SELECTED SECTIONS

REVISED DRAFT

ENVIRONMENTAL IMPACT REPORT

TIDEWATER CROSSING

STOCKTON, CALIFORNIA

EIR FILE NO. 2-05

SCH#2005122101

LSA

July 2008

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EIR FILE NO. 2-05

SCH#2005122101

Submitted to:

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July 2008

CHAPTER 1.0 INTRODUCTION

This document has been prepared to document changes that have occurred with the proposed project and/or conditions that potentially affect previous findings presented in the March 2008 Draft Environmental Impact Report (DEIR) prepared for the Tidewater Crossing project. Specifically, this document includes revisions to the Air Quality Section (Section 4.2) of the March 2008 DEIR, which address comments received by the City of Stockton during the public circulation period specific to items described below, and revisions to the Air Quality Section that address consistency with the City's recently adopted 2035 General Plan. Additionally, In light of the comments received, and recent availability of information and analytical tools, the City of Stockton has re-examined the project's effects on global warming due to the contribution of GHG Emissions and has prepared the supplemental information and analysis presented in this revised document.

By way of background, on March 6, 2008, the City of Stockton circulated the March 2008 DEIR document for public review initiating a 45 day public review period that ended on April 21, 2008. A number of comments that were received by the City of Stockton during that review period will be addressed in conjunction with the preparation of the Final Environmental Impact. However, several comments that were received by the City brought into question the adequacy of the information contained in the Air Quality Section of the DEIR describing the public health impacts of conventional air pollutants, and the provision of mitigation measures to address those impacts. Comments were also received that highlighted potential inconsistencies between Project impacts and the SJVAPCD's Air Quality Management Plan (AQMP). Additional comments received by the City during the public review period brought into question the adequacy of the analysis of Greenhouse Gas (GHG) emissions generated by the project, the potential effects expected on global warming and the provision of mitigation measures to address project-related impacts.

For overall air quality the March 2008 DEIR concludes:

"Compliance with SJVAPCD regulations will assist in reducing the cumulative project impacts on air quality although impacts cannot be completely mitigated to less than significant. Additionally, the project land use has not been planned under the existing General Plan and is, therefore, inconsistent with the AQMP. As discussed above, the project will have an air quality impact that is significant and unavoidable."

The conclusion as stated above is no longer valid as it pertains to the proposed project. The City of Stockton adopted a new General Plan (2035) in December 2007, and the territory covered by the project is planned within the City's Land Use Element with an urban land use designation. The Air Quality Section presented in this document has been revised to reflect the recent adoption of the 2035 General Plan and subsequent consistency with the Air Quality 2007 Ozone Plan for the San Joaquin Valley. The Section also has been revised to include mitigation measures to reduce project-related air quality impacts.

The March 2008 DEIR Air Quality Section includes a sub-section that addresses project-related climate change. In the March 2008 document, the DEIR concludes that the project does not generate sufficient GHG emissions to create a significant impact. Specifically, the DEIR concludes:

"Construction of the proposed project could contribute to atmospheric greenhouse gas emissions resulting in a potentially significant impact. With the application of mitigation measures presented in Land Use, Air Quality, Transportation, and Public Services the impacts should be reduced to less than significant on global warming. In addition, implementation of the measures recommended by the California Attorney General will further reduce the project's contribution to greenhouse gas emissions."

The issues involving GHG Emissions are evolving as a science. At the time the March 2008 DEIR was circulated, information and the analysis contained in the document was presented to address the project impacts to the extent available at the time. This document includes new information, including a quantification of GHG Emissions from the project, an analysis and discussion of impacts and a list of mitigation measures to reduce project-related GHG Emissions; all leading to a clarification to the findings presented in the March 2008 DEIR with respect to the air quality section and specifically to global warming and climate change issues.

Since global warming/climate change is addressed as a subsection of air quality, it can be concluded that the project will mitigate global warming impacts to levels that are less than significant (as indicated above), but will have a cumulative impact that is significant and unavoidable (also as indicated above). Nevertheless, as a result of the blending of the air quality assessment with the global warming/climate change assessment, the project level findings and cumulative level findings require additional clarity. For this reason, this document presents a separate global warming/climate change section (Section 4.15), which was created to assist in distinguishing the project's effects from GHG emissions.

In accordance with CEQA Guidelines Section 15088.5, "Recirculation of an EIR Prior to Certification", the City has determined that based on the new information and change to the previous findings with respect to global warming issues, recirculation is appropriate. As allowed in subsection (2), when an EIR is revised in part and the lead agency is recirculating only the revised chapters or portions of the EIR, the lead agency may request that reviewers limit their comments to the revised chapters.

Overall, all other sections, discussions, analysis, etc., included in the March 2008 DEIR remain as presented in that document. Only the section involving Section 4.2 Air Quality has been amended/modified. With the reformatting of the EIR to provide a separate Global Climate Change section, Section 4.2 Air Quality has been revised to omit the global climate change discussion. The previously described Impact AIR-5 statement has been removed and the Air Quality Section reformatted and impact statements renumbered accordingly.

4.2 AIR QUALITY

An assessment of the project's air quality emissions/contributions was prepared for this EIR. Air quality modeling data is provided in Appendix E.

4.2.1 Existing Setting

The project site is located within the County of San Joaquin, which is part of the San Joaquin Valley Air Basin (SJVAB) and is under the jurisdiction of the SJVAPCD. The air quality assessment for the proposed project includes estimating emissions associated with short-term construction and long-term operation of the proposed project.

A number of air quality modeling tools are available to assess the air quality impacts of projects. In addition, certain air districts, such as the SJVAPCD, have created guidelines and requirements to conduct air quality analyses. The methodologies provided by the SJVAPCD in its Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI, adopted August 20, 1998; revised January 10, 2002) and the Caltrans Transportation Project-Level Carbon Monoxide Protocol (December 1997) were adhered to in the assessment of air quality impacts for the proposed project.

Regional Air Quality

Both the State of California (State) and the federal government have established health-based ambient air quality standards (AAQS) for seven air pollutants. As shown in Table 4.2.A, these pollutants include ozone (O_3), CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), coarse particulate matter with a diameter of 10 microns or less (PM_{10}), fine particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and lead. In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

In addition to setting out primary and secondary AAQS, the State has established a set of episode criteria for O_3, CO, NO_2, SO_2, suspended particulate matter (PM_{10} and $PM_{2.5}$), and lead. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. Health effects are progressively more severe as pollutant levels increase from Stage One to Stage Three. Table 4.2.B lists the health effects of these criteria pollutants and their potential sources. These health effects would not occur unless the standards are exceeded by a large margin or for a prolonged period of time. The State AAQS are more stringent than the federal AAQS.

The California Clean Air Act (CCAA) provides the air districts, such as SJVAPCD, with the authority to manage transportation activities at indirect sources. Indirect sources of pollution are generated when minor sources collectively emit a substantial amount of pollution. Examples of this would be the motor vehicles at an intersection, a mall, and on highways. SJVAPCD also regulates stationary sources of pollution throughout its jurisdictional area. Direct emissions from motor vehicles are regulated by the California Air Resources Board (ARB).

Table 4.2.A: Ambient Air Quality Standards

POLLUTANT	AVERAGING TIME	CALIFORNIA STANDARDS[1]		FEDERAL STANDARDS[2]		
		CONCENTRATION[3]	METHOD[4]	PRIMARY[2,5]	SECONDARY[2,6]	METHOD[7]
Ozone (O_3)	1-Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	--	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.070 ppm (137 µg/m)		0.08 ppm (157 µg/m^3)		
Respirable Particulate Matter (PM_{10})	24-Hour	50 µg/m^3	Gravimetric or Beta Attenuation*	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetic Analysis
	Annual Arithmetic Mean	20 µg/m^3*		50 µg/m^3		
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	No Separate State Standard		65 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetic Analysis
	Annual Arithmetic Mean	12 µg/m^3*	Gravimetric or Beta Attenuation*	15 µg/m^3		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Nondispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Nondispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		–	--	--
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	–	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1-Hour	0.25 ppm (470 µg/m^3)		–		
Lead	30-day average	1.5 µg/m^3	Atomic Absorption	–	–	High Volume Sampler and Atomic Absorption
	Calendar Quarter	–		1.5 µg/m^3	Same as Primary Standard	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	–	Spectrophotometry (Pararosaniline Method)
	24-Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	–	
	3-Hour	–		–	0.5 ppm (1300 µg/m^3)	
	1-Hour	0.25 ppm (655 µg/m^3)		–	–	
Visibility Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of 10 miles or more (0.07–30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		**No Federal Standards**		
Sulfates	24-Hour	25 µg/m^3	Ion Chromatography*			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Cloride[9]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Source: ARB, May 2005

*This concentration was approved by the ARB on April 28, 2005, and is expected to become effective in early 2006.

Footnotes:

[1] California standards for ozone; carbon monoxide (except Lake Tahoe); sulfur dioxide (1 and 24 hour); nitrogen dioxide; suspended particulate matter, PM10; and visibility reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[2] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 ?g/m3 is equal to or less than one. For PM2.5, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact EPA for further clarification and current federal policies.

[3] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] Any equivalent procedure that can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

[5] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[6] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[7] Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.

[8] New federal eight-hour ozone and fine particulate matter standards were promulgated by EPA on July 18, 1997. Contact EPA for further clarification and current federal policies.

[9] The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Table 4.2.B: Public Health Impacts Summary of the Major Criteria Air Pollutants

POLLUTANTS	SOURCES	PRIMARY EFFECTS
Ozone (O_3)	Atmospheric reaction of organic gases with nitrogen oxides in sunlight.	Aggravation of respiratory and cardiovascular diseases. Irritation of eyes. Impairment of cardiopulmonary function. Plant leaf injury.
Nitrogen Dioxide (NO_2)	Motor vehicle exhaust. High temperature stationary combustion. Atmospheric reactions.	Aggravation of respiratory illness. Reduced visibility. Reduced plant growth. Formation of acid rain.
Carbon Monoxide (CO)	Incomplete combustion of fuels and other carbon containing substances, such as motor exhaust. Natural Events, such as decomposition of organic mater.	Reduced tolerance for exercise. Impairment of mental function. Impairment of fetal development. Death at high levels of exposure. Aggravation of some heart diseases (angina).
Suspended Particulate Mater (PM_{10} and $PM_{2.5}$)	Stationary combustion of solid fuels. Construction activities. Industrial processes.	Reduced lung function. Aggravation of the effects of gaseous pollutants. Aggravation of respiratory and cardiorespiratory diseases.

POLLUTANTS	SOURCES	PRIMARY EFFECTS
	Atmospheric chemical reactions.	Increased cough and chest discomfort. Soiling. Reduced visibility.
Sulfur Dioxide (SO_2)	Combustion of sulfur containing fossil fuels. Smelting of sulfur bearing metal ores. Industrial processes.	Aggravation of respiratory diseases (asthma, emphysema). Reduced lung function. Irritation of eyes. Reduced visibility. Plant injury. Deterioration of metals, textiles, leather, finishes, coatings, etc.
Lead (Pb)	Contaminated soil (e.g., from leaded fuels and lead-based paints).	Impairment of blood function and nerve construction. Behavioral and hearing problems in children.

Source: CARB 2001

Climate/Meteorology

Air pollution is directly related to a region's topographic features. The SJVAB is defined by the Sierra Nevada mountains in the east (8,000-14,000 feet in elevation), the Coast Range in the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains in the south (6,000-8,000 feet in elevation). The valley is basically flat with a slight downward gradient to the northwest. The valley opens to the sea at the Carquinez Strait, where the Sacramento-San Joaquin Delta empties into San Francisco Bay. Thus, the San Joaquin Valley (SJV) could be considered a “bowl” open only to the north.

Although marine air generally flows into the basin from the San Joaquin River delta, the region's topographic features restrict air movement through and out of the basin. The Coast Range hinders wind access into the SJV from the west, the Tehachapis prevent southerly passage of air, and the high Sierra Nevada range is a significant barrier to the east. These topographic features result in weak air flow, which becomes blocked vertically by high barometric pressure over the SJV. As a result, the SJVAB is susceptible to pollutant accumulation over time. Most of the surrounding mountains are above the normal height of summer inversion layers (1,500-3,000 feet).

During the summer, wind speed and direction data indicate that wind usually originates at the north end of the SJV and flows in a south-southeasterly direction through the SJV, through Tehachapi Pass, and into the Southeast Desert Air Basin. During the winter, wind speed and direction data indicate that wind occasionally originates in the south end of the SJV and flows in a north-northwesterly direction. Also during the winter months, the SJV experiences light, variable winds of less than 10 mph. Low wind speeds combined with low inversion layers in the winter create a climate conducive to high CO and PM_{10} concentrations.

The climatological station monitoring temperature closest to the project site is the Stockton station. The monthly average temperature recorded at the Stockton station for the last 40 years ranges from 45.6 degrees (F) in January to 77.3 degrees (F) in July. January is typically the coldest month in this

area. The Stockton monitoring station also records precipitation throughout the year. Average rainfall measured for the last 40 years varied from 2.85 inches in January to 0.73 inch or less between May and October, with an average annual total of 14.00 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuations in the weather.

Air Pollution Constituents and Attainment Status

Table 4.2.C describes the six criteria air pollutants and their attainment status in the Basin based on ARB's Area Designations (Activities and Maps) (http://www.arb.ca.gov/desig/desig.htm). ARB provided the Environmental Protection Agency (EPA) with California's recommendations for eight-hour ozone area designations on July 15, 2003. The recommendations and supporting data were an update to a report submitted to the EPA in July 2000. On December 3, 2003, the EPA published its proposed designations. EPA's proposal differs from the State's recommendations primarily on the appropriate boundaries for several nonattainment areas. ARB responded to the EPA's proposal on February 4, 2004. EPA finalized the eight-hour ozone designations in April 2004.

The EPA issued the final $PM_{2.5}$ implementation rule in fall 2004 and issued the final designations on December 14, 2004.

Table 4.2.C: Attainment Status in the San Joaquin Area

Emissions	State	Federal
Ozone: 1-hour	Severe nonattainment	No Federal Standard (Revoked June 2005)
Ozone: 8-hour	Not Established	Serious Nonattainment
PM_{10}	Nonattainment	Serious Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Attainment	Attainment/Unclassified
NO_2	Attainment	Attainment/Unclassified
SO_2	Attainment	Unclassified
All others	Attainment/Unclassified	Attainment/Unclassified

Source: ARB, January 2006

Ozone

O_3 (smog) is formed by photochemical reactions between NOX and reactive organic gases (ROG) rather than being directly emitted. O_3 is a pungent, colorless gas typical of Southern California smog. Elevated O_3 concentrations result in reduced lung function, particularly during vigorous physical activity. This health problem is particularly acute in sensitive receptors such as the sick, the elderly,

and young children. O_3 levels peak during summer and early fall. The SJVAPCD requested an extreme (from severe) nonattainment designation for the federal one-hour ozone standard for the SJVAB. The EPA approved the redesignation of the federal ozone attainment status to extreme in April 2004. The approval of the redesignation reduces the emissions cap for major sources from 25 to 10 tons per year. However, it will push the attainment date from 2005 to 2010, thereby avoiding any penalty fees associated with a nonconforming status. Effective June 15, 2005, the EPA revoked in full the federal 1-hour ozone ambient air quality standard, including associated designations and classifications, in all areas except 14 early action compact areas that do not include the SJVAB.

Carbon Monoxide

CO is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairments to central nervous system functions. The San Joaquin area is designated as attainment/unclassified for federal CO standards and attainment for State CO standards.

Nitrogen Oxides

NO_2, a reddish brown gas, and nitric oxide (NO), a colorless, odorless gas, are formed from fuel combustion under high temperature or pressure. These compounds are referred to as nitrogen oxides, or NO_x. NO_x is a primary component of the photochemical smog reaction. It also contributes to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition (i.e., acid rain). NO_2 decreases lung function and may reduce resistance to infection. The entire Basin is designated as attainment/unclassified under federal standards and attainment under State standards.

Sulfur Dioxide

SO_2 is a colorless, irritating gas formed primarily from incomplete combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels. SO_2 irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter, and reduces visibility and the level of sunlight. The San Joaquin area is designated as unclassified for federal CO standards and attainment for State SO_2 standards.

Lead

Lead is found in old paints and coatings, plumbing, and a variety of other materials. Once in the bloodstream, lead can cause damage to the brain, nervous system, and other body systems. Children are highly susceptible to the effects of lead. The entire Basin is in attainment for federal and State lead standards.

Particulate Matter

Particulate matter is the term used for a mixture of solid particles and liquid droplets found in the air. Coarse particles, PM_{10}, derive from a variety of sources, including windblown dust and grinding

operations. Fuel combustion and resultant exhaust from power plants and diesel buses and trucks are primarily responsible for fine particle, $PM_{2.5}$, levels. Fine particles can also be formed in the atmosphere through chemical reactions. PM_{10} can accumulate in the respiratory system and aggravate health problems such as asthma. The EPA's scientific review concluded that $PM_{2.5}$ which penetrates deeply into the lungs, is more likely than PM_{10} to contribute to the health effects listed in a number of recently published community epidemiological studies at concentrations that extend well below those allowed by current PM_{10} standards. These health effects include premature death and increased hospital admissions and emergency room visits (primarily the elderly and individuals with cardiopulmonary disease); increased respiratory symptoms and disease (children and individuals with cardiopulmonary disease such as asthma); decreased lung functions (particularly in children and individuals with asthma); and alterations in lung tissue and structure and in respiratory tract defense mechanisms. The entire Basin is a nonattainment area for federal and State PM_{10} and $PM_{2.5}$ standards.

Local Air Quality

The SJVAPCD, together with the ARB, maintains ambient air quality monitoring stations in the Basin. The air quality monitoring station closest to the site is the Stockton-Hazelton Station, and its air quality trends are representative of the ambient air quality in the project area. The pollutants monitored are CO, O_3, PM_{10}, $PM_{2.5}$, and NO_2.

The ambient air quality data in Tables 4.2.D and 4.2.E show that CO and NO_2 levels are well below relevant State and federal standards. $PM_{2.5}$ levels were consistently lower than standards. O_3 and PM_{10} levels occasionally exceeded State and federal standards during the last three years. Also shown in Table 4.2.E, SO_2 levels are not monitored in the San Joaquin Basin.

Table 4.2.D: Ambient Air Quality at Stockton-Hazelton Air Monitoring Station

	One-Hour Carbon Monoxide[1]		One-Hour Ozone		Coarse Suspended Particulate (PM_{10})		Nitrogen Dioxide	
	Max. 1-Hour Conc. (ppm)	Number of Days Exceeded	Max. 1-Hour Conc. (ppm)	Number of Days Exceeded	Max. 24-Hour Conc. ($\mu g/m^3$)	Number of Days Exceeded	Max. Conc. (ppm)	Number of Days Exceeded
State Stds.	> 20 ppm/ 1 hr		> .09 ppm/1 hr		> 50 $\mu g/m^3$, 24 hrs		> .25 ppm/1 hr	
2005	2.6	0	0.1	3	61	2	0.09	0
2004	3.7	0	0.1	1	60	3	0.08	0
2003	5.8	0	0.1	3	90	3	0.09	0
Maximum	**5.8**		**0.1**		**90**		**0.09**	
Federal Stds.	> 35 ppm/1 hr		> .12 ppm/1 hr		> 150 $\mu g/m^3$, 24 hrs		0.053 ppm, annual average	
2005	2.6	0	0.1	NA	61	0	0.02	0

	One-Hour Carbon Monoxide[1]		One-Hour Ozone		Coarse Suspended Particulate (PM_{10})		Nitrogen Dioxide	
	Max. 1-Hour Conc. (ppm)	**Number of Days Exceeded**	**Max. 1-Hour Conc. (ppm)**	**Number of Days Exceeded**	**Max. 24-Hour Conc. ($\mu g/m^3$)**	**Number of Days Exceeded**	**Max. Conc. (ppm)**	**Number of Days Exceeded**
2004	3.7	0	0.1	NA	60	0	0.02	0
2003	5.8	0	0.1	NA	90	0	0.02	0
Maximum	**5.8**		**0.1**		**90**		**0.02**	

Source: ARB and EPA 2003-2005
ppm = parts per million
NA = not applicable
Data taken from the EPA Web site; others taken from the ARB Web site.

Table 4.2.E: Ambient Air Quality at Stockton Hazelton Air Monitoring Station

	Eight-Hour Carbon Monoxide		Eight-Hour Ozone		Fine Suspended Particulate ($PM_{2.5}$)		Sulfur Dioxide	
	Max. 8-Hour Conc. (ppm)	**Number of Days Exceeded**	**Max. 8-Hour Conc. (ppm)**	**Number of Days Exceeded**	**Max. 24-Hour Conc. ($\mu g/m$)**	**Number of Days Exceeded**	**Max. Conc. (ppm)**	**Number of Days Exceeded**
State Stds.	> 9.0 ppm/8 hrs		> .07 ppm/8 hrs		No State Standard		> .04 ppm/24 hrs	
2005	2.7	0	0.09	NA[1]	44	NA	ND[2]	ND
2004	2.5	0	0.08	NA	41	NA	ND	ND
2003	3.1	0	0.09		45	NA	ND	ND
Maximum	**3.1**		0.09		45		**ND**	
Federal Stds.	> 9.0 ppm/8 hrs		> .08 ppm/8 hrs		> 65 $\mu g/m^3$, 24 hrs		0.03 ppm, annual average	
2005	2.7	0	0.09	1	44	0	ND	ND
2004	2.5	0	0.08	0	41	0	ND	ND
2003	3.1	0	0.09	1	45	0	ND	ND
Maximum	**3.1**		0.09		45		**ND**	

Source: ARB and EPA 2003-2005
1 NA = Not applicable; no State standard.
2 ND = No data. Monitored data for SO_2 are not available.

4.2.2 Regulatory Settings

Federal Regulations/Standards

Pursuant to the federal Clean Air Act (CAA) of 1970, the EPA established national ambient air quality standards (NAAQS) for six major pollutants, termed "criteria" pollutants. Criteria pollutants are defined as those pollutants for which the federal and State governments have established AAQS, or criteria, for outdoor concentrations in order to protect public health.

Data collected at permanent monitoring stations are used by the EPA to classify regions as "attainment" or "nonattainment," depending on whether the regions met the requirements stated in the primary NAAQS. Nonattainment areas have additional restrictions as required by the EPA.

The San Joaquin Valley is a single air quality nonattainment area containing six metropolitan planning organizations (MPOs) and two rural transportation-planning agencies (TPAs) that conduct transportation planning activities within the Valley. The EPA has designated the San Joaquin Council of Governments (SJCG) as the MPO responsible for ensuring the area's compliance with the CAA.

The EPA established new national air quality standards for ground-level O_3 and $PM_{2.5}$ matter in 1997. On May 14, 1999, the Court of Appeals for the District of Columbia Circuit issued a decision ruling that the CAA, as applied in setting the new public health standards for O_3 and particulate matter, was unconstitutional as an improper delegation of legislative authority to the EPA. On February 27, 2001, the U.S. Supreme Court upheld the way the government sets air quality standards under the CAA. The court unanimously rejected industry arguments that the EPA must consider financial cost as well as health benefits in writing standards. The justices also rejected arguments that the EPA took lawmaking power from Congress when it set tougher standards for O_3 and particulate matter in 1997. Nevertheless, the court threw out the EPA's policy for implementing new O_3 rules, saying that the agency ignored a section of the law that restricts its authority to enforce such rules.

In April 2003, the EPA was cleared by the White House Office of Management and Budget (OMB) to implement the eight-hour ground-level O_3 standard. The EPA issued the proposed rule implementing the eight-hour O_3 standard in April 2003. The EPA completed final eight-hour nonattainment status on April 15, 2004 and revoked the one-hour standard on June 15, 2005.

The EPA issued the final $PM_{2.5}$ implementation rule in fall 2004. The EPA issued final designations on December 14, 2004.

State Regulations/Standards

The State of California began to set California ambient air quality standards (CAAQS) in 1969 under the mandate of the Mulford-Carrell Act. The CAAQS are generally more stringent than the NAAQS. In addition to the six criteria pollutants covered by the NAAQS, there are CAAQS for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. These standards are also listed in Table 4.2.A.

Originally, there were no attainment deadlines for CAAQS. However, the CCAA of 1988 provided a time frame and a planning structure to promote their attainment. The CCAA required nonattainment areas in the State to prepare attainment plans and proposed to classify each such area on the basis of the submitted plan, as follows: moderate, if CAAQS attainment could not occur before December 31, 1994; serious, if CAAQS attainment could not occur before December 31, 1997; and severe, if CAAQS attainment could not be conclusively demonstrated at all.

The attainment plans require a minimum 5 percent annual reduction in the emissions of nonattainment pollutants unless all feasible measures have been implemented. The San Joaquin area of the SJVAB is currently classified as a nonattainment area for three criteria pollutants: ozone (O_3), suspended coarse particulates (PM_{10}), and suspended fine particulates ($PM_{2.5}$).

Regional Air Quality Planning Framework

The 1976 Lewis Air Quality Management Act established the SJVAPCD and other air districts throughout the State. The federal CAA Amendments of 1977 required that each state adopt an implementation plan outlining pollution control measures to attain the federal standards in nonattainment areas of the state.

The ARB coordinates and oversees both State and federal air pollution control programs in California. It oversees activities of local air quality management agencies and is responsible for incorporating air quality management plans for local air basins into a State Implementation Plan (SIP) for EPA approval. The ARB maintains air quality monitoring stations throughout the State in conjunction with local air districts. Data collected at these stations are used by the ARB to classify air basins as "attainment" or "nonattainment" with respect to each pollutant and to monitor progress in attaining air quality standards. The ARB has divided the State into 15 air basins. Significant authority for air quality control within them has been given to local air districts that regulate stationary source emissions and develop local nonattainment plans.

The California Clean Air Act (CCAA) provides the SJVAPCD with the authority to manage transportation activities at indirect sources and regulate stationary source emissions. Indirect sources of pollution are generated when minor sources collectively emit a substantial amount of pollution. An example of this would be the motor vehicles at an intersection, a mall, and on highways. As a State agency, the ARB regulates motor vehicles and fuels for their emissions.

Regional Air Quality Management Plan (AQMP)

The SJVAPCD has adopted several attainment plans to achieve State and federal air quality standards to comply with CCAA and federal Clean Air Act Amendments (FCAAA) requirements. The SJVAPCD must continuously monitor its progress in implementing attainment plans and must periodically report to the ARB and the EPA. It must also periodically revise its attainment plans to reflect new conditions and requirements in accordance with schedules mandated by the CCAA and FCAAA.

The CCAA requires districts to adopt air quality attainment plans and to review and revise their plans to address deficiencies in interim measures of progress once every three years. The SJVAPCD's AQMP was adopted in 1991 and was most recently updated in 2001.

To meet FCAAA and CCAA requirements, the SJVAPCD has submitted numerous plans for attaining ozone, PM_{10}, and CO standards. The ozone plan projected attainment of the federal ozone standard by 1999, but did not achieve its goal. The SJVAPCD is in the process of preparing a draft ozone plan and has requested a redesignation of extreme nonattainment status for the federal one-hour ozone standard. The CO plan demonstrates that CO attainment has already been reached. The PM_{10} attainment plan sets forth the approach the SJVAPCD will use to attain the NAAQS for PM_{10}. The SJVAPCD Governing Board adopted a 2003 PM_{10} plan in June 2003 and forwarded it to the ARB. The ARB adopted the plan in June 2003 and forwarded it to the EPA. The EPA found the plan complete in August 2003 and finalized approval of the 2003 PM_{10} plan in April 2004.

4.2.3 Impact Significance Criteria

A project would normally be considered to have a significant effect on air quality if the project would conflict with or obstruct implementation of the applicable air quality plan; violate any air quality standards or contribute substantially to an existing or projected air quality violation; result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors); expose sensitive receptors to substantial pollutant concentrations; or create objectionable odors affecting a substantial number of people (Guidelines for the implementation of the California Environmental Quality Act, Public Resources Code §15000-15387).

In addition to the federal and State AAQS, as listed in Table 4.2.A, there are annual emissions thresholds for operation of a proposed project in the SJVAB. The San Joaquin area of the SJVAB is administered by the SJVAPCD, and guidelines and emissions thresholds established by the SJVAPCD in its Guide for Assessing and Mitigating Air Quality Impacts (SJVAPCD, adopted August 1998 and revised January 10, 2002) are used in this analysis.

SJVAPCD also requires evaluation of cumulative air quality impacts. CEQA defines cumulative impacts as two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. Cumulative impacts can result from individually minor, but collectively significant, projects. An adequate cumulative impact analysis considers a project over time and in conjunction with other related past, present, and reasonably foreseeable future projects whose impacts might compound or interrelate with those of the project being assessed.

Thresholds of Significance for Construction Emissions

A project’s construction phase produces many types of emissions, but PM_{10} is the pollutant of greatest concern. Rather than provide a quantitative significance threshold for PM_{10}, the SJVAPCD has determined that a project's impacts will be less than significant if the project complies with certain mitigation measures. Accordingly, the SJVAPCD has determined that compliance with Regulation VIII for all sites and implementation of all other control measures indicated in Tables 4.2.F and 4.2.G

below (as appropriate, depending on the size and location of the project site) will constitute sufficient mitigation to reduce PM_{10} impacts to a level considered less than significant.

The control measures listed in Table 4.2.F (Regulation VIII Control Measures) are required for all construction sites by regulation. Table 4.2.G lists additional measures that may be required due to sheer project size or proximity of the project to sensitive receptors. Table 4.2.G also lists additional control measures (Optional Measures) that may be implemented if further emissions reductions are deemed necessary by the Lead Agency.

The SJVAPCD recognizes that the measures listed in Tables 4.2.F and 4.2.G focus on PM10 emissions from fugitive dust sources. It indicates that Lead Agencies seeking to reduce emissions from construction equipment exhaust should also consider the mitigation measures listed in Table 4.2.H. The SJVAPCD recognizes that these measures are difficult to implement due to poor availability of alternative fueled equipment and the challenge of monitoring these activities.

Table 4.2.F: Regulation VIII Control Measures for Construction Emissions of PM_{10}

REGULATION VIII CONTROL MEASURES. - THE FOLLOWING CONTROLS ARE REQUIRED TO BE IMPLEMENTED AT ALL CONSTRUCTION SITES (INCLUDES CHANGES EFFECTIVE MAY 15, 2002).
• All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover. • All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant. • All land clearing, grubbing, scraping, excavation, land leveling, grading, cut & fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking. • When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained. • All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. (The use of dry brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions.) (Use of blower devices is expressly forbidden.) • Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant. • Within urban areas, trackouts shall be immediately removed when they extend 50 or more feet from the site, and at the end of each workday. • Any site with 150 or more vehicle trips per day shall prevent carryout and trackout.

Source: SJVAPCD, 2002

Table 4.2.G: Enhanced and Additional Control Measures for Construction Emissions of PM_{10}

ENHANCED CONTROL MEASURES - THE FOLLOWING MEASURES SHOULD BE IMPLEMENTED AT CONSTRUCTION SITES WHEN REQUIRED TO MITIGATE SIGNIFICANT PM_{10} IMPACTS (NOTE, THESE MEASURES ARE TO BE IMPLEMENTED IN ADDITION TO REGULATION VIII REQUIREMENTS):
• Limit traffic speeds on unpaved roads to 15 mph; and • Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.
ADDITIONAL CONTROL MEASURES - THE FOLLOWING CONTROL MEASURES ARE STRONGLY ENCOURAGED AT CONSTRUCTION SITES THAT ARE LARGE IN AREA, LOCATED NEAR SENSITIVE RECEPTORS, OR WHICH FOR OTHER REASON WARRANT ADDITIONAL EMISSIONS REDUCTIONS:
• Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site; • Install wind breaks at windward side(s) of construction areas; • Suspend excavation and grading activity when winds exceed 20 mph; and* • Limit area subject to excavation, grading, and other construction activity at any one time.

Source: *SJVAPCD, 2002*

*Notes: *Regardless of windspeed, an owner/operator must comply with Regulation VIII's 20 percent capacity limitation.*

Table 4.2.H: Construction Equipment Mitigation Measures

EMISSION SOURCE	MITIGATION MEASURES
Heavy duty equipment (scrapers, graders, trenchers, earth movers, etc.)	• Use of alternative fueled equipment or catalyst equipped diesel construction equipment. • Minimize idling time (e.g., 10 minutes maximum) • Limit the hours of operation of heavy duty equipment and/or the amount of equipment in use • Replace fossil-fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set) • Curtail construction during periods of high ambient pollutant concentrations; this may include ceasing of construction activity during the peak-hour of vehicular traffic on adjacent roadways • Implement activity management (e.g., rescheduling activities to reduce short-term impacts)

Source: SJVAPCD 2002

Thresholds for Operational Emissions

The term "project operations" refers to the full range of activities that can or may generate pollutant emissions when the development is functioning in its intended use. Ozone precursor emissions from project operations should be compared to the following thresholds:

Ozone Precursor Thresholds

10 tons per year of ROG

10 tons per year of NO_X

Projects with operation related emissions that exceed any of the above listed emissions thresholds are considered significant.

Local Carbon Monoxide Concentrations Thresholds

California State one hour CO standard of 20.0 ppm

California State eight hour CO standard of 9.0 ppm

Projects that would result in CO concentrations exceeding the above standards are considered significant.

Odor Impacts Threshold

Any project with the potential to frequently expose members of the public to objectionable odors will be deemed to have a significant impact.

Hazardous Air Pollutants (HAPs)

The definition of substantial pollutant concentrations varies for pollutants without defined significance standards or air contaminants not covered by the standard criteria cited above. With regard to hazardous air pollutants, also known as toxic air contaminants (TAC), "substantial" is taken to mean that the individual cancer risk exceeds a threshold considered to be a prudent risk management level. If best-available control technology for toxics (T-BACT) has been applied, the individual cancer risk to the maximum exposed individual (MEI) must not exceed 10 in 1 million in order for an impact to be determined not to be significant.

Airborne impacts are also derived from materials considered to be a nuisance for which there may not be associated standards. Odors or the deposition of large-diameter dust particles outside of the PM10 size range would be included in this category. It is considered a significant impact for odors and large-diameter dust particles if the SJVAPCD nuisance (Rule 402) would be potentially violated.

The following limits for maximum individual cancer risk (MICR), cancer burden, and noncancer acute and chronic hazard indices (HI) from project emissions of TACs have been established for the Basin:

MICR and Cancer Burden. MICR is the estimated probability of a potential MEI contracting cancer as a result of exposure to TACs over a period of 70 years for residential and 46 years for worker receptor locations. The MICR calculations include multipathway consideration, when applicable. Cancer Burden is the estimated increase in the occurrence of cancer cases in a population subject to a MICR of greater than or equal to one in one million (1.0 x 10-6) resulting from exposure to TACs.

The cumulative increase in MICR that is the sum of the calculated MICR values for all TACs emitted from the project will not result in any of the following:

- An increased MICR greater than 10 in 1 million (1.0 x 10-5) at any receptor location (assumes the project will be constructed with T-BACT)
- A cancer burden greater than 0.5

Chronic HI. This is the ratio of the estimated long-term level of exposure to a TAC for a potential MEI to its chronic reference exposure level. The chronic HI calculations include multipathway considerations, when applicable.

- The cumulative increase in total chronic HI for any target organ system due to total emissions from the project will not exceed 1.0 at any receptor location.

Acute HI. This is the ratio of the estimated maximum one-hour concentration of a TAC for a potential MEI to its acute reference exposure level.

- The cumulative increase in total acute HI for any target organ system due to total emissions from the project will not exceed 1.0 at any receptor location.
- Accidental Release/Acutely Hazardous Air Emissions

The determination of significance for potential impacts from accidental release of acutely hazardous air pollutants should be made in consultation with local administering agency of the Risk Management Preventive Program. The County health department, Office of Emergency Services, or local fire department is usually the administering agency.

Evaluating Cumulative Air Quality Impacts

The SJVAPCD recommends the following procedures to evaluate potential cumulative air quality impacts:

- Evaluate cumulative ozone impacts
- Evaluate cumulative PM_{10} impacts
- Evaluate cumulative CO impacts
- Evaluate cumulative hazardous air pollutant (HAP) impacts

4.2.4 Impacts And Mitigation Measures

Effects Determined to Be Less Than Significant

Impact AIR-1: The project is not expected to create objectionable odors.

Construction of the proposed project may expose the surrounding sensitive receptors to airborne particulates and fugitive dust, as well as a small quantity of construction equipment pollutants (i.e., usually diesel-fueled vehicles and equipment). Temporary odor from diesel exhaust would be

expected during construction, however, no long term odor impacts are anticipated that would effect adjacent sensitive receptors or onsite residential uses.

A potential for odor impacts may be associated with the proposed industrial uses depending upon the ultimate use. The industrial uses are combined in one location and are sufficiently distant from sensitive receptors to create a long term odor impact. Therefore, no mitigation measures are proposed.

Impact AIR-2: The project is not expected to create long-term air quality impacts with localized effects.

Vehicular trips associated with the proposed project would contribute to congestion at intersections and along roadway segments in the project vicinity. Localized air quality effects would occur when emissions from vehicular traffic increase in local areas as a result of the proposed project. The primary mobile source pollutant of local concern is CO, which is a direct function of vehicle idling time and, thus, traffic flow conditions. CO transport is extremely limited; it disperses rapidly with distance from the source under normal meteorological conditions. However, under certain extreme meteorological conditions, CO concentrations proximate to a congested roadway or intersection may reach unhealthful levels affecting local sensitive receptors (residents, school children, the elderly, hospital patients, etc.). Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service or with extremely high traffic volumes. In areas with high ambient background CO concentration, modeling is recommended to determine a project's effect on local CO levels.

An assessment of project-related impacts on localized ambient air quality requires that future ambient air quality levels be projected. Existing CO concentrations in the immediate project vicinity are not available. Per EPA guidelines, the highest of the second-highest CO concentrations measured within the past three years were used as the background levels (see Table 4.2.I). At the Stockton-Hazelton Monitoring Station, the background concentrations are 4.9 ppm for the one-hour period and 3.0 ppm for the eight-hour period.

The highest CO concentrations would occur during peak traffic hours; hence, CO impacts calculated under peak traffic conditions represent a worst-case analysis. Based on the same traffic impact analysis used for the long-term regional analysis above, CO hot spot analyses were conducted for existing and cumulative conditions. The impact on local carbon monoxide levels was assessed with the ARB-approved CALINE4 air quality model, which allows microscale CO concentrations to be estimated along roadway corridors or near intersections. This model is designed to identify localized concentrations of carbon monoxide, often termed "hot spots." A brief discussion of input to the CALINE4 model follows. The analysis was performed for the worst-case wind angle and wind speed condition and is based upon the following assumptions:

- Selected modeling locations represent the intersections closest to the project site, with the highest project-related vehicle turning movements and the worst level of service deterioration.
- Twenty receptor locations with the possibility of extended outdoor exposure from 8 to 24 meters (approximately 26 to 79 feet) of the roadway centerline near intersections were modeled to determine CO concentrations.

- The calculations assume a meteorological condition of almost no wind (0.5 m/second), a suburban topographical condition between the source and receptor, and a mixing height of 1,000 m, representing a worst-case scenario for CO concentrations.
- CO concentrations are calculated for the one-hour averaging period and then compared to the one-hour standards. CO eight-hour averages are extrapolated using a persistence factor of 0.7 to predict the eight-hour concentration.
- Concentrations are given in parts per million (ppm) at each of the receptor locations.
- The "at-grade" link option with speed adjusted based on average cruise speed and number of vehicles per lane per hour was used rather than the "intersection" link selection in the CALINE4 model (Caltrans has suggested that the "intersection" link should not be used due to an inappropriate algorithm based on outdated vehicle distribution). Emissions factors from the EMFAC2002 model were used for the vehicle fleet.
- The highest level of the second-highest one-hour and eight-hour CO concentrations monitored at the Stockton-Hazelton Monitoring Station in the past three years were used as background concentrations (4.9 ppm for the one-hour CO and 3.0 ppm for the eight-hour CO). The "background" concentrations are then added to the model results for future with and without the proposed project conditions.

In order to determine the proposed project's impact on the local air quality, the CO levels were modeled at six intersections in the project area for the existing and future scenarios. These intersections are those that the project will have the most affect on traffic volumes. The CALINE4 model printouts are included in Appendix E. Table 4.2.I. lists the CO concentrations from existing (2006) traffic. None of the intersections currently have CO concentrations that exceed federal or State standards.

Table 4.2.J compares the CO concentrations from 2006 traffic with all approved operational projects in the vicinity of this project with CO concentrations from additional traffic related to the proposed project. Table 4.2.K compares CO concentrations without and with the project in 2035. As shown in Tables 4.2.J and 4.2.K, none of the six intersections analyzed would exceed either the one-hour or the eight-hour CO concentration federal and State standards. Table 4.2.J shows that in 2006, the proposed project would contribute at most a 2.0 ppm increase to the one-hour and a 1.4 ppm increase to the eight-hour CO concentrations at these intersections. Table 4.2.K shows that in 2035, the proposed project would contribute at most a 0.2 ppm increase to the one-hour and a 0.2 ppm increase to the eight-hour CO concentrations at these intersections. The proposed project would not have a significant impact on local air quality for CO, and no mitigation measures would be required.

Table 4.2.I: Existing (2006) CO Concentrations[1]

Intersection	Receptor Distance to Road Centerline (Meters)	Existing One-Hour CO Concentration (ppm)	Existing Eight-Hour CO Concentration (ppm)	Exceed State Standards?	
				1-HR	8-HR
Airport Way/Sperry Road	14	7	3.9	No	No
	14	6.9	3.9	No	No
	14	6.9	3.9	No	No
	14	6.9	3.9	No	No
Quantas Lane/Arch Airport Road	21	7	3.9	No	No
	19	6.9	3.9	No	No
	19	6.9	3.9	No	No
	12	6.8	3.8	No	No
Airport Way/Performance Drive	17	6.7	3.7	No	No
	17	6.7	3.7	No	No
	17	6.7	3.7	No	No
	15	6.7	3.7	No	No
Ash Street/French Camp Road	8	7	3.9	No	No
	8	6.9	3.9	No	No
	8	6.9	3.9	No	No
	8	6.9	3.9	No	No
Airport Way/French Camp Road	14	7.9	4.6	No	No
	14	7.9	4.6	No	No
	14	7.7	4.4	No	No
	14	7.6	4.4	No	No
French Camp Road/Sperry Road	24	5.8	3.1	No	No
	22	5.8	3.1	No	No
	22	5.8	3.1	No	No
	22	5.8	3.1	No	No

Source: LSA Associates, Inc., February 2006

[1] Includes ambient one-hour concentration of 4.9 ppm and ambient eight-hour concentration of 3.0 ppm, measured at the Stockton-Hazelton air quality monitoring station.

Table 4.2.J: 2006 Other Approved Projects Without and With Project CO Concentrations[1]

Intersection	Receptor Distance to Road Centerline (Meters)	Project-Related Increase 1-hr/8-hr (ppm)	Without/With Project One-Hour CO Concentration (ppm)	Without/With Project Eight-Hour CO Concentration (ppm)	Exceed State Standards?[2]	
					1-HR	8-HR
Airport Way/Sperry Road	14/21	0.9/0.7	6.1/7.0	3.8/4.5	No	No
	14/19	0.7/0.5	6.1/6.8	3.8/4.3	No	No
	14/17	0.7/0.5	6.0/6.7	3.8/4.3	No	No
	14/17	0.6/0.4	6.0/6.6	3.8/4.2	No	No
Quantas Lane/Arch Airport Road	21/21	0.8/0.6	6.1/6.9	3.8/4.4	No	No
	19/21	0.8/0.5	6.0/6.8	3.8/4.3	No	No
	19/21	0.8/0.5	6.0/6.8	3.8/4.3	No	No
	39069	0.8/0.6	5.9/6.7	3.7/4.3	No	No
Airport Way/Performance Drive	17/17	0.7/0.5	5.8/6.5	3.6/4.1	No	No
	17/17	0.6/0.5	5.8/6.4	3.6/4.1	No	No
	17/17	0.6/0.5	5.8/6.4	3.6/4.1	No	No
	15/15	0.6/0.5	5.8/6.4	3.6/4.1	No	No
Ash Street/French Camp Road	38945	2.0/1.4	6.1/8.1	3.8/5.2	No	No
	38942	1.5/1.0	6.0/7.5	3.8/4.8	No	No
	38942	1.5/1.0	6.0/7.5	3.8/4.8	No	No
	38942	1.4/1.0	6.0/7.4	3.8/4.8	No	No
Airport Way/French Camp Road	14/14	1.8/1.2	7.0/8.8	4.5/5.7	No	No
	14/14	1.5/1.0	7.0/8.5	4.5/5.5	No	No
	14/14	1.5/1.1	6.8/8.3	4.3/5.4	No	No
	14/14	1.5/1.0	6.7/8.2	4.3/5.3	No	No
French Camp Road/Sperry Road	24/24	0.0/0.0	4.9/4.9	3.0/3.0	No	No
	24/24	0.0/0.0	4.9/4.9	3.0/3.0	No	No
	22/22	0.0/0.0	4.9/4.9	3.0/3.0	No	No
	22/22	0.0/0.0	4.9/4.9	3.0/3.0	No	No

Source: LSA Associates, Inc., September 2006

1 Includes ambient one-hour concentration of 4.9 ppm and ambient eight-hour concentration of 3.0 ppm, measured at the Stockton-Hazelton air quality monitoring station.

2 The one-hour CO State standard is 20 ppm, and the eight-hour CO standard is 9 ppm.

Table 4.2.K: 2035 Without and With Project CO Concentrations[1]

Intersection	Receptor Distance to Road Centerline (Meters)	Project-Related Increase 1-hr/8-hr (ppm)	Without/With Project One-Hour CO Concentration (ppm)	Without/With Project Eight-Hour CO Concentration (ppm)	Exceed State Standards?[2]	
					1-HR	8-HR
Airport Way/Sperry Road	24/24	0.1/0.1	5.5/5.6	3.4/3.5	No	No
	24/24	0.1/0.1	5.5/5.6	3.4/3.5	No	No
	24/24	0.1/0.1	5.5/5.6	3.4/3.5	No	No
	24/24	0.1/0.1	5.5/5.6	3.4/3.5	No	No
Quantas Lane/Arch Airport Road	28/28	0.2/0.2	5.5/5.7	3.4/3.6	No	No
	26/26	0.1/0.1	5.5/5.6	3.4/3.5	No	No
	24/24	0.1/0.1	5.5/5.6	3.4/3.5	No	No
	21/21	0.1/0.0	5.4/5.5	3.4/3.4	No	No
Airport Way/Performance Drive	24/24	0.0/0.0	5.4/5.4	3.4/3.4	No	No
	23/23	0.1/0.1	5.3/5.4	3.3/3.4	No	No
	17/17	0.1/0.1	5.3/5.4	3.3/3.4	No	No
	17/17	0.0/0.0	5.3/5.3	3.3/3.3	No	No
Ash Street/French Camp Road	21/21	0.2/0.1	5.3/5.5	3.3/3.4	No	No
	21/21	0.1/0.1	5.3/5.4	3.3/3.4	No	No
	20/20	0.1/0.1	5.3/5.4	3.3/3.4	No	No
	20/20	0.1/0.1	5.3/5.4	3.3/3.4	No	No
Airport Way/French Camp Road	26/28	0.1/0.1	5.5/5.6	3.4/3.5	No	No
	24/26	0.1/0.1	5.5/5.6	3.4/3.5	No	No
	22/24	0.2/0.1	5.4/5.6	3.4/3.5	No	No
	14/22	0.2/0.1	5.4/5.6	3.4/3.5	No	No
French Camp Road/Sperry Road	24/24	0.0/0.0	5.6/5.6	3.5/3.5	No	No
	24/24	0.1/0.1	5.5/5.6	3.4/3.5	No	No
	22/22	0.0/0.0	5.5/5.5	3.4/3.4	No	No
	22/22	0.0/0.0	5.5/5.5	3.4/3.4	No	No

Source: LSA Associates, Inc., September 2006

1 Includes ambient one-hour concentration of 4.9 ppm and ambient eight-hour concentration of 3.0 ppm, measured at the Stockton-Hazelton air quality monitoring station.

2 The one-hour CO State standard is 20 ppm, and the eight-hour CO standard is 9 ppm.

Impact AIR-3: The project is not expected to create hazardous air pollutant emissions.

Light industrial land uses are proposed within the project limits at a distance of approximately 600 feet from the proposed residential developments. The operations expected to occur within these facility will not emit any HAPs in any significant quantity other than diesel exhaust. While there will be other toxic substances in use on site, compliance with State and federal handling regulations will

bring emissions to below a level of significance. In addition to the proposed industrial facilities there is an existing Union Pacific Railroad track located adjacent to the proposed residential uses.

As the proposed project is currently in the planning stage the types of facilities to be located within the industrial areas are unknown. Therefore, the diesel health risk assessment was based on a large industrial facility that would generate up to 5,300 diesel truck trips per day. There is little rail activity on the rail line in the vicinity of the industrial uses. UPRR was contacted to determine the rail frequency usage on the rail lines within the project. According to UPRR representative Jim Smith, the rail line usage fluctuates and actual usage is not an indicator of potential conditions. Therefore, UPRR indicated that the worst case usage frequency should be used to assess health risks. To evaluate the worst case conditions it is estimated that up to 84 trains would pass in a one-week period, an average of 12 trains per day.

The ARB model, EMFAC2002, was used for emissions factors for trucks both idling and operating to determine the total emissions of diesel exhaust particulate from the project. Emissions factors in the EPA's Technical Highlights: Emission Factors for Locomotives (EPA420-F-97-051, December 1997) were used as a source of train engine emission rates. Refer to Appendix E for details of the analysis.

Carcinogenic and Chronic Project-Related Emissions Impacts. There would be long-term operational emissions from the diesel-powered trucks delivering and removing supplies and materials from the project site and diesel emissions from rail activities on the Union Pacific Railroad track. The primary health risk from heavy-duty truck and train emissions is diesel particulate exhaust. The results of the analysis are shown in Table N. Even with the conservative modeling technique used (concentrating all truck exhaust to emit from the center of the project area), the nearest residences to the would be exposed to an unmitigated inhalation cancer risk of no more than 1.6 in 1 million, less than the threshold of 10 in one million (see Table 4.2.L). The HI would be 0.002, less than the threshold of 1.0. No significant health risk would occur, and no mitigation is necessary.

Table 4.2.L: Project-Related Health Risk Assessment Results

	Cancer Risk (number in 1 million)	**Chronic Hazard Index**
Nearest Residences	1.6	0.005
Threshold	**10**	**1**

Source: LSA Associates, Inc., February 2006

Impact AIR-4: The project is not expected to create air pollutants that have short-term acute health effects.

No activity related to the project will emit any toxic air pollutants that have short-term acute health effects. There will be no machinery within to emit any toxic air pollutants that have short-term acute health effects. Therefore, the potential for short-term acute exposure to project-related toxic emissions will be less than significant.

In addition, the proposed project is not expected to result in any accidental release of acutely hazardous air emissions. Compliance with the City and SJVAPCD rules and regulations will ensure that no significant accidental release/acutely hazardous air emissions impacts will occur. No mitigation measures are recommended.

Impact AIR-5: The project is consistent with Air Quality Attainment Plan (AQAP).

A consistency analysis determination plays an essential role in local agency project review by linking local planning and unique individual projects to the AQAP in the following ways. It fulfills the CEQA goal of fully informing local agency decision makers of the environmental costs of the project under consideration at a stage early enough to ensure that air quality concerns are fully addressed. It also provides the local agency with ongoing information, assuring local decision makers that they are making real contributions to clean air goals defined in the most current AQAP.

An AQAP describes air pollution control strategies to be taken by counties or regions classified as nonattainment areas. Currently, the project region is in nonattainment for ozone, PM_{10}, and $PM_{2.5}$. The AQAP's main purpose is to bring the area into compliance with the requirements of federal and State air quality standards. Implementation of the proposed project would contribute to the delay of the attainment in the region.

Although the proposed project would have originally required an amendment to be consistent with the City's 1990 General Plan, the recently adopted 2035 General Plan includes the project site as an area designated as "Village". Since the City of Stockton General Plan has been considered in the preparation of the Air Quality 2007 Ozone Plan for the San Joaquin Valley, the project is considered to be consistent with the AQAP. Consequently, this impact is considered less than significant and no mitigation measures are required.

Potentially Significant Impacts

Impact AIR-6: The project could create short-term fugitive dust and exhaust-related impacts.

Air pollutant emissions associated with the project would occur over the short-term from construction activities, such as fugitive dust from site preparation and grading and emissions from equipment exhaust. The SJVAPCD's approach to CEQA analyses of PM_{10} impacts is to require implementation of effective and comprehensive control measures rather than detailed quantification of emissions. Because construction activities will incorporate all feasible mitigation measures, project-related construction emissions will be less than significant. Compliance with Regulation VIII and implementation of applicable control measures, indicated in Tables 4.2.F and 4.2.G, will reduce PM_{10} impacts to a level considered less than significant. No additional measures are recommended.

Mitigation Measure AIR-1a: The SJVAPCD Regulation VIII, Control Measures for Construction Emissions of PM10 (as shown in Tables 4.2.F, 4.2.G and 4.2.H), are required to be implemented at all construction sites. Compliance with the above Regulation VIII requirements would lessen the fugitive dust impact during construction to a level considered less than significant.

Mitigation Measure AIR-1b: Architectural coatings and asphalt paving conducted on site shall adhere to rules and regulations stated in the SJVAPCD Rulebook. Compliance with Rule 4601, Architectural Coatings, and Rule 4641, Asphalt Paving, would lessen impacts from architectural coatings and asphalt paving to a level considered less than significant.

The above mitigation measures will reduce construction impacts to the extent feasible and comply with SJVAPCD requirements for reducing construction equipment exhaust. However, the mitigation measures do not completely mitigate for the project's air quality impacts. The remaining impacts, discussed below, would be adverse and unavoidable.

Impact AIR-7: The project would create long-term exhaust related impacts.

Long-term air emissions impacts are those associated with project-related stationary and mobile sources. The proposed project, consisting of mixed-use (residential, commercial, and industrial) uses, is only a newly added part of a larger overall area development. Because the larger overall development was approved, this analysis only shows the incremental increase. The stationary source emissions from this land use would come from its consumption of natural gas and electricity. The traffic study prepared for this project (Fehr & Peers, August 2006) predicted vehicular trips associated with the proposed project that would contribute to the congestion at intersections and along roadway segments in the project vicinity. As indicated in the traffic analysis, the proposed project would generate a total of 49,430 daily vehicular trips. Using the ARB model URBEMIS2002 (version 8.7.0), emissions associated with project-related vehicular trips and stationary sources were calculated and are included in Table 4.2.M. As shown, the project's emissions would exceed the SJVAPCD annual emissions thresholds. Therefore, the proposed project's impact is ***significant***, and mitigation measures are required. The URBEMIS2002 (version 8.7.0) model run is included in Appendix E.

Table 4.2.M: Tidewater Crossing Project Operational Emissions

SOURCE	POLLUTANTS (TONS/YEAR)	
	ROC	**NO_X**
Proposed Emissions		
Stationary sources:	79.03	8.94
Vehicular traffic:	97.98	129.84
Proposed Subtotal	**177.02**	**138.78**
SJVAPCD Threshold	10	10
Exceeds Threshold?	Yes	Yes
Significant Impact?	Yes	Yes

Source: LSA Associates, Inc., September 2006.

Despite great progress in air quality improvement, approximately 146 million people nationwide lived in counties with pollution levels above the NAAQS in 2002. Out of the 230 nonattainment areas identified during the 1990 Clean Air Act Amendment designation process, 124 areas remain as

nonattainment today. In these nonattainment areas, however, the severity of air pollution episodes has decreased.

As shown in Table 4.2.B, long-term exposure to elevated levels of criteria pollutants could result in potential health effects. However, as stated in the Thresholds of Significance, emissions thresholds established by the air district are used to manage total regional emissions within an air basin based on the air basin attainment status for criteria pollutants. These emissions thresholds were established for individual projects that would contribute to regional emissions and pollutant concentrations that may affect or delay the projected attainment target year for certain criteria pollutants. This is a Master Development Plan project, much larger than an individual project, and has the potential to result in large emissions.

Due to the conservative nature of the thresholds and the basin wide context of an individual project's emissions, there is no direct correlation of a single project to localized health effects. One individual project having emissions exceeding a threshold does not necessarily result in adverse health effects for residents in the project vicinity. This is especially true when the criteria pollutants exceeding thresholds are those with regional effects, such as ozone precursors like ROG and NO_X.

Project Operations Related Impacts

The project would result in total (vehicular and stationary) daily emissions exceeding the annual emissions thresholds established by the SJVAPCD. No feasible mitigation measures would reduce the impacts to less than significant. However, the proposed project will be required to comply with Title 24 of the California Code of Regulations established by the Energy Commission regarding energy conservation standards. The project applicant shall incorporate the following in building plans:

1. Solar or low-emissions water heaters shall be used with combined space/water heater units.
2. Double-paned glass or window treatment for energy conservation shall be used in all exterior windows.
3. Buildings shall be oriented north/south where feasible.

Implementation of Mitigation Measures AIR-1a and AIR1b, as well as GCC-1 through GCC-7 will help to reduce the project's air quality impacts. Even with the implementation of these mitigation measures, this impact will remain significant and unavoidable.

Cumulative Impacts

The traffic study included vehicular trips from all present and future projects in the project vicinity. Therefore, CO hot spot concentrations calculated at these intersections include the cumulative traffic effect. Based on Tables 4.2.J and 4.2.K, no significant cumulative CO impacts would occur.

Cumulative Projects. Past development in the county and throughout the San Joaquin Valley has resulted, in combination with meteorological conditions and transport of pollutants from other air basins, in substantial to severe air quality problems in the San Joaquin Valley Air Basin (SJVAB). As above, San Joaquin County is in nonattainment for ozone and particulate matter 10 microns or less in

diameter (PM10). As a result, the San Joaquin Valley Air Pollution Control District (SJVAPCD) has established a significance threshold of 10 tons per year (tpy) for oxides of nitrogen (NOX) and reactive organic gases (ROG), ozone precursors, during construction. For PM10, SJVAPCD requires implementation of effective and comprehensive control measures and compliance with applicable rules and regulations rather than detailed quantification of construction emissions. Construction of the project would contribute cumulatively to the local and regional air pollutants, together with other projects under construction. The project would result in significant operational air quality impacts. Thus, it is anticipated that these additional emissions would result in significant cumulative air quality impacts.

Construction Impacts. A number of individual projects in the City will be under construction simultaneously with the proposed project (a listing of planned and approved development projects in the City of Stockton is presented in Table 3.1.A). Depending on construction schedules and actual implementation of projects in the area, generation of fugitive dust and pollutant emissions during construction may result in substantial short-term increases in air pollutants. However, all construction projects in the San Joaquin Valley are required to meet the requirements of Regulation VIII. The SJVAPCD has determined compliance with Regulation VIII reduces construction related air impacts to a less than significant level. Additionally, the SJVAPCD has included construction emissions as part of the Air Quality Attainment Plan. Therefore construction of this project and cumulative projects in the region would not impede the region's attainment of air quality standards.

Long-Term Operational Impacts. The incremental daily emission increase associated with project operational trip generation is identified in the above section for reactive organic gases (ROG) and nitrogen oxides (NO_x) (two precursors of ozone) and coarse particulate matter (PM_{10}). The SJVAPCD has established thresholds of significance for ozone precursors and fugitive dust of 10 pounds per day. The project regional emissions are based on the additional vehicle trips generated by the proposed project. The emissions associated with the project would be considered significant.

Long-term emissions from related projects, considered in light of the nonattainment status of the air basin, would be cumulatively significant. The proposed project would result in significant and unavoidable long-term regional (operational)-related air quality impacts and would exceed the SJVAPCD thresholds. It would, therefore, contribute considerably to the cumulative air quality impact. Related projects would contribute to a similar degree. Project-related air emissions, cumulative development air emissions, and air emissions from other reasonably foreseeable future projects in the SJVAB as a whole would continue to contribute to long-term increases in emissions that would exacerbate existing and projected nonattainment conditions. Thus, the proposed project would contribute considerably to a significant and unavoidable cumulative air quality impact. With respect to mitigation, the DEIR includes all available feasible mitigation to reduce the proposed project's contribution to cumulative air quality impacts. However, while mitigation measures would substantially reduce air emissions from the proposed project, they are not sufficient to reduce the proposed project's cumulative contribution to below a level that is not considerable. Therefore, the proposed project would contribute considerably to cumulatively significant and unavoidable air quality impacts associated with ROG and NO_X during long-term operation of the proposed project.

Toxic Air Contaminants. Given that compliance with applicable rules and regulations would be required for the control of stationary-source emissions of toxic air contaminants (TACs), both on- and off the site, the proposed project's contribution to long-term cumulative increases in stationary-source

TAC concentrations would be considered minor. Construction of proposed project would result in temporary, short-term diesel exhaust emissions from on-site heavy duty equipment. Construction of the proposed project would result in the generation of diesel particulate matter (PM) emissions from the use of off-road diesel equipment required for site grading and excavation, paving, and other construction-related activities. The use of mobilized equipment would be temporary and there are few sensitive receptors located immediately adjacent to the construction site.

Implementation of Mitigation Measures GCC-8 and GCC-9 will help to reduce vehicle miles traveled, and therefore reduce cumulative air quality impacts. Even with the implementation of this mitigation measure, this impact will remain significant and unavoidable.

4.2.5 Level Of Significance After Mitigation

Compliance with SJVAPCD regulations will assist in reducing the project level and cumulative project impacts on air quality although impacts cannot be completely mitigated to less than significant. Additionally, the project land use is found to be consistent with the recently adopted 2025 General Plan and is, therefore, also consistent with the Air Quality 2007 Ozone Plan. As discussed above, the project will have an air quality impact that is significant and unavoidable.

4.15 GLOBAL CLIMATE CHANGE

In June of 2008, the Office of Planning and Research (OPR) issued a technical advisory concerning CEQA and climate change. The technical advisory is provided by the OPR as a service to CEQA practitioners. OPR publishes technical guidance from time to time on issues that broadly affect the practice of CEQA and land use planning. The following section has been prepared in accordance with this technical advisory.

4.15.1 Existing Setting

Global climate change is happening not because of natural processes, or gradually over thousands of years. Rather, temperatures are rising quickly and dramatically, climbing with the concentrations of greenhouse pollutants that are released into the Earth's atmosphere. Global climate change is a result of human activities.

The effects of global climate change are already present - disappearing glaciers, shrinking snow pack, droughts, coastal erosion, bigger and more regular storms, and more extreme heat waves. Since 2006, eleven of the past twelve years are on the list of the twelve warmest years since reliable record keeping began in 1850. Arctic sea ice declined in 2006 by the largest amount ever, losing an area roughly the size of Texas and California combined.

Greenhouse gases (GHG), including carbon dioxide, methane, water vapor, nitrous oxide, and other atmospheric gases, play an important role in regulating the surface temperature of the Earth. The Earth's atmosphere acts like a greenhouse, warming the planet similar to a greenhouse warming the air inside its glass walls. GHGs allow light to penetrate, and prevent heat from escaping. GHGs are transparent to solar radiation and are effective in absorbing infrared radiation. As a result, radiation that otherwise would reflect back into space is retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect.

The increased consumption of fossil fuels (wood, coal, gasoline, etc.) has substantially increased atmospheric levels of greenhouse gases. As atmospheric concentrations of greenhouse gases rise, so do temperatures. Over time this rise in temperatures would result in climate change. Theories concerning climate change and global warming existed as early as the late 1800s. By the late 1900s that understanding of the earth's atmosphere had advanced to the point where many climate scientists began to accept that the earth's climate is changing. Many climate scientists agree that some warming has occurred over the past century and will continue through this century.

Common Greenhouse Gases:

Carbon dioxide (CO_2) is an odorless, colorless gas, which has both natural and anthropogenic sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources of carbon dioxide are from burning coal, oil, natural gas, and wood. Concentrations of carbon dioxide were 379 parts per million (ppm) in 2005, which is an increase of 1.4 ppm per year since 1960. In California, the most common GHG is CO_2, which constitutes approximately 84 percent of all GHG emissions. CO_2 emissions in California are mainly associated with in-state fossil fuel combustion and with fossil fuel combustion in out-of-state power plants

supplying electricity to California. Other activities that produce CO_2 emissions include mineral production, waste combustion, and land use changes that reduce vegetation.

Methane (CH_4) is a flammable gas and is the main component of natural gas. When one molecule of methane is burned in the presence of oxygen, one molecule of carbon dioxide and two molecules of water are released. There are no adverse health effects from methane. A natural source of methane is from the anaerobic decay of organic matter. Geologic deposits, known as natural gas fields, also contain methane, which is extracted for fuel. Other sources are from landfills, fermentation of manure, and cattle.

Water vapor (H_2O) is the most abundant and important GHG. Water vapor maintains a climate necessary for life. The main sources of water vapor are evaporation, sublimation (change from solid to gas of ice and snow), and transpiration from plants.

Nitrous oxide (N_2O) is a colorless greenhouse gas produced by microbial processes in soil and water, including reactions in fertilizer containing nitrogen. Anthropogenic sources include vehicle emissions, fossil-fuel fired power plants, nylon production, nitric acid production, etc. Nitrous oxide is produced by microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load.

Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric ozone; therefore, their production was stopped as required by the Montreal Protocol in 1987.

Hydrofluorocarbons (HFCs) are synthetic man-made chemicals that are used as a substitute for CFCs for automobile air conditioners and refrigerants.

Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Aerosols can also affect cloud formation. Sulfate aerosols are emitted when fuel-containing sulfur is burned. Black carbon (or soot) is emitted during bio mass burning or incomplete combustion of fossil fuels. Particulate matter regulation has been lowering aerosol concentrations in the United States; however, global concentrations are likely increasing.

Sulfur hexafluoride (SF6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It has the highest GWP of any gas evaluated, 23,900. Concentrations in the 1990s were about 4 ppt (EPA 2006). Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Individual GHGs have varying warming potentials and atmospheric lifetimes. The potential for a GHG to hold heat in the atmosphere is considered its global warming potential (GWP). Carbon Dioxide (CO_2) is the reference gas for measuring GWP. CO_2 has a GWP of one. Methane (CH_4) is a more potent GHG than CO_2. Each ton of CH_4 has 21 times the effect on global warming as one ton of CO_2. Therefore, CH_4 has a GWP of 21. Multiplying the GWP for each non-CO_2 GHG provides a standardized carbon dioxide equivalent (CO_2 e), which enables a project's combined global warming potential to be expressed. Table 4.15.A presents the GWPs and estimated lifetimes of common GHGs.

Table 4.15.A: Green House Gases Lifetimes

Greenhouse Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100 Year Time Horizon)
Carbon Dioxide (Co2)	50-200	1
Methane (Ch4)	12 ± 3	21
Nitrous Oxide (N2o)	120	310

Source: Intergovernmental Panel on Climate Change, 2001

Greenhouse gases in the atmosphere provide hospitable surface temperatures necessary to sustain life on earth. Human activities, however, such as the burning of fossil fuels, have contributed increasing concentrations of heat-trapping GHGs into the atmosphere. Over the past 200 years the global concentration of CO_2 has substantially increased, and it is widely accepted that anthropogenic sources of GHGs are contributing to global climate change.

The specific climatic mechanisms, duration, and severity of effects, however, are not fully understood. A variety of mechanisms and complex feedback loops interact to establish the average global temperature. A change in ocean temperature, for example, may alter circulating ocean currents, which may change ocean temperatures (as seen in el Niño and la Niña events).

According to the National Oceanic and Atmospheric Administration and the National Aeronautics and Space Administration, the Earth's average surface temperature has increased by about 1.2 to 1.4 Degrees Fahrenheit since 1900. The United Nations Intergovernmental Panel on Climate Change (IPCC) predicts that global mean temperature from 1990 to 2100 is expected to rise by 1.1°C to 6.4°C (IPCC 2007).

California is one of the largest contributors of GHGs in the U.S., and has been listed as the sixteenth largest emitter in the world. Transportation activities contribute about 40 percent of the state's total GHG emissions, and electricity generation, the second largest source in the state, contributes over 20 percent of our GHG emissions. Other sources of GHG emissions include manufacturing, agriculture, and other activities.

Worldwide, U.S. & California Emissions of GHG

In 2004, total worldwide GHG emissions were estimated to be 20,135 Tg CO_2 Eq., excluding emissions/removals caused by removal of vegetation and forestry. (Note that sinks, or GHG removal processes, plays an important role in the GHG inventory as forest and other vegetative land uses such as agriculture and rain forest absorb carbon).

In 2004, GHG emissions in the U.S. were 7,074.4 Tg CO2 Eq. In 2005, total U.S. GHG emissions were 7,260.4 Tg CO2 Eq., a 16.3 percent increase from 1990 emissions, while U.S. gross domestic product has increased by 55 percent over the same period. Emissions rose from 2004 to 2005, increasing by 0.8 percent. The main causes of the increase were: (1) strong economic growth in 2005, leading to increased demand for electricity; and (2) an increase in the demand for electricity due to warmer summer conditions. However, a decrease in demand for fuels due to warmer winter conditions and higher fuel prices moderated the increase in emissions.

California is a substantial contributor of GHG emissions as it is the second largest contributor in the U.S. and the sixteenth largest in the world. In 2004, California produced 492 Tg CO_2 Eq., which is approximately seven percent of the total nationwide GHG emissions. On the other hand, among the states, California has the fourth lowest per capita rate of GHG emissions, due to its temperate climate and to its enhanced energy regulations. The major source of GHG in California is transportation, contributing 41 percent of the State's total GHG emissions. Electricity generation is the second largest source, contributing 22 percent of the State's GHG emissions.

A study of California's greenhouse gas emissions from 1990 to 2004 concluded emissions from burning gasoline and jet fuel topped other sources, making up 40.7 percent of carbon dioxide pollution. Electricity generation accounted for 22.2 percent, industrial sources for 20.5 percent and agriculture and forestry for 8.3 percent. Other sources rounded out the equation at 8.3 percent. Carbon dioxide made up 84 percent of the state's total greenhouse gas emissions.

Effects of Global Climate Change in California

The impacts from global warming are widespread and potentially devastating. The impacts are immediate, and they will continue to grow. As stated in a report to the Governor in March 2006,

> Today's climate variability and weather extremes already pose significant risks to California's citizens, economy, and environment. They reveal the State's vulnerability and existing challenges in dealing with the vagaries of climate. Continued climate changes, and the risk of abrupt or surprising shifts in climate, will further challenge the state's ability to cope with climate-related stresses.

The Earth's average surface temperature will increase between 2.5° and 10.4°F (1.4°-5.8°C) between 1990 and 2100 if no major efforts are undertaken to reduce the emissions of greenhouse gases (the "business-as-usual" scenario). This is significantly higher than what the Intergovernmental Panel on Climate Change (IPCC) Panel predicted in 1995 (1.8°-6.3°F, or 1.0°-3.5°C), mostly because scientists expect a reduced cooling effect from tiny particles (aerosols) in the atmosphere, secondary impacts to the natural environmental in California may include:

a. **Eroding Coastlines:** Rising sea levels along the California coastline, particularly in San Francisco and the San Joaquin Delta. During the past century, sea levels along California's coast have risen about seven inches. If global warming emissions continue unabated, sea level is expected to rise an additional 22 to 35 inches by the end of the century, inundating coastal areas with salt water, accelerating coastal erosion, threatening vital levees and inland water systems,

and disrupting wetlands and natural habitats. In particular, saltwater intrusion would threaten the quality and reliability of the state's major fresh water supply that is pumped from the southern edge of the Sacramento/San Joaquin River Delta into the system of aqueducts which carry it to Southern California.

b. **Severe Heat:** Extreme-heat conditions, such as heat waves and very high temperatures, which could last longer and become more frequent. As temperatures rise from global warming, the frequency and severity of heat waves will grow—as will the potential for bad air days. The risk of illness and death due to dehydration, heart attack, and stroke, will increase as a result. Those most likely to suffer are children, the elderly, and other vulnerable populations.

c. **Air Quality:** An increase in heat-related human deaths, infectious diseases, and a higher risk of respiratory problems caused deteriorating air quality. Global warming increases the frequency, duration, and intensity of conditions conducive to the formation of smog. Most vulnerable are the elderly, those whose health is already compromised (such as children with asthma).

d. **Losses to the Sierra Snow Pack:** Reduced snowpack and stream flow in the Sierra Nevada Mountains, affecting winter recreation and water supplies. Higher temperatures diminish snowfall and cause the snow that does fall to melt earlier. This reduces the amount of water stored in the Sierra snow pack, which accounts for approximately half of the surface water stored in the State. Reductions and early melting of the snow pack will aggravate the State's already overstretched water resources and cause increased flooding.

e. **Severity of Storms:** Potential increase in the severity of winter storms, which can affecting peak stream flows and increase flooding along waterways and low line area. These heavy runoffs of remove natural minerals which are important to local ecosystems. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

f. **Damage to Agriculture:** Changes in growing season conditions that could affect California agriculture, causing variations in crop quality and yield. By reducing the State's natural water storage capacity, raising temperatures, increasing salt water intrusion in agricultural regions, causing flooding, and increasing the risk of pest infestations and other calamities, global warming poses a serious threat to California's $68 billion agricultural industry. In fact, during the period 1951 to 2000, the growing season lengthened by about a day per decade, this increased crops' exposure to heat ("degree days"). Such changes threaten many of the State's most valuable crops, including stone fruits, grapes, tomatoes and lettuce. Global warming also threatens livestock. The 2006 summer heat wave killed thousands of dairy cows in California's Central Valley and caused a decrease in milk production in surviving animals.

g. **Habitat Modification and Destruction:** Changes in distribution of plant and wildlife species due to changes in temperature, competition from colonizing species, change in hydrologic cycles, and other climate-related effects. While it is difficult to generalize what impacts the changing climate has on the State's varied ecosystems, it already is clear that rising temperatures, altered water supplies, and other environmental variations make some habitats less hospitable for sensitive plants and animals. For example, some local populations of the threatened checkerspot butterfly already have disappeared due to changes in the weather (Stanford Report, May 14, 2004). A similar fate could await other species, such as trout and salmon, which favor cold water and are extremely sensitive to slight changes in temperature. Further, marine algae blooms, associated in part with increases in ocean temperatures, have

proliferated in the past eight years and may help explain the alarming increase in beachings and mass die-offs of whales, dolphins, and other ocean mammals that the federal government has documented over the last quarter century. In California alone, more than 14,000 seals, sea lions and dolphins have landed sick or dead along the shoreline in the last decade.

h. **Higher Risk of Wildfires:** Pest infestation and increasing temperatures make forests more vulnerable to fires. Wildfires are a major environmental hazard that have historically cost California more than $800 million each year and contribute to "bad air days" throughout the state. As global warming accelerates, so will these wildfires, and the damage to health and property that they cause. By century's end, the State may have as many as 55 percent more large wildfires.

i. **Increase Demand for Electricity:** Rising temperatures lead to increased demand for electricity and pressure on the State's supply system. During the summer of 2006 heat wave, power usage in Los Angeles rose so dramatically, that it caught power officials completely off guard.

j. **Financial Cost to Californians:** Apart from the potentially devastating impacts that climate change will have on California's natural resources, public health, and its economy, global warning already places a tremendous strain on the State finances. The State must pay for programs to re-build levees that protect agricultural lands against salt water infiltration; to study and respond to the impacts of a reduced Sierra snow pack on California's water supply; to protect wildlife and habitats from climate-related degradation; to respond to coastal erosion; to prepare for the increased risk of wildfires; to respond to the increased health risks associated with rising temperatures and declining air quality, and more.

These changes in California's climate and ecosystems are occurring at a time when California's population is expected to increase from 34 million to 59 million by the year 2040 (California Energy Commission 2005). As such, the numbers of people potentially affected by climate change as well as the amount of anthropogenic GHG emissions expected under a "business as usual" scenario are expected to increase. Similar changes as those noted above for California would also occur in other parts of the world with regional variations in resources affected and vulnerability to adverse side effects.

State-wide temperature increases due to fossil-fuel consumption are correlated to the severity of the natural environmental impacts as noted in Table 4.15.B.

4.15.2 Regulatory Setting

A variety of governmental agencies have initiated programs directed towards the regulatory environment. These include the United Nations Agreements, and recent California State Legislation and regulations that specifically address greenhouse gas emissions and global climate change. At the time of writing, there are no known applicable regulations setting ambient air quality emissions standards for greenhouse gases.

California Code of Regulations Title 24 Part 6: California's Energy Efficiency Standards for

Table 4.15.B: Climate Change Scenarios for California

IPCC Emissions Scenarios	Summary of Projected Global Warming Impacts (2070-2099, as compared to 1961-1990)	State-wide Temperature Rise
Higher Emissions: Rapid, fossil-fuel intensive growth	• 90% loss in Sierra snow pack • 22-30 inches of sea level rise • 3-4 times as many heatwave days in major urban centers • 2.5 times the number critically dry years • 4-6 times as many heat-related deaths in major urban centers • 20% increase in electricity demand • Increase in days meteorologically conducive to ozone formation	Higher Warming Range: 8-10.4 ºF
Medium-High Emissions: Primarily fossil-fuel dependent growth with some green technology	• 70- 80 % loss in Sierra snow pack • 14-22 inches of sea level rise • 2.5-4 times as many heatwave days in major urban centers • 2-6 times as many heat-related deaths for major urban centers • 75-85% increase in days meteorologically conducive to ozone formation • 2-2.5 times the number critically dry years • 11% increase in electricity demand • 30% decrease in forest yields (pine) • 55% increase in the expected risk of large wildfires	Medium Warming Range: 5.5-7.9 ºF
Lower Emissions: Shift to service & information economy with lots of green technology	• 30-60 % loss in Sierra snow pack • 6-14 inches of sea level rise • 2-2.5 times as many heatwave days in major urban centers • 2-3 times as many heat-related deaths for major urban centers • 25-35% increase in days meteorologically conducive to ozone formation • Up to 1-1.5 times the number critically dry years • 3-6 % increase in electricity demand • 7-14% decrease in forest yields (pine) • 10-35% increase in the risk of large wildfires	Lower Warming Range: 3.0-5.4 ºF

Source: Cayan, D., Luers, A., Hanemann, M., Franco, G. and Croes, B. 2006.

Residential and Nonresidential Buildings, were established in 1978 and are updated periodically to allow incorporation of new energy efficiency technologies and methods. The latest amendments require new homes to use half the energy they used a decade ago. Electricity production by fossil fuels results in GHG emissions. Energy efficient buildings require less electricity. Increased energy efficiency, therefore, results in decreased greenhouse gas emissions.

Assembly Bill 1493: In 2002, Governor Gray Davis signed Assembly Bill (AB) 1493. AB 1493 requires that the California Air Resources Board (ARB) develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by the ARB to be vehicles whose primary use is noncommercial personal transportation in the state."

Executive Order S-3-05: Executive Order S-3-05, which was signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. The order declares that increased temperatures could reduce the Sierra's snow pack, further exacerbating California air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80% below the 1990 level by 2050.

The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The Secretary will also submit biannual reports to the governor and state legislature describing: (1) progress made toward reaching the emission targets; (2) impacts of global warming on California's resources; and (3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of the CalEPA created a Climate Act Team (CAT) made up of members from various state agencies and commission. CAT released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

Assembly Bill 32, The California Climate Solutions Act of 2006: In September 2006, the Global Warming Solutions Act of 2006 (AB 32) was signed into law by Governor Arnold Schwarzenegger. It was the first legislation cutting global warming pollution in the United States. AB 32 requires that statewide greenhouse gas emissions are reduced to 1990 levels by the year 2020, this result in roughly a 25% reduction under business as usual estimates. This reduction will be accomplished through an enforceable statewide cap on greenhouse gas emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide greenhouse gas emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address greenhouse gas emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle greenhouse gas emissions under the authorization of AB 32.

AB 32 requires that the California Air Resources Board (CARB) adopt a quantified cap on greenhouse emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves reductions in greenhouse gas emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically

efficient manner and conditions to ensure that businesses and consumers are not unfairly affect by the reductions.

Senate Bill 1368: SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 requires the California Public Utilities Commission (PUC) to establish a greenhouse gas emission performance standard for base load generation from investor owned utilities by February 1, 2007. The California Energy Commission (CEC) has recently established a similar standard for local publicly owned utilities.

These standards cannot exceed the greenhouse gas emission rate from a base load combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the PUC and CEC.

4.15.3 Impact Significance Criteria

California has not adopted thresholds of significance for GHG emissions. As noted above, California has established a goal of reducing statewide GHG emissions to below 1990 levels. The climate theories, methodologies and threshold discussions are evolving at a rapid pace with new ideas constantly emerging with respect to global climate change as acknowledged by the Attorney General's office and the scientific community. Disagreements among professionals and the governmental institutions continue to dominate current events lending to the uncertainty for accurately forecasting the potential changes due to any individual project, decision or circumstance. Nevertheless, it is generally agreed that the application of mitigation measures directed towards reducing air quality degradation, energy savings and reduction on the dependency of vehicular usage will lessen the contribution of greenhouse gas emissions and ultimately slow down the consequences associated with global climate changes.

This EIR considers the GHG emissions from the project significant, or "cumulatively considerable," if implementation of the project would:

GCC-a: Substantially increase the total contribution of GHG emissions above current levels.

4.15.4 Impacts and Mitigation Measures

Impact GCC-1: GHG emissions associated with the implementation of the project could result in direct, indirect, and other project-related GHG emission that could substantially increase the total contribution of GHG emissions above current levels.

An analysis of the Tidewater Crossing's three most important GHG emissions (CO_2, CH_4, and N_2O) is presented below. The emissions of the individual gases were estimated and then converted to their CO_2 equivalents (CO_2e) using the individually determined global warming potential (GWP) of each gas. Thus, total GHG emissions = total CO_2 emissions + total CO_2e emissions form CH_4 and N_2O.

Implementation of the proposed Tidewater Crossing Master Development Plan would generate greenhouse gases through the construction and operation of new residential, commercial, and recreational uses. GHG emissions from the project would specifically arise from project construction and from sources associated with project operation, including direct sources such as motor vehicles, natural gas consumption, solid waste handling/treatment, and indirect sources such as electricity generation.

Average annual uses of electricity and natural gas for residential, industrial, and commercial land uses combined with vehicle trips per day are estimated for the proposed project in Table 4.15.C. Also shown in Table 4.15.C are the estimated project-related greenhouse gas emissions.

Table 4.15.C: Project Specific Analysis

Project Parameters	
	2009
Vehicles (trips/day)	45,930
Electricity used (MWh/year)	70,118
Natural Gas burned (cf/day)	629,000

	Emissions (tons per year)				%
Emission Source	**CO_2**	**CH_4**	**N_2O**	**CO_2e**[1]	
Vehicles	61,400	23.81	6.6	63,900	64%
Electricity Production	21,390	0.2349	0.1297	21,440	22%
Natural Gas Combustion	13,780	0.264	0.25	13,860	14%
Total Annual Emissions	96,600	24.31	6.98	99,200	100%

Based on the above emissions, the total CO_2e are calculated below and are expressed in metric tonne per year (Tg).

Emission Source	**Total CO_2e (Tg per year)**
Vehicles	0.0580
Electricity Production	0.0194
Natural Gas Combustion	0.0126
Total (CO_2e)	0.0900

1.1025	tons/metric tonne
1,000,000	metric tonne/Tg

Area GHG Usage			Year of data
State	492	Tg/year	2004

[1] CO_2e represents total emissions (equivalent) inclusive of a conversion factor for the Global Warming Potential.

Global warming potentials (GWPs) are used to compare the abilities of different GHGs to trap heat in the atmosphere. GWPs are based on the radiative efficiency (heat-absorbing ability) of each gas relative to that of CO_2, as well as the decay rate of each gas (the amount removed from the atmosphere over a given number of years) relative to that of CO_2. The GWP provides a construct for converting emissions of various gases into a common measure, which allows climate analysts to aggregate the radiative impacts of various GHGs into a uniform measure denominated in carbon or CO_2 equivalents.

The generally accepted authority on GWPs is the Intergovernmental Panel on Climate Change (IPCC). In 2001, the IPCC updated its estimates of GWPs for key GHGs. The table below lists the GWPs to calculate carbon dioxide equivalents (CO_2e.)

Global Warming Potential

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50-200	1
Methane	12 ± 3	21
Nitrous Oxide	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CF_4)	50,000	6,500
PFC: Hexafluoromethane (C_2F_6)	10,000	9,200
Sulfur Hexafluoride (SF_6)	3,200	23,900

Construction GHG Emissions

The project would emit greenhouse gases during construction of the project from the operation of construction equipment and from worker and building supply vendor vehicles. Because the specific size, location, and construction techniques and scheduling that will be utilized for development occurring within the project site is not currently known, the provision of precise emission estimates for development is not currently feasible and would require the City to speculate regarding future projects' potential environmental impacts. As such, the City is not required to engage in such speculation (CEQA Guidelines, Section 15145).

Operational GHG Emissions

The Tidewater Crossing Master Development Plan would generate GHG during its operation, principally from motor vehicle use, electricity and natural gas consumption, and solid waste disposal.

Motor Vehicle GHG Emissions: The largest source of GHG emissions associated with the proposed project would be on-and-off site motor vehicle use. CO_2 emissions, the primary greenhouse gas from mobile sources, are directly related to the quantity of fuel consumed. Two important determinants of transportation-related GHG emissions are vehicle miles traveled (VMT) and vehicle fuel efficiency. VMT in the California region has steadily increased over the last quarter-century.

However, while gross incremental global warming impacts related to vehicle or energy usage associated with a project can be quantified, gross calculations result in over counting of emissions because they do not take into account the fact that these emissions are not "new" in a global sense, even if they are newly attributable to a particular project. For example, to determine the increment of change in GHG emissions that is a result of a proposed project's vehicle trips, it would not be sufficient or accurate simply to quantify GHG emissions based on vehicle miles traveled, unless those vehicle miles can be compared to the vehicle miles that are already being traveled by persons who may move to an area that is proposed to be developed. There is not yet any methodology for determining the increment of change that should be attributed to a project, which might result in some drivers relocating from other areas. Further, these calculations are "today's current numbers" in that they do not take into account anticipated regulatory changes in vehicle efficiency standards which will reduce per vehicle GHG emissions over time.

CO_2 emissions during operation of the project at buildout were estimated using URBEMIS2007. Total CO_2 emissions related to the operation of motor vehicles would be 61,400 tons per year. Combustion of fossil fuels also generates CH_4 and N_2O.

In total, the proposed project would be anticipated to increase greenhouse gas emissions (CO_2e) attributable to mobile sources by 63,900 tons per year. Although motor vehicle energy consumption would increase under the proposed project, the transportation demand management plan and traffic improvements proposed for the project are designed to the improve energy efficiency of the transportation system by increasing use of more fuel-efficient public transit, carpools, and vanpools, and improving circulation system levels of service. Any reductions in traffic congestion realized through implementation of enhanced transit operations would also allow for more energy-efficient vehicular travel.

As an example of the effect of density and mixed use development on vehicle usage efficiency, researchers have determined that the most significant factor in determining travel and transportation outcomes is density. Controlling for other factors, the difference below low and high density metropolitan areas is more than 40 percent daily per capita VMT. Doubling of neighborhood density can be expected to result in approximately 15 percent reduction in both vehicle trips and VMT per capita. (See, 13 Ewing R. and R. Cervero, "Travel and the Built Environment," Transportation Research Record, Vo. 1780, pp. 87-114, 2001, cited in California Energy Commission, The Role of Land Use in Meeting California's Energy and Climate Change Goals, Final Staff Report, August 2007, CEC-600-2007-008-SF.) In sum, overall VMT decline as accessibility, density, and/or land-use mixing increase.

Included in the proposed project Master Development Plan are locations for two school sites. Of these sites, one is proposed as an elementary school, and is located in an area surrounded by residential and local park uses. It is anticipated that this school would be developed prior to the completion of Phase 4, dependent upon market demands. The other school would be developed as necessary to serve school district needs, and would be developed if and when the need arises within the district.

Electricity and Natural Gas GHG Emissions: The proposed project would use electricity for its residential, school, park and other components, which would contribute to GHG emissions. The generation of electricity through the combustion of fossil fuels typically yields CO_2 and, to a much smaller extent, CH_4 and N_2O. CO_2 emissions during operation of the project at buildout were estimated using URBEMIS2007. Total CO_2 emissions related to electricity and natural gas is 35,170 tons per year.

Solid Waste GHG Emissions: The Tidewater Crossing Master Development Plan includes a school, parks and residential homes. Solid waste generated by the project would contribute to State's GHG emissions. Treatment and disposal of municipal, industrial and other solid waste produces significant amounts of CH_4. In addition to CH_4, solid waste disposal sites also produce biogenic CO_2 and non-methane volatile organic compounds (NMVOCs) as well as smaller amounts of N_2O, nitrogen oxides (NO_x) and carbon monoxide (CO). CH_4 produced at solid waste sites contributes approximately 3 to 4 percent to the annual global anthropogenic GHG emissions (IPCC, 2001).

Waste management practices in California have changed significantly over the last decade. State mandated waste minimization and recycling/reuse policies have been introduced to reduce the amount of waste disposed of in landfills, and alternative waste management practices to solid waste disposal on land have been implemented to reduce the environmental impacts of waste management. Landfill gas recovery has become more common as a measure to reduce CH_4 emissions from solid waste disposal sites.

Other Greenhouse Gas Emissions: At present, there is a federal ban on CFCs; therefore, it is assumed the project will not generate emissions of CFCs. The project may emit a small amount of HFC emissions from leakage and service of refrigeration and air conditioning equipment and from disposal at the end of the life of the equipment. However, the details regarding refrigerants to be used in the project and the capacity of these are unknown at this time. PFCs and sulfur hexafluoride are typically used in industrial applications, none of which would be used by the project. Therefore, it is not anticipated that the project would contribute significant emissions of these additional greenhouse gases.

Project Findings

Based on project-related greenhouse gas emissions estimates, it is anticipated that the project emissions will contribute to the global inventory of greenhouse gas emissions. The quantitative analysis above indicates that the project's greenhouse gas emissions would not be considered substantial.

The design concept for the Tidewater Crossing Master Development Plan is based upon a set of guiding principles that are intended to result in successful residential neighborhoods and communities. These principles balance the requirements for vehicular access with pedestrian access, density with open space, and facilities with community needs. A well balanced land development plan ultimately reduces vehicular dependency, conserves energy, and reduces project emissions

ultimately contributing less or even reversing long-term climate changes and the consequences of global warming.

The issue of global climate change has become increasingly important in the CEQA process. As a result, the City of Stockton, recognizing the significant issue of global climate change and greenhouse gas emissions, has encouraged the development industry to consider implementing new programs such as the Build It Green program. Therefore, the City and the applicant have agreed that additional design features to further reduce the project's greenhouse gas emissions are appropriate.

To further ensure that the proposed development minimizes its contribution to global warming/climate change, the following applicable mitigation measures will be implemented:

Build It Green Program

Mitigation Measure GCC-1. The owners, developers and/or successors-in-interest (ODS) shall be subject to and comply with the City's adopted "Build It Green" Program, green point rated guidelines in effect at the time of construction. In the absence of a City adopted program, the ODS shall adhere to the guidelines of the California Green Builder Program, which is recognized by the California Energy Commission. Accordingly, the ODS shall adhere to the following standards:

a. Utilize building insulation that exceeds Title 24 standards. Utilize high-performance windows that employ advanced technologies, such as protective coatings and improved frames, to retain heat in during winter and prevent heat during summer.
b. Incorporate building techniques that ensure tight building construction and efficient duct systems. Require the use of efficient heating and cooling equipment for all residential. Commercial and industrial buildings.
c. Utilize efficient building products with standards the meet *EnergyStar*™ criteria. *EnergyStar*™ qualified homes may also be equipped with *EnergyStar*™ qualified products- lighting fixtures, compact fluorescent bulbs, ventilation fans, and appliances, such as refrigerators, dishwashers, and washing machines.
d. Require the use of reflective, *EnergyStar*™ cool roofs on all building structures in the project.
e. All commercial/industrial building structures within the project will comply with LEED-certified standards in effect at the time of construction. The ODS will not be required to participate in the formal LEED inspection and certification process, but will be required to demonstrate to the City the ability to be certified to LEED standards.

Emission Reduction/Air Quality

Mitigation Measure GCC-2. The owner, developer, and/or successor-in-interest (ODS) shall address the impacts from project-relate emissions through the implementation of the following measures:

a. File an application for each proposed tentative subdivision map or other final entitlements to the San Joaquin Valley Air Pollution Control District (APCD) for a permit pursuant to Rule 9510

indirect Source Rule (ISR), if applicable. The ODS shall incorporate emission reduction measures into the project and pay ISR fees as required by the APCD.

b. Prohibit wood-burning fireplaces and wood stoves within the project.

c. Impose restrictions in commercial and industrial parking areas and loading/access zones that limit idling time for commercial vehicles, including delivery and construction vehicles.

Land Use

Mitigation Measure GCC-3. The owner, developer and/or successors-in-interest are required to implement the following measures regarding land use to reduce greenhouse gas emission impacts for the proposed project.

a. Locate truck-oriented delivery/service facilities (e.g., loading docks, trash enclosures), where the potential exists for vehicles to emit Toxic Air Emissions, as far away as feasibly possible from sensitive receptors by placing buildings or other obstructions between the source of the emission and normally downwind receptors.

b. Provide sidewalks and pedestrian paths throughout as much of the project as possible and connect to open space areas, parks, schools, and commercial areas to encourage walking and bicycling.

c. Mid-block paths shall be installed to facilitate pedestrian movement through long blocks and cul-de-sacs.

d. To the extent practicable, the comprehensive the bicycle circulation system shall provide access to all neighborhoods and amenities within the proposed project and enhances comfort and safety for pedestrians by offering ample lighting, planted medians, tree lined streets, crosswalks and wide sidewalks.

Public Infrastructure/Services

Mitigation Measure GCC-4. The owner, developer and/or successors-in-interest are required to implement the following measures regarding public services to reduce greenhouse gas emission impacts for the proposed project.

a. Provide the necessary facilities and infrastructure to encourage the use of low or zero-emission vehicles (electric vehicle charging facilities and conveniently located alternative fueling stations) in the industrial uses.

b. A non-potable source of water (e.g., reclaimed) shall be utilized for landscape irrigation in public spaces.

Building Construction & Energy Conservation

Mitigation Measure GCC-5. The following measures shall be used singularly or in combination to accomplish an overall reduction in residential energy consumption relative to the requirements of State of California Title 24:

a. Energy-efficient design shall be provided for homes and buildings, including automated control systems for heating and air conditioning, lighting controls and energy-efficient lighting in buildings, increased insulation, and light-colored roof materials to reflect heat.

b. Residences shall be constructed with energy efficient appliances and home systems such as Energy Star appliances, energy efficient (i.e., Low E2) windows, tightly sealed ducts, florescent or energy efficient light bulbs with motion sensors where practicable, backyard outlets for electrical mower and other yard equipment operations, R-6 duct insulation, radiant roof barrier sheathing, 14 Seasonal Energy Efficiency Ratio air conditioning and ventilation systems, air conditioning with Thermostatic Expansion Valve metering devices that help regulate flow of liquid refrigerant, 0.95 Annual Fuel Utilization Efficiency furnaces, and gas dryer stubs.

c. Buildings and outdoor structures shall include green-building materials, such as low-emission concrete, recycled aggregate, recycled reinforcing, or waffle pods to be used in foundations; recycled plastics to be used in community structures such as fencing or playground equipment; wood flooring materials treated with low emission varnishes and floor board substrates to be made from low emission particleboard; compact fluorescent light bulbs in all buildings; and use of recycled building materials such as recycled aluminum for window frames or post-consumer plastic for piping.

d. Contractors shall minimize and recycle construction-related waste.

e. Include energy-conserving features as options for home buyer/commercial or industrial tenant. These include:

   - increased energy efficiency;
   - increased wall and ceiling insulation (beyond building code requirements);
   - energy-efficient windows (double-paned or Low-E);
   - high-albedo (reflecting) roofing materials;
   - cool paving;
   - radiant heat barriers;
   - energy-efficient lighting, appliances, and heating and cooling systems;
   - installation of solar water-heating systems;
   - provide low NOx-emitting or high-efficiency, energy-efficient water heaters;
   - installation of clean-energy features that promote energy self-sufficiency (e.g., photovoltaic cells, solar thermal electricity systems);
   - installation of programmable thermostats for all heating and cooling systems;
   - awnings or other shading mechanisms for windows;
   - porch, patio, and walkway overhangs;
   - ceiling fans or whole-house fans;
   - passive solar cooling and heating designs (e.g., natural convection, thermal flywheels);
   - daylighting (natural lighting) systems such as skylights, light shelves, and interior transom windows;

- electrical outlets around the exterior of units to encourage the use of electric landscape maintenance equipment;
- bicycle parking facilities for patrons and employees in covered secure areas (shall be conveniently located at each destination point);
- use of low and no-VOC coatings and paints;
- natural gas fireplaces (instead of wood burning fireplaces or heathers) and natural gas lines (if available to the project area) in backyard or patio areas to encourage the use of gas barbecues;
- on-site employee cafeterias or eating areas;
- pre-wire units with high-speed modem connections/DSL and extra phone lines;
- employee shower and locker areas for bicycle and pedestrian commuters; and
- use of low or nonpolluting landscape maintenance equipment (e.g., electric lawn mowers, reel mowers, leaf vacuums, electric trimmers and edgers).

f. Use locally made building materials for construction of the project and associated infrastructure to reduce truck trips.

g. Large canopy trees shall be carefully selected and located to protect buildings from energy-consuming environmental conditions and shade-paved areas. Trees shall be selected to shade 50% of paved areas within 15 years.

h. Optimize building's thermal distribution by separating ventilation and thermal conditioning systems.

i. For pool heating and maintenance, use solar heating, automatic covers, and efficient pumps and motors for pools and spas.

j. Design buildings to accommodate solar power systems; solar panels on homes, commercial building, carports and over parking areas; solar and tankless hot water heaters; and energy-efficient heating ventilation and air conditioning.

k. The principles of passive solar design shall be incorporated into building structures, including basic design principles are large south-facing windows with proper overhangs, as well as tile, brick, or other thermal mass material used in flooring or walls to store the sun's heat during the day and release it back into the building at night or when the temperature drops.

Water Conservation

Mitigation Measure GCC-6: The owner, developer and/or successors-in-interest are required to prepare a water conservation plan for the proposed project to the satisfaction of the Director of Municipal Utilities. The plan shall address of the following, as appropriate:

a. Water-efficient landscapes shall be provided for all publicly landscaped areas, including parks, roadway medians and roadside landscaping.

b. Water-efficient irrigation systems and devices shall be required in all landscaped areas.

c. All building shall include water-efficient fixtures and appliances.

Solid Waste

Mitigation Measure GCC-7: The owner, developer and/or successors-in-interest are required to implement the following to reduce the solid waste impacts from the proposed project.

a. Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).

b. Provide interior and exterior storage areas for recyclables and green waste and adequate recycling containers located in public areas.

Transportation System Management

Mitigation Measure GCC-8: The owner, developer and/or successors-in-interest of the commercial and industrial land uses are required to form a Transportation Management Association or join and existing association to address the following:

a. Implement carpool/vanpool program such as carpool ride matching for employees, assistance with vanpool formation and provision of vanpool vehicles.

b. Provide transit incentives (e.g., transit use incentives for employees, transit route maps and schedules posted at work site, and design and locate buildings to facilitate transit access.

c. Provide bicycle enhancing infrastructure that includes bikeways/paths connecting to a bikeway system, secure bicycle parking, and/or employee lockers and showers.

d. Establish midday shuttle service from worksite to food service establishments/commercial uses and provide shuttle to transit stations/multimodal centers.

e. Promote ride sharing programs by designating a certain percentage of parking spaces for ride sharing vehicles, designating adequate passenger loading and unloading and waiting areas for ride sharing vehicles, and providing a web sit or message board for coordinating rides.

Trip Reduction

Mitigation Measure GCC-9. The owner, developer, and/or successor-in-interest (ODS) shall address the following measures during the preparation of improvement plans to address an overall reduction in project-related vehicle miles traveled (VMT), including:

Traffic Calming

a. Traffic calming measures shall be included as part of the proposed project design with the objective of improving the overall quality of life for neighborhood residents by reducing safety hazards and nuisance impacts resulting from speeding vehicles, careless drivers and cut-through traffic.

b. Vehicle speeds within the project should be maintained at a level that provides maximum safety for residents. Consistent with the City's adopted Traffic Calming Guidelines, the project shall

incorporate roundabouts, short block lengths, traffic circles, and high visibility crosswalks to reduce traffic speeds and enhance pedestrian safety.

Services Operational

a. Ensure the provision of convenience-serving commercial uses (e.g., bank ATM, dry cleaners, hardware, dry goods) for project area residents.

b. Provide on-site childcare or contribute to off-site childcare services within walking distance.

Pedestrian Sidewalks & Pathways

a. Connections to nearby public uses and commercial areas shall be made as direct as possible to promote walking.

b. Sidewalks and bikeways shall be designed to separate pedestrian and bicycle pathways from vehicle paths.

c. Sidewalks and pedestrian pathways shall be easy to navigate and designed to facilitate pedestrian movement through the project and create a safe environment for all potential users from obstacles and automobiles.

d. Convenient pathways should be provided in large parking lots to address safe pedestrian movement.

e. Sidewalks shall be designed for high visibility (e.g., brightly painted, different color of concrete, etc.) when crossing parking lots, streets, and similar vehicle paths.

Bicycle

a. The bicycle circulation system should be planned to act as a regional circulation system connecting the proposed project to Stockton's roadway/bikeway system.

b. Bicycle parking shall be provided at the commercial sites. Additional, secure bicycle parking is incorporated at the multi-family home development.

c. Incorporate bicycle lanes and routes into the street system.

d. Incorporate bicycle-friendly intersections into street design.

e. For commercial building, require adequate bicycle parking near building entrances to promote cyclist safety, security, and convenience. For larger commercial building, provide facilities that encourage bicycle commuting, including locked bicycle storage or covered or indoor bicycle parking, locker rooms with showers.

f. Create bicycle lanes and walking paths directed to the location of schools, parks and other destination points.

Transit

a. A through roadway should connect adjacent developments so as to permit transit circulation between developments.

b. In major employment/commercial areas, parking should be prohibited on collector and arterial streets to provide access to bus stops in these areas.

c. Shielded openings in subdivisions sound walls should be provided to facilitate more direct pedestrian access to transit stops.

d. In major employment/commercial areas, the Transit District should be encouraged to post route and schedule information.

e. Commercial and industrial developments should have easy access to major arterials and transit stops.

f. The project would encourage public transportation by incorporating bus turnouts, shelters, and walkways into the design. As detailed in the City of Stockton's Traffic Calming Guidelines, the San Joaquin Regional Transit District (SJRTD) will review project site plans and identify potential bus stop locations.

g. Locate the highest density land use at or within ¼ mile of a transit stop.

h. Provide transit-enhancing infrastructure that includes bus shelters, benches, street lighting, route signs and displays and bus turn-outs.

i. Prior to approval of the Tentative Map, contact San Joaquin Regional Transit District (SJRTD) to identify appropriate location(s) for bus stops within the community.

Based on the project GHG emissions noted in Table 4.15.C, at a project level, the application of reasonable and feasible measures will assist in reducing the global climate change effects. However, as a result of the uncertainties and professional/scientific disagreements, the ability to forecast project conclusions with absolute certainty remains elusive, irrespective of the implementation of mitigation measures. It is therefore concluded that the project will have a significant and adverse effect absent conclusive findings and measurable thresholds. For this reason, even with the implementation of mitigation measures, including state-of-the-art programs such as Build It Green, the project will have a significant and unavoidable impact on global climate change. The conditions outlined in Significance Criteria GCC-a will occur.

Cumulative Impacts

Operation-related activities would result in Tidewater Crossing generated emissions of greenhouse gases (GHGs). The proposed project would accommodate more than 7,750 new residents, which is substantial. Although the overall percentage contribution of project GHG emissions is incremental, when combined with other significant development projects in the City of Stockton and greater San Joaquin County region, the proposed project's contribution to long-term atmospheric GHG emissions would be considered significant on a cumulative basis. The proposed project would produce substantial levels of new GHG emissions, based on a per-capita calculation and a substantial number of new residents, resulting in a significant and unavoidable impact. Mitigation measures would reduce

GHG from the proposed project, but they are not sufficient to reduce the proposed project's cumulative impact contribution to less than significant levels. Because the impact would be significant on a project-by-project basis, the proposed project would also result in a significant contribution to global warming impacts on an incremental basis. Thus, the proposed project would result in a substantial contribution to a significant and unavoidable cumulative impact.

Based on the cumulative projects proposed in the City of Stockton and the surrounding region, the incremental contribution of GHG from these projects is substantial in size and scale. When considered collectively, the cumulative effects combine together to create the potential for measurable changes. Even with the application of the proposed measures and design features, the potential climate-related changes will remain significant and unavoidable on a cumulative level. The conditions outlined in Significance Criterion GCC-a will occur.

4.15.5 Level of Significance After Mitigation

Implementation of the additional design features listed above will help reduce the project's contribution to greenhouse gas emissions. However, despite implementation of the project's sustainable design and the mitigation measures, GHG emissions at a project level cannot be completely mitigated and will have an incremental, significant and adverse effect on the environment. When combined with projected growth, the GHG emissions from the project and the total GHG from the region are expected to substantially increase when compared with current conditions. Therefore, estimated cumulative GHG emissions would be considered significant and unavoidable on a cumulative basis.