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## **759 Eckhoff Street**

### **MOBILE SOURCE HEALTH RISK ASSESSMENT**

#### **CITY OF ORANGE**

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## **LIST OF ABBREVIATED TERMS**

(1)	Reference
µg	Microgram
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
APS	Auxiliary Power System
AQMD	Air Quality Management District
ARB	Air Resources Board
CEQA	California Environmental Quality Act
CPF	Cancer Potency Factor
DPM	Diesel Particulate Matter
EMFAC	Emission Factor Model
EPA	Environmental Protection Agency
HHD	Heavy Heavy-Duty
HI	Hazard Index
HRA	Health Risk Assessment
LHD	Light Heavy-Duty
MATES	Multiple Air Toxics Exposure Study
MEIR	Maximally Exposed Individual Receptor
MEIW	Maximally Exposed Individual Worker
MHD	Medium Heavy-Duty
NAD	North American Datum
OEHHA	Office of Environmental Health Hazard Assessment
PM10	Particulate Matter 10 microns in diameter or less
Project	759 Eckhoff Street
REL	Reference Exposure Level
RM	Recommended Measures
SCAQMD	South Coast Air Quality Management District
SRA	Source Receptor Area
TAC	Toxic Air Contaminant
TA	Traffic Analysis
URF	Unit Risk Factor
UTM	Universal Transverse Mercator
VMT	Vehicle Miles Traveled

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## EXECUTIVE SUMMARY

This report evaluates the potential health risk impacts to sensitive receptors (which are residents) and adjacent workers associated with the development of the proposed Project, more specifically, health risk impacts as a result of exposure to Toxic Air Contaminants (TACs) including diesel particulate matter (DPM) as a result of heavy-duty diesel trucks accessing the site. This section summarizes the significance criteria and Project health risks.

The results of the health risk assessment from Project-generated DPM emissions are provided in Table ES-1, ES-2, and ES-3 below for the Project.

### CONSTRUCTION IMPACTS

The land use with the greatest potential exposure to Project construction DPM source emissions is Location R1 which is located approximately 1,470 feet north of the Project site at the existing Orangeland RV Park at 1600 West Struck Avenue. At the maximally exposed individual receptor (MEIR), the maximum incremental cancer risk attributable to Project construction DPM source emissions is estimated at 0.94 in one million, which is less than the South Coast Air Quality Management District's (SCAQMD's) significance threshold of 10 in one million. At this same location, non-cancer risks were estimated to be  $\leq 0.01$ , which would not exceed the applicable threshold of 1.0. As such, the Project will not cause a significant human health or cancer risk to adjacent land uses as a result of Project construction activity. All other receptors during construction activity would experience less risk than what is identified for this location.

### OPERATIONAL IMPACTS

#### Residential Exposure Scenario:

The residential land use with the greatest potential exposure to Project DPM source emissions is Location R1 which is located approximately 1,470 feet north of the Project site at the existing Orangeland RV Park at 1600 West Struck Avenue. At the MEIR, the maximum incremental cancer risk attributable to Project DPM source emissions is estimated at 0.10 in one million, which is less than the SCAQMD's significance threshold of 10 in one million. At this same location, non-cancer risks were estimated to be  $<0.01$ , which would not exceed the applicable significance threshold of 1.0. Because all other modeled residential receptors are exposed to lesser concentrations and are located at a greater distance from the Project site and primary truck route than the MEIR analyzed herein, and TACs generally dissipates with distance from the source, all other residential receptors in the vicinity of the Project site would be exposed to less emissions and therefore less risk than the MEIR identified herein. As such, the Project will not cause a significant human health or cancer risk to nearby residences.

Worker Exposure Scenario<sup>1</sup>:

The worker receptor land use with the greatest potential exposure to Project DPM source emissions is Location R7, which represents the adjacent potential worker receptor 79 feet north of the Project site. At the maximally exposed individual worker (MEIW), the maximum incremental cancer risk impact is 0.21 in one million which is less than the SCAQMD's threshold of 10 in one million. Maximum non-cancer risks at this same location were estimated to be <0.01, which would not exceed the applicable significance threshold of 1.0. Because all other modeled worker receptors are located at a greater distance than the MEIW analyze herein, and DPM dissipates with distance from the source, all other worker receptors in the vicinity of the Project would be exposed to less emissions and therefore less risk than the MEIW identified herein. As such, the Project will not cause a significant human health or cancer risk to adjacent workers.

School Child Exposure Scenario:

There are no schools located within a ¼ mile of the Project site. As such, there would be no significant impacts that would occur to any schools in the vicinity of the Project.

Proximity to sources of toxics is critical to determining the impact. In traffic-related studies, the additional non-cancer health risk attributable to proximity was seen within 1,000 feet and was strongest within 300 feet. California freeway studies show about a 70-percent drop-off in particulate pollution levels at 500 feet. Based on California Air Resources Board (CARB) and SCAQMD emissions and modeling analyses, an 80-percent drop-off in pollutant concentrations is expected at approximately 1,000 feet from a distribution center (1).

The 1,000-foot evaluation distance is supported by research-based findings concerning Toxic Air Contaminant (TAC) emission dispersion rates from roadways and large sources showing that emissions diminish substantially between 500 and 1,000 feet from emission sources.

For purposes of this assessment, a one-quarter mile radius or 1,320 feet geographic scope is utilized for determining potential impacts to nearby schools. This radius is more robust than, and therefore provides a more health protective scenario for evaluation than the 1,000-foot impact radius identified above.

**CONSTRUCTION AND OPERATIONAL IMPACTS**

The land use with the greatest potential exposure to Project construction and operational DPM source emissions is Location R1. At the MEIR, the maximum incremental cancer risk attributable to Project construction and operational DPM source emissions is estimated at 1.04 in one million, which is less than the threshold of 10 in one million. At this same location, non-cancer risks were estimated to be ≤ 0.01, which would not exceed the applicable threshold of 1.0. As such, the Project will not cause a significant human health or cancer risk to adjacent land uses as a result

1 SCAQMD guidance does not require assessment of the potential health risk to on-site workers. Excerpts from the document OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines—The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA 2003), also indicate that it is not necessary to examine the health effects to on-site workers unless required by RCRA (Resource Conservation and Recovery Act) / CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) or the worker resides on-site.



of Project construction and operational activity. All other receptors during construction activity would experience less risk than what is identified for this location.

#### NET CHANGE IN DPM IMPACTS

The Project site is currently occupied by an existing use. As summarized in the *759 Eckhoff Scoping Memorandum*, the existing use generates a total of approximately 150 two-way passenger vehicle trips per day and 18 two-way truck trips per day for a total of 168 two-way trips per day (2). As a conservative measure, no credit has been taken for the existing truck trips and associated DPM emissions.

**TABLE ES-1: SUMMARY OF CONSTRUCTION CANCER AND NON-CANCER RISKS**

Time Period	Location	Maximum Lifetime Cancer Risk (Risk per Million)	Significance Threshold (Risk per Million)	Exceeds Significance Threshold
2 Year Exposure	Maximum Exposed Sensitive Receptor	0.94	10	NO
Time Period	Location	Maximum Hazard Index	Significance Threshold	Exceeds Significance Threshold
Annual Average	Maximum Exposed Sensitive Receptor	≤0.01	1.0	NO

**TABLE ES-2: SUMMARY OF OPERATIONAL CANCER AND NON-CANCER RISKS**

Time Period	Location	Maximum Lifetime Cancer Risk (Risk per Million)	Significance Threshold (Risk per Million)	Exceeds Significance Threshold
30 Year Exposure	Maximum Exposed Sensitive Receptor	0.10	10	NO
25 Year Exposure	Maximum Exposed Worker Receptor	0.21	10	NO
Time Period	Location	Maximum Hazard Index	Significance Threshold	Exceeds Significance Threshold
Annual Average	Maximum Exposed Sensitive Receptor	≤0.01	1.0	NO
Annual Average	Maximum Exposed Worker Receptor	≤0.01	1.0	NO

**TABLE ES-3: SUMMARY OF CONSTRUCTION AND OPERATIONAL CANCER AND NON-CANCER RISKS**

<b>Time Period</b>	<b>Location</b>	<b>Maximum Lifetime Cancer Risk (Risk per Million)</b>	<b>Significance Threshold (Risk per Million)</b>	<b>Exceeds Significance Threshold</b>
30 Year Exposure	Maximum Exposed Sensitive Receptor	1.04	10	NO
<b>Time Period</b>	<b>Location</b>	<b>Maximum Hazard Index</b>	<b>Significance Threshold</b>	<b>Exceeds Significance Threshold</b>
Annual Average	Maximum Exposed Sensitive Receptor	≤0.01	1.0	NO

# 1 INTRODUCTION

The South Coast Air Quality Management District (SCAQMD) typically issues a comment letter on the Notice of Preparation of a CEQA Document. Per the SCAQMD's typical comment letter, if a proposed Project is expected to generate/attract diesel trucks, which emit diesel particulate matter (DPM) or other Toxic Air Contaminants (TACs), preparation of a HRA is necessary. This document serves to meet the SCAQMD's request for preparation of a HRA. This HRA has been prepared in accordance with the document Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis (3) and is comprised of all relevant and appropriate procedures presented by the United States Environmental Protection Agency (U.S. EPA), California EPA and SCAQMD. Cancer risk is expressed in terms of expected incremental incidence per million population. The SCAQMD has established an incidence rate of ten (10) persons per million as the maximum acceptable incremental cancer risk due to TAC exposure from a project such as the proposed Project. This threshold serves to determine whether or not a given project has a potentially significant development-specific and cumulatively considerable impact.

The AQMD has published a report on how to address cumulative impacts from air pollution: *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution* (4). In this report the AQMD states (Page D-3):

*"...the AQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR. The only case where the significance thresholds for project specific and cumulative impacts differ is the Hazard Index (HI) significance threshold for toxic air contaminant (TAC) emissions. The project specific (project increment) significance threshold is  $HI > 1.0$  while the cumulative (facility-wide) is  $HI > 3.0$ . It should be noted that the HI is only one of three TAC emission significance thresholds considered (when applicable) in a CEQA analysis. The other two are the maximum individual cancer risk (MICR) and the cancer burden, both of which use the same significance thresholds (MICR of 10 in 1 million and cancer burden of 0.5) for project specific and cumulative impacts.*

*Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant."*

The SCAQMD has also established non-carcinogenic risk parameters for use in HRAs. Non-carcinogenic risks are quantified by calculating a "hazard index," expressed as the ratio between the ambient pollutant concentration and its toxicity or Reference Exposure Level (REL). An REL is a concentration at or below which health effects are not likely to occur. A hazard index less than one (1.0) means that adverse health effects are not expected. In this HRA, non-carcinogenic exposures of less than 1.0 are considered less-than-significant. Both the cancer risk and non-carcinogenic risk thresholds are applied to the nearest sensitive receptors below.

## **1.1 SITE LOCATION**

The proposed Project is located south of West Collins Avenue and east of North Eckhoff Street at 759 North Eckhoff Street in the City of Orange, as shown on Exhibit 1-A. The State Route 57 (SR-57) freeway is located approximately 0.50 mile west of the Project site boundary.

The Project is located adjacent to existing industrial uses to the north, south, and east, and the Orange County Department of Education/Foster building west of the Project site. The Orange County Children and Family Services to the west and the Orangeland RV Park to the north representing the nearest residential use to the Project site. Per the City of Orange General Plan, the Project site is designated for Light Industrial uses. Light Industrial designation is intended for uses that are compatible with nearby commercial and residential districts and that do not produce substantial environmental nuisances (noise, odor, dust, smoke, glare, etc.). This designation allows for manufacturing, processing, and distribution of goods (5).

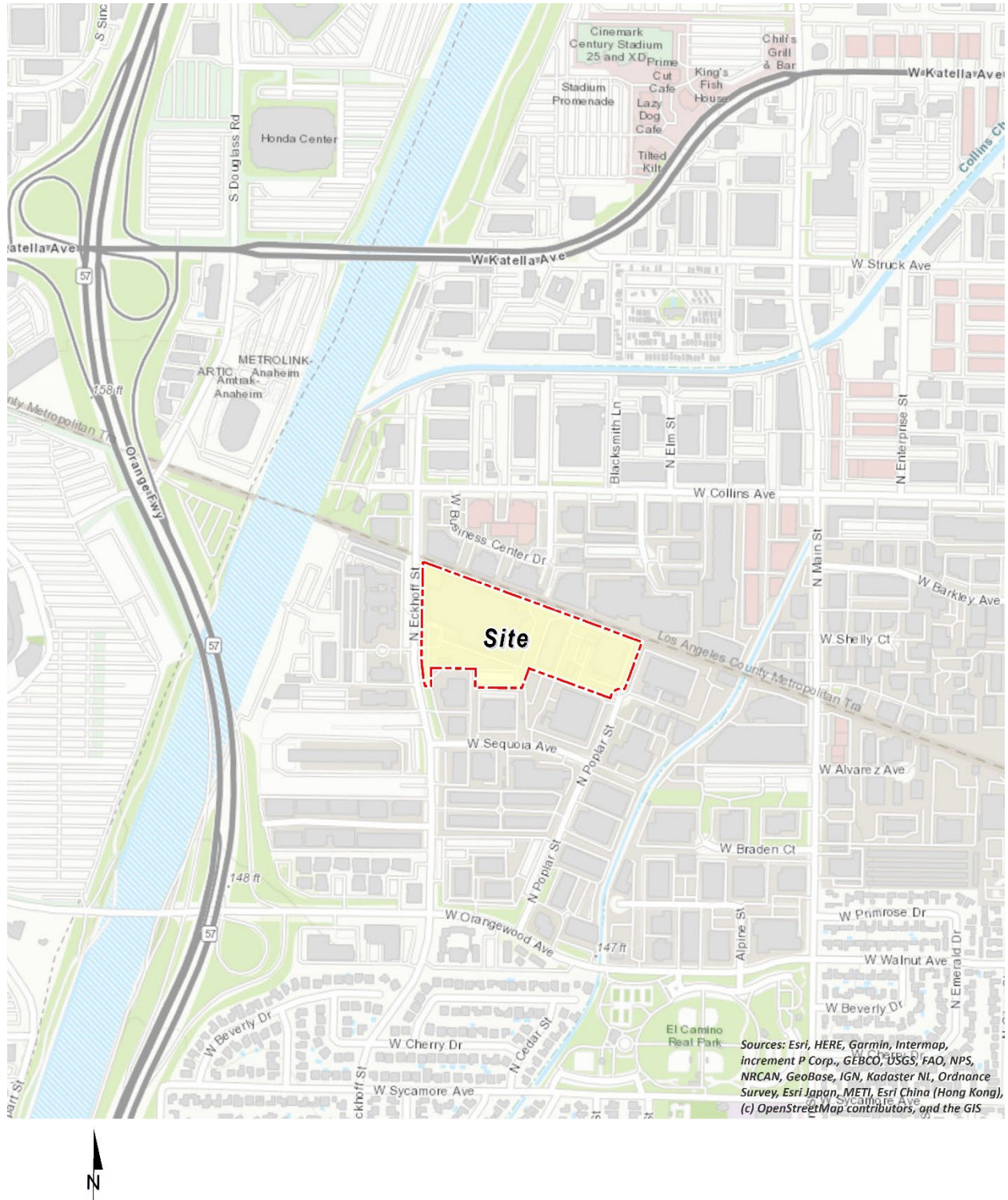
## **1.2 PROJECT DESCRIPTION**

Exhibit 1-B illustrates the preliminary Project site plan. The proposed Project is to consist of 51,598 square feet (sf) of general light industrial use and 241,164 sf of warehousing use within two buildings. The Project is anticipated to be open by the year 2023.

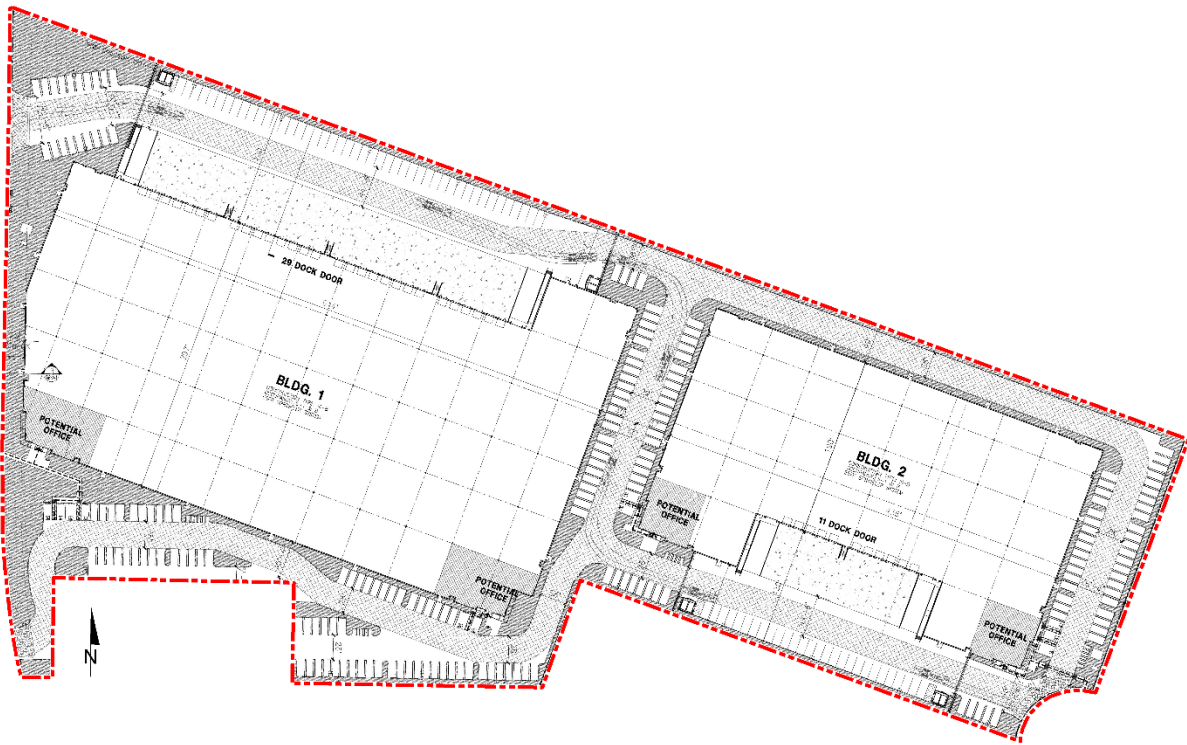
At the time this HRA was prepared, the future tenants of the proposed Project were unknown. Because the operating hours of perspective building tenants is not known at this time, this HRA is intended to describe potential toxic emission impacts associated with the expected typical 24-hour, seven day per week operational activities at the Project site, which provides a conservative analysis of impacts.

As summarized in the *759 Eckhoff Street Scoping Memorandum* prepared by Urban Crossroads, Inc., the Project is expected to generate a total of approximately 682 vehicular trips-ends per day (actual vehicles) which includes 138 two-way truck trips per day (2).


## EXHIBIT 1-A: LOCATION MAP



## EXHIBIT 1-B: SITE PLAN



### LEGEND:

 Site Boundary

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## 2 BACKGROUND

### 2.1 BACKGROUND ON RECOMMENDED METHODOLOGY

This HRA is based on SCAQMD guidelines to produce conservative estimates of human health risk posed by exposure to DPM. The conservative nature of this analysis is due primarily to the following factors:

- The ARB-adopted diesel exhaust Unit Risk Factor (URF) of 300 in one million per  $\mu\text{g}/\text{m}^3$  is based upon the upper 95 percentile of estimated risk for each of the epidemiological studies utilized to develop the URF. Using the 95<sup>th</sup> percentile URF represents a very conservative (health-protective) risk posed by DPM because it represents breathing rates that are high for the human body (95% higher than the average population).
- The emissions derived assume that every truck accessing the Project site will idle for 15 minutes under the unmitigated scenario, and this is an overestimation of actual idling times and thus conservative.<sup>2</sup> The California Air Resources Board (CARB's) anti-idling requirements impose a 5-minute maximum idling time and therefore the analysis conservatively overestimates DPM emissions from idling by a factor of 3.

### 2.2 CONSTRUCTION HEALTH RISK ASSESSMENT

#### 2.2.1 EMISSIONS CALCULATIONS

The emissions calculations for the construction HRA component are based on an assumed mix of construction equipment and hauling activity as presented in the *759 Eckhoff Street Air Quality Analysis* ("technical study") prepared by Urban Crossroads, Inc. (6)

Construction related DPM emissions are expected to occur primarily as a function of heavy-duty construction equipment that would be operating on-site.

As discussed in the technical study, the Project would result in approximately 368 total working-days for construction activity. The construction duration by phase is shown on Table 2-1. A detailed summary of construction equipment assumptions by phase is provided at Table 2-2. The CalEEMod emissions outputs are presented in Appendix 2.1. The modeled emission sources for construction activity are illustrated on Exhibit 2-A.

<sup>2</sup> Although the Project is required to comply with ARB's idling limit of 5 minutes, staff at SCAQMD recommends that the on-site idling emissions should be estimated for 15 minutes of truck idling (personal communication, in person, with Jillian Wong, December 22, 2016), which would take into account on-site idling which occurs while the trucks are waiting to pull up to the truck bays, idling at the bays, idling at check-in and check-out, etc.



**TABLE 2-1: CONSTRUCTION DURATION**

Phase Name	Start Date	End Date	Days
Demolition/Crushing	04/04/2022	09/02/2022	110
Site Preparation	09/03/2022	09/16/2022	10
Grading	09/17/2022	10/28/2022	30
Building Construction	10/29/2022	08/30/2023	218
Paving	08/03/2023	08/30/2023	20
Architectural Coating	07/06/2023	08/30/2023	40


**TABLE 2-2: CONSTRUCTION EQUIPMENT ASSUMPTIONS**

Phase Name	Equipment	Amount	Hours Per Day
Demolition/Crushing	Concrete/Industrial Saws	1	8
	Crushing/Proc. Equipment	1	8
	Excavators	3	8
	Rubber Tired Dozers	2	8
Site Preparation	Crawler Tractors	4	8
	Rubber Tired Dozers	3	8
Grading	Crawler Tractors	2	8
	Excavators	2	8
	Graders	1	8
	Rubber Tired Dozers	1	8
	Scrapers	2	8
Building Construction	Cranes	1	8
	Crawler Tractors	3	8
	Forklifts	3	8
	Generator Sets	1	8
	Welders	1	8
Paving	Pavers	2	8
	Paving Equipment	2	8
	Rollers	2	8
Architectural Coating	Air Compressors	1	8

## EXHIBIT 2-A: MODELED CONSTRUCTION EMISSION SOURCES



### LEGEND:

 Construction Activity

## 2.3 OPERATIONAL HEALTH RISK ASSESSMENT

### 2.3.1 ON-SITE AND OFF-SITE TRUCK ACTIVITY

Vehicle DPM emissions were calculated using emission factors for particulate matter less than 10 $\mu$ m in diameter (PM<sub>10</sub>) generated with the 2017 version of the Emission FACTor model (EMFAC) developed by the CARB. EMFAC 2017 is a mathematical model that CARB developed to calculate emission rates from motor vehicles that operate on highways, freeways, and local roads in California and is commonly used by the ARB to project changes in future emissions from on-road mobile sources (7). The most recent version of this model, EMFAC 2017, incorporates regional motor vehicle data, information and estimates regarding the distribution of vehicle miles traveled (VMT) by speed, and number of starts per day.

Several distinct emission processes are included in EMFAC 2017. Emission factors calculated using EMFAC 2017 are expressed in units of grams per vehicle miles traveled (g/VMT) or grams per idle-hour (g/idle-hr), depending on the emission process. The emission processes and corresponding emission factor units associated with diesel particulate exhaust for this Project are presented below.

For this Project, annual average PM<sub>10</sub> emission factors were generated by running EMFAC 2017 in EMFAC Mode for vehicles in the Orange County jurisdiction. The EMFAC Mode generates emission factors in terms of grams of pollutant emitted per vehicle activity and can calculate a matrix of emission factors at specific values of temperature, relative humidity, and vehicle speed. The model was run for speeds traveled in the vicinity of the Project. The vehicle travel speeds for each segment modeled are summarized below.

- Idling – on-site loading/unloading and truck gate
- 5 miles per hour – on-site vehicle movement including driving and maneuvering
- 25 miles per hour – off-site vehicle movement including driving and maneuvering.

Calculated emission factors are shown at Table 2-3. As a conservative measure, a 2023 EMFAC 2017 run was conducted and a static 2023 emissions factor data set was used for the entire duration of analysis herein (e.g., 30 years). Use of 2023 emission factors would overstate potential impacts since this approach assumes that emission factors remain “static” and do not change over time due to fleet turnover or cleaner technology with lower emissions that would be incorporated into vehicles after 2023. Additionally, based on EMFAC 2017, Light-Heavy-Duty Trucks 1 are comprised of 41.3% diesel, Light-Heavy-Duty Trucks 2 are comprised of 60.6% diesel, Medium-Heavy-Duty Trucks are comprised of 78.9% diesel, and Heavy-Heavy-Duty Trucks are comprised of 91.8% diesel. Trucks fueled by diesel are accounted for by these percentages accordingly in the emissions factor generation. Appendix 2.2 includes additional details on the emissions estimates from EMFAC.

The vehicle DPM exhaust emissions were calculated for running exhaust emissions. The running exhaust emissions were calculated by applying the running exhaust PM<sub>10</sub> emission factor (g/VMT) from EMFAC over the total distance traveled. The following equation was used to

estimate off-site emissions for each of the different vehicle classes comprising the mobile sources (8):

$$\text{Emissions}_{\text{speedA}} \text{ (g/s)} = \text{EF}_{\text{RunExhaust}} \text{ (g/VMT)} * \text{Distance (VMT/trip)} * \text{Number of Trips (trips/day)} / \text{seconds per day}$$

Where:

$\text{Emissions}_{\text{speedA}}$  (g/s): Vehicle emissions at a given speed A;

$\text{EF}_{\text{RunExhaust}}$  (g/VMT): EMFAC running exhaust PM<sub>10</sub> emission factor at speed A;

Distance (VMT/trip): Total distance traveled per trip.

Similar to off-site traffic, on-site vehicle running emissions were calculated by applying the running exhaust PM<sub>10</sub> emission factor (g/VMT) from EMFAC and the total vehicle trip number over the length of the driving path using the same formula presented above for on-site emissions. In addition, on-site vehicle idling exhaust emissions were calculated by applying the idle exhaust PM<sub>10</sub> emission factor (g/idle-hr) from EMFAC and the total truck trip over the total assumed idle time (15 minutes). The following equation was used to estimate the on-site vehicle idling emissions for each of the different vehicle classes (8):

$$\text{Emissions}_{\text{idle}} \text{ (g/s)} = \text{EF}_{\text{idle}} \text{ (g/hr)} * \text{Number of Trips (trips/day)} * \text{Idling Time (min/trip)} * \frac{60 \text{ minutes}}{\text{per hour}} / \text{seconds per day}$$

Where:

$\text{Emissions}_{\text{idle}}$  (g/s): Vehicle emissions during idling;

$\text{EF}_{\text{idle}}$  (g/s): EMFAC idle exhaust PM<sub>10</sub> emission factor.

**TABLE 2-3: 2023 WEIGHTED AVERAGE DPM EMISSIONS FACTORS**

Speed	Weighted Average
General Light Industrial Land Use	
0 (idling)	0.0769(g/idle-hr)
5	0.01347 (g/s)
Warehouse Land Use	
0 (idling)	0.08204(g/idle-hr)
5	0.01309 (g/s)
General Light Industrial + Warehouse Land Use	
25	0.01889 (g/s)

Each roadway was modeled as a line source (made up of multiple adjacent volume sources). Due to the large number of volume sources modeled for this analysis, the corresponding coordinates of each volume source have not been included in this report but are included in Appendix 2.3. The DPM emission rate for each volume source was calculated by multiplying the emission factor (based on the average travel speed along the roadway) by the number of trips and the distance traveled along each roadway segment and dividing the result by the number of volume sources along that roadway, as illustrated on Table 2-4. The modeled emission sources are illustrated on

Exhibit 2-B. The modeling domain is limited to the Project's primary truck route and includes off-site sources in the study area for more than  $\frac{3}{4}$  mile. This modeling domain is more inclusive and conservative than using only a  $\frac{1}{4}$  mile modeling domain which is the distance supported by several reputable studies which conclude that the greatest potential risks occur within a  $\frac{1}{4}$  mile of the primary source of emissions (1) (in the case of the Project, the primary source of emissions is the on-site idling and on-site travel).

On-site truck idling was estimated to occur as trucks enter and travel through the Project site. Although the Project's diesel-fueled truck and equipment operators will be required by State law to comply with CARB's idling limit of 5 minutes, staff at SCAQMD recommends that the on-site idling emissions be calculated assuming 15 minutes of truck idling (9), which would take into account on-site idling which occurs while the trucks are waiting to pull up to the truck bays, idling at the bays, idling at check-in and check-out, etc. As such, this analysis calculates truck idling at 15 minutes, consistent with SCAQMD's recommendation.

As summarized in the *759 Eckhoff Street Traffic Study* prepared by Urban Crossroads, Inc., the Project is expected to generate a total of approximately 622 vehicular trips-ends per day (actual vehicles) which includes 170 two-way truck trips per day (2).

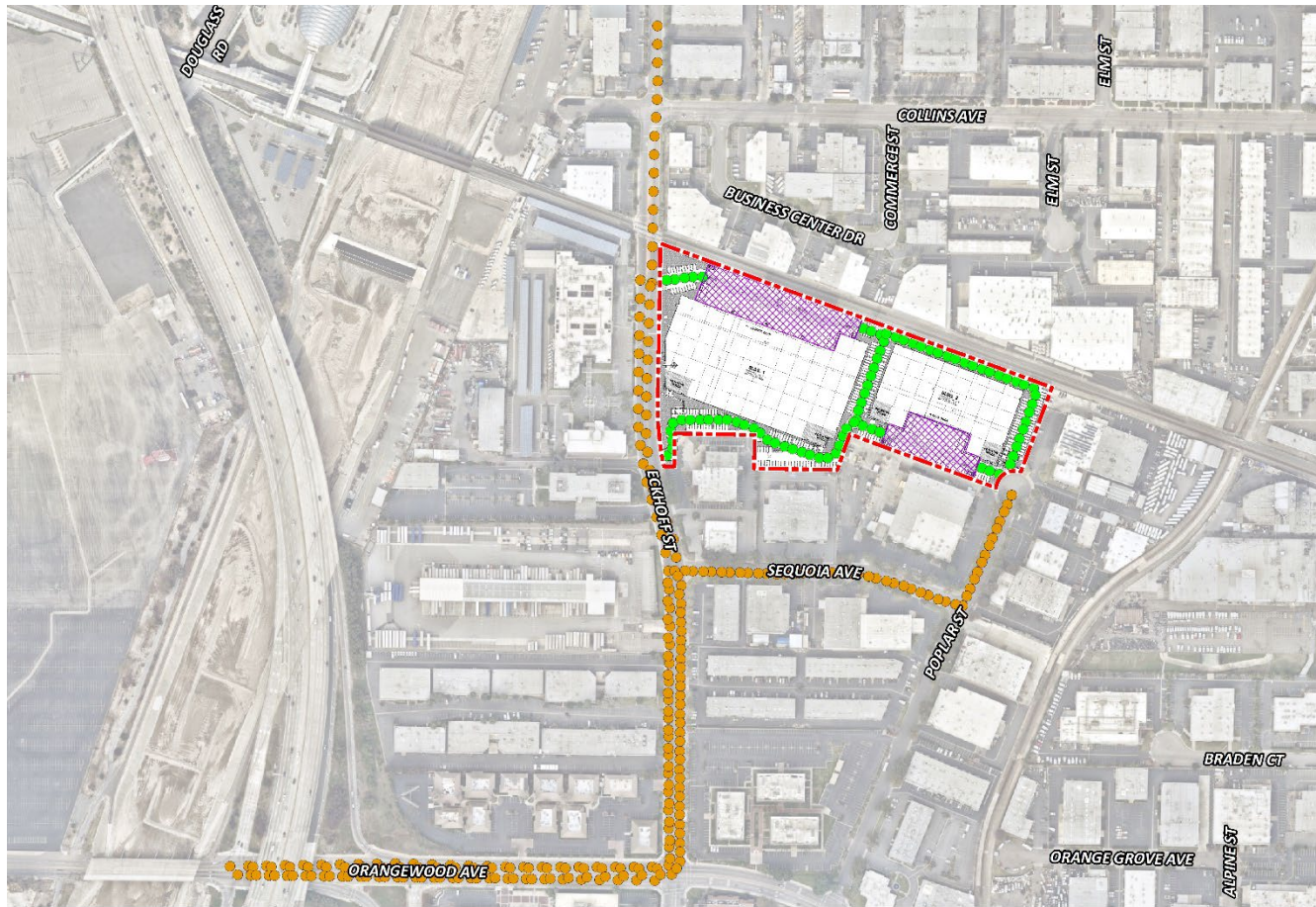
## 2.3 EXPOSURE QUANTIFICATION

The analysis herein has been conducted in accordance with the guidelines in the Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis (3). SCAQMD recommends using the Environmental Protection Agency's (U.S. EPA's) AERMOD model. For purposes of this analysis, the Lakes AERMOD View (Version 10.0.1) was used to calculate annual average particulate concentrations associated with site operations. Lakes AERMOD View was utilized to incorporate the U.S. EPA's latest AERMOD Version 21112 (10).

The model offers additional flexibility by allowing the user to assign an initial release height and vertical dispersion parameters for mobile sources representative of a roadway. For this HRA, the roadways were modeled as adjacent volume sources. Roadways were modeled using the U.S. EPA's haul route methodology for modeling of on-site and off-site truck movement. More specifically, the Haul Road Volume Source Calculator in Lakes AERMOD View has been utilized to determine the release height parameters. Based on the US EPA methodology, the Project's modeled sources would result in a release height of 3.49 meters, and an initial lateral dimension of 4.0 meters, and an initial vertical dimension of 3.25 meters.

SCAQMD-recommended model parameters are presented in Table 2-5 (11). The model requires additional input parameters including emission data and local meteorology. Meteorological data from the SCAQMD's KSNM monitoring station (SRA 17) was used to represent local weather conditions and prevailing winds (12).



**EXHIBIT 2-B: MODELED EMISSION SOURCES****LEGEND:**

- Site Boundary
- On-Site Truck Idling
- On-Site Truck Travel
- Off-Site Truck Travel

TABLE 2-4: DPM EMISSIONS FROM PROJECT TRUCKS (2023 ANALYSIS YEAR)

Truck Emission Rates						
Source	Trucks Per Day	VMT <sup>a</sup> (miles/day)	Truck Emission Rate <sup>b</sup> (grams/mile)	Truck Emission Rate <sup>b</sup> (grams/idle-hour)	Daily Truck Emissions <sup>c</sup> (grams/day)	Modeled Emission Rates (g/second)
On-Site Idling Building 1	58			0.0820	1.19	1.377E-05
On-Site Idling Building 2	11			0.0877	0.24	2.791E-06
On-Site Travel Building 1	116	32.23	0.0131		0.42	4.882E-06
On-Site Travel Building 2	22	6.11	0.0135		0.08	9.527E-07
Off-Site Travel 15% Outbound Truck Travel	10	1.71	0.0064		0.01	1.261E-07
Off-Site Travel 50% Outbound Truck Travel	35	21.44	0.0064		0.14	1.585E-06
Off-Site Travel 65% Inbound Truck Travel	45	28.26	0.0064		0.18	2.090E-06
Off-Site Travel 35% Outbound Truck Travel	24	16.69	0.0064		0.11	1.234E-06
Off-Site Travel 35% Inbound Truck Travel	24	16.76	0.0064		0.11	1.239E-06
<sup>a</sup> Vehicle miles traveled are for modeled truck route only. <sup>b</sup> Emission rates determined using EMFAC 2017. Idle emission rates are expressed in grams per idle hour rather than grams per mile. <sup>c</sup> This column includes the total truck travel and truck idle emissions. For idle emissions this column includes emissions based on the assumption that each truck idles for 15 minutes.						

**TABLE 2-5: AERMOD MODEL PARAMETERS**

Dispersion Coefficient (Urban/Rural)	Urban (Population 3,010,232)
Terrain (Flat/Elevated)	Elevated (Regulatory Default)
Averaging Time	1 year (5-year Meteorological Data Set)
Receptor Height	0 meters (Regulatory Default)

Universal Transverse Mercator (UTM) coordinates for World Geodetic System (WGS) 84 were used to locate the Project site boundaries, each volume source location, and receptor locations in the Project site's vicinity. The AERMOD dispersion model summary output files for the proposed Project are presented in Appendix 2.3. Modeled sensitive receptors were placed at residential and non-residential locations.

Receptors may be placed at applicable structure locations for residential and worker property and not necessarily the boundaries of the properties containing these uses because the human receptors (residents and workers) spend a majority of their time at the residence or in the workplace's building, and not on the property line. It should be noted that the primary purpose of receptor placement is focused on long-term exposure. For example, the HRA evaluates the potential health risks to residents and workers over a period of 30 or 25 years of exposure, respectively. Notwithstanding, as a conservative measure, receptors were placed at either the outdoor living area or the building façade, whichever is closer to the Project site.

For purposes of this HRA, receptors include both residential and non-residential (worker) land uses in the vicinity of the Project. These receptors are included in the HRA since residents and workers may be exposed at these locations over a long-term duration of 30 and 25 years, respectively. This methodology is consistent with SCAQMD and OEHHA recommended guidance.

Any impacts to residents or workers located further away from the Project site than the modeled residential and workers would have a lesser impact than what has already been disclosed in the HRA at the MEIR and MEIW because concentrations dissipate with distance.

Consistent with SCAQMD modeling guidance, all receptors were set to existing elevation height so that only ground-level concentrations are analyzed (13). United States Geological Survey (USGS) Digital Elevation Model (DEM) terrain data based on a 1-minute topographic quadrangle map series using AERMAP was utilized in the HRA modeling to set elevations.

Discrete variants for daily breathing rates, exposure frequency, and exposure duration were obtained from relevant distribution profiles presented in the 2015 OEHHA Guidelines. Tables 2-6 through 2-7 summarize the Exposure Parameters for Residents and Workers based on 2015 OEHHA Guidelines. Appendix 2.4 includes the detailed risk calculation.



**TABLE 2-6: EXPOSURE ASSUMPTIONS FOR INDIVIDUAL CANCER RISK (CONSTRUCTION ACTIVITY)**

Age	Daily Breathing Rate (L/kg-day)	Age Specific Factor	Exposure Duration (years)	Fraction of Time at Home	Exposure Frequency (days/year)	Exposure Time (hours/day)
0 to 2	1,090	10	2	0.85	345	8

**TABLE 2-7: EXPOSURE ASSUMPTIONS FOR INDIVIDUAL CANCER RISK (30 YEAR RESIDENTIAL)**

Age	Daily Breathing Rate (L/kg-day)	Age Specific Factor	Exposure Duration (years)	Fraction of Time at Home	Exposure Frequency (days/year)	Exposure Time (hours/day)
-0.25 to 0	361	10	0.25	0.85	350	24
0 to 2	1,090	10	2	0.85	350	24
2 to 16	572	3	14	0.72	350	24
16 to 30	261	1	14	0.73	350	24

**TABLE 2-8: EXPOSURE ASSUMPTIONS FOR INDIVIDUAL CANCER RISK (25 YEAR WORKER)**

Age	Daily Breathing Rate (L/kg-day)	Age Specific Factor	Exposure Duration (years)	Exposure Frequency (days/year)	Exposure Time (hours/day)
16 to 41	230	1	25	250	12

## 2.4 CARCINOGENIC CHEMICAL RISK

The SCAQMD CEQA Air Quality Handbook (1993) states that emissions of toxic air contaminants (TACs) are considered significant if a HRA shows an increased risk of greater than 10 in one million. Based on guidance from the SCAQMD in the document Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis (3), for purposes of this analysis, 10 in one million is used as the cancer risk threshold for the proposed Project.

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 10 in one million implies a likelihood that up to 10 people, 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.

Guidance from CARB and the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA) recommends a refinement to the standard point estimate approach when alternate human body weights and breathing rates are utilized to assess risk for susceptible subpopulations such as children. For the inhalation pathway, the procedure requires the incorporation of several discrete variates to effectively quantify dose. Once determined, contaminant dose is multiplied by the cancer potency factor (CPF) in units of inverse dose expressed in milligrams per kilogram per day (mg/kg/day)<sup>-1</sup> to derive the cancer risk estimate. Therefore, to assess exposures, the following dose algorithm was utilized.

$$\text{DOSE}_{\text{air}} = (\text{C}_{\text{air}} \times [\text{BR}/\text{BW}] \times A \times \text{EF}) \times (1 \times 10^{-6})$$

Where:

DOSE <sub>air</sub>	=	chronic daily intake (mg/kg/day)
C <sub>air</sub>	=	concentration of contaminant in air (ug/m <sup>3</sup> )
[BR/BW]	=	daily breathing rate normalized to body weight (L/kg BW-day)
A	=	inhalation absorption factor
EF	=	exposure frequency (days/365 days)
BW	=	body weight (kg)
1 x 10 <sup>-6</sup>	=	conversion factors (ug to mg, L to m <sup>3</sup> )

$$\text{RISK}_{\text{air}} = \text{DOSE}_{\text{air}} \times \text{CPF} \times \text{ED}/\text{AT}$$

Where:

DOSE <sub>air</sub>	=	chronic daily intake (mg/kg/day)
CPF	=	cancer potency factor
ED	=	number of years within particular age group
AT	=	averaging time

## 2.5 NON-CARCINOGENIC EXPOSURES

An evaluation of the potential noncarcinogenic effects of chronic exposures was also conducted. Adverse health effects are evaluated by comparing a compound's annual concentration with its toxicity factor or Reference Exposure Level (REL). The REL for diesel particulates was obtained from OEHHA for this analysis. The chronic reference exposure level (REL) for DPM was established by OEHHA as 5 µg/m<sup>3</sup> (OEHHA Toxicity Criteria Database, <http://www.oehha.org/risk/chemicaldb/index.asp>).

The non-cancer hazard index was calculated (consistent with SCAQMD methodology) as follows:

The relationship for the non-cancer health effects of DPM is given by the following equation:

$$HI_{DPM} = C_{DPM}/REL_{DPM}$$

Where:

$HI_{DPM}$  = Hazard Index; an expression of the potential for non-cancer health effects.

$C_{DPM}$  = Annual average DPM concentration ( $\mu\text{g}/\text{m}^3$ ).

$REL_{DPM}$  = Reference exposure level (REL) for DPM; the DPM concentration at which no adverse health effects are anticipated.

For purposes of this analysis the hazard index for the respiratory endpoint totaled less than one for all receptors in the project vicinity, and thus is less than significant.

## 2.6 POTENTIAL PROJECT-RELATED DPM SOURCE CANCER AND NON-CANCER RISKS

### CONSTRUCTION IMPACTS

The land use with the greatest potential exposure to Project construction DPM source emissions is Location R1 which is located approximately 1,470 feet north of the Project site at the existing Orangeland RV Park at 1600 West Struck Avenue. At the MEIR, the maximum incremental cancer risk attributable to Project construction DPM source emissions is estimated at 0.94 in one million, which is less than the SCAQMD's significance threshold of 10 in one million. At this same location, non-cancer risks were estimated to be  $\leq 0.01$ , which would not exceed the applicable threshold of 1.0. As such, the Project will not cause a significant human health or cancer risk to adjacent land uses as a result of Project construction activity. All other receptors during construction activity would experience less risk than what is identified for this location. The nearest modeled receptors are illustrated on Exhibit 2-C.

### OPERATIONAL IMPACTS

#### Residential Exposure Scenario:

The land use with the greatest potential exposure to Project construction DPM source emissions is Location R1 which is located approximately 1,470 feet north of the Project site at the existing Orangeland RV Park at 1600 West Struck Avenue. At the MEIR, the maximum incremental cancer risk attributable to Project DPM source emissions is estimated at 0.10 in one million, which is less than the SCAQMD's significance threshold of 10 in one million. At this same location, non-cancer risks were estimated to be  $<0.01$ , which would not exceed the applicable significance threshold of 1.0. Because all other modeled residential receptors are exposed to lesser concentrations and are located at a greater distance from the Project site and primary truck route than the MEIR analyzed herein, and TACs generally dissipates with distance from the source, all other residential receptors in the vicinity of the Project site would be exposed to less emissions and therefore less risk than the MEIR identified herein. As such, the Project will not cause a significant human health or cancer risk to nearby residences. The nearest modeled receptors are illustrated on Exhibit 2-C.

Worker Exposure Scenario<sup>3</sup>:

The worker receptor land use with the greatest potential exposure to Project DPM source emissions is Location R7, which represents the adjacent potential worker receptor 79 feet north of the Project site. At the MEIW, the maximum incremental cancer risk impact is 0.21 in one million which is less than the SCAQMD's threshold of 10 in one million. Maximum non-cancer risks at this same location were estimated to be <0.01, which would not exceed the applicable significance threshold of 1.0. Because all other modeled worker receptors are located at a greater distance than the MEIW analyze herein, and DPM dissipates with distance from the source, all other worker receptors in the vicinity of the Project would be exposed to less emissions and therefore less risk than the MEIW identified herein. As such, the Project will not cause a significant human health or cancer risk to adjacent workers. The nearest modeled receptors are illustrated on Exhibit 2-C.

School Child Exposure Scenario:

There are no schools located within a ¼ mile of the Project site. As such, there would be no significant impacts that would occur to any schools in the vicinity of the Project.

Proximity to sources of toxics is critical to determining the impact. In traffic-related studies, the additional non-cancer health risk attributable to proximity was seen within 1,000 feet and was strongest within 300 feet. California freeway studies show about a 70-percent drop-off in particulate pollution levels at 500 feet. Based on California Air Resources Board (CARB) and SCAQMD emissions and modeling analyses, an 80-percent drop-off in pollutant concentrations is expected at approximately 1,000 feet from a distribution center (1).

The 1,000-foot evaluation distance is supported by research-based findings concerning Toxic Air Contaminant (TAC) emission dispersion rates from roadways and large sources showing that emissions diminish substantially between 500 and 1,000 feet from emission sources.

For purposes of this assessment, a one-quarter mile radius or 1,320 feet geographic scope is utilized for determining potential impacts to nearby schools. This radius is more robust than, and therefore provides a more health protective scenario for evaluation than the 1,000-foot impact radius identified above.

**CONSTRUCTION AND OPERATIONAL IMPACTS**

The land use with the greatest potential exposure to Project construction and operational DPM source emissions is Location R1. At the MEIR, the maximum incremental cancer risk attributable to Project construction and operational DPM source emissions is estimated at 1.04 in one million, which is less than the threshold of 10 in one million. At this same location, non-cancer risks were estimated to be ≤ 0.01, which would not exceed the applicable threshold of 1.0. As such, the

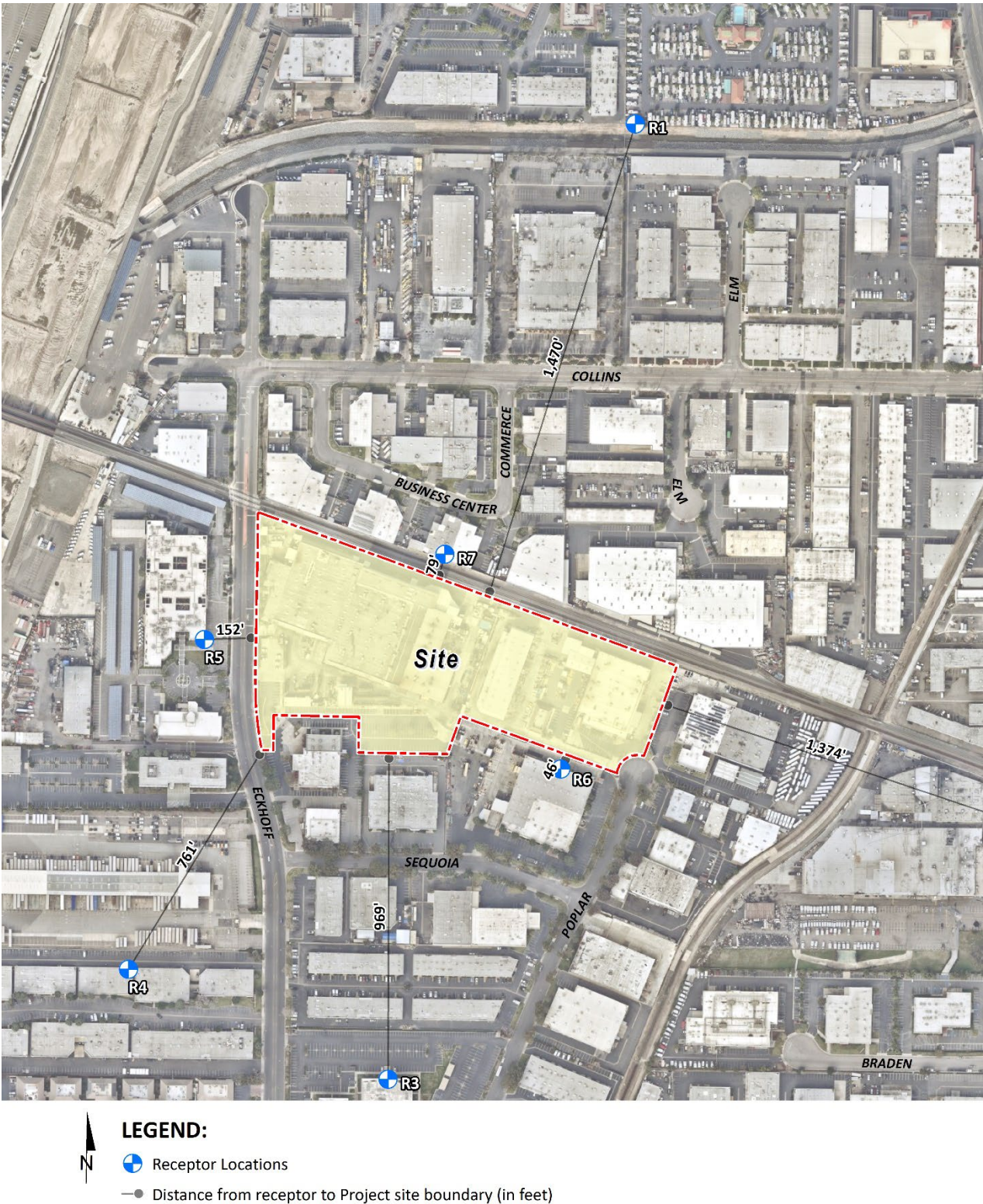
3 SCAQMD guidance does not require assessment of the potential health risk to on-site workers. Excerpts from the document OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines—The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA 2003), also indicate that it is not necessary to examine the health effects to on-site workers unless required by RCRA (Resource Conservation and Recovery Act) / CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) or the worker resides on-site.

Project will not cause a significant human health or cancer risk to adjacent land uses as a result of Project construction and operational activity. All other receptors during construction activity would experience less risk than what is identified for this location. The nearest modeled receptors are illustrated on Exhibit 2-C.

#### **NET CHANGE IN DPM IMPACTS**

The Project site is currently occupied by an existing use. As summarized in the *759 Eckhoff Scoping Memorandum*, the existing use generates a total of approximately 150 two-way passenger vehicle trips per day and 18 two-way truck trips per day for a total of 168 two-way trips per day (2). As a conservative measure, no credit has been taken for the existing truck trips and associated DPM emissions.

EXHIBIT 2-C: RECEPTOR LOCATIONS



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### 3 REFERENCES

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<http://www.aqmd.gov/home/air-quality/meteorological-data/modeling-guidance>.



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## 4 CERTIFICATIONS

The contents of this health risk assessment represent an accurate depiction of the impacts to sensitive receptors associated with the proposed 759 Eckhoff Street Project. The information contained in this health risk assessment report is based on the best available data at the time of preparation. If you have any questions, please contact me at (949) 660-1994.

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Master of Science in Environmental Studies  
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### PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Planners  
AWMA – Air and Waste Management Association  
ASTM – American Society for Testing and Materials

### PROFESSIONAL CERTIFICATIONS

Environmental Site Assessment – American Society for Testing and Materials • June 2013  
Planned Communities and Urban Infill – Urban Land Institute • June 2011  
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April 2008  
Principles of Ambient Air Monitoring – California Air Resources Board • August 2007  
AB2588 Regulatory Standards – Trinity Consultants • November 2006  
Air Dispersion Modeling – Lakes Environmental • June 2006

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## **APPENDIX 2.1:**

### **CALEEMOD OUTPUTS**

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**APPENDIX 2.2:**

**EMFAC EMISSIONS SUMMARY**

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## **APPENDIX 2.3:**

### **AERMOD MODEL INPUT/OUTPUT**

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## **APPENDIX 2.4:**

### **RISK CALCULATIONS**

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