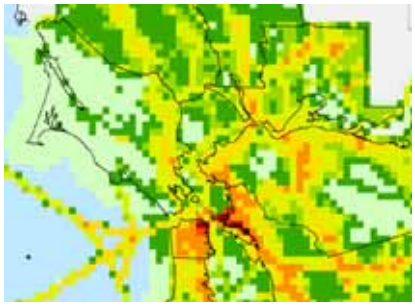
Bay Area Air Quality Management District

Bay Area 2010 Clean Air Plan



Final Program Environmental Impact Report

August 18, 2010

State Clearinghouse No. 2009082059

Association of Bay Area Governments

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Metropolitan Transportation Commission

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PREFACE

This document constitutes the Final Program Environmental Impact Report (EIR) for the 2010 Clean Air Plan. The Draft EIR was released for a 45-day public review and comment period from March 11, 2010 to April 26, 2010. Five comment letters were received from the public. The comment letters and responses are in Appendix C of this document. Modifications to the Draft EIR have been made, due to revisions to the draft 2010 Clean Air Plan EIR, such that it is now a Final EIR. Additions to the text of the EIR are denoted using underline. Text that has been deleted is shown using ~~strike through~~.

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BAY AREA AIR QUALITY MANAGEMENT DISTRICT

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1.0 Introduction and Executive Summary

1.1 Introduction

The Bay Area Air Quality Management District ("Air District" or "BAAQMD"), in conjunction with the Metropolitan Transportation Commission and the Association of Bay Area Governments, is preparing the Bay Area 2010 Clean Air Plan (CAP). The proposed CAP provides a strategy for making progress toward attainment of the California ozone standards in the Bay Area. The 2010 CAP is an update of and progress report for the 2005 Ozone Strategy in compliance with the California Clean Air Act.

The California Clean Air Act requires regions that do not meet the California ozone standards to prepare plans for attaining the standards, and to update these plans every three years. In summary, these plans must include estimates of current and future emissions of the pollutants that form ozone, and a control strategy, including all "feasible measures," to reduce these emissions. The plans must also address the transport of air pollutants to certain neighboring regions.

Both the US EPA and the California Air Resources Board (CARB) have established health-based ambient air standards for ground-level ozone. The California ozone standards are currently set at 0.09 parts per million (ppm) averaged over one hour, and 0.07 ppm averaged over eight hours. The San Francisco Bay Area air basin is designated as a nonattainment area for both the California 1-hour ozone standard and the California 8-hour ozone standard.

The first Bay Area plan for the California ozone standards was the 1991 Clean Air Plan. Subsequently, the Clean Air Plan was updated and revised in 1994, 1997, 2000 and 2005. Each of these triennial updates proposed additional measures to reduce emissions from a wide range of sources, including industrial and commercial facilities, motor vehicles, and "area sources." The 2005 Ozone Strategy was the last triennial update to the Bay Area strategy to achieve the State ozone standards.

The 2010 CAP, as well as all of its predecessor plans, differs from a general plan, which is adopted by local government to direct and control land use, because the CAP, unlike a general plan, is not a prerequisite to the agency actions described in the plan. The Air District has authority to adopt regulations regardless whether they implement a control measure described in a plan. This has some significance for CEQA analysis because the impacts of the 2010 CAP can occur regardless whether the CAP is adopted.

BAAQMD has taken a multi-pollutant control strategy approach for developing the 2010 CAP. The multi-pollutant plan addresses ozone, particulate matter, key air toxics, and key greenhouse gases via an integrated control strategy intended to satisfy ozone planning requirements, while taking due account of the interactions among the various air pollutants in order to achieve the greatest possible reductions in emissions across all the air pollutants.

Because ozone is formed through chemical reactions between reactive organic gases (ROG) and nitrogen oxides (NOx) in the presence of sunlight, efforts to reduce ozone seek to limit emissions of ROG and NOx into the atmosphere. In general, ROG comes from evaporation or incomplete combustion of fuels, from the use of solvents in cleaning operations and in paints and other coatings, and in various industrial and commercial operations. NOx is produced through combustion of fuels by mobile sources – cars, trucks, construction equipment, locomotives, aircraft, marine vessels – and stationary sources such as power plants and other industrial facilities.

Exceedances of the California and national ozone standards in the Bay Area have decreased significantly with the regulation and reduction of ozone precursor emissions (i.e. ROG and NOx). This improvement is due to California and national regulations requiring cleaner motor vehicles and fuels, District regulations requiring reduced emissions from industrial and commercial sources, as well as programs to reduce the use of motor vehicles.

The 2010 CAP is also aimed at reducing particulate matter, toxic air contaminants and greenhouse gas emissions. Particulate matter includes fine PM ($PM_{2.5}$) and coarser particles (PM_{10}). While PM_{10} is directly emitted as dust and smoke, $PM_{2.5}$ is a complex pollutant that is both directly emitted as well as created by secondary formation via chemical reactions in the atmosphere that transform (1) NOx and ammonia to ammonium nitrate and (2) sulfur dioxide and ammonia to ammonium sulfate. There are hundreds of toxic air contaminants (TAC) (e.g. diesel PM, benzene, 1,3-butadiene, formaldehyde, acetaldehyde, hexavalent chromium, etc.) that can cause a wide range of acute and chronic health effects, including cancer and mortality. There are no ambient air quality standards for TACs, because, for regulatory purposes, it is assumed that there is no safe threshold below which health impacts will not occur.

Greenhouse gases (GHG) refer to gases that contribute to global warming. In addition to negative impacts on air quality as higher temperatures contribute to increased levels of ozone and PM, climate change may cause a wide range of ecological, social, economic, and demographic impacts at both the global and the local scale. The CAP will seek to maximize reductions of greenhouse gases, primarily carbon dioxide (CO_2) and methane, in crafting a control strategy to reduce ambient concentrations of ozone, PM, and air toxics.

1.1.1 California Environmental Quality Act

The California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq., requires that the potential environmental impacts of proposed projects be evaluated and that feasible methods to reduce or avoid identified significant adverse environmental impacts of these projects be identified.

To fulfill the purpose and intent of CEQA, the BAAQMD has prepared this Program Environmental Impact Report (EIR) to address the potential environmental impacts associated with the proposed 2010 CAP. Prior to making a decision on the 2010 CAP,

the BAAQMD Board of Directors must review and certify the EIR as providing adequate information on the potential adverse environmental impacts of implementing the proposed 2010 CAP.

1.1.2 Notice of Preparation

A Notice of Preparation (NOP) for the Bay Area 2010 CAP (included as Appendix A of this EIR) was distributed to responsible agencies and interested parties for a 30-day review on August 20, 2009. A notice of the availability of this document was distributed to other agencies and organizations and was placed on the BAAQMD's web site, and was also published in newspapers throughout the area of the BAAQMD's jurisdiction. Nineteen comment letters were submitted on the NOP and are included in Appendix B of this EIR. The NOP refers to this project as the "Bay Area 2009 Clean Air Plan." The Bay Area 2010 Clean Air Plan analyzed in this EIR is the same project described in the NOP, the only difference being the slight change in the name of the project.

1.1.3 Type of EIR

CEQA provisions for program EIRs in connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program, including adoptions of broad policy programs are separate from the provisions of EIRs prepared for specific types of projects (e.g., land use projects) (Cal. Code Regs., tit. 14, § 15168, hereafter, "CEQA Guidelines"). The EIR for the 2010 CAP is a program EIR because it examines the environmental effects of proposed control measures that will ultimately be implemented through rules, or regulations and related programs promulgated as part of a continuing ongoing regulatory program.

A program EIR allows consideration of broad policy alternatives and program-wide mitigation measures at a time when an agency has greater flexibility to deal with basic problems of cumulative impacts. A program EIR also plays an important role in establishing a structure within which CEQA reviews of future related actions can be effectively conducted. This concept of covering broad policies in a program EIR and incorporating the information contained therein by reference into subsequent EIRs for specific projects is known as "tiering" (CEQA Guidelines §15152). A program EIR will provide the basis for future environmental analyses and will allow project-specific CEQA documents to focus solely on the new effects or detailed environmental issues not previously considered. If an agency finds that no new effects could occur, or no new mitigation measures would be required, the agency can approve the activity as being within the scope of the project covered by the program EIR, and no new environmental document would be required (CEQA Guidelines §15168, subd. (c)(5)).

The degree of specificity required in an EIR corresponds to the degree of specificity involved in the underlying activity described in the EIR (CEQA Guidelines §15146). Because the level of information regarding potential impacts from control measures recommended in the 2010 CAP is relatively general at this time, the environmental

impact forecasts are also general or qualitative in nature. In certain instances, such as future ambient air quality concentrations, impacts are quantified to the degree feasible.

1.1.4 Intended Uses of This Document

In general, a CEQA document is an informational document that informs a public agency's decision-makers, and the public generally, of potentially significant adverse environmental effects of a project, identifies possible ways to avoid or minimize the significant effects, and describes reasonable alternatives to the project (CEQA Guidelines §15121). A public agency's decision-makers must consider the information in a CEQA document prior to making a decision on the project. Accordingly, this EIR is intended to: (a) provide the BAAQMD Board of Directors and the public with information on the environmental effects of the proposed project; and, (b) be used as a tool by the BAAQMD Board to facilitate decision making on the proposed project. Additionally, CEQA Guidelines section 15124, subdivision (d)(1), requires a public agency to identify the following specific types of intended uses of a CEQA document:

1. A list of the agencies that are expected to use the EIR in their decision-making;

2. A list of permits and other approvals required to implement the project; and

3. A list of related environmental review and consultation requirements required by federal, state, or local laws, regulations, or policies.

Local public agencies, such as cities, and counties could be expected to tier off this EIR when considering land use and planning decisions related to projects that implement a control measure in the 2010 CAP, pursuant to CEQA Guidelines §15152. There is no State, federal or local permits required to adopt the 2010 CAP. However, implementation of some of the control measures will require various permits from all levels of government. The 2010 CAP is an update of and progress report for the 2005 Ozone Strategy in compliance with the California Clean Air Act requirements for ozone and, as such, requires approval from the California Air Resources Board. The Notice of Preparation (NOP) for this EIR was distributed to a comprehensive list of affected parties, including federal, state and local environmental agencies and other interested stakeholders.

1.1.5 Areas of Potential Controversy

In accordance with CEQA Guidelines section 15123, subdivision (b)(2), the areas of controversy known to the lead agency including issues raised by agencies and the public shall be identified in the EIR. This section highlights the areas of controversy raised during the NOP public comment period.

The public expressed concern that TCM B-1 Freeway and Arterial Operations Strategies and TCM B-3 Bay Area Express Lane Network will improve freeway travel conditions and therefore induce demand for freeway vehicle travel, resulting in increased air pollution and air quality impacts.

The Air District agrees that it is important to analyze the air quality impacts of the projects described in TCM B-1 and TCM B-3. The Air District will commission an independent analysis to evaluate the air quality impacts from these control measures, including any increases in GHG emissions.

The public expressed concern that TCM B-4 Goods Movement and Emission Reduction Strategies will improve freeway, rail and shipping for goods movement, inducing demand for goods movement in the Bay Area and therefore resulting in increased air pollution and air quality impacts.

The Air District agrees that it is important to address the potential air pollution and air quality impacts created by goods movement projects. For this reason, in addition to TCM B-4, the CAP control strategy includes LUM 1 Goods Movement. LUM 1 includes strategies to reduce emissions from goods movement by promoting mode shift, efficiencies, and funding cleaner equipment, among other measures, to reduce emissions and population exposure from the goods movement sector.

The public expressed concern that SSM 7 Open Burning will prevent fire management agencies from conducting controlled burning, and that this will increase the risk of environmental damage from wild fires.

The Air District's intent for SSM 7 is to consider further limiting discretionary agricultural burning. Staff is aware of the necessity of controlled burning to reduce fire hazards in remote locations. This measure is not intended to limit burning to reduce fire hazards.

The public expressed concern that TCM D-3 Local Land Use Strategies may result in increased ~~exposed~~ exposure to air pollution in areas with mixed land uses, such as industrial, manufacturing, commercial and residential uses.

The Air District shares this concern, which is a key rationale for developing the Land Use & Local Impact measures in the CAP control strategy. These measures address reducing emissions from goods movement activities (LUM 1), developing an indirect source review to reduce construction and vehicular emissions associated with new or modified land uses (LUM 2), updating CEQA guidelines and increasing the District's review of CEQA projects (LUM 3), providing technical assistance to local governments regarding local land use issues and mitigating population exposure (LUM 4), tracking cumulative health risks in impacted communities (LUM 5), and expanding the District's air monitoring program in impacted communities (LUM 6). All six LUMs will help the Air District monitor and evaluate pollution exposure, and prevent increased population exposure to air pollution.

The public expressed concern that MSM A-4 Replacement or Repair of High-Emitting Vehicles requires participants to destroy vehicles, and that destroying vehicles increases energy use and therefore air pollution.

The Air District reports that existing state legislation for early retirement of light duty (and heavy duty) vehicles requires that the vehicle be destroyed.

The public expressed concern that MSM C-3 Reduce Emissions from Recreational Watercraft will create environmental hazards if the Air District retires recreational boating equipment but does not require the equipment to be destroyed. The retired equipment could eventually be abandoned by the owners and create an environmental hazard.

The Air District notes that MSM C-3 is an engine exchange program for outboard engines and it does not include retiring older boats. Therefore, since older engines will be exchanged for newer engines, it is not expected that this equipment will result in derelict boats that are then abandoned. Instead, the Air District anticipates that boat owners will exchange dirtier engines for newer and cleaner engines and then continue to use the equipment for boating purposes.

The public expressed concern that MSM A-1 Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles does not require the destruction of the retired vehicle. Without that program element, this measure would not have air quality benefits. It would have the unintended consequence of making used cars cheaper, because of increased supply, possibly resulting in more VMT and emissions. The Air District notes that retired vehicles are scraped and recycled under this measure.

Finally, it should be noted that a number of the comments received in response to the NOP raise issues regarding the content of the 2010 CAP, and will be addressed in that context; they do not raise CEQA issues. That is, they do not address potential significant adverse environmental impacts of the CAP or the individual control measures; do not suggest or raise other issues regarding mitigation of those impacts; do not suggest or raise other issues regarding alternatives to eliminate or reduce those impacts; or otherwise raise issues related to the adequacy of the environmental review.

1.1.6 Project Objectives

CEQA Guidelines section 15124(b) requires an EIR to include a statement of objectives, which describes the underlying purpose of the proposed project. The purpose of the statement of objectives is to aid the lead agency in identifying alternatives and the decision-makers in preparing a statement of findings and a statement of overriding considerations, if necessary. The objectives of the proposed 2010 CAP are summarized in the following bullet points.

- Comply with the 1988 California Clean Air Act requirements including:
  1. Apply best available retrofit control technology (BARCT);
  2. Implement all feasible measures through an expeditious implementation schedule;
  3. Reduce population exposure to ozone and its precursors according to a prescribed schedule;

4. Provide for the attainment of the California ozone ambient air quality standard at the earliest practicable date.

- Comply with transport mitigation requirements in Health and Safety Code §40912.
- Reduce ambient concentrations of particulate matter.
- Reduce ambient concentrations of toxic air contaminants.
- Reduce greenhouse gas emissions, while crafting a strategy to reduce ambient concentrations of ozone, particulate matter and toxic air contaminants.

1.1.7 Document Format

State CEQA Guidelines outline the information required in an EIR, but allow the format of the document to vary. (CEQA Guidelines §15120, subd. (a).) The information in the EIR complies with CEQA Guidelines sections 15122 through 15131 and consists of the following:

Chapter 1: Introduction

Chapter 2: Project Description

Chapter 3: Environmental Setting, Impacts and Mitigation Measures

Chapter 4: Alternatives

Chapter 5: Other CEQA Topics

Chapter 6: References

Chapter 7: Acronyms

Appendix A: Notice of Preparation/Initial Study

Appendix B: Comments Received on the Notice of Preparation/Initial Study

1.2 Executive Summary of ~~DRAFT~~ Final EIR

1.2.1 Executive Summary – Chapter 2: Project Description

The BAAQMD has jurisdiction of an area encompassing 5,600 square miles. The Air District includes all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties, and portions of southwestern Solano and southern Sonoma counties. The San Francisco Bay Area is characterized by a large, shallow basin surrounded by coastal mountain ranges tapering into sheltered inland valleys. The Basin is bounded by the Pacific Ocean to the west and includes complex terrain consisting of coastal mountain ranges, inland valleys and bays.

In response to state and federal requirements and guidelines, air quality planning in the Bay Area to date has been performed on a pollutant by pollutant basis, with an emphasis on ozone planning. The United States Environmental Protection Agency (U.S. EPA) has been moving to gradually embrace the concept of planning on a multi-pollutant basis. BAAQMD has taken a multi-pollutant control strategy approach for developing the 2010 CAP. The multi-pollutant plan addresses ozone, particulate matter, air toxics, and greenhouse gases via an integrated control strategy that is aimed at ozone planning requirements while identifying the benefits and disadvantages of the control strategy on each of the pollutants.

The California and national governments have established ambient air quality standards (AAQS) for ground level ozone (and other air pollutants) that are intended to protect human health from ozone's adverse effects. Air quality standards define the maximum amount of a pollutant that can be present in outdoor air without harm to public health. The standards are generally set at levels low enough to protect even the most sensitive individuals in communities. National ambient air quality standards are set by the U.S. EPA, while State standards are set by the California Air Resources Board (CARB).

In April 2004, the U.S. EPA designated regions as attainment and non-attainment areas for the 8-hour standard. These designations took effect on June 15, 2004. The U.S. EPA formally designated the Bay Area as a non-attainment area for the national 8-hour ozone standard, and classified the region as "marginal" according to five classes of non-attainment areas for ozone, which range from marginal to extreme. On November 9, 2005, the U.S. EPA followed up its Phase 1 implementation rule with the Phase 2 rule. The Phase 2 rule outlines the emission controls and planning requirements regions must address in their implementation plans. The U.S. EPA also revoked the 1-hour ozone standard, which had an attainment deadline of November 15, 2005.

The 2010 CAP will include an assessment of the region's progress toward attaining the California ozone standards and reducing exposure to ozone and other pollutants. The 2010 CAP will identify all "feasible measures", as required by the California Clean Air Act (CCAA), for control of ozone precursors that will assist the Bay Area in attaining the California ozone standards and address pollutant transport to downwind regions.

To satisfy California's all "feasible measures" requirements, the Air District reviewed and evaluated 872 potential control measures compiled from a variety of sources. In addition, staff reviewed measures that had previously been considered and rejected during preparation of the Bay Area 2005 Ozone Strategy to see if the rationale for rejecting a measure at that time is still valid for purposes of the 2010 CAP. The 872 measures reviewed included:

- 394 measures from recently-adopted air quality attainment plans.
- 390 measures from the 2005 Ozone Strategy control measure review process.
- 40 measures suggested by the public.
- 48 measures suggested by Air District staff.

The 2010 CAP builds upon the foundation established in earlier ozone plans, including the 2005 Ozone Strategy, that were based upon three major categories of control measures: Stationary Source Measures, Mobile Source Measures, and Transportation Control Measures. The 2010 CAP control strategy also introduces two new control measure categories: Land Use and Local Impacts Measures, and Energy and Climate Measures.

The ~~draft~~ control strategy proposes a total of 55 control measures in five categories, including:

- 18 control measures to reduce emissions from stationary and area sources
- 10 mobile source control measures
- 17 transportation control measures
- 6 land use and local impact control measures
- 4 energy and climate control measures.

1.2.2 Executive Summary – Chapter 3: Environmental Setting, Impacts and Mitigation Measures

CEQA Guidelines section 15125, subdivision (a), requires that an EIR include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the NOP is published. This environmental setting will normally constitute the baseline of physical conditions by which a lead agency determines whether an impact is significant. The description of the environmental setting shall be no longer than is necessary to an understanding of the significant effects of the proposed project and its alternatives.

The CEQA Guidelines also require EIRs to identify significant environmental effects that may result from a proposed project (CEQA Guidelines §15126.2, subd. (a)). Direct and indirect significant effects of a project on the environment should be identified and described, with consideration given to both short- and long-term impacts. If significant adverse environmental impacts are identified, the CEQA Guidelines require a discussion of measures that could either avoid or substantially reduce any adverse environmental impacts to the greatest extent feasible (CEQA Guidelines §15126.4).

Chapter 3 describes the existing environmental setting, analyzes the potential environmental impacts, and recommends mitigation measures, when significant environmental impacts have been identified. In addition, cumulative impacts and mitigation are also addressed. Each of the resources identified as potentially significant in the NOP/IS are analyzed in Chapter 3. Chapter 3 also includes a discussion of the environmental resources where no significant impacts were found.

Every control measure in the 2010 Ozone Strategy was evaluated to determine whether or not it has the potential to generate adverse environmental impacts. A summary of that evaluation is in Table 1-1 (located at the end of Chapter 1). It was determined from the

NOP/IS, that implementation of the 2010 CAP could have significant adverse impacts on the environmental factors of Air Quality, Hazards and Hazardous Materials, Hydrology and Water Quality, and Utilities and Service Systems.

1.2.2.1 Air Quality

The 2008 air quality data from the BAAQMD monitoring stations shows that all monitoring stations were below the California standard and federal ambient air quality standards for CO, NO_2, and SO_2. The Bay Area is designated as a non-attainment area for the federal and state 8-hour ozone standard. The California 8-hour standard was exceeded on 20 days in 2008 in the Air District. The federal 8-hour standard was exceeded on 12 days in 2008.

All monitoring stations were in compliance with the federal PM_{10} standards. The California PM_{10} standards were exceeded on five days in 2008. The Air District exceeded the federal $PM_{2.5}$ standard on 12 days in 2008, most frequently in Vallejo and San Jose. The 2010 CAP is aimed at reducing emissions of ozone, particulate matter (PM_{10} and $PM_{2.5}$), toxic air contaminants and GHG emissions. The health effects associated with criteria pollutants, including ozone, ozone precursors, and particulate matter are addressed in this section.

Global climate change refers to changes in average climatic conditions on the earth as a whole, including temperature, wind patterns, precipitation and storms. The existing setting regarding Greenhouse Gas (GHG) emissions is provided in Section 3.2.1.

Section 3.2.3 evaluates secondary air pollutant emissions that could occur as a consequence of efforts to reduce emissions (e.g., increase emissions from electricity use). Secondary air quality impacts are potential increases in air pollutants that occur indirectly from implementation of control measures in the 2005 Ozone Strategy.

Secondary air quality impacts from increased electricity demand are expected to be less than significant, as well as secondary air quality impacts from control of stationary sources, reformulation of digital printing materials, construction activities, and impacts due to the "weekend effect" and ozone transport. Secondary impacts from increased traffic near localized areas create the potential for localized increases in CO emissions (CO "Hot Spots") and could be significant. For a more detailed summary of air quality impacts see Tables 1-1 and 1-2.

1.2.2.2 Hazards and Hazardous Materials

The goal of the 2010 CAP is to attain and maintain the State ozone standard as well as reducing ambient concentrations of particulate matter, TACs, and GHGs, thus improving air quality and protecting public health. Some of the proposed control measures intended to improve overall air quality may have direct or indirect hazards associated with their implementation. Hazard concerns are related to the potential for fires, explosions or the release of hazardous substances in the event of an accident or upset conditions.

Hazardous materials are stored at facilities that produce certain materials and at facilities where hazardous materials are a part of the production process. Currently, hazardous materials are transported throughout the district in great quantities via all modes of transportation including rail, highway, water, air, and pipeline. The Initial Study for the 2010 CAP identified the use of reformulated products, use of alternative fuels, and use of add-on control devices (e.g., SCRs) that may use hazards materials as possibly increasing the potential for hazards.

Increased usage of alternative fuels (i.e., biofuels, CNG, LNG, LPG, and hydrogen) is not expected to generate significant adverse hazard impacts. Similarly, potential hazard impacts from fuel additives, as well as those from the use of reformulated materials in the digital printing industry, are expected to be less than significant. The hazard impacts associated with the use and transport of aqueous ammonia are also less than significant. Potentially, the hazard impacts associated with the use and transport of anhydrous ammonia required for SCRs due to the implementation of control measures are potentially significant, but mitigation measures are proposed to reduce the potential of this impact to less than significant. For a more detailed summary of hazard impacts see Tables 1-1 and 1-2.

1.2.2.3 Hydrology/Water Quality

The San Francisco Bay Delta system is comprised on the convergence of the Sacramento and San Joaquin Rivers which combine to form the largest estuary on the West Coast of the United States, where fresh water from rivers and numerous smaller tributaries flows out through the Bay into the Pacific Ocean. The San Francisco Bay Estuary (Estuary) encompasses roughly 1,600 square miles, receives runoff from about 40 percent of the land in California (about 60,000 square miles), provides drinking water to approximately two-thirds of California, irrigates as much as 4.5 million acres of farmland, and is surrounded by the nine Bay Area counties. The San Francisco Bay estuary includes deep-water channels, tidelands, and marshlands that provide a variety of habitats for plants and animals.

Surface waters in the Bay Area include freshwater rivers and streams, coastal waters, and estuarine waters. Many of the original drainages toward the San Francisco Bay have been channelized and put underground due to urbanization, though a few remain.

Stormwater pollution occurs when rain comes into contact with materials and picks up and washes contaminants into storm drains, creeks or the Bay. Common sources of pollution include equipment and vehicles that may leak oil, grease, hydraulic fluid or fuel, construction materials and products, waste materials, landscaping runoff containing fertilizers, pesticides or weed killers, and erosion of disturbed soil. Stormwater discharges associated with industrial and construction activities are regulated according to California Code of Regulations Section 402(p) under the National Pollutant Discharge Elimination System (NPDES) permitting system.

Stormwater pollution prevention plans (SWPPPs) are designed to identify and evaluate sources of pollutants associated with industrial and construction activities that may affect the quality of stormwater discharges and authorized non-stormwater discharges from a facility; and to identify and implement site-specific BMPs to reduce or prevent pollutants associated with industrial or construction activities in stormwater discharges or authorized non-stormwater discharges.

The overall goals of water quality regulation according to the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) are to protect and maintain thriving aquatic ecosystems and the resources those systems provide to society, and to accomplish these goals in an economically and socially sound manner.

Water use in the Bay Area is predominantly urban, with more than 50 percent of the use being residential. About 70 percent of the water supply in the San Francisco Bay Hydrologic Region is imported.

No significant water quality impacts were identified from the use of alternative fuels, the increased use of hybrid and electric vehicles, from the use of reformulated solvents associated with the digital printing industry, or from the use of wet gas scrubbers. For a more detailed summary of water quality impacts see Table 1-1 and 1-2.

Impacts of the 2010 CAP on water demand are potentially significant due to add on control equipment, primarily wet gas scrubbers. It is unlikely that reclaimed water can be used at all facilities and that overall water demand would be minimized to 300,000 gallons per day or less. Therefore, the impacts of the 2010 CAP on water demand remain significant. For a more detailed summary of water demand impacts see Table 1-1 and 1-2.

1.2.2.4 Utilities

Electricity: Power plants in California meet approximately 78 percent of the in-state electricity demand; hydroelectric power from the Pacific Northwest provides another seven percent and power plants in the southwestern United States provide another 15 percent.

Local electricity distribution service is provided to customers within the Air District by privately-owned utilities such as PG&E. Many public-owned utilities, such as Alameda Power and Telecom, East Bay Municipal Utility District and the Santa Clara Electric Department also provide service. PG&E is the largest electricity utility in the Bay Area, with a service area that covers all, or nearly all, of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties. PG&E provides approximately 95 percent of the total electricity demand in the Air District.

No significant impacts on electricity demand due to implementation of the 2010 CAP were identified. For a more detailed summary of air quality impacts see Tables 1-1 and 1-2.

Solid/Hazardous Wastes: Permit requirements, capacity, and surrounding land use are three of the dominant factors limiting the operations and life of landfills. Landfills are permitted by the local enforcement agencies with concurrence from the California Integrated Waste Management Board (CIWMB). Local agencies establish the maximum amount of solid waste which can be received by a landfill each day and the operational life of a landfill.

There are three primary classes of landfill sites permitted to receive varying severity of waste materials. Class I sites are facilities that can accept hazardous waste as well as municipal solid waste, construction debris, and yard waste. Class II sites may receive certain designated waste along with municipal solid waste, construction debris, and yard waste. Class III sites can only accept non-hazardous waste, e.g., solid waste construction debris, wood and yard waste, and certain non-hazardous industrial waste. A total of 18 Class III active landfills are located within the Air District with a total capacity of 49,924 tons per day.

There are two hazardous waste (Class I) facilities in California, the Chemical Waste Management Inc. (CWMI) Kettleman Hills facility in King's County, and the Safety-Kleen facility in Buttonwillow (Kern County). Hazardous waste also can be transported to permitted facilities outside of California. About 809,462 tons of hazardous waste was generated in the nine counties that comprise the Air District in 2008. The most common types of hazardous waste generated in the Bay Area include contaminated soils, waste oil and mixed oil, other inorganic solid waste, inorganic solids, unspecified solvent mixture, and asbestos-containing waste. Not all wastes are disposed of in a hazardous waste facility. Many of the wastes generated, including waste oil, are recycled.

No significant adverse impacts on landfill capacity are expected due to early retirement of equipment. No significant impacts on solid/hazardous waste were identified, and specifically from the disposal of batteries, from air pollution control technologies, and from carbon absorption, therefore, impacts are expected to be less than significant. For a more detailed summary of solid/hazardous waste impacts, see Tables 1-1 and 1-2.

Potential Environmental Impacts Found Not To Be Significant: While all the environmental topics required to be analyzed under CEQA were reviewed to determine if the proposed amendments would create significant impacts, the screening analysis (see Appendix A for the NOP/IS) concluded that the following environmental areas would not be significantly adversely affected by the 2010 CAP: aesthetics, agriculture resources, biological resources, cultural resources, geology/soils, land use/planning, mineral resources, noise, population/housing, public services, recreation, and transportation/traffic. ~~The following summarizes the conclusions from the NOP/IS for the environmental resources for which the environmental impacts associated with the implementation of the 2010 CAP were found to be less than significant.~~

1.2.3 Executive Summary – Chapter 4: Alternatives

This EIR provides a discussion of alternatives to the proposed project as required by CEQA. According to the CEQA guidelines, alternatives should include realistic measures to attain the basic objectives of the proposed project and provide means for evaluating the comparative merits of each alternative (CEQA, Guidelines, § 15126.6(a)). In addition, though the range of alternatives must be sufficient to permit a reasoned choice, they need not include every conceivable project alternative (CEQA Guidelines §15126.6(a)).

The possible alternatives to the proposed 2010 CAP are limited by the nature of the project. The Plan fulfills the California Clean Air Act requirements that all regions that do not meet the State ozone standards update plans for attaining the standards every three years. In summary, these plans must include estimates of current and future emissions of particulate matter and the pollutants that form ozone, and a control strategy, including "all feasible measures," to reduce these emissions. The following alternatives to the proposed project were evaluated.

- **Alternative 1 – No Project Alternative:** Under the No Project Alternative, it is assumed that the 2010 CAP will not be implemented. TCMs already approved by the MTC would still occur. However, the control measures currently proposed by the BAAQMD as part of the 2010 CAP would not be implemented including the stationary source measures, the mobile source control measures, the land use measures and the energy and climate measures (see Table 2-1). None of the Project Objectives would be achieved under the No Project Alternative.

- **Alternative 2 – Ozone Control Strategy Only:** Under Alternative 2, only those control measures that are required to be implemented to comply with the California Clean Air Act requirements for ozone would be implemented; therefore, control measures that would reduce emissions of NOx and VOCs would still be implemented. Control measures that would reduce particulate matter, toxic air contaminants and GHG emissions (only) would not be implemented. Under Alternative 2, some of the Project Objectives outlined in Section 4.2 would be achieved including compliance with the California Clean Air Act for ozone and compliance with the ozone transport mitigation requirements. The other objectives of reducing ambient concentrations of particulate matter, toxic air contaminants, and GHG emissions would not be achieved under Alternative 2.

- **Alternative 3 – Reduce Criteria Pollutants Only:** Under Alternative 3, those control measures that would reduce emissions of criteria pollutants (i.e., NOx, VOCs and particulate matter) would be implemented. Control measures that would reduce TACs and GHG emissions would not be implemented. Under Alternative 3, some of the Project Objectives outlined in Section 4.2 would be achieved including compliance with the California Clean Air Act for ozone,

compliance with the ozone transport mitigation requirements, and reducing ambient concentrations of particulate matter. The other objectives of reducing toxic air contaminants and GHG emissions would not be achieved under Alternative 3.

Pursuant to CEQA Guidelines §15126.6(e)(2), if the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives. Since the no project alternative would not achieve the long-term benefits of the 2010 CAP or any of the objectives of the 2010 CAP, and, technically, is not a legally viable alternative, it is not the environmentally superior alternative.

Among the alternatives analyzed, the environmentally superior alternative is considered to be Alternative 2, Ozone Control Strategy Only. Under Alternative 2, most of the emission reductions associated with the proposed project would occur and the potentially significant impact of increased water demand would be eliminated. Thus, anticipated air quality benefits achieved under Alternative 2 would be similar to the proposed project, so Alternative 2 is considered the environmentally superior alternative. However, the proposed project is expected to be environmentally superior to all of the alternatives analyzed, including Alternative 2, because the particulate matter emission reductions would be greater under the proposed project.

1.2.4 Executive Summary – Chapter 5: Other CEQA Topics

1.2.4.1 Relationship between Short-term Uses and Long-Term Productivity

Implementing the 2010 CAP is not expected to achieve short-term goals at the expense of long-term environmental productivity or goal achievement. The proposed CAP provides a strategy for making progress toward attainment of the California ozone standards in the Bay Area. By showing progress toward attainment of the State ambient air quality standards, the Strategy is expected to enhance short and long-term environmental productivity in the region. Implementing the 2010 CAP would not narrow the range of beneficial uses of the environment. Because no short-term environmental benefits are expected at the expense of achieving long-term environmental goals, there is no justification for delaying the proposed action. This project needs to be implemented as the BAAQMD is required by the CCAA to formally adopt a triennial update to the region's strategy for achieving the State ambient air quality standards. The BAAQMD is proceeding with the 2010 CAP pursuant to this mandate.

1.2.4.2 Significant Irreversible Environmental Changes

Implementation of the 2010 CAP is not expected to result in significant irreversible adverse environmental changes. The 2010 CAP would place only an incremental demand on nonrenewable and limited resources, such as energy and water supplies, relative to the accelerated rate of use of these resources due to population growth and increased consumer demand.

Some of the control measures in the 2010 CAP could result in potentially significant impacts to localized air quality and water demand. The extent of these potential impacts could not be fully analyzed due to the lack of specificity of the control measures, the type of control that may be implemented by the regulated community, and the uncertainty of their implementation. Mitigation measures have been identified that could minimize these potentially significant impacts.

The 2010 CAP would result in reduced emissions of ozone precursors, particulate matter, toxic air contaminants, and GHG emissions thereby improving air quality and related public health. The project will result in significantly reduced emissions of air pollutants, thereby improving air quality and related public health. The 2010 CAP also includes GHG emission reductions that help the Bay Area achieve the AB32 goals, reducing the overall impact of global climate change.

1.2.4.3 Growth-Inducing Impacts

Growth-inducing impacts can generally be characterized in three ways: (1) a project includes sufficient urban infrastructure to result in development pressure being placed on less developed adjacent areas; (2) a large project affects the surrounding community by producing a "multiplier effect," which results in additional community growth; and (3) a new type of development is allowed in an area, which subsequently establishes a precedent for additional development of a similar character.

None of the above scenarios characterize the proposed project. The control measures contained in the 2010 CAP accommodate the projected growth for the region – they are not the cause of residential, commercial, industrial, and infrastructure development. The 2010 CAP does not change jurisdictional authority or responsibility concerning land use or property issues (Section 40716 of the California Health and Safety Code) and, therefore, is not considered to be growth-inducing.

TABLE 1-1

Summary of Environmental Impacts, Mitigation Measures, and Residual Impacts

IMPACT	MITIGATION MEASURES	RESIDUAL IMPACT
AIR QUALITY		
Secondary air quality impacts from increased electricity demand are expected to be less than significant.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
No significant secondary air quality impacts from control of stationary sources have been identified.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
No significant secondary air quality impacts from reformulation of digital printing materials have been identified.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
No significant secondary air quality impacts associated with construction activities have been identified.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
Air quality impacts due to the "weekend effect" and ozone transport are not significant.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
Secondary impacts from increased traffic near localized areas create the potential for localized increases in CO emissions (CO "Hot Spots") and could be significant.	The increase in localized emissions can be reduced by encouraging non-drive access to transit centers and implementation of development that is more conducive to walking and bicycling. Project level environmental analysis on the implementation of the various control measures will be required to determine the potential for impacts at specific locations.	The potential for localized increases in CO emissions is considered a significant impact.

TABLE 1-1

Summary of Environmental Impacts, Mitigation Measures, and Residual Impacts (continued)

IMPACT	MITIGATION MEASURES	RESIDUAL IMPACT
AIR QUALITY (continued)		
Secondary impacts from miscellaneous sources were determined to be less than significant.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
The impacts associated with non-criteria pollutants were determined to be less than significant.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
The impacts of the 2010 CAP are expected to reduce emissions of compounds that contribute to global warming and ozone so no significant impacts were identified.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
HAZARDS		
The hazard impacts associated with the use and transport of aqueous ammonia are less than significant. The hazard impacts associated with the use and transport of anhydrous ammonia required for SCRs due to the implementation of control measures are potentially significant.	The use of aqueous ammonia at concentrations less then 20 percent is recommended.	The use of aqueous ammonia at concentrations less then 20 percent by volume is expected to reduce hazard impacts to less than significant.
Increased usage of alternative fuels (i.e., biofuels, CNG, LNG, LPG, and hydrogen) is not expected to generate significant adverse hazard impacts.	Users of alternative fuels shall comply with existing regulations and recommended safety procedures assuring hazards impacts associated with the use of alternative clean-fuels to be the same or less than those of conventional fuels.	Significant hazard impacts are not expected from the increased use of alternative fuels.

TABLE 1-1

Summary of Environmental Impacts, Mitigation Measures, and Residual Impacts (continued)

IMPACT	MITIGATION MEASURES	RESIDUAL IMPACT
HAZARDS (continued)		
Potential impacts from fuel additives are expected to be less than significant	Federal regulations require that additives evaluated for potential health impacts associated with exposure, secondary air impacts (including generation of toxic air contaminants), hazard impacts, impacts on water quality, and any other potential environmental impacts that could occur, prior to approving the additives to be used in any fuel.	Impacts are expected to be less than significant.
Hazard impacts associated with the use of reformulated materials in the digital printing industry are expected to be less than significant	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
HYDROLOGY/WATER QUALITY		
No significant hydrology/water quality impacts were identified from the use of alternative fuels.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
No significant hydrology/water quality impacts were identified from the increased use of hybrid and electric vehicles.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
No significant hydrology/water quality impacts were identified from the use of reformulated solvents associated with the digital printing industry.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
No significant water quality impacts were identified from the use of wet gas scrubbers.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.

TABLE 1-1

Summary of Environmental Impacts, Mitigation Measures, and Residual Impacts (concluded)

IMPACT	MITIGATION MEASURES	RESIDUAL IMPACT
HYDROLOGY/WATER QUALITY (CONTINUED)		
Impacts of the 2010 CAP on water demand are potentially significant due to add on control equipment, primarily wet gas scrubbers.	Use reclaimed water to the extent feasible at facilities that install WGS to mitigate the increase in water demand and conduct an engineering review of the WGS to assure that a minimal amount of water is used.	It is unlikely that reclaimed water can be used at all facilities and that overall water demand would be minimized to 300,000 gallons per day or less. Therefore, the impacts of the 2010 CAP on water demand remain significant.
UTILITIES AND SERVICE SYSTEMS		
No significant impacts on electricity demand were identified.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
No significant impacts on solid/hazardous waste were identified, and specifically from the disposal of batteries.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
No significant impacts on solid/hazardous waste were identified, and specifically from air pollution control technologies.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.
No significant impacts on solid/hazardous waste were identified, and specifically from carbon absorption.	None required since no significant impacts were identified. However, it is recommended that recycling and reusing activated carbon should be required to minimize the amount of spent carbon waste being transferred to landfills.	Impacts are expected to be less than significant.
No significant adverse impacts on landfill capacity are expected due to early retirement of equipment.	None required since no significant impacts were identified.	Impacts are expected to be less than significant.

TABLE 1 -2
Bay Area 2010 Clean Air Plan ~~Draft~~ Control Measures

Control Measure Number	Source Category	Description	Pollutant	Not Signif.	Potential Impact						
					Air			Hydrology/ Water Quality	Utilities and Service Systems		
					Secondary	GHG	Hazard		Energy	Water	Solid/Haz Waste
Stationary and Area Source Measures											
SSM 1	Metal-Melting Facilities	Limit emissions of organic compounds, fine particulates, toxic compounds and odors from foundry operations and metal melting in the District			X	X			X		X
SSM 2	Digital Printing	Establish VOC limits or control requirements for inkjet, electro-photographic and other digital printing technologies.	ROG		X	X	X			X	
SSM 3	Livestock Waste	Establish management practices to reduce ROG, ammonia, PM, GHG.	ROG, GHG, ammonia		X	X			X		X
SSM 4	Natural Gas Processing and Distribution	Reduce emissions from natural gas production facilities.	ROG, TACs, GHG (CH_4)	3							
SSM 5	Vacuum Trucks	Require carbon or other control technology on vacuum trucks.	ROG,		X	X			X		X
SSM6	General Particulate Matter Weight Rate Limitation	Reduce particulate weight limitation as a function of exhaust gas volume and/or as a function of process weight rate.	PM					X	X	X	
SSM 7	Open Burning	Further limit agricultural burning of some crops to be burned on a given day.	ROG,PM, NOx	1, 2							
SSM 8	Coke Calcining	Reduce SOx emissions from coke calcining.	SO_X,		X	X		X	X	X	X
SSM 9	Cement Kilns	Further limit NOx and SOx from cement production and reduce toxic emissions.	NOx, SO_X,		X	X	X	X	X	X	X
SSM 10	Refinery Boilers and Heaters	Further reduce NOx emissions from refinery boilers, heaters and steam generators.	NOx,		X	X	X		X		X
SSM 11	Residential Fan Type Furnaces	Reduce allowable NOx limits for residential furnaces.	NOx		X	X			X		X
SSM 12	Space Heating	Establish NOx limits for industrial and commercial space heating.	NOx		X	X			X		X
SSM 13	Dryers, Ovens, Kilns	Establish NOx limits for industrial dryers, ovens, and kilns.	NOx		X	X	X		X		X

TABLE 1-2
Bay Area 2010 Clean Air Plan ~~Draft~~ Control Measures (continued)

Control Measure Number	Source Category	Description	Pollutant	Not Signif.	Potential Impact						
					Air			Hydrology/ Water Quality	Utilities and Service Systems		
					Secondary	GHG	Hazard		Energy	Water	Solid/Haz Waste
SSM 14	Glass Furnaces	Reduce NOx limits in Regulation 9, Rule 12 for glass furnaces.	NOx		X	X	X		X		X
SSM 15	Greenhouse Gases in Permitting - Energy Efficiency	Consider greenhouse gas (GHG) emissions during permitting of new or modified stationary sources. This includes (1) adopting GHG CEQA significance threshold for stationary sources, and (2) requiring GHG reduction measures in ministerial permits.									X
SSM 16	Revise Regulation 2, Rule 2: New Source Review	Amend Reg. 2, Rule 2 to address the District's anticipated non-attainment status of the 24-hour $PM_{2.5}$ National Ambient Air Quality Standard.			X	X			X		X
SSM 17	Revise Regulation 2, Rule 5: New Source Review for Air Toxics	Revise District permitting requirements in Reg. 2, Rule 5, New Source Review of TACs, to impose more stringent standards based on revisions to OEHHA risk factors and methodologies. For Priority CARE Communities, prevent cumulative impacts by tracking the toxicity-weighted emissions from all sources in the identified communities.			X	X			X		X
SSM 18	Revise Air Toxics "Hot Spots" Program	Revise the District's Air Toxics Hot Spots program to incorporate more stringent risk reduction requirements from existing sources.			X	X			X		X

TABLE 1-2
Bay Area 2010 Clean Air Plan ~~Draft~~ Control Measures (continued)

Control Measure Number	Source Category	Description	Pollutant	Not Signif.	Potential Impact						
					Air		Hazard	Hydrology/ Water Quality	Utilities and Service Systems		
					Secondary	GHG			Energy	Water	Solid/Haz Waste
Transportation Control Measures											
TCM A-1	Improve Local and Areawide Bus Service	Improve transit by providing new Express Bus or Bus Rapid Transit on major travel corridors, fund replacement of older buses, and implementing Transit Priority Measures on key transit routes.	All	4							
TCM A-2	Improve Local and Regional Rail Service	Improve rail service by sustaining and expanding local and regional rail services and by providing funds to maintain rail-cars, stations, and other rail capital assets.	All	4							
TCM B-1	Implement Freeway Performance Initiative	Improve the performance and efficiency of freeway and arterial systems through operational improvements, including include implementing the Freeway Performance Initiative, the Arterial Management Program and the Bay Area Freeway Service Patrol.	All	4							
TCM B-2	Improve Transit Efficiency and Use	Improve transit efficiency and use through continued operation of 511 Transit, and full implementation of TransLink fare payment system and the Transit Hub Signage Program.	All	4							
TCM B-3	Bay Area Express Lane Network	Introduce roadway pricing on Bay Area highways through the implementation of an express lane network, also known as a High Occupancy Toll (HOT) lane network.	All	4							
TCM B-4	Goods Movement Improvements and Emission Reduction Strategies	Improve goods movement and reduce emissions from diesel equipment through implementation of the Bay Area's Trade Corridors Improvement Fund (TCIF) projects and various BAAQMD funding programs to replace or retrofit diesel equipment.	All	4							

TABLE 1-2
Bay Area 2010 Clean Air Plan ~~Draft~~ Control Measures (continued)

Control Measure Number	Source Category	Description	Pollutant	Not Signif.	Potential Impact						
					Air		Hazard	Hydrology/ Water Quality	Utilities and Service Systems		
					Secondary	GHG			Energy	Water	Solid/Haz Waste
Transportation Control Measures (continued)											
TCM C-1	Support Voluntary Employer-Based Trip Reduction Program	Support voluntary employer trip-reduction programs through implementation of the 511 Regional Rideshare Program and Congestion Management Agency rideshare programs, BAAQMD's Spare the Air Program, encouraging cities to adopt transit benefit ordinances, and support Bay Area shuttle service providers.	All	4							
TCM C-2	Implement Safe Routes to Schools and Safe Routes to Transit	Facilitate safe routes to schools and transit by providing funds and working with transportation agencies, local governments, schools, and communities to implement safe access for pedestrians and cyclists.	All	4							
TCM C-3	Promote Rideshare Services and Incentives	Promote rideshare services and incentives through the implementation of the 511 Regional Rideshare Program and Congestion Management Agency rideshare programs including marketing rideshare services, operating rideshare information call center and website, and providing vanpool support services.	All	4							
TMC C-4	Conduct Public Outreach and Education	Educate the public about the air quality, environmental, and social benefits of carpooling, vanpooling public transit, biking, walking, and telecommuting through the Spare the Air campaign and Transportation Climate Action Campaign.	All	1,2							
TCM C-5	Promote Smart Driving/Speed Moderation	Educate the public about the air quality and climate protection benefits of reducing high-speed driving and observing posted speed limits.	All	1, 3							
TCM D-1	Improve Bicycle Access and Facilities	Expand bicycle facilities serving transit hubs, employment sites, educational and cultural facilities, residential areas, shopping districts, and other activity centers.	All	4							

TABLE 1-2
Bay Area 2010 Clean Air Plan ~~Draft~~ Control Measures (continued)

Control Measure Number	Source Category	Description	Pollutant	Not Signif.	Potential Impact						
					Air		Hazard	Hydrology/ Water Quality	Utilities and Service Systems		
					Secondary	GHG			Energy	Water	Solid/Haz Waste
Transportation Control Measures (continued)											
TCM D-2	Improve Pedestrian Access and Facilities	Provide funding for projects to improve pedestrian access to transit hubs, employment sites, educational and cultural facilities, residential areas, shopping districts, and other activity centers.	All	4							
TCM D-3	Support Local Land Use Strategies	Promote land use patterns, policies, and infrastructure investments that support mixed-use, transit-oriented development that reduce motor vehicle dependence and facilitate walking, bicycling and transit use.	All	4							
TCM E-1	Value Pricing Strategies	Test and implement value pricing (congestion pricing) on Bay Area toll bridges to manage travel demand during congested periods. Measure may also include value pricing in the City of San Francisco.	All	1, 2							
TCM E-2	Parking Pricing and Management Strategies	Promote policies to implement market-rate pricing of parking facilities, reduce parking requirements for new development projects, parking "cash-out", unbundling of parking in residential and commercial leases, shared parking at mixed-use facilities, etc.	All	1,2							
TCM E-3	Implement Transportation Pricing Reform	Develop a regional transportation pricing strategy that includes policy evaluation and implementation. Pricing policies to be evaluated include gasoline taxes, bridge tolls, congestion pricing, parking pricing, HOT lanes, VMT or carbon fees, pay-as-you-drive insurance, etc.	All	1, 2							

TABLE 1-2
Bay Area 2010 Clean Air Plan ~~Draft~~ Control Measures (continued)

Control Measure Number	Source Category	Description	Pollutant	Not Signif.	Potential Impact						
					Air		Hazard	Hydrology/ Water Quality	Utilities and Service Systems		
					Secondary	GHG			Energy	Water	Solid/Haz Waste
Mobile Source Control Measures (On-Road Light-Duty Vehicles)											
MSM A-1	Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles	Expand the use of Super Ultra-low Emission and Partial-Zero emission light-duty passenger vehicles and trucks within the Bay Area.	All		X	X	X	X	X		X
MSM A-2	Zero Emission Vehicles and Plug-in Hybrids	Expand the use of Zero Emission and Plug-in Hybrid passenger vehicles and light-duty trucks within the Bay Area.	All		X	X			X		
MSM A-3	Green Fleets for Light, Medium & Heavy-Duty Vehicles	Develop a green fleet certification component of the Bay Area Green Business program, promote best practices for green fleets, and evaluate existing grant programs to ensure incentive funding is directed towards fleets and vehicles that meet stringent fuel economy standards.	All		X	X	X	X	X		X
MSM A-4	Replacement or Repair of High-Emitting Vehicles	Enhancements to the Vehicle Buy Back program to increase participation from car owners; e.g., via higher cash payments and/or increased marketing. Consider including motorcycles, or other potential enhancements, e.g. implementing the SCAQMD's vehicle repair program. Pursue improvements to the District's Smoking Vehicle program.	All								X

TABLE 1-2
Bay Area 2010 Clean Air Plan ~~Draft~~ Control Measures (continued)

Control Measure Number	Source Category	Description	Pollutant	Not Signif.	Potential Impact						
					Air			Hydrology/ Water Quality	Utilities and Service Systems		
					Secondary	GHG	Hazard		Energy	Water	Solid/Haz Waste
Mobile Source Control Measures (On-Road Heavy-Duty Vehicles)											
MSM B-1	HDV Fleet Modernization	Provide incentives to accelerate the replacement or retrofit of on-road heavy-duty diesel engines in advance of requirements for the ARB in-use heavy-duty truck regulation.	TAC's, NOx, ROG, PM, ammonia								X
MSM B-2	Low NOx Retrofits for In-Use Engines	Provide cash incentives to install retrofit devices that reduce NOx emissions from 1994-2006 heavy-duty engines. Continue requiring software updates to engine control modules in model year 1993-1998 diesel trucks as a condition of all heavy duty vehicle retrofit grants.	NOx,		X	X	X				X
MSM B-3	Efficient Drive Trains	Encourage development and demonstration of hybrid drive trains for medium- and heavy-duty vehicles, in partnership with ARB, CEC and other existing programs.	All		X	X			X		
Mobile Source Control Measures (Off-Road Equipment)											
MSM C-1	Construction and Farming Equipment	Reduce emissions from construction and farming equipment by 1) cash incentives to retrofit construction and farm equipment with diesel particulate matter filters or upgrade to a Tier III or IV off-road engine; 2) work with CARB, CEC and others to develop more fuel efficient off-road engines and drive-trains; 3) work with local communities, contractors and developers to encourage the use of renewable alternative fuels in applicable equipment.	ROG, NOx, PM, ammonia, TAC's, GHG		X	X	X	X	X		X
MSM C-2	Lawn & Garden Equipment	Reduce emissions from lawn and garden equipment through voluntary retirement and replacement programs.	ROG, NOx, PM		X	X			X		X
MSM C-3	Recreational Vessels	Reduce emissions from recreational vessels through voluntary retirement and replacement programs.	ROG, NOx, PM, GHG		X	X			X		X

TABLE 1-2
Bay Area 2010 Clean Air Plan ~~Draft~~ Control Measures (continued)

Control Measure Number	Source Category	Description	Pollutant	Not Signif.	Potential Impact						
					Air		Hazard	Hydrology/ Water Quality	Utilities and Service Systems		
					Secondary	GHG			Energy	Water	Solid/Haz Waste
Land Use and Local Impact Control Measures											
LUM 1	Goods Movement	Reduce diesel PM and GHG emissions from goods movement through targeted enforcement of CARB diesel ATCMs in impacted communities, partnerships with ports and other stakeholders, increased signage indicating truck routes and anti-idling rules, shifts in freight transport mode, shore-side power for ships, and improvements in the efficiency of engine drive trains, distribution systems (roadways, logistic systems) and land use patterns.	ROG, NOx, CO_2, PM, GHG		X	X	X		X		X
LUM 2	Indirect Source Review Rule	Develop an indirect source review rule to reduce construction and vehicular emissions associated with new or modified land uses in the Bay Area.	All		X	X	X	X	X		X
LUM 3	Enhanced CEQA Program	1) Develop revised CEQA guidelines and thresholds of significance and 2) expand District review of CEQA documents.	All		X	X	X	X	X	X	X
LUM 4	Land Use Guidelines	Provide guidance to local governments re: 1) air quality and greenhouse gases in General Plans, and 2) how to address and mitigate population exposure related to infill development.	ROG, NOx, PM, CO_2, GHG,		X	X	X		X		X
LUM 5	Reduce Risk from Stationary Sources in Impacted Communities	Establish a system to track cumulative health risks from all emission sources in impacted communities (as identified by the District's CARE program) in order to monitor progress in reducing population exposure.			X	X			X		X
LUM 6	Enhanced Air Quality Monitoring	Expand monitoring program to provide better local air quality monitoring data in impacted communities.	na	3							

TABLE 1-2
Bay Area 2010 Clean Air Plan ~~Draft~~ Control Measures (continued)

Control Measure Number	Source Category	Description	Pollutant	Not Signif.	Potential Impact						
					Air			Hydrology/ Water Quality	Utilities and Service Systems		
					Secondary	GHG	Hazard		Energy	Water	Solid/Haz Waste
Energy and Climate Measures											
ECM 1	Energy Efficiency	Provide 1) education to increase energy efficiency; 2) technical assistance to local governments to adopt and enforce energy-efficient building codes; and 3) incentives for improving energy efficiency at schools.	ROG, NOx, PM, $SO_{X,}$ GHG								X
ECM 2	Renewable Energy	Promote distributed renewable energy generation (solar, micro wind turbines, cogeneration, etc.) on commercial and residential buildings, and at industrial facilities	ROG, NOx, PM, $SO_{X,}$ GHG			X			X		
ECM 3	Urban Heat Island Mitigation	Mitigate the "urban heat island" effect by requiring and promoting cool roofing, cool paving, and other strategies.	ROG, NOx, PM,, GHG			X					
ECM 4	Tree-Planting	Promote planting of low-VOC-emitting shade trees to reduce urban heat island effects, save energy, absorb CO_2 and other air pollutants.	ROG, PM, $SO_{X,}$ GHG, CO_2	1							

1. Control technologies do not generate significant impacts
2. Changes in operating practices with no impact identified
3. Changes in testing, inspection, or enforcement procedures with no impact
4. TCMs that were evaluated as part of the Transportation 2035 Plan EIR (2010) prepared by the MTC

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CHAPTER 2

PROJECT DESCRIPTION

2.0 Project Description

2.1 Introduction

The Bay Area Air Quality Management District (District or BAAQMD), in conjunction with the Metropolitan Transportation Commission and the Association of Bay Area Governments, is preparing the Bay Area 2010 Clean Air Plan (CAP). The proposed CAP provides a strategy for making progress toward attainment of the California ozone standards in the Bay Area. The 2010 CAP is an update of and progress report for the 2005 Ozone Strategy in compliance with the California Clean Air Act (CCAA).[1]

In response to state and federal requirements and guidelines, air quality planning in the Bay Area to date has been performed on a pollutant by pollutant basis, with an emphasis on ozone planning. However, in the past several years, there has been growing interest in the concept of multi-pollutant air quality planning. In January 2004, the National Research Council issued recommendations calling for air quality agencies to pursue a multi-pollutant, risk-based, "one atmosphere" approach for air quality planning. The United States Environmental Protection Agency (U.S. EPA) has been moving to gradually embrace the concept of planning on a multi-pollutant basis. This update of the 2005 Ozone Strategy will provide a multi-pollutant approach to air quality planning in the Bay Area. Although there are no requirements to develop a multi-pollutant plan at this time, the multi-pollutant framework offers a number of potential benefits. In its role as a multi-pollutant plan, the CAP addresses ozone, particulate matter, air toxics, and greenhouse gases via an integrated control strategy that complies with State ozone planning requirements, while identifying co-benefits or disbenefits of the control strategy on each of the pollutants.

Ozone is the principal component of photochemical "smog." Ozone is highly reactive, and at high concentrations near ground level, can be harmful to public health.[2] The 2010 CAP is a strategy to continue to reduce emissions of the pollutants that form ground-level ozone, and to assure that the region attains and maintains compliance with State ozone standards.

Ozone is not emitted directly from pollution sources. Instead, ozone is formed in the atmosphere through complex chemical reactions between hydrocarbons (also known as "reactive organic gases" or "volatile organic compounds"), and nitrogen oxides, in the presence of sunlight. Ozone levels are usually highest on hot, windless summer afternoons, especially in inland valleys.

[1] It is important to note that the 2010 CAP differs from a general plan, which is adopted by local government to direct and control land use. Unlike a general plan, the CAP is not a prerequisite to the agency actions described in the plan. The Air District has authority to adopt regulations regardless whether they implement a control measure described in a plan. This has some significance for CEQA analysis because the impacts of the 2010 CAP can occur regardless whether the CAP is adopted.

[2] While ground level ozone is a harmful air pollutant, ozone in the upper atmosphere is beneficial because it blocks the sun's harmful ultraviolet rays. The 2010 CAP focuses on reducing *ground level* ozone only.

Ozone can damage the tissues of the lungs and respiratory tract. High concentrations of ozone irritate the nose, throat and respiratory system and constrict the airways. Ozone also can aggravate other respiratory conditions such as asthma, bronchitis and emphysema. Repeated exposure to high ozone levels can make people more susceptible to respiratory infection and lung inflammation, and permanently damage lung tissue. Children are most at risk, as they are active outdoors in the summer, when ozone levels are highest. Seniors and people with respiratory illnesses are also especially sensitive to ozone's effects. Even healthy adults, working or exercising outdoors during high ozone levels, can be affected. Ozone also damages trees, agricultural crops and other plants.

The California and national governments have established ambient air quality standards (AAQS) for ground level ozone (and other air pollutants) that are intended to protect human health from ozone's adverse effects. Air quality standards define the maximum amount of a pollutant that can be present in outdoor air without harm to public health. The standards are generally set at levels low enough to protect even the most sensitive individuals in our communities. National ambient air quality standards are set by the U.S. EPA, while State standards are set by the California Air Resources Board (CARB).

The BAAQMD operates a network of air quality monitoring stations throughout the region to constantly monitor air quality conditions. Data from the air monitoring stations allows the Air District to determine whether the region meets State and national ambient air quality standards and to track progress in improving air quality.

The one-hour national ambient air quality standard for ozone is 0.12 parts per million (ppm). The California one-hour ozone standard is more stringent than the national standard, and is set at 0.09 ppm. An exceedance of the national or State standard occurs if and when ozone concentrations at any Air District monitoring station equal or exceed the national or State standard, respectively, over a one-hour period. In 2008, the national one-hour ozone standard was not exceeded, while the State standard was exceeded on nine days.

In July 1997, the U.S. EPA established a new national ozone standard. The 8-hour standard became effective in June 2004. Defined as "concentration-based," the national ozone standard is set at 85 parts per billion averaged over eight hours. The determination of whether a region attains the standard is based on the 3-year average of the annual 4th highest daily maximum 8-hour ozone concentration. This national 8-hour standard is considered to be more health protective because it protects against health effects that occur with longer exposure to lower ozone concentrations.

In April 2004, the U.S. EPA designated regions as attainment and nonattainment areas for the 8-hour standard. These designations took effect on June 15, 2004. The U.S. EPA formally designated the Bay Area as a nonattainment area for the national 8-hour ozone standard, and classified the region as "marginal" according to five classes of nonattainment areas for ozone, which range from marginal to extreme. On November 9, 2005, the U.S. EPA followed up its Phase 1 implementation rule with the Phase 2 rule. The Phase 2 rule outlines the emission controls and planning requirements regions must

address in their implementation plans. The U.S. EPA also revoked the 1-hour ozone standard, which had an attainment deadline of November 15, 2005.

At present, US EPA has not finalized a new proposed 75 parts per billion 8-hour standard. Final signature on this proposed standard is anticipated by August 31, 2010, and designations will be effective August 31, 2011.

California Planning Requirements

The California Clean Air Act requires regions that do not meet the California one-hour or eight-hour ozone standards to prepare plans for attaining the standard, and to update these plans every three years. These plans must include estimates of current and future emissions of the pollutants that form ozone. Plans are also required to achieve a reduction in district-wide emissions of 5 percent per year for ozone precursors (Health & Safety Code Section 40914); if an air district is unable to achieve a 5 percent annual reduction, the district must propose a control strategy which includes all "feasible measures" to reduce these emissions. Like other air districts throughout the state, the Bay Area AQMD has not been able to demonstrate a 5 percent reduction per year in ozone precursors, so the CAP complies with the requirement to include all feasible control measures. In addition, plans must also propose measures to reduce transport of air pollutants to downwind regions. California has not set a deadline to attain the California ozone standards.

The first Bay Area plan for the California ozone standards was the 1991 Clean Air Plan. Subsequently, the Clean Air Plan was updated and revised in 1994, 1997, 2000 and 2005. Each of these triennial updates proposed additional measures to reduce emissions from a wide range of sources, including industrial and commercial facilities, motor vehicles, and "area sources." The 2005 Ozone Strategy was the last triennial update to the Bay Area strategy to achieve the State ozone standards.

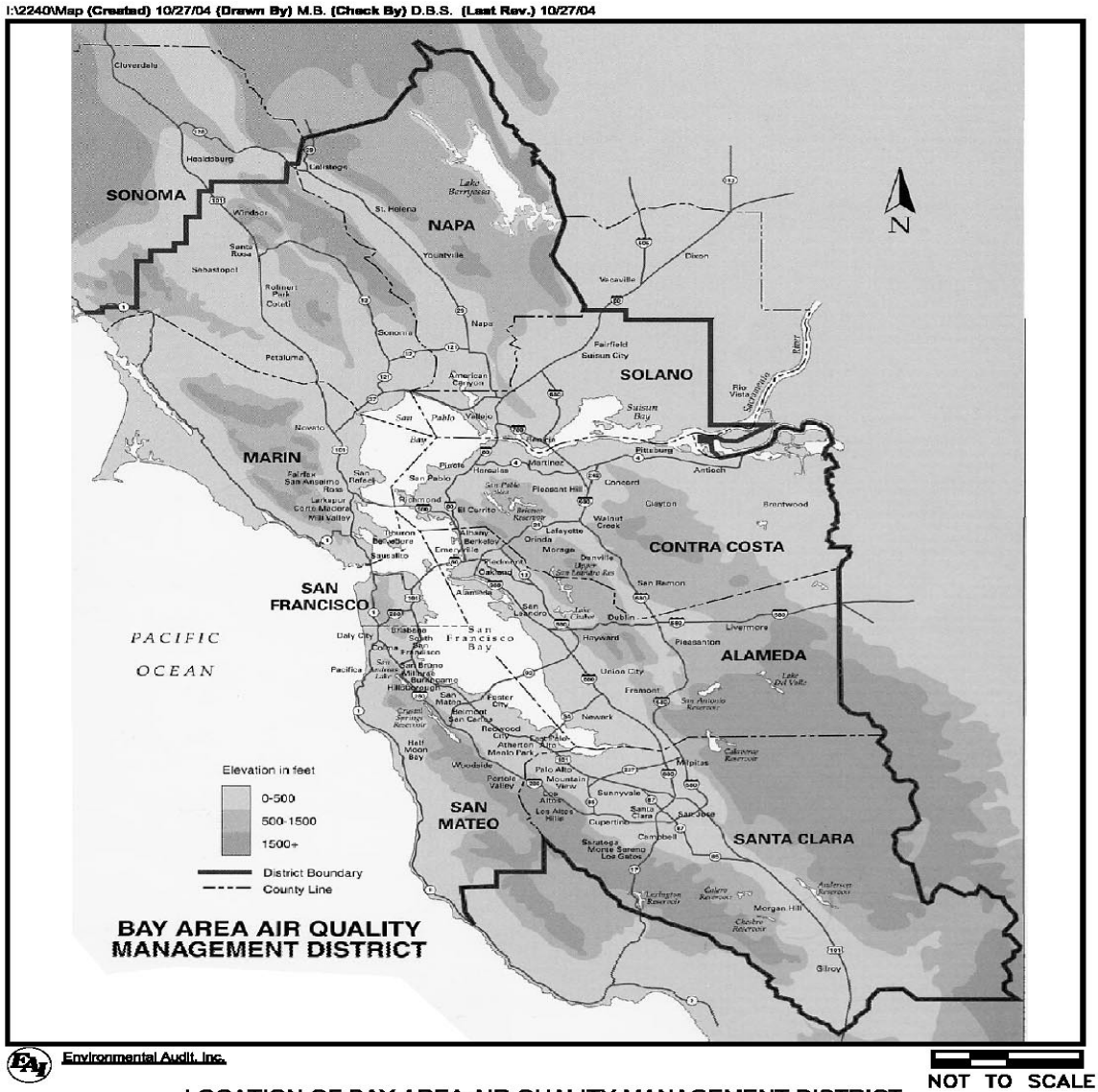
BAAQMD has taken a multi-pollutant control strategy approach for developing the 2010 CAP. The multi-pollutant plan addresses ozone, particulate matter, air toxics, and greenhouse gases via an integrated control strategy that is aimed at ozone planning requirements while identifying the benefits and disadvantages of the control strategy on each of the pollutants.

Purpose and Organization of the 2010 CAP

The most recent plan for the State ozone standard was the Bay Area 2005 Ozone Strategy. With the 2010 CAP, the Air District is addressing the planning requirements for State ozone standards. Volume 1 of the CAP describes the scope and objectives of the CAP, provides technical information regarding Bay Area air quality and emissions, and provides a summary and discussion of the CAP control strategy. Volume 2 of the CAP provides descriptions of the individual control measures that comprise the CAP control strategy.

2.2 Project Location

The BAAQMD has jurisdiction over an area encompassing 5,600 square miles. The Air District includes all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties, and portions of southwestern Solano and southern Sonoma counties. The San Francisco Bay Area is characterized by a large, shallow basin surrounded by coastal mountain ranges tapering into sheltered inland valleys. The combined climatic and topographic factors result in increased potential for the accumulation of air pollutants in the inland valleys and reduced potential for buildup of air pollutants along the coast. The Basin is bounded by the Pacific Ocean to the west and includes complex terrain consisting of coastal mountain ranges, inland valleys and bays (see Figure 2-1).



LOCATION OF BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Figure 2-1

2.3 Proposed Control Strategy

The 2010 CAP will include an assessment of the region's progress toward attaining the California ozone standards and reducing exposure to ozone and other pollutants. The 2010 CAP will identify all "feasible measures," as required by the CCAA, for control of ozone precursors that will assist the Bay Area in attaining the California ozone standards and address pollutant transport to downwind regions. The CAP will be prepared in accordance with applicable provisions of the CCAA. It will update the Bay Area 2005 Ozone Strategy adopted by the District Board of Directors on January 4, 2006.

Measures included in the CAP are expected to produce environmental benefits by reducing emissions of ozone precursors and other air pollutants. Chapter 3 of this Program EIR evaluates whether any measures may have secondary adverse environmental impacts.

2.3.1 Overview of the Control Strategy

The 2010 CAP builds upon the foundation established in earlier ozone plans, including the 2005 Ozone Strategy, that were based upon three major categories of control measures: Stationary Source Measures, Mobile Source Measures, and Transportation Control Measure. The 2010 CAP control strategy also introduces two new control measure categories: Land Use and Local Impacts Measures, and Energy and Climate Measures.

The ~~draft~~ control strategy proposes a total of 55 control measures, in five categories, as summarized in Table 2-1, including:

- 18 control measures to reduce emissions from stationary and area sources
- 10 mobile source control measures
- 17 transportation control measures
- 6 land use and local impact control measures
- 4 energy and climate control measures.

Stationary Source Measures (SSMs) are measures that the District adopts and enforces pursuant to its authority to control emissions from factories, refineries, dry cleaners, auto body shops, gasoline stations, etc. The 18 SSMs proposed in the ~~draft~~ control strategy will enhance the District's regulations to ensure that the Bay Area effectively controls emissions from stationary sources.

TABLE 2-1 BAAQMD 2010 Clean Air Plan Control Measures

Number	Name	Description
Stationary and Area Source Measures		
SSM 1	Metal Melting Facilities	Limit emissions of organic compounds, fine particulates, toxic compounds and odors from foundry operations and metal melting facilities.
SSM 2	Digital Printing	Establish VOC limits or control requirements for inkjet, electro-photographic and other digital printing technologies.
SSM 3	Livestock Waste	Establish management practices to reduce ROG, ammonia, PM, GHG.
SSM 4	Natural Gas Processing and Distribution	Reduce emissions of VOCs and methane from natural gas production facilities.
SSM 5	Vacuum Trucks	Require carbon or other control technology on vacuum trucks to reduce emissions of VOCs.
SSM 6	General Particulate Matter Weight Rate Limitation	Reduce particulate weight limitation as a function of exhaust gas volume and/or as a function of process weight rate.
SSM 7	Open Burning	Further limit agricultural burning of some crops to be burned on a given day to reduce VOCs, NOx, and PM.
SSM 8	Coke Calcining	Reduce SOx emissions from coke calcining.
SSM 9	Cement Kilns	Further limit NOx and SOx from cement production and reduce toxic emissions.
SSM 10	Refinery Boilers and Heaters	Further reduce NOx emissions from refinery boilers, heaters and steam generators.
SSM 11	Residential Fan Type Furnaces	Reduce allowable NOx limits for residential furnaces.
SSM 12	Space Heating	Establish NOx limits for industrial and commercial space heating.
SSM 13	Dryers, Ovens, Kilns	Establish NOx limits for industrial dryers, ovens and kilns.
SSM 14	Glass Furnaces	Reduce NOx limits for glass furnaces.
SSM 15	Greenhouse Gases in Permitting – Energy Efficiency	Consider greenhouse gas (GHG) emissions during permitting of new or modified stationary sources. This may include (1) adopting GHG CEQA significance threshold for stationary sources, and (2) requiring GHG reduction measures in ministerial permits.

TABLE 2-1 BAAQMD 2010 Clean Air Plan Control Measures

Number	Name	Description
SSM 16	Revise Regulation 2, Rule 2: New Source Review	Amend Reg. 2, Rule 2 to address the District's anticipated non-attainment status of the 24-hour PM2.5 National Ambient Air Quality Standard.
SSM 17	Revise Regulation 2, Rule 5: New Source Review for Air Toxics	Implement more health-protective District permitting requirements in Regulation 2, Rule 5, New Source Review of Toxic Air Contaminants based on revisions to OEHHA risk factors and methodologies. For Priority CARE Communities, track the toxicity-weighted emissions from all sources in the identified communities.
SSM 18	Revise Air Toxics "Hot Spots" Program	Revise the District's Air Toxics Hot Spots program to incorporate more stringent risk reduction requirements from existing sources.
Transportation Control Measures		
TCM A-1	Improve Local and Areawide Bus Service	Improve transit by providing new Express Bus or Bus Rapid Transit on major travel corridors, funding the replacement of older and dirtier buses, and implementing Transit Priority Measures on key transit routes.
TCM A-2	Improve Local and Regional Rail Service	Improve rail service by sustaining and expanding local and regional rail services and by providing funds to maintain rail-cars, stations, and other rail capital assets.
TCM B-1	Implement Freeway Performance Initiative	Improve the performance and efficiency of freeway and arterial systems through operational improvements, including implementing the Freeway Performance Initiative, the Arterial Management Program and the Bay Area Freeway Service Patrol.
TCM B-2	Improve Transit Efficiency and Use	Improve transit efficiency and use through continued operation of 511 Transit, and full implementation of TransLink® fare payment system and the Transit Hub Signage Program.
TCM B-3	Bay Area Express Lane Network	Introduce roadway pricing on Bay Area highways through the implementation of an express lane network, also known as a High Occupancy Toll (HOT) lane network.
TCM B-4	Goods Movement Improvements and Emission Reduction Strategies	Improve goods movement and reduce emissions from diesel equipment through implementation of the Bay Area's Trade Corridors Improvement Fund (TCIF) projects and various funding programs to replace or retrofit diesel equipment.

TABLE 2-1 BAAQMD 2010 Clean Air Plan Control Measures

Number	Name	Description
TCM C-1	Support Voluntary Employer-Based Trip Reduction Program	Support voluntary employer trip-reduction programs through the implementation of the 511 Regional Rideshare Program and Congestion Management Agency rideshare programs, the Spare the Air Program, encouraging cities to adopt transit benefit ordinances, and supporting Bay Area shuttle service providers.
TCM C-2	Implement Safe Routes to Schools and Safe Routes to Transit	Facilitate safe routes to schools and transit by providing funds and working with transportation agencies, local governments, schools, and communities to implement safe access for pedestrians and cyclists.
TCM C-3	Promote Rideshare Services and Incentives	Promote rideshare services and incentives through the implementation of the 511 Regional Rideshare Program and Congestion Management Agency rideshare programs including marketing rideshare services, operating rideshare information call center and website, and providing vanpool support services.
TCM C-4	Conduct Public Outreach and Education	Educate the public about the air quality, environmental, and social benefits of carpooling, vanpooling, taking public transit, biking, walking, and telecommuting, through the Spare the Air campaign and Transportation Climate Action Campaign.
TCM C-5	Promote Smart Driving/Speed Moderation	Educate the public about the air quality and climate protection benefits of reducing high-speed driving and observing posted speed limits.
TCM D-1	Improve Bicycle Access and Facilities	Expand bicycle facilities serving transit hubs employment sites, educational and cultural facilities, residential areas, shopping districts, and other activity centers.
TCM D-2	Improve Pedestrian Access and Facilities	Provide funding for projects to improve pedestrian access to transit hubs, employment sites, educational and cultural facilities, residential areas, shopping districts, and other activity centers.
TCM D-3	Support Local Land Use Strategies	Promote land use patterns, policies, and infrastructure investments that support mixed-use, transit-oriented development that reduce motor vehicle dependence and facilitate walking, bicycling and transit use.
TCM E-1	Value Pricing Strategies	Test and implement value pricing (congestion pricing) on Bay Area toll bridges to manage travel demand during congested periods. Measure may also include value pricing in the City of San Francisco.

TABLE 2-1 BAAQMD 2010 Clean Air Plan Control Measures

Number	Name	Description
TCM E-2	Parking Pricing and Management Strategies	Promote policies to implement market-rate pricing of parking facilities, reduce parking requirements for new development projects, parking "cash-out", unbundling of parking in residential and commercial leases, shared parking at mixed-use facilities, etc.
TCM E-3	Implement Transportation Pricing Reform	Develop a regional transportation pricing strategy that includes policy evaluation and implementation. Pricing policies to be evaluated include gasoline taxes, bridge tolls, congestion pricing, parking pricing, HOT lanes, VMT or carbon fees, pay-as-you-drive insurance, etc.
Mobile Source Control Measures (On-Road Light Duty Vehicles)		
MSM A-1	Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles	Expand the use of Super Ultra-low Emission (SULEV) and Partial -Zero emission (PZEV) light-duty passenger vehicles and trucks within the Bay Area.
MSM A-2	Zero Emission Vehicles and Plug-in Hybrids	Expand the use of Zero Emission (ZEV) and Plug-in Hybrid (PHEV) passenger vehicles and light-duty trucks within the Bay Area, working in partnership with the Bay Area Electric Vehicle Corridor coalition.
MSM A-3	Green Fleets (Light, Medium & Heavy-Duty Vehicles)	Develop a green fleet certification component of the Bay Area Green Business program, promote best practices for green fleets, and evaluate existing grant programs to ensure incentive funding is directed towards fleets and vehicles that meet stringent fuel economy standards.
MSM A-4	Replacement or Repair of High-Emitting Vehicles	Enhance the Air District's Vehicle Buy Back program to increase participation from car owners; e.g., via higher cash payments and/or increased marketing. Consider including motorcycles in the VBB programs, or other potential enhancements , e.g. implementing a vehicle repair program. Pursue improvements to the Air District's Smoking Vehicle program.
Mobile Source Control Measures (On-Road Heavy Duty Vehicles)		
MSM B-1	HDV Fleet Modernization	Provide incentives to accelerate the replacement or retrofit of on-road heavy-duty diesel engines in advance of requirements for the ARB in-use heavy-duty truck regulation.

TABLE 2-1 BAAQMD 2010 Clean Air Plan Control Measures

Number	Name	Description
MSM B-2	Low NOx Retrofits for In-Use Engines	Provide cash incentives to install retrofit devices that reduce NOx emissions from MY 1994-2006 heavy-duty engines. Continue requiring software updates to engine control modules in model year 1993-1998 diesel trucks as a condition of all heavy duty vehicle retrofit grants.
MSM B-3	Efficient Drive Trains	Encourage development and demonstration of hybrid drive trains for medium- and heavy-duty vehicles, in partnership with ARB, CEC and other existing programs.
Mobile Source Control Measures (Off-Road Equipment)		
MSM C-1	Construction and Farming Equipment	Reduce emissions from construction and farming equipment by 1) cash incentives to retrofit construction and farm equipment with diesel particulate matter filters or upgrade to a Tier III or IV off-road engine; 2) work with CARB, CEC and others to develop more fuel efficient off-road engines and drive-trains; 3) work with local communities, contractors and developers to encourage the use of renewable alternative fuels in applicable equipment.
MSM C-2	Lawn & Garden Equipment	Reduce emissions from lawn and garden equipment through voluntary retirement and replacement programs.
MSM C-3	Recreational Vessels	Reduce emissions from recreational vessels through voluntary retirement and replacement programs.
Land Use and Local Impact Control Measures		
LUM 1	Goods Movement	Reduce diesel PM and GHG emissions from goods movement in the Bay Area through targeted enforcement of CARB diesel ATCMs in impacted communities, partnerships with ports and other stakeholders, increased signage indicating truck routes and anti-idling rules, shifts in freight transport mode, shore-side power for ships, and improvements in the efficiency of engine drive trains, distribution systems (roadways, logistic systems) and land use patterns.
LUM 2	Indirect Source Review Rule	Develop an indirect source review rule to reduce construction and vehicular emissions associated with new or modified land uses.
LUM 3	Enhanced CEQA Program	1) Develop revised CEQA guidelines and thresholds of significance and 2) expand District review of CEQA documents.

TABLE 2-1 BAAQMD 2010 Clean Air Plan Control Measures

Number	Name	Description
LUM 4	Land Use Guidelines	Provide guidance to local governments re: 1) air quality and greenhouse gases in General Plans, and 2) how to address and mitigate population exposure related to land use development.
LUM 5	Reduce Risk in Impacted Communities	Establish a system to track cumulative health risks from all emissions sources in impacted communities (as identified by the District's CARE program) in order to monitor progress in reducing population exposure.
LUM 6	Enhanced Air Quality Monitoring	Expand monitoring program to provide better local air quality monitoring data in impacted communities.
Energy and Climate Control Measures		
ECM 1	Energy Efficiency	Provide 1) education to increase energy efficiency; 2) technical assistance to local governments to adopt and enforce energy- efficient building codes; and 3) incentives for improving energy efficiency at schools.
ECM 2	Renewable Energy	Promote distributed renewable energy generation (solar, micro wind turbines, cogeneration, etc.) on commercial and residential buildings, and at industrial facilities
ECM 3	Urban Heat Island Mitigation	Mitigate the "urban heat island" effect by promoting the implementation of cool roofing, cool paving and other strategies.
ECM 4	Tree-Planting	Promote planting of low-VOC-emitting shade trees to reduce urban heat island effects, save energy, and absorb CO2 and other air pollutants.

Transportation Control Measures (TCMs) are strategies to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions. The ~~draft~~ Control Strategy includes 17 TCMs to improve transit service, improve system efficiency, encourage sustainable travel behavior, support focused growth, and implement pricing strategies. The TCMs for the 2010 CAP were developed by reviewing the 2005 Ozone Strategy measures and modifying and expanding them based on new investment and policy decisions. In particular, the TCMs have been updated to reflect the policy and investment decisions made in the MTC's regional transportation plan, Transportation 2035: Change in Motion (MTC, 2009).

Mobile Source Measures (MSMs) are measures that reduce emissions by accelerating the replacement of older vehicles and equipment via programs such as the District's

Vehicle Buy-Back and Smoking Vehicle Programs, and promoting advanced-technology vehicles that reduce emissions of criteria pollutants and/or greenhouse gases. Since CARB is responsible for establishing statewide motor vehicle emissions standards and fuel specification, implementation of the MSMs relies heavily upon incentive programs such as the Carl Moyer Program and the District's Transportation Fund for Clean Air in order to achieve voluntary emission reductions in advance of, or in addition to, CARB requirements.

Land Use and Local Impacts Measures (LUMs) are proposed to: (1) promote focused growth to reduce the need for motor vehicle travel, based upon the regional FOCUS partnership which aims to channel future growth toward priority development areas; and (2) ensure that the Bay Area plans for focused growth in a way that protects people from exposure to air pollution from stationary and mobile sources of emissions. Building on the District's Community Air Risk Evaluation (CARE) program and Clean Air Communities Initiative, this component of the control strategy emphasizes the need to monitor and reduce population exposure to hazardous pollutants in communities that are most heavily impacted by emissions. The measures in this category draw upon rulemaking, notably development of a new indirect source review rule, promoting best practices, providing incentives to reduce emissions from heavy-duty diesel equipment used in goods movement; targeted enforcement of CARB rules; revised CEQA guidelines and enhance CEQA review; and enhanced air quality monitoring.

Energy and Climate Measures are intended to reduce ambient concentrations of criteria pollutants, reduce greenhouse gas emissions by promoting energy efficiency, alternative and renewable forms of energy, and urban heat island mitigation via cool roofing, cool paving, and tree-planting.

2.3.2 Control Measure Development

To satisfy California's all "feasible measures" requirements, the Air District reviewed and evaluated 872 potential control measures compiled from a variety of sources. The Air District staff sought ideas for new sources to control, including ideas submitted by the public, Air District staff, other California air district control measures contained in recently-adopted air quality plans, as well as air quality plans from metropolitan areas outside of California, In addition, staff reviewed measures that had previously been considered and rejected during preparation of the Bay Area 2005 Ozone Strategy to see if the rationale for rejecting a measure at that time is still valid for purposes of the 2010 CAP. The 872 measures reviewed included:

- 394 measures from recently-adopted air quality attainment plans.
- 390 measures from the 2005 Ozone Strategy control measure review process.
- 40 measures suggested by the public.
- 48 measures suggested by Air District staff.

Staff reviewed stationary source, area source, mobile source, and transportation control measures from the following plans:

California Air Quality Attainment Plans

- 2007 Air Quality Management Plan (South Coast AQMD, May 2007)
- Sacramento Regional 8-Hour Ozone Attainment And Reasonable Further Progress Plan (Draft January 2009, Sacramento Metropolitan AQMD)
- 2007 Ozone Plan (April 30, 2007, San Joaquin Valley Unified APCD)
- 2008 Air Quality Management Plan (August 2008, Monterey Bay Unified APCD)
- 2007 Clean Air Plan (August 2007, Santa Barbara APCD)
- Eight-Hour Ozone Attainment Plan For San Diego County (May 2007, San Diego APCD)
- Ventura County 2007 Air Quality Management Plan (May 13, 2008, Ventura APCD)

Out of State Air Quality Attainment Plans

- Houston-Galveston-Brazoria regional SIP (April 2010)
- New York SIP for Ozone (8-Hour NAAQS) Attainment Demonstration for NY Metro Area (August 9, 2007)
- Proposed Maintenance Plan for Southeast Michigan (February 2009)
- Draft Chicago 8-Hour Ozone Attainment Demonstration and Maintenance Plan (December 2008)
- Proposed Georgia's State Implementation Plan for the Atlanta 8-Hour Ozone Nonattainment Area (March 29, 2009)

In total, Air District staff considered 872 control measure suggestions, not including transportation control measures. In evaluating a control measure, staff considered a variety of factors, including:

- Technological feasibility of proposed controls;
- Emission inventory of the source category and total likely emission reductions from proposed controls;
- Cost-effectiveness in dollars per ton of emissions reduced;
- Enforceability, including whether emission reductions are real, quantifiable, permanent, enforceable, and surplus;
- Rate (and timing) of emissions reductions;
- Public acceptability, including interests and concerns of community members;
- Pollutant reduced (volatile organic compounds, nitrogen oxides or both);
- Any potential adverse environmental impacts; and
- Socioeconomic impacts.

2.3.3 Addressing Transport Requirements

The CCAA requires CARB to periodically assess transport of ozone and ozone precursors from upwind to downwind regions, and to establish mitigation requirements for upwind districts (Cal. Health and Saf. Code § 39610[3]). The CCAA also requires air districts to address transport mitigation requirements in the triennial updates to strategies

[3] All statutory references in this chapter are to the California Health and Safety Code, unless otherwise noted.

to achieve the State ozone standard (Sec. 40912). To summarize the transport mitigation requirements, the Air District must:

1. Adopt and implement all feasible measures;
2. Adopt and implement Best Available Retrofit Control Technology (BARCT);
3. Adopt a no-net-increase permitting program for sources above 10 tons per year;
4. Include measures to attain the standard in specified downwind regions.

The 2010 CAP addresses all of the above. The requirements to adopt all feasible measures, and implement BARCT on all existing stationary sources are necessary for the Bay Area to meet both attainment planning and transport mitigation requirements. These requirements are addressed in the control strategy as well as through Air District rule development and permitting processes. With respect to the no-net-increase requirement, the Air District adopted a 10 ton/year no net increase requirement for ozone precursors in District Regulation 2, Rule 2: New Source Review on December 21, 2004. Regarding measures sufficient to attain the State ozone standard in specified transport areas, this is accomplished through the proposal to adopt all feasible measures as identified in the control strategy. As adoption of all feasible measures represents the most stringent control strategy that can be accomplished, this requirement is met with the approval of each triennial plan.

2.3.4 Stationary Source Measures

A brief description of each of the ~~19~~ 18 Stationary Source Measures is provided below. Full descriptions and evaluations of each individual control measure are provided in Volume 2 of the CAP.

SSM 1 – Metal Melting Facilities: Limit emissions of organic compounds, fine particulates, toxic compounds and odors from foundry operations and metal melting facilities in the District by requiring efficient capture and control systems.

SSM 2 - Digital Printing: This control measure would reduce ROG emissions from digital printing operations by one of two approaches: (1) adopting VOC limits on inks and solvents used; or (2) adopting control technology requirements.

SSM 3 - Livestock Waste: This control measure would reduce organic emissions from livestock waste by requiring best management practices already being implemented in San Joaquin Valley Unified Air Pollution Control District, Sacramento Metropolitan and South Coast Air Quality Management Districts to be applied at Bay Area dairies.

SSM 4 - Natural Gas Processing and Distribution: Equipment at natural gas wells in the District is prone to leaks and excess emissions. Emissions are mostly methane, a GHG, with smaller amounts of VOCs and some toxic compounds. Exemptions for these gas wells in Rule 8-37 would be reconsidered and excess emissions controlled.

SSM 5 - Vacuum Trucks: This control measure would reduce organic emissions from vacuum trucks by requiring emission controls on vacuum trucks utilized in liquid clean-up and transfer operations in refineries and at other locations.

SSM 6 - General Particulate Matter Weight Rate Limitation: This control measure would reduce the District's allowable weight rate limitations for particulate matter.

SSM 7 - Open Burning: This control measure would consider further limitations on open burning in Regulation 5: Open Burning.

SSM 8 - Coke Calcining: This control measure would limit emissions of sulfur dioxide from coke calcining by requiring a minimum of 80 percent sulfur capture.

SSM 9 - Cement Kilns: This control measure would reduce NOx and SOx emissions from cement kilns. There is one cement manufacturing facility in the Bay Area, Lehigh Southwest Cement.

SSM 10 - Refinery Boilers and Heaters: This control measure would consider options to further reduce NOx emissions from petroleum refinery boilers and heaters.

SSM 11 – Residential Fan Type Furnaces: This control measure would reduce NOx emissions from residential fan type central furnaces by reducing allowable NOx emission limits on new and replacement furnace installations. This control measure does not address older homes with simple small floor heaters or larger central furnaces for condominiums, apartment buildings, and commercial space heating.

SSM 12 - Space Heating: This control measure would reduce NOx emissions from large condominium and apartment building central furnaces, and from commercial space heating through retrofit of low NOx burners.

SSM 13 - Dryers, Ovens, and Kilns: This control measure would reduce NOx emissions from combustion devices that are currently exempt from the requirements of Regulation 9, Rule 7: *Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters* (Reg 9-7). Reg. 9-7 exempts the following types of combustion devices: kilns, ovens, and furnaces used for drying, baking, heat treating, cooking, calcining, or vitrifying.

SSM 14 - Glass Furnaces: This control measure would reduce NOx emission from gas-fired glass melting facilities.

SSM 15 - Greenhouse Gases in Permitting - Energy Efficiency: This control measure would mitigate increases in greenhouse gas (GHG) emissions from new and modified permitted sources, reviewing implementation of energy efficiency measures, where appropriate on new sources subject to the Air District's jurisdiction.

SSM 16 – Revise Regulation 2, Rule 2: New Source Review: This control measure would amend Regulation 2, Rule 2 to address the District's anticipated non-attainment status of the 24-hour $PM_{2.5}$ National Ambient Air Quality Standard.

SSM 17 – Revise Regulation 2, Rule 5: New Source Review for Air Toxics: This measure proposes to revise District permitting requirements via amendments to Regulation 2, Rule 5, New Source Review of Toxic Air Contaminants (TACs), to impose more stringent standards based on revisions to OEHHA risk factors and methodologies. The measure also commits the District to develop a method to track cumulative impacts from air toxics in impacted communities identified by the District's CARE program.

SSM 18 - Revise Air Toxics "Hot Spots" Program: This control measure would revise the District's Air Toxics Hot Spots program focusing on existing sources of toxic air contaminants.

2.3.5 Bay Area Rule Development Process

Most stationary source measures in the Ozone Strategy are implemented through the rule development process. The Bay Area Air District goes through a detailed process to adopt rules and regulations to impose standards on, and limit emissions from, Bay Area industry.

Subsequent to rule adoption by the Board, BAAQMD staff work to prepare inspection protocols, policies and procedures to interpret the rule as necessary, and to prepare compliance advisories to notify affected parties of the rule and compliance dates. Staff also forwards the rule to CARB.

Each December, the Air District Board of Directors approves an annual regulatory schedule and notifies CARB of its expected rule development schedule for the following calendar year, as required by the CCAA. Table 2-2 shows the proposed scheduled for regulation adoption during 2010, 2011, and 2012.

TABLE 2-2
Regulatory Agenda, 2010 – 2012

2010 Regulatory Agenda

CM #	Control Measure (Reg. and Rule)	ER Potential
SSM 1	Metal Melting Facilities	TBD PM[1]
SSM 5	Vacuum Trucks	6.0 tpd ROG
SSM 6	General Particulate Matter (Reg. 6-1)	2.87 PM
SSM 9	Cement Kilns	4.38 tpd NOx[2]
SSM 10	NOx from Petroleum Refinery Boilers and Heaters (Reg. 9-10)	2.9 tpd NOx
SSM 17	New Source Review for Toxic Air Contaminants (Reg. 2-5)	n/a[4]
SSM 18	Air Toxics Hot Spots	TBD

2011 Regulatory Agenda

CM #	Control Measure (Reg. and Rule)	ER Potential
SSM 4	Natural Gas Production and Distribution (Reg. 8-37)	0.3 – 0.4 tpd ROG[3]
SSM 7	Open Burning	0.04 ROG
SSM 8	Petroleum Coke Calcining	2.6 tpd SO2
SSM 11	NOx from Residential Fan Furnaces (Reg. 9-4)	4.2 tpd NOx
SSM 12	NOx from Large Residential and Commercial Space Heating	1.2 tpd NOx
SSM 16	New Source Review for PM2.5	n/a[4]
LUM 2	Indirect Source Review Rule	0.3 ROG, 0.24 NOx, 0.47 PM10[2]

2012 Regulatory Agenda

CM #	Control Measure (Reg and Rule)	ER Potential
SSM 2	Digital Printing	TBD ROG
SSM 3	Livestock Waste	0.3 tpd ROG[3]
SSM 13	NOx from Dryers, Ovens and Kilns	0.2 tpd NOx
SSM 14	NOx from Glass Furnaces (Reg. 9-12)	0.38 tpd NOx
SSM 15	GHG in Permitting	n/a[4]

1 Control Measure would also reduce toxic air contaminants.
2 Control Measure would also reduce toxic air contaminants, SOx and PM.
3 Control Measure would also reduce methane, a potent greenhouse gas.
4 New Source Review and permitting decisions mitigate emissions from future sources; consequently, no reductions from baseline are projected.

2.3.6 Transportation Control Measures

Motor vehicles are the largest source of ozone precursors in the Bay Area, so reducing these emissions is essential to regional efforts to attain the State ozone standards and reduce ozone transport. Motor vehicles are also a large source of TACs and GHG emissions. Motor vehicle emissions have dropped substantially over the years thanks to State and national regulations on vehicles and fuels, and motor vehicle emissions are expected to continue to decrease in the future due to turnover in vehicle fleet, as new vehicles that meet stringent emissions standards replace older vehicles. TCMs play a critical role in complementing State and national regulatory efforts by reducing motor

vehicle use[4]. TCMs also provide co-benefits such as improved mobility, enhanced safety, and reduced congestion.

CCAA TCM Requirements

The CCAA emphasizes transportation control measures. CCAA legislative intent states that in developing attainment plans, air districts shall "focus particular attention on reducing the emissions from transportation and areawide emission sources" (Sec. 40910). The CCAA specifically requires air districts to "adopt, implement and enforce transportation control measures." TCMs are defined as "any strategy to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions" (Sec. 40717). TCMs must be sufficient to substantially reduce the rate of increase in vehicle trips and vehicle miles traveled (Sec. 40918). Section 40233 lays out a process for developing a TCM emission reduction target and TCM plan when developing the 1991 Clean Air Plan. The Air District and MTC in 1991 complied with the required process. Under the CCAA, setting a TCM emission reduction target in subsequent planning cycles is discretionary. While a TCM emission reduction target was not set in subsequent plans, the TCMs have undergone extensive revision and expansion, as described below.

The TCMs proposed for the 2010 CAP are summarized in Table 2-1 and below. The TCMs for the 2010 CAP were developed by reviewing the 2005 Ozone Strategy measures and modifying and expanding them based on new investment and policy decisions. In particular, the TCMs have been updated to reflect the policy and investment decisions made in the MTC's regional transportation plan, *Transportation 2035: Change in Motion* (MTC, 2009).

TCM A-1 – Improve Local and Areawide Bus Service: TCM A-1 will improve transit by sustaining and improving existing service, including new Express Bus or Bus Rapid Transit on major travel corridors, and funding the replacement of older and dirtier buses.

TCM A-2 – Improve Local and Regional Rail Service: TCM A-2 will improve rail service by sustaining and expanding existing services and by providing funds to maintain rail-cars, stations, and other rail capital assets. Specific projects for implementation include BART extensions, Caltrain electrification, Transbay Transit Center Building and rail foundation, Capital Corridor intercity rail service, and Sonoma Marin Area Rail Transit (SMART) District commuter rail project.

TCM B-1 – Implement Freeway Performance Initiative: TCM B-1 will improve the performance and efficiency of freeway and arterial systems through operational improvements. These improvements include implementing the Freeway Performance Initiative (FPI), the Bay Area Freeway Service Patrol (FSP), and the Arterial Management Program.

[4] TCMs are distinguished from mobile source measures in that mobile source measures reduce vehicle *emission rates*, while TCMs reduce vehicle *use* by reducing vehicle trips and/or vehicle miles traveled.

TCM B-2 – Improve Transit Efficiency and Use: This measure will improve transit efficiency and make transit more convenient for riders, through continued operation of 511 Transit, and full implementation of TransLink® fare payment system and the Transit Hub Signage Program.

TCM B-3 - Bay Area Express Lane Network: TCM B-3 will seek to correctly price travel demand on Bay Area highways by developing and implementing a seamless, regionally-managed Express Lane Network throughout the Bay Area and improving regional transit service. This system will offer free-flowing conditions for carpools, buses and toll payers by adjusting tolls based upon the level of congestion.

TCM B-4 - Goods Movement Improvements and Emission Reduction Strategies: Goods movement is a critical component of the Bay Area's economic and transportation system, and a significant contributor to air quality issues. Exposure to diesel pollution from goods movement greatly impacts the health of residents near ports, rail yards, distribution centers, and roads with high truck volumes. Investing in the Bay Area's trade corridors and continuing to offer incentives for diesel engine owners to reduce emissions will address existing air quality issues as well as help the region to prepare for continued growth in this important sector of our economy.

TCM C-1 – Support Voluntary Employer-Based Trip Reduction Program: This measure will support voluntary efforts by Bay Area employers to encourage their employees to use alternative commute modes, such as transit, ridesharing, bicycling, walking, telecommuting, etc.

TCM C-2 – Implement Safe Routes to Schools and Safe Routes to Transit: This measure will facilitate safe routes to schools and transit by providing funds and working with transportation agencies, local governments, schools, and communities to implement safe access for pedestrians and cyclists. Likely projects will include implementation of bicycle facilities, such as lanes, routes, paths, and parking, and improvements to pedestrian facilities, such as sidewalks/paths, benches, reduced street width, reduced intersection turning radii, crosswalks with activated signals, curb extensions/bulbs, buffers between sidewalks and traffic lanes and streets trees.

TCM C-3 – Promote Rideshare Services and Incentives: This measure will promote rideshare services and incentives through the implementation of the 511 Regional Rideshare Program, as well as local rideshare programs implemented by Congestion Management Agencies. These activities will include marketing rideshare services, operating rideshare information call center and website, and providing vanpool support services. This measure also encourages the expansion of car-sharing programs.

TCM C-4 - Conduct Public Outreach & Education: This measure will encourage Bay Area residents to make choices that benefit air quality by educating the public about the health effects of air pollution and the air quality benefits of choosing transportation modes that reduce motor vehicle use, such as carpooling, vanpooling, taking public

transit, biking, walking, and telecommuting. BAAQMD will implement this measure through the Spare the Air (STA) Every Day campaign and the Spare the Air episodic program ("STA Alerts"). In addition, MTC and BAAQMD in partnership will implement the outreach component of the Transportation Climate Action Campaign. Implementation actions include marketing and incentive programs to alert the public to the connection between air pollution and motor vehicle usage, and promoting the benefits of reducing single-occupant motor vehicle use every day, and in particular on poor air quality days when BAAQMD issues a STA Alert.

TCM C-5 – Promote Smart Driving/Speed Moderation: Pollutant emissions rates vary based on the speed a vehicle is traveling. The emission/speed relationship varies for each pollutant, but emission rates generally are lowest in the 30-45 mile per hour mph range. Vehicles traveling on Bay Area freeways at speeds above 65 mph emit significantly more ROG, NOx and GHGs than cars and trucks traveling at speeds between 35 and 55 mph. This measure focuses on public education to encourage drivers to observe posted speed limits and adopt other fuel efficient driving practices, supplemented by more rigorous enforcement of speed limits, especially to reduce high-speed driving on freeways.

TCM D-1 – Improve Bicycle Access and Facilities: TCM D-1 will expand bicycle facilities serving employment sites, educational and cultural facilities, residential areas, shopping districts, and other activity centers. Typical improvements include bike lanes, routes, paths, and bicycle parking facilities. This TCM also includes improving bicycle access to transit and supporting the annual Bike to Work event.

TCM D-2 – Improve Pedestrian Access and Facilities: TCM D-2 will improve pedestrian facilities and encourage walking by funding projects that improve pedestrian access to transit, employment and major activity centers. Improvements may include sidewalks/paths, benches, reduced street width, reduced intersection turning radii, crosswalks with activated signals, curb extensions/bulbs, buffers between sidewalks and traffic lanes, and street trees.

TCM D-3 – Support Local Land Use Strategies: TCM D-3 will support and promote land use patterns, policies, and infrastructure investments that support higher density mixed-use, residential and employment development near transit in order to facilitate walking, bicycling and transit use.

TCM E-1 - Value Pricing Strategies: TCM E-1 will pursue implementation of value pricing strategies such as tolling on trans-bay bridges and cordon pricing recommendations from San Francisco County's Mobility, Access, and Pricing Study.

TCM E-2 - Parking Pricing and Management Strategies: Parking policies and practices have a profound impact on vehicle travel and mode choice, as well as land use patterns and the quality of the built environment. Parking policies are also an important tool in implementing focused growth strategies. This control measure outlines how the Air District, in cooperation with its regional agency partners, will 1) take actions at the regional level to implement parking policies that will benefit air quality, and 2) encourage

and support local parking policies to reduce motor vehicle travel and promote focused growth.

TCM E-3 - Implement Transportation Pricing Reform: Motor vehicle travel imposes a variety of costs on society, including air pollution, that are not fully reflected in the price that drivers currently pay to own and operate a vehicle. Transportation pricing strategies can provide a powerful mechanism to reduce motor vehicle travel, traffic congestion, and tailpipe emissions of criteria pollutants and greenhouse gases. This control measure proposes that the Air District and its regional agency partners collaborate to develop and implement a regional transportation pricing policy strategy.

2.3.7 Mobile Source Control Measures

The term "mobile source", as used in the CCAA and by the Air District, refers collectively to vehicular sources and other non-stationary sources. Mobile sources are defined in the CCAA as self-propelled devices that may travel upon a highway, including automobiles, trucks, construction equipment, farm equipment, and off-road vehicles. "Non-vehicular" mobile sources or "non-road" sources as they are defined in the federal Clean Air Act (CAA), include ships, boats, aircraft, locomotives, and lawn and garden equipment. Mobile sources are by far the largest sources of ozone precursors.

State and national programs play a critical role in reducing air pollutant emissions from mobile sources. Mobile source emissions are regulated by establishing equipment emission standards and by regulating the fuel used in the equipment. The federal CAA contains a special provision allowing California to set motor vehicle emission standards that are specific to the State. The California standards cover motor vehicles (including cars, motorcycles, and trucks), heavy industrial and construction equipment, off-highway vehicles such as dirt bikes and all-terrain vehicles, and lawn, garden and other utility engines. In California, these mobile sources are regulated primarily by CARB.

To ensure that motor vehicle emission control systems continue to operate properly they are regulated through in-use performance standards. The State of California has had an inspection and maintenance (I&M) program since 1984, and responsibility for the State's I&M program implementation rests with the California Bureau of Automotive Repair (BAR). In 2002, AB 2637 (Cardoza) was signed into law and required BAR to implement an Enhanced Area Smog Check Program in the urbanized regions of the San Francisco Bay Area. The program went into full effect in October 2003, and requires the use of a dynamometer to simulate the vehicle's emissions while in motion. In addition, the pass/fail cut points for emissions are more stringent for enhanced smog check areas and certain vehicles suspected of higher emissions are directed to Test-Only stations.

The Air District does not have the authority to regulate mobile sources but reduces mobile source emissions by providing grants or incentives to encourage the use of cleaner vehicles and fuels. The Transportation Fund for Clean Air (TFCA) is a grant program that funds both mobile source and transportation control measures implemented by local public agencies. To fund these measures the State Legislature allows the Air District to impose a $4 surcharge on motor vehicle registration fees paid for vehicles registered in

the Bay Area. Mobile source measures funded through the TFCA program include incentives to encourage the purchase or lease of clean fuel vehicles, as well as engine retrofits and repowers. Other TFCA-funded programs include the Vehicle Buy Back program which provides incentives to accelerate the retirement of older, high emitting vehicles from the region's roadways, and the 1-800-EXHAUST Smoking Vehicle Complaint line.

The Air District administers the State-funded Carl Moyer Program in the Bay Area. The Carl Moyer Program provides incentives that cover the incremental cost of cleaner heavy-duty engines with a primary focus of reducing NOx emissions. Among the eligible projects are cleaner on-road, off-road, marine, locomotive and stationary agricultural pump engines, as well as forklifts, airport ground support equipment, and auxiliary power units. The Air District also has grant programs for low emission school buses and heavy-duty diesel PM_{10} filter retrofits.

In addition to State and federal regulations and Air District incentive programs, the 2010 CAP includes control measures that reduce emissions from on-road and off-road mobile sources. These control measures encourage the retirement of older, more-polluting equipment and the introduction of new, less-polluting equipment, or encourage operational changes (e.g. less idling) to reduce emissions. The measures would be implemented mainly through incentive programs. A brief description of each of the mobile source control measures is provided below. Refer to Volume 2 of the 2010 CAP for full descriptions and evaluations of each individual stationary and mobile source control measure.

MSM A-1 - Promote Clean, Fuel Efficient Light and Medium-Duty Vehicles: The Air District, in cooperation with local businesses, city and county governments, and state and federal agencies, will expand the use of Super Ultra-low Emission (SULEV) and Partial-Zero (ZEV) emission light-duty passenger vehicles and trucks within the Bay Area. Emphasis will be placed on vehicles capable of using renewable, low-carbon fuels.

MSM A-2 - Zero Emission Vehicles (ZEV) and Plug-in Hybrids: The Air District, in cooperation with local businesses, city and county governments, and state and federal agencies, will expand the use of Zero Emission (ZEV) and Plug-in Hybrid (PHEV) passenger vehicles and light-duty trucks within the Bay Area.

MSM A-3 - Green Fleets (Light, Medium and Heavy-Duty Vehicles): This control measure consists of three elements: a) development of a green fleet certification as part of the ABAG Green Business Program; b) the promotion of best practices for green fleets through a dedicated website; outreach to local governments; and outreach to business groups and grant applicants to promote best practices; and c) potential revisions to the District's Transportation Fund for Clean Air (TFCA) and other grant programs to ensure funding is directed towards fleets meeting GHG performance standards.

MSM A-4 - Replacement or Repair of High-Emitting Vehicles: This control measure proposes enhancements to three long-running programs to control emissions from in-use

light-duty motor vehicles: the Air District's Vehicle Buy Back and Smoking Vehicle complaint programs, and the State's Smog Check program.

MSM B-1 – HDV Fleet Modernization: Between 2010 and 2015, the Air District will directly provide, and encourage other organizations to provide, incentives for the purchase of new trucks that meet the California Air Resources Board's 2010 emission standards for heavy-duty engines. This program is designed to assist truck owners/operators to replace pre-2003 heavy-duty diesel trucks (Class 7 and 8) with new diesel-fueled or natural gas-fueled trucks in advance of requirements of CARB's in-use truck regulation.

MSM B-2 - Low NOx Retrofits for In-Use Engines: Between 2010 and 2015, the Air District will provide incentives to install CARB-verified abatement equipment to reduce NOx emissions from existing on-road heavy-duty truck engines. Emphasis will be placed on bringing existing engines into early compliance with CARB's in-use truck regulation. The Air District will also continue to require software updates to engine control modules in model year (MY) 1993-1998 diesel trucks to reduce excess NOx emissions as a condition of all heavy-duty vehicle retrofit grants. The Air District will work with CARB to evaluate the feasibility of installing or replacing catalytic convertors on gasoline powered heavy-duty vehicles.

MSM B-3 - Efficient Drive Trains: The Air District will either directly commit and/or work with partner agencies and companies to provide funding to underwrite development and demonstration of hybrid drive trains for medium- and heavy-duty vehicles.

MSM C-1 - Construction and Farming Equipment: The Air District will work to reduce emissions from construction and farming equipment by pursuing the following strategies: a) expenditure of cash incentives between 2010 and 2020 to retrofit engines with diesel particulate filters or upgrade to equipment with electric, Tier III or Tier IV off-road engines; b) work with the California Air Resources Board, the California Energy Commission and others to develop more fuel-efficient off-road engines and drive-trains; and c) work with local communities, contractors, farmers and developers to encourage the use of renewable electricity and renewable fuels, such as biodiesel from local crops and waste fats and oils, in applicable equipment.

MSM C-2 - Lawn and Garden Equipment: Use of gasoline lawn mowers and leaf blowers contribute to summertime ozone levels primarily through the release of volatile organic compounds (VOCs). While progressively more stringent emission standards have reduced pollution from lawnmowers and leaf blowers, sufficient numbers of older two-stroke engines remain in use in the Bay Area to warrant Air District efforts to pursue a clean-up program. The Air District will pursue removal of these older engines through voluntary exchange programs that target residential lawn mowers and backpack-style leaf blowers used by professional gardeners and landscapers.

MSM C-3 - Recreational Vessels: Use of four-stroke or two-stroke inboard/outboard engines in pleasure craft contribute to summertime ozone levels primarily through the release of volatile organic compounds. While progressively more stringent emission

standards have reduced pollution from these engines, sufficient numbers of older four- and two-stroke engines remain in use in the Bay Area to warrant Air District efforts to pursue a clean-up program. In addition, new inboard/outboard engines are also more fuel efficient.

2.3.8 Land Use and Local Impact Control Measures

The Land Use and Local Impact Control Measures are proposed to: (1) promote focused growth to reduce the need for motor vehicle travel, based upon the regional FOCUS partnership which aims to channel future growth toward priority development areas; and (2) ensure that the Bay Area plans for focused growth in a way that protects people from exposure to air pollution from stationary and mobile sources of emissions. Building on the District's CARE program and Clean Air Communities Initiative, this component of the control strategy emphasizes the need to monitor and reduce population exposure to hazardous pollutants in communities that are most heavily impacted by emissions. The measures in this category draw upon rulemaking, notably development of a new indirect source review rule; promoting best practices; providing incentives to reduce emissions from heavy-duty diesel equipment used in goods movement; targeted enforcement of CARB rules; revised CEQA guidelines and enhance CEQA review; and enhanced air quality monitoring. The LUMs proposed as part of the 2010 CAP are summarized below.

LUM 1 - Goods Movement: This control measure aims to reduce emissions and population exposure related to movement of freight in the Bay Area by means of incentives, enforcement, research, strategic partnerships, and outreach. Regional components of this measure will focus on reducing truck use by encouraging a shift to other modes of freight transport by supporting pilot projects and research, as well as working with partner agencies to promote land uses patterns and distribution systems (roadways, logistic systems) that result in less vehicle miles traveled. At the local level, this measure includes targeted enforcement of ARB diesel regulations, outreach to businesses and fleets operating in goods movement corridors to encourage turnover to cleaner engines, and installation of signage to indicate trucks routes and anti-idling regulations. This measure also calls for advocating for container fees to be imposed on goods transported through Bay Area ports to fund strategies to offset goods movement emissions.

LUM 2 - Indirect Source Review Rule: The Air District will develop an indirect source review (ISR) rule to reduce construction and operating emissions associated with new or modified land uses in the Bay Area. Indirect sources are development projects that generate or attract motor vehicle trips and emissions. The rule may also address other sources of emissions, such as fireplaces, home heating and cooling and landscape maintenance equipment. Air pollutant emissions from these sources can adversely affect local and regional air quality. The District will consider the legal issues, political acceptability, local government acceptability, enforceability, staffing or other resources needed when defining the scope of the ISR.

LUM 3 - Enhanced CEQA Program: The District will develop and issue updated California Environmental Quality Act (CEQA) guidelines to provide guidance on

evaluating air quality impacts of development projects and local plans, determining whether an impact is significant, and mitigating significant air quality impacts related to new or modified projects. The updated guidelines will provide revised thresholds of significance for criteria pollutants and toxic air contaminants, and newly-adopted thresholds for greenhouse gas emissions. In addition to issuing revised CEQA guidelines, the District will also strengthen its existing CEQA review program, as resources permit, by increasing the number of CEQA documents that the District reviews and by quantifying estimated reductions in emissions of criteria pollutants, air toxics, and greenhouse gases from the District's CEQA program.

LUM 4 - Land Use Guidance: Local land use decisions have direct impacts on air quality and population exposure to air pollutants. This measure summarizes programs and resources that the Air District will make available to local agencies to help them develop goals, policies and implementation measures that will benefit air quality and reduce motor vehicle travel and emissions. With its regional partners, the Air District is committed to assisting local governments to include smart growth principles and climate protection elements in their general plans and other relevant plans in order to reduce criteria pollutants and greenhouse gas emissions.

LUM 5 – Reduce Risk in Impacted Communities: This measure describes a set of complementary actions and programs that comprise key elements of the Air District's strategy to reduce emissions and population exposure from stationary sources in impacted communities as identified by the Air District's CARE Program. Key elements of this measure include:

- The District will establish a system to track cumulative health risks from all emission sources, including new permitted stationary sources, in order to help monitor progress in reducing population exposure in impacted communities.

- The District will revise rules to tighten requirements in order to reduce emissions of air toxics and particulate matter from existing sources via its Air Toxics "Hot Spots" Program and from new sources via its New Source Review rules. See SSMs 16, 17, and 18 for additional description of these rule revisions.

LUM 6 - Enhanced Air Quality Monitoring: The Air District will evaluate and enhance its capabilities, as resources permit, to monitor air quality on a region-wide basis, as well as on a localized basis in the impacted communities identified under the District's CARE program.

2.3.9 Energy and Climate Control Measures

Energy and Climate Measures are intended to reduce ambient concentrations of criteria pollutants and reduce greenhouse gas emissions by promoting energy efficiency, alternative and renewable forms of energy, and urban heat island mitigation via cool roofing, cool paving, and tree-planting.

ECM 1 - Energy Efficiency: This control measure consists of three components: (1) provide education and outreach to increase energy efficiency in residential and commercial buildings and industrial facilities, (2) provide technical assistance to local governments to adopt and enforce energy efficiency building codes, and (3) provide incentives for increasing energy efficiency at schools.

ECM 2 - Renewable Energy: This control measure consists of two components: (1) promote incorporation of renewable energy sources into new developments and redevelopment projects, and (2) foster innovative renewable energy projects through provision of incentives. Note: In addition, as part of the Further Study Measure entitled "Enhancement to Energy Measures," the District will evaluate the cost-effectiveness of solar thermal technology for consideration as a potential solar hot water heating rule.

ECM 3 - Urban Heat Island Mitigation: The control measure includes regulatory and educational approaches to reduce the "urban heat island" (UHI) phenomenon by increasing the application of "cool roofing" and "cool paving" technologies.

ECM 4 - Tree Planting: The control measure includes voluntary approaches to reduce the "urban heat island" phenomenon by increasing shading in urban and suburban communities through planting of (low VOC-emitting) trees and preservation of natural vegetation and ground cover.

2.3.10 Emission Reductions

Implementation of the 55 control measures is expected to result in overall emission reductions in the Bay Area. A summary of emission reductions from the control measures proposed in the 2010 CAP is provided in Table 2-5.

2.3.11 Further Study Measures

Further study measures are measures for which insufficient information was available during the development of the control strategy to allow for a comprehensive review. For example, emissions data for some source categories or the emissions reduction potential of some control measures may be uncertain. In these cases, further study may be warranted if the other aspects of a suggested control, such as public acceptability and adverse environmental impacts appear positive. The 2010 CAP includes the description of Further Study Measures that have been identified and commits staff to follow up on and continue to evaluate the further study measures, and move forward with any that are deemed feasible as a result of the study. Therefore, the potential environmental impacts associated with Further Study Measures are not evaluated in this Program EIR as they are not included as commitments in the 2010 CAP. Additional CEQA review would be required if any of the Further Study Measures are proposed to be implemented.

TABLE 2-3
Emission Reductions of Proposed Control Measures (2012 Estimates)

Control Measure	Description	Estimated Emission Reductions (tons/day) (1)				
		ROG	NOx	PM_{10}	SO_2	GHG[(2)]
Stationary and Area Source Measures						
SSM 1	Metal-Melting Facilities	--	--	--	--	--
SSM 2	Digital Printing	--	--	--	--	--
SSM 3	Livestock Waste	0.300	--	--	--	65
SSM 4 (3)	Natural Gas Processing and Distribution	0.300	--	--	--	120
SSM 5	Vacuum Trucks	6.000	--	--	--	--
SSM 6	General Particulate Matter Weight Rate Limitation	--	--	2.583	--	--
SSM 7	Open Burning	0.040	0.010	--	--	--
SSM 8 (3)	Coke Calcining	--	--	--	2.6	--
SSM 9 (3)	Cement Kilns	--	4.380	--	--	--
SSM 10 (3)	Refinery Boilers and Heaters	--	2.900	--	--	--
SSM 11 (4)	Residential Fan Type Furnaces	--	4.200	--	--	--
SSM 12 (4)	Space Heating	--	1.200	--	--	--
SSM 13 (3)	Dryers, Ovens, Kilns	--	0.20	--	--	--
SSM 14	Glass Furnaces	--	0.38	--	--	--
SSM 15	Greenhouse Gases in Permitting – Energy Efficiency	--	--	--	--	--
SSM 16	Revise Regulation 2, Rule 2: New Source Review	--	--	--	--	--
SSM 17	Revise Regulation 2, Rule 5: New Source Review for Air Toxics	--	--	--	--	--
SSM 18	Revise Air Toxics “Hot Spots” Program	--	--	--	--	--
Transportation Control Measures						
TCM A-1	Improve Local and Areawide Bus Service	0.028	0.032	0.005	--	23
TCM A-2(3)	Improve Local and Regional Rail Service	0.139	0.152	0.043	--	516
TCM B-1	Implement Freeway Performance Initiative	0.922	3.315	0.178	--	2,451
TCM B-2	Improve Transit Efficiency and Use	0.004	0.005	0.001	--	6.130
TCM B-3	Bay Area Express Lane Network	0.860	1.362	0.660	--	1,892
TCM B-4 (3)	Goods Movement Improvements and Emission Reduction Strategies	0.585	4.818	0.276	--	4,045
TCM C-1	Support Voluntary Employer-Based Trip Reduction Program	0.076	0.094	0.033	--	97
TCM C-2	Implement Safe Routes to Schools and Safe Routes to Transit	0.008	0.008	0.001	--	8.182
TCM C-3	Promote Rideshare Services and Incentives	0.084	0.105	0.013	--	153
TCM C-4	Conduct Public Outreach and Education	0.020	0.020	0.003	--	40.42
TCM C-5	Promote Smart Driving/Speed Moderation	0.074	0.168	0.010	--	180
TCM D-1	Improve Bicycle Access and Facilities	0.004	0.004	<0.001	--	4.44
TCM D-2	Improve Pedestrian Access and Facilities	0.003	0.002	<0.001	--	1.76
TCM D-3	Support Local Land Use Strategies	0.242	0.311	0.580	--	873.63
TCM E-1	Value Pricing Strategies	--	0.0105	0.003	<0.001	9.87
TCM E-2	Parking Pricing and Management Strategies	0.180	0.188	0.025	--	294
TCM E-3	Implement Transportation Pricing Reform	0.115	0.120	0.016	--	188

TABLE 2-3 (continued)

Control Measure	Description	Estimated Emission Reductions (tons/day) (1)				
		ROG			ROG	
Mobile Source Control Measures						
MSM A-1	Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles	0.050	0.030	0.009	--	<0.001
MSM A-2	Zero Emission Vehicles and Plug-in Hybrids	0.010	0.010	0.009	--	<0.001
MSM A-3	Green Fleets (Light, Medium & Heavy-Duty Vehicles)	0.020	0.020	0.030	--	<0.001
MSM A-4	Replacement or Repair of High-Emitting Vehicles	4.370	2.060	0.030	--	44.143
MSM B-1	HDV Fleet Modernization	0.100	5.000	0.110	--	0.64
MSM B-2	Low Nox Retrofits for In-Use Engines	--	0.990		--	
MSM B-3	Efficient Drive Trains	0.010	0.290	0.009	--	0.23
MSM C-1	Construction and Farming Equipment	0.040	0.720	0.020	--	
MSM C-2	Lawn & Garden Equipment	0.040	0.009	0.010	--	<0.001
MSM C-3	Recreational Vessels	0.060	0.009	--	--	0.416
Land Use and Local Impact Control Measures						
LUM 1	Goods Movement	0.012	1.719	0.015	--	2,561
LUM 2	Indirect Source Review Rule	0.302	0.244	0.467	.003	340
LUM 3 (3)	Enhanced CEQA Program	0.440	0.350	0.670	--	447
LUM 4	Land Use Guidelines	0.077	0.081	0.011	--	139
LUM 5	Reduce Risk in Impacted Communities	--	--	--	--	--
LUM 6	Enhanced Air Quality Monitoring	--	--	--	--	--
Energy and Climate Control Measures						
ECM 1 (3)	Energy Efficiency	0.05	0.52	0.32	0.44	543
ECM 2 (3)	Renewable Energy	<0.001	<0.001	<0.001	<0.001	0.56
ECM 3	Urban Heat Island Mitigation	0.002	0.025	0.015	0.021	30
ECM 4	Tree-Planting	0.005	0.072	0.044	0.062	76
	TOTAL EMISSION REDUCTIONS:	**15.57**	**36.13**	**6.20**	**3.13**	**15,150**

Notes:

1. Emission reduction estimates are for year 2012, except as noted.
2. Greenhouse gas (GHG) emissions are reported as CO_2 equivalent emissions in short tons (2,000 lbs.) per day.
3. Emission reduction estimate is for year 2020.
4. Estimated reductions for this measure represent reductions that will be achieved upon full implementation of the measure. Full implementation is not anticipated until a year post-2020.

DBS:2648:DEIR:Emission Reduction Table

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CHAPTER 3

ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

Introduction
Air Quality
Hazards and Hazardous Materials
Hydrology and Water Quality
Utilities and Service Systems

3.0 Environmental Setting, Impacts and Mitigation Measures

3.1 Introduction

CEQA provisions for program EIRs in connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program, including adoptions of broad policy programs are separate, from the provisions of EIRs prepared for specific types of projects (e.g., land use projects) (CEQA Guidelines §15168). The EIR for the 2010 CAP is a program EIR because it examines the environmental effects of proposed control measures that will ultimately be implemented as rules or regulations and promulgated as part of a continuing ongoing regulatory program.

The degree of specificity required in an EIR corresponds to the degree of specificity involved in the underlying activity described in the EIR (CEQA Guidelines §15146). Because the level of information regarding potential impacts from control measures recommended in the 2010 CAP is relatively general at this time, the environmental impact forecasts are also general or qualitative in nature.

CEQA Guidelines §15125(a) requires that an EIR include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published. This environmental setting will normally constitute the baseline physical conditions against which a lead agency determines whether an impact is significant. The description of the environmental setting shall be no longer than is necessary to gain an understanding of the significant effects of the proposed project and its alternatives.

The CEQA Guidelines also require EIRs to identify significant environmental effects that may result from a proposed project (CEQA Guidelines §15126.2(a)). Direct and indirect significant effects of a project on the environment should be identified and described, with consideration given to both short- and long-term impacts. If significant adverse environmental impacts are identified, the CEQA Guidelines require a discussion of measures that could either avoid or substantially reduce any adverse environmental impacts to the greatest extent feasible (CEQA Guidelines §15126.4).

This chapter describes the existing environmental setting, analyzes the potential environmental impacts, and recommends mitigation measures (when significant environmental impacts have been identified) for those environmental areas identified in the Initial Study (see Appendix A). These areas include the following: air quality; hazards; hydrology/water quality; and utilities and service systems. Included for each impact category is a discussion of the environmental setting, significance criteria, project-specific impacts, feasible project-specific mitigation (if necessary and available), impacts remaining after mitigation (if any), cumulative impacts (if any) and feasible cumulative impact mitigation (if necessary and available).

Every control measure in the 2010 CAP was evaluated to determine whether or not it has the potential to generate adverse environmental impacts. A table has been prepared in each subchapter where control measures have been identified that have the potential to generate significant adverse impacts to that environmental resource. Table 3.1-1 lists the various control

measures which were evaluated and determined not to have significant adverse impacts on the environment.

TABLE 3.1-1

Control Measures with No Significant Adverse Environmental Impacts

Control Measure	Control Measure Description	Reason Not Significant
SSM 4	Natural Gas Processing and Distribution	3
SSM 7	Open Burning	1,2
TCM C-4	Conduct Public Outreach and Education	1,2
TCM C-5	Smart Driving/Speed Moderation	1,3
TCM E-1	Value Pricing Strategies	1,2
TCM E-2	Parking Pricing and Management Strategies	1,2
TCM E-3	Implement Transportation Pricing Reform	1,2
LUM 6	Enhanced Air Quality Monitoring	3
ECM 4	Tree-Planting	1

1. Control technologies do not generate adverse impacts.
2. Changes in operating practices with no impact identified.
3. Changes in testing, inspection or enforcement procedures with no impact.

There are several reasons why the control measures in Table 3.1-1 are not expected to generate significant adverse impacts. First, the primary control methods of compliance do not involve control equipment that would generate any adverse secondary or cross media impacts. For example, TCM C-4 – Conduct Public Outreach and Education would educate the public about the benefits of carpooling, vanpooling, use of public transit, biking, waling and telecommuting to reduce air emission, and TCM C-5 would educate the public about emission benefits of reducing driving speed. Neither of these control measures is expected to generate adverse secondary environmental quality impacts.

Another reason control measures in Table 3.1-1 were determined to have no significant adverse impacts is because they consist primarily of changes in operating practices, and are primarily administrative in nature. Control Measures TCM E-1, TCM E-2 and TCM E-3 would increase fees for certain transportation activities (e.g., higher bridge tolls, congestion pricing, gas tax increases, and parking fees) to discourage travel in single occupancy vehicles. The imposition of fees would not generate environmental impacts. In addition, several control measures would increase inspection and monitoring activities (SSM 4 and LUM 6) which would also not result in adverse environmental impacts.

The MTC approved a variety of transportation control measures and strategies in the Transportation 2035 Regional Transportation Plan. These measures and recommendations have accordingly been moved forward for inclusion in the region's air quality plans and are included as part of the 2010 CAP, along with additional TCMs proposed to be implemented by BAAQMD, local governments, and others. The impacts of implementation of the TCMs approved by MTC were evaluated in a separate CEQA document, the Final Environmental Impact Report for the Transportation 2035 Plan for the San Francisco Bay Area (SCH No.

2008022101) (MTC, 2009). A list of the TCMs included in the 2010 CAP that were included in the 2035 Transportation Plan is included in Table 3.1-2. The ~~Draft EIR~~ Final EIR for the 2010 CAP relies on the environmental analyses in the MTC 2009 Final ~~P~~EIR for the evaluation of the environmental impacts of implementing the TCMs developed by MTC. Environmental impacts from implementing the TCMs proposed in the 2010 CAP will be addressed in the ~~Draft PEIR~~ Final EIR for the 2010 CAP under cumulative impacts. The environmental impacts from implementing the TCMs evaluated in the 2035 Transportation Plan Final ~~P~~EIR will be summarized in the ~~Draft EIR~~ Final EIR for the 2010 CAP under cumulative impacts.

TABLE 3.1-2

Control Measures Addressed in Previous EIR

Control Measure	Control Measure Description
TCM A-1	Improve Local and Areawide Bus Service
TCM A-2	Improve Local and Regional Rail Service
TCM B-1	Implement Freeway Performance Initiative
TCM B-2	Improve Transit Efficiency and Use
TCM B-3	Bay Area Express Lane Network
TCM B-4	Goods Movement Improvements and Emission Reduction Strategies
TCM C-1	Support Voluntary Employer-Based Trip Reduction Program
TCM C-2	Implement Safe Routes to Schools and Safe Routes to Transit
TCM C-3	Promote Rideshare Services and Incentives
TCM D-1	Improve Bicycle Access and Facilities
TCM D-2	Improve Pedestrian Access and Facilities
TCM D-3	Support Local Land Use Strategies

3.2 Air Quality

3.2.1 Environmental Setting

3.2.1.1 Criteria Air Pollutants

3.2.1.1.1 Ambient Air Quality Standards and Health Effects

It is the responsibility of the BAAQMD to ensure that California and federal ambient air quality standards are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter (PM), sulfur dioxide (SO_2) and lead. These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution. The California Ambient Air Quality Standards (SAAQS) are more stringent than the federal standards, and in the case of PM_{10} and SO_2 far more stringent. California has also established standards for sulfate, visibility, hydrogen sulfide, and vinyl chloride.

The California and National Ambient Air Quality Standards (NAAQS) for each of these pollutants and their effects on health are summarized in Table 3.2-1.

TABLE 3.2-1

Federal and State Ambient Air Quality Standards

	STATE STANDARD	FEDERAL PRIMARY STANDARD	MOST RELEVANT EFFECTS
AIR POLLUTANT	CONCENTRATION/ AVERAGING TIME	CONCENTRATION/ AVERAGING TIME	
Ozone	0.09 ppm, 1-hr. avg. > 0.070 ppm, 8-hr	0.075 ppm, 8-hr avg. >	(a) Short-term exposures: (1) Pulmonary function decrements and localized lung edema in humans and animals (2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; (d) Property damage
Carbon Monoxide	9.0 ppm, 8-hr avg. > 20 ppm, 1-hr avg. >	9 ppm, 8-hr avg.> 35 ppm, 1-hr avg.>	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses
Nitrogen Dioxide	~~0.25~~ 0.18 ppm, 1-hr avg. > 0.03 ppm, ann. avg.>	0.053 ppm, ann. avg.>	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration
Sulfur Dioxide	0.04 ppm, 24-hr avg.> 0.25 ppm, 1-hr. avg. >	0.03 ppm, ann. avg.> 0.14 ppm, 24-hr avg.> 0.50 ppm, 3-hr avg.>	(a) Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma
Suspended Particulate Matter (PM_{10})	20 µg/m^3, ~~annarithmetic~~ annual arithmetic mean > 50 µg/m^3, 24-hr average>	~~50 µg/m^3, annual arithmetic mean >~~ Annual standard revoked in 2006 150 µg/m^3, 24-hr avg.>	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; (b) Excess seasonal declines in pulmonary function, especially in children
Suspended Particulate Matter ($PM_{2.5}$)	12 µg/m^3, annual arithmetic mean>	15 µg/m^3, annual arithmetic mean> 35 µg/m^3, 24-hour average>	Decreased lung function from exposures and exacerbation of symptoms in sensitive patients with respiratory disease; elderly; children.
Sulfates	25 µg/m^3, 24-hr avg. >=		(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) Property damage
Lead	1.5 µg/m^3, 30-day avg. >=	~~1.5 µg/m^3, calendar quarter>~~ 0.15 µg/m^3, rolling 3 month avg>	(a) Increased body burden; (b) Impairment of blood formation and nerve conduction
Visibility-Reducing Particles	In sufficient amount to give an extinction coefficient >0.23 inverse kilometers (visual range to less than 10 miles) with relative humidity less than 70%, 8-hour average (10am – 6pm PST)		Nephelometry and AISI Tape Sampler; instrumental measurement on days when relative humidity is less than 70 percent

U.S. EPA requires CARB and BAAQMD to measure the ambient levels of air pollution to determine compliance with the NAAQS. To comply with this mandate, the BAAQMD monitors levels of various criteria pollutants at 26 monitoring stations within the San Francisco Bay Area. A summary of the 2008 maximum concentration and number of days exceeding California and federal ambient air standards at the BAAQMD monitoring stations are presented in Table 3.2-2.

Air quality conditions in the San Francisco Bay Area have improved since the Air District was created in 1955. Ambient concentrations of air pollutants and the number of days on which the region exceeds air quality standards have fallen dramatically (see Table 3.2-3). The Air District is in attainment of the California and federal ambient air quality standards for CO, nitrogen oxides (NOx), and sulfur oxides (SOx). The Air District is unclassified for the federal 24-hour PM_{10} standard. Unclassified means that the monitoring data were incomplete and at the time of designations did not support a designation of attainment or non-attainment. However, the Air District does not comply with the State 24-hour PM_{10} standard.

The 2008 air quality data from the BAAQMD monitoring stations are presented in Table 3.4-2. All monitoring stations were below the State standard and federal ambient air quality standards for CO, NO_2, and SO_2. The Bay Area is designated as a non-attainment area for the federal and state 8-hour ozone standard. The State 8-hour standard was exceeded on 20 days in 2008 in the Air District, most frequently in the Eastern District (Bethel Island, Livermore, Concord, and Benecia) (see Table 3.2-2). The federal 8-hour standard was exceeded on 12 days in 2008.

All monitoring stations were in compliance with the federal PM_{10} standards. The California PM_{10} standards were exceeded on five days in 2008, most frequently in the Eastern District (Bethel Island). The Air District exceeded the federal $PM_{2.5}$ standard on 12 days in 2008, most frequently in Vallejo and San Jose (see Table 3.2-2).

Criteria Pollutants Health Effects

The 2010 CAP is aimed at reducing emissions of ozone, particulate matter (PM_{10} and $PM_{2.5}$), toxic air contaminants and GHG emissions. The health effects associated with criteria pollutants; including ozone, ozone precursors, and particulate matter are addressed in this section.

TABLE 3.2-2
Bay Area Air Pollution Summary 2008

MONITORING STATIONS	Ozone						CARBON MONOXIDE			NITROGEN DIOXIDE			SULFUR DIOXIDE			PM10				PM2.5				
	Max 1-Hr	Cal 1-Hr Days	Max 8-Hr	Nat. 8-Hr Days	Cal Days	3-Yr Avg	Max 1-Hr	Max 8-Hr	Nat/Cal Days	Max 1-Hr	Ann Avg	Nat/Cal Days	Max 24-Hr	Ann Avg	Nat/Cal Days	Ann Avg	Max 24-Hr	Nat Day	Cal Days	Max 24-Hr	Nat Days	3-Yr Avg	Ann Avg	3-Yr Avg
NORTH COUNTIES	(ppb)		(ppb)				(ppm)			(ppb)			(ppb)			(µg/m^3)				(µg/m^3)			(µg/m^3)	
Napa	107	1	77	2	2	61	3.2	1.8	0	64	10	0	--	--	--	21.6	50	0	0	--	--	--	--	--
San Rafael	85	0	69	0	0	50	1.8	1.1	0	56	13	0	--	--	--	18.6	41	0	0	--	--	--	--	--
Santa Rosa*	76	0	64	0	0	51	3.5	1.5	0	49	11	0	--	--	--	*	*	*	*	30.8	0	30.4	8.6	8.4
Vallejo*	109	1	75	0	3	60	2.7	2.3	0	67	10	0	4	1.2	0	*	*	*	*	50.0	7	36.4	9.9	9.8
COAST & CENTRAL BAY																								
Berkley*	53	0	49	0	0	*	2.8	1.7	0	55	14	0	4	13	0	22.5	44	0	0	--	--	--	--	--
Oakland*	86	0	64	0	0	*	3.0	1.6	0	70	15	0	--	--	--	--	--	--	--	30.1	0	*	9.5	*
Richmond	--	--	--	--	--	--	--	--	--	--	--	--	8	1.5	0	--	--	--	--	--	--	--	--	--
San Francisco	82	0	66	0	0	46	5.7	2.3	0	62	16	0	5	1.5	0	22.0	41	0	0	29.4	0	26.3	9.8	9.4
San Pablo	84	0	63	0	0	50	2.5	1.3	0	67	12	0	4	1.4	0	20.9	44	0	0	--	--	--	--	--
EASTERN DISTRICT																								
Benecia*	123	2	86	3	7	*	1.0	0.8	0	38	7	0	5	1.6	0	18.1	52	0	1	--	--	--	--	--
Bethel Island	109	4	90	4	10	76	1.5	1.1	0	41	7	0	4	1.4	0	24.1	77	0	3	--	--	--	--	--
Concord	119	3	88	6	8	78	1.6	1.1	0	50	10	0	4	1.2	0	17.5	51	0	1	60.3	3	34.6	9.3	9.0
Crockett	--	--	--	--	--	--	--	--	--	--	--	--	13	2.1	0	--	--	--	--	--	--	--	--	--
Fairfield	116	2	90	1	2	68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Livermore*	141	5	110	6	8	81	2.4	1.4	0	58	13	0	--	--	--	*	*	*	*	38.6	2	36.2	10.1	9.6
Martinez	--	--	--	--	--	--	--	--	--	--	--	--	6	1.7	0	--	--	--	--	--	--	--	--	--
Pittsburg*	106	1	83	1	2	71	2.8	1.4	0	56	10	0	6	1.8	0	*	*	*	*	--	--	--	--	--
SOUTH CENTRAL BAY																								
Fremont*	112	1	78	1	3	61	1.9	1.4	0	62	14	0	--	--	--	*	*	*	*	28.6	0	28.8	9.4	9.5
Hayward	114	1	86	1	3	63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood City*	82	0	69	0	0	53	4.3	1.9	0	69	14	0	--	--	--	*	*	*	*	27.9	0	29.3	9.1	9.0
San Leandro	96	1	68	0	0	55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SANTA CLARA VALLEY																								
Gilroy*	103	1	79	1	4	73	--	--	--	--	--	--	--	--	--	--	--	--	--	25.5	0	*	--	--
Los Gatos	122	2	97	2	6	72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
San Jose Central	118	1	80	2	3	65	3.3	2.5	0	80	17	0	--	--	--	23.4	57	0	1	41.9	5	35.8	11.5	11.0
San Martin	123	2	77	2	5	76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sunnyvale	93	0	76	1	2	60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Bay Area Days over Standard		**9**		**12**	**20**				**0**			**0**			**0**			**0**	**5**		**12**			

*Station Information: $PM_{2.5}$ monitoring at Gilroy began Mar. 1, 2007, three-year average statistics not available. Benicia and Berkeley sites opened in 2007, Apr. 1 and Dec. 13 respectively; no three-year ozone statistics available. Oakland site opened Nov. 1, 2007, no three-year ozone or $PM_{2.5}$ statistics available. PM_{10} monitoring was discontinued on June 30, 2008 at Freemont, Livermore, Pittsburg, Redwood City, Santa Rosa, and Vallejo, statistics no longer available. SO_2 monitoring was discontinued at San Francisco Dec. 31, 2008

(ppb) = parts per billion (ppm) = parts per million, (µg/m^3) = micrograms per cubic meter

TABLE 3.2-3
Ten-Year Bay Area Air Quality Summary
(days over standard)

Year	Ozone			Carbon Monoxide				Nitrogen Dioxide	Sulfur Dioxide		PM10		PM2.5
	8-Hr	1-Hr	8-Hr	1-Hr		8-Hr		1-Hr	24-Hr		24-Hr*		24-Hr**
	Nat.	Cal.	Cal.	Nat.	Cal.	Nat.	Cal.	Cal.	Nat.	Cal.	Nat.	Cal.	Nat.
1998	16	29	--	0	0	0	0	0	0	0	0	5	--
1999	9	20	--	0	0	0	0	0	0	0	0	12	--
2000	4	12	--	0	0	0	0	0	0	0	0	7	1
2001	7	15	--	0	0	0	0	0	0	0	0	10	5
2002	7	16	--	0	0	0	0	0	0	0	0	6	7
2003	7	19	--	0	0	0	0	0	0	0	0	6	0
2004	0	7	--	0	0	0	0	0	0	0	0	7	1
2005	1	9	9	0	0	0	0	0	0	0	0	6	0
2006	12	18	22	0	0	0	0	0	0	0	0	15	10
2007	1	4	9	0	0	0	0	0	0	0	0	4	14
2008	12	9	20	0	0	0	0	0	0	0	0	5	12

* PM10 is sampled every sixth day – actual days over standard can be estimated to be six times the numbers listed.

** On Dec. 17, 2006, the U.S. EPA implemented a more stringent national 24-hour PM2.5 standard – revising it from 5 g/m3 to 25 g/m3. PM2.5 exceedance days for 2006, 2007, and 2008 reflect the new standard.

Ozone: Ozone is not emitted directly from pollution sources. Instead ozone is formed in the atmosphere through complex chemical reactions between hydrocarbons, or reactive organic gases (ROG, also commonly referred to as volatile organic compounds or VOC), and nitrogen oxides (NOx), in the presence of sunlight. ROG and NOx are referred to as ozone precursors.

NOx and VOC emissions have been decreasing state-wide and in the San Francisco Bay Area since 1975 and are projected to continue declining through 2010. Most NOx emissions are produced by the combustion of fuels. Mobile sources of NOx include motor vehicles, aircraft, trains, ships, recreation boats, industrial and construction equipment, farm equipment, off-road recreational vehicles, and other equipment. Stationary sources of NOx include both internal and external combustion processes in industries such as manufacturing, food processing, electric utilities, and petroleum refining. Area-wide sources, which include residential fuel combustion, waste burning, and fires, contribute only a small portion to the total NOx emissions. NO_2 is a component of NOx, and its presence in the atmosphere can be correlated with emissions on NOx.

VOC emissions result primarily from incomplete fuel combustion and the evaporation of paints, solvents and fuels. Mobile sources are the largest contributors to VOC emissions. Stationary sources include processes that use solvents (such as manufacturing,

degreasing, and coating operations) and petroleum refining, and marketing. Area-wide VOC sources include consumer products, pesticides, aerosol and architectural coatings, asphalt paving and roofing, and other evaporative emissions.

NOx and VOC emissions have been reduced for both stationary and mobile sources. Stationary source emissions of VOC and NOx have been substantially reduced due to stringent District regulations. Mobile source emissions of VOC and NOx have been substantially reduced because of strict state and federal standards, despite an increase in vehicle miles traveled in the Bay Area.

Ozone (O_3), a colorless gas with a sharp odor, is a highly reactive form of oxygen. High ozone concentrations exist naturally in the stratosphere. Some mixing of stratospheric ozone downward through the troposphere to the earth's surface does occur; however, the extent of ozone mixing is limited. At the earth's surface in sites remote from urban areas ozone concentrations are normally very low (0.03-0.05 ppm).

While ozone is beneficial in the stratosphere because it filters out skin-cancer-causing ultraviolet radiation, ground level ozone is harmful because it is a highly reactive oxidant with damaging effects on human health, plants and materials at the earth's surface.

The BAAQMD began ozone monitoring in a few places in 1959. A large ozone monitoring network was established in 1965. The monitoring data in Table 3.2-3 illustrates the improvement in air quality that has occurred when measured by the decrease in the number of days per year that the Bay Area exceeded the State and federal ozone standards. However, ozone concentrations in the BAAQMD still exceed the federal and State 8-hour ozone standards on occasion, and the Bay Area is therefore designated as non-attainment for the State 8-hour ozone standard.

The propensity of ozone for reacting with organic materials causes it to be damaging to living cells, and ambient ozone concentrations in the Bay Area are occasionally sufficient to cause health effects. Ozone enters the human body primarily through the respiratory tract and causes respiratory irritation and discomfort, makes breathing more difficult during exercise, and reduces the respiratory system's ability to remove inhaled particles and fight infection, while long-term exposure damages lung tissue. People with respiratory diseases, children, the elderly, and people who exercise heavily are more susceptible to the effects of ozone.

Plants are sensitive to ozone and ozone is responsible for significant crop damage. Ozone is also responsible for damage to forests and other ecosystems.

Particulate Matter (PM_{10} and $PM_{2.5}$): Particulate matter, or PM, consists of microscopically small solid particles or liquid droplets suspended in the air. PM can be emitted directly into the air or it can be formed from secondary reactions involving gaseous pollutants that combine in the atmosphere. Particulate pollution is primarily a problem in winter, accumulating when cold, stagnant weather comes into the Bay Area. PM is usually broken down further into two size distributions, PM_{10} and $PM_{2.5}$. PM_{10} is

particulate matter with a diameter of 10 micrometers or less and $PM_{2.5}$, a subset of PM_{10}, is particulate matter with a diameter of 2.5 micrometers or less. Of great concern to public health are particles small enough to be inhaled into the deepest parts of the lung. Respirable particles (particulate matter less than about 10 micrometers in diameter) can accumulate in the respiratory system and aggravate health problems such as asthma, bronchitis and other lung diseases. Children, the elderly, exercising adults, and those suffering from asthma are especially vulnerable to adverse health effects of PM_{10} and $PM_{2.5}$ (CARB, 2007).

A consistent correlation between elevated ambient fine particulate matter (PM_{10} and $PM_{2.5}$) levels and premature deaths, hospital admissions, emergency room visits and asthma attacks has been observed in different parts of the United States and various areas around the world. Studies have reported an association between long-term exposure to air pollution dominated by fine particles ($PM_{2.5}$) and increased mortality, reduction in life-span, and an increased mortality from lung cancer (CARB, 2007).

Daily fluctuations in fine particulate matter concentration levels have also been related to hospital admissions for acute respiratory conditions, to school absences, to lost work days, to a decrease in respiratory function in normal children and to increased medication use in children and adults with asthma. Studies have also shown lung function growth in children is reduced with long-term exposure to particulate matter (CARB, 2007).

The elderly, people with pre-existing respiratory and/or cardiovascular disease and children appear to be more susceptible to the effects of PM_{10} and $PM_{2.5}$ (CARB, 2007).

3.2.1.1.2 Current Emissions Inventory

Emission inventories developed for the 2010 CAP use 2005 as the base year. An emission inventory is a detailed estimate of air pollutant emissions from a range of sources in a given area, for a specified time period. Future projected emissions incorporate current levels of control on sources, growth in activity in the Air District and implementation of future programs that affect emissions of air pollutants.

There are literally millions of sources of ozone precursors in the Bay Area, including industrial and commercial facilities, motor vehicles, and consumer products such as household cleaners and paints. Even trees and plants produce ozone precursors. Sources of ozone precursors produced by human activity are called anthropogenic sources while natural sources, produced by plants and animals, are called biogenic sources. In the Bay Area, emissions from anthropogenic sources are much higher than from biogenic sources.

The main sources of ROG are motor vehicles and evaporation of fuels, solvents and other petroleum products. NOx is produced mainly through combustion, and so the major sources are motor vehicles, off-road mobile sources and combustion at industrial and other facilities. Table 3.2-4 shows the existing inventory of the major sources of ozone precursors in 2005 (baseline) as well as the anticipated emission inventories in 2009, 2012, 2015, and 2020.

Likewise there are many sources of particulate matter in the Bay Area, including industrial and commercial facilities, entrained road dust, and construction operations. Table 3.2-5 shows the inventory of the major sources of particulate matter (including PM_{10} and $PM_{2.5}$) in 2005 (baseline) as well as the anticipated emission inventories in 2009, 2012, 2015, and 2020.

Stationary Sources

Stationary sources can be further divided between point and area sources.

Point Sources: Point sources are those that are identified on an individual facility or source basis, such as refineries and manufacturing plants. BAAQMD maintains a computer data bank with detailed information on operations and emissions characteristics for nearly 4,000 facilities, with roughly 20,000 different sources, throughout the Bay Area. Parameters that affect the quantities of emissions are updated regularly.

Area Sources: Area sources are stationary sources that are individually very small, but that collectively make a large contribution to the inventory. Many area sources do not require permits from the BAAQMD, such as residential heating, and the wide range of consumer products such as paints, solvents, and cleaners. Some facilities considered to be area sources do require permits from the BAAQMD, such as gas stations and dry cleaners. Emissions estimates for area sources may be based on the BAAQMD data bank, calculated by CARB using statewide data, or calculated based on surrogate variables.

Mobile Sources

Mobile sources include on-road motor vehicles such as automobiles, trucks and buses, as well as off-road sources such as construction equipment, boats, trains and aircraft. Estimates of on-road motor vehicle emissions include consideration of the fleet mix (vehicle type, model year, and accumulated mileage), miles traveled, ambient temperatures, vehicle speeds, and vehicle emission factors, as developed from comprehensive CARB testing programs. The BAAQMD also receives vehicle registration data from the Department of Motor Vehicles. Some of these variables change from year to year, and the projections are based upon expected changes. Emissions from off-road mobile sources are calculated using various emission factors and methodologies provided by CARB and U.S. EPA.

TABLE 3.2-4
Bay Area ROG and NOx Baseline[1] Emission Annual Average Inventory[2] Projections (Tons/Day)[3]

	Reactive Organic Gases[4]					Oxides of Nitrogen[5]				
SOURCE CATEGORY	**2005**	**2009**	**2012**	**2015**	**2020**	**2005**	**2009**	**2012**	**2015**	**2020**
INDUSTRIAL/COMMERCIAL PROCESSES										
PETROLEUM REFINING FACILITIES										
Basic Refining Processes	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
Wastewater (Oil-Water) Separators	1.9	0.9	0.9	0.9	1.0	--	--	--	--	--
Wastewater Treatment Facilities	0.1	0.1	0.1	0.1	0.1	--	--	--	--	--
Cooling Towers	2.2	2.2	2.3	2.4	2.5	--	--	--	--	--
Flares & Blowdown Systems	0.8	0.8	0.8	0.9	0.9	0.2	0.2	0.2	0.2	0.3
Other Refining Processes	0.1	0.2	0.2	0.2	0.2	--	--	--	--	--
Fugitives	0.6	0.6	0.7	0.7	0.7	--	--	--	--	--
Subtotal	**5.8**	**5.0**	**5.1**	**5.3**	**5.5**	**0.5**	**0.5**	**0.6**	**0.6**	**0.6**
CHEMICAL MANUFACTURING FACILITIES										
Coating, Inks, Resins & Other Facilities	0.3	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1
Pharmaceuticals & Cosmetics	0.7	0.7	0.7	0.7	0.7	1.5	1.6	1.7	1.7	1.9
Fugitives - Valves & Flanges	0.7	0.7	0.7	0.8	0.8	--	--	--	--	--
Subtotal	**1.6**	**1.6**	**1.7**	**1.7**	**1.9**	**1.6**	**1.7**	**1.7**	**1.8**	**2.0**
OTHER INDUSTRIAL/COMMERCIAL PROCESSES										
Bakeries	0.9	1.0	1.0	1.0	1.1	--	--	--	--	--
Cooking	1.3	1.2	1.3	1.3	1.3	--	--	--	--	--
Wineries & Other Food & Agr. Processes	1.5	1.5	1.6	1.7	1.9	--	--	--	--	--
Metallurgical & Minerals Manufacturing	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2
Waste Management	5.6	5.8	5.8	5.9	6.0	--	--	--	--	--
Semiconductor Manufacturing	0.3	0.3	0.3	0.3	0.3	--	--	--	--	--
Fiberglass Products Manufacturing	0.3	0.3	0.3	0.3	0.4	--	--	--	--	--
Rubber & Plastic Products Manufacturing	0.3	0.3	0.3	0.4	0.4	--	--	--	--	--
Contaminated Soil Aeration	0.1	0.1	0.1	0.1	0.1	--	--	--	--	--
Other Industrial Commercial	0.8	0.8	0.9	0.9	1.0	--	--	--	--	--
Subtotal	**11.2**	**11.5**	**11.8**	**12.1**	**12.6**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
PETROLEUM PRODUCT/SOLVENT EVAPORATION										
PETROLEUM REFINERY EVAPORATION										
Storage Tanks	3.4	3.6	3.7	3.8	4.0	--	--	--	--	--
Loading Operations	0.1	0.1	0.1	0.1	0.1	--	--	--	--	--
Subtotal	**3.5**	**3.6**	**3.8**	**3.9**	**4.1**	**--**	**--**	**--**	**--**	**--**

TABLE 3.2-4
Bay Area ROG and NOx Baseline[1] Emission Annual Average Inventory[2] Projections (Tons/Day)[3]

	Reactive Organic Gases[4]					Oxides of Nitrogen[5]				
SOURCE CATEGORY	**2005**	**2009**	**2012**	**2015**	**2020**	**2005**	**2009**	**2012**	**2015**	**2020**
FUELS DISTRIBUTION										
Natural Gas Distribution	0.6	0.6	0.7	0.7	0.8	--	--	--	--	--
Bulk Plants & Terminals	3.1	1.8	1.8	1.9	1.8	--	--	--	--	--
Trucking	3.2	3.0	2.9	2.9	2.8	--	--	--	--	--
Gasoline Filling Stations	7.5	5.8	5.5	5.3	5.0	--	--	--	--	--
Aircraft Fueling	2.8	2.6	2.6	2.5	2.5	--	--	--	--	--
Recreational Boat Fueling	0.9	0.9	0.9	1.0	1.0	--	--	--	--	--
Portable Fuel Container Spillage	6.7	4.1	3.3	2.8	2.3	--	--	--	--	--
Other Fueling	0.3	0.3	0.3	0.3	0.4	--	--	--	--	--
Subtotal	**25.1**	**19.2**	**18.0**	**17.3**	**16.6**	**--**	**--**	**--**	**--**	**--**
OTHER ORGANIC COMPOUNDS EVAPORATION										
Cold Cleaning	3.1	3.2	3.3	3.4	3.6	--	--	--	--	--
Vapor Degreasing	--	--	--	--	--	--	--	--	--	--
Handwiping	3.3	2.0	1.8	1.9	2.0	--	--	--	--	--
Dry Cleaners	--	--	--	--	--	--	--	--	--	--
Printing	3.0	3.1	3.1	3.2	3.3	--	--	--	--	--
Adhesives & Sealants	9.2	9.5	9.6	9.6	9.7	--	--	--	--	--
Structures Coating	23.0	23.8	24.2	24.7	25.4	--	--	--	--	--
Industrial/Commercial Coating	13.6	13.8	14.1	14.5	15.2	--	--	--	--	--
Storage Tanks	0.8	0.8	0.9	0.9	1.0	--	--	--	--	--
Lightering & Ballsting	1.9	2.2	2.4	2.6	2.9	--	--	--	--	--
Other Organics Evaporation	1.8	2.0	2.1	2.2	2.3	--	--	--	--	--
Subtotal	**59.7**	**60.3**	**61.5**	**63.0**	**65.5**	**--**	**--**	**--**	**--**	**--**
COMBUSTION - STATIONARY SOURCES										
FUELS COMBUSTION										
Domestic	9.0	9.3	9.6	9.8	10.3	14.4	14.9	15.2	15.6	16.2
Cogeneration	1.4	1.4	1.5	1.5	1.6	4.1	4.2	4.2	4.3	4.6
Power Plants	--	0.1	0.1	0.1	0.1	1.7	2.2	2.2	2.3	2.5
Oil Refineries External Combustion	0.5	0.5	0.5	0.5	0.6	13.7	14.2	14.7	15.1	15.9
Glass Melting Furnaces - Natural Gas	--	--	--	--	--	1.4	1.4	1.5	1.6	1.7
Reciprocating Engines	0.8	0.7	0.6	0.5	0.4	7.7	7.1	6.8	6.5	5.9
Turbines	0.1	0.1	0.1	0.1	0.1	1.6	1.6	1.6	1.7	1.8
Landfill/Cement Plant Combustion	1.2	1.3	1.3	1.4	1.4	16.7	15.3	15.8	16.3	17.1
Subtotal	**13.0**	**13.3**	**13.6**	**13.9**	**14.5**	**61.2**	**60.9**	**61.9**	**63.2**	**65.6**

TABLE 3.2-4
Bay Area ROG and NOx Baseline[1] Emission Annual Average Inventory[2] Projections (Tons/Day)[3]

	Reactive Organic Gases[4]					Oxides of Nitrogen[5]				
SOURCE CATEGORY	**2005**	**2009**	**2012**	**2015**	**2020**	**2005**	**2009**	**2012**	**2015**	**2020**
BURNING OF WASTE MATERIAL										
Incineration	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3
Planned Fires	0.3	0.3	0.3	0.3	0.4	0.2	0.2	0.2	0.2	0.2
Subtotal	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.5**	**0.5**
Banked Emissions 6	**0.0**	**9.5**	**9.5**	**9.5**	**9.5**	**0.0**	**7.2**	**7.2**	**7.2**	**7.2**
Alternative Compliance Allowance 7	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**4.9**	**4.9**	**4.9**	**4.9**
Subtotal (District Jurisdiction)	**120.2**	**124.4**	**125.3**	**127.1**	**130.5**	**63.8**	**75.8**	**77.0**	**78.4**	**80.9**
COMBUSTION - MOBILE SOURCES										
ON-ROAD MOTOR VEHICLES										
Passenger Cars	66.3	45.1	33.2	25.6	18.6	52.4	35.4	26.0	19.3	12.5
Light Duty Trucks<6000lbs	41.3	33.6	29.2	25.4	20.5	50.4	36.9	29.8	23.9	16.5
Medium Duty Trucks 6001-8500 lbs	6.0	5.0	4.7	4.5	4.1	11.7	8.7	7.3	6.1	4.4
Light Heavy Duty Trucks 8501-14000lbs	5.2	4.0	3.4	3.0	2.5	12.0	10.2	8.8	7.9	6.6
Medium Heavy Duty Trucks 14001-33000lbs	4.4	3.2	2.4	1.9	1.3	31.7	26.3	20.8	15.9	10.1
Heavy Heavy Duty Trucks>33000 lbs	5.3	4.2	3.3	2.6	1.8	56.1	45.7	34.8	26.0	16.9
School/Urban Buses	1.2	1.1	1.1	1.1	1.1	16.4	16.0	15.8	15.0	14.1
Motor-Homes	0.4	0.3	0.2	0.2	0.1	1.3	1.1	1.0	0.8	0.5
Motorcycles	8.4	7.5	7.0	6.9	6.9	1.9	2.0	2.0	2.1	2.1
Subtotal	**138.5**	**103.9**	**84.6**	**71.0**	**56.6**	**233.7**	**182.3**	**146.3**	**116.9**	**83.7**
OFF-HIGHWAY MOBILE SOURCES										
Lawn and Garden Equipment	19.5	16.5	15.1	14.0	12.9	2.9	2.4	2.3	2.2	2.2
Transportation Refrigeration Units	2.4	1.7	1.1	0.8	0.8	4.6	5.1	5.7	5.6	5.6
Agricultural Equipment	1.6	1.3	1.0	0.8	0.5	7.4	6.2	5.2	4.2	2.7
Construction and Mining Equipment	12.2	9.8	8.4	7.3	5.7	72.9	62.9	54.5	45.1	30.7
Industrial Equipment	3.7	2.6	2.1	1.8	1.6	20.7	15.6	12.8	10.6	8.3
Light Duty Commercial Equipment	7.0	5.7	4.8	4.0	3.3	7.9	7.1	6.5	5.6	4.4
Trains	1.1	1.0	1.0	1.0	1.1	13.8	11.9	12.8	13.1	13.8
Off Road Recreational Vehicles	1.0	0.8	0.8	0.9	1.0	0.1	--	--	--	0.1
Ships [8]	1.8	2.1	2.3	2.5	2.9	41.3	47.0	51.8	57.1	67.2
Commercial Boats	3.0	2.8	2.5	2.2	2.1	24.7	22.1	20.0	17.2	16.2
Recreational Boats	18.3	16.7	15.8	15.3	15.1	3.6	4.1	4.1	4.1	4.3
Subtotal	**71.6**	**60.8**	**54.9**	**50.5**	**47.1**	**199.8**	**184.4**	**175.7**	**164.9**	**155.4**

TABLE 3.2-4
Bay Area ROG and NOx Baseline[1] Emission Annual Average Inventory[2] Projections (Tons/Day)[3]

		Reactive Organic Gases[4]					Oxides of Nitrogen[5]				
	SOURCE CATEGORY	**2005**	**2009**	**2012**	**2015**	**2020**	**2005**	**2009**	**2012**	**2015**	**2020**
AIRCRAFT											
	Commercial Aircraft	1.9	2.9	3.6	4.2	5.1	12.1	18.9	21.3	22.3	24.3
	General Aviation	0.7	0.7	0.7	0.8	0.8	0.2	0.4	0.4	0.5	0.5
	Military Aircraft	3.3	3.3	3.4	3.4	3.4	4.9	4.9	5.0	5.0	5.1
	Airport Ground Support Equipment	0.9	1.0	1.0	1.1	1.2	3.8	4.1	4.3	4.5	4.9
	Subtotal	**6.7**	**7.9**	**8.7**	**9.4**	**10.5**	**21.1**	**28.3**	**31.0**	**32.3**	**34.8**
MISCELLANEOUS OTHER SOURCES											
	Construction Operations	--	--	--	--	--	--	--	--	--	--
	Farming Operations	--	--	--	--	--	--	--	--	--	--
	Entrained Road Dust-Paved Roads	--	--	--	--	--	--	--	--	--	--
	Entrained Road Dust-Unpaved Roads	--	--	--	--	--	--	--	--	--	--
	Wind Blown Dust	--	--	--	--	--	--	--	--	--	--
	Animal Waste	5.5	5.5	5.5	5.5	5.5	--	--	--	--	--
	Agricultural Pesticides	0.8	0.8	0.8	0.8	0.8	--	--	--	--	--
	Non-Agricultural Pesticides	0.2	0.2	0.2	0.2	0.2	--	--	--	--	--
	Consumer Products(Excluding Pesticides)	45.2	46.7	47.9	49.1	51.2	--	--	--	--	--
	Other Sources	4.0	3.6	3.6	3.7	3.7	2.2	2.0	2.0	2.0	2.0
	Subtotal	**55.6**	**56.8**	**58.0**	**59.2**	**61.3**	**2.2**	**2.0**	**2.0**	**2.0**	**2.0**
	GRAND TOTAL EMISSIONS	**393**	**354**	**331**	**317**	**306**	**521**	**473**	**432**	**394**	**357**

1. Inventory and projections assume implementation of all control measures adopted as of December 31, 2006, including Smog Check II for the Bay Area.
2. The annual average inventory represents average day emissions. ABAG Projections 2007 were used to project future emissions from on-road motor vehicles. ABAG Projections 2002 was the regional population projections used for the planning inventory.
3. Entries are rounded to nearest whole number, totals may not equal to sums of column entries.
4 Photochemically reactive organic compounds excludes methane and other non-reactives and roughly 160 tpd of ROG emissions from natural sources.
5. Oxides of nitrogen (nitric oxide and/or nitrogen dioxide), NOx as NO2.
6. Banked Emissions show the total current deposits in the District's emissions banking program as allowed by BAAQMD Regulation 2, Rules 2 and 4. These emissions were reduced (beyond regulations) and banked, but may be withdrawn from the bank and emitted in future years.
7. Surplus emissions, voluntarily reduced, available for alternative compliance with BARCT requirements of selected rules, as prescribed by State law and BAAQMD Regulation 2, Rule 9.
8. California Air Resources Board (ARB) has recently developed statewide emissions estimates for ocean-going vessels (OGVs) occurring within 100 nautical miles of the California coastline. As a result, these emissions are substantially higher than those reported in the previous version of the inventory published in the 2005 Ozone Strategy, which accounted for ship activities within three miles of the Golden Gate Bridge.

TABLE 3.2-5
Bay Area PM Baseline[1] Emission Annual Average Inventory[2] Projections (Tons/Day)[3]

	Particulate Matter< 10 microns[4]					Particulate Matter< 2.5 microns[5]				
SOURCE CATEGORY	**2005**	**2009**	**2012**	**2015**	**2020**	**2005**	**2009**	**2012**	**2015**	**2020**
INDUSTRIAL/COMMERCIAL PROCESSES										
PETROLEUM REFINING FACILITIES										
Basic Refining Processes	0.8	0.9	0.9	0.9	1.0	0.5	0.5	0.5	0.5	0.6
Wastewater (Oil-Water) Separators	--	--	--	--	--	--	--	--	--	--
Wastewater Treatment Facilities	--	--	--	--	--	--	--	--	--	--
Cooling Towers	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Flares & Blowdown Systems	--	--	--	--	--	--	--	--	--	--
Other Refining Processes	0.1	0.1	0.1	0.1	0.1	--	--	--	--	--
Fugitives	--	--	--	--	--	--	--	--	--	--
Subtotal	**1.1**	**1.1**	**1.1**	**1.2**	**1.2**	**0.7**	**0.7**	**0.7**	**0.8**	**0.8**
CHEMICAL MANUFACTURING FACILITIES										
Coating, Inks, Resins & Other Facilities	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Pharmaceuticals & Cosmetics	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.5
Fugitives - Valves & Flanges	--	--	--	--	--	--	--	--	--	--
Subtotal	**0.5**	**0.5**	**0.6**	**0.6**	**0.6**	**0.5**	**0.5**	**0.5**	**0.5**	**0.6**
OTHER INDUSTRIAL/COMMERCIAL PROCESSES										
Bakeries	--	--	--	--	--	--	--	--	--	--
Cooking	13.7	13.9	14.2	14.4	15.1	12.8	13.0	13.3	13.5	14.1
Wineries & Other Food & Agr. Processes	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3
Metallurgical & Minerals Manufacturing	4.2	4.5	4.7	4.9	5.3	2.9	3.0	3.2	3.3	3.5
Waste Management	1.1	1.2	1.2	1.2	1.3	0.3	0.3	0.4	0.4	0.4
Semiconductor Manufacturing	--	--	--	--	--	--	--	--	--	--
Fiberglass Products Manufacturing	--	--	--	--	--	--	--	--	--	--
Rubber & Plastic Products Manufacturing	--	--	--	--	--	--	--	--	--	--
Contaminated Soil Aeration	--	--	--	--	--	--	--	--	--	--
Other Industrial Commercial	1.1	1.2	1.2	1.2	1.3	0.5	0.5	0.5	0.6	0.6
Subtotal	**20.7**	**21.3**	**21.9**	**22.4**	**23.5**	**16.8**	**17.2**	**17.7**	**18.0**	**18.9**
COMBUSTION - STATIONARY SOURCES										
FUELS COMBUSTION										
Domestic	19.7	20.4	21.0	21.6	22.6	19.0	19.7	20.3	20.8	21.8
Cogeneration	0.8	0.9	0.9	0.9	1.0	0.8	0.9	0.9	0.9	1.0
Power Plants	0.3	0.4	0.4	0.4	0.5	0.3	0.4	0.4	0.4	0.5

TABLE 3.2-5
Bay Area PM Baseline[1] Emission Annual Average Inventory[2] Projections (Tons/Day)[3]

	Particulate Matter< 10 microns[4]					Particulate Matter< 2.5 microns[5]				
SOURCE CATEGORY	**2005**	**2009**	**2012**	**2015**	**2020**	**2005**	**2009**	**2012**	**2015**	**2020**
Oil Refineries External Combustion	1.7	1.8	1.8	1.9	2.0	1.7	1.8	1.8	1.9	2.0
Reciprocating Engines	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.2
Turbines	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2
Landfill/Cement Plant Combustion	2.0	2.1	2.2	2.2	2.4	2.0	2.1	2.2	2.2	2.3
Subtotal	**25.0**	**26.0**	**26.7**	**27.5**	**28.8**	**24.3**	**25.3**	**26.0**	**26.7**	**28.0**
BURNING OF WASTE MATERIAL										
Incineration	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Planned Fires	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4
Subtotal	**0.5**	**0.5**	**0.5**	**0.6**	**0.6**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Banked Emissions 6	**0.0**	**0.3**	**0.3**	**0.3**	**0.3**	**0.0**	**0.2**	**0.2**	**0.2**	**0.2**
Alternative Compliance Allowance 7	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Subtotal (District Jurisdiction)	**47.8**	**49.8**	**51.1**	**52.4**	**55.0**	**42.8**	**44.4**	**45.6**	**46.8**	**49.0**
COMBUSTION - MOBILE SOURCES - ON-ROAD MOTOR VEHICLES										
Passenger Cars	3.1	3.2	3.4	3.6	3.8	1.7	1.8	1.9	2.0	2.2
Light Duty Trucks<6000lbs	2.4	2.6	2.8	3.0	3.3	1.5	1.7	1.9	2.0	2.2
Medium Duty Trucks 6001-8500 lbs	0.6	0.6	0.7	0.7	0.8	0.4	0.4	0.5	0.5	0.6
Light Heavy Duty Trucks 8501-14000lbs	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Medium Heavy Duty Trucks 14001-33000lbs	0.8	0.8	0.7	0.6	0.5	0.7	0.7	0.6	0.5	0.4
Heavy Heavy Duty Trucks>33000 lbs	2.3	1.7	1.3	1.0	0.7	2.1	1.5	1.1	0.8	0.5
School/Urban Buses	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Motor-Homes	--	--	--	--	--	--	--	--	--	--
Motorcycles	0.1	0.1	0.1	0.1	0.1	--	--	--	--	--
Subtotal	**9.8**	**9.6**	**9.5**	**9.5**	**9.7**	**6.9**	**6.6**	**6.4**	**6.4**	**6.4**
OFF-HIGHWAY MOBILE SOURCES										
Lawn and Garden Equipment	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Transportation Refrigeration Units	0.5	0.4	0.3	0.2	0.1	0.5	0.4	0.3	0.2	0.1
Agricultural Equipment	0.4	0.4	0.3	0.2	0.1	0.4	0.4	0.3	0.2	0.1
Construction and Mining Equipment	4.4	3.7	3.2	2.5	1.6	4.3	3.6	3.1	2.5	1.6
Industrial Equipment	0.7	0.6	0.5	0.4	0.3	0.7	0.6	0.5	0.4	0.2
Light Duty Commercial Equipment	0.7	0.7	0.7	0.6	0.5	0.7	0.7	0.7	0.6	0.5
Trains	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Off Road Recreational Vehicles	--	--	--	--	--	--	--	--	--	--

TABLE 3.2-5
Bay Area PM Baseline[1] Emission Annual Average Inventory[2] Projections (Tons/Day)[3]

	Particulate Matter< 10 microns[4]					Particulate Matter< 2.5 microns[5]				
SOURCE CATEGORY	**2005**	**2009**	**2012**	**2015**	**2020**	**2005**	**2009**	**2012**	**2015**	**2020**
Ships [8]	3.1	3.6	3.9	4.3	5.1	3.1	3.5	3.8	4.2	5.0
Commercial Boats	1.1	1.0	0.9	0.8	0.8	1.1	1.0	0.9	0.8	0.7
Recreational Boats	1.0	1.3	1.5	1.8	2.3	1.0	1.3	1.5	1.8	2.3
Subtotal	**12.7**	**12.2**	**11.9**	**11.4**	**11.3**	**12.4**	**11.9**	**11.7**	**11.2**	**11.1**
AIRCRAFT										
Commercial Aircraft	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
General Aviation	--	--	--	--	--	--	--	--	--	--
Military Aircraft	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Airport Ground Support Equipment	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Subtotal	**0.5**	**0.5**	**0.5**	**0.6**	**0.6**	**0.5**	**0.5**	**0.5**	**0.5**	**0.6**
MISCELLANEOUS OTHER SOURCES										
Construction Operations	27.0	27.3	28.7	30.2	32.6	2.7	2.7	2.9	3.0	3.3
Farming Operations	1.2	1.2	1.2	1.2	1.2	0.2	0.2	0.2	0.2	0.2
Entrained Road Dust-Paved Roads	72.1	76.5	79.8	83.4	89.5	10.8	11.5	12.0	12.5	13.4
Entrained Road Dust-Unpaved Roads	12.6	13.1	13.4	13.8	14.5	1.3	1.3	1.3	1.4	1.5
Wind Blown Dust	6.5	6.5	6.5	6.5	6.5	1.2	1.2	1.2	1.2	1.2
Animal Waste	11.2	11.2	11.2	11.2	11.2	1.4	1.4	1.4	1.4	1.4
Agricultural Pesticides	--	--	--	--	--	--	--	--	--	--
Non-Agricultural Pesticides	--	--	--	--	--	--	--	--	--	--
Consumer Products (Excluding Pesticides)	--	--	--	--	--	--	--	--	--	--
Other Sources	7.0	6.4	6.4	6.4	6.4	6.3	5.7	5.7	5.7	5.8
Subtotal	**137.5**	**142.2**	**147.3**	**152.6**	**161.9**	**23.8**	**24.0**	**24.7**	**25.4**	**26.6**
GRAND TOTAL EMISSIONS	**208**	**214**	**220**	**227**	**238**	**86**	**87**	**89**	**90**	**94**

1. Inventory and projections assume implementation of all control measures adopted as of December 31, 2006, including Smog Check II for the Bay Area.
2. The annual average inventory represents average day emissions. ABAG Projections 2007 were used to project future emissions from on-road motor vehicles. ABAG Projections 2002 was the regional population projections used for the planning inventory.
3. Entries are rounded to nearest whole number, totals may not equal to sums of column entries.
4. Note that these are direct emissions only and do not include secondary PM10 such as ammonium nitrate and ammonium sulfate
5. Note that these are direct emissions only and do not include secondary PM2.5 such as ammonium nitrate and ammonium sulfate
6. Banked Emissions show the total current deposits in the District's emissions banking program as allowed by BAAQMD Regulation 2, Rules 2 and 4. These emissions were reduced (beyond regulations) and banked, but may be withdrawn from the bank and emitted in future years.
7. Surplus emissions, voluntarily reduced, available for alternative compliance with BARCT requirements of selected rules, as prescribed by State law and BAAQMD Regulation 2, Rule 9.
8. CARB has developed statewide emissions estimates for ocean-going vessels occurring within 100 nautical miles of the California coastline. As a result, these emissions are substantially higher than those reported in the previous version of the inventory published in the 2005 Ozone Strategy, which accounted for ship activities within three miles of the Golden Gate Bridge.

3.2.1.3 Non-Criteria Pollutants

Although the primary mandate of the BAAQMD is attaining and maintaining the national and State Ambient Air Quality Standards for criteria pollutants within the BAAQMD jurisdiction, the BAAQMD also has a general responsibility to control, and where possible, reduce public exposure to airborne toxic compounds. The State and federal government have set health-based ambient air quality standards for criteria pollutants. The air toxics program was established as a separate and complementary program designed to evaluate and reduce adverse health effects resulting from exposure to TACs.

The BAAQMD works to understand and to control both locally elevated concentrations (i.e., "hot spots") and ambient background concentrations of TACs. The major elements of the Air District's air toxics program are outlined below.

- Preconstruction review of new and modified sources for potential health impacts, and the requirement for new/modified sources with non-trivial TAC emissions to use the Best Available Control Technology.

- The Air Toxics Hot Spots Program, designed to identify industrial and commercial facilities that may result in locally elevated ambient concentrations of toxic air contaminants, to report significant emissions to the affected public, and to reduce unacceptable health risks.

- Control measures designed to reduce emissions from source categories of TACs, including rules originating from the State Toxic Air Contaminant Act and the federal Clean Air Act.

- The toxic air contaminant emissions inventory, a database that contains information concerning routine and predictable emissions of TACs from permitted stationary sources.

- Ambient monitoring of toxic air contaminant concentrations at a number of sites throughout the Bay Area.

Air Toxics Emission Inventory

The BAAQMD maintains a database that contains information concerning emissions of TACs from permitted stationary sources in the Bay Area. This inventory, and a similar inventory for mobile and area sources compiled by CARB, is used to plan strategies to reduce public exposure to TACs. The detailed concentrations of various TACs are reported in the BAAQMD, Toxic Air Contaminant Control Program, 2003 Annual Report (BAAQMD, 2007) and summarized in Table 3.2-6 and Table 3.2-7. The 2003 TAC data shows decreasing concentrations of many TACs in the Bay Area.

TABLE 3.2-6

Summary of 2003 BAAQMD Ambient Air Toxics Monitoring Data

Compound	LOD (ppb)[1]	% of Samples < LOD[2]	Max. Conc. (ppb)[3]	Min. Conc. (ppb)[4]	Mean Conc. (ppb)[5]
Acetone	0.30	0	121.4	0.6	6.80
Benzene	0.10	1.78	2.4	0.5	0.401
1,3-butadiene	0.15	75.7	0.89	0.075	0.12
Carbon tetrachloride	0.01	0	0.16	0.09	0.108
Chloroform	0.02	62.5	1.47	0.01	0.024
Ethylbenzene	0.10	44.2	0.90	0.05	0.135
Ethylene dibromide	0.02	100	0.01	0.01	0.01
Ethylene dichloride	0.10	100	0.05	0.05	0.05
Methylene chloride	0.50	82.9	3.40	0.25	0.356
Methyl ethyl ketone	0.20	7.7	5.80	0.1	0.496
Metyl tert-butyl ether	0.30	32.9	4.80	0.15	0.532
Perchloroethylene	0.01	42.4	0.28	0.005	0.026
Toluene	0.10	0.2	6.0	0.05	1.062
1,1,1-Trichloroethane	0.05	72.3	2.47	0.025	0.084
Trichloroethylene	0.05	93.8	0.33	0.025	0.029
Trichlorofluoromethane	0.01	0	.046	0.18	0.266
1,1,2-trichlorotrifluoroethane	0.01	0	1.16	0.06	0.077
Vinyl chloride	0.30	100	0.15	0.15	0.15
m/p-xylene	0.10	2.8	3.40	0.05	0.535
o-xylene	0.10	27.9	1.30	0.05	0.186

Source: BAAQMD, 2007

NOTES: Table 3-4 summarizes the results of the BAAQMD gaseous toxic air contaminant monitoring network for the year 2003. These data represent monitoring results at 19 of the 20 separate sites at which samples were collected. Data from the Fort Cronkhite "clean-air" background site was not included. Data from the Oakland-Davie Stadium site was available from January through March.

(1) "LOD" is the limit of detection of the analytical method used.

(2) "% of samples < LOD" is the percent of the total number of air samples collected in 2003 that had pollutant concentrations less than the LOD.

(3) "Maximum Conc." is the highest daily concentration measured at any of the 19 monitoring sites.

(4) "Minimum Conc." is the lowest daily concentration measured at any of the 19 monitoring sites.

(5) "Mean Conc." is the arithmetic average of the air samples collected in 2003 at the 19 monitoring sites. In calculating the mean, samples with concentrations less than the LOD were assumed to be equal to one half the LOD concentration.

TABLE 3.2-7

Concentration of Toxic Air Contaminants in the Bay Area (2003)

Monitoring Station (mean ppb*)	Chemical[(1)]											
	BENZ	CCl_4	$CHCl_3$	DCM	EDB	EDC	MTBE	PERC	TCA	TCE	TOL	VC
Oakland – Davie Stadium	0.44	0.11	0.01	0.29	0.01	0.05	0.21	0.03	0.03	0.03	0.94	0.15
San Leandro	0.28	0.11	0.08	0.28	0.01	0.05	0.32	0.02	0.03	0.03	0.89	0.15
Livermore – Rincon Ave	0.39	0.11	0.02	0.27	0.01	0.05	0.46	0.02	0.31	0.03	0.90	0.15
Oakland – Filbert Street	0.50	0.11	0.02	0.34	0.01	0.05	0.46	0.05	0.03	0.03	1.33	0.15
Pittsburg – W 10th St.	0.38	0.11	0.02	0.49	0.01	0.05	0.80	0.02	0.03	0.03	1.27	0.15
Martinez	0.33	0.11	0.01	0.30	0.01	0.05	0.65	0.01	0.09	0.03	0.79	0.15
Crockett	0.20	0.11	0.02	0.74	0.01	0.05	0.38	0.01	0.05	0.03	0.36	0.15
Concord – Treat Blvd.	0.43	0.12	0.03	0.25	0.01	0.05	0.56	0.03	0.03	0.03	1.79	0.15
Richmond – 7th St	0.35	0.11	0.02	0.30	0.01	0.05	0.53	0.02	0.03	0.03	1.21	0.15
Bethel Island	0.24	0.11	0.01	0.27	0.01	0.05	0.43	0.01	0.03	0.03	0.50	0.15
San Pablo – Rumrill Blvd	0.38	0.11	0.02	0.34	0.01	0.05	0.63	0.03	0.03	0.03	1.04	0.15
San Rafael	0.38	0.10	0.02	0.26	0.01	0.05	0.37	0.08	0.03	0.03	0.84	0.15
Fort Cronkite – Sausalito	0.14	0.11	0.01	0.25	0.01	0.05	0.24	0.01	0.06	0.03	0.27	0.15
Napa – Jefferson St	0.48	0.11	0.03	0.25	0.01	0.05	0.82	0.02	0.03	0.03	1.08	0.15
San Francisco – Arkansas St	0.40	0.11	0.02	0.49	0.01	0.05	0.37	0.03	0.10	0.03	1.04	0.15
Redwood City	0.53	0.11	0.04	0.29	0.01	0.05	0.68	0.04	0.03	0.09	1.72	0.15
Sunnyvale	0.40	0.10	0.03	0.31	0.01	0.05	0.39	0.03	0.03	0.03	0.80	0.15
San Jose – Jackson Street	0.59	0.11	0.02	0.37	0.01	0.05	0.73	0.03	0.03	0.03	1.54	0.15
Vallejo – Tuolumne St	0.52	0.11	0.02	0.62	0.01	0.05	0.84	0.02	0.03	0.03	1.18	0.15
Santa Rosa – 5th St	0.41	0.11	0.02	0.30	0.01	0.05	0.45	0.01	0.66	0.03	0.97	0.15

(1) BENZ = benzene, CCl_4 = carbon tetrachloride, $CHCl_3$ = chloroform, DCM = methylene chloride, EDB = ethylene dibromide, EDC = ethylene dichloride, MTBE = methyl tertiary butyl ether, PERC = perchloroethylene, TCA = 1,1,1-trichloroethane, TCE = trichloroethylene, TOL = toluene, and VC = vinyl chloride.

Source: BAAQMD, 2007.

*Values below the detection limit are set to one-half the detection limit for statistical calculations

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The most dramatic emission reductions in recent years have been for certain chlorinated compounds that are used as solvents including 1,1,1-trichloroethane, methylene chloride, and perchloroethylene. Table 3.2-6 contains a summary of ambient air toxics listed by compound.

Toxic Air Contaminants

Table 3.2-7 contains a summary of ambient air toxics monitoring data of TACs measured at monitoring stations in the Bay Area by the District in 2003 (the most recent year for which the BAAQMD has monitoring data for TACs). One of the primary health risks of concern due to exposure to TACs is the risk of contracting cancer.

Two particular TACs used in some consumer products, methylene chloride and perchloroethylene, are specifically exempted from the VOC definition because of their very low ozone-forming capabilities. As a result, some manufacturers may choose to use methylene chloride or perchloroethylene in the reformulations to reduce the VOC content in meeting future limits. In California, however, the California Air Resources Board's consumer product regulation bans the use of the two chemicals in most consumer products. In addition, potential product liability and regulations such as California's Proposition 65 are expected to minimize the use of most toxic materials because manufacturers would have to provide public notices if any Proposition 65 listed-material is used.

Health Effects

The primary health risk of concern due to exposure to TACs is the risk of contracting cancer. The carcinogenic potential of TACs is a particular public health concern because many scientists currently believe that there are not "safe" levels of exposure to carcinogens without some risk of cancer. The proportion of cancer deaths attributable to air pollution has not been estimated using epidemiological methods. Risks are calculated for the carcinogenic TACs for which routine sampling was performed by the BAAQMD or CARB in 2003 (see Table 3.2-8).

Community Air Risk Evaluation (CARE) Program

The CARE program was initiated in 2004 to evaluate and reduce health risks associated with exposures to outdoor TACs in the Bay Area. The program examines TAC emissions from point sources, area sources, and on-road and off-road mobile sources with an emphasis on diesel exhaust, which is a major contributor to airborne health risk in California (BAAQMD, 2009). The main objectives of the program are to:

- Characterize and evaluate potential cancer and non-cancer health risks associated with exposure to TACs from both stationary and mobile sources throughout the Bay Area.

- Assess potential exposures to sensitive receptors including children, senior citizens, and people with respiratory illnesses.

TABLE 3.2-8

Cancer Risk Due to Average Ambient Concentrations of

Toxic Air Contaminants Measured in the Bay Area (2003)

Gaseous TACs	Concentration		Unit Risk	Cancer Risk
	ppb	$\mu g/m^3$	$(\mu g/m^3)^{-1}$	Chances in a million
1,3 – Butadiene (1,3)	0.09	0.21	1.7E-04	36.0
Benzene (2)	0.40	1.30	2.9E-05	37.7
Carbon Tetrachloride (2)	0.11	0.70	4.2E-05	29.1
Formaldehyde (1)	2.18	2.72	6.0E-06	16.3
Acetaldehyde (1)	0.72	1.32	2.7E-06	3.6
Perchloroethylene (2)	0.03	0.18	5.9E-06	1.1
Methylene Chloride (2)	0.36	1.27	1.0E-06	1.3
MTBE (2)	0.53	1.95	2.6E-07	0.5
Chloroform (2)	0.02	0.12	5.3E-06	0.6
Trichloroethylene (1,3)	0.02	0.12	2.0E-06	0.2
Particulate TACs	ng/m^3	$\mu g/m^3$	$(\mu g/m^3)^{-1}$	**Chances in a million**
Chromium (hexavalent) (1)	0.10	1.00E-04	1.5E-01	14.4
Dioxin (4)	0.000025	2.50E-08	3.8E+01	1.0
Nickel (1)	3.30	3.30E-03	2.6E-04	0.8
PAHs (1,5)	0.47	4.70E-04	1.1E-03	0.5
Lead (1)	7.80	7.80E-03	1.2E-05	0.1
Total for all TACs				**143**

Source: BAAQMD, 2007

NOTES:

Table 5 summarizes the cancer risks associated with exposure to average ambient (outdoor) TAC levels measured at a number of sites in the Bay Area during 2003. Cancer risks are calculated for the inhalation pathway using the Unit Risk Factors adopted by Cal/EPA's Office of Environmental Health Hazard Assessment for the Air Toxics Hot Spots Program, and assuming 70-year continuous exposure. Risks are calculated for the carcinogenic TACs for which routine sampling was performed by the BAAQMD or CARB in 2003, except for ethylene dibromide, ethylene dichloride, and vinyl chloride, which were excluded because none of these were detected in any of the air samples taken. In calculating average concentrations, samples less than the limit of detection (LOD) was assumed to be equal to one half the LOD concentration.

(1) The concentration used is the mean of all daily samples taken for the three Bay Area sites in the CARB network in 2003 [Fremont, San Francisco – Arkansas St., and San Jose – Jackson St. sites. Note that CARB began sampling for acrylonitrile at these three sites in mid-2003; data are not included in cancer risk calculation for 2003 but will be available for 2004 and beyond.

(2) The concentration used is the mean of all daily samples taken for the BAAQMD network in 2003, as specified in Table 4.

(3) CARB data are used for this TAC because an analytical method with a lower LOD was used by CARB.
(4) The dioxin concentration represents the average annual chlorinated dioxin and furan concentrations (expressed as 2,3,7,8-TCDD TEQs using WHO-97 TEFs) at the following CADAMP sites: Crockett, Livermore, Oakland, Richmond, and San Jose.
(5) The PAH concentration represents the sum of the following species collected as PM_{10}: benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

- Identify significant sources of TAC emissions and prioritize use of resources to reduce TACs in the most highly impacted areas (i.e., priority communities).
- Develop and implement mitigation measures - such as grants, guidelines, or regulations - to achieve cleaner air for the public and the environment, focusing initially on priority communities.

The CARE program is an on-going program that encourages community involvement and input. The technical analysis portion of the CARE program is being implemented in three phases that includes an assessment of the sources of TAC emissions, modeling and measurement programs to estimate concentrations of TAC, and an assessment of exposures and health risks. Throughout the program, information derived from the technical analyses will be used to focus emission reduction measures in areas with high TAC exposures and high density of sensitive populations. To assist the District in guiding this program, CARE Task Force members that include representatives from the community, industry, health departments, and research institutions meet on an as-needed basis to receive updates, discuss and review recent findings, and provide input on program direction (BAAQMD, 2009).

In 2008, the CARE Program impacted six communities that were identified to be high-priority recipients of grant funding to support risk reduction activities through the CARE Mitigation Action Plan in efforts to reduce exposure to diesel exhaust (BAAQMD, 2009).

In participation with the California Air Resources Board and the Port of Oakland, released draft and final versions of a Health Risk Assessment for West Oakland, which revealed that residents of West Oakland have about three times the cancer risk from diesel PM emissions compared to the Bay Area average. Most of the risk was shown to be due to on-road trucks on local streets and freeways. Air District staff, in conjunction with local residents of West Oakland, conducted a truck survey project designed to identify the numbers and types of trucks moving goods along their streets, as well as to establish the most heavily traveled routes, in order to plan effective mitigation measures (BAAQMD, 2009).

BAAQMD Staff has met with community and industry groups to develop a resolution on cumulative impacts of air pollution and on continuing to reduce air contaminants in impacted communities. The Air District's Board of Directors adopted the resolution on July 30, 2008.

Greenhouse Gas Inventory

Global climate change refers to changes in average climatic conditions on the earth as a whole, including temperature, wind patterns, precipitation and storms. Global warming, a related concept, is the observed increase in the average temperature of the earth's surface and atmosphere. One identified cause of global warming is an increase of GHGs in the atmosphere. The six major GHGs identified by the Kyoto Protocol are CO_2, methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). The GHGs absorb longwave radiant energy reflected by the earth, which warms the atmosphere. GHGs also radiate longwave radiation both upward to space and back down toward the surface of the earth. The downward part of this longwave radiation absorbed by the atmosphere is known as the "greenhouse effect." Some studies indicate that the potential effects of global climate change may include rising surface temperatures, loss in snow pack, sea level rise, more extreme heat days per year, and more drought years.

Events and activities, such as the industrial revolution and the increased combustion of fossil fuels (e.g., gasoline, diesel, coal, etc.), have heavily contributed to the increase in atmospheric levels of GHGs. As reported by the CEC, California contributes 1.4 percent of the global and 6.2 percent of the national GHG emissions (CEC, 2004). The GHG inventory for California is presented in Table 3.2-8 (CARB, 2007 and CARB, 2009). Approximately 80 percent of GHG emissions in California are from fossil fuel combustion and over 70 percent of GHG emissions are carbon dioxide emissions (see Table 3.2-9).

In response to growing scientific and political concern regarding global climate change, California has recently adopted a series of laws to reduce both the level of GHGs in the atmosphere and to reduce emissions of GHGs from commercial and private activities within the state. In September 2002, Governor Gray Davis signed Assembly Bill (AB) 1493, requiring the development and adoption of regulations to achieve "the maximum feasible reduction of greenhouse gases" emitted by non-commercial passenger vehicles, light-duty trucks, and other vehicles used primarily for personal transportation in the State. Setting emission standards on automobiles is primarily the responsibility of the U.S. EPA. The Federal Clean Air Act, however, allows California to set a state-specific emission standard on automobiles if it first obtains a waiver from the U.S. EPA. On March 6, 2008 the U.S. EPA denied California's request for a waiver. In response, California sued the U.S. EPA claiming that the denial was not based on the scientific data. Subsequently, U.S. EPA granted the request by California for a waiver of Clean Air Act preemption for California's greenhouse gas emission standards for 2009 and later model years of new motor vehicles, which were adopted by CARB on September 24, 2004.

In June 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05, which established GHG emissions reduction targets for the state, as well as a process to ensure that the targets are met. As a result of this executive order, the California Climate Action Team (CAT), led by the Secretary of the California State Environmental Protection

Agency (CalEPA), was formed. The CAT published its report in March 2006, in which it laid out several recommendations and strategies for reducing GHG emissions and reaching the targets established in the Executive Order.[5]

TABLE 3.2-9

California GHG Emissions and Sinks Summary

(Million metric Tons CO_2 - Equivalent)

Categories Included in the Inventory	1990 (1)	2006 (2)
ENERGY	**386.41**	**419.32**
Fuel Combustion Activities	**381.16**	**414.03**
Energy Industries	157.33	160.82
Manufacturing Industries & Construction	24.24	19.03
Transport	150.02	184.78
Other Sectors	48.19	49.41
Non-Specified	1.38	2.16
Fugitive Emissions from Fuels	**5.25**	**5.28**
Oil and Natural Gas	2.94	3.25
Other Emissions from Energy Production	2.31	2.03
INDUSTRIAL PROCESSES & PRODUCT USE	**18.34**	**30.22**
Mineral Industry	4.85	5.92
Chemical Industry	2.34	0.37
Non-Energy Products from Fuels & Solvent Use	2.29	1.85
Electronics Industry	0.59	0.77
Product Uses as Substitutes for Ozone Depleting Substances	0.04	13.38
Other Product Manufacture & Use Other	3.18	1.67
Other	5.05	6.25
AGRICULTURE, FORESTRY, & OTHER LAND USE	**19.11**	**25.10**
Livestock	11.67	15.68
Land	0.19	0.19
Aggregate Sources & Non-CO_2 Emissions Sources on Land	7.26	9.24
WASTE	**9.42**	**9.23**
Solid Waste Disposal	6.26	6.31
Wastewater Treatment & Discharge	3.17	2.92
EMISSION SUMMARY		
Gross California Emissions	**433.29**	**483.87**
Sinks and Sequestrations	**-6.69**	**-4.07**
Net California Emissions	**426.60**	**479.80**

Source: (1) CARB, 2007.
(2) CARB, 2009.

[5] California Climate Action Team. Climate Action Team Report to Governor Schwarzenegger and the Legislature, 2006.

The greenhouse gas targets are:

- By 2010, reduce to 2000 emission levels;
- By 2020, reduce to 1990 emission levels; and,
- By 2050, reduce to 80 percent below 1990 levels.

In September 2006, Governor Schwarzenegger signed California's Global Warming Solutions Act of 2006 (AB32). AB32 will require CARB to:

- Establish a statewide GHG emissions cap for 2020, based on 1990 emissions, by January 1, 2008;
- Adopt mandatory reporting rules for significant sources of GHG emissions by January 1, 2008;
- Adopt an emissions reduction plan by January 1, 2009, indicating how emissions reductions will be achieved via regulations, market mechanisms, and other actions; and,
- Adopt regulations to achieve the maximum technologically feasible and cost-effective reductions of GHGs by January 1, 2011.

SB1368, a companion bill to AB32, requires the CPUC and the CEC to establish GHG emission performance standards for the generation of electricity, whether generated inside the State, or generated outside, and then imported into California. SB1368 provides a mechanism for reducing the emissions of electricity providers, thereby assisting CARB to meet its mandate under AB32. On January 25, 2007, the CPUC adopted an interim GHG Emissions Performance Standard (EPS), which is a facility-based emissions standard requiring that all new long-term commitments for baseload generation to serve California consumers be with power plants that have GHG emissions no greater than a combined cycle gas turbine plant. That level is established at 1,100 pounds of CO_2 per megawatt-hour (MW-hr). Further, on May 23, 2007, the CEC adopted regulations that establish and implement an EPS of 1,100 pounds of CO_2 per MW-hr (see CEC order No. 07-523-7).

SB97, passed in August 2007, is designed to work in conjunction with CEQA and AB32. SB97 requires the California Office of Planning and Research (OPR) to prepare and develop guidelines for the mitigation of GHG emissions or the effects thereof, including but not limited to, effects associated with transportation and energy consumption. These guidelines must be transmitted to the Resources Agency by July 1, 2009, to be certified

and adopted by January 1, 2010. The OPR and the Resources Agency are required to periodically update these guidelines to incorporate new information or criteria established by CARB pursuant to AB32. SB97 will apply to any EIR, negative declaration, mitigated negative declaration, or other document required by CEQA, prepared for a limited number of types of projects, which has not been finalized.

There has also been activity at the Federal level on the regulation of GHGs. In *Massachusetts v. Environmental Protection Agency* (Docket No. 05–1120), argued November 29, 2006 and decided April 2, 2007, the U.S. Supreme Court held that not only did the U.S. EPA have authority to regulate greenhouse gases, but that the U.S. EPA's reasons for not regulating greenhouse gases did not fit the statutory requirements. The U.S. Supreme Court ruled that CO_2 and other greenhouse gases are pollutants under the Clean Air Act, which U.S. EPA must regulate if it determines they pose an endangerment to public health or welfare. On April 24, 2009, the U.S. EPA determined that GHG emissions from new motor vehicles and engines contribute to air pollution which may reasonably be anticipated to endanger public health and welfare (74 FR 18886, April 24, 2009). On October 30, 2009, the U.S. EPA issued the Final Mandatory Report of Greenhouse Gases Rule. The rule requires reporting of GHG emissions from large sources and suppliers (facilities that emit 25,000 metric tons of GHGs per year or more) in the United States, and is intended to collect accurate and timely emissions data to inform policy decision. It is presently unclear whether EPA will proceed with regulatory action or whether the endangerment finding will serve primarily as a spur to Congressional action.

The legislative and regulatory activity detailed above may ultimately result in requirements for significant development and implementation of energy efficient technologies and shifting of energy production to renewable sources.

The proposed project results in combustion source emission reductions. Therefore, CO_2 emissions will decrease concurrently with the criteria pollutant emissions from the proposed project.

An emissions inventory is a detailed estimate of the amount of air pollutants discharged into the atmosphere of a given area by various emission sources during a specific time period. The emission inventory in Table 3.2-9 focuses on direct greenhouse gas (GHG) emissions due to human activities only, and compiles estimated emissions from industrial, commercial, transportation, domestic, forestry, and agriculture activities in the San Francisco Bay Area region of California. The GHG emission inventory reports direct emissions generated from sources within the Bay Area Air Quality Management District (BAAQMD). The report does not include indirect emissions of a source, such as those from a power plant supplying electricity to the source. The power plant emissions are included as direct emissions of the power plant. Emissions of CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 are estimated using the most current activity and emission factor data from various sources. Emission factor data was obtained from the U.S. Department of Energy's (DOE's) Energy Information Administration (EIA), the California Energy Commission (CEC), and CARB.

Under "business as usual" conditions, GHG emissions are expected to grow in the future due to population growth and economic expansion. Table 3.2-10 shows emissions trends by major sources for the period 1990 to 2016.

If the current trends continue, Bay Area GHG emissions are expected to increase at a rate of approximately 1.4 percent per year. Even though 2002 emissions were a little lower than some historical years' emissions due to economic slowdown and the events of September 11, 2001, the long term GHG emissions trends are expected to go upwards absent policy changes. Year-to-year fluctuation in emissions trends are due to variation in economic activity and the fraction of electric power generation in this region. Power generation in the Bay Area varies year-to-year depending on various factors including the availability of hydroelectric and other imported power (BAAQMD, 2006).

Greenhouse gas emissions are projected based on estimated growth in various source categories. For example, CARB's On- and Off-road Mobile computer models were utilized to project GHGs. In these models, fuel consumption estimates were based on the change of fleet mix and the growth of various types of on-road and off-road vehicles. For aircraft categories, the fleet mix and the growth data from the Metropolitan Transportation Commission's 2000 Regional Airport Systems Plan was incorporated into the GHG projection models. The projected GHG emissions from power plants operating in the Bay Area were based on the 2003 California Energy Commission's Fuel Usage Report (BAAQMD, 2006).

The GHG projections from other major sources such as landfills, natural gas fuel distribution, and cement manufacturing were estimated by using Association of Bay Area Government's employment and population data. California Integrated Waste Management data were also considered in the landfill projection process. This GHG emission inventory will be updated as additional information about activity data, emission factors and other inputs becomes available (BAAQMD, 2006).

TABLE 3.2-10

Bay Area Emission Trends by Major Sources ("Business as Usual")
(Million metric Tons CO_2 - Equivalent)

Category	1990	2000	2002	2006	2008	2016
Transportation	41.2	42.7	43.2	47.6	49.3	53.7
Ind./Commercial	20.9	21.7	22.0	23.0	23.5	25.4
Power Plants	7.9	7.3	6.1	7.2	8.1	8.8
Oil Refining	4.6	4.7	4.8	5.0	5.1	5.5
Domestic	8.1	9.1	9.3	9.7	9.9	10.4
Total	**82.7**	**85.5**	**85.4**	**92.6**	**95.8**	**103.9**

Source: BAAQMD, 2006

Table 3.2-11 provides a more recent GHG inventory and estimate of future GHG emissions in the Bay Area.

TABLE 3.2-11
Bay Area Greenhouse Gas Emission Inventory Projections
(Million Metric Tons CO2-Equivalent)

SOURCE CATEGORY Year	2005	2009	2012	2015	2020
INDUSTRIAL/COMMERCIAL					
Oil Refineries					
Refining Processes	3.4	3.5	3.6	3.7	3.9
Refinery Make Gas Combustion	4.7	4.9	5.0	5.2	5.4
Natural Gas and Other Gases Combustion	4.8	5.0	5.1	5.3	5.5
Liquid Fuel Combustion	0.1	0.1	0.1	0.1	0.1
Solid Fuel Combustion	1.0	1.0	1.1	1.1	1.1
Waste Management					
Landfill Combustion Sources	0.0	0.0	0.0	0.0	0.0
Landfill Fugitive Sources	1.2	1.2	1.2	1.2	1.2
Composting/POTWs	0.4	0.4	0.4	0.4	0.4
Other Industrial/ Commercial					
Cement Plants	0.9	0.9	0.9	0.9	1.0
Commercial Cooking	0.1	0.1	0.1	0.1	0.2
ODS Substitutes/Nat. Gas Distrib./Other	3.6	5.2	6.3	7.5	9.4
Reciprocating Engines	0.6	0.6	0.6	0.7	0.7
Turbines	0.4	0.4	0.4	0.4	0.4
Natural Gas- Major Combustion Sources	1.6	2.5	2.6	2.7	2.8
Natural Gas- Minor Combustion Sources	8.8	9.2	9.5	9.9	10.4
Coke Coal	1.0	1.0	1.1	1.1	1.2
Other Fuels Combustion	0.3	0.4	0.4	0.4	0.4
Subtotal	32.8	36.3	38.4	40.6	44.2
RESIDENTIAL FUEL USAGE					
Natural Gas	6.4	6.6	6.8	6.9	7.2
LPgas/Liquid Fuel	0.2	0.2	0.2	0.2	0.2
Solid Fuel	0.1	0.2	0.2	0.2	0.2
Subtotal	6.7	6.9	7.1	7.2	7.5
ELECTRICITY/ CO-GENERATION					
Co-Generation	5.5	5.5	5.7	6.0	6.4
Electricity Generation	2.8	3.1	3.2	3.3	3.5
Electricity Imports	6.8	7.3	7.6	7.9	8.3
Subtotal	15.1	15.8	16.5	17.2	18.3
OFF-ROAD EQUIPMENT					
Lawn and Garden Equipment	0.1	0.1	0.1	0.1	0.1
Construction Equipment	1.7	1.9	1.9	2.0	2.2
Industrial Equipment	0.7	0.8	0.8	0.9	1.0
Light Commercial Equipment	0.2	0.2	0.3	0.3	0.3
Subtotal	2.8	3.0	3.2	3.3	3.6
TRANSPORTATION (con'd next page)					
Off-Road					
Locomotives	0.1	0.1	0.1	0.1	0.1
Ships	0.7	0.8	0.8	0.9	1.0
Boats	0.6	0.6	0.5	0.5	0.6

TABLE 3.2-11
Bay Area Greenhouse Gas Emission Inventory Projections
(Million Metric Tons CO2-Equivalent)

SOURCE CATEGORY Year	2005	2009	2012	2015	2020
Commercial Aircraft	1.8	2.0	2.1	2.3	2.6
General Aviation	0.2	0.2	0.2	0.3	0.3
Military Aircraft	0.5	0.5	0.5	0.5	0.5
On-Road					
Passenger Cars/Trucks up to 10,000 lbs	26.6	27.1	27.9	29.0	30.9
Medium/Heavy Duty Trucks > 10,000 lbs	3.3	3.3	3.4	3.5	3.7
Urban,School and Other Buses	0.8	0.8	0.8	0.8	0.9
Motor-Homes and Motorcycles	0.2	0.2	0.2	0.2	0.2
Subtotal	34.8	35.6	36.7	38.1	40.7
AGRICULTURE/FARMING					
Agricultural Equipment	0.2	0.2	0.2	0.2	0.2
Animal Waste	0.6	0.6	0.6	0.6	0.6
Soil Management	0.3	0.3	0.3	0.3	0.3
Biomass Burning	0.0	0.0	0.0	0.0	0.0
Subtotal	1.1	1.1	1.1	1.1	1.1
GRAND TOTAL EMISSIONS	**93.4**	**98.7**	**103.0**	**107.5**	**115.4**

3.2.1.4 Transport of Air Pollutants

Since 1989, CARB has evaluated the impacts of the transport of ozone and ozone precursor emissions from upwind areas to the ozone concentration in downwind areas. These analyses demonstrate that the air basin boundaries are not true boundaries of air masses. All urban areas are upwind contributors to their downwind neighbors.

The Bay Area is both a contributor and a receptor for ozone and ozone precursor transport. Ozone precursors emitted in the Bay Area are transported into northern California, including the San Joaquin Valley, the Sacramento Valley, the Mountain Counties, and the coastal areas from Sonoma County to San Luis Obispo County (see Figure 3-1). The Bay Area is a receptor area for ozone and ozone precursors transported from the broader Sacramento area (CARB, 2001) (see Figure 3-1).

The Bay Area is bounded to the west by the Pacific Ocean and the Bay. Mountains surround the Bay Area to the north, east and south. On many summer days a sea breeze pushes relatively clean air from the Pacific Ocean toward the east, where air flows predominantly through passes in the surrounding mountains. As it moves from west to east the sea breeze flow picks up pollutants from the central Bay Area and transports the mix of clean coastal air and pollutants to surrounding regions. On some summer days, however, a high-pressure zone sets up over Central California and can block the sea breeze. On such days, air from the Central Valley can flow from east to west. These days can also produce high ozone in the Bay Area and the Central Valley.

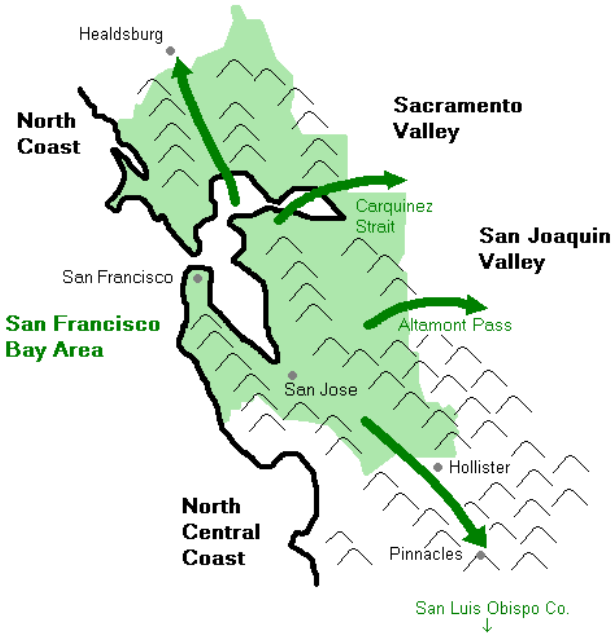

FIGURE 3-1
Ozone Transport from the BAAQMD

At the Altamont Pass, electricity-generating windmills lining the hill crests attest to the strong, steady winds blowing eastward into the San Joaquin Valley. Areas in the path of these natural inland air currents, such as Vacaville in the Sacramento Valley, and Tracy in the San Joaquin Valley, may be influenced by pollutants transported from the Bay Area. Areas further downwind, such as the cities of Sacramento and Stockton, may also be impacted by transport from the Bay Area, but to a lesser degree (CARB, 2001). The degree to which emissions from the Bay Area contribute to exceedances of ozone standards in neighboring air districts is under investigation and has not yet been quantified.

On some days when the State standard is violated in the Sacramento area, pollutants from the Bay Area are carried in by the delta breeze. However, on hot summer days when the temperature in Sacramento climbs into the high 90's and above, stagnant wind conditions allow a buildup of local emissions, and the ozone concentration can violate the State or federal standards. Only when a strong evening delta breeze disperses these accumulated pollutants do the ozone concentrations decrease (CARB, 2001).

On some days, pollutants transported from the Bay Area may impact the northern San Joaquin Valley, possibly mixing with local emissions to contribute to State and federal violations at Stockton and Modesto. On other days, violations of the State standard may be due entirely to local emissions. The impact of Bay Area transport diminishes with distances, so metropolitan areas such as Fresno and Bakersfield to the south are less

affected. In those areas, ozone concentrations are dominated by local emissions (CARB, 2001).

To the south, winds funnel pollutants into the Santa Clara Valley. Surface winds can carry these pollutants southeast to Hollister in the North Central Coast Air Basin. Ozone violations in Hollister may largely be caused by this transport, with transport aloft from the northern San Joaquin Valley occasionally making a contribution. Winds can also carry pollutants over the hills south of Hollister, as far as northern San Luis Obispo County (CARB, 2001).

In Sonoma County, summer prevailing winds blow across the Sonoma Plain from the southern portion of Sonoma County, which lies within the Bay Area Air Basin, to the northern part, which lies within the North Coast Air Basin. The Bay Area portion of Sonoma County, comprising the urban areas of Santa Rosa and Petaluma, is a substantial source of ozone precursor emissions. High ozone concentrations at Healdsburg, in the North Coast, are entirely due to emissions transported from the Bay Area (CARB, 2001).

3.2.2 Significance Criteria

To determine whether or not air quality impacts from the proposed project are significant, impacts will be evaluated and compared to the significance criteria in Table 3.2-12. If impacts equal or exceed any of the following criteria, they will be considered significant.

TABLE 3.2-12

Air Quality Significance Thresholds for Project Operations

Significance Thresholds for Localized Impacts	
Pollutant	Significance Threshold
PM10	~~80~~ 82 lbs/day or 15 tons/yr
CO	Project plus background >20 ppm (1-hour average) Project plus background > 9 ppm (8-hour average)
Diesel Particulate Emissions and other TACs	Maximum Exposed Individual (MEI) Cancer Risk ≥ 10 in 1 million Hazard Index ≥ 1.0 at the MEI
Significance Thresholds for Regional Impacts	
Pollutant	Significance Threshold
ROG	net increase in emissions
NOx	net increase in emissions
PM10/PM2.5	net increase in emissions
GHG	net increase in emissions

For construction emissions, if BAAQMD-recommended Best Management Practices (BMPs), which are tiered based on the size of the construction site (less than or greater than four acres), are incorporated into the proposed project, then air quality impacts from project construction can be considered less than significant.

3.2.3 Environmental Impacts

The purpose of the 2010 CAP is to establish a comprehensive program to attain the State 8-hour ozone standard and reduce emissions of particulate matter and GHG emissions through implementation of different categories of control measures. Implementation of the control measures contained in the 2010 CAP is required to make progress toward meeting the State ozone standard.

This subchapter evaluates secondary air pollutant emissions that could occur as a consequence of efforts to reduce ozone (e.g., increase emissions from electricity use). Secondary air quality impacts are potential increases in air pollutants that occur indirectly from implementation of control measures in the 2005 Ozone Strategy. Table 3.2-13 lists the control measures with potential secondary air quality impacts.

TABLE 3.2-13

Control Measures with Potential Secondary Air Quality Impacts

Control Measures	Control Measure Description	Control Methodology	Air Quality Impact
SSM 1	Metal-Melting Facilities	Control of PM and VOC emissions through use of baghouse, carbon adsorption and afterburners.	Increased emissions from electricity use. Potential increase in combustion emissions, including GHGs. Increased NOx emissions if VOC emissions are controlled through combustion process.
SSM 2	Digital Printing	Limit VOC content on inks and solvents or use VOC control equipment, e.g., carbon adsorption or afterburners.	Potential change in VOC and toxic air contaminants from reformulation Control equipment could generate combustion emissions, including GHGs, and increase emissions from electricity use. Increased NOx emission if VOC emissions are controlled through combustion process.
SSM 3	Livestock Waste	Develop BMPs for reducing VOC emissions. Air pollution control devices could include anaerobic digesters, aerobic lagoon, aerated static piles, and biofilters.	Increased emissions (including GHGs) from electricity use. Increase in construction emissions. Combustion emissions from drying systems.
SSM 5	Vacuum Trucks	Require carbon or other control technology on vacuum trucks.	Increased emissions (including GHGs) from electricity use.
SSM 8	Coke Calcining	Control of SO2 emissions through dry or semi-dry scrubbing, or wet gas scrubbing.	Increased emissions (including GHGs from electricity use. Construction emissions to replace equipment. Secondary particulate control may be required.
SSM 9	Cement Kilns	Further control of NOx emissions through low-NOx burners retrofit or replacement or use of SCR. Reduce SOx emissions using wet gas scrubber.	Construction emissions to replace equipment. Increased emissions (including GHGs) from electricity use. Potential increase in ammonia emissions.
SSM 10	Refinery Boilers and Heaters	Further control of NOx emissions through low-NOx burners retrofit or replacement or use of SCR.	Increased emissions (including GHGs) from electricity use. Potential increase in ammonia emissions from SCR. Construction emissions to replace equipment.
SSM 11	Residential Fan Type Furnaces	Reduce allowable NOx limits in residential furnaces primarily through use of low NOx burners.	Potential increase in energy use and GHG emissions from low NOx burner retrofits.

TABLE 3.2-13 (continued)

Control Measures	Control Measure Description	Control Methodology	Air Quality Impact
SSM 12	Space Heating	Reduce allowable NOx limits in condo/apt. buildings and commercial furnaces/heaters primarily through use of low NOx burners.	Potential increase in energy use and GHG emissions from low NOx burner retrofits.
SSM 13	Dryers, Ovens, Kilns	Further control of NOx through low-NOx burners retrofit or replacement.	Increased emissions (including GHGs) from electricity use. Construction emissions to replace equipment.
SSM 14	Glass Furnaces	Further NOx control through alternative combustion techniques or add-on control equipment.	Increased emissions (including GHGs) from electricity use. Construction emissions to replace equipment. Potential increase in ammonia emissions.
SSM 16	Revise Regulation 2, Rule 2: New Source Review	Further reduction of PM through replacement, retrofit or additional control equipment, e.g., baghouses.	Increased emissions (including GHGs) from electricity use. Construction emissions to replace equipment.
SSM 17	Revise Regulation 2, Rule 5: New Source Review for Air Toxics	Further reduction of TACs through replacement, retrofit or additional control equipment, e.g., afterburners, carbon adsorption, etc.	Increased emissions (including GHGs) from electricity use. Construction emissions to replace equipment.
SSM 18	Revise Air Toxics "Hot Spots" Program	Further reduction of TACs through replacement, retrofit or additional control equipment, e.g., afterburners, carbon adsorption, etc.	Increase emissions from electricity use. Construction emissions to replace equipment.
MSM A-1	Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles	Expand the use of Super Ultra-Low Emission (SULEV) and partial zero (ZEV) emissions vehicles and trucks. Encourage use of renewable fuels.	Increase emissions from electricity use. Production of renewable fuels could increase local emissions.
MSM A-2	Zero Emission Vehicles and Plug-in Hybrids	Expand the use of ZEV and Plug-in Hybrid vehicles and trucks	Increase emissions from electricity use.
MSM A-3	Green Fleets for Light, Medium & Heavy-Duty Vehicles	Promote SULEV and ZEV vehicles, accelerated retirement of older vehicles, Encourage use of renewable fuels.	Increase emissions from electricity use. Production of renewable fuels could increase local emissions.
MSM B-2	Low NOx Retrofits for In-Use Engines	Accelerated turnover of existing equipment, retrofit of existing equipment with add-on controls, e.g., NOx absorbers, exhaust gas recirculation, and SCRs.	Potential decrease in engine efficiency could increase fuel use and related emissions. Potential increase in ammonia emissions.
MSM B-3	Efficient Drive Trains	Encourage development and demonstration of hybrid drive trains.	Increase emissions from electricity use.
MSM C-1	Construction and Farming Equipment	Accelerated turnover of existing equipment, retrofit of existing equipment with add-on controls, e.g., PM filters. Use of alternative fuels and renewable diesel fuels.	Potential decrease in engine efficiency could increase fuel use and related emissions. Production of renewable fuels could increase local emissions.

TABLE 3.2-13 (concluded)

Control Measures	Control Measure Description	Control Methodology	Air Quality Impact
MSM C-2	Lawn & Garden Equipment	Retirement of existing equipment and encourage use of new electric equipment.	Increase emissions from electricity use.
MSM C-3	Recreational Vessels	Reduce emissions from recreational vessels through voluntary retirement and replacement programs.	Increase emissions from electricity use.
LUM 1	Goods Movement	Reduce diesel emissions through shore-side power for ships, improvements in the efficiency of engine drive trains, and other measures.	Increase emissions from electricity use. Construction emissions to replace equipment. Production of renewable fuels could increase local emissions.
LUM 2	Indirect Source Review Rule	Measures to reduce construction and vehicular emissions could include accelerated turnover of existing equipment, fees, retrofit of existing equipment, use of renewable fuels, and increase use of SULEV or ZEV vehicles.	Potential decrease in engine efficiency could increase fuel use and related emissions. Production of renewable fuels could increase local emissions. Increase emissions from electricity use.
LUM 3	Enhanced CEQA Program	Additional mitigation measures could be imposed which could encourage accelerated turnover of existing equipment, fees, retrofit of existing equipment, use of renewable fuels, and increase use of SULEV or ZEV vehicles.	Potential decrease in engine efficiency could increase fuel use and related emissions. Production of renewable fuels could increase local emissions. Increase emissions from electricity use.
LUM 4	Land Use Guidelines	Additional measures could be imposed which could encourage accelerated turnover of existing equipment, fees, retrofit of existing equipment, use of renewable fuels, and increase use of SULEV or ZEV vehicles.	Potential decrease in engine efficiency could increase fuel use and related emissions. Production of renewable fuels could increase local emissions. Increase emissions from electricity use.
LUM 5	Reduce Risk from Stationary Sources in Impacted Communities	Further reduction of risk through replacement, retrofit or additional control equipment.	Increase emissions from electricity use. Construction emissions to replace equipment.
ECM 2	Renewable Energy	Control measure could encourage the use of onsite cogeneration equipment.	Potential increase in combustion emissions and localized emission increases. Increase in construction emissions.

3.2.3.1 Criteria Pollutants

As identified in Table 3.2-13, potential secondary air quality impacts evaluated in this section are associated with: (1) increase electricity demand; (2) emissions from new control equipment installed at stationary sources; (3) change in the use of VOCs; (4) increase in construction activities; (5) potential impacts of NOx controls and ozone transport; (6) emissions from mobile sources; and (7) miscellaneous air quality issues.

Secondary Impacts from Increased Electricity Demand

Project-Specific Impacts: Electricity is often used as the power source to operate various components of add-on control equipment, such as ventilation systems, fan motors, vapor recovery systems, etc., and from the increase electrification of mobile sources. Increased demand for electrical energy may require generation of additional electricity, which in turn could result in increased indirect emissions of criteria pollutants in the Bay Area and in other portions of California.

Control measures that could result in an increase in electricity use include measures that would require add-on controls (see Table 3.2-13). Some of the transportation control measures would include electrification of mobile sources including MSM A-1 – Promote Clean Fuel Efficient Light & Medium-Duty Vehicles, MSM A-2 – Zero Emission Vehicles and Plug-in Hybrids, and MSM A-3 – Green Fleets for Light, Medium, & Heavy-Duty Vehicles.

An increase in the use of electric vehicles would require the generation of additional electricity in the Air District and other areas of California. The potential increase and amount of electricity is unknown. Because the control measures are general in nature, it is difficult to determine what, if any, impacts could be expected. Several control measures target emission reductions from transportation measures that would encourage the development of vehicle control technology to meet or exceed ultra-low emission vehicle standards. Such technology would include electric and advance hybrid electric vehicles as a result of advanced battery technology and development of property support infrastructure. The increased demand for electrical energy may require generation of additional electricity, which in turn may result in increased indirect emissions of all criteria pollutants (due to the increase in natural gas combustion used to generate more electricity). The amount of electricity generated is described in the energy impacts Subchapter 3.17 of this EIR.

Electrification of motor vehicles and other commercial and industrial equipment will reduce petroleum fuel usage in the Bay Area. At that time, there may be an increase in emissions due to increased electric power generation due to increased demand. The number of electric vehicles is unknown at this time. While the control measures may cause an increase in NOx emissions associated with increased electricity generation, overall the 2010 CAP should achieve a net reduction in NOx emissions.

An incremental increase in electricity demand would not create significant adverse air quality impacts. However, if electricity demand exceeds available power, additional sources of electricity would be required. Electricity generation within the Air District is subject to BAAQMD Regulation 9, Rule 9, which regulates NOx emissions (the primary pollutant of concern from combustion to generate electricity) from existing power generating equipment. Regulation 9, Rule 9 establishes NOx concentration limits from electric generating facilities. As a result, NOx emissions from existing electric generating facilities will not increase significantly, regardless of increased power generation for add-on control equipment or electrification activities.

New power generation equipment would be subject to Regulation 9, Rule 9. New power generating equipment would not result in air quality impacts because they would be subject to BACT requirements, and all emission increases would have to be offset (through emission reduction credits) before permits could be issued. Further, emissions from the combustion of gasoline or diesel fuels are generally the emissions that would be reduced when electrification is proposed and replaced with emissions from the combustion of natural gas (as would generally occur from electricity generating facilities). Emissions from diesel combustion (e.g., construction equipment) are orders of magnitude higher than emissions from the combustion of natural gas, so overall emissions are expected to decrease. No significant adverse impacts to air quality are expected from control measures requiring electricity use. The emissions from electrical generation have been included in the emissions inventory prepared for the 2010 CAP. Table 3.2-14 summarizes the emissions associated with electric generation in 2005 and 2012.

TABLE 3.2-14
Annual Average Emissions for Electric Generation in the Bay Area (tons/day)

Source Category	VOC	NOx	PM10	PM2.5
2005 Emission Inventory[1]				
Cogeneration	1.4	4.1	0.8	0.8
Power Plants	0.1[2]	1.7	0.3	0.3
Total:	1.5	5.8	1.1	1.1
2012 Emission Inventory[1]				
Cogeneration	1.5	4.2	0.9	0.9
Power Plants	0.1	2.2	0.4	0.4
Total:	1.6	6.4	1.3	1.3
Emission Increases (Emissions in 2012 minus emissions in 2005)	0.1	0.6	0.2	0.2
Emission Increases Converted to Pounds per Day	200	1,200	400	400
Projected Increase Associated with the 2010 CAP[3] (lbs/day)	40	120	40	40

(1) Source: BAAQMD, 2009
(2) Based on 2009 data as 2005 data were not available.
(3) Assumes that overall increase in electricity associated with the 2010 CAP is about one percent of the increases in electricity generation that occurs between the years 2005 and 2012.

The inventory prepared for the 2010 CAP includes estimates for cogeneration and power plants in 2005 and 2012 (and subsequent years). It is assumed that the emissions associated with electrical generation that are part of the control measures would partially contribute to the emission changes identified in the emission inventories. The inventory also accounts for growth in population. It has been estimated that implementation of all the control measures is expected to result in an overall increase in electricity in 2012 of less than one percent, relative to the projected peak electricity demand in 2012. The estimated VOC and NOx emissions due to increased electrical demand associated with implementation of the 2010 CAP are expected to increase.

The control measures that may encourage electrification of sources include MSM A-1 – Promote Clean, Fuel-Efficient Light and Medium-Duty Vehicles, MSM A-2 – Zero Emission Vehicles and Plug-In Hybrids, and MSM A-3 – Green Fleets. These control measures would encourage electrification of mobile sources and decreased use of fossil fuels. Table 3.3-16 estimates the emission reductions associated with implementation of the proposed control measures. Based on Table 3.2-15, the overall emission decreases are expected to be greater than the emission increases.

TABLE 3.2-15

Estimated Emission Reductions Associated with Control Measures That May Require Electrification of Sources (tons/day)

Control Measure	Year	ROG (TPD)	NOx (TPD)	PM10 (TPD)	CO2e (TPD)
MSM A-1 (Promote Clean, Fuel-Efficient Light and Medium-Duty Vehicles)	2020	0.51	0.29	0.20	0.18
MSM A-2 (Zero Emission Vehicles and Plug-In Hybrids	2020	0.18	0.13	0.02	0.30
MSM A-3 (Green Fleets)	2020	0.08	0.10	0.07	0.33
Total Emission Reductions	2020	0.77	0.52	0.29	0.81
Total Emission Reductions (lbs/day)	2020	1,540	1,040	580	1,620

Based on Table 3.2-14 and 3.2-15 and due to the existing regulations that would apply to the generation of electricity in the Bay Area, emissions from power generating equipment in the Air District are not expected to be significant.

The BAAQMD does not regulate electricity generating facilities outside of the Air District so the rules and regulations discussed above do not apply to electricity generating facilities outside of the Air District. About 78 percent of the electricity used in California is generated in-state and about 22 percent is imported (CEC, 2007). While these electricity generating facilities would not be subject to BAAQMD rules and regulations, they would be subject to the rules and regulations of the local air pollution control District and the U.S. EPA. These agencies also have established New Source Review regulations for new and modified facilities that generally require compliance with BACT or lowest achievable emission reduction technology. Most electricity generating plants use natural gas, which provides a relatively clean source of fuel (as compared to coal- or diesel-fueled plants). The emissions from these power plants would also be controlled by local, state, and federal rules and regulations, minimizing overall air emissions. These rules and regulations may differ from the BAAQMD rules and regulations because the ambient air quality and emission inventories in other air districts are different than those in the Bay Area. Compliance with the applicable air quality rules and regulations are expected to minimize air emissions in the other air districts to less than significant.

Electricity in California is also generated by alternative sources that include hydroelectric plants, geothermal energy, wind power, and solar energy, which are clean sources of energy. These sources of electricity generate little, if any, air emissions. Increased use of these and other clean technologies will continue to minimize emissions from the generation of electricity.

Conclusion: Based on the above evaluation and significance criteria, the secondary air quality impacts due to electricity generation are expected to be less than significant.

Project-Specific Mitigation: No significant secondary air quality impacts from increased electricity demand have been identified so no mitigation measures are required.

Secondary Impacts from Control of Stationary Sources

Project-Specific Impacts: Emission reductions from the control of emissions at several stationary sources could result in secondary emissions. Options for further NOx emission reductions could include addition of control equipment [selective catalytic reduction (SCR)], process changes to reduce emissions or require that new equipment meet more stringent emission limits. Installation of new SCR equipment or increasing the control efficiency of existing equipment would be expected to increase the amount of ammonia used for NOx control. As a result ammonia slip emissions could increase, thus, contributing to PM_{10} concentrations. Ammonia can be released in liquid form, thus, directly generating PM_{10} emissions. Ammonia can also be released in gaseous form where it is a precursor to PM_{10} emissions. Injecting ammonia at the proper molar ratio, increasing the amount of catalyst used, or installing scrubbers can minimize potential increases in ammonia slip emissions.

Control Measures SSM 9 – Cement Kilns, SSM -10 Refinery Boilers and Heaters, and SSM 14 – Glass Furnaces could reduce NOx by using SCR, which may potentially result

in increased ammonia emissions due to "ammonia slip" (release). Ammonia slip can increase as the catalyst ages and becomes less effective. Ammonia slip from SCR equipment is continuously monitored and controlled. A limit on ammonia slip is normally included in permits to operate for stationary sources, which should minimize potential air quality impacts associated with ammonia slip from these sources.

A number of control measures could result in a decrease in VOC emissions from various facilities including: (1) SSM 1- Metal-Melting Facilities; (2) SSM 2 – Digital Printing; (3) SSM 17 – Revise Regulation 2, Rule 5: New Source Review for Air Toxics; and (4) SSM 18 – Revise Air Toxics "Hot Spots" Program. The methods to control VOC emissions could include vapor recovery devices such as afterburners, incinerators, or flares, resulting in combustion emissions, including NOx and CO emissions. While some control measures may cause a small increase in CO and NOx emissions, the 2010 CAP control measures will achieve an overall reduction in VOC and NOx. The emission control devices require air permits to operate. Emissions from vapor recovery devices are generally controlled by using efficient combustion practices and enforced with permit conditions, therefore, secondary impacts from these control measures are not expected.

Conclusion: Based on the discussion above and the impact evaluation criteria, secondary air quality impacts from stationary source control measures are expected to be less than significant.

Project-Specific Mitigation: No significant secondary air quality impacts from control of stationary sources have been identified so no mitigation measures are required.

Secondary Emissions from Use of Lower VOCs Materials

Project-Specific Impacts: One of the proposed control measures is expected to encourage the reformulation of digital printing ink and solvents, SSM 2 – Digital Printing. To obtain VOC emission reductions from digital inks it is expected that inks would be reformulated with a lower VOC content or use exempt compound formulations. Similar to Regulation 8, Rule 20 – Graphic Arts Printing and Coating Operations, SSM 2 may result in the substitution of reactive solvents with exempt compounds. The exempt compounds for Regulation 8-20 are limited to acetone, methyl acetate, parachlorobenzotrifluoride (PCBTF), and or methylated siloxanes (VMS). These compounds are not considered to VOCs and, thus, their increase in use would not generate VOC emissions. According to the most recent studies conducted for the technological assessment, these types of materials have a low toxicity (SCAQMD, 2006). In addition, a number of cleaners are water-based which is not expected to generate VOC emissions.

Future compliant materials are expected to contain less hazardous materials (or will contain non-hazardous materials) as compared to solvent-borne inks and cleaning materials, resulting in an environmental benefit.

Conclusion: Based on the preceding analysis of potential secondary air quality impacts from implementing rules that would reformulating digital printing inks and solvents, it is concluded that the overall air quality effects will be a VOC emission reduction. Therefore, impacts associated with the use of lower VOC printing materials are expected to be less than significant.

Project-Specific Mitigation: No significant secondary air quality impacts from reformulation of digital printing materials have been identified so no mitigation measures are required.

Secondary Air Quality Impacts from Construction Activities

While implementing the 2010 CAP control measures is expected to reduce operational emissions, construction-related activities associated with installing or replacing equipment, for example, are expected to generate emissions from construction worker vehicles, trucks, and construction equipment. Implementation of some of the control measures may require or result in the construction of new infrastructure including construction of controls at stationary sources (e.g., SCR systems and other air pollution control equipment), onsite cogeneration equipment, and additional infrastructure to support electrification of new sources.

The inventory prepared for the 2010 CAP includes estimates of the construction emission inventory for construction activities in 2005, 2009, 2012, 2015 and 2020 (see Table 3.2-16). It is assumed that construction activities to implement control measures in the 2010 CAP contribute to construction activity emission inventories.

TABLE 3.2-16

Estimated Construction Emissions in the Bay Area
(tons/day)

Source Category	VOC	NOx	PM10	PM2.5
2005 Emission Inventory[(1)]				
Construction and Mining Equipment	12.2	72.9	4.4	4.3
2012 Emission Inventory[(1)]				
Construction and Mining Equipment	8.4	54.5	3.2	3.1
2020 Emission Inventory[(1)]				
Construction and Mining Equipment	5.7	30.7	1.6	1.6
Emission Reductions (2005 Emissions – 2020 Emissions)	-6.5	-42.2	-2.8	-2.7

1. Source: BAAQMD, 2009

Construction activities include the installation of control equipment on existing stationary sources, which would not involve extensive construction activities and would not be expected to result in significant emissions. Other construction activities could involve the installation of new infrastructure. As shown in Table 3.2-16, the estimated VOC, NOx, PM_{10} and $PM_{2.5}$ emissions associated with construction in the Air District are

expected to be reduced between the 2005 and the 2012 and 2020 emission inventories, resulting in an air quality benefit. CARB's emission standards for off-road mobile sources are the main source of the reduction in combustion emissions from off-road equipment expected between the 2005 and 2020 inventories.

Construction activities will need to be evaluated on a project-by-project basis as the magnitude of individual projects, the location of sensitive receptors, etc., could result in significant construction impacts. However, overall, the emissions inventories associated with construction equipment are expected to decrease. Therefore, no significant impact air quality impacts are expected due to implementation of the 2010 CAP.

Conclusion: Based on the preceding analysis of potential secondary air quality impacts associated with construction activities, it is concluded that the overall air quality effects will be a reduction in emissions associated with construction activities. Therefore, construction impacts associated with implementing the 2010 CAP are expected to be less than significant.

Project-Specific Mitigation: No significant secondary air quality impacts associated with construction activities have been identified so no mitigation measures are required. It is expected that BAAQMD basic mitigation measures would be imposed on construction activities (BAAQMD, 2009b), e.g., all exposed surface areas will be watered twice per day; all haul tracks transporting soil, sand, or other loose material off-site shall be covered; all vehicle speeds on unpaved roads shall be limited to 15 miles per hour; all roadways, driveways, and sidewalks will be completed as soon as possible; and all construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications.

Potential Adverse Impacts and Ozone Transport

Project-Specific Impacts: It has been well established that both NOx and VOC are involved in the formation of ground-level ozone, and thus reducing NOx emissions generally lowers ozone formation. However, studies have shown that lowering NOx alone can, under conditions of low VOC to NOx ratios, lead to localized increases in ozone. At sufficiently low VOC to NOx ratios, reducing NOx can increase ozone production efficiency, potentially resulting in higher ozone concentrations. This phenomenon has been investigated as a likely cause of the so-called "ozone weekend effect."

The "ozone weekend effect" refers to the observation that ozone measurements in some locations, primarily large metropolitan areas, are typically higher on weekends compared to weekdays. Smog-forming emissions mostly come from sources such as cars, trucks, factories, and fossil-fuel power plants that produce lower total emissions on weekends than on weekdays. One theory as to what causes the weekend effect indicates that many urban areas of the state are VOC-limited, and therefore reducing NOx emissions disproportionately in relation to VOC emissions will cause ozone concentrations to increase. CARB has been studying the weekend effect because it has become a

regulatory issue. It has been offered by some as evidence that reductions of NOx emissions alone would be counter-productive for reducing ambient ozone levels.
Understanding the weekend effect is not a simple task because ozone formation, transport, and destruction in the lower atmosphere are highly complex processes. CARB is currently evaluating various possible explanations of the ozone weekend effect. The hypotheses address temporal, spatial, and compositional changes in emissions from weekdays to weekends and how these changes might interact with meteorological and photochemical processes to produce the observed weekday to weekend differences in ozone concentrations (CARB, 2003).

Although in the Bay Area NOx reductions alone have the potential to increase ozone, a strategy of concurrent reductions of the major precursors of ozone, VOC and NOx, has been used for about 20 years to reduce ozone levels in the Bay Area on all days of the week, including weekends. Historical trends of air monitoring data show substantial reductions in ozone concentrations and therefore the public's exposure to ozone on both weekend and weekdays. Combined reductions of VOC and NOx, thus are not counter-productive for attaining ambient air quality standards. The 2010 CAP includes control measures that will reduce both NOx and VOC, as well as other pollutants. This strategy is expected to prevent an increase in ozone concentration that might occur from decreases in only NOx emissions.

While the degree of pollutant transport and its effect on ozone concentrations in affected areas have not yet been quantified, the effect of the 2010 CAP on ozone precursor pollutants to downwind regions is clear. Decreasing VOC and NOx emissions within the Bay Area through implementation of the Ozone Strategy is expected to decrease ambient ozone concentrations in the Bay Area and to decrease the available ozone and ozone precursors available for transport into neighboring air basins. Therefore, implementation of the proposed Ozone Strategy is not expected to result in any adverse impacts associated with the transport of ozone or ozone precursors to neighboring air basins.

In 2003, CARB amended State regulations on ozone transport mitigation. CARB retained the requirement for upwind transport Districts, such as the Bay Area, to apply BARCT. CARB also added two new requirements related to the adoption of all feasible measures and no net increase thresholds for new source review permitting programs. These measures should further reduce transport impacts, if any, on neighboring districts.

The District amended Rule 2-2 requiring new or modified permitted sources that emit or have the potential to emit 10 tons or greater per year of an ozone precursor to fully offset their emission increase. In addition, implementation of the 2010 CAP will fulfill the District's obligation to adopt all feasible measures. The emissions reductions from these measures are also expected to reduce transport impacts.

Conclusion: Based on the above analysis, the potential air quality impacts from increased ozone concentrations due to decreased NOx emissions proposed as part of the 2010 CAP is considered less than significant. In addition, the potential impacts to

downwind areas from the reduction of NOx and VOC emissions resulting from the 2010 CAP is considered less than significant.

Project-Specific Mitigation: Air quality impacts due to the "weekend effect" and ozone transport are not significant so no mitigation measures are required.

Emissions from Mobile Sources

Project-Specific Impacts: The 2010 CAP proposes a number of control measures that could require the use of clean fuels and use of alternatives, such as compressed natural gas, hydrogen, or other alternative fuels including MSM A-1- Promote Clean, Fuel Efficient Light and Medium Duty Vehicles, MSM A-2 – Zero Emission Vehicles and Plug-in Hybrids, MSM A-3 – Green Fleets for Light, Medium and Heavy-Duty Vehicles, MSM C-1 – Construction and Farming Equipment, LUM 1 – Goods Movement, LUM 2 – Indirect Source Review Rule, LUM 3 – Enhanced CEQA Program, and LUM 4 – Land Use Guidelines.

Clean fuels are expected to be fuels other than petroleum fuels (e.g., natural gas) so that no modifications are required to refineries and no increase in emissions from refineries is expected. The use of alternative fuels, such as compressed natural gas, would be expected to displace petroleum-based fuels. The use of alternative fuels in mobile sources is expected to result in fewer air emissions than the use of petroleum-based fuels. The control measures that may encourage the use of alternative fuels would decrease the use of fossil fuels. Table 3.3-17 estimates the emission reductions associated with implementation of the proposed control measures. Based on Table 3.2-17, the overall emission decreases are expected to be greater than the emission increases.

TABLE 3.2-17

Estimated Emission Reductions Associated with Control Measures That May Require Alternative Fuels (tons/day)

Control Measure	Year	ROG (TPD)	NOx (TPD)	PM10 (TPD)	CO_2e (TPD)
MSM A-1 (Promote Clean, Fuel-Efficient Light and Medium-Duty Vehicles)	2020	0.51	0.29	0.20	0.18
MSM A-2 (Zero Emission Vehicles and Plug-In Hybrids)	2020	0.18	0.13	0.02	0.30
MSM A-3 (Green Fleets)	2020	0.08	0.10	0.07	0.33
MSM C-1 (Construction and Farming Equipment)	2020	0.20	3.60	0.09	NA
LUM 1(Goods Movement)	2020	0.36	6.00	0.20	4,198
LUM 2 (Indirect Source Review Rule)	2020	0.30	0.24	0.47	340
LUM 3 (Enhanced CEQA Program)	2020	0.44	0.35	0.67	447
LUM 4 (Land Use Guidelines)	2020	0.09	0.10	0.03	353.51
Total Emission Reductions	2020	2.16	10.81	1.75	5339.32
Total Emission Reductions (lbs/day)	2020	4,320	21,620	3,500	10,678,640

Although overall the 2010 CAP is anticipated to reduce emissions from mobile sources, compared to the existing baseline, some control measures could encourage increased traffic and related emissions in localized areas. For example, LUM2 – Indirect Source Review, LUM 3 – Enhanced CEQA Program, and LUM 4 – Land Use Guidelines would encourage a reduction in vehicle miles traveled on a regional basis but could encourage an increase in localized emissions. These control measures could result in reduced vehicle miles traveled but increased localized traffic, e.g., near transit centers, thus, generating increases in emissions, particularly CO emissions or CO "hot spots," in the local areas. The intent of the control measures would be to increase CEQA review and mitigation of large development projects that exceed certain thresholds. Such CEQA review is expected to include traffic analyses and review of localized emission increases. Implementation of the control measures LUM 2 and LUM 4 would be expected to increase and mitigate increased emissions on a regional as well as a localized area. Under these control measures the BAAQMD would develop CEQA guidelines for evaluating air quality impacts and mitigating significant impacts. However, for land use

projects, the BAAQMD is generally not the lead agency under CEQA. Lead agencies would be encouraged to use the guidance and incorporate applicable mitigation measures, however, the implementation of the guidance information and mitigation measures would be up to the lead agency. Although unlikely, lead agencies could approve projects that have localized air quality impacts and adopt findings and statement of overriding considerations. Therefore, localized increases in CO emissions are considered potentially significant.

Conclusion: The 2010 CAP is expected to result in an overall reduction in emissions from mobile sources on a regional basis. However, some control measures could encourage increased traffic and related emissions in localized areas (e.g., LUM 2 and LUM 4). These control measures could result in increased traffic near transportation terminals, thus, generating increases in emissions, particularly CO emissions or CO "hot spots," in the local areas surrounding the transit terminals. While localized CO impacts are unlikely due to declining trends in background CO concentrations, the level of analysis provided in this Program DEIR prevented the District from concluding the impact would be less than significant. Therefore, based on the above evaluation and significance criteria, the potential for localized increases in CO emissions is considered a significant impact.

Project-Specific Mitigation: The impacts associated with localize emissions will be evaluated when specific rules/guidance documents are prepared for LUM 3 and LUM 4. The increase in localized emissions can be reduced by encouraging non-drive access to transit centers and implementation of development that is more conducive to walking and bicycling. However, the effectiveness of these mitigation measures cannot be quantified so the impact remains significant. Project level environmental analysis on the implementation of the various control measures will be required to determine the potential for impacts at specific locations.

Miscellaneous Air Quality Issues

The purpose of the 2010 CAP is to assure the Bay Area continues progress toward attaining the State eight-hour ozone standard as well as ambient air quality standards for particulate matter through implementation of different control measures. By revising and updating emission inventories and control strategies and preparing the 2010 CAP, the BAAQMD is complying with State law with respect to ozone attainment planning. The 2010 CAP further identifies the rules and regulations that the BAAQMD and other agencies will be working to implement in the near future. Therefore, issues on the CEQA environmental checklist related to impacts on the existing air quality plan, rules and regulations or future compliance dates are not applicable to the 2010 CAP. The 2010 CAP Strategy establishes a new air quality plan and identifies control measures that will be implemented through adoption of rules and regulations to achieve compliance with the State ozone standard, as well as PM_{10} and $PM_{2.5}$ standards, as expeditiously as practicable. No significant adverse impacts are anticipated on the existing 2005 Ozone Strategy as the 2010 CAP includes additional control measures that were not included in the 2005 Ozone Plan that will lead to even further emission reductions. Therefore, no

significant adverse impacts have been identified for the CEQA environmental checklist topics under air quality plan, rules and regulations, and future compliance dates.

3.2.3.2 Toxic Air Contaminants

Project-Specific Impacts: One control measures in the 2010 CAP may result in the substitution of solvents. When a product is reformulated to meet new VOC limits, however, a manufacturer could use a chemical, not used before, that may be a toxic air contaminant. This potential impact associated with this substitution is addressed below.

Use of Reformulated Materials

The 2010 CAP includes control measures that could require reformulation of consumer products including inks and solvents used in digital printing (SSM 2).

Manufacturer's of digital inks and solvents would be expected to comply with the control measure by lowering the VOC content in inks used in the Bay Area. A number of VOCs currently used in coating and solvent formulations have also been identified as TACs, such as ethylene-based glycol ethers, TCE, and toluene. When a product is reformulated to meet new VOC limits, however, a manufacturer could use a chemical, not used before, that may be a TAC. Control Measure SSM 2 does not provide exemptions to compounds that are TACs so there is no incentive to use TACs.

Conventional solvents include chemicals such as toluene, xylene, methyl alcohol, Stoddard Solvent, methyl ethyl ketone (MEK), isopropyl alcohol, ethylene glycol monobutyl ether (EGBE), ethylene glycol monomethyl ether (EGME), and ethylene glycol monoethyl ether (EGEE). The coatings and solvents being reformulated to comply with the proposed amendments are such chemicals as acetone, PBCTF, propylene glycol monomethyl ethers, di-propylene glycol monomethyl ethers (DPM), 3-ethoxypropanoic acid (an ethyl ester), and isopropyl alcohol, as well as water. Table 3.2-18 provides a summary of toxicity data associated with conventional coatings and products commonly used in reformulated coatings and surface preparation and cleaning solvents.

Replacement solvents for reformulated products are generally common chemicals used in a wide variety of industrial and consumer applications. Their widespread use indicates that users have the ability to use these compounds in a safe manner. Current cleaning formulations contain materials that are as toxic as, or more toxic than, formulations expected to be used to comply with VOC limits on digital printing inks. Thus, the possible increased use of potentially toxic materials in reformulated solvents/coatings are expected to be balanced by a concurrent decrease in the use of materials in currently used products that are typically more toxic, so TAC impacts would not be expected to increase compared to existing conditions.

TABLE 3.2-18

Toxicity of Conventional and Replacement Solvents

Conventional Solvents				
Solvents	TLV (ACGIH) (ppm)	PEL (OSHA) (ppm)	STEL[2] (ACGIH) (ppm)	IDLH (NIOSH) (ppm)
Toluene	50	200		500
Xylene	100	100	150	900
MEK	200	200	300	3000
Stoddard Solvent	100	500	Not Available	3448
Ethyl Alcohol	1000	1000	Not Available	3300[3]
Methyl Alcohol	200	200	250	6000[3]
Isopropyl Alcohol	400	400	500	2000[3]
EGBE	25	50	Not Available	700
EGEE	5	200	Not Available	500
EGME	5	25	Not Available	200
Replacement Solvents				
Acetone	750	1000	1000	2500[3]
Texanol	Not Established	Not Established	Not Established	Not Established
Di-Propylene Glycol	Not Established	Not Established	Not Established	Not Established
Propylene Glycol	3.21[1]	Not Established	Not Established	Not Established
Ethylene Glycol	39	Not Established	Not Available	Not Established
PCBTF	Not Established	Not Established	Not Established	Not Established
1,1,1-trichloroethane	350	350	450	700
Methylene Chloride	50	500	Not Available	2300
n-Butyl Acetate	150	150	200	1700[3]
t-Butyl Acetate	200	200	Not Available	1500[3]
Isobutyl Acetate	150	200	250	1300[3]
Methyl Acetate	200	200	250	3100[3]
TDI	0.005	0.02	0.02	2.5
HDI	0.005	Not Established	Not Established	Not Established
MDI	0.005	0.02	0.02	7.33

(1) 2007 AIHA Workplace Environmental Exposure Level; (2) STEL = short-term exposure limit (usually 15 minutes); and (3) Based on 10 percent of the lower explosive limit.

It is expected that future compliant materials will contain less hazardous materials (or will contain non-hazardous materials) as compared to previous solvent-borne coatings, resulting in an environmental benefit because the reformulated coatings and solvents are less toxic than previous solvent-borne coatings and solvents. In addition, a number of cleaners are water-based which is not expected to generate toxic air contaminants. Therefore, the potential impacts of reformulated digital printing inks are not expected to result in an increase in toxic air contaminants.

Toxic Air Contaminant Emission Reductions

Implementation of the 2010 CAP provides a multi-pollutant approach to air quality planning in the Bay Area. As a multi-pollutant plan, the 2010 CAP includes control measures to reduce ozone, particulate matter, air toxics, and GHG emissions. The proposed control measure strategy promotes fuel efficiency and pollution prevention, which also reduces greenhouse gas emissions. Measures that reduce vehicle miles traveled, fuel use and/or increase use of alternative fuels also help reduce TAC emissions. The control measures that are expected to result in GHG emissions reductions are included in Table 3.2-19.

TABLE 3.2-19

Estimated TAC Emission Reductions Associated with 2010 CAP

Control Measure	Description	TAC Emission Reductions (tons per day)			
		Benzene	Butadiene	Formal-dehyde	Acetal-dehyde
MSM A-1	Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles	0.001	<0.001	<0.001	<0.001
MSM A-2	Zero Emission Vehicles and Plug-in Hybrids	<0.001	<0.001	<0.001	<0.001
MSM A-3	Green Fleets	<0.001	<0.001	<0.001	<0.001
MSM A-4	Replacement or Repair of High-Emitting Vehicles	0.089	0.018	0.064	0.045
MSM B-1	HDV Fleet Modernization	0.001	<0.001	0.009	0.016
MSM B-3	Efficient Drive Trains	<0.001	<0.001	0.001	0.002
LUM 2	Indirect Source Review Rule	0.007	0.001	0.006	0.002
LUM 3	Enhanced CEQA Program	0.010	0.010	0.010	--
Total Emission Reductions (tons/day):		0.111	0.034	0.093	0.068
Total Emission Reductions (lbs/day):		222	68	186	136

The control measures listed in Table 3.2-19 are the ones for which TAC emissions could be reasonably estimated. A number of other control measures are included as part of the 2010 CAP for which the calculation of TAC emissions reductions cannot be estimated at this time including SSM 17 (Revise Regulation 2, Rule 5: New Source Review for Toxic Air Contaminants), SSM 18 (Revise Air Toxic "Hot Spots" Program), and LUM 5 (Reduce Risk from Stationary Sources in Impacted Communities).

In general, it is expected that the 2010 CAP control measure strategy will reduce emissions of TACs. The basis for this conclusion is that many TACs are also classified as VOCs. To the extent that control measures reduce VOC emissions, associated TAC emission reductions could occur as well. Some measures for motor vehicle and transportation source categories would reduce emissions of toxic components of gasoline such as benzene, toluene, and xylene. Use of alternative fuels may increase methanol and aldehyde emissions. Electrification may cause greater emissions of benzene, aldehydes, metals, and polynuclear aromatic hydrocarbons from fuel-based power generating facilities. However, if the process being electrified was previously powered by direct

combustion of fossil fuels, then electrification is expected to result in an overall decrease in toxic emissions.

Although overall the 2010 CAP is anticipated to reduce emissions from mobile sources, compared to the existing baseline, some control measures could encourage increased traffic and related emissions in localized areas. For example, LUM 3 – Enhanced CEQA Program and LUM 4 – Land Use Guidelines would encourage a reduction in vehicle miles traveled on a regional basis but could encourage an increased in localized emissions. These control measures could result in increased traffic near transit centers, thus, generating increases in emissions, particularly CO emissions in the local areas. The intent of the control measures would be to increase CEQA review and mitigation of large development projects that exceed certain thresholds. Such CEQA review is expected to include traffic analyses and review of localized emission increases. These control measures are not expected to result in an increase in TAC emissions, including diesel particulate emissions. LUM 3 is expected to reduce diesel particulate emissions by 0.26 tons per day by 2020. TAC emission reductions associated with LUM 4 are speculative at this time. Implementation of the control measures LUM 3 and LUM 4 would be expected to mitigate increased emissions on a regional as well as a localized basis. Other control measures associated with the 2010 CAP are aimed at reducing TAC impacts in specific portions of the community, including LUM 5 (Reduce Risk from Stationary Sources in Impacted Communities). The overall impact of the implementation of the 2010 CAP is expected to be a reduction in TAC emissions so that no significant adverse TAC emissions are expected do to implementation of the 2010 CAP.

Conclusion: Based on the above evaluation and significance criteria, the 2010 CAP is expected to result in an overall decrease in TAC emissions on a regional basis. Therefore, based on the above evaluation, impacts associated with TAC emissions are expected to be less than significant.

Project-Specific Mitigation: Air quality impacts associated with the use of reformulated materials are not significant so no mitigation measures are required.

3.4.3.3 Global Warming and Stratospheric Ozone Depletion

GHG emissions from a single project or plan would not necessarily create a significant adverse project-specific global climate change effect. Rather, it is the increased accumulation of GHG emissions from more than one project or many individual sources that may contribute to adverse global climate change impacts. The resultant consequences of that climate change can cause adverse environmental effects such as flooding of coastal areas, increased fire hazards, etc. In virtually every project subject to CEQA review, a project's GHG emissions will be relatively small compared to global or even statewide GHG emissions, and, as such, will almost certainly have no detectable impact on global climate change. Due to the complex physical, chemical, and atmospheric mechanisms involved in global climate change, sufficient tools are not yet available to accurately identify the specific impact, if any, to global climate change from one project's incremental increase in global GHG emissions. As a result, project-specific

GHG emissions and determining the significance of potential impacts are more properly assessed on a cumulative basis and are discussed in Section 3.2.5, Cumulative Air Quality Impacts.

3.2.4 Mitigation Measures

Mitigation measures have been discussed under each subcategory. In summary, mitigation measures were required due to potential localized increases in CO emissions, as they could exceed the BAAQMD significance thresholds. While localized CO impacts are unlikely due to statewide use of oxygenated fuels and declining trends in background CO concentrations, the level of analysis provided in this Program DEIR prevented the District from concluding the impact would be less than significant.

3.2.5 Cumulative Air Quality Impacts

3.2.5.1 Criteria Pollutants Cumulative Impacts

Some secondary emissions may occur as a result of implementing one or more control measures in the 2010 CAP, and some of these impacts are considered significant. The overall emission reductions in the 2010 CAP are expected to far outweigh any potential secondary adverse air quality impacts that may occur. Each control measure will be subject to additional environmental analysis when rules are adopted or amended by the BAAQMD to implement the control measure. At that time, the BAAQMD will evaluate specific technologies likely to be used, identify any secondary impacts, and identify feasible mitigation measures, as necessary. Rules implemented by the BAAQMD and other agencies are expected to have a cumulative beneficial impact on air quality by lowering criteria pollutant emissions.

Cumulative Construction Emissions: Construction-related emissions for projects included in the Transportation 2035 Plan as well as the 2010 CAP may come from: (1) grading, excavation, road building, and other earthmoving activities; (2) travel by construction equipment, especially on unpaved surfaces; and (3) exhaust from construction equipment. The air quality impacts would occur in localized areas, depending on specific site conditions. The overall impact of the proposed Transportation 2035 Plan due to construction of transportation project would result in a direct but short-term impact as projects advance into construction at different times, over the 25-year horizon for the Transportation 2035 Plan. In some instances there may be capital projects with longer construction periods that would produce construction emissions that may be longer-term. Therefore, cumulative construction-related emissions are considered to be a potentially significant impact. As project-level environmental documents are prepared for CEQA/NEPA purposes, project-level analysis would estimate construction emissions for each project based on detailed plans and site-specific information, and would establish mitigation measures to reduce air quality impacts.

Cumulative Operational Emissions: The forecast for the Bay Area includes a significant increase in population and employment growth with a related increase in

traffic (vehicles miles traveled) over the next 25 years. The 2010 CAP and other air plans and control measures have been developed, in part, to develop a strategy for attaining and maintaining compliance with ambient air quality standards in spite of this population growth. Emissions of NOx and ROG are expected to decline in the future, even as population and traffic increase due to various control measures. However, emissions of PM10 in the Air District are expected to increase (see Table 3.2-15).

The cumulative effects of the 2010 CAP, the TCMs in the Transportation 2035 Plan and other air quality rules, regulations, and plans are expected to be a reduction in vehicle miles traveled in the Bay Area compared to the No Project Alternative or baseline, thus providing beneficial impacts to the transportation system as well as air quality. As shown in Table 3.2-20, the emissions for ROG, NOx, and CO from mobile sources would decrease substantially between 2006 and 2035 due to implementation of the Transportation 2035 Plan. When compared to the baseline conditions (2006), implementation of the Transportation 2035 Plan would reduce ROG emissions by 72 percent, NOx emissions by 80 percent, and CO emissions by 78 percent, providing a direct air quality benefit. The major reason for these reductions in the increasingly stringent emission controls CARB has adopted for new vehicle engines and fuels over the past few decades. Other contributors include emission –control devices, the Enhanced Smog Check Program and fleet turnover wherein older polluting cares are retired and replaced with newer and less polluting vehicles.

TABLE 3.2-20

Cumulative Emission Estimates for Criteria Pollutants

	(tons per day)			**Total Change 2006 to 2035 with RTP[(1)]**		**Difference 2035 with RTP and 2035 without RTP[(1)]**	
	2006	**2035 No RTP[(1)]**	**2035 with RTP[(1)]**	**Numerical**	**Percent**	**Numerical**	**Percent**
ROG	131.1	37.5	37.2	-93.9	-72%	-0.3	-0.7%
NOx	209.8	43.2	42.8	-166.9	-80%	-0.3	-0.8%
CO	1,235.4	272.3	268.7	-966.7	-78%	-3.6	-1.3%
PM10	65.7	84.7	84.1	18.3	28%	-0.6	-0.7%
PM2.5	17.2	20.7	20.4	3.2	19%	-0.2	-1.2%

(1) Refers to the MTC's Transportation 2035 Plan (MTC, 2009)

As shown in Table 3.2-20, PM_{10} and $PM_{2.5}$ emissions from mobile sources would increase by 28 percent and 19 percent, respectively, compared to 2006 conditions. The higher levels of particulate matter emissions in 2035 are due to the fact that these emissions are strongly influenced by the 32 percent growth in vehicle miles traveled (which affects entrained dust), with some contributions from tire and brake wear and exhaust. The increase in VMT is largely due to regional population and employment growth.

The reason particulate matter emissions from mobile sources are not increasing at the same rate as VMT (32 percent) is the stringent emission controls adopted by CARB for new vehicle engines, particularly diesel engines. In addition, the Transportation 2035 Plan reduces PM_{10} emissions by 0.7 percent and $PM_{2.5}$ emissions by 1.2 percent below what they would be without the plan. (MTC, 2009) PM control programs implemented by the local Air Districts also contribute to the emission reductions relative to VMT. Nonetheless, the increase in particulate matter emissions overall represents a potentially significant cumulative impact (MTC, 2009).

The control measures proposed by the BAAQMD as part of the 2010 CAP are estimated to achieve about 15.75 tons per day of VOC emission reductions, and about 36.13 tons per day of NOx emission reductions, providing a beneficial air quality impact (see Table 2.3).

Control measures that encourage the use of mass transit or increase service by transportation that uses diesel fuel could result in increased emissions and potentially significant localized emissions of CO. On balance, an overall decrease in vehicle miles traveled and air emissions would be anticipated regionally; however, significant air quality impacts associated with CO could occur locally. While localized CO impacts are unlikely due to statewide use of oxygenated fuels and declining trends in background CO concentrations, the level of analysis possible in this Program DEIR prevents the District from concluding the impact would be less than significant. Mitigation measures for these impacts were addressed in the impact-specific discussions above.

The overall PM_{10} emission inventory is expected to increase (see Table 3.2-20)**.** The increase in PM_{10} emissions is largely associated with increase in population and not the 2010 CAP. The 2010 CAP is expected to result in an overall reduction of about 6.2 tons per day of PM_{10}. Control measures to be implemented by CARB are expected to provide additional PM_{10}, ROG and NOx emission reductions in the Air District, primarily associated with reduced emissions from mobile sources and consumer products.

Conclusion: Cumulative construction-related emissions are considered to be a potentially significant impact. As project-level environmental documents are prepared for CEQA/NEPA purposes, project-level analysis would estimate construction emissions for each project based on detailed plans and site-specific information, and would establish mitigation measures to reduce air quality impacts.

The emissions for ROG, NOx, and CO would decrease substantially between 2006 and 2035 due in part to implementation of the Transportation 2035 Plan, providing a direct air quality benefit. Emissions of particulate matter would increase between 2006 and 2035, primarily to due an increase in VMT associated with regional population and employment growth. The increase in particulate matter emissions overall represents a potentially significant cumulative impact (MTC, 2009).

Control measures that encourage the use of mass transit or increase service by transportation that uses diesel fuel could result in increased emissions and potentially significant localized emissions of CO. On balance, an overall decrease in vehicle miles traveled and air emissions would be anticipated regionally; however, significant air quality impacts associated with CO could occur locally and are potentially significant. Mitigation measures for these impacts were addressed in the impact specific discussions above.

Cumulative Impact Mitigation for Criteria Pollutants: The mitigation measures developed by the MTC for the Transportation 2035 Plan (MTC, 2009) to reduce construction-related air quality impacts that shall be considered by project sponsors and decision-makers may include, but are not limited to the following:

- Water of dust suppressants shall be applied to exposed earth surfaces at all transportation construction projects to control emissions at least twice daily;
- All trucks hauling dirt, san, soil, or other loose materials off-site shall be covered to wetted or shall maintain at least two feet of freeboard, i.e., minimum vertical distance between the top of the load and the top of the trailer;
- All excavating and grading activities shall cease during periods of high winds;
- All construction roads that have high traffic volumes, shall be surfaced with base material or decomposed granite, or shall be paved or otherwise be stabilized;
- Public streets shall be cleaned, swept or scraped at frequent intervals or at least three times a week or once a day if visible soil material has been carried onto adjacent public roads (no mechanical “dry” sweeping shall be allowed);
- Construction equipment shall be visually inspected prior to leaving the site and loose direct dirt shall be washed off with wheel washers as necessary;
- Paving or water or non-toxic soil stabilizers shall be applied as needed to reduce off-site transport of fugitive dust from all unpaved access roads, parking and staging areas and other unpaved surfaces;
- Traffic speeds on all unpaved surfaces shall not exceed 15 mph;
- Alternative fuels shall be used in construction equipment where feasible;
- Idling time of construction vehicles and equipment shall not exceed five (5) minutes;
- Construction vehicles shall be properly maintained and tuned;

- Deliveries related to construction activities that affect traffic flow shall be scheduled during off-peak hours (e.g., 10 a.m. and 3 p.m.) and coordinated to achieve consolidated truck trips. When the movement of construction materials and/or equipment impacts traffic flow, temporary traffic control shall be provided to improve traffic flow (e.g., flag person);

- Construction activity shall utilize electricity from power poles rather than temporary diesel power generators and/or gasoline power generators;

- Hydro-seed or apply non-toxic soil stabilizers to inactive construction areas;

- Install sandbags or other erosion control measures to prevent silt run-off to public roadways;

- Install wind breaks, or plant trees/vegetative wind breaks at windward side(s) or construction areas;

- Maintain on-site truck loading zones;

- Configure on-site construction parking to minimize traffic interference and to ensure emergency vehicle access;

- Provide temporary traffic control during all phases of construction activities to improve traffic flow;

- During construction, replace ground cover in disturbed areas as quickly as possible;

- During the period of construction, install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip;

- Employ a balanced cut/fill ratio on construction sites, thus reducing haul truck trip emissions;

- Construction sites/site operator shall comply with BAAQMD Regulation 6, Rule 1 – Particulate Matter;

- Use an emissions calculator in the planning of every construction project that uses the proposed equipment fleet and hours of use to project reactive organic gases, nitrogen oxides, particulate matter, and carbon dioxide emissions, then quantify the reductions achievable through the use of cleaner/newer equipment; and

- All off-road construction vehicles must be alternative fuel vehicles, or diesel-powered vehicles with the most recent CARB-certified tier or better engines or retrofitted/repowered to meet equivalent emission standards.

Implementation of these mitigation measures would be expected to reduce the direct, short-term impact of most individual construction projects to a less-than-significant level for the region overall. However, additional analysis and mitigation may be required for some construction projects; these mitigation measures shall be identified in project-level environmental documents. Because the location and duration of specific construction projects is unknown and the implementation/effectiveness of the mitigation measures is uncertain, the localized construction-related air quality impacts are considered to remain significant following mitigation.

The following mitigation measures are recommended to address the overall cumulative increase in particulate emissions.

- MTC and BAAQMD, in partnership with CARB and other partners who would like to participate, shall work to leverage existing air quality and transportation funds and seek additional funds to continue to implement the BAAQMD's Lower-Emission Bus Program to retrofit older diesel school buses with emission control devices and replace older school buses with clean school buses, and to develop and implement other similar programs aimed at retrofits and replacements of heavy duty fleet vehicles.

- MTC and BAAQMD in partnership with the Port of Oakland, CARB and other partners who would like to participate, shall work together to identify, prioritize and implement actions beyond those identified in the Statewide Goods Movement Emission Reduction Plan to reduce diesel particulate matter and other air emissions.

- MTC and BAAQMD, in partnership with the Port of Oakland, CARB and other partners who would like to participate, shall work together to secure incentive funding that may be available through the Carl Moyer Memorial Air Quality Standards Attainment Program to reduce port-related emissions.

- MTC and BAAQMD, in partnership with the Port of Oakland, CARB and other partners who would like to participate, shall work together to secure Proposition 1B Goods Movement Emission Reduction Program funds to invest in Bay Area related programs. These funds directly support early and accelerated diesel particulate matter reduction programs and can help ease the transition into compliance with adopted and proposed CARB regulations.

- MTC and BAAQMD, in partnership with the Port of Oakland, CARB and other partners who would like to participate, shall work together to develop and seek resources for the San Francisco Bay Area Green Ports Initiative, which is a program to reduce air pollution from trucks, ships, and other equipment associated with Bay Area port operations.

Despite feasible mitigation, this overall cumulative impact is assumed to remain significant and unavoidable. However, the proposed project's contribution to the overall cumulative impact is not cumulatively considerable.

3.2.5.2 Non-Criteria Pollutants Cumulative Impacts

Toxic Air Contaminants

Implementing the 2010 CAP is expected to reduce TAC emissions. The basis for this conclusion is that many TACs are also classified as VOCs. To the extent that control measures reduce VOC emissions, associated TAC emission reductions could occur as well. Some measures for motor vehicle and transportation source categories would reduce emissions of toxic components of gasoline such as benzene, toluene, and xylene. Implementing the 2010 CAP may contribute to new or additional non-criteria pollutant emissions. For example, increases in the use of certain TACs could occur in reformulated products if they are specifically exempted from the VOC definition due to their very low ozone-forming capabilities. There is a potential that the exempt compounds may create air quality impacts if the exempt solvents contain toxic compounds that are not regulated by the State and federal TAC programs. However, these compounds are not exempted from BAAQMD rules and regulations so there is no incentive to use these compounds in the Bay Area.

CARB has identified particulate matter from diesel-fuel engines as a toxic air contaminant and is implementing regulations to reduce particulate matter emissions from diesel-fueled engines and vehicles. Recent regulations to reduce diesel particulate matter emissions include the following:

> **Off-Road:** Cargo handling equipment at ports and intermodal rail yards, mobile agriculture equipment, off-road equipment, locomotives, new off-road engines and equipment, and transport refrigeration units.
>
> **On-Road:** Heavy-Duty Vehicles – Trucks and buses (retrofit); new heavy duty vehicle regulations; buses; chip reflash for diesel trucks; regulations to limit idling of heavy duty trucks and school buses; port trucks and drayage trucks; and solid waste collection vehicles.
>
> **Marine and Related Equipment:** Commercial harbor craft; recreational marine engines; ocean-going ships; and shore power.
>
> **Stationary Diesel Engines and Portable Diesel Equipment:** Recent regulations to diesel engines and portable diesel equipment including diesel agricultural engines, airborne toxic control measure for stationary compression-ignition engines; portable diesel fueled engines, and transportation refrigeration units.
>
> **Diesel Fuel Program:** CARB has regulated diesel fuel requirements to minimize emissions, including emissions of diesel particulate that are generated during fuel

combustion. The primary method of regulation has been to minimize the sulfur content of fuel which helps reduce particulate formation.

TCMs included in the Transportation 2035 Plan and as part of the 2010 CAP include a number of measures that will reduce mobile source emissions and reduce vehicle miles traveled including TCM A-1 (Improve Local and Areawide Bus Service), TCM A-2 (Improve Local and Regional Rail Service), TCM B-2 (Improve Transit Efficiency and Use), TCM B-3 (Bay Area Express Lane Network), TCM B-4 (Goods Movement Improvements and Emission Reduction Strategies), TCM C-1 (Support Voluntary Employer-Based Trip Reduction Program), TCM C-3 (Promote Rideshare Services and Incentives), TCM D-1 (Improve Bicycle Access and Facilities), TCM D-2 (Improve Pedestrian Access and Facilities), TCM D-3 (Support Local Land Use Strategies), TCM E-1 (Value Pricing Strategies), TCM E-2 (Parking Pricing and Management Strategies), and TCM E-3 (Implement Transportation Pricing Reform). The projected emission benefits associated with the full implementation of the Transportation 2035 Plan and the 2010 CAP, is an overall reduction of diesel particulate emissions of about 77 percent, with an associated cancer risk reduction. Therefore, the cumulative impacts of the 2010 CAP, Transportation 2035 Plan, and implementation of related CARB regulations will have a beneficial impact on reducing TAC emissions and the related risks associated with activities that expose nearby individuals to diesel particulate emissions.

The cumulative impact of the 2010 CAP, CARB regulations, regional programs, and the Transportation 2035 Plan for the Bay Area are that TAC emissions would continue to decline through 2035. As shown in Table 3.2-21, there would be a 77 percent decrease in diesel particulate matter, a 78 percent decrease in 1,3-butadiene, and a 76 percent decrease in benzene compared to existing conditions as part of the Transportation2035 Plan. Additional TAC emission reductions are expected from the 2010 CAP (see Table 3.2-22).

TABLE 3.2-21

Emission Estimates for Toxic Air Contaminants Pollutants

	(kilograms per day)			**Change 2006 to 2035 with RTP[(1)]**		**Difference 2035 with RTP and 2035 without RTP[(1)]**	
	2006	**2035 No RTP[(1)]**	**2035 with RTP[(1)]**	**Numerical**	**Percent**	**Numerical**	**Percent**
Diesel PM	3,073	728	716	-2,356	-77%	-12	-1.6
1,3- Butadiene	241	53	53	-188	-78%	-0.1	-0.3
Benzene	1,284	316	311	-73	-76%	-5	-1.7

(1) Refers to the MTC's Transportation 2035 Plan (MTC, 2009)

TCMs that encourage the use of mass transit or increase service by transportation providers that use diesel fuel could result in increased emissions and potentially localized

TAC emissions of diesel exhaust. On balance, the magnitude of the overall emission decreases is expected to outweigh any localized emissions increases. A number of TCMs and control measures are aimed at reducing localized air quality impacts, e.g., TCM A-1 (Improve Local and Areawide Bus Service, TCM D-1 (Improve Bicycle Access and Facilities), TCM D-2 (Improve Pedestrian Access and Facilities), and TCM D-3 (Support Local Land Use Strategies.

Conclusion: Based on the above analysis, the cumulative air quality impacts on TAC emissions are expected to be beneficial.

Greenhouse Gas Emissions

The 2010 CAP as a whole is expected to promote a net decrease in greenhouse gases. The proposed control measure strategy promotes fuel efficiency and pollution prevention, which also reduces greenhouse gas emissions. Measures that reduce fuel use and/or increase use of alternative fuels will also be beneficial. In general, strategies that conserve energy and promote clean technologies usually also reduce greenhouse gas emissions. As shown in Table 3.2-9, the fuel combustion and the generation of electricity are responsible for a large portion of greenhouse gases produced in California.

The 2010 CAP proposed a total of 55 control measures in five categories, including:

- 18 control measures to reduce emissions from stationary and area sources
- 10 mobile source control measures
- 17 transportation control measures
- 6 land use and local impact control measures
- 4 energy and climate control measures.

The 2010 CAP is a multi-pollutant plan that addresses ozone, particulate matter, air toxics, and greenhouse gases via an integrated control strategy that is aimed at ozone planning requirements, but also includes emission reductions for other pollutants including GHG emissions. The control measures that are expected to result in GHG emissions reductions are included in Table 3.2-22.

Several stationary source measures are expected to result in a reduction in GHG emissions including SSM 3 (Livestock Waste); SSM 4 (Natural Gas Processing and Distribution), and SSM 15 (Greenhouse Gases in Permitting). See Table 3.2-22 for estimated GHG emission reductions associated with the stationary source control measures.

TABLE 3.2-22
Estimated GHG Emission Reductions Associated with 2010 CAP

Control Measure	Description	GHG Emission Reductions (tons per day)
Stationary and Area Source Measures		
SSM 3	Livestock Waste	65
SSM 4	Natural Gas Processing and Distribution	120
SSM 15	Greenhouse Gases in Permitting – Energy Efficiency	TBD
Transportation Control Measures		
TCM A-1	Improve Local and Areawide Bus Service	23
TCM A-2	Improve Local and Regional Rail Service	516
TCM B-1	Implement Freeway Performance Initiative	2,451
TCM B-2	Improve Transit Efficiency and Use	6.13
TCM B-3	Bay Area Express Lane Network	1,892
TCM B-4	Goods Movement Improvements and Emission Reduction Strategies	4,045
TCM C-1	Support Voluntary Employer-Based Trip Reduction Program	97
TCM C-2	Implement Safe Routes to Schools and Safe Routes to Transit	8.182
TCM C-3	Promote Rideshare Services and Incentives	153
TCM C-4	Conduct Public Outreach and Education	40.42
TCM C-5	Promote Smart Driving/Speed Moderation	180
TCM D-1	Improve Bicycle Access and Facilities	4.44
TCM D-2	Improve Pedestrian Access and Facilities	1.76
TCM D-3	Support Local Land Use Strategies	873.63
TCM E-1	Value Pricing Strategies	9.68
TCM E-2	Parking Pricing and Management Strategies	294
TCM E-3	Implement Transportation Pricing Reform	188
Mobile Source Control Measures		
MSM A-1	Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles	<0.001
MSM A-2	Zero Emission Vehicles and Plug-in Hybrids	<0.001
MSM A-3	Green Fleets (Light, Medium & Heavy-Duty Vehicles)	<0.001
MSM A-4	Replacement or Repair of High-Emitting Vehicles	44.143
MSM B-1	HDV Fleet Modernization	0.64
MSM B-3	Efficient Drive Trains	0.23
MSM C-2	Lawn & Garden Equipment	<0.001
MSM C-3	Recreational Vessels	0.416
Land Use and Local Impact Control Measures		
LUM 1	Goods Movement	2,561
LUM 2	Indirect Source Review Rule	340
LUM 3	Enhanced CEQA Program	447
LUM 4	Land Use Guidelines	139
Energy and Climate Control Measures		
ECM 1	Energy Efficiency	543
ECM 2	Renewable Energy	0.56
ECM 3	Urban Heat Island Mitigation	30
ECM 4	Tree-Planting**	76
	Total Estimated GHG Emission Reductions:	15,150

***TBD – emissions reductions to be determined**

** Emissions reduction figures for ECM 4: Tree-Planting were calculated in tons per day assuming 4,262,940 ten year old Cherry Plum trees planted, the daily reduction is derived from the annual reduction divided by 365 days per year.

The TCMs are intended to reduce vehicle miles traveled, petroleum fuel use, and related criteria pollutants. Another beneficial impact of the TCMs (reduce in vehicle miles traveled and fuel use) is a reduction in GHG emissions. The estimated emission reductions associated with implementation of the TCMs is shown in Table 3.2-22.

A number of control measures have been suggested for the control of mobile sources including MSM A-1 (Promote Clean Fuel Efficient Light and Medium Duty Vehicles); MSM A-2 (Zero Emission Vehicles and Plug-in Hybrids); MSM A-3 (Green Fleets for Light, Medium and Heavy-Duty Vehicles); MSM B-3 (Efficient Drive Trains); MSM C-1 (Construction and Farming Equipment); MSM C-2 (Lawn and Garden Equipment); MSM and C-3 (Recreational Vessels). All of these control measures are expected to reduce both criteria pollutant and greenhouse gas emissions from mobile sources through alternative fuels (electricity or natural gas) or through the use of more efficient engines.

Other strategies that promote fuel efficiency and pollution prevention will also reduce greenhouse gas emissions including, LUM 1 (Goods Movement), LUM 2 (Indirect Source Review Rule), LUM 3 (Enhanced CEQA Program), LUM 4 (Land Use Guidelines), ECM 1 (Energy Efficiency), ECM 2 (Renewable Energy), ECM 3 (Urban Heat Island Mitigation), and ECM 4 (Tree Planting). In general, strategies that conserve energy and promote clean technologies also reduce greenhouse gas emissions. The emission estimates associated with these control measures are provided in Table 3.2-22.

The overall GHG emissions associated with the 2010 CAP, including the TCMs developed as part of MTC's Regional Transportation Plan, Transportation 2035, is expected to be about 5.0 million metric tons per year (see Table 3.2-22), providing a large reduction in GHG emissions.

As discussed under Subsection 3.2.3.1 Criteria Pollutants – Secondary Impacts from Increased Electricity Demand, some of the proposed control measures would encourage electrification of mobile sources and increase the demand for electrical energy. The increased demand for electrical energy may require generation of additional electricity which in turn could result in increased indirect of criteria pollutants, as well as GHG emissions. While control measures may cause an increase in GHG emissions associated with increased electricity generation, overall the 2010 CAP and related control measures are expected to result in a net reduction in GHG emissions. Further, ECM 1 – Energy Efficiency is expected to result in a reduction in electricity use of about one percent (BAAQMD, 2009). Therefore, the 2010 CAP is expected to have a net effect of reducing emissions of compounds that contribute to global warming and ozone depletion.

Conclusion: Overall, the 2010 CAP and related TCMs will reduce non-criteria pollutants on a regional level. Further, implementation of the Transportation 2035 Plan and other CARB regulations will further reduce TAC emissions of diesel exhaust as well as GHG emissions percent. Considering the air quality benefits provided by the 2010 CAP and other related air quality programs, no significant cumulative adverse impacts are expected.

Cumulative Impact Mitigation for Non-Criteria Pollutants: No significant cumulative impacts for non-criteria pollutants were identified so no mitigation measures are required

3.2.6 Summary of Air Quality Impacts

- Secondary Impacts from Increased Electricity Demand: A number of control measures in the 2010 CAP may encourage electrification of mobile and other sources and decreased use of fossil fuel. The overall emission decreases associated with electrification are expected to exceed emission increases associated with increased generation of electricity so impacts are less than significant.

- Secondary Impacts from Control of Stationary Sources: Emission reductions from the control of stationary sources could generate secondary emissions, e.g., PM_{10}, ammonia, or NOx and CO from the use of emission control equipment. Secondary emissions are generally limited by permit conditions or assuring efficient combustion. While some control measures may cause small increases in emissions, the 2010 CAP is expected to achieve greater emission reductions than emission increases so no significant impacts are expected.

- Secondary Emissions from Use of Lower VOC Materials: The air quality impacts from implementing rules that would reformulate digital printing inks and solvents are expected to result in an overall VOC emission reduction. Impacts associated with the se of lower VOC printing materials are expected to be less than significant.

- Secondary Air Quality Impacts from Construction Activities: Implementation of the 2010 CAP may result in additional construction activities. The overall impact of implementing the CAP is expected to be a reduction in emissions associated with construction activities so no significant impacts are expected.

- Ozone Transport: The potential air quality impacts from increased ozone concentrations due to decreased NOx emissions proposed as part of the 2010 CAP is considered less than significant. In addition, the potential impacts to downwind areas from the reduction of NOx and VOC emissions resulting from the 2010 CAP is expected to provide a beneficial impact and reduced ambient concentrations of ozone.

- Emissions from Mobile Sources: The 2010 CAP is expected to result in an overall reduction in emissions from mobile sources on a regional basis. However, some control measures could encourage increased traffic and related emissions in localized areas. These control measures could result in increased traffic near transportation terminals, thus, generating increases in emissions, particularly CO emissions or CO "hot spots," in the local areas surrounding the transit terminals. While localized CO impacts are unlikely due to declining trends in background CO concentrations, the level of analysis possible in this Program ~~DEIR~~ Final EIR prevented the District from concluding the impact would be less than significant.

- TACs Impacts: The 2010 CAP is expected to result in an overall decrease in TAC emissions on a regional basis. Therefore, impacts associated with TAC emissions are less than significant.

- Cumulative Construction Emissions: Construction-related emissions for projects included in the Transportation 2035 Plan as well as the 2010 CAP may come from: (1) grading, excavation, road building, and other earthmoving activities; (2) travel by construction equipment, especially on unpaved surfaces; and (3) exhaust from construction equipment. The air quality impacts would occur in localized areas, depending on specific site conditions and could result in direct, short-term impacts. Therefore, cumulative construction-related emissions are considered to be a potentially significant impact.

- Cumulative Operational Emissions: The emissions for ROG, NOx, and CO would decrease substantially between 2006 and 2035 due to implementation of various programs, including the Transportation 2035 Plan, providing a direct air quality benefit. Emissions of particulate matter would increase between 2006 and 2035, primarily to due an increase in VMT associated with regional population and employment growth. The increase in particulate matter emissions overall represents a potentially significant cumulative impact (MTC, 2009).

  Control measures that encourage the use of mass transit or increase service by transportation that uses diesel fuel could result in increased emissions and potentially significant localized emissions of CO. On balance, an overall decrease in vehicle miles traveled and air emissions would be anticipated regionally; however, significant air quality impacts associated with CO could occur locally and are potentially significant.

- Cumulative TAC Emissions: The cumulative impact of the 2010 CAP, CARB regulations, regional programs, and the Transportation 2035 Plan for the Bay Area are that TAC emissions would continue to decline through 2035. TCMs that encourage the use of mass transit or increased service by transportation providers that use diesel fuel could result in increased emissions and potentially localized TAC emissions of diesel exhaust. On balance, the magnitude of the overall emissions decreases is expected to outweigh any localized emission increases so no significant impacts are expected.

- Greenhouse Gas Emissions: The overall GHG emissions associated with the 2010 CAP, including the TCMs developed as part of MTC's Regional Transportation Plan, Transportation 2035, is expected to be a large reduction in GHG emissions providing a beneficial impact to GHG emissions.

3.3 Hazards and Hazardous Materials

3.3.1 Environmental Setting

The goal of the 2010 CAP is to attain and maintain the State ozone standard as well as reducing ambient concentrations of particulate matter, TACs, and GHGs, thus improving air quality and protecting public health. Some of the proposed control measures intended to improve overall air quality may, however, have direct or indirect hazards associated with their implementation. Hazard concerns are related to the potential for fires, explosions or the release of hazardous substances in the event of an accident or upset conditions.

The potential for hazards exist in the production, use, storage and transportation of hazardous materials. Hazardous materials may be found at industrial production and processing facilities. Some facilities produce hazardous materials as their end product, while others use such materials as an input to their production process. Examples of hazardous materials used as consumer products include gasoline, solvents, and coatings/paints. Hazardous materials are stored at facilities that produce such materials and at facilities where hazardous materials are a part of the production process. Specifically, storage refers to the bulk handling of hazardous materials before and after they are transported to the general geographical area of use. Currently, hazardous materials are transported throughout the district in great quantities via all modes of transportation including rail, highway, water, air, and pipeline.

The Initial Study for the 2010 CAP identified the use of reformulated products, use of alternative fuels, and use of add-on control devices (e.g., SCRs) that may use hazards materials as possibly increasing the potential for hazards.

The potential hazards associated with industrial activities are a function of the materials being processed, processing systems, and procedures used to operate and maintain the facility. The hazards that are likely to exist are identified by the physical and chemical properties of the materials being handled and their process conditions. Possible hazards include the following:

- **Toxic gas clouds:** Toxic gas clouds are releases of volatile chemicals (e.g., anhydrous ammonia, chlorine, and hydrogen sulfide) that could form a cloud and migrate off-site, thus exposing individuals. "Worst-case" conditions tend to arise when very low wind speeds coincide with an accidental release, which can allow the chemicals to accumulate rather than disperse.

- **Torch fires (gas and liquefied gas releases), flash fires (liquefied gas releases), pool fires, and vapor cloud explosions (gas and liquefied gas releases):** The rupture of a storage tank or vessel containing a flammable gaseous material (like propane or gasoline), without immediate ignition, can result in a vapor cloud explosion. The "worst-case" upset would be a release that produces a large aerosol cloud with flammable properties. If the flammable cloud does not ignite after

dispersion, the cloud would simply dissipate. If the flammable cloud were to ignite during the release, a flash fire or vapor cloud explosion could occur. If the flammable cloud were to ignite immediately upon release, a torch fire would ensue.

- **Thermal Radiation:** Thermal radiation is the heat generated by a fire and the potential impacts associated with exposure. Exposure to thermal radiation would result in burns, the severity of which would depend on the intensity of the fire, the duration of exposure, and the distance of an individual to the fire.

- **Explosion/Overpressure:** Process vessels containing flammable explosive vapors and potential ignition sources are present at industrial facilities, e.g., refineries and chemical plants. Explosions may occur if the flammable/explosive vapors came into contact with an ignition source. An explosion could cause impacts to individuals and structures in the area due to overpressure.

3.3.1.1 Hazardous Materials Incidents

The Department of Transportation, Office of Pipeline and Hazardous Materials Safety Administration (PHMSA) is a post incident reporting system to collect data on incidents involving the accidental release of hazardous materials. Information on accidental releases of hazardous materials are reported to PHMSA. In 2008, 1,598 hazardous materials incidents that occurred within California were reported to PHMSA. The incidents resulted in 21 injuries (non-hospitalized), two people hospitalized, and caused about $1.5 million in damages (PHMSA, 2009).

In the last ten years about 79 hazardous materials incidents related to ammonia releases that occurred within California have been reported to PHMSA. Eight of those incidents were in the Bay Area. The incidents resulted in 4 injuries (non-hospitalized), one person hospitalized, and caused about $148,000 in damages (PHMSA, 2009).

The transport of ethanol has been more common in the last decade. A total of 50 hazardous materials incidents in California related to ethanol releases were reported to PHMSA in 2008. The incidents results in no injuries (hospitalized or non-hospitalized) and caused about $2,500 in damages (PHMSA, 2009)

The California Hazardous Materials Incident Reporting System (CHMIRS) is a post incident reporting system to collect data on incidents involving the accidental release of hazardous materials. Information on accidental releases of hazardous materials are reported to and maintained by OES. In 2007, there were a total of 1,312 incidents reported in the nine counties regulated by the BAAQMD (see Table 3.3-1). The statistical information is from a widely distributed cross section of sources in California. These data may not accurately represent the actual occurrences of incidents throughout the state because of differences in population, non-uniform distribution of commercial and industrial facilities, and differences in resources between participating agencies statewide.

TABLE 3.3-1

Hazardous Materials Incidents 2007 by County

COUNTY	REPORTED INCIDENTS
Alameda	284
Contra Costa	300
Marin	71
Napa	33
San Francisco	104
San Mateo	117
Santa Clara	123
Solano*	161
Sonoma*	119
Total No. of Reported Incidents	1,312

Source: OES, 2009

* Not all of Solano or Sonoma Counties are within the jurisdiction of BAAQMD

The location of the spills varies (see Table 3.3-2). In the nine counties that comprise the Air District hazardous materials incidents during transportation, at waterways, and at commercial facilities were the most common locations, respectively, for hazardous materials incidents. About 25 percent of the hazardous materials incidents that occurred at waterways occurred within the nine counties that comprise the Bay Area.

3.3.1.2 Hazards Associated with Air Pollution Control and Alternative Fuels

The BAAQMD has evaluated the hazards associated with previous air plans (2005 Ozone Strategy) and proposed BAAQMD rules. The analyses covered a range of potential air pollution control technologies and equipment. EIRs prepared for the previous air plans have specifically evaluated hazard impacts from: (1) add-on control equipment; (2) alternative coating methods; and (3) alternative fuels.

The use of add-on pollution control equipment may concentrate or utilize hazardous materials. A malfunction or accident when using add-on pollution control equipment could potentially expose people to hazardous materials, explosions, or fires. The transport, use, and storage of ammonia, both aqueous and anhydrous, (used in SCR systems) may result in a release in the event of an accident.

The potential hazards associated with alternative coating methods were analyzed in the 2005 Ozone Strategy and determined to be less than significant. The greatest hazard associated with both current and alternative coating methods is flammability.

TABLE 3.3-2

Hazardous Materials Incidents 2007

Spillsite	BAAQMD	Statewide	Percent of State Total
Waterways	172	692	25%
Transportation	549	2,873	19%
Industrial	41	217	19%
Commercial	138	910	15%
Residential	128	1,043	12%
Utilities	33	282	12%
Military	3	68	4%
Other	181	1,095	17%
Total	**1,312**	**7,767**	**17%**

Source: OES, 2009

Alternative fuels may be used to reduce emissions from both stationary source equipment and motor vehicles. The alternative fuels may included reformulated gasoline, ethanol, compressed natural gas, liquefied petroleum gas (LPG) or propane, biodiesel, and electrically charged batteries. Like conventional fossil fuels, alternative fuels may create fire hazards, explosions or accidental releases during fuel transport, storage, dispensing, and use. Electric batteries also present a fire and explosion hazards due to the presence of reactive compounds, which may be subjected to high temperatures.

Liquid Natural Gas (LNG)

Liquid Natural Gas or LNG is essentially no different from the natural gas used in homes and businesses everyday, except that it has been refrigerated to about minus 260 degrees Fahrenheit at which point it becomes a clear, colorless, and odorless liquid. As a liquid, natural gas occupies only one six-hundredth of its gaseous volume and can be transported economically (Parfomak, et al., 2003). LNG weighs slightly less than half as much as water, so it floats on water. However, when LNG comes in contact with any warmer surface such as water or air, it evaporates very rapidly ("boil"), returning to its original, gaseous volume. As the LNG vaporizes, a vapor cloud resembling ground fog will form under relatively calm atmospheric conditions. The vapor cloud is initially heavier than air since it is so cold, but as it absorbs more heat, it becomes lighter than air, rises, and can be carried away by the wind. An LNG vapor cloud cannot explode in the open atmosphere, but it could burn.

LNG is considered a hazardous material. The primary safety concerns are the potential consequences of an LNG spill. LNG hazards result from three of its properties:

- Cryogenic temperatures

- Dispersion characteristics

- Flammability characteristics

The extreme cold of LNG can directly cause injury or damage. Although momentary contact on the skin can be harmless, extended contact will cause severe freeze burns. On contact with certain metals, LNG can cause immediate cracking. Although not poisonous, exposure to the center of a vapor cloud could cause asphyxiation due to the absence of oxygen. LNG vapor clouds can ignite within the portion of the cloud where the concentration of natural gas is between a five and a 15 percent (by volume) mixture with air (CEC, 2009). To catch fire, however, this portion of the vapor cloud must encounter an ignition source. Otherwise, the LNG vapor cloud will simply dissipate into the atmosphere. An ignited LNG vapor cloud is very dangerous, because of its tremendous radiant heat output. Furthermore, as a vapor cloud continues to burn, the flame could burn back toward the evaporating pool of spilled liquid, ultimately burning the quickly evaporating natural gas immediately above the pool, giving the appearance of a "burning pool" or "pool fire." An ignited vapor cloud or a large LNG pool fire can cause extensive damage to life and property.

Spilled LNG would disperse faster on the water than on land, because water spills provide very limited opportunity for containment. Furthermore, LNG vaporizes more quickly on water, because water provides an enormous heat source. For these reasons, most analysts conclude that the risks associated with shipping, loading, and off-loading LNG are much greater than those associated with land-based storage facilities. Preventing spills and responding immediately to spills should they occur are major factors in the design of LNG facilities (CEC, 2003).

Beyond routine industrial hazards and safety considerations, LNG presents specific safety considerations. In the event of an accidental release of LNG, the safety zone around a facility protects neighboring communities from personal injury, property damage or fire (Foss, 2003). One accident that affected the public was in Cleveland, Ohio in 1944. Research stemming from the Cleveland incident has influenced safety standards used today. During the past four decades, LNG facilities have had a favorable safety record, as the LNG industry has expanded. Generally, multiple layers of protection create four critical safety conditions, all of which are integrated with a combination of industry standards and regulatory compliance. The four requirements for safety – primary containment, secondary containment, safeguard systems and separation distance, apply across the LNG value chain, from production, liquefaction and shipping, to storage and re-gasification (Foss, 2003).

Liquefied Petroleum Gas (LPG)

More than 350,000 light-and medium-duty vehicles travel the nation's highways using LPG (or LP gas), while over 4 million vehicles use it worldwide. LPG is a mixture of several gases that is generally called "propane," in reference to the mixture's chief ingredient. LPG changes to the liquid state at the moderately high pressures found in an

LPG vehicle's fuel tank. LPG is formed naturally, interspersed with deposits of petroleum and natural gas. Natural gas contains LPG, water vapor, and other impurities that must be removed before it can be transported in pipelines as a salable product. LPG processed in the U.S. is typically from natural gas purification and crude oil refining (SCAQMD, 2007).

Propane is an odorless, nonpoisonous gas that has the lowest flammability range of all alternative fuels. High concentrations of propane can displace oxygen in the air, though, causing the potential for asphyxiation. Ethyl mercaptan is an odorant that is typically added to propane to warn of the presence of gas. While LPG itself does not irritate the skin, the liquefied gas becomes very cold upon escaping from a high-pressure tank, and may therefore cause frostbite, should it contact unprotected skin. One of the main dangers with LPG is that it is highly flammable. As with gasoline, LPG can form explosive mixtures with air. Since the gas is slightly heavier than air, it may form a continuous stream that stretches a considerable distance from a leak or open container, which may lead to a flashback explosion upon contacting a source of ignition (U.S. DOE, 2003).

Propane vehicles emit about one-third fewer reactive organic gases than gasoline-fueled vehicles. Nitrogen oxide and carbon monoxide emissions are also 20 percent and 60 percent less, respectively. Unlike gasoline-fueled vehicles, there are no evaporative emissions while LPG vehicles are running or parked, because LPG fuel systems are tightly sealed. Small amounts of LPG may escape into the atmosphere during refueling, but these vapors are 50 percent less reactive than gasoline vapors, so they have less of a tendency to generate smog-forming ozone. LPG's extremely low sulfur content means that the fuel does not contribute significantly to acid rain.

Many propane vehicles are converted gasoline vehicles. The relatively inexpensive conversion kits include a regulator/vaporizer that changes liquid propane to a gaseous form and an air/fuel mixer that meters and mixes the fuel with filtered intake air before the mixture is drawn into the engine's combustion chambers. LPG vehicles additionally require a special fuel tank that is strong enough to withstand the LPG storage pressure of about 130 pounds per square inch. The gaseous nature of the fuel/air mixture in an LPG vehicle's combustion chambers eliminates the cold-start problems associated with liquid fuels. In contrast to gasoline engines, which produce high emission levels while running cold, LPG engine emissions remain similar whether the engine is cold or hot. Also, because LPG enters an engine's combustion chambers as a vapor, it does not strip oil from cylinder walls or dilute the oil when the engine is cold. This helps LPG powered engines to have a longer service life and reduced maintenance costs. Also helping in this regard is the fuel's high hydrogen-to-carbon ratio (C_3H_8), which enables propane powered vehicles to have less carbon build-up than gasoline- and diesel-powered vehicles. LPG delivers roughly the same power, acceleration, and cruising speed characteristics as gasoline. It does yield a somewhat reduced driving range, however, because it contains only about 70-75 percent of the energy content of gasoline. It's high octane rating (around 105) means, though, that an LPG engine's power output and fuel efficiency can be increased beyond what would be possible with a gasoline engine

without causing destructive "knocking." Such fine-tuning can help compensate for the fuel's lower energy density. The cost of constructing an LPG fueling station is also similar to that of a comparably sized gasoline dispensing system (SCAQMD, 2007).

Biofuels

Biomass is renewable biological material, primarily plant matter or products derived from plant matter. Sources of biomass include stalks and leaves of corn and other crops, treelimbs or vegetation removed to reduce forest fire hazards, wood chips or sawdust from lumber and paper processing, municipal solid waste (e.g., discarded wood or paper products, yard trimmings, food scraps, etc.), and grassy or woody crops grown specifically for biofuels production. Bio-fuel is a generic term for transport fuel that can be produced from renewable material of plant or animals origin and are substitutes or partial substitutes for fossil, (or mineral) fuels. Biofuels are liquid, solid, or gaseous fuels derived from renewable biological sources. Biomass can be burned directly for thermal energy or converted to other high-value energy sources including ethanol, biodiesel, methanol, hydrogen or methane. Currently, ethanol from corn grain and biodiesel are the only biofuels produced in the United States on an industrial scale (U.S. DOE, 2008).

Most of the four billion gallons of ethanol produced in 2005 came from 13 percent of the U.S. corn crop, representing a 17 percent increase in ethanol production from 2005. Ethanol is widely used as a fuel additive. The oxygen contained in ethanol improves gasoline combustibility. E10 (10% ethanol and 90% gasoline blend) is available from gas stations all over the United States. E85 (85% ethanol and 15% gasoline blend) is available mainly in corn-producing states (U.S. DOE, 2008). The capacity to produce ethanol in the United States has grown to about six billion gallons as of 2007 (FEMA, 2008).

Biodiesel is a biologically derived diesel fuel substitute created by chemically reacting vegetable oils or animal fats with alcohol. Most biodiesel in the United States comes from soybean oil or restaurant greases. Biodiesel is readily used by vehicles with diesel engines. In 2005, about 75 million gallons of biodiesel were produced, tripling the 25 million gallons produced in 2004 (U.S. DOE, 2008).

The hazards associated with polar solvents like ethanol differ from hydrocarbon fuels (i.e., gasoline and diesel). Traditional methods of fighting hydrocarbon fires have been found to be ineffective against polar solvent (ethanol-blended) fuels. While gasoline tends to float on top of water, ethanol fuels are water soluble and tend to blend with water. Alcohol-resistant foam has been recommended as a means of extinguishing ethanol fires.

Unblended ethanol and other biofuels are considered to be hazardous liquids. Ethanol is a highly flammable liquid with explosive limits in the range of 3.5 percent to 19 percent in air and a flash point of 54 degrees Fahrenheit. By comparison, the explosive range for natural gas varies between five and 15 percent in air. Substances with a flash point lower than 100 degrees Fahrenheit are considered flammable. The flash point of an ethanol

water mixture increases as ethanol is diluted with water. The flash point of an 80 percent ethnol/water mixture is about 75 degrees Fahrenheit, and for 70 percent ethanol-water mix is about 84 degrees Fahrenheit. Ethanol vapors are also combustible, heavier than air, and may form an explosive mixture when combined with air. Similar to highly volatile liquids, ethanol vapors may travel considerable distances to sources of ignition and flash back (U.S. DOT, 2007).

3.3.2 Significance Criteria

The impacts associated with hazards will be considered significant if any of the following occur:

- Non-conformance to regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection.

- Exposure to hazardous chemicals in concentrations equal to or greater than the Emergency Response Planning Guideline (ERPG) 2 levels.

3.3.3 Environmental Impacts

Table 3.3-3 lists the control measures associated with the 2010 CAP with potential hazard impacts. The potential hazard impacts include hazards associated the use of reformulated products, use of alternative fuels, and use of add-on control devices (e.g., SCRs) that may use hazardous materials as possibly increasing the potential for hazards.

Ammonia Use in SCRS

Project Specific Impacts: Proposed control measures SSM 9 – Cement Kilns; SSM 10 – Refinery Boilers and Heaters; SSM 13 – Dryers, Ovens, Kilns; SSM 14 – Glass Furnaces; MSM B-2 – Low NOx; and Retrofits for In-Use Engines may require or encourage the use of SCR to reduce NOx emissions. Ammonia or urea is used to react with the NOx, in the presence of a catalyst, to form nitrogen gas and water. In some SCR installations, anhydrous ammonia is used. Safety hazards related to the transport, storage, and handling of ammonia exist. Ammonia has acute and chronic non-cancer health effects and also contributes to ambient PM_{10} emissions under some circumstances.

On-Site Release Scenario: The use of anhydrous ammonia involves greater risk than aqueous ammonia (ammonia at concentrations of less than 20 percent) because it is stored and transported under pressure. In the event of a leak or rupture of a tank, anhydrous ammonia is released and vaporizes into the gaseous form, which is its normal state at atmospheric pressure and produces a toxic cloud. Aqueous ammonia is a liquid at ambient temperatures and gas is only produced when a liquid pool from a spill evaporates. Under current OES regulations implementing the CalARP requirements, aqueous ammonia is regulated under California Health and Safety Code Section 2770.1.

TABLE 3.3-3
Control Measures with Potential Hazard Impacts

Control Measures	Control Measure Description	Control Methodology	Hazard Impact
SSM 2	Digital Printing	Limit VOC content on inks and solvents or use VOC control equipment, e.g., carbon adsorption or afterburners.	Potential increased use of water based formulations.
SSM 9	Cement Kilns	Further control of NOx emissions through low-NOx burners retrofit or replacement or use of SCR. Reduce SOx emissions using wet gas scrubber.	SCR to control NOx could result in ammonia hazard impacts.
SSM 10	Refinery Boilers and Heaters	Further control of NOx emissions through low-NOx burners retrofit or replacement or use of SCR.	SCR to control NOx could result in ammonia hazard impacts.
SSM 13	Dryers, Ovens, Kilns	Further control of NOx through low-NOx burners retrofit or replacement.	SCR to control NOx could result in ammonia hazard impacts.
SSM 14	Glass Furnaces	Further NOx control through alternative combustion techniques or add-on control equipment.	SCR to control NOx could result in ammonia hazard impacts.
MSM A-1	Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles	Expand the use of Super Ultra-Low Emission (SULEV) and partial zero (ZEV) emissions vehicles and trucks. Encourage use of renewable fuels.	The use of alternative fuels and fuel additives can result in hazard impacts. Production of alternative fuels could increase hazards.
MSM A-3	Green Fleets for Light, Medium & Heavy-Duty Vehicles	Promote SULEV and ZEV vehicles, accelerated retirement of older vehicles, Encourage use of renewable fuels.	Increase emissions from electricity use. Production of renewable fuels could increase hazards.
MSM B-2	Low NOx Retrofits for In-Use Engines	Accelerated turnover of existing equipment, retrofit of existing equipment with add-on controls, e.g., NOx absorbers, exhaust gas recirculation, and SCRs.	SCR to control NOx could result in ammonia hazard impacts.
MSM C-1	Construction and Farming Equipment	Accelerated turnover of existing equipment, retrofit of existing equipment with add-on controls, e.g., PM filters. Use of alternative fuels and renewable diesel fuels.	The use of alternative fuels and fuel additives can result in hazard impacts. Production of alternative fuels could increase hazards.
LUM 1	Goods Movement	Reduce diesel emissions through shore-side power for ships, improvements in the efficiency of engine drive trains, and other measures.	The use of alternative fuels and fuel additives can result in hazard impacts. Production of alternative fuels could increase hazards.

TABLE 3.3-3 (concluded)

Control Measures	Control Measure Description	Control Methodology	Hazard Impact
LUM 2	Indirect Source Review Rule	Measures to reduce construction and vehicular emissions could include accelerated turnover of existing equipment, fees, retrofit of existing equipment, use of renewable fuels, and increase use of SULEV or ZEV vehicles.	The use of alternative fuels and fuel additives can result in hazard impacts. Production of alternative fuels could increase hazards.
LUM 3	Enhanced CEQA Program	Additional mitigation measures could be imposed which could encourage accelerated turnover of existing equipment, fees, retrofit of existing equipment, use of renewable fuels, and increase use of SULEV or ZEV vehicles.	The use of alternative fuels and fuel additives can result in hazard impacts. Production of alternative fuels could increase hazards.
LUM 4	Land Use Guidelines	Additional measures could be imposed which could encourage accelerated turnover of existing equipment, fees, retrofit of existing equipment, use of renewable fuels, and increase use of SULEV or ZEV vehicles.	The use of alternative fuels and fuel additives can result in hazard impacts. Production of alternative fuels could increase hazards.

Some of the control measures would require the increased use and storage of ammonia. Cement kilns, refinery boilers and heaters, dryers, ovens and kilns may be required or choose to use SCRs to comply with regulations that may be developed from the proposed 2010 CAP control measures. All of these are industrial and commercial facilities, and are expected to be located in industrial/commercial zones. However, the use and storage of anhydrous ammonia would be expected to result in significant hazard impacts as there is the potential for anhydrous ammonia to migrate off-site and expose individuals to concentrations of ammonia that could lead to adverse health impacts. Anhydrous ammonia would be expected to form a vapor cloud (since anhydrous ammonia is a gas at standard temperature and pressure) and migrate from the point of release. The number of people exposed and the distance that the cloud would travel would depend on the meteorological conditions present. Depending on the location of the spill, a number of individuals could be exposed to high concentrations of ammonia resulting in potentially significant impacts.

In the event of an aqueous ammonia release, the ammonia solution would have to pool and spread out over a flat surface in order to create sufficient evaporation to produce a significant vapor cloud. For a release from on-site vessels or storage tanks, spills would be released into a containment area, which would limit the surface area of the spill and the subsequent toxic emissions. The containment area would limit the potential pool size,

minimizing the amount of spilled material that would evaporate, form a vapor cloud, and impact residences or other sensitive receptors in the area of the spill. Significant hazard impacts associated with a release of aqueous ammonia would not be expected.

Transportation Release Scenario: Use and transport of anhydrous ammonia involves greater risk than aqueous ammonia because it is stored and transported under pressure. In the event of a leak or rupture of a tank, anhydrous ammonia is released and vaporizes into the gaseous form, which is its normal state at atmospheric temperature and pressure, and produces a toxic cloud. Aqueous ammonia is a liquid at ambient temperatures and pressure, and gas is only produced when a liquid pool from a spill evaporates. Deliveries of ammonia would be made to each facility by tanker truck via public roads. The maximum capacity of a tanker truck is 150 barrels. Regulations for the transport of hazardous materials by public highway are described in 49 Code of Federal Regulations (CFR) 173 and 177. Nineteen percent aqueous ammonia is considered a hazardous material under 49 CFR 172.

Although trucking of ammonia and other hazardous materials is regulated for safety by the U.S. Department of Transportation, there is a possibility that a tanker truck could be involved in an accident spilling its contents. The factors that enter into accident statistics include distance traveled and type of vehicle or transportation system. Factors affecting automobiles and truck transportation accidents include the type of roadway, presence of road hazards, vehicle type, maintenance and physical condition, and driver training. A common reference frequently used in measuring risk of an accident is the number of accidents per million miles traveled. Complicating the assessment of risk is the fact that some accidents can cause significant damage without injury or fatality.

The actual occurrence of an accidental release of a hazardous material cannot be predicted. The location of an accident or whether sensitive populations would be present in the immediate vicinity also cannot be identified. In general, the shortest and most direct route that takes the least amount of time would have the least risk of an accident. Hazardous material transporters do not routinely avoid populated areas along their routes, although they generally use approved truck routes that take population densities and sensitive populations into account.

The hazards associated with the transport of regulated (CCR Title 19, Division 2, Chapter 4.5 or the CalARP requirements) hazardous materials, including ammonia, would include the potential exposure of numerous individuals in the event of an accident that would lead to a spill. Factors such as amount transported, wind speed, ambient temperatures, route traveled, and distance to sensitive receptors are considered when determining the consequence of a hazardous material spill.

In the unlikely event that the tanker truck would rupture and release the entire 150 barrels of aqueous ammonia, the ammonia solution would have to pool and spread out over a flat surface in order to create sufficient evaporation to produce a significant vapor cloud. For a road accident, the roads are usually graded and channeled to prevent water accumulation and a spill would be channeled to a low spot or drainage system, which

would limit the surface area of the spill and the subsequent toxic emissions. Additionally, the roadside surfaces may not be paved and may absorb some of the spill. Without this pooling effect on an impervious surface, the spilled ammonia would not evaporate into a toxic cloud and impact residences or other sensitive receptors in the area of the spill. An accidental aqueous ammonia spill occurring during transport is, therefore, not expected to have significant impacts.

In the unlikely event that a tanker truck would rupture and release the entire contents of anhydrous ammonia, the ammonia would be expected to form a vapor cloud (since anhydrous ammonia is a gas at standard temperature and pressure) and migrate from the point of release. There are federal, State and local agencies with jurisdiction over hazardous materials and waste are responsible for ensuring that hazardous materials and waste handling activities are conducted in accordance with applicable laws and regulations. While compliance with these laws and regulations will minimize the chance of an accidental release of anhydrous ammonia, the potential will still exist that an unplanned release could occur. The number of people exposed and the distance that the cloud would travel would depend on the meteorological conditions present. Depending on the location of the spill, a number of individuals could be exposed to high concentrations of ammonia resulting in potentially significant impacts.

Conclusion: Based on the above evaluation and significance criteria, the hazard impacts associated with the use and transport of aqueous ammonia are less than significant. The hazard impacts associated with the use and transport of anhydrous ammonia are potentially significant.

Project-Specific Mitigation: Based upon the preceding information, the use of aqueous ammonia (ammonia at concentrations of less than 20 percent) hazards would mitigate the potentially significant impacts associated with anhydrous ammonia.

Use of Alternative Fuels

The 2010 CAP would establish incentive programs that may require or promote the use of alternative fuels, including control measures MSM A-1, MSM C-1, LUM 1, LUM 2, LUM 3, and LUM 4. Use of alternative fuels in place of conventional fuels may present a potential safety issue due to the increased transport, use, and handling of alternative fuels. Most of the alternative fuels are flammable and increased use could result in increased hazards associated with their transport and use, particularly in mobile sources.

Biofuels

The hazards related to biofuels are primarily associated with the fuel produced from renewable materials, which are primarily methanol and ethanol at this time, and not the material from which the fuels are produced (e.g., corn, wood chips, vegetation, etc.). Therefore, the hazard impacts associated with biofuels will be limited to the discussion of methanol and ethanol.

Methanol or methyl alcohol can be produced from natural gas, coal or biomass. Methanol is mainly produced from natural gas. The methanol fuel that is most widely used currently is M85, a mixture of 85 percent methanol and 15 percent unleaded gasoline. Pure methanol burns with an invisible flame, so gasoline is often added as a safety measure to produce a visible flame in case of fire. M100, consisting of 100 percent methanol, may increasingly be used for low emission methanol powered vehicles, but M85 is the more likely fuel of choice for safety reasons.

Ethanol or ethyl alcohol used for the production of fuels is primarily from corn. Ethanol is a highly flammable liquid with explosive limits in the range of 3.5 to 19 percent in air and a flash point of 54 degrees Fahrenheit. Ethanol vapors are also combustible, heavier than air, and may form an explosive mixture when combined with air.

Project-Specific Impacts: The energy content of methanol and ethanol is lower than gasoline or diesel fuel. Based on energy, about 1.68 gallons of M85 methanol is equal to one gallon of gasoline. Compared to one gallon of diesel the fuel equivalent for M85 is 2.3. Based on energy, about 1.4 gallons of ethanol would be equal one gallon of gasoline (U.S. DOE, 2008). This requires larger fuel tanks in a methanol vehicle to achieve the same range as a gasoline- or diesel-powered vehicle. It would also require about 68 (gasoline) to 130 (diesel) percent more tanker deliveries to supply refueling stations with the same available energy as conventional fuels. Since the probability of accidents is related to the miles traveled, about 68 to 130 percent more delivery accidents can be expected with methanol than conventional fuels (assuming that they are delivered from similar source locations in similar sized tankers). However, the truck accident rate is small, on the order of one accident per five million miles traveled and the accident rate with chemical releases is even less, so this would not be a significant risk factor.

Methanol and ethanol are more corrosive to rubber and plastic parts than gasoline and diesel fuel, which requires that parts more tolerant to such corrosion be incorporated into vehicles and refueling stations. Methanol-fueled vehicles also require a special (more expensive) lubricant with additives that enhance acid neutralization.

Compared with diesel fuel and gasoline the following can be stated:

- Diesel fuel and gasoline contain components that are considerably more hazardous than methanol and ethanol. For example, diesel fuel contains highly toxic polycyclic aromatic hydrocarbons (PAHs) and gasoline contains an array of toxic compounds, including benzene, a known carcinogen;

- Diesel fuel and gasoline vapors are heavier than air (for a specific gravity of air equal to one, gasoline is 3.4 and diesel is greater than 4). Methanol and ethanol are heavier than air but lighter (specific gravity is 1.11 for methanol) than gasoline and diesel fuel and disperses more readily in air than gasoline or diesel fuel;

- Methanol and ethanol have a higher auto ignition temperature (800 degrees Fahrenheit [^{o}F] and 780^{o}F, respectively) than diesel fuel (500 ^{o}F) or gasoline (500 ^{o}F);

- Methanol and ethanol are more difficult to ignite since they have a "lower flammability limit" that is higher (5.5 percent and 3.5 percent, respectively) than gasoline (approximately one percent) or diesel fuel (0.5 percent);

- Unlike gasoline, methanol and ethanol can ignite in enclosed spaces such as fuel tanks since the upper flammability limit is 15 percent for methanol and about 19 percent for ethanol and they are slightly heavier than air. For gasoline in a confined space, the vapor concentration exceeds the higher flammability limit (7.6 percent) and is therefore too high to ignite in the tank. Modifications such as materials inside the fuel tank that can arrest and quench flame propagation and modifications to isolate the tank from sparks and ignition sources are required to avoid ignition in the fuel tanks; and,

- In case of fire, methanol and ethanol can be extinguished with water while water on gasoline or diesel fuel spreads the fire.

There was a great deal of interest in the use of methanol as a motor fuel in the 1970's because of the oil crises that occurred at that time. Methanol was generally readily available at low cost. However, problems occurred early in the development of methanol-gasoline blends due to improper blending and handling techniques. These problems led to consumer and media problems, which hindered continued interest in the use of methanol as a vehicle fuel. Consequently, it is not expected that methanol use will increase substantially. On the other hand, ethanol is commonly used in gasoline blends in most parts of the United States with about six billion gallons used in 2007 (FEMA, 2008) and its use is expected to rise.

Conclusion: Based upon the preceding information, hazards associated with methanol and ethanol (and therefore biofuels) are approximately equivalent or less compared to gasoline and diesel. Therefore, slightly increased usage of methanol or ethanol along with a concurrent decline in usage of gasoline and diesel will not significantly alter existing hazards associated with mobile source fuels. Consequently, increased usage of biofuels is not expected to generate significant adverse hazard impacts.

Project-Specific Mitigation: Increased usage of biofuels is not expected to generate significant adverse hazard impacts so no mitigation measures are required.

Compressed Natural Gas

Natural gas is a mixture of hydrocarbons, mainly methane, that are in gaseous form at ambient temperature and pressure. Natural gas can be compressed to increase its density, and in compressed form it contains a high enough fuel value that it can be used as a fuel

for motor vehicles. Typical on-board pressures for CNG range from 3,000 to 3,600 pounds per square inch gauge (psig).

Project-Specific Impacts: Compared with diesel fuel and gasoline the following can be stated:

- Diesel fuel and gasoline are toxic to the skin and lungs and CNG is not;
- Diesel fuel and gasoline vapors are heavier than air (for specific gravity of air equal to one, gasoline is 3.4 and diesel fuel is greater than 4). CNG is lighter than air (specific gravity is 0.55) and disperses more readily in air;
- CNG has a higher autoignition temperature (1,200 ^{o}F) than diesel fuel (500 ^{o}F) or gasoline (500 ^{o}F);
- CNG is more difficult to ignite since it has a "lower flammability limit" that is higher (5.3 percent) than gasoline (one percent) or diesel fuel (0.5 percent); and,
- Natural gas can be directly shipped via pipelines to the compressor station, rather than by on-road delivery trucks, and has less delivery accident risk than vehicle shipments.

The compressed natural gas cylinders in vehicles are built to rigorous quality standards (Standards for CNG Vehicular Fuel Systems are specified in NFPA 52). CNG fuel tanks are made of one-half to three-quarter inch aluminum or steel and have been shown to be safer than conventional gasoline tanks in accidents. In collisions, gasoline-fueled vehicles have a much higher rate of fuel leakage and fires than CNG-fueled vehicles (SAE, 1995). If a sudden release of CNG were to occur, the gas tends to disperse rather than pooling or forming a vapor cloud like gasoline. Due to the high ignition temperature of CNG, the risk of fire is lower than gasoline and comparable to diesel fuel.

CNG bottles are typically stored above ground as opposed to below ground for gasoline or diesel fuel tanks. As such, there is a risk of vehicles colliding with the bottles causing a gas release. This can generally be mitigated by installation of curbing and bollards to protect the tanks from vehicle operations.

Conclusion: Based upon the preceding information, hazards associated with CNG are approximately equivalent or less compared to gasoline and diesel. Therefore, increased usage of CNG with a concurrent decline in usage of gasoline and diesel will not significantly alter existing hazards associated with mobile source fuels. Consequently, increased usage of CNG is not expected to generate significant adverse hazard impacts.

Project-Specific Mitigation: Increased usage of CNG is not expected to generate significant adverse hazard impacts so no mitigation measures are required.

Liquefied Natural Gas

Natural gas can be liquefied by refrigerating it to below -161.5 degrees Celsius or -259 ^{o}F at atmospheric pressure. Once liquefied, LNG is much more compact, occupying only 1/600th of its gaseous volume (Parfomak, et al., 2003). This makes it more economical to ship over long distances and to use in heavy-duty vehicles. LNG is usually shipped in refrigerated trucks to user locations. LNG fueling stations consist of an above-ground storage tank and insulation systems. Typical storage tanks are 30,000 to 70,000 gallons in capacity. Suppliers usually refill them in 10,000-gallon increments. The inner tank is stainless steel and is surrounded by an outer carbon steel tank that forms about a four-inch annulus around the tank. The annulus is evacuated and filled with pearlite insulation. Two pressure safety valves (PSVs) set at 80 psig and 100 psig to protect the inner tank. The outer jacket is also protected in case of an inner jacket leak (SCAQMD, 2007).

Project-Specific Impacts: The energy content of a gallon of LNG is lower than a gallon of diesel fuel (2.1 gallons of LNG have the same fuel value as one gallon of diesel fuel). This requires larger fuel tanks in an LNG-fueled vehicle to achieve the same driving range as a diesel powered vehicle. It would also require about 110 percent more tanker deliveries to supply refueling stations with the same available energy as diesel fuel. Since the probability of accidents is related to the miles traveled, about 110 percent more delivery accidents can be expected with LNG than with diesel fuel (assuming that they are delivered from similar source locations in similar sized tankers), the miles traveled are probably much greater than for diesel fuel deliveries. However, the national truck accident rate is small (on the order of one accident per five million miles traveled) and the accident rate with chemical releases is even less, so this would not be a controlling risk factor (SCAQMD, 2007).

Other safety issues associated with LNG are similar to those discussed previously for CNG, with the added hazards associated with handling a cryogenic liquid. The hazards posed by the use of LNG versus gasoline and diesel fuel are:

- Diesel fuel and gasoline are toxic to the skin and lungs and natural gas is not;
- Diesel fuel and gasoline vapors are heavier than air (for specific gravity of air equal to one, gasoline is 3.4, diesel is greater than 4). Natural gas is lighter than air (specific gravity is 0.55) and disperses more readily in air;
- Natural gas has a higher autoignition temperature (1,200 ^{o}F) than diesel (500 ^{o}F) or gasoline (500 ^{o}F). Natural gas is more difficult to ignite since it has a "lower flammability limit" that is higher (5.3 percent) than gasoline (one percent) or diesel fuel (0.5 percent);
- Cryogenic liquids have the potential risk to workers of burns (frost-bite) that can be suffered if workers come in contact with the liquid or with surfaces that are not insulated. Proper safety equipment and training can minimize these hazards; and,

- Since LNG is a cryogenic liquid, in the event of a release from an aboveground storage tank or tanker truck, a fraction of the liquid immediately flashes off to gas while the remainder will pool and boil violently emitting dense vapor. The liquid transitions to dense vapor and the dense vapor transitions to gas as the liquid and vapor draw heat from the surroundings. If a source of ignition is present, the boiling liquid, vapor cloud and gas could explode and burn, threatening surrounding facilities and other storage vessels.

The safety record of LNG-fueled vehicles is not as well established as that of CNG-fueled vehicles, due to the much smaller number of LNG-fueled vehicles in use. If spilled, however, the vapor cloud above the LNG pool is very difficult to ignite, due to the narrow range of flammability of natural gas vapor.

One of the major concerns with the use of LNG-fueled vehicles is the possibility that excess vapor pressure might be vented in an enclosed area, such as a parking garage, possibly causing an explosion. Fuel tanks of inactive vehicles can store LNG up to eight to ten days without pressure relief valves being activated. Inactive vehicles left enclosed for long periods of time could pose problems.

Conclusion: Based upon the preceding information, hazards associated with LNG are approximately equivalent or less compared to gasoline and diesel. Therefore, increased usage of LNG with a concurrent decline in usage of gasoline and diesel will not significantly alter existing hazards associated with mobile source fuels. Consequently, increased usage of LNG is not expected to generate significant adverse hazard impacts.

Project-Specific Mitigation: Increased usage of LNG is not expected to generate significant adverse hazard impacts so no mitigation measures are required.

Liquefied Petroleum Gas

LPG consists mainly of propane, propylene, butane, and butylene in various mixtures. For LPG fuels in the United States, the mixture is mainly propane. It is produced as a by-product of natural gas processing and petroleum refining. Propane is a liquid at -42.1 ^{o}F and atmospheric pressure. At about 80 ^{o}F and a pressure of about 150 psig, propane can be stored as a liquid. LPG is stored in tanks that typically range from 12,000 gallons to 120,000 gallons. Transports carry 8,000 to 11,000 gallons and rail cars range from 11,000 to 34,500 gallons.

Project-Specific Impacts: The energy content of a gallon of LPG is lower than a gallon of gasoline (based on energy content, about 1.36 gallons of LPG are equal to a gallon of gasoline). Compared to one gallon of diesel the fuel equivalent for LPG is 1.86. This requires larger fuel tanks in a methanol vehicle to achieve the same range as a gasoline- or diesel-powered vehicle. It would also require about 36 (gasoline) to 86 (diesel) percent more tanker deliveries to supply refueling stations with the same available energy as conventional fuels. Since the probability of accidents is related to the miles traveled,

about 36 to 86 percent more delivery accidents can be expected with LPG than conventional fuels (assuming that they are delivered from similar source locations in similar sized tankers). However, the national truck accident rate is small (on the order of one accident per five million miles traveled) and the accident rate with chemical releases is even less, so this would not be a significant risk factor.

Compared with diesel fuel and gasoline the following can be stated:

- Diesel fuel and gasoline are toxic to the skin and lungs and propane is not;
- Diesel fuel gasoline vapors are heavier than air (for specific gravity of air equal to one, gasoline is 3.4, diesel fuel is 4.0). LPG is lighter than gasoline and diesel fuel but heavier than air (specific gravity is 1.52). It disperses more readily in air than gasoline or diesel fuel;
- LPG has a higher autoignition temperature (920 ^{o}F) than diesel fuel (500 ^{o}F) or gasoline (500 ^{o}F);
- LPG is more difficult to ignite since it has a "lower flammability limit" that is higher (2.0 percent) than gasoline (one percent) or diesel fuel (0.5 percent).

LPG is generally stored in above ground tanks. In case of a rupture, there is the potential for the gas to pool and boil off. This presents the possibility of a boiling liquid, vapor cloud explosion and fire with potential consequences to nearby structures and other storage tanks. NFPA 58 Code specifies the separation distances required between various sized LPG tanks. LPG poses a somewhat greater safety risk than CNG, but lower than gasoline. Unlike natural gas, LPG vapors are heavier than air, so that leaks from the fuel system tend to pool at ground level rather than disperse. The flammability limits of LPG vapor in air are also broader than those for natural gas.

Conclusion: Based upon the preceding information, hazards associated with LPG are approximately equivalent or less compared to gasoline and diesel. Therefore, increased usage of LPG with a concurrent decline in usage of gasoline and diesel will not significantly alter existing hazards associated with mobile source fuels. Consequently, increased usage of LPG is not expected to generate significant adverse hazard impacts.

Project-Specific Mitigation: Increased usage of LPG is not expected to generate significant adverse hazard impacts so no mitigation measures are required.

Hydrogen

Hydrogen-fueled cars are not currently commercially available, but hydrogen can also be used to power mobile sources. In the 1950's, the National Aeronautics and Space Administration (NASA) began using hydrogen as a fuel. Hydrogen is the simplest, lightest and most plentiful element in the universe. In its normal gaseous state, hydrogen is a colorless, odorless, tasteless, non-toxic gas that burns invisibly. Most hydrogen is

made from natural gas through a process known as reforming. Reforming separates hydrogen from hydrocarbons by adding heat. Hydrogen can also be produced from a variety of sources including water and biomass. About 160 hydrogen vehicles are being used in demonstration programs in California, including vehicles in some specific fleets and buses. Hydrogen would be stored in above ground vessels. Hydrogen holds more energy per unit mass than other fuels. One kilogram of hydrogen contains as much energy (114,000 Btu LHV) as a gallon of gasoline, which weighs 2.7 kilograms (CEC, 2006r).

Project-Specific Impacts: Fuel cells using hydrogen are two to three times more efficient than an internal combustion engine using gasoline or natural gas. Some researchers claim that a fuel economy improvement of a hybrid hydrogen vehicle with a factor of 1.7 over conventional gasoline vehicles should be attributed to hydrogen-fueled vehicles. Others argue that the improvement from a comparable vehicle is only 1.1 over gasoline because hydrogen vehicles would require larger engines and fuel tanks to achieve the same performance and range as gasoline vehicles. A 2.0 improvement for hydrogen fuel cell vehicles has been estimated (CEC, 2006r). Therefore, fewer truck deliveries to supply refueling stations with hydrogen are expected to provide the same available energy as conventional fuels. Since the probability of accidents is related to the miles traveled, fewer accidents are expected using hydrogen than conventional fuels (assuming that they are delivered from similar source locations in similar sized tankers). However, the national truck accident rate is small (on the order of one accident per five million miles traveled) and the accident rate with chemical releases is even less, so this would not be a significant risk factor.

Hydrogen is not more dangerous than other fuels. Hydrogen's hazards are usually managed easier than hydrocarbon fuels because hydrogen is lighter than air, and it burns upward and disperses. Hydrogen can cause brittleness in some material, including metals, and can generate electrostatic charges and sparks through flow or agitation (CEC, 2006r).

Compared with diesel fuel and gasoline the following can be stated:

- Diesel fuel and gasoline are toxic to the skin and lungs and hydrogen is non-toxic and non-reactive, so if released, it does not present a health hazard to humans;

- Diesel fuel gasoline vapors are heavier than air (for specific gravity of air equal to one, gasoline is 3.4, diesel fuel is 4.0). Hydrogen is 14 times lighter than air. If released it quickly dissipates into the atmosphere.

- Hydrogen has an extremely low ignition energy requirement, about 20 microjoules can ignite a hydrogen/air mixture, which is about 10 times less than what is required to ignite a gasoline/air mixture;

- Hydrogen is clear, odorless, and tasteless. It burns with an extremely hot, but nonluminous flame which is difficult to see. The flame of burning hydrogen has few warning properties.

- Hydrogen has an usually large flammability range and can form ignitable mixtures between four and 75 percent by volume in air. Given confinement and good mixing, hydrogen can be detonated over the range of 18 to 59 percent by volume in air.

The use of hydrogen has raised some concerns over the possible accumulation of hydrogen near the ceilings of enclosed spaces. Current indications are that relatively minor mitigation such as hydrogen sensors, assurance of positive ventilation and avoidance of ceiling-area entrapments will be sufficient in enclosed garages and repair facilities. In parking structures, existing ventilation standards may prove adequate, particularly in structures with open sides. In home garages, a passive above-door vent may suffice (CCFP, 2001).

Local fire officials in locales such as Sacramento, where hydrogen prototype vehicles are being used have begun to address the hydrogen safety issue for emergency response training and operations. The principal concerns associated with compressed hydrogen include flame invisibility, lack of radiant heat, and fire suppression difficulty. These challenges have been handled by familiarizing emergency response personnel with the characteristics of hydrogen. Emergency procedures are expected to evolve into standardized codes before any commercialization begins. Such procedures are expected to cover both vehicle and structure fires involving hydrogen, including fueling sites.

Conclusion: Based upon the preceding information, hazards associated with hydrogen are not greater than gasoline and diesel. However, procedures are expected to evolve into standardized codes before commercialization begins. Therefore, increased usage of hydrogen with a concurrent decline in usage of gasoline and diesel will not significantly alter existing hazards associated with mobile source fuels. Consequently, increased usage of hydrogen is not expected to generate significant adverse hazard impacts.

Project-Specific Mitigation: Increased usage of hydrogen is not expected to generate significant adverse hazard impacts so no mitigation measures are required.

Electric and Hybrid Vehicles Powered Vehicles

Electricity used to power vehicles is commonly provided by batteries, but fuel cells are also an emerging competitor. Batteries are energy storage devices and fuel cells convert chemical energy to electricity. Commercially available electric vehicles (EVs) are mostly battery-powered at the current time. The following discussion concentrates therefore on battery powered EVs.

Project-Specific Impacts: In 1996, the International Center for Technology Assessment (ICTA) conducted a comprehensive review of the safety concerns associated with the use

of EVs. ICTA evaluated what it considered to be the four most pressing safety considerations associated with the use of EVs, which include hydrogen offgassing, electrolyte spillage, electric shock, and exposure to toxic fumes. First, the ICTA found that hydrogen offgassing risks are not present in the three types of batteries likely to be used in EVs. In fact, in these three battery technologies hydrogen gas is not released as part of the chemical processes, which take place during normal operation. Additionally, the risk of hydrogen emissions during stressful conditions has been virtually eliminated by the use of seals and proper valve regulation. Finally, the National Electric Code's (NEC's) and the Society of Automotive Engineers (SAE) recommended safety practices and guidelines for the operation and maintenance of EVs, which is expected under the proposed project, eliminates any hydrogen gas risk during EV battery recharging (ICTA, 1996).

Second, the ICTA found that EV batteries do not present a serious risk of burns from electrolyte spillage. While electrolyte leakage presents a risk in today's internal combustion engine (ICE) vehicles because of their use of flooded lead acid batteries, most EVs use batteries that are sealed, maintenance-free, and use either starved or gelled electrolyte. Moreover, the SAE, in conjunction with existing federal safety standards, has established standards that regulate the amount of electrolyte allowed to escape during an EV accident. As a result of these battery technologies and the SAE efforts, the amount of electrolyte that can escape during a battery broken by accident has been minimized to the point of providing EV users extreme safety (ICTA, 1996).

Third, the ICTA found that the risk of electric shock from EV use and charging has been thoroughly addressed and poses minimal safety risk. In fact, the entire design of EVs has been premised around minimizing electrical hazards. The high voltage circuits in current EV designs are self-contained and entirely isolated from the passenger compartment, other electric conductors on board the vehicle, and from the vehicle chassis itself (unlike the battery in a conventional ICE vehicle, which uses the frame as grounding). EVs further isolate sources of electricity by using automatic disconnection devices in the event of a malfunction to disconnect the main propulsion battery from all electrical components in the vehicle. Finally, the SAE and manufacturers have worked closely to ensure that the NEC provides for the safe use of both conductive and inductive EV charging systems (ICTA, 1996).

Fourth, the ICTA found that the configuration of modern EV batteries virtually eliminates the risk of exposure to toxic and hazardous materials during normal operating conditions. By isolating batteries and battery packs from the rest of a vehicle operating system, designers have limited the chance of fire causing batteries to release toxic fumes. Moreover, crash tests and direct combustion attempts have indicated that batteries themselves are virtually non-flammable. In addition, U.S. OSHA has set strict standards to ensure that battery manufacturers do not expose workers to harmful doses of toxic or carcinogenic materials during manufacture (ICTA, 1996).

Overall, the ICTA's findings support the view that the widespread adoption of EVs will result in a significantly safer fleet of vehicles than the gasoline- or diesel-fueled ICEs

currently in use (ICTA, 1996). Given the ICTA's findings on EV safety, significant hazards risks are not expected from using this technology.

Summary of Alternative Fuels Hazard Impacts: Conventional fuels, such as gasoline and diesel fuel, have been used since the introduction of the ICE, and their associated hazards are well known. The alternative clean-fuels discussed in this section pose different hazards during storage, handling, transport, and use than conventional fuels. In general, the hazards posed by the conversion to alternative clean fuels appear no greater than those posed by conventional fuels, particularly when compared to gasoline. Hazards due to fuel leakage are lower due to the lower vapor densities, higher autoignition temperatures, and the higher "Lower Flammability Limits" of the clean fuels compared to gasoline. The hazards posed by the use of alternative clean fuels that may be slightly higher than those posed by the conventional fuels in the following areas:

Methanol - Unlike gasoline or diesel, methanol can ignite in confined spaces due to its high upper flammability limit, which exceeds its saturated vapor concentration.

CNG - The main additional hazard associated with the use of CNG versus conventional fuels is the exposure to high pressures employed during storage, dispensing, and operations. Due to these high pressures, a large amount of gas could escape in a short amount of time and, if present under flammable conditions, could explode in the presence of an ignition source. Another potentially significant hazard is a release of natural gas during vehicle maintenance.

LNG - The main additional hazard associated with the use of LNG versus conventional fuels are personal injuries from contact with a cryogenic liquid and the potential for a large fire stemming from release in the case of an accident (e.g. a tanker truck accident or storage tank failure). Another potentially significant hazard is a release of natural gas during vehicle maintenance.

LPG - The main additional hazard associated with the use of LPG versus conventional fuels is the potentiality of a large fire stemming from a release in the case of an accident (e.g., a tanker truck accident). Another potentially significant hazard is a release of propane gas during vehicle maintenance.

Hydrogen – The main additional hazard associated with the use of hydrogen versus conventional fuels is the difficulty in seeing hydrogen fires and the potential of a large fire stemming from a release in the case of an accident (e.g., a tanker truck accident). Another potentially significant hazard is a release of hydrogen in an enclosed space, e.g., garage or vehicle maintenance facility.

EV and Hybrid Vehicles- Specific safety issues involving EV technology revealed no potentially significant risks in utilizing this technology. Overall, the widespread adoption of EVs will result in a significantly safer fleet of vehicles than the gasoline- and diesel-fuel powered ICEs currently in use.

There are various existing regulations and recommended safety procedures that, when employed, will reduce any slightly higher insignificant hazards associated with use of alternative clean fuels to the same or lower level as conventional fuels. Table 3.3-2 summarizes some of the regulations and safety procedures associated with use of alternative clean fuels.

Therefore, when affected vehicle owners and maintenance personnel comply with existing regulations and recommended safety procedures, hazards impacts associated with the use of alternative clean-fuels will be the same or less than those of conventional fuels. Accordingly, significant hazards impacts are not expected from the implementation of the proposed fleet vehicle rules and related amendments.

Use of alternative fuels will require additional knowledge and training of owners/operators of fueling stations regarding maintaining and operating alternative fuel refueling stations and emergency responders. Further, as use of alternative fuels increases in the district, use of conventional fuels such as gasoline and diesel will decline. As a result, explosion and flammability hazards associated with conventional fuels will also decline. In addition, hazards and hazardous clean-up associated with accidental releases of conventional fuels, especially diesel, are essentially eliminated with increasing use of alternative fuels.

Conclusion: When users of alternative fuels comply with existing regulations and recommended safety procedures, hazards impacts associated with the use of alternative clean-fuels will be the same or less than those of conventional fuels. Accordingly, hazards impacts from the increased use of alternative fuels are expected to be similar to or less than hazards associated with conventional fuels. Therefore, significant hazard impacts are not expected from the increased use of alternative fuels.

Project-Specific Mitigation: Increased usage of alternative is not expected to generate significant adverse hazard impacts so no mitigation measures are required.

Use of Fuel Additives

Project-Specific Impacts: Mobile Source Control Measures MSM A-1 and C-1 could encourage the use of fuel additives to provide emission reductions. In the past, the introduction of fuel additives into gasoline has resulted in environmental impacts, e.g., lead and MTBE. Before proposing rules requiring fuel additives, federal regulations require that the additives be evaluated for their toxic effects. The additives need to be evaluated for their potential health impacts associated with exposure, secondary air impacts (including generation of toxic air contaminants), hazard impacts, impacts on water quality, and any other potential environmental impacts that could occur. These studies are required prior to approving the additives to be used in any fuel and require that the benefits of the additive (e.g., emission reductions) outweigh any of the negative impacts associated with the additive.

TABLE 3.3-4

Summary of Hazards and Existing Safety Regulations/Procedures Associated with Alternative Clean-Fuels

Fuel Type	Hazard	Regulation/Procedure
Methanol	Methanol can ignite in enclosed spaces such as fuel tanks since its upper flammability limit is 15 percent and it is slightly heavier than air.	Modifications such as materials inside the fuel tank that can arrest and quench flame propagation and modifications to isolate the tank from sparks and ignition sources are required to avoid ignition in the fuel tanks.
CNG	CNG bottles are typically stored outside and are required to be above ground (NFPA 52) as opposed to below ground for gasoline or diesel tanks. There is a risk of vehicles colliding with the bottles causing a gas release.	Collisions can be mitigated by installation of curbing and bollards to protect the tanks from vehicle operations (LAFC57.42.16).
	Releasing gas in a maintenance shop can potentially create explosive hazards.	Installation of methane detection systems in the shop can provide early detection of leaks and alert the maintenance personnel. (If integrated with vent systems, vents are not required to operate continuously - CFC 2903.2.5). Ignition sources can be reduced/eliminated by ensuring that all electrical systems in the shop are explosion proof (smoking and open flames are prohibited under CFC 2901.7). Providing adequate ventilation can prevent the occurrence of explosive conditions (required under CFC 2903.1). Procedures can be established to ensure that all vehicles requiring maintenance are defueled and depressurized before admission to the maintenance depot.
LNG	LNG is a cryogenic liquid and has the potential risk to workers of burns (frostbite) that can be suffered if workers come in contact with the liquid or with surfaces that are not insulated.	Proper safety equipment and training can mitigate these hazards.
	LNG is generally stored above ground. Since it is a cryogenic liquid, in the event of a release, a fraction of the liquid immediately flashes off to gas while the majority of the remainder will pool and boil violently emitting dense vapor. If a source of ignition is present, the boiling liquid, dense vapor and gas could explode and burn threatening surrounding facilities and other storage vessels.	Tanks can be protected by containment dikes (required if neighboring tanks can be affected LAFC57.42.11) and physically separated LAFC57.42.10) so that they do not interact in case of a fire or explosion. Deluge systems can be installed to cool neighboring tanks in case of a fire.

TABLE 3.3-4 (concluded)

Summary of Hazards and Existing Safety Regulations/Procedures Associated with Alternative Clean-Fuels

Fuel Type	Hazard	Regulation/Procedure
LNG (cont.)	Releasing LNG in an enclosed area where there are potential ignition sources such as a maintenance shop my pose an explosive hazard. (A flammable concentration within an enclosed space in the presence of an ignition source can explode).	Installation of flammable gas detection systems in a maintenance shop can provide early detection of leaks and alert the maintenance personnel. (Required for LNG under CFC2903.3). Ignition sources can be reduced/eliminated by ensuring that all electrical systems in the shop are explosion proof (smoking and open flames are prohibited under CFC 2901.7). Providing adequate ventilation can prevent the occurrence of explosive conditions (required under CFC2903.1). Vehicle fuel shut-off valves shall be closed prior to repairing any portion of the vehicle fuel system (CFC2903.4.1). Vehicles fueled by LNG, which may have sustained damage to the fuel system, shall be inspected for integrity with a gas detector before being brought into the garage (CFC2903.4.2). Procedures can be established to ensure that all vehicles are defueled prior to maintenance.
Hydrogen	Releasing gas in enclosed spaces with its related explosive hazards may pose an explosive hazard. (A flammable concentration within an enclosed space in the presence of an ignition source can explode).	Installation of combustible gas detection systems can provide early detection of leaks. Ignition sources can be reduced/eliminated by ensuring that all electrical systems in the shop are explosion proof. Providing adequate ventilation can prevent the occurrence of explosive conditions. Procedures can be established to ensure that all vehicles maintenance are defueled prior to maintenance.
EV and Hybrid Vehicles	Certain types of batteries that are used in commercially available electric vehicles emit hydrogen during the charging process. Emission of hydrogen gas in an enclosed setting such as a garage presents the potential for the accumulation of flammable concentrations.	Forced ventilation can prevent build-up but if ventilation fails, a hazardous condition can occur. NEC and SAE recommended practices provide strict guidance for eliminating hydrogen gas risk.

CFC = California Fire Code

LAFC = City of Los Angeles Fire Code. It is expected that cities in Orange, Riverside, and San Bernardino Counties have in place similar regulations.

NFPA = National Fire Protection Association

NEC = National Electric Code

SAE = Society of Automotive Engineers

Conclusion: Because of these requirements, the potential impacts of fuel additives are less than significant because negative impacts would be identified and mitigated, as necessary, prior to their use.

Project-Specific Mitigation: Compliance with existing regulations would mitigate impacts associated with fuel additives. No significant hazard impacts are expected from the use of fuel additives so no mitigation is required.

Use of Reformulated Materials

Project-Specific Impacts: The 2010 CAP includes control measures that could require reformulation of consumer products including inks and solvents used in digital printing (SSM 2). Manufacturer's of digital inks and solvents would be expected to comply with the control measure by lowering the VOC content in inks used in the Bay Area. A number of VOCs currently used in coating and solvent formulations have also been identified as TACs, such as ethylene-based glycol ethers, TCE, and toluene. When a product is reformulated to meet new VOC limits, however, a manufacturer could use a chemical, not used before, that may be a TAC. Control Measure SSM 2 does not provide exemptions to compounds that are TACs so there is no incentive to use TACs.

The use of new formulations of inks may alter chemical constituents of the solvents used in these operations. Regulations aimed on lower VOC materials have indicated that manufacturers tend to use less hazardous solvents in reformulated products. It is expected that this will continue to be the trend with digital printing inks and solvents and future compliant coatings will contain less hazardous materials, or non-hazardous materials, compared to conventional inks, resulting in a net benefit regarding hazards (CARB, 2006).

The use of digital printing inks is not expected to change from current practice and, thus, the amount of material transported is not expected to change. Therefore, no additional transport of the solvents and inks is expected and, thus, no new hazards to the public will be created through transport, use, or disposal of hazardous materials. As a result, the proposed amendments are not expected to increase the probability of a hazardous material release.

It is assumed that coatings would be reformulated as water-based or with solvents that are less toxic. There are two hazards to be considered when evaluating hazard impacts from reformulating products and solvents; flammability and ignitions/explosions. Reformulation with water-based materials would reduce the risk of flammability, since solvents are not typically included as part of the formulation of these coatings. Alternative solvents can be used (e.g., TBAC and acetone) which have the same flammability rating as the conventional solvents (e.g., toluene, xylene, MEK) (see Table 3.3-5). The National Fire Protection Association (NFPA) Flammability Classification for PCBTF is the lowest of the solvents evaluated (1 = combustible if heated versus 3 =

warning: flammable liquid flash point below 100°F)). Consequently, no increase in flammability due to reformulation is expected.

TABLE 3.3-5

Chemical Characteristics for Common Solvents

Chemical Compounds	M.W.	Boiling Point (°F)	Flashpoint (°F)	Vapor Pressure (mmHg @ 68 °F)	Lower Explosive Limit (% by Vol.)	Flammability Classification (NFPA)*
Traditional/Conventional Solvents						
Toluene	92	231	40	22	1.3	3
Xylene	106	292	90	7	1.1	3
MEK	72	175	21	70	2.0	3
Isopropanol	60	180	53	33	2.0	3
Butyl Acetate	116	260	72	10	1.7	3
Isobutyl Alcohol	74	226	82	9	1.2	3
Stoddard Solvent	144	302-324	140	2	0.8	2
Petroleum Distillates (Naptha)	100	314-387	105	40	1.0	4
EGBE	118	340	141	0.6	1.1	2
EGME	76	256	107	6	2.5	2
EGEE	90	275	120	4	1.8	2
Replacement Solvents						
Acetone	58	133	1.4	180	2.6	3
Di-Propyl Glycol	134	451	279	30	1	1
Propylene Glycol	76	370	210	0.1	2.6	1
Ethylene Glycol	227	388	232	0.06	3.2	1
Texanol	216	471	248	0.1	0.62	1
Oxsol 100	181	282	109	5	0.90	1
t-Butyl Acetate	113	208	59	34	1.5	3

Source: SCAQMD, 2005

*National Fire Protection Association. 0 = minimal; 1 = slight; 2 = moderate; 3 = serious; 4 = severe

The autoignition temperature of a substance is the temperature at or above which a material will spontaneously ignite (catch fire) without an external source of ignition, such as a spark or flame. Flash point is the lowest temperature at which a liquid would have a concentration in the air near the liquid surface which could be ignitable by an external source of ignition (spark or flame). The lower the flash point, the easier it is to ignite the material. TBAC has characteristics that are in the range of the conventional solvents (boiling points, evaporation rates, flash points and explosive limits, auto-ignition temperatures and vapor pressures) for the solvent it would replace. PCBTF also has

characteristics that are similar to the solvents likely to be replaced; however, PCBTF's autoignition temperature is lower. While the autoignition temperature for PCBTF is the lowest of the solvents presented it is still 194^{o}F and the flashpoint temperature of 109^{o}F is higher than both the replacement solvents evaluated (CARB, 2006).

Acetone has characteristics that are similar to the conventional solvents it would likely replace; however, the flash point temperature is the lowest compared to all solvents evaluated. Acetone vapors will not cause an explosion unless the vapor concentration exceeds 26,000 ppm. In contrast, toluene vapors can cause an explosion at 12,000 ppm; the concentration of MEK that could cause an explosion is 14,000 ppm; and the concentration of xylene vapors that could cause an explosion is even lower at 10,000 ppm. Under operating guidelines of working with flammable materials in well-ventilated areas, as prescribed by the fire department codes, it would be difficult to achieve concentrated streams of such vapors. Therefore, reformulation is not expected to increase, and may actually reduce, ignition or explosion hazards.

The following safety practices and application techniques are recommended by the National Association of Corrosion Engineers (NACE) and the Society for Protective Coatings during the application of coatings and solvents including future compliant coatings and surface preparation and cleaning solvents.

- **Worker Isolation –** Areas where coatings with hazardous materials are applied should be restricted to essential workers. If feasible, these workers should avoid direct contact with hazardous materials by using automated equipment or an area with plenty of ventilation.

- **Protective Clothing and Equipment** – When there is the potential for hazardous material exposure, workers should be provided with and required to use appropriate personal protective clothing and equipment such as coveralls, footwear, chemical-resistant gloves and goggles, full faceshields, and suitable respiratory equipment.

- **Respiratory Protection –** Only the most protective respirators should be used for situations involving exposures to hazardous materials because they have poor warning properties, are potent sensitizers, or may be carcinogenic. Any respiratory protection program must, at a minimum, meet the requirements of the OSHA respiratory protection standard [29 CFR 1910.134]. Respirators must be certified by NIOSH and MSHA according to 30 CFR or by NIOSH (effective July 19, 1995) according to 42 CFR 84.

- **Worker and Employer Education –** Worker education is vital to a good occupational safety and health program. OSHA requires that workers be informed about hazardous materials they work with, potential hazards of those materials, training to minimize hazards, potential health effects of exposure, and methods to prevent exposure.

Conclusion: Based upon all of the above considerations, hazard impacts are expected to be less than significant. It is expected that the lower VOC content materials will contain less hazardous materials, or non-hazardous materials, as compared to conventional products, resulting in a net benefit regarding hazards. Reformulation with water-based coatings would reduce the risk of flammability, since solvents are not typically included as part of the formulation of these coatings and replacement solvents, like TBAC and acetone, have the same flammability rating as the conventional solvents that would be replaced (toluene, xylene, MEK). Replacement solvents generally have autoignition temperature and flash point temperature characteristics that are similar or better than conventional solvents. Reformulation is not expected to increase, and may actually reduce, flammability, ignition and explosion hazards. Local fire department and OSHA regulations coupled with standard operating practices ensure that conditions are in place to protect against hazard impacts. Therefore, no significant impacts on hazards are expected.

Project-Specific Mitigation: Increased usage of reformulated materials is not expected to generate significant adverse hazard impacts so no mitigation measures are required.

3.3.4 Mitigation Measures

Mitigation measures have been discussed under each subcategory. In summary, the hazard impacts associated with the use and transport of aqueous ammonia are less than significant. The hazard impacts associated with the use and transport of anhydrous ammonia are potentially significant. The use of aqueous ammonia would reduce the potentially significant impact of anhydrous ammonia use to less than significant.

3.3.5 Cumulative Hazard Impacts

The analysis of the hazard and hazardous material impacts associated with implementation of the 2010 CAP concluded that the hazard impacts associated with reformulated products, the use of alternative fuels, and the use of fuel additives are expected to be less than significant. The hazard impacts associated with the increased use of ammonia in SCR systems were concluded to be potentially significant.

The Transportation 2035 Plan was determined to have less than significant impacts on hazardous materials. Hazardous materials are highly regulated at the state and federal levels. The existing regional transportation system already carries vehicles that transport hazardous materials. It was determined that the changes proposed to the transportation system through the Transportation 2035 Plan would be less than significant as they related to changes in the handling, location of, or exposure to hazardous materials and would not require the transport of additional hazardous materials (MTC, 2009).

Based on the above analysis, cumulative hazard impacts are limited to the hazards identified for the 2010 CAP and no additional cumulative impacts have been identified.

Cumulative Hazard Impact Mitigation: Mitigation measures were imposed due to potentially significant hazard impacts associated with implementing the 2010 CAP (see subsection 3.3.3). No other significant cumulative hazard impacts have been identified so no further mitigation measures are required.

3.3.6 Summary of Hazard Impacts

The following is the summary of the conclusions of the analysis of hazard impacts associated with implementation of the 2010 CAP.

- Ammonia Use in SCR Systems: The use of ammonia in SCR systems could be potentially significant due to implementation of the control measures. However, the use of aqueous ammonia at concentrations less than 20 percent by volume is expected to reduce hazard impacts associated with ammonia use to less than significant.

- Use of Alternative Fuels: The hazard impacts associated with the use of alternative fuels due to implementation of the 2010 CAP control measures were determined to be less than significant when users of alternative fuels comply with existing regulations and recommended safety procedures. Further, any increase in the use of alternative fuels will result in a concurrent decrease in the amount of conventional fuels used in the district.

- Fuel Additives: The analysis indicates that the hazard impacts associated with fuel additives are expected to be less than significant. The use of fuel additives would require evaluation for their potential health impacts associated with exposure, secondary air impacts, hazard impacts, water quality impacts, etc., prior to approval. Because of these requirements, significant hazard impacts associated with the use of fuel additives are not expected.

- Reformulated Products: The analysis indicates that the hazard impacts associated with reformulated digital inks and solvents are expected to be less than significant. An increase of future compliant reformulated materials would be expected to result in a concurrent reduction in the amount of materials formulated with conventional solvents. Further, the net number of accidental releases would be expected to remain constant, regardless of formulations being used, allowing for population growth in the district. Furthermore, solvents used in reformulated products tend to be less hazardous than conventional solvents.

3.4 Hydrology and Water Quality

3.4.1 Environmental Setting

Regional Physiography

The San Francisco Bay Delta system is located at the convergence of the Sacramento and San Joaquin Rivers which combine to form the largest estuary on the West Coast of the United States, where fresh water from rivers and numerous smaller tributaries flows out through the Bay into the Pacific Ocean. The San Francisco Bay Estuary (Estuary) encompasses roughly 1,600 square miles, receives runoff from about 40 percent of the land in California (about 60,000 square miles), provides drinking water to approximately two-thirds of California, irrigates as much as 4.5 million acres of farmland, and is surrounded by the nine Bay Area counties. The San Francisco Bay estuary includes deep-water channels, tidelands, and marshlands that provide a variety of habitats for plants and animals. The Estuary is composed of three distinct hydrographic regimes: The South Bay extends from the Bay Bridge to the southern terminus of the Bay in San Jose, and the Central and North Bays connect the Delta and the Pacific Ocean.

The North Bay consists of several small bays, the two largest being San Pablo Bay and Suisun Bay. The bays are connected to each other and the ocean by deep, narrow channels ranging from 42 feet deep in San Pablo Bay to over 360 feet deep at the Golden Gate. San Pablo Bay is characterized by a deep channel surrounded by broad shoals. San Pablo Bay is connected to Suisun Bay by the narrow Carquinez Strait. Suisun Bay is a shallow basin consisting of braided channels and shallow shoals.

The Central Bay has a highly complex bathymetry. East of the Golden Gate, the depth is approximately 300 feet, where extensive intertidal mudflats are present at the eastern edge of the Central Bay. In addition, several islands are located within the Central Bay, including Treasure, Alcatraz, and Angel islands.

The South Bay is characterized by large areas of broad shallows incised by a main channel 30 to 65 feet deep. It has similar bathymetry to San Pablo and Suisun Bays. A relatively deep channel extends along the western side of the South Bay, surrounded by broad mudflats.

Surface waters in the Bay Area include freshwater rivers and streams, coastal waters, and estuarine waters. Many of the original drainages toward the San Francisco Bay have been channelized and put underground due to urbanization, though a few remain. Estuarine waters include the San Francisco Bay Delta from the Golden Gate to the Sacramento and San Joaquin Rivers, and the lower reaches of various streams that flow directly into the Bay, such as the Napa and Petaluma Rivers in the North Bay and the Coyote and San Francisco Creeks in the South Bay.

Beneficial uses of the Bay include agricultural supply; freshwater habitat; ocean, commercial and sport fishing; estuarine habitat; fresh water replenishment; ground water recharge; industrial service supply; marine habitat; fish migration; municipal and domestic water supply; navigation; industrial process water supply; preservation of rare and endangered species; contact and non-contact water recreation; shellfish harvesting; fish spawning, and wildlife habitat. Areas of special biological significant have been identified that include Bird Rock, Point Reyes Headland Reserve, Souble Point, Duxbury Reef Reserve, Farallon Islands, and James Fitzgerald Marine Reserve (RWQCB, 2007).

Water Quality

The quality of regional surface water and groundwater resources is affected by point-source and non-point-source discharges throughout individual watersheds. Regulated point sources such as wastewater treatment plant effluent discharges and industries, involve a single discharge pipe or drain into receiving waters. Non-point sources involve diffuse and nonspecific water runoff that enters receiving waters through urban and agricultural runoff, spills, atmospheric fallout, dredging, landfill seepage, and natural erosion. Common non-point sources include urban runoff, agricultural runoff, resource extraction (ongoing and historical), and natural drainage. Pollutants that enter water bodies in urban runoff include oil and gasoline by-products from parking lots, streets, and freeways.

Regionally, stormwater runoff is estimated to contribute more heavy metals to the San Francisco Bay than direct municipal and industrial dischargers, as well as significant amounts of motor oil, paints, chemicals, debris, grease, and detergents. Runoff in storm drains may also include pesticides and herbicides from lawn care products and bacteria from animal waste. Most runoff flows untreated into creeks, lakes, and the Bay. As point sources of pollution have been brought under control, the regulatory focus has shifted to non-point sources, particularly urban runoff.

The overall goals of water quality regulation according to the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) are to protect and maintain thriving aquatic ecosystems and the resources those systems provide to society, and to accomplish these goals in an economically and socially sound manner. California's regulatory framework uses water quality objectives both to define appropriate levels of environmental quality and to control activities that can adversely affect aquatic systems (RWQCB, 2007). The Basin Plan establishes water quality goals and effluent limitations for parameters such as bacteria, bioaccumulation, color, dissolved oxygen, gloating material, oil and grease, pH, radioactivity, salinity, sediment, suspended material, sulfide temperature, toxicity, turbidity, un-ionized ammonia, and limitations for specified chemical constituents. The RWQCB intends to establish water quality attainment strategies including Total Maximum Daily Loads (TMDLs) where necessary to ensure attainment and maintenance of water quality standards (RWQCB, 2007).

The San Francisco Estuary Project (SFEP) has administered a Regional Monitoring Program for the Regional Water Quality Control Board (RWQCB) and major wastewater

dischargers into the Bay since 1993. Most dischargers to the Bay are required to participate as a condition of their discharge permit. The SFEP conducts routine water quality monitoring in the Estuary. The Regional Monitoring Program measures concentrations of trace constituents in water, sediment, and transplanted bivalves at various locations in the Estuary.

The Regional Monitoring Program monitors conventional water quality (such as salinity, dissolved oxygen, and temperature) and chemistry (such as metals and pesticides), water toxicity (effects on laboratory organisms), sediment characteristics and chemistry, sediment toxicity (effects on laboratory organisms), and contaminant bioaccumulation in shellfish.

Based on water quality analyses, the level of contamination in the Estuary is high enough to impair the health of the ecosystem. The Estuary is described as moderately impaired. Indications of impairment include the toxicity of the water and sediment samples; the frequent presence of contaminant concentrations exceeding water, sediment and fish guidelines; and altered communities of sediment dwelling organisms. Overall, sites in the lower South Bay, the Petaluma River mouth, and San Pablo Bay are more contaminated than other sites. Contamination in the Central Bay is lower primarily due to mixing with relatively clean ocean water. Of all the contaminants measured by SFEP, results suggest that those of greatest concern are mercury, polychlorinated biphenyls (PCBs), trash (e.g., plastic trash), pesticides, and emerging pollutants such as, flame retardants used in many consumer products (e.g., perfluorinated chemicals). A growing body of information suggest that a primary conveyance of pollution into the Estuary is urban runoff (SFEP, 2007).

Drainage and Runoff

Stormwater pollution occurs when rain comes into contact with materials and picks up and washes contaminants into storm drains, creeks or the Bay. Common sources of pollution include equipment and vehicles that may leak oil, grease, hydraulic fluid or fuel, construction materials and products, waste materials, landscaping runoff containing fertilizers, pesticides or weed killers, and erosion of disturbed soil. Stormwater discharges associated with industrial and construction activities are regulated according to California Code of Regulations Section 402(p) under the NPDES permitting system.

Typical pollution control measures include BMPs that are designed to reduce quantities of materials used that may produce pollutants, change the way various products are handled or stored, employ various structural devices to catch and restrict the release of pollutants from the site, and set out appropriate responses to spills and leaks. Examples of BMPs include: temporary silt fences; protection devices such as rock aprons at pipe outlets; stabilized pads or aggregate at points where a construction site leads to or from a public street; temporary drain inlet protection devices such as filter fabric and sand bags; concrete washouts for cement mixers; preservation of existing vegetation; vehicle and equipment cleaning, etc. Site-specific BMPs are described in a stormwater pollution prevention plan (SWPPP).

SWPPPs are designed to identify and evaluate sources of pollutants associated with industrial and construction activities that may effect the quality of stormwater discharges and authorized non-stormwater discharges from a facility; and to identify and implement site-specific BMPs to reduce or prevent pollutants associated with industrial or construction activities in stormwater discharges or authorized non-stormwater discharges.

Floodplain Risk

Some areas of the Bay along the shoreline and drainages leading to the Bay are potential floodplains. Risks associated with building in a floodplain include threats to life and property. The level of risk is determined by the nature of the facility, its location and appropriate mitigation measures. Local city or county government agencies regulate floodplain construction, management, and mitigation through land use controls, based on determinations of flood elevations.

Groundwater

Groundwater is subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated. Where groundwater occurs in a saturated geologic unit that contains sufficient permeable thickness to yield significant quantities of water to wells and springs, it is called an aquifer. A groundwater basin is a hydrogeologic unit containing one large aquifer or several connected and interrelated aquifers. Groundwater basins are closely linked to local surface waters. As water flows from the hills toward the Bay, it percolates through permeable soils into the groundwater basins. There are three basins beneath the greater San Francisco Bay Area: The San Francisco, Santa Clara, and San Pablo Basins. The San Francisco Basin extends north from the Dumbarton Bridge to the shoreline south of Richmond and the San Pablo Basin extends north of the San Francisco Basin. The Santa Clara Basin is located south of the San Francisco Basin. The San Francisco and Santa Clara Basins have a similar stratigraphic and tectonic development, while the San Pablo Basin appears to have had a different history. Bedrock appears to be the primary boundary between the San Francisco and San Pablo Basin. The Hayward Fault appears to form a groundwater barrier along portions of the basins (Norfleet Consultants, 1998). Groundwater in the Bay Area is used for numerous purposes, including municipal and industrial water supply; however, groundwater use accounts for only about five percent of the total water usage.

Salt water intrusion occurred in upper aquifers between Alameda and Niles Cone in the Santa Clara Basin between the mid 1920's and late 1940's. A combination of drought and overpumping caused groundwater levels to fall below sea level in about 1924. When this occurred, there was widespread salt water intrusion through the young bay mud into the upper aquifer and eventually into the deeper aquifers. Evaluation for the intrusion revealed that there were no natural direct pathways to the deeper aquifers. Intrusion occurred via abandoned wells and reverse hydrostatic head from high pumping rates (Norfleet Consultants, 1998).

The RWQCB has identified 28 groundwater basins and seven sub-basins located in the San Francisco Bay Region that were or could serve as sources of high quality drinking water. Maintaining the high quality of groundwater is the primary objective of the RWQCB's Basin Plan, which defines the lowest concentration limit required for groundwater protection. The RWQCB also has water quality limits for bacterial, chemical constitutents, radioactivity, taste, and odor. Maximum Contaminant Levels (MCLs) and Secondary Maximum Contaminant Levels (SMCLs), have also been implemented to protect the beneficial uses of municipal and domestic drinking water sources (RWQCB, 2007).

Water Demand/Use

Water use in the Bay Area is predominantly urban, with more than 50 percent of the use being residential. There are also numerous industrial users around the Bay Area. Agricultural water use is a much smaller percentage of total water use in this region compared to inland regions, such as the Sacramento River region, San Joaquin River region, and the Tulare Lake region. For example, in the San Francisco Bay region part of the SCVWD service area, agricultural use is less than one percent of total water use of 383,000 acre-feet per year (2005).

About 70 percent of the water supply in the San Francisco Bay Hydrologic Region is imported. The planning, maintenance and operation cost, as well as vulnerability to drought cause the purveyors to monitor and spend capitol on their systems. This drives up the cost of water supply so that Bay Area water is fairly expensive.

Water usages in the San Francisco Bay Hydrologic Region are comparatively lower than communities located in the warmer central valley regions with inexpensive water that can range from 200 gallons per day (gpd) to 300 gpd per capita. The City of San Francisco has a per capita use value of around 100 gpd, ACWD 160 gpd, Cupertino 215 gpd, East Bay Municipal Utility District (EBMUD) Pinole area 125 gpd and Marin Municipal Water District (MWD) 145 gpd. Small lot sizes, cooler climate, and higher density development are drivers in low urban water usage. Table 3.4-1 provides a summary of water use in the Bay Area.

TABLE 3.4-1

Urban Water Usage (percent) by Sector in the North Bay and South Bay (2003)

	SFR	MFR	Com	Ind	Land	Other
North Bay	65	14	12	2	5	2
South Bay	50	18	18	5	7	2

Source: (DWR, 2009)
Single Family Residential (SFR); Manufacturing (MFR); Commercial (Com); Industrial (Ind)

The water purveyors in the Bay Area are summarized in Table 3.4-2.

TABLE 3.4-2

Bay Area Water Purveyors

Water Agency	Agency Type	Supply Sources
Santa Clara Valley Water District (SCVWD)	Wholesale	65 percent surface water
Morgan Hill	Municipal, Retail	SCVWD
Marin Municipal Water District	Retail	Local surface water
City of Santa Rosa	Municipal, Retail	SCWA
San Jose Water Company	Investor-owned, Retail	SCVWD, groundwater, local surface water
Town of Windsor	Municipal, Retail	SCWA
City of San Benito	Municipal/Ag, Retail	CVP surface water, ground water
~~S~~City of Antioch	Municipal, Retail	CCWD
City of Menlo Park	Municipal, Retail	SFPUC (Menlo Park Municipal Water District 1/3 of City)
Zone 7 Water Agency	Wholesale	SWP surface water, groundwater and a portion of local surface storage of local runoff (Del Valle Reservoir)
City of Fairfield	Municipal, Retail	Surface water, North of Delta
Cal Water	Investor-owned Retail, 24 service districts	Varies
City of Redwood City	Municipal, Retail	SFPUC
City of Santa Clara	Municipal, Retail	SCVWD, SFPUC groundwater
Sonoma County Water Agency	Wholesale	Surface water
Alameda County Water District	Retail	Diversified supply portfolio
City of Santa Cruz	Municipal, Retail	Local surface water
City of San Jose	Municipal, Retail	SCRWD, SFPUC
City of Palo Alto	Municipal, Retail	SFPUC
East Bay Municipal Utility District (EBMUD)	Retail	Surface water (90 – 95 percent Mokelumne River basin
San Francisco Public Utilities Commission (SFPUC)	Wholesale, Retail	Surface water
Contra Costa Water District	Wholesale, Retail	USBR – Surface (Delta)
City of Napa	Municipal, Retail	Local surface water and SWP
North Marin Water District	Retail	Local surface water (20 percent) and SCWA (80 percent)

Source: BAWCC, 2009

Recycled Water

Recycled water in the bay region is used in a full spectrum of applications, including landscape irrigation, agricultural needs, and as a supply to the area's many wetlands. The area has a large potential market for recycled water, up to 240,000 AF/year by 2025, as reported in the 1999 Bay Area Recycled Water Master Plan. The Plan identified opportunities to use 125,000 acre-feet per year (AF/yr) by 2010 (DWR, 2009).

Drought

The 2009 Water Year (October 1, 2008 through September 30, 2009) was the third consecutive year of below average precipitation for the state. Annual statewide precipitation totaled 76 percent, 72 percent, and 63 percent of average for Water Years 2009, 2008, and 2007, respectively.

Table 3.4-3 compares the average monthly contribution to statewide precipitation to the observed precipitation from Water Years 2009 and 2010 (to date). January, April, July, August, September, and November 2009 were exceptionally dry while February, May, June, and October 2009 were well above average. However, Water Year 2009 finished at 76 percent of an average water year. Water Year 2010 (October through December) stands at 78 percent of average. Consequently, the lack of precipitation has increased the state's accumulated water supply deficit. Data availability concludes with December, 2009 figures.

TABLE 3.4-3

Average Statewide Precipitation by Month

Month of Water Year (WY)	Avg. CA Precipitation (inches)	WY 2009 Observed	WY 2009 % of Average	WY 2010 Observed	WY 2010 % of Average
October	1.22	0.73	60%	2.07	169%
November	2.80	2.49	89%	0.77	28%
December	3.91	3.05	78%	3.33	85%
January	4.35	1.26	29%	--	--
February	3.66	5.06	138%	--	--
March	3.12	2.13	68%	--	--
April	1.64	0.59	36%	--	--
May	0.89	1.47	165%	--	--
June	0.35	0.46	133%	--	--
July	0.18	0.02	11%	--	--
August	0.28	0.06	20%	--	--
September	0.48	0.09	19%	--	--
Total	**22.88**	**17.40**	**76%**	**--**	**--**

Source: DWR, 2010

Notes: 2010 Water Year (measured from October 1, 2009 through September 30, 2010)
Average statewide precipitation by month with statewide precipitation values from Water Years 2009 and 2010. Data from California Climate Tracker (Western Region Climate Center): http://www.wrcc.dri.edu/monitor/cal-mon/frames_version.html

The month of January 2010 provided some relief to concerns about falling water levels in Lake Mendocino over the past few months. In November, 2009 the Mendocino County Board of Supervisors had amended an ordinance requiring a 50 percent mandatory requirement on communities affected by Lake Mendocino water. The ordinance was

suspended but could be imposed again if the Lake drops below the 30,000 AF level. Currently, the Lake is now at the same level as it was in 1977 and in 2008, about 16,000 AF below average (DWR, 2010).

Storage in Marin Municipal Water District reservoirs increased by about a quarter of capacity so far during January 2010, and is now above average. Storage in Santa Clara Valley Water District reservoirs increased about 14 percent of capacity so far during January, and is now above average with Coyote Reservoir approaching capacity. Storage in Yolo County Flood Control and Water Conservation District's Indian Valley Reservoir remains extremely low at only 10 percent of capacity. Note that the distribution of precipitation in the last two weeks of January 2010 has favored parts of the North Coast, and the areas immediately surrounding Lake Shasta and Lake Oroville, with less precipitation at higher elevations in the northern and central Sierra and in the North Lahontan region (DWR, 2010).

Lake Tahoe's water level has gained about three inches since the beginning of January 2010 and is back to the natural rim (elevation 6223 feet). Most reservoirs in the Sierra had only slight storage increases since most or the precipitation added to the snowpack (DWR, 2010).

Summary: The current drought period beginning in 2007, has left a significant deficit in our reservoir's carry-over supplies. Water Year 2008-09 ended with 65 percent of average statewide runoff, with the Sacramento region Water Supply Index (WSI) classified as "Dry" and San Joaquin River region WSI classified as "Below Normal". Based on storage for key reservoirs at the end of the last three water years, the state entered the 2009-2010 Water Year, beginning October 1, 2009, with its key supply reservoirs at only 69 percent of average and 42 percent of capacity. The recent January storms have raised reservoir levels a little for the major reservoirs. However, with the exception of New Don Pedro, major reservoirs are well below the historical averages for end of January storage (DWR, 2010).

3.4.2 Significance Criteria

Potential impacts on water resources will be considered significant if any of the following criteria apply:

> Violate any water quality standards or waste or storm water discharge requirements.
>
> The project will cause degradation or depletion of ground water resources substantially affecting current or future uses.
>
> The project will cause the degradation of surface water substantially affecting current or future uses.
>
> The project will result in a violation of NPDES permit requirements.

3.4.3 Environmental Impacts

Table 3.4-4 lists the control measures associated with the 2010 CAP with potential hydrology/water quality impacts, which include water quality impacts associated with alternative fuels, water quality from reformulated products, and water demand.

TABLE 3.4-4

Control Measures with Potential Hydrology and Water Impacts

Control Measures	Control Measure Description	Control Methodology	Impact
SSM 2	Digital Printing	Limit VOC content on inks and solvents or use VOC control equipment, e.g., carbon adsorption or afterburners.	Potential increased use of water-based formulations.
SSM 3	Livestock waste	Air pollution devices for larger facilities, reductions from smaller facilities (use of drying systems, enclosures, VOC/odor control (i.e., afterburner)	Potential impact on water demand and water quality due to water from wash down.
SSM 6	General Particulate Matter Weight Rate Limitation	Further control of PM emissions through process modifications or add-on control equipment, e.g., baghouses.	Potential impact on water demand for air pollution control equipment (e.g., wet scrubbers) and water quality
SSM 8	Coke Calcining	Control of SO2 emissions through dry or semi-dry scrubbing, or wet gas scrubbing.	Potential impact on water demand for air pollution control equipment (e.g., wet scrubbers) and water quality
SSM 9	Cement Kilns	Further control of NOx emissions through low-NOx burners retrofit or replacement or use of SCR. Reduce SOx emissions using wet gas scrubber.	Potential impact on water demand for air pollution control equipment (e.g., wet scrubbers) and water quality
MSM A-1	Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles	Expand the use of Super Ultra-Low Emission (SULEV) and partial zero (ZEV) emissions vehicles and trucks. Encourage use of renewable fuels.	Alternative fuels and additives can readily dissolve in water and impact ground and surface water.
MSM A-3	Green Fleets for Light, Medium & Heavy-Duty Vehicles	Promote SULEV and ZEV vehicles, accelerated retirement of older vehicles, Encourage use of renewable fuels.	Alternative fuels and additives can readily dissolve in water and impact ground and surface water.
MSM C-1	Construction and Farming Equipment	Accelerated turnover of existing equipment, retrofit of existing equipment with add-on controls, e.g., PM filters. Use of alternative fuels and renewable diesel fuels.	Alternative fuels and additives can readily dissolve in water and impact ground and surface water.

TABLE 3.4-4 (concluded)

Control Measures	Control Measure Description	Control Methodology	Impact
LUM 2	Indirect Source Review Rule	Measures to reduce construction and vehicular emissions could include accelerated turnover of existing equipment, fees, retrofit of existing equipment, use of renewable fuels, and increase use of SULEV or ZEV vehicles.	Alternative fuels and additives can readily dissolve in water and impact ground and surface water.
LUM 3	Enhanced CEQA Program	Additional mitigation measures could be imposed which could encourage accelerated turnover of existing equipment, fees, retrofit of existing equipment, use of renewable fuels, and increase use of SULEV or ZEV vehicles.	Alternative fuels and additives can readily dissolve in water and impact ground and surface water.

Water Quality Impacts

Alternative Transportation Fuels

Project-Specific Impacts: Control measures in the 2010 CAP may contribute to the increased use of alternative fuels in the BAAQMD's jurisdiction including MSM A-1, MSM A-3, MSM C-2, and LUM 2, and LUM 3. The control measures would generally be expected to result in the increased use of alternative fuels (e.g., biodiesel fuels, compressed natural gas, and liquefied natural gas).

The manufacture of alternative fuels is expected to generate less wastewater than the manufacture of fossil fuels. Refineries producing gasoline and diesel are large consumers of water and wastewater discharge. The manufacture of ethanol, methanol, natural gas, and LNG require little to no water. Therefore, the increased use of alternative fuels would not be expected to result in any greater water quality impacts. Alternatives fuels are not expected to have additives or materials that would be expected to readily dissolve in water and adversely affect ground or surface waters because materials that are covalently bonded (diesel) are not miscible in materials with polar bonds (water). Therefore, no significant adverse water quality impacts associated with the use of alternative fuels would be expected.

Conclusion: The use of these alternative fuels is not expected to result in greater adverse water quality impacts than the use of conventional fuels. A number of rules and regulations are currently in place to minimize the potential impacts from underground leaking storage tanks, and spills from fueling activities, including requirements for the

construction of the storage tanks, requirements for double containment, and installation of leak detection systems. These regulations are currently in place and minimize the potential for additional leaks from the use of conventional fuels as well as alternative fuels.

Project-Specific Mitigation: No significant hydrology/water quality impacts were identified from the use of alternative fuels as part of the 2010 CAP so no mitigation measures are required.

Electric and Hybrid Vehicles

Project-Specific Impact: Implementation of the 2010 CAP would encourage the increased use of electric vehicles. The batteries used in hybrid vehicles are different from the batteries used in traditional cars or 100 percent electric cars. The battery for the EDrive Prius hybrids is about 200 pounds as compared to an electric battery pack of about 80 pounds. The EDrive system on a Prius replaces the existing Prius nickel metal hydride (NiMH) battery with a larger advanced lithium-ion battery. The system allows the Prius to be charged at home using a standard 110/120V home outlet. Testing indicates that the batteries should last over five years, with 10 or more years being possible (www.edrivesystems.com). The electric batteries that could power these vehicles have useful lives similar to or less than the life of a conventional fossil fuel vehicle. Since some batteries contain toxic materials, water impacts are possible if they are disposed of in an unsafe manner, such as by illegal dumping or by disposal in a landfill.

The battery technologies have been developing as interest in the use of electric vehicles has increased. Most technologies employ materials that are recyclable or non-toxic. Both regulatory requirements and market forces encourage recycling. The current state regulation of battery waste is presented below.

California laws and regulations create the following incentives and requirements for disposal of recycling of batteries.

- Under CARB regulations, to certify either a new or retrofit ZEV, automakers must complete CARB's certification application, which must include a battery disposal plan. Thus, current regulations require ZEV manufacturers to take account for the full life-cycle of car batteries and to plan for safe disposal or recycling of battery materials.

- California law requires the recycling of lead-acid batteries (California Health & Safety Code §25215). Spent lead-acid batteries being reclaimed are regulated under 22 CCR sections 66266.80 and 66266.81, and 40 CFR Part 266, Subpart G.

- California law requires state agencies to purchase car batteries made from recycled material (Public Resources Code §42440).

- As of February 8, 2006, household wastes such as batteries, electronic devices and fluorescent light bulbs may not be disposed of in a landfill by anyone.

Existing battery recovery and recycling programs are expected to substantially limit potential water quality impacts that may occur from processing spent batteries. For example, the recycling of lead-acid and nickel-cadmium batteries is already a well established activity. Two secondary lead smelters (facilities that recycle lead-bearing materials) are located within California including the Quemetco facility in the City of Industry and the Exide facility in the City of Vernon. Exide recycles about 16.5 million batteries annually (DTSC, 2006) and Quemetco recycles about 10 million batteries annually (DTSC, 2001). Both of these facilities receive spent lead-acid batteries and other lead bearing material and process them to recover lead and polypropylene (from the battery casings). Acid is collected and is recycled as a neutralizing agent in the wastewater treatment system. The availability of secondary lead smelters for battery recycling reduces the potential for the illegal disposal of batteries. However, there is still the potential that used batteries could end up in landfills resulting in the potential release of heavy metals and acid to the environment.

Recycling is already well established for the battery technologies that are currently in wide use. While the switch to electric batteries has the potential to create water quality impacts from improper disposal, increasing use of EVs and HVs will result in a concomitant decrease in the use of internal combustion engines and a reduction in the impacts of such engines. For instance, decreased use of internal combustion engines will also result in a decreased generation of used engine oil as explained in the following paragraphs, since electric motors do not employ oil as a lubricant.

Approximately 122,119 tons per year of waste oil were generated in the Bay Area in 2008 (see Chapter 3.5, Utilities and Service Systems). Because of the widespread use and volume of waste oil, a portion of waste oil is illegally disposed of via sewers, waterways, on land, and disposed of in landfills. Waste oil that is illegally disposed can be released to the environment (water, land or air). The CIWMB has estimated that about 20 million gallons of used motor oil is disposed each year in an unknown manner (CIWMB, 2007). In addition, a substantial amount of motor oil leaks onto the highways from vehicles each year. This motor oil is washed into storm drains and eventually ends up in the ocean.

Since electric motors do not require motor oil as a lubricant, replacing internal combustion engines with electric engines will eliminate the impacts of motor oil use and disposal. For example, a 50 percent penetration of light-duty electric vehicles will result in a corresponding 50 percent reduction in the release of these contaminants to the environment due to illegal disposal (50 percent of 20 million gallons is 10 million gallons). Release of contaminants due to engine oil that burns up in, or leaks from engines or due to burning of recovered engine oil for energy generation will also be correspondingly reduced. Additional use of electric and hybrid vehicles is expected to have a beneficial environmental impact by reducing the amount of motor oil used,

recycled, potentially illegally disposed, or washed into storm drains and ending up in the ocean.

Conclusion: Illegal disposal of electric batteries has the potential to result in significant water quality impacts by allowing toxic metals or acids to leach into surface or ground waters. However, spent batteries have economic value and two secondary lead recycling facilities are located within California, which decreases the likelihood of illegal disposal. Further, programs are in place that require that old batteries be turned in when new batteries are purchased. Therefore, the illegal disposal of batteries and resulting water quality impacts are not expected.

Project-Specific Mitigation: No significant hydrology/water quality impacts were identified from the increased use of hybrid and electric vehicles as part of the 2010 CAP so no mitigation measures are required.

Water Quality from Reformulated Products

Project-Specific Impacts: One of the control measures in the 2010 CAP would include controlling VOC emissions through the reformulation of products, SSM 2 - Digital Printing. Emission reductions may be achieved through the use of low VOC formulations, or through the use of air pollution control equipment.

Under these control measures, petroleum-based solvents, coatings and products are expected to be reformulated with aqueous-based solvents or other low VOC solvent. Like petroleum-based materials, aqueous materials may lead to adverse impacts to water resources if contaminated solvents, coatings or products are not handled properly. However, the use of water to reformulate ink products and solvents would generally lead to products that would be less toxic than petroleum-based materials and generate fewer impacts to water quality.

The use of aqueous-based or low VOC solvents may lead to adverse impacts to water resources if contaminated solvents are not handled properly. If the ink manufacturer does not substantially increase the amount of wastewater generated, then disposing of the wastewater will generally be considered a relatively small incremental addition to the wastewater stream and no adverse impacts would be expected. If, however, the material becomes contaminated with hazardous materials during the manufacturing or cleaning process, then the solution must be disposed of properly after its useful life. Proper disposal may be accomplished by use of wastewater treatment equipment or by shipping to a waste treatment, recycling or disposal site that accepts hazardous materials.

Conclusion: As with solvent based materials, the illegal disposal of spent cleaning materials could result in significant adverse water quality impacts. Potential adverse wastewater impacts associated with reformulated solvents are expected to be minimal since reformulated products are limited to digital printing inks and solvents and compliance with State and federal waste disposal regulations would minimize adverse impacts. State and federal regulations are expected to promote the development and use

of inks formulated with non-hazardous solvents. Wastewater which may be generated from reformulated inks is expected to contain less hazardous materials than the wastewater generated for solvent-based coating operations, thereby reducing toxic influent to the POTWs.

Project-Specific Mitigation: No significant hydrology/water quality impacts were identified from the use of reformulated products as part of the 2010 CAP so no mitigation measures are required.

Water Quality from the Use of Wet Gas Scrubbers

Project-Specific Impacts: In addition, the use of wet gas scrubbers (WGS) is expected to increase the wastewater discharged from facilities that install such control devices. WGS can consume a large amount of water. An EIR prepared for a WGS permitted at the ConocoPhillips Refinery in Wilmington to control emissions from a fluid catalytic cracking unit, estimated that water use associated with the WGS was about 70 gallons per minute (about 100,800 gallons per day). Assuming an increase in water use of about 100,000 gallons per WGS, the estimated increase in wastewater discharge would be about 80 percent or about 80,000 gallons per day (the rest would be lost as steam in cooling towers). Large industrial facilities that may install a WGS are expected to have existing wastewater discharges, existing wastewater treatment requirements, and existing discharge permits, e.g., NPDES permits. Wastewater discharge permits generally require sampling for heavy metals, pH, oil and grease, dissolved sulfides, chlorides, suspended solids, chemical oxygen demand, biochemical oxygen demand, and ignitability, as well as other industry-specific pollutants. The ability to comply with existing permit limits for regulated contaminants is not expected to change as a result of the additional WGS discharge. Modifications to existing wastewater discharge permits is expected to be required for some facilities and new wastewater discharge permits may be required for others.

Conclusion: Compliance with wastewater discharge permit limits and requirements is expected to minimize the water quality impacts associated with the wastewater discharge. As a result, significant adverse water quality impacts associated with wastewater discharges at industrial facilities are not expected.

Project-Specific Mitigation: Based on the above evaluation and significance criteria, the impacts on water quality associated with implementation of the increased use of wet gas scrubbers are expected to be less than significant so no mitigation measures are required.

Potential Impacts Associated with Ground Water Depletion/Water Demand

Project-Specific Impact: Increased water consumption may occur due to add on pollution control equipment. Several of the control measures in the 2010 CAP may encourage or require reduced particulate matter emissions through the use of WGSs including SSM 6 – General Particulate Matter Weight Rate Limitation, SSM 8 – Coke

Calcining, and SSM 9 – Cement Kilns. WGSs are attractive for use in air pollution control because they are effective in removing SOx, PM10 and PM2.5. Because of their cost, they would likely only be used at large industrial facilities. No other control measures were identified that were expected to result in an increase in water use.

Flue gas containing particulates and SOx can be vented to a WGS. In the scrubber, there is intimate contacting of the particulate matter and SOx with scrubbing liquid that flows countercurrent to the gas flow. The scrubbing liquid is a mixture of water and caustic (e.g., sodium hydroxide) that is constantly re-circulated. Following the scrubber, a WGS section will remove most of the remaining fine particulates. The WGS system has two effluent streams: clean flue gas and a purge liquid. The clean flue gas passes up the stack of the scrubber system and is released to the atmosphere. The purge liquid goes to a purge treatment unit.

WGS can consume a large amount of water. An EIR prepared for a WGS permitted at the ConocoPhillips Refinery in Wilmington to control emissions from a fluid catalytic cracking unit, estimated that water use associated with the WGS was about 70 gallons per minute (about 100,800 gallons per day) (SCAQMD, 2007). Assuming that WGS were installed at three large industrial facilities, the estimated water consumed would be about 300,000 gallons per day and exceed the significance criteria of 300,000 gallons per day. Therefore, the impacts of the 2010 CAP on water demand are potentially significant.

Conclusion: The potential increase in water use associated with WGS is potentially significant.

Project-Specific Mitigation: Significant impacts on water demand were identified and require mitigation.

HWQ 1: Use reclaimed water to the extent feasible at facilities that install WGS to mitigate the increase in water demand.

HWQ 2: Conduct an engineering review of the WGS to assure that a minimal amount of water is used.

Implementation of the mitigation measures would occur on a case-by-case basis. Because each facility is different, it is unlikely that reclaimed water can be used at all facilities and that overall water demand would be minimized to 300,000 gallons per day or less. Therefore, the impacts of the 2010 CAP on water demand remain significant.

3.4.4 Mitigation Measures

The mitigation measures for each impact area were included within each subchapter. The mitigation measures identified for water demand are expected to reduce the identified impacts, but not to less than significant.

3.4.5 Cumulative Hydrology and Water Quality Impacts

Implementation of the 2010 CAP will have only minor incremental impacts on water quality compared to impacts due to population growth and are not considered significant. Water demand impacts associated with the 2010 CAP are expected to remain significant after mitigation.

The cumulative impacts for the 2010 CAP Program EIR will include the regulatory activities associated with other air quality control measures that could also generate impacts within the Bay Area. These control measures are associated with the TCMs developed by the MTC (MTC, 2009). The hydrology and water quality impacts associated with the Transportation 2035 Plan are discussed below.

Soil erosion is probable during construction, and the resulting water quality problems could include turbidity, increased algal growth, oxygen depletion, or sediment buildup, thereby degrading aquatic habitats. Sediment from project-induced erosion could also accumulate in downstream drainage facilities and interfere with stream flow, thereby aggravating downstream flooding conditions (MTC, 2009).

Depending on the transportation project location, impacts from construction could affect local storm drain catch basins, culverts, flood control channels, streams, and San Francisco Bay. Most runoff in urban areas is eventually directed to either a storm drain or water body, unless allowed to stand in a detention area and filter into the ground. For this reason, even projects not directly adjacent to or crossing a sensitive area could have an impact (MTC, 2009).

Because the Transportation 2035 Plan would increase the area of paved surfaces (roads, transit stations, park and ride lots, etc.), construction of the proposed projects combined with increased overall regional traffic could increase non-point-source pollutant concentrations in stormwater regionally. These non-point source pollutants could include oil and grease, petroleum hydrocarbons, and metals that would be transported by stormwater runoff to receiving water bodies. The paving required for highway projects could also have minor effects on the amount of surface water that filters into the ground, and groundwater basins could be affected by pollutants in the runoff from proposed transportation facilities (MTC, 2009).

In addition to potential water quality impacts, the Transportation 2035 Plan may also affect flooding. Floodplains are areas that are periodically inundated during high flows of nearby streams or high water levels in ponds or lakes. Natural floodplains offer wildlife and plant habitat, open space, and groundwater recharge benefits. Project construction could affect these floodplain values, including potentially redirecting flood waters, if not mitigated (MTC, 2009).

3.4.6 Cumulative Hydrology and Water Quality Impact Mitigation

Mitigation measures were imposed in the Transportation 2035 Plan due to potentially significant hydrology and water quality impact.

As project sponsors prepare the environmental review document for their individual project pursuant to CEQA/NEPA and prior to environmental certification, project sponsors shall consider adopting appropriate measures that would minimize or eliminate cumulatively considerable environmental impacts pursuant to CEQA/NEPA. MTC shall be provided with status reports of compliance with mitigation measures pursuant to MTC Resolution 1481, Revised (MTC, 2009).

Project sponsors shall prepare and implement, as necessary, a SWPPP in accordance with the SWRCB's General Construction Permit. The SWPPP shall be consistent with the Manual of Standards for Erosion and Sedimentation Control by the Association of Bay Area Governments, the California Stormwater Quality Association (CASQA), Stormwater Best Management Practice Handbook for Construction, policies and recommendations of the local urban runoff program (city and/or county), and the recommendations of the RWQCB. Implementation of the SWPPP shall be enforced by inspecting agencies during the construction period via appropriate options such as citations, fines, and stopwork orders. Implementation of this mitigation measure is expected to reduce the potentially significant impact on water resources to a level that is less than significant (MTC, 2009).

Additionally, mitigation measures to reduce impacts on water resources that shall be considered by project sponsors and decision-makers may include, but are not limited to, requiring projects to comply with design guidelines established in the Bay Area Stormwater Management Agencies Association's (BASMAA) *Using Start at the Source to Comply with Design Development Standards* and the *California Storm Water Best Management Practice Handbook for New Development and Redevelopment* to minimize both increases in the volume and rate of stormwater runoff, and the amount of pollutants entering the storm drain system (MTC, 2009). Implementation of these mitigation measures is expected to reduce storm water impacts to less than significant.

Implementation of transportation improvements in the Transportation 2035 Plan could result in cumulative impacts on water resources both directly by adding new impervious surfaces and by accommodating future planned urban development that could, when it occurs, have the potential to alter drainage patterns and impact water quality. The combination of Transportation 2035 Plan projects and new public and private infrastructure improvements serving future planned urban development could create higher erosion rates through increased impervious surfaces and consequently reduce groundwater recharge and increase the potential for flooding (MTC, 2009).

Overall, the potential for population growth and development to increase impervious surfaces, thereby degrading water quality, reducing recharge, and increasing flooding risk, is a significant cumulative impact. The larger portion of the cumulative impact is

likely to be attributable to regional growth, due to the fact that many proposed Project improvements will occur in locations with existing impervious surface and existing flood risk (e.g. roadway and transit maintenance and operations projects, parking improvements, lane conversions, bike lane striping, etc). Nonetheless, as some transportation improvements could either increase impervious surface or increase new population and facilities vulnerable to flood by locating them or encouraging their location in the floodplain, implementation of the TCMs has the potential to make a cumulatively considerable contribution to this impact (MTC, 2009).

Despite feasible mitigation, the overall cumulative impact related to water quality and flood risk in the Bay Area is assumed to remain significant and unavoidable. However, the contribution of the TCMs to the overall significant cumulative impact is not cumulatively considerable with the implementation of mitigation measures provided above (MTC, 2009). Water demand impacts are expected to remain significant.

3.4.7 Summary of Hydrology and Water Quality Impacts

The following is the summary of the conclusions of the analysis hydrology and water quality impacts associated with implementation of the 2010 CAP.

- Alternative Transportation Fuels: The use of alternative fuels is not expected to result in greater adverse water quality impacts than the use of convention fuels. Water quality impacts from the use of alternative fuels is expected to be equivalent to or less than adverse water quality impacts from the use of petroleum fuels and, therefore, is considered to be less than significant.

- Electric and Hybrid Vehicles: Illegal disposal of batteries is not expected to significantly impact water quality. Existing requirements Mitigation measures were developed that are expected to minimize any increase in illegal disposal of batteries by requiring the exchange of old batteries for new batteries and reducing the potential for increase illegal disposal to less than significant.

- Reformulated Products: As with solvent based materials, the illegal disposal of spent materials could result in significant adverse water quality impacts. Potential adverse wastewater impacts associated with reformulated products are expected to be minimal since reformulated products are limited to digital printing inks and solvents. Compliance with State and federal waste disposal regulations would minimize adverse impacts.

- Wet Gas Scrubbers: Compliance with wastewater discharge permit limits and requirements is expected to minimize the water quality impacts associated with the wastewater discharge from the use of WGS. As a result, significant adverse water quality impacts associated with wastewater discharges at industrial facilities are not expected.

- Groundwater Depletion/Water Demand: The water demand impacts associated with the use of WGS could exceed the significance criteria of 300,000 gallons per day and remains potentially significant, following mitigation.

- Cumulative Water Quality Impacts: Despite feasible mitigation, the overall cumulative impact related to water quality and flood risk in the Bay Area is assumed to remain significant and unavoidable. However, the contribution of the TCMs to the overall significant cumulative impact is not cumulatively considerable with the implementation of mitigation measures provided above (MTC, 2009).

3.5 Utilities and Service Systems

3.5.1 Environmental Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. Given the large area covered by the BAAQMD, public utilities are provided by a wide variety of local agencies.

3.5.1.1 Electricity

Power plants in California meet approximately 78 percent of the in-state electricity demand; hydroelectric power from the Pacific Northwest provides another seven percent and power plants in the southwestern United States provide another 15 percent (CEC, 2007). The contribution between in-state and out-of-state power plants depends upon, among other factors, the precipitation that occurred in the previous year and the corresponding amount of hydroelectric power that is available. The installed capacity of the 980 in-state power plants (greater than 0.1 megawatts - MW) totals 67,545.51 MW. These plants produced 209,856 gigawatt-hours of electricity in 2007. In the Bay Area, Control Costa County is home to one of the largest power plants in California. Smaller power plants and cogeneration facilities are located throughout the Bay Area. Pacific Gas and Electric (PG&E) is the primary supplier of electricity to northern California, including the Bay Area.

When signed into law in 1996, the electricity market in California was restructured under Assembly Bill 1890 (AB 1890). Restructuring involved decentralizing the generation, transmission, distribution and customer services, which had previously been integrated into individual, privately-owned utilities. The objective of restructuring was to increase competition in the power generation business, while increasing customer choice through the Power Exchange (PX). Additionally, the goal was to release control by privately-owned utilities of their transmission lines to a central operator called the Independent System Operator (ISO).

AB 1890 states the Legislature's intention that the State's publicly-owned utilities voluntarily give control of their transmission facilities to the ISO, just as is required of the privately-owned utilities. However, changes instituted by AB 1890 do not apply to them to the same extent as the privately-owned utilities. In-State, power plants supply most of California’s electricity demand, while hydroelectric power plants from the Pacific Northwest, and power plants in the southwestern U.S., provide for California’s out-of-state needs. The majority of power generated in the Bay Area comes from plants located in Contra Costa County. With the addition of the Gateway Generating Station (PG&E), which came on line in January 2009, Contra Costa County has three plants that consume natural gas and provide over 1,900 Megawatts (MW) of electricity (CEC, 2009).

Additionally, there are five power plants located in other counties within the district. The most recent additions to these facilities are the Von Raesfeld Power Plant, a 147 MW facility, opened in March of 2005, and the Metcalf Power Plant, a 600 MW facility, opened in May of 2005. These five facilities supply over 1,100 MW of electricity in the Bay Area (CEC, 2009).

Local electricity distribution service is provided to customers within the Air District by privately-owned utilities such as PG&E. Many public-owned utilities, such as Alameda Power and Telecom, East Bay Municipal Utility District and the Santa Clara Electric Department also provide service. PG&E is the largest electricity utility in the Bay Area, with a service area that covers all, or nearly all, of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties. PG&E provides approximately 95 percent of the total electricity demand in the Air District (CEC, 2004).

Table 3.5-1 shows the amount of electricity delivered to residential and nonresidential entities in the counties in the BAAQMD in 2006.

TABLE 3.5-1

Bay Area Utility Electricity Consumption by County for 2006

County	Residential	Non-residential	Total
Alameda	2,986	8,878	11,864
Contra Costa	2,744	5,862	8,606
Marin	701	706	1,407
Napa	377	580	957
San Francisco	1,451	4,060	5,511
San Mateo	1,594	3,362	4,955
Santa Clara	4,018	12,369	16,387
Solano	1,015	2,303	3,317
Sonoma	1,264	1,583	2,847
		Total Electricity Consumption:	55,851

Source: CEC, 2009

All usage expressed in millions of kilowatt-hour (kWh): kWh is the most commonly used unit of measure telling the amount of electricity consumed over time. It means one kilowatt (1000 watts) of electricity supplied for one hour.

Additional power plants are progressing through the permitting process. Table 3.5-2 lists the power plants under review, and shows the potential electricity generating capacity that would be available in the Bay Area once the proposed projects are constructed and permitted to operate (CEC, 2009a).

TABLE 3.5-2

Bay Area Power Plants Pending Construction or Review

Project	Docket No.	Status	Capacity (MW)	Location	Current On-Line Date
Approved/Not Under Construction					
Russell City – Calpine & GE	01-AFC-7	On Hold	600	Alameda Co.	6/12
Tesla Combined Cycle – FPL	01-AFC-21	On Hold	1,120	Alameda Co.	On Hold
Los Esteros 2 Combined Cycle – Calpine	03-AFC-2	On Hold	140	Santa Clara Co.	On Hold
East Altamont – Calpine	01-AFC-4	On Hold	1,100	Alameda Co.	On Hold
San Francisco Reliability Project City of SF	04-AFC-1	On Hold	145	San Francisco	On Hold
Projects Under Review					
Oakley Generating Station	09-AFC-4	12-mo. AFC	624	Contra Costa Co.	NA
Mariposa Peaker Project – Diamond Energy	09-AFC-3	12-mo. AFC	200	Alameda Co.	NA
Marsh Landing – Marsh Landing LLC	08-AFC-3	AFC	930	Contra Costa Co.	NA
Willow Pass Generating Station - Mirant	08-AFC-6	12-mo. AFC	550	Contra Costa Co.	7/12
Total Future Capacity			**5,409**		

Source: CEC, 2009a
*NA = not available

3.5.1.2 Solid/Hazardous Waste

Solid Waste

Permit requirements, capacity, and surrounding land use are three of the dominant factors limiting the operations and life of landfills. Landfills are permitted by the local enforcement agencies with concurrence from the California Integrated Waste Management Board (CIWMB). Local agencies establish the maximum amount of solid waste which can be received by a landfill each day and the operational life of a landfill. Landfills are operated by both public and private entities (CIWMB, 2009).

There are three primary classes of landfill sites permitted to receive varying severity of waste materials. Class I sites are facilities that can accept hazardous waste as well as municipal solid waste, construction debris, and yard waste. Class II sites may receive certain designated waste along with municipal solid waste, construction debris, and yard waste. Class III sites can only accept non-hazardous waste, e.g., solid waste construction debris, wood and yard waste, and certain non-hazardous industrial waste.

A total of 18 Class III active landfills are located within the Air District with a total capacity of 49,924 tons per day (see Table 3.5-3).

TABLE 3.5-3

Number of Class III Landfills Located within the Bay Area and Related Landfill Capacity

County	Number of Landfills	Capacity (tons/day)
Alameda(1)	3	16,096
Contra Costa	2	5,000
Marin	1	2,300
Napa	1	600
San Mateo	1	3,598
Santa Clara	7	13,100
Solano	2	6,730
Sonoma	1	2,500
TOTAL	**18**	**49,924**

(1) Sources: CIWMB, 2009

Hazardous Waste

Hazardous Wastes: There are two hazardous waste (Class I) facilities in California, the Chemical Waste Management Inc. (CWMI) Kettleman Hills facility in King's County, and the Safety-Kleen facility in Buttonwillow (Kern County). Kettleman Hills receives an average of 2,700 tons per day and has an estimated two million cubic yard capacity. The facility has a permit to continue receiving wastes until 2013 (DTSC 2007). The facility operators intend to seek a permit for development of a new landfill with a 15-year life (email Communication, Fred Paap, Chemical Waste Management Inc., September 2007). Buttonwillow receives approximately 960 tons of hazardous waste per day and has an approximate remaining capacity of 8.8 million cubic yards. The expectant life of the Buttonwillow Landfill is approximately 40 years (Personal Communication, Marianna Buoni, Clean Harbors Buttonwillow, Inc., September 2007).

Hazardous waste also can be transported to permitted facilities outside of California. The nearest out-of-state landfills are U.S. Ecology, Inc., located in Beatty, Nevada; USPCI, Inc., in Murray, Utah; and Envirosafe Services of Idaho, Inc., in Mountain Home, Idaho. Incineration is provided at the following out-of-state facilities: Aptus, located in

Aragonite, Utah and Coffeyville, Kansas; Rollins Environmental Services, Inc., located in Deer Park, Texas and Baton Rouge, Louisiana; Chemical Waste Management, Inc., in Port Arthur, Texas; and Waste Research & Reclamation Co., Eau Claire, Wisconsin.

About 809,462 tons of hazardous waste was generated in the nine counties that comprise the Air District in 2008 (see Table 3.5-4). The most common types of hazardous waste generated in the Bay Area include contaminated soils, waste oil and mixed oil, other inorganic solid waste, inorganic solids, unspecified solvent mixture, and asbestos-containing waste. Not all wastes are disposed of in a hazardous waste facility. Many of the wastes generated, including waste oil, are recycled.

TABLE 3.5-4

Hazardous Waste Generation in the Bay Area 2008
(tons per year)

Waste Name	Alameda	Contra Costa	Marin	Napa	San Francisco	San Mateo	Santa Clara	Solano	Sonoma
Contaminated Soils	68,189	141,262	8,882	215	90,450	10,176	49,545	4,190	3,565
Waste Oil and Mixed Oil	75,973	2,103	118	47	1,028	2,945	2,485	37,083	337
Other Inorganic Solid Waste	6,529	22,888	101	40	2,433	460	16,960	3,106	3,812
Metal Sludge	13,143	49	*	2	1	23	23,777	33	<1
Unspecified Solvent Mixture	2,024	193	40	82	87	2,690	33,658	113	99
Asbestos Waste	8,971	3,284	330	108	5,246	1,658	3,310	3,797	980
Other Organic Solids	2,121	13,894	107	79	1,341	2,475	5,614	690	290
Aqueous Solution with Metals	18,472	389	<1	<1	24	130	1,502	31	3
Aqueous Solution with Organic Residues	10,026	265	34	8	528	886	1,848	3,443	125
Unspecified Oil-Containing Waste	2,024	4,291	73	82	876	1,419	2,321	1,441	235
Unspecified Sludge Waste	428	5,830	1	2	29	4	116	1	3
Unspecified Aqueous Solution	1,077	638	55	5	88	226	4,163	369	23
Liquids with Halogenated Compounds	2,229	1,305	25	13	138	376	211	26	26
Total Waste Generated by County	222,033	214,214	9,981	1,385	104,179	28,584	159,908	58,070	11,108

Source: DTSC, 2009.

(1) Data presented is for entire county and not limited to the portion of the county within the Bay Area jurisdiction.

* None reported in Marin County

3.5.2 Significance Criteria

The impacts to utilities/service systems will be considered significant if any of the following criteria are met:

> The capacities of existing or proposed wastewater treatment facilities and the sanitary sewer system are not sufficient to meet the needs of the project.
>
> An increase in demand for utilities impacts the current capacities of the electric utilities.
>
> The existing water supply does not have the capacity to meet the increased demands of the project, or the project would use a substantial amount of potable water.
>
> The project increases demand for water by more than 300,000 gallons per day.
>
> The generation and disposal of hazardous and non-hazardous waste exceeds the capacity of designated landfills.

3.5.3 Utility and Service System Impacts

The potential impacts on utilities and service systems have been divided into separate sections to discuss the potentially significant impacts on: (1) electricity; (2) solid and hazardous wastes; and (3) water demand. Table 3.5-5 lists the 2010 CAP control measures that may have potentially significant utilities/service systems impacts. The impacts for electricity and solid/hazardous wastes are discussed in separate subsections below. The impacts on water demand are addressed in Section 3.4 – Hydrology and Water Quality.

3.5.3.1 Electricity

Project-Specific Impacts: The potential increase in electricity use due to implementation of the 2010 CAP is associated with the potential installation of add-on control equipment. Several control measures could result in the installation of add-on control equipment including SSM 1 – Metal-Melting Facilities, SSM 2 – Digital Printing, SSM 3 – Livestock Waste, SSM 5 – Vacuum Trucks, SSM 6 – General Particulate Mater Weight Rate Limitation, SSM – 8 Coke Calcining, SSM 9 – Cement Kilns, SSM 10 – Refinery Boilers and Heaters, SSM 13 – Dryers, Oven & Kilns, SSM 14 – Glass Furnaces, SSM 16 – Revise Regulation 2, Rule 2: New Source Review, and SSM 18 – Revise Air Toxics “Hot Spots” Program.

TABLE 3.5-5

Control Measures with Potential Utilities and Service Systems Impacts

Control Measures	Control Measure Description	Control Methodology	Impact
SSM 1	Metal-Melting Facilities	Control of PM and VOC emissions through use of baghouse, carbon adsorption and afterburners.	Potential increase in electricity demand associated with add-on air pollution control equipment. Potential increases in solid and hazardous wastes due to potential use of carbon adsorption and baghouses.
SSM 2	Digital Printing	Limit VOC content on inks and solvents or use VOC control equipment, e.g., carbon adsorption or afterburners.	Potential increased use of water based formulations.
SSM 3	Livestock Waste	Develop BMPs for reducing VOC emissions. Air pollution control devices could include anaerobic digesters, aerobic lagoon, aerated static piles, and biofilters.	Potential increase in electricity demand for air pollution control equipment. Potential increase in solid waste due to disposal of filters or catalyst from pollution control equipment.
SSM 5	Vacuum Trucks	Require carbon or other control technology on vacuum trucks.	Potential increase in electricity demand for air pollution control equipment. Potential increases in solid and hazardous wastes due to use of carbon adsorption.
SSM 6	General Particulate Matter Weight Rate Limitation	Further control of PM emissions through process modifications or add-on control equipment, e.g., baghouses.	Potential increase in electricity and water demand for air pollution control equipment (e.g., wet scrubbers). Potential increases in solid and hazardous wastes due to potential use of baghouses.
SSM 8	Coke Calcining	Control of SO_2 emissions through dry or semi-dry scrubbing, or wet gas scrubbing.	Potential increase in electricity demand for air pollution control equipment. Potential increase in water demand for wet gas scrubber. Potential increase in solid waste.
SSM 9	Cement Kilns	Further control of NOx emissions through low-NOx burners retrofit or replacement or use of SCR. Reduce SOx emissions using wet gas scrubber.	Potential increase in electricity and water demand for air pollution control equipment. Potential increase in solid/hazardous waste due to disposal of catalyst from SCR.
SSM 10	Refinery Boilers and Heaters	Further control of NOx emissions through low-NOx burners retrofit or replacement or use of SCR.	Potential increase in solid waste due to burner replacement and/or use of SCR catalyst. Potential increase in electricity demand.

TABLE 3.5-5 (cont.)

Control Measures	Control Measure Description	Control Methodology	Impact
SSM 11	Residential Fan Type Furnaces	Reduce allowable NOx limits in residential furnaces primarily through use of low NOx burners.	Potential increase in solid waste due to burner replacement. Potential increase in electricity demand.
SSM 12	Space Heating	Reduce allowable NOx limits in condo/apt. buildings and commercial furnaces/heaters primarily through use of low NOx burners.	Potential increase in solid waste due to burner replacement. Potential increase in electricity demand.
SSM 13	Dryers, Ovens, Kilns	Further control of NOx through low-NOx burners retrofit or replacement.	Potential increase in solid waste due to burner replacement. Potential increase in electricity demand.
SSM 14	Glass Furnaces	Further NOx control through alternative combustion techniques or add-on control equipment.	Potential increase in solid waste due to burner replacement and/or catalyst use. Potential increase in electricity demand.
SSM 15	Greenhouse Gases In Permitting – Energy Efficiency	Additional energy efficiency measures would be imposed on new and modified plants and equipment. Could lead to early retirement of existing equipment.	Potential increase in solid waste due to early retirement of equipment.
SSM 16	Revise Regulation 2, Rule 2: New Source Review	Further reduction of PM through replacement, retrofit or additional control equipment, e.g., baghouses.	Potential increase in solid waste due to equipment replacement and/or catalyst use. Potential increase in electricity demand.
SSM 17	Revise Regulation 2, Rule 5: New Source Review for Air Toxics	Further reduction of TACs through replacement, retrofit or additional control equipment, e.g., afterburners, carbon adsorption, etc.	Potential increase in solid waste due to equipment replacement and/or carbon use. Potential increase in electricity demand.
SSM 18	Revise Air Toxics “Hot Spots” Program	Further reduction of TACs through replacement, retrofit or additional control equipment, e.g., afterburners, carbon adsorption, etc.	Potential increase in solid waste due to equipment replacement and/or carbon use. Potential increase in electricity demand.
MSM A-1	Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles	Expand the use of Super Ultra-Low Emission (SULEV) and partial zero (ZEV) emissions vehicles and trucks. Encourage use of renewable fuels.	Potential increase in solid waste due to accelerated vehicle replacement. Potential increase in electricity demand.
MSM A-2	Zero Emission Vehicles and Plug-in Hybrids	Expand the use of ZEV and Plug-in Hybrid vehicles and trucks	Potential increase in electricity demand.
MSM A-3	Green Fleets for Light, Medium & Heavy-Duty Vehicles	Promote SULEV and ZEV vehicles, accelerated retirement of older vehicles, Encourage use of renewable fuels.	Potential increase in solid waste due to accelerated vehicle replacement. Potential increase in electricity demand.

TABLE 3.5-5 (cont.)

Control Measures	Control Measure Description	Control Methodology	Impact
MSM A-4	Replacement of Repair of High-Emitting Vehicles	Encourage early retirement or repair of high emitting vehicles and possibly motorcycles.	Potential increase in solid waste due to accelerated vehicle or engine replacement.
MSM B-1	HDV Fleet Modernization	Encourage early retirement of equipment. Provide incentives to accelerate the replacement or retrofit of on-road heavy-duty diesel engines in advance of requirements for the ARB in-use heavy-duty truck regulation.	Potential increase in solid waste due to accelerated vehicle or engine replacement.
MSM B-2	Low NOx Retrofits for In-Use Engines	Accelerated turnover of existing equipment, retrofit of existing equipment with add-on controls, e.g., NOx absorbers, exhaust gas recirculation, and SCRs.	Potential increase in solid waste due to accelerated vehicle replacement.
MSM B-3	Efficient Drive Trains	Encourage development and demonstration of hybrid drive trains.	Potential increase in electricity demand.
MSM C-1	Construction and Farming Equipment	Accelerated turnover of existing equipment, retrofit of existing equipment with add-on controls, e.g., PM filters. Use of alternative fuels and renewable diesel fuels.	Potential increase in solid waste due to accelerated equipment replacement. Potential increase in electricity demand.
MSM C-2	Lawn & Garden Equipment	Retirement of existing equipment and encourage use of new electric equipment.	Potential increase in solid waste due to accelerated equipment replacement. Potential increase in electricity demand.
MSM C-3	Recreational Vessels	Reduce emissions from recreational vessels through voluntary retirement and replacement programs.	Potential increase in solid waste due to accelerated engine replacement. Potential increase in electricity
LUM 2	Indirect Source Review Rule	Measures to reduce construction and vehicular emissions could include accelerated turnover of existing equipment, fees, retrofit of existing equipment, use of renewable fuels, and increase use of SULEV or ZEV vehicles.	Potential increase in solid waste due to accelerated equipment replacement. Potential increase in electricity demand.

TABLE 3.5-5 (concluded)

Control Measures	Control Measure Description	Control Methodology	Impact
LUM 3	Enhanced CEQA Program	Additional mitigation measures could be imposed which could encourage accelerated turnover of existing equipment, fees, retrofit of existing equipment, use of renewable fuels, and increase use of SULEV or ZEV vehicles.	Potential increase in solid waste due to accelerated equipment replacement. Potential increase in electricity demand. Potential increase in water demand associated with air pollution control equipment.
LUM 5	Reduce Risk from Stationary Sources in Impacted Communities	Further reduction of risk through replacement, retrofit or additional control equipment.	Potential increase in solid waste due to equipment replacement. Potential increase in electricity demand.
LUM 1	Goods Movement	Reduce diesel emissions through shore-side power for ships, improvements in the efficiency of engine drive trains, and other measures.	Potential increase in solid waste due to equipment replacement. Potential increase in electricity demand.
LUM 4	Land Use Guidelines	Additional measures could be imposed which could encourage accelerated turnover of existing equipment, fees, retrofit of existing equipment, use of renewable fuels, and increase use of SULEV or ZEV vehicles.	Potential increase in solid waste due to accelerated vehicle replacement. Potential increase in electricity demand.
ECM 2	Renewable Energy	Control measure could encourage the use of onsite cogeneration equipment.	Potential increase in electricity demand for air pollution control equipment, e.g., SCR.
ECM 1	Energy Efficiency	Provide education to increase energy efficiency; technical assistance to local governments to adopt and enforce energy-efficient building codes; and incentives for improving energy efficiency at schools.	Potential increase in solid waste due to equipment replacement.

Other control measures could result in an increase in the use of electric engines including MSM A-1 - Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles, MSM A-2 – Zero Emission Vehicles and Plug-in Hybrids, MSM A-3 – Green Fleets for Light, Medium & Heavy-Duty Vehicles, MSM B-3 – Efficient Drive Trains, MSM C-1 – Construction and Farming Equipment, MSM C-2 Lawn & Garden Equipment, MSM C-3 Recreational Vessels, LUM 2 – Indirect Source Review Rule, LUM 3 – Enhanced CEQA Program, LUM 5 – Reduce Risk from Stationary Sources, LUM 1 – Goods Movement, LUM4 – Land Use Guidelines, and ECM 2 - Renewable Energy.

For stationary sources, the increase in electricity demand is expected to be negligible. A number of the control measures would require natural gas rather than electricity including SSM – 8 Coke Calcining, SSM 9 – Cement Kilns, SSM 10 – Refinery Boilers and Heaters, SSM 13 – Dryers, Oven & Kilns, SSM 14 – Glass Furnaces. Reformulation of digital printing ink is expected to be used to meet VOC limits rather than the use of air pollution control equipment. Further, the primary method of control for other control measures is expected to be replacement of old equipment with newer, more energy efficient equipment, e.g., SSM 11 – Residential Fan Type Furnaces and SSM 12 Space Heating. Several control measures are aimed at increasing energy efficiency, thereby reducing electricity use including SSM 15 – Greenhouse Gases in Permitting, ECM 1 – Energy Efficiency, and ECM 2 – Renewable Energy. Therefore, some control measures are expected to reduce electricity use.

Electrification of mobile sources is expected to increase the electricity use in the Bay Area. Shifting some of the fuel source to electricity will require an additional electrical load. The estimated baseline electricity use in the Air District is about 55,851 million kWh in 2006 (see Table 3.5-1). The CEC estimates that the electricity supply will increase by about 1.3 percent per year in the PG&E service areas between 2006 and 2018 (CEC, 2007). Assuming the same increase in electricity generation occurs within the Bay Area by 2012, an increase in electricity demand of about 7.8 percent is expected [(55,851 x 0.078)+55,851 = 60,207 kWh].

Relative to the projected peak electricity demand in 2012, implementation of all the control measures is expected to result in an increase of about one percent of current electrical use in 2012 (see Table 3.5-6).

TABLE 3.5-6

Peak Electricity Demands for the Air District in 2010

(million kWh)

	2010
Baseline	60,207
Overall Impact	602
Percent of Baseline	1%

The electric energy impacts from the implementation of the 2010 CAP are expected to be less than significant. The electric energy impacts in Table 3.5-6 represent a conservative estimate of electric energy demand and peak demand impacts. These electricity impacts, although unavoidable, are expected to be less than significant because power-generating utilities are expected to have the capacity to supply the estimated electrical increase. As shown in Table 3.5-2, additional electric generating facilities have been approved or are in the process of being approved by the CEC so that sufficient electricity is expected to be available.

The 2010 CAP also includes several control measures aimed at increasing energy efficiency, thereby reducing electricity use including SSM 15 – Greenhouse Gases in Permitting, ECM 1 – Energy Efficiency, and ECM 2 – Renewable Energy. ECM 2 would promote distributed renewable energy generations, including solar, micro wind turbines and cogeneration facilities on commercial and residential buildings and at industrial facilities. Therefore, ECM 2 could increase electric generation in the Bay Area. ECM 1 would encourage the use of energy efficient equipment, provide education and technical assistance to adopt and enforce energy-efficient building codes, and provide incentives for improving energy efficiency at school. Therefore, ECM 1 could result in a decrease in electricity use. The Air District will also explore potential incentives that could be provided to promote projects and programs that in addition to reducing air pollution are energy efficient and reduce global warming gases.

Conclusion: Based upon the above considerations, significant adverse impacts to electricity generation are not expected due to implementation of the control measures within the 2010 CAP.

Project-Specific Mitigation: No mitigation measures are required because no significant impacts on electricity demand were identified.

3.5.3.2 Solid/Hazardous Waste Impacts

While the goal of the 2010 CAP is to improve air quality, some control measures have the potential to increase the generation of solid/hazardous wastes. Some air pollution control equipment may create cross-media impacts by removing pollutants from exhaust streams, which produce liquid or solids wastes that may require further treatment or disposal. Specifically, hazardous and non-hazardous waste may be generated by some types of air pollution control equipment such as electrostatic precipitators, carbon adsorption devices, wet gas scrubbers, baghouses, and filtration equipment. Other control measures may encourage early retirement of equipment and generate waste materials. The 2010 CAP control measures that may generate solid/hazardous waste impacts are included in Table 3.5-5. The analysis of solid/hazardous waste impacts assumes that safety and disposal procedures required by various agencies in California will provide reasonable precautions against the improper disposal of hazardous wastes in a municipal waste landfill. Because of state and federal requirements, some facilities are attempting to reduce or minimize the generation of solid and hazardous waste by incorporating source reduction technologies to reduce the volume or toxicity of waste generated, including improving operating procedures, using less hazardous or non-hazardous substitute materials, and upgrading or replacing inefficient processes.

Spent Batteries from Electric Vehicles

Project-Specific Impact: The 2010 CAP would encourage electrification of mobile sources including increased use of electric and electric hybrid vehicles, and potential electrification of trucks and construction equipment as part of mobile source control

measures. The batteries that could power these vehicles have useful lives similar to or less than the life of a vehicle. Since some batteries contain toxic materials, the increased use of batteries may result in an incremental increase in solid/hazardous waste impacts. In addition, environmental impacts could occur if batteries were disposed of in an unsafe manner, such as illegal dumping or by disposal in an unlined landfill.

It is difficult to predict in detail what the battery and fuel cell technologies of the future will be. It is also difficult to predict how often batteries will need replacement as this mainly depends on the battery type, the nature, and duration of its use, etc. Currently most battery packs' useful life is about three years. Replacement cost for the batteries depends on the type and number of batteries, but could cost thousands of dollars (SCAQMD, 2007).

Most battery and fuel cell technologies currently employ materials that have high economic value and, therefore, are recyclable. Additionally, both regulatory requirements and market forces require or encourage recycling. The following is a brief listing of some of the more important federal and State regulations that have created requirements or incentives for the proper disposal and recycling of EV battery packs:

- The federal Battery Act promulgated in 1996 requires that each regulated battery be labeled with a recycling symbol. NiCad batteries must be labeled with the words "NiCad" and the phrase "Battery must be recycled or disposed of properly." Lead-acid batteries must be labeled with the words "Lead," "Return," and "Recycle."

- Current California and federal regulations require ZEV manufacturers to take into account the complete life-cycle of car batteries and to plan for safe disposal and/or recycling of battery materials.

- The California Health and Safety Code does not allow the disposal of lead-acid batteries at a solid waste facility or on or in any land, surface waters, water courses, or marine waters. Legal disposal methods for used lead-acid batteries are to recycle/reuse the battery or to dispose of it at a hazardous waste disposal facility. A lead-acid battery dealer is required to accept spent batteries when a new one is purchased.

- California Public Resources Code requires state agencies to purchase car batteries made from recycled material.

- The Universal Waste Rule requires that spent batteries exhibiting hazardous waste characteristics and that are not recycled need to be managed as hazardous waste. This includes lead-acid and NiCad batteries.

Recycling of lead-acid and nickel-cadmium batteries is a well-established activity. Eighty percent of lead consumed in the United States is used to produce lead-acid batteries and the lead recovery rate from batteries is approximately 80 to 90 percent (the

remainder is plastic and fluids, e.g., sulfuric acid). According to the Lead-Acid Battery Consortium, 95 to 98 percent of all battery lead is recycled.

Because most EV batteries are recycled, it is unlikely that the increase in battery use would significantly adversely affect landfill capacity in California. As mentioned earlier, electric batteries generally hold significant residual value, and 95 to 98 percent of all lead-acid batteries are recycled. In addition, the electric batteries that would power EVs are packaged in battery packs and cannot be as easily disposed of as a single 12-volt conventional vehicle battery. It should be noted that the increased operation of EVs associated with the implementation of the 2010 CAP may result in a reduction of the amount of solid/hazardous waste generated in the Bay Area. EVs do not require the various oil and gasoline filters that are required by vehicles using internal combustion engines. As shown in Table 3.5-4, waste oil and mixed oil is one of the most common hazardous wastes generated in the Bay Area. Furthermore, EVs do not require the same type or amount of engine fluids (oil, antifreeze, etc.) that are required by vehicles using internal combustion engines. Used oil and antifreeze are considered hazardous wastes under California regulations.

Conclusion: Illegal or improper disposal of electric batteries could result in significant solid waste impacts by allowing hazardous wastes to be disposed in municipal landfill. Batteries are comprised of materials with economic value. Existing rules and regulations require the recycling of batteries; therefore, no significant adverse impacts are expected.

Project-Specific Mitigation: No mitigation measures are required because no significant impacts from the disposal of batteries on solid/hazardous waste were identified.

Potential Solid Waste Impacts due to Air Pollution Control Technologies

Project-Specific Impact: Table 3.5-5 identifies those proposed control measures that may have potential project specific impacts on solid waste due to the addition of pollution control equipment that may need disposal and replacement. It is difficult to quantify the number of facilities that would employ these types of equipment, the rate of disposal necessary to maintain the equipment, type of waste generated by the equipment (i.e., hazardous or non-hazardous) and the timing by which these technologies would come into use.

Particulate matter collected on filters is expected to be small. Diesel particulate filters are estimated to collect about 10 to 150 grams of material per vehicle per year (CARB, 2002), and the particulate collected is considered hazardous waste. The amount of material collected from these types of control equipment is expected to be minor as described in the following paragraphs and could be handled within the capacity of existing disposal facilities.

The diesel particulate matter (PM) filter system consists of a filter positioned in the exhaust stream designed to collect a significant fraction of the PM emissions while

allowing the exhaust gases to pass through the system. Since the volume of PM generated by a diesel engine is sufficient to fill up and plug a reasonably sized filter over time, some means of disposing of this trapped PM must be provided. The most promising means of disposal is to burn or oxidize the PM in the filter, thus regenerating, or cleansing, the filter.

A complete filter system consists of the filter and the means to facilitate the regeneration, if not of the disposable type. The exhaust temperature of diesels is not always sufficient to initiate regeneration in the filter. A number of techniques are available to bring about regeneration of filters. It is not uncommon for some of these various techniques to be used in combination. Some of these methods include:

- Using a catalyst coated on the filter element. The application of a base or precious metal coating applied to the surface of the filter reduces the ignition temperature necessary for oxidation of the particulate;

- Using a NOx conversion catalyst upstream of the filter to facilitate oxidation of NO to NO_2 which adsorbs on the collected PM, substantially reducing the temperature required to regenerate the filter;

- Using fuel-borne catalysts to reduce the temperature required for ignition of the accumulated material;

- Throttling the air intake to one or more of the cylinders, thereby increasing the exhaust temperature;

- Using fuel burners, electrical heaters, or combustion of atomized fuel by catalyst to heat the incoming exhaust gas to a temperature sufficient to ignite the PM;

- Using periodically compressed air flowing in the opposite direction of the PM from the filter into a collection bag which is periodically discarded or burned; and

- Throttling the exhaust gas downstream of the filter. This method consists of a butterfly valve with a small orifice in it. The valve restricts the exhaust gas flow, adding back pressure to the engine, thereby causing the temperature of the exhaust gas to rise and initiating combustion.

Baghouses and HEPA filters collect particulate emissions from stationary sources. Prefilters and filters collect particulate emissions from mobile sources of particulate emissions. These types of filtration control equipment can effectively remove particulate matter, including heavy metals, asbestos, as well as other toxic and nontoxic compounds.

Polytetrafluoroethylene (PTFE) membranes or HEPA filters can increase a system's removal efficiency up to 99.9 percent. In general, as particulate size decreases, the surface area to volume ratio increases, thus increasing the capacity of these filters to adsorb smaller particles (including hazardous materials). An increase in the use of

membranes and filters may increase solid waste requiring disposal in landfills in amounts greater than what would be produced if the 2010 CAP were not adopted. In some cases, the waste generated will be hazardous (e.g., the collection of toxic emissions). The increase in the amount of waste generated from the use of filters and the collection of additional particulate matter are expected to be small as the amount of material collected is small. Therefore, the potential impacts of the use of additional filtration equipment on solid/hazardous waste generation are less than significant.

Based on the above considerations no significant adverse solid/hazardous waste impacts are anticipated to occur from the use of particulate traps. State law requires hazardous waste generators to attempt to recycle their wastes in lieu of disposal. OEHHA has implemented a hazardous waste exchange program to promote the use, reuse, and exchange of hazardous wastes. The program is designed to assist generators of hazardous wastes to recycle their wastes and encourage the reuse of the wastes. The DTSC also publishes a directory catalog of industrial waste recyclers annually so that industries will know where to buy, sell, or exchange their wastes.

Conclusion: Based upon the above considerations, significant adverse impacts to solid and hazardous waste are not expected due to implementation of the control measures within the 2010 CAP.

Project-Specific Mitigation: No significant solid/hazardous waste impacts were identified for solid waste impacts due to air pollution control technologies as part of the 2010 CAP Ozone Strategy so no mitigation measures are required.

Carbon Adsorption

The proposed control measures may generate additional solid or hazardous waste in the form of carbon used to control organic emissions, should facilities choose to comply using activated carbon filters. The additional volume of carbon is not expected to be significant since carbon is usually collected and regenerated so that little additional solid waste would be expected.

Project-Specific Impact: Several control measures could encourage the use of carbon adsorption as air pollution control equipment including SSM 2 – Digital Printing and SSM 5 – Vacuum Trucks, SSM 16 – Revise Regulation 2, Rule 2: New Source Review, SSM 18 – Revise Air Toxic "Hot Spots" Program, and LUM 5 – Reduce Risk from Stationary Sources. The amount of solid waste that may be generated by the carbon adsorption process would depend on the number of carbon adsorbers installed, the operating characteristics, and the frequency of carbon replacement. Most of the control measures have alternative methods of compliance, e.g., use of low VOC materials, so that all facilities would not be expected to use carbon adsorption to comply.

If carbon adsorption systems are used, the amount of hazardous waste generated on an annual basis is expected to be minimal. Most activated carbon used in carbon adsorption control devices is reclaimed and reactivated, resulting in negligible impacts on solid

waste disposal facilities. Activated carbon can have a lifetime of five to 10 years; however, the operating characteristics of the control device may result in a shorter lifetime.

Spent carbon is usually recycled and reused rather than disposed in landfills. Most facilities contract out with vendors that take the spent carbon and deliver regenerated carbon. Another alternative to the land disposal of regenerated carbon is to burn the spent carbon in a thermal incinerator. With thermal incineration, the organic materials contained in the carbon are oxidized to carbon dioxide, water, and in most cases, harmless combustion by-products. Incineration destroys the toxic constituents and significantly reduces the volume of carbon to be disposed of, thus reducing solid waste impacts. The disadvantage of incineration is that without additional add-on control devices, there may be an increase in criteria pollutant emissions. Further, it is not expected that carbon adsorption will be used in every case where it is listed as a control option. It is expected that facilities will continue to choose other more cost-effective options to comply with control measures.

Conclusion: Based upon the above considerations, significant adverse solid waste impacts resulting from the use of carbon adsorption are not expected due to implementation of the control measures within the 2010 CAP.

Project-Specific Mitigation: No significant impacts due to the use of carbon adsorption are expected so no mitigation measures are required. However, it is recommended that recycling and reusing activated carbon should be required to minimize the amount of spent carbon waste being transferred to landfills.

Early Retirement of Equipment

Project-Specific Impact: Control Measures MSM A-1, MSM A-3, MSM A-4, MSM B-1, MSM B-2, MSM B-3, MSM C-1, MSM C-2, MSM C-3, LUM 2, LUM3, LUM 1, LUM4, and ECM 1 may result in the early retirement of vehicles or other equipment.

Approximately 80 percent of a retired vehicle can be recycled and reused in another capacity. Batteries, catalytic converters, tires, and other recoverable materials (e.g., metal components) are removed and the rest of the vehicle is shredded. The shredded material is then sent for recovery of metal content. Therefore, the amount of solid waste landfilled as a result of the proposed measures would be smaller than the size of the vehicle. Additionally, there are a limited number of vehicles that can be scrapped per year. These vehicles would be scrapped in the near future, regardless of the control measures as they are older vehicles. Further, these control measures are not expected to mandate that older vehicle, engines, or other equipment be scrapped. The control measures are expected to allow a number of different control methods to comply with the required emission reductions. Control measures that would require new equipment will generally require that it occur at the end of the life of the old equipment and new equipment is put into service. Some equipment, e.g., construction equipment could be sent to other locations for use, e.g., outside of California or to other countries. Some control measures are

expected to result in earlier retirement of vehicles than would have occurred without these control measures. Therefore, the control measures would not necessarily result in an increase in the generation of waste, rather they would result in an earlier generation of the waste. Based on the above, the increase in solid waste is expected to be accounted for within the California Integrated Waste Management Board's permitted capacity of the landfills within the Bay Area of about 50,000 tons per day so that no significant impacts would be expected.

The California Integrated Waste Management Act of 1989 (AB 939) requires cities and counties in California to reduce the amount of solid waste disposed in landfills by 25 percent by 1995 and by 50 percent by 2000, through source reduction, recycling and composting activities. Many cities and counties have not met these waste reduction goals. The generation of additional waste could impact the abilities of cities and counties to further reduce wastes. However, as discussed above, the increase in solid waste that is expected to be diverted to a landfill is small and many of the waste streams are recyclable.

Conclusion: Based upon the above considerations, significant adverse impacts on landfill capacity are not expected due to implementation of the control measures within the 2010 CAP.

Project-Specific Mitigation: No significant impacts on solid/hazardous waste associated with the early retirement of vehicles were identified so no mitigation measures are required.

3.5.4 Mitigation Measures

The mitigation measures for utility/service systems impacts were addressed in each subcategory. No significant impacts on utilities and service systems were identified so no mitigation measures are required.

3.5.5 Cumulative Utilities and Service System Impacts

Cumulative Energy Impacts

As indicated in Subchapter 3.5.2.1, electricity impacts associated with implementing the 2010 CAP were concluded to be less than significant.

Energy impacts were also evaluated for the Transportation 2035 Plan and the related TCMs. Implementation of the Transportation 2035 Plan, combined with anticipated regional growth and improvements in vehicle technology would result in lower daily energy consumption relative to baseline conditions. Thus, cumulative energy impacts were considered to be beneficial.

It should be noted that there are many factors that could influence future energy use including State and federal regulatory actions (e.g., changes in fuel economy standards),

local land use decisions (e.g., where city and county government approve subsequent development projects and the resulting transportation energy required to travel to and from these locations), global economic factors (e.g., the cost of oil, natural gas, electricity, and other forms of energy), and others. In light of these factors, the future transportation energy reductions in the Bay Area are uncertain. Moreover, much of the increase in energy use would be expected due to regional population growth.

On the other hand, some of these wider local, state, or national efforts could assist in energy conservation efforts, for instance, SB 375, which requires transportation planning agencies to develop a Sustainable Communities Strategy as part of regional transportation plans beginning in 2013 would be expected to result in reductions in energy consumption, compared to what would otherwise occur in future years.

Nonetheless, implementation of the Transportation 2035 Plan along with the 2010 CAP is expected to use about 5.1 percent less transportation energy than under existing conditions, and about 0.5 percent less than the No Project Alternative. The decrease in total energy use from existing conditions is primarily a result of decreased fuel consumption by on-road vehicles (cars and trucks). Given that population is expected to increase over the term of the Transportation 2035 Plan, per capita transportation energy consumption is expected to decrease by about 25 percent from existing conditions (MTC, 2009). Therefore, the overall cumulative impact of air quality control measures including the 2010 CAP and the Transportation 2035 Plan are expected to provide a beneficial impact on energy and the cumulative energy impacts are less than significant.

Cumulative Energy Impact Mitigation: No significant adverse cumulative energy impacts were identified so no mitigation measures are required.

Cumulative Solid/Waste Impacts

Implementing the 2010 CAP could increase disposal of spent batteries, carbon adsorption filters, particulate traps and filters, catalysts, and old equipment (due to early retirement of equipment). The control measures are expected to allow a number of different control methods to comply with required emission reductions. The most cost effective control measures would be expected to be implemented. Control measures that would require new equipment will generally require that it occur as the life of the old equipment is exhausted and new equipment is put into service. Further, recycling of vehicles for scrap metal is common and expected to continue. The increase in solid waste was determined to be less than significant because a substantial amount of the waste would be recycled and because sufficient landfill capacity exists to handle the small amounts that may require disposal.

Implementation of the Transportation 2035 Plan has the potential to generate solid waste during construction, such as for new transit lines, capacity enhancement facilities through grading and excavation activities. Construction debris is expected to be recycled or transported to the nearest landfill. The construction and maintenance of transportation facilities would involve the use of hazardous materials such as solvents, paints and other

architectural coatings. The use and storage of these materials will be regulated by local fire departments, CUPAs, and the California Division of Occupational Safety and Health. Materials left over from construction projects can likely be re-used on other projects. For materials that cannot be, or are not reused, disposal would be regulated by the DTSC under state and federal hazardous waste regulations. With these regulations in place, cumulative solid/hazardous waste impacts are expected to be less than significant.

Cumulative Solid/Hazardous Waste Mitigation: No significant cumulative solid/hazardous waste impacts were identified so no mitigation measures are proposed.

3.5.6 Summary of Utility and Service Systems Impacts

The following is the summary of the conclusions of the analysis of utility and service systems impacts associated with implementation of the 2010 CAP.

- Electricity: The electricity impacts from implementation of the 2010 CAP are expected to be less than significant. These electricity impacts, although unavoidable, are expected to be less than significant because power-generating utilities are expected to have the capacity to supply the estimated electrical increase.

- Solid/Hazardous Waste – Spent Batteries from Electric Vehicles: Illegal or improper disposal of electric batteries could result in significant solid waste impacts by allowing hazardous wastes to be disposed in municipal landfill. Batteries are comprised of materials with economic value. Existing rules and regulations require the recycling of batteries; therefore, no significant adverse impacts are expected.

- Solid/Hazardous Waste – Air Pollution Control Technologies: No significant adverse solid/hazardous waste impacts are anticipated to occur from the use of particulate traps due to the small quantity of wastes generated. State law regulates the generation, storage, transport and disposal of hazardous waste and encourages waste generators to recycle their wastes in lieu of disposal. OEHHA has implemented a hazardous waste exchange program to promote the use, reuse, and exchange of hazardous wastes.

- Solid/Hazardous Waste – Early Retirement of Equipment: Early retirement of equipment would not result in an increase in the generation of waste, but could result in an earlier generation of the waste. The major part of equipment that would be retired early, e.g., vehicles and trucks, is expected to be recycled so no significant waste impacts are expected.

- Cumulative Energy Impacts: Implementation of the Transportation 2035 Plan, combined with anticipated regional growth and improvements in vehicle technology would result in lower daily energy consumption relative to baseline conditions. Thus, cumulative energy impacts were considered to be beneficial.

- Cumulative Solid/Hazardous Waste Impacts: The increase in solid waste was determined to be less than significant because a substantial amount of the waste would be recycled and because sufficient landfill capacity exists to handle the small amounts that may require disposal. Waste disposal is regulated by DTSC under state and federal hazardous waste regulations. With these regulations in place, cumulative solid/hazardous waste impacts are expected to be less than significant.

3.6 Potential Environmental Impacts Found Not to be Significant

3.6.1 Introduction

While all the environmental topics required to be analyzed under CEQA were reviewed to determine if the proposed amendments would create significant impacts, the screening analysis (see Appendix A for the NOP/IS) concluded that the following environmental areas would not be significantly adversely affected by the 2010 CAP: aesthetics, agriculture resources, biological resources, cultural resources, geology/soils, land use/planning, mineral resources, noise, population/housing, public services, recreation, and transportation/traffic. The following summarizes the conclusions from the NOP/IS for the environmental resources for which the environmental impacts associated with the implementation of the 2010 CAP were found to be less than significant.

3.6.2 Aesthetics

The proposed control measures in the 2010 CAP are not expected to adversely affect scenic vistas in the District; damage scenic resources, including but not limited to trees, rock outcroppings, or historic buildings within a scenic highway; or substantially degrade the visual character of a site or its surroundings. The reason for this conclusion is that most of the proposed control measures typically affect existing commercial or industrial facilities and reduce emissions from mobile sources, increase energy efficiency, as well as measures to minimize emissions from indirect sources. Industrial or commercial facilities are typically located in appropriately zoned areas (e.g., industrial and commercial areas) that are not usually associated with scenic resources. Construction activities are expected to be limited to industrial and commercial areas. Further, modifications typically occur inside the buildings at the affected facilities, or because of the nature of the business (e.g., commercial or industrial) can easily blend with the facilities with little or no noticeable effect on adjacent areas.

The 2010 CAP may have a beneficial effect on scenic resources by improving visibility and reducing regional haze.

The proposed 2010 CAP is not expected to create additional demand for new lighting that could create glare that could adversely affect day or nighttime views in any areas. As noted above, facilities affected by proposed control measures typically make modifications in the interior of an affected facility so any new light sources would typically be inside a building or not noticeable because of the presence of existing outdoor light sources. Further, operators of commercial or industrial facilities who would make physical modifications to facilities and may require additional lighting would be located in appropriately zoned areas that are not usually located next to residential areas, so new light sources, if any, are not expected to be noticeable in residential areas. Most local land use agencies have ordinances that limit the intensity of lighting and its effects on adjacent property owners.

Based upon the above considerations, significant adverse project-specific impacts to aesthetics are not expected to occur due to implementation of the 2010 CAP.

3.6.3 Agriculture Resources

The 2010 CAP control measures typically affect existing commercial or industrial facilities, reduce emissions from mobile sources, and reduce emissions from land use decisions. The control measures are not expected to generate any new construction of buildings or other structures that would require conversion of farmland to non-agricultural use or conflict with zoning for agricultural uses or a Williamson Act contract. There are no provisions in the proposed 2010 CAP that would affect or conflict with existing land use plans, policies, or regulations or require conversion of farmland to non-agricultural uses.

The 2010 CAP could provide benefits to agricultural resources by reducing air pollutants, including ozone precursors and, thus, reducing the adverse impacts of ozone on plants and animals.

Based upon the above considerations, significant adverse project-specific impacts to agricultural resources are not expected to occur due to implementation of the 2010 CAP.

3.6.4 Biological Resources

No direct or indirect impacts from implementing 2010 CAP control measures were identified that could adversely affect plant and/or animal species in the District. The 2010 CAP control measures typically affect existing commercial or industrial facilities and reduce emissions from mobile sources, increase energy efficiency, as well as measures to minimize emissions from indirect sources. Existing commercial or industrial facilities are generally located in appropriately zoned commercial or industrial areas, which typically do not support candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service. Similarly, modifications at existing facilities would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with native or resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. Further, since the proposed 2010 CAP primarily regulates stationary emission sources at existing and new commercial or industrial facilities, it does not directly or indirectly affect local agency land use policy that may adversely affect riparian habitat or other sensitive natural communities identified in local or regional plans, policies, or regulations, or identified by the California Department of Fish and Game or U.S. Fish and Wildlife Service. Improving air quality is expected to provide health and welfare benefits to plant and animal species in the Bay Area. There are no control measures contained in the 2010 CAP that would alter this determination.

Some control measures could result in the installation of additional controls at industrial or commercial facilities. The installation of air pollution control equipment at these facilities would be consistent with commercial/industrial land uses. For these reasons the

proposed project will not adversely affect protected wetlands as defined by section 404 of the Clean Water Act, including, but not limited to marshes, vernal pools, coastal wetlands, etc., through direct removal, filling, hydrological interruption or other means.

The 2010 CAP includes the Tree Planting (ECM 4) Measure that would encourage additional tree planting. The trees are expected to be planted in urban areas as part of landscaped vegetation and are not expected to displace any native habitat or conflict with local policies. Rather the control measure is expected to encourage local tree policies to include the use of additional trees to provide landscaping that shades urban development, resulting in cooler temperatures and less energy used for cooling. Improving air quality is expected to provide health and welfare benefits to plant and animal species in the District.

Based upon the above considerations, significant adverse project-specific impacts to biological resources are not expected to occur due to implementation of the 2010 CAP.

3.6.5 Cultural Resources

Implementing control measures in the proposed 2010 CAP may require minor site preparation and grading at an affected facility. Additional development would not be expected to uncover cultural resources in already developed and urbanized areas including existing industrial and commercial facilities that may be affected by the stationary source control measures. If archaeological or paleontological resources are uncovered, significant adverse cultural resources impacts are not anticipated because there are existing laws in place that are designed to protect and mitigate potential adverse impacts to cultural resources. As with any construction activity, should archaeological resources be found during construction that results from implementing the proposed control measures, the activity would cease until a thorough archaeological assessment is conducted.

Based upon the above considerations, significant adverse project-specific impacts to agricultural resources are not expected to occur due to implementation of the 2010 CAP.

3.6.6 Geology/Soils

The proposed 2010 CAP will not directly or indirectly expose people or structures to earthquake faults, seismic shaking, seismic-related ground failure including liquefaction, landslides, mudslides or substantial soil erosion for the following reasons. When implemented as rules or regulations, control measures do not directly or indirectly result in construction of new structures. Some structural modifications, however, at existing affected facilities may occur as a result of installing control equipment or making process modifications. In any event, existing affected facilities or modifications to existing facilities would be required to comply with relevant California Building Code requirements in effect at the time of initial construction or modification of a structure.

Because facilities affected by any 2010 CAP control measures are typically located in industrial or commercial areas, which are not typically located near known geological hazards (e.g., landslide, mudflow, seiche, tsunami or volcanic hazards), no significant adverse geological impacts are expected. Tsunamis at the facilities near the water or within the ports are not expected because the San Francisco Bay is largely protected from wave action. 2010 CAP control measures will not locate sources closer to hazards such as water or increase potential exposures to tsunamis.

The proposed project does not have the potential to substantially increase the area subject to compaction or overcovering since the subject areas would be limited in size and, typically, have already been graded or displaced in some way (e.g., additional structures at industrial or commercial areas).

The proposed 2010 CAP does not contain any control measures that generate construction of residential projects in remote areas. The proposed control measures typically affect existing industrial or commercial facilities that are already connected to appropriate wastewater facilities. Therefore, the use of septic tanks or other alternative wastewater disposal systems will not be affected by implementation of the 2010 CAP.

Based upon the above considerations, significant adverse project-specific impacts to geology and soils are not expected to occur due to implementation of the 2010 CAP.

3.6.7 Land Use/Planning

The proposed 2010 CAP generally is expected to impose control requirements on stationary sources at existing commercial or industrial facilities, reduce emissions from mobile sources, increase energy efficiency, and reduce emissions from land use decisions. As a result, the proposed 2010 CAP does not require construction of structures for new land uses in any areas of the District and, therefore, is not expected to create divisions in any existing communities or conflict with any applicable habitat conservation or natural community conservation plans.

Any facilities affected by the proposed 2010 CAP would still be expected to comply with, and not interfere with, any applicable land use plans, zoning ordinances, habitat conservation or natural community conservation plans. There are no provisions of the proposed project that would directly affect these plans, policies, or regulations. There are existing links between population growth, land development, housing, traffic, and air quality. The Metropolitan Transportation Commission's (MTC) Transportation 2035 Plan accounts for these links when designing ways to improve air quality, transportation systems, land use compatibility, and housing opportunities in the region. The proposed 2010 CAP complements existing regional planning activities in the Bay Area.

Based upon the above considerations, significant adverse project-specific land use and planning impacts are not expected to occur due to implementation of the 2010 CAP.

3.6.8 Mineral Resources

There are no provisions of the proposed project that would directly result in the loss of availability of a known mineral resource of value to the region and the residents of the state, or of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. The proposed 2010 CAP is not expected to deplete non-renewable mineral resources, such as aggregate materials, metal ores, etc., at an accelerated rate or in a wasteful manner because CAP control measures are typically not mineral resource intensive measures.

Based upon the above considerations, significant adverse project-specific impacts on mineral resources are not expected to occur due to implementation of the 2010 CAP.

3.6.9 Noise

The proposed project may require existing commercial or industrial owners/operators of affected facilities to install air pollution control equipment or modify their operations to reduce stationary source emissions. The 2010 CAP could require additional control equipment that could generate noise impacts, but virtually all of the control equipment would be installed at industrial and commercial facilities.

Ambient noise levels in commercial and industrial areas are typically driven primarily by freeway and/or highway traffic in the area and any heavy-duty equipment used for materials manufacturing or processing at nearby facilities. It is not expected that any modifications to install air pollution control equipment would substantially increase ambient (operational) noise levels in the area, either permanently or intermittently, or expose people to excessive noise levels that would be noticeable above and beyond existing ambient levels. It is not expected that affected facilities would exceed noise standards established in local general plans, noise elements, or noise ordinances currently in effect. Affected facilities would be required to comply with local noise ordinances and elements, which may require construction of noise barriers or other noise control devices.

Construction activities at industrial/commercial facilities could also generate noise impacts. However, those construction activities (e.g., paving activities) would be required to comply with local noise ordinances, which generally prohibit construction during the nighttime, in order to minimize noise impacts. Compliance with the local noise ordinances is expected to minimize noise impacts associated with construction activities to less than significant.

It is also not anticipated that the proposed project will cause an increase in ground borne vibration levels because air pollution control equipment is not typically vibration intensive equipment.

Affected facilities would still be expected to comply, and not interfere, with any applicable airport land use plans and disclose any excessive noise levels to affected residences and workers pursuant to existing rules, regulations and requirements, such as

CEQA. It is assumed that operations in areas near airports are subject to and in compliance with existing community noise ordinances and applicable OSHA or Cal/OSHA workplace noise reduction requirements. In addition to noise generated by current operations, noise sources in each area may include nearby freeways, truck traffic to adjacent businesses, and operational noise from adjacent businesses. None of the proposed control measures in the 2010 CAP would locate residents or commercial buildings or other sensitive noise sources closer to airport operations.

Based upon the above considerations, significant adverse project-specific noise impacts are not expected to occur due to implementation of the 2010 CAP.

3.6.10 Population/Housing

The proposed project is not anticipated to generate any significant effects, either directly or indirectly, on the Bay Area's population or population distribution. The proposed 2010 CAP generally affects existing commercial or industrial facilities located in predominantly industrial or commercial urbanized areas throughout the District. It is expected that the existing labor pool within the areas surrounding any affected facilities would accommodate the labor requirements for any modifications at affected facilities. In addition, it is not expected that affected facilities will be required to hire additional personnel to operate and maintain new control equipment on site because air pollution control equipment is typically not labor intensive equipment. In the event that new employees are hired, it is expected that the existing local labor pool in the District can accommodate any increase in demand for workers that might occur as a result of adopting the proposed 2010 CAP. As such, adopting the proposed 2010 CAP is not expected to induce substantial population growth.

The proposed 2010 CAP is not expected to increase the demand for new workers in the area. Any demand for new employees is expected to be accommodated from the existing labor pool so no substantial population displacement is expected. Construction activities generated by the 2010 CAP are expected to be limited to stationary sources within industrial and commercial areas for the installation of new technology or equipment. The 2010 CAP is not expected to require construction activities that would displace people or existing housing.

Based upon the above considerations, significant adverse project-specific population and housing impacts are not expected to occur due to implementation of the 2009 CAP.

3.6.11 Public Resources

There is no potential for significant adverse public service impacts as a result of adopting the proposed 2010 CAP. The proposed project would not result in the need for new or physically altered government facilities in order to maintain acceptable service ratios, response times or other performance objectives. Similarly, most industrial facilities have on-site security that controls public access to facilities so no increase in the need for police services are expected. Most industrial facilities have on-site fire protection

personnel and/or have agreements for fire protection services with local fire departments. For these reasons, implementing the 2010 CAP is not expected to require additional fire protection services.

Adopting the proposed 2010 CAP is not expected to induce population growth. Thus, implementing the proposed control measures would not increase or otherwise alter the demand for schools and parks in the District.

Based upon the above considerations, significant adverse project-specific impacts on public resources are not expected to occur due to implementation of the 2010 CAP.

3.6.12 Recreation

As discussed under "Land Use and Planning" and "Population and Housing" above, there are no provisions of the proposed project that would affect land use plans, policies, ordinances, or regulations. No land use or planning requirements, including those related to recreational facilities, will be altered by the proposal.

Based upon the above considerations, significant adverse project-specific impacts on recreation are not expected to occur due to implementation of the 2010 CAP.

3.6.13 Transportation/Traffic

Adopting the proposed 2010 CAP is not expected to substantially increase vehicle trips or vehicle miles traveled in the District. The 2010 CAP includes transportation and related control measures that may result in a decrease in vehicle miles traveled. The 2010 CAP also relies on transportation control measures adopted as part of the Transportation 2035 Plan by MTC (MTC, 2009). Specific strategies that serve to reduce vehicle trips and vehicle miles traveled, such as strategies resulting in greater reliance on mass transit, ridesharing, telecommunications, etc., are expected to result in reducing traffic congestion. Although population in the District will continue to increase, implementing the transportation control measures (in conjunction with the Regional Transportation Plan) will ultimately result in greater percentages of the population using transportation modes other than single occupant vehicles. As a result, relative to population growth, existing traffic loads and the level of service designation for intersections District-wide would not be expected to degrade at current rates, but could possibly improve to a certain extent. Therefore, implementing the 2010 CAP could ultimately provide transportation improvements and congestion reduction benefits.

Neither air traffic nor air traffic patterns are expected to be directly or indirectly affected by adopting the proposed 2010 CAP.

It is not expected that adopting the proposed 2010 CAP will directly or indirectly increase roadway design hazards or incompatible risks. The transportation control measures included in the 2010 CAP are not expected to require construction of new roadways. Controlling emissions at existing commercial or industrial facilities, reducing emissions

from mobile sources, increasing energy efficiency, and reducing emissions from land use decisions are not expected to affect in any way emergency access routes at any affected commercial or industrial facilities.

The 2010 CAP is not expected to result in inadequate parking at any affected facilities in the District since transportation and related control measures reduce or limit the growth in daily vehicle trips thereby reducing the need for parking.

Adopting the proposed 2010 CAP is not expected to generate any significant adverse project-specific impacts to transportation or traffic systems.

CHAPTER 4

ALTERNATIVES ANALYSIS

Introduction
Alternatives Rejected as Infeasible
Alternatives to the Proposed Project
Alternatives Analysis
Comparison of Alternatives

4.0 Alternatives

4.1 Introduction

This EIR provides a discussion of alternatives to the proposed project as required by CEQA. According to the CEQA guidelines, alternatives should include realistic measures to attain the basic objectives of the proposed project and provide means for evaluating the comparative merits of each alternative (CEQA, Guidelines, § 15126.6(a)). In addition, though the range of alternatives must be sufficient to permit a reasoned choice, they need not include every conceivable project alternative (CEQA Guidelines §15126.6(a)). The key issue is whether the selection and discussion of alternatives fosters informed decision making and public participation. An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative (CEQA Guidelines, § 15126.6(f)(3)).

The alternatives typically included in CEQA documents are developed by breaking down the project into distinct components (e.g., emission limits, compliance dates, applicability, exemptions, etc.) and varying the specifics of one or more of the components. Different compliance approaches that generally achieve the objectives of the project may also be considered as project alternatives.

The discussion of alternatives is required to focus on alternatives to the proposed project or its location that are capable of avoiding or substantially lessening any significant effects of the proposed project on the environment. As discussed in Chapter 3 of this EIR, the proposed project may result in significant adverse environmental impacts associated with localized emissions from mobile sources and increased water demand.

4.2 Project Objectives

CEQA Guidelines section 15124, subdivision (b), requires an EIR to include a statement of objectives, which describes the underlying purpose of the proposed project. The purpose of the statement of objectives is to aid the lead agency in identifying alternatives and the decision-makers in preparing a statement of findings and a statement of overriding considerations, if necessary. The objectives of the proposed 2010 CAP are summarized as follows:

- Comply with the 1988 California Clean Air Act requirements including:
  - Apply best available retrofit control technology (BARCT);
  - Implement all feasible measures through an expeditious implementation schedule;
  - Reduce population exposure to ozone and its precursors according to a prescribed schedule;
  - Provide for the attainment of the State ozone ambient air quality standard at the earliest practicable date.
- Comply with transport mitigation requirements in Health and Safety Code §40912.
- Reduce ambient concentrations of particulate matter.
- Reduce ambient concentrations of toxic air contaminants.

- Reduce greenhouse gas emissions, while crafting a strategy to reduce ambient concentrations of ozone, particulate matter and toxic air contaminants.

4.3 Alternatives to the Proposed Project

In accordance with CEQA Guidelines section 15126.6, subdivision (c), a CEQA document should identify any alternatives that were considered by the lead agency, but were rejected as infeasible during the scoping process and briefly explain the reason underlying the lead agency's determination. Section 15126.6, subdivision (c) also states that among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (1) failure to meet most of the basic project objectives; (2) infeasibility; or (3) inability to avoid significant environmental impacts.

The possible alternatives to the proposed 2010 CAP are limited by the nature of the project. The Plan fulfills the California Clean Air Act requirements that all regions that do not meet the State ozone standards update plans for attaining the standards every three years. In summary, these plans must include estimates of current and future emissions of particulate matter and the pollutants that form ozone, and a control strategy, including all "feasible measures," to reduce these emissions.

To identify all feasible measures, staff from the BAAQMD conducted internal reviews, consulted with CARB, and solicited ideas from technical consultants. In addition, the recent ozone attainment plans for the SCAQMD, San Joaquin Valley Unified Air Pollution Control District (SJVAPCD) and the Sacramento Metropolitan Air Quality Management District (SMAQMD) were reviewed. Adopted rules in the following air districts were compared to requirements in place in the Bay Area region: SCAQMD, SMAQMD; Ventura County Air Pollution Control District, and SJVAAPCD. Each of the five air districts was responsible for identifying all feasible measures, as well as Reasonable Available Control Measures (RACM) for the stationary measures in its jurisdiction.

From these analyses, the proposed control measures for the 2010 CAP were prepared and public workshops were conducted. The following is a summary of the findings:

1. All feasible control measures that were currently available were evaluated and analyzed for inclusion in the 2010 CAP.

2. New or amended stationary control measures, mobile source control measures, land use and local impact control measures, and energy and climate control measures have been identified and are included in the 2010 CAP.

3. The 2010 CAP includes all feasible control measures provided by the public and experts.

4. The available control measures that are not included collectively would not advance the attainment date or contribute to reasonable further progress for the Bay Area

because of the insignificant or non-quantifiable amount of emissions reductions that they may potentially generate.

Based on the above, the alternatives to the 2010 CAP are limited to those identified below.

4.3.1 Alternative - No Project Alternative

CEQA requires the specific No Project Alternative to be evaluated. A No Project Alternative consists of what would occur if the proposed project was not approved. In this case, the No Project Alternative refers to the BAAQMD not adopting the 2010 CAP at this time. Adopting the No Project Alternative does not imply that no further action will be taken to implement control measures that reduce emissions that contribute to ozone or particulate matter. In this case, and in accordance with Section 15126.6, subdivision (e)(3)(A), this analysis assumes that the net effect of not adopting the Plan would be a continuation of the existing air quality plans including the 2005 Ozone Strategy and the control strategies included in that Plan.

Under the No Project Alternative, it is assumed that the 2010 CAP will not be implemented. TCMs already approved by the MTC would still occur. However, the control measures currently proposed by the BAAQMD as part of the 2010 CAP would not be implemented including the stationary source measures, the mobile source control measures, the land use measures and the energy and climate measures (see Table 2-1). None of the Project Objectives outlined in Section 4.2 would be achieved under the No Project Alternative. It is not reasonable to assume that the BAAQMD will do nothing to comply with the state Clean Air Act in perpetuity. It is assumed that an attainment plan would be prepared at some later date under the No Project Alternative.

4.3.2 Alternative 2 – Ozone Control Strategy Only

One of the goals of the 2010 CAP is to comply with the 1988 California Clean Air Act requirements related to air quality planning for non-attainment pollutants, i.e., ozone and particulate matter. Under Alternative 2, only those control measures that are required to be implemented to comply with the California Clean Air Act requirements for ozone would be implemented; therefore, control measures that would reduce emissions of NOx and VOCs would still be implemented. Control measures that would reduce particulate matter, toxic air contaminants and GHG emissions (only) would not be implemented. All measures that would provide NOx and VOC emissions reductions are included in Alternative 2. Some control measures would control multiple pollutants including NOx, VOC, TACs and/or GHG emissions so other air quality benefits would be provided under Alternative 2. The measures that would be evaluated Alternative 2 are included in Table 4-1.

TABLE 4-1
Control Measures Implemented Under Alternative 2

NUMBER	CONTROL MEASURE NAME
Stationary and Area Source Measures	
SSM 2	Digital Printing
SSM 3	Livestock Waste
SSM 4	Natural Gas Processing and Distribution
SSM 5	Vacuum Trucks
SSM 7	Open Burning
SSM 9	Cement Kilns
SSM 10	Refinery Boilers and Heaters
SSM 11	Residential Fan Type Furnaces
SSM 12	Space Heating
SSM 13	Dryers, Ovens, Kilns
SSM 14	Glass Furnaces
Transportation Control Measures	
TCM A-1	Improve Local and Areawide Bus Service
TCM A-2	Improve Local and Regional Rail Service
TCM B-1	Implement Freeway Performance Initiative
TCM B-2	Improve Transit Efficiency and Use
TCM B-3	Bay Area Express Lane Network
TCM B-4	Goods Movement Improvements and Emission Reduction Strategies
TCM C-1	Support Voluntary Employer-Based Trip Reduction Program
TCM C-2	Implement Safe Routes to Schools and Safe Routes to Transit
TCM C-3	Promote Rideshare Services and Incentives
TCM C-4	Conduct Public Outreach and Education
TCM C-5	Promote Smart Driving/Speed Moderation
TCM D-1	Improve Bicycle Access and Facilities
TCM D-2	Improve Pedestrian Access and Facilities
TCM D-3	Support Local Land Use Strategies
TCM E-1	Value Pricing Strategies
TCM E-2	Parking Pricing and Management Strategies
TCM E-3	Implement Transportation Pricing Reform
Mobile Source Control Measures	
MSM A-1	Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles
MSM A-2	Zero Emission Vehicles and Plug-in Hybrids
MSM A-3	Green Fleets (Light, Medium & Heavy-Duty Vehicles)
MSM A-4	Replacement or Repair of High-Emitting Vehicles
MSM B-1	HDV Fleet Modernization
MSM B-2	Low NOx Retrofits for In-Use Engines
MSM B-3	Efficient Drive Trains
MSM C-1	Construction and Farming Equipment
MSM C-2	Lawn & Garden Equipment
MSM C-3	Recreational Vessels
Land Use and Local Impact Control Measures	
LUM 1	Goods Movement
LUM 2	Indirect Source Review Rule
LUM 3	Enhanced CEQA Program
LUM 4	Land Use Guidelines
Energy and Climate Measures	
ECM 1	Energy Efficiency
ECM 2	Renewable Energy
ECM 3	Urban Heat Island Mitigation
ECM 4	Tree-Planting

Under Alternative 2, the following stationary source measures would be eliminated from the 2010 CAP: SSM 1 – Metal Melting Facilities, SSM 6 – General PM Weight Rate Limitation, SSM 8 – Coke Calcining, SSM 15 – GHG in Permitting/Energy Efficiency, SSM 16 – Revise Regulation 2, Rule 2, New Source Review for TACs, SSM 17 - Revise Regulation 2, Rule 5, New Source Review for TACs, SSM 18 – Changes to Toxic Hot Spots Program. Two land use measures would also be eliminated: LUM 5 – Reduce Risk from Stationary Sources in Impacted Communities and LUM 6 – Enhanced Air Quality Modeling. All the TCMs, mobile source control measures, and energy and climate measures would be implemented.

Under Alternative 2, some of the Project Objectives outlined in Section 4.2 would be achieved including compliance with the California Clean Air Act for ozone and compliance with the ozone transport mitigation requirements. The other objectives of reducing ambient concentrations of particulate matter, toxic air contaminants, and GHG emissions would not be achieved under Alternative 2. A separate plan would be required to reduce particulate matter emissions under Alternative 2.

4.3.3 Alternative 3 – Reduce Criteria Pollutants Only

Under Alternative 3, those control measures that would reduce emissions of criteria pollutants (i.e., NOx, VOCs and particulate matter) would be implemented. Control measures that would reduce TACs and GHG emissions would not be implemented. The measures that would be evaluated under Alternative 3 are included in Table 4-2.

Under Alternative 3 the following stationary source measures would be eliminated from the 2010 CAP: SSM 15 – GHG in Permitting/Energy Efficiency, SSM 17 - Revise Regulation 2, Rule 5, New Source Review for TACs, SSM 18 – Changes to Toxic Hot Spots Program. Two land use measures would also be eliminated: LUM 5 – Reduce Risk from Stationary Sources in Impacted Communities and LUM 6 – Enhanced Air Quality Modeling.

Under Alternative 3, some of the Project Objectives outlined in Section 4.2 would be achieved including compliance with the California Clean Air Act for ozone, compliance with the ozone transport mitigation requirements, and reducing ambient concentrations of particulate matter. The other objectives of reducing toxic air contaminants and GHG emissions would not be achieved under Alternative 3.

TABLE 4-2: Control Measures Implemented Under Alternative 3

NUMBER	CONTROL MEASURE NAME
Stationary and Area Source Measures	
*SSM 1	Metal Melting Facilities
SSM 2	Digital Printing
SSM 3	Livestock Waste
SSM 4	Natural Gas Processing and Distribution
SSM 5	Vacuum Trucks
*SSM 6	General PM Weight Rate Limitation
SSM 7	Open Burning
*SSM 8	Coke Calcining
SSM 9	Cement Kilns
SSM 10	Refinery Boilers and Heaters
SSM 11	Residential Fan Type Furnaces
SSM 12	Space Heating
SSM 13	Dryers, Ovens, Kilns
SSM 14	Glass Furnaces
SSM 16	Revise Regulation 2, Rule 2: New Source Review
Transportation Control Measures	
TCM A-1	Improve Local and Areawide Bus Service
TCM A-2	Improve Local and Regional Rail Service
TCM B-1	Implement Freeway Performance Initiative
TCM B-2	Improve Transit Efficiency and Use
TCM B-3	Bay Area Express Lane Network
TCM B-4	Goods Movement Improvements and Emission Reduction Strategies
TCM C-1	Support Voluntary Employer-Based Trip Reduction Program
TCM C-2	Implement Safe Routes to Schools and Safe Routes to Transit
TCM C-3	Promote Rideshare Services and Incentives
TCM C-4	Conduct Public Outreach and Education
TCM C-5	Promote Smart Driving/Speed Moderation
TCM D-1	Improve Bicycle Access and Facilities
TCM D-2	Improve Pedestrian Access and Facilities
TCM D-3	Support Local Land Use Strategies
TCM E-1	Value Pricing Strategies
TCM E-2	Parking Pricing and Management Strategies
TCM E-3	Implement Transportation Pricing Reform
Mobile Source Control Measures	
MSM A-1	Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles
MSM A-2	Zero Emission Vehicles and Plug-in Hybrids
MSM A-3	Green Fleets (Light, Medium & Heavy-Duty Vehicles)
MSM A-4	Replacement or Repair of High-Emitting Vehicles
MSM B-1	HDV Fleet Modernization
MSM B-2	Low NOx Retrofits for In-Use Engines
MSM B-3	Efficient Drive Trains
MSM C-1	Construction and Farming Equipment
MSM C-2	Lawn & Garden Equipment
MSM C-3	Recreational Vessels
Land Use and Local Impact Control Measures	
LUM 1	Goods Movement
LUM 2	Indirect Source Review Rule
LUM 3	Enhanced CEQA Program
LUM 4	Land Use Guidelines
Energy and Climate Measures	
ECM 1	Energy Efficiency
ECM 2	Renewable Energy
ECM 3	Urban Heat Island Mitigation
ECM 4	Tree-Planting

4.4 Alternatives Analysis

4.4.1 Air Quality Impacts

4.4.1.1 Alternative 1 - No Project Alternative

Under the No Project Alternative, it is assumed that the 2010 CAP will not be implemented. As shown in Table 4-3, only the TCMs already approved by the MTC would still occur. The control measures currently proposed by the BAAQMD as part of the 2010 CAP would not be implemented including the stationary source measures, the mobile source control measures, the land use measures and the energy and climate measures.

TABLE 4-3
Emission Reductions of Control Measures Under the No Project Alternative

Control Measure	Description	Estimated Emission Reductions (tons/day)				
		VOC	NOx	PM_{10}	SO_2	GHG[(1)]
Transportation Control Measures						
TCM A-1	Improve Local and Areawide Bus Service	**0.028**	**0.032**	**0.005**	**--**	**23**
TCM A-2	Improve Local and Regional Rail Service	**0.139**	**0.152**	**0.043**	**--**	**516**
TCM B-1	Implement Freeway Performance Initiative	**0.922**	**3.315**	**0.178**	**--**	**2,451**
TCM B-2	Improve Transit Efficiency and Use	**0.004**	**0.005**	**0.001**	**--**	**6.130**
TCM B-3	Bay Area Express Lane Network	**0.860**	**1.362**	**0.660**	**--**	**1,892**
TCM B-4	Goods Movement Improvements	**0.585**	**4.818**	**0.276**	**--**	**4,045**
TCM C-1	Employer-Based Trip Reduction Program	**0.076**	**0.094**	**0.033**	**--**	**97**
TCM C-2	Implement Safe Routes to Schools and Safe Routes to Transit	**0.008**	**0.008**	**0.001**	**--**	**8.182**
TCM C-3	Promote Rideshare Services and Incentives	**0.084**	**0.105**	**0.013**	**--**	**153**
TCM C-4	Conduct Public Outreach and Education	**0.020**	**0.020**	**0.003**	**--**	**40.42**
TCM C-5	Promote Smart Driving/Speed Moderation	**0.074**	**0.168**	**0.010**	**--**	**180**
TCM D-1	Improve Bicycle Access and Facilities	**0.004**	**0.004**	**<0.001**	**--**	**4.44**
TCM D-2	Improve Pedestrian Access and Facilities	**0.003**	**0.002**	**<0.001**	**--**	**1.76**
TCM D-3	Support Local Land Use Strategies	**0.242**	**0.311**	**0.580**	**--**	**873.63**
TCM E-1	Value Pricing Strategies	**--**	**0.0105**	**0.003**	**<0.001**	**9.87**
TCM E-2	Parking Pricing and Management Strategies	**0.180**	**0.188**	**0.025**	**--**	**294**
TCM E-3	Implement Transportation Pricing Reform	**0.115**	**0.120**	**0.016**	**--**	**188**
TOTAL EMISSION REDUCTIONS No Project Alternative		**3.344**	**10.715**	**1.847**	**--**	**10,783**
TOTAL EMISSION REDUCTIONS Proposed Project		15.57	35.13	6.20	3.126	15,150

1. GHG emissions are reported as CO_2 equivalent emissions in short tons per day.

Under the No Project Alternative, emission reductions associated with implementation of the TCMs would still occur and result in emissions reductions as follows: 3.344 tons/day of VOC, 10.715 tons/day of NOx, 1.847 tons/day of PM_{10} and about 10,783 tons/day of GHG emissions providing beneficial air quality impacts. Although emission reductions would still occur under the No Project Alternative, the emission reductions would be less than the proposed project because only the TCMs would be implemented (see Table 4-3), potentially resulting in higher ozone concentrations and greater ozone transport. The No Project Alternative would also provide less emission reductions associated with TACs and GHG than the proposed project.

The other potential air quality impacts related to implementation of the Plan would not be expected to occur, i.e., (1) secondary impacts from increased electricity demand, (2) secondary impacts from control of stationary sources; (2) secondary emissions from use of lower VOC materials; (3) secondary air quality impacts from construction activities; (4) impacts on ozone transport; (5) emissions from mobile sources; (6) and potential increase in toxic air contaminants associated with reformulated materials. The above impacts were expected to be less than significant in Chapter 3, except for the possible increase in mobile sources in localized areas. Therefore, the No Project Alternative would reduce or minimize the potentially significant adverse air impact of localized emissions from mobile sources associated from control measures that could encourage increase traffic in localized areas, e.g., LUM 2 – Indirect Source Review, LUM3 – Enhanced CEQA Program, and LUM 4 - Land Use Guidelines.

4.4.1.2 Alternative 2 – Ozone Control Strategy Only

Under Alternative 2, it is assumed that only the control measures that result in VOC and NOx emission reductions (and ultimately a decrease in ambient ozone concentrations) would be implemented, along with the already approved TCMs (see Table 4-4). A few of the stationary source control measures, land use measures, and energy and climate measures would not be implemented under Alternative 2.

Under Alternative 2, emission reductions would be expected as follows: 15.57 tons/day of VOC, 36.13 tons/day of NOx, 3.62 tons/day of PM_{10} and about 15,150 tons/day of GHG emissions providing beneficial air quality impacts. The emission reductions would be the same for emissions of VOC, NOx, and GHG emissions and less than the emission reductions for PM_{10} and SO_2 associated with the proposed project (see Table 4-4). Alternative 2 would also provide less emission reductions associated with TACs and GHG than the proposed project.

The other potential air quality impacts related to implementation of the Plan would not be expected to occur, i.e., (1) secondary impacts from increased electricity demand, (2) secondary impacts from control of stationary sources; (2) secondary emissions from use of lower VOC materials; (3) secondary air quality impacts from construction activities; (4) impacts on ozone transport; (5) emissions from mobile sources; (6) and potential increase in toxic air contaminants associated with reformulated materials. The above impacts were expected to be less than significant in Chapter 3, except for the possible increase in mobile sources in localized areas. Alternative 2 would not be expected to

reduce or minimize the potentially significant adverse air impact of localized emissions from mobile sources associated with control measures that could encourage increased

TABLE 4-4

Emission Reductions Associated with Alternative 2

Control Measure	Description	Estimated Emission Reductions (tons/day)				
		VOC	NOx	PM_{10}	SO_2	GHG[(1)]
Stationary and Area Source Measures						
SSM 2	Digital Printing	--	--	--	--	--
SSM 3	Livestock Waste	0.300	--	--	--	65
SSM 4	Natural Gas Processing and Distribution	0.300	--	--	--	120
SSM 5	Vacuum Trucks	6.000	--	--	--	--
SSM 7	Open Burning	0.040	0.010	--	--	--
SSM 9	Cement Kilns	--	4.380	--	--	--
SSM 10	Refinery Boilers and Heaters	--	2.900	--	--	--
SSM 11	Residential Fan Type Furnaces	--	4.200	--	--	--
SSM 12	Space Heating	--	1.200	--	--	--
SSM 13	Dryers, Ovens, Kilns	--	0.20	--	--	--
SSM 14	Glass Furnaces	--	0.38	--	--	--
Transportation Control Measures						
TCM A-1	Improve Local and Areawide Bus Service	0.028	0.032	0.005	--	23
TCM A-2	Improve Local and Regional Rail Service	0.139	0.152	0.043	--	516
TCM B-1	Implement Freeway Performance Initiative	0.922	3.315	0.178	--	2,451
TCM B-2	Improve Transit Efficiency and Use	0.004	0.005	0.001	--	6.130
TCM B-3	Bay Area Express Lane Network	0.860	1.362	0.660	--	1,892
TCM B-4	Goods Movement Improvements	0.585	4.818	0.276	--	4,045
TCM C-1	Employer-Based Trip Reduction Program	0.076	0.094	0.033	--	97
TCM C-2	Implement Safe Routes to Schools and Safe Routes to Transit	0.008	0.008	0.001	--	8.182
TCM C-3	Promote Rideshare Services and Incentives	0.084	0.105	0.013	--	153
TCM C-4	Conduct Public Outreach and Education	0.020	0.020	0.003	--	40.42
TCM C-5	Promote Smart Driving/Speed Moderation	0.074	0.168	0.010	--	180
TCM D-1	Improve Bicycle Access and Facilities	0.004	0.004	<0.001	--	4.44
TCM D-2	Improve Pedestrian Access and Facilities	0.003	0.002	<0.001	--	1.76
TCM D-3	Support Local Land Use Strategies	0.242	0.311	0.580	--	873.63
TCM E-1	Value Pricing Strategies		0.0105	0.003	<0.001	9.87
TCM E-2	Parking Pricing and Management Strategies	0.180	0.188	0.025	--	294
TCM E-3	Implement Transportation Pricing Reform	0.115	0.120	0.016	--	188
Mobile Source Control Measures						
MSM A-1	Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles	0.050	0.030	0.009	--	<0.001
MSM A-2	Zero Emission Vehicles and Plug-in Hybrids	0.010	0.010	0.009	--	<0.001
MSM A-3	Green Fleets (Light, Medium & Heavy-Duty Vehicles)	0.020	0.020	0.030	--	<0.001
MSM A-4	Replacement or Repair of High-Emitting Vehicles	4.370	2.060	0.030	--	44.143
MSM B-1	HDV Fleet Modernization	0.100	5.000	0.110	--	0.64

TABLE 4-4 (concluded)

Control Measure	Description	Estimated Emission Reductions (tons/day)				
		VOC	NOx	PM_{10}	SO_2	GHG[(1)]
Mobile Source Control Measures (cont.)						
MSM B-2	Low NOx Retrofits for In-Use Engines	--	0.990		--	
MSM B-3	Efficient Drive Trains	0.010	0.290	0.009	--	0.23
MSM C-1	Construction and Farming Equipment	0.040	0.720	0.020	--	
MSM C-2	Lawn & Garden Equipment	0.040	0.009	0.010	--	<0.001
MSM C-3	Recreational Vessels	0.060	0.009	--	--	0.416
Land Use and Local Impact Control Measures						
LUM 1	Goods Movement	0.012	1.719	0.015		2,561
LUM 2	Indirect Source Review Rule	0.302	0.244	0.467	0.003	340
LUM 3	Enhanced CEQA Program	0.440	0.350	0.670		447
LUM 4	Land Use Guidelines	0.077	0.081	0.011		139
Energy and Climate Control Measures						
ECM 1	Energy Efficiency	0.05	0.52	0.32	0.44	543
ECM 2	Renewable Energy	<0.001	<0.001	<0.001	<0.001	0.56
ECM 3	Urban Heat Island Mitigation	0.002	0.025	0.015	0.021	30
ECM 4	Tree-Planting	0.005	0.072	0.044	0.062	76
TOTAL EMISSION REDUCTIONS Alternative 2:		15.57	36.13	3.62	0.53	15,150
TOTAL EMISSION REDUCTIONS Proposed Project:		15.57	36.13	6.20	3.136	15,150

traffic in localized areas as the land use measure that could encourage localized emissions would be implemented under Alternative 2, e.g., LUM 2 – Indirect Source Review, LUM3 – Enhanced CEQA Program, and LUM 4 - Land Use Guidelines.

4.4.1.3 Alternative 3 – Reduce Criteria Pollutants Only

Under Alternative 3, it is assumed that only the control measures that result in emission reductions of criteria pollutants would be implemented, along with the already approved TCMs (see Table 4-5). A few of the stationary source control measures, land use measures, and energy and climate measures associated with TAC and GHG emission reductions would not be implemented under Alternative 3.

Under Alternative 3, emission reductions would be estimated to be essentially the same as the proposed project (see Table 4-5). This is largely because the emission reductions associated with some of the land use and energy and climate control measures are speculative and cannot be estimated at this time. Therefore, the air quality impacts associated with Alternative 3 are estimated to be the same as the proposed project. In reality, it is likely that additional emission reductions of TACs and GHG emissions would be expected under the proposed project.

TABLE 4-5

Emission Reductions under Alternative 3

Control Measure	Description	Estimated Emission Reductions (tons/day)				
		VOC	NOx	PM_{10}	SO_2	GHG[(1)]
Stationary and Area Source Measures						
SSM 1	Metal-Melting Facilities	--	--	--	--	--
SSM 2	Digital Printing	--	--	--	--	--
SSM 3	Livestock Waste	0.300	--	--	--	65
SSM 4	Natural Gas Processing and Distribution	0.300	--	--	--	120
SSM 5	Vacuum Trucks	6.000	--	--	--	--
SSM 6	General Particulate Matter Weight Rate Limitation	--	--	2.583	--	--
SSM 7	Open Burning	0.040	0.010	--	--	--
SSM 8	Coke Calcining	--	--	--	2.6	--
SSM 9	Cement Kilns	--	4.380	--	--	--
SSM 10	Refinery Boilers and Heaters	--	2.900	--	--	--
SSM 11	Residential Fan Type Furnaces	--	4.200	--	--	--
SSM 12	Space Heating	--	1.200	--	--	--
SSM 13	Dryers, Ovens, Kilns	--	0.20	--	--	--
SSM 14	Glass Furnaces	--	0.38	--	--	--
SSM 16	Revise Regulation 2, Rule 2: New Source Review	-	-	-	-	-
Transportation Control Measures						
TCM A-1	Improve Local and Areawide Bus Service	0.028	0.032	0.005	--	23
TCM A-2	Improve Local and Regional Rail Service	0.139	0.152	0.043	--	516
TCM B-1	Implement Freeway Performance Initiative	0.922	3.315	0.178	--	2,451
TCM B-2	Improve Transit Efficiency and Use	0.004	0.005	0.001	--	6.130
TCM B-3	Bay Area Express Lane Network	0.860	1.362	0.660	--	1,892
TCM B-4	Goods Movement Improvements	0.585	4.818	0.276	--	4,045
TCM C-1	Employer-Based Trip Reduction Program	0.076	0.094	0.033	--	97
TCM C-2	Implement Safe Routes to Schools and Safe Routes to Transit	0.008	0.008	0.001	--	8.182
TCM C-3	Promote Rideshare Services and Incentives	0.084	0.105	0.013	--	153
TCM C-4	Conduct Public Outreach and Education	0.02	0.020	0.003	--	40.42
TCM C-5	Promote Smart Driving/Speed Moderation	0.074	0.168	0.010	--	180
TCM D-1	Improve Bicycle Access and Facilities	0.004	0.004	<0.001	--	4.44
TCM D-2	Improve Pedestrian Access and Facilities	0.003	0.002	<0.001	--	1.76
TCM D-3	Support Local Land Use Strategies	0.242	0.311	0.580	--	873.63
TCM E-1	Value Pricing Strategies	--	0.0105	0.003	<0.001	9.87
TCM E-2	Parking Pricing and Management Strategies	0.180	0.188	0.025	--	294
TCM E-3	Implement Transportation Pricing Reform	0.115	0.120	0.016	--	188
Mobile Source Control Measures						
MSM A-1	Promote Clean, Fuel Efficient Light & Medium-Duty Vehicles	0.050	0.030	0.009	--	<0.001
MSM A-2	Zero Emission Vehicles and Plug-in Hybrids	0.010	0.010	0.009	--	<0.001
MSM A-3	Green Fleets (Light, Medium & Heavy-Duty Vehicles)	0.020	0.020	0.030	--	<0.001

TABLE 4-5 (concluded)

Control Measure	Description	Estimated Emission Reductions (tons/day)				
		VOC	NOx	PM_{10}	SO_2	GHG[1]
Mobile Source Control Measures (cont.)						
MSM A-4	Replacement or Repair of High-Emitting Vehicles	4.370	2.060	0.030	--	44.143
MSM B-1	HDV Fleet Modernization	0.100	5.000	0.110	--	0.64
MSM B-2	Low Nox Retrofits for In-Use Engines	--	0.990		--	
MSM B-3	Efficient Drive Trains	0.010	0.290	0.009	--	0.23
MSM C-1	Construction and Farming Equipment	0.040	0.720	0.020	--	
MSM C-2	Lawn & Garden Equipment	0.040	0.009	0.010	--	<0.001
MSM C-3	Recreational Vessels	0.060	0.009	--	--	0.416
Land Use and Local Impact Control Measures						
LUM 1	Goods Movement	0.012	1.719	0.015	--	2,561
LUM 2	Indirect Source Review Rule	0.302	0.244	0.467	0.003	340
LUM 3	Enhanced CEQA Program [2]	0.440	0.350	0.670	--	447
LUM 4	Land Use Guidelines	0.077	0.081	0.011	--	139
LUM 5	Reduce Risk in Impacted Communities	--	--	--	--	--
LUM 6	Enhanced Air Quality Monitoring	--	--	--	--	--
Energy and Climate Control Measures						
ECM 1	Energy Efficiency [2]	0.05	0.52	0.32	0.44	543
ECM 2	Renewable Energy [2]	<0.001	<0.001	<0.001	<0.001	0.56
ECM 3	Urban Heat Island Mitigation	0.002	0.025	0.015	0.021	30
ECM 4	Tree-Planting [3]	0.005	0.072	0.044	0.062	76
TOTAL EMISSION REDUCTIONS:		15.57	36.13	6.20	3.13	15,150
TOTAL EMISSION REDUCTIONS Proposed Project:		15.57	36.13	6.20	3.13	15,150

1. GHG emissions are reported as CO_2 equivalent emissions in short tons per day.

Alternative 3 would not be expected to reduce or minimize the potentially significant adverse air impact of localized emissions from mobile sources associated with control measures that could encourage increased traffic in localized areas as the land use measure that could encourage localized emissions would be implemented under Alternative 3.

4.4.2 Hazards and Hazardous Materials

4.4.2.1 Alternative 1 - No Project Alternative

The No Project Alternative would eliminate or reduce some of the hazard impacts associated with the 2010 CAP including: (1) the hazards associated with ammonia use and transportation; (2) hazards associated with alternative fuels; (3) hazardous associated with fuel additives; and (4) hazards associated with the use of reformulated materials (e.g., inks used in digital printing). The potential hazard impacts associated implementation of the 2010 CAP were determined to be less than significant so the No Project Alternative would not reduce significant hazard impacts to less than significant.

4.4.2.2 Alternative 2 – Ozone Control Strategy Only

Alternative 2 would include the same control measures as the proposed project for the hazards evaluated including: (1) ammonia use in SCRs; (2) alternative fuel use; (3) use of fuel additives; and (4) use of reformulated materials. Therefore, the hazard impacts associated with Alternative 2 are essentially the same as the proposed project and less than significant.

4.4.2.3 Alternative 3 – Reduce Criteria Pollutants Only

Alternative 3 would not eliminate any of the control measures associated with the 2010 CAP that were evaluated for hazard impacts. Therefore, the hazard impacts associated with Alternative 3 are the same as the proposed project and less than significant.

4.4.3 Hydrology and Water Quality

4.4.3.1 Alternative 1 - No Project Alternative

The No Project Alternative would eliminate or reduce some of the hydrology and water quality impacts associated with the 2010 CAP including potential water quality impacts associated with: (1) alternative fuels; (2) electric and hybrid vehicles; (3) reformulated products; (4) use of wet gas scrubbers; and (5) ground water depletion/water demand. It was determined that the 2010 CAP would result in potentially significant impacts on water demand/ground water depletion due to the water use associated with wet gas scrubbers for control measures that require particulate control, e.g., SSM 6 – General Particulate Matter Weight Rate Limitation, SSM 8 – Coke Calcining, and SSM 9 – Cement Kiln. The No Project Alternative would eliminate all stationary source control measures and would reduce the potentially significant impacts of ground water depletion and water demand associated with the proposed project.

4.4.3.2 Alternative 2 – Ozone Control Strategy Only

Alternative 2 would eliminate two stationary source control measures with potentially significant hydrology and water quality impacts, SSM 6 – General Particulate Matter Weight Rate Limitation, and SSM 8 – Coke Calcining. These stationary source control measures would result in potentially significant impacts on water demand/ground water depletion due to the water use associated with wet gas scrubbers for control measures that require particulate control. Alternative 2 would eliminate SSM 6 and SSM 8 and would reduce the potentially significant impacts of ground water depletion and water demand associated with the proposed project. The hazard impacts associated with (1) ammonia use in SCRs; (2) alternative fuel use; (3) fuel additives; and (4) reformulated materials would remain less than significant.

4.4.3.3 Alternative 3 – Reduce Criteria Pollutants Only

Alternative 3 would not eliminate any of the control measures associated with the 2010 CAP that were evaluated for hydrology and water quality impacts. Therefore, the hydrology and water quality impacts associated with Alternative 3 are the same as the proposed project and remain significant for water demand.

4.4.4 Utilities and Service Systems

4.4.4.1 Alternative 1 - No Project Alternative

The No Project Alternative would eliminate or reduce some of the utilities/service systems impacts associated with the 2010 CAP including impacts on electricity and; (2) solid/hazardous waste impacts. The utilities and service system impacts associated with implementation of the 2010 CAP were determined to be less than significant so the No Project Alternative would not reduce any significant utility and service system impacts to less than significant.

4.4.4.2 Alternative 2 – Ozone Control Strategy Only

Alternative 2 would eliminate several stationary source control measures with potential utilities/service system impacts including SSM 1 – Metal-Melting Facilities, SSM 6 – General Particulate Matter Weight Rate Limitation, SSM 8 - Coke Calcining, SSM 15 – Greenhouse Gases in Permitting/Energy Efficiency, SSM 16 – Revise Regulation 2, Rule 2: New Source Review, SSM 17 – Revise Regulation 2, Rule 5: New Source Review for Air Toxics, and SSM 18 – Revise Air Toxics "Hot Spots" Program. One land use measure also would be eliminated, LUM 5 – Reduce Risk from Stationary Sources in Impacted Communities. The electricity and solid/hazardous waste impacts associated with Alternative 2 are expected to be less than the proposed project. Electricity and solid/hazardous waste impacts for the proposed project were determined to be less than significant so Alternative 2 would not reduce any significant utility and service system impacts to less than significant.

4.4.4.3 Alternative 3 – Reduce Criteria Pollutants Only

Alternative 3 would eliminate several stationary source control measures with potential utilities/service system impacts including SSM 15 – Greenhouse Gases in Permitting/Energy Efficiency, SSM 17 – Revise Regulation 2, Rule 5: New Source Review for Air Toxics, and SSM 18 – Revise Air Toxics "Hot Spots" Program. One land use measure also would be eliminated, LUM 5 – Reduce Risk from Stationary Sources in Impacted Communities. The electricity and solid/hazardous waste impacts associated with Alternative 3 are expected to be less than the proposed project. Electricity and solid/hazardous waste impacts for the proposed project were determined to be less than significant so Alternative 3 would not reduce any significant utility and service system impacts to less than significant.

4.5 Environmentally Superior Alternative

Pursuant to CEQA Guidelines section 15126.6, subdivision (e)(2), if the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives. Since the no project alternative would not achieve the long-term benefits of the 2010 CAP or any of the objectives of the 2010 CAP, and is not a legally viable alternative, it is not the environmentally superior alternative.

The environmentally superior alternative is considered to be Alternative 2, Ozone Control Strategy only. Under Alternative 2, most of the emission reductions associated with the proposed project would occur and the potentially significant impact of increased water demand would be eliminated. Thus, anticipated air quality benefits achieved under Alternative 2 would be similar to the proposed project, so Alternative 2 is considered the environmentally superior alternative. However, Alternative 2 is not expected to be environmentally superior to the proposed project because the particulate matter emission reductions would be greater under the proposed project.

4.6 Comparison of Alternatives

Pursuant to CEQA Guidelines section 15126.6, subdivision (d), an EIR should include sufficient information about each alternative to allow meaningful comparison with the proposed project. Section 15126.6, subdivision (d), also recommends the use of a matrix to summarize the comparison. Table 4-6 provides this matrix comparison.

The CEQA document shall include sufficient information about each alternative to all meaningful evaluation, analysis, and comparison with the proposed project (CEQA Guidelines §15126.6(d)). A matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison. Table 4-6 lists the alternatives considered in this EIR and how they compare to proposed 2010 CAP. Table 4-6 presents a matrix that lists the significant adverse impacts as well as the cumulative impacts associated with the proposed project and the project alternatives for all environmental topics analyzed. The table also ranks each section as to whether the proposed project or a project alternative would result in greater or lesser impacts relative to one another.

TABLE 4-6
Comparison of Alternatives

ENVIRONMENTAL TOPIC	Proposed Project	No Project Alternative	Alternative 2	Alternative 3
Air Quality				
Emission Reductions/Air Quality Benefits	B	B(-)	B(-)	B(=)
Increased Electricity Demand	NS	NS(-)	NS(=)	NS(=)
Secondary Impacts from Control of Stationary Sources	NS	NS(-)	NS(=)	NS(=)
Use of Lower VOC Materials	NS	NS(-)	NS(=)	NS(=)
Construction Activities	NS	NS(-)	NS(-)	NS(=)
Electricity Generation	NS	NS(-)	NS(-)	NS(=)
Ozone Transport	NS	NS(+)	NS(=)	NS(=)
Impacts from Mobile Sources	PS	NS(-)	PS(=)	PS(=)
Impacts from Misc. Sources	NS	NS(-)	NS(=)	NS(=)
Toxic Air Contaminants	B	B(-)	B(-)	B(-)
GHG Emissions	B	B(-)	B(-)	B(-)
Hazards				
Ammonia Use	MNS	NS(-)	MNS(=)	MNS(=)
Alternative Fuels	NS	NS(-)	NS(=)	NS(=)
Fuel Additives	NS	NS(-)	NS(=)	NS(=)
Reformulated Materials	NS	NS(-)	NS(=)	NS(=)
Hydrology/Water Quality	NS	NS(-)	NS(-)	NS(=)
Alternative Transportation Fuels	NS	NS(-)	NS(-)	NS(=)
Electric/Hybrid Vehicles	NS	NS(-)	NS(-)	NS(=)
Water Quality from Reformulated Products	NS	NS(-)	NS(-)	NS(=)
Water Quality from Scrubbers	PS	NS(-)	NS(-)	PS(=)
Groundwater Depletion/Water Demand				
Utilities/Service Systems				
Electricity Demand	NS	NS(-)	NS(-)	NS(-)
Solid/Hazardous Waste:				
Spent Batteries	NS	NS(-)	NS(-)	NS(-)
Waste from Pollution Control Technologies	NS	NS(-)	NS(-)	NS(-)
Carbon Adsorption	NS	NS(-)	NS(-)	NS(-)
Early Retirement of Equipment	NS	NS(-)	NS(-)	NS(-)

Notes:
S = Significant
NS = Not Significant
MNS = Mitigated Not Significant
B = Beneficial
(-) = Potential impacts are less than the proposed project.
(+) = Potential impacts are greater than the proposed project.
(=) = Potential impacts are approximately the same as the proposed project.

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CHAPTER 5

OTHER CEQA TOPICS

Relationship Between Short-Term and Long-Term Productivity
Significant Irreversible Environmental Changes
Growth-Inducing Impacts

5.0 Other CEQA Topics

5.1 Relationship Between Short-Term and Long-Term Productivity

An important consideration when analyzing the effects of a proposed project is whether it will result in short-term environmental benefits to the detriment of achieving long-term goals or maximizing productivity of these resources. Implementing the 2009 CAP is not expected to achieve short-term goals at the expense of long-term environmental productivity or goal achievement. The proposed CAP provides a strategy for making progress toward attainment of the California ozone standards in the Bay Area. The 2009 CAP is an update of and progress report for the 2005 Ozone Strategy in compliance with the California Clean Air Act. By showing progress toward attainment of the State ambient air quality standards, the Strategy is expected to enhance short and long-term environmental productivity in the region. The 2010 CAP also provides a multi-pollutant approach to air quality planning in the Bay Area. The multi-pollutant plan addresses ozone, particulate matter, air toxics, and greenhouse gases via an integrated control strategy that is aimed at ozone planning requirements while identifying benefits as well as disadvantages of the control strategy on each of the pollutants.

Implementing the 2010 CAP would not narrow the range of beneficial uses of the environment. Of the potential environmental impacts discussed in Chapter 3, those related to localized air quality and water demand are considered potentially significant following mitigation. Implementation of the recommended mitigation measures will ensure such impacts are mitigated to the greatest degree feasible.

Because no short-term environmental benefits are expected at the expense of achieving long-term environmental goals, there is no justification for delaying the proposed action. This project needs to be implemented as the BAAQMD is required by the CCAA to formally adopt a triennial update to the region's strategy for achieving the State ambient air quality standards. The BAAQMD is proceeding with the 2010 CAP pursuant to this mandate.

5.2 Significant Irreversible Environmental Changes

CEQA requires an EIR to discuss significant irreversible environmental changes which would result from a proposed action should it be implemented. Irreversible changes include a large commitment of nonrenewable resources, committing future generations to specific uses of the environment (e.g., converting undeveloped land to urban uses), or enduring environmental damage due to an accident.

Implementation of the 2010 CAP is not expected to result in significant irreversible adverse environmental changes. The 2010 CAP would place only an incremental demand on nonrenewable and limited resources, such as energy and water supplies, relative to the accelerated rate of use of these resources due to population growth and increased consumer demand. The largely irretrievable conversion of undeveloped/agricultural land

to urban uses is a function of the growing population and local land use authority, not the 2010 CAP.

Some of the control measures in the 2010 CAP could result in potentially significant impacts to localized air quality and water demand. The extent of these potential impacts could not be fully analyzed due to the lack of specificity of the control measures, the type of control that may be implemented by the regulated community, and the uncertainty of their implementation. Mitigation measures have been identified that could minimize these potentially significant impacts. However, additional project level analysis is required to determine if these potential impacts are significant and if there are feasible mitigation measures available to reduce the impacts to less than significant.

The 2010 CAP is expected to result in long-term benefits associated with improved air quality even though the population of the Bay Area is expected to increase. The project would result in reduced emissions of ozone precursors, particulate matter, toxic air contaminants, and GHG emissions thereby improving air quality and related public health. The project will result in significantly reduced emissions of air pollutants, thereby improving air quality and related public health. Emission reductions will also directly improve the vitality of crops and other plants. The health of livestock, domestic animals and other wildlife will be indirectly enhanced by the positive effects on plant life, as well as by any direct benefits attributable to less air pollution. The damage to buildings and other structures which results from air pollution also will be diminished, as well as an improvement in aesthetics and visibility. The 2010 CAP also includes GHG emission reductions that help the Bay Area achieve the AB32 goals, reducing the overall impact of global climate change.

5.3 Growth-Inducing Impacts

A growth-inducing impact is defined as the "ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." Growth-inducing impacts can generally be characterized in three ways. In the first instance, a project is located in an isolated area and brings with it sufficient urban infrastructure to result in development pressure being placed on the intervening and surrounding land. This type of induced growth leads to conversion of adjacent acreage to higher intensity uses because the adjacent land becomes more conducive to development and, therefore, more valuable because of the availability of the extended infrastructure.

A second type of growth-inducing impact is produced when a large project, relative to the surrounding community or area, affects the surrounding community by facilitating and indirectly promoting further community growth. The additional growth is not necessarily adjacent to the site or even of the same land use type as the project itself. A project of sufficient magnitude can induce growth in a community that could alter a community's size and character significantly.

A third and more subtle type of growth-inducing impact occurs when a new type of development is allowed in an area, which then subsequently establishes a precedent for additional development of a similar character (e.g., a new university is developed which leads to additional educational facilities, research facilities and companies, housing, commercial centers, etc.)

None of the above scenarios characterize the proposed project. The control measures contained in the 2010 CAP accommodate the projected growth for the region – they are not the cause of residential, commercial, industrial, and infrastructure development. The 2010 CAP may indirectly increase the efficiency of the region's urban form through more efficient transportation (decrease in vehicle miles traveled, increased use of public transportation) and encourage more air quality efficient development patterns, e.g., LUM 2 – Indirect Source Review Rule and LUM 4 – Land Use Guidelines. However, the 2010 CAP does not change jurisdictional authority or responsibility concerning land use or property issues (Section 40716 of the California Health and Safety Code) and, therefore, is not considered to be growth-inducing.

It should be noted that there are secondary, positive growth-inducing impacts that could result from the implementation of the 2010 CAP. As air quality improves, the Bay Area could become a more attractive, healthful place to live, which could encourage additional migration to the region. However, it is not possible to predict whether this would occur, nor the extent to which this would occur. As further analysis would be speculative, this topic is not further discussed.

CHAPTER 6

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6.2 Organizations and Persons Consulted

The CEQA statues and Guidelines require that organizations and persons consulted be provided in the EIR. A number of organizations, state and local agencies, and private industry have been consulted. The following organizations and persons have provided input into this document.

Organizations

Bay Area Air Quality Management District
California Air Resources Board
Metropolitan Transportation Commission

Individuals Consulted

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CHAPTER 7

ACRONYMS

7.0 Acronyms

ABBREVIATION	DESCRIPTION
AAQS	Ambient Air Quality Standard
AB	Assembly Bill
AB 1890	Assembly Bill 1890
AB 32	California Global Warming Solutions Act of 2006
AB 939	California Integrated Waste Management Act of 1989
AF/yr	Acre Feet per year
ARB	Air Resources Board
BAAQMD	Bay Area Air Quality Management District
BAR	Bureau of Automotive Repair
BARCT	Best Available Retrofit Control Technology
BASMAA	Bay Area Stormwater Management Agencies Association
BMP	Best Management Practices
CAA	Clean Air Act
CalEPA	California State Environmental Protection Agency
CAP	Clean Air Plan
CARB	California Air Resources Board
CARE	Community Air Risk Evaluation
CAT	Climate Action Team
CCAA	California Clean Air Act
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	Methane
CHMIRS	California Hazardous Materials Incident Reporting System
CIWMB	California Integrated Waste Management Board
CO	Carbon monoxide
CO_2	Carbon dioxide
CASQA	California Stormwater Quality Association
CWMI	Chemical Waste Management Inc.
DPM	Di-propylene glycol monomethyl ethers
EBMUD	East Bay Municipal Utility District
EGBE	Ethylene glycol monobutyl ether
EGEE	Ethylene glycol monoethyl ether
EGME	Ethylene glycol monomethyl ether
EIA	Energy Information Administration
EIR	Environmental Impact Report
EPS	Emissions Performance Standard
ERPG	Emergency Response Planning Guideline
EV	Electric Vehicle
FPI	Freeway Performance Initiative
FSP	Freeway Service Patrol
GHG	Greenhouse gases

g/d	Gallons per day
HOT	High Occupancy Toll
I&M	Inspection and Maintenance
ICE	Internal Combustion Engine
ICTA	International Center for Technology Assessment
ISO	Independent System Operator
ISR	Indirect Source Review
kWh	Kilowatt Hour
LNG	Liquid Natural Gas
LOD	Limit of Detection
LPG	Liquefied petroleum gas
LUM	Land Use Measures
MCL	Maximum Contamination Level
MEI	Maximum exposed individual
MEK	Methyl Ethyl Ketone
MMT/yr	Million metric tons per year
MSM	Mobile Source Measure
MTC	Metropolitan Transportation Commission
MW	Megawatts
MWD	Municipal Water District
MW-hr	Megawatt-hour
MY	Model Year
NAAQS	National Ambient Air Quality Standards
NACE	National Association of Corrosion Engineers
NASA	National Aeronautics and Space Administration
NEC	National Electric Code
NFPA	National Fire Protection Association
NiMH	Nickel metal hydride
NO_2	Nitrogen Dioxide
NOP	Notice of Preparation
NOP/IS	Notice of Preparation/Initial Study
NOx	Nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
O_3	Ozone
OPR	Office of Planning and Research
PAHs	Polynuclear Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PCBTF	P-chlorobenzotriflouride
PG&E	Pacific Gas and Electric Company
PHEV	Plug-in Hybrid
PHMSA	Office of Pipeline and Hazardous Materials Safety Administration
PFC	Perfluorocarbon
PM	Particulate Matter
PM_{10}	Particulate matter less than 10 microns equivalent aerodynamic diameter

$PM_{2.5}$	Particulate matter less than 2.5 microns equivalent aerodynamic diameter
ppb	Parts per billion
ppm	Parts per million
psig	Pounds per square inch (gauge)
PSV	Pressure Safety Valve
PTFE	Polytetrafluoroethylene
PX	Power Exchange
RACM	Reasonable Available Control Measures
RWQCB	Regional Water Quality Control Board
SAAQS	State Ambient Air Quality Standards
SAE	Society of Automotive Engineers
SCR	Selective Catalytic Reduction
SCVWD	Santa Clara Valley Water District
SF_6	Sulfur hexafluoride
SFEP	San Francisco Estuary Project
SFPUC	San Francisco Public Utilities Commission
SJVAPCD	San Joaquin Valley Unified Air Pollution Control District
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMART	Sonoma Marin Area Rail Transit
SMCL	Secondary Maximum Contaminant Level
SO_2	Sulfur dioxide
SOx	Sulfur oxide
SSM	Stationary Source Measures
STA	Spare the Air
SULEV	Super Ultra Low Emission Vehicle
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	Toxic air contaminants
TFCA	Transportation Fund for Clean Air
TCM	Transportation Control Measure
TCIF	Trade Corridors Improvement Fund
TMDL	Total Maximum Daily Loads
TPD	Tons per Day
TPM	Transit Priority Measure
UHI	Urban Heat Island
U.S. DOE	United States Department of Energy
U.S. EPA	United States Environmental Protection Agency
ug/m^3	Micrograms per cubic meter
VIP	Vehicle Incentive Program
VMS	Methylated siloxanes
VOC	Volatile organic compounds
WGS	Wet Gas Scrubber
ZEV	Zero Emissions Vehicles