3.5 Climate Change and Energy Use

This section of the EIR analyzes quantitatively how implementation of the proposed Hillcrest Station Area Specific Plan may contribute to global climate change through greenhouse gas emissions related to transportation and electricity usage. In addition, the analysis qualitatively describes that there are no adverse impacts from sea level rise on the Planning Area. Because the State has not yet amended CEQA or the CEQA guidelines to include requirements for assessing climate change impacts, this climate change analysis has been prepared to reflect the most recent recommendations and guidance materials from the California Office of Planning and Research, the California Air Resources Board, the Attorney General, and other responsible agencies.

ENVIRONMENTAL SETTING

PHYSICAL SETTING

Global Climate Change

Global climate change (GCC) is currently one of the most important and widely debated scientific, economic, and political issues in the United States. GCC refers to a change in the average weather of the earth that may be measured by wind patterns, storms, precipitation, and temperature. The baseline by which these changes are measured originates in historical records identifying temperature changes that have occurred in the distant past, such as during previous ice ages. The rate of temperature change has typically been incremental, with warming and cooling occurring over the course of thousands of years. In the past 10,000 years the earth has experienced incremental warming as glaciers retreated across the globe. However, scientists have observed an unprecedented increase in the rate of warming over the past 150 years, roughly coinciding with the global industrial revolution.

Although GCC is now widely accepted as a concept, the extent and speed of change to be expected, and the exact contribution from human sources, remains in debate. Nonetheless, the world's leading climate scientists, the Intergovernmental Panel on Climate Change (IPCC), have reached consensus that global climate change is "very likely" caused by humans, and that hotter temperatures and rising sea levels will continue for centuries no matter how much humans control their future emissions. In particular, human influences have:

- *very likely* contributed to sea level rise and increased storm surge during the latter half of the 20th century;
- *likely* contributed to changes in wind patterns, affecting extra-tropical storm tracks and temperature patterns;
- *likely* increased temperatures of extreme hot nights, cold nights and cold days;
- *more likely than not* increased risk of heat waves, area affected by drought since the 1970s, and frequency of heavy precipitation events. (IPCC, November 2007)

The IPCC predicts that global mean temperature increase from 1990-2100 could range from 2.0 to 11.5 degrees Fahrenheit, with the most likely scenario between 3.2 and 7.1 degrees. The same report projects a sea level rise of 7 to 23 inches by the end of the century, with a greater rise possible depending on the rate of polar ice sheet melting.

According to the California Climate Action Team (CCAT), accelerating GCC has the potential to cause a number of adverse impacts in California, including but not limited to: a shrinking Sierra snowpack that would threaten the state's water supply; public health threats caused by higher temperatures and more smog; damage to agriculture and forests due to reduced water storage capacity, rising temperatures, increasing salt water intrusion, flooding, and pest infestations; critical habitat modification and destruction; eroding coastlines; increased wildfire risk; and increased electricity demand. (CCAT, April 2006) These impacts have and will continue to have considerable costs associated with them.

While all of these impacts may be felt to some extent in the Bay Area and the City of Antioch, of particular concern are high temperatures and the negative impacts on air quality, and water quality and water supply issues. Recent studies indicate that hot days correlate with poor air quality days, and air pollution is contributing to more annual deaths and cases of respiratory illness and asthma (Jacobson, 2008). In other areas of the Bay Area, sea level rise and the resulting potential for intermittent flooding and gradual inundation is a concern that must be addressed.

Greenhouse Gases

Gases that that trap heat in the Earth's atmosphere are called greenhouse gases (GHGs). These gases play a critical role in determining the Earth's surface temperature. Part of the solar radiation that enters Earth's atmosphere from space is absorbed by the Earth's surface. The Earth reflects this radiation back toward space, but GHGs absorb some of the radiation. As a result, radiation that otherwise would have escaped back into space is retained, resulting in a warming of the atmosphere. Without natural GHGs, the Earth's surface would be about 61°F cooler. (CCAT, April 2006) This phenomenon is known as the greenhouse effect. However, many scientists believe that emissions from human activities—such as electricity generation, vehicle emissions, and even farming and forestry practices—have elevated the concentration of GHGs in the atmosphere beyond naturally-occurring concentrations, contributing to the larger process of global climate change. The six primary GHGs are:

- **Carbon dioxide (CO_2),** emitted as a result of fossil fuel combustion, with contributions from cement manufacture;
- **Methane (CH_4),** produced through the anaerobic decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion;
- **Nitrous oxide (N_2O),** typically generated as a result of soil cultivation practices, particularly the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning;
- **Hydrofluorocarbons (HFCs),** primarily used as refrigerants;
- **Perfluorocarbons (PFCs),** originally introduced as alternatives to ozone depleting substances and typically emitted as by-products of industrial and manufacturing processes; and
- **Sulfur hexafluoride (SF_6),** primarily used in electrical transmission and distribution systems.

Though there are other emissions, such as diesel particulate matter, that can contribute to global warming, these six are identified explicitly in California legislation and litigation as being of primary concern. GHGs have varying potentials to trap heat in the atmosphere, known as global

warming potential (GWP), and atmospheric lifetimes. GWP ranges from 1 (carbon dioxide) to 23,900 (sulfur hexafluoride). GHG emissions with a higher GWP have a greater global warming effect on a molecule-by-molecule basis. For example, one ton of CH_4 has the same contribution to the greenhouse effect as approximately 21 tons of CO_2. (California Climate Action Registry, 2008) GWP is alternatively described as "carbon dioxide equivalents", or CO_2e. The parameter "atmospheric lifetime" describes how long it takes to restore the system to equilibrium following an increase in the concentration of a GHG in the atmosphere. Atmospheric lifetimes of GHGs range from tens to thousands of years.

California and Bay Area GHG Emissions

GHG emissions contributing to GCC are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. (CEC, December 2006) The State of California alone produces about 2 percent of the entire world's GHG emissions, with major sources here including fossil fuel consumption from transportation (41 percent), industry (23 percent), electricity production (20 percent), and agricultural and forestry (8 percent). Much like nations around the world, California government is looking at options and opportunities for drastically reducing GHG emissions with the hope of thereby delaying, mitigating, or preventing at least some of the anticipated impacts of GCC on California communities.

The Global Warming Solutions Act of 2006 (AB 32) required that the Air Resources Board determine the statewide greenhouse gas emissions level in 1990. Based on its 1990-2004 inventory work, ARB staff recommended an amount of 427 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) as the total statewide greenhouse gas 1990 emissions level and 2020 emissions limit. The Board approved the 2020 limit on December 6, 2007. (CARB, 2008) This would be approximately 9.7 $MTCO_2e$ per capita, based on the Department of Finance's projection of state population of about 44 million persons.

Table 3.5-1 California 2020 GHG Emissions Goal

Total Emissions	427,000,000
2020 Population	44,135,923
Emissions per Capita	9.7

Source: ARB, 2007; California Department of Finance, 2007; Dyett & Bhatia, 2008.

Furthermore, local and regional agencies in the Bay Area have taken steps to measure, quantify, evaluate, and regulate their contributions to GHG emissions and global warming. For example, the cities of San Francisco, San Jose, and Palo Alto, the East Bay Municipal Utility District, UC Berkeley and Stanford University, and numerous other water and power utilities, public agencies, foundations, and individual businesses are members of the Climate Action Registry, a private non-profit organization originally formed by the State of California that serves as a voluntary greenhouse gas (GHG) registry to protect and promote early actions to reduce GHG emissions by organizations. Additionally, a number of cities and counties in the Bay Area have already developed or are in the processing of completing their own climate/greenhouse gas reduction action plans and inventories.

In 2006, the Bay Area Air Quality Management District (BAAQMD) completed a baseline inventory of GHG emissions for the year 2002. According to that inventory, 85.4 million tons of

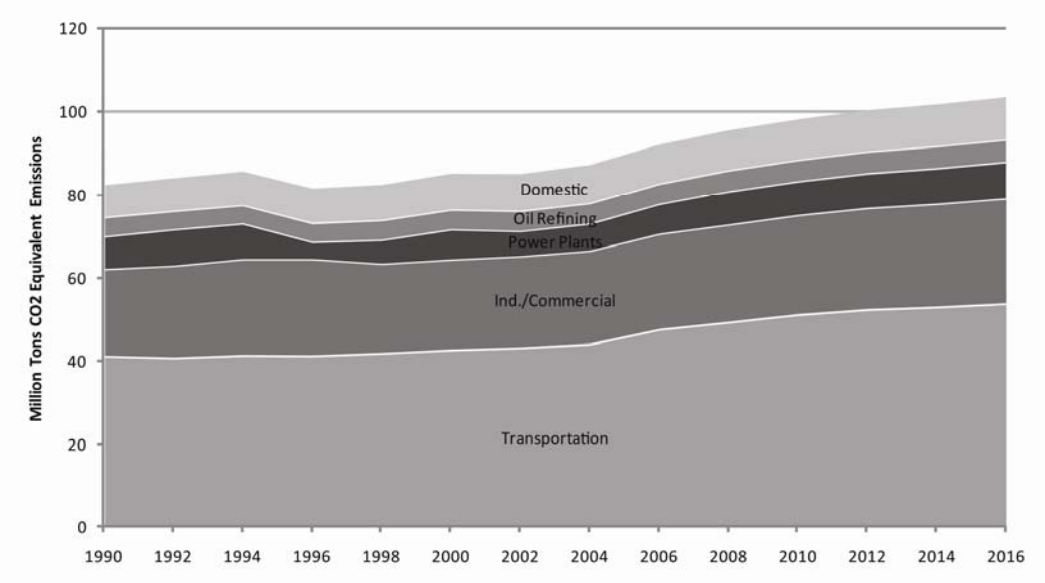
CO_2e greenhouse gases were emitted in the Bay Area that year (BAAQMD, November 2006). The Bay Area's transportation sector contributes 50 percent of the CO_2e emissions, followed by industrial and commercial sources (26 percent), domestic fuel consumption (11 percent), electricity generation at power plants (7 percent), and crude oil refining (6 percent). This is equivalent to approximately 12.6 metric tons of GHG emissions per person per year. Absent policy changes, Bay Area GHG emissions are expected to grow at a rate of 1.4 percent a year due to population growth and economic expansion. (BAAQMD, November 2006) Economic activity variations and the fraction of electric power generation in the region will cause year-to-year fluctuations in the emissions trends.

Table 3.5-2 2002 Bay Area CO_2e Emissions by Pollutant

Pollutant	*CO_2e (Million Tons/Year)*	*Percent of Total*
Carbon Dioxide	77	90%
Methane	4	5%
Nitrous Oxide	4	5%
HFC, PFC, SF_6	1	<1%
Total	86	100

Source: Bay Area Air Quality Management District, 2006

Figure 3.5-1 Bay Area Greenhouse Gas Emissions Trends by Major Source



Source: Bay Area Air Quality Management District, 2006

Contra Costa County GHG Emissions

According to the BAAQMD GHG Inventory, Contra Costa County generated more GHG emissions, 30 percent of the total, than any other county in the nine-county region. In 2008, Contra Costa County published a baseline inventory of GHG emissions for the base year 2005, as shown in Table 3.5-3 (Contra Costa County, June 2008). For countywide emissions, the inventory evaluated energy use, vehicle transportation, and waste disposal for cities and unincorporated areas in the County. Countywide data for residential, commercial, and industrial energy use was provided by PG&E. The commercial/industrial emissions are based exclusively on energy use and do not include emissions from refinery operations. Transportation data was provided by the Metropolitan Transportation Commission (MTC). Emissions calculations for land-filled waste assume an 85 percent methane recovery factor.

Table 3.5-3 Contra Costa Countywide GHG Emissions (2005)

Emissions Source	*$MTCO_2e$* [1]	*Percent of County Total*	*Emissions per Capita*
Incorporated Areas			
Residential Energy Use	1,308,216	11%	1.51
Commercial/Industrial/Direct Access Energy Use	2,530,030	21%	2.93
Transportation	3,569,319	29%	4.13
Land-filled Waste	153,043	1%	0.18
Incorporated Subtotal	**7,560,608**	**61%**	**8.75**
Unincorporated Areas			
Residential Energy Use	279,439	2%	1.75
Commercial/Industrial/Direct Access Energy Use	3,500,768	28%	21.93
Transportation	972,754	8%	6.09
Land-filled Waste	22,335	0%	0.14
Unincorporated Subtotal	**4,775,296**	**39%**	**29.91**
County Totals			
Residential Energy Use	1,587,655	13%	1.55
Commercial/Industrial/Direct Access Energy Use	6,030,798	49%	5.89
Transportation	4,542,073	37%	4.44
Land-filled Waste	175,378	1%	0.17
COUNTY TOTAL	**12,335,904**	**100%**	**12.05**
2050 County Goal (80 percent less)	2,467,181		1.36

1. $MTCO_2e$, metric tons carbon dioxide equivalent, describes the number of metric tons of carbon dioxide that would have the same climate change potential as the actual assortment of greenhouse gases.

Source: Contra Costa County Greenhouse Gas Emissions Inventory Report, June 2008; Dyett & Bhatia, 2008.

The inventory includes a more detailed analysis of County operations such as: County building energy use, streetlight energy use, water and sewage energy use, fuel use by the municipal vehicle fleet, and land-filled waste disposal from County facilities and operations. However, data for individual cities or water and sewer districts have not been analyzed separately. The inventory does not account for construction emissions.

The total county-wide GHG emissions in 2005 was approximately 12.3 million metric tons, which is equivalent to approximately 12.0 metric tons per capita per year. For the County as a whole, commercial and industrial energy use accounts for almost half of the total emissions (49 percent), followed by transportation (37 percent), residential energy use (13 percent), and land-filled waste (1 percent). The major oil refineries located in unincorporated Contra Costa County account for a large part of the greenhouse gas emissions from the commercial and industrial sectors (Contra Costa County, June 2008).

Countywide Actions to Reduce GHG Emissions

Contra Costa County adopted the long-term reduction target set by the U.S. Cool Counties Climate Stabilization Declaration in October 2007. This declaration calls for the County to work closely with local, state, and federal governments and other leaders to *develop a regional plan to reduce county geographical GHG emissions to 80 percent below current levels by 2050.* Achieving this goal would require the County to reduce its total GHG emissions from 12.3 million metric tons to less than 2.5 million metric tons. Based on a project countywide population of more than 1.8 million, the per capita emissions would need to be reduced to 1.4 metric tons of carbon dioxide equivalent emissions by 2050. To achieve this goal, the County would need to reduce its emissions by 3.5 percent or 214,538 metric tons of carbon dioxide equivalent emissions each year.

The County has implemented and planned many countywide GHG reduction measures. These measures include efforts such as establishing urban growth boundaries, encouraging mixed-use development to reduce travel distances, regulating wood burning appliances, and using methane from landfills to generate electricity, to name a few. The GHG Inventory Report also identified numerous measures for the County to consider as part of the Climate Action Plan.

City of Antioch GHG Emissions

Using the per capita average GHG emission factors for the County incorporated areas from 2005, the City of Antioch would have produced about 881,000 metric tons of GHG emissions. This is based on the 2005 population of 100,714, as estimated by the California Department of Finance, and the assumption that there are no oil refineries in Antioch. This equates to 8.75 metric tons carbon dioxide equivalent per capita.

Table 3.5-4 City of Antioch Estimated GHG Emissions (2005)

Emissions Source	*Emissions per Capita Factor*	*$MTCO_2e$* [1]
Residential Energy Use	1.51	152,078
Commercial/Industrial/Direct Access Energy Use	2.93	295,092
Transportation	4.13	415,949
Land-filled Waste	0.18	18,129
City Total	**8.75**	**881,248**

Note: Emissions estimates based on 2005 population of 100,714 and the emissions per capita factors for the Contra Costa County incorporated areas.

1. $MTCO_2e$, metric tons carbon dioxide equivalent, describes the number of metric tons of carbon dioxide that would have the same climate change potential as the actual assortment of greenhouse gases.

Source: Contra Costa County Greenhouse Gas Emissions Inventory Report, June 2008; Dyett & Bhatia, 2008.

Sea Level Rise

Sea level rise as a consequence of global warming has received considerable attention in the scientific community and the media. It is widely believed that higher global temperatures will lead to the melting of polar ice caps, which in turn will cause global sea levels to rise. The IPCC and the 2006 California Climate Action Team Report project that mean sea level will rise between 12 and 36 inches by the year 2100. Sea level rise models indicate that an 11.8 inch rise in sea level would shift the 100-year storm surge-induced flood event to once every 10 years. Historical records show that sea level in San Francisco Bay has risen seven inches over the past 150 years.

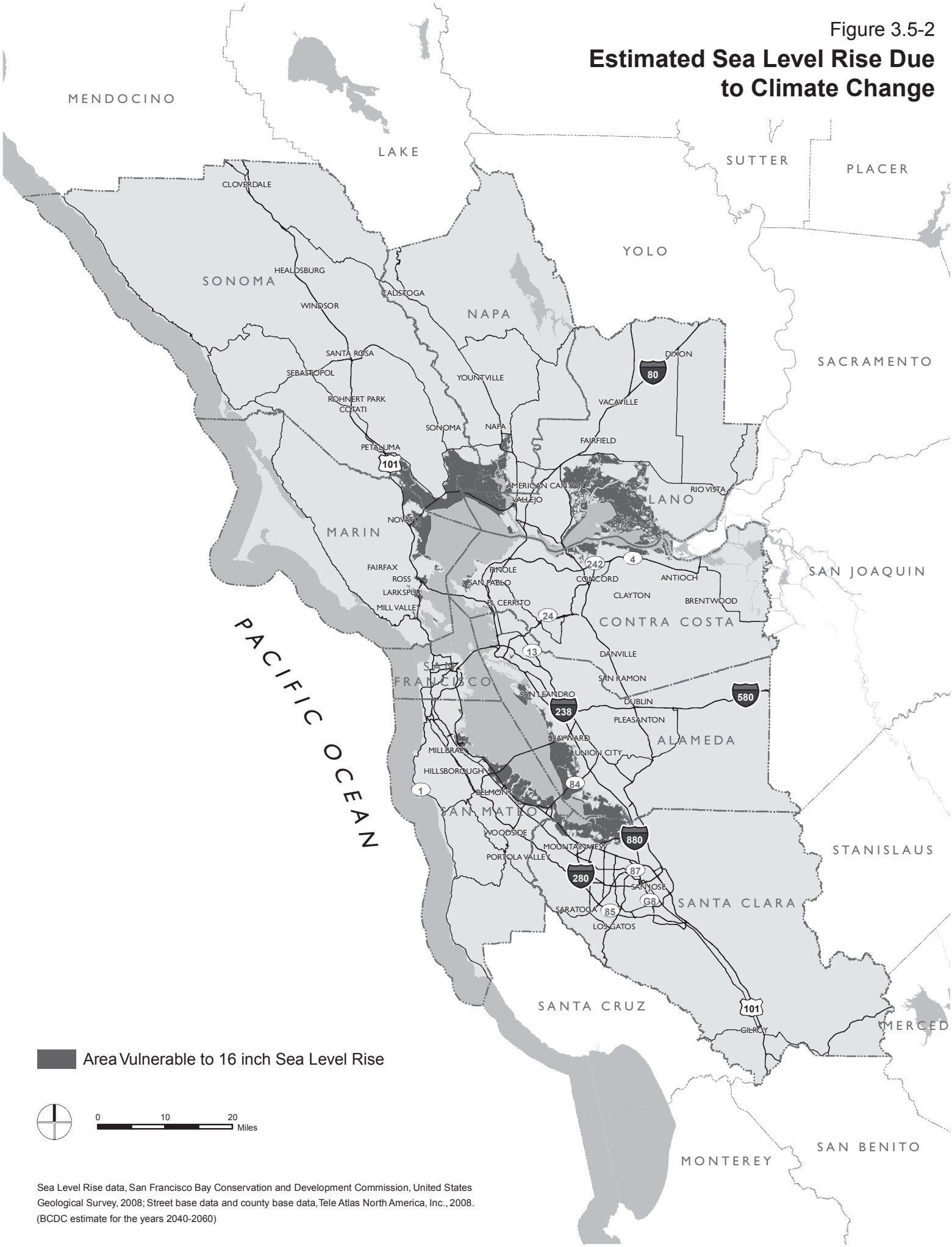
The San Francisco Bay Conservation and Development Commission (BCDC) has conducted an analysis for the Bay Area, which include U.S. Geological Survey (USGS) data and maps that generally reflect the low-lying areas of the shoreline that would be subject to tidal inundation and flooding should a one meter sea level rise occur by 2100. (BCDC, 2007) These maps indicate that the Planning Area is not within the areas impacted by sea level rise.

Energy Use

Pacific Gas & Electric (PG&E) currently provides electric services and natural gas to Antioch homes and businesses PG&E is an investor-owned utility which is regulated by the California Public Utilities Commission (CPUC). PG&E generates electricity primarily from natural gas, nuclear, and hydroelectric sources, but also from coal, wind, geothermal, and biomass sources. The combustion of fossil fuels to produce electricity generates greenhouse gases including carbon dioxide and, to a lesser extent, nitrous oxide and methane. According to the California Energy Commission, in 2006, Contra Costa County consumed a total of 8,511 million kWh of electricity, approximately 8,293 kWh per capita.

Figure 3.5-2

Estimated Sea Level Rise Due to Climate Change



Sea Level Rise data, San Francisco Bay Conservation and Development Commission, United States Geological Survey, 2008; Street base data and county base data, Tele Atlas North America, Inc., 2008. (BCDC estimate for the years 2040-2060)

REGULATORY SETTING

The regulations listed below reflect a partial list of actions the federal and state governments have taken to address global climate change. To date, the State has not imposed any requirements on local agencies to help achieve GHG emissions reductions.

Definitions

Distributed Generation

Distributed generation encompasses various small-scale types of electrical generation, such as micro-turbines, fuel cells, photovoltaics, cogeneration (reuse of waste heat) and other sources of electrical power that can be effectively located within office parks, industrial facilities, and other large buildings.

Intergovernmental Panel on Climate Change

The Intergovernmental Panel on Climate Change (IPCC) is a scientific intergovernmental body set up by the World Meteorological Organization (WMO) and by the United Nations Environment Programme (UNEP). Its role is to assess on a comprehensive, objective, open and transparent basis the latest scientific, technical and socio-economic literature produced worldwide relevant to the understanding of the risk of human-induced climate change, its observed and projected impacts, and options for adaptation and mitigation.

Federal Regulations

Global Change Research Act (1990)

In 1990, Congress passed and the President signed Public Law 101-606, the Global Change Research Act. The purpose of the legislation was: "…to require the establishment of a United States Global Change Research Program aimed at understanding and responding to global change, including the cumulative effects of human activities and natural processes on the environment, to promote discussions towards international protocols in global change research, and for other purposes." To that end, the Global Change Research Information Office (GCRIO) was established in 1991 (it began formal operation in 1993) to serve as a clearinghouse of information. The Act requires a report to Congress every four years on the environmental, economic, health and safety consequences of climate change; however, the first and only one of these reports to-date, the *National Assessment on Climate Change*, was not published until 2000. In February 2004, operational responsibility for GCRIO shifted to the U.S. Climate Change Science Program.

Massachusetts v. EPA (2007)

In this U.S. Supreme Court case, 12 states, 3 cities, and 13 environmental groups filed suit that the U.S. Environmental Protection Agency (EPA) should be required to regulate carbon dioxide and other greenhouse gases as pollutants under the federal Clean Air Act. In April 2007, the U.S. Supreme Court found that the EPA has a statutory authority to formulate standards and regulations to address greenhouse gases, which it historically has not done. To date, the EPA still has not taken any new action. It is unclear what effect the action would take, in particular on California communities as they may already be subject to more stringent regulations.

Energy Independence and Security Act of 2007

In December 2007, President Bush signed the Energy Independence and Security Act of 2007 to move the U.S. toward greater energy independence and security. This energy bill increases the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022. It also tightens the Corporate Average Fuel Economy (CAFE) standards that regulate the average fuel economy in the vehicles produced by each major automaker. The current CAFE standard for cars, set in 1984, requires manufacturers to achieve an average of 27.5 miles per gallon, while a new standard for light trucks and heavier SUVs was adopted in 2006 that would require new vehicles to achieve 24 mpg by 2011 (this standard was later challenged in court). This energy bill requires that these standards be increased such that, by 2020, the new cars and light trucks sold each year deliver a combined fleet average of 35 miles per gallon. A transition schedule for achieving these new standards was issued for comment in April 2008.

State Regulations

AB 1493 (Chapter 200, Statutes 2002)

AB 1493 (Pavley) amended Health and Safety Code sections 42823 and 43018.5 requiring the California Air Resources Board (CARB) to develop and adopt regulations that achieve maximum feasible and cost-effective reduction of GHG emissions from passenger vehicles, light-duty trucks, and other vehicles used for noncommercial personal transportation in California. The regulations prescribed by AB 1493 may not take effect prior to January 1, 2006, and they apply only to 2009 and later model years.

In September 2004, pursuant to AB 1493, the CARB approved regulations to reduce greenhouse gas emissions from new motor vehicles. Under the regulation, one manufacturer fleet average emission standard is established for passenger cars and the lightest trucks, and a separate manufacturer fleet average emission standard is established for heavier trucks. The regulation takes effect on January 1, 2006 and sets near-term emission standards, phased in from 2009 through 2012, and mid-term emission standards, phased in from 2013 through 2016. CARB calculates that the AB 1493 vehicle requirements would cumulatively produce 41 percent more GHG reductions by 2020 compared to the new federal CAFÉ standard in the Energy Independence and Security Act of 2007 (above). CARB has estimated that these regulations would reduce GHG emissions from these light-duty vehicles 18 percent by 2020 and 27 percent by 2030. (CARB, 2004) However, EPA has refused to grant a waiver that would allow California to implement these standards, and California has challenged this action in federal court.

Executive Order S-20-04 (Gov. Schwarzenegger, December 2004)

Executive Order S-20-04 commits the State to aggressive action to increase building energy efficiency, since it has been determined that commercial buildings use 36 percent of the state's electricity and account for a large percentage of greenhouse gas emissions, raw materials use and waste. In addition to requiring state-owned building to be retrofit to be more energy efficient, this EO requires the California Energy Commission to undertake all actions within its authority to increase efficiency by 20 percent by 2015, compared to Titles 20 and 24 non-residential standards adopted in 2003.

Executive Order S-3-05 (Gov. Schwarzenegger, June 2005)

The Governor of California signed Executive Order S-3-05 on June 1, 2005. The Order recognizes California's vulnerability to climate change, noting that increasing temperatures could potentially reduce snow pack in the Sierra Nevada, which is a primary source of the State's water supply. Additionally, according to this Order, climate change could influence human health, coastal habitats, microclimates, and agricultural yield. The Order set the greenhouse gas reduction targets for California: by 2010, reduce GHG emissions to 2000 levels; by 2020 reduce GHG emissions to 1990 levels; by 2050 reduce GHG emissions to 80 percent below 1990 levels.

California Global Warming Solutions Act of 2006 (AB 32)

In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Climate Solutions Act (Health and Safety Code Section 38500 et. seq.). The Act requires the reduction of statewide GHG emissions to 1990 levels by the year 2020. This change, which is equivalent to a 25 percent reduction from current emission levels, will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012.

AB 32 also directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources and address GHG emissions from vehicles. CARB has stated that the regulatory requirements for stationary sources will be first applied to electricity power generation and utilities, petrochemical refining, cement manufacturing, and industrial/commercial combustion. The second group of target industries will include oil and gas production/distribution, transportation, landfills and other GHG-intensive industrial processes.

Senate Bill 1368 (Chapter 598, Statutes of 2006)

Senate Bill (SB) 1368, signed by Governor Schwarzenegger in September 2006, required the California Public Utilities Commission (PUC) to establish a GHG emissions performance standard for "baseload" generation from investor-owned utilities by February 1, 2007. The California Energy Commission (CEC) was required to establish a similar standard for local publicly-owned utilities by June 30, 2007. The legislation further required that all electricity provided to California, including imported electricity, must be generated from plants that meet or exceed the standards set by the PUC and the CEC. In January 2007, the PUC adopted an interim performance standard for new long-term commitments (1,100 pounds of CO_2 per megawatt-hour), and in May 2007, the CEC approved regulations that match the PUC standard.

Executive Order S-01-07 (Gov. Schwarzenegger, January 2007)

In January 2008, Governor Schwarzenegger established a Low-Carbon Fuel Standard by Executive Order. Executive Order S-01-07 calls for a statewide goal to be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 ("2020 Target"), and that a Low Carbon Fuel Standard ("LCFS") for transportation fuels be established for California. Further, it directs CARB to determine if an LCFS can be adopted as a discrete early action measure pursuant to AB 32, and if so, consider the adoption of a LCFS by June 30, 2007, pursuant to Health and Safety Code Section 38560.5. The LCFS applies to all refiners, blenders, producers or importers ("Providers") of transportation fuels in California, will be measured on a full fuels cycle basis, and may be met through market-based methods by which Providers exceeding the performance required by a LCFS shall receive credits that may be applied to future obligations or traded to Providers not meeting the LCFS.

In June 2007, CARB approved the LCFS as a Discrete Early Action item under AB 32. It is expected that the regulatory process at CARB to implement the new standard will be completed no later than December 2008.

SB 97 (Chapter 185, Statutes 2007)

Senate Bill (SB) 97 directs the Office of Planning and Research (OPR) to prepare, develop, and transmit to the California Resources Agency guidelines for feasible mitigation of GHG emissions or the effects of GHG emissions, by July 1, 2009. The Resources Agency is required to certify and adopt amendments to the Guidelines implementing the California Environmental Quality Act ("CEQA Guidelines") on or before January 1, 2010. These new CEQA Guidelines will provide regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents. In the interim, the OPR offered informal guidance regarding steps lead agencies should take to address climate change in their CEQA documents. (Governor's Office of Planning and Research, 2008)

SB 375 (Chapter 728, Statutes of 2008)

On September 30, 2008, Governor Schwarzenegger signed Senate Bill (SB) 375 into law. This legislation links transportation and land use planning with the CEQA process to help achieve the GHG emission reduction targets set by AB 32. Regional transportation planning agencies are required to include a sustainable community strategy (SCS) in regional transportation plans. The SCS must contain a planned growth scenario that is integrated with the transportation network and policies in such a way that it is feasible to achieve AB 32 goals on a regional level. SB 375 also identifies new CEQA exemptions and streamlining for projects that are consistent with the SCS and qualify as Transportation Priority Projects (TPP). TPPs must meet three requirements: 1) contain at least 50 percent residential use; commercial use must have floor area ratio (FAR) of not less than 0.75; 2) have a minimum net density of 20 units per acre; and 3) be located within one-half mile of a major transit stop or high quality transit corridor included in the regional transportation plan.

Executive Order (EO) S-13-08

On November 14, 2008, Governor Schwarzenegger issued Executive Order (EO) S-13-08 directing state agencies to plan for sea level rise and climate change impacts. There are four key actions in the EO including: (1) initiate California's first statewide climate change adaptation strategy that will assess the state's expected climate change impacts, identify where California is most vulnerable and recommend climate adaptation policies by early 2009; (2) request the National Academy of Science establish an expert panel to report on sea level rise impacts in California to inform state planning and development efforts; (3) issue interim guidance to state agencies for how to plan for sea level rise in designated coastal and floodplain areas for new projects; and (4) initiate a report on critical existing and planned infrastructure projects vulnerable to sea level rise.

California Attorney General Actions

As the chief law enforcement officer of the State, charged by the Constitution to protect the public interest and the State's natural resources, California Attorney General Edmund G. Brown Jr. is committed to doing everything in his power to ensure that California meets its greenhouse gas reduction targets[1]. Examples of the Office of Attorney General's efforts include suing companies in the power industry and the auto industry for their contributions to global warming and writing letters or submitting oral testimony in over 30 different CEQA environmental review processes for city general plans, county general plans, regional transportation plans, and specific projects throughout California.

Regional and Local Regulations

Joint Policy Committee

In the Bay Area, the Joint Policy Committee (JPC) coordinates the regional planning efforts of the Association of Bay Area Governments (ABAG), the Bay Area Air Quality Management District (BAAQMD), the Bay Conservation and Development Commission (BCDC) and MTC. In fall 2006, the JPC commenced a six-month program to study the issue of climate change and to recommend an initial set of actions to be pursued jointly by the four regional agencies. The study recommends that the regional agencies build their Joint Climate Protection Strategy in service of this key goal: "To be a model for California, the nation and the world." It then organizes initial actions by six strategy elements: establish priorities, increase public awareness and motivate action, provide assistance, reduce unnecessary driving, prepare to adapt, and break old habits. (Joint Policy Committee, 2007)

Contra Costa County

Contra Costa County adopted the long-term reduction target set by the U.S. Cool Counties Climate Stabilization Declaration in October 2007. This declaration calls for the County to work closely with local, state, and federal governments and other leaders to develop a regional plan to reduce county geographical GHG emissions to 80 percent below current levels, 13.7 million metric tons of GHG emissions, by 2050.

Antioch General Plan

10.6.2 Resource Management: Air Quality Policies

a. Require development projects to minimize the generation of particulate emissions during construction through implementation of the dust abatement actions outlined in the CEQA Handbook of the Bay Area Air Quality Management District.

[1] The Attorney General global warming web portal may be found at http://ag.ca.gov/globalwarming/ The portal contains information on global warming generally, impacts in California, and documentation of the comments, speeches, op-eds, testimony, and litigation actions he has taken to support AB 32 goals.

b. Require developers of large residential and non-residential projects to participate in programs and to take measures to improve traffic flow and/or reduce vehicle trips resulting in decreased vehicular emissions. Examples of such efforts may include, but are not limited to the following.

   - Development of mixed use projects, facilitating pedestrian and bicycle transportation and permitting consolidation of vehicular trips.
   - Installation of transit improvements and amenities, including dedicated bus turnouts and sufficient rights-of-way for transit movement, bus shelters, and pedestrian easy access to transit.
   - Provision of bicycle and pedestrian facilities, including bicycle lanes and pedestrian walkways connecting residential areas with neighborhood commercial centers, recreational facilities, schools, and other public areas.
   - Contributions for off-site mitigation for transit use.
   - Provision of charging stations for electric vehicles within large employment-generating and retail developments.

c. Budget for purchase of clean fuel vehicles, including electrical and hybrid vehicles where appropriate, and, if feasible, purchasing natural gas vehicles as diesel powered vehicles are replaced.

d. Support and facilitate employer-based trip reduction programs by recognizing such programs in environmental mitigation measures for traffic and air quality impacts where their ongoing implementation can be ensured and their effectiveness can be monitored.

e. As part of the development review process for non-residential development, require the incorporation of best available technologies to mitigate air quality impacts.

f. Provide physical separations between (1) proposed new industries having the potential for emitting toxic air contaminants and (2) existing and proposed sensitive receptors (e.g., residential areas, schools, and hospitals).

g. Require new wood burning stoves and fireplaces to comply with EPA and BAAQMD approved standards.

10.8.2 Resource Management: Energy Resource Policies

a. Continue to implement Title 24 of the State Building Code, and provide incentives to encourage architects and builders to exceed the energy efficiency standards of Title 24 through increased use of passive, solar design and day-lighting.

b. Promote the use of site design, landscaping, and solar orientation to decrease the need for summer cooling and winter heating.

c. Where feasible, incorporate recycled materials in new construction.

d. Encourage the installation of energy efficient lighting, reduced thermostat settings, and elimination of unnecessary lighting in public facilities.

e. Facilitate the installation of environmentally acceptable forms of distributed generation, where such systems can be safely and economically provided.

f. Maintain City physical facilities so as to ensure that optimum energy conservation is achieved.

g. Promote purchasing of energy-efficient equipment based on a fair return on investment, and use energy-savings estimates as one basis for purchasing decisions for major energy-using devices.

h. Promote coordination of new public facilities with transit services and non-motorized transportation facilities, including bicycles, and design structures to enhance transit, bicycle, and pedestrian use.

i. The City shall review all development plans prior to approval to guarantee that energy conservation and efficiency standards of Title 24 are met and are incorporated into the design of the future proposed project.

IMPACT ANALYSIS

SIGNIFICANCE CRITERIA

As of the date of this analysis, neither the BAAQMD or CARB, nor any other state or federal agency has approved thresholds of significance or an emission rate criterion for GHG emissions. Until such requirements are issued, lead agencies responsible for complying with CEQA are using a variety of resources available to guide environmental review.

The most current and comprehensive guidance document available at this time is the California Air Pollution Control Officers Association (CAPCOA) white paper entitled *CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act*, published in January 2008. This white paper discusses evaluating and addressing greenhouse gas emissions under CEQA in order to provide a common platform of information and tools to support local governments. While not intended to dictate the manner in which a lead agency chooses to address GHGs, this paper provides a coherent look at the tools and techniques available, and suggests possible advantages and disadvantages of each analytical approach. The CAPCOA white paper discusses three basic paths lead agencies could take when contemplating CEQA thresholds of significance for GHG emissions (CAPCOA, 2008):

1. A “no threshold” approach, wherein the lead agency determines there are sufficient reasons to not specify a universal threshold for GHG emissions, and instead requires analysis on a project-by-project basis;
2. A “zero emissions” threshold, wherein the lead agency finds that any increase in GHG emissions is potentially significant under CEQA and therefore all projects under the lead agency must quantify and mitigate GHG emissions regardless of the size of the project, or prepare EIRs to disclose the unmitigable significant impact; or
3. A “non-zero” threshold, wherein the lead agency decides that there are certain GHG emission sources that are so small they will not contribute substantially to the global GHG problem, and sets thresholds of significance, or a de minimus value for cumulative impacts.

This EIR use a criterion based on a "zero emissions" threshold as a comprehensive approach to GHG impact analysis that evaluates the change in existing conditions as well as the role of the proposed Plan in the regional cumulative impact. As such, the County has the only adopted standard or goal related to GHG emissions at this time; therefore, the implementation of the proposed Hillcrest Station Area Specific Plan will have a significant impact if it would:

- Prevent the reduction of countywide greenhouse gas emissions to 80 percent below current levels by 2050.

To evaluate the potential impact on energy resources, the following criteria has been used:

- A significant impact would occur if the project would result in a substantial increase in energy consumption to the extent that energy generation capacity is exceeded.

METHODOLOGY AND ASSUMPTIONS

The 2035 climate change and energy analysis assesses cumulative impacts; it assumes the implementation of the proposed Specific Plan as part of the overall regional growth as projected by the Association of Bay Area Governments in 2007. The analysis of greenhouse gas emissions is based on the Contra Costa County baseline inventory of GHG emissions for the base year 2005.

Per capita emissions were calculated based on the County population. Table 3.5-5 shows the per capita emissions for incorporated areas, unincorporated areas, and the County as a whole. The averages for County incorporated areas were used to project emissions for the City of Antioch and the Planning Area.

Table 3.5-5 Contra Costa County 2005 Average Annual GHG Emissions Per Capita (Metric Tons)

	Incorporated Areas	*Unincorporated Areas*	*County Total*
Residential Energy Use	1.51	1.75	1.55
Commercial/Industrial/Direct Access Energy Use	2.93	21.93	5.89
Transportation	4.13	6.09	4.44
Land-filled Waste	0.18	0.14	0.17
Total Average Per Capita GHG Emissions	**8.75**	**29.91**	**12.05**

Source: Contra Costa County Greenhouse Gas Emissions Inventory Report, June 2008; Dyett & Bhatia, 2008

County 2050 GHG Goal

The Contra Costa County's goal is to develop a regional plan to reduce county geographical GHG emissions to 80 percent below current levels by 2050. Achieving this goal would require the County to reduce its total GHG emissions from 12.3 million metric tons to less than 2.5 million metric tons. Based on a project countywide population of more than 1.8 million, the per capita emissions would need to be reduced to 1.4 metric tons of carbon dioxide equivalent emissions by 2050. To achieve this goal, the County would need to reduce its emissions by 3.5 percent or 214,538 metric tons of carbon dioxide equivalent emissions each year.

Table 3.5-6 County GHG Projections to Achieve 2050 Goal

Year	Population	Percent Reduction (3.5 percent per year)	Emissions per Capita	Unit Reduction (214,538 $MTCO_2e$ per year)	Emissions per Capita
2005	1,023,400	12,335,904	12.05	12,335,904	12.05
2010	1,061,900	10,315,912	9.71	11,048,679	10.40
2015	1,107,300	8,626,692	7.79	9,975,992	9.01
2020	1,157,000	7,214,080	6.24	8,903,305	7.70
2025	1,208,200	6,032,782	4.99	7,830,617	6.48
2030	1,255,300	5,044,920	4.02	6,757,930	5.38
2035	1,300,600	4,218,820	3.24	5,685,243	4.37
2040 *	1,609,257	4,070,599	2.53	4,612,555	2.87
2050 *	1,812,242	2,467,181	1.36	2,467,181	1.36

* All population projections from ABAG 2007, except for 2040 and 2050 projections which are from California Department of Finance, 2007.

Source: ABAG, 2007; CA Department of Finance, 2007; Dyett & Bhatia, 2008.

GHG Emissions Reduction Factors

Based on adopted and proposed state and local regulations, GHG emissions are estimated to decrease. Reduction factors have been used to depict the relative influence of state regulations on GHG emissions. Implementation of the AB 1493 (Pavley) regulations could reduce GHG emissions from transportation by 22.9 percent. Implementation of Executive Order S-20-04 is intended to make non-residential buildings 20 percent more efficient (Governor Schwarzenegger, 2004). No GHG emission reduction factors are applied to residential energy use or land-filled waste.

Fuel Efficiency

In September 2004, pursuant to AB 1493 (Pavley), the CARB approved regulations to reduce greenhouse gas emissions from new motor vehicles. Under the regulation, one manufacturer fleet average emission standard is established for passenger cars and the lightest trucks, and a separate manufacturer fleet average emission standard is established for heavier trucks. The regulation took effect on January 1, 2006.

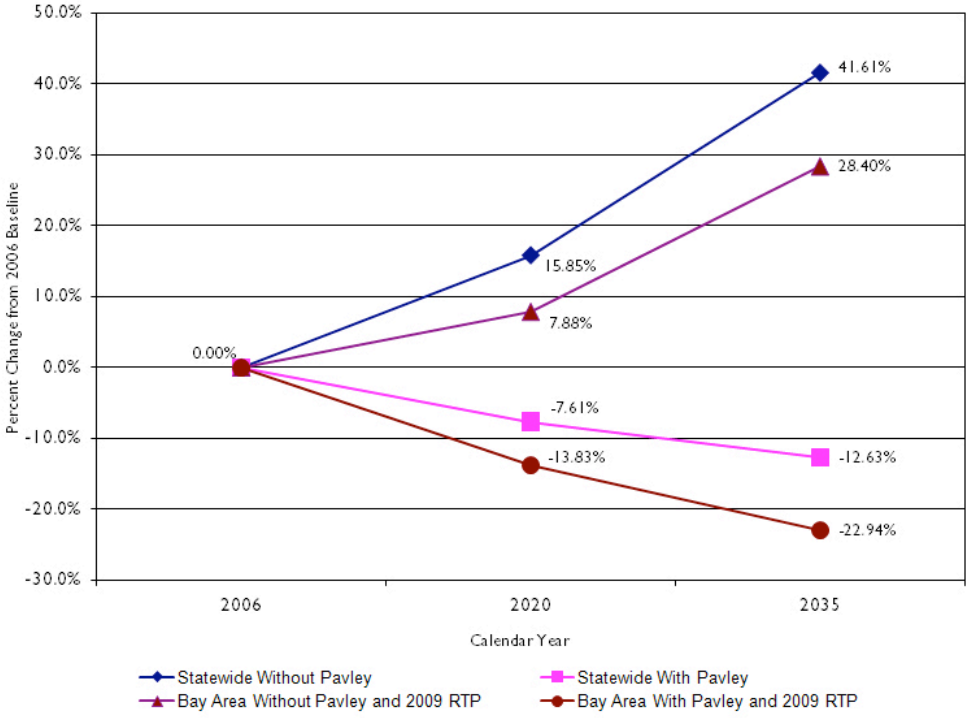
- Phase 1: set near-term emission standards, phased in from 2009 through 2012, and mid-term emission standards, phased in from 2013 through 2016
- Phase 2: The CARB intends to extend the existing requirements to obtain further reductions in the 2017 to 2020 timeframe (referred to as Pavley Phase 2 rules).

The CARB has included both Pavley Phase 1 and 2 rules in its Climate Change Proposed Scoping Plan (October 2008), pursuant to the Global Warming Solutions Act of 2006 (AB 32), which outlines the State's strategy to achieve 2020 greenhouse gas emission reductions. While EPA has refused to grant a waiver that would allow California to implement these standards, and California has challenged this action in federal court, the President-elect Obama administration has indicated it would grant the waiver.

The CARB calculates that in calendar year 2016, the Pavley Phase 1 rules will reduce California's GHG emissions by 16.4 million metric tons of carbon dioxide equivalents, and by 2020, Pavley Phase 2 would reduce emissions by 31.7 million metric tons of carbon dioxide equivalents. Further, the AB 1493 new vehicle requirements would cumulatively produce 45 percent more GHG reductions by 2020 compared to the new federal CAFE standard in the Energy Independence and Security Act of 2007 (above). (CARB, 2008)

The estimated benefits from the Pavley Phase 1 and 2 rules for California and the Bay Area are represented in the graph below. Without Pavley rules, both state and regional CO_2 emissions would increase steadily between now and 2035 as VMT increases with population growth; with Pavley rules, CO_2 emissions are projected to decrease between now and 2035. This decrease in regional 2035 CO_2 emissions compared to current levels is in large part a result of technological changes expected to reduce CO_2 emissions per VMT. The regulations would reduce climate change emissions from the light duty passenger vehicle fleet by 12.6 percent statewide and 22.9 percent in the Bay Area in 2035 compared to 2006. (MTC, December 2008).

Figure 3.5-3 On-Road Carbon Dioxide Emissions Reductions with Pavley Rules



Note: Calendar year 2020 percent changes for the Bay Area are indirectly calculated.

Source: California Air Resources Board and Metropolitan Transportation Commission (2008)

It is likely that regional carbon dioxide emissions from motor vehicles will increase and peak around year 2010 because the region will experience increases in VMT, and Pavley Phase 1 will not yet be fully implemented (it only applies to 2009 and later model year vehicles). After 2010, regional CO_2 emissions are expected to decline as the Pavley Phase 1 rules are implemented, and will continue to decline in later years as Pavley Phase 2 rules are implemented. Development

within the Planning Area and related vehicle trips are not expected to begin until after 2015 when the eBART project is complete. Therefore, the fuel efficiency improvements due to the Pavley rules should be in effect for the implementation of the proposed Plan.

Non-Residential Building Energy Efficiency

Executive Order (EO) S-20-04 commits the State to aggressive action to increase building energy efficiency, commercial buildings use 36 percent of the state's electricity and account for a large percentage of greenhouse gas emissions, raw materials use and waste. In addition to requiring state-owned building to be retrofit to be more energy efficient, this EO requires the California Energy Commission to undertake all actions within its authority to increase efficiency by 20 percent by 2015, compared to Titles 20 and 24 non-residential standards adopted in 2003. Therefore, a 20 percent reduction factor has been applied to the commercial/industrial sector energy use.

SUMMARY OF IMPACTS

Greenhouse Gas Emissions

The GHG emissions from the buildout of the proposed Specific Plan are estimated to be more than 36,000 metric tons of carbon dioxide equivalent emissions in 2035. Based on the anticipated population in the Planning Area, this would be about 7.2 metric tons of CO_2e per person.

The proposed Plan implements best practices in integrated land use and circulation planning and smart growth, as well as green building and waste reduction strategies. Project sponsors will be required to implement existing federal, state, and regional programs aimed at reducing total GHG emissions, in addition to the proposed Specific Plan objectives, principles, and policies. The VMT per capita will be lower within the Planning Area than in the City as a whole. At a minimum the GHG emissions per capita will be about 30 percent less than the countywide per capita emissions in 2035. In addition, the projected population within the Planning Area will only account for 0.4 percent of the County's total population in 2035. Therefore, it is unlikely that the implementation of the proposed Hillcrest Station Area Specific Plan will make a considerable contribution to whether the County is able to reach its 2050 GHG emission goal. Therefore, even though the cumulative impact for the region is significant, the project's contribution is less than considerable.

Energy Use

If per capita energy use were to remain constant, based on the 2006 CEC estimates, new development in the Planning Area would consume approximately 41 million kWh in 2035. This is approximately 0.4 percent of the County's total projected energy consumption. Proposed Specific Plan policies intend to ensure that new buildings are energy efficient, which may reduce the average per capita consumption for the area. According to PG&E, the anticipated energy demand would not exceed the energy generation capacity. Therefore, there is no adverse impact in terms of energy use and supply and therefore, energy use is not analyzed further.

IMPACTS AND MITIGATION MEASURES

3.5-1 *Implementation of the proposed Specific Plan would contribute to an increase in countywide greenhouse gas emissions. (Cumulatively Significant, Project Contribution Less than Considerable)*

It is reasonable to conclude that global climate change is a significant cumulative impact, as the scientific community has acknowledged its detrimental effects on ecosystems and human communities, and it is caused by the cumulative greenhouse gas emissions from human activities across the globe and over many decades. Furthermore, as global climate change is accelerated by greenhouse gases, any additional greenhouse gas emissions beyond what exists today in the atmosphere can generally be considered to contribute to this significant cumulative impact. However, for the purposes of this EIR, this analysis needs to make a determination about whether the implementation of the proposed Specific Plan makes a *cumulatively considerable contribution* to the overall cumulative impact.

County GHG Emissions

ABAG projects that Contra Costa County will have a 2035 population of 1,300,600, which is a 27 percent increase in total population (ABAG, 2007). If no GHG emissions reduction measures are implemented and the per capita emissions factors remain the same as in 2005, the County would produce approximately 15.7 million metric tons of carbon dioxide equivalent GHG emissions in 2035. With the implementation of adopted State regulations, the countywide emissions could be reduced to 13.7 million $MTCO_2e$, which is an 11 percent increase over existing levels. These reduction factors help to reduce GHG emissions per capita by more than 12 percent. This analysis is presented in Table 3.5-7. As footnoted in the table, this estimation only applies the commercial building energy efficiency factor to the estimated incorporated areas because power plants and other large industrial uses are the primary energy users in the unincorporated areas. Building efficiency would not account for a significant reduction in total energy use in power plants.

As indicated previously, the County needs to reduce its emissions by an annual average of 3.5 percent to reach its 2050 goal. In 2035, the total County emissions should be between 4.22 million and 5.7 million $MTCO_2e$, or between 3.2 and 4.4 $MTCO_2e$ per person, as shown in Table 3.5-6. The current statewide emission reduction regulations will not be sufficient to help the County reach its goal. Additional measures will need to be taken to reduce countywide GHG emissions. Therefore, the cumulative impact of regional growth in Contra Costa County is significant.

Table 3.5-7 Estimated Countywide Metric Tons GHG Emissions

	2005 $MTCO_2e$	*2035 $MTCO_2e$* [1]	*2035 $MTCO_2e$ with State Regulation Reduction Factors*	*Percent Change from Existing*
Residential Energy Use	1,587,655	2,017,690	2,017,690	27%
Commercial/Industrial/Direct Access Energy Use	6,030,798	7,664,311	7,021,247 [2]	16%
Transportation	4,542,073	5,772,347	4,450,480 [3]	-2%
Land-filled Waste	175,378	222,881	222,881	27%
Total GHG Emissions	**12,335,904**	**15,677,230**	**13,712,298**	**11%**
GHG Emissions per Capita	12.1	12.1	10.5	-12.5%

1. Based on ABAG 2007 County population projection for 2035 of 1,300,600 persons.
2. State Regulation Reduction Factors: - 20 percent building non-residential building efficiency applied to commercial/industrial/direct access based on implementation of Executive Order S-20-04. (This was applied only to the estimate population in incorporated areas in the County, because power plants and other large industrial uses are the primary energy users in the unincorporated areas. Building efficiency would not account for a significant reduction in total energy use.)
3. State Regulation Reduction Factors: - 22.9 percent fuel efficiency applied to transportation based on MTC's analysis of implementation of AB 1493 (Pavley)

Source: Contra Costa County, Dyett & Bhatia, 2008

Project GHG Emissions

Based on the 2005 estimates of County per capita GHG emissions, the projected buildout population of 5,000 persons in the Planning Area would contribute a total of 43,800 metric tons of carbon dioxide equivalent GHG emissions. If adopted State regulations related to reducing GHG emissions are implemented or enforced, the estimated total GHG emissions from the Planning Area would be approximately 36,140 metric tons. As described previously the state regulation reduction factors used in this study are: a) 20 percent non-residential building energy efficiency factor applied to commercial/industrial/direct access emissions based on implementation of Executive Order S-20-04; and b) 22.9 percent fuel efficiency factor applied to transportation emissions based on MTC's analysis of implementation of AB 1493 (Pavley). With these reduction factors, the estimated per capita emissions would be 7.2 $MTCO_2e$, which is more than 30 percent less than the countywide per capita emissions. However, the per capita emissions in the Planning Area of 7.2 is still more than the emissions level of 1.36 required to meet the County's 2050 goal, as seen in Table 3.5-6.

Table 3.5-8 Estimated Planning Area Metric Tons of GHG Emissions

Type of Energy Use	*County Incorporated Area 2005 per Capita $MTCO_2e$*	*2035 $MTCO_2e$* [1]	*2035 $MTCO_2e$ with State Regulation Reduction Factors*
Residential	1.51	7,600	7,600
Commercial/Industrial/ Direct Access	2.93	14,600	11,680 [2]
Transportation	4.13	20,700	15,960 [3]
Land-filled Waste	0.18	900	900
Total GHG Emissions		**43,800**	**36,140**
GHG Emissions per Capita		8.8	7.2

1. Based on projected population of 5,000 persons in the Planning Area.
2. State Regulation Reduction Factors: - 20 percent building non-residential building efficiency applied to commercial/industrial/direct access based on implementation of Executive Order S-20-04.
3. State Regulation Reduction Factors: - 22.9 percent fuel efficiency applied to transportation based on MTC's analysis of implementation of AB 1493 (Pavley)

Source: Dyett & Bhatia, 2008

The Contra Costa County GHG Emissions Inventory does not provide a complete breakdown of all emissions in the county, so this estimation of emissions generated by development within the Planning Area is quantified at a programmatic level, and may be understated. More detailed analysis will need to be completed to identify specific emissions generated from industrial processes, water and wastewater conveyance and treatment, and construction.

It is feasible that the emissions in the Planning Area may be lower than estimated in Table 3.5-8. In addition to complying with existing federal, state, and regional programs aimed at reducing total GHG emissions, the proposed objectives, principles, and policies in the Hillcrest Station Area Specific Plan reflect the current best practices in smart growth planning. The proposed Plan provides consumers with a variety of transportation choices and a variety of housing choices and opportunities in a location identified by regional planning agencies as a potential infill development site. The proposed Plan provides the framework for compact transit-oriented development with a mix of land uses. The travel demand model demonstrated that the VMT per capita within the Planning Area will be 7 percent less than the citywide VMT per capita at buildout.

Specific Plan Objectives and Principles that Reduce Impact

While the overall impact of the proposed Plan on GHG emissions cannot be accurately quantified, the efforts to minimize GHG emissions by prioritizing VMT reductions and the integration of land use and circulation planning are discussed qualitatively. As indicated, transportation is responsible for more than a third of the GHG emissions in Contra Costa County, and more than half of the Bay Area GHG emissions. The State of California is currently trying to adopt new fuel efficiency measures which will reduce the emissions from each vehicle, but reducing the vehicle miles traveled (VMT) has the potential to decrease regional GHG emissions significantly. MTC Travel Demand Forecasts indicate that each day Bay Area residents are making trips to work, shopping and other errands, for recreation and social occasions, school, and other non-home based trips. Land use planning can help to reduce VMT and subsequent GHG emissions by providing a mix of

uses near homes and employment, increasing densities and reducing sprawl, connecting streets, providing better access to jobs, transit, and services.

The eBART extension project is providing a new transit option to East Contra Costa County. In order to support the public investment by providing land uses that generate ridership near the proposed Hillcrest Station, the proposed Plan integrates land use and transportation in order to reduce VMT.

The following principles were used to guide the layout of the land use plan:

- Create an East County employment center.
- Provide a mix of uses that supports transit ridership.
- Ensure that vibrant pedestrian-oriented retail/restaurant/entertainment centers are the focus of the Transit Village and Town Center.
- Integrate new development with existing uses and neighborhoods.
- Limit sensitive receptors' exposure to noise and air quality emissions.
- Preserve the natural features and functions of East Antioch Creek, while enhancing its recreational uses.
- Reduce total vehicle miles traveled and regional greenhouse gas emissions.

The proposed Circulation Plan is based on the following principles:

- Provide access to all parts of the Hillcrest Station Area with a walkable, fine-grain street grid.
- Minimize impacts of Station Area development on existing residential development adjacent to the project area.
- Reduce total vehicle miles traveled and regional greenhouse gas emissions.
- Support rail and bus transit.
- Emphasize pedestrian, cyclist, and transit-rider connections to the eBART station and major destinations.
- Provide parking for BART and development as efficiently as possible.

The environmental protection and hazard mitigation principles include:

- Preserve biological resources associated with East Antioch Creek and other biological resource areas, including wetlands, wildlife habitat, and all plant and animal species that are threatened or endangered.
- Preserve natural environmental processes that protect health and safety, such as water filtration through soil that protects water quality, and riparian vegetation that minimizes erosion and flooding.
- Minimize the use of energy resources so as to ensure a sustainable long-term supply.
- Minimize air pollution.
- Remediate soil and groundwater contamination.

- Minimize the potential for loss of life, injury, property damage, and economic and social disruption resulting from natural and manmade hazards, including earthquakes, floods, landslides, and liquefaction.

It is the objective of the Specific Plan to ensure that within the Planning Area, at buildout there will be a wide mix of uses that provide a range of residential and employment options, as well as convenient retail and services. Most of the homes and jobs will be within walking distance of bus and eBART transit options, as well as a well-connected local and regional road network. The area has been designated by the City and regional planning agencies as a potential infill site since it is surrounded by existing residential neighborhoods, plus the residential densities will be higher on average than most of the City of Antioch; thereby providing an alternative to sprawl. Based on these factors, the travel model shows that the VMT per capita in the Planning Area will be approximately 13 percent less than residents in other parts of the City of Antioch.

Land use and transportation planning are not the only avenues to reducing greenhouse gas emissions. Green building standards can reduce the amount of electricity and water used in and by building. Building and urban design standards can also be enhanced to facilitate "greener" behavior. For example, if space is made available for recycling and composting receptacles, one obstacle can be removed, and total land-filled waste can be reduced. If sidewalks and delineated bike paths are available and well-lit, residents may be more willing to walk or bike for daily errands.

Emissions from construction vehicles and operations are regulated by the regional air quality management district, BAAQMD. BAAQMD's approach to analyses of construction air quality impacts is to emphasize implementation of effective and comprehensive control measures rather than detailed quantification of emissions. The Bay Area 2005 Ozone Strategy incorporates construction emissions into the on-road and off-road mobile sources analysis. The Antioch General Plan and Municipal Code require that all new construction comply with BAAQMD's dust control measures. All projects implemented under the proposed Plan would have to comply with these measures.

Specific Plan Policies that Reduce Impact

In addition to the General Plan policies, the following proposed Specific Plan policies which support energy efficiency and on-site generation, reducing VMT, and reducing waste will help to reduce the total greenhouse gas emissions from development in the Hillcrest Station Area:

County and State Greenhouse Gas Reduction Initiatives

EH-31 The City shall continue to work with the county, and other local, state, and federal governments, to develop a regional plan to reduce county geographical GHG emissions to 80 percent below current levels by 2050.

I-19 The Transit Village Master Plan should ensure that the area north of the UP railroad within 0.5 miles of the eBART station complies with the criteria for transit priority projects, as defined by California Senate Bill 375 (and any subsequent updates.)

I-20 The Town Center Master Plan should ensure that the area north of East Antioch Creek within 0.5 miles of either the Phillips Lane eBART station or shuttle stop for the Hillcrest eBART Station complies with the criteria for transit priority projects, as defined by California Senate Bill 375 (and any subsequent updates.)

Energy Efficiency

EH-32 Projects that receive financial assistance from the City or the Redevelopment Agency, including but not limited to assistance with public infrastructure, shall demonstrate the incorporation of energy efficiency measures beyond the minimum standards of Title 24 and the use of alternative energy sources such as solar power.

EH-33 All electrical appliances installed in development projects in the Hillcrest Station Area shall be Energy Star rated.

EH-34 All projects shall demonstrate that recycled materials have been incorporated into new construction.

EH-35 Non-residential projects shall meet whichever standard is lower:

- The current energy efficiency standard at the time that the development application is submitted, or
- A 20 percent reduction in energy from the 2003 Title 24 Standards, consistent with Executive Order S-20-2004 issued by Governor Schwarzenegger.

EH-36 Locate, orient, and shade the building, where feasible, as follows:

- Provide exterior shade for south-facing windows during the peak cooling season.
- Provide vertical shading against direct solar gain and glare due to low altitude sun angles for east- and west-facing windows.
- When site and location permit, orient the building with the long sides facing north and south.
- Protect the building from thermal loss, drafts, and degradation of the building envelope caused by wind and wind-driven materials such as dust, sand, and leaves with building orientation and landscape features.
- Wherever possible, use vegetation to shade buildings to limit direct solar gain and glare.

Policies that Contribute to Reducing VMT: Connected Streets

C-1 Create a connected street network of arterials and collectors that connects with existing local and regional roadways, and provides circulation throughout the Station Area.

C-2 Create a connected network of local streets appropriate for a mixed use, pedestrian-oriented environment that extends throughout the Hillcrest Station Area. The network should establish:

- Blocks that are two to four acres in size to facilitate direct and easy pedestrian access between different land uses and destinations; and,
- Maximum block lengths of approximately 450 feet, or 600 feet where a mid-block pedestrian connection is provided (measured on the longest side of the block).

C-6 Minimize cul-de-sacs to the maximum extent possible. Where cul-de-sacs are necessary due to barriers such as freeways and detention basins:

- Provide at least one pedestrian and bicycle path at the circular end in order to connect to other streets and trails, to allow emergency vehicle access when warranted and to minimize response times for emergency access; and,
- Consider designing cul-de-sacs with a planted cul-de-sac island to limit the amount of pavement and increase stormwater management opportunities.

C-8 All applications for master plans, subdivisions, and development projects shall indicate how streets are connected to existing local and regional roadways, and how a connected network of streets is created throughout the Hillcrest Station Area.

Policies that Contribute to Reducing VMT: Mixed Uses

LU-3 Create a Transit Village in the western portion of the Hillcrest Station Area north of the Union Pacific Railroad right-of-way, with direct pedestrian, bicycle, bus transit, and automobile connections to the eBART station in the median of SR 4.

LU-8 Develop a Town Center in the eastern portion of the Hillcrest Station Area that incorporates retail, entertainment, hospitality, and residential uses in a "lifestyle center" or other pedestrian-oriented format.

LU-14 Allow compatible retail, restaurant, personal service, and other commercial uses within the Office TOD district. These uses must be on the ground floor and publicly accessible.

LU-16 Up to 100 square feet of compatible retail, restaurant, personal service, office, and other commercial uses per residential unit is allowed within the Residential TOD district. These uses must be on the ground floor or second floor, and must be publicly accessible.

LU-4 Locate high-density residential development within a half-mile walk from the eBART station.

- A range of housing types may be included in a development project, some of which may be as low as 10 units per acre provided the total project meets the minimum density standard.
- Residential units should be at least 300 feet away from rail and freeway rights-of-way, or incorporate construction measures that mitigate noise and air emission impacts.

Policies that Contribute to Reducing VMT: Support Alternative Modes

LU-24 Locate eBART parking so that it is accessible to passengers arriving by car, bus, bicycle, or on foot.

LU-27 Provide public bus facilities near each eBART station.

C-3 Design streets so that they incorporate medians, landscaping, sidewalks, street trees, travel lanes, bike lanes, and on-street parking, such that they:

- Are consistent with the desired pedestrian-oriented character and safety; and,
- Meet the needs of all users including drivers, pedestrians, persons with disabilities, bicyclists, and transit users.

C-36 Develop a multi-modal transit center at the median eBART station that provides access to eBART, buses, taxies, and shuttles. Design the transit facilities to include:

- Bus transit center and approximately 8-12 bus bays (moved from the Hillcrest Park-and-Ride lot to the eBART Station parking area);
- Kiss-and-ride limited term parking area;
- Disabled parking;
- Shuttle pick up and drop off area; and,
- Safe and attractive pedestrian and bike crossings to the station.

C-38 Design arterials and arterial intersections, particularly near pedestrian-oriented streets, to accommodate transit services, including bus stops, pull-outs, and shelters.

C-39 Prioritize pedestrian and bicyclist safety at intersections and street crossings with measures such as:

- Contrasting and/or textured paving crosswalks;
- In-ground, blinking crosswalk lights; and,
- Pedestrian refuges and bulb-outs.

C-41 Require development projects to provide walking and biking routes directly to major destinations such as parks, pedestrian centers, and eBART stations.

C-42 Adopt minimum bicycle parking requirements for residential and commercial projects. Bicycle parking should be designed with the following criteria:

- Short-term parking should be visible from the main entrance of buildings.
- Long-term parking should be provided in secure, well-lighted areas.

C-46 Sidewalks should have at least a five-foot wide clear path of travel.

C-47 Provide bike routes throughout the Station Area, as illustrated in Figure 3-5.

- Class 1: Continuous multi-purpose trail along East Antioch Creek and the detention basins
- Class 2: Slatten Ranch Road, Phillips Lane, and Viera Avenue

C-48 Allow bicycle circulation on all local streets, to the extent feasible.

C-49 Design and implement a multi-use trail loop around the wetlands and East Antioch Creek. This loop should include at least two pedestrian crossings across the creek.

C-50 Provide multi-use trails that connect from East Antioch Creek to existing neighborhood parks north of the Station Area.

Policies that Contribute to Reducing VMT: Transportation Demand Management

C-22 Apply a Transportation Demand Management (TDM) program that reduces single-occupant vehicle trips to development exceeding 25,000 square feet of non-residential space. Components of TDM programs could include:

- Contributions to urban design projects, such as:
  - Bicycle parking, both short- and long-term, located in appropriate places; and,
  - Direct routes to transit (station, shuttle, or bus) and other key destinations that are well-lit and designed for pedestrian comfort.
- Employer-based programs, such as:
  - Carpool and vanpool ride-matching services;
  - Designated employer TDM contact;
  - Guaranteed ride home for transit users and car/vanpoolers;
  - Transit subsidies for employees;
  - Flexible work schedules, shortened work weeks, or options to telecommute;
  - Information campaigns using brochures, boards/kiosks, or other communication outlets; and,
  - Employer provided showers and lockers.
- Meeting or exceeding project design standards, such as:
  - Free and preferential parking for carpools, vanpools, low-emission vehicles, and car-share vehicles;
  - Passenger loading zones; and,
  - Bicycle- and pedestrian- friendly site planning and building design.

Reducing Land-filled Waste

UT-11 All new development shall participate in all solid waste source reduction and diversion programs in effect at the time of the issuance of building permits.

UT-12 All projects in the Hillcrest Station Area shall comply with the City's Construction and Demolition Debris recycling regulations by preparing a Waste Management Plan and diverting at least 50 percent of all construction and demolition debris.

UT-13 Restaurants should use on-site composting systems if a food waste recycling program is not available.

UT-14 Trees, stumps, vegetation, and soils associated with excavation and land clearing shall be composted, recycled, or reused, except when soils may be contaminated with hazardous materials, or where other conditions make this infeasible as determined by the City.

Summary of Significance

The proposed Plan implements best practices in integrated land use and circulation planning and smart growth, as well as green building and waste reduction strategies. Project sponsors will be required to implement existing federal, state, and regional programs aimed at reducing total GHG emissions, in addition to the proposed Specific Plan objectives, principles, and policies. The VMT per capita will be lower within the Planning Area than in the City as a whole. At a minimum the GHG emissions per capita will be about 30 percent less than the countywide per capita emissions in 2035. In addition, the projected population within the Planning Area will only account for 0.4 percent of the County's total population in 2035. Therefore, it is unlikely that the implementation of the proposed Hillcrest Station Area Specific Plan will not make a considerable contribution to whether the County is able to reach its 2050 GHG emission goal. Therefore, even though the cumulative impact for the region is still significant, the project's contribution is less than considerable.

Mitigation Measures

No mitigation measures required.

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