Moreno Valley Business Center

MOBILE SOURCE HEALTH RISK ASSESSMENT

CITY OF MORENO VALLEY

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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
MEISC	Maximally Exposed Individual School Child
MEIW	Maximally Exposed Individual Worker
MHD	Medium Heavy-Duty
NAD	North American Datum
OEHHA	Office of Environmental Health Hazard Assessment
PCE	Passenger Car Equivalent
PM10	Particulate Matter 10 microns in diameter or less
Project	Moreno Valley Business Center
REL	Reference Exposure Level
RM	Recommended Measures
SCAQMD	South Coast Air Quality Management District
SRA	Source Receptor Area
TAC	Toxic Air Contaminant
TIA	Traffic Impact Analysis
URF	Unit Risk Factor
UTM	Universal Transverse Mercator
VMT	Vehicle Miles Traveled

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EXECUTIVE SUMMARY

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

The results of the health risk assessment of lifetime cancer risk from Project-generated DPM emissions are provided in Table ES-1 below for the Project.

Individual Exposure Scenario:

The residential land use with the greatest potential exposure to Project DPM source emissions is Location R4, which represents an existing residential home located at 13909 Day Street, approximately 102 feet west of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, R1 is placed at the residential building façade. At the maximally exposed individual receptor (MEIR), the maximum incremental cancer risk attributable to Project DPM source emissions is estimated at 4.13 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 0.002, which would not exceed the applicable significance threshold of 1.0. Because all other modeled residential receptors are located at a greater distance from the primary source of emissions than the scenario analyzed herein, and DPM dissipates with distance from the source, all other residential receptors in the vicinity of the Project 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 adjacent residences.

Worker Exposure Scenario:

The worker receptor land use with the greatest potential exposure to Project DPM source emissions is Location R5 which represents the nearest adjacent non-residential land located approximately 176 feet south of the Project site, where an off-site worker could be present. At the maximally exposed individual worker (MEIW), the maximum incremental cancer risk impact at this location is 0.34 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 0.001, which would not exceed the applicable significance threshold of 1.0. Because all other modeled worker receptors are located at a greater distance from the primary source of emissions than the scenario analyzed 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.

TABLE ES-1: SUMMARY OF 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 Individual Receptor	4.13	10	NO
25 Year Exposure	Maximum Exposed Worker Receptor	0.34	10	NO
Time Period	**Location**	**Maximum Hazard Index**	**Significance Threshold**	**Exceeds Significance Threshold**
Annual Average	Maximum Exposed Sensitive Receptor	0.002	1.0	NO
Annual Average	Maximum Exposed Worker Receptor	0.001	1.0	NO

1 INTRODUCTION

The purpose of this Health Risk Assessment (HRA) is to evaluate Project-related impacts to sensitive receptors (residential, schools) and adjacent workers as a result of heavy-duty diesel trucks accessing the site.

The SCAQMD identifies that if a proposed Project is expected to generate/attract heavy-duty diesel trucks, which emit DPM, preparation of a mobile source HRA is recommended. This document serves to meet the SCAQMD's request for preparation of a HRA. The mobile source 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 (2) 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 DPM 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* (3). 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 of 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.

1.1 SITE LOCATION

The proposed project is located at the northeast corner of Alessandro Boulevard and Day Street, in the City of Moreno Valley as shown on Exhibit 1-A. The March Air Reserve Base/Inland Port Airport (MARB/IPA) is located approximately 1.0 miles south of the Project site. The Project site is bordered to the west, east, and south by residential uses and industrial uses to the south.

This proposed Project includes a General Plan Amendment (GPA) and a Zone Change (ZC). The site is currently designated as Residential 30 (R-30) in the City's General Plan, which would require a land use change to Business Park/Light Industrial and zoning change to Light Industrial use. The amendment is in keeping with the use south of the Project site.

1.2 PROJECT DESCRIPTION

Exhibit 1-B illustrates a preliminary site plan for the Project. The Project is anticipated to be developed within a single phase with an opening year of 2022. The proposed Project consists of 123,367 square feet (sf) of warehousing (75 percent [%] of total building sf) and 41,122 sf of high-cube cold storage warehouse use (25% of total building sf) for a total of 164,489 sf within a single building.

At the time this HRA was prepared, the future tenants of the proposed Project are 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.

Trip generation rates were obtained from the Moreno Valley Business Center Scoping Form prepared by Urban Crossroads, Inc. Based on the Scoping Form, the Project is expected to generate a total of approximately 310 two-way vehicular trips per day (155 inbound and 155 outbound) which includes 94 two-way truck trips per day (47 inbound and 47 outbound) (4).

EXHIBIT 1-A: LOCATION MAP

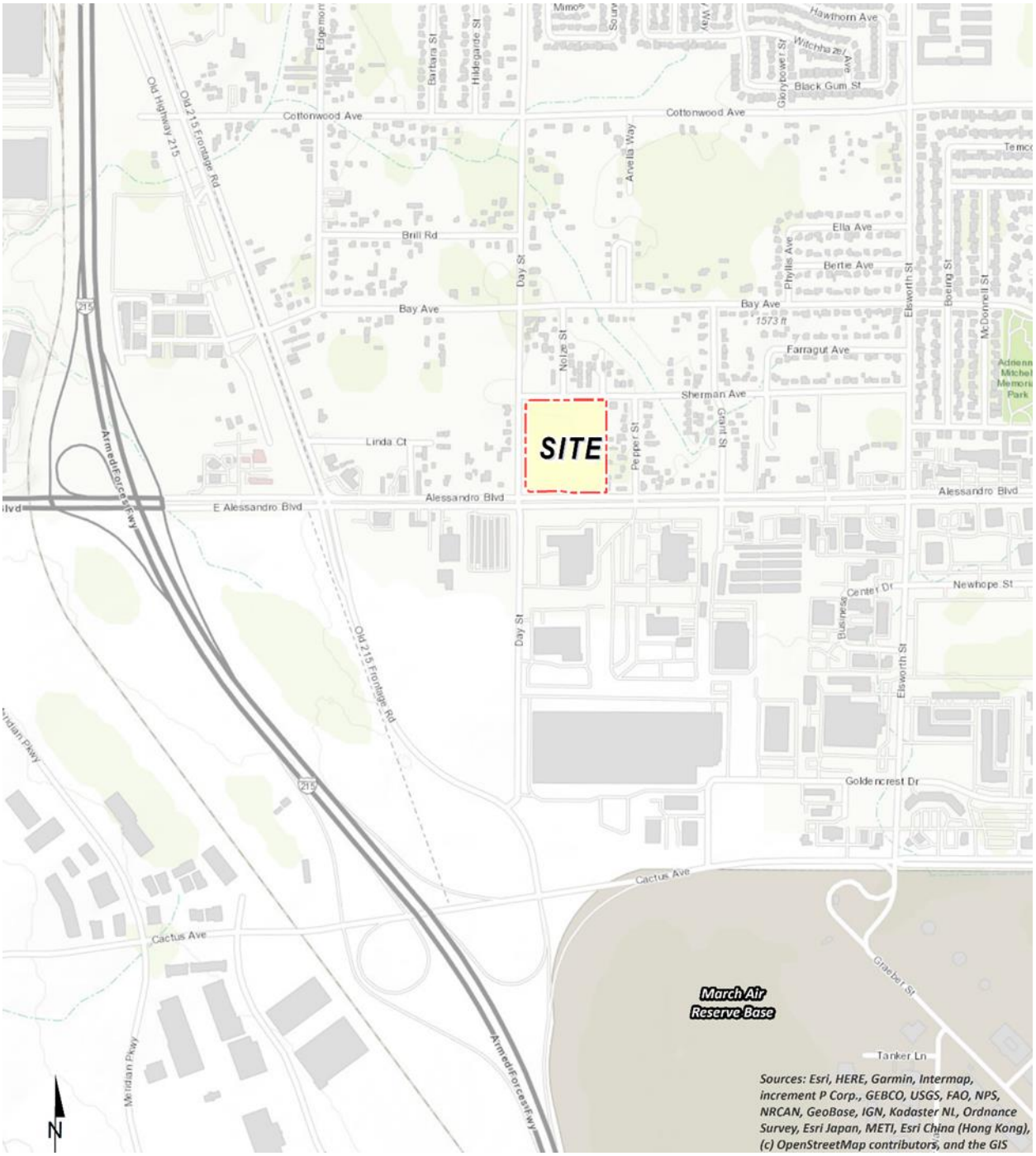
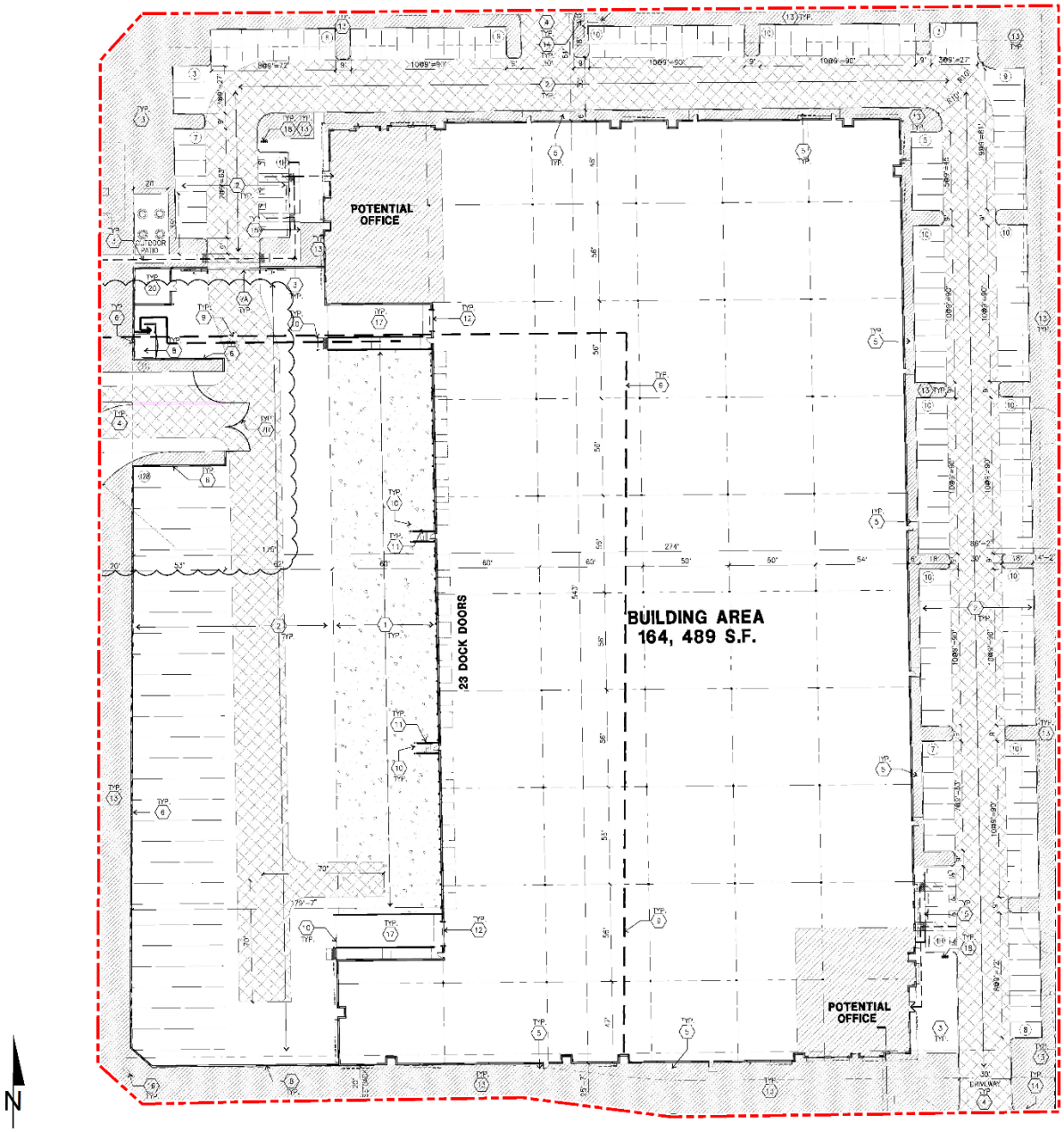


EXHIBIT 1-B: SITE PLAN



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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 µg/m3 is based upon the upper 95 percentile of estimated risk for each of the epidemiological studies utilized to develop the URF. Using the 95th 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.[1] 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 EMISSIONS ESTIMATION

2.2.1 ON-SITE AND OFF-SITE TRUCK ACTIVITY

Vehicle DPM emissions were calculated using emission factors for particulate matter less than 10µm in diameter (PM_{10}) 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 (5). 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_{10} emission factors were generated by running EMFAC 2017 in EMFAC Mode for vehicles in the Riverside County. The EMFAC Mode generates emission factors in terms of grams of pollutant emitted per vehicle activity and can calculate a matrix of

[1] 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.

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 2-1. As a conservative measure, a 2022 EMFAC 2017 run was conducted and a static 2022 emissions factor data set was used for the entire duration of analysis herein (e.g., 30 years). Use of 2022 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 2022. Additionally, based on EMFAC 2017, Light-Heavy-Duty Trucks are comprised of 49.43% diesel, Medium-Heavy-Duty Trucks are comprised of 88.51% diesel, and Heavy-Heavy-Duty Trucks are comprised of 98.85% diesel. Thus. Tricks fueled by diesel are accounted for by these percentages accordingly in the emissions factor generation.

The vehicle DPM exhaust emissions were calculated for running exhaust emissions. The running exhaust emissions were calculated by applying the running exhaust PM10 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 (6):

$Emissions_{speedA}$ (g/s) = $EF_{RunExhaust}$ (g/VMT) * Distance (VMT/trip) * Number of Trips (trips/day) / seconds per day

Where:

$Emissions_{speedA}$ (g/s): Vehicle emissions at a given speed A;

$EF_{RunExhaust}$ (g/VMT): EMFAC running exhaust PM_{10} 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_{10} 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_{10} 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 (6):

$Emissions_{idle}$ (g/s) = EF_{idle} (g/hr) * Number of Trips (trips/day) * Idling Time (min/trip) *

60 minutes per hour / seconds per day

Where:

$Emissions_{idle}$ (g/s): Vehicle emissions during idling;

EF_{idle}(g/s): EMFAC idle exhaust PM_{10} emission factor.

TABLE 2-1: 2021 WEIGHTED AVERAGE DPM EMISSIONS FACTORS

Speed	Weighted Average
0 (idling)	0.12206 (g/idle-hr)
5	0.04505 (g/s)
25	0.01935 (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 "2.1". 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 2-2. The modeling domain is limited to the Project's primary truck route and includes off-site sources in the study area for approximately ½ mile. This modeling domain is more inclusive and conservative than using only a ¼ mile modeling domain which is the distance supported by several reputable studies which conclude that the greatest potential risks occur within a ¼ 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 are 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 (7), 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.

Trip generation rates were obtained from the Moreno Valley Business Center Scoping Form prepared by Urban Crossroads, Inc. Based on the Scoping Form, the Project is expected to generate a total of approximately 310 two-way vehicular trips per day (155 inbound and 155 outbound) which includes 94 two-way truck trips per day (47 inbound and 47 outbound) (4). The focus of this HRA is the potential impacts associated with the 94 two-way truck trips accessing the site.

EXHIBIT 2-A: MODELED EMISSION SOURCES

TABLE 2-2: DPM EMISSIONS FROM PROJECT TRUCKS (2021 ANALYSIS YEAR)

Truck Emission Rates						
Source	Trucks Per Day	VMT [a] (miles/day)	Truck Emission Rate [b] (grams/mile)	Truck Emission Rate [b] (grams/idle-hour)	Daily Truck Emissions [c] (grams/day)	Modeled Emission Rates (g/second)
On-Site Idling	47			0.1221	6.46	7.482E-05
On-Site Travel	94	8.23	0.0450		0.55	6.330E-06
Off-Site Travel	94	56.07	0.0194		1.33	1.534E-05

[a] Vehicle miles traveled are for modeled truck route only.

[b] Emission rates determined using EMFAC 2017. Idle emission rates are expressed in grams per idle hour rather than grams per mile.

[c] 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. Additionally, this colum includes idling from TRUs accessing the Project, it is assumed that TRUs would idle on-site for up to 60 minutes the emissions also include those associated with on-site and off-site travel from TRUs.

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 (2). SCAQMD recommends using the Environmental Protection Agency's (U.S. EPA's) AERMOD model. For purposes of this analysis, the Lakes AERMOD View (Version 9.9.0) 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 19191 (8).

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.

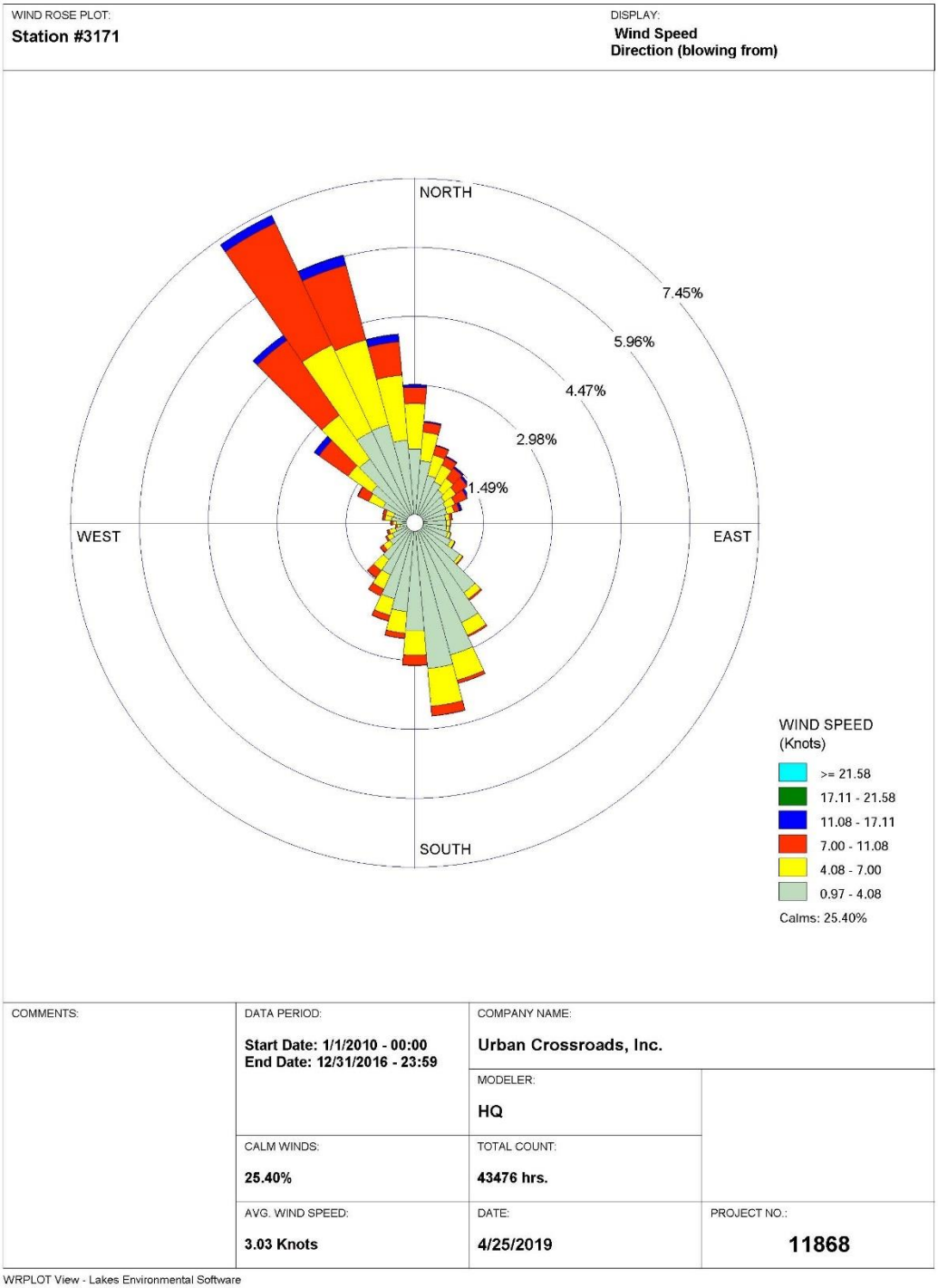
SCAQMD-recommended model parameters are presented in Table 2-3 (9). The model requires additional input parameters including emission data and local meteorology. Meteorological data from the SCAQMD's Perris monitoring station (SRA 24) was used to represent local weather conditions and prevailing winds (10). A wind rose exhibit of the Perris monitoring station is provided at Exhibit 2-B.

TABLE 2-3: AERMOD MODEL PARAMETERS

Dispersion Coefficient (Urban/Rural)	Urban (Population 2,189,641)
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 "2.1". Modeled sensitive receptors were placed at residential and non-residential locations.

EXHIBIT 2-B: WIND ROSE (SRA 24)



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. As such, even though 30 or 25 years of outdoor exposure is unlikely to occur in practical terms (because of the amount of time spent indoors), this study assumes that a resident would be exposed over 30 years for 24-hours per day at the exterior of the structure where they reside and that a worker would be exposed over 25 years for 12-hours per day at the exterior of the property where they work, positioned on the property line closest to the Project site.

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

Consistent with SCAQMD modeling guidance, all receptors were set to the elevation so that only ground-level concentrations are analyzed (11).

Discrete variants for daily breathing rates, exposure frequency, and exposure duration were obtained from relevant distribution profiles presented in the 2015 OEHHA Guidelines. Table 2-4 and 2-5 summarize the Exposure Parameters for Residents and Offsite Worker exposure scenarios based on 2015 OEHHA Guidelines. Appendix 2.2 includes the detailed risk calculation.

TABLE 2-4: 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	1090	10	2	0.85	350	24
2 to 16	572	3	14	0.72	365	24
16 to 30	261	1	14	0.73	365	24

TABLE 2-5: 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 (2), 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. 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 one million, the nearest comparison to 10 in one million is the 7 in one million lifetime chance that an individual would be struck by lightning.

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)-1 to derive the cancer risk estimate. Therefore, to assess exposures, the following dose algorithm was utilized.

$$DOSEair = (Cair \times [BR/BW] \times A \times EF) \times (1 \times 10^{-6})$$

Where:

DOSEair = chronic daily intake (mg/kg/day)

Cair = concentration of contaminant in air (ug/m3)

[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 -6 = conversion factors (ug to mg, L to m3)

RISKair = DOSEair x CPF x ED/AT

Where:

DOSEair	=	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^3 (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 (µg/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 TOXIC AIR POLLUTANTS FROM PROJECT CONSTRUCTION ACTIVITIES

During short-term construction activity, the Project will also result in some DPM which is a listed carcinogen and toxic air contaminant (TAC) in the State of California. The 2015 Office of Environmental Health Hazard Assessment (OEHHA) revised risk assessment guidelines suggest that construction projects as short as 2-6 months may warrant evaluation. Notwithstanding, based on Urban Crossroads' professional opinion and experience in preparing health risk assessments for development projects, given the size of the Project and the relatively small amount of construction equipment and relative short duration of construction activity, any DPM

generated from construction activity would be negligible and not result in any significant health risks and no further evaluation is required.

Furthermore, the SCAQMD has acknowledged that they are currently evaluating the applicability of age sensitivity factors and have not established CEQA guidance. More specifically in their response to comments received on SCAQMD Rules 1401 in June 2015 (see Board Meeting June 5, 2015), the SCAQMD explicitly states that (Page A-7 and A-8) (12):

"The Proposed Amended Rules are separate from the CEQA significance thresholds. The SCAQMD staff is currently evaluating how to implement the Revised OEHHA Guidelines under CEQA. The SCAQMD staff will evaluate a variety of options on how to evaluate health risks under the Revised OEHHA Guidelines under CEQA. The SCAQMD staff will conduct public workshops to gather input before bringing recommendations to the Governing Board. In the interim, staff will continue to use the previous guidelines for CEQA determinations."

2.7 POTENTIAL PROJECT-RELATED DPM SOURCE CANCER AND NON-CANCER RISKS[2]

Individual Exposure Scenario:

The residential land use with the greatest potential exposure to Project DPM source emissions is Location R4, which represents an existing residential home located at 13909 Day Street, approximately 102 feet west of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, R1 is placed at the residential building façade. At the MEIR, the maximum incremental cancer risk attributable to Project DPM source emissions is estimated at 4.13 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 0.002, which would not exceed the applicable significance threshold of 1.0. Because all other modeled residential receptors are located at a greater distance from the primary source of emissions than the scenario analyzed herein, and DPM dissipates with distance from the source, all other residential receptors in the vicinity of the Project 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 adjacent residences. The nearest modeled receptors are illustrated on Exhibit 2-C.

Worker Exposure Scenario:

The worker receptor land use with the greatest potential exposure to Project DPM source emissions is Location R5 which represents the nearest adjacent non-residential land located approximately 176 feet south of the Project site, where an off-site worker could be present. At the MEIW, the maximum incremental cancer risk impact at this location is 0.34 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 0.001, which would not exceed the applicable

2 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.

significance threshold of 1.0. Because all other modeled worker receptors are located at a greater distance from the primary source of emissions than the scenario analyzed 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.

EXHIBIT 2-C: MODELED RECEPTORS

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3 REFERENCES

1. **Air Resources Board.** *Air Quality and Land Use Handbook: A Community Health Perspective.* 2005.
2. **South Coast Air Quality Managment District.** Mobile Source Toxics Analysis. [Online] 2003. http://www.aqmd.gov/ceqa/handbook/mobile_toxic/mobile_toxic.html.
3. **Goss, Tracy A and Kroeger, Amy.** White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution. [Online] South Coast Air Quality Management District, 2003. [Cited: June 6, 2019.] http://www.aqmd.gov/docs/default-source/Agendas/Environmental-Justice/cumulative-impacts-working-group/cumulative-impacts-white-paper.pdf?sfvrsn=2.
4. **Urban Crossroads, Inc.** *Moreno Valley Business Center Project Scoping Form Exhibit A.* 2020.
5. **California Air Resources Board.** EMFAC 2017. [Online] https://www.arb.ca.gov/emfac/2017/.
6. **California Department of Transportation.** EMFAC Software. [Online] http://www.dot.ca.gov/hq/env/air/pages/emfac.htm.
7. **Wong, Jillian.** *Planning, Rule Development & Area Sources.* December 22, 2016.
8. **Environmental Protection Agency.** User's Guide for the AMS/EPA Regulatory Model (AERMOD). [Online] 2019. https://www3.epa.gov/ttn/scram/models/aermod/aermod_userguide.pdf.
9. —. User's Guide for the AMS/EPA Regulatory Model (AERMOD). [Online] April 2018. https://www3.epa.gov/ttn/scram/models/aermod/aermod_userguide.pdf.
10. **South Coast Air Quality Management District.** Data for AERMOD. [Online] [Cited: June 10, 2019.] https://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data/data-for-aermod.
11. —. South Coast AQMD Modeling Guidance for AERMOD. [Online] [Cited: September 18, 2019.] http://www.aqmd.gov/home/air-quality/meteorological-data/modeling-guidance.
12. —. Agenda No. 28 Proposed Amended Rules 1401 New Source Review of Toxic Air Contaminants. [Online] June 5, 2015. [Cited: September 20, 2019 .] http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2015/2015-jun1-028.pdf?sfvrsn=9.

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4 CERTIFICATION

The contents of this health risk assessment represent an accurate depiction of the impacts to sensitive receptors associated with the proposed Moreno Valley Business Center 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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Associate Principal
URBAN CROSSROADS, INC.
hqureshi@urbanxroads.com

EDUCATION

Master of Science in Environmental Studies
California State University, Fullerton • May 2010

Bachelor of Arts in Environmental Analysis and Design
University of California, Irvine • June 2006

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:

AERMOD MODEL INPUT/OUTPUT

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```
**
**************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 9.9.0
** Lakes Environmental Software Inc.
** Date: 2/4/2021
** File: C:\Lakes\AERMOD View\12589-03 HRA\12589-03 HRA.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE C:\Lakes\AERMOD View\12589-03 HRA\12589-03 HRA.isc
   MODELOPT DFAULT CONC
   AVERTIME ANNUAL
   URBANOPT 2189641
   POLLUTID OTHER
   RUNORNOT RUN
   ERRORFIL "12589-03 HRA.err"
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
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SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
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** LINE VOLUME Source ID = SLINE1
** DESCRSRC On-Site Idling
** PREFIX
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** Configuration = Adjacent
** Emission Rate = 0.00007482
** Vertical Dimension = 6.99
** SZINIT = 3.25
** Nodes = 2
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** 474290.659, 3753027.535, 472.33, 3.49, 4.00
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   LOCATION L0000265     VOLUME   474288.678 3753095.718 472.30
   LOCATION L0000266     VOLUME   474288.927 3753087.132 472.31
   LOCATION L0000267     VOLUME   474289.177 3753078.545 472.32
   LOCATION L0000268     VOLUME   474289.426 3753069.959 472.33
   LOCATION L0000269     VOLUME   474289.676 3753061.373 472.33
   LOCATION L0000270     VOLUME   474289.925 3753052.786 472.34
   LOCATION L0000271     VOLUME   474290.175 3753044.200 472.35
   LOCATION L0000272     VOLUME   474290.424 3753035.613 472.36
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** LINE VOLUME Source ID = SLINE2
** DESCRSRC On-Site Travel
** PREFIX
** Length of Side = 8.59
** Configuration = Adjacent
** Emission Rate = 6.33E-06
** Vertical Dimension = 6.99
** SZINIT = 3.25
** Nodes = 3
** 474272.344, 3753003.512, 472.42, 3.49, 4.00
** 474269.728, 3753115.543, 472.00, 3.49, 4.00
** 474240.947, 3753114.591, 472.00, 3.49, 4.00
** ----------------------------------------------------------------
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   LOCATION L0000274     VOLUME   474272.043 3753016.393 472.00
   LOCATION L0000275     VOLUME   474271.843 3753024.981 472.00
   LOCATION L0000276     VOLUME   474271.642 3753033.569 472.00
   LOCATION L0000277     VOLUME   474271.441 3753042.156 472.00
   LOCATION L0000278     VOLUME   474271.241 3753050.744 472.00
   LOCATION L0000279     VOLUME   474271.040 3753059.332 472.00
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   LOCATION L0000285     VOLUME   474269.837 3753110.858 472.29
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** PREFIX
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** Configuration = Adjacent
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** 473413.622, 3752964.976, 464.09, 3.49, 7.44
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** ------------------------------------------------------------------
   URBANSRC ALL
   SRCGROUP ALL
SO FINISHED
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**************************************
** AERMOD Receptor Pathway
**************************************
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RE STARTING
   INCLUDED "12589-03 HRA.rou"
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
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ME STARTING
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   PROFFILE PerrisADJU\PERI_V9_ADJU\PERI_v9.PFL
   SURFDATA 3171 2010
   UAIRDATA 3190 2010
   SITEDATA 99999 2010
   PROFBASE 442.0 METERS
ME FINISHED
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** AERMOD Output Pathway
**************************************
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OU FINISHED
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```
 *** Message Summary For AERMOD Model Setup ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            2 Warning Message(s)
A Total of            0 Informational Message(s)


   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


   ********   WARNING MESSAGES   ********
ME W186     289       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
     0.50
ME W187     289       MEOPEN: ADJ_U* Option for Stable Low Winds used in AERMET


***********************************
*** SETUP Finishes Successfully ***
***********************************

 *** AERMOD - VERSION  19191 ***   *** C:\Lakes\AERMOD View\12589-03 HRA\12589-03
HRA.isc                    ***        02/04/21
 *** AERMET - VERSION  16216 ***   ***
                          ***       15:33:59

                                    PAGE   1
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                                          ***     MODEL SETUP OPTIONS SUMMARY
  ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses URBAN Dispersion Algorithm for the SBL for    87 Source(s),
   for Total of    1 Urban Area(s):
   Urban Population =   2189641.0 ;  Urban Roughness Length =  1.000 m
```

```
 **Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.
        6. Urban Roughness Length of 1.0 Meter Assumed.

 **Other Options Specified:
        ADJ_U*   - Use ADJ_U* option for SBL in AERMET
        CCVR_Sub - Meteorological data includes CCVR substitutions
        TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  OTHER

 **Model Calculates ANNUAL Averages Only

 **This Run Includes:     87 Source(s);       1 Source Group(s); and       5
Receptor(s)

               with:      0 POINT(s), including
                          0 POINTCAP(s) and      0 POINTHOR(s)
                and:     87 VOLUME source(s)
                and:      0 AREA type source(s)
                and:      0 LINE source(s)
                and:      0 RLINE/RLINEXT source(s)
                and:      0 OPENPIT source(s)
                and:      0 BUOYANT LINE source(s) with      0 line(s)


 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  16216

 **Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE
Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE
Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing
Hours
                                                                 b for Both Calm
and Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   442.00 ;  Decay
```

Coef. =   0.000   ; Rot. Angle =   0.0
                  Emission Units = GRAMS/SEC   ;
Emission Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =   3.5 MB of RAM.

 **Input Runstream File: aermod.inp

 **Output Print File: aermod.out

 **Detailed Error/Message File: 12589-03 HRA.err

 **File for Summary of Results: 12589-03 HRA.sum

 *** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

                                                    *** VOLUME SOURCE DATA ***

               NUMBER EMISSION RATE   BASE   RELEASE   INIT.
INIT.   URBAN EMISSION RATE
   SOURCE   PART. (GRAMS/SEC)   X   Y   ELEV.   HEIGHT   SY
SZ   SOURCE SCALAR VARY
     ID   CATS.   (METERS) (METERS) (METERS) (METERS) (METERS)
(METERS)   BY
 -
- -

 L0000262   0   0.68020E-05 474287.9 3753121.5   473.1   3.49   4.00
3.25   YES
 L0000263   0   0.68020E-05 474288.2 3753112.9   472.6   3.49   4.00
3.25   YES
 L0000264   0   0.68020E-05 474288.4 3753104.3   472.3   3.49   4.00
3.25   YES
 L0000265   0   0.68020E-05 474288.7 3753095.7   472.3   3.49   4.00
3.25   YES
 L0000266   0   0.68020E-05 474288.9 3753087.1   472.3   3.49   4.00
3.25   YES
 L0000267   0   0.68020E-05 474289.2 3753078.5   472.3   3.49   4.00
3.25   YES
 L0000268   0   0.68020E-05 474289.4 3753070.0   472.3   3.49   4.00
3.25   YES

L0000269	0	0.68020E-05	474289.7	3753061.4	472.3	3.49	4.00	3.25 YES
L0000270	0	0.68020E-05	474289.9	3753052.8	472.3	3.49	4.00	3.25 YES
L0000271	0	0.68020E-05	474290.2	3753044.2	472.4	3.49	4.00	3.25 YES
L0000272	0	0.68020E-05	474290.4	3753035.6	472.4	3.49	4.00	3.25 YES
L0000273	0	0.39560E-06	474272.2	3753007.8	472.2	3.49	4.00	3.25 YES
L0000274	0	0.39560E-06	474272.0	3753016.4	472.0	3.49	4.00	3.25 YES
L0000275	0	0.39560E-06	474271.8	3753025.0	472.0	3.49	4.00	3.25 YES
L0000276	0	0.39560E-06	474271.6	3753033.6	472.0	3.49	4.00	3.25 YES
L0000277	0	0.39560E-06	474271.4	3753042.2	472.0	3.49	4.00	3.25 YES
L0000278	0	0.39560E-06	474271.2	3753050.7	472.0	3.49	4.00	3.25 YES
L0000279	0	0.39560E-06	474271.0	3753059.3	472.0	3.49	4.00	3.25 YES
L0000280	0	0.39560E-06	474270.8	3753067.9	472.0	3.49	4.00	3.25 YES
L0000281	0	0.39560E-06	474270.6	3753076.5	472.0	3.49	4.00	3.25 YES
L0000282	0	0.39560E-06	474270.4	3753085.1	472.0	3.49	4.00	3.25 YES
L0000283	0	0.39560E-06	474270.2	3753093.7	472.0	3.49	4.00	3.25 YES
L0000284	0	0.39560E-06	474270.0	3753102.3	472.0	3.49	4.00	3.25 YES
L0000285	0	0.39560E-06	474269.8	3753110.9	472.3	3.49	4.00	3.25 YES
L0000286	0	0.39560E-06	474265.8	3753115.4	472.6	3.49	4.00	3.25 YES
L0000287	0	0.39560E-06	474257.2	3753115.1	472.6	3.49	4.00	3.25 YES
L0000288	0	0.39560E-06	474248.7	3753114.8	472.5	3.49	4.00	3.25 YES
L0000289	0	0.25570E-06	474230.9	3753107.4	472.0	3.49	7.44	3.25 YES
L0000290	0	0.25570E-06	474230.8	3753091.4	472.0	3.49	7.44	3.25 YES
L0000291	0	0.25570E-06	474230.7	3753075.4	472.0	3.49	7.44	3.25 YES
L0000292	0	0.25570E-06	474230.6	3753059.4	472.0	3.49	7.44	3.25 YES
L0000293	0	0.25570E-06	474230.5	3753043.4	472.0	3.49	7.44	3.25 YES

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000294	0	0.25570E-06	474230.4	3753027.4	472.0	3.49	7.44	3.25	YES	
L0000295	0	0.25570E-06	474230.3	3753011.4	472.0	3.49	7.44	3.25	YES	
L0000296	0	0.25570E-06	474230.2	3752995.4	472.0	3.49	7.44	3.25	YES	
L0000297	0	0.25570E-06	474230.2	3752979.4	472.1	3.49	7.44	3.25	YES	
L0000298	0	0.25570E-06	474221.5	3752972.0	472.0	3.49	7.44	3.25	YES	
L0000299	0	0.25570E-06	474205.5	3752971.8	472.0	3.49	7.44	3.25	YES	
L0000300	0	0.25570E-06	474189.5	3752971.7	472.0	3.49	7.44	3.25	YES	
L0000301	0	0.25570E-06	474173.5	3752971.5	472.0	3.49	7.44	3.25	YES	
L0000302	0	0.25570E-06	474157.5	3752971.4	472.0	3.49	7.44	3.25	YES	
L0000303	0	0.25570E-06	474141.5	3752971.3	472.0	3.49	7.44	3.25	YES	
L0000304	0	0.25570E-06	474125.5	3752971.1	471.9	3.49	7.44	3.25	YES	
L0000305	0	0.25570E-06	474109.5	3752971.0	471.3	3.49	7.44	3.25	YES	
L0000306	0	0.25570E-06	474093.5	3752970.8	471.0	3.49	7.44	3.25	YES	
L0000307	0	0.25570E-06	474077.5	3752970.7	471.0	3.49	7.44	3.25	YES	
L0000308	0	0.25570E-06	474061.5	3752970.6	470.9	3.49	7.44	3.25	YES	

L0000309	0	0.25570E-06	474045.5	3752970.4	470.6	3.49	7.44	3.25 YES
L0000310	0	0.25570E-06	474029.5	3752970.3	470.3	3.49	7.44	3.25 YES
L0000311	0	0.25570E-06	474013.5	3752970.2	470.1	3.49	7.44	3.25 YES
L0000312	0	0.25570E-06	473997.5	3752970.0	470.0	3.49	7.44	3.25 YES
L0000313	0	0.25570E-06	473981.5	3752969.9	470.0	3.49	7.44	3.25 YES
L0000314	0	0.25570E-06	473965.5	3752969.7	470.0	3.49	7.44	3.25 YES
L0000315	0	0.25570E-06	473949.5	3752969.6	470.0	3.49	7.44	3.25 YES
L0000316	0	0.25570E-06	473933.5	3752969.5	470.0	3.49	7.44	3.25 YES
L0000317	0	0.25570E-06	473917.5	3752969.3	469.9	3.49	7.44	3.25 YES
L0000318	0	0.25570E-06	473901.5	3752969.2	469.4	3.49	7.44	3.25 YES
L0000319	0	0.25570E-06	473885.5	3752969.1	469.0	3.49	7.44	3.25 YES
L0000320	0	0.25570E-06	473869.5	3752968.9	469.0	3.49	7.44	3.25 YES
L0000321	0	0.25570E-06	473853.5	3752968.8	469.0	3.49	7.44	3.25 YES
L0000322	0	0.25570E-06	473837.5	3752968.6	469.0	3.49	7.44	3.25 YES
L0000323	0	0.25570E-06	473821.5	3752968.5	468.9	3.49	7.44	3.25 YES
L0000324	0	0.25570E-06	473805.5	3752968.4	468.7	3.49	7.44	3.25 YES
L0000325	0	0.25570E-06	473789.5	3752968.2	468.4	3.49	7.44	3.25 YES
L0000326	0	0.25570E-06	473773.5	3752968.1	468.1	3.49	7.44	3.25 YES
L0000327	0	0.25570E-06	473757.5	3752967.9	468.0	3.49	7.44	3.25 YES
L0000328	0	0.25570E-06	473741.5	3752967.8	468.0	3.49	7.44	3.25 YES
L0000329	0	0.25570E-06	473725.5	3752967.7	467.5	3.49	7.44	3.25 YES
L0000330	0	0.25570E-06	473709.5	3752967.5	467.0	3.49	7.44	3.25 YES
L0000331	0	0.25570E-06	473693.5	3752967.4	467.0	3.49	7.44	3.25 YES
L0000332	0	0.25570E-06	473677.5	3752967.3	467.0	3.49	7.44	3.25 YES
L0000333	0	0.25570E-06	473661.5	3752967.1	467.0	3.49	7.44	3.25 YES

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE VARY BY
L0000334	0	0.25570E-06	473645.5	3752967.0	466.9	3.49	7.44	3.25	YES	
L0000335	0	0.25570E-06	473629.5	3752966.8	466.8	3.49	7.44	3.25	YES	
L0000336	0	0.25570E-06	473613.5	3752966.7	466.5	3.49	7.44	3.25	YES	
L0000337	0	0.25570E-06	473597.5	3752966.6	466.2	3.49	7.44	3.25	YES	
L0000338	0	0.25570E-06	473581.5	3752966.4	465.7	3.49	7.44	3.25	YES	
L0000339	0	0.25570E-06	473565.5	3752966.3	465.2	3.49	7.44	3.25	YES	
L0000340	0	0.25570E-06	473549.5	3752966.1	464.7	3.49	7.44	3.25	YES	
L0000341	0	0.25570E-06	473533.5	3752966.0	464.1	3.49	7.44	3.25	YES	
L0000342	0	0.25570E-06	473517.5	3752965.9	463.6	3.49	7.44	3.25	YES	
L0000343	0	0.25570E-06	473501.5	3752965.7	463.1	3.49	7.44	3.25	YES	
L0000344	0	0.25570E-06	473485.5	3752965.6	463.0	3.49	7.44	3.25	YES	
L0000345	0	0.25570E-06	473469.5	3752965.5	463.0	3.49	7.44	3.25	YES	
L0000346	0	0.25570E-06	473453.5	3752965.3	463.5	3.49	7.44	3.25	YES	
L0000347	0	0.25570E-06	473437.5	3752965.2	464.0	3.49	7.44	3.25	YES	
L0000348	0	0.25570E-06	473421.5	3752965.0	464.0	3.49	7.44	3.25	YES	

 *** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

                                              *** SOURCE IDs DEFINING SOURCE GROUPS ***

 SRCGROUP ID   SOURCE IDs
 -----------   ----------

  ALL   L0000262   , L0000263   , L0000264   , L0000265   , L0000266   , L0000267   , L0000268   , L0000269   ,

             L0000270   , L0000271   , L0000272   , L0000273   , L0000274   , L0000275   , L0000276   , L0000277   ,

             L0000278   , L0000279   , L0000280   , L0000281   , L0000282   , L0000283   , L0000284   , L0000285   ,

             L0000286   , L0000287   , L0000288   , L0000289   , L0000290   , L0000291   , L0000292   , L0000293   ,

             L0000294   , L0000295   , L0000296   , L0000297   , L0000298   , L0000299   , L0000300   , L0000301   ,

             L0000302   , L0000303   , L0000304   , L0000305   , L0000306   , L0000307   , L0000308   , L0000309   ,

             L0000310   , L0000311   , L0000312   , L0000313   , L0000314   , L0000315   , L0000316   , L0000317   ,

             L0000318   , L0000319   , L0000320   , L0000321   , L0000322   , L0000323   , L0000324   , L0000325   ,

             L0000326   , L0000327   , L0000328   , L0000329   , L0000330   , L0000331   , L0000332   , L0000333   ,

             L0000334   , L0000335   , L0000336   , L0000337   , L0000338   , L0000339   , L0000340   , L0000341   ,

             L0000342   , L0000343   , L0000344   , L0000345   , L0000346   , L0000347   , L0000348   ,

*** SOURCE IDs DEFINED AS URBAN SOURCES ***

URBAN ID	URBAN POP	SOURCE IDs
	2189641.	L0000262 , L0000263 , L0000264 , L0000265 , L0000266 , L0000267 , L0000268 , L0000269 ,
		L0000270 , L0000271 , L0000272 , L0000273 , L0000274 , L0000275 , L0000276 , L0000277 ,
		L0000278 , L0000279 , L0000280 , L0000281 , L0000282 , L0000283 , L0000284 , L0000285 ,
		L0000286 , L0000287 , L0000288 , L0000289 , L0000290 , L0000291 , L0000292 , L0000293 ,
		L0000294 , L0000295 , L0000296 , L0000297 , L0000298 , L0000299 , L0000300 , L0000301 ,
		L0000302 , L0000303 , L0000304 , L0000305 , L0000306 , L0000307 , L0000308 , L0000309 ,
		L0000310 , L0000311 , L0000312 , L0000313 , L0000314 , L0000315 , L0000316 , L0000317 ,
		L0000318 , L0000319 , L0000320 , L0000321 , L0000322 , L0000323 , L0000324 , L0000325 ,
		L0000326 , L0000327 , L0000328 , L0000329 , L0000330 , L0000331 , L0000332 , L0000333 ,
		L0000334 , L0000335 , L0000336 , L0000337 , L0000338 , L0000339 , L0000340 , L0000341 ,
		L0000342 , L0000343 , L0000344 , L0000345 , L0000346 , L0000347 , L0000348 ,

*** 15:33:59

*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(474206.4, 3753135.6, 473.0, 473.0, 0.0); (474295.9,
3753214.8, 476.8, 476.8, 0.0);
(474415.9, 3753165.6, 476.0, 476.0, 0.0); (474413.7,
3753059.1, 474.7, 474.7, 0.0);
(474309.5, 3752941.3, 473.0, 473.0, 0.0);

↑ *** AERMOD - VERSION 19191 *** *** C:\Lakes\AERMOD View\12589-03 HRA\12589-03
HRA.isc *** 02/04/21
*** AERMET - VERSION 16216 *** ***
*** 15:33:59

*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** METEOROLOGICAL DAYS SELECTED FOR
PROCESSING ***

(1=YES; 0=NO)

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON
WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED
CATEGORIES ***

```
                                                                 (METERS/SEC)

                                                   1.54,    3.09,    5.14,    8.23,
10.80,
↑ *** AERMOD - VERSION  19191 ***   *** C:\Lakes\AERMOD View\12589-03 HRA\12589-03
HRA.isc                  ***        02/04/21
 *** AERMET - VERSION  16216 ***   ***
                       ***       15:33:59

                                   PAGE   9
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                                    *** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL
DATA ***

   Surface file:   PerrisADJU\PERI_V9_ADJU\PERI_v9.SFC
                  Met Version:  16216
   Profile file:   PerrisADJU\PERI_V9_ADJU\PERI_v9.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:     3171                 Upper air station no.:     3190
                  Name: UNKNOWN                                Name: UNKNOWN

                  Year:   2010                                 Year:   2010

 First 24 hours of scalar data
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN
ALBEDO  REF WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
 10 01 01   1 01   -7.9  0.125 -9.000 -9.000 -999.  106.     21.2  0.19   0.61
1.00    1.30  335.    9.1  282.5    5.5
 10 01 01   1 02   -3.9  0.088 -9.000 -9.000 -999.   62.     15.1  0.19   0.61
1.00    0.90  142.    9.1  280.9    5.5
 10 01 01   1 03   -3.9  0.088 -9.000 -9.000 -999.   62.     15.1  0.19   0.61
1.00    0.90  324.    9.1  280.4    5.5
 10 01 01   1 04   -1.3  0.064 -9.000 -9.000 -999.   39.     18.3  0.19   0.61
1.00    0.40  294.    9.1  278.8    5.5
 10 01 01   1 05   -3.9  0.088 -9.000 -9.000 -999.   62.     15.0  0.19   0.61
1.00    0.90  205.    9.1  278.1    5.5
 10 01 01   1 06   -1.3  0.065 -9.000 -9.000 -999.   39.     18.3  0.19   0.61
1.00    0.40    3.    9.1  277.0    5.5
 10 01 01   1 07   -8.0  0.125 -9.000 -9.000 -999.  106.     21.0  0.19   0.61
1.00    1.30   99.    9.1  277.0    5.5
 10 01 01   1 08   -3.3  0.086 -9.000 -9.000 -999.   61.     16.8  0.19   0.61
0.54    0.90  319.    9.1  278.8    5.5
 10 01 01   1 09   20.1  0.128  0.307  0.010   49.  110.     -9.0  0.19   0.61
```

```
0.33    0.90  239.    9.1  284.2    5.5
 10 01 01   1 10   56.7  0.087  0.560  0.010  107.   62.     -1.0  0.19   0.61
0.26    0.40  188.    9.1  289.2    5.5
 10 01 01   1 11   81.5  0.323  0.867  0.008  277.  441.    -35.9  0.19   0.61
0.23    2.70  310.    9.1  290.9    5.5
 10 01 01   1 12   97.1  0.281  1.058  0.008  421.  357.    -19.7  0.19   0.61
0.22    2.20  357.    9.1  293.1    5.5
 10 01 01   1 13   92.2  0.279  1.117  0.008  523.  354.    -20.4  0.19   0.61
0.22    2.20  356.    9.1  293.8    5.5
 10 01 01   1 14   77.6  0.275  1.102  0.008  595.  347.    -23.2  0.19   0.61
0.23    2.20   50.    9.1  294.2    5.5
 10 01 01   1 15   54.9  0.230  1.006  0.008  640.  266.    -19.2  0.19   0.61
0.27    1.80   53.    9.1  293.8    5.5
 10 01 01   1 16   12.3  0.206  0.613  0.008  648.  225.    -61.5  0.19   0.61
0.36    1.80   11.    9.1  292.5    5.5
 10 01 01   1 17   -3.6  0.087 -9.000 -9.000 -999.   71.     15.6  0.19   0.61
0.64    0.90  351.    9.1  290.4    5.5
 10 01 01   1 18   -3.8  0.087 -9.000 -9.000 -999.   62.     15.2  0.19   0.61
1.00    0.90  186.    9.1  287.5    5.5
 10 01 01   1 19   -3.8  0.087 -9.000 -9.000 -999.   62.     15.2  0.19   0.61
1.00    0.90  275.    9.1  285.9    5.5
 10 01 01   1 20   -1.2  0.064 -9.000 -9.000 -999.   39.     18.1  0.19   0.61
1.00    0.40  181.    9.1  285.4    5.5
 10 01 01   1 21   -7.8  0.125 -9.000 -9.000 -999.  106.     21.3  0.19   0.61
1.00    1.30  318.    9.1  284.9    5.5
 10 01 01   1 22   -3.8  0.088 -9.000 -9.000 -999.   62.     15.1  0.19   0.61
1.00    0.90  196.    9.1  283.1    5.5
 10 01 01   1 23   -3.8  0.088 -9.000 -9.000 -999.   62.     15.1  0.19   0.61
1.00    0.90  330.    9.1  281.4    5.5
 10 01 01   1 24   -7.9  0.125 -9.000 -9.000 -999.  106.     21.2  0.19   0.61
1.00    1.30  332.    9.1  280.9    5.5


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 10 01 01 01    5.5 0 -999.  -99.00   282.6   99.0  -99.00  -99.00
 10 01 01 01    9.1 1  335.    1.30  -999.0   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
 *** AERMOD - VERSION  19191 ***   *** C:\Lakes\AERMOD View\12589-03 HRA\12589-03
HRA.isc                    ***        02/04/21
 *** AERMET - VERSION  16216 ***   ***
                          ***       15:33:59

                                    PAGE  10
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

                   *** THE ANNUAL AVERAGE CONCENTRATION    VALUES AVERAGED OVER   5
YEARS FOR SOURCE GROUP: ALL      ***
                                    INCLUDING SOURCE(S):     L0000262    , L0000263
```

, L0000264 , L0000265 , L0000266 ,
L0000267 , L0000268 , L0000269 , L0000270 , L0000271
, L0000272 , L0000273 , L0000274 ,
L0000275 , L0000276 , L0000277 , L0000278 , L0000279
, L0000280 , L0000281 , L0000282 ,
L0000283 , L0000284 , L0000285 , L0000286 , L0000287
, L0000288 , L0000289 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
474206.42	3753135.57	0.00732	474295.88	3753214.84	0.00453
474415.92	3753165.58	0.00314	474413.66	3753059.13	0.00435
474309.47	3752941.35	0.00545			

*** MODELOPTs: RegDFAULT CONC ELEV URBAN ADJ_U*

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	NETWORK OF TYPE GRID-ID
ALL	1ST HIGHEST VALUE IS	0.00732	AT (474206.42, 3753135.57, 472.97, 472.97, 0.00)	DC
	2ND HIGHEST VALUE IS	0.00545	AT (474309.47, 3752941.35, 473.00, 473.00, 0.00)	DC

```
          3RD HIGHEST VALUE IS       0.00453 AT (  474295.88,  3753214.84,
476.79,   476.79,    0.00)  DC
          4TH HIGHEST VALUE IS       0.00435 AT (  474413.66,  3753059.13,
474.73,   474.73,    0.00)  DC
          5TH HIGHEST VALUE IS       0.00314 AT (  474415.92,  3753165.58,
475.98,   475.98,    0.00)  DC
          6TH HIGHEST VALUE IS       0.00000 AT (       0.00,        0.00,
0.00,     0.00,    0.00)
          7TH HIGHEST VALUE IS       0.00000 AT (       0.00,        0.00,
0.00,     0.00,    0.00)
          8TH HIGHEST VALUE IS       0.00000 AT (       0.00,        0.00,
0.00,     0.00,    0.00)
          9TH HIGHEST VALUE IS       0.00000 AT (       0.00,        0.00,
0.00,     0.00,    0.00)
         10TH HIGHEST VALUE IS       0.00000 AT (       0.00,        0.00,
0.00,     0.00,    0.00)


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  19191 ***   *** C:\Lakes\AERMOD View\12589-03 HRA\12589-03
HRA.isc                    ***        02/04/21
 *** AERMET - VERSION  16216 ***   ***
                       ***        15:33:59

                                   PAGE  12
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN  ADJ_U*

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            4 Warning Message(s)
 A Total of         2028 Informational Message(s)

 A Total of        43824 Hours Were Processed

 A Total of          978 Calm Hours Identified

 A Total of         1050 Missing Hours Identified (  2.40 Percent)


    ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


    ********   WARNING MESSAGES   ********
```

```
 ME W186     289       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
      0.50
 ME W187     289       MEOPEN: ADJ_U* Option for Stable Low Winds used in AERMET

 MX W450   17521       CHKDAT: Record Out of Sequence in Meteorological File at:
  14010101
 MX W450   17521       CHKDAT: Record Out of Sequence in Meteorological File at:
2 year gap

    ***********************************
    *** AERMOD Finishes Successfully ***
    ***********************************
```

AVERAGE EMISSION FACTOR
RIVERSIDE 2022

Speed	LHD1	MHD	HHD
0	0.389075	0.130109	0.01485
5	0.037927	0.062152	0.04296
25	0.013603	0.0316	0.01812

Speed	**Weighted Average Emissions**
0	**0.12206**
5	**0.04505**
25	**0.01935**

Emission Rates - 2022 Emission Factors

Truck Emission Rates						
Source	Trucks Per Day	VMT [a] (miles/day)	Truck Emission Rate [b] (grams/mile)	Truck Emission Rate [b] (grams/idle-hour)	Daily Truck Emissions [c] (grams/day)	Modeled Emission Rates (g/second)
On-Site Idling	47			0.1221	6.46	7.482E-05
On-Site Travel	94	8.23	0.0450		0.55	6.330E-06
Off-Site Travel	94	56.07	0.0194		1.33	1.534E-05

[a] Vehicle miles traveled are for modeled truck route only.

[b] Emission rates determined using EMFAC 2017. Idle emission rates are expressed in grams per idle hour rather than grams per mile.

[c] 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. Additionally, this colum includes idling from TRUs accessing the Project, it is assumed that TRUs would idle on-site for up to 60 minutes the emissions also include those associated with on-site and off-site travel from TRUs.

TRU Type	TRU - Instate Trailer TRU
Number of Units	9
Operating Time Each Unit	4

TRU Type	TRU - Instate Truck TRU
Number of Units	8
Operating Time Each Unit	4

TRU Type	TRU - Railcar TRU
Number of Units	0
Operating Time Each Unit	4

TRU Type	TRU - Railcar TRU
Number of Units	0
Operating Time Each Unit	4

Unit	Emissions Pounds per Day						Annual
	ROG	NO_x	CO	SOX	PM10	PM2.5	MT CO_2
TRU - Instate Trailer TRU	0.15	1.21	1.85	0.00	0.02	0.02	28.49
TRU - Instate Truck TRU	0.06	0.62	0.52	0.00	0.03	0.02	12.44
TRU - Railcar TRU	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRU - Railcar TRU	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.21**	**1.83**	**2.37**	**0.00**	**0.04**	**0.04**	**40.93**

20.120602 grams/day total

0.2958912 g/hr

calendar_y	season_m	sub_area	vehicle_class	fuel	temperatu	relative_h	process	speed_tim
2022	Annual	Riverside (	HHDT	Dsl	60	70	RUNEX	5
2022	Annual	Riverside (	HHDT	Dsl	60	70	RUNEX	25
2022	Annual	Riverside (	LHDT1	Dsl	60	70	RUNEX	5
2022	Annual	Riverside (	LHDT1	Dsl	60	70	RUNEX	25
2022	Annual	Riverside (	MHDT	Dsl	60	70	RUNEX	5
2022	Annual	Riverside (	MHDT	Dsl	60	70	RUNEX	25
2022	Annual	Riverside (	HHDT	Dsl			IDLEX	
2022	Annual	Riverside (	LHDT1	Dsl			IDLEX	
2022	Annual	Riverside (	MHDT	Dsl			IDLEX	

pollutant	emission_rate
PM10	0.043461
PM10	0.018326
PM10	0.076718
PM10	0.027515
PM10	0.070223
PM10	0.035704
PM10	0.015028
PM10	0.78701
PM10	0.147006

Source: EMFAC2017 (v1.0.3) Emissions Inventory
Region Type: County
Region: RIVERSIDE
Calendar Year: 2022
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Y	Vehicle Ca	Model Yea	Speed	Fuel	Population
RIVERSIDE	2022	HHDT	Aggregate	Aggregate	GAS	7.255052
RIVERSIDE	2022	HHDT	Aggregate	Aggregate	DSL	27819.82
RIVERSIDE	2022	HHDT	Aggregate	Aggregate	NG	316.9854
RIVERSIDE	2022	LHDT1	Aggregate	Aggregate	GAS	20620.88
RIVERSIDE	2022	LHDT1	Aggregate	Aggregate	DSL	20161.77
RIVERSIDE	2022	MHDT	Aggregate	Aggregate	GAS	2027.159
RIVERSIDE	2022	MHDT	Aggregate	Aggregate	DSL	15610.04

HHDT% GAS/NG	0.011521
HHDT% DSL	0.988479
LHDT1% GAS	0.505629
LHDT1% DSL	0.494371
MHDT% GAS	0.114937
MHDT% DSL	0.885063

APPENDIX 2.2:

RISK CALCULATIONS

Table 1
Quantification of Carcinogenic Risks and Noncarcinogenic Hazards
-0.25 to 0 Age Bin Exposure Scenario

Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk				Noncarcinogenic Hazards/ Toxicological Endpoints**								
					URF	CPF	DOSE	RISK	REL	RfD	RESP	CNS/PNS	CV/BL	IMMUN	KIDN	GI/LV	REPRO	EYES
	(ug/m^3)	(mg/m^3)			(ug/m^3)$^{-1}$	(mg/kg/day)$^{-1}$	(mg/kg-day)		(ug/m^3)	(mg/kg/day)								
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)
	0.00732	7.32E-06	1.00E+00	Diesel Particulate	3.0E-04	1.1E+00	2.5E-06	8.1E-08	5.0E+00	1.4E-03	1.5E-03							
TOTAL								8.1E-08			1.5E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

** Key to Toxicological Endpoints

RESP	Respiratory System
CNS/PNS	Central/Peripheral Nervous System
CV/BL	Cardiovascular/Blood System
IMMUN	Immune System
KIDN	Kidney
GI/LV	Gastrointestinal System/Liver
REPRO	Reproductive System (e.g. teratogenic and developmental effects)
EYES	Eye irritation and/or other effects

Note: Exposure factors used to calculate contaminant intake

exposure frequency (days/year)	350
exposure duration (years)	0.25
inhalation rate (L/kg-day))	361
inhalation absorption factor	1
averaging time (years)	70
fraction of time at home	0.85
age sensitivity factor (age third trimester	10

Table 2
Quantification of Carcinogenic Risks and Noncarcinogenic Hazards
0-2 Age Bin Exposure Scenario

Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk				Noncarcinogenic Hazards/ Toxicological Endpoints**								
					URF	CPF	DOSE	RISK	REL	RfD	RESP	CNS/PNS	CV/BL	IMMUN	KIDN	GI/LV	REPRO	EYES
	(ug/m^3)	(mg/m^3)			(ug/m^3)$^{-1}$	(mg/kg/day)$^{-1}$	(mg/kg-day)		(ug/m^3)	(mg/kg/day)								
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)
	0.00732	7.32E-06	1.00E+00	Diesel Particulate	3.0E-04	1.1E+00	7.7E-06	2.0E-06	5.0E+00	1.4E-03	1.5E-03							
TOTAL								2.0E-06			1.5E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

** Key to Toxicological Endpoints

RESP	Respiratory System
CNS/PNS	Central/Peripheral Nervous System
CV/BL	Cardiovascular/Blood System
IMMUN	Immune System
KIDN	Kidney
GI/LV	Gastrointestinal System/Liver
REPRO	Reproductive System (e.g. teratogenic and developmental effects)
EYES	Eye irritation and/or other effects

Note: Exposure factors used to calculate contaminant intake

exposure frequency (days/year)	350
exposure duration (years)	2
inhalation rate (L/kg-day))	1090
inhalation absorption factor	1
averaging time (years)	70
fraction of time at home	0.85
age sensitivity factor (0 to 2 years old)	10

Table 3
Quantification of Carcinogenic Risks and Noncarcinogenic Hazards
2-16 Age Bin Exposure Scenario

Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk				Noncarcinogenic Hazards/ Toxicological Endpoints**								
					URF	CPF	DOSE	RISK	REL	RfD	RESP	CNS/PNS	CV/BL	IMMUN	KIDN	GI/LV	REPRO	EYES
	(ug/m^3)	(mg/m^3)			(ug/m^3)$^{-1}$	(mg/kg/day)$^{-1}$	(mg/kg-day)		(ug/m^3)	(mg/kg/day)								
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)
	0.00732	7.32E-06	1.00E+00	Diesel Particulate	3.0E-04	1.1E+00	4.0E-06	1.8E-06	5.0E+00	1.4E-03	1.5E-03							
TOTAL								1.8E-06			1.5E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

** Key to Toxicological Endpoints

RESP	Respiratory System
CNS/PNS	Central/Peripheral Nervous System
CV/BL	Cardiovascular/Blood System
IMMUN	Immune System
KIDN	Kidney
GI/LV	Gastrointestinal System/Liver
REPRO	Reproductive System (e.g. teratogenic and developmental effects)
EYES	Eye irritation and/or other effects

Note: Exposure factors used to calculate contaminant intake

exposure frequency (days/year)	350
exposure duration (years)	14
inhalation rate (L/kg-day))	572
inhalation absorption factor	1
averaging time (years)	70
fraction of time at home	0.72
age sensitivity factor (ages 2 to 16 years	3

Table 4
Quantification of Carcinogenic Risks and Noncarcinogenic Hazards
16-30 Age Bin Exposure Scenario

Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk				Noncarcinogenic Hazards/ Toxicological Endpoints**								
					URF	CPF	DOSE	RISK	REL	RfD	RESP	CNS/PNS	CV/BL	IMMUN	KIDN	GI/LV	REPRO	EYES
	(ug/m^3)	(mg/m^3)			(ug/m^3)$^{-1}$	(mg/kg/day)$^{-1}$	(mg/kg-day)		(ug/m^3)	(mg/kg/day)								
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)
	0.00732	7.32E-06	1.00E+00	Diesel Particulate	3.0E-04	1.1E+00	1.8E-06	2.8E-07	5.0E+00	1.4E-03	1.5E-03							
TOTAL								2.8E-07			1.5E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
								0.28										

** Key to Toxicological Endpoints

RESP	Respiratory System
CNS/PNS	Central/Peripheral Nervous System
CV/BL	Cardiovascular/Blood System
IMMUN	Immune System
KIDN	Kidney
GI/LV	Gastrointestinal System/Liver
REPRO	Reproductive System (e.g. teratogenic and developmental effects)
EYES	Eye irritation and/or other effects

Note: Exposure factors used to calculate contaminant intake

exposure frequency (days/year)	350
exposure duration (years)	14
inhalation rate (L/kg-day))	261
inhalation absorption factor	1
averaging time (years)	70
fraction of time at home	0.73
age sensitivity factor (ages 16 to 30 years old)	1

Total Risk for All Age Bins (per million) **4.13**

Table 5
Quantification of Carcinogenic Risks and Noncarcinogenic Risks
25-Year Worker Exposure Scenario

	Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk				Noncarcinogenic Hazards/ Toxicological Endpoints**									
						URF	CPF	DOSE	RISK	REL	RfD	RESP	CNS/PNS	CV/BL	IMMUN	KIDN	GI/LV	REPRO	EYES
		(ug/m^3)	(mg/m^3)			(ug/m^3)$^{-1}$	($mg/kg/day$)$^{-1}$	(mg/kg-day)		(ug/m^3)	(mg/kg/day)								
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)
1	Diesel Particulates	5.50E-03	5.50E-06	1.00E+00	Diesel Particulate	3.0E-04	1.1E+00	8.7E-07	3.2E-07	5.0E+00	1.4E-03	1.1E-03							
	TOTAL								3.4E-07			1.1E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
									0.34										

** Key to Toxicological Endpoints

RESP	Respiratory System
CNS/PNS	Central/Peripheral Nervous System
CV/BL	Cardiovascular/Blood System
IMMUN	Immune System
KIDN	Kidney
GI/LV	Gastrointestinal System/Liver
REPRO	Reproductive System (e.g. teratogenic and developmental effects)
EYES	Eye irritation and/or other effects

Note: Exposure factors used to calculate contaminant intake

exposure frequency (days/year)	250
exposure duration (years)	25
inhalation rate (L/kg-day))	230
inhalation absorption factor	1
averaging time (years)	70