

West Roseville Marketplace

Retail Gasoline Station Health Risk Assessment

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ACRONYMS AND ABBREVIATIONS

ADMRT	Air Dispersion Modeling and Risk Tool
AERMAP	AERMOD terrain preprocessor
AERMOD	USEPA gaussian plume air dispersion model
BPIP	Building Profile Input Program
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
City	City of Roseville
CNS	central nervous system
EVR	enhanced vapor recovery
°F	Fahrenheit
HARP	Hotspots Analysis and Reporting Program
HRA	health risk assessment
IARC	International Agency on Research for Cancer
IEM	Iowa Environmental Mesonet
ISD	in-station diagnostic
K	Kelvin
m	meters
m/s	meters per second
MEIR	maximally exposed individual resident
MEIW	maximally exposed individual worker
NA	not applicable
NED	National Elevation Dataset
OEHHA	Office of Environmental Health Hazard Assessment
ORVR	onboard refueling vapor recovery
PCAPCD	Placer County Air Pollution Control District
REL	Recommended Exposure Limit
RMP	Risk Management Policy
SF	square feet
SMAQMD	Sacramento Metropolitan Air Quality Management District
SVAB	Sacramento Valley Air Basin

ACRONYMS AND ABBREVIATIONS (cont.)

TACs	toxic air contaminants
T-BACT	Toxics Best Available Control Technology
TOG	total organic gas
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UST	underground storage tank
UTM	Universal Transverse Mercator

EXECUTIVE SUMMARY

This report presents an assessment of the potential for increased cancer risk, non-cancer chronic health effects, and acute health effects resulting from long-term operation of a proposed retail gasoline dispensing facility (gas station) included as a component of the West Roseville Marketplace Project. Future emissions of the toxic air contaminants (TACs) from the gas station were estimated following the California Air Resources Board (CARB's) 2022 *Gasoline Service Station Industrywide Risk Assessment Technical Guidance*, and the CARB's 2013 *Revised Emission Factors for Gasoline Marketing Operations at California Gasoline Dispensing Facilities*. The project would be required to install, operate, and maintain Phase I and Phase II Enhanced Vapor Recovery (EVR) systems to control the emissions of gasoline vapor. Air dispersion modeling and health risk analysis were completed for the proposed maximum permitted annual gasoline throughput of 5.2 million gallons per year. The increased cancer risk, non-cancer chronic hazard indices, and acute hazard indices for the exposed individual residents, off-site workers, and future non-gas station project workers would be below their respective thresholds. Long-term operation of the proposed gas station would not result in a significant impact related to the exposure of sensitive receptors to substantial TAC concentrations.

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1.0 INTRODUCTION

This report presents an assessment of potential community health risk impacts associated with long-term operation of the proposed retail gasoline dispensing facility (gas station) component of the West Roseville Marketplace Project (project).

1.1 PROJECT LOCATION

The project site consists of two parcels totaling approximately 8.80 acres located on the northeast corner of the intersection of Pleasant Grove Boulevard and Fiddymment Road in the City of Roseville, California (City; see Figure 1, *Regional Location*). The project site is within the Placer County portion of the Sacramento Valley Air Basin (SVAB). Air quality in the project area is under the jurisdiction of the Placer County Air Pollution Control District (PCAPCD).

1.1.1 Existing site Conditions

The project site is currently vacant, undeveloped land covered by grass and ruderal vegetation.

1.2 PROJECT DESCRIPTION

The project consists of a retail shopping center anchored by an approximately 55,592 square-foot (SF) major tenant (store). Additional shops would include approximately 13,950 SF of retail space adjacent to the store, and approximately 5,500 SF of retail/restaurant space in a freestanding building. The gas station would be located in the southwest corner of the project site and would include eight multi-product dispensers, sixteen dispensing nozzles, and two underground storage tanks (USTs; one for gasoline and one split between gasoline and diesel). The gasoline dispensers/refueling stations would be covered by an approximately 5,805 SF canopy (45 feet by 129 feet; see Figure 2, *Site Plan*).

1.2.1 Toxics Best Available Control Technology

The Toxics Best Available Control Technology (T-BACT) for gas stations are vapor recovery systems installed to collect gasoline vapors that would otherwise escape into the atmosphere. Gasoline vapor emissions at gas stations are controlled in two phases. Phase I vapor recovery collects vapors displaced from USTs when a cargo tank truck delivers gasoline to a gas station. Phase II vapor recovery collects vapors displaced during the transfer of gasoline from a dispensing nozzle to a vehicle, fuel container, or gasoline-powered equipment; and vapors related to the storage of gasoline at a gas station. California Air Resources Board (CARB) regulations establish standards for the level of emissions control vapor recovery systems must achieve during the transfer and storage of gasoline.

Vapor recovery system performance standards for gas stations have become more stringent over the years. Since 2001, CARB has adopted a number of significant advancements as part of the enhanced vapor recovery (EVR) program. Phase I EVR, in accordance with California Executive Order VR-102, requires more durable and leak-tight components, along with an increased collection efficiency of 98 percent. Phase II EVR, in accordance with California Executive Order VR-204, includes three major advancements: (1) dispensing nozzles with less spillage and required compatibility with onboard refueling vapor recovery (ORVR) vehicles, (2) a processor to control the static pressure of the ullage, or vapor space, in the underground storage tank, and (3) an in-station diagnostic (ISD) system that provides

warning alarms to alert a gas station operator of potential vapor recovery system malfunctions. Phase I EVR was fully implemented in 2005. Phase II EVR was fully implemented between 2009 and 2011 (CARB 2013). The project would be required to implement Phase I EVR and Phase II EVR systems (with an ISD system) meeting the latest CARB performance standards.

ORVR systems were phased in beginning with 1998 model year passenger vehicles, and are now installed on all passenger, light-duty, and medium-duty vehicles manufactured since the 2006 model year. When an ORVR vehicle is fueled, almost all the gasoline vapor displaced from the fuel tank is routed to a carbon canister in the vehicle fuel system. At the start of dispensing, a small portion of the vapor in the vehicle fuel tank may escape through the fill-pipe before the onboard system is fully engaged. Uncontrolled fill-pipe emissions from ORVR vehicles are approximately two orders of magnitude lower than the same emissions from vehicles without ORVR and are easily captured by Phase II vapor recovery systems (CARB 2013).

2.0 REGULATORY AND ENVIRONMENTAL SETTING

2.1 STATE REGULATIONS

The following state legislation and regulations are applicable to the installation and operation of a retail gas station:

AB 2588 – The Air Toxics "Hot Spots" Information and Assessment Act (Assembly Bill [AB] 2588) was enacted in 1987 and requires stationary sources to report the types and quantities of certain substances routinely released into the air. The goals of the Air Toxics "Hot Spots" Act are to collect emission data, to identify facilities having localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce those significant risks to acceptable levels. As a retail gas station, the project would be subject to AB 2588 requirements through CARB and PCAPCD rules and regulations.

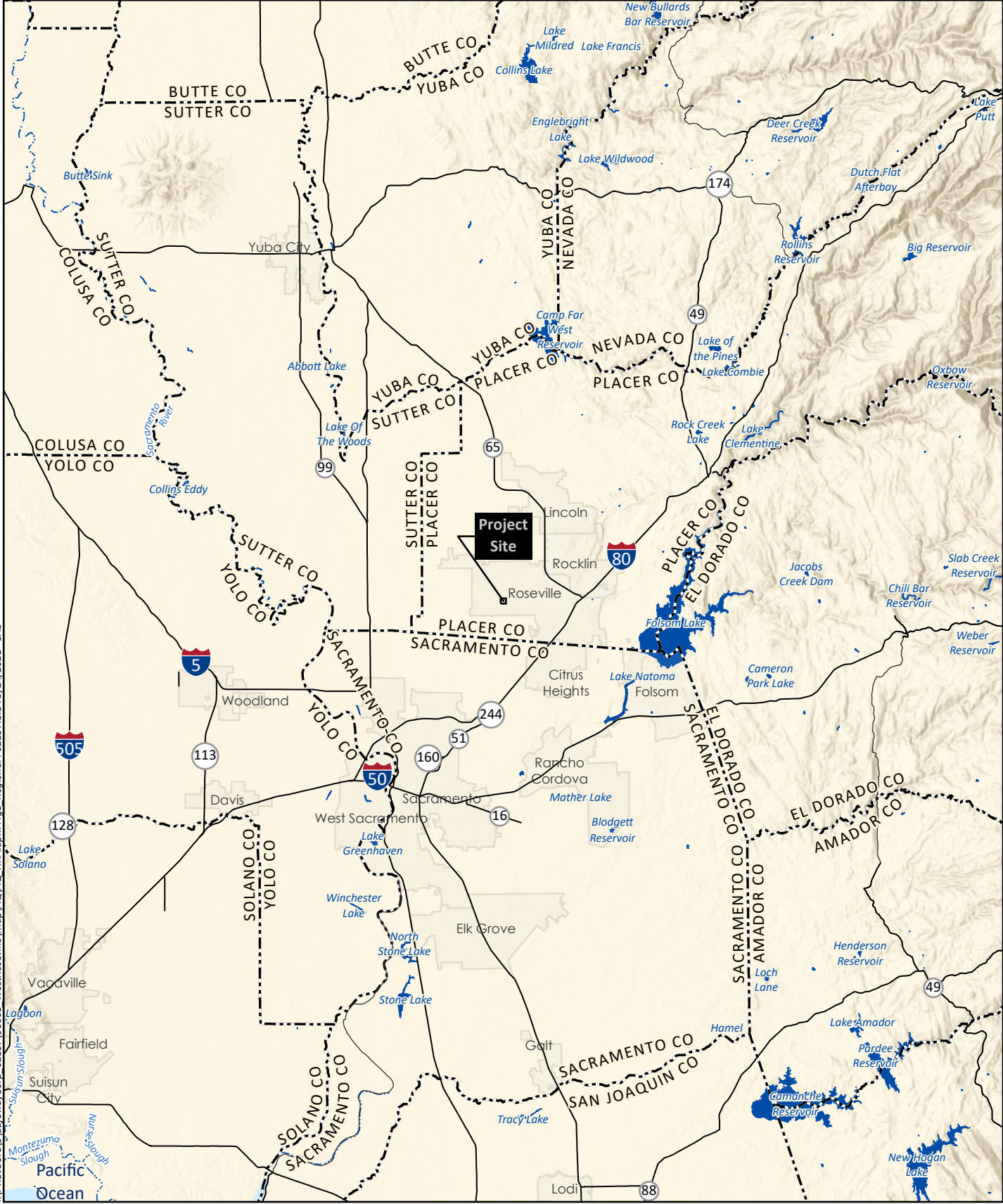
Health and Safety Code Section 42301.6 – California Health and Safety Code Section 42301.6 includes public notification requirements for new or modified source(s) of toxic air contaminants (TACs) located within 1,000 feet of a school with 12 or more students (grades kindergarten [K] through 12), also known as a "Waters Bill Notification." There are no schools with 12 or more K through 12th grade students within 1,000 feet of the project site and public notification per Health and Safety Code Section 42301.6 would not apply.

Health and Safety Code Section 93101 – California Health and Safety Code Section 93101, Airborne Toxic Control Measure – Retail Service Stations, requires owners or operators of retail gas stations to install and maintain Phase I and Phase II vapor recovery systems.

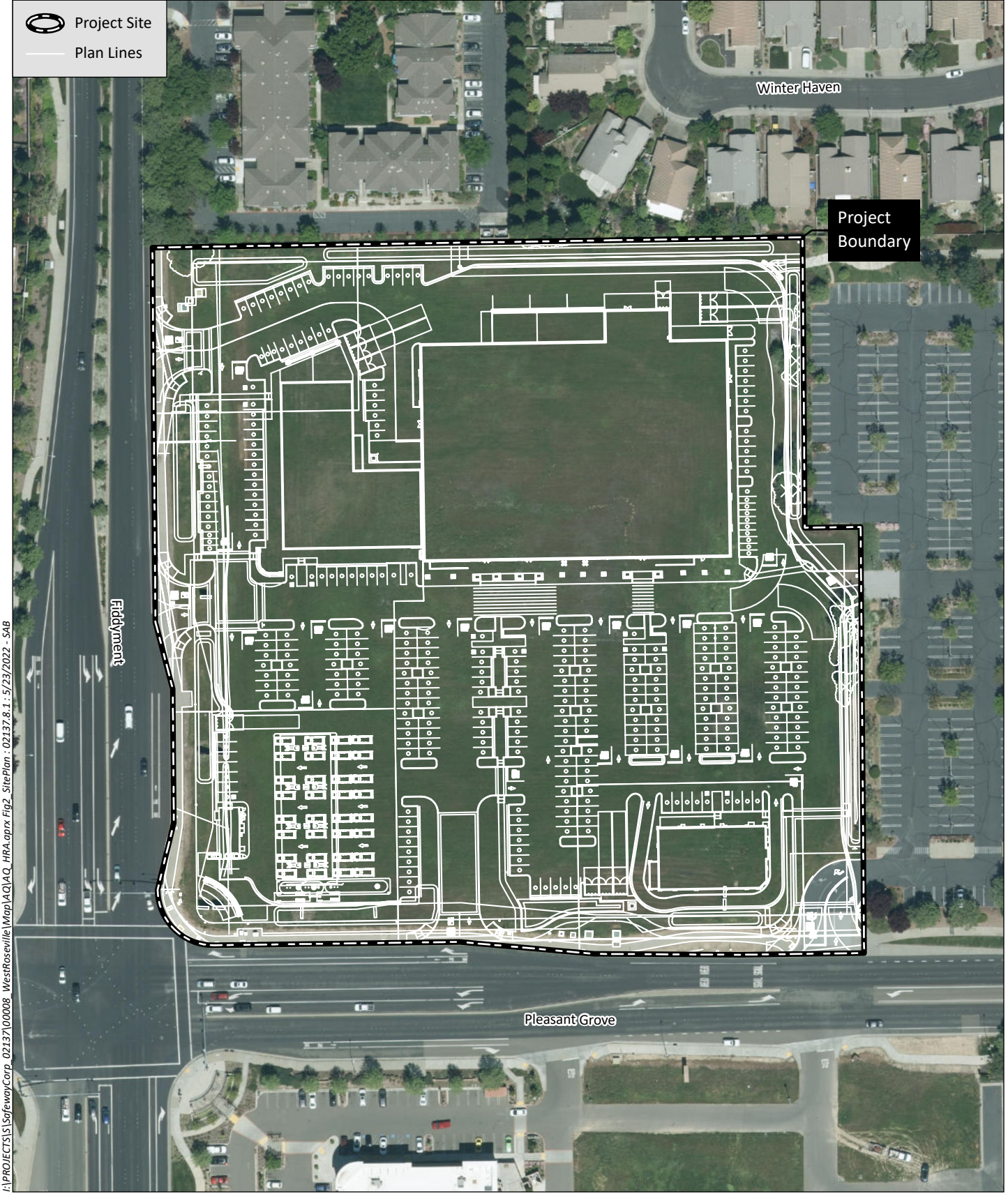
2.2 LOCAL REGULATIONS

The following PCAPCD rules would be applicable to the project's retail gas station component:

Rule 205 Nuisance – prohibits the discharge, from any source, quantities of air contaminants or other material which causes injury detriment, nuisance, or annoyance to any considerable number of persons or the public (PCAPCD 1993).



Source: Base Map Layers (ESRI, 2013)



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Project Boundary

Winter Haven

Fiddyment

Pleasant Grove

Source: Aerial (NearMap, 2019)



Rule 212 Storage of Organic Liquids – requires installation and maintenance of vapor recovery systems, and associated recordkeeping, for tanks used to store organic liquids (e.g., gasoline, diesel; PCAPCD 1997).

Rule 213 Gasoline Transfer into Stationary Storage Containers – prohibits the transfer of gasoline to any tank of more than 250 gallons unless the tank is equipped with a permanent submerged fill pipe and displaced gasoline vapors or gases are processed by a CARB certified vapor recovery system (PCAPCD 2013a).

Rule 214 Transfer of Gasoline into Vehicle Tanks – prohibits the transfer of gasoline from a stationary storage container, subject to Rule 213, into any motor vehicle fuel tank of greater than 5 gallons capacity unless such transfer is made through a fill nozzle which directs the gasoline vapors displaced by the transfer through the fill nozzle to a CARB certified vapor recovery system (PCAPCD 2013b).

Rule 410 Recordkeeping for Volatile Organic Compounds Emissions – requires an owner or operator of a stationary source using fuels, adhesives, coatings, solvents, and/or graphic arts materials to maintain daily records of operations for the most recent two-year period. In addition, the operating parameters of basic process equipment, any control equipment and capture system(s) shall be recorded and those records maintained (PCAPCD 1994).

Rule 502 New Source Review – provides for the review of new and modified stationary air pollution sources and to provide mechanisms, including emission offsets, by which authorities to construct for such sources may be granted without interfering with the attainment or maintenance of ambient air quality standards (PCAPCD 2021).

2.3 TOXIC AIR CONTAMINANTS

TACs are a diverse group of air pollutants that may cause or contribute to an increase in deaths or in serious illness or that may pose a present or potential hazard to human health. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis, or genetic damage, or short-term acute effects such as eye watering, respiratory irritation (a cough), runny nose, throat pain, and headaches. TACs are considered either carcinogenic or noncarcinogenic based on the nature of the health effects associated with exposure to the pollutant. For carcinogenic TACs, there is no level of exposure that is considered safe, and impacts are evaluated in terms of overall relative risk expressed as excess cancer cases per one million exposed individuals. Noncarcinogenic TACs differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

Activities at gasoline dispensing facilities can release gasoline vapor into the air. Gasoline vapor consists of a mixture of organic gases, including seven gases classified as TACs with quantifiable health risk factors: benzene, ethyl benzene, n-hexane, naphthalene, propylene (or propene), xylenes and toluene (CARB 2022). Note that, although the proposed gas station may include diesel dispensing, TACs associated with diesel vapor are not released in quantities sufficient enough to require analysis or reporting. For example, gasoline in the U.S. contains 0.6 to 1.3 percent benzene by volume, diesel fuel contains less than 0.02 percent benzene (International Agency on Research for Cancer [IARC] 1989).

Benzene – Benzene is a potent carcinogen and one of the highest-risk air pollutants regulated by CARB. Acute inhalation exposure of humans to benzene may cause drowsiness, dizziness, headaches, as well as

eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Chronic inhalation exposure to benzene has caused various disorders in the blood. Benzene is classified as a known human carcinogen for all routes of exposure (U.S. Environmental Protection Agency [USEPA] 2012a). Benzene contributes approximately 78 percent of the cancer risk and nearly 100 percent of the non-cancer chronic health impacts resulting from gasoline vapor emissions at retail gas stations in California (CARB 2022).

Ethyl benzene – Acute exposure to ethylbenzene in humans results in respiratory effects, such as throat irritation and chest constriction, irritation of the eyes, and neurological effects such as dizziness (USEPA 2000a).

N-hexane – Chronic exposure to hexane in air is associated with polyneuropathy in humans, with numbness in the extremities, muscular weakness, blurred vision, headache, and fatigue observed. Neurotoxic effects have also been exhibited in rats (USEPA 2000b).

Naphthalene – Acute exposure of humans to naphthalene by inhalation, ingestion, and dermal contact is associated with hemolytic anemia, damage to the liver, and neurological damage. Chronic exposure of workers and rodents to naphthalene has been reported to cause cataracts and damage to the retina. Classified as a possible human carcinogen (USEPA 2000c).

Xylenes – Acute inhalation exposure to mixed xylenes in humans results in irritation of the eyes, nose, and throat, gastrointestinal effects, and neurological effects. Chronic inhalation exposure of humans to mixed xylenes results primarily in central nervous system (CNS) effects, such as headache, dizziness, fatigue, tremors, and incoordination; respiratory, cardiovascular, and kidney effects have also been reported (USEPA 2000d).

Toluene – The CNS is the primary target organ for toluene toxicity in both humans and animals for acute and chronic exposures. CNS dysfunction and narcosis have been frequently observed in humans acutely exposed to elevated airborne levels of toluene; symptoms include fatigue, sleepiness, headaches, and nausea. Chronic inhalation exposure of humans to toluene also causes irritation of the upper respiratory tract and eyes, sore throat, dizziness, and headache (USEPA 2012b).

2.4 SENSITIVE RECEPTORS

CARB and the Office of Environmental Health Hazard Assessment (OEHHA) have identified the following groups of individuals as the most likely to be affected by air pollution: adults over 65, children under 14, infants (including in utero in the third trimester of pregnancy), and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis (CARB 2005; OEHHA 2015). Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved and are referred to as sensitive receptors locations. Examples of these sensitive receptor locations are residences, schools, hospitals, and daycare centers. For health risk assessments, the health impacts are analyzed for individual residents assumed to be standing in their primary outdoor spaces closest to the source of TACs, and for individual off-site workers assumed to be standing outside of a commercial or industrial building.

The closest existing sensitive receptor locations to the proposed gasoline pump location are single-family residences, approximately 260 feet across Fiddyment Road to the west. Additional sensitive receptor locations are senior apartments approximately 550 feet to the north, and single-family

residences approximately 640 feet northeast. The closest school to the project site is the Coyote Ridge Elementary School approximately 2,400 feet (0.45 mile) to the southeast. See Figure 3, *Modeled Receptor Locations*.

3.0 METHODOLOGY

Potential health risks to nearby sensitive receptors from the emission of TACs during operations at the proposed gasoline fueling facility were analyzed in accordance with the CARB's *Gasoline Service Station Industrywide Risk Assessment Technical Guidance* (CARB 2022), the California Air Pollution Control Officer's Association's (CAPCOA) *Gasoline Service Station Industrywide Risk Assessment Guidelines* (CAPCOA 1997), and OEHHA's *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (OEHHA 2015).

3.1 TAC SPECIATION

The TAC content in gasoline is dependent on regulated formulations. California has a summer and a winter formulation, with the summer formulation having higher a TAC content. In accordance with the CARB technical guidance, chronic (long-term) health effects are analyzed assuming an average annual TAC content based on 59.2 percent summer formulation and 40.8 percent winter formulation (CARB 2022). Acute (short-term) health effects are analyzed assuming the highest TAC content in the summer formulation (CARB 2022). Table 1, *TAC Percent Weight in Gasoline Vapor*, shows the TAC content in gasoline vapor used in the analysis. Of the seven TACs, only benzene, toluene, and xylenes have quantifiable acute health effect factors. Therefore, other TACs are not included in the acute health effect analysis (CARB 2022).

Table 1
TAC PERCENT WEIGHT IN GASOLINE VAPOR

Substance	Chronic Effects – Combined Summer and Winter Formulation	Acute Effects – Summer Formulation Only
Benzene	0.457%	0.549%
Ethyl Benzene	0.107%	NA
n-Hexane	1.82%	NA
Naphthalene	0.000445%	NA
Propylene	0.0003594%	NA
Toluene	1.11%	1.35%
Xylenes	0.409%	0.509%

Source: CARB 2022

TAC = toxic air contaminant; NA = not applicable

3.2 TAC EMISSIONS

The emissions of TACs in gasoline vapor were calculated in accordance with the CARB's *Gasoline Service Station Industrywide Risk Assessment Technical Guidance* (CARB 2022) and the CARB's *Revised Emission Factors for Gasoline Marketing Operations at California Gasoline Dispensing Facilities* (CARB 2013).

3.2.1 Modeled Sources

In accordance with the CARB technical guidance, gas station TAC emissions are broken into five sources (CARB 2022):

Loading – Emissions occur when gasoline vapors are displaced by rising liquid in the gasoline station USTs during bulk transfer of gasoline from a cargo tank to an UST. The displaced vapors are collected by a Phase I vapor recovery system that returns approximately 98 percent of vapors to the cargo tank. The remaining vapors may be emitted from the UST vent stack.

Breathing – Emissions are generated when gasoline vapors are displaced to the atmosphere during the day-to-day operation of a gas station. During periods when there is either no dispensing or when there is a significant slowdown in the dispensing of fuel to vehicles, such as overnight periods, gasoline in an UST evaporates into the headspace above the liquid fuel. The vapor growth caused by this evaporation increases UST static pressure and results in pressure driven emissions. Pressure-driven emissions are currently controlled by a processing unit that includes either a bladder tank, membrane separator, carbon canister or thermal oxidizer. The remaining vapors may be emitted from the UST vent stack.









Refueling – During the refueling process, gasoline vapors are emitted at the vehicle/nozzle interface. When dispensing gasoline to vehicles not equipped with ORVR, the rising liquid level in the vehicle fuel tank displaces gasoline vapors back through the fill-pipe where they are captured by a Phase II vapor recovery system. Vapors not captured by the Phase II vapor recovery system are emitted to the atmosphere. When an ORVR vehicle is fueled, almost all the gasoline vapor displaced from the fuel tank is routed to a carbon canister in the vehicle fuel system. At the start of dispensing, a small portion of the vapor in the vehicle fuel tank may escape through the fill-pipe before the onboard system is fully engaged. All passenger, light-duty, and medium-duty vehicles manufactured since the 2006 model year are equipped with ORVR systems. For this analysis, 89 percent of vehicles refueling at the proposed gas station were assumed to be equipped with ORVR systems, corresponding to the estimated statewide penetration of ORVR vehicles in the fleet mix in 2023 (CARB 2013).

Spillage – Emissions occur during vehicle fueling if there is overflow after a tank is filled or when other liquid fuel unintentionally discharges from the nozzle and evaporates.

Hose Permeation – Emissions occur when liquid gasoline or gasoline vapors diffuse through the dispensing hose outer surface to the atmosphere. CARB adopted performance standards for gasoline dispensing hose permeation on July 26, 2012, with all facilities subject to the standard required to comply by 2017 (CARB 2022).

3.2.2 Gasoline Throughput

Health risks are analyzed based on the average annual emissions and maximum hourly emissions. Gas station TAC emissions are proportional to the gasoline throughput (amount of gasoline dispensed in a time period). Per the project applicant, the project is anticipated to have a maximum annual throughput of 5.2 million gallons per year. Average annual TAC emissions for all sources were calculated using the reported maximum annual throughput. Maximum hourly emissions are dependent on the activity for each source and were estimated following the CARB technical guidance. The loading source (filling of underground storage tanks) maximum hourly throughput assumes one truckload of gasoline (at the maximum legal gross vehicle weight) of 8,800 gallons loaded in one hour. The breathing source

-  Project Site
-  Plan Lines
-  Gas Pumps
-  Residential Receptor
-  Worker Receptor
-  Point of Maximum Impact
-  Maximally Exposed Individual Worker
-  Maximally Exposed Individual Resident



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Source: Aerial (City of Roseville, 2019)

maximum hourly throughput is based on the average hourly gasoline throughput: 5.2 million gallons per year divided by 8,766 hours per year, or 583 gallons per hour. The refueling, spillage, and hose permeation sources maximum hourly throughput is based on the estimated maximum hourly volume of gasoline dispensed. Based on survey data, for gas stations with 5 million to 10 million gallons per year throughput, the recommended hourly throughput for modeling is 2,000 gallons per hour (CARB 2022).

3.2.3 Modeled Emissions

TAC emissions used in this analysis are calculated using emission factors for total organic gases (TOGs; equivalent to the gasoline vapor) per 1,000 gallons of gasoline throughput by source from CARB's *Revised Emission Factors for Gasoline Marketing Operations at California Gasoline Dispensing Facilities* (CARB 2013). The emission factors by source are presented in Table 2, *Gas Station Emission Factors*.

Table 2
GAS STATION EMISSION FACTORS

Source	Emission Factor (TOG pounds per 1,000 gallons)
Loading	0.150
Breathing	0.024
Refueling (Non-ORVR Vehicles)	0.420
Refueling (ORVR Vehicles)	0.021
Spillage	0.240
Hose Permeation	0.009

Source: CARB 2013

TOG = total organic gas; ORVR = onboard refueling vapor recovery

Based on the above emission factors and assumptions, the TAC emissions by source for chronic health effect analysis are shown in Table 3, *Chronic Health Effect TAC Emissions*. The complete emissions calculation sheet is included in Appendix A, *HRA Modeling Input/Output*, to this report.

Table 3
CHRONIC HEALTH EFFECT TAC EMISSIONS

Source	Benzene	Ethyl Benzene	n-Hexane	Naphthalene	Propylene	Toluene	Xylenes
Loading Annual (pounds/year)	3.56	0.83	14.2	0.003	0.028	8.58	3.19
Loading Hourly (pounds/hour)	6.03E-3	1.41E-3	2.40E-2	5.87E06	4.74E-5	1.45E-2	5.40E-3
Breathing Annual (pounds/year)	0.57	0.13	2.27	0.001	0.004	1.37	0.51
Breathing Hourly (pounds/hour)	6.51E-5	1.52E-3	2.59E-4	6.34E-7	5.21E-7	1.57E-4	5.28E-5
Refueling Annual (pounds/year)	1.54	0.36	6.14	0.002	0.012	3.71	1.38
Refueling Hourly (pounds/hour)	5.93E-4	1.39E-4	2.63E-3	5.78E-7	4.66E-6	1.43E-3	5.31E-4
Spillage Annual (pounds/year)	5.70	1.34	22.71	0.006	0.045	13.73	5.10
Spillage Hourly (pounds/hour)	2.19E-3	5.14E-4	8.74E-3	2.14E-6	1.73E-5	5.28E-3	1.96E-3
Hose Permeation Annual (pounds/year)	0.21	0.05	0.85	0.0002	0.002	0.51	0.19
Hose Permeation Hourly (pounds/hour)	8.23E-5	1.93E-5	3.28E-4	8.01E-8	6.47E-7	1.98E-4	7.36E-5

Source: CARB 2022, CARB 2013

The TAC emissions by source for acute health effect analysis are shown in Table 4, *Acute Health Effect TAC Emissions*. The complete emissions calculation sheet is included in Appendix A to this report.

Table 4
CHRONIC HEALTH EFFECT TAC EMISSIONS

Source	Benzene	Toluene	Xylenes
Loading Annual (pounds/year)	4.28	10.53	3.97
Loading Hourly (pounds/hour)	7.25E-3	1.78E-2	6.72E-3
Breathing Annual (pounds/year)	0.69	1.68	0.64
Breathing Hourly (pounds/hour)	7.82E-5	1.92E-4	7.25E-5
Refueling Annual (pounds/year)	1.85	4.56	1.72
Refueling Hourly (pounds/hour)	7.21E-4	1.75E-3	6.61E-4
Spillage Annual (pounds/year)	6.85	16.85	6.35
Spillage Hourly (pounds/hour)	2.64E-3	6.48E-3	2.44E-3
Hose Permeation Annual (pounds/year)	0.26	0.63	0.24
Hose Permeation Hourly (pounds/hour)	9.88E-5	2.43E-4	9.16E-5

Source: CARB 2022, CARB 2013

3.3 DISPERSION MODELING

Localized concentrations of benzene were modeled using Lakes AERMOD View version 10.2.1. The Lakes program utilizes the USEPA's AERMOD gaussian air dispersion model version 21112.

3.3.1 Source Parameters

In accordance with the CARB technical guidance, the loading and breathing sources were modeled as point sources with emissions emanating from the USTs vent stack at 12 feet (3.7 meters) above the ground. The location of the USTs vent stack was not known at the time of this analysis. The USTs vent stack was modeled at the default location of the center of the gas pump canopy, the stack diameter was set at 2 inches (0.05 meters), and the exhaust gas temperature was set to 64 degrees Fahrenheit (°F; 291 Kelvin [K]) for the loading source and 60 degrees °F (289 K) for the breathing source. The USTs vent stack was assumed to have a rain cap resulting in a near-zero initial vertical gas velocity (CARB 2022).

The refueling, spillage, and hose permeation sources were modeled as volume sources corresponding to the approximate volume beneath the gas pump canopy. The release height for the refueling and hose permeation was set to the recommended height of 4.9 feet (1.5 meter). The release height for the spillage source was set the recommended height of 3.3 feet (1 meter). The source parameters are summarized in Table 5, *Source Modeling Parameters* (CARB 2022).

Table 5
SOURCE MODELING PARAMETERS

Source	Release Height (m)	Stack Diameter (m)	Gas Temperature (K)	Gas Velocity (m/s)	Volume Side (m)	Volume Height (m)
Loading	3.66	0.0508	291	0.001	NA	NA
Breathing	3.66	0.0508	289	0.001	NA	NA
Refueling	1.5	NA	NA	NA	23.2	4.0
Spillage	1.0	NA	NA	NA	23.2	4.0
Hose Permeation	1.5	NA	NA	NA	23.2	4.0

Source: CARB 2022

m = meters; K = degrees Kelvin; m/s = meters per second; NA = not applicable

Emissions of gasoline vapor for gas stations are not constant throughout the day. Refueling and spillage sources vary by the quantity dispensed each hour. Loading sources only occur during fuel deliveries, typically one hour in a day on several days per week. Breathing and permeation sources may vary depending on environmental conditions and on gasoline dispensing activity. Based on recommendations in the CARB technical guidance, refueling, spillage and hose permeation sources were assumed to emit variably with 85 percent of gasoline dispensed between 6 a.m. and 8 p.m. (1.46 variable emission rate factor) and 15 percent of gasoline dispensed between 8 p.m. and 6 a.m. (0.36 variable emission rate factor; CARB 2022). Because fuel delivery schedules for the loading source are unknown, deliveries were assumed to occur at any time between 8 a.m. and 5 p.m. throughout the year (2.67 variable emission rate factor). The breathing source was assumed to occur at a steady rate throughout the year.

Downwash from the project's buildings was modeled using the Building Profile Input Program (BPIP), a building preprocessing program for AERMOD. The project building sizes and locations were estimated from the project site plan.

3.3.2 Meteorological Data

The Sacramento Metropolitan Air Quality Management District (SMAQMD) provides pre-processed meteorological data suitable for use with AERMOD for projects within the SVAB. The available data set most representative of conditions in the project vicinity was from the Sacramento International Airport

station, approximately 22 miles southwest of the project site. The Sacramento International Airport set includes 5 years of data collected between 2014 to 2018 (SMAQMD 2022). Because the project site is near the western edge of developed areas in Roseville, rural dispersion coefficients were selected in the model. Using rural dispersion coefficients is generally conservative (health protective) compared to using urban dispersion coefficients which account for urban heat island effects. A wind rose for the Sacramento International Airport shows an average speed of 7.7 miles per hour from the south-southeast (Iowa Environmental Mesonet 2019). The wind rose graphics are included in Appendix A to this report.

3.3.3 Terrain Data

United States Geological Survey (USGS) National Elevation Dataset (NED) files with a 10-meter resolution covering an area approximately one kilometer around the project site were used in the model to cover the analysis area. Terrain data was imported to the model using AERMAP (a terrain preprocessing program for AERMOD).

3.3.4 Receptor Modeling

To develop risk isopleths (linear contours showing equal level of risk) and ensure that the area of maximum impact was captured, receptors were placed in a cartesian grid 780 meters by 780 meters (approximately 2,560 feet by 2,560 feet), centered on the project site with a grid spacing of 10 meters (33 feet) and a receptor height (flagpole height) of 1.2 meters (4 feet) above the ground. Additional discrete receptors were placed at 10-meter intervals along the project property line and at the residential property line of the 17 closest identified sensitive receptors, the 2 closest existing off-site worker buildings, and the 3 future non-gas station on-site worker buildings on the project site (all project building except for the gas station kiosk). See Figure 3 for the discrete receptor locations relative to the project site and gas pumps.

3.4 RISK DETERMINATION

Adverse health effects resulting from localized concentrations of TACs were calculated using CARB's Hotspots Analysis and Reporting Program (HARP), Air Dispersion Modeling and Risk Tool (ADMRT) version 22118. Plot files from AERMOD using unitized emissions (one gram per second) for each TAC source were imported into the ADMRT. The ADMRT calculated ground-level concentrations of each TAC utilizing the imported plot files and the annual and hourly emissions inventories shown in Table 3 and Table 4. The latest cancer potency factors, non-cancer chronic Reference Exposure Limits (RELs), acute RELs, exposure paths, and target organ or system for all TACs designated by CARB are included in the ADMRT. For the residential cancer risk, an exposure duration of 30 years was selected in accordance with the OEHHA guidelines (OEHHA 2015). The model conservatively assumes that residents would be standing and breathing outdoors at the location of the property line closest to the gas station every day between 17 and 21 hours per day (depending on the age group, starting with infants in utero in the third trimester of pregnancy) for 30 years. Because there are no schools near the project site, fraction of time at home adjustments were applied to all age bins. Tier 1 fractions were used for each age bin: 0.85 for less than 2 years old, 0.72 for 2 to 16 years old, and 0.73 for 16 years and older. For off-site worker cancer risk, an exposure duration of 25 years was selected with an assumption of 8 hours per day, 5 days per week of exposure while standing outside with moderate intensity breathing rates, in accordance with the OEHHA guidelines. The Risk Management Policy (RMP) derived intake rate percentile method

was selected for residential cancer and non-cancer chronic scenarios. The modeling input and output is included in Appendix A to this report.

3.5 SIGNIFICANCE CRITERIA

For a Type A project (siting a new source of emissions), the PCAPCD recommends the following thresholds for the project's incremental contribution to community health risks (PCAPCD 2017):

Cancer Risk – An increased risk of 10 in 1 million for the maximally exposed individual to project emissions.

Chronic and Acute Health Risk – A Hazard Index of 1 for the maximally exposed individual to project emissions.

4.0 HEALTH RISK IMPACT ANALYSIS

The incremental excess cancer risk is an estimate of the chance a person exposed to a specific source of a TAC may have of developing cancer from that exposure beyond the individual's risk of developing cancer from existing background levels of TACs in the ambient air. For context, the average cancer risk from TACs in the ambient air for an individual living in an urban area of California is 830 in 1 million (CARB 2015). Cancer risk estimates do not mean, and should not be interpreted to mean, that a person will develop cancer from estimated exposures to toxic air pollutants.

The maximum estimated community incremental health effects due to exposure to the project TAC emissions from long term operation of the proposed retail gasoline dispensing facility for the Maximally Exposed Individual Resident (MEIR) and Maximally Exposed Individual Worker (MEIW) are presented in Table 6, *Maximum Incremental Health Effect*. These estimates are conservative (health protective) and assume that the resident or worker is outdoors for the entire exposure period. Note – the methodology for calculating acute health effect is the same for residents and workers, only the highest acute hazard index is shown in Table 6 (for the MEIW).

Table 6
MAXIMUM INCREMENTAL HEALTH EFFECT

	MEIR Cancer Risk (chances per million)	MEIR Non-Cancer Chronic Hazard Index	MEIW Cancer Risk (chances per million)	MEIW Non-Cancer Chronic Hazard Index	MEIW Acute Hazard Index
Results	0.5	0.003	0.2	0.009	0.89
Threshold	10	1	10	1	1
<i>Exceed Threshold?</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>

Source: Lakes AERMOD View and ADMRT

MEIR = Maximally Exposed Individual Resident; MEIW = Maximally Exposed Individual Worker

The estimated incremental excess cancer risk, chronic hazard index, and acute hazard index due to exposure to the project's TAC emissions for each receptor location shown in Figure 3 are presented in Table 7, *Discrete Receptor Incremental Cancer, Chronic, and Acute Health Effects*. The model inputs, outputs, and risk isopleth figures are available in Appendix A to this report.

Table 7
DISCRETE RECEPTOR INCREMENTAL CANCER, CHRONIC, AND ACUTE HEALTH EFFECTS

Receptor ID	Description	Cancer Risk (chances per million)	Non-Cancer Chronic Hazard Index	Acute Hazard Index
R1	Single Family Residential	0.1	0.001	0.32
R2	Single Family Residential	0.1	<0.000	0.15
R3	Single Family Residential	0.1	0.001	0.12
R4	Single Family Residential	0.1	0.001	0.13
R5	Single Family Residential	0.1	0.001	0.14
R6	Single Family Residential	0.2	0.001	0.16
R7	Single Family Residential	0.2	0.001	0.18
R8	Senior Multi-Family Residential	0.3	0.002	0.17
R9	Senior Multi-Family Residential	0.3	0.002	0.18
R10	Senior Multi-Family Residential	0.4	0.002	0.19
R11	Single Family Residential	0.3	0.002	0.17
R12	Single Family Residential	0.4	0.002	0.28
R13	Single Family Residential	0.4	0.002	0.39
R14	Single Family Residential	0.4	0.003	0.50
R15	Single Family Residential	0.5	0.003	0.51
R16	Single Family Residential	0.4	0.003	0.52
R17	Single Family Residential	0.3	0.002	0.38
C1	Off-Site Worker Building	0.1	0.006	0.59
C2	Off-Site Worker Building	<0.0	<0.000	0.15
C3	Future Project Worker Building	<0.0	0.002	0.89
C4	Future Project Worker Building	0.1	0.005	0.49
C5	Future Project Worker Building	0.2	0.009	0.50

Source: Lakes AERMOD View and ADMRT

The point of maximum off-site impact for residential cancer and non-cancer chronic health effect would be on the project's west boundary at approximately Universal Transverse Mercator (UTM) coordinates Zone 10, 642661 meters East, 4292132 meters North, on the shoulder of Pleasant Grove Boulevard. No residents or workers are anticipated to be at the point of maximum impact for prolonged periods. If residents were to be located at the point of maximum impact for 30 years, the estimated incremental excess cancer risk would be 6.0 in 1 million. The point of maximum impact is shown in Figure 3.

As shown in Table 6 and Table 7, the incremental increased cancer risks would not exceed the PCAPCD threshold of 10 in 1 million and the chronic and acute hazard indices would not exceed the PCAPCD threshold of 1. Therefore, community health effects due to exposure to TAC emissions from long term operation of the proposed retail gasoline dispensing facility would not exceed the PCAPCD thresholds at the maximum proposed permitted throughput of 5.2 million gallons per year, and long-term operation of the proposed gas station would not result in a significant impact related to the exposure of sensitive receptors to substantial TAC concentrations.

5.0 LIST OF PREPARERS

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Victor Ortiz

Air Quality Specialist
Project Manager/Senior Air Quality Specialist

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Appendix A

HRA Modeling Input/Output

Gasoline Dispensing Facility TAC Emissions

Gasoline TAC Content (% Weight in Vapor)

Substance	Chronic Health ¹	Acute Health ²
Benzene	0.457%	0.549%
Ethyl Benzene	0.107%	-
n-Hexane	1.82%	-
Naphthalene	0.000445%	-
Propylene (propene)	0.003594%	-
Toluene	1.100%	1.35%
Xylenes	0.409%	0.509%

ORVR Vehicles and Gasoline Throughput

Percent ORVR Vehicles (2023) ³	89.0%		
Project Throughput (gal/year)	5,200,000		
Throughput (gal/hour) Loading ⁴	8,800		
Throughput (gal/hour) Breathing ⁵	593		
Throughput (gal/hour) Refueling ⁶	2,000		
Throughput (gal/hour) Spillage ⁶	2,000		
Throughput (gal/hour) Permeation ⁶	2,000		

TAC Inventory Chronic Health Effects (Combined Summer and Winter Gasoline Formulation)

Source	TOG	Benzene		Ethyl Benzene		n-Hexane		Naphthalene		Propylene (propene)		Toluene		Xylenes	
	lb/1000 gal	lb/year	lb/hr	lb/year	lb/hr	lb/year	lb/hr	lb/year	lb/hr	lb/year	lb/hr	lb/year	lb/hr	lb/year	lb/hr
Loading	0.150	3.5646	6.0324E-03	0.8346	1.4124E-03	14.1960	2.4024E-02	0.0035	5.8740E-06	0.0280	4.7441E-05	8.5800	1.4520E-02	3.1902	5.3988E-03
Breathing	0.024	0.5703	6.5062E-05	0.1335	1.5233E-05	2.2714	2.5911E-04	0.0006	6.3354E-08	0.0045	5.1167E-07	1.3728	1.5661E-04	0.5104	5.8229E-05
Refueling Non-ORVR	0.420	1.0979	4.2227E-04	0.2571	9.8868E-05	4.3724	1.6817E-03	0.0011	4.1118E-07	0.0086	3.3209E-06	2.6426	1.0164E-03	0.9826	3.7792E-04
Refueling ORVR	0.021	0.4441	1.7083E-04	0.1040	3.9997E-05	1.7688	6.8032E-04	0.0004	1.6634E-07	0.0035	1.3434E-06	1.0691	4.1118E-04	0.3975	1.5288E-04
Refueling Total	0.065	1.5420	5.9309E-04	0.3610	1.3886E-04	6.1412	2.3620E-03	0.0015	5.7752E-07	0.0121	4.6643E-06	3.7117	1.4276E-03	1.3801	5.3080E-04
Spillage	0.240	5.7034	2.1936E-03	1.3354	5.1360E-04	22.7136	8.7360E-03	0.0056	2.1360E-06	0.0449	1.7251E-05	13.7280	5.2800E-03	5.1043	1.9632E-03
Hose Permeation	0.009	0.2139	8.2260E-05	0.0501	1.9260E-05	0.8518	3.2760E-04	0.0002	8.0100E-08	0.0017	6.4692E-07	0.5148	1.9800E-04	0.1914	7.3620E-05

TAC Inventory Acute Health Effects (Summer Gasoline Formulation)

Source	TOG	Benzene		Toluene		Xylenes	
	lb/1000 gal	lb/year	lb/hr	lb/year	lb/hr	lb/year	lb/hr
Loading	0.150	4.2822	7.2468E-03	10.5300	1.7820E-02	3.9702	6.7188E-03
Breathing	0.024	0.6852	7.8160E-05	1.6848	1.9220E-04	0.6352	7.2465E-05
Refueling Non-ORVR	0.420	1.3189	5.0728E-04	3.2432	1.2474E-03	1.2228	4.7032E-04
Refueling ORVR	0.021	0.5336	2.0522E-04	1.3120	5.0463E-04	0.4947	1.9026E-04
Refueling Total	-	1.8525	7.1249E-04	4.5553	1.7520E-03	1.7175	6.6058E-04
Spillage	0.240	6.8515	2.6352E-03	16.8480	6.4800E-03	6.3523	2.4432E-03
Hose Permeation	0.009	0.2569	9.8820E-05	0.6318	2.4300E-04	0.2382	9.1620E-05

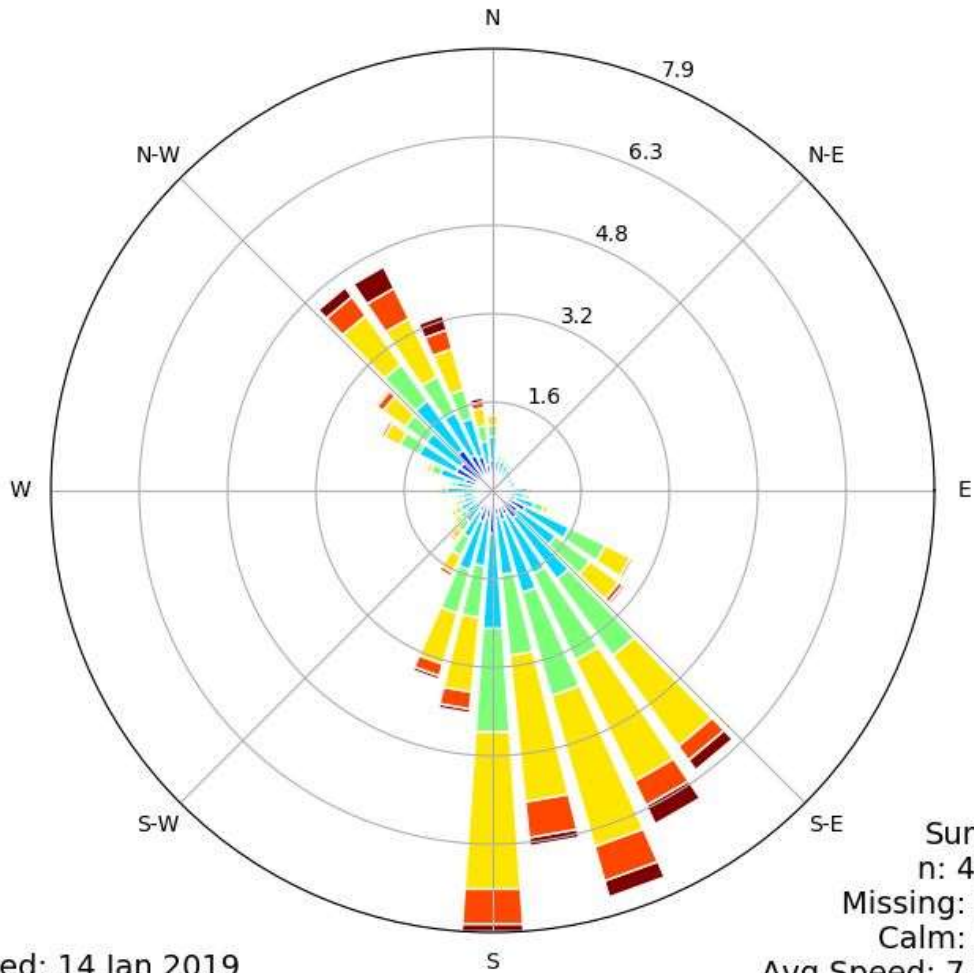
Source: Unless another source is indicated, all methods and data are from the California Air Resource Board (CARB) Gasoline Service Station Industrywide Risk Assessment Technical Guidance (2022).

Notes:

- Chronic health effects (cancer and non-cancer) are determined assuming TAC content for combined summer and winter gasoline formulations.
- Acute health effect are determined assuming TAC content for summer gasoline formulation only. Only benzene, toluene, and xylenes have Acute RELs.
- Percent gasoline dispensed to ORVR vehicles from CARB Revised Emission Factors for Phase II Vehicle Fueling at California Gasoline Dispensing Facilities, Attachment 1 (2013). For 2023 operational year - 89% ORVR vehicles.
- Maximum hourly throughput for Phase I loading operations based on delivery of 8,800 gallons (one maximum gross weight truckload) in one hour.
- Maximum hourly throughput for underground storage tank breathing based on annual average throughput (8,766 hours per year).

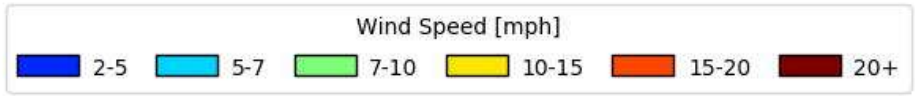


[SMF] SACRAMENTO METRO
Windrose Plot [All Year]
Period of Record: 01 Jan 1973 - 14 Jan 2019



Summary
n: 407288
Missing: 12686
Calm: 15.7%
Avg Speed: 7.7 mph

Generated: 14 Jan 2019



Control Pathway

AERMOD

Dispersion Options

Titles C:\Users\martinr\Desktop\West Roseville Marketplace HRA\West Rosevil	
Dispersion Options <input checked="" type="checkbox"/> Regulatory Default <input type="checkbox"/> Non-Default Options	Dispersion Coefficient Rural
	Output Type <input checked="" type="checkbox"/> Concentration <input type="checkbox"/> Total Deposition (Dry & Wet) <input type="checkbox"/> Dry Deposition <input type="checkbox"/> Wet Deposition
	Plume Depletion <input type="checkbox"/> Dry Removal <input type="checkbox"/> Wet Removal
	Output Warnings <input type="checkbox"/> No Output Warnings <input type="checkbox"/> Non-fatal Warnings for Non-sequential Met Data

Pollutant / Averaging Time / Terrain Options

Pollutant Type OTHER - TOG	Exponential Decay Option not available
Averaging Time Options Hours <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 6 <input type="checkbox"/> 8 <input type="checkbox"/> 12 <input type="checkbox"/> 24 <input type="checkbox"/> Month <input checked="" type="checkbox"/> Period <input type="checkbox"/> Annual	Terrain Height Options <input type="checkbox"/> Flat <input checked="" type="checkbox"/> Elevated SO: Meters RE: Meters TG: Meters
Flagpole Receptors <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Default Height = 1.20 m	

Optional Files



Re-Start File



Init File



Multi-Year Analyses



Event Input File



Error Listing File

Detailed Error Listing File

Filename: West Roseville Dispersion.err

Source Pathway - Source Inputs

AERMOD

Point Sources

Source Type	Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation (Optional)	Release Height [m]	Emission Rate [g/s]	Gas Exit Temp. [K]	Gas Exit Velocity [m/s]	Stack Inside Diameter [m]
POINT	LOAD	642655.00	4292160.00	39.06	3.66	1.00000	291.00	0.00	0.05
		Loading							
POINT	BREATH	642655.00	4292160.00	39.06	3.66	1.00000	289.00	0.00	0.05
		Breathing							

Volume Sources

Source Type	Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation (Optional)	Release Height [m]	Emission Rate [g/s]	Length of Side [m]	Building Height [m]	Initial Lateral Dim. [m]	Initial Vertical Dim. [m]
VOLUME	FUEL	642655.00	4292160.00	39.06	1.50	1.00000	23.20	Surface-Based	5.40	1.86
		Fueling								
VOLUME	SPILL	642655.00	4292160.00	39.06	1.00	1.00000	23.20	Surface-Based	5.40	1.86
		Spillage								
VOLUME	PERM	642655.00	4292160.00	39.06	1.50	1.00000	23.20	Surface-Based	5.40	1.86
		Hose Permeation								

Source Pathway

AERMOD

Building Downwash Information

Source ID: <u>LOAD</u>						
Heights [m] (10 to 360 deg)						
10-60 deg	0.00	0.00	0.00	0.00	0.00	0.00
70-120 deg	0.00	4.57	4.57	4.57	4.57	4.57
130-180 deg	0.00	0.00	0.00	0.00	0.00	0.00
190-240 deg	0.00	0.00	0.00	0.00	0.00	0.00
250-300 deg	0.00	0.00	0.00	0.00	0.00	0.00
310-360 deg	0.00	0.00	0.00	0.00	0.00	0.00
Widths [m] (10 to 360 deg)						
10-60 deg	0.00	0.00	0.00	0.00	0.00	0.00
70-120 deg	0.00	14.68	14.10	14.81	15.06	14.86
130-180 deg	0.00	0.00	0.00	0.00	0.00	0.00
190-240 deg	0.00	0.00	0.00	0.00	0.00	0.00
250-300 deg	0.00	0.00	0.00	0.00	0.00	0.00
310-360 deg	0.00	0.00	0.00	0.00	0.00	0.00
Lengths [m] (10 to 360 deg)						
10-60 deg	0.00	0.00	0.00	0.00	0.00	0.00
70-120 deg	0.00	7.67	5.70	8.03	10.11	11.89
130-180 deg	0.00	0.00	0.00	0.00	0.00	0.00
190-240 deg	0.00	0.00	0.00	0.00	0.00	0.00
250-300 deg	0.00	0.00	0.00	0.00	0.00	0.00
310-360 deg	0.00	0.00	0.00	0.00	0.00	0.00
Along Flow [m] (10 to 360 deg)						
10-60 deg	0.00	0.00	0.00	0.00	0.00	0.00
70-120 deg	0.00	-24.31	-24.30	-25.79	-26.49	-26.39
130-180 deg	0.00	0.00	0.00	0.00	0.00	0.00
190-240 deg	0.00	0.00	0.00	0.00	0.00	0.00
250-300 deg	0.00	0.00	0.00	0.00	0.00	0.00
310-360 deg	0.00	0.00	0.00	0.00	0.00	0.00
Across Flow [m] (10 to 360 deg)						
10-60 deg	0.00	0.00	0.00	0.00	0.00	0.00
70-120 deg	0.00	7.42	3.75	-0.03	-3.81	-7.48
130-180 deg	0.00	0.00	0.00	0.00	0.00	0.00
190-240 deg	0.00	0.00	0.00	0.00	0.00	0.00
250-300 deg	0.00	0.00	0.00	0.00	0.00	0.00
310-360 deg	0.00	0.00	0.00	0.00	0.00	0.00

Source ID: <u>BREATH</u>						
Heights [m] (10 to 360 deg)						
10-60 deg	0.00	0.00	0.00	0.00	0.00	0.00

Source Pathway

AERMOD

70-120 deg	0.00	4.57	4.57	4.57	4.57	4.57
130-180 deg	0.00	0.00	0.00	0.00	0.00	0.00
190-240 deg	0.00	0.00	0.00	0.00	0.00	0.00
250-300 deg	0.00	0.00	0.00	0.00	0.00	0.00
310-360 deg	0.00	0.00	0.00	0.00	0.00	0.00
Widths [m] (10 to 360 deg)						
10-60 deg	0.00	0.00	0.00	0.00	0.00	0.00
70-120 deg	0.00	14.68	14.10	14.81	15.06	14.86
130-180 deg	0.00	0.00	0.00	0.00	0.00	0.00
190-240 deg	0.00	0.00	0.00	0.00	0.00	0.00
250-300 deg	0.00	0.00	0.00	0.00	0.00	0.00
310-360 deg	0.00	0.00	0.00	0.00	0.00	0.00
Lengths [m] (10 to 360 deg)						
10-60 deg	0.00	0.00	0.00	0.00	0.00	0.00
70-120 deg	0.00	7.67	5.70	8.03	10.11	11.89
130-180 deg	0.00	0.00	0.00	0.00	0.00	0.00
190-240 deg	0.00	0.00	0.00	0.00	0.00	0.00
250-300 deg	0.00	0.00	0.00	0.00	0.00	0.00
310-360 deg	0.00	0.00	0.00	0.00	0.00	0.00
Along Flow [m] (10 to 360 deg)						
10-60 deg	0.00	0.00	0.00	0.00	0.00	0.00
70-120 deg	0.00	-24.31	-24.30	-25.79	-26.49	-26.39
130-180 deg	0.00	0.00	0.00	0.00	0.00	0.00
190-240 deg	0.00	0.00	0.00	0.00	0.00	0.00
250-300 deg	0.00	0.00	0.00	0.00	0.00	0.00
310-360 deg	0.00	0.00	0.00	0.00	0.00	0.00
Across Flow [m] (10 to 360 deg)						
10-60 deg	0.00	0.00	0.00	0.00	0.00	0.00
70-120 deg	0.00	7.42	3.75	-0.03	-3.81	-7.48
130-180 deg	0.00	0.00	0.00	0.00	0.00	0.00
190-240 deg	0.00	0.00	0.00	0.00	0.00	0.00
250-300 deg	0.00	0.00	0.00	0.00	0.00	0.00
310-360 deg	0.00	0.00	0.00	0.00	0.00	0.00

Emission Rate Units for Output

For Concentration

Unit Factor: 1E6
 Emission Unit Label: GRAMS/SEC
 Concentration Unit Label: MICROGRAMS/M**3

Source Pathway

AERMOD

Variable Emissions

Hourly Emission Rate Variation

Scenario: Scenario 1

Source ID:	FUEL						
1 to 6		0.36	0.36	0.36	0.36	0.36	0.36
7 to 12		1.46	1.46	1.46	1.46	1.46	1.46
13 to 18		1.46	1.46	1.46	1.46	1.46	1.46
19 to 24		1.46	1.46	0.36	0.36	0.36	0.36
Source ID:	PERM						
1 to 6		0.36	0.36	0.36	0.36	0.36	0.36
7 to 12		1.46	1.46	1.46	1.46	1.46	1.46
13 to 18		1.46	1.46	1.46	1.46	1.46	1.46
19 to 24		1.46	1.46	0.36	0.36	0.36	0.36
Source ID:	SPILL						
1 to 6		0.36	0.36	0.36	0.36	0.36	0.36
7 to 12		1.46	1.46	1.46	1.46	1.46	1.46
13 to 18		1.46	1.46	1.46	1.46	1.46	1.46
19 to 24		1.46	1.46	0.36	0.36	0.36	0.36

Scenario: Scenario 2

Source ID:	LOAD						
1 to 6		0.00	0.00	0.00	0.00	0.00	0.00
7 to 12		0.00	0.00	2.67	2.67	2.67	2.67
13 to 18		2.67	2.67	2.67	2.67	2.67	0.00
19 to 24		0.00	0.00	0.00	0.00	0.00	0.00

Receptor Pathway

AERMOD

Receptor Networks

Note: Terrain Elevations and Flagpole Heights for Network Grids are in Page RE2 - 1 (If applicable)
Generated Discrete Receptors for Multi-Tier (Risk) Grid and Receptor Locations for Fenceline Grid are in Page RE3 - 1 (If applicable)

Uniform Cartesian Grid

Receptor Network ID	Grid Origin X Coordinate [m]	Grid Origin Y Coordinate [m]	No. of X-Axis Receptors	No. of Y-Axis Receptors	Spacing for X-Axis [m]	Spacing for Y-Axis [m]
UCART1	642265.00	4291770.00	40	40	20.00	20.00

Discrete Receptors

Discrete Cartesian Receptors

Record Number	X-Coordinate [m]	Y-Coordinate [m]	Group Name (Optional)	Terrain Elevations	Flagpole Heights [m] (Optional)
1	642852.61	4292100.74		38.89	
2	642884.07	4292243.95		37.89	
3	642797.24	4292328.89		38.00	
4	642783.61	4292328.77		38.08	
5	642771.96	4292328.13		38.14	
6	642753.78	4292327.42		38.20	
7	642731.47	4292333.78		38.12	
8	642697.70	4292337.91		38.47	
9	642673.64	4292338.15		38.64	
10	642649.05	4292333.50		38.62	
11	642580.44	4292318.15		38.24	
12	642573.33	4292270.18		38.33	
13	642569.29	4292220.85		38.61	
14	642569.63	4292207.46		38.63	
15	642571.00	4292192.54		38.81	
16	642564.31	4292168.86		39.07	
17	642539.56	4292148.79		38.71	
18	642675.11	4292079.83		39.68	
19	642894.32	4292190.61		38.61	
20	642748.80	4292164.27		38.52	
21	642689.47	4292237.15		38.75	
22	642660.36	4292240.63		38.77	

Plant Boundary Receptors

Receptor Pathway

AERMOD

Cartesian Plant Boundary

Primary

Record Number	X-Coordinate [m]	Y-Coordinate [m]	Group Name (Optional)	Terrain Elevations	Flagpole Heights [m] (Optional)
1	642791.34	4292327.39	FENCEPRI	38.07	
2	642611.75	4292322.59	FENCEPRI	38.56	
3	642615.12	4292223.41	FENCEPRI	38.67	
4	642618.86	4292202.34	FENCEPRI	38.71	
5	642619.64	4292168.78	FENCEPRI	38.83	
6	642616.82	4292147.81	FENCEPRI	38.95	
7	642618.29	4292139.87	FENCEPRI	38.91	
8	642625.50	4292133.03	FENCEPRI	38.84	
9	642632.09	4292131.08	FENCEPRI	38.79	
10	642700.00	4292132.91	FENCEPRI	38.58	
11	642736.04	4292130.35	FENCEPRI	38.41	
12	642808.50	4292131.32	FENCEPRI	38.10	
13	642807.01	4292248.70	FENCEPRI	37.74	
14	642791.86	4292248.83	FENCEPRI	37.83	

Intermediate

Record Number	X-Coordinate [m]	Y-Coordinate [m]	Group Name (Optional)	Terrain Elevations	Flagpole Heights [m] (Optional)
1	642781.36	4292327.12	FENCEINT	38.14	
2	642771.39	4292326.86	FENCEINT	38.18	
3	642761.41	4292326.59	FENCEINT	38.20	
4	642751.43	4292326.32	FENCEINT	38.23	
5	642741.45	4292326.06	FENCEINT	38.28	
6	642731.48	4292325.79	FENCEINT	38.35	
7	642721.50	4292325.52	FENCEINT	38.49	
8	642711.52	4292325.26	FENCEINT	38.59	
9	642701.55	4292324.99	FENCEINT	38.57	
10	642691.57	4292324.72	FENCEINT	38.56	
11	642681.59	4292324.46	FENCEINT	38.57	
12	642671.61	4292324.19	FENCEINT	38.57	
13	642661.64	4292323.92	FENCEINT	38.61	
14	642651.66	4292323.66	FENCEINT	38.70	
15	642641.68	4292323.39	FENCEINT	38.76	
16	642631.70	4292323.12	FENCEINT	38.73	
17	642621.73	4292322.86	FENCEINT	38.67	
18	642612.09	4292312.67	FENCEINT	38.58	
19	642612.42	4292302.75	FENCEINT	38.59	
20	642612.76	4292292.84	FENCEINT	38.58	

Receptor Pathway

AERMOD

21	642613.10	4292282.92	FENCEINT	38.56	
22	642613.44	4292273.00	FENCEINT	38.58	
23	642613.77	4292263.08	FENCEINT	38.60	
24	642614.11	4292253.16	FENCEINT	38.62	
25	642614.45	4292243.25	FENCEINT	38.65	
26	642614.78	4292233.33	FENCEINT	38.67	
27	642616.37	4292216.39	FENCEINT	38.68	
28	642617.61	4292209.36	FENCEINT	38.70	
29	642619.06	4292193.95	FENCEINT	38.74	
30	642619.25	4292185.56	FENCEINT	38.77	
31	642619.45	4292177.17	FENCEINT	38.80	
32	642618.70	4292161.79	FENCEINT	38.87	
33	642617.76	4292154.80	FENCEINT	38.91	
34	642641.79	4292131.34	FENCEINT	38.77	
35	642651.49	4292131.60	FENCEINT	38.74	
36	642661.19	4292131.86	FENCEINT	38.70	
37	642670.90	4292132.13	FENCEINT	38.68	
38	642680.60	4292132.39	FENCEINT	38.65	
39	642690.30	4292132.65	FENCEINT	38.61	
40	642709.01	4292132.27	FENCEINT	38.54	
41	642718.02	4292131.63	FENCEINT	38.50	
42	642727.03	4292130.99	FENCEINT	38.45	
43	642745.10	4292130.47	FENCEINT	38.39	
44	642754.16	4292130.59	FENCEINT	38.35	
45	642763.21	4292130.71	FENCEINT	38.31	
46	642772.27	4292130.84	FENCEINT	38.28	
47	642781.33	4292130.96	FENCEINT	38.26	
48	642790.39	4292131.08	FENCEINT	38.20	
49	642799.44	4292131.20	FENCEINT	38.12	
50	642808.38	4292141.10	FENCEINT	38.19	
51	642808.25	4292150.88	FENCEINT	37.93	
52	642808.13	4292160.67	FENCEINT	38.02	
53	642808.00	4292170.45	FENCEINT	38.01	
54	642807.88	4292180.23	FENCEINT	38.01	
55	642807.76	4292190.01	FENCEINT	38.04	
56	642807.63	4292199.79	FENCEINT	38.07	
57	642807.51	4292209.57	FENCEINT	38.02	
58	642807.38	4292219.36	FENCEINT	37.97	
59	642807.26	4292229.14	FENCEINT	37.88	
60	642807.13	4292238.92	FENCEINT	37.80	
61	642799.44	4292248.77	FENCEINT	37.78	

Receptor Pathway

AERMOD

62	642791.80	4292258.65	FENCEINT	37.78	
63	642791.73	4292268.47	FENCEINT	37.75	
64	642791.67	4292278.29	FENCEINT	37.69	
65	642791.60	4292288.11	FENCEINT	37.60	
66	642791.54	4292297.93	FENCEINT	37.51	
67	642791.47	4292307.75	FENCEINT	37.63	
68	642791.41	4292317.57	FENCEINT	38.02	

Receptor Groups

Record Number	Group ID	Group Description
1	FENCEPRI	Cartesian plant boundary Primary Receptors
2	FENCEINT	Cartesian plant boundary Intermediate Receptors

Meteorology Pathway

AERMOD

Met Input Data

Surface Met Data

Filename: 14-18.SFC
Format Type: Default AERMET format

Profile Met Data

Filename: 14-18.PFL
Format Type: Default AERMET format

Wind Speed



Wind Speeds are Vector Mean (Not Scalar Means)

Wind Direction

Rotation Adjustment [deg]:

Potential Temperature Profile

Base Elevation above MSL (for Primary Met Tower): 7.00 [m]

Meteorological Station Data

Stations	Station No.	Year	X Coordinate [m]	Y Coordinate [m]	Station Name
Surface		2014			OAKLAND/WSO AP
Upper Air		2014			

Data Period

Data Period to Process

Start Date: 1/1/2014 Start Hour: 1 End Date: 12/25/2018 End Hour: 24

Wind Speed Categories

Stability Category	Wind Speed [m/s]	Stability Category	Wind Speed [m/s]
A	1.54	D	8.23
B	3.09	E	10.8
C	5.14	F	No Upper Bound

Output Pathway

AERMOD

Tabular Printed Outputs

Short Term Averaging Period	RECTABLE Highest Values Table										MAXTABLE Maximum Values Table	DAYTABLE Daily Values Table
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th		
1												No

Contour Plot Files (PLOTFILE)

Path for PLOTFILES: West Roseville Dispersion.AD

Averaging Period	Source Group ID	High Value	File Name
1	ALL	1st	01H1GALL.PLT
Period	ALL	N/A	PE00GALL.PLT

PROJECT TITLE:

West Roseville Marketplace Gas Station Residential Cancer Risk

COMMENTS:

Risk in chances per million

SOURCES:

5

RECEPTORS:

1704

OUTPUT TYPE:

Concentration

MAX:

14.1 ug/m³

COMPANY NAME:

**HELIX Environmental
Planning**

DATE:

5/23/2022

SCALE:

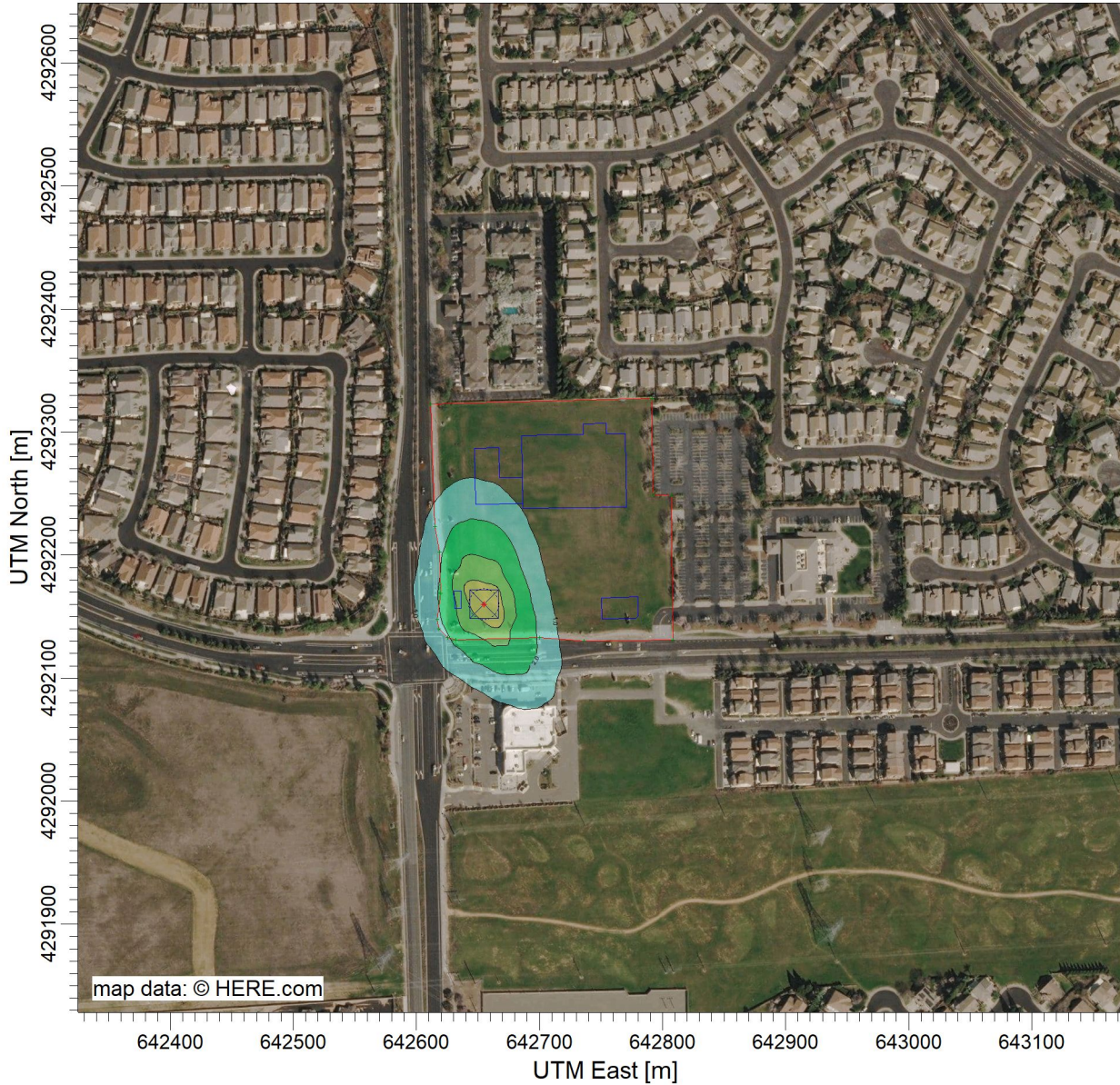
1:5,587

0



0.1 km

PROJECT NO.:



PLOT FILE OF PERIOD VALUES FOR SOURCE GROUP: ALL

ug/m³

DATE:

SCALE:

0

0.1 km

PROJECT NO.:

PROJECT TITLE:

**West Roseville Marketplace Gas Station
Worker Cancer Risk**

COMMENTS:

Risk in chances per million

SOURCES:

5

RECEPTORS:

1704

OUTPUT TYPE:

Concentration

MAX:

1.47 ug/m³

COMPANY NAME:

**HELIX Environmental
Planning**

DATE:

5/23/2022

SCALE:

1:5,588

0  0.1 km

PROJECT NO.:



PLOT FILE OF PERIOD VALUES FOR SOURCE GROUP: ALL
Max: 1.47 [ug/m³] at (642665.00, 4292150.00)

ug/m³

PROJECT TITLE:

**West Roseville Marketplace Gas Station
Residential Non-Cancer Chronic Hazard Index**

COMMENTS:

SOURCES:

5

RECEPTORS:

1704

OUTPUT TYPE:

Concentration

MAX:

8.5E-02 ug/m³

COMPANY NAME:

**HELIX Environmental
Planning**

DATE:

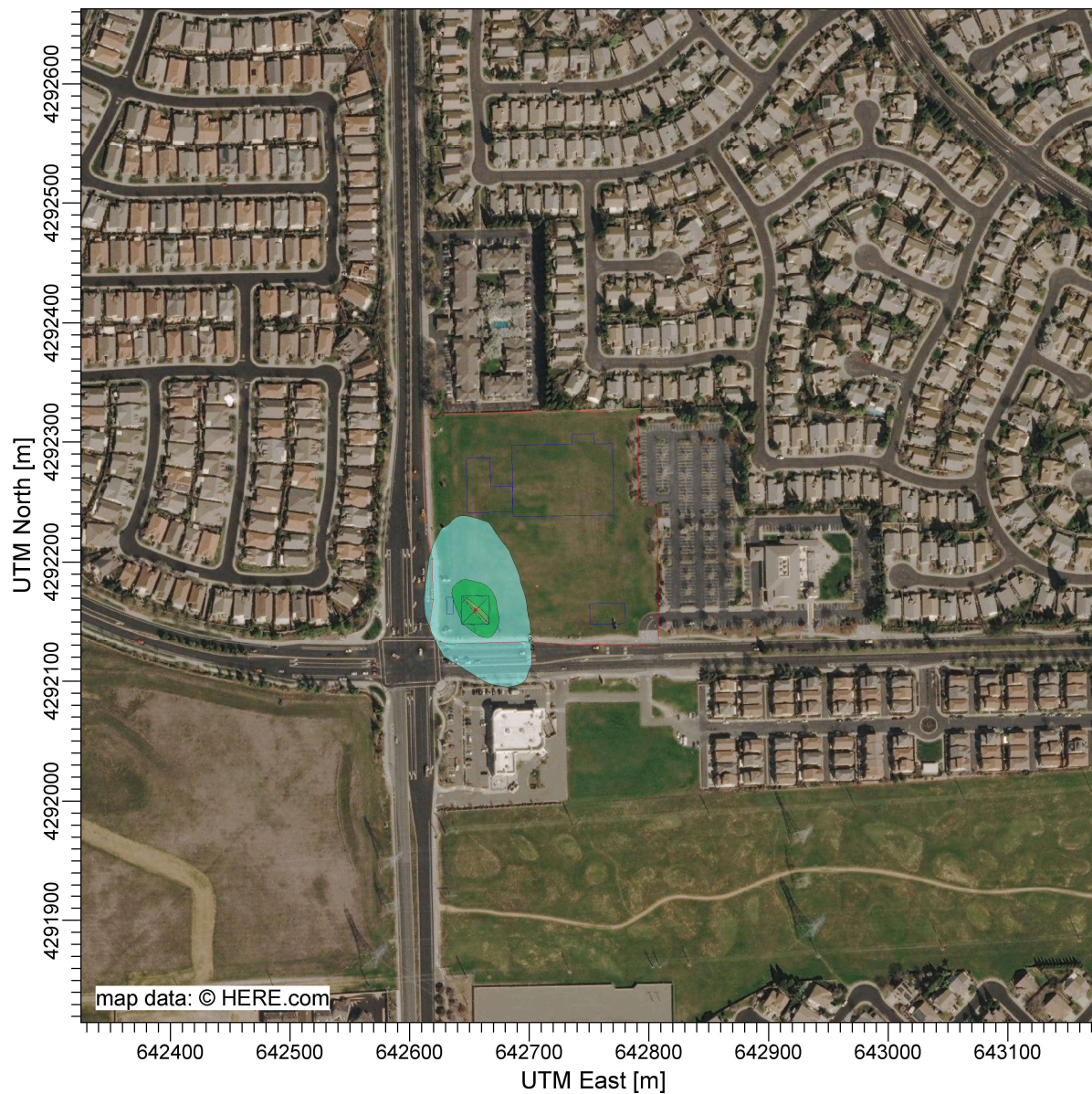
5/23/2022

SCALE:

1:5,772

0  0.1 km

PROJECT NO.:



ug/m³

PLOT FILE OF PERIOD VALUES FOR SOURCE GROUP: ALL

Max: 8.5E-02 [ug/m³] at (642665.00, 4292150.00)

8.0E-02

5.0E-02

1.0E-02

PROJECT TITLE:

**West Roseville Marketplace Gas Station
Worker Non-Cancer Chronic Hazard Index**

COMMENTS:

SOURCES:

5

RECEPTORS:

1704

OUTPUT TYPE:

Concentration

MAX:

8.5E-02 ug/m³

COMPANY NAME:

**HELIX Environmental
Planning**

DATE:

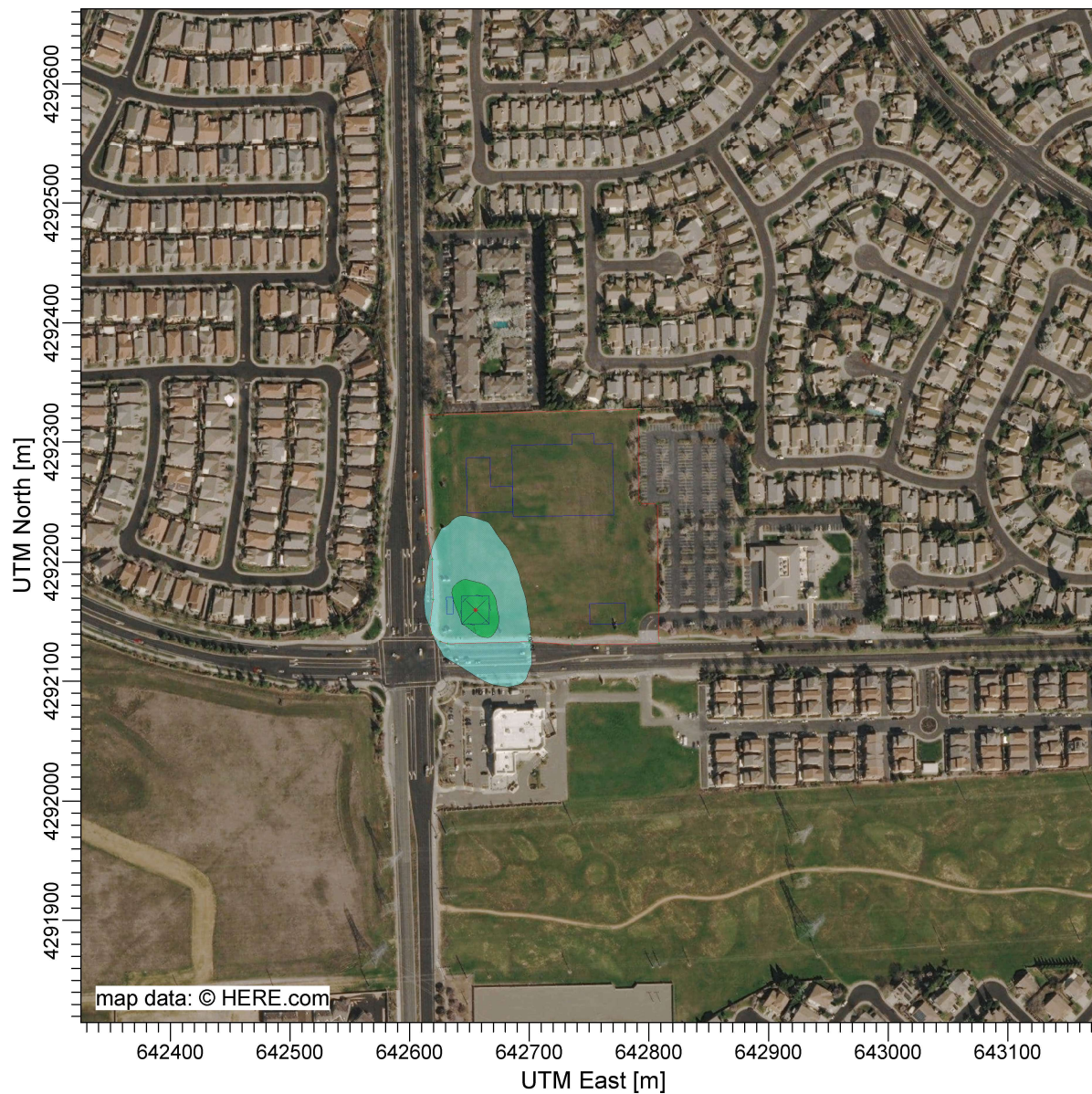
5/23/2022

SCALE:

1:5,772

0  0.1 km

PROJECT NO.:



ug/m³

PLOT FILE OF PERIOD VALUES FOR SOURCE GROUP: ALL

Max: 8.5E-02 [ug/m³] at (642665.00, 4292150.00)

8.5E-02

5.0E-02

1.0E-02

PROJECT TITLE:

**West Roseville Marketplace Gas Station
Acute Hazard Index**

COMMENTS:

SOURCES:

5

RECEPTORS:

1704

OUTPUT TYPE:

Concentration

MAX:

3.00 ug/m³

COMPANY NAME:

**HELIX Environmental
Planning**

DATE:

5/23/2022

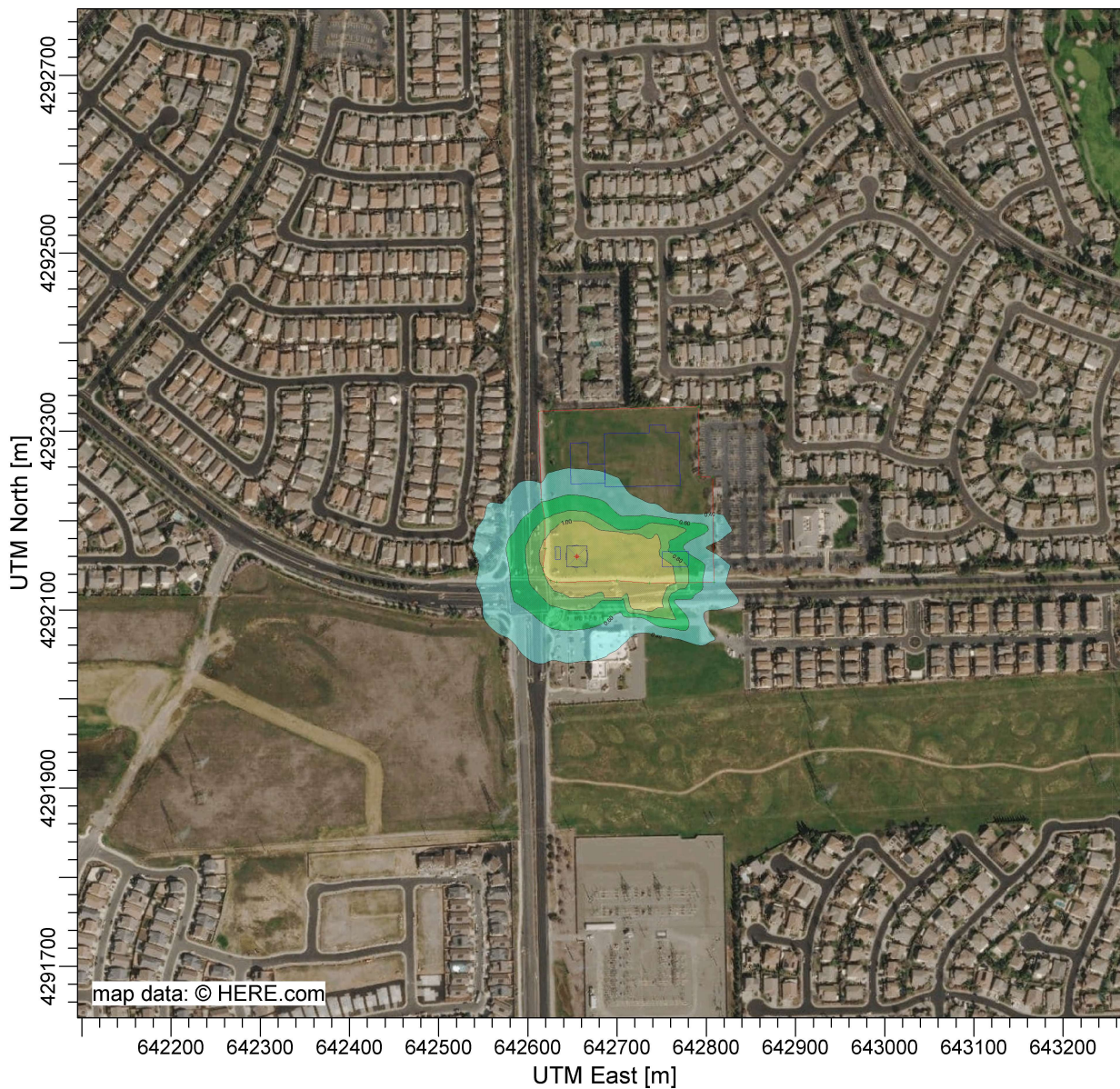
SCALE:

1:7,707

0

0.2 km

PROJECT NO.:



PLOT FILE OF HIGH 1ST HIGH 1-HR VALUES FOR SOURCE GROUP: ALL

Max: 3.00 [ug/m³] at (642685.00, 4292170.00)

PROJECT INFORMATION

HARP Version: 22118
 Project Name: WEST ROSEVILLE CHRONIC RISK
 HARP Database: NA

EMISSION INVENTORY

No. of Pollutants:35
 No. of Background Pollutants:0

Emissions

ScrID	StkID	ProID	PolID	PolAbbrev	Multi	Annual Ems (lbs/yr)	MaxHr Ems (lbs/hr)	MWAF
LOAD	0	0	71432	Benzene	1	3.5646	0.0060324	1
LOAD	0	0	100414	Ethyl Benzene	1	0.8346	0.0014124	1
LOAD	0	0	110543	Hexane	1	14.196	0.024024	1
LOAD	0	0	91203	Naphthalene	1	0.003471	5.87E-06	1
LOAD	0	0	115071	Propylene	1	0.0280332	4.74E-05	1
LOAD	0	0	108883	Toluene	1	8.58	0.01452	1
LOAD	0	0	1330207	Xylenes	1	3.1902	0.0053988	1
BREATH	0	0	71432	Benzene	1	0.570336	6.51E-05	1
BREATH	0	0	100414	Ethyl Benzene	1	0.133536	1.52E-05	1
BREATH	0	0	110543	Hexane	1	2.27136	0.00025911	1
BREATH	0	0	91203	Naphthalene	1	0.00055536	0.00025911	1
BREATH	0	0	115071	Propylene	1	0.004485312	5.12E-07	1
BREATH	0	0	108883	Toluene	1	1.3728	0.000156605	1
BREATH	0	0	1330207	Xylenes	1	0.510432	5.82E-05	1
FUEL	0	0	71432	Benzene	1	1.54204596	0.000593095	1
FUEL	0	0	100414	Ethyl Benzene	1	0.36104796	0.000138865	1
FUEL	0	0	110543	Hexane	1	6.1411896	0.002361996	1
FUEL	0	0	91203	Naphthalene	1	0.001501555	5.78E-07	1
FUEL	0	0	115071	Propylene	1	0.012127162	4.66E-06	1
FUEL	0	0	108883	Toluene	1	3.711708	0.00142758	1
FUEL	0	0	1330207	Xylenes	1	1.38008052	0.0005308	1
SPILL	0	0	71432	Benzene	1	5.70336	0.0021936	1
SPILL	0	0	100414	Ethyl Benzene	1	1.33536	0.0005136	1
SPILL	0	0	110543	Hexane	1	22.7136	0.008736	1
SPILL	0	0	91203	Naphthalene	1	0.0055536	2.14E-06	1
SPILL	0	0	115071	Propylene	1	0.004485312	1.73E-05	1
SPILL	0	0	108883	Toluene	1	13.728	0.00528	1
SPILL	0	0	1330207	Xylenes	1	5.10432	0.0019632	1
PERM	0	0	71432	Benzene	1	0.213876	8.23E-05	1
PERM	0	0	100414	Ethyl Benzene	1	0.050076	1.93E-05	1
PERM	0	0	110543	Hexane	1	0.85176	1.93E-05	1
PERM	0	0	91203	Naphthalene	1	0.00020826	8.01E-08	1
PERM	0	0	115071	Propylene	1	0.001681992	6.47E-07	1
PERM	0	0	108883	Toluene	1	0.5148	0.000198	1
PERM	0	0	1330207	Xylenes	1	0.191412	7.36E-05	1

Ground level concentration files

- 100414MAXHR.txt
- 100414PER.txt
- 108883MAXHR.txt
- 108883PER.txt
- 110543MAXHR.txt
- 110543PER.txt
- 115071MAXHR.txt
- 115071PER.txt
- 1330207MAXHR.txt
- 1330207PER.txt
- 71432MAXHR.txt
- 71432PER.txt
- 91203MAXHR.txt
- 91203PER.txt

POLLUTANT HEALTH INFORMATION

Health Database: C:\HARP2\Table: TH17320. mdb
 Health Table Version: HEALTH22013
 Official: True

PolID	PolAbbrev	InhCancer	OralCancer	AcuteREL	InhChronic REL	OralChronicREL	InhChronic8HR REL
71432	Benzene	0.01		27		3	3
100414	Ethyl Benzene	0.00087				2000	
110543	Hexane					7000	
91203	Naphthalene	0.012				9	
115071	Propylene					3000	
108883	Toluene			5000		420	830
1330207	Xylenes			22000		700	

Residential Cancer Risk

*HARP - HRACalc v22118 5/23/2022 11:03:29 AM - Cancer Risk

REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO
1601	ALL	R1	642852.61	4292100.74	9.97E-08	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1602	ALL	R2	642884.07	4292243.95	6.15E-08	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1603	ALL	R3	642797.24	4292328.89	9.40E-08	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1604	ALL	R4	642783.61	4292328.77	1.07E-07	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1605	ALL	R5	642771.96	4292328.13	1.22E-07	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1606	ALL	R6	642753.78	4292327.42	1.52E-07	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1607	ALL	R7	642731.47	4292333.78	1.95E-07	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1608	ALL	R8	642697.7	4292337.91	2.70E-07	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1609	ALL	R9	642673.64	4292338.15	3.22E-07	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1610	ALL	R10	642649.05	4292333.5	3.73E-07	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1611	ALL	R11	642580.44	4292318.15	3.06E-07	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1612	ALL	R12	642573.33	4292270.18	3.76E-07	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1613	ALL	R13	642569.29	4292220.85	3.99E-07	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1614	ALL	R14	642569.63	4292207.46	4.19E-07	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1615	ALL	R15	642571	4292192.54	4.66E-07	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1616	ALL	R16	642564.31	4292168.86	4.22E-07	30YrCancerRMP_InhSoilDermMMilk_FAH3to70
1617	ALL	R17	642539.56	4292148.79	2.65E-07	30YrCancerRMP_InhSoilDermMMilk_FAH3to70

Residential Non-Cancer Chronic Health Effect

*HARP - HRACalc v22118 5/23/2022 11:06:37 AM - Chronic Risk

REC	GRP	NETID	X	Y	SCENARIO	MAXHI
1601	ALL	R1	642852.6	4292101	NonCancerChronicDerived_InhSoilDermMMilk	0.00060
1602	ALL	R2	642884.1	4292244	NonCancerChronicDerived_InhSoilDermMMilk	0.00037
1603	ALL	R3	642797.2	4292329	NonCancerChronicDerived_InhSoilDermMMilk	0.00057
1604	ALL	R4	642783.6	4292329	NonCancerChronicDerived_InhSoilDermMMilk	0.00065
1605	ALL	R5	642772	4292328	NonCancerChronicDerived_InhSoilDermMMilk	0.00074
1606	ALL	R6	642753.8	4292327	NonCancerChronicDerived_InhSoilDermMMilk	0.00092
1607	ALL	R7	642731.5	4292334	NonCancerChronicDerived_InhSoilDermMMilk	0.00118
1608	ALL	R8	642697.7	4292338	NonCancerChronicDerived_InhSoilDermMMilk	0.00164
1609	ALL	R9	642673.6	4292338	NonCancerChronicDerived_InhSoilDermMMilk	0.00195
1610	ALL	R10	642649.1	4292334	NonCancerChronicDerived_InhSoilDermMMilk	0.00226
1611	ALL	R11	642580.4	4292318	NonCancerChronicDerived_InhSoilDermMMilk	0.00186
1612	ALL	R12	642573.3	4292270	NonCancerChronicDerived_InhSoilDermMMilk	0.00228
1613	ALL	R13	642569.3	4292221	NonCancerChronicDerived_InhSoilDermMMilk	0.00242
1614	ALL	R14	642569.6	4292207	NonCancerChronicDerived_InhSoilDermMMilk	0.00254
1615	ALL	R15	642571	4292193	NonCancerChronicDerived_InhSoilDermMMilk	0.00282
1616	ALL	R16	642564.3	4292169	NonCancerChronicDerived_InhSoilDermMMilk	0.00256
1617	ALL	R17	642539.6	4292149	NonCancerChronicDerived_InhSoilDermMMilk	0.00161

Worker Cancer Risk

*HARP - HRACalc v22118 5/23/2022 11:04:40 AM - Cancer Risk

REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO
1618	ALL	C1	642675.11	4292079.83	1.08E-07	25YrCancerDerived_InhSoilDerm
1619	ALL	C2	642894.32	4292190.61	6.10E-09	25YrCancerDerived_InhSoilDerm
1620	ALL	C3	642748.8	4292164.27	3.66E-08	25YrCancerDerived_InhSoilDerm
1621	ALL	C4	642689.47	4292237.15	9.45E-08	25YrCancerDerived_InhSoilDerm
1622	ALL	C5	642660.36	4292240.63	1.53E-07	25YrCancerDerived_InhSoilDerm

Worker Non-Cancer Chronic

*HARP - HRACalc v22118 5/23/2022 11:07:36 AM - Chronic Risk

REC	GRP	NETID	X	Y	SCENARIO	MAXHI
1618	ALL	C1	642675.11	4292079.83	NonCancerChronicDerived_InhSoilDerm	0.006
1619	ALL	C2	642894.32	4292190.61	NonCancerChronicDerived_InhSoilDerm	0.000
1620	ALL	C3	642748.8	4292164.27	NonCancerChronicDerived_InhSoilDerm	0.002
1621	ALL	C4	642689.47	4292237.15	NonCancerChronicDerived_InhSoilDerm	0.005
1622	ALL	C5	642660.36	4292240.63	NonCancerChronicDerived_InhSoilDerm	0.009

HARP Project Summary Report 5/23/2022

PROJECT INFORMATION

HARP Version: 22118
 Project Name: WEST ROSEVILLE ACUTE RISK
 HARP Database: NA

EMISSION INVENTORY

No. of Pollutants:15
 No. of Background Pollutants:0

Emissions

SrcID	StkID	ProID	PolID	PolAbbrev	Multi	Annual Ems (lbs/yr)	MaxHr Ems (lbs/hr)	MWAF
LOAD	0	0	71432	Benzene	1	4.2822	0.0072468	1
LOAD	0	0	108883	Toluene	1	10.53	0.01782	1
LOAD	0	0	1330207	Xylenes	1	3.9702	0.0067188	1
BREATH	0	0	71432	Benzene	1	0.685152	7.82E-05	1
BREATH	0	0	108883	Toluene	1	1.6848	0.000192197	1
BREATH	0	0	1330207	Xylenes	1	0.635232	7.25E-05	1
FUEL	0	0	71432	Benzene	1	1.85247972	0.000712492	1
FUEL	0	0	108883	Toluene	1	4.555278	0.00175203	1
FUEL	0	0	1330207	Xylenes	1	1.71750852	0.00066058	1
SPILL	0	0	71432	Benzene	1	6.85152	0.0026352	1
SPILL	0	0	108883	Toluene	1	16.848	0.00648	1
SPILL	0	0	1330207	Xylenes	1	6.35232	0.0024432	1
PERM	0	0	71432	Benzene	1	0.256932	9.88E-05	1
PERM	0	0	108883	Toluene	1	0.6318	0.000243	1
PERM	0	0	1330207	Xylenes	1	0.238212	9.16E-05	1

- 100414MAXHR.txt
- 100414PER.txt
- 108883MAXHR.txt
- 108883PER.txt
- 110543MAXHR.txt
- 110543PER.txt
- 115071MAXHR.txt
- 115071PER.txt
- 1330207MAXHR.txt
- 1330207PER.txt
- 71432MAXHR.txt
- 71432PER.txt
- 91203MAXHR.txt
- 91203PER.txt

POLLUTANT HEALTH INFORMATION

Health Database: C:\HARP; TH17320. mdb
 Health Table Version: HEALTH22013
 Official: True

PolID	PolAbbrev	InhCancer	OralCancer	AcuteREL	InhChronicREL	OralChronicREL	InhChronic8HR REL
71432	Benzene	0.1		27	3		3
108883	Toluene			5000	420		830
1330207	Xylenes			22000	700		

Acute Hazard Index

*HARP - HRACalc v22118 5/23/2022 11:11:25 AM - Acute Risk

REC	GRP	NETID	X	Y	SCENARIO	MAXHI
1601	ALL	R1	642852.61	4292100.74	NonCancerAcute	0.32
1602	ALL	R2	642884.07	4292243.95	NonCancerAcute	0.15
1603	ALL	R3	642797.24	4292328.89	NonCancerAcute	0.12
1604	ALL	R4	642783.61	4292328.77	NonCancerAcute	0.13
1605	ALL	R5	642771.96	4292328.13	NonCancerAcute	0.14
1606	ALL	R6	642753.78	4292327.42	NonCancerAcute	0.16
1607	ALL	R7	642731.47	4292333.78	NonCancerAcute	0.18
1608	ALL	R8	642697.7	4292337.91	NonCancerAcute	0.17
1609	ALL	R9	642673.64	4292338.15	NonCancerAcute	0.18
1610	ALL	R10	642649.05	4292333.5	NonCancerAcute	0.19
1611	ALL	R11	642580.44	4292318.15	NonCancerAcute	0.17
1612	ALL	R12	642573.33	4292270.18	NonCancerAcute	0.28
1613	ALL	R13	642569.29	4292220.85	NonCancerAcute	0.39
1614	ALL	R14	642569.63	4292207.46	NonCancerAcute	0.50
1615	ALL	R15	642571	4292192.54	NonCancerAcute	0.51
1616	ALL	R16	642564.31	4292168.86	NonCancerAcute	0.52
1617	ALL	R17	642539.56	4292148.79	NonCancerAcute	0.38
1618	ALL	C1	642675.11	4292079.83	NonCancerAcute	0.59
1619	ALL	C2	642894.32	4292190.61	NonCancerAcute	0.15
1620	ALL	C3	642748.8	4292164.27	NonCancerAcute	0.89
1621	ALL	C4	642689.47	4292237.15	NonCancerAcute	0.49
1622	ALL	C5	642660.36	4292240.63	NonCancerAcute	0.50