SECTION 3: SIGNIFICANCE THRESHOLDS

Appendix A to this report establishes two levels of significance thresholds for health risk that were applied to determine whether the project has a project-level health risk impact and a cumulatively considerable health risk impact on the environment. These thresholds are consistent with CEQA requirements and supported by substantial evidence. The thresholds applied in the assessment are as follows and are discussed in Appendix A.

3.1 - Project-Level Health Risk Significance Thresholds

In accordance with the thresholds contained within the SJVAPCD GAMAQI, the following project-level significance health risk thresholds were applied:

- A cancer risk level of 10 new cases in a population of one million
- A non-cancer hazard index of 1.0

A project that contributes a cancer risk in excess of 10 new cases in a population of million persons or a non-cancer hazard index of greater than 1.0 would be considered to have a significant project-level impact.

3.2 - Cumulative Health Risk Significance Thresholds

The Cumulative Thresholds Analysis attached as Appendix A to this report has established a cumulative toxics thresholds through independent analysis of information regarding the impacts of these pollutants, among other things. Appendix A describes the cumulative analysis approaches used by the SJVAPCD, San Luis Obispo County Air Pollution Control District, and BAAQMD and provides supporting documentation for their(??) thresholds and the geographic analysis radius for examining sources of TAC emissions.

The cumulative toxic threshold used in this HRA to evaluate cumulative TAC impacts is applied to the total of the impacts of existing sources that capture the emissions from “past projects” developed and currently emitting TACs, the project, and planned and probable future projects. Appendix A also defines what constitutes a cumulatively considerable contribution to toxic impacts for projects proposed in areas where the impact from existing sources already exceeds the cumulative threshold without the project. The cumulative thresholds applied in the assessment address two potential health risks and hazards: cancer risk and non-cancer hazards, the latter dealing the effects of TACs on the respiratory, reproductive, blood, developmental, and vision systems of the body. The cumulative thresholds are as follows:

- **Cancer Risk to Maximally Exposed Receptor** – Cumulative sources (including the project, existing sources and planned and probable future sources) within 1,000 feet analysis radius of the project would be subject to a significance threshold of 100 in one million.
- **Cancer Risk to Maximally Exposed Receptor from cumulative sources that total over 90 in one million without the project** – When cumulative TAC sources located within 1,000 feet analysis radius from the location of the project exceed a cancer risk of 90 new cases in a population of one million, a project contribution of 10 in one million will be considered a significant cumulative contribution.
- **Non-Cancer Risk to Maximum Exposed Receptor** – Cumulative sources of non-cancer hazards resulting from the same TAC emissions would be subject to a significance threshold of a chronic or acute Hazard Index of greater than 10.0 within 1,000 feet analysis radius from the location of the new source being evaluated.

SECTION 4: ASSESSING HEALTH RISK IMPACTS

The cumulative TAC assessment prepared for the Walmart Project followed a two-step process. The first step of the cumulative assessment was to estimate the maximum project-level health risk impacts and the location of the maximum exposed sensitive receptor, which is the receptor most affected by the project's TAC emissions. This maximum exposed sensitive receptor then served as the receptor location from which the contribution from all existing, planned and probable future TAC sources located within a 1,000-foot analysis radius from the project were measured. The cumulative impacts were then compared with the significance thresholds adopted for this assessment.

This health risk assessment replaces the previous HRA prepared by Illingworth and Rodkin (Illingworth and Rodkin 2010) that was included in the 2011 EIR within the project Draft EIR as Appendix I. This present assessment reflects the following updates to the previous HRA:

- The present assessment developed mobile source emissions using data from the most current version of the ARB EMFAC2011 mobile source emission model; the SJVAPCD recommends the use of most current version of EMFAC for CEQA assessments.
- The present assessment assumed that the 2 axle delivery trucks would be medium heavy duty trucks rather than light heavy duty trucks assumed in the previous assessment to ensure a more conservative estimate of emissions from these vehicles.[1]
- Applied a higher diesel particulate matter emission rate for the transport refrigeration units that operate on refrigerated trucks to reflect SJVAPCD emission factor guidance.

4.1 - Assessment of the Project-Level Health Risk Impacts

This section discusses the methods and quantifies the results of the assessment of the project-level impacts. The project involves the expansion of the existing Walmart store by up to 54,857 square feet, increasing the total store area to 181,640 square feet. Therefore, the assessment of project impacts evaluates those resulting from the addition of the 54,857 square feet of facility expansion.

4.1.1 - Estimation of Project TAC Emissions

The primary TAC emissions from the project result from the travel and idling of diesel-fueled vehicles and the operation of transport refrigeration units (TRU) used to transport perishable products.[2] The Walmart expansion project would involve the addition of three large 4+axle[3] diesel

[1] Was done in response to one of the late technical comments submitted by counsel for the petitioner in the Tulare County Superior Court CEQA lawsuit.

[2] A transport refrigeration unit or TRU is a small diesel engine that is used to refrigerate perishable products while in transit to their delivery destination.

[3] A 4+axle heavy duty truck or HHDT is more familiarly known as an "18 wheeler" truck or "big rig" truck. The smaller 2-axle trucks are used for vendor deliveries.

fueled delivery trucks and four 2-axle diesel fueled delivery trucks. Other TAC emissions result from the operation of customer and worker vehicles that travel to and from the project.

Table 1 identifies the vehicular traffic associated with the project while Exhibit 7 displays the location of the project's onsite emission sources. Exhibit 7 also provides the locations of the onsite emission sources for the existing Walmart store for comparison purposes. Note the differences in the onsite truck delivery routes between the existing Walmart store and after development of the project. The onsite truck delivery route associated with the existing Walmart store follows a straight north to source route while the truck route after the development of the project follows the outlines of the project fence line. These differences affect the impacts of the emissions from the existing Walmart store after the implementation of the project by moving the delivery truck routes closer to the adjacent residences resulting in a higher relative impact compared to the impacts from the existing Walmart truck route.

Table 1: Inventory of Project Walmart Vehicle Trips During Operations

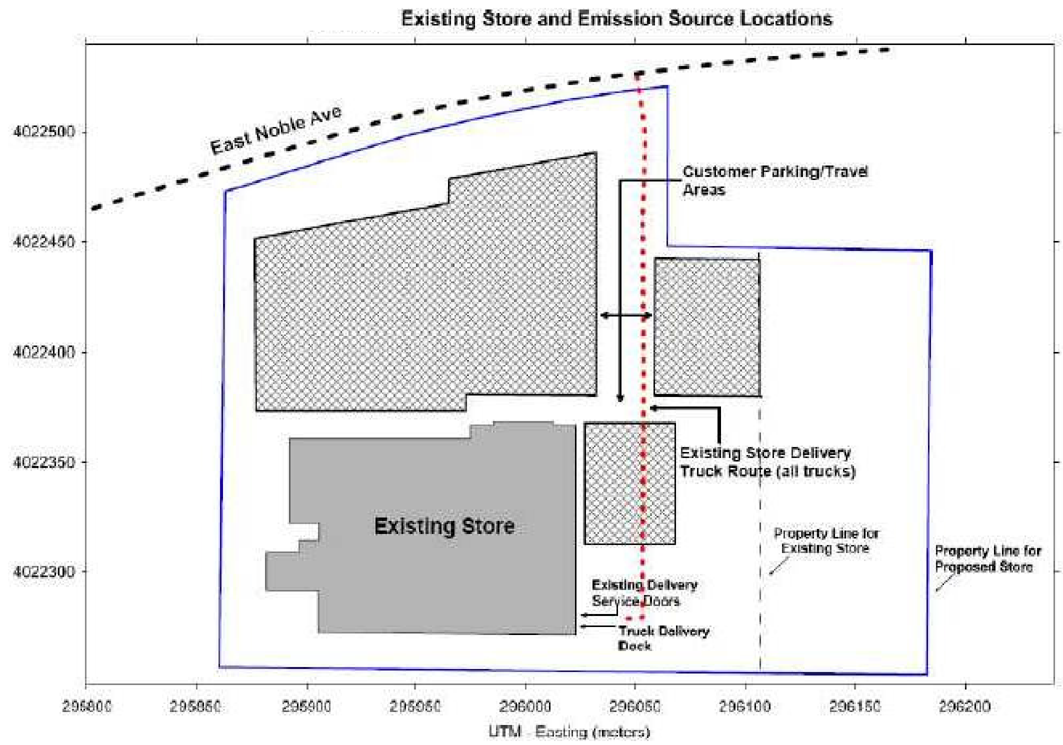
Vehicle Class[1]	Project Truck Deliveries and Vehicles (vehicles per day)	Project Truck Delivery and Vehicle Trips (trips per day)
2 axle heavy duty truck	4	8
4+ axle heavy duty truck (with TRU)	2	4
4+ axle heavy duty truck (without TRU)	1	2
Customer and Worker Vehicles (DSL and GAS)	463	925

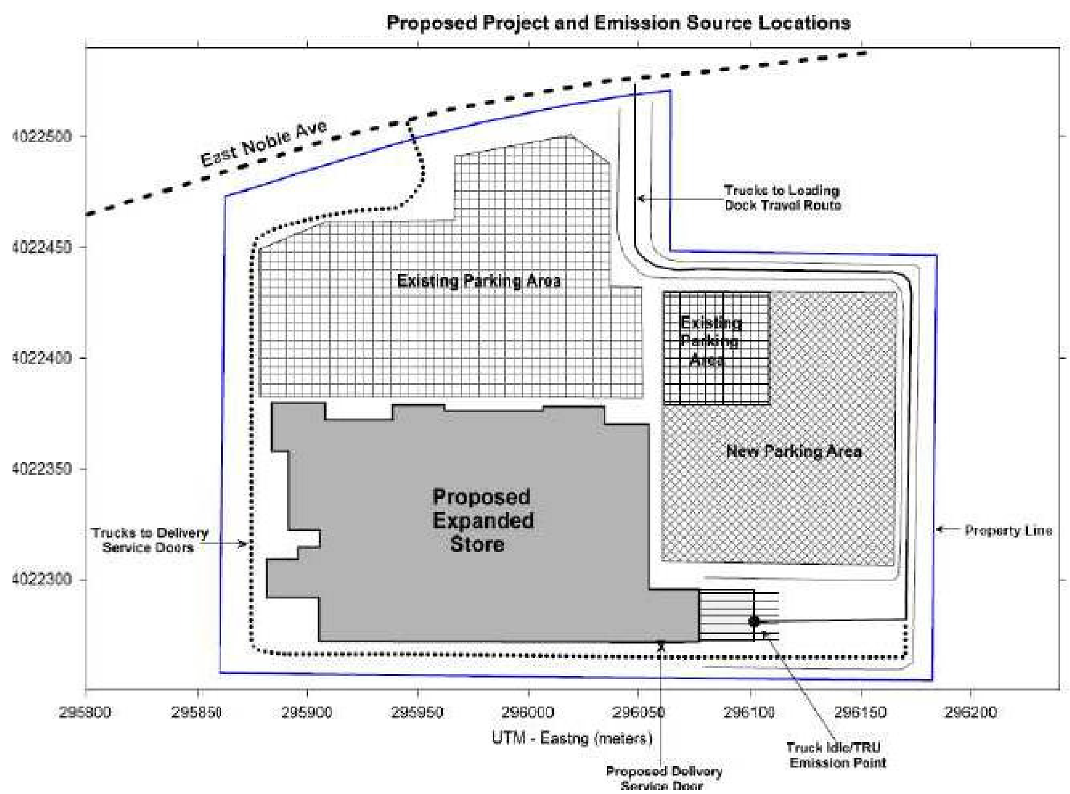
Notes:
[1] 2 axle vehicles are represented by the EMFAC medium heavy duty vehicle class; 4+ axle vehicles are represented by the EMFAC heavy-heavy duty vehicle class; all heavy duty vehicles are assumed to be diesel-fueled.
TRU = transport refrigeration unit
Source: see Appendix B for the emission calculations

The project operations assumed 24-hour store operations and customer access and with truck deliveries occurring from 6 am to 10 p.m. daily, based upon a previously imposed condition of approval Onsite vehicle travel assumed a speed of 15 mph. All delivery trucks were assumed to idle for 5 minutes per day. The rates of emissions from project operations were derived from the vehicle emission data provided by the ARB in its EMFAC2011 mobile source emission model[4].

In calculating emissions with the EMFAC2011 model for the heavy duty 4-axle trucks (HHDT), only model year trucks 2006 or newer were used since Walmart's truck fleet servicing this store is made up of trucks 2006 or newer. DPM emissions in the near future (5 to 10 years) from these types of heavy-duty diesel trucks will be substantially reduced from the emission levels used for this evaluation due to regulatory requirements for on-road heavy-duty diesel trucks. The DPM emission factors used to estimate the project's emissions are provided in Table 2.

[4] The EMFAC2011 model can predict emissions for any year from 1990 to 2035. The EMFAC2011 model is an update to a previous model EMFAC2007 and incorporates current information on vehicle usage and population, and emission rates. ARB released the EMFAC2011 model for use on September 30, 2011 and was not available for use at the time the 2010 DEIR was prepared (ARB 2011).





Michael Brandman Associates

Exhibit 7
Location of Walmart Onsite Emission Sources

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CEI ENGINEERING ASSOCIATES, INC
VISALIA WALMART EXPANSION PROJECT, CITY OF VISALIA, CA
CUMULATIVE HEALTH RISK REPORT

Table 2: DPM Emission Factors for Mobile Sources

Vehicle Speed (mph)	Diesel Vehicle Running Emission Factors (g/mi)[1]							
	LDA	LDT1	LDT2	MDT	LHDT1	LHDT2	MHDT	HHDT[2]
15 mph	0.192	0.265	0.227	0.113	0.085	0.081	0.656	0.816/0.205
25 mph	0.129	0.178	0.153	0.076	0.057	0.055	0.347	0.475/0.176
35 mph	0.095	0.131	0.112	0.056	0.042	0.040	0.264	0.392/0.180
45 mph	0.076	0.105	0.090	0.045	0.034	0.032	0.245	0.395/0.198
55 mph	0.067	0.092	0.079	0.040	0.030	0.028	0.289	0.483/0.276
	Diesel Vehicle Idling Emission Factor (g/hr)[1]							
	LDA	LDT1	LDT2	MDT	LHDT1	LHDT2	MHDT	HHDT[2]
Vehicle Idle	1.367	1.890	1.619	0.806	0.609	0.561	1.547	0.981/0.407
TRU Emission Factor (g/hp-hr)[3]								
TRU Exhaust + Idle	**0.28**	—						

Notes:
LDA = light duty automobile LDT1 and LDT2 = light duty trucks MDT = medium duty truck
LHDT1 and LHDT2 = light heavy duty trucks MHDT = medium heavy duty trucks
HHDT = heavy heavy duty trucks TRU = transportation refrigeration unit
(1) Derived from ARB EMFAC2011 for Tulare County in 2010
(2) Two emission factors are shown for the HHDT vehicle class. The value on the left applies to all non-Walmart HHDT while the value of the right applies to all Walmart HHDT
(3) Derived from ARB OFFROAD2007 fleet average for Tulare County in 2010

The burning of gasoline by gasoline-powered vehicles also results in the emissions of total organic gas (TOG) emissions,[5] which contain several toxic components including benzene and 1.3-butadiene that have identified carcinogenic and non-carcinogenic impacts. The potential health impacts from TOG emissions resulting from gasoline-powered motor vehicle traffic along the local roadway network were also accounted for in the HRA. Table 3 shows the TOG emission factors for mobile sources.

Table 3: TOG Emission Factors for Gasoline Mobile Sources

Vehicle Speed (mph)	Gasoline Vehicle Running Emission Factors (g/mi)[1]							
	LDA	LDT1	LDT2	MDT	LHDT1	LHDT2	MHDT	HHDT
15 mph	0.477	1.251	0.696	0.547	1.021	1.269	4.923	7.836
25 mph	0.332	0.902	0.491	0.364	0.702	0.865	3.335	4.461
35 mph	0.274	0.757	0.407	0.291	0.571	0.698	2.681	3.061
45 mph	0.252	0.702	0.376	0.264	0.515	0.624	2.394	2.456
55 mph	0.253	0.704	0.376	0.262	0.409	0.596	2.283	2.208

Notes:
LDA = light duty automobile LDT1 and LDT2 = light duty trucks MDT = medium duty truck
LHDT1 and LHDT2 = light heavy duty trucks MHDT = medium heavy duty trucks
HHDT = heavy heavy duty trucks
(1) Derived from ARB EMFAC2011 for Tulare County in 2010 and includes running exhaust emissions and running loss emissions

5 TOG is defined by the California Air Resources Board (ARB) as compounds of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate. TOG includes all organic gas compounds emitted to the atmosphere, including the low reactivity compounds.

In addition to the emissions generated from traffic within the project location, the project's vehicle traffic was also distributed within the local roadway network as identified in the project's traffic impact report (Kimley-Horn and Associates 2010).

4.1.2 - Air Dispersion Model

In accordance with guidance from the SJVAPCD (SJVAPCD 2010), the assessment of health risk impacts from TAC emissions applied the EPA's AERMOD Model. AERMOD represents a major scientific improvement over the ISC model that was previously recommended by the EPA for air quality assessments. AERMOD predicts pollutant concentrations from point, area, volume, line, and flare sources with variable emissions in terrain from flat to complex with the inclusion of building downwash effects from buildings on pollutant dispersion. It captures the essential atmospheric physical processes and provides reasonable estimates over a wide range of meteorological conditions and modeling scenarios.

General Model Assumptions

The basic options used in the dispersion modeling are summarized in Table 4.

Table 4: General Modeling Assumptions

Feature	Option Selected
Terrain processing	Flat terrain
Emission source configuration	See Table 5 below
Regulatory dispersion options	Fast processing
Land use	Urban
Coordinate system	UTM
Building downwash	Included in calculations
Receptor height	0 meters

As indicated in Table 4, the effects of building downwash on the dispersion of emissions from the project buildings were accounted for. Building downwash occurs when the aerodynamic turbulence, induced by nearby buildings, causes pollutants emitted from an elevated source to be mixed rapidly toward the ground (referred to as downwash). This results in potentially higher ground-level concentrations than if the buildings were not present owing to the downward mixing of emissions resulting from wind turbulence in the leeward side of the building. The AERMOD dispersion model contains algorithms to account for building downwash effects. The required information includes the location of the emission source; location of adjacent buildings; and the building geometry in terms of length, width, and height. For purposes of this analysis, the emission source and building locations and geometries were taken from the project site plan and from aerial photographs. Building heights varied from 25 feet to 40 feet depending on the particular building.

Meteorological Data

Hourly meteorological data are also required to operate the AERMOD model to determine the direction and rate of dispersion of emissions released into the atmosphere. The SJVAPCD has prepared meteorological data sets covering the period 2005-2009 for several locations within the SJVAPCD that can be used as input to the AERMOD model. These data sets include items such as wind direction and speed, air temperature, surface roughness, albedo, Bowen Ratio, and vertical temperature structure of the lower atmosphere. The SJVAPCD meteorological data set closest to the project site is from the Visalia Airport located approximately 6.5 miles west of the project site. These meteorological data are considered representative of the project site and were used in this assessment. Valid meteorological data are available from the Visalia Airport for the 4-year time period from 2006 to 2009.

4.1.3 - Receptor Network

The assessment also requires the specification of a network of receptors such that the impacts can be computed at the various locations within the network. The locations of the receptors use in the modeling analysis were shown earlier in Exhibit 6 and include the sensitive receptors located adjacent to the project.

4.1.4 - Emission Source Characterization

Each of the emission source types described above also requires geometrical and emission release specifications for use in the air dispersion model. Table 5 provides a summary of the assumptions used to configure the various emissions. The following definitions are used in defining the emission source geometrical configurations referred to in Table 5:

- *Point source*: a single identifiable local source of emissions; it is approximated in the air dispersion model as a mathematical point in the modeling region with a location and emission characteristics such as height of release, temperature, etc.; for example, a stack or vent.
- *Line source*: a series of volume sources along a path (Example: vehicular traffic along a street or within the project).
- *Area source*: a large area over which emissions are uniformly distributed (example: a parking lot).

Table 5: Summary of Existing Store and Project Emission Source Configurations

Emission Source Type	Configuration	Relevant Assumptions
Onsite Diesel Truck Traffic	Line Sources	• Emission release height: 6 feet • Vehicle Speed: 15 mph • Length of the line source (distance from the facility entrances to the loading area/docks • Vehicle types: MHDT and HHDT diesel delivery trucks • Emission factors: ARB EMFAC2011 • Loading dock activity is restricted to the hours of 6 am and 10 pm daily based upon a previously imposed condition of approval for the project.
Onsite Diesel Truck Idling	Point Sources located at the loading docks	• Emission release height: 10 feet above grade[1] • Emission release characteristics > Stack diameter: 0.3 feet > Stack velocity: 170 feet/sec > Stack temperature: 200° F • Idle time: 5 minutes in accordance with State law. Previously imposed conditions of project approval included this restriction as well. • Vehicle types: MHDT and HHDT diesel delivery trucks • Emission factors: ARB EMFAC2011 • Loading dock activity is restricted to the hours of 6 am and 10 pm daily based upon a previously imposed condition of approval for the project.
Trucks with Diesel TRUs	Point Source at the loading area/dock; line source while traveling onsite	• Stack release height of TRU 7 feet above grade[1] based on measurements from Walmart fleet trucks. • TRU Size: 34 horsepower (typical size) • Load factor: 53% • Emission factors: TRU emission factors based fleet average for Tulare County in 2010 from ARB OFFROAD2007 model
Offsite Vehicle Traffic	Line Sources along the local roadway network	• Offsite travel based on trip distribution as derived from the 2011 EIR traffic impact study • Vehicle speeds dependent on vehicle class and roadway and ranged from 25 mph to 45 mph • Emission factors: ARB EMFAC2011 • Loading dock activity is restricted to the hours of 6 am and 10 pm daily based upon a previously imposed condition of approval for the project.
Walmart Parking Lot	Area Sources located at the Walmart building	• Vehicle speed: 15 mph • Idle time of 1 minute per vehicle per day • Vehicles: diesel LDA, LDT, and MDT • Emission factors: ARB EMFAC2011

Note:
[1] The Walmart loading dock is below grade resulting in a release height 2 feet less than the SJVAPCD recommended default. This applies to the release height for truck idling and TRU operation for Walmart trucks at the loading dock.
Source: see Appendix C for the emission source details.

4.1.5 - Health Risk Assessment Methodology

The health risk assessment of toxic air contaminants involves the application of a risk characterization model to the results from the air dispersion model to estimate potential health risks at each sensitive receptor location. The estimation of health risks are calculated directly from the emissions of DPM and TOG using the AERMOD air dispersion model for the types of emission sources considered in this assessment (roadways and idling sources).

Methodology for Estimating Lifetime Cancer Risk

The methodology basically assumes that a person is exposed continuously to a project's TAC emissions for a period of 350 days per year, 24 hours per day over a 70-year lifetime period. Clearly, this methodology provides a very conservative estimate of health risks, since an individual would not typically reside in any one location for a 70-year period and be continuously exposed over that period 350 days per year, 24 hour per day.

Diesel Particulate Matter Cancer Risk Assessment Methodology for Mobile Sources

The cancer risk from mobile source-related DPM is calculated by multiplying the average DPM concentrations calculated using the AERMOD air dispersion model and an inhalation exposure factor as in Equation 1 below (OEHHA 2003).

Cancer Risk = Inhalation cancer potency factor x Dose-inhalation (EQ-1)

Where:

Cancer Risk = Total individual lifetime excess cancer risk defined as the cancer risk a hypothetical individual faces if exposed to carcinogenic emissions from a particular facility continuously, 24 hours/day, for a 70-year lifetime; this risk is defined as an excess risk because it is above and beyond the background cancer risk to the population contributed by emission sources not related to the project; cancer risk is expressed in terms of risk per million exposed individuals.

Inhalation cancer potency factor (CPF) = 1.1 (milligrams per kilogram per day)$^{-1}$ for DPM; inhalation is the principal exposure pathway for cancer impacts for DPM

Dose-inhalation = C_{air} x (DBR x A x EF x ED x 10^{-6} /AT) (EQ-2)

Where:

C_{air} = Average DPM concentrations calculated from the AERMOD model in $\mu g/m^3$
DBR = Daily breathing rate
A = Inhalation absorption factor
EF = Exposure frequency
ED = Exposure duration
AT = Averaging time period over which the exposure is averaged

Values for the components of the Inhalation Exposure Factor were provided by the SJVAPCD for sensitive receptors and are shown in Table 6.

Table 6: Values of the Inhalation Exposure Factor for DPM

Receptor	CP – DPM $(mg/kg/day)^{-1}$	DBR (liters/kg-day)	EF (days/year)	ED (years)	AT (days)
Sensitive/Residential	1.1	393	350	70	25,550

After applying Equations 1 and 2 with the values for the various factors shown in Table 6, the Cancer Risk for DPM is then calculated as:

$$\text{Cancer Risk}_{DPM} = C_{DPM} \times 414.5 \text{ (risk per million for sensitive receptors)} \quad \text{(EQ-3)}$$

Where:

Cancer Risk_{DPM} = lifetime cancer risk to sensitive receptors from DPM emissions at each receptor
C_{DPM} = Average DPM concentrations calculated from the AERMOD model in $\mu g/m^3$ at each receptor location

TOG Cancer Risk Assessment Methodology for Mobile Sources

As noted earlier, DPM comprises at least 80 percent of the estimated total airborne cancer risk from TACs. Another source of TACs results from the tailpipe emissions from gasoline vehicles and includes several important toxic compounds including benzene, ethylbenzene, formaldehyde, acrolein, 1-3,butadiene and others, individual compounds that make up TOG emissions from tailpipes. To estimate cancer risks from gasoline vehicle tailpipe emissions, the TOG emissions must first be speciated into the different compounds that make up the toxic portions of TOG. A weighted toxicity value is then developed for use in the cancer risk impact calculations that incorporates the individual toxicity of each compound that makes up the TOG emissions (BAAQMD 2011a). The following speciated profile for gasoline tailpipe TOG emissions is shown in Table 7. This profile was used to describe the toxic portion of tailpipe gasoline TOG emissions.

The cancer risk from the gasoline tailpipe emissions is estimated as follows:

$$\text{Cancer Risk}_{TOG} = C_{TOG} \times 2.5 \quad \text{(EQ-4)}$$

Where:

Cancer RiskTOG = estimated cancer risk attributable to TACs from TOG in risk per million at each receptor
C_{TOG} = average concentration of TOG concentration from the AERMOD model at each receptor location ($\mu g/m^3$)

The total cancer risk at each sensitive receptor is then the sum of the cancer risk from all sources of TACs.

$$\text{Total Cancer Risk} = \text{Cancer Risk}_{DPM} + \text{Cancer Risk}_{TOG} \quad \text{(EQ-5)}$$

Table 7: Toxic Speciation Profile of TOG Due To Tailpipe Emissions

TOG Compound	EMFAC Gasoline TOG Speciation (%TOG)	Unit Factor	Residential Cancer Risk Factors (μg/m^3)$^{-1}$	Unit Cancer Risk Weighted Factor (μg/m^3)$^{-1}$	Chronic Non-Cancer REL (μg/m^3)	Unit Chronic Non-Cancer Risk Weighted Factor (μg/m^3)	Acute Non-Cancer REL (μg/m^3)	Unit Acute Non-Cancer Risk Weighted Factor (μg/m^3)
Acetaldehyde	0.28	0.0028	0.0000027	7.537E-09	140	0.39	470	1.31
Acrolein	0.13	0.0013	0	0	0.55	0.00046	2.5	0.0035
Benzene	2.47	0.0247	0.000029	7.169E-07	60	1.48	1300	32.14
1,3-Butadiene	0.55	0.0055	0.000174	9.487E-07	20	0.11	0	0
Ethylbenzene	1.05	0.105	0.0000025	2.643E-08	2000	20.97	0	0
Formaldehyde	1.58	0.0158	0.0000061	9.602E-08	9	0.14	55	0.87
Hexane	1.60	0.0160	0	0	7000	111.92	0	0
Methanol	0.12	0.0012	0	0	4000	4.89	28000	34.22
Methyl ethyl ketone	0.02	0.0002	0	0	0	0	13000	2.37
Naphthalene	0.05	0.0005	0.000035	1.641E-08	9	0.0042	0	0
Propylene	3.06	0.0306	0	0	3000	91.86	0	0
Styrene	0.12	0.0012	0	0	900	1.11	21000	25.79
Toluene	5.76	0.0576	0	0	300	17.27	37000	2129.65
Xylenes	3.80	0.0480	0	0	700	33.61	22000	1056.22
Total Weighted Factor				**1.8E-06(1)**		**120**		**3282.58**

Note:
The Unit Cancer Risk Weighted Factor was increased to 2.5E-06 to account for the SJVAPCD's use of the 95th percentile daily breathing rate in the calculation of lifetime cancer risk.
Source: BAAQMD 2011a

Non-cancer Hazards

Exposures to certain TACs can also result in chronic (long-term) or acute (short-term) non-cancer health effects. Such effects could include respiratory, eye, dermal, reproductive, birth, and developmental problems. Non-cancer health risks are conveyed in terms of the hazard index (HI), a ratio of the predicted concentration of the facility's reported TAC emissions to a concentration considered acceptable to public health professionals. A significant risk is defined as an HI of 1 or greater. An HI of less than 1 indicates that no significant health risks are expected from the facility's TAC emissions.

The relationship for the non-cancer risks of TACs, is given by the following equation:

$$HI = C/_{REL} \qquad \text{(EQ-6)}$$

Where:

HI = Hazard Index, A unit-less number indicating the estimated potential for relative adverse health impacts from acute (short-term exposures lasting seconds to hours) and chronic non-cancer (long term exposures lasting months to years) exposures to air emissions of toxic substances.
C = Average air pollutant TAC concentration (µg/m^3) estimated through monitoring or air dispersion modeling
REL = Reference Exposure Level, defined as a concentration or dose of a toxic compound below which non-cancer health effects are not anticipated in the most sensitive receptor

Chronic Non-Cancer Hazard from Diesel Particulate Matter Mobile Source Emissions

Chronic or long-term exposures to DPM can result is non-cancer health effects. Equation 6 is used to estimate the chronic non-cancer hazard index, HI, from DPM with the following definitions:

C = annual average concentration of DPM at a receptor as calculated from an air dispersion model in units of µg/m^3
REL = reference exposure level of 5 µg/m^3

Therefore, an annual average DPM concentration exceeding 5 µg/m^3 would be necessary result in an exceedance of the SJVAPCD project-level non-cancer health risk index of 1.0

Chronic Non-Cancer Hazard from TOG Emissions

A weighted toxicity profile is used to estimate the chronic non-cancer hazard index from mobile source TOG gasoline emissions. The chronic non-cancer toxicity-weighted reference exposure level was shown earlier in Table 7 above. Equation 6 is used to estimate chronic non-cancer hazard index from the tailpipe TOG emissions with the following definitions:

C = annual average concentration of TOG at a receptor as calculated from an air dispersion model in units of µg/m^3
REL = reference exposure level of 120 µg/m^3

Acute Non-Cancer Risk from Diesel Particulate Matter Emissions

Exposures to toxic air contaminants can also result in acute (short-term) impacts. In a manner similar to assessment of chronic hazard impacts, acute hazard impacts are calculated using a hazard index.

Acute Non-Cancer Hazard from Diesel Particulate Matter Mobile Source Emissions

Currently, the California Office of Environmental Health Hazards Assessment (OEHHA) has not set an acute reference exposure level for DPM.

Acute Non-Cancer Hazard from TOG Emissions

Equation 6 is applied in estimating an acute non-cancer hazard index for tailgas TOG emissions with the following assumptions:

C = maximum on-hour average concentration of TOG at a receptor as calculated from an air dispersion model in units of $\mu g/m^3$
REL = reference exposure level of 3,283 $\mu g/m^3$ as per the toxicity-weighted acute reference exposure level provided in Table 7.

4.1.6 - Results of the Project Health Risk Assessment

This section summarizes the results of the project's health risk assessment.

Cancer Risk

Table 8 summarizes the project-level cancer risk. As noted therein, the highest cancer risk from the project at any receptor is 3.3 in one million, which occurs at the residences located at the southeast corner of the Walmart property near the intersection of East College Avenue and South Tracy Street. The reason this location is determined to be the site of the MER is that it is located the closest to the project's new TAC emissions, which come primarily from the truck access route and the new loading dock area. The modeling results are provided in Appendix C. A graphic plot of the project's cancer risk impacts is provided in Exhibit 8.

Table 8: Project-Level Cancer Risk at the Maximum Exposed Sensitive Receptor

Receptor Location	Project Cancer Risk (risk/million)	SJVAPCD Significance Threshold (risk/million)	Significant Impact?
Residences located at the southeast corner of the Walmart property near the intersection of East College Avenue and South Tracy Street	3.3	10.0	No
Source: Appendix C			

The estimated project risk largely reflects the incremental increase in truck trips and use of TRUs required to serve the expansion of the existing Walmart and relocation of the truck access route for the entire site.

Significance of Project-Level Emissions of TACs on Cancer Risk

On a project-level basis, the TAC emissions from the project would not exceed the project-level cancer risk significance threshold of 10 in one million established by the SJVAPCD.

4.1.7 - Non-Cancer Hazards

The highest non-cancer hazard index at any receptor within the area modeled was 0.002.

Significance of Project-Level Emissions of TACs on Non-Cancer Hazards

On a project-level basis, the TAC emissions from the project would not exceed the project-level non-cancer hazard index significance threshold of 1.0 established by the SJVAPCD.

4.2 - Assessment of the Cumulative Health Risk Impacts

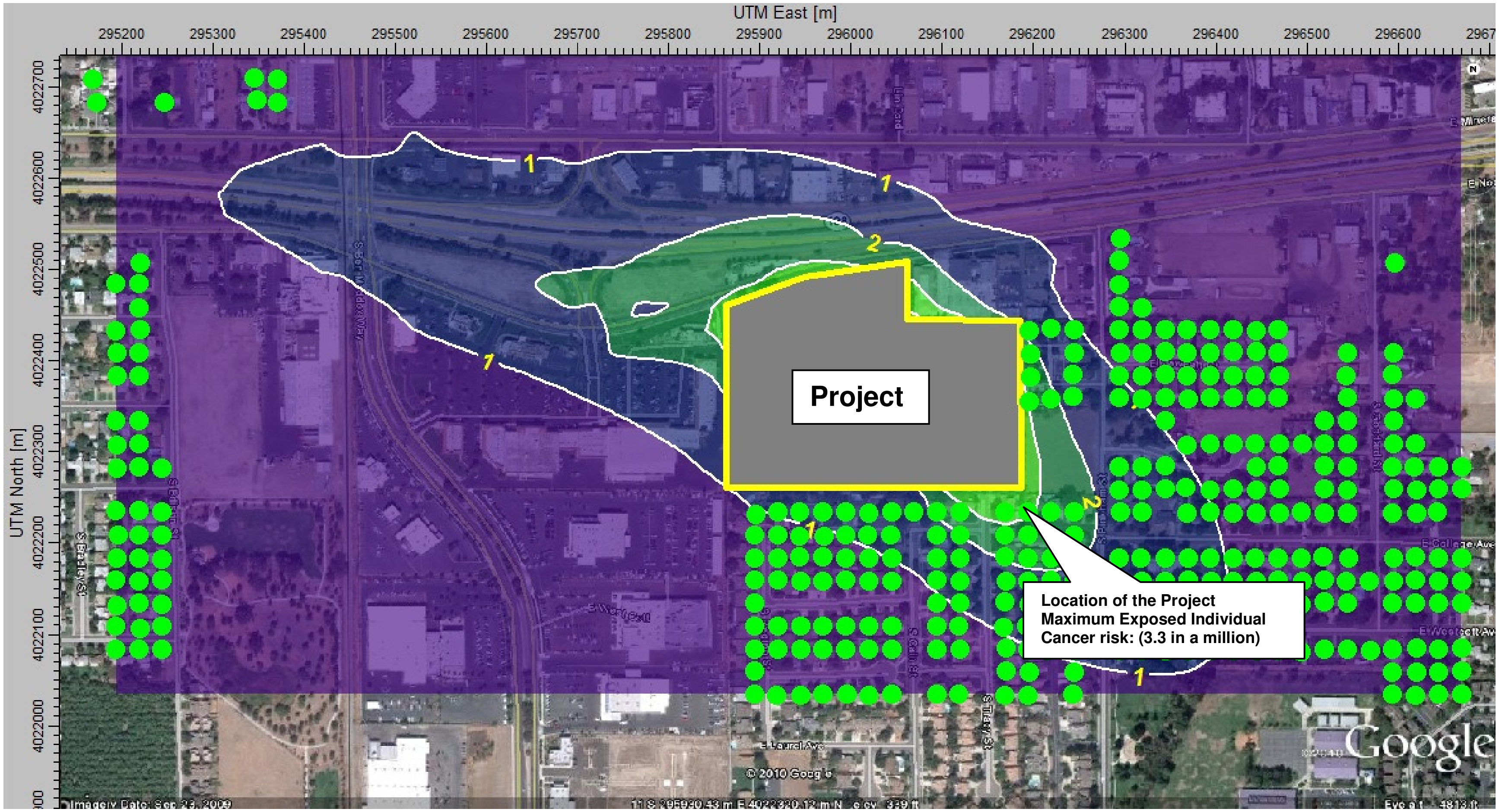
After identifying the magnitude and location of the maximum exposed sensitive receptor from the project, the next step of the assessment is to estimate emissions and risk from existing and reasonably foreseeable sources of TACs on the maximum exposed project sensitive receptor.

Various existing and reasonably foreseeable future sources of toxic air contaminants were identified within the 1000-foot analysis radius of the project. The BAAQMD also recommends including sources located beyond 1,000 feet on a case-by-case basis. In this case, review of the project area beyond the 1,000-foot radius identified a number of sources with the potential to contribute to the cumulative impact.[6] The source farthest from the project site was a food processing facility located approximately 1,450 feet west of the project site. The sources assessed were in existence in the year 2010 or were reasonably foreseeable for development, based on information provided by the City of Visalia.

4.2.1 - Estimating Existing Sources of TAC Emissions

The first requirement when preparing the cumulative analysis involves the process of identifying and quantifying the types and sources of TAC air emissions from a myriad of different existing, planned, and probable future emission sources within the 1,000-foot analysis radius of the project also termed an “emission inventory.” The existing emissions represent the level of emissions that occur on an everyday basis upon which the emissions from the project are superimposed to determine if a significant cumulative impact exists.

6 In some cases, large emission sources located just outside of the 1000-foot analysis radius were also included in the assessment; these sources included the food processing facility, a restaurant, a auto dealership, a gasoline service station, the rail line, and portions of the local roadway network. See Appendix B for emission source details.



Contours: cancer risk in units of risk per million

Location of Sensitive Receptor

Michael Brandman Associates

NORTH

Exhibit 8
Graphic Plot of Project Cancer Risks

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CUMULATIVE HEALTH RISK ASSESSMENT REPORT

Identification of the TACs of Concern

The following TACs, shown in Table 9, were identified as TACs of concern, based on a review of the types of emission sources within the 1,000-foot analysis radius of the project. Exposures to these pollutants can potentially lead to increased incidences in cancer- and non-cancer-related health effects such as eye irritations, respiratory problems, reproductive problems, blood-related problems, and developmental problems.

Table 9: Toxic Air Contaminant Emissions of Concern

TAC of Concern	Sources	Type of Toxic Effects		
			Non-carcinogenic	
		Carcinogenic	Chronic (long-term)	Acute (short-term)
DPM (Diesel Particulate Matter)	Diesel truck exhaust from truck travel and idling; truck transportation refrigeration units (TRUs) and rail locomotives	Yes	Yes	No
1,3-Butadiene	Motor vehicle exhaust	Yes	No	No
Acetaldehyde	Food processing, motor vehicle exhaust	Yes	Yes	No
Acrolein	Food processing, motor vehicle exhaust	No	Yes	Yes
Ammonia	Food processing	No	Yes	Yes
Benzene	Food processing, evaporation from gasoline service stations, motor vehicle exhaust	Yes	Yes	Yes
Benzo(a)Pyrene	Restaurant cooking	Yes	No	No
Di(2-Ethylexyl) phthalate	Food processing	Yes	No	No
Ethyl benzene	Food processing, spray paint, motor vehicle exhaust	Yes	Yes	No
Ethylene glycol	Food processing and spray paint	No	Yes	No
Ethylene glycol monobutyl ether	Food processing	No	No	Yes
Formaldehyde	Food processing, motor vehicle exhaust	Yes	Yes	Yes

Table 9 (cont.): Toxic Air Contaminant Emissions of Concern

TAC of Concern	Sources	Type of Toxic Effects		
			Non-carcinogenic	
		Carcinogenic	Chronic (long-term)	Acute (short-term)
Hexane	Food processing, motor vehicle exhaust	No	Yes	No
Isopropyl alcohol	Food processing	No	No	Yes
Methanol	Food processing, motor vehicle exhaust	No	Yes	Yes
Methyl ethyl ketone	Food processing, motor vehicle exhaust	No	No	Yes
Methylene chloride	Food processing	Yes	Yes	Yes
Napthalene	Food processing, restaurant cooking, motor vehicle exhaust	Yes	Yes	No
PAHs-w/o components	Food processing	Yes	No	No
Phosphoric acid	Food processing	No	Yes	No
Propylene	Food processing, motor vehicle exhaust	No	Yes	No
Sodium hydroxide	Food processing	No	No	Yes
Styrene	Motor vehicle exhaust	No	Yes	Yes
Toluene	Food processing, motor vehicle exhaust	No	Yee	Yes
Xylenes	Food processing, motor vehicle exhaust	No	Yes	Yes
Source: OEHHA Toxicity Criteria Database 2012.				

Table 10 summarizes the health effects of the TACs shown in Table 9.

Table 10: TAC Health Effects

TAC	Health Effects
Acetaldehyde	Acetaldehyde is a carcinogen that also causes chronic non-cancer toxicity in the respiratory system. Symptoms of chronic intoxication of acetaldehyde in humans resemble those of alcoholism. The primary acute effect of inhalation exposure to acetaldehyde is irritation of the eyes, skin, and respiratory tract in humans. At higher exposure levels, erythema, coughing, pulmonary edema, and necrosis may also occur. Acute inhalation of acetaldehyde resulted in a depressed respiratory rate and elevated blood pressure in experimental animals.
Acrolein	Acutely acrolein acts primarily as an irritant to the eyes and respiratory tract.
Ammonia	Ammonia vapors cause irritation of the eyes and respiratory tract. Higher concentrations cause conjunctivitis, laryngitis, and pulmonary edema, possibly accompanied by a feeling of suffocation. Contact with the skin causes burns and blistering. The eye is especially sensitive to alkali burns.
Benzene	Benzene is highly carcinogenic and occurs throughout California. Benzene also has non-cancer health effects. Brief inhalation exposure to high concentrations can cause central nervous system depression. Acute effects include central nervous system symptoms of nausea, tremors, drowsiness, dizziness, headache, intoxication, and unconsciousness. Neurological symptoms of inhalation exposure to benzene include drowsiness, dizziness, headaches, and unconsciousness in humans. Ingestion of large amounts of benzene may result in vomiting, dizziness, and convulsions in humans. Exposure to liquid and vapor may irritate the skin, eyes, and upper respiratory tract in humans. Redness and blisters may result from dermal exposure to benzene. Chronic inhalation of certain levels of benzene causes disorders in the blood in humans. Benzene specifically affects bone marrow (the tissues that produce blood cells). Aplastic anemia, excessive bleeding, and damage to the immune system (by changes in blood levels of antibodies and loss of white blood cells) may develop. Increased incidence of leukemia (cancer of the tissues that form white blood cells) has been observed in humans occupationally exposed to benzene.
Benzo(a)Pyrene	B(a)P is a carcinogen and is readily absorbed following inhalation, oral, and dermal routes of administration.
1,3-Butadiene	An early occupational study reported complaints of irritation of eyes, nasal passages, throat, and lungs in rubber manufacturing workers following acute exposure to unknown levels of 1,3-butadiene. Additional symptoms reported included coughing, fatigue, and drowsiness; however, all symptoms ceased on removal from the exposure.
Di(2-Ethylexyl) phthalate	DEHP, at the levels found in the environment, is not expected to cause adverse health effects in humans. Most of what we know about the health effects of DEHP comes from studies of rats and mice that were given DEHP in their food, or the DEHP was placed in their stomach with the aid of a tube through their mouth. In most of these studies, the amounts of DEHP given to the animals were much higher than the amounts found in the environment. Rats and mice appear to be particularly sensitive to some of the effects of DEHP. Thus, because certain animal models may not apply to humans, it is more difficult to predict some of the health effects of DEHP in humans using information from these studies.
Ethyl Benzene	Acute (short-term) exposure to ethylbenzene in humans results in respiratory effects, such as throat irritation and chest constriction, irritation of the eyes, and neurological effects such as dizziness. Chronic (long-term) exposure to ethylbenzene by inhalation in humans has shown conflicting results regarding its effects on the blood. Animal studies have reported effects on the blood, liver, and kidneys from chronic inhalation exposure to ethylbenzene. Limited information is available on the carcinogenic effects of ethylbenzene in humans.

Table 10 (cont.): TAC Health Effects

TAC	Health Effects
Ethylene glycol	Acute (short-term) exposure of humans to ethylene glycol by ingesting large quantities causes three stages of health effects: central nervous system (CNS) depression, followed by cardiopulmonary effects, and later renal damage.
Ethylene glycol monobutyl ether	Eye, nose and throat irritation, taste disturbances, and headache and nausea have been reported.
Formaldehyde	The major toxic effects caused by acute formaldehyde exposure via inhalation are eye, nose, and throat irritation and effects on the nasal cavity. Other effects seen from exposure to high levels of formaldehyde in humans are coughing, wheezing, chest pains, and bronchitis. Chronic exposure to formaldehyde by inhalation in humans has been associated with respiratory symptoms and eye, nose, and throat irritation. Animal studies have reported effects on the nasal respiratory epithelium and lesions in the respiratory system from chronic inhalation exposure to formaldehyde. Occupational studies have noted statistically significant associations between exposure to formaldehyde and increased incidence of lung and nasopharyngeal cancer. This evidence is considered to be “limited” rather than “sufficient” due to possible exposure to other agents that may have contributed to the excess cancers. EPA considers formaldehyde to be a probable human carcinogen (cancer-causing agent) and has ranked it in EPA’s Group B1. In California, formaldehyde has been identified as a carcinogen.
Hexane	The acute toxicity of n-hexane is low, although it is a mild anesthetic. Inhalation of high concentrations produces first a state of mild euphoria, followed by somnolence with headaches and nausea. The toxicity of n-hexane has been extensively discussed by the Agency for Toxic Substances and Disease Registry. The long-term toxicity of n-hexane in humans is well known. Extensive peripheral nervous system failure is known to occur in humans chronically exposed to levels of n-hexane ranging from 400 to 600 parts per million (ppm), with occasional exposures up to 2,500 ppm. The initial symptoms are tingling and cramps in the arms and legs, followed by general muscular weakness. In severe cases, atrophy of the skeletal muscles is observed, along with a loss of coordination and problems of vision.
Isopropyl alcohol	Symptoms of acute poisoning include dizziness, loss of coordination, headache, and confusion. Vomiting, hematemesis, diarrhea, and hypotension may occur following ingestion of large quantities of isopropyl alcohol. Late manifestations include aspiration pneumonia and kidney and liver dysfunction.
Methanol	Methanol is easily absorbed following ingestion, inhalation, or dermal exposure and is metabolized by the liver to formaldehyde, then formate. The latter metabolite is responsible for the metabolic acidosis and ocular effects characteristic of acute methanol poisoning. Odor and irritation are not adequate warnings of overexposure to methanol. The visual disturbances vary from spots or cloudiness of vision to complete blindness. Methanol toxicity can result in coma and death by respiratory or cardiac arrest.
Methyl ethyl ketone	Symptoms of acute MEK exposure include irritation of the eyes, nose, and throat. In human case studies, inhalation of MEK for its euphoric effect has also resulted in slight excitement, followed by somnolence or unconsciousness at higher concentrations. Humans occupationally exposed to MEK have also complained of mild neurologic effects including headaches, dizziness, and nausea.
Methylene Chloride	Frequently reported effects following acute inhalation exposure to MC include CNS depression at concentrations of 1,000 ppm (3,500 mg/m^3) or more and increased blood carboxyhemoglobin (COHb) content at lower concentrations due to metabolism of MC to carbon monoxide.
Napthalene	Naphthalene has been identified as a carcinogenic substance.

Table 10 (cont.): TAC Health Effects

TAC	Health Effects
PAHs-w/o components	Several studies in animals and humans indicate that prenatal exposure to PAHs results in serious or irreversible effects in the fetus, including cancer, teratogenesis, and low birth weight. As discussed in the introductory section of this report, fetal damage sustained as a result of exposure to environmental toxicants is a source of adverse postnatal health impacts.
Phosphoric acid	Phosphoric acid has low vapor pressures at room temperature and is not expected to present an inhalation hazard unless a mist is generated. Mists can probably cause irritation of the nose, throat, and respiratory tract.
Propylene	Studies show that propylene has low acute toxicity from inhalation. Inhalation of propylene gas can cause anesthetic effects and at very high concentrations, unconsciousness. However, the asphyxiation limit for humans is about 10 times higher (236,000 ppm) than the lower flammability level for propylene.
Sodium hydroxide	Sodium hydroxide is a strong irritant and has a marked corrosive action on all body tissues regardless of the route of exposure. It is also more irritating than equivalent amounts of strong acid.
Styrene	Styrene may irritate the eyes and mucous membranes and may be toxic to the central nervous system. Immediate eye and throat irritation, increased nasal mucus secretion, listlessness, impairment of balance, and drowsiness followed by unsteadiness, muscle weakness, and depression have also been reported.
Toluene	Dysfunction of the central nervous system and narcosis are the major effects of acute exposure to toluene. Irritation of the skin, eye, and respiratory tract can also result. Inhalational abuse of toluene with high-level exposure for long periods of time has produced progressive and irreversible changes in brain structure and function.
Diesel Particulate Matter (DPM)	In its comprehensive assessment of diesel exhaust, OEHHA analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, railroad workers, and equipment operators. The studies showed these workers were more likely to develop lung cancer than workers who were not exposed to diesel emissions. These studies provide strong evidence that long-term occupational exposure to diesel exhaust increases the risk of lung cancer. Exposure to diesel exhaust can have immediate health effects. Diesel exhaust can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks.
Source: Various OEHHA toxicity summaries.	

Estimation of the Existing Toxic Air Contaminant Emissions

The levels of existing TAC emissions were derived from identified sources of TAC that either were in existence in 2010 or were planned or were probable future projects based on projections provided by the City of Visalia within the 1,000-foot analysis radius, which the City has confirmed remain accurate.[7] The emissions from these various sources were estimated using a variety of data sources, including:

- Stationary source emission inventory summaries requested from the SJVAPCD (food processing, gasoline service station, and auto paint sources)
- Project traffic data and estimates of non-Walmart traffic from the project traffic impact report (Kimley-Horn and Associates 2010) from the previous HRA (Illingworth and Rodkin 2010) and estimates of non-Walmart traffic from the City of Visalia and California Department of Transportation for the local roadway network
- Rail locomotive traffic data from the project traffic impact report (Kimley-Horn and Associates 2010) for the rail line
- Restaurant cooking emissions from the methodologies recommended by the SJVAPCD
- Mobile source and rail locomotive emission rate information available from the ARB

The TAC emissions analyzed in this report include those that have been identified by the ARB as carcinogenic in nature or as causing non-cancer chronic (from long-term exposures) or acute (from short-term exposures) health impacts such as eye irritation, respiratory problems, reproductive problems, blood problems, and neurological development problems. Of particular importance are emissions of DPM from diesel-fueled motor vehicles, which the ARB has estimated as comprising about 80 percent of the airborne cancer risk from TACs in California.

The types of emission sources accounted for in this HRA included the operations at the existing Walmart site, local restaurants, car dealerships, a food processing facility, a food market, auto paint shop, gasoline service stations, the San Joaquin Valley Railroad freight line, SR-198, and the traffic along the local roadway network. The analysis includes sources beyond the 1,000-foot analysis radius to provide assurance that all sources with the potential to contribute cumulative impacts were assessed. The San Joaquin Valley Railroad and the food processing facility were up to 1,500 feet from the project site.

Stationary Emission Source Identification

Table 11 identifies the existing TAC stationary emission sources considered in this HRA along with their location and relevant TAC emissions. Exhibit 9 shows the locations of the identified stationary emission sources.

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[7] The City of Visalia has identified a proposed new carwash/fast food use located across the street from the Walmart store at 2321 E. Noble Avenue. This HRA has included this foreseeable new emission source in the emissions inventory.

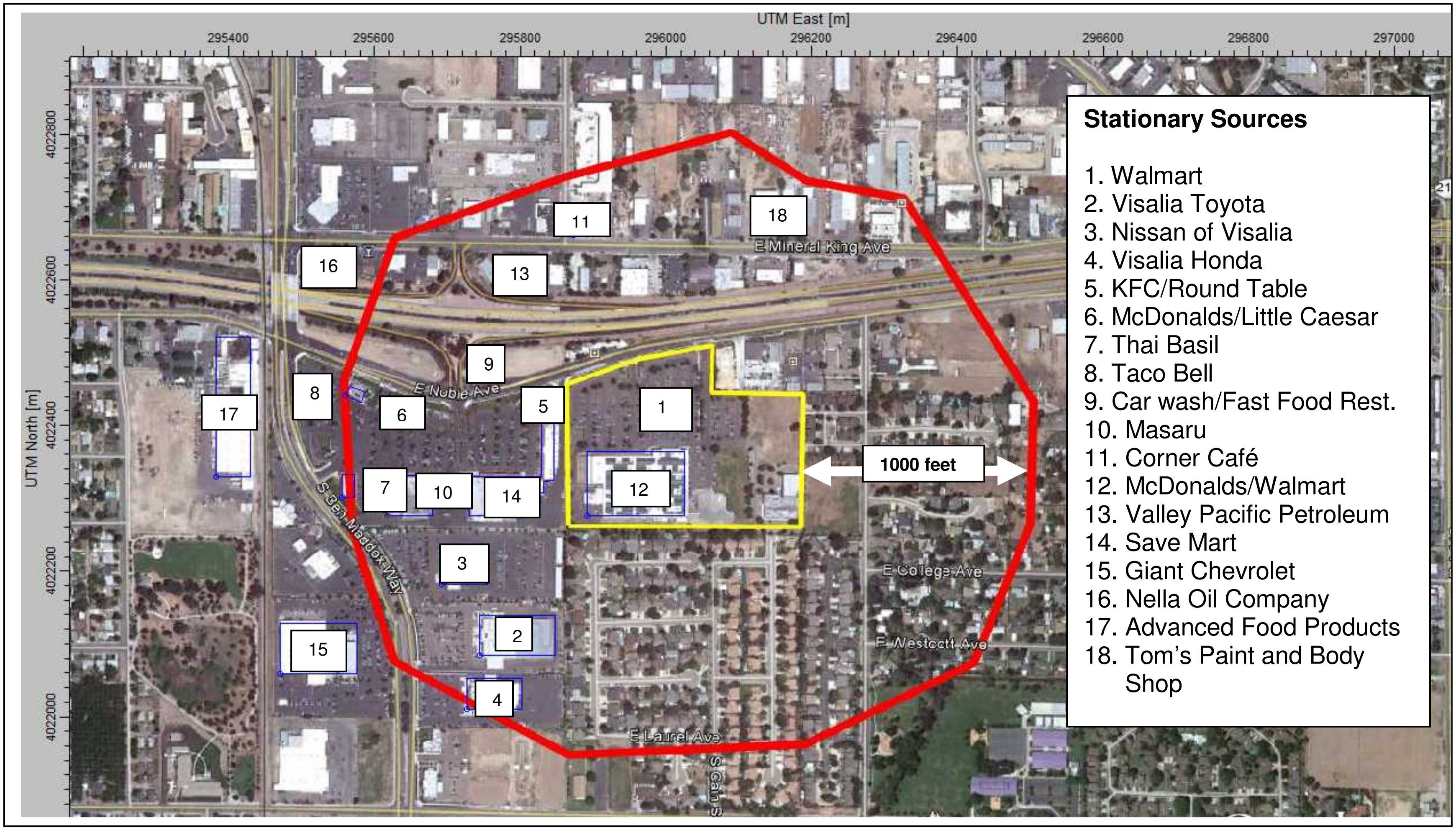

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Exhibit 9
Locations of Existing, Planned and Probable Future Stationary Sources of TAC Emissions

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Table 11: Stationary TAC Emission Sources Included in the Cumulative HRA

Facility	Business	Visalia Address	TAC Emission
Existing Walmart	Retail	1819 E. Noble Avenue	Diesel particulate emissions
Visalia Toyota	Auto Dealership	922 S. Ben Maddox Way	Diesel particulate emissions
Nissan of Visalia	Auto Dealership	830 S. Ben Maddox Way	Diesel particulate emissions
Visalia Honda	Auto Dealership	1016 S. Ben Maddox Way	Diesel particulate emissions
Giant Chevrolet	Auto Dealership	1001 S. Ben Maddox Way	Diesel particulate emissions
KFC	Restaurant	1699 E. Noble Avenue	Diesel particulates Emissions Cooking Emissions
Round Table Pizza	Restaurant	1691 E. Noble Avenue	Diesel particulates Emissions Cooking Emissions
McDonalds	Restaurant	1401 E. Noble Avenue	Diesel particulates Emissions Cooking Emissions
Little Caesars	Restaurant	1439 E. Noble Avenue	Diesel particulates Emissions Cooking Emissions
Thai Basil	Restaurant	1423 E. Noble Avenue	Diesel particulates Emissions Cooking Emissions
Taco Bell	Restaurant	1377 E. Noble Avenue	Diesel particulates Emissions Cooking Emissions
Carwash/Fast Food	Carwash/Restaurant	2321 E. Noble Avenue	Diesel particulates Emissions Cooking Emissions
Masaru Japanese Restaurant	Restaurant	1509 E. Noble Avenue	Diesel particulates Emissions Cooking Emissions
Corner Café	Restaurant	1719 E. Mineral King Avenue	Diesel particulates Emissions Cooking Emissions
McDonalds/Walmart	Restaurant	1819 E. Noble Avenue	Diesel particulates Emissions Cooking Emissions
Valley Pacific Petroleum Services	Gasoline Station	1633 E. Mineral King Avenue	VOC Evaporative Emissions
Save Mart	Food Service	1591 E. Noble Avenue	Diesel particulate emissions
Nella Oil	Gasoline Service	1375 E. Mineral King Avenue	VOC Evaporative Emissions
Advanced Food Products	Food Processing	1211 E. Noble Avenue	Various carcinogenic substances
Toms Auto Body and Paint	Automotive Painting	2000 E. Mineral King Avenue	Ethyl Benzene
Source: See Appendix D			

The Court ruling identified the Social Security Building to the east of the project as a possible cumulative source. Office buildings do not generate substantial TAC emissions. Offices generate very few diesel truck trips and do not typically include uses with processes that emit other toxics.

Existing Walmart Store Emissions

TAC emissions consist principally of DPM from the operation of the existing Walmart facility and result from the operation of diesel-powered vehicles that travel to and from the site as well as emissions from diesel vehicles as they travel and idle within the confines of the facility either within the parking lot or at the loading docks. The existing Walmart store was assumed to operate 12 hours per day. Table 12 provides an inventory of the operational vehicle trips for the existing Walmart store. Exhibit 7 shown above provides a view of the existing onsite Walmart truck route.

Table 12: Inventory of Existing Walmart Store Vehicle Trips During Operations

Vehicle Class(1)	Existing Store Truck Deliveries and Vehicles per day	Existing Store Truck Delivery and Vehicle Trips per day
2-axle heavy duty truck	8	16
4+ axle heavy duty truck (with TRU)	0	0
4+ axle heavy duty truck (without TRU)	8	16
Customer and Worker Vehicles (DSL and GAS)	3,629	7,258

Vehicle travel speeds while traveling onsite were assumed to be 15 miles per hour for both trucks and customer vehicles. Project-related vehicle travel speeds for offsite roadway segments were assumed to vary between 25 mph and 45 mph depending on the vehicle class, roadway segment and posted speed limit. The Walmart delivery trucks were assumed to idle for 5 minutes per day. Customer and worker vehicles were assumed to idle for 1 minute while idling within the parking lots of the Walmart store.

Auto Dealership Emissions

Three automobile dealerships were identified within the 1,000-foot analysis radius: Visalia Toyota, Nissan of Visalia, and Visalia Honda. A fourth dealership, Giant Chevrolet is located just outside of the 1,000-foot zone of influence and was included in the assessment. All dealerships are located along Ben Maddox Way south of Noble Avenue, as shown in Exhibit 9. For purposes of this assessment, it was assumed that each dealer would be served by one 4+axle automobile delivery truck each day. Onsite travel would be at 15 mph and each truck would idle for 15 minutes a day. The auto dealerships were assumed to be open 12 hours each day.

Restaurant Emissions

Eight existing restaurants were identified within the 1,000-foot zone of influence. A ninth restaurant, a Taco Bell restaurant, was located just outside of the zone but was included in this assessment. A tenth restaurant, car wash/fast food restaurant, is in the planning stages and its estimated TAC emissions were also included in the assessment. All restaurants are shown in Exhibit 9. The TAC emissions associated with the operation of the restaurants include DPM from delivery truck travel and idling and from the operation of the TRUs. Each restaurant was assumed to be served by one 4+axle truck with an attached TRU each day. Onsite vehicle speed was assumed to be 15 mph and each truck was assumed to idle for 15 minutes per day.

In addition, the SJVAPCD has determined that the cooking of meat would also result in the emission of certain TACs. The two main TACs from the cooking operations are polycyclic organic hydrocarbons (represented as benz(o)pyrene) and naphthalene. The estimation of TACs from restaurant cooking applied the emission methodology contained in the SJVAPCD Guidance on Air Dispersion Modeling (SJVAPCD 2010). The restaurants were assumed to be open 12 hours each day.

Gasoline Service Station Emissions

One gasoline service station, Valley Pacific Petroleum Services, is currently in operation within the 1,000-foot zone of influence. A second service station, Nella Oil—located just outside of the zone at the intersection of Ben Maddox Way and Mineral King Avenue—was also included in the assessment. Both gas stations are shown in Exhibit 9. The TAC emissions of concern are DPM emissions from the onsite travel and idling of fuel delivery trucks at the gas station and evaporative emissions of benzene from the storage and dispensing of gasoline. Benzene has also been identified by the ARB as a carcinogenic substance. Estimates of benzene from the evaporation of gasoline were derived from emission inventory reports provided by the SJVAPCD for the reporting years 2008 and 2010 and are provided in Appendix B. Onsite vehicle speed was assumed to be 15 mph and each truck was assumed to idle for 15 minutes per day. The gasoline service stations were assumed to be open 24 hours each day.

Food Service Emissions

A large food market, Save Mart Supermarket, was also identified within the 1,000-foot zone of influence and is shown in Exhibit 9. The TAC emissions from this facility consist of DPM emissions from the delivery trucks that transport goods to the store. The emissions from this facility were based on the daily truck traffic assumed to have one additional vehicle compared to the Walmart Expansion Project, namely four 2-axle heavy duty trucks, two 4+axle trucks with a TRU, and two 4+axle heavy duty trucks without a TRU as a conservative assumption in the absence of other data. Onsite vehicle speed was assumed to be 15 mph. However, each truck was assumed to idle for 15 minutes per day. This is due to the fact that compliance with the State law 5-minute limitation on truck idling is conservatively not assumed for this store as information as to the store's compliance with this rule, either voluntarily or as a condition of approval, is unavailable. The Save Mart was assumed to operate 18 hours per day.

Food Processing Emissions

A large food processing facility, Advanced Food Products, is located on the west side of Ben Maddox Way. Although located just outside of the 1,000-foot zone of influence, the TAC emissions from this facility were also included in the assessment. The location of this emission source is shown in Exhibit 9. The facility produces a wide variety of food products and includes emission-generating equipment such as natural gas-fired boilers and various process operations. Communication with the plant manager (Dave Surfus 2012) indicates that the facility received on average about 16 large, 4+axle trucks per day for product deliveries and process materials. During its operation, the facility emits a variety of TACs, some of which are carcinogenic. A listing of the TACs as derived from the

SJVAPCD emission inventory facility report is provided in Appendix B. The food processing facility operates 24 hours per day.

Mobile Source Emissions

The mobile source emissions included in this assessment derive from vehicular traffic along the local roadway network of city streets and along SR-198. Estimates of daily traffic along these local roadways were derived from traffic data contained in the previous HRA prepared by Illingworth and Rodkin (Illingworth and Rodkin 2010). This data source provided traffic trips from the existing Walmart store along with traffic trips from the project. Traffic data for not associated with either the existing Walmart store or the project were derived from traffic data provided by the City of Visalia based on traffic counts data up to the year 2010 (City of Visalia 2011) and traffic data for 2010 from the California Department of Transportation (CDOT 2010). The local roadway network included in this assessment is shown in Exhibit 10. As noted in this exhibit, roadway segments beyond the 1,000-foot analysis radius were included in the assessment to ensure that the full extent of the roadway impacts was accounted for.

Several steps are necessary to quantify the motor vehicle emissions from the local roadway network. The first step is to establish the mix of vehicles by segregating the daily traffic into the various vehicle classes since the emissions from motor vehicles depend on the class or type of vehicle. Information provided by the City of Visalia Traffic Safety Division recommended assuming that 2 percent of the non-SR-198 traffic consists of 3 axle and 4+ axle heavy duty trucks; of this total, 50 percent are 3-axle trucks and the remaining 50 percent are 4+ axle trucks. Ninety-eight percent of the traffic consists of the remaining vehicle classes, including autos, light- and medium-duty trucks, and 2-axle heavy-duty trucks.

Traffic data available from the California Department of Transportation was consulted to establish the vehicle mix for the SR-198 roadway segments included in this assessment. Approximately 9 percent of the traffic along the SR-198 segments consists of trucks. The truck traffic data is also broken down further by number of truck axles with 2-axle trucks comprising an average of 5 percent of the total traffic, 3-axle trucks comprising 0.6 percent of the total traffic, and 4+ axle trucks comprising 3.5 percent of the total traffic. In addition, to identify the number of diesel-fueled vehicles from which the estimate of DPM emissions can be derived, vehicle estimates were used from the ARB EMFAC2011 mobile source emission that provides a breakdown of vehicle class by fuel type, either gas-fueled or diesel-fueled.

The next step in the mobile source emission estimation process is to establish a vehicle profile that distributes the daily traffic total by hour of the day along each roadway segment identified in Table 13. For this purpose, estimates of vehicle miles traveled (VMT) by hour of the day within Tulare County in 2010 were used, as estimated by the ARB EMFAC2007 mobile source emission model.

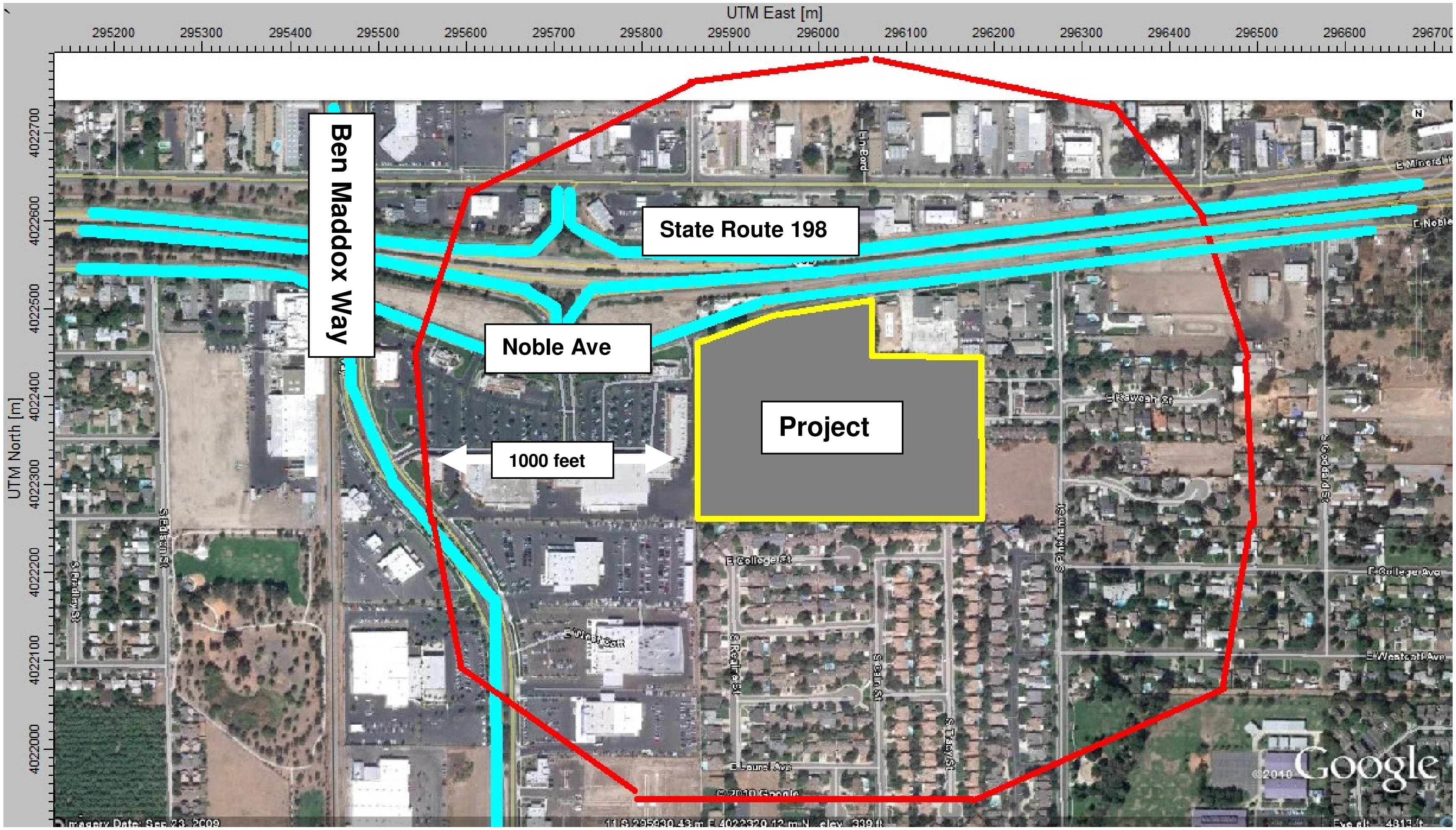

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Exhibit 10

Existing Roadway Network

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To estimate hourly traffic profile for the roadway segments, total VMT for each hour of the day as well as the daily total for vehicle are within Tulare County were noted from the EMFAC2007 model estimations. Each hourly VMT total was then divided by the daily total to establish the portion of the daily VMT contributed by each hour. The resulting number for each hour is known as a "VMT scaling factor." Exhibit 11 displays the VMT scaling factors for each hour, which basically describes the distribution of traffic during the day. As shown in this exhibit, there are two traffic peaks as represented by the scaling factors, a morning peak at around 7 a.m., and an afternoon peak at about 5 p.m. These VMT scaling factors are then input into the air dispersion model to characterize the manner in which roadway emissions vary from hour to hour each day. The VMT scaling factors calculated above were used to characterize the vehicle profile for all roadway segments.

Table 13 provides an example of the VMT scaling calculation method described above for the Noble Avenue roadway segment from Ben Maddox Way to Pinkham Street.

Table 13: Vehicle Profile for Roadway Segment, Noble Avenue—Ben Maddox Way to Pinkham Street

Time	VMT in Tulare County (2010) (VMT/1000)(1)	Hourly VMT to Daily Average Scaling Factor(2)	Roadway Segment VMT (VMT/hr)(3)
Hr 00	154	0.33	176
Hr 01	62	0.13	71
Hr 02	82	0.17	94
Hr 03	75	0.16	86
Hr 04	81	0.17	93
Hr 05	136	0.29	156
Hr 06	451	0.95	517
Hr 07	855	1.81	980
Hr 08	802	1.70	919
Hr 09	520	1.10	596
Hr 10	547	1.16	627
Hr 11	673	1.42	771
Hr 12	690	1.46	791
Hr 13	682	1.44	782
Hr 14	769	1.63	881
Hr 15	776	1.64	889
Hr 16	823	1.74	943
Hr 17	881	1.86	1010
Hr 18	617	1.31	707

Table 13 (cont.): Vehicle Profile for Roadway Segment, Noble Avenue—Ben Maddox Way to Pinkham Street

Time	VMT in Tulare County (2010) (VMT/1000)[(1)]	Hourly VMT to Daily Average Scaling Factor[(2)]	Roadway Segment VMT (VMT/hr)[(3)]
Hr 19	456	0.96	523
Hr 20	365	0.77	418
Hr 21	369	0.78	423
Hr 22	271	0.57	311
Hr 23	207	0.44	237
Daily Average	473	—	Total: 13,000 VMT per day

Notes:
(1) Hourly VMT were derived from the ARB EMFAC2007 mobile source emission model for Tulare County in 2010.
(2) Scaling Factors were derived by dividing the hourly VMT by the daily average VMT.
(3) Daily VMT total of 13,000 vehicles per day for the indicated roadway segment
Source: see Appendix D

Rail Line Emissions

The San Joaquin Valley Railroad operates a rail line that runs in a north-south direction along the western side of Ben Maddox Way. Although outside of the 1,000-foot zone of influence, the emissions from the locomotives that use the rail line were also included in this assessment. The location of the rail line is shown in Exhibit 12. According to the information contained in the project traffic impact study (Kimley and Horn and Associates 2010), there are three trains that cross the Noble Avenue crossing each day. Therefore, the assessment modeling assumed three trains per day with each train having one locomotive. The train speed as derived from the grade crossing data is 15 mph (notch setting 2). The locomotives were assumed to be an EMG GP-38 model with 1,800 horsepower, consistent with the published inventory of locomotives for the railroad (D. Bowen 2012).

Mobile Emission Factors

To estimate the emissions from mobile sources, emission factors were used that relate the amount of pollutant emission as a function of vehicle speed or idling time and vehicle class. The appropriate emission factors for DPM were obtained from use of the ARB mobile source Emission Factor Model (EMFAC2011) for the year 2010 and Tulare County and were shown earlier in Table 2. Emissions of DPM were also estimated for those facilities that involve the use of a transport refrigeration unit (TRU) using the ARB OFFROAD2007 emission model. Rail locomotive emission factors were taken from the ARB railyard health risk assessment for the Oakland Railyard (ARB 2008). The estimated locomotive emission factor was 110 grams/hour.

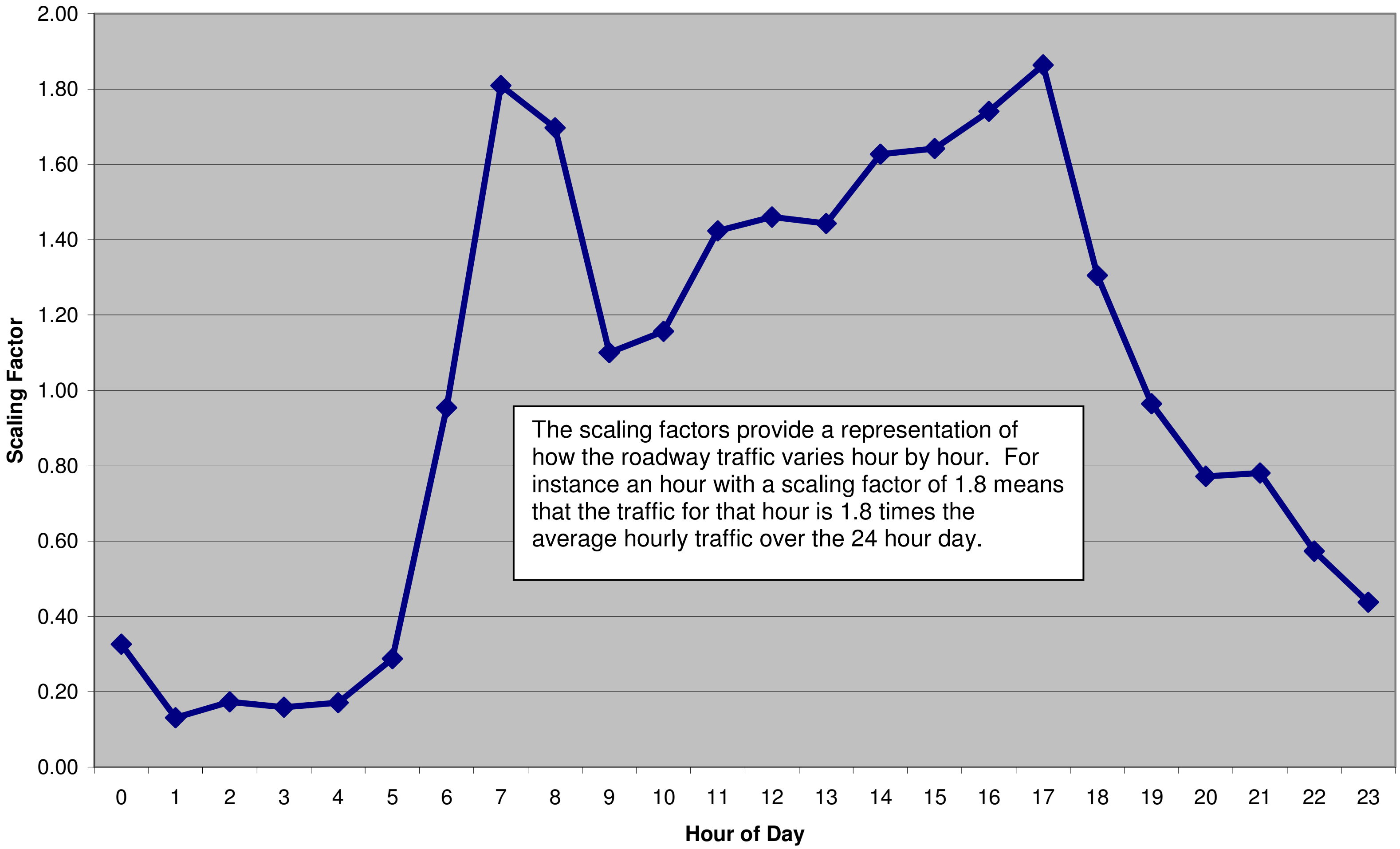

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Exhibit 11
Roadway Traffic VMT Scaling Factors

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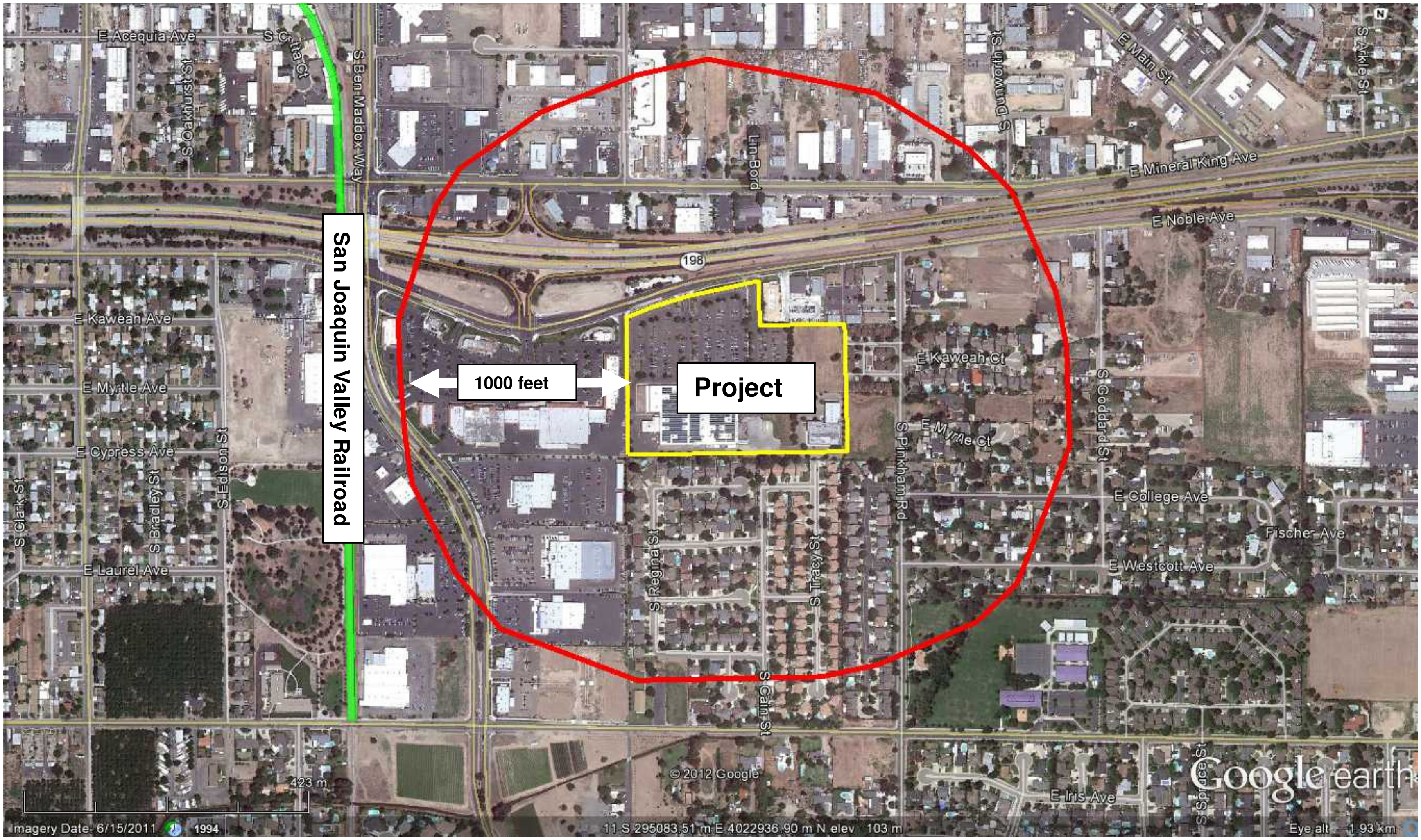

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Exhibit 12
Location of the San Joaquin Valley Railroad Line

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The burning of gasoline by gasoline-powered vehicles also results in the emissions of total organic emissions (TOG), which contains several components including benzene and 1.3-butadiene which have been identified as causing carcinogenic and non-carcinogenic impacts. The potential health impacts from TOG emissions resulting from gasoline-powered motor vehicle traffic along the local roadway network were also accounted for in the HRA. The TOG emission factors for gasoline mobile sources were shown previously in Table 3.

Air Dispersion Model and Health Risk Methodologies

The air dispersion model, meteorological data, receptor network and health risk methods were used to estimate the project's TAC emission impacts. The project's incremental emissions were added to the emissions inventory, which represents existing, planned, and probable future TAC emissions. The various emission assumptions are summarized in Table 14. Estimates of cancer risk from several of the TAC emission sources identified in Table 11 required the use of an additional health risk model called the ARB HARP model. This model was used to assess the health risks from the gasoline station evaporative emissions, restaurant cooking emissions, auto spray paint emissions, and food processing emissions.

Table 14: All Cumulative Emission Source Assumptions

Emission Source Type	Configuration	Relevant Assumptions
Onsite Diesel Truck Traffic	Line Sources	• Stack release height: 6 feet • Vehicle speed: 15 mph • Length of the line source (distance from the facility entrances to the loading area/docks at the various stationary sources (restaurants, service stations, etc.) • Vehicle types: MHDT and HHDT diesel delivery trucks • Emission factors: ARB EMFAC2011
Onsite Diesel Truck Idling	Point Sources located at the loading docks	• Stack release height:[1] > Walmart heavy duty trucks: 10 feet above grade > All other heavy duty trucks vehicles: 12 feet • Stack release characteristics > Stack diameter: 0.3 feet > Stack velocity: 170 feet/sec > Stack temperature: 200° F • Idle time: 15 minutes per truck per day for all trucks except the Walmart trucks which idle for 5 minutes per day • Vehicle types: MHDT and HHDT diesel delivery trucks • Emission factors: ARB EMFAC2011
Trucks with Diesel TRUs	Point Source at the loading area/dock; line source while traveling onsite	• Stack release height:[1] > Walmart trucks with TRUs: 7 feet above grade > All other heavy duty trucks with TRUs: 12 feet • TRU Size: 34 horsepower (typical size) • Load factor: 53% • Emission factors: TRU emission factors based fleet average for Tulare County in 2010 from ARB OFFROAD2007 model

Table 14 (cont.): Cumulative Emission Source Assumptions

Emission Source Type	Configuration	Relevant Assumptions
Offsite Vehicle Traffic	Line Sources along the local roadway network	• Offsite travel based on trip distribution as derived from the traffic impact study, the California Department of Transportation, and the City of Visalia. • Vehicle speeds dependent on vehicle class and roadway and ranged from 25 mph to 45 mph • Emission factors: ARB EMFAC2011
Walmart Parking Lot	Area Sources located at the Walmart building	• Vehicle speed: 15 mph • Idle time of 1 minute per vehicle per day • Vehicles: diesel LDA, LDT, and MDT • Emission factors: ARB EMFAC2011
Rail Line	Line Source	• Train speed: 15 mph • Notch setting: 2 • 1 locomotive per train • 3 trains per day • Emissions based on ARB Oakland Railyard study for a GP-3x locomotive
Gasoline Service Station	Point and volume sources	• Source configuration follows the CAPCOA Industry-Wide recommendations for gasoline service stations (CAPCOA 1997) • 24 hour per day operation
Food Processing Facility	Volume Source	• 24 hour per day operation • Volume source emission height: 20 feet
Restaurants	Point Sources	• Emission height: 5 feet above the top of the building • Emission released at ambient temperature • 12-hour per day operation • Save Mart: 18 hours/day operation

Note:
[1] The Walmart loading dock is below grade resulting in a release height 2 feet less than the SJVAPCD recommended default. This applies to the release height for truck idling and TRU operation for Walmart trucks that occurs at the loading dock. The loading dock configurations for other cumulative sources is not known, so SJVAPCD default release heights were used for those facilities.
Source: see Appendix B for the emission details

4.2.2 - Results of the Cumulative Health Risk Assessment

Cumulative Cancer Risks from the Project and Existing Sources of TAC Emissions

Table 15 summarizes the results of the cumulative health risk assessment for the project and existing, planned, and probable future TAC emission sources in the year 2010 in terms of lifetime cancer risks. Shown therein are the impacts at the maximum exposed receptor project receptor. Also shown is a comparison with the cumulative health risk significance threshold adopted for this assessment.

Table 15: Cumulative Cancer Risk at the Maximum Exposed Project Receptor

Receptor Location	Emission Source Category	Cancer Risk (risk per million)
Residents located at the southeast corner of the Walmart property near the intersection of East College Avenue and South Tracy Street	Existing Walmart Diesel PM (after project development) State Route 198 Diesel PM Local Street Diesel PM Rail Line Diesel PM Restaurants, Auto Dealers Gas Station, Food Related Diesel PM *Subtotal of All Existing and Planned Probable Future Diesel PM*	1.7 12.0 2.9 0.4 2.1 *19.1*
	Mobile Source Total Organic Compounds	2.5
	Existing and reasonably foreseeable future Restaurant Cooking, Gas Station Evaporation, and Auto Body Spray Painting TAC Emissions	2.3
	Total for All Existing and Planned Probable Future Sources	**23.9**
	Project Diesel PM Emissions	3.3
	Total for Project, Existing, and Planned Probable Future TAC Emissions	27.2
	Cumulative Significance Threshold	100
	Cumulatively Considerable Impact?	No

Notes:
Diesel PM = diesel particulate matter
TAC = toxic air contaminants
Source: Appendix E.

The cumulative risk is 27.2 in a million at the maximally exposed project receptor, which is located approximately 980 feet from the SR-198 freeway. It is important to note that most of the estimated cancer risk at the maximally exposed project is due to the SR-198 freeway and the major roads near the project site. These mobile sources comprise about 55 percent of the total cumulative risk. By comparison, the emissions from the project contribute roughly 12 percent to the total cumulative cancer risk. The importance of distance from these sources and the associated risk can be seen in Exhibit 13.

Significance of Cumulative Emissions of TACs on Cancer Risks[8]

On a cumulative basis, the TAC emissions from existing sources, the project, and planned probable future TAC emission sources would not exceed the cumulative cancer hazard index significance

[8] For residential projects (and other project types) that would place a sensitive receptor near existing TAC sources, the focus of the cumulative TAC analysis is the environment's impact on the proposed new receptor. Thus, the receptor site (residence) within the project's analysis area most impacted by the cumulative TAC sources would be the location used to determine if a significant cumulative impact would result from exposing residents to TAC emissions. This location may differ from the location used to estimate TAC impacts of a commercial project where the focus is the project's impact on the environment—i.e., an existing sensitive receptor.

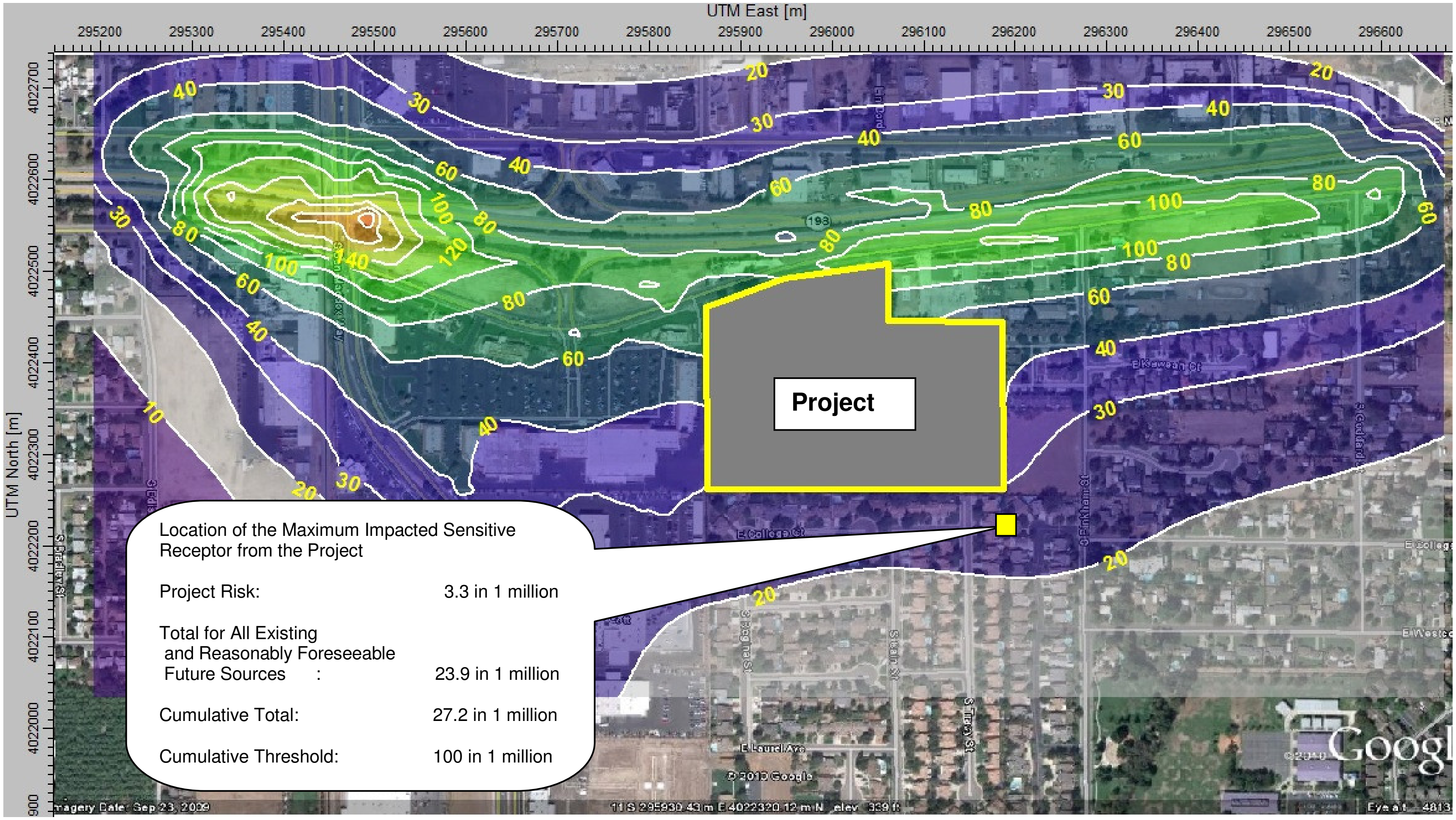
threshold of 100 established for this assessment and therefore not result in a cumulatively considerable health risk impact.

Significance of Cumulative Emissions of TAC on Non-Cancer Hazard

The maximum non-cancer hazard index calculated at the location of the maximum impacted receptor from the existing sources, the project and planned probable future TAC emissions any receptor was 0.03.

Significance of Cumulative Emissions of TACs on Non-Cancer Hazards

On a cumulative basis, the TAC emissions from the project, existing and reasonably foreseeable future TAC emission sources would not exceed the cumulative non-cancer hazard index significance threshold of 10.0 established for this assessment and, therefore, not result in a cumulatively considerable health risk impact.



Contours represent cumulative cancer risk for the project and existing, planned and probable future TAC emissions.

Contours are in units of cancer risk per million population.

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Exhibit 13
Graphic Plot of Cumulative Cancer Risks

SECTION 5: INHERENT UNCERTAINTY IN HEALTH RISK ASSESSMENT

There are substantial uncertainties involved in assessing the health risk of air pollutants. There are uncertainties in dispersion modeling, emission estimation, toxicological factors, and exposure assessment. The methodology described above for assessing health risks involving emission estimations, dispersion modeling, and toxicity risk factors have been developed to provide conservative results (in terms of over-predicting impacts). Given this, this HRA presents a picture of health risks that are somewhat greater than in reality would be the case. Some of the factors that result in the report's conservative results are discussed below.

5.1.1 - Exposures Over 70-years

The OEHHA (OEHHA 2003) recommends using the 70-year exposure duration for determining residential cancer risks. Although it is unlikely that people will reside at a single residence for 70 years, it is common that people will spend their entire lives in a major urban area. While residing in urban areas, it is very possible to be exposed to the emissions from other facilities. In order to help ensure that people do not accumulate an excess unacceptable cancer risk from cumulative exposure to stationary facilities at multiple residences, OEHHA recommends the 70-year exposure duration for risk management decisions. However, it is important to note that a person who has resided in his or her current residence for less than 70 years will have a cancer risk less than what is calculated for a 70-year risk. Nonetheless, this assessment uses the recommended 70-year exposure duration, which provides a worst-case, conservative scenario for TAC exposures.

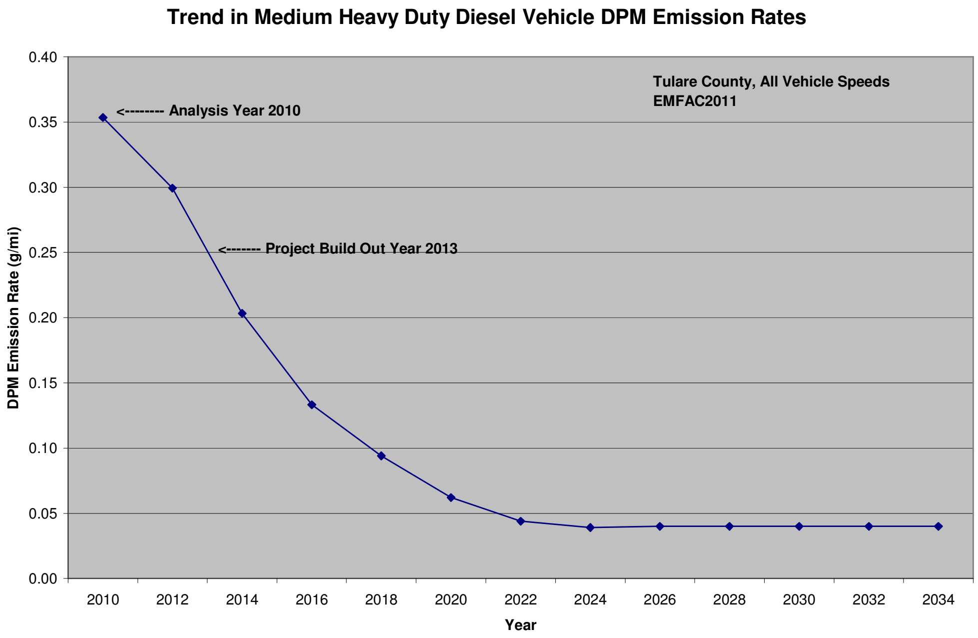
5.1.2 - Estimates of DPM Emissions from Diesel Trucks and TRUs

One very important assumption that the SJVAPCD-recommended methodology for calculating cancer risks omits is that emissions from mobile sources, particularly from heavy-duty diesel trucks are expected to decline sharply in the future. The SJVAPCD assumes that the emissions, whether from a proposed project or from the surrounding emission sources, remain unchanged for the entire 70-year exposure period over which cancer risk is estimated. This assumption results in substantially over-estimating future impacts and does not represent what is estimated to occur in the future as a result of mandated emission regulations.

Based on current emission rules already adopted by the ARB that specifically address DPM emissions from heavy-duty diesel trucks, heavy-duty diesel truck DPM emissions are expected to decline by up to 80 percent over the next 10 years from levels in 2010 on a gram per mile basis. Even during the time period from 2010 to the actual buildout year of the project in 2013, DPM emissions from heavy-duty trucks are expected to decline by 30 to 40 percent from the levels in 2010. Such rules are already included in estimating future levels of emissions as part of the emission inventories employed in the San Joaquin Valley Air Basin attainment plans for attaining ozone and particulate matter air quality standards. Exhibit 14 shows the future trends of DPM emission rates from the analysis year of 2010 used in this assessment from the types of heavy-duty truck vehicles analyzed in this assessment. These emission rates were taken from the EMFAC2011 mobile source emission model and reflect all emission control regulations currently adopted by the ARB. The ARB has also adopted emission standards that will reduce DPM emissions from transportation refrigeration units by 80 to 90 percent over the next 10 years. Finally, the EPA has also adopted emission control regulations for diesel locomotives that will result in cleaner locomotives in the future.

5.1.3 - Application of Breathing Rates in the Estimation of Cancer Risk

One of the parameters that is required to estimate cancer risk is the daily breathing rate (DBR) shown in Equation 2 above. The DBR is an estimate of the volume of air breathed by exposed populations and varies by the weight and level of physical activity of a person. The assumption required by the SJVAPCD is to use the 95^{th} percentile of the DBR, which has been established by the OEHHA as having a value of 392 liters/kilogram-day. In 2003, the ARB provided recommendations for a DBR of the 80^{th} percentile or 302 liters/kilogram-day for determining inhalation-based cancer risk (ARB 2003). Since cancer risk is directly proportional the DBR, the use of the 95^{th} percentile rather than the ARB-recommended 80^{th} percentile DBR results in a higher and extremely conservative estimate of cancer risk that is overstated by about 30 percent.



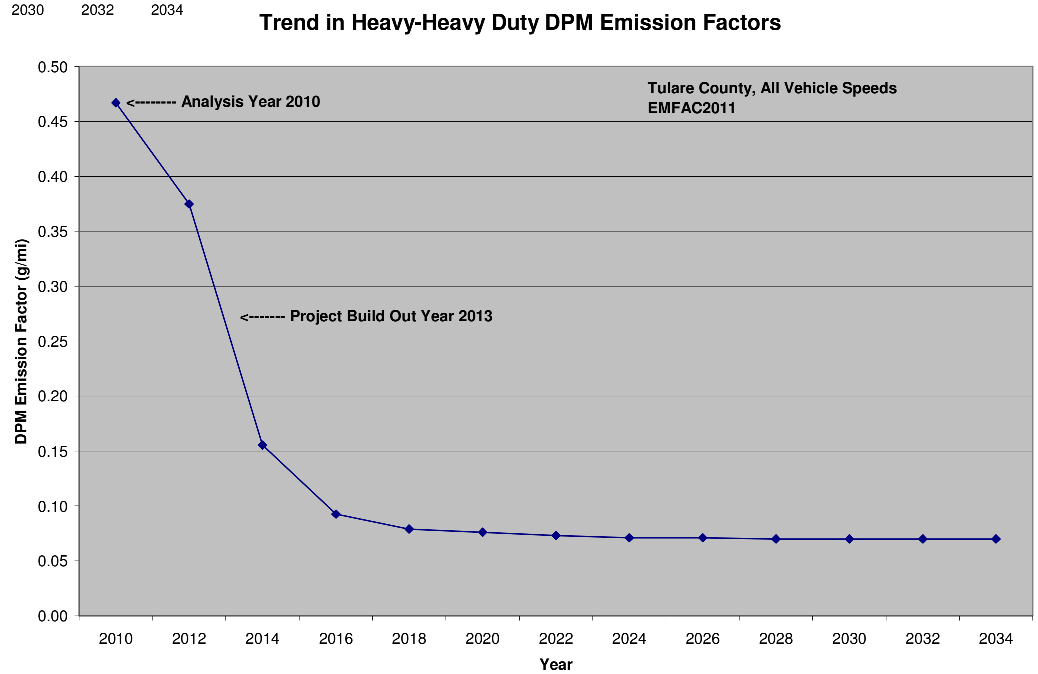


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Exhibit 14
Future Trends in DPM Emission Rates for Heavy Duty Diesel Trucks

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