Cumulative Health Risk Assessment
Visalia Walmart Expansion Project
City of Visalia, California

Prepared for:

City of Visalia
Community Development Department
315 East Acequia Avenue
Visalia, CA 93291
559.713.4003

Contact: Andrew Chamberlain, Senior Planner

Prepared by:

Michael Brandman Associates
1234 O Street
Fresno, CA 93721
559.497.0310

Contact: Dave Mitchell, Air Quality Services Manager
Author: Vince Mirabella, Senior Air Quality Scientist

Michael Brandman Associates

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ACRONYMS AND ABBREVIATIONS

µg	micrograms
ADT	average daily trips
AERMOD	American Meteorological Society/United States Environmental Protection Agency Regulatory Model
ARB	California Air Resources Board
BAAQMD	Bay Area Air Quality Management District
CAA	Federal Clean Air Act
CCAA	California Clean Air Act
DPM	diesel particulate matter
EMFAC	Emissions Factor Model
EPA	United States Environmental Protection Agency
GAMAQI	Guide for Assessing and Mitigating Air Quality Impacts
HAP	hazardous air pollutants
HHDT	heavy-heavy duty truck
LDA	light duty automobile
LDT	light duty truck
LHDT	light heavy duty truck
MDT	medium duty truck
MER	Maximum Exposed Receptor
MHDT	medium heavy duty truck
MSAT	Mobile Source Air Toxic
ppm	parts per million
SCAQMD	South Coast Air Quality Management District
SJVAB	San Joaquin Valley Air Basin

SJVAPCD	San Joaquin Valley Air Pollution Control District
TAC	toxic air contaminant
TIS	Traffic Impact Study
TOG	total organic gases
TRU	transport refrigeration unit
VMT	vehicle miles traveled

SECTION 1: INTRODUCTION

1.1 - Purpose and Methods of Analysis

A health risk assessment (HRA) is a guide that helps to determine if current or future exposures to a chemical or substance could affect the health of a population. The State of California Office of Environmental Health Hazard Assessment (OEHHA) develops methods for conducting health risk assessments. As defined under the Air Toxics “Hotspots” Information and Assessment Act of 1987 [AB 2588 (Chapter 1252, Statutes of 1987), California Health and Safety Code Section 44306], “A health risk assessment means a detailed comprehensive analysis prepared pursuant to Section 44361 to evaluate and predict the dispersion of hazardous substances in the environment and the potential for exposure of human populations and to assess and quantify both the individual and population-wide health risks associated with those levels of exposure” (OEHHA 1987).

The following health risk analysis was prepared to evaluate whether the existing levels of toxic air contaminants (TACs) in combination with the TACs emissions from planned and probable future projects together with the TACs from the operation of the Visalia Walmart Expansion Project (project) would result in a significant cumulative health risk impact to the surrounding environment.

The project consists of the 54,857 square-foot expansion of an existing Walmart located at 1819 East Noble Avenue in Visalia, California. This assessment follows the two-step procedure described by the Tulare County Court in the case of *Visalia Smart Growth Coalition vs. City of Visalia* (April 12, 2012) in preparing the cumulative assessment. This two-step procedure is as follows:

> Step one is to identify and quantify all existing impacts; then to add the project’s new impacts, then to add the impacts of any other potential (probable) projects.

The next action in step one is to establish and justify a threshold of significance for the total of all such impacts. If the cumulative total impacts are below this threshold, a finding of non-significance can be made. If the total impacts exceed the threshold, then they are cumulatively significant and step two comes into play.

If the existing conditions without the project are already significant, then a second step is required to determine of the project’s contribution is cumulatively considerable.

> Step two is to determine whether the contributions of the project are cumulatively considerable

The San Joaquin Valley Air Pollution Control District (SJVAPCD) does not provide a threshold to determine if existing sources plus the project and reasonably foreseeable sources would result in a significant cumulative TAC impact. The current Guide for Assessing and Mitigating Air Quality

Impacts ("GAMAQI") last revised in 2002 includes a discussion regarding cumulative analysis of TACs , but does not provide a cumulative threshold for TAC emissions. In practice, the SJVAPCD has not recommended preparing a cumulative TAC impact assessment that inventories existing, and probable future TAC sources to determine if a cumulative impact exists, but proceeds as if the combined total emissions without the project is significant. It then considers whether project TAC emissions would contribute 10 in a million or more to the environment. If so, the project has a significant impact as it would exceed the project-level 10 in a million threshold and in so doing, would make a cumulatively considerable contribution to a significant cumulative impact. The SJVAPCD's 2012 Draft GAMAQI explains that the District will continue to view a cumulative contribution threshold of 10 in a million as a cumulatively considerable contribution to a significant cumulative impact, but still does not set forth a threshold to determine whether a cumulative TAC impact exists.

Without an adopted cumulative TAC threshold from the SJVAPCD, MBA was required to identify an appropriate cumulative threshold to use in the project's cumulative TAC analysis. MBA also included a "cumulative contribution threshold" of 10 in a million, the application of which is necessary anytime cumulative sources without the project increase cancer risk by 90 or greater in a million. Recommendation of this cumulative contribution threshold is supported by analysis and substantial evidence. The Cumulative Toxic Threshold Document contained as Appendix A of this report contains this evidence, and was prepared in response to the Court's direction to the City to select a cumulative threshold to apply to the cumulative analysis undertaken in response to the Court's ruling.

The methodology applied in the Cumulative Threshold report is based upon a combined approach using the cumulative threshold adopted by the Bay Area Air Quality Management District (BAAQMD) in its CEQA Air Quality Guidelines (BAAQMD 2011a) and the cumulative contribution threshold proposed in the SJVAPCD 2012 Draft GAMAQI (SJVAPCD 2012). The TAC analysis and modeling conducted for the project follows the Guidance for Air Dispersion Modeling (SJVAPCD 2010) prepared by the SJVAPCD for quantification of emissions and evaluation of potential impacts to air resources. The BAAQMD CEQA Air Quality Guidance was also used in defining the geographical extent of existing sources of emissions to analyze in the cumulative assessment.

This report replaces the health risk assessment prepared by Illingworth and Rodkin (Illingworth and Rodkin 2010) and included in the 2011 EIR. The current analysis in the new HRA expands the previous HRA's analysis by quantifying and assessing the cumulative health risk impacts from emission sources located within a 1,000-foot analysis radius from the project. It also contains updated emission information based on the newest version of the ARB EMFAC2011 mobile source emission model. Although the Court ruling only found the cumulative TAC analysis deficient, the new HRA includes a project-level and cumulative TAC analysis to achieve consistent results by using the same models and assumptions for both analyses.

1.2 - Project Location

The project is located at 1819 East Noble Avenue between Ben Maddox Way and Pinkham Street in the City of Visalia, Tulare County, California. It is situated just east of the intersection of East Noble Avenue and Ben Maddox Way as shown in Exhibit 1 and Exhibit 2. The primary local access to the project site is from East Noble Avenue.

The lands surrounding the project site are almost entirely urbanized with a mixture of commercial, office, residential, church, and public facility uses. There is an existing commercial retail shopping center adjacent to the west, beyond which is a series of automobile dealerships along Ben Maddox Way to the southwest. There is a new Social Security Administration office building on property adjacent to and northeast of the project site along Noble Avenue. The land uses along the south side of Noble Avenue east to Pinkham Street consist of commercial service, church, and office uses. The lands to the east and south of the project site are largely in residential use, with the exception of one vacant 2.0-acre parcel adjacent to the southeast portion of the project site, which vacant parcel fronts onto Pinkham Street to the east. The SR-198 freeway corridor runs in an east-west direction just north of Noble Avenue, and beyond the freeway, there are various commercial and light industrial uses along Mineral King Avenue.

1.3 - Project Description

The proposed project consists of the expansion and remodeling of the existing Walmart store located in 1819 East Noble Avenue between Ben Maddox Way and Pinkham Street in east-central Visalia. The project would expand the existing Walmart store by approximately 54,857 square feet, increasing the total store area to 181,640 square feet as shown in site plan in Exhibit 3. The expansion would add a grocery component to the existing store that would add three new semi-trailer truck deliveries, of which about two would be by refrigerated truck, and up to about 4 smaller vendor truck deliveries per day.

1.4 - Summary

The report provides an analysis of the estimated project-level and cumulative health risk impacts associated with the operation of the proposed Visalia Walmart Expansion Project (project) development in Visalia, California. The analysis compiled an inventory of the toxic air contaminant (TAC) emissions from the project and existing and planned and probable future TAC sources located within a 1,000-foot analysis radius from the Walmart property line. The existing, planned, and probable future sources included the existing Walmart, local restaurants, car dealerships, gasoline service stations, a rail line, food processing facility, auto paint and body shop, and vehicle travel on local roadways.

Using this emission inventory, estimates of cancer risk and non-cancer hazards were made using an air dispersion/health risk model at sensitive receptors surrounding the project for the project sources and existing and reasonably foreseeable sources.

The results of this report support the following conclusions:

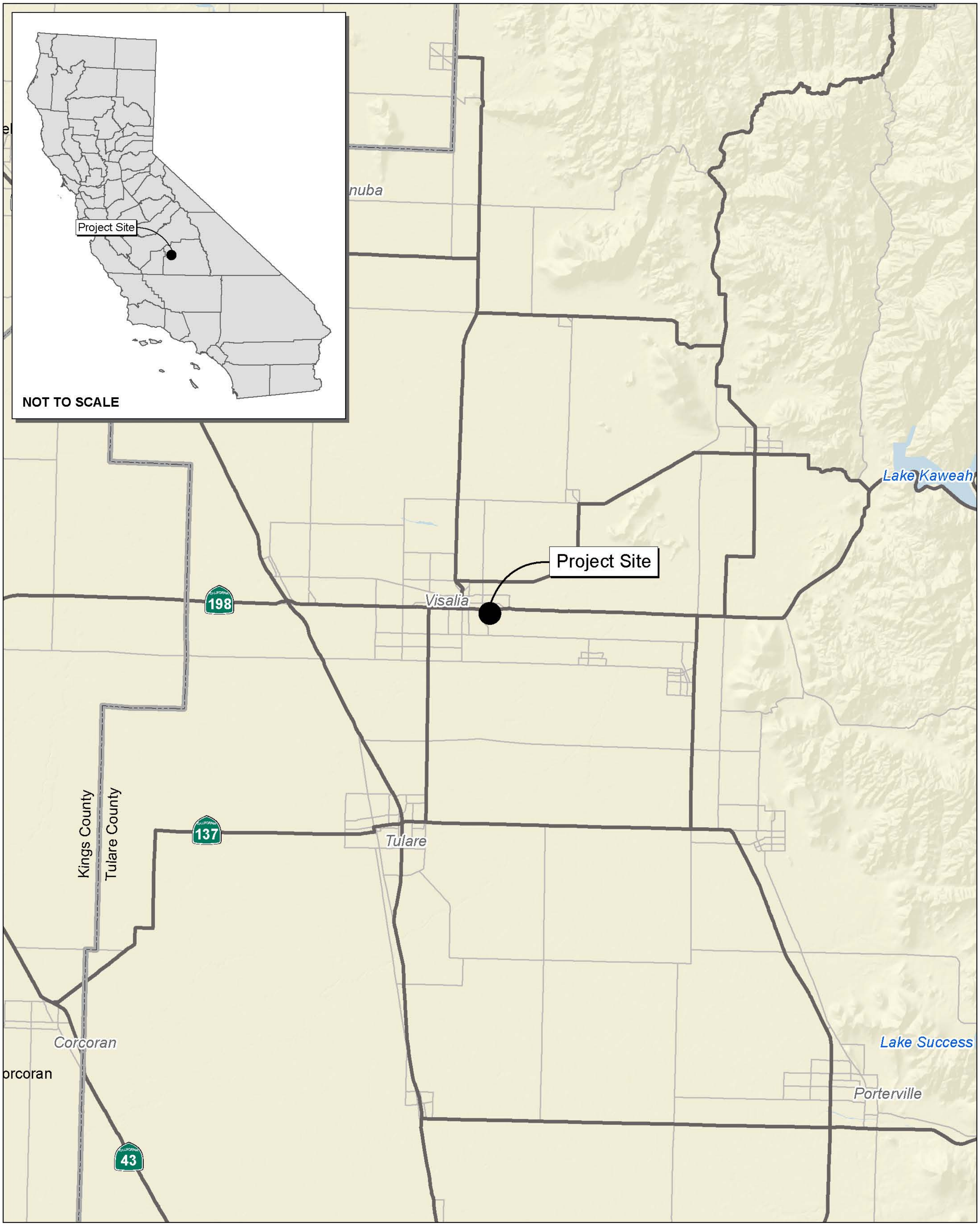
Project-Level Impacts

- The project-level health risks resulting from the operation of the project would not exceed the SJVAPCD health risk significance threshold of a cancer risk of 10 in one million nor the SJVAPCD non-cancer hazard index of 10.0 applied to project emissions.

Cumulative Impacts

A cumulative threshold was developed to enable the City of Visalia to evaluate the project's potentially significant cumulative TAC impacts in accordance with the Court's ruling. Appendix A – Visalia Cumulative Toxic Threshold Document contains analysis, supporting documentation, and substantial evidence supporting the use of the cumulative thresholds of significance. Based on the cumulative significance thresholds adopted for this analysis, the analysis herein results in the following conclusions:

- The cumulative health risk impacts of project emissions in combination with existing, planned, and probable future sources of toxic air contaminant emissions within a 1,000-foot analysis radius would not exceed a cumulative significance cancer risk threshold of 100 in one million.
- The cumulative health risk impacts of project emissions in combination with existing, planned, and probable future sources of toxic air contaminant emissions within a 1,000-foot analysis radius would not exceed the cumulative significance non-cancer hazard index of 10.0 in a million.



Source: Census 2000 Data, The CaSIL, MBA GIS 2011.

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NORTH

5 2.5 0 5 Miles

Exhibit 1
Regional Location Map

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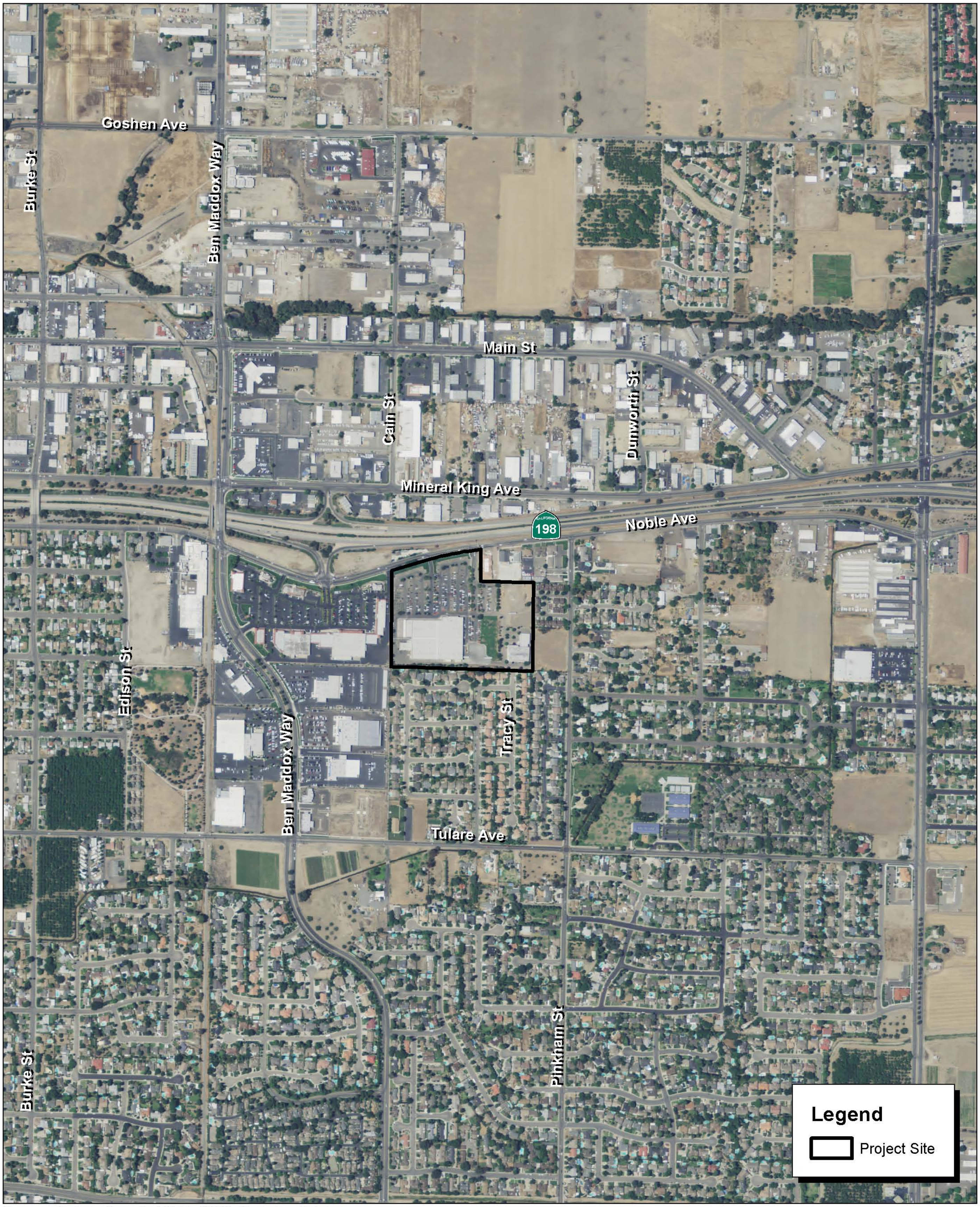

Source: Tulare County NAIP, 2009. County of Tulare.

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1,000 500 0 1,000 Feet

Exhibit 2
Local Vicinity Map
Aerial Base

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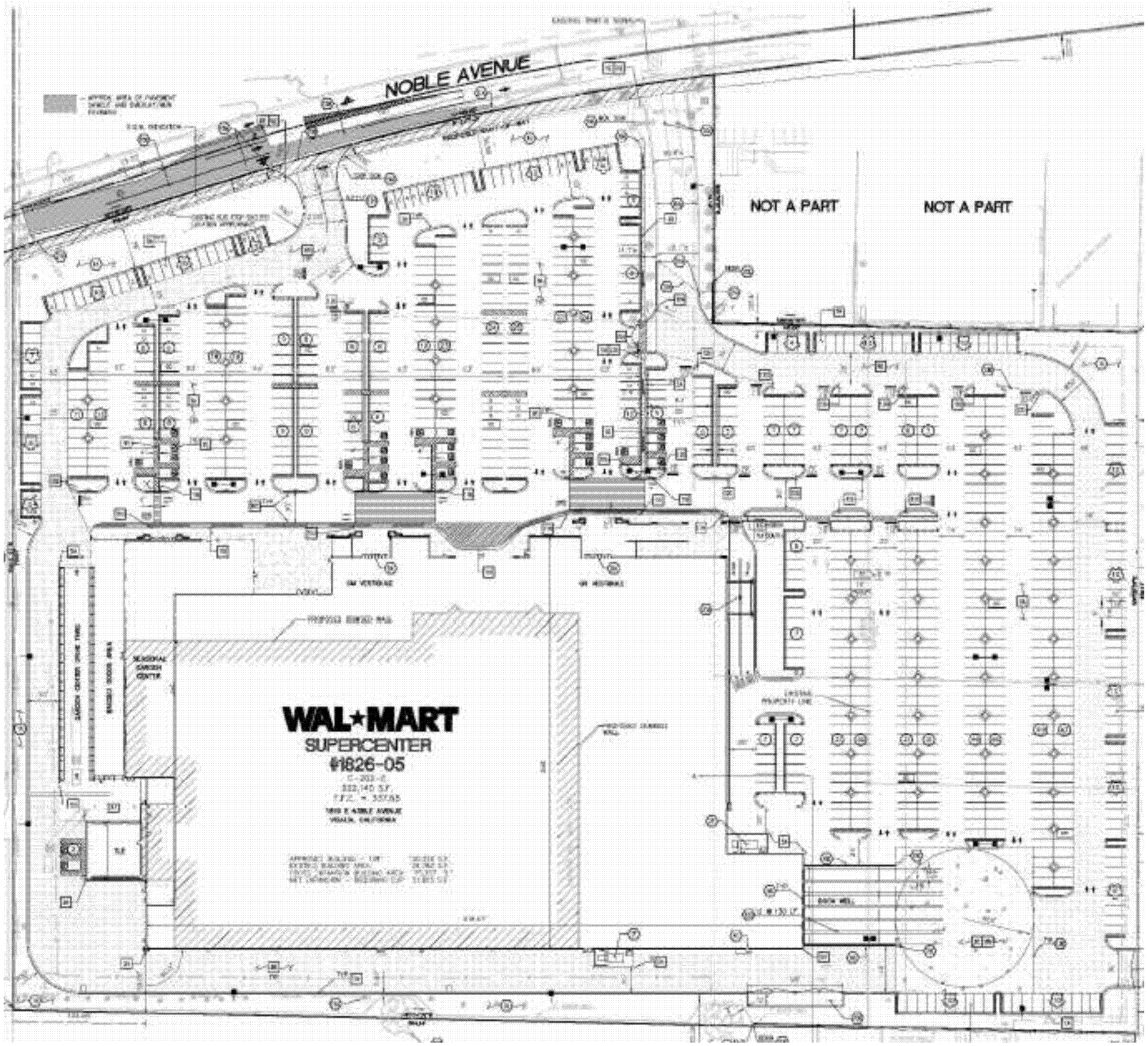

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Exhibit 3
Site Plan

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SECTION 2: SETTING

2.1 - Regulatory Setting

Air pollutants are regulated at the national, state, and air basin level with each agency having a different level of regulatory responsibility. The United States Environmental Protection Agency (EPA) regulates at the national level. ARB regulates at the state level while the SJVAPCD regulates at the air basin/regional level. The City of Visalia has within its authority the ability to manage land uses, which can affect local air quality.

2.1.1 - National and State Regulatory Agencies

The EPA handles global, international, national, and interstate air pollution issues and policies. The EPA sets national vehicle and stationary source emission standards, oversees approval of all State Implementation Plans, provides research and guidance for air pollution programs, and sets National Ambient Air Quality Standards (NAAQS), also known as federal standards. There are national standards for six common "criteria" air pollutants including ozone, nitrogen dioxide, carbon monoxide, particulate matter (PM_{10} and $PM_{2.5}$), lead, and sulfur dioxide, which were identified from provisions of the Clean Air Act of 1970. California, under the California Clean Air Act, has also defined a set of health protective California Ambient Air Quality Standards (CAAQS).

Besides the "criteria" air pollutants, there is another group of substances found in ambient air referred to as Hazardous Air Pollutants (HAPs) under the Federal Clean Air Act and Toxic Air Contaminants (TACs) under the California Clean Air Act. These contaminants tend to be localized and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects if exposure to low concentrations occurs for long periods. They are regulated at the regional, state, and federal levels. HAPs are the air contaminants identified by the EPA as known or suspected to cancer, serious illness, birth defects, or death. Many of these contaminants originate from human activities, such as fuel combustion and solvent use. Mobile Source Air Toxics (MSATs) are a subset of the 188 HAPs. Of the 21 HAPs identified by the EPA as MSATs, a priority list of six priority HAPs were identified that include diesel exhaust, benzene, formaldehyde, acetaldehyde, acrolein, and 1, 3-butadiene. While vehicle miles traveled in the United States is expected to increase by 64 percent over the period 2000 to 2020, emissions of MSATs are anticipated to decrease substantially as a result of efforts to control mobile source emissions (by 57 percent to 67 percent depending on the contaminant).

Particulate matter from diesel exhaust is the predominant TAC in urban air and is estimated to represent about 80 percent statewide of the outdoor cancer risk from TACs (ARB 2009). According to the ARB, diesel exhaust is a complex mixture of gases, vapors and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the ARB, and are listed as carcinogens either under State Proposition 65 or under the Federal Hazardous Air Pollutants programs.

The ARB Statewide comprehensive air toxics program was established in the early 1980s. The TAC Identification and Control Act (Assembly Bill [AB] 1807, Tanner 1983) created California's program to reduce exposure to air toxics. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, Connelly 1987) supplements the AB 1807 program by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

Under AB 1807, the ARB is required to use certain criteria in the prioritization for the identification and control of air toxics. In selecting substances for review, the ARB must consider criteria relating to "the risk of harm to public health, amount or potential amount of emissions, manner of, and exposure to, usage of the substance in California, persistence in the atmosphere, and ambient concentrations in the community." AB 1807 also requires the ARB to use available information gathered from the ARB 2588 program to include in the prioritization of compounds. In September 1992, the Hot Spots Act was amended by Senate Bill 1731, which required facilities that pose a significant health risk to reduce their risk through a risk management plan.

In September 2000, the ARB approved a comprehensive Diesel Risk Reduction Plan (Plan) to reduce diesel emissions from both new and existing diesel-fueled engines and vehicles. The goal of the Plan is to reduce diesel particulate matter (PM) emissions and the associated health risk by 75 percent in 2010 and 85 percent by 2020. The Plan is a roadmap that identifies the steps ARB will be taking to develop specific regulations to reduce diesel particulate matter (DPM or diesel PM) emissions. The emission reductions resulting from the Plan are expected to result in a decrease of 80 percent in cancer risk by 2020 from the levels in 2000.

Exhibit 4 provides a graph that displays emission reductions attributable to the Plan. The Plan identifies 14 measures applicable to the largest sources of DPM, most of which have been implemented. The primary provisions of the measures accomplished the following:

- Establish more stringent emission standards for new diesel-fueled engines and vehicles;
- Establish particulate trap retrofit requirements for existing engines and vehicles where traps are determined to be technically feasible and cost-effective;
- Require the sulfur content of diesel fuel to be reduced to enable the use of advanced DPM emission controls; and
- Evaluate alternatives for diesel-fueled engines and vehicles.

As a result of controls on motor vehicles, fuels, stationary sources, and consumer products, the public's exposure to air toxics has decreased dramatically. Between the early 1990s and today, the decrease in statewide average health risk ranged from approximately 20 percent for formaldehyde to approximately 90 percent for perchloroethylene.

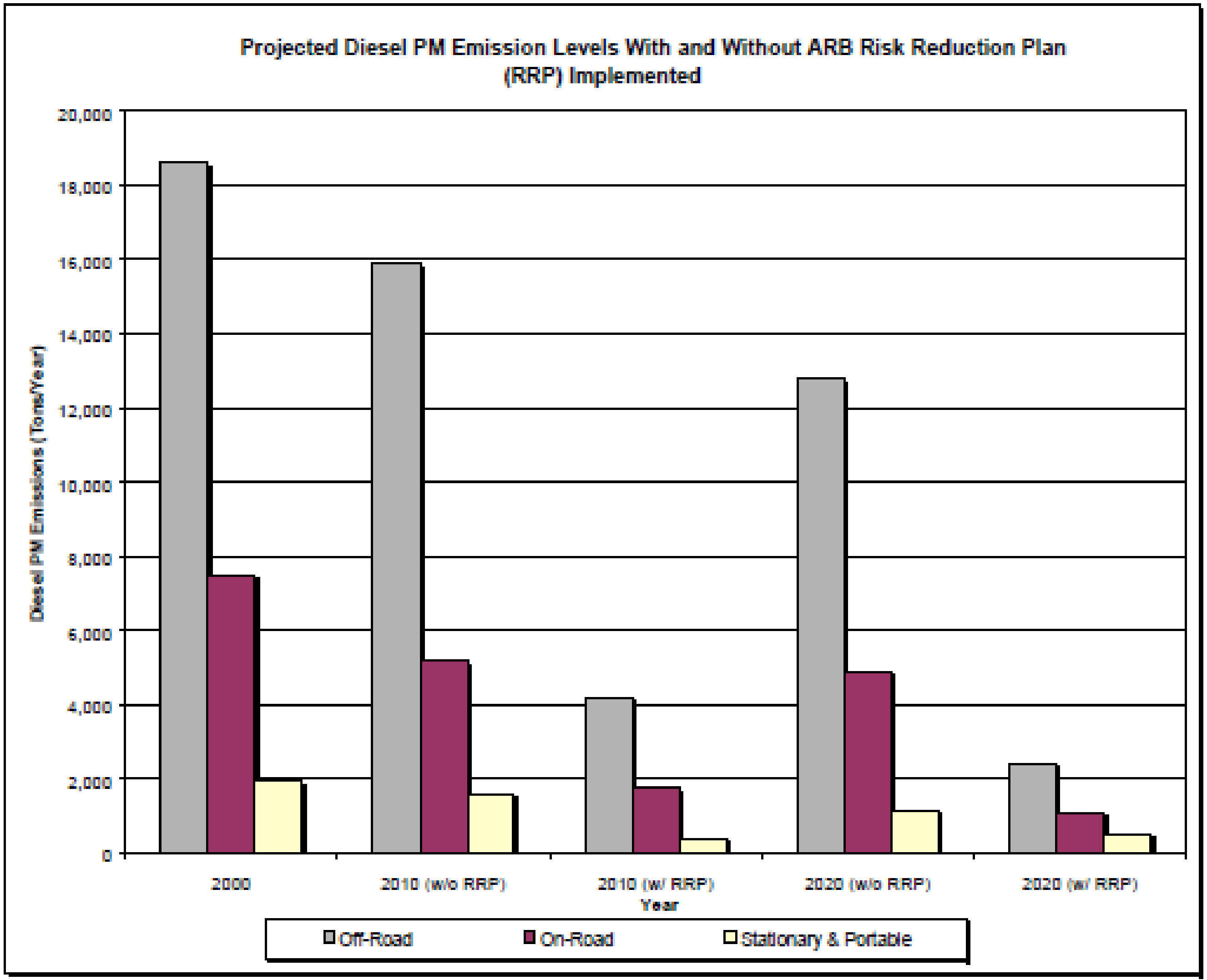

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Exhibit 4
TAC Emission Reductions Under the ARB Diesel Risk Reduction Plan

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Air toxics associated with motor vehicles and their fuels such as 1,3-butadiene and benzene have also seen significant decreases of 80 to 85 percent as a result of ARB's mobile source control program. In aggregate, the estimated cancer risk from air toxics has been reduced by approximately 60 percent since the early 1990s.

Applicable Toxic Air Contaminant Regulations

ARB's toxic air contaminant program traces its beginning to the criteria pollutant program in the 1960s. For many years, the criteria pollutant control program has been effective at reducing toxic air contaminants, since many volatile organic compounds and PM constituents are also toxic air contaminants. During the 1980s, the public's concern over toxic chemicals heightened. As a result, citizens demanded protection and control over the release of toxic chemicals into the air. In response to public concerns, the California legislature enacted the Toxic Air Contaminant Identification and Control Act governing the release of toxic air contaminants into the air. This law charges ARB with the responsibility for identifying substances as toxic air contaminants, setting priorities for control, adopting control strategies, and promoting alternative processes. ARB has designated almost 200 compounds as toxic air contaminants. Additionally, ARB has implemented control strategies for a number of compounds that pose high health risk and show potential for effective control. These programs are described in the following paragraphs.

Carl Moyer Memorial Air Quality Standards Attainment Program. Since 1998, the Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) has provided funding to encourage the voluntary purchase of cleaner engines, equipment, and emission reduction technologies. The Carl Moyer Program plays a complementary role to California's regulatory program by funding emission reductions that are surplus, i.e., early and/or in excess of what is required by regulation. The Carl Moyer Program accelerates the turnover of old, highly polluting engines; speeds the commercialization of advanced emission controls; and reduces air pollution impacts on environmental justice communities. Emission reductions achieved through the Carl Moyer Program are an important component of the California State Implementation Plan.

Airborne Toxic Control Measure for Diesel Particulate Matter from Portable Engines Rated at 50 horsepower and Greater. Effective February 19, 2011, each fleet shall comply with weighted reduced particulate matter emission fleet averages by compliance dates listed in the regulation.

ARB Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling adopts new section 2485 within Chapter 10, Article 1, Division 3, title 13 in the California Code of Regulations. The measure limits the idling of diesel vehicles to reduce emissions of toxics and criteria pollutants. The driver of any vehicle subject to this section: (1) shall not idle the vehicle's primary diesel engine for greater than five minutes at any location; and (2) shall not idle a diesel-fueled auxiliary power system for more than five minutes to power a heater, air conditioner, or any ancillary equipment on the vehicle if it has a sleeper berth and the truck is located within 100 feet of a restricted area (homes and schools).

ARB Final Regulation Order, Requirements to Reduce Idling Emissions from New and In-Use Trucks requires that new 2008 and subsequent model-year heavy-duty diesel engines be equipped with an engine shutdown system that automatically shuts down the engine after 300 seconds of continuous idling operation once the vehicle is stopped, the transmission is set to "neutral" or "park," and the parking brake is engaged. If the parking brake is not engaged, then the engine shutdown system shall shut down the engine after 900 seconds of continuous idling operation once the vehicle is stopped and the transmission is set to "neutral" or "park." Any project trucks manufactured after 2008 would be consistent with this rule, which would ultimately reduce air emissions.

ARB Regulation for In-Use Off-Road Diesel Vehicles. On July 26, 2007, the ARB adopted a regulation to reduce diesel particulate matter and NO_x emissions from in-use (existing) off-road heavy-duty diesel vehicles in California. Such vehicles are used in construction, mining, and industrial operations. The regulation limits idling to no more than five consecutive minutes, requires reporting and labeling, and requires disclosure of the regulation upon vehicle sale. The ARB is enforcing that part of the rule with fines up to $10,000 per day for each vehicle in violation. Performance requirements of the rule are based on a fleet's average NO_x emissions, which can be met by replacing older vehicles with newer, cleaner vehicles or by applying exhaust retrofits. The regulation was amended in 2010 to delay the original timeline of the performance requirements making the first compliance deadline January 1, 2014 for large fleets (over 5,000 horsepower), 2017 for medium fleets (2,501-5,000 horsepower), and 2019 for small fleets (2,500 horsepower or less).

Statewide Truck and Bus Rule. On December 12, 2008, the ARB approved this regulation to reduce emissions from existing on-road diesel trucks and buses operating in California. This regulation applies to all on-road heavy-duty diesel-fueled vehicles with a gross vehicle weight rating greater than 14,000 pounds, agricultural yard trucks with off-road certified engines, and certain diesel fueled shuttle vehicles of any gross vehicle weight rating. Out-of-state trucks and buses that operate in California are also subject. Under the regulation, older, heavier trucks, i.e. those with pre-2000 year engines and a gross vehicle weight rating greater than 26,000 pounds, are required to have installed a particulate matter filter and must be replaced with a 2010 engine between 2015 and 2020, depending on the model year. By 2015, all heavier pre-1994 trucks must be upgraded to 2010 engines and newer trucks are thereafter required to be replaced over the next 8 years. Older, more polluting trucks are required to be replaced first, while trucks that already have relatively clean 2007-2009 engines are not required to be replaced until 2023. Lighter trucks (14,001-26,000 pounds) must adhere to a similar schedule, and will all be replaced by 2020. Furthermore, nearly all trucks that are not required under the Truck and Bus Regulation to be replaced by 2015 are required to be upgraded with a particulate matter filter by that date.

ARB Airborne Toxic Control Measure. In July 2001, the ARB approved an Air Toxic Control Measure for construction, grading, quarrying and surface mining operations to minimize emissions of naturally occurring asbestos. The regulation requires application of best management practices to control fugitive dust in areas known to have naturally occurring asbestos and requires notification to the local air district prior to commencement of ground-disturbing activities. The measure establishes specific testing, notification and engineering controls prior to grading, quarrying, or surface mining in construction zones where naturally occurring asbestos is located on projects of any size. There are additional notification and engineering controls at work sites larger than one acre in size. These projects require the submittal of a "Dust Mitigation Plan" and approval by the air district prior to the start of a project.

2.1.2 - Regional and Local Regulatory Authority

The SJVAPCD is the air pollution control agency for the San Joaquin Valley Air Basin (Air Basin). The SJVAPCD is responsible for regulating emissions primarily from stationary sources, certain areawide sources, and indirect sources, but has no authority over motor vehicle emissions and other non-stationary sources of TAC emissions. The SJVAPCD maintains air quality monitoring stations throughout the Air Basin; however, the ARB also maintains monitoring stations in the Air Basin and operates the sites that monitor for TAC emissions. The SJVAPCD, in coordination with the eight countywide transportation agencies, is also responsible for developing, updating, and implementing the Air Quality Plans (AQPs) for the Air Basin. In addition, the SJVAPCD has prepared the Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI) adopted in 1998 and last updated in 2002, which sets forth recommended thresholds of significance, analysis methodologies, and provides guidance on mitigating significant impacts. The SJVAPCD is currently in the process of updating the 2002 GAMAQI. The 2012 Draft GAMAQI was circulated for public review and is currently being revised in response to comments.

Air quality plans that are required by state and federal law for ozone and particulate matter also serve to reduce other pollutants that are toxic. For instance, some toxics compounds are a subset of reactive organic gases (ROG) controlled as ozone precursor emissions. Diesel particulate matter (DPM) is a subset of both PM_{10} and $PM_{2.5}$ emissions. Therefore, some control measures adopted to achieve NAAQS and CAAQS for ozone precursors and particulate matter will also provide reductions in toxic emissions. For example, motor vehicle emission controls to reduce unburned hydrocarbons and fuel evaporation have greatly reduced toxic benzene emissions along with other reactive organic gases responsible for ozone formation.

The City of Visalia has no regulatory authority over TAC emissions, but it does have authority under California Environmental Quality Act to manage land uses and require projects to disclose potential TAC impacts associated with projects and to require mitigation to reduce significant impacts from TAC emissions. The City can also disapprove projects that have significant impacts that cannot be reduced or mitigated to less than significant levels.

2.2 - Environmental Setting

The project is located in the City of Visalia, which is located in the San Joaquin Valley Air Basin Regional and local air quality are impacted by topography, dominant airflows, atmospheric inversions, location, and season. The project is in an urban setting with a combination of commercial, retail, industrial, and residential land uses that provides a complex mix of sources of toxic air contaminants and land uses considered sensitive to these pollutants.

2.2.1 - Regional Air Quality

Air quality is a function of both the rate and location of pollutant emissions under the influence of meteorological conditions and topographic features. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal and, consequently, their effect on air quality. On occasion, the combination of topography and inversion layers can prevent the dispersion of air pollutants in the Air Basin.

Topography

The Air Basin is generally shaped like a bowl. It is open in the north and is surrounded by mountain ranges on all other sides. The Sierra Nevada mountains are along the eastern boundary (8,000 to 14,000 feet in elevation), the Coast Ranges are along the western boundary (3,000 feet in elevation), and the Tehachapi Mountains are along the southern boundary (6,000 to 8,000 feet in elevation). The mountains surrounding the Air Basin form natural horizontal barriers to the dispersion of air contaminants.

Climate

The Air Basin has an “inland Mediterranean” climate and is characterized by long, hot, dry summers and short, foggy winters. Sunlight is a catalyst in the formation of some air pollutants (such as ozone), and the Air Basin averages more than 260 sunny days per year. Temperatures in the Visalia area range from an average high of 98.3 degrees Fahrenheit (°F) in July to an average low of 37.2°F in December. The average annual rainfall is 10.83 inches.

Dominant Airflows

Dominant airflows provide the driving mechanism for transport and dispersion of air pollution. Marine air moves into the Air Basin from the San Joaquin River Delta. The wind generally flows south-southeast through the valley, through the Tehachapi Pass and into the Mojave Desert Air Basin portion of Kern County. As the wind moves through the Air Basin, it mixes with the air pollution generated locally, generally transporting air pollutants from the north to the south in the summer and in a reverse flow in the winter. The predominant winds in the project area are from the northwest direction as shown in Exhibit 5 derived from wind data at the Visalia Airport located approximately 6.5 miles west of the project site.

Inversions

Inversions are also an important component of regional air quality. In general, air temperature decreases with distance from the earth’s surface, creating a gradient from warmer air near the ground to cooler air at elevation. Under normal circumstances, the air close to the earth warms as it absorbs surface heat and begins to rise.

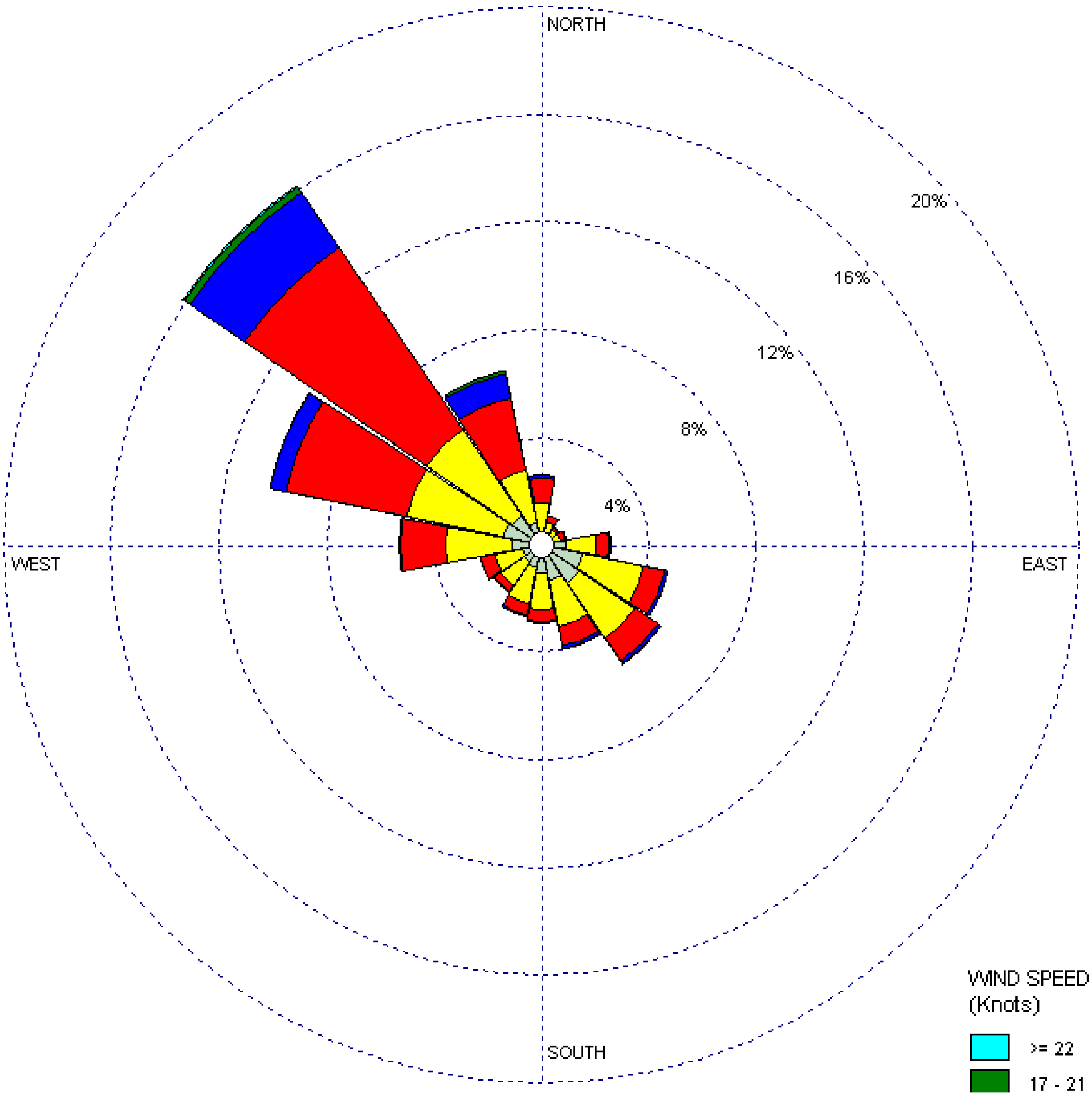

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Exhibit 5
Wind Rose for the Visalia Airport

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Winds occur when cooler air rushes in to take the place of the rising warm air. The wind and upward movement of air causes "mixing" in the atmosphere and can carry away or dilute pollution. Inversions occur when a layer of warm air sits over cooler air, trapping the cooler air beneath.

These inversions trap pollutants from dispersing vertically and the mountains surrounding the Air Basin trap the pollutants from dispersing horizontally. Strong temperature inversions occur throughout the Air Basin in the summer, fall, and winter. Daytime temperature inversions occur at elevations of 2,000 to 2,500 feet above the San Joaquin Valley floor during the summer and at 500 to 1,000 feet during the winter. The result is a relatively high concentration of air pollution in the valley during inversion episodes. These inversions cause haziness, which, in addition to moisture, may include suspended dust, a variety of emissions from vehicles, particulates from wood stoves, and other pollutants.

Location and Season

Because of the prevailing daytime winds and time-delayed nature of ozone, concentrations are highest in the southern portion of the SJVAB, such as around Bakersfield. Summers are often periods of hazy visibility and occasionally unhealthful air, while winter air quality impacts tend to be localized and can consist of (but are not exclusive to) odors from agricultural operations, soot or smoke around residential, agricultural and hazard reduction wood burning, or dust near mineral resource recovery operations.

2.2.2 - Toxic Air Contaminants

A toxic air contaminant is defined as an air pollutant that may cause or contribute to an increase in mortality or serious illness, or which may pose a hazard to human health. Toxic air contaminants are usually present in minute quantities in the ambient air. However, their high toxicity or health risk may pose a threat to public health even at very low concentrations. This contrasts with the criteria pollutants for which acceptable levels of exposure can be determined and for which the state and federal governments have set ambient air quality standards.

Diesel Particulate Matter

ARB identified particulate matter emissions from diesel-fueled engines (DPM) as a TAC in August 1998 under California's TAC program. In California, diesel engine exhaust has been identified as a carcinogen. Most researchers believe that diesel exhaust particles contribute the majority of the risk. DPM is emitted from both mobile and stationary sources. In California, on-road diesel-fueled vehicles contribute approximately 40 percent of the statewide total, with an additional 57 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources, contributing about 3 percent of emissions, include shipyards, warehouses, heavy equipment repair yards, and oil and gas production operations. Emissions from these sources are from diesel-fueled internal combustion engines. Stationary sources that report DPM emissions also include heavy construction (except highway) manufacturers of asphalt, paving materials and blocks, and electrical generation.

DPM is a subset of $PM_{2.5}$—diesel particles are typically 2.5 microns in diameter and smaller. In a document published in 2002, the EPA noted that in 1998, DPM made up about 6 percent of the total $PM_{2.5}$ inventory nationwide. The complex particles and gases that make up diesel exhaust have the physical properties of organic compounds that account for 80 percent of the total particulate matter mass consisting of hydrocarbons and their derivatives and polycyclic aromatic hydrocarbons and their derivatives. Fifteen polycyclic aromatic hydrocarbons are confirmed carcinogens, a number of which are found in diesel exhaust. The chemical composition and particle sizes of DPM vary among different engine types (heavy-duty, light-duty), engine operating conditions (idling, accelerating, decelerating), expected load, engine emission controls, fuel formulations (high/low sulfur fuel), and engine year.

Some short-term (acute) health effects of diesel exhaust exposure include eye, nose, throat, and lung irritation, and exposure can cause coughs, headaches, light-headedness, and nausea. Diesel exhaust is a major source of ambient PM pollution in urban environments. In a 2002 report from the Office of Environmental Health Hazard Assessment (OEHHA) titled "Health Effects of Diesel Exhaust Report," it was noted that numerous studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems. The National Toxicology Program asserted that more serious, long-term health effects of diesel exhaust have demonstrated an increased risk of lung cancer, although the increased risk cannot be clearly attributed to diesel exhaust exposure in its 2005 Report on Carcinogens, Eleventh Edition. The health effects of DPM are summarized later in Table 10.

The ARB has adopted regulations implementing the Diesel Risk Reduction Plan. The regulations are being phased in over time and achieve incremental reductions as new equipment and vehicles enter the fleet and old equipment and vehicles are retired. The regulations also require emission control retrofits that are implemented for different types of equipment and vehicle over time.

Other Toxic Air Contaminants

In addition to exposures to DPM, other toxic emissions are also present in urban atmospheres most notably due to various stationary sources such as industrial process facilities and gasoline service stations and mobile sources such as emissions from gasoline-fueled vehicles. Such emissions include benzene, 1,3-butadiene, formaldehyde, naphthalene, and acetaldehyde among others. The health effects of several TACs that were examined in the assessment are summarized later in Table 10.

There is a dearth of information on establishing ambient levels of toxic air contaminants in the San Joaquin Valley, particularly in the project region. The ARB has published information on toxic air contaminant (TAC) measurements taken at various times and locations in the San Joaquin Valley including Bakersfield, Fresno, Modesto, and Stockton. This information is published in the ARB Almanac, of which the latest publication is from 2009 (ARB 2009). Please refer to Appendix A, the Cumulative Toxic Threshold document, on page 19, Section 3.3.2 for a detailed discussion on this topic.

The nearest monitoring of ambient toxic emission concentrations was performed at the ARB monitoring station located on North First Street in Fresno. The monitoring site is located approximately 44 miles to the southeast of the City of Visalia. The site is situated in the center of the largest city in San Joaquin Valley with a variety of, commercial, residential, and high volume roadways and a freeway (SR-41 is 0.6 mile west of the site) in the vicinity of the monitoring station and likely would exhibit higher levels of TACs than the less urbanized area of Visalia. The ARB air monitoring website states that the site is closed. Samples for TACs were collected every 12 days. Data is averaged over a year to provide annual average emissions. The site did not monitor diesel PM. There is no direct method available for monitoring diesel PM. However, other methods are available to provide reasonable estimates of diesel PM using PM_{10} monitoring data as a surrogate and estimating the fraction that is comprised on diesel PM.

ARB analyzed monitoring data from the long-term Fresno First Street monitoring site and a temporary site located at a school as part of a special study. In May 2006, the ARB published Community Air Quality Monitoring: Fresno, Fremont Elementary School (ARB 2006). Analysis of the monitoring results indicates that the potential cancer risk at Fremont Elementary School is mostly attributable to seven of the toxic air pollutants measured during the study: benzene, 1,3-butadiene, formaldehyde, acetaldehyde, perchlorethylene, carbon tetrachloride, and methylene chloride. Including the other toxic air pollutants measured at these sites does not significantly change the overall risk at each site, nor does it change the overall relationship of cancer risk between sites.

The risk attributable to the seven TACs was estimated at 156 in a million at the Fremont School site and 139 in a million at the Fresno First Street monitoring station during the period from July 2002 through June 2003. The higher emissions and risk at the Fremont School compared with the Fresno First monitoring station were attributed to the school's location 0.5 mile east of SR-99 and the proximity to a parcel distribution facility and other industrial and warehousing uses along SR-99 (ARB 2006).

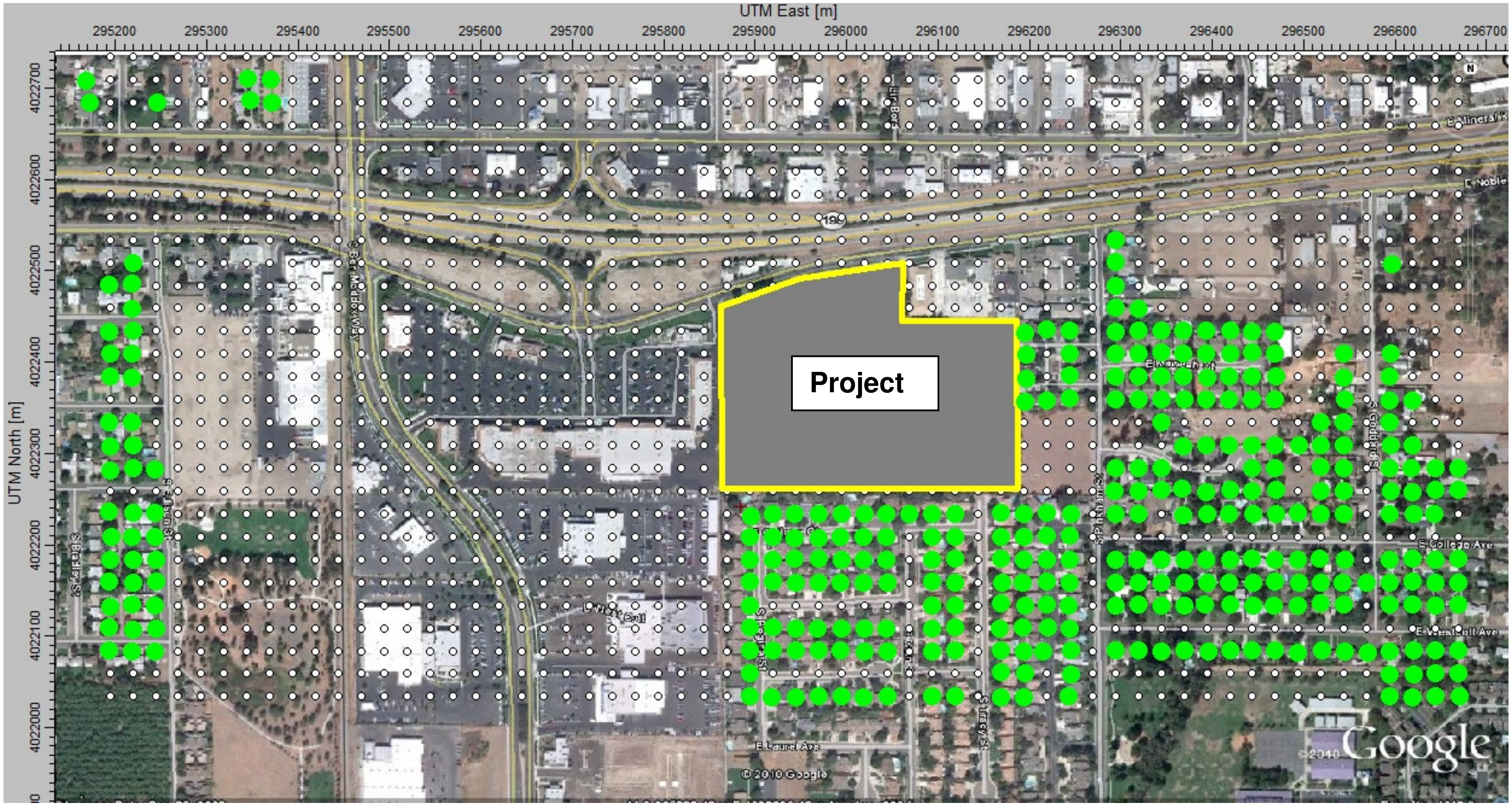
ARB has not conducted monitoring of TAC emissions in the City of Visalia; however, the mix of sources in Visalia is similar to that in Fresno and would experience similar ambient levels of TACs from non-diesel sources. However, Fresno is a substantially larger metropolitan area than Visalia with more sources and traffic, so risk is likely to be somewhat lower in Visalia. In addition, the presence of any large sources near a monitor or near a project site will result in substantially different results due to the effects of distance and dispersion. Emission concentrations and related cancer risk decline rapidly with distance from the source. ARB estimates an 80 percent reduction in risk from a high volume freeway at 500 feet (ARB 2005).

The ARB does provide emission inventories for toxic air contaminant sources on the Community Health Information System (CHAPIS) website, but the cancer risk associated with the emissions is no longer provided. ARB states that the emissions reported in CHAPIS alone do not fully represent where and what extent of exposures to air pollution or possible health risks may occur at any particular location. Weather and wind can result in exposures that occur in different locations from where the emissions actually occurred, and can create new pollutants that are due to chemical reactions in the atmosphere (ARB 2012).

2.2.3 - Sensitive Receptors

Those individuals who are sensitive to air pollution include children, the elderly, and persons with preexisting respiratory or cardiovascular illness. The SJVAPCD considers a sensitive receptor to be a location that houses or attracts children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Examples of sensitive receptors include hospitals, residences, convalescent facilities, and schools.

A review of the area surrounding the project site using the internet-based Google Earth indicated that the closest sensitive receptors to the project are a number of residences located along East College Court to the south along the project's southern property line. A 14-foot screening wall separates these residences from the Walmart store's existing and proposed new loading docks. Additional residences are located to the east along Pinkham Street. These residences along with others located within the 1,000-foot analysis radius were inserted into the air dispersion model as locations where the cumulative impacts would be calculated. The principal focus of this health risk assessment was determining health risk impacts at the residences that the project's TAC emissions would maximally impact. The locations of these sensitive receptors are shown in Exhibit 6 as small green circles. The results of the dispersion modeling were then used to identify which of the sensitive/residential receptors is estimated to be at the location of the maximum impact from the project.



Sensitive/Residential Receptor Location

Non-Residential Receptor Locations

Michael Brandman Associates

NORTH

Exhibit 6
Locations of Sensitive Receptors

34910015 • 06/2012 | 6_receptors.mxd

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VISALIA WALMART EXPANSION PROJECT, CITY OF VISALIA, CA
CUMULATIVE HEALTH RISK ASSESSMENT REPORT