# AVENUE M & DIVISION STREET WAREHOUSE PROJECT

## CONSTRUCTION AND OPERATIONAL HEALTH RISK ASSESSMENT

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Reference Number
16522-02 HRA Report

Agency
City of Lancaster

Date
March 1, 2025

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| | |
|---|---|
| µg | Microgram |
| AERMOD | American Meteorological Society/Environmental Protection Agency Regulatory Model |
| AQMD | Air Quality Management District |
| ASF | Age Sensitivity Factor |
| AVAQMD | Antelope Valley Air Quality Management District |
| CARB | California Air Resources Board |
| CEQA | California Environmental Quality Act |
| CPF | Cancer Potency Factor |
| DPM | Diesel Particulate Matter |
| EMFAC | Emission Factor Model |
| EPA | Environmental Protection Agency |
| FAH | Fraction of Time at Home |
| 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 |
| OEHHA | Office of Environmental Health Hazard Assessment |
| PM10 | Particulate Matter 10 microns in diameter or less |
| Project | Avenue M & Division Street Warehouse Project |
| REL | Reference Exposure Level |
| SCAQMD | South Coast Air Quality Management District |
| TAC | Toxic Air Contaminant |
| TA | Traffic Analysis |
| URF | Unit Risk Factor |
| UTM | Universal Transverse Mercator |

# EXECUTIVE SUMMARY

This report evaluates the potential health risk impacts to sensitive receptors 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 58 feet east of the Project site at the Regal Lodge Motel, located at 42047 Sierra Highway. R1 is placed at the building façade facing the Project site. For purposes of this analysis, this receptor was conservatively analyzed as a residential receptor. At the maximally exposed individual receptor (MEIR) the maximum incremental cancer risk attributable to Project construction DPM source emissions is estimated at 1.89 in one million, which is less than the Antelope Valley Air Quality Management District (AVAQMD) 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 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. Because all other modeled receptors are located at a greater distance from the Project site and are exposed to lesser concentrations of DPM than the MEIR analyzed herein, and TACs generally dissipate with distance from the source, all other receptors in the vicinity of the Project site would be exposed to less emissions and therefore less risk than MEIR identified herein. The nearest modeled receptors are illustrated on Exhibit 2-D.

## OPERATIONAL IMPACTS

### Residential Exposure Scenario

The residential land use with the greatest potential exposure to Project DPM source emissions is Location R2 which is located approximately 70 feet east of the Project site at the Sahara Motel, located at 42137 Sierra Highway. R2 is placed at the building façade facing the Project site. At the MEIR, the maximum incremental cancer risk attributable to Project DPM source emissions is estimated at 1.21 in one million, which is less than the AVAQMD 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. As such, the Project will not cause a significant human health or cancer risk to adjacent land uses as a result of Project operational activity. Because all other modeled residential receptors are located at a greater distance from the Project site and primary truck routes and are exposed to lesser concentrations of DPM than the MEIR analyzed herein, and TACs generally dissipate 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 receptors. The nearest modeled receptors are illustrated on Exhibit 2-D.

## Worker Exposure Scenario[1]

The worker receptor land use with the greatest potential exposure to Project DPM source emissions is Location R2, which represents the potential worker receptor located at the Sahara Motel, approximately 70 feet east of the Project site. It should be noted that this location was conservatively evaluated under both residential and worker exposure scenarios. At the maximally exposed individual worker receptor (MEIW), the maximum incremental cancer risk impact is estimated at 0.13 in one million, which is less than the AVAQMD 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. As such, the Project will not cause a significant human health or cancer risk to adjacent land uses as a result of Project operational activity. Because all other modeled worker receptors are located at a greater distance than the MEIW 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-D.

## School Child Exposure Scenario

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 South Coast Air Quality Management District (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 TAC emission dispersion rates from roadways and large sources showing that emissions diminish substantially between 500 and 1,000 feet from emission sources (1).

In addition, the Waters Bill (AB 3205) (H&SC Section, 42301.6 through 42301.9) addresses sources of hazardous air pollutants near schools and although not directly applicable to this project, this bill further evidences the propriety of considering hazardous emissions sources within a defined 1,000-foot radius. That is, pursuant to the Waters Bill, prior to approving an application for a permit to construct or modify a source which emits hazardous air emissions (i.e. DPM), which source is located within 1,000 feet from the outer boundary of a school site, the air pollution control officer shall prepare a public notice in which the proposed project or modification for which the application for a permit is made is fully described.

More recent studies suggest that in light of emission reductions due to tightening emission standards over the past twenty years, this 1,000-foot siting distance is overly conservative. Modeling performed for the 2021 report Evaluating Siting Distances for New Sensitive Receptors Near Warehouses, prepared by the Ramboll Group, demonstrates a significant reduction in DPM

[1] *AVAQMD 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.*

emissions and risk between year 2000 emissions (which were utilized by CARB in establishing its recommended siting guidance of 1,000 feet) and 2023 (2). This reduction is attributed to a significant reduction in DPM emission rates from trucks and TRUs resulting from the adoption of increasingly stringent emission standards. This reduction in DPM emission rates has resulted in a corresponding significant reduction in risk as well, despite increasingly conservative regulatory guidance in the preparation of HRAs, particularly OEHHA's adoption of age sensitivity factors (ASF) in their revised HRA guidance released in 2015.

A one-quarter mile radius, or 1,320 feet, is commonly utilized for identifying sensitive receptors, such as schools, that may be impacted by a proposed project. 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.

There are no schools within ¼ mile of the Project site. The nearest school is Adventureland Preschool, which is located approximately 6,000 feet southwest of the Project site. Because there is no reasonable potential that TAC emissions would cause significant health impacts at distances of more than ¼ mile from the air pollution source, there would be no significant impacts that would occur to any schools in the vicinity of the Project.

## CONSTRUCTION AND OPERATIONAL IMPACTS

The land use with the greatest potential exposure to Project construction and operational DPM source emissions is Location R2. At the MEIR, the maximum incremental cancer risk attributable to Project construction and operational DPM source emissions is estimated at 2.68 in one million, which is less than the AVAQMD 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 of Project construction and operational activity. All other receptors during construction and operational activity would experience less risk than what is identified for this location. The nearest modeled receptors are illustrated on Exhibit 2-D.

### 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? |
|---|---|---|---|---|
| 1.07 Year Exposure | Maximum Exposed Sensitive Receptor (Location R1) | 1.89 | 10 | NO |
| Time Period | Location | Maximum Hazard Index | Significance Threshold | Exceeds Significance Threshold? |
| Annual Average | Maximum Exposed Sensitive Receptor (Location R1) | <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 (Location R2) | 1.21 | 10 | NO |
| 25 Year Exposure | Maximum Exposed Worker Receptor (Location R2) | 0.13 | 10 | NO |
| Time Period | Location | Maximum Hazard Index | Significance Threshold | Exceeds Significance Threshold? |
| Annual Average | Maximum Exposed Sensitive Receptor (Location R2) | <0.01 | 1.0 | NO |
| Annual Average | Maximum Exposed Worker Receptor (Location R2) | <0.01 | 1.0 | NO |

## TABLE ES-3: SUMMARY OF CONSTRUCTION AND 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 (Location R2) | 2.68 | 10 | NO |
| Time Period | Location | Maximum Hazard Index | Significance Threshold | Exceeds Significance Threshold? |
| Annual Average | Maximum Exposed Sensitive Receptor (Location R2) | <0.01 | 1.0 | NO |

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# 1 INTRODUCTION

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

The AVAQMD 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 AVAQMD's recommendation for preparation of an HRA. The mobile source HRA has been prepared in accordance with the relevant documentation available including 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 AVAQMD. Cancer risk is expressed in terms of expected incremental incidence per million population. The AVAQMD 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 AVAQMD 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 of 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 Project site is located on the northwest corner of Avenue M and Division Street in the City of Lancaster, as shown on Exhibit 1-A. The Project site is currently vacant.

## 1.2 PROJECT DESCRIPTION

The proposed Project consists of two warehouse/manufacturing buildings totaling 807,005 square feet (sf) on a 37.10-acre site. Building 1 is approximately 401,973 sf, which consists of 343,973 sf of warehousing uses, 46,000 sf of manufacturing uses, and 12,000 sf of office uses. Building 2 is approximately 405,032 sf, which consists of 347,032 sf of warehousing uses, 46,000 sf of manufacturing uses, and 12,000 sf of office uses. The Project also consists of a total of 443 auto parking spaces and 148 truck trailer parking spaces. The proposed Project is anticipated to have an opening year of 2026. Exhibit 1-B presents the Project site plan.

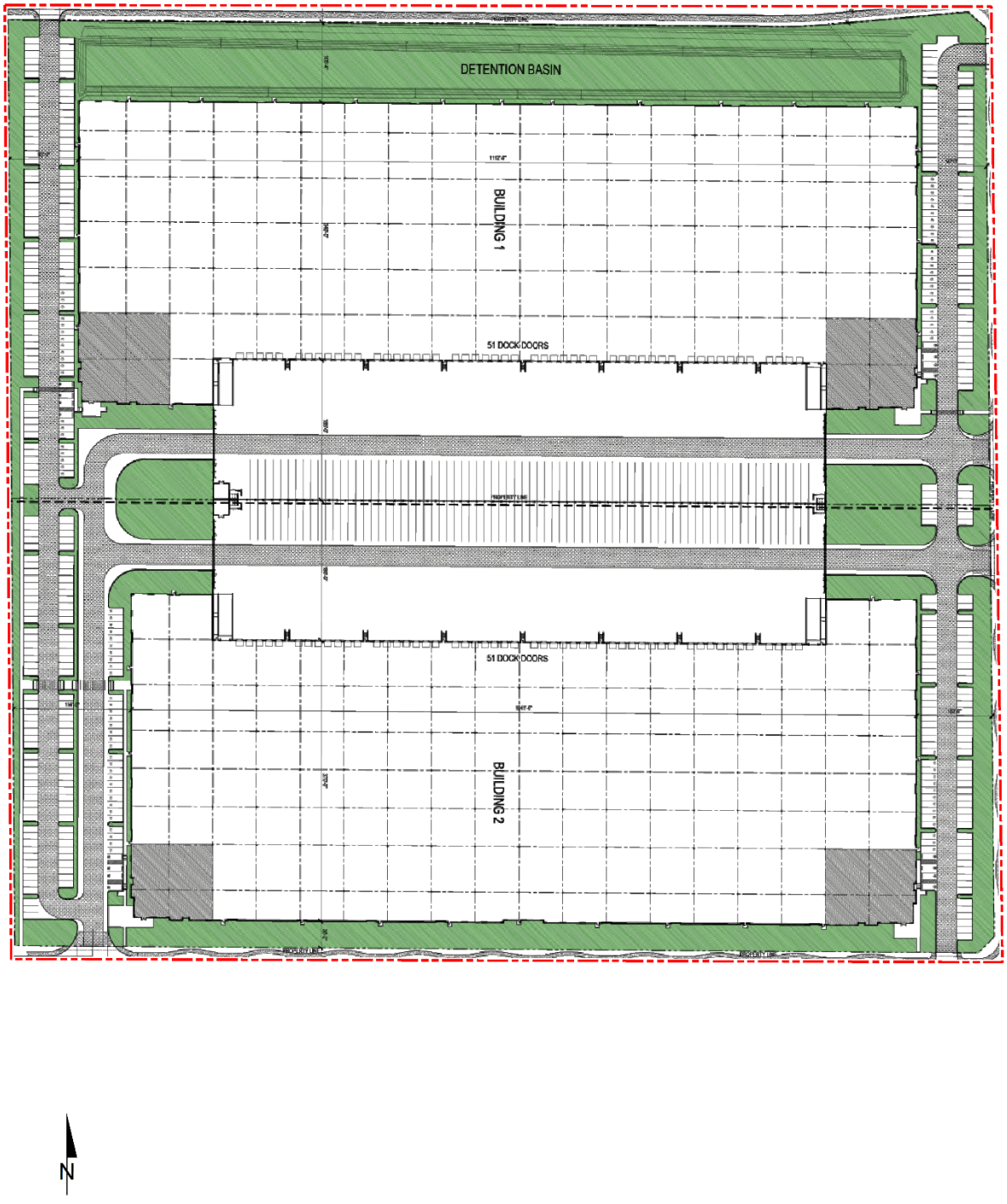
## EXHIBIT 1-A: LOCATION MAP


**LEGEND:**

N

Site Boundary

## EXHIBIT 1-B: SITE PLAN



# 2 BACKGROUND

## 2.1 BACKGROUND ON RECOMMENDED METHODOLOGY

This HRA is based on applicable 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 $\mu g/m^3$ is based upon the upper 95 percentile of estimated risk for each of the epidemiological studies utilized to develop the URF. Using the 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.
- 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. 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.

The AVAQMD 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. Carcinogenic compounds are not considered to have threshold levels (i.e., dose levels below which there are no risks). Any exposure, therefore, will have some associated risk. As a result, the State of California has established a threshold of one in one hundred thousand (1.0E-05) as a level posing no significant risk for exposures to carcinogens regulated under the Safe Drinking Water and Toxic Enforcement Act (Proposition 65). These thresholds are also consistent with the maximum incremental cancer risk established by the South Coast Air Quality Management District (SCAQMD) for projects prepared under CEQA.

Non-carcinogenic risk is expressed as a hazard index, which is quantified by comparing the exposure to the reference level via a ratio (i.e., the exposure divided by the appropriate chronic or acute value). Exposures below the reference level (a hazard index of 1.0) are not likely to be associated with any adverse health effects and are considered to be less than significant.

## 2.2 CONSTRUCTION HEALTH RISK ASSESSMENT

### 2.2.1 Emission 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 *Avenue M, Lancaster Industrial Development Project - Air Quality/GHG Assessment* ("technical study") prepared by KPC EHS Consultants (4)

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 279 total working-days of 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 modeled emission sources for construction activity are illustrated on Exhibit 2-A.

### TABLE 2-1: CONSTRUCTION DURATION

| Construction Activity | Start Date | End Date | Days |
|---|---|---|---|
| Site Preparation | 4/30/2025 | 5/27/2025 | 20 |
| Grading | 5/27/2025 | 7/28/2025 | 45 |
| Building Construction | 7/29/2025 | 2/18/2026 | 147 |
| Paving | 2/17/2026 | 4/6/2026 | 35 |
| Architectural | 4/7/2026 | 5/25/2026 | 35 |

### TABLE 2-2: CONSTRUCTION EQUIPMENT ASSUMPTIONS

| Construction Activity | Equipment | Quantity | Hours Per Day |
|---|---|---|---|
| Site Preparation | Rubber Tired Dozers | 3 | 8 |
| | Tractors/Loaders/Backhoes | 4 | 8 |
| Grading | Graders | 1 | 8 |
| | Excavators | 2 | 8 |
| | Tractors/Loaders/Backhoes | 2 | 8 |
| | Scrapers | 2 | 8 |
| | Rubber Tired Dozers | 1 | 8 |
| Building Construction | Forklifts | 3 | 8 |
| | Generator Sets | 1 | 8 |
| | Cranes | 1 | 7 |
| | Welders | 1 | 8 |
| | Tractors/Loaders/Backhoes | 3 | 7 |
| Paving | Pavers | 2 | 8 |
| | Paving Equipment | 2 | 8 |
| | Rollers | 2 | 8 |
| Architectural Coating | Air Compressors | 1 | 6 |

## EXHIBIT 2-A: MODELED CONSTRUCTION EMISSION SOURCES

## 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 10µm in diameter ($PM_{10}$) generated with the 2021 version of the EMission FACtor model (EMFAC) developed by the CARB. EMFAC 2021 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 2021, 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 2021. Emission factors calculated using EMFAC 2021 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 2021 in EMFAC Mode for vehicles in the Los Angeles 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 trailer parking
- 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 2026 EMFAC 2021 run was conducted and a static 2026 emissions factor data set was used for the entire duration of analysis herein (e.g., 30 years). Use of 2026 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 2026. Additionally, based on EMFAC 2021, Light-Heavy-Duty Trucks are comprised of 61.3% diesel, Medium-Heavy-Duty Trucks are comprised of 92.3% diesel, and Heavy-Heavy-Duty Trucks are comprised of 99.6% diesel. Trucks fueled by diesel are accounted for by these percentages accordingly in the emissions factor generation. Appendix 2.1 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 $PM_{10}$ 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):

$$Emissions_{Speed\ A} = EF_{Run\ Exhaust} \times Distance \times \frac{Number\ of\ Trips\ per\ Day}{Seconds\ per\ Day}$$

Where:

| | | |
|---|---|---|
| $Emissions_{Speed\ A}$ | = | Vehicle emissions at a given speed A (g/s) |
| $EF_{Run\ Exhaust}$ | = | EMFAC running exhaust $PM_{10}$ emission factor at speed A (g/vmt) |
| $Distance$ | = | Total distance traveled per trip (miles) |

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):

$$Emissions_{Idle} = EF_{Idle} \times Number\ of\ Trips \times Idling\ Time \times \frac{60\ minutes\ per\ hour}{seconds\ per\ day}$$

Where:

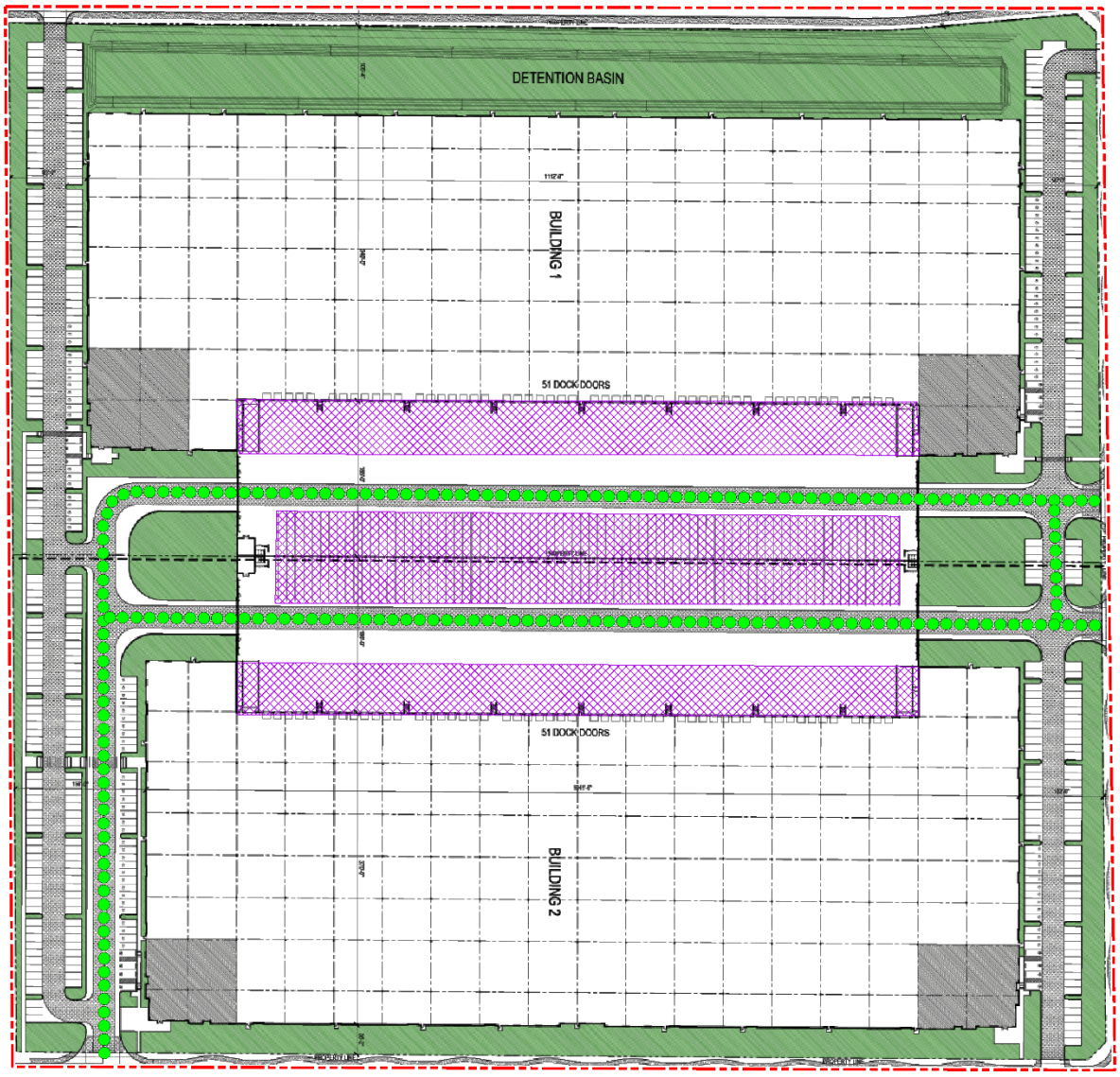
| | | |
|---|---|---|
| $Emissions_{Idle}$ | = | Vehicle emissions during Idling (g/s) |
| $EF_{Idle}$ | = | EMFAC idle exhaust $PM_{10}$ emission factor (g/s) |
| $Number\ of\ Trips$ | = | Number of trips per day |
| $Idling\ Time$ | = | Idling time (minutes per trip) |

**TABLE 2-3: 2026 WEIGHTED AVERAGE DPM EMISSION FACTORS**

| Speed (miles per hour) | Weighted Average |
|---|---|
| 0 (idling) | 0.09109 (g/idle-hour) |
| 5 | 0.01455 (g/mile) |
| 25 | 0.00703 (g/mile) |

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 Appendices 2.3 through 2-6. 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 for on-site sources and Exhibit 2-C for off-site sources. The modeling domain is limited to the Project's primary truck route and includes off-site sources in the study area for more than ¾ 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).

## EXHIBIT 2-B: MODELED ON-SITE EMISSION SOURCES



## EXHIBIT 2-C: MODELED OFF-SITE EMISSION SOURCES

## TABLE 2-4: DPM EMISSIONS FROM PROJECT TRUCKS (2026 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 - Loading Docks | 233 | | | 0.0911 | 5.31 | 6.148E-05 |
| On-Site Idling - Trailer Parking | 233 | | | 0.0911 | 1.77 | 2.049E-05 |
| On-Site Travel | 233 | 135.76 | 0.0145 | | 1.97 | 2.286E-05 |
| Off-Site Travel - Division St. 15% Inbound/Outbound | 70 | 15.25 | 0.0070 | | 0.11 | 1.241E-06 |
| Off-Site Travel - Sierra Hwy 2.5% Inbound/Outbound | 12 | 2.97 | 0.0070 | | 0.02 | 2.413E-07 |
| Off-Site Travel - Avenue M 20% Inbound/Outbound | 93 | 22.05 | 0.0070 | | 0.15 | 1.794E-06 |
| Off-Site Travel - Avenue M 12.5% Inbound/Outbound | 58 | 5.19 | 0.0070 | | 0.04 | 4.225E-07 |
| Off-Site Travel - Avenue M 70% Inbound/Outbound | 327 | 384.74 | 0.0070 | | 2.70 | 3.130E-05 |
| Off-Site Travel - Division St. 7.5% Inbound/Outbound | 35 | 3.47 | 0.0070 | | 0.02 | 2.820E-07 |
| Off-Site Travel - Sierra Hwy N. 15% Inbound/Outbound | 70 | 53.49 | 0.0070 | | 0.38 | 4.352E-06 |
| Off-Site Travel - Sierra Hwy S. 15% Inbound/Outbound | 70 | 71.57 | 0.0070 | | 0.50 | 5.823E-06 |

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

[b] Emission rates determined using EMFAC 2021. 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 at loading docks, and 5 minutes at parking spaces

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 (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. Truck idling at trailer parking areas was assumed to occur over a period of 5 minutes. Even though the Project is not within the jurisdiction of the SCAQMD, these recommendations are relevant for CEQA purposes since AVAQMD does not provide similar guidance.

As summarized in the *Avenue M & Division Street Warehouse Project Local Transportation Assessment* prepared by RK Engineering Group, Inc., at buildout the Project is expected to generate a total of approximately 1,733 two way actual vehicular trips-ends per day, which includes 467 two-way truck trips per day (8).

## 2.4 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). The U.S. EPA's AERMOD model has been utilized. For purposes of this analysis, the Lakes AERMOD View (Version 13.0.0) 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 24142 (9).

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, an initial lateral dimension of 4.0 meters, and an initial vertical dimension of 3.25 meters.

Model parameters are presented in Table 2-5. The model requires additional input parameters including emission data and local meteorology. Meteorological data from the Palmdale Airport monitoring station was used to represent local weather conditions and prevailing winds (10).

### TABLE 2-5: AERMOD MODEL PARAMETERS

| | |
|---|---|
| Dispersion Coefficient (Urban/Rural): | Rural |
| Terrain (Flat/Elevated): | Elevated (Regulatory Default) |
| Averaging Time: | Period (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 2.2 for construction and Appendix 2.3 for operation. 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 AVAQMD 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.

All receptors were set to existing elevation height so that only ground-level concentrations are analyzed. United States Geological Survey (USGS) National Elevation Dataset (NED) terrain data based on a 10 meter resolution using AERMAP was utilized in the HRA modeling to set elevations (11).

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 2-8 summarize the Exposure Parameters for Residents and Workers based on 2015 OEHHA Guidelines. Appendix 2.4 includes detailed risk calculations.

## 2.5 CARCINOGENIC CHEMICAL RISK

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.

### 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 | 1.07 | 1.00 | 250 | 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 |

Guidance from CARB and the California EPA, 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 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.

$$DOSE_{AIR} = \left(C_{AIR} \times \frac{BR}{BW} \times A \times EF\right) \times (1 \times 10^{-6})$$

Where:

$DOSE_{AIR}$ = chronic daily intake (mg/kg/day)

$C_{AIR}$ = concentration of contaminant in air (µg/m$^3$)

$\frac{BR}{BW}$ = 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) |
| $1 \times 10^{-6}$ | = | conversion factors (µg to mg, L to $m^3$) |

$$RISK_{AIR} = DOSE_{AIR} \times CPF \times ASF \times FAH \times \frac{ED}{AT}$$

Where:

| | | |
|---|---|---|
| $DOSE_{AIR}$ | = | chronic daily intake (mg/kg/day) |
| $CPF$ | = | cancer potency factor |
| $ASF$ | = | age sensitivity factor |
| $FAH$ | = | fraction of time at home |
| $ED$ | = | number of years within particular age group |
| $AT$ | = | averaging time |

## 2.6 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 REL. The REL for diesel particulates was obtained from OEHHA for this analysis. The chronic REL for DPM was established by OEHHA as 5 µg/$m^3$ (12).

The non-cancer hazard index was calculated as follows:

$$HI_{DPM} = \frac{C_{DPM}}{REL_{DPM}}$$

Where:

| | | |
|---|---|---|
| $HI_{DPM}$ | = | Hazard index (unitless) |
| $C_{DPM}$ | = | Annual average DPM concentration (µg/$m^3$) |
| $REL_{DPM}$ | = | REL for DPM (the DPM concentration at which no adverse health effects are anticipated). |

## 2.7 Potential Project-Related 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 58 feet east of the Project site at the Regal Lodge Motel, located at 42047 Sierra Highway. R1 is placed at the building façade facing the Project site. For

purposes of this analysis, this receptor was conservatively analyzed as a residential receptor. At the MEIR the maximum incremental cancer risk attributable to Project construction DPM source emissions is estimated at 1.89 in one million, which is less than the AVAQMD 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 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. Because all other modeled receptors are located at a greater distance from the Project site and are exposed to lesser concentrations of DPM than the MEIR analyzed herein, and TACs generally dissipate with distance from the source, all other receptors in the vicinity of the Project site would be exposed to less emissions and therefore less risk than MEIR identified herein. The nearest modeled receptors are illustrated on Exhibit 2-D.

## OPERATIONAL IMPACTS

### Residential Exposure Scenario

The residential land use with the greatest potential exposure to Project DPM source emissions is Location R2 which is located approximately 70 feet east of the Project site at the Sahara Motel, located at 42137 Sierra Highway. R2 is placed at the building façade facing the Project site. At the MEIR, the maximum incremental cancer risk attributable to Project DPM source emissions is estimated at 1.21 in one million, which is less than the AVAQMD 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. As such, the Project will not cause a significant human health or cancer risk to adjacent land uses as a result of Project operational activity. Because all other modeled residential receptors are located at a greater distance from the Project site and primary truck routes and are exposed to lesser concentrations of DPM than the MEIR analyzed herein, and TACs generally dissipate 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 receptors. The nearest modeled receptors are illustrated on Exhibit 2-D.

### Worker Exposure Scenario[2]

The worker receptor land use with the greatest potential exposure to Project DPM source emissions is Location R2, which represents the potential worker receptor located at the Sahara Motel, approximately 70 feet east of the Project site. It should be noted that this location was conservatively evaluated under both residential and worker exposure scenarios. At the MEIW, the maximum incremental cancer risk impact is estimated at 0.13 in one million, which is less than the AVAQMD 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. As such, the Project will not cause a significant human health or cancer risk to adjacent land uses as a result of Project operational activity. Because all other modeled worker receptors are located at a greater distance

[2] *AVAQMD 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.*

than the MEIW 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-D.

### School Child Exposure Scenario

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 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 TAC emission dispersion rates from roadways and large sources showing that emissions diminish substantially between 500 and 1,000 feet from emission sources (1).

In addition, the Waters Bill (AB 3205) (H&SC Section, 42301.6 through 42301.9) addresses sources of hazardous air pollutants near schools and although not directly applicable to this project, this bill further evidences the propriety of considering hazardous emissions sources within a defined 1,000-foot radius. That is, pursuant to the Waters Bill, prior to approving an application for a permit to construct or modify a source which emits hazardous air emissions (i.e. DPM), which source is located within 1,000 feet from the outer boundary of a school site, the air pollution control officer shall prepare a public notice in which the proposed project or modification for which the application for a permit is made is fully described.

More recent studies suggest that in light of emission reductions due to tightening emission standards over the past twenty years, this 1,000-foot siting distance is overly conservative. Modeling performed for the 2021 report Evaluating Siting Distances for New Sensitive Receptors Near Warehouses, prepared by the Ramboll Group, demonstrates a significant reduction in DPM emissions and risk between year 2000 emissions (which were utilized by CARB in establishing its recommended siting guidance of 1,000 feet) and 2023 (2). This reduction is attributed to a significant reduction in DPM emission rates from trucks and TRUs resulting from the adoption of increasingly stringent emission standards. This reduction in DPM emission rates has resulted in a corresponding significant reduction in risk as well, despite increasingly conservative regulatory guidance in the preparation of HRAs, particularly OEHHA's adoption of ASFs in their revised HRA guidance released in 2015.

A one-quarter mile radius, or 1,320 feet, is commonly utilized for identifying sensitive receptors, such as schools, that may be impacted by a proposed project. 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.

There are no schools within ¼ mile of the Project site. The nearest school is Adventureland Preschool, which is located approximately 6,000 feet southwest of the Project site. Because there is no reasonable potential that TAC emissions would cause significant health impacts at distances of more than ¼ mile from the air pollution source, there would be no significant impacts that would occur to any schools in the vicinity of the Project.

## CONSTRUCTION AND OPERATIONAL IMPACTS

The land use with the greatest potential exposure to Project construction and operational DPM source emissions is Location R2. At the MEIR, the maximum incremental cancer risk attributable to Project construction and operational DPM source emissions is estimated at 2.68 in one million, which is less than the AVAQMD 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 of Project construction and operational activity. All other receptors during construction and operational activity would experience less risk than what is identified for this location. The nearest modeled receptors are illustrated on Exhibit 2-D.

It should be noted that for clarity purposes, the receptors presented in Exhibit 2-D do not represent all modeled receptors and instead presents the nearest receptors that would experience the highest pollutant concentrations. A total of 74 receptors were modeled in the analysis. Appendix 2.5 presents a figure detailing the locations of all receptors as modeled in AERMOD.

## EXHIBIT 2-D: RECEPTOR LOCATIONS

# 3 REFERENCES


1. **Air Resources Board.** *Air Quality and Land Use Handbook: A Community Health Perspective.* 2005.
2. **Ramboll Group.** Evaluating Siting Distances for New Sensitive Receptors Near Warehouses. [Online] 2021. https://naiopie.org/wp-content/uploads/2023/03/Ramboll-Comments-on-A-Region-in-Crisis_021323.pdf.
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12. **Office of Environmental Health Hazard Assessment.** Toxicity Criteria on Chemicals Evaluated by OEHHA. [Online] https://oehha.ca.gov/chemicals.

# 4 CERTIFICATION

The contents of this health risk assessment represent an accurate depiction of the impacts to sensitive receptors associated with the proposed Avenue M & Division Street Warehouse 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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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:

# EMFAC EMISSIONS SUMMARY

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# APPENDIX 2.2:

# AERMOD MODEL OUTPUT – CONSTRUCTION

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# APPENDIX 2.3:

# AERMOD MODEL OUTPUT – OPERATION

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# APPENDIX 2.4:

# RISK CALCULATIONS

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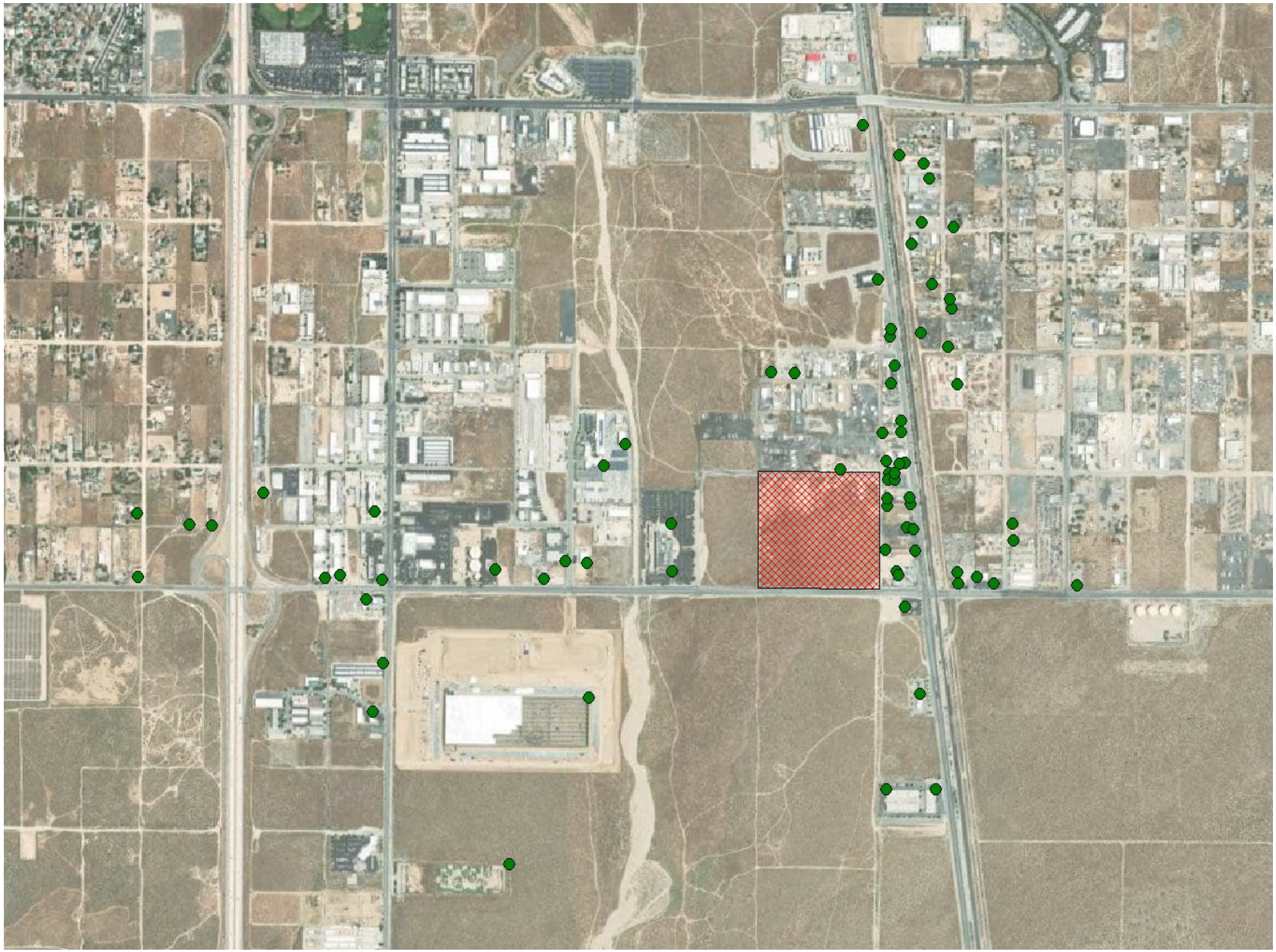
# APPENDIX 2.5:

# MODELED RECEPTORS



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