer risks prior to and after mitigation exceed the SCAQMD's cancer risk significance threshold of 10 in a million at existing sensitive receptor locations both within the project boundaries (existing residences) and at locations outside of the project boundaries.

The OEHHA 2003 guidance was used to provide estimates of cancer risk in the Draft EIR; the risk assumes a 70-year exposure duration and does not include age sensitivity for young children. The results shown in Table 66 are not directly comparable to the cancer risks as estimated in this revised assessment and shown in Table 67 for the following reasons: differences in cancer risk estimation guidance methodology; updated project assumptions (construction schedule and equipment inventory); and updated mobile source and construction emission factors.

For reference, a risk level of 1 in a million implies a likelihood that up to one person, out of one million equally exposed people, would contract cancer if exposed continuously (24 hours per day) to the specific concentration of diesel PM over the duration of the exposure. This risk would be an excess cancer risk that is in addition to any cancer risk borne by a person not exposed to these air toxics.[41]

Table 67 presents the estimated cancer risks applying the "Current OEHHA Guidance" separated by construction and operation. The "Current OEHHA Guidance" was used to provide the revised estimates of cancer risk from the project. As noted therein, the estimated cancer risks are far greater than the corresponding risks estimated using the OEHHA guidance from 2003. This is because of the use of the age-specific factors (e.g., age-sensitivity factors and daily breathing rates) applied in the "Current OEHHA Guidance" during the first 16 years, and in particular the first 2 years, of the 30-year exposure duration that greatly influence the risks over the entire 30-year exposure duration. The OEHHA 2003 guidance does not make use of any age-specific factors. Because of the use of the age-specific early-in-life factors under the "Current OEHHA Guidance," the estimated cancer risks would result in an exceedance of the 10 in a million cancer risk significance threshold in the first year of the project construction in 2015 alone. As can be seen from Table 67, the construction impacts contribute the greatest proportion of the total impact under the "Current OEHHA Guidance."

[41] Definition of a 1 in a million cancer risk from the EPA, Technology Transfer Network Air Toxics, Glossary of Key Terms, Website: www.epa.gov/ttn/atw/natamain/gloss1.html.

Table 66: Estimated Cancer Risks, 70-year Exposure Duration for Sensitive/Residential Receptors Based on "OEHHA 2003 Guidance" as Shown in the DEIR

Receptor Location	Unmitigated			Mitigated		
	Total Incremental Cancer Risk[1] (risk/million)	SCAQMD Cancer Risk Significance Threshold (risk/million)	Exceeds Threshold?	Total Incremental Cancer Risk[1] (risk/million)	SCAQMD Cancer Risk Significance Threshold (risk/million)	Exceeds Threshold?
Maximum risk anywhere in the modeling domain[2]	100.7	10	Yes	76.8	10	Yes
Maximum risk at existing residences within the project boundaries	100.7	10	Yes	76.8	10	Yes
Maximum risk at any existing residential area outside of the project boundaries[3]	22.2	10	Yes	20.9	10	Yes

Notes:
[1] 70-year average exposures from 2015 to 2084 (includes diesel PM emissions from construction and operation); cancer risk estimates derived from the EMFAC2011 emission model and "OEHHA 2003 Guidance" for estimating cancer risks as presented in the Draft EIR
[2] Location is at the existing residences within the boundaries of the project
[3] Location is at the southwest corner of the project
[4] Location is at an undeveloped property zoned for residential at the southwest corner of the project
Source: Section 4.3, Draft Environmental Impact Report

Table 67: Estimated Cancer Risks, 30-year Exposure Duration for Sensitive/Residential Receptors Based on the "Current OEHHA Guidance," Without Mitigation

Receptor Location	Incremental Cancer Risk (risk/million)			SCAQMD Cancer Risk Significance Threshold (risk/million)	Exceeds Threshold?
	Project Construction	Project Operation	Total		
Maximum risk anywhere in the modeling domain[1]	180.8	6.7	187.5	10	Yes
Maximum risk at existing residences within the project boundaries[2]	180.8	6.7	187.5	10	Yes
Maximum risk at any existing residential area outside of the project boundaries[3]	47.2	2.5	49.7	10	Yes
Maximum risk at any undeveloped residentially zoned property outside of the project boundaries[4]	40.5	2.7	43.2	10	Yes

Notes:
[2] Location is at the existing residences within the boundaries of the project
[3] Location is at the existing residences within the boundaries of the project
[4] Location is at the southwest corner of the project
[5] Location is at an undeveloped property zoned for residential at the southwest corner of the project
Source: Dispersion modeling conducted by FirstCarbon Solutions (see Appendix G). The results are 30-year average exposures from 2015 to 2044 (includes diesel PM emissions from construction and operation); cancer risk estimates derived from the EMFAC2014 emission model and "Current OEHHA Guidance" for estimating cancer risks.

On the basis of the results shown in Table 67 based on the application of the "Current OEHHA Guidance," the project would exceed the SCAQMD's cancer risk significance threshold of 10 in a million prior to the application of mitigation and would represent a potentially significant impact.

Exhibit 24 shows the incremental cancer risks for the project location based on the EMFAC2014 emission model and the application of the "Current OEHHA Guidance" cancer risk estimation methodology while Exhibit 25 provides a close-in view of the cancer risks based on the application of the "Current OEHHA Guidance." The exhibits show the cancer risk results prior to the application of mitigation.

Estimates of Cancer Risks for School Receptors

Cancer risk at schools in the area with the application of the "Current OHEHHA Guidance" is provided in Table 68. Prior to the application of mitigation, the maximum cancer risk is 3.2 in a million at Ridgecrest Elementary School. The cancer risk at the proposed high school at Ironwood Avenue and Quincy Street is 3.4 in a million. Impacts at schools are less than the 10 in one million significance threshold prior to mitigation and are less than significant.

Estimates of Cancer Risk for Worker Receptors

Estimates of worker exposures were prepared based on the assumption of a 25-year exposure duration for 50 weeks per year and 8 hours per day as described in the "Current OEHHA Guidance." Note that the OEHHA early-in-life age factors do not apply to worker receptors. The highest offsite worker cancer risk estimates prior to the application of mitigation is 4.1 in a million, less than the SCAQMD cancer risk threshold of 10 in a million. The highest onsite worker cancer risk was 10.1 in a million which exceeds the SCAQMD cancer risk significance threshold of 10 in a million. Therefore, prior to the application of mitigation, the worker cancer risk represents a significant impact.

There are a variety of state and federal programs that protect onsite workers from safety hazards, including high air pollutant concentrations (California Division of Occupational Safety and Health; Centers for Disease Control and Prevention 2012, U.S. Occupational Safety & Health Administration [OSHA]). OSHA, in particular, does not have a permissible exposure limit (PEL) for diesel PM.

Estimates of Cancer Burden

In response to comments received on the Draft EIR, an estimate of cancer burden was developed in this revised analysis. The cancer burden calculation provides an estimate of the increased number of cancer cases as a result of exposures to TAC emissions. The total cancer burden is the product of the number of persons in a population area (such as a census tract) and the estimated individual risk from TACs in that population area and then summed over all population areas. The SCAQMD indicates that the burden calculation include those population units having an incremental cancer risk of 1 in a million or greater.

Cancer risks were estimated at the geographical center (centroid) of 2,360 census tracts that spanned the Basin from Palm Springs to the City of Los Angeles. For the 70-year exposure duration based on the application of the "Current OEHHA Guidance," the cancer burden is estimated to be 1.6 out of a population of about 880,000 individuals that were estimated to have a cancer risk of 1 in a million or more. The SCAQMD has established a threshold for cancer burden of 0.5. Therefore, the project would exceed the SCAQMD's cancer burden significance threshold prior to the application of mitigation.

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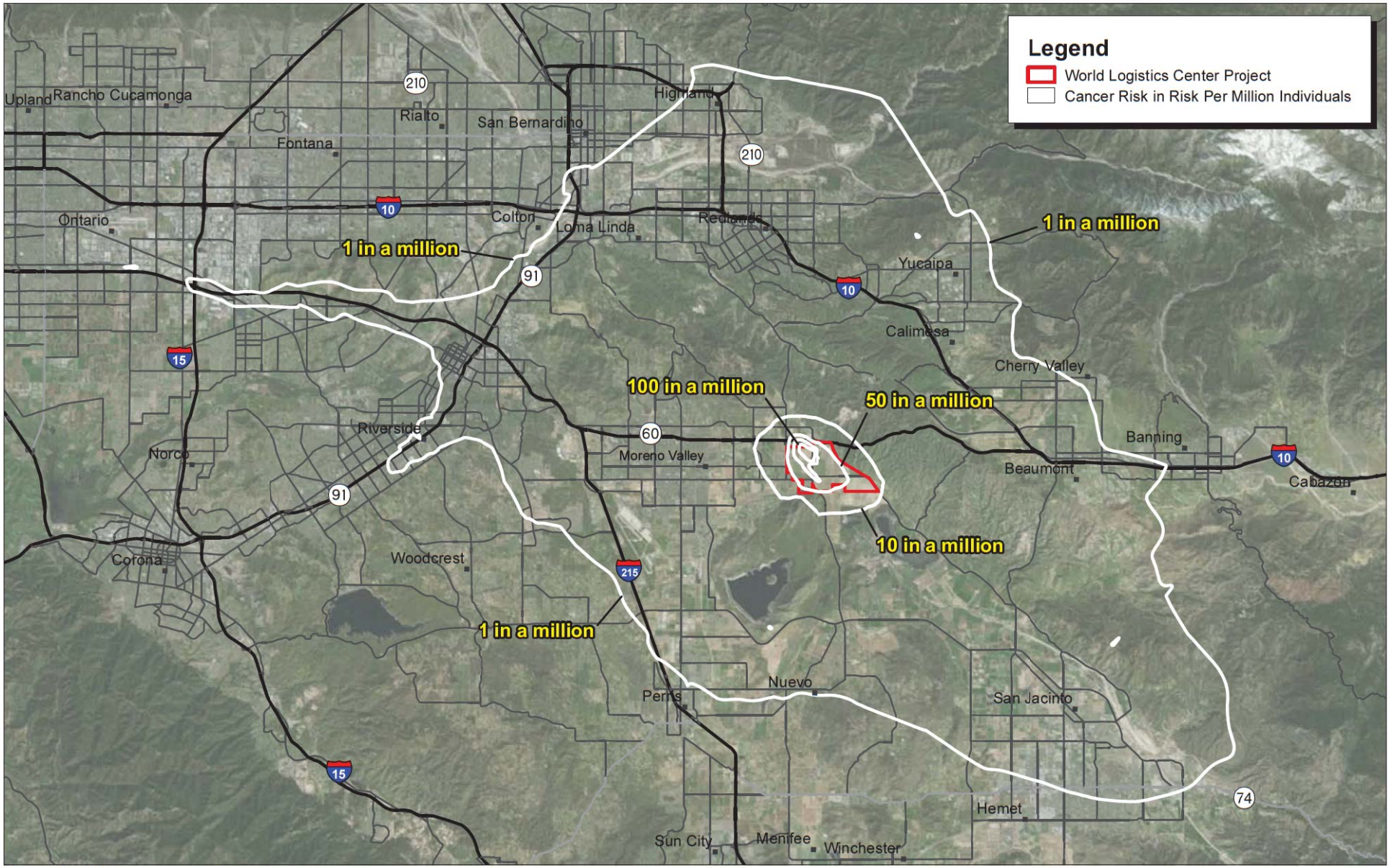

Source: FirstCarbon Solutions 2015.

FirstCarbon SOLUTIONS

4.5 2.25 0 4.5
Miles

Exhibit 24
Incremental Project Cancer Risks – 30-year Exposure Duration
Current OEHHA Guidance - Without Mitigation

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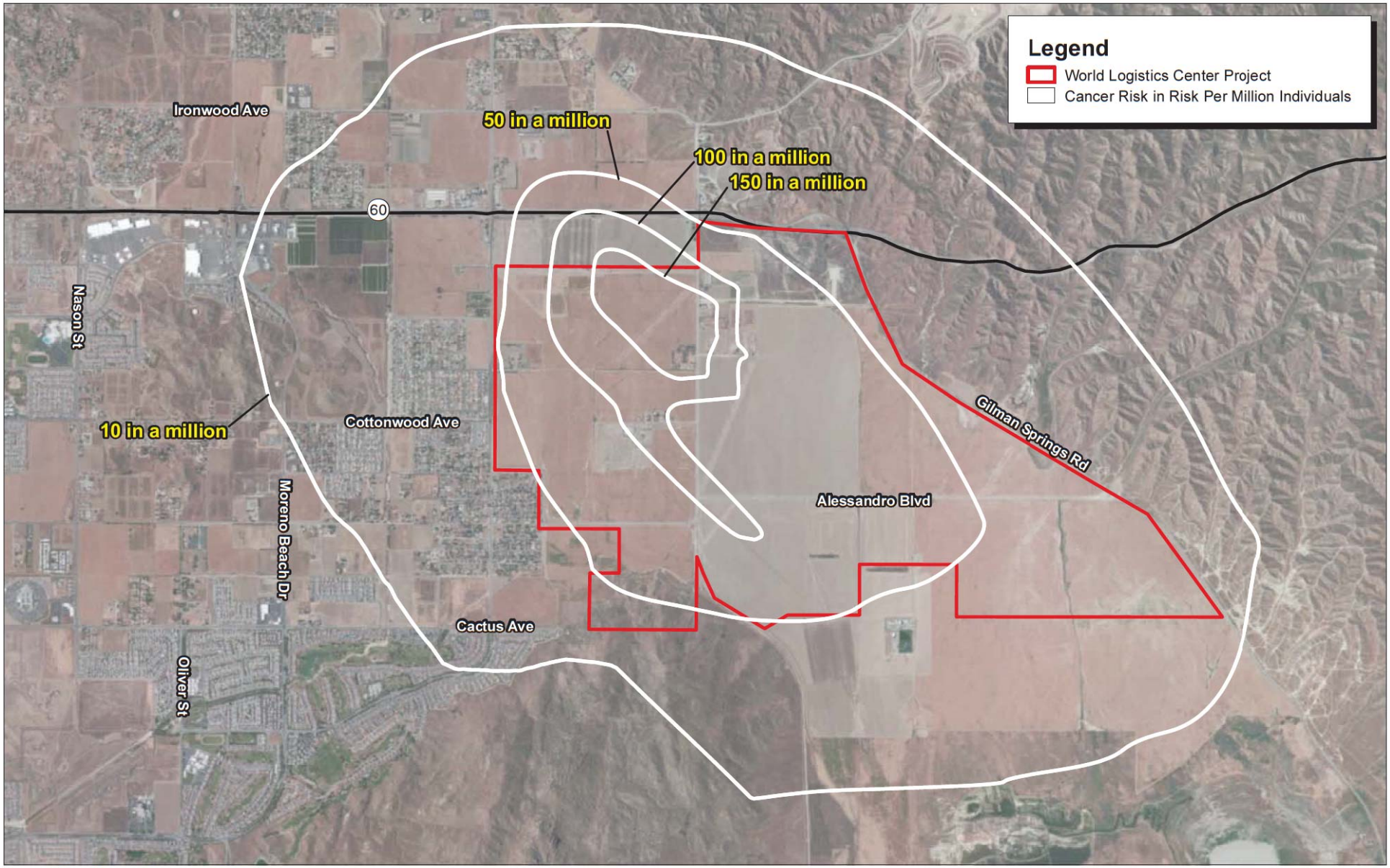

Source: FirstCarbon Solutions 2015.

FirstCarbon SOLUTIONS

3,000 1,500 0 3,000 Feet

Exhibit 25

Incremental Project Cancer Risks – 30-year Exposure Duration
Current OEHHA Guidance - Without Mitigation – Close-in View

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Table 68: Estimated Project Incremental Cancer Risks at Nearby School Sites 9-year Exposure Duration (Unmitigated)

School Name	Address in Moreno Valley	Estimated Cancer Risk[1] (risk per million)	SCAQMD Cancer Risk Significance Threshold (risk/million)	Exceeds Significance Threshold?
Alessandro School	23311 Dracaea Avenue	1.1	10	No
Armada Elementary School	25201 John F Kennedy Drive	1.0	10	No
Badger Springs Middle School	24750 Delphinium Avenue	0.9	10	No
Bear Valley Elementary School	26125 Fir Avenue	2.0	10	No
Box Springs Elementary School	11900 Athens Drive	0.9	10	No
Butterfield Elementary School	13400 Kitching Street	1.3	10	No
Chaparral Hills Elementary School	24850 Delphinium Avenue	0.9	10	No
Cloverdale Elementary School	12050 Kitching Street	1.5	10	No
Creekside Elementary School	13563 Heacock Street	0.9	10	No
Edgemont Elementary School	21790 Eucalyptus Avenue	0.8	10	No
El Potrero Elementary School	16820 Via Pamplona Drive	1.0	10	No
Hendrick Ranch Elementary School	25570 Brodiaea Avenue	1.2	10	No
Honey Hollow Elementary School	11765 Honey Hollow Street	1.0	10	No
La Jolla Elementary School	14745 Willowgrove Place	2.0	10	No
Landmark Middle School	15261 Legendary Drive	1.7	10	No
Lasselle Elementary School	26446 Krameria Avenue	0.9	10	No
March Mountain High School	24551 Dracaea Avenue	1.1	10	No
Midland Elementary School	11440 Davis Street	1.1	10	No
Moreno Elementary School	26700 Cottonwood Avenue,	1.9	10	No
Moreno Valley High School	23300 Cottonwood Avenue	0.9	10	No

Table 68 (cont.): Estimated Project Incremental Cancer Risks at Nearby School Sites 9-year Exposure Duration (Unmitigated)

School Name	Address in Moreno Valley	Estimated Cancer Risk[1] (risk per million)	SCAQMD Cancer Risk Significance Threshold (risk/million)	Exceeds Significance Threshold?
Mt View Middle School	13130 Morrison St	2.0	10	No
North Ridge Elementary School	25101 Kalmia Avenue	2.4	10	No
North Ridge Elementary School	25101 Kalmia Avenue	1.2	10	No
Palm Middle School	11900 Slawson Avenue	1.5	10	No
Ramona Elementary School	24801 Bay Avenue	1.1	10	No
Rancho Verde High School	17750 Lasselle Street	0.4	10	No
Ridgecrest Elementary School	28500 John F. Kennedy Drive	3.2	10	No
Seneca Elementary School	11615 Wordsworth Road	1.0	10	No
Serrano Elementary School	24100 Delphinium Avenue	0.8	10	No
Sunnymead Elementary School	24050 Dracaea Avenue	1.0	10	No
Sunnymead Middle School	23996 Eucalyptus Avenue	1.1	10	No
Towngate Elementary School	22480 Dracaea Avenue	0.8	10	No
Valley Christian School	26755 Alessandro Boulevard	1.6	10	No
Valley View High School	13135 Nason Street	2.1	10	No
Victoriano Elementary School	25650 Los Cabos Drive	0.9	10	No
Vista del Lago High School	15150 Lasselle Street	1.2	10	No
Proposed High School	Ironwood Avenue and Quincy Street	3.4	10	No

Note:
[1] The highest 9-year average occurs once the project commences construction; therefore the cancer risk was determined over the 9-year time period from 2015 to 2023.
Source: AERMOD modeling conducted by FirstCarbon Solutions | Michael Brandman Associates (Appendix G).

Chronic (Long-Term) Non-cancer Hazards

Chronic long-term non-cancer hazards include health effects other than cancer, including inflammation of the lungs, which may aggravate chronic respiratory symptoms and increase frequency or intensity of asthma attacks.

To determine the project's chronic hazard impact, the highest annual diesel PM concentration prior to mitigation was determined covering the years 2015 (the commencement of project construction) to 2035 (the full build out of the project). In this regard, the highest annual average diesel PM concentration determined through air dispersion modeling was 1.02 $\mu g/m^3$ in 2021, at an existing residence located within the project boundaries. This diesel PM concentration was due primarily to the impacts of diesel PM emissions from the offroad construction equipment and operational emission sources. Applying Equation 3 in Section 4.6.3 Risk Assessment Methodology, this level of diesel PM impact results in a chronic non-hazard index of 0.20. This hazard index is less than the SCAQMD's significance level of 1.0, and is, therefore, less than significant.

Significance finding before mitigation: less than significant chronic non-cancer hazards.

Acute (Short-Term) Non-cancer Hazards

Acute short-term non-cancer hazards include things like irritation of the eyes, nose, throat, and lungs, coughing, headaches, lightheadedness, and nausea.

The estimation of the acute non-cancer hazard index requires the estimation of the maximum 1-hour emission rate of total organic gases (TOG). Estimates of the project's maximum 1-hour TOG emissions were derived from the project's peak hour traffic data along the nearly 500 roadway segments identified earlier and then speciated or broken down into the various toxic air contaminant components by fuel type, gasoline and diesel as described in Table 35 (page 192). Emission rates from the ARB EMFAC2014 mobile source emission model were then used to generate the TOG emissions for each roadway segment analyzed for both gasoline and diesel vehicles. Separate estimates were then made of the maximum 1-hour average TOG impacts from gasoline vehicles and from diesel vehicles from which the acute non-cancer hazard index was determined as described in Section 4.6.3 Risk Assessment Methodology. The acute non-cancer hazard index was determined for a worst-case condition that assumed the project would be completely built out in 2012 with the project's attendant traffic and emission estimates as they would exist in 2012. This condition is the same as the Project Phase 1 and Phase 2 Full Buildout (2012) condition assumed in the Localized Significance Threshold assessment provided earlier. Based on this information, the maximum acute non-cancer hazard index found at any receptor within the model domain was 0.07, which is less than the SCAQMD's non-cancer hazard index of 1.0, and, therefore, is less than significant.

Significance finding before mitigation: less than significant acute non-cancer hazards.

Informational Purposes: Morbidity and Mortality

There is no established threshold or approved methodology for calculating morbidity and mortality. For purposes of this assessment, "morbidity" is a term for describing how an external effect such as air pollution would exacerbate an existing illness and other health effect. "Mortality" is another term for death. The following represents the result of the calculations for long-term mortality and various morbidity health endpoints due to diesel PM for the project prior to the application of mitigation. The locations for the morbidity/mortality estimations were at the location with the highest combined annual diesel PM concentration and census tract population such that the change in diesel PM would affect the greatest number of people. A cumulative total of each mortality/morbidity health endpoint was also calculated that totals the number of added cases of an identified health endpoint at each census tract location within the entire region potentially impacted by the project emissions.

The estimates of mortality and morbidity impacts are based on the application of concentration-response functions (C-R functions) that relate the change in the number of adverse health effect incidences in a population to a change in air pollutant concentration experienced by that population. However, such estimations are subject to great uncertainty. Sources of uncertainty include emission estimates, population exposure estimates, form of C-R functions, baseline rates of mortality and morbidity that are entered into the C-R functions, and occurrence of additional not-quantified adverse health effects. It should be noted that the nature of PM as a complex mixture of various pollutants—as well as the confounding health effects of pollutants such as sulfur dioxide, NO_2, CO, and ozone that tend to co-occur with PM in ambient air—greatly increase the complexity of deriving accurate PM concentration-response functions.

Exposure to the project's diesel PM emissions prior to mitigation would result in an increase in mortality of approximately 0.002 additional case per year at the location where the project has its maximum impact from diesel PM emissions or 0.2 additional case over all of the census tracts contained In the modeling domain.

Table 69 summarizes the estimates of the various morbidity health endpoints due to the emissions from the project. As shown in this table, the project would not result in a single new added case of a quantified health endpoint either at either the location where the impact would be greatest or cumulatively over the entire air dispersion modeling domain examined in this assessment (approximately 3,500 square miles, potentially impacted by the project).

Table 69: Estimates of Various Morbidity Health Endpoints from Project DPM Emissions without Mitigation

Health Endpoint	Maximum Added Occurrences (cases/year)	Cumulative Occurrences over the Entire Modeling Region (cases/year)
Long-term Mortality (Ages 30+)	0.002	0.22
Chronic Illness: Chronic Bronchitis (Age 27+)	0.010	0.99
Hospitalization: Chronic Obstructive Pulmonary Disease Age 65+)	0.00002	0.002
Hospitalization: Pneumonia (Age 65+)	0.00003	0.003
Hospitalization: Cardiovascular (Age 65+)	0.00005	0.005
Hospitalization: Asthma (Age 0-64)	0.00001	0.001
Hospitalization: Asthma-related Emergency Visits (Ages 0-64)	0.00003	0.004
Source: FirstCarbon Solutions (Appendix G-9)		

City of Moreno Valley General Plan

The City of Moreno Valley General Plan (2006) contains the following policies to help reduce air quality impacts to sensitive receptors:

- Policy 6.7.4 Locate heavy industrial and extraction facilities away from residential areas and sensitive receptors.
  - Project consistency: The project would not contain heavy industrial and extraction facilities (such as a gravel mine). The project would contain warehousing, distribution, and light logistics. Therefore, the project is consistent with this policy. Nonetheless, the proposed plan places this development at the eastern end of the City, reducing the potential residential/development interface.
- Policy 6.7.5 Require grading activities to comply with South Coast Air Quality Management District's Rule 403 regarding the control of fugitive dust.
  - Project consistency: The project would comply with all applicable rules and regulations. Mitigation Measure 4.3.6.2A requires that the project demonstrate compliance with Rule 403.

Level of Significance Before Mitigation

Level of significance for residential/sensitive receptor cancer risk: Potentially significant. The cancer risks exceed the threshold of 10 in a million at residential/sensitive receptors at locations

within and outside of the project boundary based on the application of the "Current OEHHA Guidance."

Level of significance for school-site children cancer risk: Less than significant. The cancer risk impacts are less than the threshold of 10 in a million school children located at the various surrounding school sites based on the application of the "Current OEHHA Guidance."

Level of significance for worker receptors: Potentially significant. The cancer risks are less than the significance threshold for worker receptors located outside of the project boundary but significant for receptors located within the project boundary.

Level of significance for cancer burden. Potentially significant. The project's cancer burden exceeds the cancer burden threshold of 0.5.

Level of significance for chronic and acute non-cancer hazards. Less than significant. The project impacts are less than the threshold non-cancer hazard index of 1.0

Mitigation Measures

Mitigation Measures 4.1.6.1A, 4.3.6.2A, 4.3.6.2B, 4.3.6.2D, 4.3.6.3A, 4.3.6.3B, 4.3.6.3C, 4.3.6.3D, and 4.3.6.3E are required (see Section 1.4, Mitigation Measures Applied to Project).

Project Level of Significance After Mitigation

Cancer Risk for Sensitive/Residential Receptors (Mitigated)

Less than significant. Table 70 summarizes the 30-year cancer risk estimates for sensitive/ residential receptors after application of mitigation based on the "Current OEHHA Guidance." As shown in the table, there is still a significant impact after mitigation at three existing sensitive/ residential receptors located within the project boundary prior to considering the conclusions of the Health Effects Institute study. However, there are no receptor locations outside of the project boundary that exceed the SCAQMD cancer risk significance threshold. The large reduction in cancer risk after mitigation is attributable principally to the reduced diesel PM during the first 3 to 5 years of construction when the "Current OEHHA Guidance" assigns large age sensitivity factors to the first few years of the 30-year exposure duration. Exhibit 26 and Exhibit 27 provide a regional and close-in view of the risks, respectively for the "Current OEHHA Guidance."

The cancer risk quantification using the current OEHHA guidance is provided for informational purposes only. It is to document the cancer-related impacts of the project given the assumption that new technology diesel exhaust causes cancer, which is contrary to the results in the HEI study. Mitigation requires new technology diesel: mitigation measure 4.3.6.2A(a) requires that all on-site construction equipment be Tier 4 certified, and mitigation measure 4.3.6.3B(l) requires that all diesel trucks accessing the project during operation be model year 2010 or newer. The diesel trucks and equipment accessing the project site will emit new technology diesel exhaust and therefore there would be less than significant cancer risk from the diesel exhaust. Nevertheless, the preceding

analysis applies the current OEHHA guidance to analyze the cancer risks, assuming diesel exhaust could cause cancer for informational purposes only.

Estimates of Cancer Risks for School Receptors (Mitigated)

Less than significant. Cancer risk at schools in the area are less than significant before mitigation. Mitigation would reduce school-site student cancer risks even further to a maximum of 0.3 in a million and are, therefore, less than significant.

Estimates of Cancer Risk for Worker Receptors (Mitigated)

Less than significant. Estimates of worker exposures after application of mitigation would be reduced to a maximum of 1.3 in a million for onsite worker receptors and 0.5 for offsite worker receptors, less than the SCAQMD significance threshold of 10 in a million. More importantly, these values are provided to document cancer-related impacts of the project in the assumption that new technology diesel exhaust causes cancer, contrary to what was found by the HEI study.

Estimates of Cancer Burden (Mitigated)

Less than significant. After application of mitigation, the cancer burden would be reduced to 0.1, less than the SCAQMD significance threshold of 0.5.

Estimates of Chronic and Acute Non-Cancer Hazards

Less than significant. After application of mitigation, the chronic and acute non-cancer hazards remain well below the SCAQMD hazard index of 1.0.

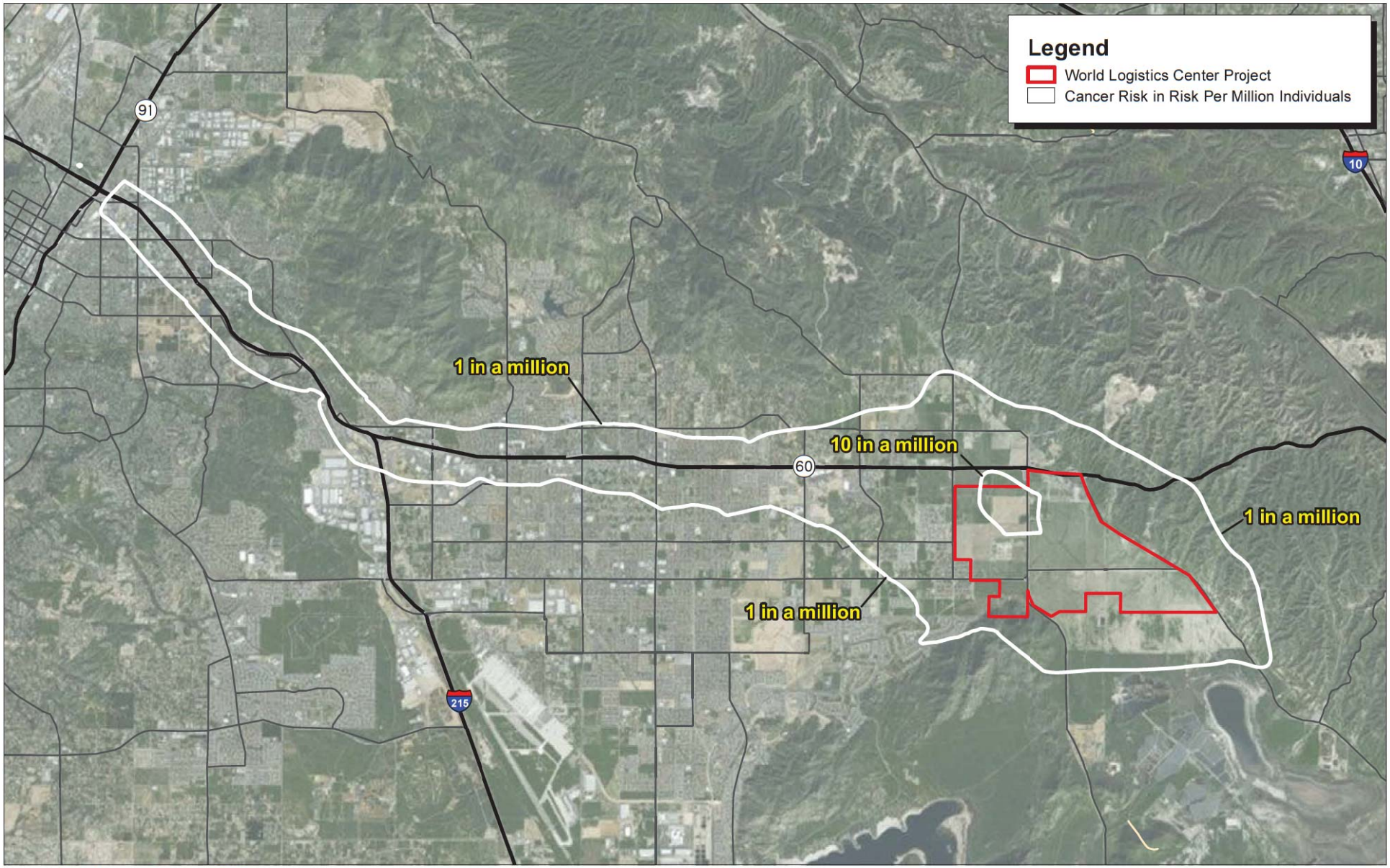
Analysis of Project Buffer Areas

As requested in comments received during the Draft EIR comment period, an analysis was conducted to compare cancer risks for a design buffer area of 250 feet from the project boundaries (this is the project design) to a buffer area of 1,000 feet from the property boundary based on the "Current OEHHA Guidance" over a 30-year exposure duration. As shown in Table 71 the results for the maximum incremental cancer risk are almost identical for the 250-foot buffer and the 1,000-foot buffer. The 1000-foot buffer would not substantially reduce air quality impacts. As shown Exhibit 28, the locations of the 10 in one million cancer risk contour line for the project design and the 1,000 foot buffer under the "Current OEHHA Guidance" exposure duration are coincident and overlap each other.

Table 70: Estimated Cancer Risks, 30-Year Exposure Duration for Sensitive/Residential Receptors, Based on the "Current OEHHA Guidance," with Mitigation

Receptor Location	Incremental Project Cancer Risk (risk per million)			SCAQMD Cancer Risk Significance Threshold (risk/million)	Exceeds Threshold?
	Construction	Operation	Total [1]		
Maximum risk anywhere in the modeling domain[2]	11.4	5.6	17.0	10	Yes
Existing residences within the project boundaries:					
13100 Theodore St	11.2	4.5	15.7	10	Yes
13200 Theodore St	11.1	4.5	15.6	10	Yes
13241 Theodore St	11.4	5.6	17.0	10	Yes
30220 Dracaea Ave	5.0	3.6	8.6	10	No
30240 Dracaea Ave	5.0	3.6	8.6	10	No
29080 Dracaea Ave	3.0	1.5	4.5	10	No
29140 Dracaea Ave	4.8	1.7	6.5	10	No
Maximum risk at any existing residential area outside of the project boundaries[3]	2.7	1.6	4.3	10	No
Maximum risk at any undeveloped residentially zoned property outside of the project boundaries[4]	2.1	1.9	4.0	10	No

Notes:
[1] 30-year average exposures from 2015 to 2044 (includes diesel PM emissions from construction and operation); cancer risk estimates derived from the EMFAC2014 emission model and "Current OEHHA Guidance" for estimating cancer risks
[2] Location is at the existing residences within the boundaries of the project
[3] Location is at the southwest corner of the project
[4] Location is at an undeveloped property zoned for residential at the southwest corner of the project
Source: Appendix G.5



Source: FirstCarbon Solutions 2015.

FirstCarbon SOLUTIONS

1.5 0.75 0 1.5
Miles

Exhibit 26
Incremental Project Cancer Risks – 30-year Exposure Duration
Current OEHHA Guidance - With Mitigation

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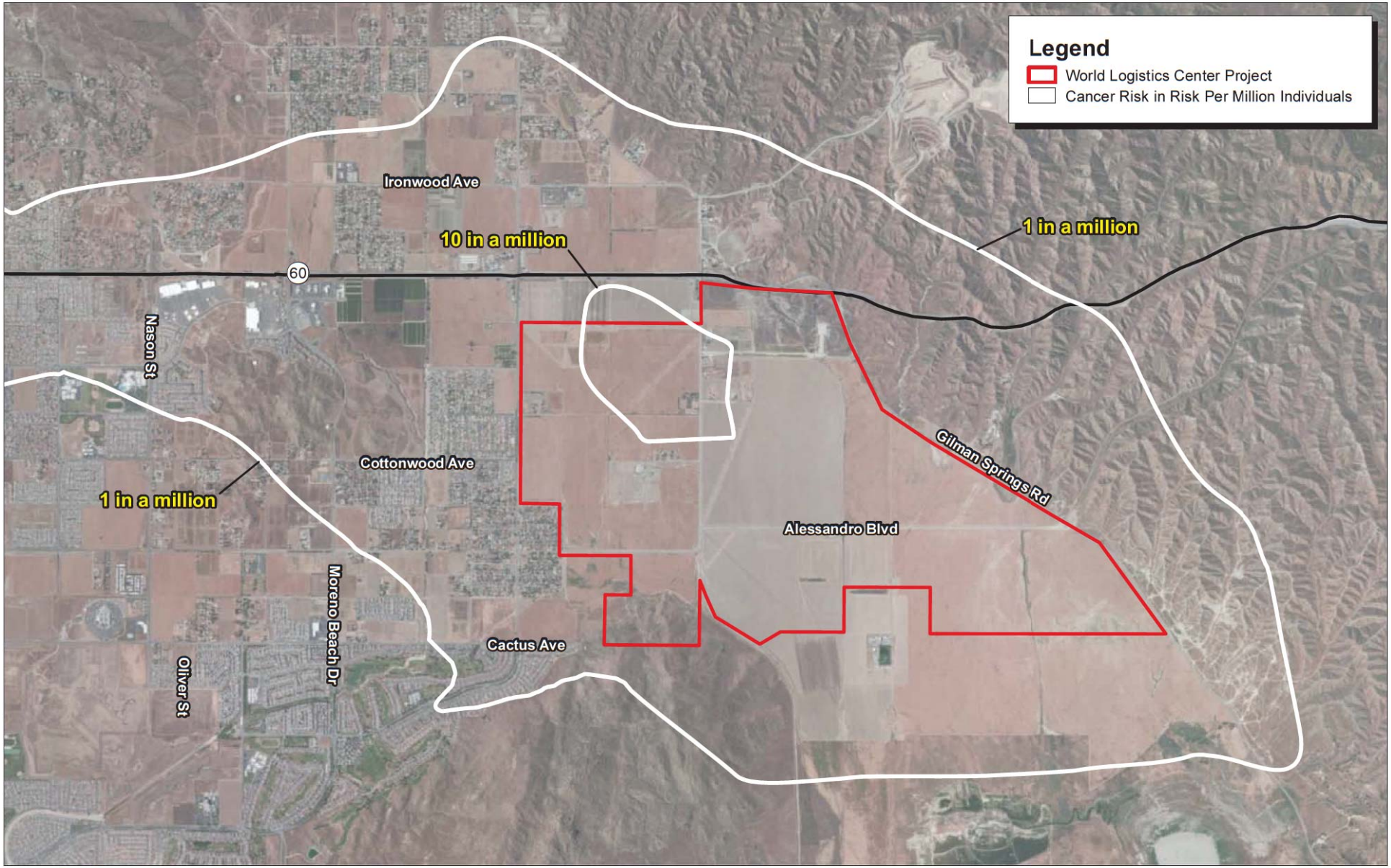

Source: FirstCarbon Solutions 2015.

FirstCarbon SOLUTIONS

3,500 1,750 0 3,500
Feet

Exhibit 27

Incremental Project Cancer Risks – 30-year Exposure Duration
Current OEHHA Guidance - With Mitigation – Close-in View

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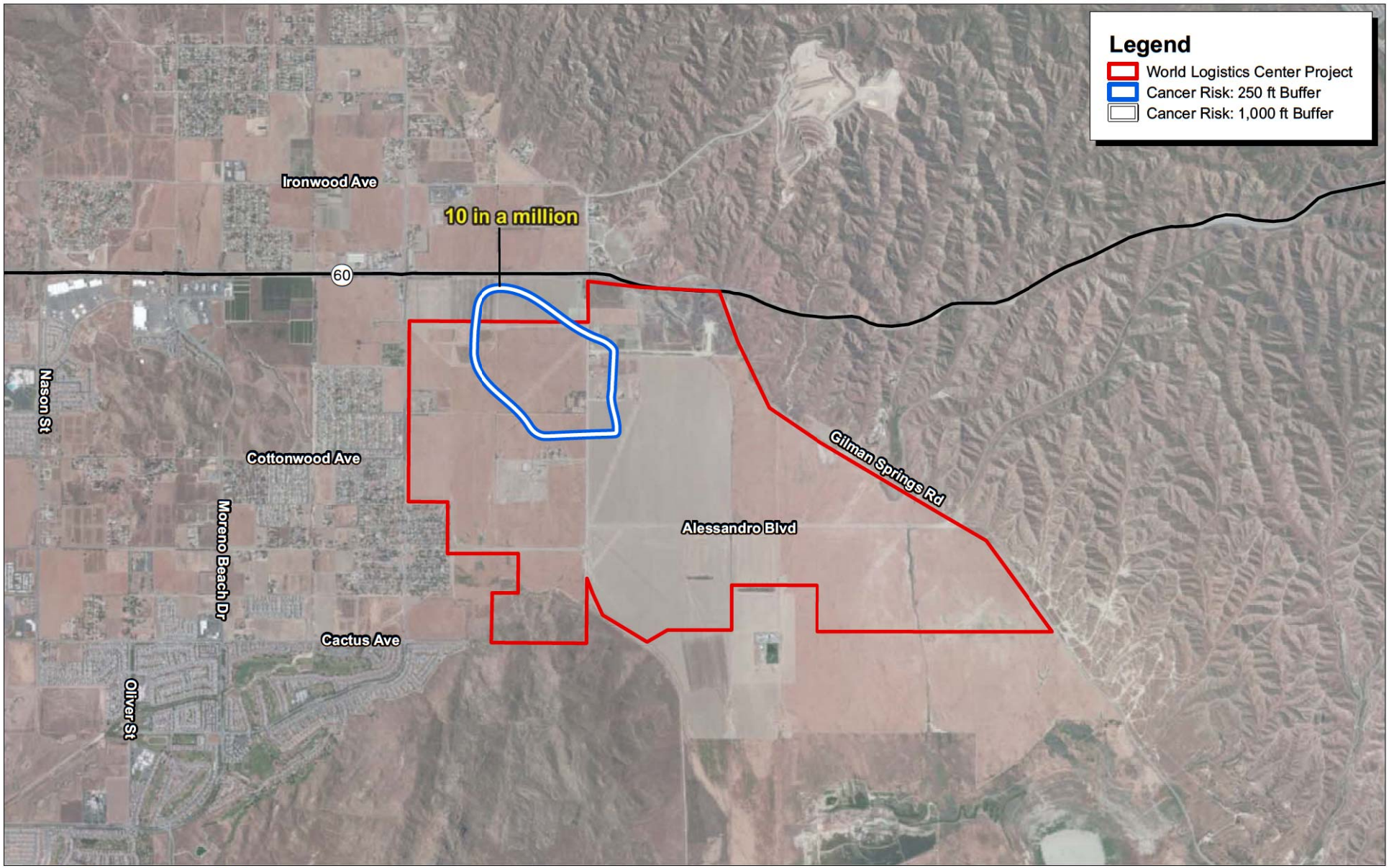

Source: FirstCarbon Solutions 2015.

FirstCarbon SOLUTIONS

3,500 1,750 0 3,500
Feet

Exhibit 28
Buffer Area Analysis – Current Design of 250 feet and a 1,000 foot Alternative Buffer Area

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Table 71: Buffer Area Analysis of Estimated Cancer Risks for Sensitive/Residential Receptors and the "Current OEHHA Guidance" with Mitigation

Receptor Location	Incremental Cancer Risk[1] (risk/million)		SCAQMD Cancer Risk Significance Threshold (risk/million)	Exceeds Threshold?
	250-Foot Buffer	1000-Foot Buffer		
Maximum risk anywhere in the modeling domain[2]	17.0	16.5	10	Yes
Maximum risk at existing residences within the project boundaries	17.0	16.5	10	Yes
Maximum risk at any existing residential area outside of the project boundaries[3]	4.3	3.9	10	No
Maximum risk at any undeveloped residentially zoned property outside of the project boundaries[4]	4.0	3.7	10	No

Notes:
(1) 30-year average exposures from 2015 to 2044 (includes diesel PM emissions from construction and operation)
(2) Location is at the existing residences within the boundaries of the project;
(3) Location is at the southwest corner of the project along Bay Avenue
(4) Location is at an undeveloped property zoned for residential at the southwest corner of the project
Source: see Appendix G.8

As discussed above, there are less than significant health risk impacts associated with the project after application of mitigation. However, under a very conservative application of the "Current OEHHA Guidance" to the proposed project, three homes within the project boundary could be identified as having a cancer risk in excess of the SCAQMD threshold. Although air quality significance thresholds have been established for outdoor environments, a significant portion of human exposure to air pollutants occurs indoors where people spend more than 90 percent of their time (EPA 2011). One approach to reduce exposure is the installation of high efficiency panel filters inside the HVAC system. Air filters and other air-cleaning devices are designed to remove pollutants from indoor air. Some are installed in the ductwork of a home's central heating, ventilating, and air-conditioning (HVAC) system to clean the air in the entire house. In studies of the effectiveness of air filtration systems in classrooms (SCAQMD 2009) and by the EPA in residences (EPA 2009b), the combination of an HVAC system with a high performance panel filter reduced indoor levels of fine particulate matter, $PM_{2.5}$ and smaller particles by 70 to 90 percent.

The use of a filtration system consisting of the application of filters with a rating of ASHRSE Standard 52.2 MERV-13 is sufficient to capture a significant portion of the diesel particulate matter. However, the filtration system would not remove the smallest of particles (less than approximately 0.01 to 0.2 micron in diameter). MERV-13 filters would, however, reduce particles in the range of 0.3 to 1 micron by up to 75 percent and particles larger than 1 micron by 90 percent (see Table 1 of the Addendum to ARB 2012). Based on measurement studies of the size distribution of the collected

DPM, approximately 0.1 to 10 percent of the total DPM mass includes particles between 0.01 and 0.2 micrometer in diameter, particles between 0.3 and 1 micrometer in diameter comprise 70 percent of the total DPM mass, and particles above 1 micrometer comprise 5 to 20 percent of the total DPM mass (DieselNet.com 2002).

Since the cancer risk from DPM is calculated from the mass of DPM emitted, the quantity of DPM reduced by the action of air filters would thus equate to a reduction in cancer risk. The application of MERV-13 air filter filtration system would result in a reduction of DPM exposures by approximately 70.5 percent. This is calculated in the following manner, based on the size of the DPM particle in micrometers (µm):

DPM size:	0.01 to 0.2 µm	0.3 to 1 µm	Greater than 1 µm
Calculation:	10% mass x 0% reduction	70% mass x 75% reduction	20% mass x 90% reduction
Reduction:	0% reduction	52.5% reduction	18% reduction

Attributing an adjustment for time that windows might be open, residents would be outside, or for different compounds that result in the cancer risk would reduce the efficacy of the filters by about 20 percent, bringing the total cancer risk reduction from the filters to 50 percent.

Absent the results of the HEI study, installation of air filters meeting the requirements discussed above on the three identified homes within the project area would reduce the OEHHA-calculated risk to below 10 in one million. The use of the filters would bring the OEHHA-calculated risk below the SCAQMD threshold eliminating any possible risk from the project on those three homes within the Specific Plan area. However, based upon the results of the HEI study, health risk impacts are less than significant and no further mitigation is required.

Cumulative Cancer Risk Impacts

Less than significant after mitigation. SCAQMD recommends that any given project's potential contribution to cumulative cancer risk impacts should be assessed using the same significance criteria as for project-specific impacts. Therefore, a project that has the potential to exceed any significance threshold on its own would also result in a cumulatively considerable significant impact. As noted from the results shown above, since the project would implement mitigation measures resulting in the cleanest on-road and off-road diesel equipment and such equipment has been shown through extensive health effects studies to not result in cancer. Therefore, the project would not result in a cumulatively considerable cancer risk impact.

Putting Cancer Risks Into Perspective

To better understand cancer risk, even though new technology diesel exhaust does not cause cancer, it helps to understand risk in other contexts. A risk level of 1 in a million implies a likelihood that up to one person, out of one million equally exposed people would contract cancer if exposed continuously (24 hours per day) to the levels of toxic air contaminants over a specified duration of time. This risk

would be an excess cancer risk that is in addition to any cancer risk borne by a person not exposed to these air toxics.[42] To put this risk in perspective, sample causes of death in the United States as well as the estimated risk of developing cancer from the project or in the South Coast Air Basin are shown in Table 72 and shown in the figure below. As an example, the risk of dying from accidental drowning is 1,000 in a million, which is 100 times more than the SCAQMD's threshold of 10 in a million and about 60 times greater than the project's maximum 30-year risk of developing cancer.

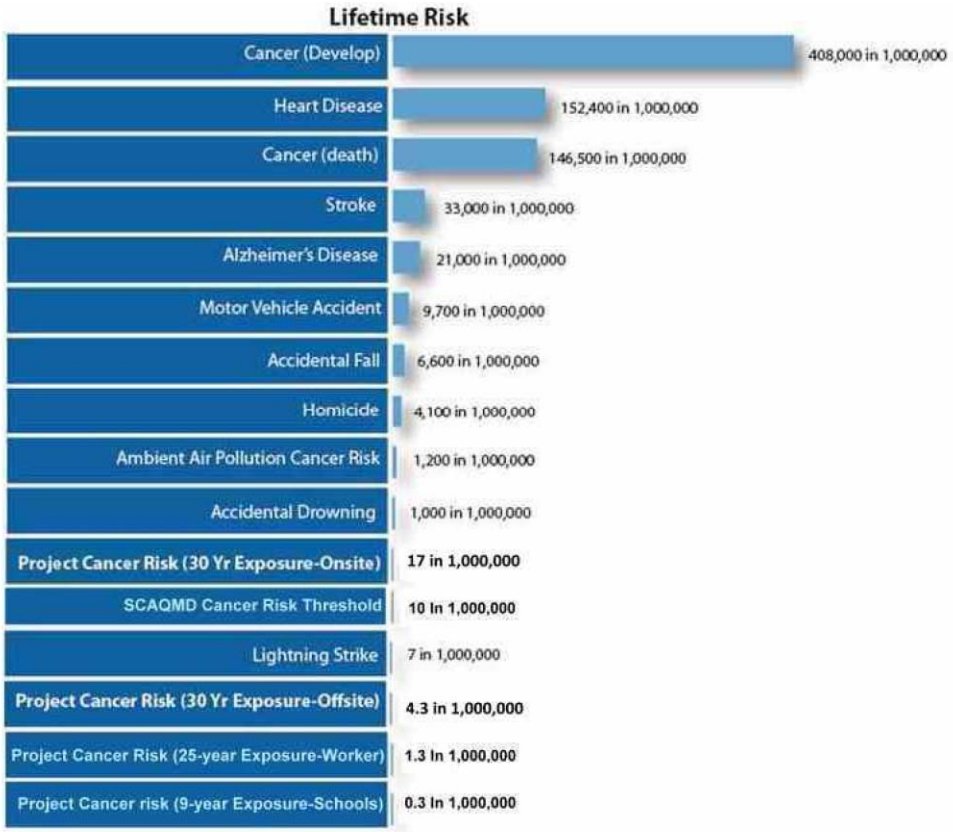


Table 72: Lifetime Risk Comparison

Cause of Death or Harm	Death Rate in 2010/1,000,000	Lifetime Risk (in a million)
Cancer (developing)*	NA	408,000
Heart disease	1,936	152,400
Cancer (death)	1,862	146,500
Chronic lower respiratory disease	447	35,200
Stroke	419	33,000
Alzheimer's disease	270	21,200

[42] Definition of a 1 in a million cancer risk from the US EPA, Technology Transfer Network Air Toxics, Glossary of Key Terms, Website: www.epa.gov/ttn/atw/natamain/gloss1.html.

Table 72 (cont.): Lifetime Risk Comparison

Cause of Death or Harm	Death Rate in 2010/1,000,000	Lifetime Risk (in a million)
Diabetes	224	17,600
Influenza and pneumonia	162	12,700
Motor vehicle accident	123	9,700
Chronic liver disease and cirrhosis	103	8,100
Accidental fall	84	6,600
Parkinson's disease	71	5,600
Homicide	53	4,100
Accidental drowning	12	1,000
Other transportation accident (non-motor vehicle - air, water)	9	670
South Coast Air Basin air pollution cancer risk (MATES-IV)	NA	367
Project residential cancer risk (30-year exposure - onsite)*	NA	17
SCAQMD cancer risk significance threshold*	NA	10
Lightning strike	0.09	7
Project residential cancer risk (30-year exposure - offsite)*	NA	4.3
Worker receptor cancer risk (25-year exposure)*	NA	1.3
Project school cancer risk (9-year exposure)*	NA	0.3

Notes:
NA and * = not applicable because these risks are from developing cancer, not dying from cancer. The other risks presented in the table are as a result of death from those causes.
Source of developing cancer: Based on 2008-2010 data from the National Cancer Institute (2014), approximately 40.8 percent of men and women will be diagnosed with cancer at some point during their lifetime (0.408 x 1,000,000).
Source of death rate (except lightning strike): Centers for Disease Control and Prevention 2013 (death rate per 100,000 population from Table 11 in the reference converted to per 1,000,000 by multiplying the rate by 10).
Source of lifetime risk (converted from death rate): death rate multiplied by the life expectancy in 2010 (78.7 years), rounded to the nearest hundred (if greater or equal to 1,000).
Source of South Coast Air Basin cancer risk: South Coast Air Quality Management District 2015 MATES-IV.
Source of project cancer risk: tables in this report (mitigated).
Source of lightning strikes death rate: National Weather Service 2013.

SECTION 6: GREENHOUSE GAS IMPACT ANALYSIS

6.1 - CEQA Guidelines

CEQA Guidelines define a significant effect on the environment as "a substantial, or potentially substantial, adverse change in the environment." To determine if a project would have a significant impact on greenhouse gases, the type, level, and impact of emissions generated by the project must be evaluated.

The following greenhouse gas significance thresholds are contained in Appendix G of the CEQA Guidelines, which were amendments adopted into the Guidelines on March 18, 2010, pursuant to SB 97. A significant impact would occur if the project would:

(a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or

(b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

6.2 - Less than Significant Impacts

Greenhouse Gas Inventory

Impact 4.7.5.1: The project would generate direct and indirect greenhouse gas emissions; however, these emissions would not have a significant impact on the environment.

Impact Analysis

Threshold of Significance

On December 5, 2008, the SCAQMD Governing Board adopted an interim greenhouse gas significance threshold for stationary sources, rules, and plans where the SCAQMD is the lead agency (SCAQMD permit threshold). Tier 3 of the threshold is recommended by the SCAQMD for industrial projects (South Coast Air Quality Management District 2015, SCAQMD Air Quality Significance Thresholds). The threshold consists of five tiers, as follows:

- Tier 1 consists of evaluating whether or not a project qualifies for any applicable exemption under CEQA. The project is not exempt under CEQA; therefore, go to Tier 2.
- Tier 2 consists of determining whether or not the project is consistent with a greenhouse gas reduction plan. If a project is consistent with a qualifying local greenhouse gas reduction plan, it does not have significant greenhouse gas emissions. There is no greenhouse gas reduction plan that could be used for CEQA purposes for this project; go to Tier 3.
- Tier 3 is a screening threshold level to determine significance using a 90 percent emission capture rate approach and is 10,000 $MTCO_2e$ per year (with construction emissions

amortized/averaged over 30 years and added to operational emissions). Project greenhouse gas emissions are compared with the threshold, 10,000 $MTCO_2e$ per year (see analysis below).

- Tier 4 was not approved in the interim greenhouse gas threshold.
- Tier 5 would allow the project proponent to purchase offsite mitigation to reduce greenhouse gas emissions to less than the screening level (in Tier 3).

Section 15064.4(b) of the CEQA Guideline amendments for greenhouse gas emissions state that a lead agency may take into account the following three considerations in assessing the significance of impacts from greenhouse gas emissions.

Consideration #1: The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting.

Consideration #2: Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.

Consideration #3: The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

AB 32 Capped and Uncapped Emissions

The ARB has designed a California cap-and-trade program that is enforceable and meets the requirements of AB 32. The program began on January 1, 2012, with an enforceable compliance obligation beginning with its 2013 greenhouse gas emissions inventory. Some of the project's greenhouse gas emissions are subject to the requirements of the AB 32 Cap and Trade Program and will have a greenhouse gas allocation based on current emissions levels. The AB 32 Cap-and-Trade Program has divided allocations into sectors. The transportation and electricity sectors would be covered by the cap-and-trade program. For more information regarding this program, please refer to Appendix D.2.

The SCAQMD has recognized that the greenhouse gas emissions associated with capped sources should not be counted for the purpose of determining what the greenhouse gas emissions are for facilities that will use electricity generated elsewhere. In September 2013, the SCAQMD adopted the following two Negative Declarations last year stating that greenhouse gas emissions subject to the ARB Cap-and-Trade Program do not count against the 10,000 $MTCO_2e$ significance threshold the SCAQMD applies when acting as a lead agency:

- Ultramar Inc. Wilmington Refinery Proposed Cogeneration Project (SCAQMD 2014)
- Phillips 66 Los Angeles Refinery Carson Plant - Crude Oil Storage Capacity Project (SCAQMD 2014)

In addition, the San Joaquin Valley Air Pollution Control District (SJVAPCD) has recently taken this one issue step further and adopted a policy: "CEQA Determinations of Significance for Projects Subject to ARB's GHG Cap-and-Trade Regulation" (SJVAPCD 2014). This policy applies when the SJVAPCD is the lead agency and when it is a responsible agency. In short, the SJVAPCD "has determined that GHG emissions increases that are covered under ARB's Cap-and-Trade regulation cannot constitute significant increases under CEQA . . ." The SJVAPCD classifies ARB's Cap-and-Trade Program as an approved greenhouse gas emission reduction plan or greenhouse gas mitigation program under CEQA Guidelines Section 15064(h) (3). Here are some other pertinent excerpts from that policy:

- Consistent with CCR §15064(h)(3), the District finds that compliance with ARB's Cap-and-Trade regulation would avoid or substantially lessen the impact of project-specific GHG emissions on global climate change.
- The District therefore concludes that GHG emissions increases subject to ARB's Cap-and-Trade regulation would have a less than significant individual and cumulative impact on global climate change.
- [I]t is reasonable to conclude that implementation of the Cap-and-Trade program will and must fully mitigate project-specific GHG emissions for emissions that are covered by the Cap-and-Trade regulation.
- [T]he District finds that, through compliance with the Cap-and-Trade regulation, project-specific GHG emissions that are covered by the regulation will be fully mitigated.

The policy acknowledges that "combustion of fossil fuels including transportation fuels used in California (on and off road including locomotives), not directly covered at large sources, are subject to Cap-and-Trade requirements, with compliance obligations starting in 2015." As such, the SJVAPCD concludes that greenhouse gas emissions associated with vehicle miles traveled cannot constitute significant increases under CEQA. This regulatory conclusion is therefore directly applicable to the project because vehicle miles traveled is by far the largest source of project greenhouse gas emissions.

Therefore, only the uncapped project emissions are compared with the SCAQMD significance threshold (see Tier 3 above).

Greenhouse Gas Inventory

For detailed assumptions used in estimating the greenhouse gas emissions, please refer to Section 4.3 and 4.4. The main greenhouse gas sources include the following:

- Removal of Vegetation (Land Use Change): The net removal of vegetation for construction results in a loss of the carbon sequestration in plants. However, planting of additional vegetation would result in additional carbon sequestration and would lower the carbon footprint of the project.
- Construction Activities: During construction of the project, greenhouse gases would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of which typically uses fossil-based fuels to operate.
- Gas, Electric, and Water Use: Natural gas use results in the emissions of methane (the major component of natural gas) and carbon dioxide from the combustion of natural gas. Electricity use can result in greenhouse gas production if the electricity is generated by combusting fossil fuel. California's water conveyance system is energy-intensive.
- Solid Waste Disposal: Solid waste generated by the project could contribute to greenhouse gas emissions in a variety of ways. Landfilling and other methods of disposal use energy for transporting and managing the waste, and they produce additional GHGs to varying degrees. Landfilling, the most common waste management practice, results in the release of methane from the anaerobic decomposition of organic materials. Methane is approximately 21 times more potent than carbon dioxide. Landfill methane can also be a source of energy. In addition, many materials in landfills do not decompose fully, and the carbon that remains is sequestered in the landfill and not released into the atmosphere.
- Motor Vehicle Use: Transportation associated with the proposed project would result in greenhouse gas emissions from the combustion of fossil fuels in daily automobile and truck trips.

Greenhouse gases identified by AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The project would generate a variety of greenhouse gases during construction and operation, including several defined by AB 32 such as carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons.

The project may also emit greenhouse gases that are not defined by AB 32. For example, the project may generate aerosols. Aerosols are short-lived particles, as they remain in the atmosphere for about one week. Black carbon is a component of aerosol, which is emitted from diesel fueled construction equipment and diesel vehicles that would access the project site. As a result of comments received on the Draft EIR, black carbon is estimated using the methods described in Section 4.4.3.

Water vapor could be emitted from evaporated water used for landscaping, but this is not a significant impact because water vapor concentrations in the upper atmosphere are primarily due to climate feedbacks rather than emissions from project-related activities.

The project would emit nitrogen oxides and volatile organic compounds, which are ozone precursors. Ozone is a greenhouse gas; however, unlike the other greenhouse gases, ozone in the troposphere (the layer we breathe) is relatively short-lived and can be reduced in the troposphere on a daily basis. Stratospheric (the layer above the troposphere) ozone can be reduced through reactions with other pollutants.

Certain greenhouse gases defined by AB 32 would not be emitted by the project. Perfluorocarbons and sulfur hexafluoride are typically used in industrial applications, none of which would be used by the project. Therefore, it is not anticipated that the project would emit perfluorocarbons or sulfur hexafluoride.

An upstream emission source (also known as life cycle emissions) refers to emissions that were generated during the manufacture of products to be used for construction of the project. Upstream emission sources for the project include but are not limited to emissions from the manufacture of cement, emissions from the manufacture of steel, and/or emissions from the transportation of building materials to the seller. The upstream emissions were not estimated because they are not within the control of the project and to do so would be speculative at this time. Additionally, the California Air Pollution Control Officers Association White Paper on CEQA and Climate Change supports this conclusion by stating, "The full life-cycle of GHG [greenhouse gas] emissions from construction activities is not accounted for . . . and the information needed to characterize [life-cycle emissions] would be speculative at the CEQA analysis level" (California Air Pollution Control Officers Association 2008, page 65). Additionally, the Office of Planning and Research removed mention of life cycle costs from Appendix F of the CEQA Guidelines in 2009 (OPR 2009). Therefore, pursuant to CEQA Guidelines Sections 15144 and 15145, upstream/life cycle emissions are speculative and no further discussion is necessary.

The project's operational emissions cannot be directly compared with the citywide community emissions inventory prepared for the City of Moreno Valley (Table 10, page 108) for the following reasons. First, the City's future inventory does not include the project's greenhouse gas emissions. The City's inventory was prepared prior to the Notice of Preparation of this project's EIR. The Notice of Preparation was released in January 2012 and the inventory was finalized in February 2012 (it was prepared in 2011).

Second, the methodology used to derive the City's inventory is different. The motor vehicle estimates in the City inventory use the Transportation Analysis and Simulation System (TRANSIMS) model, and includes trips that begin and/or end within the City limits and miles from all trips within Moreno Valley and half of the miles from trips that begin or end in Moreno Valley. The project's

motor vehicle emissions include emissions throughout the entire South Coast Air Basin as derived from a regional transportation model. Because of the fundamental differences in approach of estimating emissions, comparisons between the two inventories are meaningless.

Construction Emissions

The project would emit greenhouse gases from the combustion of fuels from vehicles and trucks used during construction and construction equipment, electricity used to pump the water used for the project, and hydrofluorocarbons from the installation of air conditioning for the offices. For assumptions used in estimating these emissions, please refer to Section 4.2 of this report. Greenhouse gas emissions from project construction equipment and worker vehicles are shown in Table 73. The emissions are from all phases of construction.

Table 73: Construction Greenhouse Gas Emissions (unmitigated)

Year	Emissions ($MTCO_2e$)
2015	14,315
2016	14,396
2017	19,052
2018	14,515
2019	25,605
2020	16,655
2021	18,318
2022	15,582
2023	18,028
2024	16,792
2025	18,041
2026	14,491
2027	17,097
2028	15,686
2029	11,789
2030	14,500
Total	**264,861**
Total: Averaged over 30 years	**8,829**
Capped: Fuel based emission sources averaged over 30 years	**8,823**
Uncapped: Refrigerant installation and construction waste averaged over 30 years	**6**

Notes:
$MTCO_2e$ = metric tons of carbon dioxide equivalents. Includes methane, carbon dioxide, hydrofluorocarbons, and black carbon.
Source of year by year emissions: CalEEMod unmitigated output and summary prepared by FirstCarbon Solutions | Michael Brandman Associates (Appendix A). Sources include onsite construction equipment, worker trips, haul trips, vendor trips, refrigerant installation for the air conditioning in the offices, construction waste, and water use.

Operational Emissions: Worst-Case 2012 Analysis

The project operational emissions for the worst-case analysis are shown in Table 74. The emissions do not reflect the existing onsite emissions. It is a worst-case analysis because the emissions assume that the motor vehicles and trucks at the completion of Phases 1 and 2 would have the same emission factors as in 2012. This is unrealistic because every year, there are newer trucks and cars on the road (and, consequently, to the project), which decreases the overall emissions. This worst-case analysis assumes that there have not been newer model trucks or cars in operation after 2012. As shown in the table, the project's uncapped emissions after Phase 1 and buildout are over the SCAQMD's significance threshold of 10,000 $MTCO_2e$ per year and are potentially significant.

Table 74: Worst-Case 2012 Analysis Greenhouse Gas Emissions (unmitigated)

Phase	Source	Emissions (tons/year)					Greenhouse Gas Emissions ($MTCO_2e$/ year)
		Carbon Dioxide	Methane	Nitrous Oxide	HFCs	Black Carbon	
Phase 1	**AB 32 Capped**						
	Mobile	*210,528*	*5.53*	*1.24*	*0.00*	*21.12*	*206,005*
	Other	*89,085*	*7.39*	*0.66*	*0.00*	*4.76*	*84,492*
	Total	*299,613*	*12.92*	*1.90*	*0.00*	*25.88*	*290,497*
	Uncapped						
	Total	5,477	285.27	0.00	0.35	0.00	**10,883**
						Significance Threshold	**10,000**
						Significant Impact?	**Yes**
Buildout	**AB 32 Capped**						
	Mobile	*370,445*	*9.75*	*2.18*	*0.00*	*37.19*	*362,507*
	Other	*137,884*	*8.11*	*1.16*	*0.00*	*2.65*	*127,503*
	Total	*508,329*	*17.86*	*3.34*	*0.00*	*39.84*	*490,010*
	Uncapped						
	Total	9,689	504.08	0.00	0.62	0.00	**19,237**
						Significance Threshold	**10,000**
						Significant Impact?	**Yes**

Notes:
$MTCO_2e$ = metric tons of carbon dioxide equivalents, which is calculated from the emissions (tons/year) by multiplying by the individual global warming potential (carbon dioxide – 1, methane – 21, nitrous oxide – 310, hydrofluorocarbons [HFCs] – 1500, black carbon 760) and converted to metric tons by multiplying by 0.9072.
Source of mobile emissions for Phase 1: FirstCarbon Solutions | Michael Brandman Associates using emission factors for the year 2012 (Appendices E.1 and E.3)
Source of mobile emissions for buildout: FirstCarbon Solutions | Michael Brandman Associates using emission factors for the year 2012 (Appendices E.1 and E.4)
Source of non-mobile capped emissions: sum of values in Table 76 (electricity, construction, yard trucks, water, natural gas, emergency generator, and forklift)
Source of uncapped emissions: sum of values in Table 76 (waste, land use change, refrigerants, sequestration)

Project Emissions, Reasonable Scenario

The emissions presented herein are a reasonable scenario, because unlike the worst-case scenario displayed above, the mobile emissions use emission factors for the actual year assessed. The motor vehicle and truck emissions for Phase 1 (2016 to 2022) use emission factors for the year 2022, whereas motor vehicle and truck emissions for Phase 2 (2023 to buildout, 2035) use emission factors for the year 2035. The unmitigated emissions do not take into account project design features and mitigation.

The emissions after completion of Phase 1 and at buildout are shown in Table 75. The format for this table differs from the one previously because it shows each "other/non-mobile" emission source individually. The shows the unmitigated project emissions at buildout by individual GHG (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, and black carbon). Those emissions are converted to $MTCO_2e$ based on the global warming potential of the gas/aerosol. The table also shows the emissions divided by AB 32 capped and uncapped emissions. AB 32 capped emissions are shown for informational purposes, as those emissions are not compared with the SCAQMD's significance threshold. As shown in the table, the uncapped emissions exceed the threshold and are significant.

A summary of project emissions year by year are shown in Table 76. As shown in both tables, the uncapped emissions are over the SCAQMD's significance threshold of 10,000 $MTCO_2e$ in the year 2022 and after. Therefore, emissions are potentially significant before mitigation.

Table 75: Project Greenhouse Gases (Detail, Phase 1 and Buildout, unmitigated)

Phase	Type of Emissions	Source	Emissions (tons/year)					Greenhouse Gas Emissions ($MTCO_2e$/year)
			Carbon Dioxide	Methane	Nitrous Oxide	Hydrofluoro-carbons	Black Carbon	
Phase 1	*AB 32 Capped*	*Mobile*	*191,328*	*1.63*	*1.27*	*0.000*	*0.968*	*174,629*
		Electricity	*67,123*	*3.09*	*0.64*	*0.000*	*0.000*	*61,183*
		Construction	*14,210*	*3.60*	*<0.01*	*0.000*	*3.771*	*15,591*
		Yard trucks	*3,183*	*0.00*	*0.00*	*0.000*	*0.000*	*2,888*
		Water	*1,326*	*0.06*	*0.01*	*0.000*	*0.000*	*1,207*
		Natural Gas	*500*	*0.01*	*0.01*	*0.000*	*0.012*	*465*
		Emergency Generator	*151*	*0.01*	*0.00*	*0.000*	*0.280*	*330*
		Forklifts	*120*	*0.00*	*0.00*	*0.000*	*0.004*	*112*
		Total Capped	*277,941*	*8.40*	*1.93*	*0.000*	*5.035*	*256,405*
	Uncapped	Waste	4,827	285.27	0.00	0.000	0.000	9,814
		Land use change	719	0.00	0.00	0.000	0.000	652
		Refrigerants	0	0.00	0.00	0.344	0.000	467
		Construction Refrigerant		0.00	0.00	0.010	0.000	13
		Sequestration	-69	0.00	0.00	0.000	0.000	-63
		Total Uncapped	5,477	285.27	0.00	0.354	0.000	**10,883**
							Significance Threshold	**10,000**
							Significant Impact?	**Yes**
Buildout	*AB 32 Capped*	*Mobile*	*297,342*	*1.54*	*2.17*	*0.00*	*0.663*	*270,846*
		Electricity	*118,844*	*5.46*	*1.13*	*0.00*	*0.000*	*108,237*
		Construction	*8,325*	*2.12*	*<0.01*	*0.00*	*1.784*	*8,823*

Table 75 (cont.): Project Greenhouse Gases (Detail, Phase 1 and Buildout, unmitigated)

Phase	Type of Emissions	Source	Emissions (tons/year)					Greenhouse Gas Emissions ($MTCO_2e$/year)
			Carbon Dioxide	Methane	Nitrous Oxide	Hydrofluoro-carbons	Black Carbon	
Buildout (*cont.*)	*AB 32 Capped (cont.)*	*Yard trucks*	*5,631*	*0.00*	*0.00*	*0.00*	*0.000*	*5,108*
		Electricity-convey water	*2,346*	*0.11*	*0.02*	*0.00*	*0.000*	*2,136*
		Natural Gas	*885*	*0.02*	*0.01*	*0.00*	*0.021*	*823*
		Emergency Generator	*266*	*0.01*	*0.00*	*0.00*	*0.495*	*583*
		Forklifts	*213*	*0.00*	*0.00*	*0.00*	*0.007*	*198*
		Total Capped	*433,852*	*9.26*	*3.33*	*0.00*	*2.970*	*396,754*
	Uncapped	Waste	8,539	504.66	0.00	0.00	0.000	17,361
		Land use change	1,272	0.00	0.00	0.00	0.000	1,154
		Refrigerants	0	0.00	0.00	0.61	0.000	827
		Construction refrigerant	0	-0.58	0.00	0.01	0.000	6
		Sequestration	-122	0.00	0.00	0.00	0.000	-111
		Total Uncapped	9,689	504.08	0.00	0.62	0.000	**19,237**
							Significance Threshold	**10,000**
							Significant Impact?	**Yes**

Notes:
$MTCO_2e$ = metric tons of carbon dioxide equivalents which is calculated from the emissions (tons/year) by multiplying by the individual global warming potential (carbon dioxide – 1, methane – 21, nitrous oxide – 310, hydrofluorocarbons – 1500, black carbon 760) and converted to metric tons by multiplying by 0.9072. <0.01 = less than 0.01
Landscaping emissions are negligible at less than one ton per year and are not included in the table.
Source of mobile emissions: Summary (Appendix E.1), Phase 1 (Appendix E.5), Buildout (Appendix E.7).
Source of construction emissions: CalEEMod output and spreadsheets (Appendix A), although note that construction would not occur at buildout but the average (over 30 years) is included according to SCAQMD recommendation. The estimated construction emission in 2022 are shown in the Phase 1 emissions. Construction uncapped emissions include leakage from refrigerant installation and construction waste.
Source of water, waste, electricity, and natural gas emissions: CalEEMod output for buildout (Appendix E.1)
Source of refrigerant emissions: Spreadsheet prepared by FirstCarbon Solutions | Michael Brandman Associates (Appendix E.1)
Source of sequestration: FirstCarbon Solutions | Michael Brandman Associates (refer to Section 4.4.2)

Table 76: Project Greenhouse Gases (Year by Year, Unmitigated)

Source	Greenhouse Gas Emissions ($MTCO_2e$/year)							
	2015	2016	2017	2018	2019	2020	2021	2022
AB 32 Capped Emissions								
Mobile	*0*	*15,982*	*31,964*	*53,274*	*74,584*	*114,159*	*153,734*	*174,629*
Electricity	*0*	*5,598*	*11,197*	*18,662*	*26,126*	*39,989*	*54,119*	*61,183*
*Construction fuel**	*14,306*	*14,388*	*19,040*	*14,503*	*25,584*	*16,633*	*18,307*	*15,578*
Yard trucks	*0*	*264*	*528*	*881*	*1,233*	*1,887*	*2,554*	*2,888*
Electricity to convey water	*0*	*110*	*221*	*368*	*516*	*789*	*1,068*	*1,207*
Natural gas	*0*	*43*	*85*	*142*	*199*	*304*	*411*	*465*
Generator	*0*	*30*	*60*	*101*	*141*	*216*	*292*	*330*
Forklifts	*0*	*10*	*20*	*34*	*48*	*73*	*99*	*112*
Total AB 32 Capped Emissions	*14,306*	*36,425*	*63,115*	*87,965*	*128,431*	*174,050*	*230,584*	*256,392*
Uncapped Emissions								
Waste	0	898	1,796	2,993	4,191	6,414	8,681	9,814
Land use change	0	60	119	199	279	426	577	652
Refrigerants	0	43	86	143	200	306	414	467
Construction refrigerant and waste*	9	9	11	11	21	22	11	4
Sequestration	0	-6	-11	-19	-27	-41	-56	-63
Total Uncapped Emissions	**9**	**1,004**	**2,001**	**3,327**	**4,664**	**7,127**	**9,627**	**10,874**
Threshold	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Significant impact?	No	No	No	No	No	No	No	Yes

Table 76 (cont.): Project Greenhouse Gases (Year by Year, Unmitigated)

Source	Greenhouse Gas Emissions ($MTCO_2e$/year)								
	2023	2024	2025	2026	2027	2028	2029	2030	Buildout
AB 32 Capped Emissions									
Mobile	*183,616*	*192,604*	*205,429*	*219,972*	*234,515*	*249,059*	*258,591*	*268,123*	*270,846*
Electricity	*64,116*	*69,981*	*76,246*	*83,364*	*90,455*	*97,573*	*102,239*	*106,904*	*108,237*
*Construction fuel**	*18,019*	*16,783*	*18,030*	*14,480*	*17,086*	*15,679*	*11,782*	*14,497*	*8,823*
Yard trucks	*3,026*	*3,303*	*3,599*	*3,935*	*4,269*	*4,605*	*4,825*	*5,046*	*5,108*
Electricity to convey water	*1,265*	*1,381*	*1,505*	*1,645*	*1,785*	*1,926*	*2,018*	*2,110*	*2,136*
Natural gas	*487*	*532*	*580*	*634*	*688*	*742*	*777*	*813*	*823*
Generator	*346*	*377*	*411*	*449*	*488*	*526*	*551*	*576*	*583*
Forklifts	*117*	*128*	*139*	*152*	*165*	*178*	*187*	*196*	*198*
Total AB 32 Capped Emissions	*270,992*	*285,089*	*305,939*	*324,631*	*349,451*	*370,288*	*380,970*	*398,265*	*396,754*
Uncapped Emissions									
Waste	10,284	11,225	12,230	13,371	14,509	15,651	16,399	17,147	17,361
Land use change	684	746	813	889	964	1040	1,090	1,140	1,154
Refrigerants	490	535	583	637	691	746	781	817	827
Construction refrigerant and waste*	9	10	11	11	11	7	7	2	6
Sequestration	-66	-72	-78	-85	-93	-100	-105	-110	-111
Total Uncapped Emissions	**11,401**	**12,444**	**13,559**	**14,823**	**16,082**	**17,344**	**18,172**	**18,996**	**19,237**
Threshold (applies to uncapped)	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Significant impact?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes:
$MTCO_2e$ = metric tons of carbon dioxide equivalents, which is calculated from the emissions (tons/year) by multiplying by the individual global warming potential (carbon dioxide – 1, methane – 21, nitrous oxide – 310, hydrofluorocarbons – 1,500, black carbon 760) and converted to metric tons by multiplying by 0.9072.
* The construction emissions as estimated for each year are shown in this table although for purposes of comparing to the threshold, the average construction emissions over 30 years is used.
Source of emissions for 2016-2030 for electricity, waste, yard trucks, generator, water, refrigerants, natural gas, and forklifts: a percentage of the emissions at buildout (Table 75) based on the square feet in operation in each respective year. Landscaping emissions are negligible at one ton/year.
Source of mobile emissions: FirstCarbon Solutions | Michael Brandman Associates (see Appendix E.1 for summary, Appendix E.5 for year 2022, and Appendix E.7 for buildout).
Source of construction emissions: Estimated using CalEEMod and procedures outlined in the spreadsheets prepared by FirstCarbon Solutions | Michael Brandman Associates.

Reductions

Several different sources were explored for feasible mitigation measures that may apply to the project, including the following:

- Office of the California Attorney General mitigation measures (Attorney General 2010). In the Response to Comments on the Draft EIR, a feasibility analysis of these measures was conducted. In the Response to Comments on the Draft EIR, a feasibility analysis of these measures was conducted.
- California Air Pollution Control Officers Association's report, *CEQA & Climate Change, Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act* (California Air Pollution Control Officers Association 2008). In the Response to Comments on the Draft EIR, a feasibility analysis of these measures was conducted.
- The Governor's Office of Planning and Research's 2008 *Technical Advisory*.
- California Air Pollution Control Officers Association's 2010 report, *Quantifying Greenhouse Gas Measures*.
- Notice of Preparation comment letter for the project from the Sierra Club, March 26, 2012.
- Comment letters on Draft EIR.

There are a variety of mitigation measures and project design features that would reduce greenhouse gas emissions, as summarized in Table 77.

Table 77: Greenhouse Gas Emissions Reduction Analysis

Category	Mitigation Measure or Project Design Feature[1]	Calculation Method and Reductions
Construction Fuel	Mitigation Measure 4.3.6.2A requires that construction off-road equipment be Tier 4.	This reduction was estimated in CalEEMod. This equipment has fewer $PM_{2.5}$ emissions (black carbon).
Construction Waste	Regulation in the California Green Building Standards require that projects divert (reduce or recycle) at least 50 percent of waste.	This reduction was estimated using the EPA's Waste Reduction Model (WARM) version 13.

Table 77 (cont.): Greenhouse Gas Emissions Reduction Analysis

Category	Mitigation Measure or Project Design Feature[1]	Calculation Method and Reductions
Vehicles: Local	Project design feature: Local bus service to the area is provided by the Riverside Transit Agency. Local bus routes would typically be extended into the project area when adequate demand is generated from this employment center. Future bus routes could circulate on available looped routes with adequate right-of-way along the major arterial roadways of Redlands Boulevard, Theodore Street, and Alessandro Boulevard. Likewise, the industrial collector roadways provide access to locations nearest building front entries.	The CAPCOA report's reduction measure TRT-1 indicates a 5.2 percent reduction in commute vehicle miles traveled for low-density suburbs for inclusion of a commute trip reduction program. The trip generation rates for which the unmitigated emissions were based are not necessarily based on development with pedestrian connections. Therefore, CalEEMod includes pedestrian connections as part of its mitigation module.
	Due to building scale, bus stops may be spread out by grouped entries or centralized gateway drive areas as compared to individual business entries.	However, the motor vehicle and truck emissions calculations are now based on more realistic trip lengths. In the Draft EIR, these measures were estimated to reduce local vehicle emissions by 3 percent. However, with the revised methods for estimating the emissions, this reduction would be more difficult to quantify. Therefore, no reductions are taken for these measures in order to provide a worst-case analysis.
	Mitigation Measure 4.3.6.4A: Class II bike lanes	
	Mitigation Measure 4.3.6.4A: Participate in Riverside County's rideshare program	
	Mitigation Measure 4.3.6.4A : Lockers for employees	
	Mitigation Measure 4.3.6.4A: Bicycle storage and changing rooms	
	Project design features: The project would have pedestrian circulation, sidewalks, and a multi-use trail.	
	Mitigation Measure 4.3.6.4A: Safe pedestrian connections	
	Mitigation Measure 4.3.6.4A: Parking for fuel efficient vehicles	
Long haul trucks	Mitigation Measure 4.3.6.3B: require model year 2010 diesel medium-heavy duty and diesel heavy-heavy duty trucks or later.	This was implemented by changing the emission factors for diesel medium-heavy duty and diesel heavy-heavy duty trucks to the EMFAC2014 for year 2010 and after. This measure is applied to the mitigated emissions.
Vehicles and Trucks	Pavley-I Regulation: A clean-car standard to reduce greenhouse gas emissions from new passenger vehicles (light duty automobiles and medium duty vehicles) from 2009 through 2016. Low Carbon Fuel Standard: A fuel standard that requires a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020.	EMFAC2014 provides emission factors for carbon dioxide that include these regulations. Therefore, both the unmitigated and mitigated emissions account for these regulations.

Table 77 (cont.): Greenhouse Gas Emissions Reduction Analysis

Category	Mitigation Measure or Project Design Feature[1]	Calculation Method and Reductions
Electricity and Natural Gas, Title 24	Mitigation Measure 4.16.4.6.1A and 4.16.4.6.1B would reduce electricity related emissions. In addition, the project would require LEED certification for buildings and would require buildings to exceed Title 24 (2008 version) by 10 percent or comply with the current version in place.	These measures are accounted for in CalEEMod through its mitigation measure module (10 percent beyond Title 24 checkbox).
Electricity, Lighting	Mitigation Measure 4.16.4.6.1B and 4.16.4.6.1C would reduce electricity from lighting.	This measure is accounted for in CalEEMod by using its mitigation measure module, "Install High Efficiency Lighting," with a reduction of 10 percent.
Solar	Mitigation Measure 4.16.4.6.1C requires that the project install solar panels to cover the electricity used for the office uses	According to the solar calculations contained in Appendix D.3 of this report, the solar would provide 19,739 MWh/year, which is 5.2 percent of the unmitigated electricity needs for the project.
Water	Mitigation Measure 4.16.1.6.1A would reduce outdoor water usage	CalEEMod mitigation for water-efficient irrigation systems (6.1% reduction, CalEEMod default)
	Mitigation Measure 4.16.1.6.1B would reduce interior water usage, including low flow fittings, fixtures and equipment.	CalEEMod mitigation for: - low-flow toilet (20% reduction in flow, CalEEMod default) - low flow bathroom faucet (32% reduction in flow, CalEEMod default) - low-flow kitchen faucet (18% reduction in flow, CalEEMod default) - low-flow shower (20% reduction in flow, CalEEMod default)
	Mitigation Measure 4.16.1.6.1C would allow reclaimed water to be used for irrigation.	No reductions are taken for the potential use of reclaimed water.
Waste	Mitigation Measure 4.7.5.1A: recycling and composting availability and reduce operational waste by at least 25 percent before 2020 and 75 percent after. Project design feature: The WLC Specific Plan (Section 5.1.6) requires that all development within the project provide enclosures or compactors for trash and recyclable materials.	Prior to the year 2020, the project would reduce operational waste by 25 percent. In 2020 and after, the project would reduce waste by 75 percent. A straight percent reduction is applied from the unmitigated waste emissions.

Notes:
[1] Project design features are from the Project Description in Section 1; mitigation measures are in Section 1.
[2] CAPCOA refers to the report, California Air Pollution Control Officers Association 2010
Source: FirstCarbon Solutions | Michael Brandman Associates.

Level of Significance Before Mitigation

Potentially significant impact.

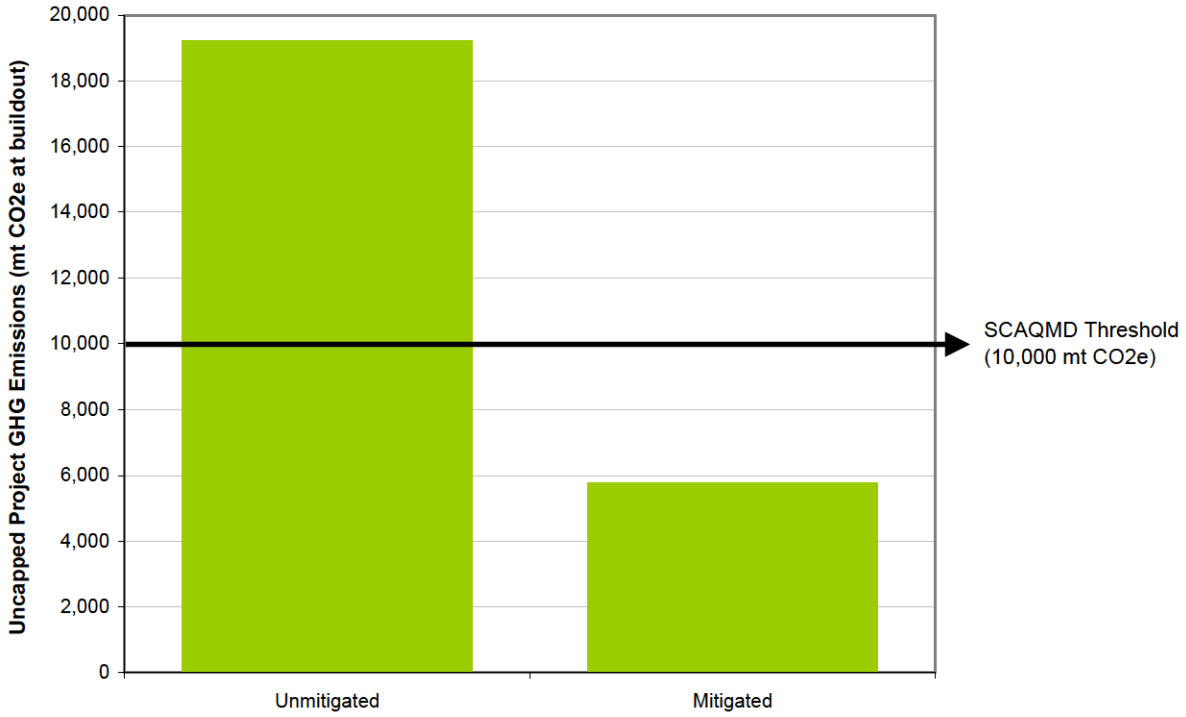
Mitigation Measures

Mitigation Measure 4.7.5.1A is required (see Section 1.4 in this report, Mitigation Measures Applied to Project, for the mitigation measure).

Level of Significance After Mitigation

Less than significant impact.

The figure below displays the unmitigated and mitigated uncapped greenhouse gas emissions at buildout. As shown in the figure, the uncapped emissions after implementation of mitigation are less than the significance threshold and are less than significant.



Mitigation measures to reduce mobile vehicle emissions would reduce greenhouse gas emissions by the quantity shown in Table 78. Motor vehicle reductions from regulation are included in the unmitigated and mitigated emissions. Mitigation reduces uncapped emissions by approximately 70 percent compared with unmitigated emissions. Mitigation reduces emissions that are capped by AB 32 by approximately 4 percent compared with unmitigated emissions. Reductions from solar are included in the capped emissions. Table 79 (page 300) displays the greenhouse gas emissions after reductions at buildout by greenhouse gas. Table 80 (page 301) displays the mitigated emissions year by year.

As shown in the tables, the project's uncapped greenhouse gas emissions do not exceed the significance threshold (10,000 $MTCO_2e$ per year) after mitigation and therefore would result in a less than significant impact.

Table 78: Greenhouse Gas Reductions at Buildout (with Reductions)

Type of Emissions	Source	Greenhouse Gas Emissions ($MTCO_2e$) at Buildout		
		Unmitigated	Reductions from Mitigation	With Reductions (Mitigated)
AB 32 Capped Emissions	*Mobile*	*270,846*	*-466*	*270,380*
	Electricity	*108,237*	*-9,131*	*99,106*
	*Construction fuel**	*8,823*	*-1,072*	*7,751*
	Yard trucks	*5,108*	*0*	*5,108*
	Electricity to convey water	*2,136*	*-207*	*1,929*
	Natural Gas	*823*	*-80*	*743*
	Generator	*583*	*-298*	*285*
	Forklifts	*198*	*0*	*198*
	Solar (electricity)	*0*	*-5,676*	*-5,676*
	Total Capped	*396,754*	*-16,930*	*379,824*
	Significant?	*No*	—	*No*
Uncapped Emissions	Waste	17,361	-13,021	4,340
	Land use change	1,154	0	1,154
	Refrigerants	827	0	827
	Construction*	6	-441	-435
	Sequestration	-111	0	-111
	Total Uncapped	**19,237**	**-13,462**	**5,775**
	Threshold	10,000	—	10,000
	Significant?	Yes	—	No

Notes:
$MTCO_2e$ = metric tons of carbon dioxide equivalents which is calculated from the emissions (tons/year) by multiplying by the individual global warming potential (carbon dioxide – 1, methane – 21, nitrous oxide – 310, hydrofluorocarbons – 1500, black carbon 760) and converted to metric tons by multiplying by 0.9072.
* Construction would not occur at buildout; however, according to SCAQMD recommendations, it is included as the average over 30 years. Construction uncapped emissions are from refrigerant installation and construction waste.
For information on the regulation and mitigation calculations, please refer to Table 77.
Source: FirstCarbon Solutions | Michael Brandman Associates (refer to appendices).

Table 79: Project Greenhouse Gases (Detail, Buildout, Mitigated)

Source	Emissions (tons/year)					Greenhouse Gas Emissions ($MTCO_2e$)
	Carbon Dioxide	Methane	Nitrous Oxide	Hydrofluoro-carbons	Black Carbon	
AB 32 Capped						
Mobile	*296,835*	*1.54*	*2.17*	*0.00*	*0.65*	*270,380*
Electricity	*108,818*	*5.00*	*1.04*	*0.00*	*0.00*	*99,106*
Construction (average)	*8,325*	*2.12*	*0.00*	*0.00*	*0.23*	*7,751*
Yard trucks	*5,631*	*0.00*	*0.00*	*0.00*	*0.00*	*5,108*
Water	*2,119*	*0.10*	*0.02*	*0.00*	*0.00*	*1,929*
Natural Gas	*796*	*0.01*	*0.01*	*0.00*	*0.02*	*743*
Emergency Generator	*314*	*0.00*	*0.00*	*0.00*	*0.00*	*285*
Forklifts	*213*	*0.00*	*0.00*	*0.00*	*0.01*	*198*
Solar	*-6,232*	*-0.29*	*-0.06*	*0.00*	*0.00*	*-5,676*
Total Capped	*416,819*	*8.48*	*3.18*	*0.00*	*0.91*	*379,824*
Uncapped						
Waste	2,135	126.17	0.00	0.00	0.00	4,340
Land use change	1,272	0.00	0.00	0.00	0.00	1,154
Refrigerants	0	0.00	0.00	0.61	0.00	827
Construction	0	-23.70	0.00	0.01	0.00	-435
Sequestration	-122	0.00	0.00	0.00	0.00	-111
Total Uncapped	**3,285**	**102.47**	**0.00**	**0.62**	**0.00**	**5,775**
Threshold	NA	NA	NA	NA	NA	10,000
For informational purposes: total uncapped without construction						6,210
					Significant?	No

Notes:
$MTCO_2e$ = metric tons of carbon dioxide equivalents which is calculated from the emissions (tons/year) by multiplying by the individual global warming potential (carbon dioxide – 1, methane – 21, nitrous oxide – 310, hydrofluorocarbons – 1,500, black carbon 760) and converted to metric tons by multiplying by 0.9072.
Landscaping emissions are negligible at less than one ton per year and are not included in the table.
Source of mobile emissions: Summary (Appendix E.1), Phase 1 (Appendix E.6), Buildout (Appendix E.8).
Source of construction emissions: CalEEMod output and spreadsheets (Appendix A), although note that construction would not occur at buildout but the average (over 30 years) is included according to SCAQMD recommendation.
Uncapped construction emissions are from refrigerant installation and construction waste (negative value because recycling would reduce emissions associated with construction waste).
Source of water, waste, electricity, and natural gas emissions: CalEEMod output for buildout (Appendix E.1)
Source of refrigerant emissions: Spreadsheet prepared by FirstCarbon Solutions | Michael Brandman Associates (Appendix E.1)
Source of sequestration: FirstCarbon Solutions | Michael Brandman Associates (refer to Section 4.4.2)

Table 80: Project Operational Greenhouse Gases Year by Year (with Reductions)

Source	2015	2016	2017	2018	2019	2020	2021	2022
AB 32 Capped Emissions								
Mobile	*0*	*15,596*	*31,193*	*51,988*	*72,783*	*111,403*	*150,023*	*170,413*
Electricity	*0*	*5,126*	*10,252*	*17,087*	*23,922*	*36,616*	*49,553*	*56,022*
*Construction fuel**	*12,267*	*12,227*	*16,203*	*12,343*	*22,003*	*14,126*	*15,647*	*13,279*
Yard trucks	*0*	*264*	*528*	*881*	*1233*	*1,887*	*2,554*	*2,888*
Electricity to convey water	*0*	*100*	*200*	*333*	*466*	*713*	*965*	*1,090*
Natural gas	*0*	*38*	*77*	*128*	*179*	*274*	*371*	*420*
Generator	*0*	*15*	*30*	*49*	*69*	*105*	*143*	*161*
Forklifts	*0*	*10*	*20*	*34*	*48*	*73*	*99*	*112*
Solar	*0*	*-294*	*-587*	*-979*	*-1,370*	*-2,097*	*-2,838*	*-3,208*
Total AB 32 Capped Emissions	*12,267*	*33,082*	*57,916*	*81,864*	*119,333*	*163,100*	*216,517*	*241,177*
Uncapped Emissions								
Waste	0	673	1,347	2,245	3,143	1,603	2,170	2,453
Land use change	0	60	119	199	279	426	577	652
Refrigerants	0	43	86	143	200	306	414	467
Construction*	-675	-675	-900	-900	-1,671	-1704	-852	-354
Sequestration	0	-6	-11	-19	-27	-41	-56	-63
Total Uncapped Emissions	**-675**	**95**	**641**	**1,668**	**1,924**	**590**	**2,253**	**3,155**
Threshold	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Significant impact?	No	No	No	No	No	No	No	No

Table 80 (cont.): Project Operational Greenhouse Gases Year by Year (with Reductions)

Source	Greenhouse Gas Emissions with Reductions ($MTCO_2e$/year)								
	2023	2024	2025	2026	2027	2028	2029	2030	Buildout
AB 32 Capped Emissions									
Mobile	*179,751*	*189,088*	*202,413*	*217,523*	*232,633*	*247,743*	*257,647*	*267,550*	*270,380*
Electricity	*58,707*	*64,077*	*69,814*	*76,331*	*82,824*	*89,342*	*93,614*	*97,885*	*99,106*
*Construction fuel**	*15,497*	*14,405*	*15,580*	*12,320*	*16,251*	*14,981*	*11,396*	*14,006*	*7,751*
Yard trucks	*3,026*	*3,303*	*3,599*	*3,935*	*4,269*	*4,605*	*4,825*	*5,046*	*5,108*
Electricity to convey water	*1,143*	*1,247*	*1,359*	*1,486*	*1,612*	*1,739*	*1,822*	*1,905*	*1,929*
Natural gas	*440*	*480*	*523*	*572*	*621*	*669*	*701*	*733*	*743*
Generator	*169*	*184*	*201*	*220*	*238*	*257*	*269*	*282*	*285*
Forklifts	*117*	*128*	*139*	*152*	*165*	*178*	*187*	*196*	*198*
Solar	*-3,362*	*-3,670*	*-3,998*	*-4,371*	*-4,743*	*-5,117*	*-5,361*	*-5,606*	*-5,676*
Total AB 32 Capped Emissions	*255,488*	*269,242*	*289,630*	*308,168*	*333,870*	*354,397*	*365,100*	*381,997*	*379,824*
Uncapped Emissions									
Waste	2,571	2,806	3,057	3,343	3,627	3,912	4,099	4,287	4,340
Land use change	684	746	813	889	964	1,040	1,090	1,140	1,154
Refrigerants	490	535	583	637	691	746	781	817	827
Construction*	-707	-755	-858	-855	-858	-562	-562	-161	-435
Sequestration	-66	-72	-78	-85	-93	-100	-105	-110	-111
Total Uncapped Emissions	**2,972**	**3,260**	**3,517**	**3,929**	**4,331**	**5,036**	**5,303**	**5,973**	**5,775**
Threshold	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Significant impact?	No	No	No	No	No	No	No	No	No

Notes:
$MTCO_2e$ = metric tons of carbon dioxide equivalents, which is calculated from the emissions (tons/year) by multiplying by the individual global warming potential (carbon dioxide – 1, methane – 21, nitrous oxide – 310, hydrofluorocarbons – 1500, black carbon 760) and converted to metric tons by multiplying by 0.9072.
* The construction emissions for each year are shown though for purposes of comparing to the threshold, the average construction emissions over 30 years is used. Uncapped construction emissions are negative because recycling the waste results in a reduction in emissions.
Source of emissions for 2016-2030 for electricity, waste, yard trucks, generator, water, refrigerants, natural gas, and forklifts: a percentage of the emissions at buildout (Table 75) based on the square feet in operation in each respective year. Landscaping emissions are negligible at one ton/year.
Source of mobile emissions: FirstCarbon Solutions | Michael Brandman Associates (see Appendix E.1 for summary, Appendix E.6 for year 2022, and Appendix E.8 for buildout).

Context of Greenhouse Gas Emissions

This analysis has concluded that the project's contributions to climate change are significant and unavoidable. Given (i) the global nature of climate change; (ii) uncertainty regarding the extent to which anthropogenic sources are the true causes of any increase in the earth's temperatures; and (iii) the lack of emissions controls being imposed by the world's most rapidly developing nations, even if there is a causal relationship between anthropogenic emissions and an increase in the world's temperature, it is possible to argue that an individual project's cumulative contribution to climate change is not foreseeable and is not cumulatively considerable.

For example, according to a forecast by the California Air Resources Board, if no actions are taken to reduce greenhouse gas emissions, California emissions would be approximately 509 million $MTCO_2e$ ($MMTCO_2e$) by the year 2020, up from approximately 431 $MMTCO_2e$ in 1990. Reductions from AB 32 (and the Scoping Plan) are to come from the following sectors (California Air Resources Board 2014):

- Energy: 25 $MMTCO_2e$
- Transportation: 23 $MMTCO_2e$
- High global warming potential: 5 $MMTCO_2e$
- Waste: 2 $MMTCO_2e$
- Cap-and-trade: 23 $MMTCO_2e$

Unfortunately, these savings are not nearly enough to compensate for the expected increase in emissions in developing countries during the same period. For example, according to projections from the Energy Information Administration,[43] emissions from Brazil are expected to increase from 235 MMT in 1990 to 534 MMT in 2020, i.e. they will have increased by 299 MMT between 1990 and 2020, more than three times the amount of emissions which will be saved by the implementation of AB 32. Even that increase, however, is insignificant compared to the 6764 MMT projected increase in China's 2020 carbon emissions during the same period of time (2293 MMT in 1990 versus 9057 in 2020) or even the 1178 MMT projected increase in India's carbon emissions (573 MMT in 1990 versus 1751 MMT in 2020). Consequently, steps taken to reduce greenhouse gas emissions in California will be ineffective with respect to global emissions, unless similar steps to reduce emissions are taken in developing countries.

In addition, the project may bring cargo containers from the Port of Los Angeles or the Port of Long Beach. The cargo containers likely originate in another country. The transportation of those goods from another country (such as China) to the ports is not included in this analysis because the emissions are speculative at this time. The emissions that occur in other countries and in international waters are not under the jurisdiction of this project or the United States. It is speculative to determine

[43] United States Energy Information Administration. 2011. Emissions of Greenhouse Gases in the United States, 2009. Website: ftp://ftp.eia.doe.gov/environment/057309.pdf. Accessed January 8, 2013.

if the project has any influence over the quantity of cargo containers brought to the United States; that is more likely a result of consumer choice or other factor.

Greenhouse Gas Reduction Plans

Impact 4.7.5.2: The project would not conflict with an applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

Impact Analysis

This impact assesses whether the project would conflict with any applicable plans, policies, or regulations, as discussed below.

Federal and State Reduction Strategies

Table 81 evaluates the consistency of the proposed project with the various federal and state energy conservation and other regulations related to greenhouse gas emissions.

Table 81: Project Compliance with Federal/State Greenhouse Gas Reduction Strategies

Strategy	Project Compliance
Mandatory Codes	
California Green Building Code The Cal Green Code prescribes a wide array of measures that would directly and indirectly result in reduction of GHG emissions from the Business as Usual Scenario (California Building Code). The mandatory measures that are applicable to nonresidential projects include site selection, energy efficiency, water efficiency, materials conservation and resource efficiency, and environmental quality measures.	**Compliant.** The project will be required to adhere to the non-residential mandatory measures as required by the Cal Green Code.
Energy Efficiency Measures	
Energy Efficiency Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts including new technologies, and new policy and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California (including both investor-owned and publicly owned utilities).	**Compliant with Mitigation Incorporated.** The proposed project will comply with current California Building Code requirements for building construction, which will help reduce greenhouse gas emissions. In addition, the project will include various energy efficient building design features and mitigation (MM 4.16.4.6.1A, B, and C) to help further reduce greenhouse gas emissions.
Renewables Portfolio Standard Achieve a 33 percent renewable energy mix statewide.	**Not applicable.** The project is not part of the State's power generation grid, but would install solar pursuant to Mitigation Measure 4.16.4.6.1.C.
Green Building Strategy Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.	**Compliant.** The proposed project will comply with current California Building Code requirements for building construction.

Table 81 (cont.): Project Compliance with Federal/State Greenhouse Gas Reduction Strategies

Strategy	Project Compliance
Water Conservation and Efficiency Measures	
Water Use Efficiency Continue efficiency programs and use cleaner energy sources to move and treat water. Approximately 19 percent of all electricity, 30 percent of all natural gas, and 88 million gallons of diesel are used to convey, treat, distribute and use water and wastewater. Increasing the efficiency of water transport and reducing water use would reduce greenhouse gas emissions.	**Compliant with Mitigation Incorporated.** The Specific Plan outlines a number of water conservation measures, and MM 4.16.1.6.1A, B, and C will help reduce potential water use even further.
Solid Waste Reduction Measures	
Increase Waste Diversion, Composting, and Commercial Recycling, and Move Toward Zero-Waste Increase waste diversion from landfills beyond the 50 percent mandate to provide for additional recovery of recyclable materials. Composting and commercial recycling could have substantial greenhouse gas reduction benefits. In the long term, zero-waste policies that would require manufacturers to design products to be fully recyclable may be necessary.	**Compliant with Mitigation Incorporated.** Data available from the California Integrated Waste Management Board indicates that the City of Moreno Valley has not achieved the 50 percent diversion rate. The project will comply with Mitigation Measure 4.7.5.1A to help increase solid waste diversion, composting, and recycling. The measure would also have a goal to reduce waste by 75 percent after 2020.
Transportation and Motor Vehicle Measures	
Vehicle Climate Change Standards AB 1493 (Pavley) required the State to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of GHG emissions from passenger vehicles and light-duty trucks. Regulations were adopted by the ARB in September 2004. **Light-Duty Vehicle Efficiency Measures** Implement additional measures that could reduce light-duty greenhouse gas emissions. For example, measures to ensure that tires are properly inflated can both reduce greenhouse gas emissions and improve fuel efficiency. **Adopt Heavy- and Medium-Duty Fuel and Engine Efficiency Measures** Regulations to require retrofits to improve the fuel efficiency of heavy-duty trucks that could include devices that reduce aerodynamic drag and rolling resistance. This measure could also include hybridization of and increased engine efficiency of vehicles. **Low Carbon Fuel Standard** ARB identified this measure as a Discrete Early Action Measure. This measure would reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020.	**Compliant.** The project does not involve the manufacture of vehicles. However, vehicles that are purchased and used within the project site would comply with any vehicle and fuel standards that the ARB adopts or has adopted. In addition, the project would require medium-heavy and heavy-heavy duty trucks be 2010 or newer (MM 4.3.6.3B).

Table 81 (cont.): Project Compliance with Federal/State Greenhouse Gas Reduction Strategies

Strategy	Project Compliance
Regional Transportation-Related Greenhouse Gas Targets Develop regional greenhouse gas emissions reduction targets for passenger vehicles. Local governments will play a significant role in the regional planning process to reach passenger vehicle greenhouse gas emissions reduction targets. Local governments have the ability to directly influence both the siting and design of new residential and commercial developments in a way that reduces GHGs associated with vehicle travel.	**Compliant.** Specific regional emission targets for transportation emissions do not directly apply to this project; regional greenhouse gas reduction target development is outside the scope of this project. The project will comply with any plans developed by the City.
Measures to Reduce High Global Warming Potential Gases ARB has identified Discrete Early Action measures to reduce greenhouse gas emissions from the refrigerants used in car air conditioners, semiconductor manufacturing, and consumer products. ARB has also identified potential reduction opportunities for future commercial and industrial refrigeration, changing the refrigerants used in auto air conditioning systems, and ensuring that existing car air conditioning systems do not leak.	**Compliant.** New products used or serviced on the project site would comply with future ARB rules and regulations.
Notes: AB = Assembly Bill ARB = California Air Resources Board Source of project compliance: based on project information and the analysis contained in this report.	

City of Moreno Valley Climate Action Strategy

The City of Moreno Valley Energy Efficiency and Climate Action Strategy (Strategy) was approved in October 2012. The Strategy identifies ways that the City can reduce energy and water consumption and greenhouse gas emissions as an organization (its employees and the operation of its facilities) and outlines the actions that the City can encourage and community members can employ to reduce their own energy and water consumption and greenhouse gas emissions. The policies in the document are to reduce greenhouse gas emissions in 2010 by 15 percent by 2020. The following consists of an analysis of project consistency with the policies in the Strategy.

- R2-T1: Land Use Based Trips and VMT Reduction Policies. Encourage the development of Transit Priority Projects along High Quality Transit Corridors identified in the SCAG Sustainable Communities Plan, to allow a reduction in vehicle miles traveled.
  - Project consistency: Not applicable. A Transit Priority Project is one that has at least 50 percent residential use based on area, at least 20 units per acre and is within a ½ mile of a major transit stop or High Quality Transit Corridor. A High Quality Transit Corridor is defined as one with 15-minute frequencies during peak commute hours. The proposed project does not include a residential component and is not along a High Quality Transit

Corridor nor are there any High Quality Transit Corridors or major transit stops in the vicinity of the project area. As a result, the strategy is not applicable.

- R2-T3: Employment-Based Trip Reductions. Require a Transportation Demand Management (TDM) program for new development to reduce automobile travel by encouraging ride-sharing, carpooling, and alternative modes of transportation.
  - Project consistency: Consistent with implementation of Mitigation Measure 4.3.6.4A.
- R2-E1: New Construction Residential Energy Efficiency Requirements. Require energy efficient design for all new residential buildings to be 10 percent beyond the current Title 24 standards.
  - Project consistency: Not applicable; this measure applies to residential projects.
- R2-E2: New Construction Residential Renewable Energy. Facilitate the use of renewable energy (such as solar (photovoltaic) panels or small wind turbines) for new residential developments. Alternative approach would be the purchase of renewable energy resources offsite.
  - Project consistency: This measure applies to residential projects; nevertheless, the project is incorporating solar pursuant to Mitigation Measure 4.16.4.6.1C.
- R2-E5: New Construction Commercial Energy Efficiency Requirements. Require energy efficient design for all new commercial buildings to be 10% beyond the current Title 24 standards.
  - Project consistency: Consistent with Mitigation Measure 4.16.4.6.1C.
- R3-E1: Energy Efficient Development, and Renewable Energy Deployment Facilitation and Streamlining. Updating of codes and zoning requirements and guidelines to further implement green building practices. This could include incentives for energy efficient projects.
  - Project consistency: Not applicable.
- R3-L2: Heat Island Plan. Develop measures that address "heat islands." Potential measures include using strategically placed shade trees, using paving materials with a Solar Reflective Index of at least 29, an open grid pavement system, or covered parking.
  - Project consistency: Consistent; the Specific Plan indicates that vehicle parking areas are to be landscaped to provide a shade canopy (50 percent coverage at maturity).
- R2-W1: Water Use Reduction Initiative. Consider adopting a per capita water use reduction goal, which mandates the reduction of water use of 20 percent per capita with requirements applicable to new development and with cooperative support of the water agencies.
  - Project consistency: Consistent. California Green Building Standards Code, Chapter 5, Division 5.3, Section 5.303.2 requires that indoor water use be reduced by 20 percent. Section 5.304.3 requires irrigation controllers and sensors. The Specific Plan (Section 4.2.2) also contains a variety of water conservation features. MM 4.16.1.6.1A, B, and C also provides water reduction measures.

- R3-W1: Water Efficiency Training and Education. Work with EMWD and local water companies to implement a public information and education program that promotes water conservation.
    - Project consistency: Not applicable.
- R2-S1: City Diversion Program. For Solid Waste, consider a target of increasing the waste diverted from the landfill to a total of 75 percent by 2020.
    - Project consistency: Consistent. The project would be consistent with this target with implementation of MM 4.7.5.1A.

As outlined above and in Appendix D.2 of this report, Project Consistency with Moreno Valley Energy Efficiency and Climate Action Strategy, of this report, many of the measures are not applicable to the project. The project is consistent with the applicable measures in the Strategy; therefore, the project is consistent with the Strategy.

City of Moreno Valley General Plan

The City adopted its General Plan in 2006. The General Plan does not contain policies directly related to greenhouse gases; however, it does have some air quality policies that are related to a greenhouse gas reduction, which are explored in Table 82 below. As shown in the table, the project is consistent with the applicable policies.

Table 82: City of Moreno Valley General Plan Air Quality Policies

Objective or Policy	Project Consistency
Objective 6.6 Promote land use patterns that reduce daily automotive trips and reduce trip distance for work, shopping, school, and recreation.	**Consistent.** The project is providing employment opportunities to Moreno Valley and the surrounding area.
6.6.1 Provide sites for new neighborhood commercial facilities within close proximity to the residential areas they serve.	**Not applicable.** The project does not propose the development of neighborhood commercial facilities or residential dwellings.
6.6.2 Provide multi-family residential development sites in close proximity to neighborhood commercial centers in order to encourage pedestrian instead of vehicular travel.	**Not applicable.** The project is industrial and does not propose the development of residential uses.
6.6.3 Locate neighborhood parks in close proximity to the appropriate concentration of residents in order to encourage pedestrian and bicycle travel to local recreation areas.	**Not applicable.** The project is industrial and does not propose the development of residential uses.
Objective 6.7 Reduce mobile and stationary source air pollutant emissions.	**Consistent.** The project would be implementing feasible mitigation measures to reduce mobile and stationary emissions (MM 4.3.6.3B, 4.3.6.3C, 4.3.6.3D, and 4.3.6.4A).

Table 82 (cont.): City of Moreno Valley General Plan Air Quality Policies

Objective or Policy	Project Consistency
6.7.1 Cooperate with regional efforts to establish and implement regional air quality strategies and tactics.	**Not applicable.** This measure is beyond the scope of the project; the City will continue to work with the SCAQMD in regional planning efforts.
6.7.2 Encourage the financing and construction of park-and-ride facilities.	**Not applicable.** The project consists of industrial uses; a park and ride on the project would not be feasible.
6.7.3 Encourage express transit service from Moreno Valley to the greater metropolitan areas of Riverside, San Bernardino, Orange and Los Angeles Counties.	**Not applicable.** No express mass transit facilities are designated on the project site or planned on the project site; therefore, this measure is beyond the scope of the project.
6.7.6 Require building construction to comply with the energy conservation requirements of Title 24 of the California Administrative Code.	**Consistent.** The project is required to comply with Title 24 requirements.
Notes: Policies 6.7.4 and 6.7.5 are discussed in Section 5 of this report, *Air Quality Impact Analysis, Sensitive Receptors* (Impact AIR-4). Source of objective and policy: Moreno Valley General Plan (2006). Source of project consistency: FirstCarbon Solutions | Michael Brandman Associates based on project information.	

Southern California Association of Governments, Regional Transportation Plan, Sustainable Communities Strategy 2012- 2035

The Sustainable Communities Strategy (SCS) within the Regional Transportation Plan demonstrates the region's ability to attain and exceed the greenhouse gas emission reduction targets set by the ARB. The SCS outlines the plan for integrating the transportation network and related strategies with an overall land use pattern that responds to projected growth, housing needs, changing demographics, and transportation demands. The regional vision of the SCS maximizes current voluntary local efforts that support the goals of SB 375, as evidenced by several Compass Blueprint Demonstration Projects and various county transportation improvements. The SCS focuses the majority of new housing and job growth in high-quality transit areas and other opportunity areas in existing main streets, downtowns, and commercial corridors, resulting in an improved jobs-housing balance and more opportunity for transit-oriented development. This overall land use development pattern supports and complements the proposed transportation network that emphasizes active transportation and transportation demand management.

The RTP/SCS exceeds its greenhouse gas emission-reduction targets set by ARB by achieving a 9 percent reduction by 2020 and a 16 percent reduction by 2035 compared to the 2005 level on a per capita basis.

The assumptions regarding Moreno Valley that SCAG used in its analysis are shown in Table 83.

Table 83: Southern California Association of Governments Assumptions for Moreno Valley

Year	Population	Households	Employment
2008	187,400	51,100	32,300
2020	213,700	60,000	48,000
2035	255,200	72,800	64,400
Source: Southern California Association of Governments 2012.			

Strategies in the RTP that include the Local Jurisdiction as a responsible party, that could be applicable to the project, and that pertain to air quality or greenhouse gases are shown in Table 84. Many of the strategies are similar to the project's mitigation measures and project design features.

Table 84: Select Regional Transportation Plan Strategies

RTP Strategy	Responsible Party	Project Consistency
Encourage the use of range-limited battery electric and other alternative fueled vehicles through policies and programs, such as, but not limited to, neighborhood oriented development, complete streets, and Electric (and other alternative fuel) Vehicle Supply Equipment in public parking lots.	Local Jurisdictions, COGs, SCAG, CTCs	Consistent with MM 4.3.6.3B (non-diesel yard trucks), 4.3.6.3C (alternative fuel station), and 4.3.6.4A (electric vehicle charging stations).
Support projects, programs, and policies that support active and healthy community environments that encourage safe walking, bicycling, and physical activity by children, including, but not limited to development of complete streets, school siting policies, joint use agreements, and bicycle and pedestrian safety education.	Local Jurisdictions, SCAG	Consistent with MM 4.3.6.4A (bicycle lanes, storage lockers, and pedestrian connections/pathways).
Engage in a strategic planning process to determine the critical components and implementation steps for identifying and addressing open space resources, including increasing and preserving park space, specifically in park-poor communities.	Local Jurisdictions, SCAG	The project is consistent with City's goal of conserving open space. As compared to the Moreno Highlands Specific Plan, the proposed project would change the zoning on 910 acres of the California Department of Fish and Wildlife Conservation Buffer Area from residential to open space. The proposed project preserves the zoning of 74 acres of open space in the southwest corner of the project site for passive open space and recreation uses. Finally, a network of trails have been proposed within the project site to provide public trail access to the Lake Perris Recreational Area and the San Jacinto Wildlife Area.

Table 84 (cont.): Select Regional Transportation Plan Strategies

RTP Strategy	Responsible Party	Project Consistency
Develop first-mile/last-mile strategies on a local level to provide an incentive for making trips by transit, bicycling, walking, or neighborhood electric vehicle or other zero emission vehicle options.	CTCs, Local Jurisdictions	Consistent with MM 4.3.6.4A (Riverside County's Rideshare Program), bicycle lanes, and pedestrian access.
Encourage transit fare discounts and local vendor product and service discounts for residents and employees of transit oriented development/high quality transit areas or for a jurisdiction's local residents in general who have fare media.	Local Jurisdictions	Not applicable. This measure is for areas in transit oriented development.
Encourage the implementation of a Complete Streets policy that meets the needs of all users of the streets, roads and highways - including bicyclists, children, persons with disabilities, motorists, neighborhood electric vehicle (NEVs) users, movers of commercial goods, pedestrians, users of public transportation and seniors - for safe and convenient travel in a manner that is suitable to the suburban and urban contexts within the region.	Local Jurisdictions, COGs, SCAG, CTCs	Although the project is not implementing what is labeled as a "Complete Streets" policy, the project would be including bicycle lanes and pedestrian access (MM 4.3.6.4A) and would implement handicapped access pursuant to current regulations.
Support work-based programs that encourage emission reduction strategies and incentivize active transportation commuting or ride-share modes.	SCAG, Local Jurisdictions	Consistent through MM 4.3.6.4A (Riverside County's Rideshare Program; designated parking for carpool/van pools).
Develop infrastructure plans and educational programs to promote active transportation options and other alternative fueled vehicles, such as neighborhood electric vehicles, and consider collaboration with local public health departments, walking/biking coalitions, and/or Safe Routes to School initiatives, which may already have components of such educational programs in place.	Local Jurisdictions	Consistent with MM 4.3.6.4A (bicycle lanes, pedestrian access, electric vehicle charging) and 4.3.6.3C (alternative fueling infrastructure)
Encourage the development of telecommuting programs by employers through review and revision of policies that may discourage alternative work options.	Local Jurisdictions, CTCs	Not applicable. Tenants may choose to implement telecommuting if feasible.
Emphasize active transportation and alternative fueled vehicle projects as part of complying with the Complete Streets Act (AB 1358).	State, SCAG, Local Jurisdictions	Consistent with MM 4.3.6.3C (alternative fueling station) and MM 4.3.6.4A (electric vehicle charging stations)

Notes:
SCAG = Southern California Association of Governments
CTCs = county transportation commissions
COGs = subregional councils of governments
Source: Southern California Association of Governments 2012.

Scoping Plan

The California State Legislature adopted AB 32 in 2006. AB 32 focuses on reducing greenhouse gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) to 1990 levels by the year 2020. Pursuant to the requirements in AB 32, the ARB adopted the Climate Change Scoping Plan (Scoping Plan) in 2008, which outlines actions recommended to obtain that goal. The First Update to the Scoping Plan was approved in 2014. The Scoping Plan calls for an "ambitious but achievable" reduction in California's greenhouse gas emissions, cutting approximately 30 percent from business-as-usual emission levels projected for 2020, or about 10 percent from 2008 levels. On a per-capita basis, that means reducing annual emissions of 14 tons of carbon dioxide for every man, woman and child in California down to about 10 tons per person by 2020.

The Scoping Plan contains a variety of strategies to reduce the State's emissions. As shown in Table 85, the project does not conflict with applicable measures in the Scoping Plan.

Table 85: Analysis of Scoping Plan Reduction Measures

Scoping Plan Reduction Measure	Consistency Analysis
1. California Cap-and-Trade Program Linked to Western Climate Initiative. Implement a broad-based California Cap-and-Trade program to provide a firm limit on emissions. Link the California cap-and-trade program with other Western Climate Initiative Partner programs to create a regional market system to achieve greater environmental and economic benefits for California. Ensure California's program meets all applicable AB 32 requirements for market-based mechanisms.	**Not Applicable.** This cap-and-trade system covers products or services (such as electricity) and the cost of the cap-and-trade system would be transferred to the consumers. Large industrial uses are the most likely source of participants for this program, and it is not likely individual logistics warehousing will be an active participant in this program.
2. California Light-Duty Vehicle Greenhouse Gas Standards. Implement adopted standards and planned second phase of the program. Align zero-emission vehicle, alternative and renewable fuel and vehicle technology programs with long-term climate change goals.	**Not applicable.** This is a statewide measure that cannot be implemented by an individual project applicant or lead agency. The standards would be applicable to the light-duty vehicles that would access the project site.
3. Energy Efficiency. Maximize energy efficiency building and appliance standards; pursue additional efficiency including new technologies, policy, and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California.	**Applicable.** This is a measure for the state to increase its energy efficiency standards. However, the project will increase its energy efficiency through existing regulation and project design by implementing current Title 24 energy standards and green building characteristics. In addition, Mitigation Measures 4.16.4.6.1A and B would increase energy efficiency, and MM 4.16.4.6.1C would require exceeding Title 24 (2008 version) by 10 percent or comply with the version in place at the time.

Table 85 (cont.): Analysis of Scoping Plan Reduction Measures

Scoping Plan Reduction Measure	Consistency Analysis
4. Renewable Portfolio Standard. Achieve 33 percent renewable energy mix statewide. Renewable energy sources include (but are not limited to) wind, solar, geothermal, small hydroelectric, biomass, anaerobic digestion, and landfill gas.	**Partially applicable.** This is a measure applicable to the utility provider for the project. However, the project would incorporate onsite solar (MM 4.16.4.6.1C) to reduce its electricity related emissions. In addition, Moreno Valley Electric Utility purchases its power from Southern California Edison, which is subject to the Renewable Portfolio Standard.
5. Low Carbon Fuel Standard. Develop and adopt the Low Carbon Fuel Standard.	**Partially Applicable.** This is a statewide measure that cannot be implemented by an individual project applicant or lead agency. However, the standard would be applicable to the fuel used by vehicles that would access the project site.
6. Regional Transportation-Related Greenhouse Gas Targets. Develop regional greenhouse gas emissions reduction targets for passenger vehicles. This measure refers to SB 375.	**Partially Applicable.** The project is not directly related to developing greenhouse gas emission reduction targets. However, this project will improve the jobs/housing ratio for the City and thereby help reduce commuter-related emissions. For a discussion of the Regional Transportation Plan and the Sustainable Communities Strategy, refer to the discussion above.
7. Vehicle Efficiency Measures. Implement light-duty vehicle efficiency measures.	**Partially Applicable.** The standards would be applicable to the light-duty vehicles that would access the project site.
8. Goods Movement. Implement adopted regulations for the use of shore power for ships at berth. Improve efficiency in goods movement activities.	**Not Applicable.** The project does not propose any changes to maritime, rail, or intermodal facilities or forms of transportation. However, the project is related to goods movement and provides logistics warehousing away from port areas.
9. Million Solar Roofs Program. Install 3,000 MW of solar-electric capacity under California's existing solar programs.	**Partially Applicable.** This measure is to increase solar throughout California, which is being done by various electricity providers and existing solar programs. Pursuant to MM 4.16.4.6.1C, the project will be incorporating onsite solar panels.
10. Medium/Heavy-Duty Vehicles. Adopt medium and heavy-duty vehicle efficiency measures.	**Partially Applicable.** This is a statewide measure that cannot be implemented by an individual project applicant or lead agency. However, the standards would be applicable to the vehicles that access the project site.
11. Industrial Emissions. Require assessment of large industrial sources to determine whether individual sources within a facility can cost-effectively reduce greenhouse gas emissions and provide other pollution reduction co-benefits. Reduce greenhouse gas emissions from fugitive emissions from oil and gas extraction and gas transmission. Adopt and implement regulations to control fugitive methane emissions and reduce flaring at refineries.	**Not Applicable.** This measure would apply to the direct greenhouse gas emissions at major industrial facilities emitting more than 0.5 $MMTCO_2e$ (500,000 $MTCO_2e$) per year. It is not anticipated that the project would emit more than 500,000 $MTCO_2e$ per year, and the project is not considered a single facility but would consist of multiple warehouse buildings. The project is a "project" under CEQA but not one facility, which is why a programmatic EIR is being prepared. This measure would be applicable to power plants, refineries, cement plants, and other related sources. In

Table 85 (cont.): Analysis of Scoping Plan Reduction Measures

Scoping Plan Reduction Measure	Consistency Analysis
	addition, the majority of emissions from the project are indirect, and not direct, since the majority of the emissions are from trucks and motor vehicles.
12. High Speed Rail. Support implementation of a high-speed rail system.	**Not applicable.** This is a statewide measure that cannot be implemented by a project applicant or lead agency.
13. Green Building Strategy. Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.	**Applicable.** The state now requires development to use various green building practices. The project will implement green building strategies through existing regulation. In addition, Mitigation Measures 4.16.4.6.1A and B would increase energy efficiency and MM 4.16.4.6.1C would require that the project exceed Title 24 (2008 version) by 10 percent or comply with the current version.
14. High Global Warming Potential Gases. Adopt measures to reduce high global warming potential gases.	**Applicable.** This would be applicable to the high global warming potential gases that would be used by the project (such as in air conditioning).
15. Recycling and Waste. Reduce methane emissions at landfills. Increase waste diversion, composting, and commercial recycling. Move toward zero-waste.	**Not Applicable.** The project would not contain a landfill. The State wishes to help increase waste diversion. The project would reduce waste with implementation of mitigation.
16. Sustainable Forests. Preserve forest sequestration and encourage the use of forest biomass for sustainable energy generation.	**Not Applicable.** No forested lands exist onsite.
17. Water. Continue efficiency programs and use cleaner energy sources to move and treat water.	**Not Applicable.** This is a measure for state and local agencies. However, the project would reduce water through project design (i.e., implementation of the Specific Plan) and Mitigation Measures 4.16.6.1A, B, and C in the EIR.
18. Agriculture. In the near-term, encourage investment in manure digesters and at the five-year Scoping Plan update determine if the program should be made mandatory by 2020.	**Not Applicable.** No grazing, feedlot, or other agricultural activities that generate manure occur onsite or are proposed to be implemented by the project.
Source of ARB Scoping Plan Reduction Measure: California Air Resources Board 2008b. Source of Project Consistency or Applicability: FirstCarbon Solutions | Michael Brandman Associates.	

Executive Order S-3-05

As discussed in Impact 4.7.5.1, the SCAQMD developed its thresholds based on consistency with California Executive Order S-3-05. As shown in Impact 4.7.5.1, the project's uncapped greenhouse gas emissions would not exceed the SCAQMD's industrial threshold. Therefore, the project would not conflict with Executive Order S-3-05. This impact is less than significant.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

Mitigation Measures 4.3.6.3B, 4.3.6.3C, 4.3.6.3D, 4.3.6.4A, 4.7.5.1A, 4.16.1.6.1A, 4.16.1.6.1B, 4.16.1.6.1C, 4.16.4.6.1A, 4.16.4.6.1B, and 4.16.4.6.1C are required.

Level of Significance After Mitigation

Less than significant impact.

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SECTION 7: ALTERNATIVES ANALYSIS FOR AIR QUALITY AND GREENHOUSE GAS EMISSIONS

The following analysis provides an estimate of regional emissions for air quality and greenhouse gases. This analysis does not provide an alternatives analysis for the localized analysis or health risk assessment.

7.1 - Alternative Summary

Operational air pollutant and greenhouse gas emissions are estimated for the project alternatives shown in Table 86. For a full description of the project alternatives, please refer to the project EIR.

Table 86: Project Alternatives

Alternative	Logistics Warehousing (percent of project)	Light Industrial	Retail Comm.	Prof./Med Office	Other
Proposed Project	2610 acres 40.6 msf	0 acres 0 msf	0 acres 0 msf	0 acres 0 msf	74.3 acres open space
No Project - No Build	0 acres 0 msf	0 acres 0 msf	0 acres 0 msf	0 acres 0 msf	2610 acres agriculture
No Project - Moreno Highlands Specific Plan	0 acres 0 msf	361 acres	106.5 acres 1.1 msf	0 acres 0 msf	709.3 acres 4,051 du
Alternative 1 Reduced Density	2610 acres 28 msf (70%)	0 acres 0 msf	0 acres 0 msf	0 acres 0 msf	74.3 acres open space
Alternative 2 Mixed Use A	1400 acres 22 msf (54%)	1000 acres 20 msf	50 acres 0.5 msf	100 acres 1 msf	70 acres open space
Alternative 3 Mixed Use B	603 acres 10 msf (25%)	0 acres 0 msf	0 acres 0 msf	0 acres 0 msf	1,146 acres residential 6,532 du 861 acres open space and facilities
Alternative Sites	40.6 msf (100%)	0 acres 0 msf	0 acres 0 msf	0 acres 0 msf	0 acres 0 msf

Notes:
msf = million square feet; du = residential dwelling units
Source: World Logistics Center EIR.

7.2 - Operational Emissions for Alternatives

7.2.1 - Emissions Summary

The Draft EIR estimated alternatives emissions using CalEEMod version 2011. For the revised analysis, the new version of CalEEMod was used, version 2013.2.2. Only the operational emissions

were estimated; construction emissions were not estimated, as it is assumed that construction-related emissions would be similar for most of the alternatives.

Air Pollutant Criteria Emissions

Table 87 displays a summary of the operational regional air pollutant emissions for the alternatives. As shown in the table, all alternatives except for the "no project" alternative exceed the SCAQMD significance thresholds for VOC, NO_x, CO, PM_{10}, and $PM_{2.5}$. Alternative 2 has the highest overall emissions, because the alternative has high vehicle miles traveled.

Table 87: Operational Regional Air Pollutant Emissions (Alternatives)

Alternative	Emissions (pounds/day)				
	VOC	NO_X	CO	PM_{10}	$PM_{2.5}$
Proposed Project	593	1,097	1,396	1,121	304
No project	<1	5	3	352	77
No project: Moreno Highlands Specific Plan	765	712	3,494	973	300
Alternative 1: Reduced Density	415	768	977	785	213
Alternative 2: Mixed Use A	1,307	1,794	5,683	2,135	603
Alternative 3: Mixed Use B	569	762	2,912	960	278
Alternative sites	593	1,097	1,396	1,121	304
Threshold	**55**	**55**	**550**	**150**	**55**
Exceed threshold?	Yes	Yes	Yes	Yes	Yes

Notes:
VOC = volatile organic compounds NO_X = nitrogen oxides CO = carbon monoxide
PM_{10} and $PM_{2.5}$ = particulate matter Sulfur dioxide emissions are negligible
Source of proposed project and alternative sites: Table 63 buildout (mitigated, without accounting for the reduction from existing uses).
Source of no project: Table 38 (existing).
Source of no project - Moreno Highlands Specific Plan: Table 90.
Source of Alternative 1: 70 percent of the proposed project emissions.
Source of Alternative 2: Table 92.
Source of Alternative 3: Table 94.
Source of significance thresholds: South Coast Air Quality Management District 2015.

Greenhouse Gas Emissions

The greenhouse gas emissions for the alternatives are shown in Table 88. The emissions are divided into emissions capped under AB 32 and those that are uncapped. Consistent with SCAQMD's approach in the Phillips 66 Negative Declaration, only uncapped emissions are compared against the threshold. As shown in the table, none of the uncapped emissions for the alternatives exceed the SCAQMD's threshold. The emissions are *with* mitigation/regulation and are *without* construction emissions. Construction emissions are excluded because it is assumed that construction-related emissions for the alternatives would be similar to the project. Additionally, construction emissions

primarily consist of capped emissions and would not be directly compared with the SCAQMD greenhouse gas emissions threshold.

Table 88: Greenhouse Gas Emissions (Operation, Buildout, Alternatives)

Alternative	AB 32 Capped Emissions with Mitigation ($MTCO_2e$/year)	Uncapped Emissions with Mitigation ($MTCO_2e$/year)
Proposed project	372,073	6,210
No project	59	0
No project: Moreno Highlands Specific Plan	264,089	2,601
Alternative 1: Reduced Density	260,451	4,347
Alternative 2: Mixed Use A	574,763	6,856
Alternative 3: Mixed Use B	222,235	2,925
Alternative sites	372,073	6,210
Threshold	**None**	**10,000**

Notes:
$MTCO_2e$ = metric tons of carbon dioxide equivalents.
Source of proposed project and alternative sites: Table 78 at buildout (mitigated, without construction emissions).
Source of no project: CalEEMod output (tractor emissions, Appendix E.1).
Source of no project - Moreno Highlands Specific Plan: Table 91.
Source of Alternative 1: 70 percent of the proposed project emissions.
Source of Alternative 2: Table 93.
Source of Alternative 3: Table 95.

7.2.2 - Moreno Highlands Specific Plan

Modeling Assumptions

The Moreno Highlands Specific Plan (MHSP) Draft EIR (1991) indicated that there would be 7,763 total dwelling units, divided into 5,900 single family residential units (76 percent), 791 attached single family homes (10 percent), and 1,072 multi-family homes (14 percent). During review of the Draft EIR, a comment was made that this alternative could not be built as originally approved because since that time the State had purchased 1,000 acres as a buffer for the San Jacinto Wildlife Area. Therefore, the number of dwelling units in the alternatives analysis was reduced to 4,051 total dwelling units. The percentages of 76 percent single family and 24 percent multi-family are applied to the new total dwelling units. The emissions estimates assume that there would be 3,078 single family residences, 972 low-rise apartments, and 1.1 million sq ft of office.

The emissions from the MHSP in the Draft EIR were estimated using CalEEMod 2011. To be consistent with the estimates in this revised analysis, the emissions were re-estimated using CalEEMod version 2013.2.2 using the following assumptions:

- Trip generation for the original MHSP was forecast to be 178,608 average daily trips (see project Traffic Impact Analysis, 2014). For the revised MHSP, the trips were reduced by 33 percent to 119,668 per day.
- Operational in 2030.
- Residential units would have only natural gas fireplaces, pursuant to SCAQMD Rule 445.
- Land use change from agriculture to urban (1,177 acres).
- Trip lengths for the home-work trips were changed from the CalEEMod default (14.7 miles) to a more specific trip length (27 miles) appropriate to the project location, as shown in Table 89.
- All other variables used CalEEMod defaults.

Table 89: Home to Work Trip Lengths for Moreno Highlands Specific Plan

Distance	Assumed Distance (miles)	Share (%)	Weighted Average (miles)
Less than 10 miles	5	27.8	1.4
10 to 24 miles	17	29.8	5.1
25 to 50 miles	38	22.2	8.4
Greater than 50 miles	65	20.2	12.1
Total	—	100.0	**27.0**

Source of Share: U.S. Census Bureau 2013.
Source of Assumed Distance: the midpoint of the range; for the range for greater than 50 miles is the approximate distance to Los Angeles from Moreno Valley.
Source of Weighted Average: distance multiplied by the share divided by 100.

Emissions

The operational criteria air pollutant emissions for the Moreno Highlands Specific Plan are shown in Table 90 and the greenhouse gas emissions are shown in Table 91.

Table 90: Moreno Highlands Specific Plan Operational Emissions

Source	Emissions (pounds per day)				
	VOC	NO_X	CO	PM_{10}	$PM_{2.5}$
Motor vehicles	274	669	3,139	958	285
Natural gas	4	39	20	3	3
Painting	115	-	-	-	-
Consumer products	347	-	-	-	-
Natural gas hearths	15	0	1	10	10

Table 90 (cont.): Moreno Highlands Specific Plan Operational Emissions

Source	Emissions (pounds per day)				
	VOC	NO_X	CO	PM_{10}	$PM_{2.5}$
Landscaping	10	4	334	2	2
Total	**765**	**712**	**3,494**	**973**	**300**
Significance Threshold	55	55	550	150	55
Significant Impact?	Yes	Yes	Yes	Yes	Yes

Notes:
VOC = volatile organic compounds NO_X = nitrogen oxides CO = carbon monoxide
PM_{10} and $PM_{2.5}$ = particulate matter Sulfur dioxide emissions are negligible.
Source of emissions: Appendix E.2, CalEEMod Output prepared by FirstCarbon Solutions | Michael Brandman Associates.
Source of significance thresholds: South Coast Air Quality Management District 2015.

Table 91: Moreno Highlands Specific Plan Greenhouse Gas Emissions

Category	Source	Emissions ($MTCO_2e$/year)
AB 32 Capped	Mobile	160,220
	Electricity	43,165
	Natural gas	8,109
	Hearth (natural gas)	978
	Water	15,407
	Subtotal: AB 32 capped	**264,089**
Uncapped	Waste*	2,001
	Land use change	530
	Landscaping	70
	Subtotal: uncapped	**2,601**
	Threshold	**10,000**
	Exceed threshold?	**No**

Notes:
$MTCO_2e$ = metric tons of carbon dioxide equivalents
* Waste emissions are reduced by 75 percent pursuant to project mitigation (it is assumed that the same mitigation would be applied to the alternatives); unmitigated is 8,004
Black carbon emissions are not included
Source: CalEEMod output, Appendix E.2

7.2.3 - Alternative 1

Alternative 1 would have 28 msf of logistics warehousing. Therefore, emissions were estimated based on a percentage of the project's emissions; the emissions are shown in Table 87 and Table 88.

7.2.4 - Alternative 2

Alternative 2 would have 22 msf of logistics warehousing, 20 msf of light industrial, 0.5 msf of retail/commercial, and 1 msf of professional/medical offices.

Modeling Assumptions

For the logistics center, the emissions were estimated as 54 percent of the project's emissions based on the square footage. New model runs were not completed for the logistics center uses. The mitigated values were used, since it is assumed that similar mitigation would be applied.

For the light industrial, shopping center, and office uses, the emissions were estimated using CalEEMod. The trip generation rates provided by the traffic consultant (PB, personal communication) were used for weekday trips and are as follows:

- General light industrial: 6.97 trips/1,000 sq ft
- Shopping center: 42.7 trips/1,000 sq ft
- General office building: 11.03 trips/1,000 sq ft

For Saturday and Sunday trips for the general office building, the CalEEMod defaults were used, which are lower than the weekday trips (Saturday has 1.64 and Sunday 0.76 trips/1,000 sq ft) because in general, office uses are primarily active on the weekdays. For the shopping center and the light industrial, the same trip generation rate was used for each day of the week. All other CalEEMod default values for motor vehicles were used (trip length, trip percentages, emission factors, etc.). The CalEEMod default values were used for electricity, natural gas, waste, and water generation estimates. The land use change for the non-logistics warehousing land use was estimated based on 1,150 acres for this alternative using the same assumptions as for the project emissions. (The logistics warehousing land use change is estimated as a percent of the project emissions.)

Emissions

The air pollutant and greenhouse gas emissions for Alternative 2 are shown in Table 92 and Table 93, respectively.

Table 92: Alternative 2 Operational Emissions

Land Use	Source	Emissions (pounds/day)				
		VOC	NO_X	CO	PM_{10}	$PM_{2.5}$
Logistics warehousing	All	320	592	754	605	164
Light industrial, retail, office	Mobile	405	1,022	4,776	1,516	425
	Natural gas	20	180	151	14	14
	Area	562	0	2	0	0
Total	**All**	**1,307**	**1,794**	**5,683**	**2,135**	**603**

Table 92 (cont.): Alternative 2 Operational Emissions

Land Use	Source	Emissions (pounds/day)				
		VOC	NO_X	CO	PM_{10}	$PM_{2.5}$
Significance Threshold		55	55	550	150	55
Significant Impact?		Yes	Yes	Yes	Yes	Yes

Notes:
VOC = volatile organic compounds NO_X = nitrogen oxides CO = carbon monoxide
PM_{10} and $PM_{2.5}$ = particulate matter Sulfur dioxide emissions are negligible
Area emissions include sources from natural gas, painting, and consumer products.
Source of logistics warehousing: 54 percent of mitigated project emissions shown in Table 87 (buildout).
Source of light industrial, retail, office: CalEEMod modeling conducted by FirstCarbon Solutions | Michael Brandman Associates (see Appendix E.2). Area sources include painting, consumer products, and landscaping.

Table 93: Alternative 2 Operational Greenhouse Gas Emissions

Category	Land Use	Source	Emissions ($MTCO_2e$/year)
AB 32 Capped	Logistics warehousing	Mobile, electricity, yard trucks, electricity to convey water, natural gas, generator, forklifts, solar	200,920
	Light industrial, retail, office	Mobile	244,288
		Electricity	69,058
		Natural gas	35,973
		Electricity to convey water	24,524
	Subtotal: AB 32 capped		**574,763**
Uncapped	Logistics warehousing	Waste, land use change, refrigerants, sequestration	3,353
	Light industrial, retail, office	Waste*	2,986
		Land use change	517
	Subtotal: uncapped		**6,856**
	Threshold		**10,000**
	Exceed threshold?		**No**

Notes:
$MTCO_2e$ – metric tons of carbon dioxide equivalents
* Operational waste emissions are reduced by 75 percent because the project greenhouse gas mitigation is applied (unmitigated emissions are 11,944 $MTCO_2e$).
Black carbon emissions are excluded from the light industrial, retail, and office uses
Construction emissions are excluded from both land uses
Source of logistics warehousing emissions: 54 percent of mitigated project emissions (without construction).
Source of light industrial, retail, and office: CalEEMod output (Appendix E.2)

7.2.5 - Alternative 3

Alternative 3 would have 10 million sq ft of logistics warehousing and 6,532 residential dwelling units: 76 percent single family residences (4,964 dwelling units) and 24 percent low-rise apartments, 1,568 dwelling units.

Modeling Assumptions

For the logistics center, the emissions were estimated as 25 percent of the project's emissions—new model runs were not completed. The mitigated values were used, since it is assumed that similar mitigation would be applied.

Emissions for residential uses were estimated using CalEEMod using the following trip generation rates:

- Single-family residential: 9.57 trips/dwelling unit
- Multi-family residential: 6.59 trips/dwelling unit

Additionally, the home to work trip length was increased to 27 miles (see the Moreno Highlands Specific Plan discussion for the basis). The CalEEMod default values were used for the other sources with the exception of fireplaces, which were assumed to be all natural gas pursuant to SCAQMD Rule 445. In addition, the land use change estimates for the residential uses were based on 1,146 acres. It is assumed that this alternative would be built out in 2030.

Emissions

The air pollutant emissions for Alternative 3 are shown in Table 94 and greenhouse gas emissions are shown in Table 95.

Table 94: Alternative 3 Operational Emissions

Land Use	Source	Emissions (pounds/day)				
		VOC	NO_X	CO	PM_{10}	$PM_{2.5}$
Logistics warehousing	All	148	274	349	280	76
Residential	Mobile	156	434	2,005	664	186
	Natural gas	6	48	20	4	4
	Area	259	6	538	12	12
Total	**All**	**569**	**762**	**2,912**	**960**	**278**
Significance Threshold		55	55	550	150	55
Significant Impact?		Yes	Yes	Yes	Yes	Yes

Table 94 (cont.): Alternative 3 Operational Emissions

Land Use	Source	Emissions (pounds/day)				
		VOC	NO_X	CO	PM_{10}	$PM_{2.5}$

Notes:
VOC = volatile organic compounds NO_X = nitrogen oxides
CO = carbon monoxide PM_{10} and $PM_{2.5}$ = particulate matter
Area = painting, consumer products, landscaping, and natural gas hearths
Sulfur dioxide emissions are negligible.
Source of logistics warehouse emissions: 25 percent of mitigated project emissions (buildout, without construction).
Source of residential emissions: CalEEMod modeling by FirstCarbon Solutions | Michael Brandman Associates (see Appendix E.2)

Table 95: Alternative 3 Greenhouse Gas Emissions

Category	Land Use	Source	Emissions ($MTCO_2e$/year)
AB 32 Capped	Logistics warehousing	Mobile, electricity, yard trucks, electricity to convey water, natural gas, generator, forklifts, solar	93,018
	Residential	Mobile	101,720
		Electricity	12,789
		Natural gas	10,154
		Hearths (natural gas)	1,578
		Water	2,976
	Subtotal: AB 32 capped		**222,235**
Uncapped	Logistics warehousing	Waste, land use change, refrigerants, sequestration	1,553
	Residential	Waste*	744
		Landscaping	112
		Land use change	516
	Subtotal: uncapped		**2,925**
	Threshold		**10,000**
	Exceed threshold?		**No**

Notes:
$MTCO_2e$ = metric tons of carbon dioxide equivalents
* Waste emissions are reduced by 75 percent pursuant to project greenhouse gas mitigation (unmitigated emissions are 2,976 $MTCO_2e$)
Construction emissions are excluded.
Black carbon emissions are excluded from the residential uses.
Source of logistics warehousing emissions: 25 percent of mitigated project emissions at buildout.
Source of residential emissions: CalEEMod output (Appendix E.2).

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