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CITY OF BAKERSFIELD
PLANNING DEPARTMENT

February 1, 2019

Steven Esselman
Principal Planner
Kern County Planning and Community Development Department
2700 M St #100
Bakersfield, CA 93301

***Re: Air Quality Impact Assessment Ashe Road & Taft Hwy Commercial - Kamboj***

Mr. Esselman,

WZI is submitting this assessment for a commercial project located at northeast corner of Ashe road and Taft highway, on behalf of Kamboj. Enclosed with this letter is the AQIA and a flash drive with the CalEEMod and AERMOD inputs.

Please do not hesitate to contact me if you have any questions or require additional information.

Thank you,

Richard B Wilson
Vice President of Engineering

1717 28th Street Bakersfield, California 93301 (661) 326-1112 FAX: (661) 326-0191

# Air Quality Impact Assessment

# Ashe Road & Taft Hwy Commercial
# Kamboj
# Bakersfield, California

***January 2019***

***Submitted to:***
Ankush Kamboj
4939 Calloway Dr, ste 101
Bakersfield, ca 93312


***Prepared by:***
WZI Inc.
1717 28th Street
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# 1 TABLE OF CONTENTS

**TABLES**

## EXHIBITS



## APPENDICES



## FLASH-DRIVE

# 1 EXECUTIVE SUMMARY

## 1.1 PURPOSE

WZI Inc. (WZI) was asked to prepare an air quality impact assessment for the Taft Hwy and Ashe Rd. Commercial project, referred to within as the proposed project, on behalf of Ankush Kamboj. This assessment examines the potential impact on air quality resulting from the proposed project located in the northeast corner of Taft Hwy and Ashe Rd in the City of Bakersfield in Kern County, California. This document was prepared in accordance with the San Joaquin Valley Air Pollution Control District's *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI)*, March 19, 2015 Revision*.

The General Commercial Project is a proposed 6.48 Acre development comprised of General Commercial development in the City of Bakersfield. The proposed project is located near the northeast corner of the intersection of Ashe Road and Taft Hwy in the City of Bakersfield. More specifically, the proposed project will reside on the southwest portion of Section 34, Township 30 South, Range 27 East (**Exhibit 1** "Project Location Map"). The project site is composed of three parcels (APN Number(s): 532-050-02, 532-050-03, & 532-050-05). The current land use for the project site is (RR) 'Rural Residential'. The zoning is (A-1) 'Limited Agriculture' for each parcel (**Exhibit 2** "Land Use Designations" and **Exhibit 3** "Zoning Map"). The proposed land use is (GC) 'General Commercial'. The project requires a zone change to (C-2 / P.C.D.) 'General Commercial / Planned Commercial Development'. This study is based on the following development scenario:

**TABLE 1.1-1**
**Development Scenario**

| Current Zoning | Area Size or # of Units | Proposed Development |
|---|---|---|
| A-1 | 6.48 acres | General Commercial / Planned Commercial Development (C-2/P.C.D.) |

WZI is a professional consulting firm with experience in regulatory compliance, environmental engineering and geology. The members of WZI are State of California Registered Environmental Assessors, Geologists, and Environmental Scientists. WZI expresses no opinion as to disciplines, subjects and/or practices outside those specifically enumerated below. Further, WZI expresses no opinion herein as to any matters of California or federal law. This Air Quality Impact Assessment is based on the foregoing and subject to limitations, qualifications, exceptions and assumptions set forth herein.

## 1.2 RESULTS AND CONCLUSIONS

The project is located in the southern portion of the San Joaquin Valley Air Basin (SJVAB), in Kern County, California. The SJVAB has an extensive set of laws, rules, and regulations, governing air pollution of all types, including mobile and stationary. During the last twenty years, the air quality has shown a steady trend of improvement as indicated by monitoring conducted by the San Joaquin Valley Air Pollution Control District (SJVAPCD) and the California Air Resources Board (CARB). This assessment identifies air impacts related to the project's construction and operation phases which are discussed in the sections to follow.

## 1.2.1 CONSTRUCTION AND OPERATIONS PHASE

The construction of the proposed project is expected to begin in 2021 and end in 2022. The annual unmitigated and mitigated emissions during the construction phase are shown in **Table 1.2-1.**

**TABLE 1.2-1**
**Construction Related Emissions (tons/year)**

| Year | ROG | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| Unmitigated (Baseline) | | | | | | |
| 2020 | 0.2616 | 2.3863 | 1.9501 | 0.00433 | 0.2253 | 0.1433 |
| 2021 | 0.3767 | 0.1209 | 0.1414 | 0.00024 | 0.00921 | 0.00677 |
| Maximum | 0.3767 | 2.3863 | 1.9501 | 0.00433 | 0.2253 | 0.1433 |
| Mitigated | | | | | | |
| 2020 | 0.2616 | 2.3863 | 1.9501 | 0.00433 | 0.2253 | 0.1433 |
| 2021 | 0.3767 | 0.1209 | 0.1414 | 0.00024 | 0.00921 | 0.00677 |
| Maximum | 0.3767 | 2.3863 | 1.9501 | 0.00433 | 0.2253 | 0.1433 |

The project will be in full operation in year 2021 at its build out.

**TABLE 1.2-2**

**Operational Emissions (tons/year)**

| Year | ROG | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| Unmitigated (Baseline) | | | | | | |
| 2022 | 1.5197 | 3.2527 | 5.9899 | .00992 | 0.4995 | 0.1447 |
| Mitigated | | | | | | |
| 2022 | 1.5197 | 3.2527 | 5.9899 | .00992 | 0.4995 | 0.1447 |

The total project emissions for the year 2022 represents the project maximum year emissions[1]. It is likely that construction and operation may overlap but were modeled in separate years per limitations of the model utilized. As a liberal estimation both the years construction and operation occur were considered the same year. The results are shown in **Table 1.2-3.**

*(Table 1.2-3 on next page.)*

[1] The maximum year emissions are determined based on the sum of the project criteria pollutants ROG, NOx, PM10 and PM2.5 emissions.

**TABLE 1.2-3**
**Total Project Maximum Year Emissions -2022 (tons/year)**

| Emissions | ROG | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| | Unmitigated (Baseline) | | | | | |
| Construction Emissions | 0.3767 | 2.3863 | 1.9501 | 0.00433 | 0.2253 | 0.1433 |
| Operational Emissions | 1.5197 | 3.2527 | 5.9899 | 0.00992 | 0.4995 | 0.1447 |
| **Total Emissions-Unmitigated** | **1.8964** | **5.639** | **7.94** | **0.01425** | **0.7248** | **0.288** |
| | Mitigated | | | | | |
| Construction Emissions | 0.3767 | 2.3863 | 1.9501 | 0.00433 | 0.2253 | 0.1433 |
| Operational Emissions | 1.5197 | 3.2527 | 5.9899 | 0.00992 | 0.4995 | 0.1447 |
| **Total Emissions-Mitigated** | **1.8964** | **5.639** | **7.94** | **0.01425** | **0.7248** | **0.288** |
| **SJVAPCD Level of Significance** | **10** | **10** | **100** | **27** | **15** | **15*** |

*****USEPA specified interim use of $PM_{10}$ threshold for $PM_{2.5}$

Based on the project criteria pollutant emissions shown in the above tables, the impacts of the project are considered to be *less than significant*.

## 1.2.2 CUMULATIVE IMPACTS

The cumulative analysis is based, in part, on a quantitative analysis of other projects in the vicinity of the proposed project. This analysis utilizes the State of California Department of Finance population projections, and the Kern Council of Governments' (Kern COG) adopted regional growth forecast used for the regional air quality conformity analysis required by the 1990 Federal Clean Air Act Amendments (CAAA).

An analysis was done of the existing and proposed projects within a 1.5 mile radius of the proposed project. Eight (8) projects were identified and modeled using the CalEEMod Version 2016.3.2 computer model to predict the cumulative impacts. Emissions for the operational phase of the proposed projects were based on project acreage totals provided by the Kern County Planning Department. The predicted model outputs, including the proposed project, are summarized in **Table 1.2-4** and **1.2-5**.

**TABLE 1.2-4**
**Cumulative Emissions - Construction Sources (tons/year)**

| Name | ROG | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| This Project | 0.3767 | 2.3863 | 1.9501 | 0.00433 | 0.2253 | 0.1433 |
| Cumulative Projects | 26.1822 | 5.4987 | 4.1205 | 0.0144 | 1.3331 | 0.7337 |
| **Total** | **26.5589** | **7.885** | **6.0706** | **0.01873** | **1.5584** | **0.877** |

**TABLE 1.2-5**
**Cumulative Emissions - Operational Sources (tons/year)**

| Name | ROG | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| This Project | 1.5197 | 3.2527 | 5.9899 | .00992 | 0.4995 | 0.1447 |
| Cumulative Projects | 0.7337 | 56.9525 | 85.8635 | 0.3624 | 18.4024 | 9.8660 |
| **Total** | **2.2534** | **60.2052** | **91.8534** | **0.37232** | **18.9019** | **10.0107** |

**Kern COG Analysis**

Utilization of Kern Council of Governments (Kern COG) data provided a framework for assistance in determining the cumulative significance of a project. A project is said to be in conformance cumulatively when it is in line with regional, state, and federal emissions budgets and air quality improvement goals. Through the demonstration that a project's emissions are less than, or consistent with projected growth in a particular local area, linked to a regional air basin projection, which then ties to federal requirements, cumulative compliance can be determined.

## 1.2.3 CONCLUSIONS

Based on the analysis presented in this study, the impacts of the project are summarized as follows:

**Project Impacts (Construction and Operational)**

**No Impacts were found to be Significant and Unavoidable:**
Criteria Pollutant air impacts are considered *less than significant*.

The project specific impacts from greenhouse gases from the proposed development are considered to be *less than significant after ERC credits are purchased.*

The project specific Criteria Pollutant impacts based on Criteria Pollutant Modeling and SJVAPCD Operational Thresholds are considered to be *less than significant*.

The project specific visibility impacts based on the San Joaquin Valley Air Pollution Control District's *Guide for Assessing and Mitigating Air Quality Impact* ("GAMAQI"), Criteria Pollutant Modeling and SJVAPCD Operational Thresholds are considered to be *less than significant.*

The project specific health risks impacts based on modeling and the San Joaquin Valley Air SJVAPCD standards are considered to be *less than significant*.

The project specific CO health risk impact based on modeling is considered to be *less than significant*.

The project specific impact of Valley Fever based on the location of the project is considered *less than significant*.

**Cumulative Impacts**
**Impacts found to be Significant and Unavoidable:**

No Criteria Pollutant air impacts are considered significant and unavoidable after mitigation.

**Impacts Found to be Less than Significant:**

The cumulative Criteria Pollutant impacts based on Criteria Pollutant Modeling and San Joaquin Valley Air Pollution Control District (SJVAPCD) Operational Thresholds are considered to be *less than significant*.

The cumulative visibility impacts based on the San Joaquin Valley Air Pollution Control District's *Guide for Assessing and Mitigating Air Quality Impacts* ("GAMAQI"), Criteria Pollutant Modeling and SJVAPCD Operational Thresholds are considered to be *less than significant.*

The cumulative health risks impacts based on modeling and the SJVAPCD standards are considered to be *less than significant*.

The cumulative CO health risk impact based on modeling is considered to be *less than significant*.

The cumulative impact of Valley Fever based on the location of the project is considered to be *less than significant*.

The Kern Council of Government Conformity Analysis shows the project's impacts as being *less than significant*.

The cumulative impacts from greenhouse gases from the proposed development are considered to be *less than significant after ERC credits are purchased.*

# 2 INTRODUCTION

The Ashe Rd & Taft Hwy Commercial Project is a proposed general commercial land development totaling 6.48 acres and currently zoned for (A-1) 'Limited Agriculture'. A two fast food restaurants with drive-thrus, a shopping center, and a convenience market with gasoline pumps are planned to be developed on the property, serving the southwest residences of the City of Bakersfield. The proposed project is located at the northeast corner of the intersection of Ashe Rd & Taft Hwy in the southwest portion of the City of Bakersfield, California. More specifically, the proposed project will reside on the southwest portion of Section 34, Township 30 South, Range 27 East (**Exhibit 1** "Project Location Map"). The project site is composed of three parcels (APN Number(s): 532-050-02, 532-050-03, & 532-050-05). The current land use for the project site is (RR) 'Rural Residential'. The zoning is (A-1) 'Limited Agriculture' for each parcel (**Exhibit 2** "Land Use Designations" and **Exhibit 3** "Zoning Map"). The proposed land use is (GC) 'General Commercial'. The project requires a zone change to (C-2 / P.C.D.) 'General Commercial / Planned Commercial Development'. This study is based on the following development scenario:

**TABLE 2.0-1**
**Development Scenario**

| Current Zoning | Area Size or # of Units | Proposed Development |
|---|---|---|
| A-1 | 6.48 acres | General Commercial / Planned Commercial Development (C-2/P.C.D.) |

The project is located in close proximity to existing residential developments.

# 3 ENVIRONMENTAL SETTING

## 3.1 CLIMATE

The San Joaquin Valley lies in the central region of the State of California; it is bounded to the east by the Sierra Nevada Mountain Range, bounded to the west by the Coastal Mountain Range and to the south by the Tehachapi Mountains. The proposed project site is located in the southern portion of the valley.

The climate of the southern San Joaquin Valley is classified as a Dry–Summer Subtropical type, and is characterized by hot summers, mild winters, and minimal amounts of precipitation. The major climatic controls in the SJVAB are the surrounding mountains and the Pacific High pressure system over the ocean. The Great Basin High pressure system to the east also affects the valley, primarily during winter months. These influences result in distinct seasonal weather characteristics.

The Pacific High is a semi–permanent, subtropical, high-pressure system located off the Pacific Coast. The Pacific High tends to migrate seasonally. During the summer, it moves northward and dominates the regional climate. This high produces persistent temperature inversions and a predominantly northwest airflow. Clear skies, high temperature, low humidity, and relatively good air circulation characterize this season. The Pacific High blocks migrating extra-tropical storms, therefore very little precipitation occurs in the summer months. Occasionally, tropical air moves into the area and thunderstorms may occur over the adjacent mountains.

As the Pacific High shifts southward during the fall, its dominance is diminished in the San Joaquin Valley. During this transition period, the storm belt and zone of strong westerly winds also shifts southward, into California. Three weather regimes generally prevail during winter: (1) storm periods which are usually characterized by cloudiness, precipitation, and shifting, gusty winds; (2) clear weather associated with either a buildup of pressure through the interior of California following these storms or the influence of a well–developed Great Basin High pressure system; and (3) persistent fog or stratus clouds and temperature inversions associated with a weak influence of the Great Basin High trapping a layer of cool, moist air in the San Joaquin Valley. Thus sky, temperature, and humidity conditions are much more variable during winter. Air movement is also variable, with stagnant conditions occurring more frequently than during summer.

The nearby Temblor Range to the west and its foothills modify the local climate of the project area. Radiative cooling at night, especially during clear conditions, results in a distinct down slope drainage flow. Thus, the mountains provide a distinct diurnal wind pattern of generally northerly winds during the day and a westerly drainage flow at night.

The western side of the San Joaquin Valley experiences fewer days of fog and less dense fog than does the eastern side at comparable elevations. Thunderstorms tend to be less frequent, probably averaging less than one per year.

Diurnal wind regimes markedly affect the horizontal transport of air in the project area. During the summer, northeast winds dominate the daytime regime. These winds, generated by the Pacific High offshore, are enhanced by the San Joaquin Valley orientation and by the thermal low that develops in the central valley during this season. In response to this thermal low, air moves inland through passes in the coastal ranges, principally the Carquinez Strait near San Francisco, and flows to the south in the San Joaquin Valley as an up–valley northwesterly wind. This general northwest flow in the San Joaquin Valley is expressed locally as a more northeasterly wind under the influence of local terrain on the west–side of the valley.

Dominant nighttime wind directions during summer are markedly different from those of the daytime. Winds with a northerly component have a low frequency of occurrence at night. The high frequency of west to southwest winds at night is due primarily to down slope drainage flow.

During the winter months, northerly to northeasterly winds remain dominant in the daytime. However, winds are more variable than during summer, due in part to: (1) the southward migration of the Pacific High and resultant storm passages; (2) the absence of a strong thermal trough; and (3) the varied influence of the Great Basin High. As in summer, winds during winter nights are predominantly from the west to southwest and are associated with drainage flow. Wind speeds are generally higher in summer than in winter in the project area. Calm conditions occur most often in winter but are relatively infrequent during either season.

The mountains to the east, south and west essentially block the region from transport of very cold air from the mid–continent in winter, and the relatively cool, marine air from the Pacific Ocean during summer. Transport of marine air through the Carquinez Strait during summer has a moderating effect on northern portions of the San Joaquin Valley, but this effect is not great in the southern portion of the valley. In this area, temperature regimes are influenced primarily by topography, the higher elevations generally experiencing cooler temperatures.

About 90 percent of the precipitation in the San Joaquin Valley occurs from November through April, generally in association with storms that move eastward from the Pacific Ocean during this period. Precipitation is low because the mountains to the west and south produce a rain shadow effect by intercepting prefrontal, moisture–laden west and south winds. The southern San Joaquin Valley receives precipitation primarily from cold, unstable, northwesterly flow that usually follows a frontal passage. **Table 3.1-1** presents climate data representative of the project area.

**TABLE 3.1-1**
**Representative Temperature, Relative Humidity and Precipitation Data from Bakersfield, California[2]**

| Month | Average Daily Temperature (°F) | | Relative Humidity (%) | | Average Rainfall(inches) |
|---|---|---|---|---|---|
| | Maximum | Minimum | Morning | Afternoon | |
| January | 56.2 | 39.3 | 84 | 62 | 1.16 |
| February | 62.8 | 42.4 | 80 | 51 | 1.24 |
| March | 68.7 | 46.5 | 74 | 42 | 1.21 |
| April | 75 | 50.2 | 67 | 33 | 0.52 |
| May | 83.5 | 57.5 | 57 | 26 | 0.18 |
| June | 90.9 | 64.2 | 51 | 23 | 0.08 |
| July | 97.1 | 70.5 | 48 | 21 | 0 |
| August | 95.8 | 69 | 54 | 24 | 0.04 |
| September | 90 | 64 | 58 | 29 | 0.08 |
| October | 79.4 | 55 | 63 | 34 | 0.3 |
| November | 65.7 | 44.6 | 76 | 50 | 0.64 |
| December | 56.6 | 39 | 84 | 62 | 1.02 |
| *Annual* | *76.9* | *53.6* | *66* | *38* | *6.47* |

## 3.2 DESCRIPTION OF POLLUTANTS

The following is a general description of the sources of pollutants, and the physical effects and health effects of air pollutants expected to be present in the project vicinity.

**Ozone**[3]

Ozone occurs in two layers of the atmosphere. The layer surrounding the earth's surface is the troposphere. Ground level or "bad" ozone is an air pollutant that damages human health, vegetation, and many common materials. It is a key ingredient to urban smog. The troposphere extends to a level about 10 miles above ground level where it meets the second layer, the stratosphere. The stratospheric or "good" ozone layer extends upward from about 10 to 30 miles and protects life on earth from the sun's harmful ultraviolet rays (UV-B).

[2] Western Regional Climate Center, Bakersfield WSO ARPT, California (040442) 1981-2010 Monthly Climate Summary

[3] "Air Quality Criteria for Ozone and Related Photochemical Oxidants", Vol. II EPA 600/R-05/004bF, US EPA (February 2006).

"Bad" ozone is known as a photochemical pollutant. It needs ROG, $NO_X$, and sunlight. ROG and $NO_X$ are emitted from various sources throughout Kern County. In order to reduce ozone concentrations, it is necessary to control the emissions of these ozone precursors.

Significant ozone formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight.

Ozone is a regional air pollutant. It is generated over a large area and is transported and spread by wind. Ozone, the primary constituent of smog, is the most complex, difficult to control, and pervasive of the criteria pollutants. Unlike other pollutants, ozone is not emitted directly into the air by specific sources. Ozone is created by sunlight acting on other air pollutants (called precursors), specifically oxides of nitrogen ($NO_X$) and reactive organic gases (ROGs). Sources of precursor gases to the photochemical reaction that form ozone number in the thousands. Common sources include consumer products, gasoline vapors, chemical solvents, and combustion products of various fuels. Originating from gas stations, large industrial facilities, and small businesses such as bakeries and dry cleaners, the ozone-forming chemical reactions often take place in another location, catalyzed by sunlight and heat. High ozone concentrations can form over large regions when emissions from motor vehicles and stationary sources are carried hundreds of miles from their origins. Approximately 50 million people lived in counties with air quality levels above U.S. EPA's health-based national air quality standard in 1994. The highest levels of ozone were recorded in Los Angeles. High levels also persist in other heavily populated areas including the Texas Gulf Coast and much of the Northeast.[4]

While the ozone in the upper atmosphere absorbs harmful ultraviolet light, ground-level ozone is damaging to the tissues of plants, animals, and humans, as well as to a wide variety of inanimate materials such as plastics, metals, fabrics, rubber, and paints. Societal costs from ozone damage include increased medical costs, the loss of human and animal life, accelerated replacement of industrial equipment, and reduced crop yields.

An evaluation of California's Health–based ambient air quality standards was mandated by the Children's Environmental Health Protection Act (CEHPA).

Health Effects

While ozone in the upper atmosphere protects the earth from harmful ultraviolet radiation, high concentrations of ground level ozone can adversely affect the human respiratory system. Many respiratory ailments, as well as cardiovascular diseases, are aggravated by exposure to high ozone levels. Ozone also damages natural ecosystems such as forests and foothill communities, and damages agricultural crops and some man-made materials, such as rubber, paint, and plastics.[5]

Symptoms from ground-level ozone include cough, chest tightness, pain upon taking a deep breath, worsening of wheezing and other asthma symptoms, stuffy nose, eye irritation, reduced resistance to colds and other infections.[6] High levels of ozone may negatively impact immune systems making people more susceptible to respiratory illnesses including bronchitis and pneumonia. Ozone also accelerates aging and exacerbates pre-existing asthma and bronchitis and in cases of high concentrations can lead to the development of asthma in active children.[7] Active people, both children and adults, appear to be more at risk from ozone exposure than those with a low level of activity. Children appear to be at greater risk

[4] http://www.arb.ca.gov/homepage.htm

[5] "Final Environmental Impact Report, Revised Update of the Kern County General Plan, SCH# 2002071027," County of Kern. (2007).

[6] "Ozone and Air Quality Standards," CARB (2002).

[7] "Extreme Ozone Attainment Demonstration Plan-San Joaquin Valley Air Basin Plan Demonstrating Attainment of Federal 1-hour Ozone Standard," San Joaquin Valley Air Pollution Control District (October 2004).

since they spend more time outdoors and have lower body mass. Additionally, the elderly and those with respiratory disease are also considered sensitive populations for ozone.[8]

**Reactive Organic Gases and Volatile Organic Compounds** [9]

Hydrocarbons are organic gases that are formed solely of hydrogen and carbon. There are several subsets of organic gases including Volatile Organic Compounds (VOCs) and Reactive Organic Gases (ROGs). ROGs include all hydrocarbons except those exempted by the California Air Resources Board (CARB). Therefore, ROGs are a set of organic gases based on state rules and regulations. VOCs are similar to ROGs in that they include all organic gases except those exempted by federal law. The list of compounds exempt from the definition of VOC is included by the SJVAPCD and is presented in SJVAPCD Rule 1020 Definitions. VOCs are therefore a set of organic gases based on federal rules and regulations. Both VOCs and ROGs are emitted from incomplete combustion of hydrocarbons or other carbon-based fuels. Combustion engine exhaust, oil refineries, and oil-fueled power plants are the primary sources of hydrocarbons. Another source of hydrocarbons is evaporation from petroleum fuels, solvents, dry cleaning solutions, and paint. Both ROG and VOC terminology will be used in this analysis.

Health Effects

The primary health effects of hydrocarbons result from the formation of ozone and its related health effects. High levels of hydrocarbons in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. Carcinogenic forms of hydrocarbons are considered Toxic Air Contaminants, or air toxics. There are no health standards for ROG separately. In addition, some compounds that make up ROG are also toxic. An example is benzene, which is a carcinogen.

**Carbon Monoxide** [10]

Carbon monoxide (CO) is emitted by mobile and stationary sources as a result of incomplete combustion of hydrocarbons or other carbon-based fuels. CO is an odorless, colorless, poisonous gas that is highly reactive.

CO is a byproduct of motor vehicle exhaust, which contributes more than two-thirds of all CO emissions nationwide. In cities, automobile exhaust can cause as much as 95% of all CO emissions. These emissions can result in high concentrations of CO, particularly in local areas with heavy traffic congestion. Other sources of CO emissions include industrial processes and fuel combustion in sources such as boilers and incinerators. Despite an overall downward trend in concentrations and emissions of CO, some metropolitan areas still experience high levels of CO.

Health Effects

CO enters the bloodstream and binds more readily to hemoglobin than oxygen, reducing the oxygen-carrying capacity of blood, thus reducing oxygen delivery to organs and tissues. The health threat from CO is most serious for those who suffer from cardiovascular disease. Healthy individuals are also affected, but only at higher levels of exposure. Carbon monoxide binds strongly to hemoglobin, the oxygen-carrying protein in blood, and thus reduces the blood's capacity for carrying oxygen to the heart, brain, and other parts of the body. At high concentrations, CO can cause heart difficulties in people with chronic diseases, and can impair mental abilities. Exposure to elevated CO levels is associated with visual impairment, reduced work capacity, reduced manual dexterity, poor learning ability, difficulty performing complex tasks, and death.

[8] Ibid

[9] "Air Quality Criteria for Ozone and Related Photochemical Oxidants Vol. I and Vol. II," EPA 600/R-05/004aF and EPA 600/R-05/004bF US, EPA (February 2006).

[10] "Air Quality Criteria for Carbon Monoxide," EPA/600/P-99/001F, U.S. EPA (June 2000).

**Nitrogen Oxides** [11]

Nitrogen oxides ($NO_X$) are a family of highly reactive gases that are a primary precursor to the formation of ground-level ozone, and react in the atmosphere to form acid rain. $NO_X$ is emitted from the use of solvents and combustion processes in which fuel is burned at high temperatures, principally from motor vehicle exhaust and stationary sources such as electric utilities and industrial boilers. A brownish gas, nitrogen dioxide is a strong oxidizing agent that reacts in the air to form corrosive nitric acid, as well as toxic organic nitrates.

Health Effects

$NO_X$ can irritate the lungs, cause lung damage, and lower resistance to respiratory infections such as influenza. The effects of short-term exposure are still unclear, but continued or frequent exposure to concentrations that are typically much higher than those normally found in the ambient air may cause increased incidence of acute respiratory illness in children. Health effects associated with $NO_X$ are an increase in the incidence of chronic bronchitis and lung irritation. Chronic exposure to $NO_2$ may lead to eye and mucus membrane aggravation, along with pulmonary dysfunction. $NO_X$ can cause fading of textile dyes and additives, deterioration of cotton and nylon, and corrosion of metals due to production of particulate nitrates. Airborne $NO_X$ can also impair visibility. $NO_X$ is a major component of acid deposition in California. $NO_X$ may affect both terrestrial and aquatic ecosystems. $NO_X$ in the air is a potentially significant contributor to a number of environmental effects such as acid rain and eutrophication in coastal waters. Eutrophication occurs when a body of water suffers an increase in nutrients that reduce the amount of oxygen in the water, producing an environment that is destructive to fish and other animal life.

**Particulate Matter**

Particulate matter[12,13,14,15] pollution consists of very small liquid and solid particles floating in the air. Some particles are large or dark enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. Particulate matter is a mixture of materials that can include smoke, soot, dust, salt, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles and industrial sources undergo chemical reactions in the atmosphere. $PM_{10}$ refers to particles less than or equal to 10 microns in aerodynamic diameter. $PM_{2.5}$ refers to particles less than or equal to 2.5 microns in aerodynamic diameter and are a subset, or portion of $PM_{10}$.

In the Western United States, there are sources of $PM_{10}$ in both urban and rural areas. $PM_{10}$ and $PM_{2.5}$ are emitted from stationary and mobile sources, including diesel trucks and other motor vehicles, power plants, industrial processing, wood burning stoves and fireplaces, wildfires, dust from roads, construction, landfills, and agriculture, and fugitive windblown dust. Because particles originate from various sources, their chemical and physical compositions vary widely.

Health Effects

$PM_{10}$ and $PM_{2.5}$ particles are small enough – about 1/7$^{th}$ the thickness of a human hair – to be inhaled into, and lodge in, the deepest parts of the lung, evading the respiratory system's natural defenses. Health

[11] "Air Quality Criteria for Ozone and Related Photochemical Oxidants Vol. I and Vol. II," EPA 600/R-05/004aF and EPA 600/R-05/004bF, US EPA (February 2006).

[12] "Review of the National Air Quality Standards for Particulate Matter: Assessment of Scientific and Technical Information," EPA-450/5-82-001, U.S. EPA (July 1996).

[13] "$PM_{10}$ Attainment Demonstration Plan," San Joaquin Valley Air Pollution Control District (2003).

[14] "Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates," Cal EPA ARB (May 2005).

[15] Sulfates and SOx also create fine particulate matter. Their health effects are related to the particulate matter.

problems begin as the body reacts to these foreign particles. Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, and coughing, bronchitis, and respiratory illnesses in children. Recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. Non health-related effects include reduced visibility and soiling of buildings. $PM_{10}$ can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. $PM_{10}$ and $PM_{2.5}$ can aggravate respiratory disease, and cause lung damage, cancer, and premature death.

Although particulate matter can cause health problems for everyone, certain people are especially vulnerable to adverse health effects of $PM_{10}$ and $PM_{2.5}$. These "sensitive populations" include children, the elderly, exercising adults, and those suffering from chronic lung disease such as asthma or bronchitis. Of greatest concern are recent studies that link $PM_{10}$ and $PM_{2.5}$ exposure to the premature death of people who already have heart and lung disease, especially the elderly. Acidic $PM_{10}$ and $PM_{2.5}$ can also damage manmade materials and is a major cause of reduced visibility in many parts of the U.S.

**Sulfur Oxides** [16]

Sulfur dioxide is a colorless, pungent gas belonging to the family of sulfur oxide gases ($SO_X$), formed primarily by combustion of sulfur-containing fossil fuels (mainly coal and oil), and during metal smelting and other industrial processes. Sulfur oxides can react to form sulfates, which significantly reduce visibility. $SO_X$ is a precursor to particulate matter formation.

<u>Health Effects</u>

The major health concerns associated with exposure to high concentrations of $SO_X$ include effects on breathing, respiratory illness, alterations in pulmonary defenses, and aggravation of existing cardiovascular disease. Major subgroups of the population that are most sensitive to $SO_X$ include individuals with cardiovascular disease or chronic lung disease (such as bronchitis or emphysema) as well as children and the elderly. Emissions of $SO_X$ also can damage the foliage of trees and agricultural crops. Together, $SO_X$ and $NO_X$ are the major precursors to acid rain, which is associated with the acidification of lakes and streams, and accelerated corrosion of buildings and monuments.

**Toxic Air Contaminants**[17,18]

According to Section 39655 of the California Health and Safety Code, a toxic air contaminant (TAC) is "an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health." In addition, 189 substances which have been listed as federal hazardous air pollutants (HAPs) pursuant to Section 7412 of Title 42 of the United States Code are TACs under the state's air toxics program pursuant to Section 39657 (b) of the California Health and Safety Code.[19]

<u>Health Effects</u>

The TACS can cause various cancers depending on the particular chemicals, type and duration of exposure. Additionally, some of the TACs may cause short-term and/or long-term health effects. The ten

[16] "Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates," Cal EPA ARB (May 2003).
[17] "Toxic Air Contaminant Emissions, Air Quality, and Health Risk," ARB Almanac, Ch. 5, California Air Resources Board (2008)
[18] "Guidance Manual for the Preparation of Health Risk Assessment and Part II: Technical Support Document for Describing Available Cancer Potency Factors," Air Toxics Hot Spots Program Risk Assessment Guidelines, Cal EPA (Aug. 2003 and Dec. 2002).
[19] State of California, Office of Environmental Health Hazard Assessment website

TACs posing the greatest health risk in California are: acetaldehyde; benzene; 1, 3-butadiene; carbon tetrachloride; chromium (hexavalent); para-dichlorobenzene; formaldehyde, methylene chloride; perchloroethylene; and diesel particulate matter (diesel PM).[20] A description of these pollutants, their sources and health effects are contained in "ARB Almanac, Chapter 5: Toxic Air contaminant Emissions, Air Quality and Health Risk." Health risk guidelines are developed by the Office of Environmental Health Hazard Assessment for the list of chemicals regulated as toxic.[21]

**Vinyl Chloride** [22]

The project does not emit vinyl chloride, therefore, it will not be discussed further in this report. Vinyl chloride monomer is a sweet smelling, colorless gas at ambient temperature. Landfills, publicly owned treatment works and PVC production are the major identified sources of vinyl chloride emissions in California. Polyvinyl chloride (PVC) can be fabricated into several products such as PVC pipes, pipefitters, and plastics.

Health Effects

In humans, epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of a rare cancer, liver angiosarcoma, and have suggested a relationship between exposure and lung and brain cancers.

**Lead**[23]

The project does not emit lead, therefore, it will not be discussed further in this report. Lead is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. Lead, which was used to increase the octane rating in auto fuel, was phased out of gasoline starting in 1973 and banned completely in a final EPA ruling in 1996. Since gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels and the use of leaded fuel has been mostly phased out, the ambient concentrations of lead have dropped dramatically.

Health Effects

Short-term exposure to high levels of lead can cause vomiting, diarrhea, convulsions, coma or even death. However, even small amounts of lead can be harmful, especially to infants, young children and pregnant women. Symptoms of long-term exposure to lower lead levels may be less noticeable but are still serious. Anemia is common and damage to the nervous system may cause impaired mental function. Other symptoms are appetite loss, abdominal pain, constipation, fatigue, sleeplessness, irritability and headache. Continued excessive exposure, as in an industrial setting, can affect the kidneys.

Lead exposure is most serious for young children because they absorb lead more easily than adults and are more susceptible to its harmful effects. Even low-level exposure may harm the intellectual development, behavior, size and hearing of infants. During pregnancy, especially in the last trimester, lead can cross the placenta and affect the fetus. Female workers exposed to high levels of lead have more miscarriages and stillbirths.[24]

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[20] "Toxic Air Contaminant Emissions, Air Quality, and Health Risk," ARB Almanac, Ch. 5, California Air Resources Board (2008)

[21] "Guidance Manual for the Preparation of Health Risk Assessment and Part II: Technical Support Document for Describing Available Cancer Potency Factors," Air Toxics Hot Spots Program Risk Assessment Guidelines, Cal EPA (Aug. 2003 and Dec. 2002). Air Toxics Hot Spots Program Risk Assessment Guidelines, OEHHA, (2003)

[22] "Final Environmental Impact Report, Revised Update of the Kern County General Plan, SCH# 2002071027," County of Kern.

[23] Ibid

[24] http://www.hc-sc.gc.ca/english/iyh/environment/lead.html

### Hydrogen Sulfide

The project does not emit hydrogen sulfide, therefore it will not be discussed further in this report. Hydrogen sulfide ($H_2S$) gas is produced during the anaerobic decomposition of manure as a byproduct of bacterial reduction of sulfur-containing compounds, including proteins. $H_2S$ is colorless, with a characteristic odor of rotten eggs. Atmospheric $H_2S$ is primarily oxidized to $SO_2$, which is eventually converted into sulfate, then sulfuric acid. When sulfuric acid is transported back to the earth through "acid rain", it can damage plant tissue and aquatic ecosystems.

While no federal standard exists for $H_2S$, a California standard exists. $H_2S$ is primarily associated with geothermal activity and oil production activities, and is not monitored in the SJVAB because no geothermal sites exist. The San Joaquin Valley Air Basin is unclassified for $H_2S$ attainment.

<u>Health Effects</u>

It can cause dizziness, irritation to eyes, mucous membranes, and the respiratory tract, nausea, and headaches at low concentrations. Exposure to higher concentrations (above 100 ppm), can cause olfactory fatigue, respiratory paralysis, and death. $H_2S$ can be detected by the nose at extremely low concentrations, as low as 1/400 the threshold for harmful human health effects. $H_2S$ does not accumulate in the body, but is quickly excreted at normal exposure concentrations. Acute health effects don't occur until the exposure is greater than the body's ability to excrete the excess sulfur. Hydrogen sulfide can present a workplace hazard in confined spaces.

## 3.3 PROJECT SITE CONDITIONS

### Existing Conditions

The project site is located within the City of Bakersfield. Currently the site is mostly vacant with some houses in the northwest portion.

### Sensitive Receptors

The SJVAPCD identifies a sensitive receptor as a location where human populations, especially children, senior citizens, and sick persons are present, and where there is a reasonable expectation of continuous human exposure to pollutants, according to the averaging period for ambient air quality standards, such as 24-hour, 8-hour or 1-hour. Examples of sensitive receptors include residences, hospitals, and schools.[25] Industrial and commercial uses are not considered sensitive receptors.

Within a one-mile radius of the project site, there are residential developments and schools that are considered sensitive receptors.

**TABLE 3.3-1**
**Sensitive Receptors within One-Mile Radius**

| Sensitive Receptors | Direction from Project Boundary |
|---|---|
| Various Residences | Surrounding Project |
| Schools | North and east of Project |

# 4 REGULATORY SETTING

[25] GAMAQI.

Regulatory oversight for air quality in the San Joaquin Valley Air Basin rests at the regional level with the San Joaquin Valley Air Pollution Control District (SJVAPCD), the California Air Resources Board (CARB) at the state level, and the U.S. Environmental Protection Agency (U.S. EPA) Region IX office at the federal level.

## 4.1 U.S. ENVIRONMENTAL PROTECTION AGENCY

The Federal Clean Air Act (CAA), in particular the 1990 amendments to the Federal Clean Air Act (CAA) provides the principal framework for national, state and local efforts to protect air quality. The Clean Air Act designates the Office of Air Quality Planning & Standards (OAQPS) as responsible for setting and enforcing the standards known as national ambient air quality standards (NAAQS), for pollutants which are considered harmful to people and the environment. OAQPS is also responsible for ensuring that these air quality standards are met, or attained (in cooperation with state, Tribal and local governments) through national standards and strategies to control pollutant emissions from automobiles, factories and other sources.

OAQPS is responsible for setting the National Ambient Air Quality Standards (NAAQS), which control pollutants harmful to people and the environment. There are two types of standards, primary and secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects, such as damage to farm crops and vegetation and damage to buildings. The six criteria pollutants addressed in the NAAQS are Carbon Monoxide, Nitrogen Dioxide, Lead, Ozone (smog), Particulate Matter and Sulfur Dioxide. If the levels of these pollutants are higher than what is considered acceptable by EPA, then the area in which the level is too high is called a nonattainment area. OAQPS monitors very closely many areas for criteria pollutants and attainment.

These standards promulgated by the CAA identify levels of air quality for "criteria" pollutants that are considered the maximum levels of ambient (background) air pollutants considered safe, over a given averaging period with an adequate margin of safety, to protect the public health and welfare. Averaging periods vary by pollutant and range from 1-hour standards to annual standards. Units of measure for the standards are in parts per million (ppm) by volume, milligrams per cubic meter of air ($mg/m^3$), and micrograms per cubic meter of air ($\mu g/m^3$). The criteria pollutants include ozone, carbon monoxide (CO), nitrogen dioxide ($NO_2$ is a form of $NO_X$), sulfur oxides ($SO_2$ is a form of $SO_X$), particulate matter less than 10 and 2.5 microns in diameter ($PM_{10}$ and $PM_{2.5}$, respectively) and lead. The U.S. EPA also has regulatory and enforcement jurisdiction over emission sources beyond state waters (outer continental shelf), and those that are under the exclusive authority of the federal government, such as aircraft, locomotives, and interstate trucking.

Based on monitoring data recorded throughout the country, the U.S. EPA identifies air sheds that are achieving the NAAQS and designates them as being in attainment. Other regions may also be designated as non-attainment or unclassified based on available data and because they have levels above the NAAQS or have not been classified and are treated as attainment. Areas designated non-attainment are further defined by classifications ranging from sub marginal to extreme. The year in which the attainment is reached determines the non-attainment classification, i.e., serious, severe, and extreme. Each specific classification has defined time periods for reaching attainment and various sanctions for failure to make progress. The SJVAB is designated non-attainment for the ozone 8-hour standard, and is designated as a serious non-attainment area for $PM_{2.5}$.[26] In September 2008, SJVAPCD was determined to be in attainment for $PM_{10}$.

Through various programs, OAQPS monitors for criteria pollutants. One program is the Ambient Air Monitoring Program. Through this program, air quality samples are collected to judge attainment of

[26] San Joaquin Valley Air Pollution Control District, 2006 $PM_{10}$ Plan – San Joaquin Valley Plan to Attain Federal Standards for Particulate Matter 10 Microns and Smaller. 2006.

ambient air quality standards, to prevent or alleviate air pollution emergencies, to observe pollution trends throughout regions and to evaluate the effects of urban, land-use and transportation planning relating to air pollution. There are other important types of pollution monitoring programs; two of which are Enhanced Ozone Monitoring and Air Pollution Monitoring.

The Enhanced Ozone Monitoring Program goes one step further. The chief objective of the enhanced ozone monitoring program is to provide an air quality database that will assist air pollution control agencies in evaluating, tracking the progress of, and, if necessary, refining control strategies for attaining the ozone NAAQS. EPA has required more extensive monitoring of ozone and its precursors in areas with persistently high ozone levels (mostly large metropolitan areas).

In order to work towards attainment, OAQPS requires that each state containing nonattainment areas to develop a written plan for cleaning the air in those areas. The plans developed are called State Implementation Plans (SIPS). Through these plans, the states outline efforts that they will make to try to correct the levels of air pollution and bring their areas back into attainment.

## 4.2 CALIFORNIA AIR RESOURCES BOARD

The California Air Resources Board (CARB), a department of the California Environmental Protection Agency, oversees air quality planning and control throughout California. It is primarily responsible for ensuring implementation of the 1989 amendments to the California Clean Air Act (CCAA), responding to the Federal CAA requirements, and regulating emissions from motor vehicles sold in California and emissions from various types of equipment available commercially. It also sets fuel specifications to further reduce vehicular emissions.

The amendments to the CCAA establish ambient air quality standards for the state, California Ambient Air Quality Standards, (CAAQS), and a legal mandate to achieve these standards by the earliest practicable date. These standards apply to the same criteria pollutants as the Federal CAA, and also include sulfate, visibility, hydrogen sulfide, and vinyl chloride. They are also more stringent than the federal standards and, in the case of $PM_{10}$, far more stringent.

The San Joaquin Valley Air Basin is designated as non-attainment area according to the state standards for Ozone, and $PM_{2.5}$. Concentrations of all other pollutants meet state standards.

CARB is also responsible for regulations pertaining to Toxic Air Contaminants (TACs)[27]. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987, Connelly) was enacted in 1987 as a means to establish a formal air toxics emission inventory risk quantification program. The Act, as amended, establishes a process that requires stationary sources to report the type and quantities of certain substances their facilities routinely release into the air basin. The goal of the Act is to collect emission data, identify facilities having localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce the potential health risk to below a level of significance. Owners of facilities found to pose significant risks by an air district must prepare and implement risk reduction audit plans within 6 months of the determination. Each air pollution control district ranks the data for purposes of risk assessment into high, intermediate, and low priority categories. When considering the ranking, the potency, toxicity, quantity, volume of hazardous materials released from the facility, and the proximity of the facility to receptors, all are in consideration by an air district.

CARB is also responsible for regulation of Global Climate Change emissions. This will be discussed in Section 8, "Global Climate Change" of this report.

## 4.3 SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT (SJVAPCD)

[27] http://www.arb.ca.gov/homepage.htm

Air districts have the primary responsibility of air pollution control from all stationary source emissions. SJVAPCD has implemented the Indirect Source Rule (ISR) 9510 which allows the district to assess fees based on mobile source emissions related to new development projects and to utilize a portion of the collected fees on air emission reduction projects. Air districts adopt and enforce rules and regulations to achieve state and federal ambient air quality standards and enforce applicable state and federal law.

State law recognized that air pollution does not respect political boundaries and therefore required CARB to divide the state into separate air basins that each have similar geographical and meteorological conditions [California Health and Safety Code Section 39606 (a)]. Originally, air pollution was regulated separately by county Air Pollution Control Districts (APCDs). Although this is still the practice in most counties in California, many county agencies began to realize that air quality problems are best managed on a regional basis and began to combine their regulatory agencies into regional agencies. This was the case for the San Joaquin Valley Air Basin, where until 1991 each county operated a local APCD, at that time the San Joaquin Valley Unified Air Pollution Control District (currently named San Joaquin Valley Air Pollution Control District) was formed. The SJVAPCD boundaries and monitoring station locations are shown on **Exhibit 4** "SJVAPCD Monitoring Station Locations."

SJVAPCD Environmental Review Guidelines state that CEQA applies to projects that have the potential for causing a significant effect on the environment.[28]

In August of 1998, the San Joaquin Valley Air Pollution Control District, (SJVAPCD) prepared its *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI). GAMAQI is an advisory document that provides lead agencies, consultants, and project applicants with analysis guidance and uniform procedures for addressing air quality in environmental documents. Local jurisdictions are not required to utilize the methodology outlined therein. This document describes the criteria that the District uses when reviewing and commenting on the adequacy of environmental documents. It recommends thresholds for use in determining whether or not projects would have significant adverse environmental impacts, identifies methodologies for predicting project emissions and impacts, and identifies measures that can be used to avoid or reduce air quality impacts. An update of the GAMAQI was approved on January 10, 2002 and will be used as a guidance document for this study. According to the GAMAQI, the project is under the size thresholds and it is considered as Small Project Analysis Level (SPAL).

The San Joaquin Valley Air Pollution Control District Rules and Regulations contain several rules which may apply to the proposed project.

**<u>Regulation II</u>** (Permits) - Regulation II (Rules 2010-2550) is a series of rules covering permitting requirements within the air basin. SJVAPCD regulations require any person constructing, altering, replacing or operating any source operation which emits, may emit, or may reduce emissions to obtain an Authority to Construct or a Permit to Operate. Most new stationary sources, if they emit over 2 pounds of pollutants per day, will be subject to Best Available Control Technology in accordance with the SJVAPCD's New Source Review Rule and to the New Source Review Rule.[29]

**<u>Regulation VIII</u>** (Fugitive $PM_{10}$ Prohibitions)- Regulation VIII (Rules 8011-8081) is a series of rules designed to reduce non-exhaust specific $PM_{10}$ emissions (predominantly dust/dirt) generated by human activity, including construction and demolition activities, road construction, bulk materials storage, paved and unpaved roads, carryout and track out, etc. If a construction project is 10.0 or more acres in area or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days, a Dust Control Plan must be submitted as specified in Section 6.3.1 of Rule 8021. Construction activities shall not commence until the SJVAPCD has approved the Dust Control Plan. The project could also be subject to provisions within Rule 8021

[28] San Joaquin Valley Air Pollution Control District, Environmental Review Guidelines, 2000.
[29] SJVAPCD Rules and Regulations, October, 2010.

(Construction, Demolition, Excavation, Extraction and Other Earthmoving Activities), Rule 8031 (Bulk Materials), Rule 8041 (Carryout and Track Out), Rule 8051 (Open Areas), Rule 8061 (Paved and Unpaved Roads), and Rule 8071 (Unpaved Vehicle/Equipment Traffic Areas). Rule 8061 places thresholds and requirements on limiting Visible Dust Emissions (VDE) from unpaved road segments. Rule 8071 also contains thresholds and requirements.

**Rule 3135** (Dust Control Plan Fee) requires the applicant to submit a fee in addition to a Dust Control Plan. The purpose of this fee is to recover the SJVAPCD's cost for reviewing these plans and conducting compliance inspections.

**Rule 4002** (National Emission Standards for Hazardous Air Pollutants) In the event that any portion of an existing building will be renovated, partially demolished or removed, the project will be subject to SJVAPCD Rule 4002. Prior to any demolition activity, an asbestos survey of existing structures on the project site may be required to identify the presence of any asbestos containing building material (ACBM). Any identified ACBM having the potential for disturbance must be removed by a certified asbestos contractor in accordance with CAL-OSHA requirements.

**Rule 4102** (Nuisance) applies to any source operation that emits or may emit air contaminants or other materials. In the event that the project or construction of the project creates a public nuisance, it could be in violation and be subject to SJVAPCD enforcement action.

**Rule 4601** (Architectural Coatings) limits volatile organic compounds from architectural coatings. This rule specifies architectural coatings storage, clean up and labeling requirements.

**Rule 4641** (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations) Asphalt paving operations associated with this project will be subject to Rule 4641. This rule applies to the manufacture and use of cutback asphalt, slow cure asphalt and emulsified asphalt for paving and maintenance operations.

**Rule 9510** (Indirect Source Review) This rule requires the applicants of certain development projects to submit an application to the SJVAPCD when applying for the development's last discretionary approval. Projects subject to the rule are required to quantify indirect emissions (mobile source emissions), area source emissions and construction exhaust emissions and to mitigate a portion of these emissions. The ISR rule became effective March 1, 2006. Rule 9510 was adopted to reduce the impacts of growth in emissions from all new development in the San Joaquin Valley.

The emission reductions expected from the rule allow the SJVAPCD to achieve attainment of the federal air quality standards for ozone by 2023[30].

In the context of toxic air contaminants, to meet the requirements of federal and State law, the SJVAPCD has created an Integrated Air Toxic Program. This program serves as a tool for implementation of the requirements outlined in Title III of the 1990 Federal Clean Air Act Amendments. The goals of SJVAPCD risk management efforts are to: 1) minimize increases in toxic emissions associated with new and modified sources of air pollution; and 2) ensure that new and modified sources of air pollution do not pose unacceptable health risks at nearby residences and businesses. In order to achieve these goals, the SJVAPCD reviews the risk associated with each permitting action where there is an increase in emissions of Toxic Air Contaminants. SJVAPCD staff, as part of the engineering evaluation for these projects, performs this risk management review. The risk management review is performed concurrently with other project review functions necessary to process permit applications with the SJVAPCD. Under the SJVAPCD's risk management policy, Best Available Control Technology must be applied to all units that, based on their potential emissions may pose greater than *de minimus* risks. Facilities that pose health risks above SJVAPCD action levels are required to submit plans to reduce their risk. Action levels for risk

[30] San Joaquin Valley Air Pollution Control District Ozone Attainment Plan, 2007

were established in the SJVAPCD's Board-Approved Risk Reduction policy. The action level for cancer risk is 10 cases per million exposed persons, based on the maximum exposure beyond facility boundaries at a residence or business. The action level for non-cancer risk is a hazard index of 1.0 at any point beyond the facility boundary where a person could reasonable experience exposure to such risk.

The SJVAPCD has an extensive stationary source permitting program[31] that includes New Source Review Rules, which are in the approved State Implementation Plan. These rules require offsets of emissions of ozone and particulates precursors at a ratio of greater than one to one, when ten tons and fifteen tons are exceeded. The rules also require that each new stationary source, which exceeds two pounds per day of pollutants, shall install Best Available Control Technology.

## 4.4 CITY OF BAKERSFIELD

The City of Bakersfield Metropolitan General Plan Conservation Element (Air Quality) contains goals, policies, objectives, and implementation measures that comprehensively address general conditions and site specific circumstances that may affect air quality.[32] The policies are listed below.

Policy 3 Require dust abatement measures during significant grading and construction operations.

Policy 11 Improve the capacity of the existing road system through improved signalization, more right turn lanes and traffic control systems.

Policy 12 Encourage the use of mass transit, carpooling, and other transportation options to reduce vehicle miles traveled.

Policy 13 Consider establishing priority parking areas for carpoolers in projects with relatively large numbers of employees to reduce vehicle miles traveled and improve air quality.

Policy 15 Promote the use of bicycles by providing attractive bicycle paths and requiring provision of storage facilities in commercial and industrial projects.

Policy 16 Cooperate with Golden Empire Transit and Kern Regional Transit to provide a comprehensive mass transit system for Bakersfield; require large-scale new development to provide related improvements, such as bus stop shelters and turnouts.

Policy 18 Encourage walking for short distance trips through the creation of pedestrian friendly sidewalks and street crossings.

Policy 19 Promote a pattern of land uses which locates residential uses in close proximity to employment and commercial services to minimize vehicular travel.

Policy 22 Require the provision of secure, convenient bike storage racks at shopping centers, office buildings, and other places of employment in the Bakersfield Metropolitan area.

Policy 23 Encourage the provision of shower and locker facilities by employers, for employees who bicycle or jog to work.

## 4.5 NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Ambient air quality standards are regulatory levels of ambient pollutant concentrations which, when exceeded, may adversely impact the health and welfare of the public. National Ambient Air Quality Standards (NAAQS) were established as a result of the provisions of the Federal Clean Air Act (CAA) of 1970. The national standards are divided into primary standards, designed to protect public health, and secondary standards intended to protect the public from any known or anticipated adverse effects of a

[31] SJVAPCD Rules and Regulations, October, 2010.
[32] Metropolitan Bakersfield General Plan, 2002, Chapter V- Conservation Element, E. Air Quality

pollutant. The national standards may be equaled continuously and exceeded once per year. National standards have been established for ozone, nitrogen dioxide, carbon monoxide, particulate matter less than 10 microns, particulate matter less than 2.5 microns, sulfur dioxide, and lead.

California Ambient Air Quality Standards (CAAQS) were established in 1969 as a result of the Mulford-Carrell Act. In addition to the national standards, California also established standards for visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. California standards for ozone, nitrogen dioxide, carbon monoxide, particulate matter less than 10 microns in aerodynamic diameter, and sulfur dioxide are not to be exceeded. The pollutants and their corresponding national and state ambient air quality standards are shown in **Table 4.5-1**.

*(Table 4.5-1 on next page.)*

**TABLE 4.5-1**
**Ambient Air Quality Standards[33]**

| Pollutant | Averaging Time | California Standards [1] | | National Standards [2] | | |
|---|---|---|---|---|---|---|
| | | Concentration[3] | Method[4] | Primary [3, 5] | Secondary [3, 6] | Method [7] |
| **Ozone ($O_3$)** | 1 Hour | 0.09 ppm (180 µg/m$^3$) | Ultraviolet Photometry | — | Same as Primary Standard | Ultraviolet Photometry |
| | 8 Hour | 0.070 ppm (137 µg/m$^3$) | | 0.070 ppm (137 µg/m$^3$) | | |
| **Respirable Particulate Matter ($PM_{10}$)** | 24 Hour | 50 µg/m$^3$ | Gravimetric or Beta Attenuation | 150 µg/m$^3$ | Same as Primary Standard | Inertial Separation and Gravimetric Analysis |
| | Annual Arithmetic Mean | 20 µg/m$^3$ | | — | | |
| **Fine Particulate Matter ($PM_{2.5}$)** | 24 Hour | — | — | 35 µg/m$^3$ | Same as Primary Standard | Inertial Separation and Gravimetric Analysis |
| | Annual Arithmetic Mean | 12 µg/m$^3$ | Gravimetric or Beta Attenuation | 12.0 µg/m$^3$ | 15 µg/m$^3$ | |
| **Carbon Monoxide (CO)** | 1 Hour | 20 ppm (23 mg/m$^3$) | Non-Dispersive Infrared Photometry (NDIR) | 35 ppm (40 mg/m$^3$) | — | Non-Dispersive Infrared Photometry (NDIR) |
| | 8 Hour | 9.0 ppm (10 mg/m$^3$) | | 9 ppm (10 mg/m$^3$) | — | |
| | 8 Hour (Lake Tahoe) | 6 ppm (7 mg/m$^3$) | | — | — | |
| **Nitrogen Dioxide ($NO_2$)[8]** | 1 Hour | 0.18 ppm (339 µg/m$^3$) | Gas Phase Chemiluminescence | 100 ppb (188 pg/m$^3$) | — | Gas Phase Chemiluminescence |
| | Annual Arithmetic Mean | 0.030 ppm (57 µg/m$^3$) | | 0.053 ppm (100 µg/m$^3$) | Same as Primary Standard | |
| **Sulfur Dioxide ($SO_2$)[9]** | 1 Hour | 0.25 ppm (655 µg/m$^3$) | Ultraviolet Fluorescence | 75 ppb (196 pg/m$^3$) | — | Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method) |
| | 3 Hour | — | | — | 0.5 ppm (1300 µg/m$^3$) | |
| | 24 Hour | 0.04 ppm (105 µg/m$^3$) | | 0.14 ppm (for certain areas)[11] | — | |
| | Annual Arithmetic Mean | — | | 0.030 ppm (for certain areas)[11] | — | |
| **Lead[10,11]** | 30 Day Average | 1.5 µg/m$^3$ | Atomic Absorption | — | — | High Volume Sampler and Atomic Absorption |
| | Calendar Quarter | — | | 1.5 µg/m3 (for certain areas)[12] | Same as Primary Standard | |
| | Rolling 3-Month Average | — | | 0.15 µg/m$^3$ | | |
| **Visibility Reducing Particles[12]** | 8 Hour | See footnote 14 | Beta Attenuation and Transmittance through Filter Tape | **No National Standards** | | |
| **Sulfates** | 24 Hour | 25 µg/m$^3$ | Ion Chromatography | | | |
| **Hydrogen Sulfide** | 1 Hour | 0.03 ppm (42 µg/m$^3$) | Ultraviolet Fluorescence | | | |
| **Vinyl Chloride[10]** | 24 Hour | 0.01 ppm (26 µg/m$^3$) | Gas Chromatography | | | |

California Air Resources Board (5/4/16)

[33] California Air Resources Board, http://www.arb.ca.gov/research/aaqs/aaqs2.pdf, 05/04/2016.

Footnotes to Table 4.5-1

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.
8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 µg/m3 to 12.0 µg/m3 . The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 µg/m3 , as was the annual secondary standard of 15 µg/m3 . The existing 24-hour PM10 standards (primary and secondary) of 150 µg/m3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
11. On June 2, 2010, a new 1-hour SO2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

The Federal Clean Air Act Amendments made in 1977 require each state to identify geographic areas in compliance with the national standards as well as those areas that are not in compliance. These designations are known as the "attainment" status designations. Areas not in compliance with the national standards are termed "nonattainment" and are subject to New Source Review (NSR) regulations. Areas meeting the national standards are referred to as "attainment" and are subject to Prevention of Significant Deterioration (PSD) and NSR regulations. Areas with insufficient data to make a determination are "unclassified" but are treated as "attainment" areas until proven otherwise. The designation of an area is made on a pollutant-specific basis. Therefore, it is possible to be located in an area designated nonattainment for one pollutant, but attainment or unclassified for other pollutants.

The California Air Resources Board (CARB) coordinates and oversees state air quality management districts and air pollution control districts. CARB has retained authority over mobile sources but has delegated much of the control of stationary sources to local agencies. They, much like the federal program, designate areas as "attainment", "non-attainment", or "unclassified" based on ambient air data that has been collected in the applicable area. **Table 4.5-2** is a listing of the State and Federal attainment status for the Kern County portion of the San Joaquin Valley Air Basin.

**TABLE 4.5-2**
**Kern County –SJVAPCD Portion Attainment Status**

| Pollutant | Designation/Classification | |
|---|---|---|
| | **Federal Standards**[a] | **State Standards**[b] |
| Ozone – 1 hour | No Federal Standard[f] | Nonattainment/Severe |
| Ozone – 8 hour | Nonattainment/ Extreme[e] | Nonattainment |
| $PM_{10}$ | Attainment[c] | Nonattainment |
| $PM_{2.5}$ | Nonattainment[d] | Nonattainment |
| Carbon Monoxide | Attainment /Unclassified | Attainment/Unclassified |
| Nitrogen Dioxide | Attainment/Unclassified | Attainment |
| Sulfur Dioxide | Attainment/Unclassified | Attainment |
| Lead (Particulate) | No Designation/Classification | Attainment |
| Hydrogen Sulfide | No Federal Standard | Unclassified |
| Sulfates | No Federal Standard | Attainment |
| Visibility Reducing Particles | No Federal Standard | Unclassified |
| Vinyl Chloride | No Federal Standard | Attainment |

[a] See 40 CFR Part 81
[b] See CCR Title 17 Sections 60200-60210
[c] On September 25, 2008, EPA redesignated the San Joaquin Valley to attainment for the PM10 National Ambient Air Quality Standard (NAAQS) and approved the PM10 Maintenance Plan.
[d] The Valley is designated nonattainment for the 1997 PM2.5 NAAQS. EPA designated the Valley as nonattainment for the 2006 PM2.5 NAAQS on November 13, 2009 (effective December 14, 2009).
[e] Though the Valley was initially classified as serious nonattainment for the 1997 8-hour ozone standard, EPA approved Valley reclassification to extreme nonattainment in the Federal Register on May 5, 2010 (effective June 4, 2010).
[f] Effective June 15, 2005, the U.S. Environmental Protection Agency (EPA) revoked the federal 1-hour ozone standard, including associated designations and classifications. EPA had previously classified the SJVAB as extreme nonattainment for this standard. EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan on March 8, 2010 (effective April 7, 2010). Many applicable requirements for extreme 1-hour ozone nonattainment areas continue to apply to the SJVAB.

The urbanized areas of Fresno, Bakersfield, Stockton, and Modesto are designated as attainment and all of the non-urbanized areas of the San Joaquin Valley Basin are designated as unclassified for the federal CO standards.

In July 1997, the U.S. EPA announced new health-based standards for ozone and $PM_{2.5}$. $PM_{2.5}$ is a subset of $PM_{10}$ and a microscopic form of particle pollution primarily composed of diesel soot and other combustion by-products. Previously, the NAAQS for particulate matter applied to the highest 24-hour or annual averages measured within a monitoring planning area. Monitoring networks were often designed to measure the highest values, even though these networks did not necessarily represent the overall exposure of populations to excessive particulate concentrations. Some data from these networks were disregarded by epidemiologists as being unrelated to health indicators such as hospital admissions and death. The new forms for these standards are intended to provide more robust measures for the particulate matter indicator. While $PM_{10}$ network design and siting criteria are unchanged, new $PM_{2.5}$ monitoring networks to determine compliance or non-compliance are intended to best represent the exposure of populations that might be affected by elevated $PM_{2.5}$ concentrations.

$PM_{2.5}$ measurements from central California indicate that the annual 15 $mg/m^3$ standard is exceeded in several populated areas, specifically in the central and southern San Joaquin Valley (where the Proposed Project is located). These high annual averages are dominated by elevated concentrations in the cities and in non-urban locations during winter and fall. $PM_{2.5}$ constitutes approximately 80% of $PM_{10}$ during winter and approximately 50% of $PM_{10}$ during the rest of the year. Other $PM_{2.5}$ exceedances have occurred as isolated events at one or two locations when a nearby activity contributed a large bolus of fugitive dust, or when wind typically dominated by the coarse particle fraction. Windblown dust excursions have been most often found in the southern San Joaquin Valley and in the high desert, especially in the vicinity of Owens Lake.

## 4.6 AIR QUALITY DESIGNATION CLASSIFICATIONS[34]

### 4.6.1 NATIONAL DESIGNATION CATEGORIES

**Non-Attainment Area**: Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.

**Unclassified/Attainment Area**: Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant or meets the national primary or secondary ambient air quality standard for the pollutant.

**Ozone Classifications:**

| | |
|---|---|
| **Marginal** | Primary standard, attainment date of 3 years after enactment |
| **Moderate** | Primary standard, attainment date 6 years after enactment |
| **Serious** | Primary standard, attainment date 9 years after enactment |
| **Severe 15** | Primary standard, attainment date 15 years after enactment |
| **Severe 17** | Primary standard, attainment date 17 years after enactment |
| **Extreme** | Primary standard attainment date 20 years after enactment |

**Incomplete (or No) Data:** An area designated as an ozone non-attainment area as of the date of enactment of the Clean Air Act Amendments of 1990 and did not have sufficient data to determine if it is meeting or is not meeting the ozone standard.

**Carbon Monoxide Classifications:**

**Serious**: A design value of 16.5 ppm and above and a primary standard attainment date of December 21, 2000.

**Moderate:** A design value of 9.1 up to 16.4 ppm and a primary standard attainment date of December 31, 1995.

**Not Classified:** An area designated as a carbon monoxide non-attainment area as of the date of enactment of the Clean Air Act Amendments of 1990 and did not have sufficient data to determine if it is meeting or is not meeting the carbon monoxide standard.

### 4.6.2 STATE DESIGNATION CLASSIFICATIONS

**Unclassified**: A pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or non-attainment.

**Attainment:** A pollutant is designated attainment if the State standard for that pollutant was not violated at any site in the area during a three-year period.

**Non-attainment:** A pollutant is designated non-attainment if there was at least one violation of a State standard for that pollutant in the area.

[34] "Final Environmental Impact Report, Revised Update of the Kern County General Plan, SCH# 2002071027," County of Kern.

**Non-attainment/Transitional:** A subcategory of the non-attainment designation. An area is designated non-attainment/transitional to signify that the area is close to attaining the standard for that pollutant.

As part of the 1990 Federal CAA Amendments, 189 substances commonly used in many businesses, including manufacturing and industrial processes, were identified as Toxic Air Contaminants (TACs). The amendments required the U.S. EPA to establish a 10-year schedule for developing new regulations for controlling these pollutants using maximum achievable control technology (MACT). Under Title III to the 1990 Federal Clean Air Act Amendments, the U.S. EPA was also required to develop regulations to address urban area risk, residual risk, and accidental releases of Toxic Air Contaminants.

Pursuant to the CAA, states may develop a State Implementation Plan (SIP) to explain how they will achieve the CAA standards within the state. If the SIP is deemed acceptable, the U.S. EPA will delegate responsibility for implementation pursuant to the SIP. California has an approved SIP. These implementation plans are updated and revised periodically based on changes in conditions, and revision in standards.

### 4.6.3 EXISTING AIR QUALITY IN THE SAN JOAQUIN VALLEY BASIN [35]

The San Joaquin Valley Air Basin (SJVAB) consists of eight counties: Fresno, Kern (western and central), Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare. Cumulatively, these counties make up about 16% of California's geographic area, making the SJVAB the second largest air quality basin delineated by the California Air Resources Board. The SJVAB consists of a continuous intermountain valley approximately 250 miles long and averaging 80 miles wide. The geography of mountainous areas to the east, west and south, in combination with long summers and relatively short winters, contributes to local climate episodes that prevent dispersion of pollutants. Although marine air generally flows into the SJVAB from the San Joaquin River Delta, the region's topographic features restrict air movement through and out of the valley. Additionally the surrounding mountainous areas are generally higher in elevation than the summer inversion layers. As a result, the SJVAB is highly susceptible to pollutant accumulation over time.

**Monitoring Stations**

The SJVAB has 33 monitoring stations to measure air quality, 21 operated by the SJVAPCD, 2 by the National Park Service, 1 by Tachi-Yokut, 8 by the California Air Resources Board and 2 jointly operated by the SJVAPCD and CARB. **Exhibit 4** "SJVAPCD Monitoring Station Locations" shows the location of these monitoring stations. By using the data collected at these stations the attainment status and the progress towards attainment is measured.

**REGIONAL AMBIENT AIR QUALITY**[36]
**Ozone**

The long-term trends in the SJVAB for the number of days over the federal 1-hour ozone standard has decreased basin-wide from a peak of 80 days in the late 1970's to 28 days in 2016. Short-term trends show a decrease in the number of days over the standard basin-wide from below 94 days in 1999 to 28 days in 2016. On July 18, 2016, the EPA published in the Federal Register a final action determining the SJVAB has attained the 1-hour ozone national standard.

[35] California Air Resources Board, http://www.arb.ca.gov/adam/welcome.html.
[36] "Extreme Ozone Attainment Demonstration Plan-San Joaquin Valley Air Basin Plan Demonstrating Attainment of Federal 1-hour Ozone Standard," San Joaquin Valley Air Pollution Control District (October 8, 2004).

### Particulate

The air quality data shows an overall improvement in $PM_{10}$ and $PM_{2.5}$. The peak 24-hour $PM_{10}$ exceedance was 439 micrograms per cubic meter in 1990 and only 132.5 micrograms per cubic meter in 2016. The peak 24-hour $PM_{2.5}$ exceedance was 23.4 micrograms per cubic meter in 1999 and only 15.6 micrograms per cubic meter in 2016. As of October 2006, the San Joaquin Valley had attained the federal $PM_{10}$ and $PM_{2.5}$ standard and had received approval as an attainment basin for this pollutant. The number of days of exceedance has decreased over time from 59 in 1990 to 5 in 2004-2006. The District adopted the 2016 Moderate Area Plan for the 2012 PM2.5 Standard on September 15, 2016. This plan addresses the EPA federal annual PM2.5 standard of 12 µg/m3, established in 2012. This plan includes an attainment impracticability demonstration and request for reclassification of the Valley from Moderate nonattainment to Serious nonattainment.[37]

### All Other Pollutants

The remaining federal criteria pollutants ($NO_X$, $SO_X$, CO) that are measured by the monitoring stations have been shown to be in attainment.

### Toxic Air Contaminants

Toxics have been monitored at four sites in the SJVAB as shown on **Exhibit 4 "**SJVAPCD Monitoring Station Locations." The toxic air contaminants are: acetaldehyde; benzene; 1, 3-butadiene; carbon tetrachloride; chromium (hexavalent); para-dichlorobenzene; formaldehyde, methylene chloride; perchloroethylene; and diesel particulate matter (diesel PM). These are the TACs that are considered to pose the greatest health risk in SJVAB. **Table 4.6-1** on the following page demonstrates that in general since 1992 the volume of toxics in the SJVAB and the health risk posed by these toxics has decreased.

*(Table 4.6-1 on next page.)*

[37] http://www.valleyair.org/Air_Quality_Plans/PM_Plans.htm

**TABLE 4.6-1**[38]

**San Joaquin Valley Air Basin Annual Average Toxic Air Contaminant Concentration and Health Risk**

| TAC* | Conc[1]./Risk[2] | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetaldehyde | Annual Avg | 1.38 | 1.73 | 1.29 | 0.54 | 1.28 | 1.19 | 1.30 | 1.56 | 1.09 | 1.15 | 1.24 | 1.34 | 1.14 | 1.42 | 1.33 | 1.15 |
| | Health Risk | 7 | 8 | 6 | 3 | 6 | 6 | 6 | 8 | 5 | 6 | 6 | 7 | 6 | 7 | 6 | 6 |
| Benzene | Annual Avg | 1.36 | 1.32 | 1.33 | 1.16 | 0.73 | 0.71 | 0.76 | 0.69 | 0.63 | 0.538 | 0.552 | 0.463 | 0.372 | 0.374 | 0.362 | 0.318 |
| | Health Risk | 126 | 122 | 123 | 107 | 68 | 66 | 71 | 64 | 58 | 50 | 51 | 43 | 34 | 35 | 34 | 29 |
| 1,3-Butadiene | Annual Avg | 0.236 | 0.339 | 0.323 | 0.264 | 0.222 | 0.195 | 0.233 | 0.177 | 0.158 | 0.15 | 0.146 | 0.095 | 0.08 | 0.082 | 0.069 | 0.065 |
| | Health Risk | 89 | 127 | 121 | 99 | 83 | 73 | 88 | 67 | 59 | 56 | 55 | 36 | 30 | 31 | 26 | 24 |
| Carbon Tetrachloride | Annual Avg | | 0.109 | | 0.098 | 0.077 | | 0.114 | | 0.096 | 0.086 | 0.091 | 0.097 | | | | |
| | Health Risk | | 29 | | 26 | 20 | | 30 | | 25 | 23 | 24 | 26 | | | | |
| Chromium, Hexavalent | Annual Avg | 0.23 | 0.21 | 0.19 | 0.28 | 0.13 | 0.11 | 0.10 | 0.10 | 0.12 | | 0.086 | 0.078 | 0.083 | 0.076 | 0.05 | 0.083 |
| | Health Risk | 34 | 31 | 29 | 42 | 20 | 16 | 15 | 15 | 18 | | 13 | 12 | 13 | 11 | 8 | 12 |
| Para-Dichlorobenzene | Annual Avg | 0.11 | 0.13 | 0.11 | 0.11 | 0.10 | 0.13 | | | 0.11 | 0.13 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | |
| | Health Risk | 7 | 9 | 7 | 8 | 7 | 9 | | | 7 | 9 | 10 | 10 | 10 | 10 | 10 | |
| Formaldehyde | Annual Avg | 1.46 | 1.67 | 1.80 | 2.10 | 2.96 | 2.77 | 2.86 | 3.44 | 2.61 | 3.08 | 3.13 | 3.02 | 2.27 | 2.52 | 2.78 | 2.51 |
| | Health Risk | 11 | 12 | 13 | 15 | 22 | 20 | 21 | 25 | 19 | 23 | 23 | 22 | 17 | 19 | 20 | 18 |
| Methylene Chloride | Annual Avg | 0.55 | 0.76 | 0.59 | 0.61 | 0.54 | 0.53 | 0.52 | 0.50 | 0.53 | 0.27 | 0.16 | 0.14 | 0.11 | 0.12 | 0.11 | 0.1 |
| | Health Risk | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Perchloroethylene | Annual Avg | 0.104 | 0.473 | 0.067 | 0.068 | 0.068 | 0.056 | 0.039 | | 0.076 | 0.052 | 0.039 | 0.033 | 0.027 | 0.032 | 0.032 | 0.026 |
| | Health Risk | 4 | 19 | 3 | 3 | 3 | 2 | 2 | | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 |
| Diesel PM[3] | Annual Avg | | | | (1.7) | | | | | (1.3) | | | | | | | |
| | Health Risk | | | | (510) | | | | | (390) | | | | | | | |
| Average Basin Risk | w/o Diesel PM | 280 | 360 | 304 | 305 | 231 | 194 | 235 | 181 | 196 | 169 | 184 | 157 | 111 | 114 | 105 | 90 |
| | w/ Diesel PM | | | | (815) | | | | | (586) | | | | | | | |

1. Concentrations for Hexavalent chromium are expressed as ng/m3 and concentrations for diesel PM are expressed as ug/m3. Concentrations for all other TACs are expressed as parts per billion.
2. Health Risk represents the number of excess cancer cases per million people based on a lifetime (70-year) exposure to the annual average concentration. It reflects only those compounds listed in this table and only those with data for that year. There may be other significant compounds for which we do not monitor or have health risk information. Additional information about interpreting the toxic air contaminant air quality trends can be found in Chapter 1, Interpreting the Emission and Air Quality Statistics.
3. Diesel PM estimates are based on receptor modeling techniques, and the estimates are available only for selected years. Currently, the estimates are being reviewed.

[38] "Toxic Air Contaminant Emissions, Air Quality, and Health Risk," ARB Almanac, Ch. 5, California Air Resources Board (2009)

## 4.6.4 CRITERIA POLLUTANTS

The California Air Resources Board (CARB) operates several meteorological and air quality monitoring stations in the San Joaquin Valley area. **Tables 4.6-2** through **4.6-8** present the most recent summaries of the monitored air quality for ozone ($O_3$), Particulate Matter less than 10 microns in aerodynamic diameter ($PM_{10}$), Particulate Matter less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$), Carbon Monoxide (CO), and Nitrogen Dioxide ($NO_X$). No data is available for Sulfur Dioxide ($SO_2$), Lead (Pb), Hydrogen Sulfide ($H_2S$) or Vinyl Chloride ($C_2H_3Cl$) in Kern County. **Exhibit 4,** "SJVAPCD Monitoring Station Locations" shows the locations of the various monitoring stations in the area surrounding the SJVAB.

For the purposes of background data and air quality assessment, this analysis will rely on data collected in the past years for the CARB monitoring stations that are closest in proximity to the proposed development.

**TABLE 4.6-2**
**Background Ambient Air Quality Data for 1-Hour Ozone**

| CARB Air Monitoring Station | Number of Days* Exceeding 1-Hour NAAQS | | | Number of Days Exceeding 1-Hour CAAQS (0.09 ppm) | | | Maximum 1-Hour Concentration (ppm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2015 | 2016 | 2017 | 2015 | 2016 | 2017 | 2015 | 2016 | 2017 |
| Bakersfield – California Ave. | - | - | 0 | 6 | 0 | 11 | 0.104 | 0.092 | 0.122 |
| Bakersfield –Municipal Airport | - | - | - | 23 | 8 | 9 | 0..118 | 0.102 | 0.118 |

*NAAQS 1-Hour standard has been rescinded and replaced with an 8-Hour standard which is more restrictive.
- = No reported data

**TABLE 4.6-3**
**Background Ambient Air Quality Data for 8-Hour Ozone**

| CARB Air Monitoring Station | Number of Days Exceeding 8-Hour NAAQS (0.075 ppm) | | | Number of Days Exceeding 8-Hour CAAQS (0.070 ppm) | | | Maximum 8-Hour Concentration (ppm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2015 | 2016 | 2017 | 2015 | 2016 | 2017 | 2015 | 2016 | 2017 |
| Bakersfield – California Ave. | 28 | 30 | 47 | 54 | 63 | 87 | 0.097 | 0.086 | 0.104 |
| Bakersfield –Municipal Airport | 55 | 41 | 26 | 73 | 66 | 57 | 0.106 | 0.093 | 0.101 |

- = No reported data

**TABLE 4.6-4**
**Background Ambient Air Quality Data for $PM_{10}$ - National**

| CARB Air Monitoring Station | Annual Average (μg/m³) | | | Days Exceeding NAAQS (>150 μg/m³) | | | Maximum National 24-Hour Concentration NAAQS (150 μg/m³) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2015 | 2016 | 2017 | 2015 | 2016 | 2017 | 2015 | 2016 | 2017 |
| Bakersfield – California Ave. | 44.5 | 41.2 | 42.6 | 0 | 0 | 0 | 104.7 | 90.9 | 138.0 |
| Oildale – Manor Street | 36.5 | 41.6 | 19.3 | - | 0 | - | 98.5 | 89.1 | 59.4 |

- = No reported data

**TABLE 4.6-5**
**Background Ambient Air Quality Data for $PM_{10}$ - State**

| CARB Air Monitoring Station | Annual Average (μg/m³) | | | Days Exceeding CAAQS (>50 μg/m³) | | | Maximum California 24-Hour Concentration CAAQS (50 μg/m³) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2015 | 2016 | 2017 | 2015 | 2016 | 2017 | 2015 | 2016 | 2017 |
| Bakersfield – California Ave. | 44.1 | 40.9 | 42.6 | 121.4 | 121.4 | 98.7 | 103.6 | 92.2 | 143.6 |
| Oildale – Manor Street | - | - | - | - | - | - | 104.4 | 88.4 | 210.0 |

- = No reported data

**TABLE 4.6-6**
**Background Ambient Air Quality Data for $PM_{2.5}$**

| CARB Air Monitoring Station | Annual Average(μg/m³) | | | Days Exceeding NAAQS (>35 μg/m³) | | | Maximum 24-Hour Concentration NAAQS (35 μg/m³) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2015 | 2016 | 2017 | 2015 | 2016 | 2017 | 2015 | 2016 | 2017 |
| Bakersfield – California Ave. | 16.6 | 14.5 | 15.9 | 32.3 | 25.5 | 30.2 | 111.9 | 66.4 | 101.8 |
| Bakersfield – Golden St. Hwy. | 16.7 | 14.8 | 16.2 | 30.8 | 21.8 | 29.7 | 91.1 | 53.9 | 74.3 |

- = No reported data

**TABLE 4.6-7**
**Background Ambient Air Quality Data for $NO_X$**

| CARB Air Monitoring Station | Annual Average (0.03 ppm) | | | Days Exceeding CAAQS (0.18 ppm) | | | Maximum 1-Hour Concentration CAAQS (0.18 ppm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2010 | 2011 | 2012 | 2010 | 2011 | 2012 |
| Bakersfield – California Ave. | 0.014 | 0.015 | 0.015 | 0 | 0 | 0 | 0.079 | 0.064 | 0.064 |
| Bakersfield – Golden St. Hwy. | 0.019 | - | - | 0 | - | - | 0.033 | - | - |

- = No reported data

**TABLE 4.6-8**
**Background Ambient Air Quality Data for CO**

| CARB Air Monitoring Station | Days Exceeding NAAQS (>9.0 ppm) | | | Days Exceeding CAAQS (>9.0 ppm) | | | Maximum 8-Hour Concentration NAAQS (9.0 ppm) CAAQS (9.0 ppm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2008 | 2009 | 2010 | 2008 | 2009 | 2010 | 2008 | 2009 | 2010 |
| Bakersfield – Golden State Hwy. | 0 | 0 | 0 | 0 | 0 | 0 | 2.17 | 1.51 | 1.34 |

**Existing Conditions at Project Site**
The project site is located within the City of Bakersfield. No onsite data exists for criteria pollutants or toxics. However, using the highest background concentration from the surrounding monitors over the past years will liberally represent the background concentrations at the site.

# 5 THRESHOLDS OF SIGNIFICANCE

**Criteria Pollutants**

For the purposes of this air quality analysis and consistent with SJVAPCD guidance documents,[39] actions that violate federal standards[40] for criteria pollutants (i.e., primary standards designed to safeguard the health of people considered to be sensitive receptors while outdoors and secondary standards designed to safeguard human welfare) are considered significant impacts. Additionally, actions that violate state standards developed by the California Air Resources Board (CARB) or criteria developed by the SJVAPCD including thresholds for criteria pollutants are considered significant impacts.[41] Projects that would generate 10 tons per year of either ROG or $NO_X$ are considered to have a potentially significant air quality impact.[42,43] This includes both direct and indirect emissions combined.

**Visibility** [44]

The California State Ambient Air Quality Standard for Visibility Reducing Particles (VRP) represents a policy judgment that a certain minimum degree of visibility is conducive to public welfare, regardless of location. This policy is manifested as a State wide minimum dry air particle extinction limit of 0.23/km (230 $Mm^{-1}$) averaged from 9 AM to 5 PM (PST) when Relative Humidity (RH) is less than 70 percent. This is roughly equivalent to $V_r$= 10 miles. The standard is 0.07/km (70$Mm^{-1}$) for the Lake Tahoe Air Basin (roughly equivalent to $V_r$ – 30 miles). Equivalent $PM_{10}$ concentrations when this standard is just met range from about 50µg/$m^3$ for a fine particle dominated urban setting (e.g., Sacramento in the winter) to 90 or more µg/$m^3$ for a mixture of coarse and fine particles (e.g., Central Valley summer). The Lake Tahoe VRP limit equates to $PM_{10}$ concentrations ranging from about 16 to 25 µg/$m^3$ over a similar range of aerosol characteristics.

**Health Risk-Based Thresholds** [45,46]

The California Office of Environmental Health Hazard Assessment (OEHHA) is responsible for setting health risk thresholds for air toxics. These thresholds include Reference Exposure Levels (RELs) for non-carcinogenic toxins that pose potential acute and/or chronic health risks and Unit Risk Factors (URFs) for carcinogens. The RELs and URFs represent exposure levels that OEHHA deems not likely to cause adverse effects in a human population, including sensitive receptors.

[39] SJVAPCD Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI), March 19, 2015 Revision
[40] Federal Clean Air Act, as amended (42 U.S.C. 7401 et seq.)., Title I – Air Pollution Control and Prevention.
[41] California Health and Safety Code, Division 26, Air Resources §39000 et seq.
[42] California Health and Safety Code, §40920.
[43] San Joaquin Valley Air Pollution Control District Rule 2201, §4.2.3.
[44] Cal EPA Air Resources Board and Office of Environmental Health Hazard Assessment, Staff Report: Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates; May 2003.
[45] See GAMAQI and OEHHA, Air Toxics “Hot Spots” Program.
[46] Cal EPA Air Toxics Hot Spots Program Risk Assessment Guidelines, Guidance Manual, and Part II: Technical Support Document for Describing Available Cancer Potency Factors.

These thresholds are based on the most recent scientific data and are designed to protect the most sensitive individuals in the population by inclusion of margins of safety. The thresholds approved by the SJVAPCD are a potential to increase cancer risk for the person with maximum exposure potential by 20 in one million or a non-cancer Hazard Index greater than 1 for both acute and chronic exposure.

There are no thresholds of significance for Valley Fever that have been adopted by the state or by the County of Kern. However, the likelihood of its occurrence can be determined based on the proposed project location.

**Odor-based Thresholds** [47]

Projects that would potentially generate objectionable odorous emissions proposed to locate near existing sensitive receptors or other land uses where people may congregate could constitute a significant air quality impact to existing uses. Also, residential or other sensitive receptor projects built for the intent of attracting people locating near existing odor sources could also cause a significant air quality impact for the proposed uses. The SJVAPCD suggests a threshold based on the distance of the odor source from the project and complaint records for a facility or similar facility. If there is one confirmed complaint per year averaged over a three-year period, or three unconfirmed complaints per year averaged over a three-year period[48], the odor impact is considered significant.

The air contaminants which may be emitted at the proposed project have no known odors associated with them.

**Construction Specific Thresholds** [49]

The SJVAPCD approach to analyses of construction impacts is to require implementation of effective and comprehensive control measures rather than to require detailed quantification of emission concentrations for modeling of direct impacts. $PM_{10}$ emitted during construction can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors, making quantification difficult. Despite this variability in emissions, experience has shown that there are a number of feasible control measures that can be reasonably implemented to significantly reduce $PM_{10}$ emissions from construction. The SJVAPCD has determined that compliance with Regulation VIII for all sites and implementation of all other control measures indicated in Tables 6-2 and 6-3 of the GAMAQI (as appropriate, depending on the size and location of the project site) could constitute sufficient mitigation to reduce non-exhaust specific fugitive emission impacts to a reduced level of significance. Additionally, SJVAPCD has adopted Rule 9510, the Indirect Source Review Rule, which is designed to reduce the construction $PM_{10}$ by 50% and the construction $NO_X$ by 20%.

Certain mitigation measures will be required during the construction phase of the project as described in Section 6. Implementation of these mitigation measures could assist in the reduction of the project's construction emissions to a level that is below significance according to the SJVAPCD. The project specific construction emissions were quantified, modeled, and compared along with the operational emissions against the NAAQS and CAAQS in order to determine local impact significance.

[47] GAMAQI. March 19, 2015 Revision
[48] Ibid
[49] See GAMAQI and district recommendations at http://www.valleyair.org/.

**General Thresholds** [50]

As provided in CEQA, CEQA states that a project could have a potentially significant air quality impact on the environment if it would:

- Conflict with or obstruct implementation of air quality plans;
- Violate ambient air quality standards or contribute to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under Federal or State standards;
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors.

# 6 PROJECT IMPACTS

The Project Specific Impact Analyses are broken into the following sub elements:

- Criteria Pollutants impact
- Visibility Impacts
- Public Health/Hazards Impacts
- Mobile Source – Carbon Monoxide Hotspot Impacts

The Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI) considers construction emissions (short term emissions) and operational emissions (long term emissions) separately.

**CalEEMod** [51] **and GAMAQI** [52]

For this project, California Emissions Estimator Model (CalEEMod) is used to estimate the criteria pollutant emissions for both construction and operation.

Construction emissions are considered short-term impacts and are temporary in nature. CalEEMod estimates construction related emission based on the size of the project, construction time, and construction equipment etc.

CalEEMod operational emissions are comprised of two separate sources: area and mobile sources. Area sources generate emissions from activities like space heating and landscape maintenance while mobile sources result from vehicular travel with vehicles travelling throughout the city and county. These emissions are calculated for the build out period and take into account future fleet mixes and emission controls.[53] Emissions from area sources and mobile sources are depicted as long-term impacts.

CalEEMod typically analyzes construction and operational emissions separately. For project build-outs longer than 5 years, an interim year analysis is recommended by GAMAQI.[54]

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50 CEQA Guidelines.

51 California Emissions Estimator Model, developed by ENVIRON International Corporation with SCAQMD and other California Districts

52 GAMAQI. March 19, 2015 Revision

53 Used SJVAPCD residential fleet mix. https://www.valleyair.org/ISR/Documents/Accepted%20URBEMIS%20default%20values%20012909.xls

54 GAMAQI. March 19, 2015 Revision

CalEEMod was developed to provide meaningful analysis of both short and long term urban impacts, and to encourage mitigations such as trip reduction during project planning. Discrete CalEEMod analysis is limited to annual periods. GAMAQI recommends that the short-term construction output from the model not be combined with the operational model without creating a new combinatorial model. CalEEMod uses a simplified set of emission factors to estimate impacts separately for predetermined construction periods and for operational periods as independent events and does not factor in: small discrete periods of project overlap, incremental periods smaller than one year, individual build out rates for each particular element of construction, schedule utilization of individual pieces of equipment, pro-ration for occupancy rate, retrofit technology over the life of equipment, pollutant reactivity, pollutant transport, adjustments for construction program constraints due to localized conflicts between both resident's quiet enjoyment and the construction effort. Other than the Conformity Analysis discussed below, no models have been developed that can reliably perform these adjustments. CalEEMod results are provided in quantity form, i.e., tons/year. This model is used for project related impacts analysis.

Where site specific or project specific data was available, CalEEMod 2016.3.2 factors were modified to fit with the information. Where little or no information was available for a project, default values were selected.

## 6.1 PROJECT SHORT-TERM EMISSIONS

Short-term impacts from the project will primarily result in fugitive particulate matter emissions during construction. Grading, excavation, trenching, filling, and other construction activities result in increased dust emissions. Regulation VIII of the San Joaquin Valley Air Pollution Control District specifies control measures for specified outdoor sources of non-exhaust specific fugitive particulate matter emissions. Rule 8011 contains administrative requirements, Rule 8021 applies to construction activities, and Rule 8071 applies to vehicle and equipment parking, fueling, and service areas. The San Joaquin Valley Air Pollution Control District does not require a permit for these activities, but does impose measures to control fugitive dust, such as the application of water or a chemical dust suppressant.

SJVAPCD's *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI), does not necessarily require a quantification of construction emissions for all projects. Quantification is generally only required at the request of the lead agency. In general, the SJVAPCD assumes that implementation of these measures will bring the construction impacts to a reduced level of significance. For this project, the construction emissions were quantified in order to demonstrate that the impacts from the project would be below the applicable thresholds.

Construction will also result in exhaust emissions (not reduced by District Regulation VII) from diesel-powered heavy equipment. Exhaust emissions from construction include emissions associated with the transport of machinery and supplies to and from the site, emissions produced onsite as the equipment is used and emissions from trucks transporting excavated materials from the site and fill soils to the site. Examples of these emissions include CO, ROG, $NO_X$, and $PM_{10}$.

Exhaust emission factors for typical diesel-powered heavy equipment are based on U.S. EPA AP-42 emissions factors. Actual exhaust emissions will vary substantially from day to day. Numerous variables factored into estimating total construction emissions include: level of activity, length of construction period, number of pieces and types of equipment in use, site characteristics, weather conditions, number of construction personnel, and amount of materials to be transported onsite or offsite. Additional exhaust emissions would be associated with the transport of workers and materials. Because the specific mix of construction equipment in a build-out period is not presently known for this project, specific equipment emissions on a yearly basis are estimated.

Using the emissions rates from CalEEMod Version 2016.3.2 and the recommended construction fleet provided in **Appendix I** "San Joaquin Valley Air Pollution Control District's Recommended Vehicle Fleet," the construction emissions for this project were quantified. The table below shows the annual construction emissions after mitigation.

**TABLE 6.1-1**
**Construction Related Emissions (tons/year)**

| Year | ROG | $NO_X$ | CO | SOx | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| 2020 | 0.2616 | 2.3863 | 1.9501 | 0.00433 | 0.2253 | 0.1433 |
| 2021 | 0.3767 | 0.1209 | 0.1414 | 0.00024 | 0.00921 | 0.00677 |
| Maximum | 0.3767 | 2.3863 | 1.9501 | 0.00433 | 0.2253 | 0.1433 |

No mitigation measures are used in the CalEEMod modeling pertaining to the construction.

The San Joaquin Valley Air Basin is designated non-attainment for particulates for both state and federal standards. Although the proposed land uses are not considered a potential source for significant particulate emissions, fugitive particulate emissions will occur during construction. Control measures are required and enforced by the San Joaquin Valley Air Pollution Control District under Regulation VIII. As stated in GAMAQI, the SJVAPCD guidance document, implementation of these control measures will result in short-term emissions that are lower in level of significance or considered *less than significant*. The following three rules related to fugitive dust control may apply to this project:

Rule 8011 Fugitive dust administrative requirements for control of fine particulate matter.

Rule 8021 Fugitive dust requirements for control of fine particulate matter from construction, demolition, excavation, extraction, and earthmoving activities.

Rule 8071 Fugitive dust requirements for control of fine particulate matter from vehicle and/or equipment parking, shipping, receiving, transfer, fueling and service areas one acre or larger.

In addition, the project should include the following as requirements of the local municipal code:

> Water sprays or chemical suppressants must be used in all unpaved areas to control fugitive emissions. All access roads and parking areas must be covered with asphalt-concrete paving.

Compliance with Regulation VIII of the San Joaquin Valley Air Pollution Control District and the local municipal code would reduce particulate emission impacts to reduced levels of significance or *less than significant*.

## 6.2 PROJECT LONG-TERM EMISSIONS

Long-term emissions are caused by mobile sources (vehicle emissions), stationary source, and other area source energy consumption (heating and cooling) emissions. The major long-term impacts to air quality would be emissions caused by motor vehicles traveling to and from the area.

### Operational Emissions Quantification

The proposed project operational emissions would be generated by area sources and mobile sources as a result of normal day-to-day activities on the project site after occupation. These emissions would be generated during the operation of landscape maintenance equipment, and from consumer products. Mobile emissions would be generated by the motor vehicles traveling to and from the project site, including heavy-duty diesel trucks.[55]

### Area Source Emissions

The area source emissions have been quantified utilizing the CalEEMod Version 2016.3.2 computer model. This model is a land use and transportation based computer model designed to estimate regional air emissions from new development projects. While previous versions were only designed to estimate emissions from motor vehicle trips, CalEEMod Version 2016.3.2 can estimate emissions from such sources as gas heaters, furnaces or blowers, and landscape maintenance equipment. The model accounts for specific meteorological conditions and topography that characterize each specific air basin in California.

The CalEEMod inputs and outputs along with the assumptions and CalEEMod default changes are provided in **Appendix I** "CalEEMod Specific Inputs and Outputs."

The project area source emissions for the year 2021 are presented in **Table 6.2-1**.

**TABLE 6.2-1**
**Project Area Source Emissions by Sub Category (tons/year)**

| Category | ROG | $NO_X$ | CO | $PM_{10}$ | $PM_{2.5}$ | $SO_X$ |
|---|---|---|---|---|---|---|
| Architectural Coating | 0.3594 | - | - | - | - | - |
| Consumer Products | 0.1958 | - | - | - | - | - |
| Landscaping | 0.00029 | 0.00003 | 0.00311 | 0.00001 | 0.00005 | - |

### Mobile Source Emissions

Build-out of the proposed project will result in increased vehicle trips in the San Joaquin Valley. The vehicles associated with these trips will emit criteria pollutants including $NO_X$ and ROG, which are considered ozone precursors. Kern County is a non-attainment area for federal air quality standards for ozone and particulates. Nitrogen oxides and reactive organic gases are regulated as ozone precursors. A precursor is defined by the SJVAPCD as "a directly emitted air contaminant that, when released into the atmosphere forms or causes to be formed or contributes to the formation of a secondary air contaminant for which an ambient air quality standard has been adopted…"

The SJVAPCD regulates air quality in Kern County. The predicted emissions associated with vehicular traffic (mobile sources) are not subject to the SJVAPCD permit requirements. However, the SJVAPCD is responsible for overseeing efforts to improve air quality within the San Joaquin Valley. The SJVAPCD has prepared an Air Quality Attainment Plan to bring the San Joaquin Valley into compliance with the California Ambient Air Quality Standard for ozone. The SJVAPCD reviews

[55] Jones and Stokes, Software User's Guide; CalEEMod 2016.3.2, Emission Estimation for Land Use Development Projects, November 2017.

land use changes to evaluate the potential impact on air quality. The SJVAPCD has established a significance level for ROG and $NO_X$ of 10 tons per year each and 15 tons per year for $PM_{10}$.[56] US EPA has recommended the use of the $PM_{10}$ standards as the interim standard for $PM_{2.5}$.

Vehicle emissions have been estimated using the CalEEMod Version 2016.3.2 computer model. CalEEMod predicts carbon monoxide, reactive organic gases, nitrogen oxides, oxides of sulfur, and particulate matter emissions from motor vehicle traffic associated with new or modified land uses. Trip generation rates were obtained from the traffic study provided by Ruettgers & Schuler Civil Engineers (see **Appendix II** "Traffic Study"). Average trip length was calculated from intersection traffic volumes obtained from projections in the traffic study. The modeling results can be viewed in **Appendix I** "Project Specific CalEEMod Inputs and Outputs".

The project mobile source emissions and the total operational Emissions are presented in **Table 6.2-2** and **6.2-3** respectively.

**TABLE 6.2-2**
**Project Mobile Source Emissions (tons/year)**

| | ROG | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| Unmitigated | 1.2804 | 3.1873 | 5.9318 | .00953 | 0.4945 | 0.1397 |
| Mitigated | 1.2804 | 3.1873 | 5.9318 | .00953 | 0.4945 | 0.1397 |

**TABLE 6.2-3**
**Mitigated Operational Emissions by Category (tons/year)**

| Category | ROG | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| Area | 0.2321 | .00003 | .00311 | - | .00001 | 0.00001 |
| Energy | 0.0072 | 0.0654 | 0.0550 | 0.00039 | 0.00497 | 0.00497 |
| Mobile | 1.2804 | 3.1873 | 5.9318 | 0.00953 | 0.4945 | 0.1397 |
| Waste | - | - | - | - | - | - |
| Water | - | - | - | - | - | - |

The construction and operation were assumed to occur in the same year. The project maximum emissions occur in year 2022 and the results are shown in **Table 6.2-4.**

**TABLE 6.2-4**
**Total Project Maximum Year Emissions 2021 (tons/year)**

| Project | ROG | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| Construction Emissions | 0.3767 | 2.3863 | 1.9501 | 0.00433 | 0.2253 | 0.1433 |
| Operational Emissions | 1.5197 | 3.2527 | 5.9899 | .00992 | 0.4995 | 0.1447 |
| **Total Emissions-Mitigated** | **1.8964** | **5.639** | **7.94** | **0.01425** | **0.7248** | **0.288** |
| **SJVAPCD Level of Significance** | **10** | **10** | **100** | **27** | **15** | **15*** |

*USEPA specified interim use of $PM_{10}$ threshold for $PM_{2.5}$

[56] GAMAQI. March 19, 2015 Revision

None of the predicted criteria emissions exceed the applicable significance level. Therefore, the impacts from project sources are considered to be *less than significant*.

**Ambient Air Quality Modeling-Construction Phase**
Emissions from construction operations were modeled using AERMOD and the San Joaquin Valley approved meteorological data for the years of 2013 to 2017, to investigate the impact of the project (**Appendix III** "AERMOD Criteria Pollutant Impacts). The maximum impacts from the models are shown in **Table 6.2-5.**

**TABLE 6.2-5**
**Project Criteria Pollutant[57] Impact Model Results**
**Construction Impacts**

| Pollutant | Averaging period | Project Impact ($\mu g/m^3$) | PSD SIL ($\mu g/m^3$) | NAAQS ($\mu g/m^3$) | CAAQS ($\mu g/m^3$) |
|---|---|---|---|---|---|
| $NO_X$ | 1 – hour[58] | 178.7726 | | 188 | 339 |
| | Annual | 10.35834 | | | |
| $SO_X$ | 1-hour | 0.25241 | -- | 196 | 655 |
| | 3-hour | 0.13881 | -- | 1,300 | -- |
| | 24-hour | 0.05075 | -- | 365 | 105 |
| | Annual | 0.01463 | | | |
| CO | 1-hour | 151.5479 | -- | 40,000 | 23,000 |
| | 8-hour | 55.32913 | -- | 10,000 | 10,000 |
| $PM_{10}$ | 24-hour | 3.62515 | 5 | 150 | 50 |
| | Annual | 1.04478 | 1 | | |
| $PM_{2.5}$ | 24-hour | 2.64556 | 5 | 35 | -- |
| | Annual | 0.76242 | 1 | 15 | 12 |

The maximum predicted impacts were compared to the California and National Ambient Air Quality Standards (CAAQS and NAAQS) and PSD SIL. The short term impacts from construction of the project are below the applicable standards, therefore, the impacts are considered *less than significant*.

**Ambient Air Quality Modeling-Operation Phase**
There are no potential stationary sources in the project; therefore ambient air impact modeling for operations of stationary source is not modeled.

[57] No hydrogen sulfide, vinyl chloride, or $SO_X$ is expected to be emitted from the proposed facility during construction and therefore was not modeled or listed in this table
[58] Tier-I approach was used to compare with the new Federal one-hour NOx standard. Project's maximum 1 hour modeling concentration was combined with the background for the nearest monitoring site (California Avenue)

## 6.3 VISIBILITY IMPACTS

An analysis was conducted of the potential project-related impacts to visibility, including Class I areas[59] located within 100 kilometers of the project site (**Exhibit 5**, "Site Location-100 Kilometer Radius"). The following section describes the analysis methodology and results.

**Models and Modeling Techniques**

The U.S.EPA model VISCREEN was used with default screening values to estimate impacts to visibility at the Class I areas nearest to the project site. There are two Class I areas located within an approximate 100-kilometer boundary that are administrated by National Park Service (NPS): Domeland Wilderness Area and San Rafael Wilderness Area.

Historically, a representative of NPS, as well as meteorologists at the military site, were contacted for guidance regarding the Air Quality Related Values (AQRVs) of the Class I areas. Additionally, two guidance documents, *Guidelines for Evaluating Pollution Impacts on Class I Wilderness Areas in California*[60], and *Assessment of Air Quality and Air Pollutant Impacts in Class I National Parks of California*[61], were used in this analysis.

**TABLE 6.3-1**
**Class I Areas in the Vicinity of the Project**

| | PSD Class | Administering Agency |
|---|---|---|
| **National Parks/Monuments** | | |
| Domeland Wilderness | I | NPS |
| San Rafael Wilderness | I | NPS |

VISCREEN uses two scattering angles to calculate potential plume visual impacts for cases where the plume is likely to be the brightest (i.e. 10 degree azimuth for the forward scatter case) and the darkest (i.e. 140 degree for the backward scatter case). The forward scatter case produces a very bright plume when the sun is placed directly in front of the observer, while the backward scatter case produces a dark plume when the sun is directly behind the observer. For viewing backgrounds, the terrain is assumed to be black and located as close to the observer and the plume as possible. This assumption yields the darkest possible background against which plumes are the most likely to be visible. However, actual viewing backgrounds would be much lighter and located much further away from the observer.

Distances from each site to the closest and most distant borders, as well as the standard visual range of each Class I area evaluated are presented in **Table 6.3-2** below.

**TABLE 6.3-2**
**Distances and Visual Ranges for Nearby Class I Areas**

| | Distance to Closest Boundary (km) | Distance to Farthest Boundary (km) | Standard Visual Range (km) |
|---|---|---|---|
| **National Parks/Monuments** | | | |
| San Rafael Wilderness | 94 | 121 | 243 |
| Domeland Wilderness | 68.4 | 101 | 249 |

[59] Lands designated as ***Class I Areas*** under the Clean Air Act Amendments of 1977 are afforded the highest level of protection from air pollutants in the nation. These lands consist of national wildernesses (Forest Service), parks (National Park Service) and wildlife refuges (U.S. Fish & Wildlife Service) in existence at the time the amendment was passed (http://www.fs.fed.us/outernet/r6/aq/natarm/c1info.htm).

[60] USDA Forest Service, Guidelines for Evaluating Pollution Impacts on Class I Wilderness Areas in California.

[61] National Park Service, Assessment of Air Quality and Air Pollutant Impacts in Class I National Parks of California.

### Level 1 Screening Analysis Results

A Level 1 screening analysis of the visibility impacts was conducted using the default settings as indicated in **Table 6.3-3**.

**TABLE 6.3-3**
**Level 1 Default VISCREEN Settings**

| Transport Scenario Specifications | | |
|---|---|---|
| Plume–Source–Observer Angle | 11.25 | degrees |
| Stability Class | 6 (F) | |
| Wind Speed | 1.00 | m/s |
| **Ambient Pollutant Concentrations** | | |
| Ozone | 0.04 | ppm |
| **Particle Characteristics** | | |
| **Particle Type** | **Mass Flow (lb/hr)** | |
| Primary ($NO_2$) | 0.0 | |
| Soot | 0.0 | |
| Sulfate | 0.0 | |

The Level 1 analysis was conducted using pollutant emissions presented in **Table 6.2-1**. In accordance with U.S.EPA VISCREEN guidance, primary $NO_2$ was assumed to be zero, while $PM_{10}$ emissions from diesel combustion sources were assumed to be particulate. The VISCREEN results are presented in **Appendix IV**, "Project Specific U.S.EPA VISCREEN Model Results."

The emission rates used in the VISCREEN model are based on the area source emissions. The indirect source operational emissions will not occur onsite and therefore cannot contribute to a visible plume originating from the site. Since the sources onsite will be spread out and will not contribute to a single plume, like the one being considered in the model, the analysis is liberal.

**TABLE 6.3-4**
**Level 1 Visibility Screening Analysis**
**Worst–Case Facility Emissions Inputs**

| Pollutant | Emissions (tons/yr) |
|---|---|
| Particulate | 0.00008 |
| $NO_X$ (as $NO_2$) | 0.00049 |
| Primary $NO_2$ | 0.00 |
| Soot | 0.00 |
| Primary $SO_4$ | 0.00 |

**TABLE 6.3-5**
**Level 1 Results for the Project at San Rafael Wilderness**
**Screening Criteria INSIDE Class I Area ARE NOT Exceeded**

| Back ground | Theta | Azimuth | Distance | Alpha | Delta E Criteria | Delta E Plume | Contrast Criteria | Contrast Plume |
|---|---|---|---|---|---|---|---|---|
| Sky | 10 | 136 | 121 | 32 | 2 | 0.000 | 0.05 | 0.000 |
| Sky | 140 | 136 | 121 | 32 | 2 | 0.000 | 0.05 | 0.000 |
| Terrain | 10 | 136 | 121 | 32 | 2 | 0.000 | 0.05 | 0.000 |
| Terrain | 140 | 136 | 121 | 32 | 2 | 0.000 | 0.05 | 0.000 |

**TABLE 6.3-6**
**Level 1 Results for the Project at Domeland Wilderness**
**Screening Criteria INSIDE Class I Area ARE NOT Exceeded**

| Back ground | Theta | Azimuth | Distance | Alpha | Delta E Criteria | Delta E Plume | Contrast Criteria | Contrast Plume |
|---|---|---|---|---|---|---|---|---|
| Sky | 10 | 147 | 101 | 21 | 2 | 0.000 | 0.05 | 0.000 |
| Sky | 140 | 147 | 101 | 21 | 2 | 0.000 | 0.05 | 0.000 |
| Terrain | 10 | 147 | 101 | 21 | 2 | 0.000 | 0.05 | 0.000 |
| Terrain | 140 | 147 | 101 | 21 | 2 | 0.000 | 0.05 | 0.000 |

It can be seen from the results that the proposed project will not exceed the standards for visibility at sensitive receptors within 100 km.

Visibility was evaluated in proximity to the project in accordance with the California visibility standard.[62] The California Ambient Air Quality Standard for Visibility Reducing Particles policy is a statewide minimum dry air particle extinction limit of 0.23/km averaged from 9 a.m. to 5 p.m. (PSI) when relative humidity is less than 70 percent. Equivalent $PM_{10}$ concentrations when this standard is just met range from about 50µg/m$^3$ for a fine particle dominated setting (e.g. Sacramento in winter) to 90 or more µg/m$^3$ for a mixture of coarse and fine particles (e.g. Central Valley summer). The maximum modeled $PM_{10}$ project impact is shown on **Table 6.2-5**. This impact is less than the 90 µg/m$^3$ limit, therefore is considered to be *less than significant*.

## 6.4 PROJECT SPECIFIC PUBLIC HEALTH/HAZARDS IMPACTS

### 6.4.1 HEALTH RISK ASSESSMENT

**Toxic Air Contaminants**

The analysis is used to determine if the operation of the project would have a significant health risk on the nearby sensitive receptors. The toxic air containments for each source are located in **Appendix V** "AERMOD/HARP Health Risk Impacts"**.**

**Health Risk to the Project from Existing Industrial Activities**

The project site does not contain existing oil production facilities. The project is located in an area that includes a mixture of suburban developments and agricultural land in the southwestern portion of the City of Bakersfield. The subject property is bordered to the north and east sides by suburban residences, which make up most of the sensitive receptors. Residential properties continue northeast from the project, including schools. Agricultural land makes up the majority of the surrounding land moving counterclockwise from the northwest to the southeast. There are no industrial projects within a close radius of the project which may significantly impact the project's sensitive receptors.

**Health Risk Analysis of Operation of the Project on Existing Sensitive Receptors**

The SJVAPCD identifies a sensitive receptor as a location where human populations, especially children, senior citizens, and sick persons, are present, and where there is a reasonable expectation of continuous human exposure to pollutants, according to the averaging period for ambient air quality standards, such as 24-hour, 8-hour or 1-hour. Examples of sensitive receptors include

[62] Cal EPA, Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates, 2003 .

residences, hospitals, and schools.[63] Industrial and commercial uses are not considered sensitive receptors.

**Exposure Assessment**[64]

The purpose of the exposure assessment is to estimate the extent of public exposure to each substance for which cancer risk will be quantified or non-cancer effects evaluated. This involves emission quantification, modeling of environmental transport, evaluation of environmental fate, identification of exposure routes, identification of exposed populations, and estimating short-term and long-term exposure levels.

**Emissions Quantification**

For this risk assessment, air toxics emissions from the project were quantified based on the design specifications described above, and analytical sample analyses. Emission estimates were based on hourly and annual emission calculations.

Peak hourly emissions are in units of grams per second (g/s).

Annual emissions (g/s) = (Peak Hourly - g/s) x Operating Schedule (hr/day) x days per year (day/yr) / (8,760 hr/yr)

This results in an annualized emission rate of the pollutant expressed on a short-term basis.

**Modeling of Environmental Transport**

The Hot Spots Analysis and Reporting Program - Version 17052[65] (HARP-2) model was utilized for the air toxics exposure assessment. HARP is a computer software package that combines the tools of emission inventory database, facility prioritization calculation, air dispersion modeling, and risk assessment analysis. All of these tools are tied to a single database allowing information to be shared and utilized.
Model control parameters were identical to those utilized for the criteria pollutant impact analysis described above.
AMS/EPA Regulatory Model Improvement Committee, AERMIC Model (AERMOD) atmospheric dispersion model is used for modeling the potential impacts of area sources in simple (i.e., flat) and complex (i.e., hilly) terrain. This program uses Gaussian dispersion to determine concentration of pollutants from sources. It is an accepted mathematical estimate of pollutant levels based on distance from a point source and physical conditions of equipment, site and weather conditions. The model is limited to approximately a 50 kilometer radius; however this analysis reports the impacts at their maximum location. The units of output are micrograms per cubic meter. This model is used for both project specific long term and short term impacts and cumulative impacts.

**Identification of Exposure Routes**

The exposure analysis included the five pathways including those recommended by the OEHHA (inhalation, dermal exposure, soil ingestion, and mother's milk) and homegrown produce.

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[63] GAMAQI. March 19, 2015 Revision

[64] U.S. EPA, User's Guide for the Industrial Source Complex (ISC3) Dispersion Models, EPA-454/B-95-003a and EPA-454/B-95003b, including Addendum dated 2002.

[65] California ARB 'Air Dispersion Modeling & Risk Tool' (HARP-2) latest update February 21, 2017.

**Identification of Exposed Populations**
For this assessment, the entire surrounding area within a two (2) kilometer radius was reviewed for potential sensitive receptors. There are residences bordering the north, south, and west of the project, continuing out within a two-kilometer radius. Receptors were placed in an appropriate polar grid, decreasing in density with increasing distance from the project site encompassing all of the residences. All potential existing sensitive populations to include residences, schools, hospitals, churches, etc. were screened. The receptor grid does not represent actual persons, but rather, was utilized to determine the locality of the maximum predicted impacts to neighboring receptors.
For individual worker related receptors, a 25-meter spaced grid was used over each property.

**Estimated Short- and Long-Term Exposure Levels**
The HARP-2 model was used to estimate the acute non-carcinogenic health risk impacts of the project. HARP-2 is a multi-source, multi-pollutant, multi-pathway risk assessment model.

**Risk Characterization**
Risk characterization is the process of evaluating the risks due to facility emissions. As explained above, the HARP-2 model calculates the estimated cancer and non-cancer health risk based on the predicted short-term and long-term exposure levels for each air toxic at each model receptor. This section presents the total predicted individual cancer risk for residential and working populations and the total population excess cancer burden. It also evaluates the predicted non-cancer health hazards from the proposed project.
CARB generally considers a potential cancer risk of twenty in a million (i.e., $20 \times 10^{-6}$) as significant. For acute or chronic non-cancer health impacts, the significance threshold is 1.0.

| | |
|---|---|
| Excess Cancer Risk: | $20.0 \times 10^{-6}$ |
| Non-Cancer Health Hazard Indices: | 1.0 |

**Construction & Operation Direct Toxic Impacts**
Health risk analysis was performed for the construction and operational phases of the project. The area of the project was modeled as a source of emission and the District approved modeling guidance was used for operational truck travel. The maximum annual diesel particulate matter emission from construction and operational activities was used to estimate the health impacts.

**Cancer Impacts**
The total individual excess cancer risk is defined as the cancer risk a hypothetical individual faces if exposed to carcinogenic emissions from a particular facility continuously, 24 hours a day, 261 days a year, for the four year life of the project. This risk is defined as an excess risk because it is above and beyond the background cancer risk to the population.
Since the modeled maximum cancer risk is lower than the 20E-06 threshold, the impact is considered *less than significant*. Regarding the worker screening; there were no apparent worker receptors in the area, therefore, the entire two-kilometer radius was treated as being all sensitive receptors. Therefore, the entire area was screened in the most stringent possible way with the Health Risk Analysis model (70-year exposure with full time screening at each receptor). The detailed model results are contained in **Appendix V**.
The health risk associated with these criteria pollutant impacts are discussed in **Section 3.2,** "Description of Pollutants."

**TABLE 6.4-1**
**Maximum Exposed Residential & Worker Receptors**
**Cancer Risk**

**Residential Receptor**

| Emissions Source | # | UTM Easting (meters) | UTM Northing (meters) | Maximum Risk* |
|---|---|---|---|---|
| Construction | 348 | 311376.6 | 3904736 | 5.52E-07 |
| Operation | 973 | 311319.6 | 3904669 | 4.40E-07 |
| | | | **Cumulative Risk:** | 9.92E-07 |

**Worker Receptor**

| Emissions Source | # | UTM Easting (meters) | UTM Northing (meters) | Maximum Risk* |
|---|---|---|---|---|
| Construction | 574 | 311462.4 | 3904648 | 1.11E-08 |
| Operation | 567 | 311319.6 | 3904669 | 2.76E-08 |
| | | | **Cumulative Risk:** | 3.87E-08 |

* 2 year construction period screening beginning at the earliest possible age group: third trimester

Since the modeled maximum cumulative cancer risk is lower than the 20E-06 threshold, the impact is considered *less than significant*. Regarding the worker screening; there were no apparent worker receptors in the area, therefore, the entire two-kilometer radius was treated as being all sensitive receptors. Therefore, the entire area was screened in the most stringent possible way with the Health Risk Analysis model (70-year exposure with full time screening at each receptor). The detailed model results are contained in **Appendix V**.

The health risk associated with these criteria pollutant impacts are discussed in **Section 3.2,** "Description of Pollutants."

**Chronic Non-Cancer Health Impacts**

Scientists at OEHHA have established No Adverse Effect Level (NAEL) concentrations for non-carcinogenic chemicals. In determining these thresholds, OEHHA has assumed continuous exposure, 24 hours a day, 365 days a year, with a 70-year exposure. According to OEHHA, exposure to non-carcinogens at or below the chronic NAEL will not result in adverse chronic non-cancer health effects to the public.

**TABLE 6.4-2**
**Maximum Exposed Residential & Worker Receptors**
**Chronic Non-Cancer Risk**

**Residential Receptor**

| Emissions Source | # | UTM Easting (meters) | UTM Northing (meters) | Maximum Risk* |
|---|---|---|---|---|
| Construction | 348 | 311376.6 | 3904736 | 6.21E-04 |
| Operation | 973 | 311319.6 | 3904669 | 1.36E-03 |
| | | | **Cumulative Risk:** | 1.98E-03 |

**Worker Receptor**

| Emissions Source | # | UTM Easting (meters) | UTM Northing (meters) | Maximum Risk* |
|---|---|---|---|---|
| Construction | 574 | 311462.4 | 3904648 | 8.56E-04 |
| Operation | 567 | 311319.6 | 3904669 | 1.36E-03 |
| | | | **Cumulative Risk:** | 2.22E-03 |

* 2 year construction period screening beginning at the earliest possible age group: third trimester

Since the modeled maximum cumulative chronic hazard index is lower than 1, the impact is considered *less than significant*. Similar to the cancer risk screening, there were no apparent worker receptors in the area, therefore, the entire two-kilometer radius was treated as being all sensitive receptors. Therefore, the entire area was screened in the most stringent possible way with the Health Risk Analysis model (70-year exposure with full time screening at each receptor). The model results are contained in **Appendix V**.

The health risk associated with these criteria pollutant impacts are discussed in **Section 3.2,** "Description of Pollutants."

**Acute Non-Cancer Health Impacts**
Scientists at OEHHA believe that one-hour average exposures at or below the acute NAEL will not result in acute adverse health effects to the public. OEHHA only considers the inhalation exposure pathway for acute health effects.

**TABLE 6.4-3**
**Maximum Exposed Residential & Worker Receptors**
**Acute Non-Cancer Risk**

**Residential Receptor**

| Emissions Source | # | UTM Easting (meters) | UTM Northing (meters) | Maximum Risk* |
|---|---|---|---|---|
| Construction | N/A** | N/A** | N/A** | N/A** |
| Operation | 973 | 311319.6 | 3904669 | 1.28E-03 |
| | | | **Cumulative Risk:** | 1.28E-03 |

**Worker Receptor**

| Emissions Source | # | UTM Easting (meters) | UTM Northing (meters) | Maximum Risk* |
|---|---|---|---|---|
| Construction | N/A** | N/A** | N/A** | N/A** |
| Operation | 567 | 311319.6 | 3904669 | 1.28E-03 |
| | | | **Cumulative Risk:** | 1.28E-03 |

* 2 year construction period screening beginning at the earliest possible age group: third trimester

** No detectible acute (non-cancer) health risk from diesel emissions during construction.

The toxic emissions from construction of the project involve diesel exhaust. Diesel exhaust does not have an acute Reference Exposure Limit (REL) for short term inhalation, therefore, construction acute non-cancer risk is not applicable. Since the modeled maximum cumulative chronic non-cancer hazard index is lower than 1, the impact is considered *less than significant*. The model results are contained in **Appendix V**.

The health risk associated with these criteria pollutant impacts are discussed in **Section 3.2,** “Description of Pollutants.”

**Uncertainty in Impact Assessment**[66]

Predictions of future health risks include substantial uncertainties. There are model and data uncertainties with respect to the assumed emissions, dispersion modeling and toxicological factors, and uncertainties with respect to the characteristics of the potentially exposed population. For example, possible exposure scenarios can be based on the assumption that a person resides in the same location for the average period in U.S. residency (approximately 9 years), or for the 90$^{th}$ percentile of residency (approximately 30 years), or for an entire lifetime (approximately 70 years). Further, that exposure may be assumed at the highest modeled concentration, or some average, or a modestly high concentration representative of the exposed population.

Because risk assessments are often performed to limit impacts to public health, the assumptions used in assessments are typically liberal in nature. The risk assessment methodology described above followed the CAPCOA and OEHHA guidelines, which are specified by regulators with a liberal bias. The following discussion provides qualitative assessments of the uncertainty associated with three major areas of the health risk assessment.

**Air Dispersion Modeling**

In general, U.S.EPA-approved dispersion models such as AERMOD tend to over-predict concentrations rather than under-predict. For example, the model algorithms assume chemical emissions are not transformed in the atmosphere into other chemical compounds. For certain pollutants, conversion may occur quickly enough to reduce concentrations from the liberal model predictions.

**Exposure Assessment**

The most important uncertainties related to exposure include the definitions of exposed populations and their exposure characteristics. The choice of a “residential” maximally exposed individual is very liberal in the sense that no real person is likely to spend 24 hours a day, 365 days a year over a 70-year period at exactly the point of highest toxicity-weighted annual average air concentration. The greatest true exposure is likely to be at least 10 times lower than that calculated for the maximum exposed individual (MEI).

**Toxicity Assessment**

The use of toxicity data in risk estimation is also uncertain. Estimates of toxicity for this risk assessment were obtained from the *Air Toxics Hot Spots Program Risk Assessment Guidelines* (OEHHA, 2015), which is among the most liberal compilations of toxicity information. Toxicity estimates are derived either from observations in humans or from projections derived from experiments with laboratory animals. Human data are obviously more relevant for health risk assessments, but are often uncertain because of: 1) difficulty of estimating exposures associated

[66] OEHHA, Air Toxics “Hot Spots” Program.

with the health effect of interest; 2) insufficient study populations; 3) relatively high occupational exposures (the source of human data) that are extrapolated and applied to low environmental exposures; or 4) variations in the susceptibility of different populations when compared to the population as a whole. Cancer risk coefficients from human data are typically considered proportional to pollutant concentration at any level of exposure (i.e., a linear, no-threshold model), which is liberal at low environmental doses. For non-cancer effects, the lowest exposure known to cause effects in humans is usually divided by uncertainty or safety factors to account for variations in receptor susceptibility and other factors. When toxicity estimates are derived from animal data, they usually involve extra safety factors to account for the possibility of greater sensitivity in humans, and the less-than-human-lifetime observations in animals. Overall, the toxicity assumptions and criteria used in the proposed project's risk assessment tend to over-estimate the risks.

**Odor Impacts**

Odor is strongest at its source and dissipates with increasing distance. The offensiveness and degree of odor is ultimately dependent on the sensitivity of the receptors exposed to the odor. Temperature, wind, dust conditions, topography, and the presence of physical obstructions affect the degree of odor impacts on nearby sensitive receptors. The maximum summer temperature in the southern San Joaquin Valley is above 90ºF (**Table 3.1-1**). Odor compounds travel further in warm climates than in relatively cooler climates. During windy conditions, odor compounds are diluted with fresh air and, consequently, disperse more quickly and are less noticeable at a distance. However, wind direction also defines the direction of travel for odors. Physical obstructions, such as windbreaks, cause more rapid dilution of odorous compounds and also capture odor-containing fugitive dust.

Historical wind data from the nearby National Weather Service (NWS) station at the Bakersfield/Kern County – Meadows Field Airport was examined to determine wind patterns in the project area. In the project area, winds generally blow from the northwest or southeast, depending on the time of day and season.

Compounds associated with this project are not known to contribute to odors. The odor impacts are therefore considered *less than significant*.

### 6.4.2 MOBILE SOURCE CARBON MONOXIDE HOTSPOT IMPACTS

**California LINE Source Dispersion Model (CALINE4)** [67]

CALINE-4 is an offsite consequence model used in conjunction with traffic related information. This program allows micro scale CO concentrations to be estimated along each roadway corridor or near intersections. This model is designed to identify localized concentrations of carbon monoxide, often termed "hot spots." GAMAQI requires that a CO hotspot analysis be performed if the results of the traffic study show a reduction in level of service to "E" or "F" or worsen an existing level of service "F."[68] A Hotspot analysis provides an estimate of localized concentration (i.e., micrograms per cubic meter) of CO related to mobile sources. This model is used for cumulative traffic related impacts. Carbon monoxide emissions are a function of vehicle idling time and, thus, under normal meteorological conditions, depend on traffic flow conditions. Carbon monoxide transport is

[67] Caltrans User's Guide for CL-4: A User Friendly Interface for the CALINE-4 Model for Transportation project Impact Assessments, 1998.

[68] GAMAQI. March 19, 2015 Revision

extremely limited; it disperses rapidly with distance from the source. Under certain extreme meteorological conditions, however, CO concentrations close to a congested roadway or intersection may reach unhealthful levels, affecting sensitive receptors (residents, school children, hospital patients, the elderly, etc.). Typically, high CO concentrations are associated with roadways or intersections operating at an unacceptable Level of Service (LOS). Mitigation is typically required for intersections which are projected to have a LOS of D or worse by the year 2035. Mitigation ensures the LOS is D or C.
A traffic study was prepared by Ruettgers & Schuler Civil Engineers Group. The results of the trip generation analyses suggest that the proposed project with mitigations will result in no intersections to have a LOS of D or worse by the year 2035. Based on the study, a hot spot analysis is not required.

Therefore, the project-specific CO health risks from the surrounding intersections are considered *less than significant*.

# 7 CUMULATIVE IMPACTS

The Cumulative Impact Analyses are broken into five sub-elements:

- Cumulative Criteria Air Pollutant Impacts
- Cumulative Carbon Monoxide Hot Spots Impacts
- Cumulative Visibility Impacts
- Cumulative Public Health/Hazards Impacts
- TCAG Conformity Analysis
- Triennial Plan Projections Approach

This Air Quality Impact Assessment considered the effects of the project with the cumulative impacts of growth in the area. The *Guide for Assessing and Mitigating Air Quality Impacts*[69] under CEQA defines cumulative impacts as two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. The document also states, "any proposed project that would individually have a significant air quality impact… would also be considered to have a significant cumulative air quality impact. Impacts of local pollutants (CO, TACs) are cumulatively significant when modeling shows that the combined emissions from the project and other existing and planned projects will exceed air quality standards."[70] If a project related air quality impact is individually less than significant, the impacts of reasonably anticipated future activities, probable future projects and past projects are included based on similar air quality impacts, transport considerations and geographic location.

This project is fully mitigated or is mitigated to less than significant. Cumulative impacts of the proposed project when considered together with past, existing and reasonably foreseeable future projects are not cumulatively considerable and are less than significant. A cumulative impact analysis has been included in this study. This analysis considered the following cumulative impacts:

[69] GAMAQI. March 19, 2015 Revision
[70] Ibid.

**Cumulative Ozone Impacts -** Ozone impacts are the result of the cumulative emissions from numerous sources in the region and transport from outside the region. Ozone is produced in chemical reactions involving ROG, $NO_X$, and sunlight.
**Cumulative $PM_{10}$ and $PM_{2.5}$ Impacts -** $PM_{10}$ and $PM_{2.5}$ has the potential to cause significant local problems during periods of dry conditions accompanied by high winds, and during periods of heavy earth disturbing activities. $PM_{10}$ and $PM_{2.5}$ may have cumulative local impacts, if, for example, several unrelated grading or earth-moving projects are underway simultaneously at nearby sites.
**Cumulative CO Impacts** – Cumulative carbon monoxide impacts are accounted for in the CO "Hot Spot" screening analysis described earlier in this document.
**Cumulative Hazardous Air Pollutant (TAC) Impacts** – Cumulative analysis for TACs focused on local impacts on sensitive receptors. The SJVAPCD recommends screening a radius of 1 mile for TAC cumulative impacts.
**Cumulative Odor Impacts** – Cumulative analysis for odors focused on local impacts on sensitive receptors.

The Lead Agency has determined that a quantitative cumulative analysis needs to be prepared when the proposed project will be individually significant or when a zone change or general plan amendment is required.

The cumulative analysis is based, in part, on a quantitative analysis of projects in the vicinity of the proposed project, and is supplemented with the State of California Department of Finance population projections, and an analysis of data utilized by the Kern Council of Governments' (Kern COG) adopted regional growth forecast used for the regional air quality conformity analysis required by the 1990 Federal Clean Air Act Amendments (CAAA).[71] The nearby project analysis quantifies operational project impacts along with all identified projects in the vicinity of the proposed site for comparison with San Joaquin Valley Air Basin and the basin's Kern County portion totals for $NO_X$ and ROG. The Kern COG analysis confirms whether the proposed project, when added to existing and proposed development and compared with local and regional growth forecasts,[72] are in line with those forecasts, and therefore, in conformance with SIP emission budgets or baseline emissions for $NO_X$, ROG, CO and $PM_{10}$. Along with CO "Hot Spot" analysis and TACs, the combined analyses provide a detailed description of the project's overall cumulative impact on air quality.

[71] Kern Council of Governments, Final Conformity Analysis for the 2007 Federal Transportation Improvement Program, Amendment #6 and the 2007 Regional Transportation Plan (RTP), October 18, 2007.
[72] This regional approach includes all aspects of growth within the San Joaquin Valley Air Basin including distribution centers, industrial uses, housing, and infrastructure development.

## 7.1 CUMULATIVE CRITERIA POLLUTANTS

### Regional Analysis

An analysis was made of the existing and proposed projects within a 1.5-kilometer radius of the project. Eight (8) development projects have been identified and modeled using the CalEEMod Version 2016.3.2 computer model to predict cumulative impacts. The cumulative projects identified were determined based on a Kern County Cumulative GIS map (See **Exhibit 6** "Cumulative Projects- 1.5-mile Radius"). Some projects that have not yet been approved may not appear in this study. Emissions for the operational phase of the proposed projects were based on housing lot totals and commercial acreage totals provided by the County of Kern Planning Department. Building square footages were estimated where information was not available. In accordance with SJVAPCD guidance, fireplaces were not considered.

**Tables 7.1-1** and **7.1-2** shows construction and operational emissions prior to imposition of mandatory new indirect source offsets or discounting of design benefits or other mitigations imposed on the projects during review cycle versus those that are entitled and not yet constructed or operational. Cumulative Construction Emissions represent an average annual emission rate associated with construction compared to the average annual construction related emissions associated with the proposed project. The proposed and cumulative project operational emissions were calculated for the year 2022; a construction schedule was generated by CalEEMod. In subsequent years vehicle emissions calculated by the model decrease due to the imposition of scheduled mobile source regulatory requirements. The predicted model outputs, including the proposed project, are summarized in **Tables 7.1-1 and 7.1-2**, and attached in **Appendix VII** "CalEEMod Cumulative Impact Modeling."

**TABLE 7.1-1**
**Cumulative Emissions – Construction Sources (tons/year)**

| Name | ROG | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| This Project | 0.3767 | 2.3863 | 1.9501 | 0.00433 | 0.2253 | 0.1433 |
| Cumulative Projects | 26.1822 | 5.4987 | 4.1205 | 0.0144 | 1.3331 | 0.7337 |
| **Total** | **26.5589** | **7.885** | **6.0706** | **0.01873** | **1.5584** | **0.877** |

**TABLE 7.1-2**
**Cumulative Emissions - Operational Sources (tons/year)**

| Name | ROG | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| This Project | 1.5197 | 3.2527 | 5.9899 | .00992 | 0.4995 | 0.1447 |
| Cumulative Projects | 0.7337 | 56.9525 | 85.8635 | 0.3624 | 18.4024 | 9.8660 |
| **Total** | **2.2534** | **60.2052** | **91.8534** | **0.37232** | **18.9019** | **10.0107** |

These emissions may be overstated due to the fact that the list includes discretionary projects that are subject to mitigation measures which have yet to be determined. Additionally, emissions modeling used liberal assumptions and default values extensively, this tends to cause significant overstatement of emissions values.

The San Joaquin Valley Air Basin has been designated as a non-attainment area for the ozone standards, both federal and state. A quantitative modeling analysis was conducted to address potential cumulative criteria pollutant impacts in the project area. The modeling approach employed is consistent with federal, state and SJVAPCD guidance for considering the impacts from various stationary sources.

Under federal modeling guidance, "nearby" sources are considered to determine cumulative ambient impacts. The federal *Guideline on Air Quality Models*[73] defines a "nearby" source as any source expected to cause a significant concentration gradient in the vicinity of the proposed new source. Vicinity is defined as the "impact area," which is a circular area with a radius extending from the source to the most distant point where the model predicts an impact in excess of the significance threshold.[74] Under federal guidance, no additional modeling would be required if the maximum impacts do not exceed the significance threshold.

The initial model indicated that the PSD SIL shown in **Table 6.2-5** has not been exceeded at the limits of the proposed project's fence line; therefore in accordance with New Source Review (NSR) regulations and PSD guidelines issued by U.S. EPA, the project will not conflict with or obstruct implementation of SJVAPCD's air quality plan, cause a violation of the CO standard, or impact the attainment status of SJVAPCD. Additionally, since the project is below the PSD SIL, the cumulative impact will be *less than significant*.

## 7.2 CUMULATIVE VISIBILITY

As discussed in the thresholds section of this study the threshold for the California visibility is correlated to the standard Extinction Coefficient of 0.23 per kilometer. This equates to 90 $\mu g/m^3$ of $PM_{10}$. There is no modeled $PM_{10}$ impact for the project. Due to this fact, the project is considered *less than significant.*

## 7.3 CUMULATIVE OPERATIONAL EMISSIONS

Long-Term Operational Emissions differ from Cumulative Criteria Pollutant Impacts in that Long-Term Operational impacts are based on contributions to the surrounding inventory. In contrast, Criteria Pollutant impacts are based on concentration related impacts to the immediate surroundings within the limits of the model. The long-term emissions from similar past, present and future foreseeable related projects in the SJVAB south of the project are combined to consider the cumulative impacts. All other known and reasonably foreseeable projects in the SJVAB are assumed to be in the Conformity Analysis discussed below in the regional analysis, Kern COG Conformity Analysis.

## 7.4 CUMULATIVE PUBLIC HEALTH/HAZARDS

There are no impacted sensitive receptors within the project; therefore the cumulative projects would not pose any public health hazards to the proposed project.

## 7.5 CONFORMITY ANALYSIS[75] AND DEPARTMENT OF FINANCE PROJECTIONS

### 7.5.1 KERN COG CONFORMITY ANALYSIS

Utilization of Kern COG data provides a framework for assistance in determining the cumulative significance of a project. Through the demonstration that a project's emissions are less than or consistent with projected growth in a particular local area, linked to a regional air basin projection,

[73] U.S. EPA, 2003.
[74] Ibid
[75] KCOG, Final Conformity Analysis for Amendment #2 to the 2009 Interim Federal Transportation Improvement Program, and 2007 Regional Transportation Plan, Amendment #1, January 15, 2009.

which ties to federal requirements, then that project could be said to be *in conformance* cumulatively as it is in line with regional, state and federal emissions budgets and air quality improvement goals.

The Final Conformity Analysis for Amendment #2 to the 2009 Interim Federal Transportation Improvement Program and the 2007 Regional Transportation Plan Amendment #1 complies fully with the July 1, 2004, EPA final rule that amended the transportation conformity rule to include criteria and procedures for the new 8-hour ozone and fine particulate matter ($PM_{2.5}$) national ambient air quality standards.

CEQA guidelines 15064(h)(3) states, "A lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program which provides specific requirements that will avoid or substantially lessen the cumulative problem (e.g. water quality control plan, air quality plan, integrated waste management plan) within the geographic area in which the project is located. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency."

It is important to note that the Kern COG conformity analysis highlights a project's conformance with existing local planning and does not serve as a determinant of a single project's impact.

### 7.5.2 CONSISTENCY WITH THE AIR QUALITY ATTAINMENT PLAN

The California Clean Air Act requires non-attainment districts with severe air SJVAPCD prepared an Air Quality Attainment Plan for the San Joaquin Valley Air Basin in compliance with the requirements of the Act. The plan requires best available retrofit technology on specific types of stationary sources to reduce emissions. The California Clean Air Act and the Air Quality Attainment Plan also identify transportation control measures as methods of reducing emissions from mobile sources. The California Clean Air Act defines transportation control measures as "any strategy to reduce vehicle trips, vehicle use, vehicle miles traveled, and vehicle idling or traffic congestion for the purpose of reducing motor vehicle emissions." The Air Quality Attainment Plan for the San Joaquin Valley Air Basin identifies the provisions to accommodate the use of bicycles, public transportation, and traffic flow improvements as transportation control measures.

# 8 GREENHOUSE GASES

GHGs trap heat in the atmosphere and contribute to global climate change, which is defined by the U.S. EPA as any significant change in the measures of climate lasting for an extended period of time, including major changes in temperature, precipitation, wind patterns and other effects.

The principal GHGs[76] resulting from human activity that enter and accumulate in the atmosphere are:

- **$CO_2$**: Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, coal, etc.), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). Carbon dioxide is also removed from the

[76] U.S. EPA. Greenhouse Gas (GHG) Emissions. Available at: http://www.epa.gov/climatechange/emissions/index.html. Accessed: September 2016.

atmosphere (or sequestered) when it is absorbed by plants as part of the biological carbon cycle.

- **Methane ($CH_4$)**: Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.
- **Nitrous Oxide ($N_2O$)**: Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.
- **Fluorinated Gases:** Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are often used as substitutes for ozone-depleting substances (i.e., CFCs, HCFCs, and halons). These gases are typically emitted in smaller quantities; but, because they are potent GHGs, they are sometimes referred to as High Global Warming Potential[77] (GWP) gases.

# 9 GREENHOUSE GASES: REGULATORY SETTING

## 9.1 FEDERAL

**Clean Air Act**

In *Massachusetts v. Environmental Protection Agency* (2007) 549 U.S. 497, the U.S. Supreme Court held that the U.S. EPA has authority under the CAA to regulate $CO_2$ emissions if those emissions pose an endangerment to the public health or welfare.

In 2009, the U.S. EPA issued an endangerment finding under the CAA, concluding that GHGs threaten the public health and welfare of current and future generations and that motor vehicles contribute to GHG pollution. These findings provide the basis for adopting national regulations to mandate GHG emission reductions under the CAA.

Of relevance to the proposed project, to date, the U.S. EPA has exercised its authority to regulate mobile sources that reduce GHG emissions via the control of vehicle manufacturers, as discussed immediately below.

**Federal Vehicle Standards**

In response to the U.S. Supreme Court ruling discussed above, the Bush Administration issued Executive Order 13432 in 2007 directing the U.S. EPA, the Department of Transportation (DOT), and the DOE to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the National Highway Traffic Safety Administration (NHTSA) issued a final rule regulating fuel efficiency for and GHG emissions from cars and light-duty trucks for model Year 2011; and, in 2010, the U.S. EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, President Obama issued a memorandum directing the DOT, DOE, U.S. EPA and NHTSA to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the U.S. EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017–2025 light-

[77] High GWP gases are non-$CO_2$ gases that cause the atmosphere to heat faster than $CO_2$. Specifically, GWPs compare the radiative forcing or ability to trap heat of one metric ton of a GHG to a metric ton of $CO_2$.

duty vehicles. The proposed standards projected to achieve 163 grams/mile of $CO_2$ in model Year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon (mpg) if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021, and NHTSA intends to set standards for model years 2022–2025 in a future rulemaking.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the U.S. EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for $CO_2$ emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the U.S. EPA, this regulatory program will reduce GHG emissions and fuel consumption for the affected vehicles by 6 to 23% over the 2010 baselines.[78]

Recently, the U.S. EPA and NHTSA finalized the next phase (Phase 2) of the fuel economy and GHG standards for medium- and heavy-duty trucks, which will apply to vehicles with model Year 2018 and later. CARB staff plan to propose a Phase 2 program for California in response to completion of the federal rulemaking.[79]

### Energy Independence and Security Act

The Energy Independence and Security Act of 2007 (EISA) facilitates the reduction of national GHG emissions by requiring the following:

- Increasing the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard that requires fuel producers to use at least 36 billion gallons of biofuel in 2022;
- Prescribing or revising standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances;
- Requiring approximately 25% greater efficiency for light bulbs by phasing out incandescent light bulbs between 2012 and 2014; requiring approximately 200% greater efficiency for light bulbs, or similar energy savings, by 2020; and,
- While superseded by the U.S. EPA and NHTSA actions described above, (i) establishing MPG targets for cars and light trucks and (ii) directing the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for trucks.

Additional provisions of EISA address energy savings in government and public institutions, promote research for alternative energy, additional research in carbon capture, international energy programs, and the creation of green jobs.

[78] The emission reductions attributable to the regulations for medium- and heavy-duty trucks were not included in the project's emissions inventory due to the difficulty in quantifying the reductions. Excluding these reductions results in a more conservative (i.e., higher) estimate of emissions for the project.

[79] CARB, CA Phase 2 GHG. Available at: http://www.arb.ca.gov/msprog/onroad/caphase2ghg/caphase2ghg.htm. Accessed: September 2016.

## 9.2 CALIFORNIA

**Executive Order S-3-05**

In 2005, former Governor Schwarzenegger signed Executive Order S-3-05, which established the following GHG emission reduction targets for California: (1) by 2010, reduce GHG emissions to 2000 levels; (2) by 2020, reduce GHG emissions to 1990 levels; and (3) by 2050, reduce GHG emissions to 80% below 1990 levels.

**Assembly Bill 32**

AB 32, the California Global Warming Solutions Act of 2006, was enacted after considerable study and expert testimony before the Legislature. The heart of AB 32 is the requirement that statewide GHG emissions be reduced to 1990 levels by 2020 (Health & Safety Code, §38550). In order to achieve this reduction mandate, AB 32 requires CARB to adopt rules and regulations in an open public process that achieve the maximum technologically feasible and cost-effective GHG reductions.

Of relevance to this analysis, in 2007, CARB approved a statewide limit on the GHG emissions level for Year 2020 consistent with the determined 1990 baseline: 427 million MT $CO_2e$. CARB's adoption of this limit is in accordance with Health & Safety Code Section 38550.

Further, in 2008, CARB adopted the *Climate Change Scoping Plan: A Framework for Change* (Scoping Plan) in accordance with Health & Safety Code Section 38561. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions for various emission sources/sectors to 1990 levels by 2020.

In the Scoping Plan, CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of approximately 28.5% from the otherwise projected 2020 emissions level; i.e., those emissions that would occur in 2020, absent GHG-reducing laws and regulations (referred to as Business-As-Usual [BAU] ).[80] For example, in further explaining CARB's BAU methodology, CARB assumed that all new electricity generation would be supplied by natural gas plants, no further regulatory action would impact vehicle fuel efficiency, and building energy efficiency codes would be held at 2005 standards.

The Scoping Plan identified a Cap-and-Trade program as one of the strategies California will employ to reduce GHG emissions. The adopted Cap-and-Trade program is implemented by CARB and caps GHG emissions from the industrial, utility, and transportation fuels sectors – which account for roughly 85% of the State's GHG emissions.[81]

In the 2011 Final Supplement to the Scoping Plan's Functional Equivalent Document, CARB revised its estimates of the projected 2020 emissions level in light of the economic recession and the availability of updated information about GHG reduction regulations. Based on the new economic data, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of 21.7% (down from 28.5%) from the BAU conditions. When the 2020 emissions level projection also was updated to account for newly implemented regulatory measures,

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[80] CARB, (December 2008), "*Climate Change Scoping Plan,*" pg. 12. Available at: https://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. Accessed: September 2016.

[81] CARB (May 2014), "*First Update to the Climate Change Scoping Plan,*" p. 85. Available at: https://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf. Accessed: September 2016.

including the Pavley standards (model years 2009–2016) and the Renewable Portfolio Standard (12% to 20%), CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of 16% (down from 28.5%) from the BAU conditions.

Most recently, in 2014, CARB adopted the *First Update to the Climate Change Scoping Plan: Building on the Framework* (First Update).[82] The First Update found that California is on track to meet the 2020 emissions reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80% below 1990 levels by 2050 if the State realizes the expected benefits of existing policy goals.

As part of the First Update, CARB recalculated the State's 1990 emissions level using more recent GWPs identified by the International Panel on Climate Change (IPCC). Using the recalculated 1990 emissions level and the revised 2020 emissions level projection identified in the 2011 Final Supplement, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of approximately 15% (instead of 28.5% or 16%) from the BAU conditions.

The First Update also includes a strong recommendation from CARB for setting a mid-term statewide GHG emissions reduction target. CARB specifically recommended that the mid-term target be consistent with: (i) the United States' pledge to reduce emissions 42% below 2005 levels (which translates to a 35% reduction from 1990 levels in California); and (ii) the long-term policy goal of reducing emissions to 80% below 1990 levels by 2050. However, to date, there is no legislative authorization for a post-2020 GHG reduction target.

**Governor's Climate Change Pillars**

In his January 2015 inaugural address, Governor Brown provided the framework for a California Climate Strategy, consisting of six key pillars[83]:

- Increase the percentage of renewable energy in the statewide portfolio to 50% by 2030.
- Reduce the use of petroleum fuels in vehicles by 50% by 2030.
- Double energy efficiency savings of existing buildings by 50% by 2030.
- Manage natural and working land to increase carbon sequestration.
- Reduce short-lived climate pollutants, mainly black carbon, fluorinated gases, and $CH_4$.
- Implement a Safeguarding California plan to provide adaptive management of climate related issues.

On April 29, 2015, Governor Brown issued Executive Order B-30-15, which includes the goal of reducing statewide GHG emissions 40% below 1990 levels by 2030, and reaffirms the goal of reducing statewide GHG emissions 80% below 1990 levels by 2050.

**Senate Bill 32**

Enacted in 2016, Senate Bill (SB) 32 codifies the 2030 emissions reduction goal of Executive Order B-30-15 by required CARB to ensure that statewide GHG emissions are reduced to 40% below 1990

82 Health & Safety Code §38561(h) requires CARB to update the Scoping Plan every five years.
83 CARB, The Governor's Climate Change Pillars: 2030 Greenhouse Gas Reduction Goals. Available at: http://www.arb.ca.gov/cc/pillars/pillars.htm. Accessed: September 2016..

levels by 2030. Relatedly, CARB currently is preparing an update to its Scoping Plan that will present the State's framework for achievement of the 2030 reduction target.

**Energy-Related Sources**

As amended by SB 350 (De León, 2015), California's Renewables Portfolio Standard requires retail sellers of electric services to increase procurement from eligible renewable energy resources to 33% of total retail sales by 2020, and 50% of total retail sales by 2030.

**Mobile Sources**

In 2004, and pursuant to AB 1493 (the Pavley standards), CARB adopted regulations to reduce GHG emissions from passenger vehicles and light-duty trucks with model years 2009–2016. In 2012, CARB approved the Advanced Clean Cars program, a new emissions-control program for passenger vehicles and light-duty trucks with model years 2017–2025. The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero-emission vehicles. By 2025, when the rules will be fully implemented, new automobiles will emit 34% fewer global warming gases and 75% fewer smog-forming emissions.

Executive Order S-1-07 requires a 10% or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by CARB by 2020.[84] In 2009, CARB approved the LCFS regulations, which became fully effective in April 2010. The LCFS regulations were re-adopted by CARB in September 2015 in response to related litigation.

The Sustainable Communities and Climate Protection Act of 2008, or SB 375, coordinates land use planning, RTPs, and funding priorities to help California meet the GHG reduction mandates established in AB 32.[85] As specifically codified in Government Code Section 65080, SB 375 requires the Metropolitan Planning Organization relevant to the project area (here, the TCAG) to include a Sustainable Communities Strategy in its RTP that will achieve GHG emission reduction targets set by CARB by reducing VMT from light-duty vehicles (i.e., passenger vehicles and light-duty trucks) through the development of more compact, complete, and efficient communities. For the area under TCAG's jurisdiction, including the project site, CARB adopted regional targets for reduction of mobile source-related GHG emissions by 5% for 2020 and by 10% for 2035.

**Building Standards**

Title 24, Part 6 of the California Code of Regulations regulates the design of building shells and building components. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. The 2013 Building Energy Efficiency Standards (2013 Building Standards), effective July 1, 2014, are the currently applicable building standards. However, the California Energy Commission (CEC) has adopted the 2016 Building Energy Efficiency Standards (2016 Building Standards), and those standards will become effective on January 1, 2017, prior the commencement of the project's building construction activities.

Relatedly, the California Public Utilities Commission, CEC, and CARB have a shared, established goal of achieving Zero Net Energy (ZNE) for new construction in California. The key policy timelines

84 Carbon intensity is a measure of the GHG emissions associated with the various production, distribution and use steps in the "lifecycle" of a transportation fuel.

85 The Scoping Plan and subsequent First Update, as adopted by CARB in December 2008 and May 2014, respectively, rely on the requirements of SB 375 to secure GHG emission reductions from local land use decisions.

include: (1) all new residential construction in California will be ZNE by 2020, and (2) all new commercial construction in California will be ZNE by 2030.

The CEC also periodically amends and enforces Appliance Efficiency Regulations contained in Title 20 of the California Code of Regulations. The regulations establish water and energy efficiency standards for both federally-regulated appliances and non-federally regulated appliances. The most current Appliance Efficiency Regulations, dated July 2015, cover 23 categories of appliances (e.g., refrigerators; plumbing fixtures; dishwashers; clothes washer and dryers; televisions) and apply to appliances offered for sale in California.

In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CALGreen, and establishes voluntary and mandatory standards pertaining to the planning and design of sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and interior air quality. CALGreen is periodically amended; the 2016 CALGreen standards will become effective on January 1, 2017.

**Solid Waste Diversion**

The California Integrated Waste Management Act of 1989 (AB 939), as modified by AB 341, requires each jurisdiction's source reduction and recycling element to include an implementation schedule that shows: (1) diversion of 25% of all solid waste by January 1, 1995, through source reduction, recycling, and composting activities; (2) diversion of 50% of all solid waste on and after January 1, 2000; and (3) diversion of 75% of all solid waste on or after 2020, and annually thereafter. The California Department of Resources Recycling and Recovery (CalRecycle) is required to develop strategies, including source reduction, recycling, and composting activities, to achieve the 2020 goal.

CalRecycle published a discussion document, entitled *California's New Goal: 75 Percent Recycling*, which identified concepts that would assist the State in reaching the 75% goal by 2020. Subsequently, in August 2015, CalRecycle released the *AB 341 Report to the Legislature*, which identifies five priority strategies for achievement of the 75% goal: (1) moving organics out of landfills; (2) expanding recycling/manufacturing infrastructure; (3) exploring new approaches for State and local funding of sustainable waste management programs; (4) promoting State procurement of post-consumer recycled content products; and, (5) promoting extended producer responsibility.

## 9.3 SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT

**CEQA-Based Guidance**

In December 2009, the SJVAPCD published its report entitled, *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* in which the district, among other things, provides guidance on (i) assessing the significance of project-specific GHG impacts, (ii) identifying and quantifying GHG emission reduction measures for development projects and (iii) providing tools to streamline evaluation of project-specific GHG effects. The SJVAPCD suggests that projects exempt from the requirements of CEQA, and projects complying with an approved plan or mitigation program be determined to have a less than significant cumulative impact. Where projects are not exempt from CEQA and in the absence of an approved plan or mitigation program, projects complying with Best Performance Standards do not require specific quantification of GHG emissions. Projects not fitting any of the described standards, programs or exemptions require quantification of GHG emissions and demonstration that GHG emissions have been reduced or mitigated by 29% from the State's projected 2020 BAU emissions. In addition, where a lead agency has determined that an EIR is required, regardless of whether the project incorporates Best Performance Standards, quantification of GHG emissions is required.

In their document, the SJVAPCD proposes quantitative thresholds including mass of GHG emissions generated per unit of activity, GHG emissions per capita, and percent reduction compared to BAU.

In June 2014, the SJVAPCD published CEQA Determinations of Significance for Projects Subject to CARB's GHG Cap-and Trade Regulation (APR-2025). The SJVAPCD concluded that all GHG emission increases resulting from the combustion of any fuel produced, imported and/or delivered in California are mitigated under Cap-and-Trade. Therefore, GHG emission increases caused by fuel use (other than jet fuels) are determined to have a less than significant impact on global climate change under CEQA.

## 9.4 KERN COUNTY COUNCIL OF GOVERNMENTS

**2014 Sustainable Communities Strategy**

As previously discussed, SB 375 requires KCOG to incorporate a Sustainable Communities Strategy into its RTP that achieves the GHG emission reduction targets set by CARB. KCOG's Sustainable Communities Strategy is included in the 2014-2040 Regional Transportation Plan & Sustainable Communities Strategy (RTP/SCS), which was adopted by KCOG in June 2014.

KCOG has released its preliminary Sustainable Communities Strategy (SCS) within the Preliminary 2014 Regional Transportation Plan. The intent of the SCS is to achieve the state's emissions reduction targets for automobiles and light trucks, by better coordinating transportation expenditures with forecasted development patterns. The SCS will also provide opportunities for a stronger economy, healthier environment and safer quality of life for community members in Kern County.

## 9.5 KERN COUNTY

**Regional Transportation Plan**

The City of Bakersfield falls within Kern County, which has adopted a Regional Transportation Plan (RTP), a copy of which is available at https://www.arb.ca.gov/cc/sb375/kerncog_2014_rtp.pdf. This plan serves to create progress towards statewide GHG reduction and sustainability goals. As provided on page ES-4 of the County's CAP:

> *Land use is one of the most important elements of effective transportation planning. Kern COG does not have jurisdiction over land use planning, but the agency does advise and encourage dialogue among those involved in the decision making process. The RTP/SCS was developed in consultation with local jurisdictions and is consistent with existing adopted General Plans and Zoning. Kern COG will continue to use the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) to communicate with Kern cities and the county on issues of land use, transportation and air quality, to ensure that land use projects are environmentally sound. At the core of the 2014 RTP are seven goals:*
> *1. Mobility – Improve the mobility of people and freight;*

*2. Accessibility – Improve accessibility to major employment and other regional activity centers;*
*3. Reliability – Improve the reliability and safety of the transportation system;*
*4. Efficiency – Maximize the efficiency of the existing and future transportation system;*
*5. Livability – Promote livable communities;*
*6. Sustainability – Minimize effects on the environment; and*
*7. Equity – Ensure an equitable distribution of the benefits among various demographic and user groups.*

The RTP further provides:

*The 2014 Regional Transportation Plan (RTP) is a 26-year blueprint that establishes a set of regional transportation goals, policies, and actions intended to guide development of the planned multimodal transportation systems in Kern County. It has been developed through a continuing, comprehensive, and cooperative planning process, and provides for effective coordination between local, regional, state, and federal agencies. The Congestion Management Program (CMP) is designed to ensure that a balanced transportation system is developed, relating population and traffic growth, land use decisions, performance standards, and air quality improvements. New to the 2014 RTP, California's Sustainable Communities and Climate Protection Act, or Senate Bill (SB) 375, calls for the Kern County RTP to include a Sustainable Communities Strategy (SCS) that reduces greenhouse gas (GHG) emissions from passenger vehicles and light-duty trucks by 5 percent per capita by 2020 and 10 percent per capita by 2035 as compared to 2005. The California Air Resources Board (ARB) set the emissions reduction target for Kern County (and other areas of the state). Targets are reflective of conditions in each area of the state and are tailored to address conditions in each area. As will be discussed in more detail below, SB 375 will help meet the State goals included in Assembly Bill 32, the Global Warming Solutions Act of 2006. Meeting these targets will point the County toward overall sustainability and will provide benefits beyond reducing carbon emissions.*

*The updated RTP includes a Sustainable Communities Strategy (SCS) that reduces greenhouse gas (GHG) emissions from passenger vehicles and light-duty trucks by 5 percent per capita by 2020 and 10 percent per capita by 2035 as compared to 2005. The SCS component of the RTP will work in tandem with other RTP policies to reduce not only CO2 emissions but also federal criteria pollutant emissions. We will achieve and exceed our CO2 emissions reduction target set by CARB by achieving more than a 5% reduction by 2020 and more than a 10% by 2035 compared to the 2005 16.7 lbs. per capita.*

*Based on the analysis of strategies included in the SCS, CO2 emissions are anticipated to be 14.1% lower than 2005 levels by 2020 and 16.6% lower by 2035, exceeding the targets established by CARB in 2010.*

# 10 GREENHOUSE GASES: ENVIRONMENTAL SETTING

## 10.1 GREENHOUSE EFFECT

As described by the U.S. EPA, GHGs act like a blanket around Earth, trapping energy in the atmosphere and causing it to warm. This phenomenon is called the greenhouse effect and is natural and necessary to support life on Earth. However, the buildup of GHGs can change Earth's climate and result in dangerous effects to human health and welfare and to ecosystems.[86]

## 10.2 CLIMATE CHANGE EFFECTS

Globally, climate change has the potential to impact numerous environmental resources through anticipated, though uncertain, impacts related to future air temperatures and precipitation patterns.

Scientific modeling predicts that the continued emission of GHGs at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. A warming of about 0.2 degree Celsius (°C, 0.36°F) per decade is projected, and there are identifiable signs that global warming is taking place, including substantial loss of ice in the Arctic.[87]

The understanding of the role that GHG emissions plays on global climate trends is complex and involves varying uncertainties and a balance of different effects. Acknowledging uncertainties regarding the rate at which anthropogenic (i.e., human caused) GHG emissions may continue to increase,[88] and the impact of such emissions on climate change, the IPCC devises emission scenarios that utilize various assumptions about the rates of economic development, population growth, and technological advancement over the course of the next century. While the projected effects of global warming on weather and climate are uncertain and likely to vary regionally, the following effects are expected by the IPCC.[89]

- It is very likely that the Arctic sea ice cover will continue to shrink and thin, with the Northern Hemisphere spring snow cover and global glacier volume also decreasing;
- It is virtually certain that there will be more frequent hot and fewer cold temperature extremes over most land areas on daily and seasonal timescales, with heat waves occurring at a higher frequency and duration;
- The global ocean will continue to warm during the 21st century, with heat penetrating from the surface to the deep ocean and affecting ocean circulation;
- Further uptake of carbon by the ocean will increase ocean acidification;
- Changes in the global water cycle in response to the warming over the 21st century will not be uniform. The contrast in precipitation between wet and dry regions and between wet and dry seasons will increase, although there may be regional exceptions;

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86 See U.S. EPA. Climate Change: Basic Information. Available at: https://www3.epa.gov/climatechange/basics/. Accessed: September 2016.

87 IPCC (2013), "*Climate Change 2013 - The Physical Science Basis - Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.*" Available at: http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf. Accessed: September 2016.

88 These uncertainties are attributable to various factors under human control, such as future population growth and the locations of that growth; the amount, type, and locations of economic development; the amount, type, and locations of technological advancement; adoption of alternative energy sources; legislative and public initiatives to curb emissions; and public awareness and acceptance of methods for reducing emissions.

89 IPCC (2013), "*Summary for Policymakers,*" Climate Change 2013 The Physical Science Basis Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Available at: http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_SPM_FINAL.pdf. Accessed: September 2016.

Most aspects of climate change will persist for many centuries even if GHG emissions cease entirely.

Potential secondary effects from global warming also include a global rise in sea level, impacts to agriculture and water supply, changes in disease vectors, and changes in habitat and biodiversity.

According to CARB, some of the potential California-specific impacts of global warming may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. The California Climate Change Center has released three assessment reports on climate change in California, the most recent in 2012.[90] Per California's Third Climate Change Assessment, by 2050, the State is projected to warm by approximately 2.7°F above 2000 averages, a threefold increase in the rate of warming over the last century.

To protect the State's public health and safety, resources, and economy, the California Natural Resources Agency—in coordination with other State agencies — has updated the *2009 California Climate Adaptation Strategy* with the 2014 *Safeguarding California: Reducing Climate Risk* plan. Additionally, in March 2016, the California Natural Resources Agency released *Safeguarding California: Implementation Action Plans*, a document that shows how California is acting to convert the recommendations contained in the 2014 *Safeguarding California* plan into action. The 2016 *Action Plans* document is divided by ten sectors,[91] and shows the path forward by presenting the risks posed by climate change, the adaptation efforts underway, and the actions that will be taken to safeguard residents, property, communities and natural systems.

## 10.3 GHG EMISSIONS INVENTORIES

Because the effects of GHG emissions on global climate change extend well beyond the project vicinity, the following discussion provides context regarding global, national, statewide and countywide GHG emission levels. While annual emission inventories provide the basis for establishing historical emission trends, there are many factors affecting GHG emissions, including the state of the economy, changes in demography, improved efficiency, and changes in environmental conditions.

### 10.3.1 GLOBAL/INTERNATIONAL

The global GHG emissions total reported in 2016 was approximately 49,000 million metric tons (MMT) $CO_2e$.[92] Energy generation, including electricity and transportation, accounts for 24,010 MMT $CO_2e$ or 49% of the inventory total. And, $CO_2$ emissions from the United States represent approximately 15% of the global $CO_2$ emissions.[93]

90 CEC (July 2012), "*Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California.*" Available at: http://www.energy.ca.gov/2012publications/CEC-500-2012-007/CEC-500-2012-007.pdf . Accessed: September 2016.

91 The ten sectors include: agriculture; biodiversity and habitat; emergency management; energy; forestry; land use and community development; oceans and coastal resources and ecosystems; public health; transportation; and, water.

92 World Resource Institute. CAIT Climate Data Explorer. Available at: http://cait.wri.org/. Accessed: January 2019.

93 U.S. EPA. Global Greenhouse Gas Emissions Data. Available at: https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data. Accessed: January 2019.

**Table 10.3-1**
**Global $CO_2e$ Emissions Inventory (2016)**
**(MMT $CO_2e$)**

| Sector | Emissions |
|---|---|
| Electricity and Heat Production (25%) | 12,250 |
| Industry (21%) | 10,290 |
| Agriculture, Forestry, and Other Land Use (24%) | 11,760 |
| Transportation (14%) | 6,860 |
| Buildings (6%) | 2,940 |
| Other Energy (10%) | 4,900 |
| **Source:** U.S. EPA (2018), Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2016 EPA 430-R-18-003. Available at: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks. Accessed: January 2019. | |

## 10.3.2 UNITED STATES

In 2016, total U.S. GHG emissions were 6,511 MMT $CO_2e$.[94] The emission inventory by sector in the U.S. for the Year 2014 is shown in **Table 10.3-2** below.

**Table 10.3-2**
**U. S. $CO_2e$ Emissions Inventory (2014)**
**(MMT $CO_2e$)**

| Economic Sector | Emissions |
|---|---|
| Electricity Generation (34%) | 2,213 |
| Transportation (34%) | 2,213 |
| Industry (15%) | 977 |
| Agriculture (9%) | 586 |
| Commercial & Residential (10%) | 651 |
| Other Energy (6%) | 391 |
| **Source:** U.S. EPA (April 2016), Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2014 EPA 430-R-16-002. Available at: https://www.epa.gov/ghgemissions/overview-greenhouse-gases#carbon-dioxide Accessed: January 2018. | |

Total U.S. emissions have increased by 2.4% from 1990 to 2016, and emissions increased from 2015 to 2016 by 1.9% (124 MM $CO_2e$). The decrease from 2015 to 2016 was due to a decrease in $CO_2$ emissions from fossil fuel combustion as a result from substitution from coal to natural gas and other non-fossil energy sources in the electric power sector and warmer winter conditions in 2016 resulting in a decreased demand for heating fuel in the residential and commercial sectors.

The primary GHG emitted by human activities in the United States was $CO_2$, representing approximately 82% of total GHG emissions. The largest source of $CO_2$ is the combustion of fossil fuels. Emissions resulting from fossil fuel combustion from transportation accounted for the largest portion (36%) of U.S. GHG emissions in 2016. Industrial activities accounted for the second largest

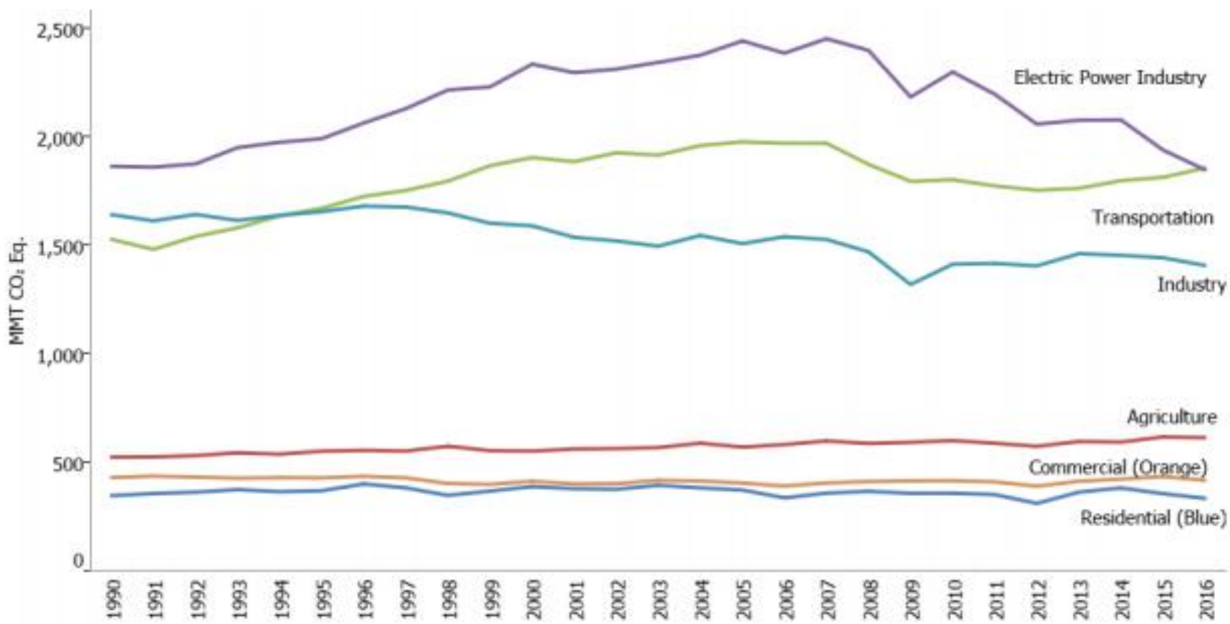
94 U.S. EPA (2018), "*Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2016*" EPA 430-R-18-003. Available at: https://www.epa.gov/ghgemissions/overview-greenhouse-gases. Accessed: January 2019.

portion (27%) and emissions from residential comprised the third largest portion. The commercial economic sector accounts for the remaining emissions generated by fossil fuel combustion.

$CO_2e$ emissions by sector from 1990 through 2016 are shown in **Exhibit 22**. Transportation emissions have increased, electrical and industrial emissions have decreased and agricultural, commercial and residential emissions have remained nearly constant.

*(Exhibit 22 on next page.)*

**Exhibit 22**
**U. S. Emissions Allocated to Economic Sectors**




Reference: Inventory Of U.S. Greenhouse Gas Emissions And Sinks: 1990-2016, USEPA #430-R-18-003

Sinks for GHGs include carbon sequestration in forests, trees in urban areas, agricultural soils, and land-filled yard trimmings and food scraps. These sinks, in aggregate, offset 11.5% of the total emissions in 2016.

### 10.3.3 CALIFORNIA

In 2016, California emitted approximately 429 MMT $CO_2e$, a decrease of 12 MMT $CO_2e$ when compared to the 2015 inventory data[95] (see **Table 10.3-3**).

Transportation is the source of approximately 39% of the State's GHG emissions, followed by electricity generation (both in-state and out-of-state) at 16%, and industrial sources at 21%. Agriculture and forestry is the source of approximately 8% of the State's GHG emissions. Residential and commercial activities also comprised approximately 9% of the inventory.

*(Table 10.3-3 on next page.)*

95 Differences with the table are due to rounding.

**Table 10.3-3**
**California $CO_2e$ Emissions Inventory (1990 to 2016)**
**(MMT $CO_2e$)**

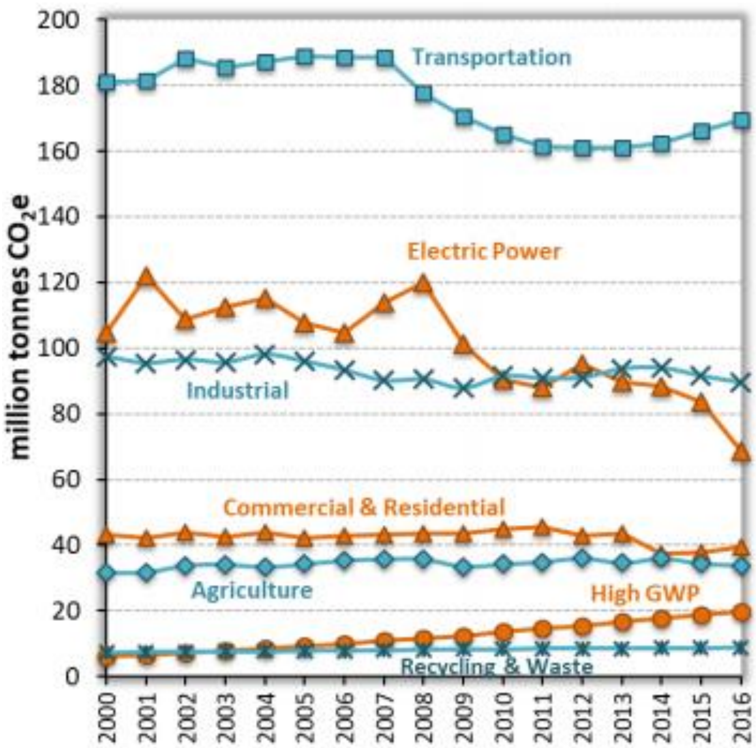
| **Categories included in the inventory** | **1990-1999[1]** | | | | | | | | | | **2000-2016[2]** | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1990** | **1991** | **1992** | **1993** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** |
| Electricity Generation (In State) | 49 | 46 | 55 | 51 | 59 | 45 | 42 | 44 | 48 | 51 | 59 | 63 | 50 | 48 | 49 | 45 | 50 | 54 | 54 | 53 | 47 | 41 | 51 | 49 | 51 | 50 | 42 |
| Electricity Generation (Imports) | 62 | 57 | 50 | 56 | 56 | 54 | 50 | 56 | 58 | 56 | 46 | 59 | 59 | 64 | 66 | 63 | 55 | 60 | 66 | 48 | 44 | 47 | 44 | 40 | 37 | 34 | 26 |
| Transportation | 151 | 147 | 153 | 149 | 151 | 155 | 156 | 159 | 162 | 166 | 173 | 174 | 181 | 179 | 181 | 183 | 183 | 183 | 173 | 166 | 161 | 157 | 157 | 157 | 159 | 163 | 166 |
| Industrial | 105 | 102 | 99 | 97 | 97 | 98 | 100 | 106 | 107 | 104 | 88 | 86 | 87 | 87 | 89 | 87 | 84 | 81 | 81 | 79 | 83 | 82 | 82 | 85 | 85 | 82 | 80 |
| Commercial | 14 | 14 | 12 | 12 | 12 | 12 | 12 | 12 | 13 | 14 | 13 | 12 | 14 | 13 | 13 | 13 | 13 | 13 | 13 | 14 | 14 | 14 | 14 | 14 | 13 | 13 | 14 |
| Residential | 30 | 30 | 29 | 29 | 30 | 27 | 27 | 27 | 31 | 32 | 29 | 28 | 29 | 28 | 29 | 28 | 28 | 28 | 29 | 28 | 29 | 30 | 27 | 28 | 23 | 23 | 24 |
| Agriculture & Forestry | 19 | 18 | 19 | 19 | 20 | 20 | 20 | 21 | 20 | 22 | 4 | 4 | 5 | 4 | 5 | 5 | 6 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 5 | 5 | 4 |
| Not Specified | 1 | 1 | 1 | 2 | 3 | 5 | 6 | 7 | 8 | 10 | 1.2 | 1.1 | 1 | 1 | .9 | .9 | .9 | .8 | .85 | .8 | .8 | .8 | .8 | .8 | .8 | .8 | .8 |
| **Net California Emissions Inventory[3]** | **431** | **415** | **418** | **415** | **428** | **416** | **413** | **432** | **447** | **455** | **413** | **427** | **426** | **427** | **433** | **424** | **419** | **424** | **421** | **392** | **381** | **376** | **381** | **378** | **373** | **370** | **357** |

**Notes:**

1. CARB (2007), 1990 to 2004 Inventory Data and Documentation. Available at https://www.arb.ca.gov/cc/inventory/archive/tables/ghg_inventory_sector_all_90-04_ar4.pdf Accessed: January 2019.
2. CARB (June 2016), *0F1FCalifornia Greenhouse Gas Emissions for 2000 to 2016 – Trends of Emissions and Other Indicators.* Available at: http://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2014/ghg_inventory_trends_00-14_20160617.pdf. Accessed: January 2019.
3. CARB (June 2018), California CO2 inventory for 2000-2016 – by Sector and Activity. Available at: https://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_sector_sum_2000-16co2.pdf Accessed: January 2019.
4. All numbers are rounded to the nearest whole number.

The inventory for 1990 through 2016 is shown graphically in **Exhibit 23**. The transportation sector remains the largest source of GHG emissions in the State, accounting for 36% of the inventory, and shows a small increase in emissions in 2016. Emissions from the electricity sector continue to decline due to growing zero-GHG energy generation sources. Emissions from the remaining sectors have remained relatively constant.

**Exhibit 23**
**California GHG Emissions Trends by Sector (2000 to 2016)**

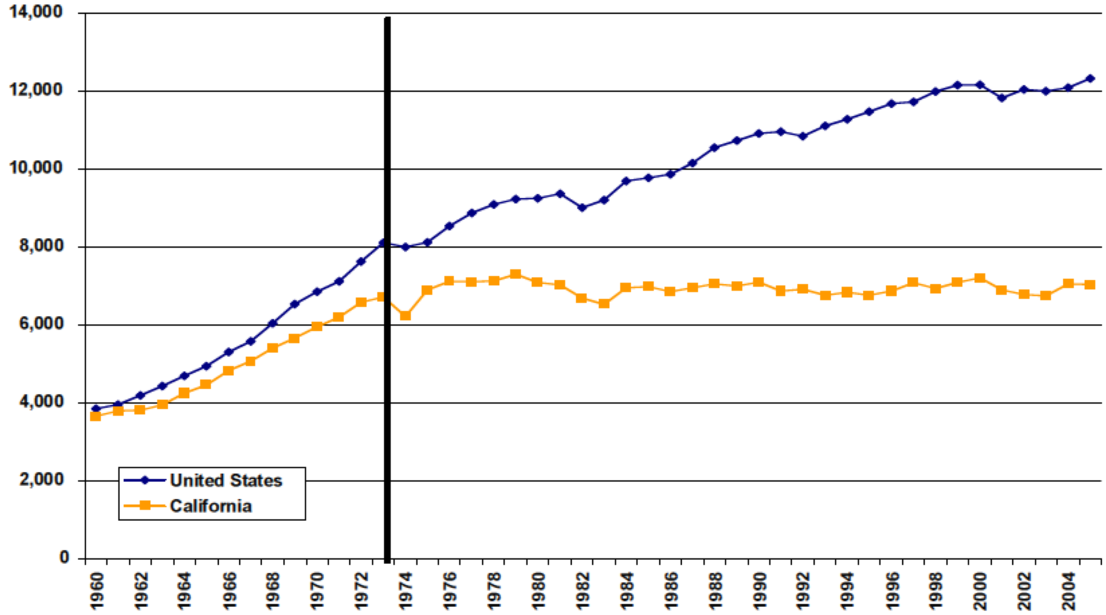



**Source:** CARB, 2018, California Greenhouse Gas Emissions for 2000 to 2016

When compared to nationwide emissions inventory data, California's relative contribution is due primarily to the sheer size of California, as compared to other states. For example, Californians uses less electricity per person than the nationwide average. While per capita electricity consumption in the United States increased by nearly 50% over the past 30 years, California's per capita electricity use decreased, as shown in **Exhibit 24**, due in large part to cost-effective building and appliance efficiency standards and other energy efficiency programs. Another factor that has reduced California's fuel use and GHG emissions on a per capita basis is its mild climate, as compared to that of many other states.

*(Exhibit 24 on next page.)*

**Exhibit 24**
**California vs. U.S. Per Capita Electricity Use (1960 to 2005)**
**(Kilowatt Hours Per Person)**




Source: California Energy Commission

Per Capita Emissions[96]

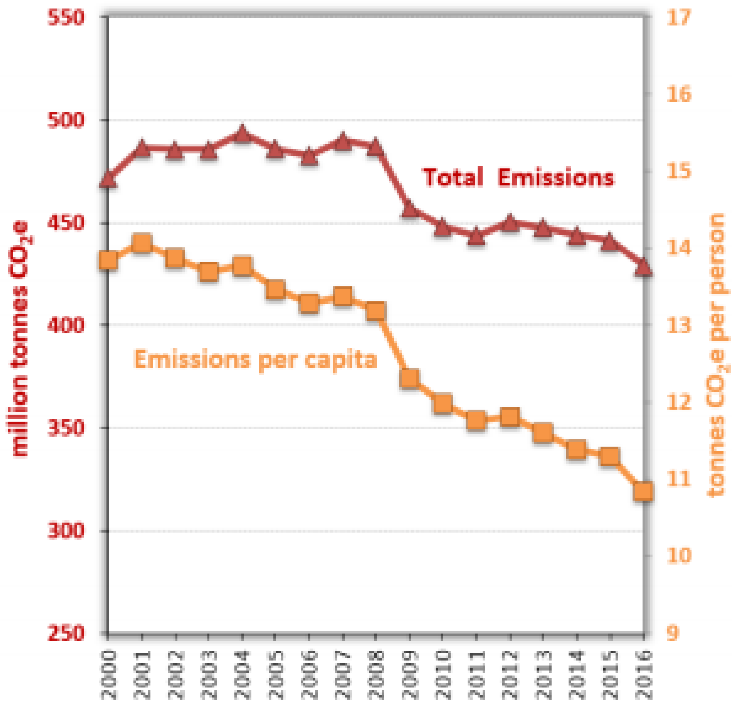
As illustrated in **Exhibit 25**, in 2016, California had a gross per capita emissions level of 10.8 MT $CO_2$e/person. This compares favorably with a value of 14.5 MT $CO_2$e/person in 1990 and 13.9 MT $CO_2$e/person in 2000.

The per capita comparison is a useful metric for emissions evaluation because it shows that emissions have not grown consistently with population, indicating that various regulatory programs and policies have achieved emission reductions.

*(Exhibit 25 on next page.)*

96 CARB (2018), "*0F1FCalifornia Greenhouse Gas Emissions for 2000 to 2016 – Trends of Emissions and Other Indicators.*" Available at: http://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2014/ghg_inventory_trends_00-14_20160617.pdf. Accessed: January 2019.

**Exhibit 25**
**Total California GHG Emissions and Emissions per Capita (2000 to 2016)**




Source: CARB, 2018, California Greenhouse Gas Emissions for 2000 to 2016

# 11 GREENHOUSE GASES: THRESHOLDS OF SIGNIFICANCE

## 11.1 APPENDIX G OF THE CEQA GUIDELINES

Per Appendix G of the CEQA Guidelines, the thresholds of significance for GHGs are:

a) Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

## 11.2 STATE OF CALIFORNIA

### 11.2.1 2020 TARGET

As previously discussed, AB 32 requires the State to return to its 1990 emissions level by 2020. Based on CARB's evaluation in the First Update, the AB 32 mandate equates to a 15% reduction from the estimated BAU emissions. Therefore, the significance evaluation that follows considers whether the proposed project's emissions would achieve a 15% reduction from the estimated BAU emissions, pursuant to the same assumptions used by CARB.

#### 11.2.2 POST-2020 TARGETS

As previously discussed, SB 32 requires a 40% reduction from 1990 levels by 2030, and Executive Order S-3-05 requires an 80% reduction from 1990 levels by 2050. Therefore, the significance evaluation that follows considers whether the proposed project's emissions would conflict with the emissions trends that need to be established to achieve these goals.

### 11.3 SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT

#### 11.3.1 CEQA GUIDANCE FOR LAND USE AGENCIES

In accordance with the SJVAPCD's *Guidance for Valley Land-Use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA*,[97] the significance evaluation that follows considers whether the proposed project's emissions would demonstrate a 29% reduction from the estimated BAU emissions.

Additionally, although not specifically issued to address GHGs, the SJVAPCD has published Air Quality Guidelines for General Plans that identify goals, policies and programs designed to reduce vehicle trips and miles traveled, as well as improve energy conservation. Projects with design features or mitigation measures that are consistent with these goals, policies and programs would reduce not only traditional air quality pollutants, but also GHGs. Therefore, the significance evaluation that follows considers whether the proposed project is consistent with the SJVAPCD's Air Quality Guidelines for General Plans.

### 11.4 KERN COUNCIL OF GOVERNMENTS

#### 11.4.1 2014 SUSTAINABLE COMMUNITIES STRATEGY

The significance evaluation that follows considers whether the proposed project is consistent with the VMT-based metrics, trends and objectives of KCOG's 2014 Sustainable Communities Strategy. This evaluation uniquely focuses on the project's mobile source-related emissions from passenger cars and light-duty trucks.

### 11.5 KERN COUNTY

#### 11.5.1 CLIMATE ACTION PLAN

The significance evaluation that follows considers whether the proposed project is consistent with the County's CAP, as provided by the Regional Transportation Plan and Sustainable Communities Strategy. The project will be part of the RTP area, and is expected to conform with RTP and SCS requirements.

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[97] SJVAPCD (December 2009), "*Guidance for Valley Land-Use Agencies in Addressing GHG Emission Impacts for New Projects Under CEQA.*" Available at: http://www.valleyair.org/Programs/CCAP/12-17-09/3%20CCAP%20-%20FINAL%20LU%20Guidance%20-%20Dec%2017%202009.pdf. Accessed: September 2016.

# 12 PROJECT IMPACTS

## 12.1 MODELS AND METHODS USED IN ANALYSIS

The project's development details for the emissions estimation models were determined through site plans, a Traffic Study, and supporting documentation. Construction is planned to begin in 2020 with operations starting in 2021.

An estimate for operations population count used in the **State Goals Comparison** graph, further in this section, were drawn from the number of planned employees tending to the facility during operation.

CalEEMod was used to estimate project-generated construction and operational GHG emissions. Operations emissions were estimated for Year 2021, which is the project's first full year of operations. Mobile, area, energy, water and solid waste source emissions were estimated based on regulatory requirements, PDFs, and mitigation measures. If no information was available, default values were used.

## 12.2 PROJECT-SPECIFIC ANALYSIS

### 12.2.1 EXISTING CONDITIONS

The property is mostly vacant land with some housing structures in the northeast portion. The surrounding land to the north, south, and west is primarily residential with empty land caddie corner, east, and south.

### 12.2.2 BUSINESS-AS-USUAL EMISSIONS

Business-As-Usual (BAU) is a term used by California agencies to describe the rate of greenhouse gas emissions assuming no climate regulations. It is a projection into the future of the greenhouse gases which could be emitted by projects based on current technologies and existing regulations in the absence of other reductions. BAU includes forecasted demographic and economic growth, whereas the historic CEQA baseline non- greenhouse gas impact analysis does not include any growth factors. Understanding this difference, between historic CEQA analyses and the Greenhouse Gas element of CEQA is critical to a reasoned analysis of Global Climate Change impacts. The baseline for greenhouse gases is BAU.

The Business-As-Usual emissions for the project are estimated assuming the same methodology used by CARB to forecast the state-wide emissions. This projection assumes no change in vehicle fleet mix over time, no intervening climate change reductions measures, strategies or actions, and no VMT reduction from the central location of the jobsite. (See **Appendix IX**, "Greenhouse Gas Emission Calculations")

**Table 12.3-1**
**Project GHG Emissions (Business-As-Usual)**

| Emission Source | Metric Tons/Year $CO_2e$ |
|---|---|
| Area-Source Emissions | 0.00673 |
| Energy-Source Emissions | 223.2036 |
| Mobile-Source Emissions | 1024.332 |
| Waste-Source Emissions | 49.7068 |
| Water-Source Emissions | 15.4046 |
| Total Emissions | 1312.6541 |

### 12.3.2.1 PROJECT UNMITIGATED/ MITIGATED [98]

The project does not have any project specific greenhouse gas mitigation measures, therefore the project's unmitigated GHG emissions are the same as the mitigated emissions. (See **Appendix VIII**, "Greenhouse Gas Emission Calculations")
By year 2020, the enforcement of the California Light-Duty Vehicle Greenhouse Gas Standards, Low Carbon Fuel Standard will reduce the greenhouse gas emissions from mobile sources by approximately 20%.[99] The adjustments for Pavley and Low Carbon Fuel Standards are only applicable for future years and do not impact EMFAC values prior to these regulations implementations (i.e, 1990, 2000, 2005, etc). These regulations are accounted for in CalEEmod based on burden mode EMFAC runs and the post-processor.

**Table 12.3-2**
**Project GHG Emissions (2021)**

| Emission Source | Metric Tons/Year $CO_2e$ |
|---|---|
| Area-Source Emissions | 0.00643 |
| Energy-Source Emissions | 223.2038 |
| Mobile-Source Emissions | 878.8951 |
| Waste-Source Emissions | 49.7068 |
| Water-Source Emissions | 15.4048 |
| Total Emissions | 1,167.2169 |

The percent reduction between the project's mitigated emission and Business-As-Usual (BAU) emissions for the project should be equal to or greater than 16%[100] to conform with the goals of AB 32 as indicated in the Scoping Plan supplement; the percent reduction between the project's mitigated emission and 2008 Scoping Plan Baseline emissions should be equal to or greater than 15% to conform with the goals of AB32; the percent reduction between the project's mitigated emission and BAU should be equal to or greater than 29% to conform with the goals of AB 32 in the

[98] This "unmitigated" value is calculated using the CalEEmod program in its currently adopted form with default settings with the exception that WZI conforms to the project specific trip lengths; since the project does not have mitigation measures, the unmitigated and mitigated are the same.
[99] California Air Resources Board, Climate Change Scoping Plan, May 2014
[100] California Air Resources Board, Aug, 2011, Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document

Climate Change Action Plan (CCAP) with SJVAPCD. Thereby BAU and 2008 Scoping Plan Baseline are both treated as a greenhouse gas baseline for the project level analysis[101].

**Table 12.3-3** below illustrate the project's greenhouse gas emissions compared to BAU and 2008 scoping plan baseline emissions. The percentage reductions does not meet the SJVAPCD required 29% from BAU or the 15% & 16% from AB32, explained further in section 12.3.2.2.

**TABLE 12.3-3**
**Comparison of Net BAU and Project Mitigated Emissions** (MT-$CO_2$e)

| Emission Source | Business-as-usual | Project Mitigated (2020) |
|---|---|---|
| Total Emissions | 1312.6541 | 1,167.2169 |
| Percentage Reduction | | 11.08% |
| Required Carbon Credit Amount | | 235.23 MT $CO_2$e |

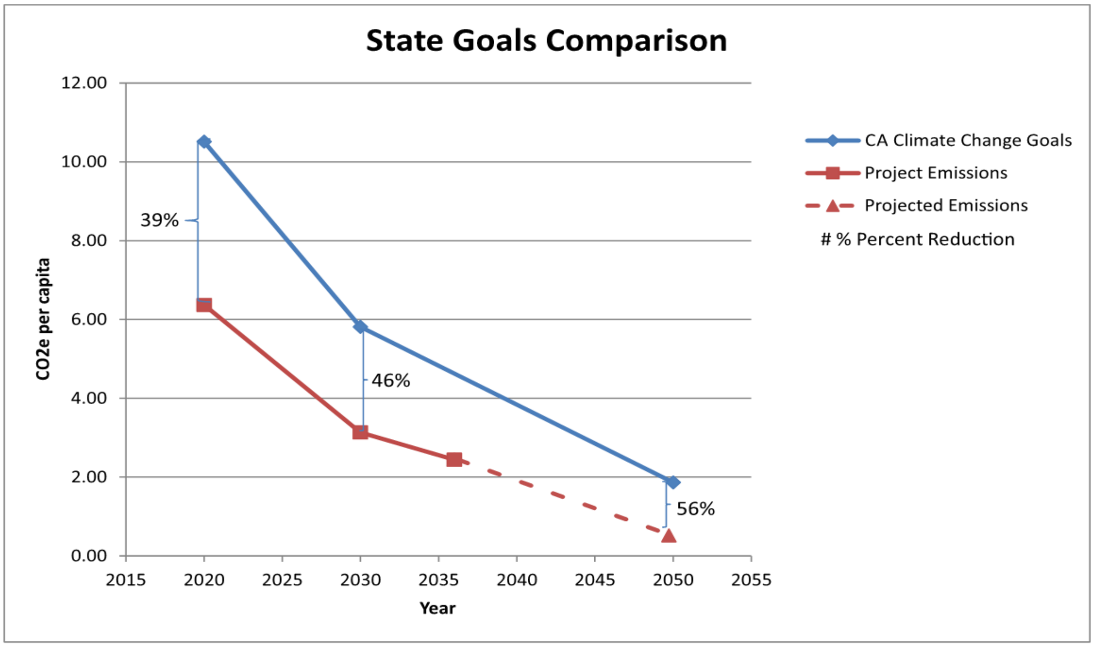
### 12.3.2.2 CONCLUSION REGARDING PROJECT SPECIFIC IMPACTS

The 15%, 16%, & 29% GHG emission reduction compared to BAU has not been met (**Table 12.3-3**). The required GHG reductions are an estimate. Once a project is developed the project will require GHG reductions, or the purchase of Emission Reduction Credits (ERC's). The project will require the purchase of 235.23 MT $CO_2$e carbon credits to meet the 29% reduction.

## 12.2.3 POST-2020 TARGETS

As illustrated in the State Goals Comparison chart on the following page, the project's emissions trajectory is lower than the State's emissions trajectory on a per capita basis in 2020 and 2030. Specifically, as the chart below demonstrates, the project's per capita emissions remain below state goals through 2035, and if additional reductions from statewide efforts to reach the 2050 goal are applied, the project can be predicted to remain below statewide goals through 2050, and thereby would not obstruct the State's efforts to achieve its post-2020 goals. That being said, it should be noted that the State's inventory data includes sectors/sources not captured by this project.

[101] CARB, Climate Change Scoping Plan, Dec 2008, Pg 108




*Service population used in the calculation of CO2e per capita was determined by estimating employment and using that number as population. This value is seen as an overestimation and accounts for the individuals working onsite. 44 Employees per Fast-food restaurant, 10 employees for convenience market with gasoline pumps, and 103 employees for shopping center. Number of employees was based on square feet per employee: 50sqft/EMP – Fast food restaurants, 400sqft/EMP – Shopping center, Gasoline and service station = 10 EMP

## 12.3.4 EVALUATION OF SIGNIFICANCE

Per Appendix G of the CEQA Guidelines, the thresholds of significance for GHGs, and project analysis for each are:

a) *Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?*

   As discussed in the analysis above, due to project features, and offsetting emissions through Emissions Reduction Credits, the project will not generate GHG emissions that may have a significant impact on the environment.

b) *Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?*

The project will conform with all applicable state and local plans, policies, and regulations. Because the project does not exceed significance thresholds for either threshold, the Greenhouse Gas emissions impact of the project is *less than significant*.

# 13 VALLEY FEVER EXPOSURE

Coccidioidomycosis, more commonly known as "Valley Fever," is an infection caused by inhalation of the spores of the Coccidioides Immitis fungus, which grows in the soils of the southwestern United States. The fungus is very prevalent in the soils of California's San Joaquin Valley, particularly in Kern County. The ecologic factors that appear to be most conducive to survival and replication of the spores are high summer temperatures, mild winters, sparse rainfall, and alkaline, sandy soils.

Based on skin test surveys, the incidence of Valley Fever is between 25,000 and 100,000 new infections per year, with 70 deaths annually in the United States. It is difficult to determine the exact number of primary pulmonary and disseminated (cases in which the spores spread throughout the body) cases contracted annually, since diagnosis and reporting of cases is very incomplete. In Kern County, data from laboratory test reports indicate the occurrence of about 270 symptomatic infections per year, including 12 disseminated cases with an average of 5 deaths annually.

At least 60 percent of primary coccidioidomycosis is acquired symptomatically, with a positive result on a skin test being the only manifestation of infection. Forty percent of the infections become symptomatic with a disease spectrum ranging from mild influenza-like illness to a fulminating dissemination resulting in death. Primary coccidioidomycosis is limited to the initial lesions in the lungs where symptoms typically include fever, which may be 99 to 104 degrees Fahrenheit, chills, profuse sweating at night, and chest pain, which may worsen to include coughing, loss of appetite, headache, generalized muscle and joint aches, and slight swelling and redness of the joints. The prognosis of primary coccidioidomycosis is usually reliable and symptoms generally clear within two or three weeks. Patients whose symptoms persist after 6 to 8 weeks may be considered to have persistent pulmonary coccidioidomycosis.

Dissemination of coccidioidomycosis to sites in the body other than the lungs usually occurs within the first or second month and can cause a variety of symptoms. Dissemination may involve any organ of the body, except those in the gastrointestinal tract. The skin, bones, joints, meninges, and genitourinary system are most commonly involved. Involvement of a vital organ may result in death. Meningitis occurs in one-third to one-half of all patients with disseminated disease. Untreated coccidioidal meningitis is usually fatal within less than two years.

The five major factors that have an effect on the susceptibility to coccidioidal dissemination are race, sex, pregnancy, age and immunosuppression. In a retrospective study of the Kern County Health Department records, 64 deaths were recorded for the period 1901 to 1936, when the County had a population of 82,570. According to this data, Mexicans were 3.4 times more likely than whites to develop coccidioidal dissemination; blacks were 13.7 times more likely; and Filipinos were 175.5 times more likely. Death due to the disease was five times greater for Mexicans, 23.3 times greater for blacks, and 191.4 times greater for Filipinos than for white patients. Adult white females are ordinarily quite resistant to dissemination of the disease, but if they acquire the infection during the last half of pregnancy, there is a risk that it will spread beyond the lungs. Children under five and older individuals, perhaps those above fifty, also appear to be more likely to undergo dissemination of the infection.

The highest incidence rates within Kern County have occurred in the areas of Northeast Bakersfield, Lamont-Arvin, Taft, and Edwards Air Force Base. New residents to the San Joaquin Valley have usually never been exposed to "Valley Fever," and as a result are particularly susceptible to the infection. Many longtime residents of the area have at some time been exposed to the fungus, become infected, and have recovered, and are thus immune. However, occasionally, changes in the person's immune system brought about by other diseases or treatments which lower or suppress the immune system can allow a reactivation or reinfection.[102]

The soils in the areas of Arvin and Lamont are derived from decomposing Quaternary alluvial fan deposits. These, however, are sourced from Mesozoic Sierran granitic rocks having a different mineralogical and consequent chemical content than the soil in the area of the project. The soils in the area of Edwards Air Force Base are composed of decomposed, reworked non-marine alluvium, evaporite playa, sand, and terrace deposits. These have been derived from various Mesozoic granitic rocks. The increased aridity and prevalence of evaporites would alter the chemical composition, as compared to the soil in the area of the project, which forms in a wetter environment. The soils in the Taft area are mainly sourced from the nearby outcropping marine Miocene Monterey Formation consisting mainly of sands, silts and diatomites. These again should form a somewhat dissimilar mineralogical and consequent chemical content than the soil in the area of the project. The soils in the area of Sharks Tooth Hill in Northeast Bakersfield which is endemic for San Joaquin Valley Fever, *Coccidioidomycosis,* is composed of the decomposed marine Round Mountain Silt Member of the Miocene Monterey Formation. The soil in the area of the project is derived from decomposing Quaternary fluvial deposits as sourced from the Sierra Nevada Mountains, composed of Cretaceous granites. This rock type would lead to similar soils based upon the similar mineralogical and consequent chemical content. [103, 104]

The subject project area is not underlain by the type of sediments that are known to contain Valley Fever spores. Considering the SJVAPCD Regulation VIII dust control measures, the risk of contracting Valley Fever in connection with the cumulative impact of the subject projects is considered to be unlikely.

[102] http://www.vfce.arizona.edu/FAQ.htm#howdoigetvelleyfever

[103] United States Department of Agriculture, Soil Survey of Kern County California Northwestern Part, "Sheet NO. 30, Kern County, California" (Rosedale Quadrangle). 1988.

[104] State of California, Department of Conservation, Division of Mines and Geology, "Geologic Map of California," Bakersfield Sheet. 1964.

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Green California Website: http://www.green.ca.gov/default.htm
http://www.arb.ca.gov/cc/inventory/data/forecast.htm#summary_forescast
http://www.eia.doe.gov/oiaf/1605/state/state_emissions.html
http://www.epa.gov/climatechange/emissions/index.html
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Institute for Local Government California Climate Action Network: http://www.cacities.org/index.jsp?displaytype=&section=climate&zone=ilsg
Intergovernmental Panel on Climate Change: http://www.ipcc.ch/
Local Governments for Sustainability (ICLEI): http://www.iclei.org
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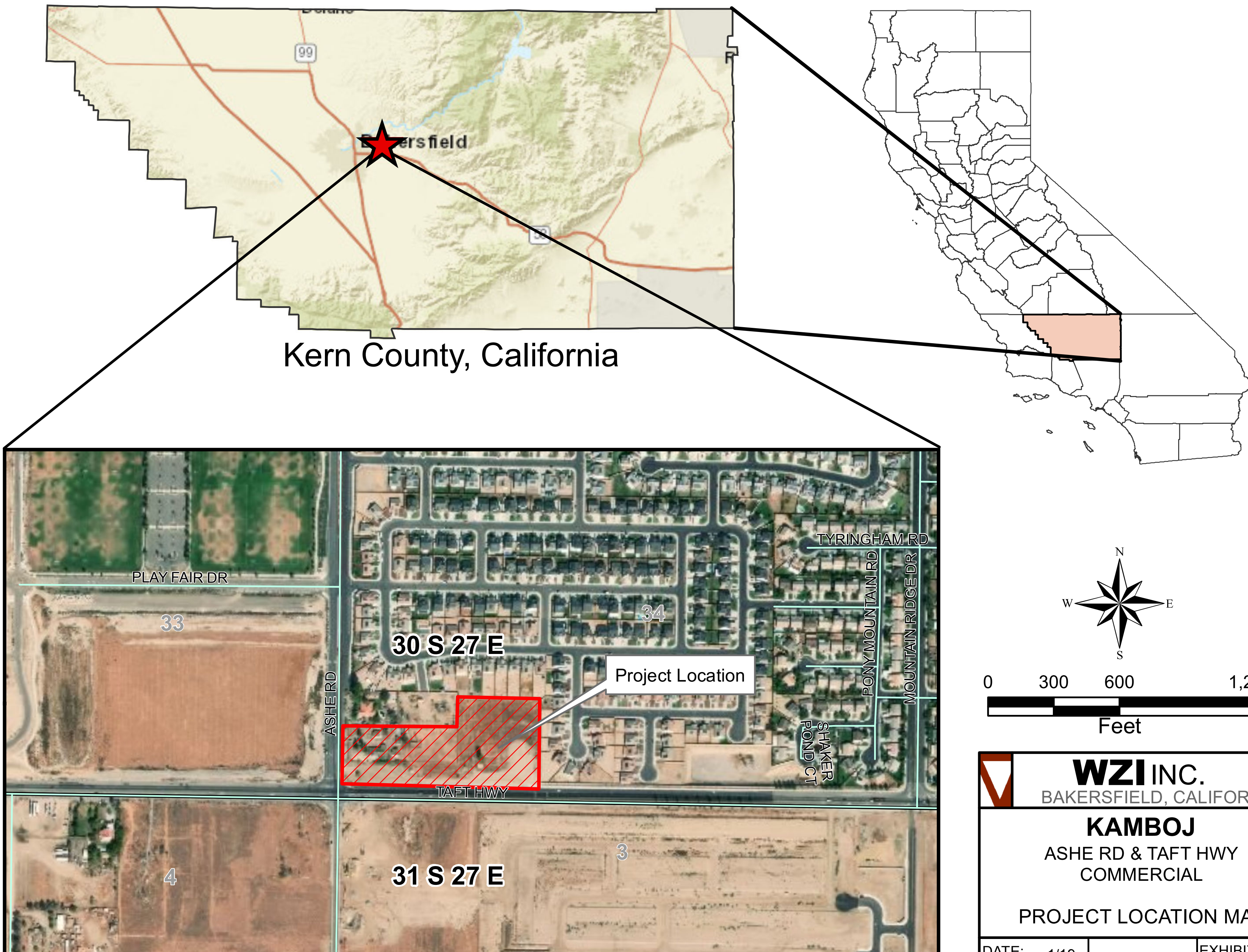
United States Environmental Protection Agency: http://www.epa.gov/climatechange/policy/index.html
Western Climate Initiative: http://www.westernclimateinitiative.org

Exhibits

Exhibit 1

Project Location Map




**WZI** INC.
BAKERSFIELD, CALIFORNIA

**KAMBOJ**
ASHE RD & TAFT HWY
COMMERCIAL

PROJECT LOCATION MAP

| DATE: | 1/19 | | EXHIBIT: | 1 |
|---|---|---|---|---|

Exhibit 2

Land Use Designations

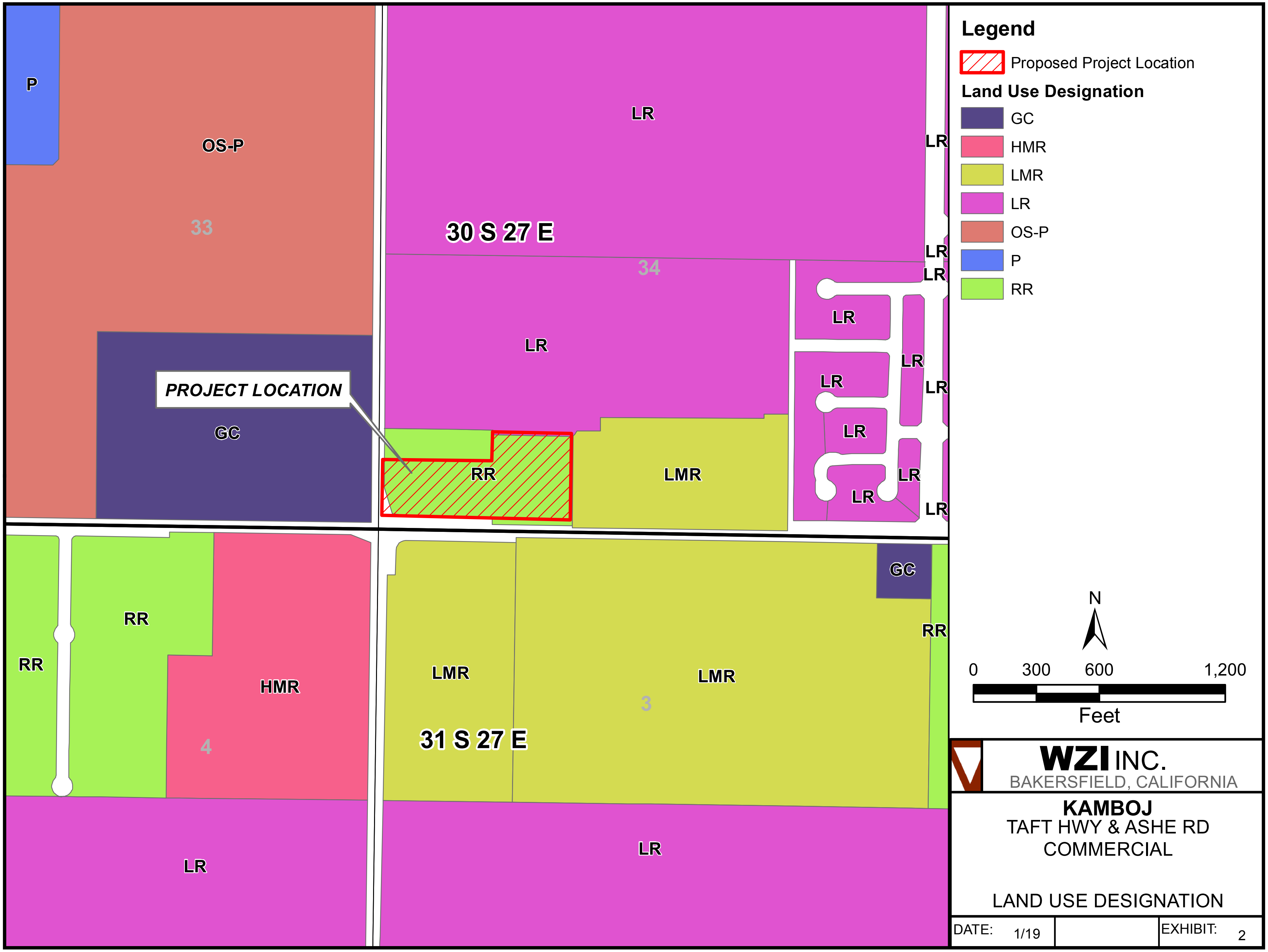
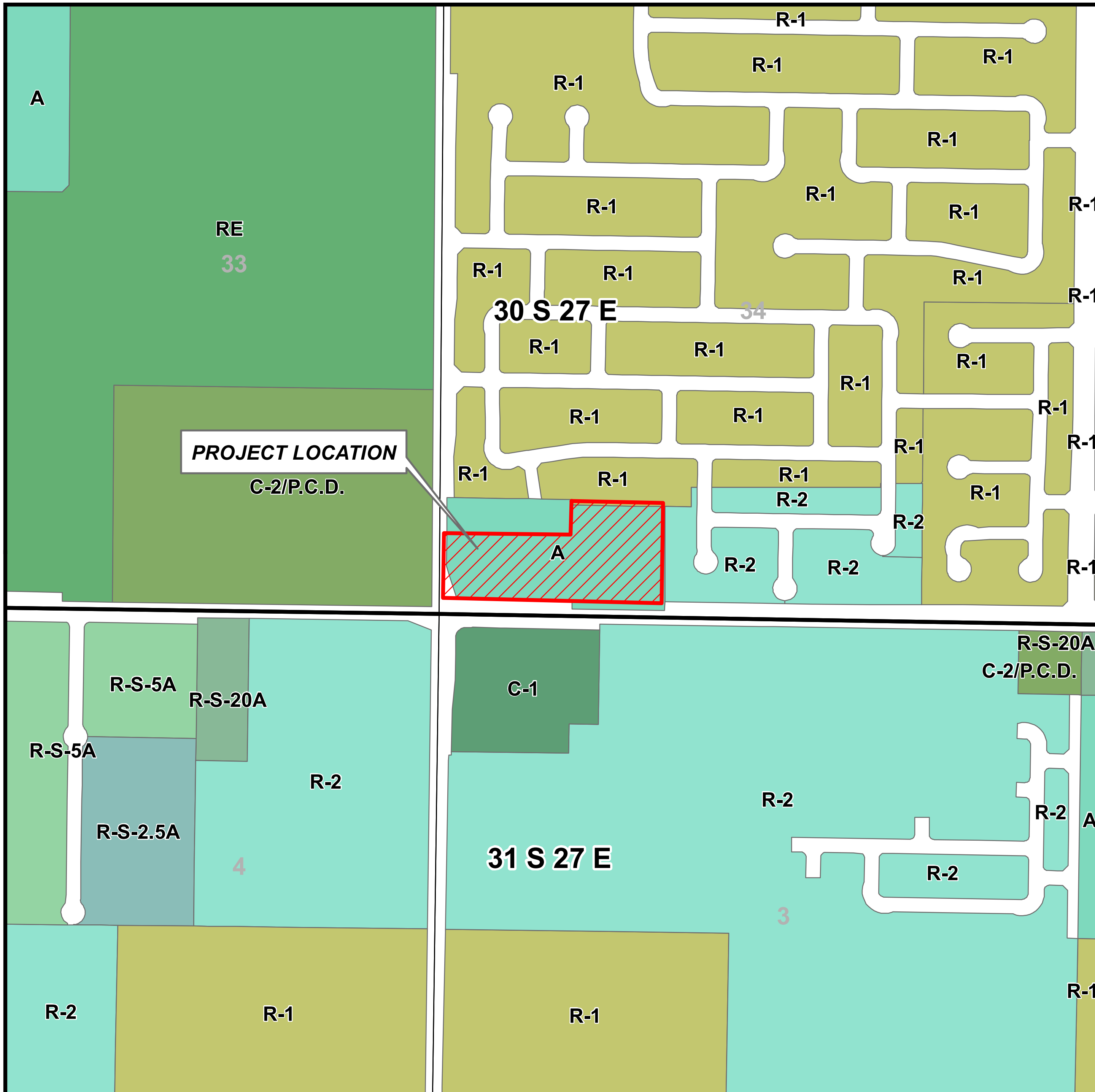

P
OS-P
33
LR
30 S 27 E
34
LR
PROJECT LOCATION
GC
RR
LMR
LR
GC
RR
HMR
4
LMR
31 S 27 E
3
LR
Legend
Proposed Project Location
Land Use Designation
GC
HMR
LMR
LR
OS-P
P
RR
N
0 300 600 1,200
Feet
WZI INC.
BAKERSFIELD, CALIFORNIA
KAMBOJ
TAFT HWY & ASHE RD
COMMERCIAL
LAND USE DESIGNATION
DATE: 1/19
EXHIBIT: 2

Exhibit 3

Zoning Map




**Legend**

Proposed Project Location

**Zone Designation**

- A Agricultural
- C-1 Limited Commercial
- C-2 Combining
- R-1 One Family Dwelling
- R-2 Limited Multiple Family Dwelling Zone - 1 unit/2,500 sq. ft.
- R-S-2.5A Residential Suburban - 2.5 acre minimum
- R-S-20A Residential Suburban - 20 acre minimum
- R-S-5A Residential Suburban - 5 acre minimum
- RE RECREATION

N

0 300 600 1,200
Feet

**WZI** INC.
BAKERSFIELD, CALIFORNIA

**KAMBOJ**
TAFT HWY & ASHE RD
COMMERCIAL

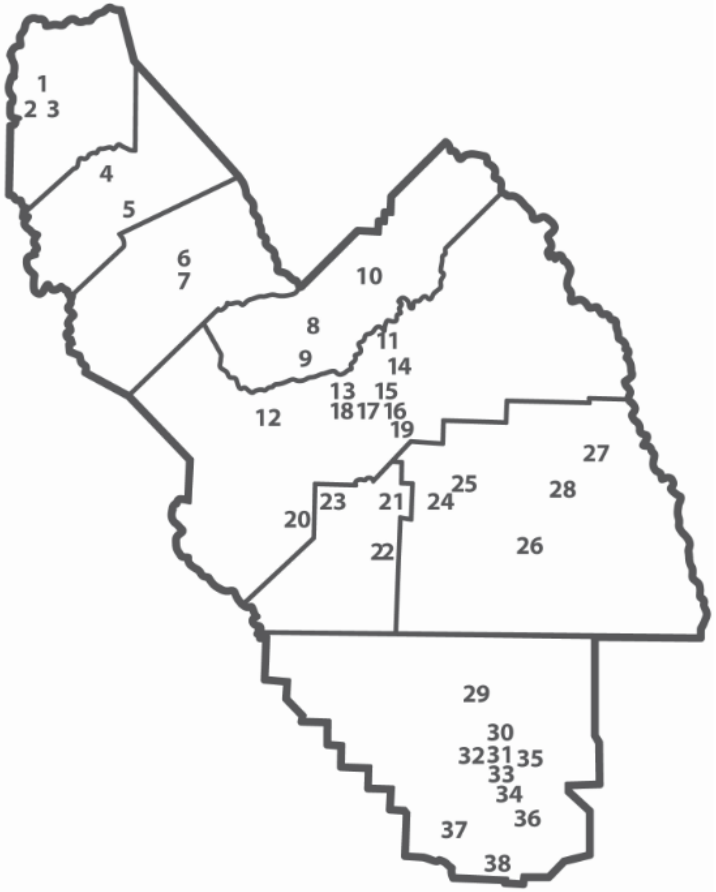
ZONING MAP

| DATE: 1/19 | | EXHIBIT: 3 |
|---|---|---|

Exhibit 4

SJVAPCD Monitoring Station Locations

# Air Monitoring Sites in Operation




As of July 2018

**SAN JOAQUIN COUNTY**
- ■ 1 Stockton-Hazelton: G, M, P, F, T
- ★ 2 Tracy-Airport: G, M, P, F
- ★ 3 Manteca: P, F, M

**STANISLAUS COUNTY**
- ■ 4 Modesto-14th St: G, M, P, F
- ★ 5 Turlock: G, M, P, F

**MERCED COUNTY**
- ★ 6 Merced-M St: P, F
- ★ 7 Merced-Coffee: G, F, M

**MADERA COUNTY**
- ★ 8 Madera City: G, P, F, M
- ★ 9 Madera-Pump Yard: G, M

**Other[1]:**
Chukchansi Indians
- ▲ 10 Picayune Rancheria: G, F, P, M

**FRESNO COUNTY**
**Other[1]:**
Monache Tribe/Foothill Yokut Indians
- ▲ 11 Table Mountain AMS⁺: G, F, P, M
- ★ 12 Tranquillity: G, F, M
- ★ 13 Fresno-Sky Park: G, M
- ★ 14 Clovis: G, M, P, F
- ■ 15 Fresno-Garland: G, M, P, F, T, N, L
- ★ 16 Fresno-Pacific: F
- ★ 17 Fresno-Drummond: G, P, M
- ★ 18 Fresno-Foundry: G, M
- ★ 19 Parlier: G, M
- ★ 20 Huron: F, M

**KINGS COUNTY**
- ★ 21 Hanford: G, F, M, P
- ★ 22 Corcoran: F, M, P

**Other[1]:**
Tachi Yokut Tribe
- ▲ 23 Santa Rosa Rancheria: G, M, P

**TULARE COUNTY**
- ★ 24 Visalia Airport: M
- ■ 25 Visalia-Church St: G, F, M, P
- ★ 26 Porterville: G, F, M

**Other[2]:**
- ▲ 27 Lower Kaweah: A, G, M
- ▲ 28 Ash Mountain: A, G, M, F

**KERN COUNTY**
- ● 29 Shafter: G, M
- ■ 30 Oildale: G, M, P
- ★ 31 Bakersfield-Golden/M St: F, P
- ■ 32 Bakersfield-Calif Ave: A, G, M, P, F, T
- ★ 33 Bakersfield-Muni: G, M
- ■ 34 Bakersfield-Airport (Planz): F
- ■ 35 Edison: G, M
- ■ 36 Arvin-Di-Giorgio: G, M
- ★ 37 Maricopa: G, M
- ★ 38 Lebec: F, M

**MONITORING OPERATION**
- ★ Sites operated by the District
- ● Sites operated by the District & CARB
- ■ Sites operated by CARB
- ▲ Sites operated by other agencies
  - Other[1] Tribal
  - Other[2] National Park Service
- ⁺ Air Monitoring Station (AMS)

**MONITORING DESIGNATIONS**

| | | | |
|---|---|---|---|
| A | Acid Deposition | P | Particulate (PM10) |
| F | Fine Particulate (PM2.5) | N | National Core |
| G | Gaseous | T | Toxins |
| M | Meteorological | L | Lead |

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

**WZI INC.**
BAKERSFIELD, CALIFORNIA

**KAMBOJ**
TAFT HWY & ASHE RD
COMMERCIAL

SJVAPCD MONITORING STATION LOCATIONS

DATE: 1/19 | EXHIBIT: 4

Exhibit 5

Site Location-100 Kilometer Radius


**Legend**

- 100km Radius
- Class 1 Hazards
- Proposed Project Location

N

0 12.5 25 50

Kilometers

**WZI INC.**
BAKERSFIELD, CALIFORNIA

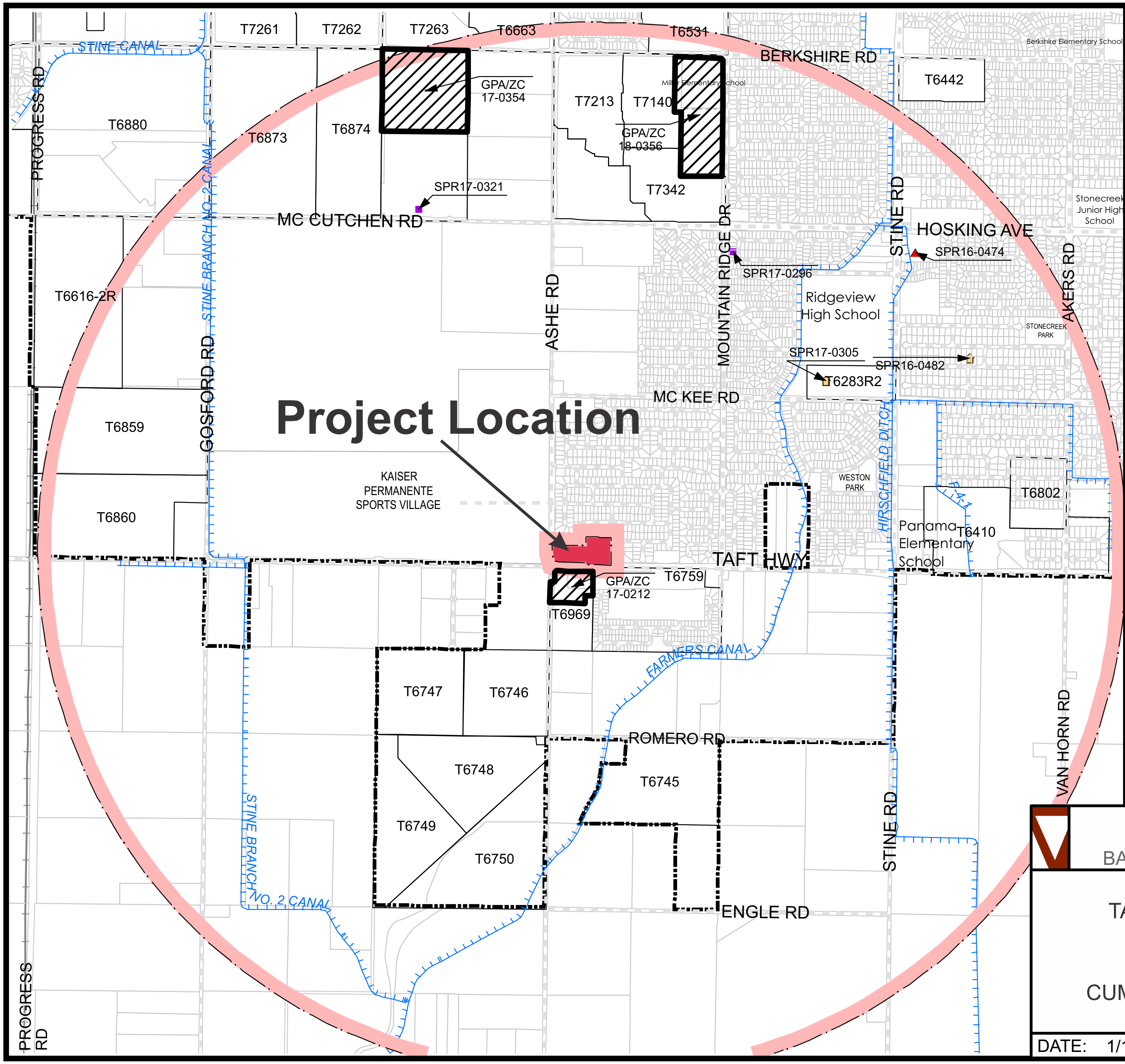
**KAMBOJ**
TAFT HWY & ASHE RD
COMMERCIAL

SITE LOCATION
100 KILOMETER RADIUS

| DATE: 1/19 | | EXHIBIT: 5 |
|---|---|---|

Exhibit 6

Cumulative Projects Radius Map




# Legend

Projects of Interest

1.5 Mile Radius

**NOTE:** Map is modified by WZI inc from an original provided by the Kern County Planning Deparment.

N

0 1,000 2,000
Feet

**WZI INC.**
BAKERSFIELD, CALIFORNIA

**KAMBOJ**
TAFT HWY & ASHE RD
COMMERCIAL

CUMULATIVE PROJECTS -
1.5-MILE RADIUS

| DATE: | 1/19 | | EXHIBIT: | 6 |
|---|---|---|---|---|

# Appendices

Appendix I

Project Specific CalEEMod 2016.3.2 Inputs and Outputs (included in PDF)

# Appendix II

Traffic Study (included in PDF)

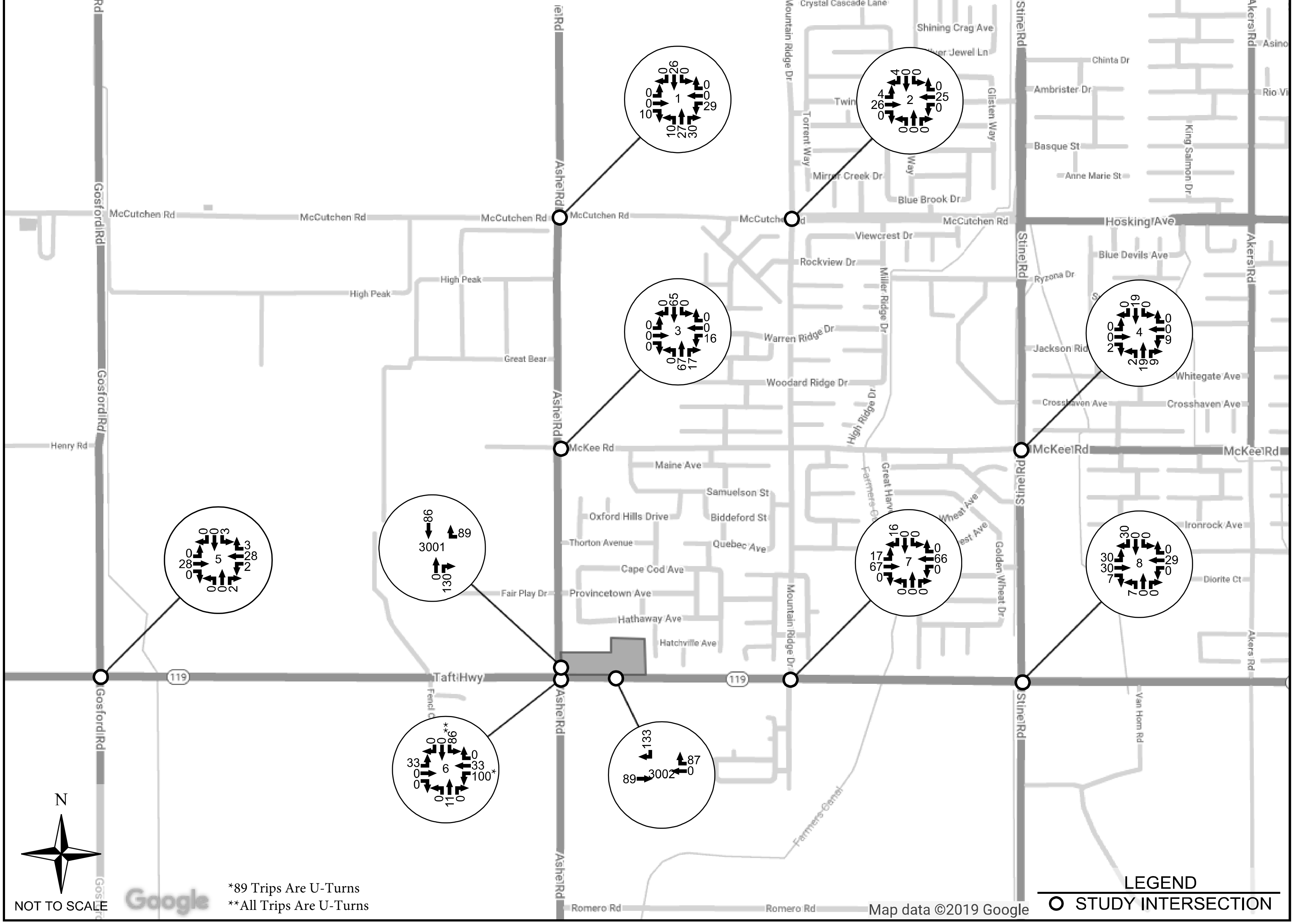
# Trip Generation

For Proposed Taft Hwy and Ashe Rd Commercial Center

1/7/2019

| General Information | | | Daily Trips | | AM Peak Hour Trips | | | PM Peak Hour Trips | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ITE Code | Development Type | Variable | ADT RATE | ADT | Rate | In % Split/ Trips | Out % Split/ Trips | Rate | In % Split/ Trips | Out % Split/ Trips |
| 934 | Fast-Food Restaurant w/Drive-Thru | 2.2<br>1000 sq ft GFA | 470.95 | 1036 | 40.19 | 51%<br>45 | 49%<br>43 | 32.67 | 52%<br>37 | 48%<br>34 |
| 934 | Fast-Food Restaurant w/Drive-Thru | 1.9<br>1000 sq ft GFA | 470.95 | 895 | 40.19 | 51%<br>39 | 49%<br>37 | 32.67 | 52%<br>32 | 48%<br>30 |
| 820 | Shopping Center | 41.43<br>1000 sq ft GLA | eq | 3302 | eq | 62%<br>107 | 38%<br>66 | eq | 48%<br>136 | 52%<br>147 |
| 853 | Convenience Market with Gasoline Pumps | 2.7<br>1000 sq ft GFA | 624.2 | 1685 | 40.59 | 50%<br>55 | 50%<br>55 | 49.29 | 50%<br>67 | 50%<br>67 |
| sub-total | | | | 6,918 | | 246 | 201 | | 272 | 278 |
| *Adjustments* | | | | | | | | | | |
| Capture | | 5% | | 346 | | 12 | 10 | | 14 | 14 |
| Pass-by | | 15% | | 1,038 | | 37 | 30 | | 41 | 42 |
| Total | | | | 5,534 | | 197 | 161 | | 217 | 222 |

# SCOPE MAP


Berkshire Rd
McCutchen Rd
Hosking Ave
High Peak
Great Bear
Henry Rd
McKee Rd
Taft Hwy
119
Gosford Rd
Ashe Rd
Mountain Ridge Dr
Stine Rd
Akers Rd
Romero Rd
N
NOT TO SCALE
*89 Trips Are U-Turns
**All Trips Are U-Turns
Map data ©2019 Google
LEGEND
STUDY INTERSECTION

## Taft & Ashe Commercial Development Fleet Mix

| LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.552 | 0.2424 | 0.11 | 0.0542 | 0.0014 | 0.0009 | 0.009 | 0.0206 | 0 | 0.0044 | 0.0026 | 0.0009 | 0.0016 |

# Appendix III

# AERMOD Criteria Pollutant Impacts

**CONSTRUCTION AERMOD RESULTS** All Units: (μg/m³)

| 2013 | 1-HR | 3-HR | 8-HR | 24-HR | ANNUAL |
|---|---|---|---|---|---|
| CO | 151.5479 | | 55.27433 | | |
| NOX | 178.7726 | | | | 10.35834 |
| PM2.5 | | | | 2.64556 | 0.76242 |
| PM10 | | | | 3.62515 | 1.04478 |
| SOX | 0.25241 | 0.13881 | | 0.05075 | 0.01463 |

| 2014 | 1-HR | 3-HR | 8-HR | 24-HR | ANNUAL |
|---|---|---|---|---|---|
| CO | 127.4543 | | 55.32913 | | |
| NOX | 150.3508 | | | | 9.13237 |
| PM2.5 | | | | 2.09796 | 0.66458 |
| PM10 | | | | 2.94244 | 0.90469 |
| SOX | 0.21228 | 0.11543 | | 0.0386 | 0.01289 |

| 2015 | 1-HR | 3-HR | 8-HR | 24-HR | ANNUAL |
|---|---|---|---|---|---|
| CO | 101.2399 | | 40.06595 | | |
| NOX | 119.427 | | | | 9.32171 |
| PM2.5 | | | | 1.90585 | 0.66046 |
| PM10 | | | | 2.66137 | 0.88484 |
| SOX | 0.16862 | 0.10046 | | 0.03535 | 0.01316 |

| 2016 | 1-HR | 3-HR | 8-HR | 24-HR | ANNUAL |
|---|---|---|---|---|---|
| CO | 99.48324 | | 47.29507 | | |
| NOX | 117.3548 | | | | 9.49463 |
| PM2.5 | | | | 2.05039 | 0.68598 |
| PM10 | | | | 2.89205 | 0.92987 |
| SOX | 0.1657 | 0.11505 | | 0.03733 | 0.01341 |

| 2017 | 1-HR | 3-HR | 8-HR | 24-HR | ANNUAL |
|---|---|---|---|---|---|
| CO | 103.1443 | | 46.42601 | | |
| NOX | 121.6736 | | | | 9.32334 |
| PM2.5 | | | | 1.83117 | 0.69735 |
| PM10 | | | | 2.5471 | 0.96434 |
| SOX | 0.17179 | 0.10722 | | 0.03421 | 0.01316 |

| AVERAGE | 1-HR | 3-HR | 8-HR | 24-HR | ANNUAL |
|---|---|---|---|---|---|
| CO | 116.5739 | | 48.8781 | | |
| NOX | 137.5158 | | | | 9.526078 |
| PM2.5 | | | | 2.106186 | 0.694158 |
| PM10 | | | | 2.933622 | 0.945704 |
| SOX | 0.19416 | 0.115394 | | 0.039248 | 0.01345 |

| MAX | 1-HR | 3-HR | 8-HR | 24-HR | ANNUAL |
|---|---|---|---|---|---|
| CO | 151.5479 | | 55.32913 | | |
| NOX | 178.7726 | | | | 10.35834 |
| PM2.5 | | | | 2.64556 | 0.76242 |
| PM10 | | | | 3.62515 | 1.04478 |
| SOX | 0.25241 | 0.13881 | | 0.05075 | 0.01463 |

| Standard | 1-HR | 3-HR | 8-HR | 24-HR | ANNUAL |
|---|---|---|---|---|---|
| CO | 23,000 | | 10,000 | | |
| NOX | 188 | | | | 57 |
| PM2.5 | | | | 35 | 12 |
| PM10 | | | | 50 | 20 |
| SOX | 196 | 1300 | | 105 | 78 |

| Pass/Fail | 1-HR | 3-HR | 8-HR | 24-HR | ANNUAL |
|---|---|---|---|---|---|
| CO | PASS | | PASS | | |
| NOX | PASS | | | | PASS |
| PM2.5 | | | | PASS | PASS |
| PM10 | | | | PASS | PASS |
| SOX | PASS | PASS | | PASS | PASS |

**PASS**

# Appendix IV

# Project Specific U.S. EPA VISCREEN Model Results

Visual Effects Screening Analysis for
Source: DMS
Class I Area: San Rafael Wilderness

*** Level-1 Screening ***

Input Emissions for

| | | |
|---|---|---|
| Particulates | 0.00 | TON/YR |
| NOx (as NO2) | 0.00 | TON/YR |
| Primary NO2 | 0.00 | TON/YR |
| Soot | 0.00 | TON/YR |
| Primary SO4 | 0.00 | TON/YR |

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

| | | |
|---|---|---|
| Background Ozone: | 0.04 | ppm |
| Background Visual Range: | 243.00 | km |
| Source-Observer Distance: | 94.00 | km |
| Min. Source-Class I Distance: | 94.00 | km |
| Max. Source-Class I Distance: | 121.00 | km |
| Plume-Source-Observer Angle: | 11.25 | degrees |

Stability: 6
Wind Speed: 1.00 m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

| | | | | | Delta E | | Contrast | |
|---|---|---|---|---|---|---|---|---|
| Backgrnd | Theta | Azi | Distance | Alpha | Crit | Plume | Crit | Plume |
| SKY | 10. | 136. | 121.0 | 32. | 2.00 | 0.000 | 0.05 | 0.000 |
| SKY | 140. | 136. | 121.0 | 32. | 2.00 | 0.000 | 0.05 | 0.000 |
| TERRAIN | 10. | 136. | 121.0 | 32. | 2.00 | 0.000 | 0.05 | 0.000 |
| TERRAIN | 140. | 136. | 121.0 | 32. | 2.00 | 0.000 | 0.05 | 0.000 |

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE NOT Exceeded

| | | | | | Delta E | | Contrast | |
|---|---|---|---|---|---|---|---|---|
| Backgrnd | Theta | Azi | Distance | Alpha | Crit | Plume | Crit | Plume |
| SKY | 10. | 155. | 167.1 | 14. | 2.00 | 0.000 | 0.05 | 0.000 |
| SKY | 140. | 155. | 167.1 | 14. | 2.00 | 0.000 | 0.05 | 0.000 |
| TERRAIN | 10. | 0. | 1.0 | 169. | 6.46 | 0.000 | 0.16 | 0.000 |
| TERRAIN | 140. | 0. | 1.0 | 169. | 4.15 | 0.000 | 0.16 | 0.000 |

Visual Effects Screening Analysis for
Source: DMS
Class I Area: Domeland Wilderness

*** Level-1 Screening ***

Input Emissions for

| | | |
|---|---|---|
| Particulates | 0.00 | TON/YR |
| NOx (as NO2) | 0.00 | TON/YR |
| Primary NO2 | 0.00 | TON/YR |
| Soot | 0.00 | TON/YR |
| Primary SO4 | 0.00 | TON/YR |

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

| | | |
|---|---|---|
| Background Ozone: | 0.04 | ppm |
| Background Visual Range: | 249.00 | km |
| Source-Observer Distance: | 68.40 | km |
| Min. Source-Class I Distance: | 68.40 | km |
| Max. Source-Class I Distance: | 101.00 | km |
| Plume-Source-Observer Angle: | 11.25 | degrees |
| Stability: | 6 | |
| Wind Speed: | 1.00 | m/s |

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

| | | | | | Delta E | | Contrast | |
|---|---|---|---|---|---|---|---|---|
| Backgrnd | Theta | Azi | Distance | Alpha | Crit | Plume | Crit | Plume |
| SKY | 10. | 147. | 101.0 | 21. | 2.00 | 0.000 | 0.05 | 0.000 |
| SKY | 140. | 147. | 101.0 | 21. | 2.00 | 0.000 | 0.05 | 0.000 |
| TERRAIN | 10. | 147. | 101.0 | 21. | 2.00 | 0.000 | 0.05 | 0.000 |
| TERRAIN | 140. | 147. | 101.0 | 21. | 2.00 | 0.000 | 0.05 | 0.000 |

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE NOT Exceeded

| | | | | | Delta E | | Contrast | |
|---|---|---|---|---|---|---|---|---|
| Backgrnd | Theta | Azi | Distance | Alpha | Crit | Plume | Crit | Plume |
| SKY | 10. | 0. | 1.0 | 169. | 2.66 | 0.000 | 0.06 | 0.000 |
| SKY | 140. | 0. | 1.0 | 169. | 2.00 | 0.000 | 0.06 | 0.000 |
| TERRAIN | 10. | 0. | 1.0 | 169. | 2.29 | 0.000 | 0.06 | 0.000 |
| TERRAIN | 140. | 0. | 1.0 | 169. | 2.00 | 0.000 | 0.06 | 0.000 |

Appendix V

HARP Health Risk Impacts – MEIR

**HARP - Air Dispersion Modeling and Risk Tool v18159 - Construction Worker Cancer Risk
**1/30/2019
**Exported Risk Results

| REC | X | Y | RISK_SUM | SCENARIO | INHAL_RISK | |
|---|---|---|---|---|---|---|
| 574 | 311462.4 | 3904648 | 1.11E-08 | 1YrCancerDerived_InhSoilDerm | 1.11E-08 | HIGHEST RISK |
| 573 | 311412.8 | 3904649 | 1.09E-08 | 1YrCancerDerived_InhSoilDerm | 1.09E-08 | |
| 575 | 311506 | 3904647 | 1.08E-08 | 1YrCancerDerived_InhSoilDerm | 1.08E-08 | |
| 585 | 311479.1 | 3904728 | 1.04E-08 | 1YrCancerDerived_InhSoilDerm | 1.04E-08 | |
| 576 | 311549.6 | 3904646 | 9.89E-09 | 1YrCancerDerived_InhSoilDerm | 9.89E-09 | |
| 572 | 311363.2 | 3904651 | 9.80E-09 | 1YrCancerDerived_InhSoilDerm | 9.80E-09 | |
| 565 | 311319.2 | 3904705 | 9.74E-09 | 1YrCancerDerived_InhSoilDerm | 9.74E-09 | |
| 586 | 311439.3 | 3904729 | 9.54E-09 | 1YrCancerDerived_InhSoilDerm | 9.54E-09 | |
| 566 | 311318.8 | 3904678 | 9.33E-09 | 1YrCancerDerived_InhSoilDerm | 9.33E-09 | |
| 587 | 311399.4 | 3904730 | 9.21E-09 | 1YrCancerDerived_InhSoilDerm | 9.21E-09 | |
| 588 | 311359.5 | 3904731 | 8.85E-09 | 1YrCancerDerived_InhSoilDerm | 8.85E-09 | |
| 567 | 311319.6 | 3904669 | 8.55E-09 | 1YrCancerDerived_InhSoilDerm | 8.55E-09 | |
| 564 | 311319.7 | 3904732 | 8.15E-09 | 1YrCancerDerived_InhSoilDerm | 8.15E-09 | |
| 568 | 311320.4 | 3904665 | 8.03E-09 | 1YrCancerDerived_InhSoilDerm | 8.03E-09 | |
| 578 | 311593.3 | 3904658 | 7.70E-09 | 1YrCancerDerived_InhSoilDerm | 7.70E-09 | |
| 577 | 311593.2 | 3904645 | 7.31E-09 | 1YrCancerDerived_InhSoilDerm | 7.31E-09 | |
| 569 | 311322.4 | 3904658 | 7.25E-09 | 1YrCancerDerived_InhSoilDerm | 7.25E-09 | |
| 579 | 311594.2 | 3904694 | 7.14E-09 | 1YrCancerDerived_InhSoilDerm | 7.14E-09 | |
| 570 | 311325 | 3904654 | 6.90E-09 | 1YrCancerDerived_InhSoilDerm | 6.90E-09 | |
| 571 | 311327.2 | 3904652 | 6.81E-09 | 1YrCancerDerived_InhSoilDerm | 6.81E-09 | |
| 584 | 311480.2 | 3904769 | 6.62E-09 | 1YrCancerDerived_InhSoilDerm | 6.62E-09 | |
| 583 | 311518.8 | 3904768 | 6.07E-09 | 1YrCancerDerived_InhSoilDerm | 6.07E-09 | |
| 580 | 311595.1 | 3904730 | 5.28E-09 | 1YrCancerDerived_InhSoilDerm | 5.28E-09 | |
| 582 | 311557.4 | 3904767 | 4.43E-09 | 1YrCancerDerived_InhSoilDerm | 4.43E-09 | |
| 581 | 311596 | 3904766 | 2.07E-09 | 1YrCancerDerived_InhSoilDerm | 2.07E-09 | |
| 16 | 311286.3 | 3904321 | 5.65E-10 | 1YrCancerDerived_InhSoilDerm | 5.65E-10 | |
| 15 | 311266.3 | 3904321 | 5.35E-10 | 1YrCancerDerived_InhSoilDerm | 5.35E-10 | |
| 12 | 311286.3 | 3904301 | 5.31E-10 | 1YrCancerDerived_InhSoilDerm | 5.31E-10 | |
| 14 | 311246.3 | 3904321 | 5.05E-10 | 1YrCancerDerived_InhSoilDerm | 5.05E-10 | |
| 11 | 311266.3 | 3904301 | 5.03E-10 | 1YrCancerDerived_InhSoilDerm | 5.03E-10 | |
| 8 | 311286.3 | 3904281 | 5.00E-10 | 1YrCancerDerived_InhSoilDerm | 5.00E-10 | |
| 13 | 311226.3 | 3904321 | 4.77E-10 | 1YrCancerDerived_InhSoilDerm | 4.77E-10 | |
| 10 | 311246.3 | 3904301 | 4.77E-10 | 1YrCancerDerived_InhSoilDerm | 4.77E-10 | |
| 7 | 311266.3 | 3904281 | 4.75E-10 | 1YrCancerDerived_InhSoilDerm | 4.75E-10 | |
| 4 | 311286.3 | 3904261 | 4.72E-10 | 1YrCancerDerived_InhSoilDerm | 4.72E-10 | |

**HARP - Air Dispersion Modeling and Risk Tool v18159 - Operation Worker Cancer Risk
**1/30/2019
**Exported Risk Results

| REC | X | Y | RISK_SUM | SCENARIO | INHAL_RISK | SOIL_RISK | DERMAL_RISK | |
|---|---|---|---|---|---|---|---|---|
| 567 | 311319.6 | 3904669 | 2.76E-08 | 25YrCancerDerived_InhSoilDerm | 2.76E-08 | 1.01E-15 | 8.75E-16 | HIGHEST RISK |
| 566 | 311318.8 | 3904678 | 2.44E-08 | 25YrCancerDerived_InhSoilDerm | 2.44E-08 | 1.01E-15 | 8.75E-16 | |
| 565 | 311319.2 | 3904705 | 1.19E-08 | 25YrCancerDerived_InhSoilDerm | 1.19E-08 | 3.76E-16 | 3.26E-16 | |
| 573 | 311412.8 | 3904649 | 9.62E-09 | 25YrCancerDerived_InhSoilDerm | 9.62E-09 | 5.26E-15 | 4.56E-15 | |
| 564 | 311319.7 | 3904732 | 6.29E-09 | 25YrCancerDerived_InhSoilDerm | 6.29E-09 | 5.64E-16 | 4.89E-16 | |
| 588 | 311359.5 | 3904731 | 4.70E-09 | 25YrCancerDerived_InhSoilDerm | 4.70E-09 | 5.64E-16 | 4.89E-16 | |
| 574 | 311462.4 | 3904648 | 3.87E-09 | 25YrCancerDerived_InhSoilDerm | 3.87E-09 | 3.36E-15 | 2.91E-15 | |
| 575 | 311506 | 3904647 | 3.79E-09 | 25YrCancerDerived_InhSoilDerm | 3.79E-09 | 1.90E-15 | 1.65E-15 | |
| 587 | 311399.4 | 3904730 | 3.64E-09 | 25YrCancerDerived_InhSoilDerm | 3.64E-09 | 2.47E-15 | 2.14E-15 | |
| 572 | 311363.2 | 3904651 | 3.38E-09 | 25YrCancerDerived_InhSoilDerm | 3.38E-09 | 2.91E-15 | 2.52E-15 | |
| 576 | 311549.6 | 3904646 | 3.18E-09 | 25YrCancerDerived_InhSoilDerm | 3.18E-09 | 2.40E-15 | 2.08E-15 | |
| 586 | 311439.3 | 3904729 | 2.73E-09 | 25YrCancerDerived_InhSoilDerm | 2.73E-09 | 2.47E-15 | 2.14E-15 | |
| 568 | 311320.4 | 3904665 | 2.58E-09 | 25YrCancerDerived_InhSoilDerm | 2.58E-09 | 1.01E-15 | 8.75E-16 | |
| 569 | 311322.4 | 3904658 | 2.41E-09 | 25YrCancerDerived_InhSoilDerm | 2.41E-09 | 1.64E-15 | 1.42E-15 | |
| 570 | 311325 | 3904654 | 2.29E-09 | 25YrCancerDerived_InhSoilDerm | 2.29E-09 | 1.64E-15 | 1.42E-15 | |
| 571 | 311327.2 | 3904652 | 2.21E-09 | 25YrCancerDerived_InhSoilDerm | 2.21E-09 | 1.64E-15 | 1.42E-15 | |
| 585 | 311479.1 | 3904728 | 1.93E-09 | 25YrCancerDerived_InhSoilDerm | 1.93E-09 | 1.83E-15 | 1.59E-15 | |
| 577 | 311593.2 | 3904645 | 1.76E-09 | 25YrCancerDerived_InhSoilDerm | 1.76E-09 | 2.21E-15 | 1.91E-15 | |
| 578 | 311593.3 | 3904658 | 1.58E-09 | 25YrCancerDerived_InhSoilDerm | 1.58E-09 | 1.39E-15 | 1.20E-15 | |
| 584 | 311480.2 | 3904769 | 1.24E-09 | 25YrCancerDerived_InhSoilDerm | 1.24E-09 | 1.01E-15 | 8.75E-16 | |
| 579 | 311594.2 | 3904694 | 1.09E-09 | 25YrCancerDerived_InhSoilDerm | 1.09E-09 | 1.01E-15 | 8.75E-16 | |
| 16 | 311286.3 | 3904321 | 1.03E-09 | 25YrCancerDerived_InhSoilDerm | 1.03E-09 | 8.22E-16 | 7.12E-16 | |
| 15 | 311266.3 | 3904321 | 9.87E-10 | 25YrCancerDerived_InhSoilDerm | 9.87E-10 | 8.22E-16 | 7.12E-16 | |
| 583 | 311518.8 | 3904768 | 9.62E-10 | 25YrCancerDerived_InhSoilDerm | 9.62E-10 | 8.22E-16 | 7.12E-16 | |
| 12 | 311286.3 | 3904301 | 9.53E-10 | 25YrCancerDerived_InhSoilDerm | 9.53E-10 | 8.22E-16 | 7.12E-16 | |
| 14 | 311246.3 | 3904321 | 9.38E-10 | 25YrCancerDerived_InhSoilDerm | 9.38E-10 | 8.22E-16 | 7.12E-16 | |
| 11 | 311266.3 | 3904301 | 9.15E-10 | 25YrCancerDerived_InhSoilDerm | 9.15E-10 | 8.22E-16 | 7.12E-16 | |
| 13 | 311226.3 | 3904321 | 8.85E-10 | 25YrCancerDerived_InhSoilDerm | 8.85E-10 | 8.22E-16 | 7.12E-16 | |
| 8 | 311286.3 | 3904281 | 8.84E-10 | 25YrCancerDerived_InhSoilDerm | 8.84E-10 | 8.22E-16 | 7.12E-16 | |
| 10 | 311246.3 | 3904301 | 8.74E-10 | 25YrCancerDerived_InhSoilDerm | 8.74E-10 | 8.22E-16 | 7.12E-16 | |
| 7 | 311266.3 | 3904281 | 8.52E-10 | 25YrCancerDerived_InhSoilDerm | 8.52E-10 | 8.22E-16 | 7.12E-16 | |
| 9 | 311226.3 | 3904301 | 8.30E-10 | 25YrCancerDerived_InhSoilDerm | 8.30E-10 | 8.22E-16 | 7.12E-16 | |
| 4 | 311286.3 | 3904261 | 8.23E-10 | 25YrCancerDerived_InhSoilDerm | 8.23E-10 | 8.22E-16 | 7.12E-16 | |
| 6 | 311246.3 | 3904281 | 8.16E-10 | 25YrCancerDerived_InhSoilDerm | 8.16E-10 | 8.22E-16 | 7.12E-16 | |
| 3 | 311266.3 | 3904261 | 7.95E-10 | 25YrCancerDerived_InhSoilDerm | 7.95E-10 | 8.22E-16 | 7.12E-16 | |

**HARP - Air Dispersion Modeling and Risk Tool v18159 - Construction Worker Chronic (non-cancer) Risk
**1/30/2019
**Exported Risk Results

| REC | X | Y | SCENARIO | RESP | MAXHI | |
|---|---|---|---|---|---|---|
| 574 | 311462.4 | 3904648 | NonCancerChronicDerived_InhSoilDerm | 0.000856 | 0.000856 | HIGHEST RISK |
| 573 | 311412.8 | 3904649 | NonCancerChronicDerived_InhSoilDerm | 0.000848 | 0.000848 | |
| 575 | 311506 | 3904647 | NonCancerChronicDerived_InhSoilDerm | 0.000838 | 0.000838 | |
| 585 | 311479.1 | 3904728 | NonCancerChronicDerived_InhSoilDerm | 0.000805 | 0.000805 | |
| 576 | 311549.6 | 3904646 | NonCancerChronicDerived_InhSoilDerm | 0.000765 | 0.000765 | |
| 572 | 311363.2 | 3904651 | NonCancerChronicDerived_InhSoilDerm | 0.000759 | 0.000759 | |
| 565 | 311319.2 | 3904705 | NonCancerChronicDerived_InhSoilDerm | 0.000754 | 0.000754 | |
| 586 | 311439.3 | 3904729 | NonCancerChronicDerived_InhSoilDerm | 0.000738 | 0.000738 | |
| 566 | 311318.8 | 3904678 | NonCancerChronicDerived_InhSoilDerm | 0.000722 | 0.000722 | |
| 587 | 311399.4 | 3904730 | NonCancerChronicDerived_InhSoilDerm | 0.000713 | 0.000713 | |
| 567 | 311319.6 | 3904669 | NonCancerChronicDerived_InhSoilDerm | 0.000662 | 0.000662 | |
| 564 | 311319.7 | 3904732 | NonCancerChronicDerived_InhSoilDerm | 0.000631 | 0.000631 | |
| 568 | 311320.4 | 3904665 | NonCancerChronicDerived_InhSoilDerm | 0.000622 | 0.000622 | |
| 578 | 311593.3 | 3904658 | NonCancerChronicDerived_InhSoilDerm | 0.000596 | 0.000596 | |
| 577 | 311593.2 | 3904645 | NonCancerChronicDerived_InhSoilDerm | 0.000566 | 0.000566 | |
| 569 | 311322.4 | 3904658 | NonCancerChronicDerived_InhSoilDerm | 0.000561 | 0.000561 | |
| 579 | 311594.2 | 3904694 | NonCancerChronicDerived_InhSoilDerm | 0.000553 | 0.000553 | |
| 570 | 311325 | 3904654 | NonCancerChronicDerived_InhSoilDerm | 0.000535 | 0.000535 | |
| 571 | 311327.2 | 3904652 | NonCancerChronicDerived_InhSoilDerm | 0.000528 | 0.000528 | |
| 584 | 311480.2 | 3904769 | NonCancerChronicDerived_InhSoilDerm | 0.000512 | 0.000512 | |
| 583 | 311518.8 | 3904768 | NonCancerChronicDerived_InhSoilDerm | 0.00047 | 0.00047 | |
| 580 | 311595.1 | 3904730 | NonCancerChronicDerived_InhSoilDerm | 0.000409 | 0.000409 | |
| 582 | 311557.4 | 3904767 | NonCancerChronicDerived_InhSoilDerm | 0.000343 | 0.000343 | |
| 581 | 311596 | 3904766 | NonCancerChronicDerived_InhSoilDerm | 0.00016 | 0.00016 | |
| 16 | 311286.3 | 3904321 | NonCancerChronicDerived_InhSoilDerm | 4.38E-05 | 4.38E-05 | |
| 15 | 311266.3 | 3904321 | NonCancerChronicDerived_InhSoilDerm | 4.14E-05 | 4.14E-05 | |
| 12 | 311286.3 | 3904301 | NonCancerChronicDerived_InhSoilDerm | 4.11E-05 | 4.11E-05 | |
| 14 | 311246.3 | 3904321 | NonCancerChronicDerived_InhSoilDerm | 3.91E-05 | 3.91E-05 | |
| 11 | 311266.3 | 3904301 | NonCancerChronicDerived_InhSoilDerm | 3.90E-05 | 3.90E-05 | |
| 8 | 311286.3 | 3904281 | NonCancerChronicDerived_InhSoilDerm | 3.87E-05 | 3.87E-05 | |
| 13 | 311226.3 | 3904321 | NonCancerChronicDerived_InhSoilDerm | 3.69E-05 | 3.69E-05 | |
| 10 | 311246.3 | 3904301 | NonCancerChronicDerived_InhSoilDerm | 3.69E-05 | 3.69E-05 | |
| 7 | 311266.3 | 3904281 | NonCancerChronicDerived_InhSoilDerm | 3.68E-05 | 3.68E-05 | |
| 4 | 311286.3 | 3904261 | NonCancerChronicDerived_InhSoilDerm | 3.66E-05 | 3.66E-05 | |
| 9 | 311226.3 | 3904301 | NonCancerChronicDerived_InhSoilDerm | 3.49E-05 | 3.49E-05 | |

**HARP - Air Dispersion Modeling and Risk Tool v18159 - Operation Worker Chronic (non-cancer) Risk
**1/30/2019
**Exported Risk Results

| REC | X | Y | SCENARIO | CNS | KIDNEY | GILV | REPRO/DEVEL | RESP | EYE | ENDO | BLOOD | MAXHI | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 567 | 311319.6 | 3904669 | NonCancerChronicDerived_InhSoilDerm | 0.000137 | 3.64E-06 | 3.64E-06 | 0.00012456 | 0.00014 | 1.56E-05 | 3.64E-06 | 0.001361 | 0.001361 | HIGHEST RISK |
| 566 | 311318.8 | 3904678 | NonCancerChronicDerived_InhSoilDerm | 0.00012 | 3.21E-06 | 3.21E-06 | 0.0001098 | 0.000124 | 1.37E-05 | 3.21E-06 | 0.001196 | 0.001196 | |
| 565 | 311319.2 | 3904705 | NonCancerChronicDerived_InhSoilDerm | 5.46E-05 | 1.45E-06 | 1.45E-06 | 4.98E-05 | 5.85E-05 | 6.23E-06 | 1.45E-06 | 0.00055 | 0.00055 | |
| 573 | 311412.8 | 3904649 | NonCancerChronicDerived_InhSoilDerm | 3.90E-05 | 1.04E-06 | 1.04E-06 | 3.56E-05 | 4.54E-05 | 4.45E-06 | 1.04E-06 | 0.000393 | 0.000393 | |
| 564 | 311319.7 | 3904732 | NonCancerChronicDerived_InhSoilDerm | 2.49E-05 | 6.65E-07 | 6.65E-07 | 2.28E-05 | 2.94E-05 | 2.85E-06 | 6.65E-07 | 0.000252 | 0.000252 | |
| 574 | 311462.4 | 3904648 | NonCancerChronicDerived_InhSoilDerm | 1.40E-05 | 3.72E-07 | 3.72E-07 | 1.27E-05 | 1.76E-05 | 1.59E-06 | 3.72E-07 | 0.000141 | 0.000141 | |
| 587 | 311399.4 | 3904730 | NonCancerChronicDerived_InhSoilDerm | 1.14E-05 | 3.03E-07 | 3.03E-07 | 1.04E-05 | 1.59E-05 | 1.30E-06 | 3.03E-07 | 0.000114 | 0.000114 | |
| 575 | 311506 | 3904647 | NonCancerChronicDerived_InhSoilDerm | 7.73E-06 | 2.06E-07 | 2.06E-07 | 7.05E-06 | 1.51E-05 | 8.82E-07 | 2.06E-07 | 7.79E-05 | 7.79E-05 | |
| 586 | 311439.3 | 3904729 | NonCancerChronicDerived_InhSoilDerm | 7.59E-06 | 2.02E-07 | 2.02E-07 | 6.93E-06 | 1.16E-05 | 8.66E-07 | 2.02E-07 | 7.64E-05 | 7.64E-05 | |
| 572 | 311363.2 | 3904651 | NonCancerChronicDerived_InhSoilDerm | 2.12E-05 | 5.62E-07 | 5.62E-07 | 1.93E-05 | 2.64E-05 | 2.41E-06 | 5.62E-07 | 7.04E-05 | 7.04E-05 | |
| 568 | 311320.4 | 3904665 | NonCancerChronicDerived_InhSoilDerm | 1.83E-05 | 4.87E-07 | 4.87E-07 | 1.67E-05 | 2.18E-05 | 2.09E-06 | 4.87E-07 | 6.10E-05 | 6.10E-05 | |
| 569 | 311322.4 | 3904658 | NonCancerChronicDerived_InhSoilDerm | 1.62E-05 | 4.31E-07 | 4.31E-07 | 1.48E-05 | 1.97E-05 | 1.85E-06 | 4.31E-07 | 5.40E-05 | 5.40E-05 | |
| 585 | 311479.1 | 3904728 | NonCancerChronicDerived_InhSoilDerm | 5.26E-06 | 1.40E-07 | 1.40E-07 | 4.80E-06 | 8.16E-06 | 6.01E-07 | 1.40E-07 | 5.30E-05 | 5.30E-05 | |
| 576 | 311549.6 | 3904646 | NonCancerChronicDerived_InhSoilDerm | 4.96E-06 | 1.32E-07 | 1.32E-07 | 4.53E-06 | 1.21E-05 | 5.66E-07 | 1.32E-07 | 5.00E-05 | 5.00E-05 | |
| 570 | 311325 | 3904654 | NonCancerChronicDerived_InhSoilDerm | 1.45E-05 | 3.85E-07 | 3.85E-07 | 1.32E-05 | 1.80E-05 | 1.65E-06 | 3.85E-07 | 4.82E-05 | 4.82E-05 | |
| 571 | 311327.2 | 3904652 | NonCancerChronicDerived_InhSoilDerm | 1.33E-05 | 3.54E-07 | 3.54E-07 | 1.22E-05 | 1.69E-05 | 1.52E-06 | 3.54E-07 | 4.44E-05 | 4.44E-05 | |
| 16 | 311286.3 | 3904321 | NonCancerChronicDerived_InhSoilDerm | 3.90E-06 | 1.04E-07 | 1.04E-07 | 3.56E-06 | 4.76E-06 | 4.45E-07 | 1.04E-07 | 3.94E-05 | 3.94E-05 | |
| 15 | 311266.3 | 3904321 | NonCancerChronicDerived_InhSoilDerm | 3.75E-06 | 9.98E-08 | 9.98E-08 | 3.42E-06 | 4.56E-06 | 4.27E-07 | 9.98E-08 | 3.78E-05 | 3.78E-05 | |
| 584 | 311480.2 | 3904769 | NonCancerChronicDerived_InhSoilDerm | 3.73E-06 | 9.95E-08 | 9.95E-08 | 3.41E-06 | 5.37E-06 | 4.26E-07 | 9.95E-08 | 3.76E-05 | 3.76E-05 | |
| 12 | 311286.3 | 3904301 | NonCancerChronicDerived_InhSoilDerm | 3.57E-06 | 9.51E-08 | 9.51E-08 | 3.26E-06 | 4.38E-06 | 4.07E-07 | 9.51E-08 | 3.60E-05 | 3.60E-05 | |
| 14 | 311246.3 | 3904321 | NonCancerChronicDerived_InhSoilDerm | 3.57E-06 | 9.51E-08 | 9.51E-08 | 3.25E-06 | 4.33E-06 | 4.07E-07 | 9.51E-08 | 3.60E-05 | 3.60E-05 | |
| 577 | 311593.2 | 3904645 | NonCancerChronicDerived_InhSoilDerm | 3.47E-06 | 9.26E-08 | 9.26E-08 | 3.17E-06 | 6.96E-06 | 3.96E-07 | 9.26E-08 | 3.50E-05 | 3.50E-05 | |
| 11 | 311266.3 | 3904301 | NonCancerChronicDerived_InhSoilDerm | 3.44E-06 | 9.17E-08 | 9.17E-08 | 3.14E-06 | 4.22E-06 | 3.93E-07 | 9.17E-08 | 3.47E-05 | 3.47E-05 | |
| 13 | 311226.3 | 3904321 | NonCancerChronicDerived_InhSoilDerm | 3.36E-06 | 8.96E-08 | 8.96E-08 | 3.07E-06 | 4.09E-06 | 3.84E-07 | 8.96E-08 | 3.39E-05 | 3.39E-05 | |
| 578 | 311593.3 | 3904658 | NonCancerChronicDerived_InhSoilDerm | 3.31E-06 | 8.83E-08 | 8.83E-08 | 3.02E-06 | 6.33E-06 | 3.78E-07 | 8.83E-08 | 3.34E-05 | 3.34E-05 | |
| 10 | 311246.3 | 3904301 | NonCancerChronicDerived_InhSoilDerm | 3.29E-06 | 8.78E-08 | 8.78E-08 | 3.01E-06 | 4.03E-06 | 3.76E-07 | 8.78E-08 | 3.32E-05 | 3.32E-05 | |
| 8 | 311286.3 | 3904281 | NonCancerChronicDerived_InhSoilDerm | 3.28E-06 | 8.75E-08 | 8.75E-08 | 2.99E-06 | 4.06E-06 | 3.74E-07 | 8.75E-08 | 3.31E-05 | 3.31E-05 | |
| 7 | 311266.3 | 3904281 | NonCancerChronicDerived_InhSoilDerm | 3.17E-06 | 8.46E-08 | 8.46E-08 | 2.90E-06 | 3.91E-06 | 3.62E-07 | 8.46E-08 | 3.20E-05 | 3.20E-05 | |
| 9 | 311226.3 | 3904301 | NonCancerChronicDerived_InhSoilDerm | 3.13E-06 | 8.34E-08 | 8.34E-08 | 2.85E-06 | 3.82E-06 | 3.57E-07 | 8.34E-08 | 3.16E-05 | 3.16E-05 | |
| 6 | 311246.3 | 3904281 | NonCancerChronicDerived_InhSoilDerm | 3.05E-06 | 8.13E-08 | 8.13E-08 | 2.78E-06 | 3.75E-06 | 3.48E-07 | 8.13E-08 | 3.08E-05 | 3.08E-05 | |
| 4 | 311286.3 | 3904261 | NonCancerChronicDerived_InhSoilDerm | 3.03E-06 | 8.07E-08 | 8.07E-08 | 2.76E-06 | 3.76E-06 | 3.45E-07 | 8.07E-08 | 3.06E-05 | 3.06E-05 | |
| 583 | 311518.8 | 3904768 | NonCancerChronicDerived_InhSoilDerm | 2.97E-06 | 7.90E-08 | 7.90E-08 | 2.71E-06 | 4.19E-06 | 3.38E-07 | 7.90E-08 | 2.99E-05 | 2.99E-05 | |
| 3 | 311266.3 | 3904261 | NonCancerChronicDerived_InhSoilDerm | 2.94E-06 | 7.83E-08 | 7.83E-08 | 2.68E-06 | 3.64E-06 | 3.35E-07 | 7.83E-08 | 2.96E-05 | 2.96E-05 | |
| 5 | 311226.3 | 3904281 | NonCancerChronicDerived_InhSoilDerm | 2.91E-06 | 7.76E-08 | 7.76E-08 | 2.66E-06 | 3.58E-06 | 3.32E-07 | 7.76E-08 | 2.94E-05 | 2.94E-05 | |
| 2 | 311246.3 | 3904261 | NonCancerChronicDerived_InhSoilDerm | 2.83E-06 | 7.55E-08 | 7.55E-08 | 2.59E-06 | 3.50E-06 | 3.23E-07 | 7.55E-08 | 2.86E-05 | 2.86E-05 | |

**HARP - Air Dispersion Modeling and Risk Tool v18159 - Operation Worker Acute (non-cancer) Risk
**1/30/2019
**Exported Risk Results

| REC | X | Y | SCENARIO | CNS | IMMUN | REPRO/DEVEL | RESP | EYE | BLOOD | MAXHI | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 567 | 311319.6 | 3904669 | NonCancerAcute | 1.33E-05 | 0.001275 | 0.0012833 | 1.33E-05 | 1.33E-05 | 0.001275 | 0.001283 | HIGHEST RISK |
| 566 | 311318.8 | 3904678 | NonCancerAcute | 1.27E-05 | 0.00121 | 0.001218 | 1.27E-05 | 1.27E-05 | 0.00121 | 0.001218 | |
| 573 | 311412.8 | 3904649 | NonCancerAcute | 1.11E-05 | 0.001094 | 0.0011015 | 1.11E-05 | 1.11E-05 | 0.001094 | 0.001102 | |
| 565 | 311319.2 | 3904705 | NonCancerAcute | 1.04E-05 | 0.001024 | 0.0010309 | 1.04E-05 | 1.04E-05 | 0.001024 | 0.001031 | |
| 587 | 311399.4 | 3904730 | NonCancerAcute | 9.49E-06 | 0.000943 | 0.00094883 | 9.49E-06 | 9.49E-06 | 0.000943 | 0.000949 | |
| 564 | 311319.7 | 3904732 | NonCancerAcute | 9.22E-06 | 0.000914 | 0.00092002 | 9.22E-06 | 9.22E-06 | 0.000914 | 0.00092 | |
| 586 | 311439.3 | 3904729 | NonCancerAcute | 7.69E-06 | 0.000771 | 0.00077639 | 7.69E-06 | 7.69E-06 | 0.000771 | 0.000776 | |
| 574 | 311462.4 | 3904648 | NonCancerAcute | 7.55E-06 | 0.000758 | 0.00076345 | 7.55E-06 | 7.55E-06 | 0.000758 | 0.000763 | |
| 585 | 311479.1 | 3904728 | NonCancerAcute | 6.31E-06 | 0.000636 | 0.00064033 | 6.31E-06 | 6.31E-06 | 0.000636 | 0.00064 | |
| 575 | 311506 | 3904647 | NonCancerAcute | 5.60E-06 | 0.000566 | 0.0005697 | 5.60E-06 | 5.60E-06 | 0.000566 | 0.00057 | |
| 584 | 311480.2 | 3904769 | NonCancerAcute | 5.11E-06 | 0.00052 | 0.00052334 | 5.11E-06 | 5.11E-06 | 0.00052 | 0.000523 | |
| 583 | 311518.8 | 3904768 | NonCancerAcute | 4.54E-06 | 0.000461 | 0.00046428 | 4.54E-06 | 4.54E-06 | 0.000461 | 0.000464 | |
| 576 | 311549.6 | 3904646 | NonCancerAcute | 4.39E-06 | 0.000446 | 0.0004494 | 4.39E-06 | 4.39E-06 | 0.000446 | 0.000449 | |
| 582 | 311557.4 | 3904767 | NonCancerAcute | 3.89E-06 | 0.000396 | 0.00039855 | 3.89E-06 | 3.89E-06 | 0.000396 | 0.000399 | |
| 579 | 311594.2 | 3904694 | NonCancerAcute | 3.63E-06 | 0.00037 | 0.00037281 | 3.63E-06 | 3.63E-06 | 0.00037 | 0.000373 | |
| 578 | 311593.3 | 3904658 | NonCancerAcute | 3.56E-06 | 0.000363 | 0.00036559 | 3.56E-06 | 3.56E-06 | 0.000363 | 0.000366 | |
| 580 | 311595.1 | 3904730 | NonCancerAcute | 3.54E-06 | 0.000362 | 0.00036385 | 3.54E-06 | 3.54E-06 | 0.000362 | 0.000364 | |
| 577 | 311593.2 | 3904645 | NonCancerAcute | 3.53E-06 | 0.000361 | 0.00036302 | 3.53E-06 | 3.53E-06 | 0.000361 | 0.000363 | |
| 581 | 311596 | 3904766 | NonCancerAcute | 3.44E-06 | 0.000351 | 0.00035338 | 3.44E-06 | 3.44E-06 | 0.000351 | 0.000353 | |
| 16 | 311286.3 | 3904321 | NonCancerAcute | 2.57E-06 | 0.000263 | 0.000265 | 2.57E-06 | 2.57E-06 | 0.000263 | 0.000265 | |
| 15 | 311266.3 | 3904321 | NonCancerAcute | 2.50E-06 | 0.000256 | 0.00025777 | 2.50E-06 | 2.50E-06 | 0.000256 | 0.000258 | |
| 14 | 311246.3 | 3904321 | NonCancerAcute | 2.50E-06 | 0.000256 | 0.00025725 | 2.50E-06 | 2.50E-06 | 0.000256 | 0.000257 | |
| 13 | 311226.3 | 3904321 | NonCancerAcute | 2.38E-06 | 0.000244 | 0.00024585 | 2.38E-06 | 2.38E-06 | 0.000244 | 0.000246 | |
| 12 | 311286.3 | 3904301 | NonCancerAcute | 2.38E-06 | 0.000244 | 0.00024532 | 2.38E-06 | 2.38E-06 | 0.000244 | 0.000245 | |
| 11 | 311266.3 | 3904301 | NonCancerAcute | 2.34E-06 | 0.00024 | 0.00024147 | 2.34E-06 | 2.34E-06 | 0.00024 | 0.000241 | |
| 10 | 311246.3 | 3904301 | NonCancerAcute | 2.33E-06 | 0.000239 | 0.00024058 | 2.33E-06 | 2.33E-06 | 0.000239 | 0.000241 | |
| 9 | 311226.3 | 3904301 | NonCancerAcute | 2.27E-06 | 0.000233 | 0.00023439 | 2.27E-06 | 2.27E-06 | 0.000233 | 0.000234 | |
| 7 | 311266.3 | 3904281 | NonCancerAcute | 2.20E-06 | 0.000226 | 0.00022725 | 2.20E-06 | 2.20E-06 | 0.000226 | 0.000227 | |
| 8 | 311286.3 | 3904281 | NonCancerAcute | 2.19E-06 | 0.000225 | 0.00022641 | 2.19E-06 | 2.19E-06 | 0.000225 | 0.000226 | |
| 6 | 311246.3 | 3904281 | NonCancerAcute | 2.18E-06 | 0.000224 | 0.00022511 | 2.18E-06 | 2.18E-06 | 0.000224 | 0.000225 | |
| 5 | 311226.3 | 3904281 | NonCancerAcute | 2.16E-06 | 0.000221 | 0.0002225 | 2.16E-06 | 2.16E-06 | 0.000221 | 0.000223 | |
| 3 | 311266.3 | 3904261 | NonCancerAcute | 2.10E-06 | 0.000215 | 0.00021644 | 2.10E-06 | 2.10E-06 | 0.000215 | 0.000216 | |
| 2 | 311246.3 | 3904261 | NonCancerAcute | 2.05E-06 | 0.00021 | 0.00021126 | 2.05E-06 | 2.05E-06 | 0.00021 | 0.000211 | |
| 4 | 311286.3 | 3904261 | NonCancerAcute | 2.04E-06 | 0.00021 | 0.000211 | 2.04E-06 | 2.04E-06 | 0.00021 | 0.000211 | |
| 1 | 311226.3 | 3904261 | NonCancerAcute | 2.04E-06 | 0.00021 | 0.00021088 | 2.04E-06 | 2.04E-06 | 0.00021 | 0.000211 | |

# Appendix VI

# HARP Health Risk Impacts – MEIW

**HARP - Air Dispersion Modeling and Risk Tool v18159 - Construction Residential Cancer Risk
**1/30/2019
**Exported Risk Results

| REC | X | Y | RISK_SUM | SCENARIO | INHAL_RISK | |
|---|---|---|---|---|---|---|
| 348 | 311376.6 | 3904736 | 5.52E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.52E-07 | HIGHEST RISK |
| 628 | 311505.4 | 3904625 | 5.42E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.42E-07 | |
| 347 | 311350.5 | 3904737 | 5.37E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.37E-07 | |
| 629 | 311530.4 | 3904625 | 5.29E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.29E-07 | |
| 346 | 311325.7 | 3904737 | 5.06E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.06E-07 | |
| 630 | 311555.4 | 3904625 | 5.02E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.02E-07 | |
| 353 | 311599.7 | 3904650 | 4.65E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.65E-07 | |
| 352 | 311600.1 | 3904673 | 4.63E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.63E-07 | |
| 631 | 311580.4 | 3904625 | 4.49E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.49E-07 | |
| 7 | 311476.7 | 3904771 | 4.29E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.29E-07 | |
| 345 | 311376.5 | 3904752 | 4.24E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.24E-07 | |
| 351 | 311600.6 | 3904700 | 4.16E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.16E-07 | |
| 8 | 311501.7 | 3904771 | 4.08E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.08E-07 | |
| 344 | 311351.2 | 3904753 | 4.07E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.07E-07 | |
| 343 | 311326.5 | 3904753 | 3.95E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.95E-07 | |
| 609 | 311505.4 | 3904600 | 3.92E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.92E-07 | |
| 6 | 311451.7 | 3904771 | 3.92E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.92E-07 | |
| 610 | 311530.4 | 3904600 | 3.85E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.85E-07 | |
| 611 | 311555.4 | 3904600 | 3.66E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.66E-07 | |
| 9 | 311526.7 | 3904771 | 3.57E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.57E-07 | |
| 5 | 311426.7 | 3904771 | 3.55E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.55E-07 | |
| 632 | 311605.4 | 3904625 | 3.54E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.54E-07 | |
| 4 | 311401.7 | 3904771 | 3.33E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.33E-07 | |
| 612 | 311580.4 | 3904600 | 3.32E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.32E-07 | |
| 350 | 311600.6 | 3904728 | 3.26E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.26E-07 | |
| 3 | 311376.7 | 3904771 | 3.22E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.22E-07 | |
| 2 | 311351.7 | 3904771 | 3.14E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.14E-07 | |
| 1 | 311326.7 | 3904771 | 3.06E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.06E-07 | |
| 591 | 311505.4 | 3904575 | 2.98E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 2.98E-07 | |
| 358 | 311623.9 | 3904651 | 2.93E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 2.93E-07 | |
| 592 | 311530.4 | 3904575 | 2.93E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 2.93E-07 | |
| 613 | 311605.4 | 3904600 | 2.80E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 2.80E-07 | |
| 593 | 311555.4 | 3904575 | 2.80E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 2.80E-07 | |
| 357 | 311624.4 | 3904674 | 2.79E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 2.79E-07 | |
| 10 | 311551.7 | 3904771 | 2.79E-07 | 1YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 2.79E-07 | |

**HARP - Air Dispersion Modeling and Risk Tool v18159 - Operation Residential Cancer Risk
**1/30/2019
**Exported Risk Results

| REC | X | Y | RISK_SUM | SCENARIO | INHAL_RISK | SOIL_RISK | DERMAL_RISK | MMILK_RISK | |
|---|---|---|---|---|---|---|---|---|---|
| 973 | 311319.6 | 3904669 | 4.40E-07 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.40E-07 | 2.62E-14 | 2.42E-15 | 7.44E-15 | HIGHEST RISK |
| 972 | 311318.8 | 3904678 | 3.89E-07 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 3.89E-07 | 2.62E-14 | 2.42E-15 | 7.44E-15 | |
| 971 | 311319.2 | 3904705 | 1.90E-07 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 1.90E-07 | 9.76E-15 | 9.01E-16 | 2.77E-15 | |
| 979 | 311412.8 | 3904649 | 1.53E-07 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 1.53E-07 | 1.36E-13 | 1.26E-14 | 3.87E-14 | |
| 970 | 311319.7 | 3904732 | 1.00E-07 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 1.00E-07 | 1.46E-14 | 1.35E-15 | 4.16E-15 | |
| 346 | 311325.7 | 3904737 | 8.79E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 8.79E-08 | 1.46E-14 | 1.35E-15 | 4.16E-15 | |
| 347 | 311350.5 | 3904737 | 7.50E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 7.50E-08 | 1.46E-14 | 1.35E-15 | 4.16E-15 | |
| 994 | 311359.5 | 3904731 | 7.48E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 7.48E-08 | 1.46E-14 | 1.35E-15 | 4.16E-15 | |
| 628 | 311505.4 | 3904625 | 6.85E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 6.85E-08 | 7.06E-14 | 6.52E-15 | 2.00E-14 | |
| 343 | 311326.5 | 3904753 | 6.72E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 6.72E-08 | 3.11E-14 | 2.87E-15 | 8.82E-15 | |
| 609 | 311505.4 | 3904600 | 6.46E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 6.46E-08 | 8.04E-14 | 7.43E-15 | 2.28E-14 | |
| 980 | 311462.4 | 3904648 | 6.17E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 6.17E-08 | 8.71E-14 | 8.04E-15 | 2.47E-14 | |
| 348 | 311376.6 | 3904736 | 6.11E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 6.11E-08 | 3.11E-14 | 2.87E-15 | 8.82E-15 | |
| 981 | 311506 | 3904647 | 6.03E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 6.03E-08 | 4.93E-14 | 4.55E-15 | 1.40E-14 | |
| 591 | 311505.4 | 3904575 | 5.97E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.97E-08 | 8.53E-14 | 7.88E-15 | 2.42E-14 | |
| 629 | 311530.4 | 3904625 | 5.95E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.95E-08 | 6.88E-14 | 6.36E-15 | 1.95E-14 | |
| 993 | 311399.4 | 3904730 | 5.80E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.80E-08 | 6.40E-14 | 5.91E-15 | 1.82E-14 | |
| 344 | 311351.2 | 3904753 | 5.76E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.76E-08 | 3.11E-14 | 2.87E-15 | 8.82E-15 | |
| 610 | 311530.4 | 3904600 | 5.58E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.58E-08 | 7.86E-14 | 7.26E-15 | 2.23E-14 | |
| 573 | 311505.4 | 3904550 | 5.46E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.46E-08 | 6.88E-14 | 6.36E-15 | 1.95E-14 | |
| 978 | 311363.2 | 3904651 | 5.38E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.38E-08 | 7.55E-14 | 6.97E-15 | 2.14E-14 | |
| 592 | 311530.4 | 3904575 | 5.15E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.15E-08 | 7.86E-14 | 7.26E-15 | 2.23E-14 | |
| 1 | 311326.7 | 3904771 | 5.14E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.14E-08 | 4.75E-14 | 4.39E-15 | 1.35E-14 | |
| 982 | 311549.6 | 3904646 | 5.07E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 5.07E-08 | 6.22E-14 | 5.74E-15 | 1.76E-14 | |
| 345 | 311376.5 | 3904752 | 4.97E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.97E-08 | 4.75E-14 | 4.39E-15 | 1.35E-14 | |
| 555 | 311505.4 | 3904525 | 4.92E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.92E-08 | 6.88E-14 | 6.36E-15 | 1.95E-14 | |
| 630 | 311555.4 | 3904625 | 4.87E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.87E-08 | 7.19E-14 | 6.64E-15 | 2.04E-14 | |
| 574 | 311530.4 | 3904550 | 4.75E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.75E-08 | 7.37E-14 | 6.81E-15 | 2.09E-14 | |
| 611 | 311555.4 | 3904600 | 4.66E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.66E-08 | 8.83E-14 | 8.16E-15 | 2.51E-14 | |
| 2 | 311351.7 | 3904771 | 4.47E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.47E-08 | 4.75E-14 | 4.39E-15 | 1.35E-14 | |
| 538 | 311505.4 | 3904500 | 4.39E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.39E-08 | 6.88E-14 | 6.36E-15 | 1.95E-14 | |
| 593 | 311555.4 | 3904575 | 4.38E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.38E-08 | 8.35E-14 | 7.71E-15 | 2.37E-14 | |
| 992 | 311439.3 | 3904729 | 4.35E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.35E-08 | 6.40E-14 | 5.91E-15 | 1.82E-14 | |
| 556 | 311530.4 | 3904525 | 4.34E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.34E-08 | 7.37E-14 | 6.81E-15 | 2.09E-14 | |
| 974 | 311320.4 | 3904665 | 4.11E-08 | 70YrCancerDerived_InhSoilDermMMilk_FAH16to70 | 4.11E-08 | 2.62E-14 | 2.42E-15 | 7.44E-15 | |

**HARP - Air Dispersion Modeling and Risk Tool v18159 - Construction Residential Chronic (non-cancer) Risk
**1/30/2019
**Exported Risk Results

| REC | X | Y | SCENARIO | RESP | MAXHI | |
|---|---|---|---|---|---|---|
| 348 | 311376.6 | 3904736 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000621 | 0.000621 | HIGHEST RISK |
| 628 | 311505.4 | 3904625 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000609 | 0.000609 | |
| 347 | 311350.5 | 3904737 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000604 | 0.000604 | |
| 629 | 311530.4 | 3904625 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000595 | 0.000595 | |
| 346 | 311325.7 | 3904737 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000569 | 0.000569 | |
| 630 | 311555.4 | 3904625 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000564 | 0.000564 | |
| 353 | 311599.7 | 3904650 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000523 | 0.000523 | |
| 352 | 311600.1 | 3904673 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000521 | 0.000521 | |
| 631 | 311580.4 | 3904625 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000505 | 0.000505 | |
| 7 | 311476.7 | 3904771 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000483 | 0.000483 | |
| 345 | 311376.5 | 3904752 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000477 | 0.000477 | |
| 351 | 311600.6 | 3904700 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000468 | 0.000468 | |
| 8 | 311501.7 | 3904771 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000459 | 0.000459 | |
| 344 | 311351.2 | 3904753 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000458 | 0.000458 | |
| 343 | 311326.5 | 3904753 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000444 | 0.000444 | |
| 609 | 311505.4 | 3904600 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000441 | 0.000441 | |
| 6 | 311451.7 | 3904771 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000441 | 0.000441 | |
| 610 | 311530.4 | 3904600 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000432 | 0.000432 | |
| 611 | 311555.4 | 3904600 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000411 | 0.000411 | |
| 9 | 311526.7 | 3904771 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000402 | 0.000402 | |
| 5 | 311426.7 | 3904771 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000399 | 0.000399 | |
| 632 | 311605.4 | 3904625 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000398 | 0.000398 | |
| 4 | 311401.7 | 3904771 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000375 | 0.000375 | |
| 612 | 311580.4 | 3904600 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000373 | 0.000373 | |
| 350 | 311600.6 | 3904728 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000366 | 0.000366 | |
| 3 | 311376.7 | 3904771 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000362 | 0.000362 | |
| 2 | 311351.7 | 3904771 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000353 | 0.000353 | |
| 1 | 311326.7 | 3904771 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000344 | 0.000344 | |
| 591 | 311505.4 | 3904575 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000335 | 0.000335 | |
| 358 | 311623.9 | 3904651 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000329 | 0.000329 | |
| 592 | 311530.4 | 3904575 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000329 | 0.000329 | |
| 613 | 311605.4 | 3904600 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000315 | 0.000315 | |
| 593 | 311555.4 | 3904575 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000314 | 0.000314 | |
| 357 | 311624.4 | 3904674 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000314 | 0.000314 | |
| 10 | 311551.7 | 3904771 | NonCancerChronicDerived_InhSoilDermMMilk | 0.000314 | 0.000314 | |

**HARP - Air Dispersion Modeling and Risk Tool v18159 - Operation Residence Chronic (non-cancer) Risk
**1/30/2019
**Exported Risk Results

| REC | X | Y | SCENARIO | CNS | KIDNEY | GILV | EPRO/DEVI | RESP | EYE | ENDO | BLOOD | MAXHI | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 973 | 311319.6 | 3904669 | cDerived_I | 0.000137 | 3.64E-06 | 3.64E-06 | 0.000125 | 0.00014 | 1.56E-05 | 3.64E-06 | 0.001361 | 0.001361 | HIGHEST RISK |
| 972 | 311318.8 | 3904678 | cDerived_I | 0.00012 | 3.21E-06 | 3.21E-06 | 0.00011 | 0.000124 | 1.37E-05 | 3.21E-06 | 0.001196 | 0.001196 | |
| 971 | 311319.2 | 3904705 | cDerived_I | 5.46E-05 | 1.45E-06 | 1.45E-06 | 4.98E-05 | 5.85E-05 | 6.23E-06 | 1.45E-06 | 0.00055 | 0.00055 | |
| 979 | 311412.8 | 3904649 | cDerived_I | 3.90E-05 | 1.04E-06 | 1.04E-06 | 3.56E-05 | 4.54E-05 | 4.45E-06 | 1.04E-06 | 0.000393 | 0.000393 | |
| 970 | 311319.7 | 3904732 | cDerived_I | 2.49E-05 | 6.65E-07 | 6.65E-07 | 2.28E-05 | 2.94E-05 | 2.85E-06 | 6.65E-07 | 0.000252 | 0.000252 | |
| 346 | 311325.7 | 3904737 | cDerived_I | 2.08E-05 | 5.55E-07 | 5.55E-07 | 1.90E-05 | 2.54E-05 | 2.38E-06 | 5.55E-07 | 0.00021 | 0.00021 | |
| 347 | 311350.5 | 3904737 | cDerived_I | 1.68E-05 | 4.48E-07 | 4.48E-07 | 1.54E-05 | 2.14E-05 | 1.92E-06 | 4.48E-07 | 0.00017 | 0.00017 | |
| 343 | 311326.5 | 3904753 | cDerived_I | 1.47E-05 | 3.93E-07 | 3.93E-07 | 1.34E-05 | 1.90E-05 | 1.68E-06 | 3.93E-07 | 0.000149 | 0.000149 | |
| 980 | 311462.4 | 3904648 | cDerived_I | 1.40E-05 | 3.72E-07 | 3.72E-07 | 1.27E-05 | 1.76E-05 | 1.59E-06 | 3.72E-07 | 0.000141 | 0.000141 | |
| 348 | 311376.6 | 3904736 | cDerived_I | 1.29E-05 | 3.43E-07 | 3.43E-07 | 1.17E-05 | 1.71E-05 | 1.47E-06 | 3.43E-07 | 0.00013 | 0.00013 | |
| 344 | 311351.2 | 3904753 | cDerived_I | 1.20E-05 | 3.21E-07 | 3.21E-07 | 1.10E-05 | 1.61E-05 | 1.37E-06 | 3.21E-07 | 0.000121 | 0.000121 | |
| 993 | 311399.4 | 3904730 | cDerived_I | 1.14E-05 | 3.03E-07 | 3.03E-07 | 1.04E-05 | 1.59E-05 | 1.30E-06 | 3.03E-07 | 0.000114 | 0.000114 | |
| 1 | 311326.7 | 3904771 | cDerived_I | 1.07E-05 | 2.85E-07 | 2.85E-07 | 9.77E-06 | 1.44E-05 | 1.22E-06 | 2.85E-07 | 0.000108 | 0.000108 | |
| 573 | 311505.4 | 3904550 | cDerived_I | 1.04E-05 | 2.77E-07 | 2.77E-07 | 9.50E-06 | 1.49E-05 | 1.19E-06 | 2.77E-07 | 0.000105 | 0.000105 | |
| 591 | 311505.4 | 3904575 | cDerived_I | 1.04E-05 | 2.77E-07 | 2.77E-07 | 9.48E-06 | 1.59E-05 | 1.19E-06 | 2.77E-07 | 0.000105 | 0.000105 | |
| 555 | 311505.4 | 3904525 | cDerived_I | 9.90E-06 | 2.64E-07 | 2.64E-07 | 9.03E-06 | 1.36E-05 | 1.13E-06 | 2.64E-07 | 9.98E-05 | 9.98E-05 | |
| 345 | 311376.5 | 3904752 | cDerived_I | 9.87E-06 | 2.63E-07 | 2.63E-07 | 9.01E-06 | 1.37E-05 | 1.13E-06 | 2.63E-07 | 9.94E-05 | 9.94E-05 | |
| 609 | 311505.4 | 3904600 | cDerived_I | 9.75E-06 | 2.60E-07 | 2.60E-07 | 8.89E-06 | 1.67E-05 | 1.11E-06 | 2.60E-07 | 9.83E-05 | 9.83E-05 | |
| 538 | 311505.4 | 3904500 | cDerived_I | 9.12E-06 | 2.43E-07 | 2.43E-07 | 8.33E-06 | 1.22E-05 | 1.04E-06 | 2.43E-07 | 9.20E-05 | 9.20E-05 | |
| 2 | 311351.7 | 3904771 | cDerived_I | 8.94E-06 | 2.38E-07 | 2.38E-07 | 8.16E-06 | 1.23E-05 | 1.02E-06 | 2.38E-07 | 9.01E-05 | 9.01E-05 | |
| 628 | 311505.4 | 3904625 | cDerived_I | 8.73E-06 | 2.33E-07 | 2.33E-07 | 7.97E-06 | 1.71E-05 | 9.97E-07 | 2.33E-07 | 8.81E-05 | 8.81E-05 | |
| 521 | 311505.4 | 3904475 | cDerived_I | 8.28E-06 | 2.21E-07 | 2.21E-07 | 7.55E-06 | 1.10E-05 | 9.45E-07 | 2.21E-07 | 8.35E-05 | 8.35E-05 | |
| 574 | 311530.4 | 3904550 | cDerived_I | 8.11E-06 | 2.16E-07 | 2.16E-07 | 7.40E-06 | 1.26E-05 | 9.26E-07 | 2.16E-07 | 8.18E-05 | 8.18E-05 | |
| 556 | 311530.4 | 3904525 | cDerived_I | 8.00E-06 | 2.13E-07 | 2.13E-07 | 7.30E-06 | 1.17E-05 | 9.13E-07 | 2.13E-07 | 8.07E-05 | 8.07E-05 | |
| 592 | 311530.4 | 3904575 | cDerived_I | 7.84E-06 | 2.09E-07 | 2.09E-07 | 7.15E-06 | 1.33E-05 | 8.95E-07 | 2.09E-07 | 7.91E-05 | 7.91E-05 | |
| 981 | 311506 | 3904647 | cDerived_I | 7.73E-06 | 2.06E-07 | 2.06E-07 | 7.05E-06 | 1.51E-05 | 8.82E-07 | 2.06E-07 | 7.79E-05 | 7.79E-05 | |
| 539 | 311530.4 | 3904500 | cDerived_I | 7.61E-06 | 2.03E-07 | 2.03E-07 | 6.94E-06 | 1.08E-05 | 8.68E-07 | 2.03E-07 | 7.68E-05 | 7.68E-05 | |
| 992 | 311439.3 | 3904729 | cDerived_I | 7.59E-06 | 2.02E-07 | 2.02E-07 | 6.93E-06 | 1.16E-05 | 8.66E-07 | 2.02E-07 | 7.64E-05 | 7.64E-05 | |
| 3 | 311376.7 | 3904771 | cDerived_I | 7.48E-06 | 1.99E-07 | 1.99E-07 | 6.82E-06 | 1.06E-05 | 8.53E-07 | 1.99E-07 | 7.53E-05 | 7.53E-05 | |
| 505 | 311505.4 | 3904450 | cDerived_I | 7.45E-06 | 1.99E-07 | 1.99E-07 | 6.80E-06 | 9.77E-06 | 8.50E-07 | 1.99E-07 | 7.51E-05 | 7.51E-05 | |
| 27 | 311326.7 | 3904796 | cDerived_I | 7.30E-06 | 1.95E-07 | 1.95E-07 | 6.66E-06 | 1.01E-05 | 8.33E-07 | 1.95E-07 | 7.36E-05 | 7.36E-05 | |
| 610 | 311530.4 | 3904600 | cDerived_I | 7.25E-06 | 1.93E-07 | 1.93E-07 | 6.61E-06 | 1.40E-05 | 8.27E-07 | 1.93E-07 | 7.31E-05 | 7.31E-05 | |
| 522 | 311530.4 | 3904475 | cDerived_I | 7.09E-06 | 1.89E-07 | 1.89E-07 | 6.47E-06 | 9.79E-06 | 8.09E-07 | 1.89E-07 | 7.15E-05 | 7.15E-05 | |
| 978 | 311363.2 | 3904651 | cDerived_I | 2.12E-05 | 5.62E-07 | 5.62E-07 | 1.93E-05 | 2.64E-05 | 2.41E-06 | 5.62E-07 | 7.04E-05 | 7.04E-05 | |
| 489 | 311505.4 | 3904425 | cDerived_I | 6.68E-06 | 1.78E-07 | 1.78E-07 | 6.10E-06 | 8.70E-06 | 7.62E-07 | 1.78E-07 | 6.74E-05 | 6.74E-05 | |

**HARP - Air Dispersion Modeling and Risk Tool v18159 - Operation Residential Acute (non-cancer) Risk
**1/30/2019
**Exported Risk Results

| REC | X | Y | SCENARIO | CNS | IMMUN | EPRO/DEVI | RESP | EYE | BLOOD | MAXHI |
|---|---|---|---|---|---|---|---|---|---|---|
| 973 | 311319.6 | 3904669 | NonCancerAcute | 1.33E-05 | 0.001275 | 0.001283 | 1.33E-05 | 1.33E-05 | 0.001275 | 0.001283 |
| 972 | 311318.8 | 3904678 | NonCancerAcute | 1.27E-05 | 0.00121 | 0.001218 | 1.27E-05 | 1.27E-05 | 0.00121 | 0.001218 |
| 979 | 311412.8 | 3904649 | NonCancerAcute | 1.11E-05 | 0.001094 | 0.001102 | 1.11E-05 | 1.11E-05 | 0.001094 | 0.001102 |
| 971 | 311319.2 | 3904705 | NonCancerAcute | 1.04E-05 | 0.001024 | 0.001031 | 1.04E-05 | 1.04E-05 | 0.001024 | 0.001031 |
| 347 | 311350.5 | 3904737 | NonCancerAcute | 1.02E-05 | 0.001009 | 0.001016 | 1.02E-05 | 1.02E-05 | 0.001009 | 0.001016 |
| 348 | 311376.6 | 3904736 | NonCancerAcute | 9.81E-06 | 0.000972 | 0.000978 | 9.81E-06 | 9.81E-06 | 0.000972 | 0.000978 |
| 993 | 311399.4 | 3904730 | NonCancerAcute | 9.49E-06 | 0.000943 | 0.000949 | 9.49E-06 | 9.49E-06 | 0.000943 | 0.000949 |
| 970 | 311319.7 | 3904732 | NonCancerAcute | 9.22E-06 | 0.000914 | 0.00092 | 9.22E-06 | 9.22E-06 | 0.000914 | 0.00092 |
| 346 | 311325.7 | 3904737 | NonCancerAcute | 9.08E-06 | 0.000902 | 0.000908 | 9.08E-06 | 9.08E-06 | 0.000902 | 0.000908 |
| 344 | 311351.2 | 3904753 | NonCancerAcute | 8.95E-06 | 0.000892 | 0.000898 | 8.95E-06 | 8.95E-06 | 0.000892 | 0.000898 |
| 345 | 311376.5 | 3904752 | NonCancerAcute | 8.71E-06 | 0.000869 | 0.000874 | 8.71E-06 | 8.71E-06 | 0.000869 | 0.000874 |
| 343 | 311326.5 | 3904753 | NonCancerAcute | 8.19E-06 | 0.000819 | 0.000824 | 8.19E-06 | 8.19E-06 | 0.000819 | 0.000824 |
| 2 | 311351.7 | 3904771 | NonCancerAcute | 7.78E-06 | 0.00078 | 0.000786 | 7.78E-06 | 7.78E-06 | 0.00078 | 0.000786 |
| 992 | 311439.3 | 3904729 | NonCancerAcute | 7.69E-06 | 0.000771 | 0.000776 | 7.69E-06 | 7.69E-06 | 0.000771 | 0.000776 |
| 1 | 311326.7 | 3904771 | NonCancerAcute | 7.56E-06 | 0.000759 | 0.000764 | 7.56E-06 | 7.56E-06 | 0.000759 | 0.000764 |
| 980 | 311462.4 | 3904648 | NonCancerAcute | 7.55E-06 | 0.000758 | 0.000763 | 7.55E-06 | 7.55E-06 | 0.000758 | 0.000763 |
| 3 | 311376.7 | 3904771 | NonCancerAcute | 7.57E-06 | 0.000758 | 0.000763 | 7.57E-06 | 7.57E-06 | 0.000758 | 0.000763 |
| 4 | 311401.7 | 3904771 | NonCancerAcute | 7.13E-06 | 0.000717 | 0.000722 | 7.13E-06 | 7.13E-06 | 0.000717 | 0.000722 |
| 5 | 311426.7 | 3904771 | NonCancerAcute | 6.57E-06 | 0.000664 | 0.000668 | 6.57E-06 | 6.57E-06 | 0.000664 | 0.000668 |
| 28 | 311351.7 | 3904796 | NonCancerAcute | 6.48E-06 | 0.000654 | 0.000658 | 6.48E-06 | 6.48E-06 | 0.000654 | 0.000658 |
| 29 | 311376.7 | 3904796 | NonCancerAcute | 6.34E-06 | 0.000641 | 0.000645 | 6.34E-06 | 6.34E-06 | 0.000641 | 0.000645 |
| 991 | 311479.1 | 3904728 | NonCancerAcute | 6.31E-06 | 0.000636 | 0.00064 | 6.31E-06 | 6.31E-06 | 0.000636 | 0.00064 |
| 27 | 311326.7 | 3904796 | NonCancerAcute | 6.29E-06 | 0.000634 | 0.000639 | 6.29E-06 | 6.29E-06 | 0.000634 | 0.000639 |
| 6 | 311451.7 | 3904771 | NonCancerAcute | 6.10E-06 | 0.000617 | 0.000621 | 6.10E-06 | 6.10E-06 | 0.000617 | 0.000621 |
| 30 | 311401.7 | 3904796 | NonCancerAcute | 6.08E-06 | 0.000614 | 0.000618 | 6.08E-06 | 6.08E-06 | 0.000614 | 0.000618 |
| 609 | 311505.4 | 3904600 | NonCancerAcute | 5.80E-06 | 0.000588 | 0.000592 | 5.80E-06 | 5.80E-06 | 0.000588 | 0.000592 |
| 31 | 311426.7 | 3904796 | NonCancerAcute | 5.79E-06 | 0.000586 | 0.00059 | 5.79E-06 | 5.79E-06 | 0.000586 | 0.00059 |
| 628 | 311505.4 | 3904625 | NonCancerAcute | 5.59E-06 | 0.000567 | 0.00057 | 5.59E-06 | 5.59E-06 | 0.000567 | 0.00057 |
| 981 | 311506 | 3904647 | NonCancerAcute | 5.60E-06 | 0.000566 | 0.00057 | 5.60E-06 | 5.60E-06 | 0.000566 | 0.00057 |
| 55 | 311376.7 | 3904821 | NonCancerAcute | 5.53E-06 | 0.000562 | 0.000565 | 5.53E-06 | 5.53E-06 | 0.000562 | 0.000565 |
| 54 | 311351.7 | 3904821 | NonCancerAcute | 5.50E-06 | 0.000557 | 0.000561 | 5.50E-06 | 5.50E-06 | 0.000557 | 0.000561 |
| 32 | 311451.7 | 3904796 | NonCancerAcute | 5.42E-06 | 0.00055 | 0.000553 | 5.42E-06 | 5.42E-06 | 0.00055 | 0.000553 |
| 56 | 311401.7 | 3904821 | NonCancerAcute | 5.29E-06 | 0.000537 | 0.00054 | 5.29E-06 | 5.29E-06 | 0.000537 | 0.00054 |
| 591 | 311505.4 | 3904575 | NonCancerAcute | 5.26E-06 | 0.000533 | 0.000536 | 5.26E-06 | 5.26E-06 | 0.000533 | 0.000536 |
| 53 | 311326.7 | 3904821 | NonCancerAcute | 5.24E-06 | 0.000531 | 0.000534 | 5.24E-06 | 5.24E-06 | 0.000531 | 0.000534 |

HIGHEST RISK

Appendix VII

CalEEMod 2016.3.2 Cumulative Impact Modeling (included in PDF)

# Appendix VIII

# Greenhouse Gas Emission Calculations

# GHG BAU Comparison

| 2005 (tons/year) | | | | | | |
|---|---|---|---|---|---|---|
| | Bio-CO2 | Nbio-CO2 | Total CO2 | CH4 | N2O | CO2e |
| Area | | | | | | 0.00673 |
| Energy | | | | | | 223.2036 |
| Mobile | | | | | | 1024.332 |
| Waste | | | | | | 49.7068 |
| Water | | | | | | 15.4046 |
| Total | | | | | | 1312.654 |

| 2021 (tons/year) | | | | | | |
|---|---|---|---|---|---|---|
| | Bio-CO2 | Nbio-CO2 | Total CO2 | CH4 | N2O | CO2e |
| Area | | | | | | 0.00643 |
| Energy | | | | | | 223.2038 |
| Mobile | | | | | | 878.8951 |
| Waste | | | | | | 49.7068 |
| Water | | | | | | 15.4048 |
| Total | | | | | | 1,167.22 |

| | | | |
|---|---|---|---|
| 29% Reduction Goal for 2020: | **380.6697** | **MT $CO_2e$** | |
| Project Reduction: | **145.44** | **MT $CO_2e$** | |
| Difference: | **-235.23** | **MT $CO_2e$** | (Requires Carbon Credit Purchase) |
| % Reduction (2005 vs 2019): | **11.08** | **%** | |