2011 Air Monitoring Network Report

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Definition of Terms

ADT ……. Average Daily Traffic
AGL ……. Above Ground Level
AQS ……. Air Quality System; the EPA national air quality database
Air District …… Bay Area Air Quality Management District (BAAQMD)
BAM …… Beta Attenuation Monitor, a type of continuous $PM_{2.5}$ monitor
CARB …… California Air Resources Board
CBSA …… Core Based Statistic Area (similar to MSA for the Bay Area)
CFR ……. Code of Federal Regulations
CO …… Carbon Monoxide
CH_4 ……. Methane
DOT ……. Department of Transportation
DL …… (Tree) Drip Line
EPA ……. U. S. Environmental Protection Agency
FEM ……. Federal Equivalent Method
FRM ……. Federal Reference Method
GC ……. Gas Chromatograph
GIS ……... Geographic Information System
HC …… Hydrocarbons, including CH_4 and NMHC
HiVol …… High Volume
H_2S ……. Hydrogen Sulfide
ICPMS ……Inductively Coupled Plasma Mass Spectrometry
Maintenance Plan.. A Plan submitted by states to EPA that outlines how the NAAQS will be maintained for a particular region.
MSA ……. Metropolitan Statistical Area
NAAQS …… National Ambient Air Quality Standards
NATTS …….. National Air Toxics Trends Stations
NCore ..……. National Core (Monitoring Program)
NEI ..……. National Emissions Inventory
NMHC …….. Non-methane Hydrocarbons
NO ..……... Nitric Oxide
NO_2 ……... Nitrogen Dioxide
NO_x ……... Oxides of Nitrogen
NO_y ……... Total Reactive Nitrogen
O_3 ……... Ozone
PAMS ……. Photochemical Assessment Monitoring Stations
PPB ……. Parts per billion
PM ……. Particulate Matter
$PM_{2.5}$…… Particulates less than or equal to 2.5 microns in size
$PM_{2.5F}$ …… $PM_{2.5}$ measured using a filter-based monitor
$PM_{2.5C}$ …… $PM_{2.5}$ measured using a continuous monitor
PM_{10} ……... Particulates less than or equal to 10 microns in size
PM_{10C} ……. PM_{10} measured using a continuous monitor

Definition of Terms (continued)

$PM_{10-2.5}$ …….. PM Coarse - PM less than or equal to 10 microns and greater than 2.5 microns in size
PWEI ……. Population Weighted Emissions Index
SIP ……. State Implementation Plan – A Plan submitted by states to EPA that outlines how the NAAQS will be met for a particular region.
SLAMS ……. State or Local Air Monitoring Station
SO_2 ……..... Sulfur Dioxide
SPM …… Special Purpose Monitor
STN …… Speciation Trends Network
TAMS……. Total Atmospheric Mercury
UFP……. Ultrafine Particulate less than or equal to 0.1 microns
VOC ……... Volatile Organic Compound

Overview of Network Operation

Network Design

The Bay Area Air Quality Management District (Air District) is the public agency responsible for air quality management in the nine Bay Area counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, southwestern Solano, and southern Sonoma. The Air District operates air monitoring stations in each of these nine counties. The Air District began measuring air quality in the San Francisco Bay Area in 1957. In 2011 there were 27 air monitoring stations in the Air District air monitoring network including one station operated by the California Air Resources Board.

Twenty-three of the 27 stations are classified by EPA as State and Local Air Monitoring Stations (SLAMS) that are permanently sited and meet all EPA monitor siting criteria. The remaining four are classified as Special Purpose Monitoring (SPM) stations that do not meet EPA siting criteria (Crockett), measure a pollutant for which there are no siting criteria (Fort Cronkhite), or are short-term monitoring sites (Cupertino and Patterson Pass).

Short-term monitoring sites are re-locatable trailers and shelters with a comprehensive set of air quality instruments to characterize local air quality. Instruments at these sites are operated on SLAMS sampling schedules for a minimum of one year allowing data comparison with permanent monitoring sites. Statistical data relationships between short-term and nearby permanent sites provides long-term estimates of air quality at temporary monitoring sites.

The Air District also performs air monitoring as part of other programs. These include programs that the Air District has initiated, such as meteorological monitoring, the ambient toxics program, and programs required by EPA. EPA programs currently include the National Air Toxics Trends Stations (NATTS) Program, the National Core (NCore) Program, the Photochemical Assessment Monitoring Stations (PAMS) Program, and the $PM_{2.5}$ Speciation Trends Network (STN) Program. Summaries of these programs can be found later in this report.

The San Francisco Bay Area contains over 100 cities. Although resources do not allow placement of air pollution monitors in every city, it can be demonstrated that air pollution levels, in the absence of significant local sources, are similar within each geographical region of the Bay Area. That is, cities within each of the major valleys of the Bay Area can have similar air quality levels. Consequently, a few sites can characterize an area. Generally, locations for permanent air monitoring sites are initially based on knowledge of population density and local wind patterns, while the final site selection is determined after analyzing preliminary air quality measurements collected from field studies, temporary monitoring studies, and mobile monitoring data.

The purpose of the Air District monitoring network is:

- To provide air pollution data to the general public in a timely manner.
- To support compliance with California and national ambient air quality standards. When sites do not meet the standards, attainment plans are developed to attain the standards.
- To support air pollution research studies.

To meet its monitoring objectives the Air District monitoring network collects ambient air data at locations with a variety of monitoring site types. These site types, as defined in 40 CFR Part 58, Appendix D, Table D-1, are intended to characterize air pollution levels in areas of high pollution, high population, transported air pollution, and air pollution near specific sources.

Ambient air monitoring at Air District stations is intended to meet one or more of the following monitoring objectives:

- A determination of typical concentrations in areas of high population density.
- A determination of the highest concentrations expected to occur in the area covered by the network.
- A determination of impacts from significant sources.
- A determination of general background concentration levels.
- A determination of the extent of regional pollutant transport.

Population Oriented

The primary purpose of air quality standards is to protect the public health. Air monitoring stations are placed in areas with high population density to evaluate exposure to air pollution. In most cases, stations are located within the largest cities in each county. Because people spend more time at home than at work, air monitoring sites are generally located in residential areas rather than at downtown locations. To be consistent with EPA's list of Site Types in Table D-1 of 40 CFR Part 58, the term "population orientated" will be used in place of "typical concentrations in areas of high population density", for clarity in this monitoring objective.

Highest Concentration

EPA regulations require that air quality in areas where the public has access be reduced to levels below the national ambient air standards. Consequently, monitoring must also be done at locations expected to have the highest concentrations, even if populations are sparse in that area. High concentrations may be found close to major sources, or further downwind if pollutants are emitted from tall stacks. High concentrations may also be found at distant downwind locations when the pollutants such as ozone or secondary particulate matter are a result of chemical reactions in the atmosphere.

Source Impact

There are five refineries within the Air District: Chevron, Shell, Tesoro, ConocoPhillips, and Valero. Because these sources have the potential to emit significant amounts of SO_2 and H_2S, the Air District operates SO_2 and H_2S monitoring stations near these sources. When the

monitors downwind of the source show concentrations above the applicable standards or exceed concentrations listed in Air District Regulation 9, Rules 1 and 2, a notice of violation may be issued to the source. The Port of Oakland also can be a significant source of particulates, CO, and toxics and the Oakland West air monitoring station is located downwind of the Port of Oakland to measure pollution impacts on West Oakland.

General Background

The Air District operates stations in areas that have no significant emissions from mobile, area, or industrial sources. At these sites, the measured concentrations reflect the transported air quality levels from upwind areas. When designing control strategies to reduce pollution levels, it is important to know if areas outside the boundaries of the Air District are contributing to high pollutant levels within the Air District. Where there are no significant emission sources upwind of a site, then the site is considered to be a general background site.

Regional Transport

The Air District shares a common boundary with six other air districts: Monterey Bay Unified APCD, San Joaquin Valley APCD, Sacramento Metropolitan AQMD, Yolo-Solano AQMD, Lake County AQMD, and Northern Sonoma County APCD. When upwind areas have significant air pollution sources, pollutants may be transported into the Bay Area Air District and result in overall higher air pollution levels in the Bay Area. The Air District operates monitoring stations near the borders of the Air District to measure the air pollution concentrations transported into and out of the Bay Area Air District.

Each monitoring objective is associated with a spatial scale for each site. For example, a regional transport site is meant to represent air quality levels over a large area, while a highest concentration site may represent a spatial scale of no more than a few blocks or so, in size. Spatial scales are defined in 40 CFR, Part 58, Appendix D. They are: micro scale – having dimensions of several meters up to 100 meters; middle scale – having dimensions of 100 meters to 0.5 km; neighborhood scale – having dimensions of 0.5 km to 4.0 km; urban scale – having dimensions of 4 to 50 km; and regional scale – having dimensions of up to hundreds of km. Table 1 lists the appropriate scales for each monitoring objective.

Table 1. SLAMS Monitoring Objectives and Appropriate Spatial Scales.

Monitoring Objective	Appropriate Spatial Scale
1. Highest Concentration	Micro, middle, neighborhood
2. Population Oriented	Neighborhood, urban
3. Source Impact	Micro, middle, neighborhood
4. General Background	Urban, regional
5. Regional Transport	Urban, regional

The desired spatial scale of a monitoring site must conform to established criteria for the distance from roadways, based on traffic volumes. There are different distance requirements for each pollutant, which can be found in 40 CFR Part 58, Appendix E. Additionally, the

spatial scale can also be affected if trees or obstructions are too close to the monitoring probe. The goal in siting monitoring stations is to match the spatial scale with the desired monitoring objective. Table 2 lists the stations, their monitoring objectives, and the pollutants measured at each site.

Table 2. List of Monitoring Stations within the Air District for 2011.

Site	Station Name	Type[1]	Monitoring Objective	Pollutants Monitored[1]
1	Bethel Island	SLAMS	Regional Transport& Highest Concentration	O_3, NO_x, SO_2, CO, PM_{10}, Toxics
2	Concord	SLAMS	Population Oriented, Highest Concentration	O_3, NO_x, SO_2, CO, HC, PM_{10}, $PM_{2.5F}$, Toxics
3	Fairfield	SLAMS	Population Oriented & Regional Transport	O_3
4	Gilroy	SLAMS	Population Oriented, Highest Concentration, & Regional Transport	O_3, $PM_{2.5C}$
5	Hayward	SLAMS	Population Oriented & Regional Transport	O_3
6	Livermore	SLAMS	Population Oriented & Highest Concentration	O_3, NO_x, HC, $PM_{2.5F}$, $PM_{2.5C}$, Speciated $PM_{2.5}$, Toxics
7	Los Gatos	SLAMS	Population Oriented & Highest Concentration	O_3
8	Martinez	SLAMS	Source Impact	SO_2, Toxics
9	Napa	SLAMS	Population Oriented	O_3, NO_x, CO, PM_{10}, $PM_{2.5C}$, Toxics
10	Oakland	SLAMS	Population Oriented	O_3, NO_x, CO, $PM_{2.5C}$, Toxics
11	Oakland West	SLAMS	Population Oriented & Source Impact	O_3, NO_x, SO_2, CO, $PM_{2.5C}$, Speciated $PM_{2.5}$, Toxics
12	Point Reyes[2]	SLAMS	General Background	$PM_{2.5C}$
13	Point Richmond	SLAMS	Source Impact	H_2S
14	Redwood City	SLAMS	Population Oriented	O_3, NO_x, CO, $PM_{2.5F}$, $PM_{2.5C}$, Toxics
15	Richmond 7th	SLAMS	Source Impact	SO_2, H_2S, Toxics
16	Rodeo	SLAMS	Source Impact	H_2S
17	San Francisco	SLAMS	Population Oriented	O_3, NO_x, CO, PM_{10}, $PM_{2.5C}$, Toxics
18	San Jose	SLAMS NCore[3]	Population Oriented & Highest Concentration	O_3, NO_x, NO_y, SO_2, CO, HC, PM_{10}, $PM_{2.5F}$, $PM_{2.5C}$, Speciated $PM_{2.5}$, Toxics
19	San Martin	SLAMS	Highest Concentration	O_3
20	San Pablo	SLAMS	Population Oriented	O_3, NO_x, SO_2, CO, PM_{10}, Toxics
21	San Rafael	SLAMS	Population Oriented	O_3, NO_x, CO, PM_{10}, $PM_{2.5C}$, Toxics
22	Santa Rosa	SLAMS	Population Oriented	O_3, NO_x, CO, $PM_{2.5C}$, Toxics
23	Vallejo	SLAMS	Population Oriented	O_3, NO_x, SO_2, CO, $PM_{2.5F}$, $PM_{2.5C}$, Speciated $PM_{2.5}$, Toxics

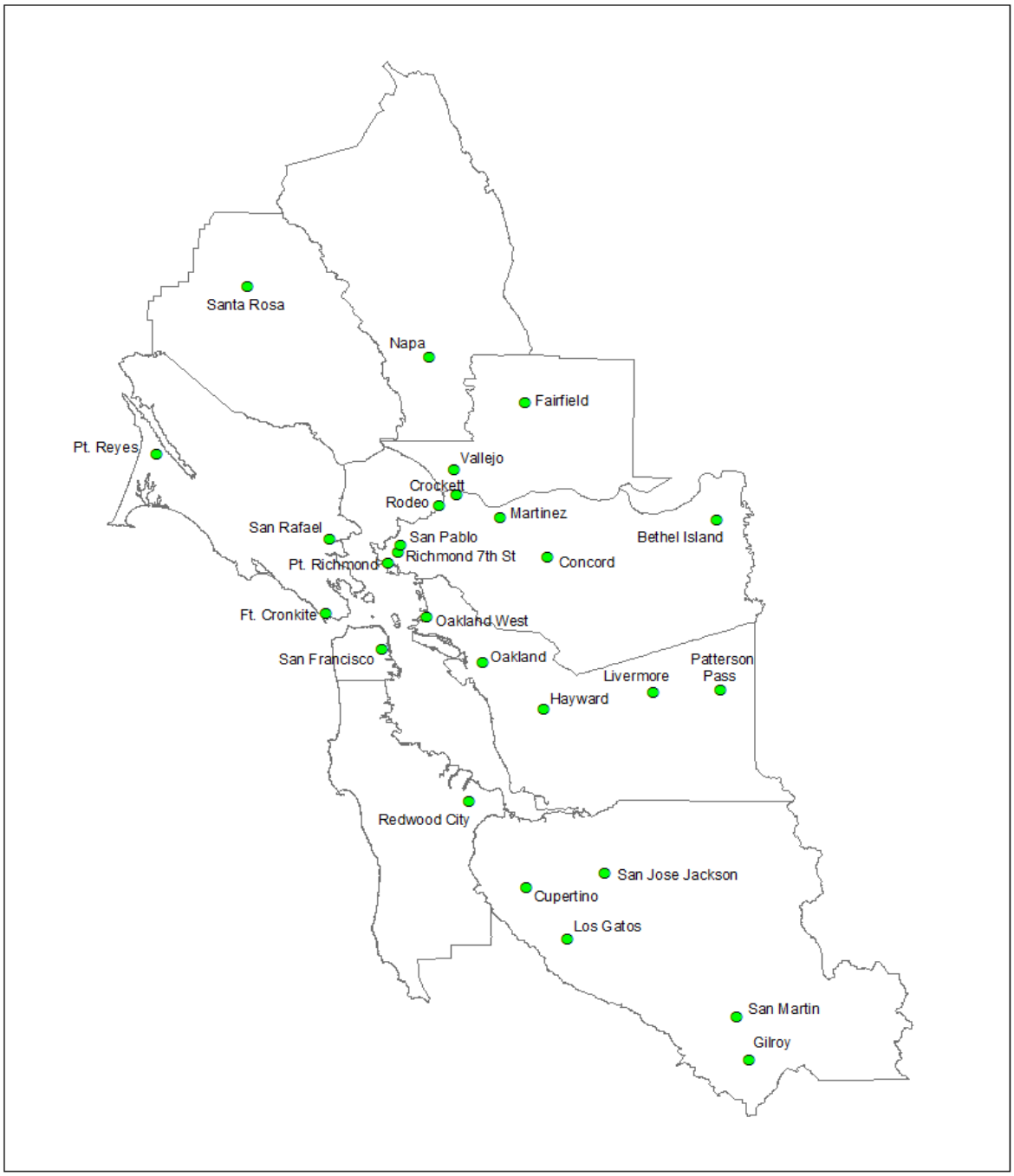
Site	Station Name	Type[1]	Monitoring Objective	Pollutants Monitored[1]
24	Crockett	SPM	Source Impact	SO_2, Toxics
25	Cupertino Monte Vista Park	SPM	Population Oriented & Source Impact	O_3, NO_x, SO_2, CO, HC, PM_{10}, $PM_{2.5C}$, Toxics, TAMS
26	Fort Cronkhite	SPM	General Background	Toxics
27	Patterson Pass	SPM	Regional Transport	NO_x

[1] See pages 5 and 6 for acronym definitions.
[2] Operated by the California Air Resources Board.
[3] San Jose is a designated NCore monitoring site. Refer to the NCore section of this document for a full description of the nationwide NCore monitoring program.

EPA suggests that the appropriate spatial scale for population oriented sites should be neighborhood or urban. Using the current EPA methodology to determine spatial scales, the air monitoring sites in Napa, Oakland, San Pablo and San Rafael would be characterized as middle scale. However, the Air District believes the spatial scale of the site would be better characterized as neighborhood scale. This is because EPA's distance requirements from roads are based on 1979 vehicle emission levels. Fleet average vehicle emission factors in the Bay Area are 95% lower for hydrocarbons, 95% lower for CO, 82% lower for NO_x, and 48% lower for PM_{10} in 2009 compared to 1979.

Figure 1 shows Air District SLAMS and SPM monitoring sites in 2011. Table 3 through Table 11 lists the minimum number of monitors required within the network for each pollutant. The section following Table 2 describes recent changes to the monitoring network and proposed changes to the monitoring network. The final section provides detailed descriptions of the monitoring objectives for each air monitoring site and a brief explanation for choosing the type of monitor at each site.

Figure 1. Map of Air District SLAMS and SPM Sites

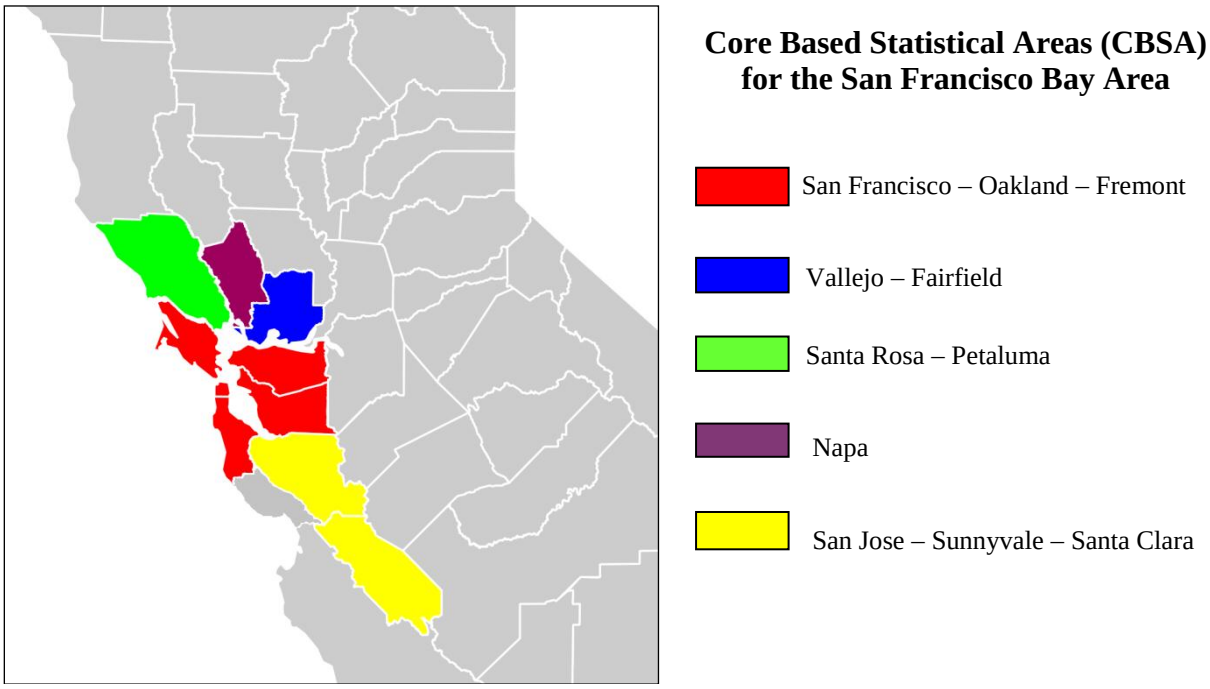


Minimum Monitoring Requirements

The Bay Area meets or exceeds all minimum monitoring requirements for 2011 and 2012 for all criteria pollutants. Recently several new monitoring requirements were added by EPA including near-road NO_2 and CO monitoring; SO_2 monitoring in areas where both SO_2 emissions and population are highest; and lead monitoring at three airports in the Bay Area. Where new requirements apply, the year when new monitoring requirements take effect is stated in the table description in the sections which follow. Airport lead monitoring was targeted to begin in late December 2011 but did not commence until February 3, 2012 at Palo Alto and Reid-Hillview airports; and on March 10, 2012 at San Carlos Airport.

During the past three years, no exceptional event designations were requested by the Air District. Therefore, none of the design values listed in the tables of this section have been adjusted for exceptional events. In the Bay Area, potential exceptional events would generally be restricted to wildfires that contribute to exceedances of the NAAQS.

In the tables describing minimum monitoring requirements in the following sections, some pollutants have monitoring requirements based on Metropolitan Statistical Area (MSA) while others are based on Core Based Statistical Areas (CBSA). Both MSA and CBSA are used within EPA regulations because the federal government changed its definitions in 2003. Consequently, older EPA mandated monitoring requirements still refer to MSAs. For all practical purposes the two terms are identical and define the same boundaries for the San Francisco Bay Area and adjoining counties. EPA minimum monitoring requirements are not based on the Air District boundary but on the MSA or CBSA. Therefore, some monitors listed in the tables are included as counting toward the minimum requirements even though the monitor is located in, and is operated by, another Air District.



Minimum Monitoring Requirements for Ozone

The number of required ozone monitors in each MSA is determined by the MSA population and design value, as specified in Table D-2 of 40 CFR Part 58, Appendix D. Ozone design values are a calculated concentration[a] used for comparison with the national standard to determine the attainment status of an area. Table 3 shows that the Air District monitoring network meets or exceeds the ozone minimum monitoring requirements. No additional monitors are required in the State Implementation Plan (SIP) or Maintenance Plan for ozone.

Table 3. Minimum Monitoring Requirements for Ozone.

MSA	County or Counties	Pop. 2010 Census	Design Value[a] (ppb) 2011	Design Value Site & AQS ID	Required SLAMS Monitors	Active SLAMS Monitors	Additional SLAMS Monitors Needed
San Francisco-Oakland-Fremont	SF, Marin, Alameda, San Mateo, Contra Costa	4,335,391	76	Livermore 060010007	3	8	0
San Jose-Sunnyvale-Santa Clara	Santa Clara, San Benito	1,836,911	74	San Martin 060852006	2	5 [b]	0
Santa Rosa-Petaluma	Sonoma	483,878	50	Santa Rosa 060970003	1	2 [c]	0
Vallejo-Fairfield	Solano	413,344	69	Fairfield 060950005	2	3 [d]	0
Napa	Napa	136,484	65	Napa 060550003	1	1	0

a Design values are calculated at each monitoring site by taking the 3-year mean (2009-2011) of the 4th highest 8-hour concentration. The design values shown for each MSA in this table are the highest design value of monitors in the MSA. Design values at or below the 0.075 ppm National Ambient Air Quality 8-hour Ozone Standard meet the standard.

b One of the five monitors is not in the BAAQMD. It is in Hollister which is in the Monterey Bay Unified Air Pollution Control District.

c One of the two monitors is not in the BAAQMD. It is in Healdsburg which is in the Northern Sonoma County Air Pollution Control District.

d One of the three monitors is not in the BAAQMD. It is in Vacaville which is in the Yolo-Solano Air Quality Management District.

Minimum Monitoring Requirements for $PM_{2.5}$

The number of required $PM_{2.5}$ monitors in each MSA is determined by the MSA population and design value, as specified in Table D-5 of Appendix D to 40 CFR Part 58. $PM_{2.5}$ design values are a calculated concentration[ab] used for comparison with the national standard to determine the attainment status of an area. Table 4 shows that the Air District air monitoring network meets or exceeds the $PM_{2.5}$ minimum monitoring requirements. 40 CFR Part 58 also requires continuous $PM_{2.5}$ monitors equal to at least one-half (round up) the number of $PM_{2.5}$ SLAMS monitors. Table 5 shows that the monitoring network meets or exceeds this additional requirement.

EPA designated the Bay Area as nonattainment of the $PM_{2.5}$ standard on October 8, 2009. The effective date of the designation is December 14, 2009 and the Air District has three years to develop a State Implementation Plan (SIP) to demonstrate the Bay Area will achieve the revised standard by December 14, 2014. The SIP for the $PM_{2.5}$ standard must be submitted to EPA by December 14, 2012. Air quality monitoring data shows that the Bay Area attained the national 24-hour $PM_{2.5}$ standard during the three-year period from 2009 through 2011.

Table 4. Minimum Monitoring Requirements for $PM_{2.5}$ SLAMS.

MSA	County or Counties	Pop. 2010 Census	Annual Design Value[a] (µg/m^3) 2011	Annual Design Value site & AQS ID	Daily Design Value[b] (µg/m^3) 2011	Daily Design Value site & AQS ID	Required SLAMS Monitors	Active SLAMS Monitors	Additional SLAMS Monitors Needed
San Francisco-Oakland-Fremont	SF, San Mateo, Alameda, Marin, Contra Costa	4,335,391	9.9	San Francisco 060750005	28	Livermore 06010007	2	6	0
San Jose-Sunnyvale-Santa Clara	Santa Clara, San Benito	1,836,911	9.6	San Jose 060850005	30	San Jose 060850005	3	3[d]	0
Santa Rosa-Petaluma	Sonoma	483,878	8.0	Santa Rosa 060970003	24	Santa Rosa 060970003	0	1	0
Vallejo-Fairfield	Solano	413,344	9.1	Vallejo 060950004	29	Vallejo 060950004	0	1	0
Napa	Napa	136,484	N/A[c]	N/A[c]	N/A[c]	N/A[c]	0	0	0

a Annual design values are calculated at each monitoring site by taking the 3-year mean (2009-2011) of the annual averages for each site. The design values shown for each MSA in this table are the highest design value of monitors in the MSA. Design values at or below the national $PM_{2.5}$ annual standard of 15 µg/m^3 indicate the area meets the standard.

b Daily design values are calculated by taking the 3-year mean (2009-2011) of the 98th percentiles for each site. The design values shown for each MSA in this table are the highest design value of monitors in the MSA. Design values at or below the national $PM_{2.5}$ 24-hour standard of 35 µg/m^3 indicate the area meets the standard.

c There are no FRM or FEM PM2.5 monitors in Napa County, so there is no design value.

d One of the three monitors is not in the BAAQMD. It is in Hollister which is in the Monterey Bay Unified Air Pollution Control District.

Table 5. Minimum Monitoring Requirements for continuous $PM_{2.5}$ monitors.

MSA	County or Counties	Pop. 2010 Census	Annual Design Value[a] (µg/m^3) 2011	Annual Design Value site & AQS ID	Daily Design Value[b] (µg/m^3) 2011	Daily Design Value site & AQS ID	Required Continuous Monitors	Active Continuous Monitors	Additional Continuous Monitors Needed
San Francisco-Oakland-Fremont	SF, San Mateo, Alameda, Marin, Contra Costa	4,335,391	9.9	San Francisco 060750005	28	Livermore 06010007	1	7 [d]	0
San Jose-Sunnyvale-Santa Clara	Santa Clara, San Benito	1,836,911	9.6	San Jose 060850005	30	San Jose 060850005	2	4 [e]	0
Santa Rosa-Petaluma	Sonoma	483,878	8.0	Santa Rosa 060970003	24	Santa Rosa 060970003	0	1	0
Vallejo-Fairfield	Solano	413,344	9.1	Vallejo 060950004	29	Vallejo 060950004	0	1	0
Napa	Napa	136,484	N/A[c]	N/A[c]	N/A[c]	N/A[c]	0	1	0

a Annual design values are calculated at each monitoring site by taking the 3-year mean (2009-2011) of the annual averages for each site. The design values shown for each MSA in this table are the highest design value of monitors in the MSA. Design values at or below the national $PM_{2.5}$ annual standard of 15 µg/m^3 indicate the area meets the standard.

b Daily design values are calculated by taking the 3-year mean (2009-2011) of the 98th percentiles for each site. The design values shown for each MSA in this table are the highest design value of monitors in the MSA. Design values at or below the national $PM_{2.5}$ 24-hour standard of 35 µg/m^3 indicate the area meets the standard.

c There are no FRM or FEM PM2.5 monitors in Napa County, so there is no design value. There is a non-FEM monitor.

d One of the seven continuous monitors is at Point Reyes and is operated by the California Air Resources Board.

e Two of the four continuous monitors are not in the BAAQMD. One is in Hollister and the other is at Pinnacles National Monument – both monitors are in the Monterey Bay Unified Air Pollution Control District.

Minimum Monitoring Requirements for PM_{10}

The number of required PM_{10} monitors in each MSA is specified in Table D-4 of Appendix D to 40 CFR Part 58. Table 6 shows that the Air District monitoring network meets or exceeds the PM_{10} minimum monitoring requirements[a]. No additional monitors are required for the State Implementation Plan (SIP) or Maintenance Plan because the Bay Area has never been designated as non-attainment for PM_{10}, and no SIP or Maintenance Plans have been prepared for PM_{10}.

Table 6. Minimum Monitoring Requirements for PM_{10}.

MSA	County or Counties	Pop. 2010 Census	Highest 24-hr conc. (µg/m^3) 2011	Highest 24-hr conc. site & AQS ID	Monitors Required[a]	Monitors Active	Monitors Needed
San Francisco-Oakland-Fremont	SF, San Mateo, Alameda, Marin, Contra Costa	4,335,391	72	Bethel Island 060131002	2	5	0
San Jose-Sunnyvale-Santa Clara	Santa Clara, San Benito	1,836,911	75	Hollister 060690002	2	2[b]	0
Santa Rosa-Petaluma	Sonoma	483,878	42	Healdsburg 060970002	0	3[c]	0
Vallejo-Fairfield	Solano	413,344	35	Vacaville 060953001	0	1[d]	0
Napa	Napa	136,484	54	Napa 060550003	0	1	0

a For PM_{10} in the Bay Area, the number of monitors required depends on the population of the MSA and whether the ambient concentration of PM_{10} exceed 80% of the 150 µg/m^3 NAAQS. No stations in the MSA regions listed exceed the 80% threshold. Therefore, the minimum monitoring requirement is determined from Table D-4 of Appendix D, Part 58 of 40 CFR under the "low concentration" category.

b One of the two monitors is not in the BAAQMD. It is in Hollister which is in the Monterey Bay Unified Air Pollution Control District.

c These monitors are not in the BAAQMD. They are in Healdsburg, Guerneville, and Cloverdale; and all are in the Northern Sonoma Air Pollution Control District.

d This monitor is not in the BAAQMD. It is in Vacaville which is in the Yolo-Solano Air Quality Management District.

Minimum Monitoring Requirements for SO_2
The number of required SO_2 monitors in each Core Based Statistic Area (CBSA) is proportional to the product of the total amount of SO_2 emissions in the CBSA and its population as specified in 40 CFR Part 58, Appendix D, Section 4.4. The resulting value is defined as the Population Weighted Emissions Index (PWEI). SO_2 emissions are from the 2008 National Emissions Inventory (NEI).

No additional SO_2 monitors are required for SIP or Maintenance Plans because the Air District has never been designated as non-attainment for SO_2 and no SIP or maintenance plans have been prepared for SO_2. In 2011 the Air District operated seven permanent SO_2 monitors in its SLAMS network and two SO_2 monitors at SPM sites.

Table 7. Minimum Monitoring Requirements for SO_2 in 2013.

CBSA	County or Counties	Pop. 2010 Census	Total SO_2 (tons/yr) 2008	PWEI (million-person-tons/yr)	Monitors Required	Monitors Active	Monitors Needed
San Francisco-Oakland-Fremont	SF, San Mateo, Alameda, Marin, Contra Costa	4,335,391	12666	54912	1	5	0
San Jose-Sunnyvale-Santa Clara	Santa Clara, San Benito	1,836,911	707	1299	0	1	0
Santa Rosa-Petaluma	Sonoma	483,878	177	86	0	0	0
Vallejo-Fairfield	Solano	413,344	5459	2256	0	1	0
Napa	Napa	136,484	44	6	0	0	0

Minimum Monitoring Requirements for NO_2
Effective April 12, 2010 EPA revised the minimum monitoring requirements for NO_2 in 40 CFR Part 58, Appendix D, Section 4.3. By January 1, 2013, the Air District must operate NO_2 monitors at population-oriented sites and at sites within 50 meters of major freeways.

Based on Bay Area population and traffic counts, the Bay Area will need to operate at least two monitors sited to measure the area-wide NO_2 concentrations, and at three sites near freeways. No additional monitors were required for the SIP or Maintenance Plans because

the Air District had not been designated as non-attainment for NO_2 and no SIP or maintenance plans were prepared for NO_2.

In 2011, the Air District operated 15 area-wide NO_2 monitors in the Bay Area (13 SLAMS sites plus two SPM sites). NO and NO_2 are formed from vehicle, power plant and other industrial emissions, and contribute to the formation of fine particulate pollution and smog. A description of the Air District Plan to meet near-road NO_2 monitoring requirements is contained in Appendix A. Table 8 shows the minimum NO_2 monitoring requirements.

Table 8. Minimum Monitoring Requirements for NO_2 in 2013.

CBSA	County or Counties	Pop. 2010 Census	Annual Design[a] Value (ppb) 2011	Daily Design[b] Value (ppb) 2011	Area-wide Monitors Required	Area-wide Monitors Active	Area-wide Monitors Needed
					Near-road Monitors Required	Near-road Monitors Active	Near-road Monitors Needed
San Francisco-Oakland-Fremont	SF, San Mateo, Alameda, Marin, Contra Costa	4,335,391	16	70	1	9	0
					2	0	2
San Jose-Sunnyvale-Santa Clara	Santa Clara, San Benito	1,836,911	15	50	1	1	0
					1	0	1
Santa Rosa-Petaluma	Sonoma	483,878	9	36	0	1	0
					0	0	0
Vallejo-Fairfield	Solano	413,344	10	40	0	1	0
					0	0	0
Napa	Napa	136,484	8	36	0	1	0
					0	0	0

[a] Annual design values are determined for each monitoring site by calculating the arithmetic average of all of the reported 1-hour values for the most current year. The design values shown for each MSA in this table are the highest design value of monitors in the MSA. Design values at or below the national NO_2 annual standard of 53 ppb meet the standard.

[b] Daily design values are calculated at each monitoring site by taking the 3-year mean (2009-2011) of the 8th highest daily maximum 1-hour concentration. The design values shown for each MSA in this table are the highest design value of monitors in the MSA. Design values at or below the national NO_2 1-hour standard of 100 ppb meet the standard.

Minimum Monitoring Requirements for CO

40 CFR Part 58, Appendix D, Section 4.2 states that one CO monitor is required to operate collocated with one required near-road NO_2 monitor in CBSA populations of one million persons or more. It also states that if a CBSA has more than one required near-road NO_2 monitor, only one CO monitor is required to be collocated with a near-road monitor within the CBSA. There are no other minimum requirements for CO monitoring. The Air District intends to operate a collocated CO monitor with all required near-road NO_2 monitors.

The Air District was re-designated attainment for the 8-hour average CO NAAQS in 1998. The Air District CO maintenance plan is contained within the California Air Resource Board document "2004 Revision to the California State Implementation Plan for Carbon Monoxide." The plan does not specify the number of CO monitors needed. The Air District operates one CO monitor within each of the nine Bay Area counties plus additional CO monitors in large cities. There are currently 12 CO monitors in the SLAMS network.

Table 9. Minimum Monitoring Requirements for CO in 2015.

CBSA	County or Counties	Pop. 2010 Census	Near-Road Monitors Required	Near-Road Monitors Active	Near-Road Monitors Needed
San Francisco-Oakland-Fremont	SF, San Mateo, Alameda, Marin, Contra Costa	4,335,391	1	0	1
San Jose-Sunnyvale-Santa Clara	Santa Clara, San Benito	1,836,911	1	0	1
Santa Rosa-Petaluma	Sonoma	483,878	0	0	0
Vallejo-Fairfield	Solano	413,344	0	0	0
Napa	Napa	136,484	0	0	0

Minimum Monitoring Requirements for Lead

40 CFR Part 58, Appendix D, Section 4.5 requires lead monitoring near sources expected to contribute to a maximum lead concentration in ambient air in excess of the NAAQS. In the Bay Area there are no sources meeting this criteria according to the 2008 National Emissions Inventory (NEI). However, additional sections of 40 CFR do require source oriented monitoring near three airports in the Bay Area (Palo Alto, San Carlos, and Reid-Hillview) because emissions from piston engine aircraft using leaded fuel may approach 0.50 tons per year. Additionally, lead monitoring is conducted at San Jose because it is an NCore monitoring location. Although lead monitoring at San Jose was not required until 2011, the Air District began monitoring for lead at San Jose in January 2008.

Table 10. Minimum Monitoring Requirements for lead at NCore.

NCore Site	CBSA	Pop. 2010 Census	Monitors Required	Monitors Active	Monitors Needed
San Jose	San Jose-Sunnyvale-Santa Clara	1,836,911	1	1	0

Table 11. Source Oriented lead monitoring at airports.

Source Name	Address	Pb Emissions (tons/yr)	Emission Inventory Source Data & Yr	Monitors Required	Monitors Active	Monitors Needed
San Carlos Airport	620 Airport Drive San Carlos 94070	0.53	NEI/2008	1	0	1
Palo Alto Airport	1925 Embarcadero Road Palo Alto 94303	0.66	NEI/2008	1	0	1
Reid-Hillview Airport	2500 Cunningham Avenue San Jose 95148	0.53	NEI/2008	1	0	1

Modifications Made to Network in 2011

This section discusses specific changes made to instrumentation at Air District air monitoring stations in 2011. A more complete discussion of all instrumentation operating at the air monitoring stations can be found later in this document.

Concord

The Air District discontinued monitoring ozone precursors CH_4/NMHC on May 31, 2011. Monitoring of these non-criteria pollutants was discontinued to allow better utilization of Air District resources as monitoring for the PAMS program was brought online.

Cupertino Monte Vista

The Air District began measuring ozone precursors CH_4/NMHC at this site on April 1, 2011. The Air District intended to measure these compounds when the station opened in September 2010, but the instrumentation requires high pressure hydrogen gas cylinders which were not permitted by the Santa Clara County Fire Department. As an alternative to compressed gas cylinders, new laboratory grade equipment was procured by the Air District. The new equipment required modification of the monitoring trailer and additional permitting thus delaying the start of CH_4/NMHC monitoring.

Livermore

The Air District replaced the filter-based $PM_{2.5}$ sampler at Livermore with a continuous FEM-BAM $PM_{2.5}$ instrument on March 1, 2011. The continuous FEM-BAM $PM_{2.5}$ allows real-time display of the data on the Air District webpage and hourly analysis of the data.

NCore Program Lead Monitoring

The Air District's NCore monitoring site at San Jose was brought fully online effective January 1, 2011. Lead monitoring at San Jose has been on a 1-in-6 day schedule since January 2008 and will continue on this schedule indefinitely. A detailed description of the NCore monitoring program can be found in the NCore section of this document.

Photochemical Assessment Monitoring Stations (PAMS)

EPA is funding hourly VOC speciated hydrocarbon measurements at three sites in the Bay Area: Livermore, Patterson Pass, and San Ramon. The Air District is supplementing these measurements with NOx and meteorological measurements at the three sites. The Livermore site was fully operational on August 1, 2010. At Patterson Pass, hydrocarbon and NOx monitoring began on March 1, 2011 and meteorological data collection began on October 27, 2011. At San Ramon meteorological data collection began on December 14, 2011 and NOx began on January 1, 2012. Hydrocarbon monitoring began on May 1, 2012. A full description of the PAMS monitoring program is in the PAMS section of this document.

San Jose

The San Jose station was approved as an NCore program station by EPA in October 2009 with additional monitoring requirements effective January 1, 2011. To meet NCore program requirements PM coarse started being calculated every 3rd day in January 2011. PM coarse is calculated (not measured) as the difference between PM_{10} and $PM_{2.5}$ measurements. Also to meet NCore requirements, PM_{10} sampling was changed from a 1-in-6 day schedule to a 1-in-3 day schedule year-round. $PM_{2.5}$ sampling was changed from 1-in-6 day schedule to a 1-in-3 day schedule in summer but continued to operate daily in winter. Also, NO_y monitoring began on January 1, 2011 to meet NCore requirements. More information about the NCore program can be found in the NCore section of this document.

The Air District discontinued monitoring ozone precursors CH_4/NMHC on December 31, 2011 at San Jose. Monitoring of these non-criteria pollutants was discontinued to better utilize Air District resources for the PAMS program. A full description of the PAMS program can be found in the PAMS section of this document.

Vallejo

The Air District replaced the filter-based $PM_{2.5}$ sampler at Vallejo with a continuous FEM-BAM $PM_{2.5}$ instrument on March 1, 2011. The continuous FEM-BAM $PM_{2.5}$ allows real-time display of the data on the Air District webpage and hourly analysis of the data.

Proposed Modifications to Network in 2012-2013

This section discusses proposed changes to be made to the instrumentation at Air District air monitoring stations in the next 18 months. A more complete discussion of instrumentation and programs operating at the air monitoring stations can be found later in this document.

Cupertino Monte Vista

The Air District will discontinue this site on December 31, 2012 at the completion of the two year air monitoring study. As was done after a full year of data were collected, a summary analysis of data along with comparisons to other Air District and California monitoring sites will be performed.

Airport Lead Monitoring

On December 27, 2010 EPA published a new regulation for lead monitoring which included lead monitoring at airports having lead emissions of one ton per year or greater. Although no airports in the Bay Area exceed the one ton per year emission threshold, the regulation lists a requirement for the Air District to participate in a 1-year EPA funded lead monitoring study at three airports: San Carlos, Palo Alto, and Reid-Hillview.

The airports chosen for this study were selected because they are near heavily populated areas and service piston engine aircraft which still use leaded fuels. Leaded aviation gas used in piston engine aircraft accounts for nearly 50% of the total lead emissions in the United States annually.

Samples will be taken on a 1-in-6 day schedule at the three sites and sample dates will coincide with sample dates taken at the San Jose NCore site. The San Carlos site will have two samplers: a primary and a collocated sampler with the collocated sampler operating on a 1-in-12 day schedule.
Airport lead monitoring began on February 3, 2012 at Palo Alto and Reid-Hillview; and on March 10, 2012 at San Carlos. Monitoring is scheduled to end after one year but will be extended if lead concentrations are greater than 50% of the 0.15 $\mu g/m^3$ NAAQS.

Near-Road Monitoring (NO_2, CO, and Ultrafine Particles)
Effective April 12, 2010 EPA revised the NAAQS for NO_2 and established a one-hour standard of 100 ppb. The annual standard was left at 53 ppb. The new regulation also requires NO_2 monitoring at three sites within 50 meters of major roadways in the Bay Area by January 1, 2013. The timeline for near-road monitoring sites to be brought online is currently under review by EPA.

Effective October 31, 2011 EPA revised the monitoring requirements for CO to include collocated monitoring at some near-road NO_2 sites. Although not all sites monitoring near-road NO_2 are required to have CO monitors, the Air District will include CO monitors at all near-road NO_2 monitoring sites in the Bay Area.

Ultrafine particulate monitoring (UFP) is not required by EPA regulations but the Air District plans to equip each near-road monitoring site with instrumentation capable of detecting nanoscale particles with sizes less than 0.1 microns (100 nanometers).

An expanded description of proposed near-road monitoring and proposed locations for near-road monitoring sites can be found in Appendix A on page 116 of this document.

Photochemical Assessment Monitoring Stations (PAMS)
The new San Ramon site began recording NOx data collection on January 1, 2012. Data collection for hydrocarbons began on May 1, 2012. A full description of the PAMS monitoring program can be found in the PAMS section of this document.

Redwood City
In May 2012, the Air District received verbal approval from EPA to close the $PM_{2.5}$ FRM instrument used as a collocated instrument at this site. The shutdown is planned because only one collocated $PM_{2.5}$ monitoring site is required in the San Francisco-Oakland-Fremont CBSA and two are in operation (the other is at Concord). This change will allow for better utilization of resources in conjunction with the opening of a $PM_{2.5}$ FEM-BAM at San Jose. The proposed date for the closure of the $PM_{2.5}$ FRM instrument is September 30, 2012.

San Jose
In May 2012, the Air District received verbal approval from EPA to replace the $PM_{2.5}$ BAM at San Jose with a $PM_{2.5}$ FEM-BAM. The existing $PM_{2.5}$ FRM sampler will continue to operate, but will change from primary to collocated. The new $PM_{2.5}$ FEM BAM will be the primary instrument. The proposed date for this change is October 1, 2012.

Santa Rosa
The lease for this site expired at the end of 2011 and the property owner declined to exercise an option to renew the lease for five years. As of June 2011, this site is on a month to month occupancy agreement. The owners are agreeable to giving the Air District two to three months advance notice if they decide that the property must be vacated.

Ultrafine particulate
Ultrafine particulate (UFP) are nanoscale particles with sizes less than 100 nanometers or 0.1 microns. Monitoring for UFP began at San Pablo in February 2012; and at Livermore, Redwood City, and San Rafael in April 2012. UFP monitoring is planned for all near-road NO_2 monitoring sites in the Bay Area.

Removing a NAAQS Compliance Monitor

When the Air District proposes changes to the air monitoring network, the proposed changes are included in the Annual Monitoring Network Plan. The Annual Monitoring Network Plan is posted on the Air District web site for 30 days for public comment on the proposed changes. After the public comment period, the Air District reviews and considers the comments before making a final decision on a change to air monitoring network. The Air District submits the Annual Monitoring Network Plan with public comments to the EPA Region 9 Regional Administrator by July 1 each year.

Before shutting down a SLAMS (State or Local Air Monitoring Station) monitor, 40 CFR Part 58.14c requires that the Air District obtain the Regional Administrator's written approval. The Regional Administrator will normally approve the shutdown of a SLAMS monitor when any of the following situations apply:

1) Criteria pollutant monitors which have shown attainment of the national standards during the previous five years may be removed if the probability is less than 10% that the monitor will exceed 80% of NAAQS during the next three years, and if the monitor is not required by an attainment or maintenance plan.
2) CO, PM_{10}, SO_2, or NO_2 monitors may be removed if the monitor has shown consistently lower concentrations than another monitor for the same pollutant in the same county during the previous five years.
3) Criteria pollutant monitors that have not violated the national standards in the most recent five years may be removed if the State Implementation Plan (SIP) provides a method of representing the air quality in the applicable county.
4) $PM_{2.5}$ monitors may be removed when EPA determines that measurements are not comparable to the relevant NAAQS because of siting issues.
5) Criteria pollutant monitors which are located upwind of an urban area to characterize transport may be removed if the monitor has not recorded violations of the relevant NAAQS in the previous five years, and if the monitor is being replaced by another monitor that characterizes transport.

6) Criteria pollutant monitors not eligible for removal under any of the above criteria may be moved to a nearby location with the same scale of representation if logistical problems beyond the agency's control make it impossible to continue operation at its current site.

The closure of a SPM (Special Purpose Monitor) monitor does not require approval from EPA, but a change in the designation of a monitoring site from SLAMS to SPM requires approval of the Regional Administrator.

Data Submission Requirement

After all data review procedures are complete, the Air District submits monthly air quality and associated precision and accuracy reports to the EPA AQS database within 90 days of the end of every month. By May 1 each year, the Air District submits a data certification letter to Region 9 stating that the previous calendar year of data is complete and correct. The certification letter for 2011 data was submitted to EPA Region 9 on April 19, 2012.

Site Information Definitions

The next section describes each air quality station operated within the Bay Area Air Quality Management District. In 2011 there were 27 stations operating in the Air District (23 SLAMS stations and 4 SPM stations).

The station description includes siting information about the station and the individual monitors at the station. Monitors must be operated following EPA requirements found in 40 CFR Part 58. These regulations also specify monitor siting criteria. Table 12 below lists these siting criteria where applicable.

Table 12. Monitor Information and EPA Air Monitoring Siting Criteria.

Monitor Information	Definition of Terms
Monitoring Objective	The purpose for monitoring at that location. Choices include Highest Concentration, Population Oriented, Source Impact, General Background, and Regional Transport.
Spatial scale	The relative distance over which the air pollution measurements are representative. Choices are Micro, Middle, Neighborhood, Urban, and Regional scales.
Sampling method	*40 CFR Part 58 Appendix C, 2.0*: requires that the monitor used must be from EPA's current List of Designated Reference and Equivalent Methods.
PM filter analysis method	Describes whether the PM filters are analyzed in-house by the local agency or at an outside laboratory.
Start date	The date valid data collection began for that pollutant at that air monitoring station.
Operation schedule	Describes if the monitor is operated continuously or intermittently (as for PM).
Sampling season	Most monitors operate all year, but some monitors may only operate during months when pollution potential is highest, e.g. ozone.
Distance to road from gaseous probe	*40 CFR Part 58 Appendix E, 6.0*: requires that monitors be located far enough from roadways to minimize local mobile impacts on measurements. Recommended distances are found in Table E-1 for NO_x and ozone, Table E-2 for CO, and Figure E-1 for PM.
Ground cover	*40 CFR Part 58 Appendix E, 3.0*: states that particulate samplers should not be located in an unpaved area unless there is vegetative ground cover year round, so that the impact of wind blown dusts will be kept to a minimum.
Probe height (AGL)	*40 CFR Part 58 Appendix E, 2.0*: requires that probe height be 2-15 meters above ground level (AGL).
Probe height above roof	*40 CFR Part 58 Appendix E, 2.0*: requires the probe be at least 1 meter vertically or horizontally away from any supporting structure.
Distance from obstructions on roof	*40 CFR Part 58 Appendix E, 4.0*: requires that the distance from the obstacle to the probe or inlet must be at least twice the height that the obstacle protrudes above the probe or inlet. PM samplers must have a 2 meter separation from walls, parapets and structures. 4.0 (b)

Table 12 continued. Monitor Information and EPA Air Monitoring Siting Criteria.

Monitor Information	Definition of Terms
Distance from obstructions not on roof	*40 CFR Part 58 Appendix E, 4.0*: requires that the distance from the obstacle to the probe or inlet must be at least twice the height that the obstacle protrudes above the probe or inlet.
Distance from tree (DL)	*40 CFR Part 58 Appendix E, 5.0*: requires that probe be at least 10 meters from the nearest tree drip line.
Distance to furnace or incinerator flue	*40 CFR Part 58 Appendix E, 3.0*: requires that scavenging be minimized by keeping the probe away from furnace or incineration flues or other minor sources of SO_2 or NOx. The separation distance should take into account the heights of the flues, type of waste or fuel burned, and the sulfur content of the fuel.
Distance between collocated monitors	*40 CFR Part 58 appendix A, 3.2.5.6*: requires that PM monitors be 2-4 meters apart for flow rates >200L/m and have a 1-4 meter separation for flow rates <200 L/m.
Unrestricted airflow	*40 CFR Part 58 Appendix E, 4.0*: requires the probe or inlet to have unrestricted airflow in an arc of at least 180 degrees. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential.
Probe material	*40 CFR Part 58, Appendix E, 9.0*: requires that either Pyrex glass or FEP Teflon be used for intake sampling lines.
Residence time	*40 CFR Part 58, Appendix E, 9.0*: recommends a residence time of 20 seconds or less for gaseous sampling.
Will there be changes within the next 18 mos?	Describes if any changes are expected to occur to that monitor at that station within the next 18 months.
Is it suitable for comparison against the annual $PM_{2.5}$?	*40 CFR 58.30*: requires that $PM_{2.5}$ data that are representative, not of area-wide, but rather of relatively unique population-oriented micro-scale, localized hot spot, or unique population-oriented middle-scale impact sites are only eligible for comparison to the 24-hour $PM_{2.5}$ NAAQS.
Frequency of flow rate verification for manual PM samplers	*40 CFR 58, Appendix A, 3.3.2*: requires that a one-point flow rate verification check must be performed at least once every month for low-volume PM samplers and quarterly for hi-volume PM samplers.
Frequency of flow rate verification for automated PM analyzers	*40 CFR 58, Appendix A 3.2.3*: requires a one-point flow rate verification check must be performed at least once every month.
Frequency of one-point QC check (gaseous)	*40 CFR Part 58 Appendix A, 3.2.1*: requires that QC checks be performed at least once every two weeks.
Last Annual Performance Evaluation (gaseous)	*40 CFR Part 58 Appendix A, 3.2.2*: requires that SO_2, CO, O_3, and NO_2 monitors have annual performance evaluations. Section 3.2.7 requires that performance evaluations of PM monitors must be performed annually through the PEP (Performance Evaluation Program).
Last two semi-annual flow rate audits for PM monitors	*40 CFR Part 58 Appendix A, 3.2.4 (automated methods) and 3.3.3 (manual methods)*: require that PM samplers have flow rate checks every six months.

Included in each site description is the number of days when a criteria pollutant measurement exceeded the National Ambient Air Quality Standard (NAAQS). The national standards for hourly and daily averaging times are shown in Table 13 below. Based on the past ten years of air monitoring data, only ozone and $PM_{2.5}$ are pollutants of interest to Bay Area residents because the other pollutants rarely, if ever, exceed the NAAQS. The table below is abbreviated for clarity. A full list of national and California air quality standards can be found at: http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm

Table 13. National Ambient Air Quality Standards (as of December 31, 2011)

Pollutant	Averaging Time	Standard
Ozone	8 hour	0.075 ppm
$PM_{2.5}$	24 hour	35 $\mu g/m^3$
PM_{10}	24 hour	150 $\mu g/m^3$
Carbon Monoxide	1 hour	35 ppm
	8 hour	9 ppm
Sulfur Dioxide	1 hour	75 ppb
Nitrogen Dioxide	1 hour	100 ppb

More detailed information about NAAQS standards, including past standards, may be found at: http://epa.gov/air/criteria.html

Detailed Site Information for SLAMS Stations

Bethel Island

Site Name	Bethel Island
AQS ID	06-013-1002
GIS coordinates	38.0063° N, 121.6419° W
Location	Trailer in parking lot
Address	5551 Bethel Island Rd, Bethel Island CA 94511
County	Contra Costa
Distance to road from gaseous probe	Bethel Island Rd: 63 meters Sandmound Blvd: 110 meters
Traffic count	Bethel Island Rd: 5,550 ADT (2009) Sandmound Blvd: 1,537 ADT (2006)
Groundcover	Gravel surrounded by grassy fields
Representative Area	San Francisco-Oakland-Fremont MSA

Bethel Island was chosen for an air monitoring site to measure pollutant transport between the California Central Valley and the San Francisco Bay Area. The site is 26 miles east of the only sea-level gap (the Carquinez Strait) between the two regions. Local pollution emissions are low due to the rural nature of the area and the lack of any industrial sources within six miles of the site. The nearest town is Bethel Island, 0.6 miles to the north, with a population of 2,137 according to the 2010 census. The Bethel Island station was operated by CARB from 1981 until late 1986 and then it was transferred to the Air District.

Ozone and NO/NO_2 are measured because the area is in the transport corridor between the San Francisco Bay Area and the Central Valley, both of which are major sources of ozone, ozone precursors, and particulates. Traffic volume near the site is low, so CO measurements tend to be representative of natural background levels, or regional transport. SO_2 is measured because the area is downwind from numerous refineries, which can be large sources of SO_2. PM_{10} is measured because easterly winds occasionally transport particulates from the Central Valley, and because the filters can be analyzed to determine sulfate and nitrate levels transported from the Central Valley.

Background levels of toxic compounds are determined from canister samples taken at Bethel Island on a 1-in-12 day schedule and later analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

During the most recent three years, this site recorded 11 exceedances of the national 8-hour ozone standard and no exceedances of the national standards for PM_{10}, NO_2, SO_2, or CO.

Bethel Island Monitor Information

Pollutant	O3	CO	NO/NO2	SO2	PM10
Monitoring Objective	Regional Transport & Highest Conc.	General Background	Regional Transport	Regional Transport	Regional Transport
Spatial scale	Regional	Regional	Regional	Regional	Regional
Sampling method	TECO 49i	TECO 48i	TECO 42C	TECO 43C	Andersen GUV-16HBLA
PM filter analysis method	N/A	N/A	N/A	N/A	Weighed by Air District
Start date	01/01/87*	01/01/87*	01/01/87*	01/01/87*	11/05/86
Operation schedule	Continuous	Continuous	Continuous	Continuous	1-in-6
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	6.7 m	6.7 m	6.7 m	6.7 m	5.2 m
Probe height above roof	3.0 m	3.0 m	3.0 m	3.0 m	1.5 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	None	None	None	None	None
Distance from tree (DL)	13.3 m	13.3 m	13.3 m	13.3 m	14.4 m
Distance to furnace or incinerator flue	None	None	None	None	None
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow	270°	270°	270°	270°	270°
Probe material	Teflon	Teflon	Teflon	Teflon	N/A
Residence time	13 s	14 s	14 s	14 s	N/A
Will there be changes within the next 18 mos?	No	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A	Weekly
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Every other day	Every other day	Every other day	Every other day	N/A
Last Annual Performance Evaluation (gaseous)	10/26/11	10/26/11	10/26/11	10/26/11	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A	10/26/11 05/10/11

* Start date of data collected by the Air District. Data collection by CARB began on March 1, 1981.

Concord

Site Name	Concord
AQS ID	06-013-0002
GIS coordinates	37.9360° N, 122.0262° W
Location	One story commercial building
Address	2956-A Treat Blvd, Concord CA 94518
County	Contra Costa
Distance to road from gaseous probe	Treat Blvd: 181 meters Oak Grove Rd: 244 meters
Traffic count	Treat Blvd: 41,218 ADT (2005) Oak Grove Rd: 26,742 ADT (2005) Interstate 680: 242,000 ADT (2008)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

Concord was chosen for an air monitoring site because it is the largest city in Contra Costa County, with a 2010 population of 122,067 according to the 2010 census; and because of the high pollution potential due to locally emitted and transported pollutants into the area. Since Concord is located in the Diablo Valley, locally emitted pollutants can become trapped when winds are light. Large emission sources in the valley include the two major freeways, Interstate 680 and California Highway 4; and two refineries at the north end of the valley.

The air monitoring site is located in the back of a shopping center, near the intersection of two major streets, and surrounded by residential neighborhoods. There is no industry in the immediate vicinity. NO/NO_2 and CH_4/NMHC are measured because of local mobile emissions. Monitoring of CH_4/NMHC was discontinued on May 31, 2011 because of the development of PAMS network (described elsewhere in this report), which is a more effective allocation of resources. The PAMS network better defines the measurement and sources of ozone precursors, making additional measurements of CH_4/NMHC at Concord superfluous.

Ozone is measured at the site because hot, inland summertime temperatures combined with precursor pollutants stagnating in the surrounding valley often produces high ozone levels. Carbon monoxide is measured because the site is near two major roads, Treat Blvd and Oak Grove Road. SO_2 is measured because the site is six miles south of the Tesoro and the Shell Refineries, both potential major sources of SO_2. PM_{10} and $PM_{2.5}$ are measured because light winds combined with surface-based inversions during the winter months can cause elevated particulate levels in the valley.

The collocated $PM_{2.5}$ sampler operated on a 1-in-6 day schedule all year.

VOC toxic compounds are sampled at Concord on a 1-in-12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

During the most recent three years, this site recorded five exceedances of the national 8-hour ozone standard, four exceedances of the national 24-hour $PM_{2.5}$ standard, and no exceedances of the national standards for $PM_{10,}$ $NO_{2,}$ SO_2, or CO.

Concord Monitor Information

Pollutant	**O3**	**CO**	**NO/NO2**	**SO2**	**CH4/NMHC***
Monitoring Objective	Population oriented & Highest Conc.	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Urban	Neighborhood
Sampling method	TECO 49i	TECO 48i	TECO 42i	TECO 43i	TECO 55C
PM filter analysis method	N/A	N/A	N/A	N/A	N/A
Data Start date	04/08/80	02/21/80	NO2: 01/01/80 NO: 03/01/80	02/01/80	CH4:12/31/99 NMHC:05/10/06
Operation schedule	Continuous	Continuous	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	9.2 m	9.2 m	9.2 m	9.2 m	9.2 m
Probe height above roof	3.1 m	3.1 m	3.1 m	3.1 m	3.1 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	None	None	None	None	None
Distance from tree (DL)	24.0 m	24.0 m	24.0 m	24.0 m	24.0 m
Distance to furnace or incinerator flue	None	None	None	None	None
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	Teflon	Teflon
Residence time	9 s	10 s	11 s	10 s	8 s
Will there be changes within the next 18 mos?	No	No	No	No	Yes*
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Every other day	Every other day	Every other day	Every other day	Every other day
Last Annual Performance Evaluation (gaseous)	08/03/11	08/03/11	08/03/11	08/03/11	02/08/11
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A	N/A

* CH4/NMHC was discontinued on May 31, 2011

Concord Monitor Information

Pollutant	**PM10**	**FRM PM2.5**	**FRM PM2.5 Collocated**
Monitoring Objective	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Sampling method	Andersen HiVol 1200	Partisol-Plus 2025 w/VSCC	Partisol-Plus 2025 w/VSCC
PM filter analysis method	Weighed by Air District	Weighed by Air District	Weighed by Air District
Data Start date	11/04/86	03/19/99	03/19/99
Operation schedule	1-in-6	Apr-Sep: 1-in-3 Oct-Mar: daily	1-in-6
Sampling season	All year	All year	All year
Probe height (AGL)	5.8 m	5.9 m	5.9 m
Probe height above roof	1.5 m	2 m	2 m
Distance from obstructions on roof	None	None	None
Distance from obstructions not on roof	None	None	None
Distance from tree (DL)	15.0 m	13.1 m	17.4 m
Distance to furnace or incinerator flue	None	None	None
Distance between collocated monitors	N/A	3.2 m	3.2 m
Distance between PM10 and PM2.5 monitors	7.5 m	7.5 m	3.2 m
Unrestricted airflow	360°	360°	360°
Probe material	N/A	N/A	N/A
Residence time	N/A	N/A	N/A
Will there be changes within the next 18 mos?	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	Yes	Yes
Frequency of flow rate verification for manual PM samplers	Weekly	Monthly	Monthly
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	N/A	N/A	N/A
Last Annual Performance Evaluation (gaseous)	N/A	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	08/02/11 02/07/11	08/02/11 02/07/11	08/02/11 02/07/11

Fairfield

Site Name	Fairfield
AQS ID	06-095-0005
GIS coordinates	38.2271° N, 122.0756° W
Location	Small trailer in open field
Address	1010 Chadbourne Rd, Fairfield CA 94534
County	Solano
Distance to road from gaseous probe	Cordelia Rd: 194 meters Chadbourne Rd: 705 meters
Traffic count	Cordelia Rd: 3,751 ADT (2007) Chadbourne Rd: 500 ADT (2007)
Groundcover	Vegetative
Representative Area	Vallejo-Fairfield MSA

Fairfield was chosen for monitoring ozone transport between the San Francisco Bay Area and the Sacramento Valley. Fairfield lies in the northeast part of the Air District in the Carquinez Strait Region, the only sea level gap between the Bay Area and the Central Valley. Prevailing westerly winds carry ozone and its precursors from the Bay Area to the Sacramento Valley.

The monitoring site is located in a rural area between Fairfield/Suisun City and the greater Bay Area. Prevailing winds are westerly during the summer season. Therefore, the monitor normally measures ozone concentrations coming from the Bay Area. Occasionally easterly winds transport ozone from the Central Valley to Fairfield and the Bay Area.

Over the past decade the Fairfield/Suisun City area has grown considerably. According to the 2010 census the area has a combined population of 138,815, the largest urban area in Solano County. As a result, Fairfield is also a population oriented ozone monitoring site.

Ozone concentrations measured at Fairfield exceeded the national 8-hour ozone standard on five days during the last three years.

Fairfield Monitor Information

Pollutant	**O3**
Monitoring Objective	Regional transport & Population oriented
Spatial scale	Regional
Sampling method	TECO 49i
Analysis method	N/A
Start date	05/29/02
Operation schedule	Continuous
Sampling season	Apr 1-Nov 30
Probe height (AGL)	3.7 m
Probe height above roof	1.0 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	>50 m
Distance to furnace or incinerator flue	None
Unrestricted airflow	360°
Probe material	Teflon
Residence time	5 s
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Every other day
Last Annual Performance Evaluation (gaseous)	11/07/11
Last two semi-annual flow rate audits for PM monitors	N/A

Gilroy

Site Name	Gilroy
AQS ID	06-085-0002
GIS coordinates	36.9996° N 121.5747° W
Location	Air monitoring shelter next to water pump station
Address	9th and Princevalle St, Gilroy CA 95020
County	Santa Clara
Distance to road from gaseous probe	Princevalle St: 18.3 meters 9th St: 15.7 meters 10th St. 185.0 meters
Traffic count	Princevalle St: 5,000 ADT (2008) 9th St: 1,400 ADT (estimate) 10th St. 12,700 ADT (2008)
Groundcover	paved
Representative Area	San Jose-Sunnyvale-Santa Clara MSA

Gilroy was originally chosen as an air monitoring site to measure ozone and particulate transport between the San Francisco and Monterey Bay Areas. Prevailing northwesterly afternoon winds carry ozone and ozone precursors from the San Jose area southward through the Santa Clara Valley. When temperatures are hot, and solar insolation is strong, these precursors react and can form high concentrations of ozone in the Gilroy area. As Gilroy grew in population (48,821 according to the 2010 census) the site was considered not only an ozone transport site but also a population oriented ozone site. $PM_{2.5}$ is measured because light winds combined with surface-based inversions during the winter months can cause elevated particulate levels in the valley.

The monitoring site is located in a residential area of Gilroy on the west side of the Santa Clara Valley. Air quality studies have shown that the west side of the valley has higher ozone levels than the east side. This is due to elevated terrain on the west side that shelters the western part of Gilroy from the strong winds in the afternoon produced by the Monterey Bay sea breeze. Residents have preferred the sheltered area and built most of the town on the west side of the valley.

In the most recent three years, the national 8-hour ozone standard was exceeded six times and the national 24-hour $PM_{2.5}$ standard was exceeded twice. One of the $PM_{2.5}$ exceedances was due to smoke from a wildfire on August 14, 2009.

Gilroy Monitor Information

Pollutant	**O3**	**Continuous PM2.5 FEM BAM**
Monitoring Objective	Regional Transport, Highest Concentration, Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood
Sampling method	TECO 49i	Met One FEM BAM 1020
PM filter analysis method	N/A	N/A
Data Start date	07/01/80	10/31/09
Operation schedule	Continuous	Continuous
Sampling season	Apr 1 – Nov 30	All year
Probe height (AGL)	4.7 m	3.0 m
Probe height above roof	2.6 m	N/A
Distance from obstructions on roof	None	N/A
Distance from obstructions not on roof	None	1.8 m
Distance from tree (DL)	26 m	26 m
Distance to furnace or incinerator flue	14.3 m	14.3 m
Distance between collocated monitors	N/A	N/A
Unrestricted airflow	360º	360°
Probe material	Teflon	N/A
Residence time	16 s	N/A
Will there be changes within the next 18 mos?	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	Yes
Frequency of flow rate verification for manual PM samplers	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	Every two weeks
Frequency of one-point QC check (gaseous)	Every other day	N/A
Last Annual Performance Evaluation (gaseous)	11/10/11	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	11/10/11 04/20/11

Hayward

Site Name	Hayward
AQS ID	06-001-2001
GIS coordinates	37.6545° N, 122.0315° W
Location	Pump house near water tank
Address	3466 La Mesa Drive, Hayward CA 94542
County	Alameda
Distance to road from gaseous probe	Hayward Blvd: 26.2 meters La Mesa Dr: 38 meters
Traffic count	Hayward Blvd: 4,293 ADT (2010) La Mesa Dr: 500 ADT (estimate)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

The Hayward air monitoring site was chosen to measure ozone at a higher elevation. Located on the east side of Hayward at an elevation of 951 feet, it is the highest elevation monitoring site in the Air District measuring ozone. Studies had shown that on high ozone days, a cloud of ozone and ozone precursors moves southward from Oakland on the west side of the East Bay Hills.

Because ozone monitoring sites were already in place in the low-lying areas of the East and South Bay, i.e. in Oakland and San Jose, this site was chosen to be between them, but at a higher elevation. Thus, the site gives an indication of ozone levels aloft. The Hayward site is also important because it provides air quality forecasting information concerning residual ozone from the previous day. Although there is a large water tank onsite in the upwind direction, the instrument probe is high enough to avoid the tank being an obstacle. The scale of this site is considered to be regional because it is representative of ozone levels aloft.

The Hayward site was shut down during the 2010 ozone season due to the demolition reconstruction of the water tank nearby. Prior to the temporary shutdown in 2010, the national 8-hour ozone standard was exceeded on four days (2007-2009). In 2011, the national 8-hour ozone standard was not exceeded at this site.

Hayward Monitor Information

Pollutant	**O3**
Monitoring Objective	Population oriented & Regional Transport
Spatial scale	Regional
Sampling method	TECO 49i
PM filter analysis method	N/A
Start date	05/31/77
Operation schedule	Continuous
Sampling season	April 1-November 30
Probe height (AGL)	6.7 m
Probe height above roof	3.1 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	11.4 m
Distance to furnace or incinerator flue	N/A
Distance between collocated monitors	N/A
Unrestricted airflow	360°
Probe material	Teflon
Residence time	15 s
Will there be changes within the next 18 months?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Every other day
Last Annual Performance Evaluation (gaseous)	11/14/11
Last two semi-annual flow rate audits for PM monitors	N/A

Livermore

Site Name	Livermore
AQS ID	06-001-0007
GIS coordinates	37.6875° N, 121.7842° W
Location	One story commercial building
Address	793 Rincon Avenue, Livermore CA 94551
County	Alameda
Distance to road from gaseous probe	Rincon Ave: 67 meters Pine St: 94 meters Interstate 580: 1,400 meters
Traffic count	Rincon Ave: 2,400 ADT (2005) Pine St: 4,800 ADT (2005) Interstate 580 at Portola Ave: 184,000 ADT (2010)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

Livermore was chosen for an air monitoring site because it is the largest city in eastern Alameda County, with a 2010 population of 80,968 according to the 2010 census. Past measurements have shown this area to have the highest ozone levels in the Bay Area. Livermore is located within the Livermore Valley, an east-west oriented inland valley between the San Francisco Bay and the Central Valley. Wind analyses of high ozone days show ozone precursors moving to this valley from the Hayward and Niles Canyon Gaps to the west, and from the San Ramon Valley to the north. The air monitoring site is west of the city center, in a residential neighborhood. The station is in a small one-story shopping center, with a little-used parking lot in front of the station and a city park behind it.

There are no industrial sources in the immediate vicinity of the site. Ozone and its precursors, CH_4/NMHC and NO/NO_2, are measured because the area is downwind of large sources of ozone precursors. $PM_{2.5}$ is measured because light winds combined with surface-based inversions during the winter months can cause elevated particulate levels.

The $PM_{2.5}$ FRM sampler operated daily from January 1, 2011 through February 28, 2011, and was then replaced with a continuous $PM_{2.5}$ FEM-BAM monitor on March 1, 2011.

VOC toxic compounds are sampled at Livermore on a 1-in-12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

The Livermore site is part of a Bay Area Photochemical Assessment Monitoring Stations (PAMS) program. This is a program to measure hourly speciated hydrocarbons using a gas chromatograph analyzer at three Bay Area locations. The other two locations are San Ramon and Patterson Pass. A full description of the PAMS program can be found in this document.

During the most recent three years, this site recorded 11 exceedances of the national 8-hour ozone standard, six exceedances of the national 24-hour $PM_{2.5}$ standard, and no exceedances of the national NO_2 standard.

Livermore Monitor Information

Pollutant	**O3**	**NO/NO2**	**CH4/NMHC**	**Continuous PM2.5 FEM BAM**	**Speciated PM2.5**
Monitoring Objective	Population oriented & Highest Conc.	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49i	TECO 42i	TECO 55C	Met One FEM BAM 1020	Met One SASS
PM filter analysis method	N/A	N/A	N/A	N/A	Analyzed by DRI
Data Start date	01/01/00	NO2:12/31/99 NO: 01/01/00	CH4: 12/31/99 NMHC:04/20/05	03/01/11	06/11/08
Operation schedule	Continuous	Continuous	Continuous	Continuous	1-in-6
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	6.1 m	6.1 m	6.1 m	5.1 m	5.1 m
Probe height above roof	3.3 m	3.3 m	3.3 m	2.0 m	2.0 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	None	None	None	None	None
Distance from tree (DL)	51 m	51 m	51 m	52 m	55 m
Distance to furnace or incinerator flue	16.5 m	16.5 m	16.5 m	21 m	17 m
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Distance between PM10 and PM2.5 monitors	N/A	N/A	N/A	BAM to PM2.5: 5.2 m BAM to SASS: 3.5 m	SASS to BAM: 3.5 m SASS to PM2.5: 2.7 m
Unrestricted airflow	360°	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	N/A	N/A
Residence time	10 s	10 s	10 s	N/A	N/A
Will there be changes within the next 18 months?	No	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	Yes	No
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A	Monthly
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	Every two weeks	N/A
Frequency of one-point QC check (gaseous)	Every other day	Every other day	Every other day	N/A	N/A
Last Annual Performance Evaluation (gaseous)	07/19/11	07/19/11	07/19/11	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	07/18/11 01/12/11	07/18/11 01/12/11

Los Gatos

Site Name	Los Gatos
AQS ID	06-085-1001
GIS coordinates	37.2269° N 121.9798° W
Location	Top of fire station's hose drying tower
Address	306 University Ave, Los Gatos CA 95030
County	Santa Clara
Distance to road From gaseous probe	University Ave: 37.2 meters Bentley Ave: 26.5 meters State Route 17: 291 meters
Traffic count	University Ave: 13,600 ADT (2005) Bentley Ave: 400 ADT (estimate) State Route 17: 58,000 ADT (2010)
Groundcover	Paved
Representative Area	San Jose-Sunnyvale-Santa Clara MSA

Los Gatos was chosen for an ozone monitoring site because prevailing northerly winds transport ozone and ozone precursors from the densely populated area around the south Bay Area to the west side of the Santa Clara Valley. Mobile sampling studies as well as long-term monitoring in the Saratoga and Los Gatos areas showed Los Gatos to have the highest ozone levels in the area.

High ozone levels are in part due to Los Gatos being situated at the base of the Santa Cruz Mountains, which act as a barrier to the movement of polluted air. The monitoring site is located near the downtown area at a fire station surrounded by residential neighborhoods. The city of Los Gatos has a 2010 population of 29,413 according to the 2010 census.

In the most recent three years, this site recorded six exceedances of the national 8-hour ozone standard.

Los Gatos Monitor Information

Pollutant	**O3**
Monitoring Objective	Population oriented & Highest concentration
Spatial scale	Neighborhood
Sampling method	TECO 49i
PM filter analysis method	N/A
Data Start date	04/01/72
Operation schedule	Continuous
Sampling season	All year
Probe height (AGL)	11.0 m
Probe height above roof	3.2 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	15.5 m
Distance to furnace or incinerator flue	4.3 m
Distance between collocated monitors	N/A
Unrestricted airflow	360º
Probe material	Teflon
Residence time	16 s
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Daily
Last Annual Performance Evaluation (gaseous)	07/13/11
Last two semi-annual flow rate audits for PM monitors	N/A

Martinez

Site Name	Martinez
AQS ID	06-013-2001
GIS coordinates	38.0128° N, 122.1345° W
Location	Small sampling shelter next to fire station
Address	521 Jones St, Martinez CA 94553
County	Contra Costa
Distance to road from gaseous probe	Jones St: 22 meters Alhambra Ave: 19 meters
Traffic count	Jones St: 2,000 ADT (2008) Alhambra Ave: 9,800 ADT (2008)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

Martinez was chosen for SO_2 source impact monitoring because the Shell and Tesoro oil refineries are located in north and east sections of the city. Because the Carquinez Strait boarders the city to the north, the prevailing winds are from the west. However, north and east winds can transport SO_2 emissions from the refineries over populated areas of the city.

The monitoring site is located near downtown Martinez and is 0.5 miles south of the Shell Refinery and 2.5 miles west of the Tesoro Refinery. According to the 2010 census, Martinez has a 2010 population of 35,824. There are no industrial activities or SO_2 sources nearby other than the refineries.

VOC toxic compounds are sampled at Martinez on a 1-in-12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

SO_2 concentrations measured at Martinez did not exceed the national 1-hour 75-ppb standard during the last three years.

Martinez Monitor Information

Pollutant	**SO2**
Monitoring Objective	Source Impact
Spatial scale	Neighborhood
Sampling method	TECO 43C
Analysis method	N/A
Start date	07/02/73
Operation schedule	Continuous
Sampling season	All year
Probe height (AGL)	7.2 m
Probe height above roof	2.7 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	11.2 m
Distance to furnace or incinerator flue	None
Unrestricted airflow	360°
Probe material	Teflon
Residence time	13 s
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Every other Day
Last Annual Performance Evaluation (gaseous)	09/02/11
Last two semi-annual flow rate audits for PM monitors	N/A

Napa

Site Name	Napa
AQS ID	06-055-0003
GIS coordinates	38.3110° N, 122.2962° W
Location	One story commercial building
Address	2552 Jefferson St, Napa CA 94558
County	Napa
Distance to road from gaseous probe	Jefferson St: 15 meters
Traffic count	Jefferson St: 19,143 ADT (2007)
Groundcover	Paved
Representative Area	Napa MSA

Napa was chosen for an air monitoring location because it is the largest city in Napa County with a 2010 population of 76,915 according to the 2010 census. The city is located in the center of Napa Valley where agricultural burning and fireplace usage during the fall and winter can result in high particulate levels. In summer months, Napa can have elevated ozone levels when central Bay Area ozone precursors are transported northward into the valley.

The air monitoring site is situated about a mile north of downtown Napa in a mixed residential and commercial neighborhood. There are no industrial sources in the immediate vicinity. Ozone and NO/NO_2 are measured because southerly winds carry ozone and its precursors into Napa. Carbon monoxide is measured because the Napa Valley is a major tourist attraction with resulting high traffic volumes through the city. PM_{10} and continuous $PM_{2.5}$ are measured because of agricultural and household wood burning.

VOC toxic compounds are sampled at Napa on a 1-in-12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

During the most recent three years, this site recorded three exceedances of the national 8-hour ozone standard. No exceedances of the national standards for PM_{10}, NO_2 or CO were measured during the last three years. The continuous $PM_{2.5}$ (BAM) monitor has recorded measurements above the national 24-hour $PM_{2.5}$ standard on two days during the most recent three years. This monitor is not a recognized FRM or FEM method, and the data cannot be used to determine violations of the national $PM_{2.5}$ standards, or its attainment status. Only FRM or FEM based $PM_{2.5}$ measurements may be used for comparison with national $PM_{2.5}$ standards.

Napa Monitor Information

Pollutant	O3	CO	NO/NO2
Monitoring Objective	Population oriented	Population oriented	Population oriented
Spatial scale	Middle	Middle	Middle
Sampling method	TECO 49i	TECO 48i	TECO 42i
PM filter analysis method	N/A	N/A	N/A
Start date	07/01/76	07/01/73	07/01/73
Operation schedule	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year
Probe height (AGL)	8.9 m	8.9 m	8.9 m
Probe height above roof	5.2 m	5.2 m	5.2 m
Distance from obstructions on roof	None	None	None
Distance from obstructions not on roof	None	None	None
Distance from tree (DL)	25 m	25 m	25 m
Distance to furnace or incinerator flue	5.7 m	5.7 m	5.7 m
Distance between collocated monitors	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°
Probe material	Teflon	Teflon	Teflon
Residence time	8 s	8 s	9 s
Will there be changes within the next 18 mos?	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Every other day	Every other day	Every other day
Last Annual Performance Evaluation (gaseous)	08/24/11	08/24/11	08/24/11
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A

Napa Monitor Information

Pollutant	**PM10**	**PM10 Collocated**	**Continuous PM2.5 BAM**
Monitoring Objective	Population oriented	Population oriented	Population oriented
Spatial scale	Middle	Middle	Middle
Sampling method	Tisch Env. HiVol TE-6000	Tisch Env. HiVol TE-6000	Met One BAM 1020
PM filter analysis method	Weighed by Air District	Weighed by Air District	N/A
Start date	11/04/86	06/08/04	01/04/07
Operation schedule	1-in-6	1-in-6	Continuous
Sampling season	All year	All year	All year
Probe height (AGL)	5.5 m	5.5 m	5.5 m
Probe height above roof	1.8 m	1.8 m	1.8 m
Distance from obstructions on roof	None	None	None
Distance from obstructions not on roof	None	None	None
Distance from tree (DL)	21 m	17.6 m	26 m
Distance to furnace or incinerator flue	5.0 m	3.5 m	8.8 m
Distance between collocated monitors	3.4 m	3.4m	N/A
Distance between PM10 and PM2.5 monitors	6.1 m	9.5 m	Prim: 6.1 m Col: 9.5 m
Unrestricted airflow	360°	360°	360°
Probe material	N/A	N/A	N/A
Residence time	N/A	N/A	N/A
Will there be changes within the next 18 mos?	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	No – not reference or equivalent method
Frequency of flow rate verification for manual PM samplers	Weekly	Weekly	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	Every two weeks
Frequency of one-point QC check (gaseous)	N/A	N/A	N/A
Last Annual Performance Evaluation (gaseous)	N/A	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	08/23/11 02/15/11	08/23/11 02/15/11	08/28/11 02/15/11

Oakland

Site Name	Oakland
AQS ID	06-001-0009
GIS coordinates	37.7431 ° N, 122.1699° W
Location	Two-story commercial building
Address	9925 International Blvd, Oakland CA 94603
County	Alameda
Distance to road from gaseous probe	International Blvd: 19 meters 99th St: 23 meters 98th St: 43 meters
Traffic count	International Blvd: 26,912 ADT (2006) 99th St: 100 ADT (estimate) 98th St: 31,340 ADT (2002)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

Oakland is an important area for air pollution monitoring because it is the largest city in Alameda County, with a population of 390,724 according to the 2010 census. It has large emission sources within its boundaries, such as a major maritime port, an international airport, extensive areas of industry, and a number of major freeways. These sources have the potential to emit significant amounts of CO and ozone precursors, as well as particulates and organic toxic compounds.

The monitoring site is located seven miles southeast of downtown Oakland, on a commercial strip in a residential area. Ozone and NO/NO_2 are measured to monitor population exposure to these pollutants. Carbon monoxide is measured because of the high volume of traffic in the city, which includes several major freeways. $PM_{2.5}$ is measured due to the large emission sources in the area, and because light winds combined with wood burning, vehicular traffic, and surface-based inversions during winter can cause elevated particulate concentrations.

VOC toxic compounds are sampled at Oakland on a 1-in-12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

During the most recent three years, the national 24-hour $PM_{2.5}$ standard was exceeded on 4 days. No exceedances of the national standards for ozone, NO_2 or CO were measured during the last three years.

Oakland Monitor Information

Pollutant	**O3**	**CO**	**NO/NO2**	**Continuous PM2.5 FEM BAM**
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Middle	Middle	Middle	Middle
Sampling method	TECO 49i	API 300E	TECO 42i	Met One FEM BAM 1020
Analysis method	N/A	N/A	N/A	N/A
Start date	11/01/07	11/01/07	11/01/07	10/01/2009
Operation schedule	Continuous	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year	All year
Probe height (AGL)	10 m	10 m	10 m	8.0 m
Probe height above roof	4 m	4 m	4 m	2.4 m
Distance from obstructions on roof	None	None	None	None
Distance from obstructions not on roof	None	None	None	None
Distance from tree (DL)	21 m	21 m	21 m	21 m
Distance to furnace or incinerator flue	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	N/A
Residence time	13 s	14 s	13 s	N/A
Will there be changes within the next 18 mos?	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	Yes
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	Every two weeks
Frequency of one-point QC check (gaseous)	Every other day	Every other day	Every other day	N/A
Last Annual Performance Evaluation (gaseous)	10/19/11	10/19/11	11/17/11	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	10/19/11 05/31/11

Oakland West

Site Name	Oakland West
AQS ID	06-001-0011
GIS coordinates	37.8148 ° N, 122.2823° W
Location	Shelter in parking lot
Address	1100 21st St, Oakland CA 94607
County	Alameda
Distance to road from gaseous probe	Grand Ave: 34 meters Linden St: 33 meters Adeline St: 168 meters 21st St: 80 meters
Traffic count	Grand Ave: 19,796 ADT (2002) Linden St: 500 ADT (estimate) Adeline St: 7,586 ADT (2002) 21st St: 500 ADT (estimate)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

The Air District opened a monitoring station one mile downwind of the Port of Oakland in February 2009 because the Port of Oakland is considered a major area source of diesel particulate matter emissions. Studies have shown that the West Oakland community is exposed to higher concentrations of diesel particulate matter than elsewhere in the Bay Area, resulting in higher potential cancer risks.

Carbon monoxide, NO/NO_2, and continuous $PM_{2.5}$ are measured to determine the impact of emissions from the Port of Oakland and its associated diesel-truck traffic, and vehicle traffic from nearby highways. SO_2 is measured to determine the impact of emissions from ship traffic. Ozone monitoring was added on December 13, 2010.

Because the Port of Oakland can be a large source of VOC toxic compounds, the Air District has been sampling for toxics since 2001 at a site several blocks from the current Oakland West monitoring site. Toxics monitoring was moved to the new station when it opened in February 2009. VOC toxic compounds are sampled at Oakland West on a 1-in-12 day schedule, and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

Since the site opened in February 2009, there have been no exceedances of the national standards for Ozone, NO_2, SO_2, or CO. The continuous $PM_{2.5}$ (BAM) monitor recorded a measurement above the national 24-hour $PM_{2.5}$ standard on one day. This monitor is not a recognized FRM or FEM method, and the data cannot be used to determine violations of the national $PM_{2.5}$ standards, or its attainment status. Only FRM or FEM based $PM_{2.5}$ measurements may be used for comparison with national $PM_{2.5}$ standards.

Oakland West Monitor Information

Pollutant	O3	CO	NO/NO2	SO2
Monitoring Objective	Population oriented	Source Impact	Source Impact	Source Impact
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49C	TECO 48i	TECO 42C	TECO 43C
Analysis method	N/A	N/A	N/A	N/A
Start date	12/13/10	02/25/09	02/25/09	02/25/09
Operation schedule	Continuous	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year	All year
Probe height (AGL)	5.7 m	5.7 m	5.7 m	5.7 m
Probe height above roof	3.1 m	3.1 m	3.1 m	3.1 m
Distance from obstructions on roof	None	None	None	None
Distance from obstructions not on roof	None	None	None	None
Distance from tree (DL)	40 m	40 m	40 m	40 m
Distance to furnace or incinerator flue	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	Teflon
Residence time	10 s	10 s	10 s	10 s
Will there be changes within the next 18 mos?	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Every other day	Every other day	Every other day	Every other day
Last Annual Performance Evaluation (gaseous)	11/16/11	11/16/11	11/16/11	11/16/11
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A

Oakland West Monitor Information

Pollutant	Continuous PM2.5 BAM	Speciated PM2.5
Monitoring Objective	Source Impact	Source Impact
Spatial scale	Neighborhood	Neighborhood
Sampling method	Met One BAM 1020	Met One SASS
PM filter analysis method	N/A	Analyzed by DRI
Data Start date	02/25/09	02/12/09
Operation schedule	Continuous	1-in-6
Sampling season	All year	All year
Probe height (AGL)	5.2 m	4.7 m
Probe height above roof	2.6 m	2.1 m
Distance from obstructions on roof	None	None
Dist from obstructions not on roof	None	None
Dist from tree (DL)	40 m	39 m
Distance to furnace or incinerator flue	N/A	N/A
Distance between collocated monitors	N/A	N/A
Distance between PM10 and PM2.5 monitors	BAM to SASS: 1.1 m	SASS to BAM: 1.1 m
Unrestricted airflow	360°	360°
Probe material	N/A	N/A
Residence time	N/A	N/A
Will there be changes w/in the next 18 mos?	No	No
Is it suitable for comparison against the annual PM2.5?	No – not reference or equivalent method	No
Frequency of flow rate verification for manual PM samplers	N/A	Monthly
Frequency of flow rate verification for automated PM analyzers	Every two weeks	N/A
Frequency of one-point QC check (gaseous)	N/A	N/A
Last Annual Perform. Evaluation (gaseous)	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	11/15/11 01/18/11	11/15/11 01/18/11

Point Reyes

Site Name	Point Reyes
AQS ID	06-041-0003
GIS coordinates	38.1228° N, 122.9084° W
Location	At ground level behind a ranger residence
Address	170 Pierce Point Rd, Point Reyes CA 94956
County	Marin
Distance to road from probe	Pierce Point Rd: 95 meters
Traffic count	Pierce Point Rd: 225 ADT (estimate)
Groundcover	Grass
Representative Area	San Francisco-Oakland-Fremont MSA

Point Reyes was chosen for an air monitoring site because it is representative of background $PM_{2.5}$ levels. Air pollution levels at this site are usually low due to the rural nature of the area and because the upwind air flow is usually from the Pacific Ocean 2.5 miles to the west. This site is operated by the California Air Resources Board.

The site is located within the Point Reyes National Seashore. Within the park are scattered dairy farms. There are no industrial sources within 20 miles of the park. Between the ocean and the air monitoring site the land is relatively flat with low vegetation. The air monitoring site is located behind a ranger residence at the north end of the park. The closest towns are Marshall, three miles to the northeast with a population of a few hundred; and Inverness three miles to the southeast with a population of 1304 according to the 2010 census.

The continuous $PM_{2.5}$ (BAM) monitor at Point Reyes recorded no days above the national 24-hour $PM_{2.5}$ standard during the most recent three years. However, this monitor is not a recognized FRM or FEM method, and the data cannot be used to determine violations of the national $PM_{2.5}$ standards, or its attainment status. Only FRM or FEM based $PM_{2.5}$ measurements may be used for comparison with national $PM_{2.5}$ standards.

Point Reyes Monitor Information

Pollutant	**Continuous PM2.5 BAM**
Monitoring Objective	General Background
Spatial scale	Regional
Sampling method	Met One BAM 1020
PM filter analysis method	N/A
Start date	12/01/00
Operation schedule	Continuous
Sampling season	All year
Probe height (AGL)	3.0 m
Probe height above roof	N/A
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	35 m
Distance to furnace or incinerator flue	>50 m
Distance between collocated monitors	N/A
Unrestricted airflow	360°
Probe material	N/A
Residence time	N/A
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	No – not reference or equivalent method
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	Twice per month
Frequency of one-point QC check (gaseous)	N/A
Last Annual Performance Evaluation (gaseous)	N/A
Last two semi-annual flow rate audits for PM monitors	08/10/11 09/09/10

Point Richmond

Site Name	Point Richmond
AQS ID	06-013-0005
GIS coordinates	37.9262° N, 122.3856° W
Location	Air monitoring shelter next to fire station
Address	140 W. Richmond Ave, Richmond CA 94801
County	Contra Costa
Distance to road From gaseous probe	W. Richmond Ave: 10.2 meters Interstate 580: 266 meters
Traffic count	W. Richmond Ave: 1,340 ADT (2003) Interstate 580: 68,200 ADT (2010)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

Point Richmond was chosen for H_2S source impact monitoring because the community is at the immediate southern periphery of the Chevron Refinery. The monitoring site is located in downtown Point Richmond, 0.2 miles south of the Chevron Refinery boundary. Point Richmond, a neighborhood within the City of Richmond, has a population of 3,780 according to the 2010 census.

Although prevailing winds in the area are from the south-southwest, occasional northerly winds will transport H_2S emissions from the refinery over the community. H_2S gases at Chevron can be emitted from the processing units, one mile to the north, or the Chevron Richmond Long Wharf Complex, one mile to the west, where crude oil and other feedstock chemicals from tankers are unloaded.

Point Richmond Monitor Information

Pollutant	**H2S**
Monitoring Objective	Source impact
Spatial scale	Neighborhood
Sampling method	TECO 45C
PM filter analysis method	N/A
Data Start date	01/01/99
Operation schedule	Continuous
Sampling season	All year
Probe height (AGL)	3.4 m
Probe height above roof	0.9 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	17 m
Distance to furnace or incinerator flue	7.3 m
Distance between collocated monitors	N/A
Unrestricted airflow	360º
Probe material	Teflon
Residence time	4 s
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Weekly
Last Annual Performance Evaluation (gaseous)	11/01/11
Last two semi-annual flow rate audits for PM monitors	N/A

Redwood City

Site Name	Redwood City
AQS ID	06-081-1001
GIS coordinates	37.4829° N 122.2035° W
Location	One-story commercial building
Address	897 Barron Ave, Redwood City CA 94063
County	San Mateo
Distance to road from gaseous probe	Barron Ave: 13 meters Bay Road: 24 meters Warrington Ave: 131 meters US Highway 101: 455 meters
Traffic count	Barron Ave: 1,200 ADT (2009) Bay Road: 8715 ADT (2008) Warrington Ave: 1140 ADT (2008) US Highway 101: 201,000 ADT (2010)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

Redwood City was chosen for an air monitoring site because it is one of the largest cities in San Mateo County, with a population of 76,815 according to the 2010 census. Being midway between San Francisco and San Jose, the site is well positioned to monitor ozone precursors and ozone moving southward across the peninsula as they are channeled by the coastal mountains to the west. Generally, Redwood City characterizes an area between South San Francisco and Palo Alto, which has a low air pollution potential due to the frequent presence of the sea breeze. Although the sea breeze typically keeps pollution levels low, when winds are light, high levels of ozone precursors, ozone, or particulates can occur due to the large number of sources in the area.

The air monitoring site is located in a commercial/industrial zone bordered by US Highway 101 on one side and residential areas on the other three sides. NO/NO_2 and ozone are collected because the area is a large source of ozone precursor emissions and ozone. Carbon monoxide is monitored because of the high traffic volume in the area with US Highway 101 0.3 miles north of the site. $PM_{2.5}$ is collected because light winds combined with surface-based inversions during the winter months can cause particulate levels to become elevated.

VOC toxic compounds are sampled at Redwood City on a 1-in-12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

An FRM $PM_{2.5}$ monitor at this site is the collocated monitor for the FEM $PM_{2.5}$ monitoring network. For 2011, the collocated FRM $PM_{2.5}$ sampler was on a 1-in-6 day schedule. In May 2012, the Air District received verbal approval from EPA to close the $PM_{2.5}$ FRM instrument used as a collocated instrument at this site. The shutdown is planned because only one collocated $PM_{2.5}$ monitoring site is required in the San Francisco-Oakland-Fremont CBSA and two are in operation (the other is at Concord). This allows better utilization of

resources while allowing a $PM_{2.5}$ FEM-BAM to open at San Jose in 2012. The proposed date for the closure of the $PM_{2.5}$ FRM instrument is September 30, 2012.

In the most recent three years, this site recorded one exceedance of the national 8-hour ozone standard and two exceedances of the national 24-hour $PM_{2.5}$ standard. No exceedances of the national standards for NO_2 or CO were measured during the last three years.

Redwood City Monitor Information

Pollutant	**O3**	**CO**	**NO/NO2**
Monitoring Objective	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49i	TECO 48i	TECO 42i
PM filter analysis method	N/A	N/A	N/A
Data Start date	07/01//76	03/01/67	03/01/67
Operation schedule	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year
Probe height (AGL)	6.8 m	6.8 m	6.8 m
Probe height above roof	3.6 m	3.6 m	3.6 m
Distance from obstructions on roof	None	None	None
Distance from obstructions not on roof	None	None	None
Distance from tree (DL)	46 m	46 m	46 m
Distance to furnace or incinerator flue	12.7 m	12.7 m	12.7 m
Distance between collocated monitors	N/A	N/A	N/A
Unrestricted airflow	360º	360º	360º
Probe material	Teflon	Teflon	Teflon
Residence time	12 s	12 s	12 s
Will there be changes within the next 18 mos?	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Every other day	Every other day	Every other day
Last Annual Performance Evaluation (gaseous)	07/27/11	07/27/11	07/27/11
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A

Redwood City Monitor Information

Pollutant	Continuous PM2.5 FEM BAM	FRM PM2.5 Collocated*
Monitoring Objective	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood
Sampling method	Met One FEM BAM 1020	Partisol-Plus 2025 w/VSCC
PM filter analysis method	N/A	Weighed by Air District
Data Start date	10/01/09	10/01/09
Operation schedule	Continuous	1-in-6
Sampling season	All year	All year
Probe height (AGL)	5.5 m	5.3 m
Probe height above roof	2.2 m	2.2 m
Distance from obstructions on roof	None	None
Dist from obstructions not on roof	None	None
Distance from tree (DL)	47 m	44 m
Distance to furnace or incinerator flue	11.0 m	14.0 m
Distance between collocated monitors	4 m	4 m
Distance between PM2.5 samplers	BAM to PM2.5: 4.0 m	PM2.5 to FEM BAM : 4.0 m
Unrestricted airflow	360º	360º
Probe material	N/A	N/A
Residence time	N/A	N/A
Will there be changes within the next 18 mos?	No	Yes*
Is it suitable for comparison against the annual PM2.5?	Yes	Yes
Frequency of flow rate verification for manual PM samplers	N/A	Monthly
Frequency of flow rate verification for automated PM analyzers	Every two weeks	N/A
Frequency of one-pt QC check (gaseous)	N/A	N/A
Last Annual Perform. Evaluation (gaseous)	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	07/27/11 02/01/11	07/27/11 02/01/11

* The Air District is proposing to close this monitor on September 30, 2012.

Richmond 7th

Site Name	Richmond 7th
AQS ID	06-013-0006
GIS coordinates	37.9481° N, 122.3648° W
Location	Fire station
Address	1065 7th Street, Richmond CA 94801
County	Contra Costa
Distance to road from gaseous probe	7th St: 21.5 meters Hensley St: 29.9 meters Richmond Parkway: 200 meters
Traffic count	7th St: 3,125 ADT (2007) Hensley St: 2,125 ADT (2007) Richmond Parkway: 35,650 ADT (2007)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

Richmond 7th Street was chosen for H_2S and SO_2 source impact monitoring because it is near the eastern boundary of the Chevron Refinery. Richmond has a population of 103,701 according to the 2010 census and the site is located 0.5 miles east of the refinery boundary, where the monitor is expected to measure the highest concentrations in an area where the public has access. Normally, monitoring is done downwind of the prevailing wind direction. However, the prevailing winds are from the south, and carry emissions over San Pablo Bay. Since it is impractical to monitor over San Pablo Bay, a monitoring site was chosen downwind of the secondary wind direction, on the east side of the refinery.

VOC toxic compounds are sampled at Richmond 7th on a 1-in-12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

SO_2 concentrations measured at Richmond 7th did not exceed the national 1-hour 75 ppb standard during the last three years.

Richmond 7th Monitor Information

Pollutant	SO2	H2S
Monitoring Objective	Source impact	Source impact
Spatial scale	Neighborhood	Neighborhood
Sampling method	TECO 43C	TECO 45C
PM filter analysis method	N/A	N/A
Start date	07/01/80	01/01/99
Operation schedule	Continuous	Continuous
Sampling season	All year	All year
Probe height (AGL)	8.4 m	8.4 m
Probe height above roof	2.8 m	2.8 m
Distance from obstructions on roof	None	None
Distance from obstructions not on roof	None	None
Distance from tree (DL)	10 m	10 m
Distance to furnace or incinerator flue	N/A	N/A
Distance between collocated monitors	N/A	N/A
Unrestricted airflow	360°	360°
Probe material	Teflon	Teflon
Residence time	9 s	10 s
Will there be changes within the next 18 mos?	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A
Frequency of one-point QC check (gaseous)	Every other day	Every two weeks
Last Annual Performance Evaluation (gaseous)	11/02/11	11/02/11
Last two semi-annual flow rate audits for PM monitors	N/A	N/A

Rodeo

Site Name	Rodeo
AQS ID	06-013-0007
GIS coordinates	38.0343º N, 122.2704º W
Location	Single story storage area at fire station
Address	326 Third Street, Rodeo CA 94572
County	Contra Costa
Distance to road from gaseous probe	Third St: 13.3 meters Parker St: 249.0 meters
Traffic count	Third St: 500 ADT (estimate) Parker St: 7,417 ADT (2008)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

Rodeo was chosen for H_2S source impact monitoring because the ConocoPhillips Refinery is on the eastern boundary of the town of Rodeo. Although the prevailing winds in the area are from the southwest, northeast winds can transport H_2S emissions from the refinery over the populated area of the town. The population of Rodeo was 8,679 according to the 2010 census. The monitoring site is located in a residential area 0.6 miles southwest of the ConocoPhillips Refinery.

Rodeo Monitor Information

Pollutant	**H2S**
Monitoring Objective	Source impact
Spatial scale	Neighborhood
Sampling method	TECO 45C
PM filter analysis method	N/A
Start date	04/01/02
Operation schedule	Continuous
Sampling season	All year
Probe height (AGL)	7.0 m
Probe height above roof	2.5 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	>50 m
Distance to furnace or incinerator flue	10.9 m
Distance between collocated monitors	N/A
Unrestricted airflow	360°
Probe material	Teflon
Residence time	12 s
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers audit	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Every two weeks
Last Annual Performance Evaluation (gaseous)	08/29/11
Last two semi-annual flow rate audits for PM monitors	N/A

San Francisco

Site Name	San Francisco
AQS ID	06-075-0005
GIS coordinates	37.7659° N, 122.3990° W
Location	One-story commercial building
Address	10 Arkansas St, Suite N, San Francisco CA 94107
County	San Francisco
Distance to road from gaseous probe	16th St: 32.0 meters Arkansas St: 17.0 meters Interstate 280: 300 meters U.S. Highway 101: 504 meters
Traffic count	16th St: 12,278 ADT (2006) Arkansas St: 500 ADT (estimate) Interstate 280: 99,000 ADT (2010) U.S. Highway 101: 215,000 (2010)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

San Francisco was chosen for an air monitoring site because it is the second largest city in the San Francisco Bay Area, with a population of 805,235 according to the 2010 census. Although the sea breeze typically keeps pollution levels low, light wind conditions can result in high levels of ozone precursors or particulates due to the large number of sources in the city. The east side of the city was selected for a monitoring site because it is more densely populated (including a large number of daytime visitors and commuters), has some industry, and, as a transportation hub, has generally higher traffic volume. The site is located near the fringe of the central business district, in an area of light industry that is close to a residential area and two major freeways.

Ozone and NO/NO_2 are measured to monitor population exposure to these pollutants, and because this is a source area for ozone precursors. Carbon monoxide is measured because of the high traffic volume. PM_{10} and $PM_{2.5}$ are measured because stagnant days combined with surface-based inversions can cause elevated particulate levels, and because of the contribution of heavy vehicular traffic to PM levels.

VOC toxic compounds are sampled at San Francisco by both the Air District and CARB on a 1-in-12 day schedule and analyzed by their respective laboratories. Carbonyls and metals are also sampled by CARB on the same 1-in-12 day schedule. Information about the CARB toxics monitoring program can be found at http://www.arb.ca.gov/toxics/toxics.htm. Information about toxics monitoring by the Air District can be found in the Toxics Program section of this report.

During the most recent three years, this site recorded six exceedances of the national 24-hour $PM_{2.5}$ standard and no exceedances of the national standards for ozone, PM_{10}, NO_2, or CO.

San Francisco Monitor Information

Pollutant	**O3**	**CO**	**NO/NO2**	**PM10**	**Continuous PM2.5 FEM BAM**
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49C	TECO 48i	TECO 42i	Andersen HiVol 1200	Met One FEM BAM 1020
PM Filter Analysis method	N/A	N/A	N/A	Weighed by Air District	N/A
Start date	01/01/86	01/01/86	NO: 12/01/85 NO2: 01/01/86	11/16/86	10/01/09
Operation schedule	Continuous	Continuous	Continuous	1-in-6	Continuous
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	10.5 m	10.5 m	10.5 m	7.6 m	8.3 m
Probe height above roof	4.4 m	4.4 m	4.4 m	1.5 m	2.2 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	None	None	None	None	None
Distance from tree (DL)	15.3 m	15.3 m	15.3 m	17.5 m	15.9 m
Distance to furnace or incinerator flue	5.2 m	5.2 m	5.2 m	7.0 m	7.3 m
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Distance between PM10 and PM2.5 samplers	N/A	N/A	N/A	2.3 m	2.3 m
Unrestricted airflow	360°	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	N/A	N/A
Residence time	9 s	9 s	10 s	N/A	N/A
Will there be changes within the next 18 mos?	No	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A	Yes
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	Weekly	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A	Every two weeks
Frequency of one-point QC check (gaseous)	Every other day	Every other day	Every other day	N/A	N/A
Last Annual Performance Evaluation (gaseous)	12/09/11	12/09/11	12/09/11	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	12/08/11 05/04/11	12/12/11 05/04/11

San Jose

Site Name	San Jose
AQS ID	06-085-0005
GIS coordinates	37.3485° N, 121.8949° W
Location	Top floor of two-story commercial building
Address	158 E. Jackson St, San Jose CA 95112
County	Santa Clara
Distance to road from gaseous probe	Jackson St: 15.1 meters 4th St: 34.7 meters
Traffic count	Jackson St: 5,992 ADT (2007) 4th St: 6,164 ADT (2007)
Groundcover	Paved
Representative Area	San Jose-Sunnyvale-Santa Clara MSA

San Jose was chosen for an air monitoring site because it is the largest city in Santa Clara County and the largest city in the Bay Area, with a population of 945,942 according to the 2010 census. The air monitoring site is located in the center of northern Santa Clara Valley, in a commercial and residential part of downtown San Jose. This area is completely encircled by major freeways, and has a large airport just to the west-northwest.

Ozone precursors emitted within the central San Francisco Bay Area are often carried into the San Jose area by the prevailing northwesterly winds. The northern half of the Santa Clara Valley is densely populated and the associated activities of the residents also add significant pollutant emissions into the air. The air quality in this location is representative of a large part of the valley due to the diurnal up valley and down valley air flow, which mixes the pollutants throughout the valley.

NO/NO_2 and ozone are monitored because of the large amount of ozone precursor emissions near the area as well as from upwind areas. The Air District discontinued monitoring ozone precursors CH_4/NMHC on December 31, 2011. Monitoring of these non-criteria pollutants was discontinued to allow better utilization of Air District resources as monitoring for the PAMS program was brought online.

Carbon monoxide is measured because of the significant traffic volume in the area. PM_{10} and $PM_{2.5}$ are monitored because light winds combined with surface-based inversions within the valley during winter months can cause elevated particulate levels.

Gaseous VOC toxic compounds, carbonyls, and metals are sampled at San Jose on a one in six day schedule as part of the NATTS program. Gaseous toxic compounds and carbonyls are analyzed by the Air District laboratory while metals are analyzed by an outside laboratory. CARB also does sampling for VOC toxic compounds, carbonyls, and metals at San Jose but this sampling is on a 1-in-12 day schedule and the analysis is done by the CARB laboratory. More information about the CARB toxics monitoring program can be

found at http://www.arb.ca.gov/toxics/toxics.htm. Information about toxics monitoring by the Air District can be found in the Toxics Program section of this report.

The San Jose station was approved by EPA as a National Core (NCore) multi-pollutant monitoring station on October 30, 2009 and NCore air monitoring began on January 1, 2011. The NCore program requires reporting of PM coarse ($PM_{10-2.5}$) every 3rd day. Consequently, in 2011 the PM_{10} sampling frequency changed from 1-in-6 days to 1-in-3 days and the $PM_{2.5}$ summer frequency changed from 1-in-6 days to 1-in-3 days.

On December 14, 2010, EPA revised the monitoring requirements for lead and required lead monitoring at NCore sites. The lead measurements at San Jose come from PM_{10} filters on a 1-in-6 day schedule. Lead measurements began in January 2008 (before NCore). Because PM_{10} is sampled on a 1-in-3 day schedule, only every 2nd PM_{10} filter is used for lead analysis.

Monitoring of NO_y began at San Jose on January 1, 2011 to meet NCore requirements. NOy is total reactive nitrogen and plays an important role in ozone formation. A full description of the NCore monitoring program can be found in the NCore section of this document.

In May 2012, the Air District received verbal approval from EPA to replace the $PM_{2.5}$ BAM at San Jose with a $PM_{2.5}$ FEM-BAM. The existing $PM_{2.5}$ FRM sampler will continue to operate, but will change from primary to collocated. The new $PM_{2.5}$ FEM BAM will be the primary instrument. The proposed date for this change is October 1, 2012.

In the most recent three years, this site recorded three exceedances of the national 8-hour ozone standard and five exceedances of the national 24-hour $PM_{2.5}$ standard. No exceedances of the national standards for PM_{10}, NO_2, SO_2, or CO were measured during the last three years.

San Jose Monitor Information

Pollutant	O3	CO*	NO/NO2	CH4/NMHC**	SO2*	NOy
Monitoring Objective	Population oriented	Population oriented & Highest concentration	Population oriented & Highest concentration	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49i	TECO 48iTLE	TECO 42i	TECO 55C	TECO 43iTLE	API 200 EU/NOy
PM filter analysis method	N/A	N/A	N/A	N/A	N/A	N/A
Data start date	11/01/02	11/01/02	11/01/02	CH4: 11/22/02 NMHC: 07/06/06	02/10/09	01/01/11
Operation schedule	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year	All year	All year	All year
Probe height (AGL)	11.9 m	11.9 m	11.9 m	11.9 m	11.9 m	10.9 m
Probe height above roof	4.3 m	4.3 m	4.3 m	4.3 m	4.3 m	3.3 m
Distance from obstructions on roof	None	None	None	None	None	None
Distance from obstructions not on roof	None	None	None	None	None	None
Distance from tree (DL)	13.1 m	13.1 m	13.1 m	13.1 m	13.1 m	13.1 m
Distance to furnace or incinerator flue	4.6 m	4.6 m	4.6 m	4.6 m	4.6 m	4.6 m
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow	360º	360º	360º	360º	360º	360º
Probe material	Teflon	Teflon	Teflon	Teflon	Teflon	Teflon
Residence time	13 s	14 s	13 s	11 s	13 s	1 s
Will there be changes within the next 18 mos?	No	No	No	Yes**	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Every other day	Every other day	Every other day	Every other day	Every other day	Every other day
Last Annual Performance Evaluation (gaseous)	12/13/11	08/16/11	12/13/11	12/13/11	08/16/11	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A	N/A	N/A

* High sensitivity instruments required for CO and SO_2 at NCore sites.
** CH4/NMHC was discontinued on December 31, 2011.

San Jose Monitor Information

Pollutant	PM10	FRM PM2.5	Continuous PM2.5 BAM*	Speciated PM2.5	Lead (from PM10)
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	Partisol 2025 without VSCC	Partisol-Plus 2025 w/VSCC	Met One BAM 1020	Met One SASS	Partisol 2025 without VSCC
PM filter analysis method	Weighed by Air District	Weighed by Air District	N/A	Analyzed by RTI	Analyzed by ERG
Data start date	10/15/02	10/05/02	01/01/04	10/05/02	01/01/08
Operation schedule	1-in-3	Apr-Sep:1-in-3 Oct-Mar: daily	Continuous	1-in-3	1-in-6
Sampling season	All year	All year	All year	All year	All year
Probe height	8.9 m	8.9 m	9.8m	8.9 m	8.9 m
Probe height above roof	2.2 m	2.2 m	2.0 m	2.1 m	2.2 m
Distance from obstructions on roof	None	None	None	None	None
Dist from obstructions not on roof	None	None	None	None	None
Distance from tree (DL)	11.0 m	14.9 m	11.9 m	16.1 m	11.0 m
Distance to furnace or incinerator flue	1.5 m	3.0 m	3.4 m	2.4 m	1.5 m
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Distance between PM10 and PM2.5 samplers	PM10 to PM2.5: 3.2m PM10 to SASS: 4.1m PM10 to BAM: 3.5 m	PM2.5 to PM10: 3.2m PM2.5 to PM10: 4.1m PM2.5 to BAM: 3.9m	BAM to PM10: 3.5 m BAM to PM2.5: 3.9 m BAM to SASS: 7.9 m	SASS to PM10: 4.1 m SASS to BAM: 7.9 m SASS to PM2.5: 4.1 m	N/A
Unrestricted airflow	360º	360º	360º	360º	360º
Probe material	N/A	N/A	N/A	N/A	N/A
Residence time	N/A	N/A	N/A	N/A	N/A
Will there be changes within the next 18 mos?	No	No	Yes*	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	Yes	No – not reference or equivalent method	No	N/A
Frequency of flow rate verification for manual PM samplers	Monthly	Monthly	N/A	Monthly	Monthly
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	Every two weeks	N/A	N/A
Frequency of 1-pt QC check (gaseous)	N/A	N/A	N/A	N/A	N/A
Last Annual Perform. Evaluation (gaseous)	N/A	N/A	N/A	N/A	NA
Last two semi-annual flow rate audits for PM monitors	12/12/11 04/26/11	12/12/11 04/26/11	12/12/11 04/26/11	12/12/11 04/26/11	12/12/11 04/26/11

* The Air District is proposing to replace this monitor with a $PM_{2.5}$ FEM-BAM instrument effective October 1, 2012.

San Martin

Site Name	San Martin
AQS ID	06-085-2006
GIS coordinates	37.0794° N 121.6000° W
Location	Air monitoring shelter next to maintenance shed
Address	13030 Murphy Ave, San Martin CA 95046
County	Santa Clara
Distance to road from gaseous probe	Murphy Ave: 57.0 meters US Highway 101: 455 meters
Traffic count	Murphy Ave: 350 ADT (2011) US Highway 101: 107,000 ADT (2010)
Groundcover	Vegetative
Representative Area	San Jose-Sunnyvale-Santa Clara MSA

San Martin was chosen as an ozone air monitoring site because earlier field measurements showed this area to have the highest ozone concentrations in the Santa Clara Valley. Prevailing winds transport ozone and ozone precursors down the valley from the densely populated San Jose area as well as the surrounding San Francisco Bay. Because ozone is formed by a chemical reaction between organic and nitrogen oxide gases in the presence of sunlight, the highest ozone concentrations are usually observed tens of miles downwind from the highest concentration of emission sources (freeways, power generating facilities, etc.) because the reactions involving the organic gases are relatively slow.

San Martin is located in an agricultural area at the south end of the Santa Clara Valley approximately 24 miles southeast of downtown San Jose. The town has a small population of 7,027 (2010 Census) and no industrial sources. The monitoring site is located at the South County Airport, in the center of the valley and about 0.3 miles west of US Highway 101.

In the most recent three years, this site recorded nine exceedances of the national 8-hour ozone standard.

San Martin Monitor Information

Pollutant	**O3**
Monitoring Objective	Highest concentration
Spatial scale	Neighborhood
Sampling method	TECO 49i
PM filter analysis method	N/A
Data Start date	04/30/94
Operation schedule	Continuous
Sampling season	Apr 1 – Nov 30
Probe height (AGL)	4.8 m
Probe height above roof	2.8 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	23 m
Distance to furnace or incinerator flue	N/A
Distance between collocated monitors	N/A
Unrestricted airflow	360º
Probe material	Teflon
Residence time	18 s
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Every other day
Last Annual Performance Evaluation (gaseous)	07/12/11
Last two semi-annual flow rate audits for PM monitors	N/A

San Pablo

Site Name	San Pablo
AQS ID	06-013-1004
GIS coordinates	37.9604° N, 122.3568° W
Location	One story commercial building
Address	1865-D Rumrill Blvd, San Pablo CA 94806
County	Contra Costa
Distance to road from gaseous probe	Rumrill Blvd: 15.8 meters
Traffic count	Rumrill Blvd: 16,800 ADT (2010)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

San Pablo was chosen for an air monitoring site because the area is in the most populated portion of western Contra Costa County. San Pablo, with a population of 29,139 (according to the 2010 census), is almost completely surrounded by the city of Richmond. Richmond has a population of 103,701 according to the 2010 census. This area has heavy industry, high traffic volume, including two major freeways, and it is very close to the Chevron Refinery. Ozone and NO/NO_2 are measured because the area is downwind of the central San Francisco Bay Area, which is a large source of ozone precursor emissions. Carbon monoxide is measured because the high traffic volume in the area. SO_2 is measured because the site is 1.2 miles downwind of the Chevron refinery, which can be a significant source of SO_2 emissions. PM_{10} is measured because stagnant days in the fall and winter can result in elevated particulate levels.

VOC toxic compounds are sampled at San Pablo on a 1-in-12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

The station was temporarily closed from March 2009 to May 2010 due to heavy damage from a fire in the building.

This site recorded one exceedance of the national 8-hour ozone standard during the last three years (as noted above, operations were suspended during a portion of this period). No exceedances of the national standards for NO_2, SO_2, CO or PM_{10} were measured during the past three years.

San Pablo Monitor Information

Pollutant	O3	CO	NO/NO2	SO2	PM10
Monitoring Objective	Population oriented	Population oriented	Population oriented	Source Impact	Population oriented
Spatial scale	Middle	Middle	Middle	Neighborhood	Middle
Sampling method	TECO 49i	TECO 48i	TECO 42i	TECO 43i	Tisch Env. HiVol TE-6000
PM filter analysis method	N/A	N/A	N/A	N/A	Weighed by Air District
Start date	09/13/02	09/13/02	09/13/02	09/13/02	09/23/02
Operation schedule	Continuous	Continuous	Continuous	Continuous	1-in-6
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	9.0 m	9.0 m	9.0 m	9.0 m	6.4 m
Probe height above roof	5.6 m	5.6 m	5.6 m	5.6 m	2.2 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	None	None	None	None	None
Distance from tree (DL)	>50 m	>50 m	>50 m	>50 m	>50 m
Distance to furnace or incinerator flue	None	None	None	None	None
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	Teflon	N/A
Residence time	8 s	8 s	6 s	6 s	N/A
Will there be changes within the next 18 mos?	No	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A	Weekly
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Every other day	Every other day	Every other day	Every other day	N/A
Last Annual Performance Evaluation (gaseous)	07/08/11	07/08/11	07/08/11	07/08/11	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A	07/05/11 01/12/11

San Rafael

Site Name	San Rafael
AQS ID	06-041-0001
GIS coordinates	37.9724° N, 122.5200° W
Location	Second floor of two-story commercial building
Address	534 4th Street, San Rafael CA 94901
County	Marin
Distance to road from gaseous probe	4th St: 18 meters Irwin St: 48 meters US Highway 101: 112 meters
Traffic count	4th St: 4,248 ADT (2010) Irwin St: 17,531 ADT (2007) US Highway 101: 159,000 ADT (2010)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

San Rafael was chosen for an air monitoring site because it is the largest city in Marin County with a population of 57,713 according to the 2010 census. The city's climate and air quality is representative of that found throughout the populous eastern side of the county. Afternoon sea breezes typically keep pollution levels low. However, when the sea breeze is absent, local sources can cause elevated pollution levels.

The monitoring site is located in a commercial building about a block east of US Highway 101 and near major highway access ramps. It is one half mile east of the downtown San Rafael business district. There is no industrial activity in the immediate area. Ozone and NO/NO_2 are measured to monitor general population exposure to these pollutants. Carbon monoxide and PM_{10} are measured because the site is close to a major transportation corridor. $PM_{2.5}$ is measured because light winds combined with wood burning, vehicular traffic, and surfaced-based inversions during winter can cause elevated particulate concentrations.

VOC toxic compounds are sampled at San Rafael on a 1-in-12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

In October 2009, a continuous Federal Equivalent Method (FEM) $PM_{2.5}$ monitor was added to this site as the Air District's $PM_{2.5}$ network was expanded to have at least one monitor per county. The FEM $PM_{2.5}$ monitor provides hourly measurements of $PM_{2.5}$ concentrations.

Since $PM_{2.5}$ monitoring began in October 2009, five exceedances of the national 24-hour $PM_{2.5}$ standard have been measured. No exceedances of the national standards for ozone, PM_{10}, NO_2 or CO were measured during the last three years.

San Rafael Monitor Information

Pollutant	O3	CO	NO/NO2	PM10	Continuous PM2.5 FEM BAM
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Middle	Middle	Middle	Middle	Middle
Sampling method	TECO 49i	TECO 48i	TECO 42C	Andersen HiVol 1200	Met One FEM BAM 1020
PM filter Analysis method	N/A	N/A	N/A	Weighed by Air District	N/A
Start date	07/01/76	10/01/67	NO: 01/01/68 NO2:10/01/67	11/04/86	10/27/09
Operation schedule	Continuous	Continuous	Continuous	1-in-6	Continuous
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	11.9 m	11.9 m	11.9 m	7.0 m	7.1 m
Probe height above roof	5.2 m	5.2 m	5.2 m	1.9 m	2.0 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	21 m	21 m	21 m	20 m	18.5 m
Distance from tree (DL)	14 m	14 m	14 m	15 m	12.5 m
Distance to furnace or incinerator flue	3.5 m	3.5 m	3.5 m	2.3 m	3.4 m
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Distance between PM10 and PM2.5 samplers	N/A	N/A	N/A	3.2 m	3.2 m
Unrestricted airflow	360°	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	N/A	N/A
Residence time	10 s	10 s	11 s	N/A	N/A
Will there be changes within the next 18 mos?	No	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A	Yes
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	Weekly	Every two weeks
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Every other day	Every other day	Every other day	N/A	N/A
Last Annual Performance Evaluation (gaseous)	09/08/11	09/08/11	09/08/11	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	09/07/11 02/15/11	07/27/11 02/01/11

Santa Rosa

Site Name	Santa Rosa
AQS ID	06-097-0003
GIS coordinates	38.4435° N, 122.7102° W
Location	Second floor of two-story commercial building
Address	837 5th St, Santa Rosa CA 95404
County	Sonoma
Distance to road from gaseous probe	5th St: 24 meters E St: 79 meters College Ave: 210 meters Brookwood Ave: 228 meters US Highway 101: 918 meters
Traffic count	5th St: 2,347 ADT (2009) E St: 5,876 ADT (2009) College Ave: 13,304 ADT (2009) Brookwood Ave: 15,604 ADT (2009) US Highway 101: 121,000 ADT (2010)
Groundcover	Paved
Representative Area	Santa Rosa-Petaluma MSA

Santa Rosa was chosen for an air monitoring site because it is the largest city in Sonoma County with a population of 167,814 according to the 2010 census. The city's climate is strongly influenced by the Pacific Ocean and the marine air flow typically keeps pollution levels low. However, during light winds or strong nighttime temperature inversions, local sources can cause elevated pollution levels. The monitoring site is located just east of the downtown urban core and 0.5 miles east of US Highway 101.

There are no industrial sources in the immediate area. Ozone and NO/NO_2 are measured to monitor general population exposure to these pollutants. Carbon monoxide is measured because of the local urban traffic volume and proximity to the Highway 101 transportation artery. $PM_{2.5}$ is measured because light winds combined with wood burning, vehicular traffic, and surface-based inversions in winter can cause elevated particulate concentrations.

VOC toxic compounds are sampled at Santa Rosa on a 1-in-12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

Pollutant concentrations measured at Santa Rosa did not exceed the national standards for ozone, $PM_{2.5}$, NO_2 or CO during the last three years.

The lease for this site expired at the end of 2011 and the property owner declined to exercise an option to renew the lease for five years. As of June 2011, this site is on a month to month occupancy agreement. The owners are agreeable to giving the Air District two to three months advance notice if they choose that the property must be vacated.

Santa Rosa Monitor Information

Pollutant	**O3**	**CO**	**NO/NO2**	**Continuous PM2.5 FEM BAM**
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49i	TECO 48i	TECO 42i	Met One FEM BAM 1020
Analysis method	N/A	N/A	N/A	N/A
Start date	04/17/81	04/17/81	NO: 01/01/82 NO2:04/17/81	10/23/09
Operation schedule	Continuous	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year	All year
Probe height (AGL)	10.7 m	10.7 m	10.7 m	8.1 m
Probe height above roof	5.2 m	5.2 m	5.2 m	2.0 m
Distance from obstructions on roof	None	None	None	None
Distance from obstructions not on roof	21 m	21 m	21 m	21 m
Distance from tree (DL)	13.7 m	13.7 m	13.7 m	13.7 m
Distance to furnace or incinerator flue	4.7 m	4.7 m	4.7 m	5.7 m
Distance between collocated monitors	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	N/A
Residence time	8 s	10 s	9 s	N/A
Will there be changes within the next 18 mos?	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	Yes
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	Every two weeks
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Every other day	Every other day	Every other day	N/A
Last Annual Performance Evaluation (gaseous)	12/01/11	12/01/11	12/01/11	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	12/01/11 06/16/11

Vallejo

Site Name	Vallejo
AQS ID	06-095-0004
GIS coordinates	38.1025° N, 122.2380° W
Location	One story commercial building
Address	304 Tuolumne St, Vallejo CA 94590
County	Solano
Dist. to road from probe	Tuolumne St: 18 meters Capitol St: 30 meters Solano Ave: 33 meters Interstate 80: 700 meters
Traffic count	Tuolumne St: 5,100 ADT (2008) Capitol St: 500 ADT (2008) Solano Ave: 8,600 ADT (2008) Interstate 80: 136,000 ADT (2010)
Groundcover	Paved
Representative Area	Vallejo-Fairfield MSA

Vallejo was chosen for an air monitoring site because it is the largest city in Solano County with a population of 115,942 according to the 2010 census. The monitoring site is located in a mixed commercial and residential neighborhood one mile east of downtown and 0.5 miles west of Interstate 80.

Ozone and NO/NO_2 are measured because southerly winds can transport ozone and its precursors into Vallejo from the heavily populated central Bay Area and easterly winds can transport ozone from the Central Valley through the Carquinez Strait. $PM_{2.5}$ is measured because high concentrations typically occur during the winter when nighttime valley drainage winds, wood burning, and shallow temperature inversions trap pollutants from local sources and the Napa Valley to the north. East winds can also transport particulate into Vallejo through the Carquinez Strait from the Central Valley. Carbon monoxide is measured because Interstate 80 passes through the middle of the urban area east of the monitoring site. SO_2 is measured to monitor general population exposure and because refineries located to the south and east can be significant sources of SO_2.

The $PM_{2.5}$ FRM sampler operated daily from January 1, 2011 through February 28, 2011, and was replaced with a continuous $PM_{2.5}$ FEM-BAM monitor on March 1, 2011.

VOC toxic compounds are sampled at Vallejo on a 1-in-12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

During the most recent three years, this site recorded one exceedance of the national 8-hour ozone standard and eleven exceedances of the national 24-hour $PM_{2.5}$ standard. No exceedances of the national standards for NO_2, SO_2, or CO were measured during the last three years.

Vallejo Monitor Information

Pollutant	O3	CO	NO/NO2	SO2
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49i	TECO 48i	TECO 42i	TECO 43i
PM Filter Analysis method	N/A	N/A	N/A	N/A
Start date	07/01/76	07/01/76	07/01/76	07/01/76
Operation schedule	Continuous	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year	All year
Probe height (AGL)	9.6 m	9.6 m	9.6 m	9.6 m
Probe height above roof	4.3 m	4.3 m	4.3 m	4.3 m
Distance from obstructions on roof	None	None	None	None
Distance from obstructions not on roof	None	None	None	None
Distance from tree (DL)	N/A	N/A	N/A	N/A
Distance to furnace or incinerator flue	3.7 m	3.7 m	3.7 m	3.7 m
Distance between collocated monitors	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	Teflon
Residence time	10 s	12 s	12 s	12 s
Will there be changes within the next 18 mos?	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Every other day	Every other day	Every other day	Every other day
Last Annual Performance Evaluation (gaseous)	11/22/11	11/22/11	11/22/11	11/22/11
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A

Vallejo Monitor Information

Pollutant	**Continuous PM2.5 FEM BAM**	**Speciated PM2.5**
Monitoring Objective	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood
Sampling method	Met One FEM BAM 1020	Met One SASS
PM Filter Analysis method	N/A	Analyzed by DRI
Start date	03/01/11	6/11/08
Operation schedule	Continuous	1-in-6
Sampling season	All year	All Year
Probe height (AGL)	5.8 m	6.6 m
Probe height above roof	1.9 m	2.3 m
Distance from obstructions on roof	None	None
Distance from obstructions not on roof	None	None
Distance from tree (DL)	N/A	N/A
Distance to furnace or incinerator flue	2.5 m	5.4m
Distance between collocated monitors	N/A	N/A
Distance between SASS and PM2.5 samplers	BAM to SASS: 2.9 m	SASS to BAM: 2.9 m
Unrestricted airflow	360°	360°
Probe material	N/A	N/A
Residence time	N/A	N/A
Will there be changes within the next 18 mos?	Yes	No
Is it suitable for comparison against the annual PM2.5?	Yes	No
Frequency of flow rate verification for manual PM samplers	N/A	Monthly
Frequency of flow rate verification for automated PM analyzers	Every two weeks	N/A
Frequency of one-point QC check (gaseous)	N/A	N/A
Last Annual Performance Evaluation (gaseous)	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	11/21/11 05/18/11	11/21/11 05/18/11

Detailed Site Information for SPM Stations

Crockett

Site Name	Crockett
AQS ID	06-013-1001
GIS Coordinates	38.0549º N, 122.2332º W
Location	Pump house
Address	End of Kendall Avenue, Crockett CA 94525
County	Contra Costa
Distance to road from gaseous probe	San Pablo Ave: 68.4 meters
Traffic count	San Pablo Ave: 8,763 ADT (2007)
Groundcover	Vegetative
Representative Area	San Francisco-Oakland-Fremont MSA

Crockett was chosen for SO_2 source impact monitoring because it is downwind of the ConocoPhillips Refinery. Prevailing winds in the area are from the west, which transport SO_2 emissions from the refinery over the town of Crockett, a predominately residential community with a population of 3,094 according to the 2010 census. The monitoring site is located on the west side of Crockett 0.9 miles northeast of the refinery boundary. The only other major industry near Crockett is C&H Sugar, which is not a significant source of SO_2 emissions.

VOC toxic compounds are sampled at Crockett on a 1-in-12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

Crockett is classified as an SPM site. EPA siting criteria specifies that the probe be located at least 10 meters from the drip line of all trees within the 180 degree arc of unrestricted airflow for source impact monitoring as determined by the predominant wind direction and the direction of the refinery. The closest tree drip line within the 180 degree arc is less than 10 meters from the probe, which does not meet siting criteria. The Air District has been unable to negotiate with the local homeowner's association for the removal of this tree. Even though one of the siting criteria for a SLAMS site cannot be met, the site is still suitable for source impact monitoring as an SPM site.

SO_2 concentrations measured at Crockett did not exceed the national 1-hour 75 ppb standard during the last three years.

Crockett Monitor Information

Pollutant	**SO2**
Monitor Objective	Source impact
Spatial scale	Neighborhood
Sampling method	TECO 43C
PM filter analysis method	N/A
Start date	01/01/79
Operation schedule	Continuous
Sampling season	All year
Probe height (AGL)	6.2 m
Probe height above roof	2.4 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	< 10 m
Distance to furnace or incinerator flue (m)	N/A
Distance between collocated monitors	N/A
Unrestricted airflow	270°
Probe material	Teflon
Residence time	10 s
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers audit	N/A
Frequency of flow rate verification for automated PM analyzers audit	N/A
Frequency of one-point QC check (gaseous)	Every other day
Last Annual Performance Evaluation (gaseous)	10/14/11
Last two semi-annual flow rate audits for PM monitors	N/A

[*] Closest tree within the 180 degree arc of unrestricted air flow for source impact monitoring.

Cupertino Monte Vista Park

Site Name	Cupertino Monte Vista
AQS ID	06-085-2009
GIS coordinates	37.3184° N, 122.0697° W
Location	Trailer in parking lot
Address	22601 Voss Ave, Cupertino CA 95104
County	Santa Clara
Distance to road from gaseous probe	Foothill Blvd: 91 meters Voss Ave: 63 meters McKlintock Lane: 118 meters Woodbridge Ct: 70 meters
Traffic count	Foothill Blvd: 8,960 ADT (2009) Voss Ave: 1,000 ADT estimate McKlintock Lane: 200 ADT (estimate) Woodbridge Ct: 1,000 ADT (estimate)
Groundcover	Paved
Representative Area	San Jose-Sunnyvale-Santa Clara MSA

The Air District began a two year ambient air monitoring study in Cupertino on September 1, 2010. The purpose of the study is to determine the pollution impacts to local residents from vehicle traffic and the Lehigh Cement Plant located one mile west of the site. According to the 2010 census, the City of Cupertino has a population of 58,302. The Air District plans to close this station on December 31, 2012.

The air monitoring station is located in Monte Vista Park. Although the purpose of the study is primarily source-oriented exposure from the cement plant and the associated truck traffic, the Air District is also monitoring population exposure to criteria pollutants including ozone, NO_2, SO_2, CO, PM_{10}, and $PM_{2.5}$, as well as toxics, metals, and mercury. An Air District meteorological system is also located in the park.

Ozone and its precursors (NO/NO_2) are measured because the area is downwind of precursor sources during the warmer months. Carbon monoxide is measured because of car and truck traffic on residential streets and because two freeways pass through Cupertino. SO_2 is measured because the cement plant uses petroleum coke as fuel to heat the cement kiln. Continuous $PM_{2.5}$ and filter based PM_{10} are also measured because light winds combined with surface-based inversions during the winter months may cause elevated particulate levels.

On April 1, 2011, the Air District started measuring ozone precursors CH_4/NMHC at Cupertino. These compounds were intended to be measured when the station opened but they require high pressure compressed hydrogen gas cylinders in order to operate. The gas cylinders were not permitted by the Santa Clara County Fire Department. As an alternate to compressed gas cylinders, new laboratory grade equipment was procured by the Air District.

The new equipment required extensive modification of the monitoring trailer and required additional permits, thus delaying the start of CH_4/NMHC monitoring.

Gaseous toxic compounds and metals are sampled at Cupertino on a 1-in-6 day schedule and are analyzed at the Air District laboratory. Metals analysis was done by CARB for samples collected through March 2011. Samples collected from April through December 2011 were analyzed at the Air District's laboratory.

Information about toxics monitoring by the Air District can be found in the Toxics Program section of this report. Total Atmospheric Mercury is sampled for 24-hour periods on a 1-in-6 day schedule with laboratory analysis done by Frontier Geosciences. Toxic monitoring results, including mercury, are posted on a monthly basis on the Air District's website at:
http://www.baaqmd.gov/sitecore-s/~/media/Files/Technical%20Services/Cupertino_toxics.ashx

Since opening in September 2010, one exceedance of the national 8-hr ozone standard has been measured, but no exceedances of the national standards for PM_{10}, NO_2, SO_2 or CO have been measured. Additionally, the continuous $PM_{2.5}$ (BAM) monitor has not recorded any concentrations above the national 24-hour $PM_{2.5}$ standard. However, this monitor is not a recognized FRM or FEM method, and the data cannot be used to determine violations of the national $PM_{2.5}$ standards, or its attainment status. Only FRM or FEM based $PM_{2.5}$ measurements may be used for comparison with national $PM_{2.5}$ standards.

Cupertino Monte Vista Monitor Information

Pollutant	O3	CO	NO/NO2	SO2	CH4/NMHC
Monitoring Objective	Population Oriented & Source Impact	Population Oriented & Source Impact	Population Oriented & Source Impact	Population Oriented & Source Impact	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49C	TECO 48I	TECO 42I	TECO 43C	TECO 55C
PM filter analysis method	N/A	N/A	N/A	N/A	N/A
Start date	9/1/10	9/1/10	9/1/10	9/1/10	CH4: 04/01/11 NMHC: 04/01/11
Operation schedule	Continuous	Continuous	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	4.6 m	4.6 m	4.6 m	4.6 m	4.6 m
Probe height above roof	2.0 m	2.0 m	2.0 m	2.0 m	2.0 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	None	None	None	None	None
Distance from tree (DL)	5.2 m	5.2 m	5.2 m	5.2 m	5.2 m
Distance to furnace or incinerator flue	None	None	None	None	None
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	Teflon	Teflon
Residence time	13 s	14 s	15 s	15 s	16 s
Will there be changes within the next 18 mos?	Yes	Yes	Yes	Yes	Yes
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Every other day	Every other day	Every other day	Every other day	Every other day
Last Annual Performance Evaluation (gaseous)	8/30/11	8/30/11	8/30/11	8/30/11	8/30/11
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A	N/A

Cupertino Monte Vista Monitor Information

Pollutant	**PM10**	**Continuous PM2.5 BAM**
Monitoring Objective	Population Oriented & Source Impact	Population Oriented & Source Impact
Spatial scale	Neighborhood	Neighborhood
Sampling method	Andersen HiVol 1200	Met One BAM 1020
PM Filter Analysis method	Weighed by Air District	N/A
Start date	9/9/10	9/15/10
Operation schedule	1-in-6	Continuous
Sampling season	All year	All year
Probe height (AGL)	4.3 m	4.9 m
Probe height above roof	1.5 m	2.2 m
Distance from obstructions on roof	None	None
Distance from obstructions not on roof	None	None
Distance from tree (DL)	2 m	3 m
Distance to furnace or incinerator flue	None	None
Distance between collocated monitors	N/A	N/A
Distance between PM10 and PM2.5 samplers	PM10 to BAM: 2.4 m	BAM to PM10: 2.4 m
Unrestricted airflow	360°	360°
Probe material	N/A	N/A
Residence time	N/A	N/A
Will there be changes within the next 18 mos?	Yes	Yes
Is it suitable for comparison against the annual PM2.5?	N/A	No – not reference or equivalent method
Frequency of flow rate verification for manual PM samplers	Weekly	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	Every two weeks
Frequency of one-point QC check (gaseous)	N/A	N/A
Last Annual Performance Evaluation (gaseous)	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	03/01/11 08/29/11	03/01/11 08/02/11

Fort Cronkhite

Site Name	Fort Cronkhite
AQS ID	06-041-0004
GIS coordinates	37.832725° N, 122.527658° W
Location	At ground level behind a ranger residence
Address	Building 1111, Fort Cronkhite, Sausalito CA
County	Marin
Distance to road from probe	Bunker Road: 16 meters
Traffic count	Bunker Road: 948 ADT (2007)
Groundcover	Vegetative
Representative Area	San Francisco-Oakland-Fremont MSA

Fort Cronkhite was chosen for an air toxics monitoring site because it is representative of ambient levels of toxics compounds transported into the Bay Area from the Pacific Ocean due to prevailing westerly winds. The site is ½ mile east of the Pacific Ocean, on the north side of the Golden Gate gap which opens into the San Francisco Bay. The monitor is located within the Golden Gate National Recreation Area (GGNRA) near the visitor center at Fort Cronkhite. Low concentrations of toxics from this site provide a baseline to compare other toxics measurements in the Bay Area.

Toxics concentrations measured at this site should not be considered to be at pristine natural background levels. There are toxics contributions from emissions transported across the Pacific Ocean from Asia, from ships headed to and from the Bay Area and Central Valley ports, and from ships sailing along the coast. Additionally, there can be a small contribution from vehicle traffic in areas upwind of the site within the GGNRA. In spite of these contributions, when winds are from the west, the toxics levels at this site reflect the lowest levels in the Bay Area.

The closest industrial sources are in San Francisco about eight miles southeast of the site. The closest towns are Sausalito, three miles to the east northeast with a population of 7,061, and Marin City, three miles to the northeast with a population of 2,666 based on the 2010 census. Sausalito and Marin City have little impact on the monitoring site because winds are typically from the west so the site is upwind of these towns, and the towns have no significant industrial sources.

This site is operated as part of the Air District's Toxics Program with samples taken on a 1-in-12 day schedule. Samples are collected using a Xontech canister and are analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

Fort Cronkhite Monitor Information

Pollutant	**Canister Toxics**
Monitoring Objective	General Background
Spatial scale	Regional
Sampling method	Xontech 910A
PM filter analysis method	N/A
Start date	3/26/87
Operation schedule	1-in-12
Sampling season	All year
Probe height (AGL)	7.3 m
Probe height above roof	0.9 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	20 m
Distance to furnace or incinerator flue	N/A
Distance between collocated monitors	N/A
Unrestricted airflow	360°
Probe material	Teflon
Residence time	N/A
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	N/A
Last Annual Performance Evaluation (gaseous)	N/A

Patterson Pass

Site Name	Patterson Pass
AQS ID	06-001-2005
GIS coordinates	37.6896 ° N, 121.6319° W
Location	Trailer
Address	13224 Patterson Pass Road
County	Alameda
Distance to road from gaseous probe	Patterson Pass Road: 400 meters
Traffic count	Patterson Pass Road: 1,410 (2009)
Groundcover	Vegetative
Representative Area	San Francisco-Oakland-Fremont MSA

The new Patterson Pass site is part of a Bay Area Photochemical Assessment Monitoring Stations (PAMS) program. This is a program to measure hourly speciated hydrocarbons using a gas chromatograph analyzer at three Bay Area locations (the other two locations are San Ramon and Livermore). A full description of the PAMS program can be found in the PAMS section of this document.

The site is located in an unincorporated area in the hills east of Livermore. It was established in August 2010 to provide additional information about potential transport of ozone precursor compounds eastward from the Bay Area to the Central Valley. EPA is funding the VOC speciated hydrocarbon monitoring. In March 2011, the Air District added a NO/NO_2 monitor at this site.

Since NO_2 monitoring began in March 2011, no exceedances of the national NO_2 standard have been measured.

Patterson Pass Monitor Information

Pollutant	**NO/NO2**
Monitoring Objective	Regional Transport
Spatial scale	Regional
Sampling method	TECO 42i
Analysis method	N/A
Start date	03/01/11
Operation schedule	Continuous
Sampling season	All year
Probe height (AGL)	6 m
Probe height above roof	2.9 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	N/A
Distance to furnace or incinerator flue	N/A
Distance between collocated monitors	N/A
Unrestricted airflow	360°
Probe material	Teflon
Residence time	7 s
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Every other day
Last Annual Performance Evaluation (gaseous)	09/15/11
Last two semi-annual flow rate audits for PM monitors	N/A

Special Monitoring Programs Conducted in 2011

Meteorology Program

The Air District operates a meteorological monitoring program to provide accurate measurements of ambient meteorological parameters to meet the requirements of many programs within the Air District. Air District programs using meteorological data are: air quality forecasting, photochemical modeling, source modeling, and data analysis. To obtain high quality data to be used for regulatory applications, the Air District considers EPA recommendations for siting, instrumentation, data accuracy, and quality assurance.

The placement of meteorological stations depends on the use of the data. Sites chosen for air quality forecasting are located in areas that show the general wind and temperature patterns within the Air District. Photochemical modeling sites are chosen to show boundary conditions, general conditions, and upper air measurements. Source modeling sites are chosen to be representative of the source and receptor domain to be modeled. Sites used for data analysis are usually located near high pollution areas to determine the trajectories between source areas and downwind high concentration areas, as well as the general atmospheric conditions occurring during the episodes.

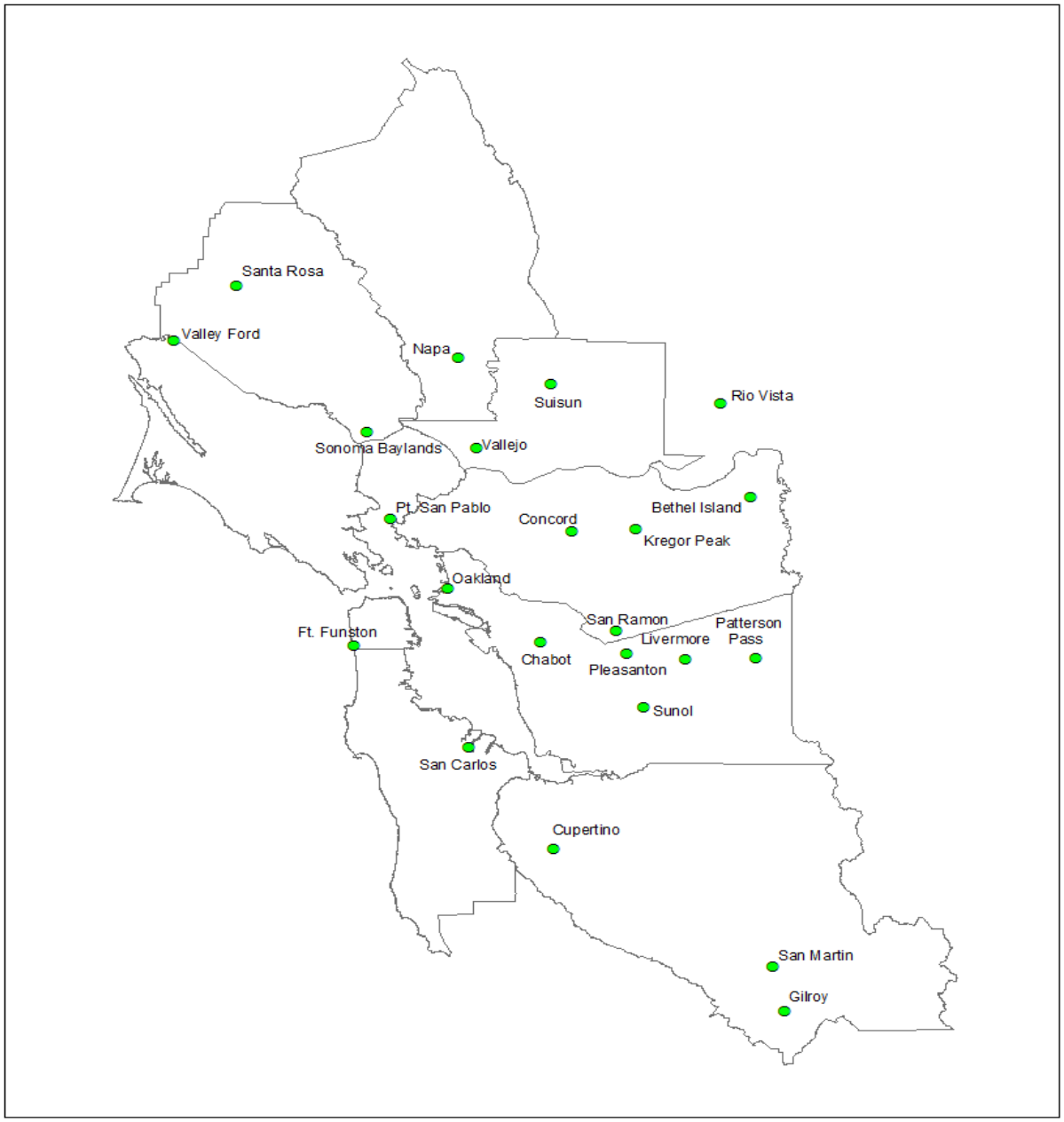
Because most Air District air monitoring stations are in urban or suburban neighborhoods where multistory buildings and trees are nearby, it is not possible to place meteorological systems at all Air District air monitoring stations and meet EPA meteorological siting recommendations. EPA recommends wind systems be located at a height of 10 meters or at plume height if the use is source oriented modeling. In addition, the distance between the wind instrument and any obstruction should be at least 10 times the height of the obstruction.

The current meteorological network has 23 sites. Figure 2 shows the locations of the sites in 2011. Ten of these sites are located at or adjacent to air monitoring stations (Bethel Island, Cupertino Monte Vista Park, Suisun, Concord, Patterson Pass, San Ramon, Vallejo, Livermore, Gilroy, and San Martin). The other air monitoring stations have obstructions to air flow nearby, necessitating placement of the meteorological sites further away. Additionally, to meet forecasting or photochemical modeling needs, some meteorological sites have been placed on ridges or mountain tops, such as at Chabot, Patterson Pass, and Kregor Peak. Sensors used in the Air District's meteorological network include wind speed and direction, temperature, relative humidity, precipitation, and pressure.

Hourly-averaged data are made available to District staff and the public on the Air District's web page, and are archived in the Technical Service Division's database. Each site is visited monthly by Air District staff for a visual inspection of the instrumentation. If problems are seen, a technician visits the site to correct problems. Data is also reviewed on an ongoing basis by Air District meteorologist providing daily air quality forecasts for the Bay Area.

Data recorded at airports, oil refineries, sewage treatment plants, universities, and private companies are included in the Technical Services Division meteorological database as long as they meet EPA recommended siting and maintenance specifications. If requested by facilities, Air District staff will advise where to place meteorological stations and how to maintain the sensors so the data can be used for regulatory purposes.

Figure 2. Map of Air District Meteorological Monitoring Sites for 2011.



National Air Toxics Trends Station (NATTS) at San Jose

EPA established the National Air Toxics Trends Stations (NATTS) network in 2003. NATTS was created to expand and improve national toxics monitoring with the major goal of identifying toxics trends in urban and rural settings throughout the United States. EPA and the Air District agreed to include San Jose in the NATTS network because of its history of high quality air toxics data back to 1991 (when canister sampling at San Jose began), and because San Jose is the largest city in Northern California with a 2010 population of 945,942. The Air District began operating a NATTS site at the San Jose air monitoring station on January 1, 2003. NATTS pollutants can be grouped into three categories: hazardous air pollutants, continuous measurements, and polycyclic aromatic hydrocarbons.

Hazardous Air Pollutants (HAPs) Measurements

The Clean Air Act Amendments of 1990 listed 188 HAPs of interest. Of these, EPA selected fifteen HAPs for trends analysis in the original 2003 NATTS monitoring program. These selections were based on toxicity, available measurement methods, cost of measurement, correlation with other important HAPs, and anticipated concentration levels. Table 14 lists the NATTS HAPs measured by the Air District along with the year NATTS measurements began. Hexavalent chromium is the only required NATTS airborne toxic compound that the Air District does not directly measure, because the current sampling methodology allows significant deterioration of the compound before the analysis can be performed. Chromium is measured instead as an estimate of hexavalent chromium concentrations. In the future, the Air District may sample for hexavalent chromium when better sampling techniques are developed.

Table 14. List of the 15 NATTS HAPs Monitored by the Air District.

Hazardous Air Pollutant or Species	Year NATTS Measurements Began	Parameter Type	Sample Source	Analyzing Lab	Analysis equipment
Benzene	2003	VOC	SUMMA canister	BAAQMD	GC
1, 3 Butadiene	2003	VOC	SUMMA canister	BAAQMD	GC
Carbon tetrachloride	2003	VOC	SUMMA canister	BAAQMD	GC
Chloroform	2003	VOC	SUMMA canister	BAAQMD	GC
Tetrachloroethylene	2003	VOC	SUMMA canister	BAAQMD	GC
Trichloroethylene	2003	VOC	SUMMA canister	BAAQMD	GC
Acrolein	2008	Carbonyl	SUMMA canister	BAAQMD	GC/MS
Formaldehyde	2006	Carbonyl	cartridge	BAAQMD	HPLC
Acetaldehyde	2006	Carbonyl	cartridge	BAAQMD	HPLC
Antimony	2008	metal	¼ PM10 filter[1]	ERG	ICPMS
Arsenic	2008	metal	¼ PM10 filter[1]	ERG	ICPMS
Cadmium	2008	metal	¼ PM10 filter[1]	ERG	ICPMS
Manganese	2008	metal	¼ PM10 filter[1]	ERG	ICPMS
Nickel	2008	metal	¼ PM10 filter[1]	ERG	ICPMS
Chromium[2]	2008	metal	¼ PM10 filter[1]	ERG	ICPMS

[1] PM_{10} Lo-Vol Teflon filter is sample source effective 12/22/10

[2] Chromium is measured as an estimate of hexavalent chromium.

Emission sources of the NATTS HAPs in Table 14 above:

- Benzene and 1, 3 butadiene are emitted by mobile sources (cars and trucks).
- Carbon tetrachloride, tetrachloroethylene and trichloroethylene are used for cleaning, but Air District regulations have significantly reduced their use.
- Chloroform is produced in the chlorination of water.
- Acrolein is generated by diesel and jet engines.
- Formaldehyde and acetaldehyde are formed during combustion processes. Formaldehyde is also created during the manufacture of some building materials and household products, and continues to off gas after manufacturing.
- Antimony comes from the soil.
- Arsenic compounds originate from soil and the smelting of metals.
- Nickel and cadmium compounds are naturally found in some soils and can be emitted from fossil fuel combustion, cement manufacturing and electroplating. Also, cadmium comes from tire wear.
- Manganese compounds naturally occur in some soils and can be emitted from steel plants, power plants and coke ovens.
- Hexavalent chromium is emitted during chrome plating operations, and is believed to be a byproduct of the cement-making process.

The Air District samples for the 14 NATTS pollutants and chromium on a 1-in-6 day schedule. Benzene; 1, 3 butadiene; acrolein; trichloroethylene; carbon tetrachloride; chloroform; and trichloroethylene are collected in canisters over a 24-hour period using a Xontech 910a sampler. The canister contents are then analyzed in the Air District laboratory using a Gas Chromatograph (GC) or a Gas Chromatograph/Mass Spectrometer (GC/MS). Formaldehyde and acetaldehyde (carbonyls) are collected using a cartridge on one sampling channel of a Xontech 924 toxics sampler. In the Air District laboratory, exposed cartridges are analyzed for carbonyls using High Performance Liquid Chromatograph (HPLC). During most of 2010, metals were collected on a standard PM_{10} filter. A quarter section of each filter was sent to ERG (EPA's designated contract laboratory) for analysis using Inductively Coupled Plasma Mass Spectrometry (ICPMS). With the implementation of the Lo-Vol collection method for PM_{10} in December 2010, a Teflon PM_{10} filter is sent to ERG for analysis.

Continuous Measurements

As part of the NATTS program, the Air District makes continuous measurements of CO. High sensitivity CO is measured as an analysis tool because of correlation to benzene and 1, 3 butadiene, two of the largest contributors to air toxic exposure.

Polycyclic Aromatic Hydrocarbons (PAHs) Measurements

In May 2008, the Air District began sampling for a number of PAHs under the NATTS program. PAHs are products of incomplete combustion, and are found primarily in soil, sediment and oily substances, as opposed to in water or air. However, they are also a component of concern in particulate matter in air and have probable human carcinogenic (cancer), mutagenic (genetic mutation), and taratogenic (birth defects) properties. Table 15 lists the PAH compounds being measured by the Air District.

Table 15. List of 22 NATTS PAH Compounds Measured by the Air District.

9-Fluorenone	Coronene
Acenaphthene	Cyclopenta(cd)pyrene
Acenaphthylene	Dibenz(a,h)anthracene
Anthracene	Fluoranthene
Benzo(a)anthracene	Fluorene
Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene
Benzo(b)fluoranthene	Naphthalene
Benzo(e)pyrene	Perylene
Benzo(g,h,i)perylene	Phenanthrene
Benzo(k)fluoranthene	Pyrene
Chrysene	Retene

The Air District does not have the equipment to meet the specific requirements to perform the analysis for these compounds, so ERG (EPA's designated contract laboratory) provides the filter media and analysis. PAH compounds are collected on a filter for a 24-hour period using a standard HiVol Polyurethane Foam (PUF) sampler on the NATTS 1-in-6 day sampling schedule. Filters are then sent to the ERG laboratory for analysis.

Summary NATTS data are available from the EPA's AirData web site at http://www.epa.gov/airdata/ad_maps.html. These data may also be found on the BAAQMD web site in the Toxic Air Contaminant Control Program Annual Report at http://www.baaqmd.gov/Divisions/Engineering/Air-Toxics/Toxic-Air-Contaminant-Control-Program-Annual-Report.aspx.

In addition to the NATTS analytes discussed in this section, the Air District also samples for other toxics compounds at San Jose. These are discussed in the Toxics Program section of this report.

NCore Program

In October 2006 the EPA revised 40 CFR Parts 53 and 58 to enhance ambient air quality monitoring to improve air quality measurements. One significant revision was the requirement to establish National Core (NCore) multi-pollutant monitoring stations. These stations will provide data on several pollutants at lower detection limits and replace the National Air Monitoring Station (NAMS) networks that have existed for several years. NCore stations will also be used to monitor trends of pollutants already in attainment. EPA recognized that pollutants already in attainment, and likely to remain so, did not need to be measured at all sites in a monitoring network. NCore stations are to be located in areas which represent the highest pollution levels for both attainment and non-attainment pollutants within an agency's boundaries. By reducing the number of monitors needed in a network, agencies can allocate scarce resources to other monitoring programs.

NCore stations are intended to:

- Report data to the public in a timely manner through AirNOW, air quality forecasting, and other public reporting mechanisms.
- Support development of emissions control strategies through air quality model evaluation and other observational methods.
- Track long-term trends for accountability of emissions control programs and health assessments that contribute to ongoing reviews and attainment of the National Ambient Air Quality Standards (NAAQS).
- Support scientific studies ranging across technological, health, and atmospheric disciplines including ecosystem assessments.

EPA designed the national NCore network to have a mixture of urban and rural sites. In Northern California, EPA desired a monitoring station that would represent a large urban area. Recommendations for locating NCore urban sites are found in 40 CFR Part 58 Appendix D and other EPA publications:

- Urban NCore stations are to be located at neighborhood or urban scale to provide representative exposure levels throughout the metropolitan area population.
- Urban NCore stations should be located where significant pollution levels exist.
- Population oriented monitoring is highly recommended.
- No biasing local pollutant emission sources should be within 500 meters at urban stations.
- Collocation with other network programs (such as NATTS, STN, CASTNET, IMPROVE, NADP, PAMS) is encouraged.
- Siting of monitors at NCore sites must meet SLAMS requirements as specified in 40 CFR Part 58.

EPA and the Air District cooperatively agreed to establish the Northern California NCore station in San Jose. EPA will provide funding and the Air District will operate the station. The station is operational as of January 1, 2011. The city of San Jose was chosen as the NCore site because it is the largest city in the Bay Area with nearly one million residents. Exceedances of both the ozone and 24-hour $PM_{2.5}$ national standards have been measured in

San Jose. Consequently, operating an NCore station in the San Jose area would meet the requirement of being in an urban area with significant air pollution problems.

San Jose is located in the southern part of the Bay Area, and lies within the Santa Clara Valley. Wind patterns in the Santa Clara Valley are influenced greatly by the terrain, resulting in a prevailing flow roughly parallel to the valley's northwest-southeast orientation. During the daytime a sea breeze commonly carries pollutants from San Francisco, San Mateo and Alameda counties southward into the Santa Clara Valley, while a drainage flow carrying pollutants toward the bay, in the opposite direction, occurs during the nighttime hours. This diurnal up valley and down valley air flow mixes pollutants throughout the valley, making San Jose representative of a large part of the Bay Area.

The monitoring objective for the current San Jose air quality monitoring station is population exposure. Monitoring at a population-oriented station is intended to represent air quality levels over a large area having a high population density. Consequently, the site cannot be too close to large emission sources such as industrial sources or highways, and the surrounding land use should be relatively uniform. EPA has defined neighborhood or urban scale as the appropriate area of representativeness for population oriented monitoring. Neighborhood scale has dimensions of 4 km around the monitoring station, and urban scale has a 50 km radius. Figure 3 shows the location of the current San Jose monitoring station (as a blue balloon), and a 4 km circle around the site representing a neighborhood scale area.

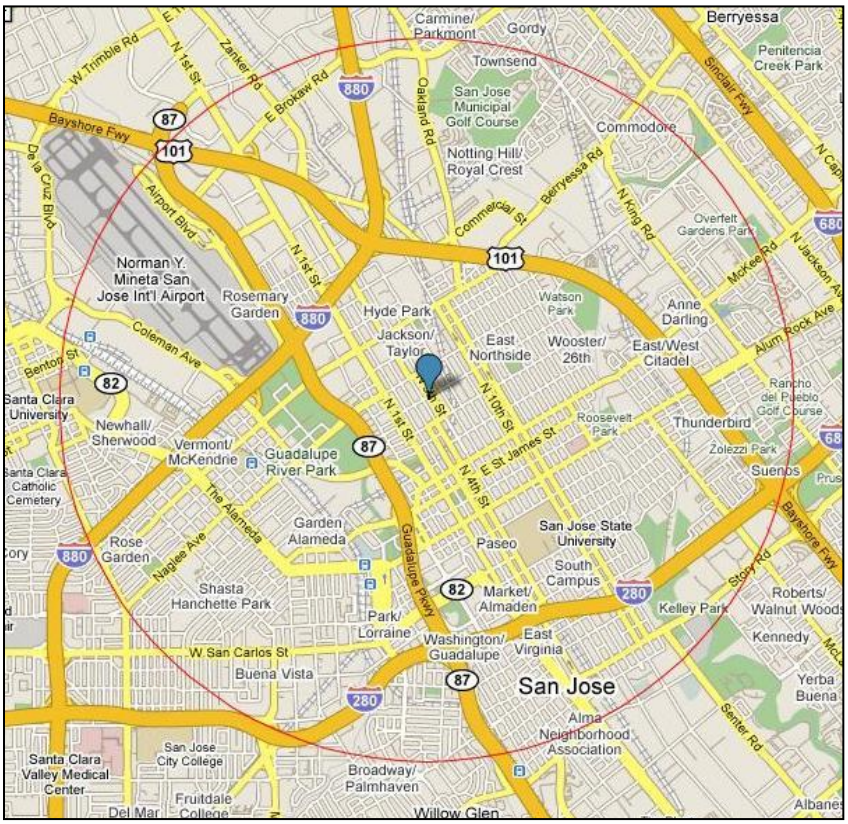


Figure 3. Map showing area of Neighborhood Scale at the San Jose NCore station.

The map shows that the current station is located in a residential/commercial area of San Jose. The station is located on Jackson Street, 1.6 km NW of the downtown core. The Air District has operated air monitoring stations at various locations near downtown San Jose since 1968, and current station has been in operation since 2002. The downtown area is encircled by freeways, but the closest freeway to the air monitoring station is 800 meters to the WSW, which is sufficiently distant to prevent vehicular emissions from dominating the general air quality at the San Jose station. The San Jose Airport is 2 to 4 km from the air monitoring station, distant enough that impacts from airport emissions would be relatively low at the monitoring station. There are no large point sources within 500 meters of the station. The only significant emission sources within a 4 km radius of the San Jose air monitoring station are:

- The Norman Y. Mineta San José International Airport, located from 2-4 km NW of the site, is a significant source. The airport averaged 256 commercial and 141 general aviation departures and landings per day in 2008.
- Reed & Graham, Inc. (an asphalt batch plant) - located 3.7 km SSW of the site.
- Central Concrete Supply Company, Inc. - located 1.9 km SSW of the site.
- San Jose State University Cogeneration Plant - located 2.6 km SSE of the site.

The San Jose air monitoring station was located to provide air quality data representative of neighborhood scale monitoring. The station currently monitors all criteria pollutants, toxics, and is part of the EPA NATTS and STN programs. This existing station meets all the site selection criteria for an NCore station.

NCore Monitors

Table 16 lists the NCore monitors operating at the San Jose station as well as the sampling methodology, sampling frequency and spatial scale for the monitors. Because ambient concentrations of the criteria pollutants CO and SO_2 are well below the NAAQS at population oriented sites across the U.S., EPA requires NCore sites to use higher sensitivity instruments than conventional instruments for these pollutants (note the use of TLE type instruments for CO and sulfur dioxide, meaning Trace Level-Enhanced). $PM_{10-2.5}$ is measured using the difference between measurements of a pair of Partisol-Plus Model 2025 Sequential samplers, with one configured as a $PM_{2.5}$ sampler and the other configured as a PM_{10} sampler. Lead is collected using the PM_{10} Teflon filter, which is sent to ERG (EPA's designated contract laboratory) for analysis using Inductively Coupled Plasma Mass Spectrometry (ICPMS).

Table 16. NCore Monitors

Monitor Type	Sampling Method	Sampling Frequency	Spatial Scale
Carbon Monoxide (CO)	TECO 48i TLE	Continuously	Neighborhood
Nitrogen Oxide (NO_x)	TECO 42i	Continuously	Neighborhood
Ozone (O_3)	TECO 49i	Continuously	Neighborhood
Sulfur Dioxide (SO_2)	TECO 43i TLE	Continuously	Neighborhood
FRM $PM_{2.5}$	Partisol-Plus 2025 w/VSCC	Apr-Sep: 1-in-3 day Oct-Mar: Daily	Neighborhood
BAM $PM_{2.5}$*	Met One Model 1020	Continuously	Neighborhood
$PM_{2.5}$ Speciation	Met One SASS	1-in-3 day	Neighborhood
Total Reactive Nitrogen (NO_y)	API 200EU/NOy	Continuously	Neighborhood
$PM_{10-2.5}$	Partisol-Plus 2025 Sequential $PM_{10-2.5}$ Air Sampler Pair	1-in-3 day	Neighborhood
Lead	PM_{10} Teflon filter analyzed by ERG using ICPMS	1-in-3 day	Neighborhood
Meteorological	EPA approved a waiver to use meteorological data from the San Jose Airport as official data for the NCore site.	Continuously	N.A.

*The Air District is proposing to change this instrument to a $PM_{2.5}$ FEM-BAM effective October 1, 2012.

Photochemical Assessment Monitoring Stations (PAMS)

The 1990 Clean Air Act Amendments required EPA to promulgate rules for the enhanced monitoring of ozone and its precursors (NO/NO_2 and VOCs) because of continued nonattainment of the National Ambient Air Quality Standard (NAAQS) for ozone nationwide. Subsequent revisions to EPA's Air Monitoring regulations, 40 CFR Part 58, required air pollution agencies to establish Photochemical Assessment Monitoring Stations (PAMS) in ozone nonattainment areas classified as serious, severe, or extreme. The Bay Area is not in any of these categories, but is in marginal nonattainment of the ozone NAAQS. Consequently, the Air District applied for and received funding from EPA to conduct measurements of VOC speciated hydrocarbons. Monitoring began in 2010 and will continue for at least three years.

The objectives of the Bay Area PAMS program are to:

- Measure air quality improvement progress
- Track emission trends
- Improve photochemical model performance
- Adjust ozone control strategies

Traditionally, summertime Bay Area ozone concentrations are highest in the Livermore and Santa Clara Valleys. Meteorological conditions are ideal for ozone formation in these areas when precursor NO/NO_2 and hydrocarbons are present in upwind areas. To better understand the atmospheric chemistry, emissions sources, emission reductions strategies, and pollutant transport, three locations in the Livermore area monitor for speciated hydrocarbons. Each PAMS site has meteorological wind and temperature sensors.

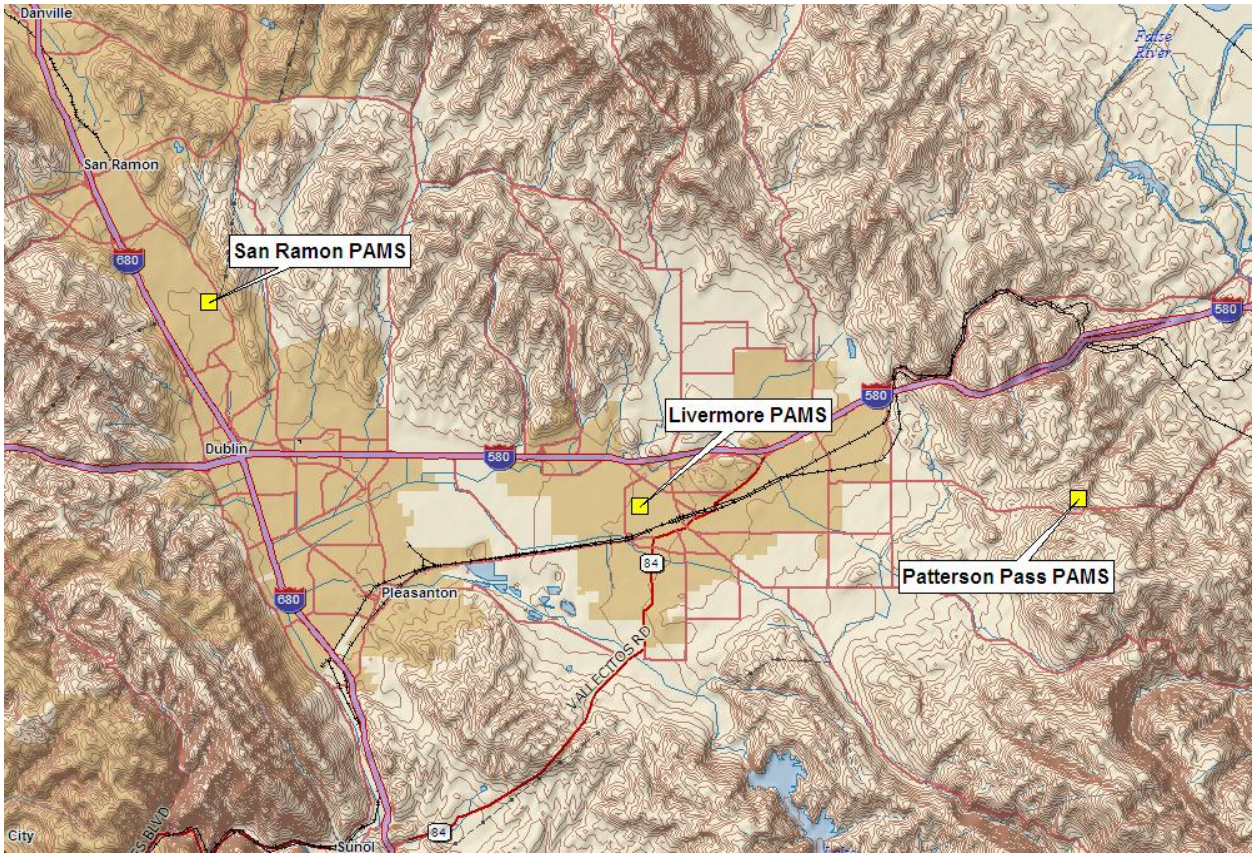
Site	Parameter	Start Date for PAMS Data Collection
Livermore	Air Monitoring	August 1, 2010
	Meteorology	August 1, 2010
San Ramon	Air Monitoring	January 1, 2012 (NO/NO_2)
		May 1, 2012 (hydrocarbons)
	Meteorology	December 14, 2011
Patterson Pass	Air Monitoring	March 1, 2011 (NO/NO_2)
		August 1, 2010 (hydrocarbons)
	Meteorology	October 27, 2011

The Air District's long existing Livermore air monitoring station was selected as a PAMS site because Livermore usually has the most number of days per year exceeding the ozone NAAQS in the Bay Area. The site already had meteorological sensors measuring wind, temperature, and solar radiation; and air monitoring instruments measuring NO/NO_2 and ozone. As a result, the cost to add speciated hydrocarbon monitoring at Livermore was minimal.

The San Ramon and Patterson Pass sites are temporary sites operated solely for the PAMS program. The San Ramon PAMS provides information on ozone precursors and ozone

formation in the San Ramon Valley that may contribute to ozone concentrations in the Livermore Valley. While the EPA provided funding for speciated hydrocarbon monitoring at San Ramon, the Air District added ozone and NO/NO_2 so data from this site can be compared to data collected at Livermore. This site may become a permanent location for ozone and NO/NO_2 monitoring if these pollutants frequently exceed the NAAQS. The Patterson Pass site is located in the hills east of Livermore and provides additional information on the potential transport of ozone precursor compounds eastward from the Bay Area to the Central Valley. EPA funded speciated hydrocarbon monitoring and the Air District added a NOx monitor at this site. The three PAMS locations are shown in Figure 4.

Figure 4. Map of the three PAMS sites in the Livermore Valley.



EPA identifies 57 organic ozone precursor compounds usually measured at PAMS locations because of their significance in photochemical ozone pollution. The Air District measures 55 of the 57 compounds every hour using a gas chromatograph (GC) instrument. The GC does not analyze for two compounds EPA considers important ozone precursors: formaldehyde and acetone. The Air District determined that it is too costly to measure these compounds hourly. Table 17 below lists the 55 compounds measured by the GC.

Table 17. List of speciated hydrocarbons measured by Gas Chromatograph

Ethane	n-decane	2-methylheptane
Ethylene	Cyclopentane	m/p xylene
Propane	Isoprene	Benzene
Propylene	2-2-dimethylbutane	Toluene
Acetylene	1-hexene	Ethylbenzene
n-butane	2-4-dimethylpentane	o-xylene
Isobutane	Cyclohexane	1-3-5-trimethylbenzene
t-2-butene	3-methylhexane	1-2-4-trimethylbenzene
c-2-butene	2-2-4-trimethylpentane	n-propylbenzene
n-pentane	2-3-4-trimethylpentane	Isopropylbenzene
Isopentane	3-methylheptane	o-ethyltoluene
1-pentene	Methylcyclohexane	m-ethyltoluene
t-2-pentene	Methylcyclopentane	p-ethyltoluene
c-2-pentene	2-methylhexane	m-diethylbenzene
3-methylpentane	1-butene	p-diethylbenzene
n-hexane	2-3-dimethylbutane	Styrene
n-heptane	2-methylpentane	1-2-3-trimethylbenzene
n-octane	2-3-dimethylpentane	
n-nonane	n-undecane	

The GCs operate year-round which is a deviation from EPA protocols that only require these measurements during ozone episodes. Year-round measurements are desired because the same hydrocarbons that lead to high ozone in summer also contribute to secondary formation of particulate pollution in winter.

All ozone, NO/NO_2, and speciated hydrocarbon data are submitted to EPA's AQS database. When enough data is collected to yield a better understanding of emissions and photochemical processes in the Livermore area, the Air District will evaluate whether the instrumentation should be moved to the Santa Clara Valley for a similar PAMS program.

$PM_{2.5}$ Speciation Sampling Programs

EPA established a fine particulate ($PM_{2.5}$) standard in 1997 and required States to install and operate new $PM_{2.5}$ samplers to determine where the national ambient $PM_{2.5}$ air standards are not being met. As part of the $PM_{2.5}$ monitoring program, EPA also established a network of speciation monitors at sites expected to exceed the $PM_{2.5}$ standard. The primary purpose of the speciation monitors is to provide a chemical composition of the particulate matter which will point to the emission sources. This network is known as the Speciation Trends Network (STN).

A $PM_{2.5}$ sampler was installed at the San Jose air monitoring station in January 1999 and the first year of data showed exceedances of the national standard. Consequently, EPA requested that a Met One Spiral Ambient Speciation Sampler (SASS) sampler be installed at San Jose in early 2000 as part of the STN network. Exceedances of the $PM_{2.5}$ national standard have also been recorded at other Bay Area sites, and in 2008 the Air District added SASS samplers at Vallejo and Livermore. In 2009 the Air District added a SASS sampler at the new Oakland West air monitoring station. Knowing the chemical composition of particulates on days over the standard at four Bay Area sites will help determine which emission reduction strategies will most likely lead to attainment of the national standard.

Speciation Trends Network (STN) Program

STN sites have the primary objective of defining long-term concentration trends of the elements, ions, and organic and elemental carbon components that make up $PM_{2.5}$ particles. San Jose was chosen as an STN station because it was already collecting $PM_{2.5}$ mass, has recorded exceedances of the $PM_{2.5}$ standard, and is the largest city in Northern California. At San Jose, $PM_{2.5}$ samples are collected using a SASS sampler. The sampler operates 24 hours from midnight to midnight, and samples are on a 1-in-3 day schedule.

The SASS samplers draw air through size-selective nozzles that exclude particles greater than 2.5 microns. SASS samplers uses Teflon, nylon and quartz filters upon which to collect the samples, which are later weighed using a mass balance and analyzed using energy-dispersive X-ray fluorescence, ion chromatography, and thermal/optical analysis techniques to measure the components. The San Jose filter analysis is done by RTI, an EPA contract laboratory in North Carolina. Sixty-two chemical species listed in Table 17 are measured from each SASS filter sample at RTI, and can be viewed on the EPA's AirData web site at http://www.epa.gov/airdata/ad_maps.html.

BAAQMD Supplemental Speciation Network Program

The Air District also operates SASS samplers at its stations in Vallejo, Livermore, and Oakland West. Vallejo and Livermore were selected for sampling because there was an interest in determining the source of $PM_{2.5}$ particles on days that exceed the standard at those sites. These sites may have a different $PM_{2.5}$ composition from that of San Jose because exceedances often occur on days when the air flow is from the Central Valley. Oakland West was selected because it is downwind of the Port of Oakland, a major source of diesel particulate matter. The samplers, sampling procedures, analysis techniques and species analyzed are the same as for the STN program with the following exceptions: the collection frequency is 1-in-6 days; DRI provides the filters, does the analysis and submits the data to AQS; and filters from these sites also are analyzed for palladium, thallium and uranium.

Table 18 is color coded with green (the first 13 rows) listing elements, blue (the next two rows) listing anions and cations, and yellow (the next eight rows) listing organic and elemental carbon types.

Table 18. $PM_{2.5}$ Speciation Measurements at Air District Sites.

Antimony	Cesium	Magnesium	Sodium
Arsenic	Europium	Mercury	Strontium
Aluminum	Gallium	Nickel	Sulfur
Barium	Gold	Niobium	Tantalum
Bromine	Hafnium	Phosphorous	Terbium
Cadmium	Iron	Potassium	Tin
Calcium	Indium	Rubidium	Titanium
Chromium	Iridium	Samarium	Tungsten
Cobalt	Lanthanum	Scandium	Vanadium
Copper	Lead	Selenium	Yttrium
Chlorine	Manganese	Silicon	Zinc
Cerium	Molybdenum	Silver	Zirconium
Palladium[1]	Thallium[1]	Uranium[1]	
Ammonium Cation	Chloride Anion	Potassium Cation	Nitrate Anion
Sodium Cation	Sulfate Anion		
Total Organic Carbon (sum of the OC Fractions below)			
Elemental Carbon Fraction 1 (carbon released at 550ºC in 10% oxygen/90% helium gas)			
Elemental Carbon Fraction 2 (carbon released at 700ºC in 10% oxygen/90% helium gas)			
Elemental Carbon Fraction 3 (carbon released at 800ºC in 10% oxygen/90% helium gas)			
Organic Carbon Fraction 1 (carbon released at 120ºC in helium gas)			
Organic Carbon Fraction 2 (carbon released at 250ºC in helium gas)			
Organic Carbon Fraction 3 (carbon released at 450ºC in helium gas)			
Organic Carbon Fraction 4 (carbon released at 550ºC in helium gas)			

[1] Elements measured only at Vallejo, Livermore, and Oakland West.

Toxics Program

The Clean Air Act Amendments of 1990 required EPA to set emission standards for major sources of Hazardous Air Pollutants (HAPs). The Act also required EPA to assess the risks to human health from HAPs. By 2011 EPA had listed 187 compounds as HAPs. All HAPs listed by EPA are known to cause or are suspected of causing cancer, birth defects, reproduction problems, and other serious illnesses. Exposure time to certain levels of some HAPs can cause difficulty in breathing, nausea or other illnesses and can even cause death.

Toxic pollutants (HAPs) are emitted daily by industrial and chemical manufacturing processes, commercial activities, refinery operations, gasoline marketing and motor vehicles within the Bay Area. Ambient concentrations vary by proximity to sources and current meteorological conditions.

The Air District established an ambient air toxics monitoring program with the objectives of:

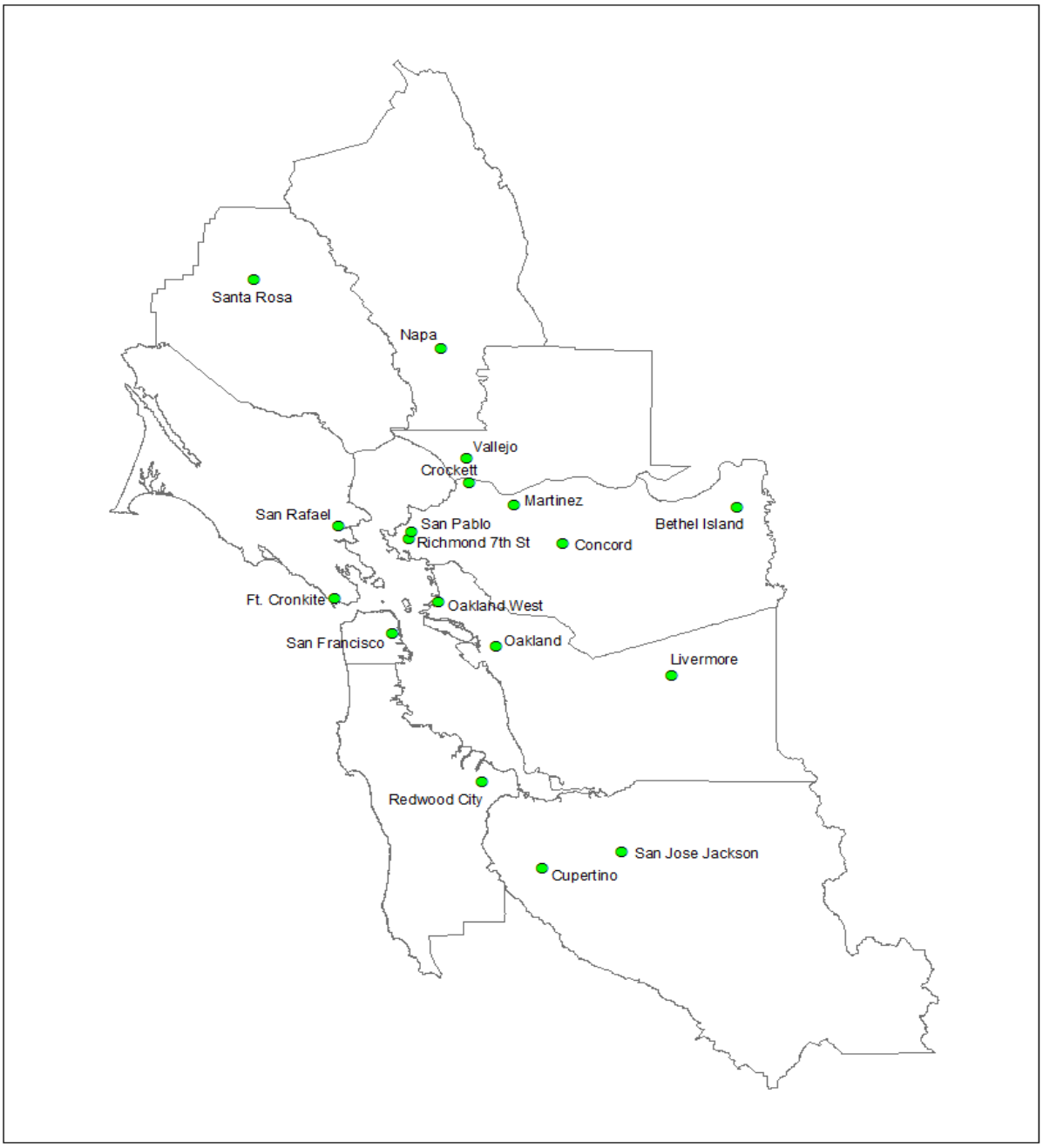
- Establishing trends and evaluating the effectiveness of HAP reduction strategies.
- Characterizing ambient concentrations in local areas.
- Providing data to support and evaluate dispersion and deposition models.
- Providing data to the scientific community to support studies to reduce uncertainty about the relationships between ambient levels of HAPs, actual human exposure to air toxics, and health effects from such exposures.

Figure 5 is a map of the 18 toxics monitoring sites operating in 2011. Locations are at existing Air District SLAMS and SPM monitoring stations and were selected to obtain a wide geographical coverage of contaminant levels throughout the Bay Area. The sites are generally located in major population centers or downwind of major industrial sources such as refineries. There is also an ambient background site at Fort Cronkhite. The toxics data collected at San Jose are also reported to EPA as part of the NATTS program.

Air samples are collected at Air District toxics monitoring sites for a 24 hour period on a 1-in-12 day schedule except at special study sites such as Cupertino and San Jose where sampling is on a 1-in-6 day schedule as described later in this section. A 1-in-12 day schedule allows samples to be taken on a different day of the week over the course of months. This is the same schedule EPA and CARB use for their toxics monitoring program, thereby allowing Bay Area toxics concentrations to be compared to concentrations measured elsewhere across the country.

Gaseous (VOC) toxics are collected in 6-liter SUMMA stainless steel canisters using Xontech 910 samplers. The sampler continuously collects an ambient air sample for 24-hours to ensure capturing transient and intermittent toxic releases. In 2011, canister samples were analyzed within 30 days of sample collection using capillary gas chromatography employing photoionization and electron capture detectors. Samples taken after January 1, 2012 were analyzed using gas chromatography and mass spectrometry.

Figure 5. Map of Air District Toxics Monitoring Sites for 2011.



Both the Air District and CARB have toxic monitoring programs in the Bay Area. CARB conducts toxic monitoring on a 1-in-12 day schedule at two sites: San Francisco and San Jose. CARB supplies the canisters and performs the laboratory analyses, while Air District staff operates the CARB sampler and ships the canisters to CARB. Because the Air District also does toxics monitoring at San Francisco and San Jose, the two sets of data allow calculation of the measurement precision at these sites, and by extrapolation, an estimate of the precision of the toxics measurement program.

Once a quarter at San Francisco, an additional canister sample is taken on a scheduled sample day using a collocated sampler. Both samples are analyzed by the Air District laboratory, and the results allow an additional measure of precision.

The Air District laboratory analyzes for the 19 gaseous toxic compounds listed in Table 19. Compounds selected for analysis were those that had high toxicity or were known to have high emissions in the Bay Area, or some combination of the two. Another consideration was whether the current methodology could accurately detect a compound at reasonable expense, based on previous CARB studies. Some compounds, such as carbon tetrachloride, are measured because their concentration in the ambient air does not change much over time. This is useful because carbon tetrachloride or other similar, stable compounds can be used as a control for quality purposes. If the measurement of such a control is unusually high or low, there may be a problem in the sampling, transport, storage or analysis procedures requiring additional analysis of the accuracy of the affected sample.

Table 19. List of Toxic Compounds Measured by the Air District in 2011.

Acetone	Methyl Ethyl Ketone
Benzene	Methylene Chloride
1, 3 Butadiene	M/P Xylene
Carbon Tetrachloride	Perchloroethylene
Chloroform	1,1,2 Trichlorotrifluoroethane
Ethylbenzene	Trichloroethylene
Ethylene Dibromide	Trichlorofluoromethane
Ethylene Dichloride	Toluene
O-Xylene	Vinyl Chloride
Methyl Chloroform	

Additional Gaseous Toxics Measured at San Jose

In 2011, additional gaseous toxics compounds from canisters were measured at San Jose: acrolein, acetonitrile, acrylonitrile, and ethanol. Acrolein was measured because San Jose is a NATTS program monitoring site and the NATTS program requires acrolein to be measured. The Air District uses a gas chromatography mass spectrometry method to measure acrolein. This method allows detection of the other three compounds with virtually no additional cost.

The Air District also measures polycyclic aromatic hydrocarbons, metals, and aldehydes at San Jose for the NATTS program. See the NATTS section of this document for more information about the NATTS program.

In January 2012, the Air District laboratory began using a new gas chromatography mass spectrometry instrument for analysis of samples from canisters. The new instrument allowed for an increase in the number of compounds analyzed from 19 to 23, as listed in Table 20. The additional four compounds are: acrolein, acetonitrile, acrylonitrile, and ethanol.

Table 20. List of Toxic Compounds Measured by the Air District in 2012.

Acetone	O-Xylene
Acetonitrile	Methyl Chloroform
Acrolein	Methyl Ethyl Ketone
Acrylonitrile	Methylene Chloride
Benzene	M/P Xylene
1, 3 Butadiene	Perchloroethylene
Carbon Tetrachloride	1,1,2 Trichlorotrifluoroethane
Chloroform	Trichloroethylene
Ethanol	Trichlorofluoromethane
Ethylbenzene	Toluene
Ethylene Dibromide	Vinyl Chloride
Ethylene Dichloride	

Toxics Monitoring at Cupertino

In 2011, the Air District operated a Xontech 910 sampler to collect toxic samples in canisters at Cupertino on a 1-in-6 day schedule. In addition to the compounds listed in Table 20, there was interest in measuring formaldehyde and acetaldehyde. These compounds are highly reactive and cannot be accurately measured using a canister sample. Instead, they are collected on a chemically treated cartridge using a Xontech 924 sampler, operated on the same 1-in-6 day schedule as the Xontech 910 used for canister samples. Samples are analyzed at the Air District laboratory using High Performance Liquid Chromatography.

At Cupertino, the Xontech 924 sampler is used to collect metals on Teflon filters on the same 1-in-6 day schedule used for other toxics sampling. Samples are analyzed by CARB using X-Ray Fluorescence Spectrometry (XRF). The metals analyzed for are listed in Table 21. Results are posted on the BAAQMD web site at:
http://www.baaqmd.gov/sitecore-s/~/media/Files/Technical%20Services/Cupertino_toxics.ashx

Table 21. Metals measured at Cupertino using XRF

Aluminium	Chromium	Molybdenum	Strontium
Antimony	Cobalt	Nickel	Sulfur
Arsenic	Copper	Phosphorus	Tin
Barium	Iron	Potassium	Titanium
Bromine	Lead	Rubidium	Vanddium
Calcium	Manganese	Selenium	Yttrium
Chlorine	Mercury	Silicon	Zinc

In addition to CARB's measurement of metals, the Air District laboratory began measuring the metals listed above in January 2011 using XRF on the same samples that CARB analyzed to compare results. The Air District discontinued asking CARB to do metals analysis beginning with samples collected in April 2011.

Additional Mercury Monitoring at Cupertino Monte Vista Park

Due to public concern about mercury emissions from the nearby Lehigh Southwest Cement Plant in Cupertino, the Air District began monitoring for Total Atmospheric Mercury (TAMS) at the Cupertino Monte Vista Park site on September 11, 2010.

Total atmospheric mercury includes both vapor and particulate forms of mercury whereas mercury measured on a filter using XRF methods yields solely the particulate form of mercury. Total atmospheric mercury is collected on a carbon trap using a Xontech 924 sampler on the same 1-in-6 day schedule as the particulate mercury collected on Teflon filters. The carbon trap is analyzed by Frontier Geosciences. Results are posted on the BAAQMD web site at:
http://www.baaqmd.gov/sitecore-s/~/media/Files/Technical%20Services/Cupertino_toxics.ashx

Summary toxics data are available from the EPA's AirData web site at http://www.epa.gov/airdata/. These data may also be found on the BAAQMD web site in the Toxic Air Contaminant Control Program Annual Report at http://www.baaqmd.gov/Divisions/Engineering/Air-Toxics/Toxic-Air-Contaminant-Control-Program-Annual-Report.aspx.

Appendix A: Proposed site locations for near-road NO_2 monitoring

Background

Effective April 12, 2010 the minimum monitoring requirements for NO_2 in 40 CFR Part 58, Appendix D, Section 4.3 were revised to include at least one near-road monitoring site in a CBSA with a population of 500,000 or more based on the latest available census figures. Also, a second near-road site is required if the CBSA has a population of 2,500,000 or more. Near-road NO_2 monitoring sites are required within 50 meters of major roadways and operational by January 1, 2013. Based on CBSA population, the Air District is required to operate three near-road NO_2 monitoring sites. Two are required in the San Francisco-Oakland-Fremont CBSA and one is required in the San Jose-Sunnyvale-Santa Clara CBSA.

According to the EPA, on-road and non-road mobile sources account for approximately 60% of NOx emissions and traffic-related exposures can dominate personal exposures to NO_2. Research suggests that the concentrations of on-road mobile source pollutants such as NOx, CO, directly emitted toxics, and certain size distributions of particulate mater, such as ultrafine PM, typically display peak concentrations on or immediately adjacent to roads. For this reason, an ongoing effort is being made by the Air District and EPA Region 9 to find suitable monitoring locations for near-road NO_2 monitoring in the Bay Area.

Site Selection Criteria

The primary factor in determining locations for near-road NO_2 monitoring is the annual average daily traffic count (AADT). Traffic count information for 2010 was obtained from the State of California, Department of Transportation (DOT) and may be found at this link: http://traffic-counts.dot.ca.gov/2010all/Route2-4.html

Table 22 shows the top 30 most heavily travelled road segments in the Bay Area. Although the most desired monitoring location is along road segments with the highest AADT, it is not the only consideration in choosing a site.

EPA also requires consideration of fleet mix (percentage of total traffic that is heavy duty trucks), roadway design and grade, congestion patterns, terrain, and meteorology. Fleet mix is an important consideration because heavy duty trucks can produce 10 to 100 times the amount of NOx and particulate matter than light duty vehicles. Fleet mix for major road segments in California (2010 data) may be found from the California DOT at: www.dot.ca.gov/hq/traffops/saferesr/trafdata/truck2010final.pdf. Monitoring is desired where maximum hourly NO_2 concentrations are expected to occur.

Table 22. Top 30 AADT Road Segments (2010) in the Bay Area.

County	Highway or Interstate	Location Description	Ahead AADT (north or east of location)	Fleet Mix (% of trucks)*
Alameda	80	BERKELEY, GILMAN ST	272,000	4.8
Alameda	80	EMERYVILLE, POWELL ST	265,000	4.8
Alameda	80	BERKELEY, JCT. RTE. 13 EAST	262,000	4.8
Alameda	80	BERKELEY, UNIVERSITY AVE	259,000	4.8
Contra Costa	680	WALNUT CREEK, N. MAIN	255,000	2.7
Contra Costa	680	PLEASANT HILL, OAK PARK	252,000	3.3
San Mateo	101	SAN MATEO, JCT. RTE. 92	250,000	3.5
San Mateo	101	SAN MATEO, KEHOE AVE	248,000	4.6
San Mateo	101	SAN MATEO, THIRD AVE	247,000	4.4
Alameda	80	END INDEP ALIGN	245,000	2.5
Alameda	80	OAKLAND BAY BR TOLL	245,000	2.5
Santa Clara	101	SAN JOSE, JCT. RTE. 280 W	244,000	6.0
Santa Clara	280	SAN JOSE, BIRD AVE	241,000	2.0
San Mateo	101	SAN MATEO, PENINSULA AVE	239,000	4.4
San Mateo	101	SAN MATEO, POPLAR/DORE	238,000	4.4
San Mateo	101	BURLINGAME, BRDWAY	238,000	4.4
Santa Clara	280	MCLAUGHLIN AVE	238,000	3.4
Contra Costa	680	WALNUT CREEK, RTE. 24 W.	233,000	4.1
Contra Costa	680	WALNUT CREEK, YGNACIO VAL	233,000	3.8
Contra Costa	680	GEARY RD	233,000	3.1
Contra Costa	680	PLEASANT HILL, CONTRA COSTA	233,000	3.8
San Mateo	101	SAN FRANCISCO AIRPORT	232,000	4.4
San Mateo	101	S SAN FRANCISCO, JCT RTE 380 W	232,000	4.4
Santa Clara	280	SAN JOSE, JCT. RTE. 82	232,000	2.0
Contra Costa	680	PLEASANT HILL, MONUMENT	227,000	4.4
San Mateo	101	BELMONT, RALSTON AVE	226,000	4.8
San Mateo	280	JUNIPERO SIERRA	226,000	1.2
San Mateo	101	SAN MATEO, EAST HILLSDALE	225,000	4.8
San Francisco	101	SAN FRANCISCO, PAUL AVE	225,000	4.6
Alameda	580	OAKLAND, JCT. RTES. 24/980	222,000	1.1

* The California DOT does not have fleet mix values for all locations listed. Where fleet mix was not counted, an estimated percentage was calculated from nearby segments that were counted. Estimated values are shown in blue font.

Choosing a suitable location for monitoring also depends on the proximity of obstructions between the roadway and a potential monitoring site and knowledge of pending road construction or other planned changes in roadway usage or design. Additionally, to aid the Air District in selecting sites, temporary monitoring (one to two weeks) was conducted at various locations to assess where maximum concentrations are found and what other monitoring issues need to be considered when finalizing a decision on near-road monitoring sites. Ideally, monitoring sites will be along flat, non-elevated roadway segments, near public property, and with a representative meteorological site within 2-3 miles.

Proposed Site Listed in 2010 Annual Network Plan Not Agreeable To EPA Region 9

In the 2010 Annual Network Plan, the Air District stated that the first near-road monitoring site was being considered for the area near the Bay Bridge toll plaza. However, this location was not agreeable to EPA Region 9. Although EPA concurred that the toll plaza area is frequently congested and has the appropriate mix of vehicles and trucks, they suggested a monitoring site where vehicle speeds were steadier and not influenced by vehicle acceleration and deceleration near the toll plaza. Additionally, the prevailing winds near the toll plaza are not perpendicular to the roadway and may not transport pollutants to a monitoring location south and east of the toll plaza as the Air District was considering for near-road monitoring.

Revised Proposed Site #1

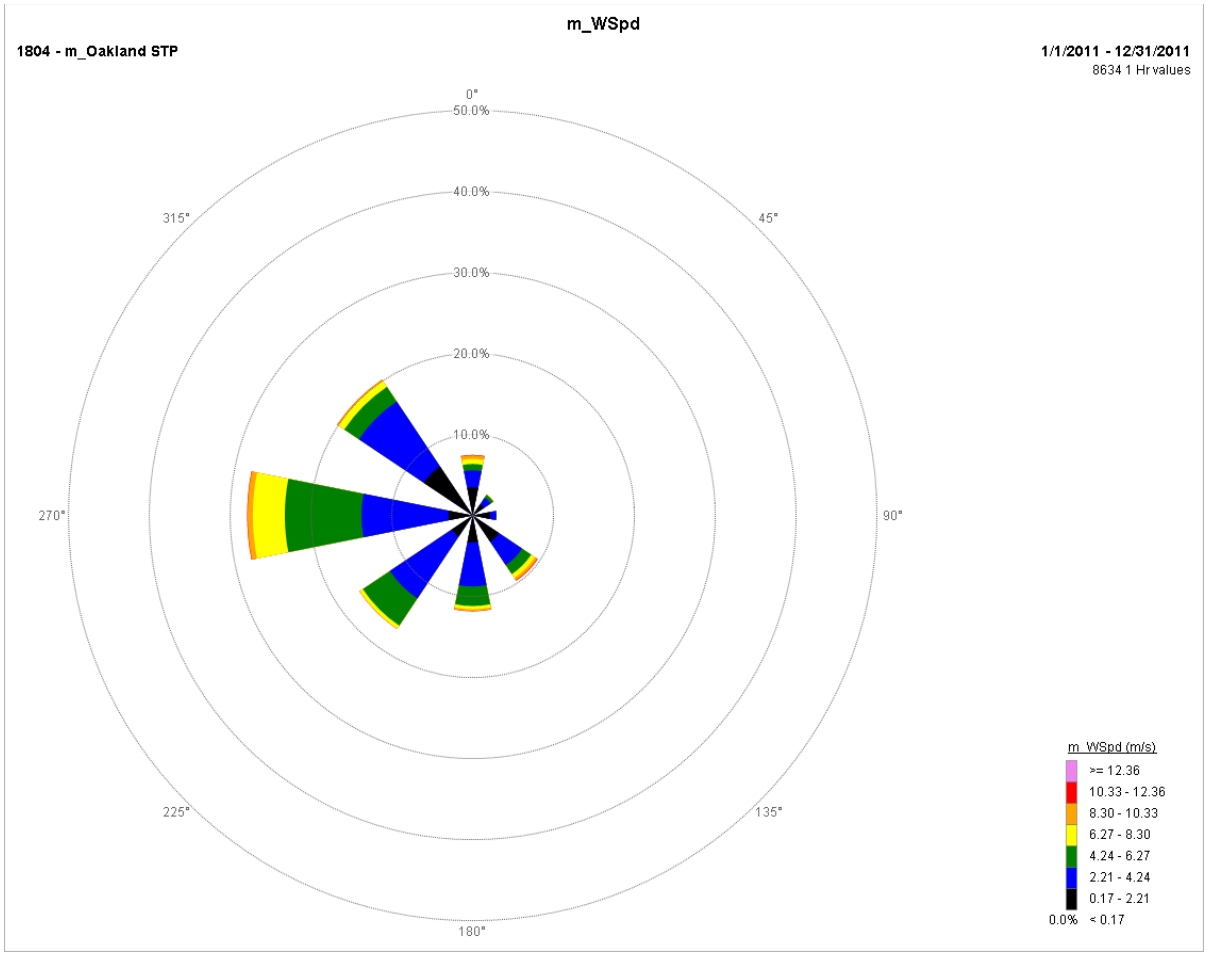
The Air District and EPA Region 9 have agreed on a monitoring location east of Highway 80 near Aquatic Park in Berkeley. This road segment has the highest AADT of all road segments in the Bay Area. This stretch of freeway is quite flat with little slope between the freeway and the adjoining property both to the west (the Bay) and to the east (Aquatic Park). Also, because the freeway runs south to north in this area with westerly prevailing winds, a monitoring site just east of the highway appears to be ideal for near-road NO_2 monitoring.

The Air District is working with local agencies to develop firm plans and agreements to have this site operational before January 1, 2013. The Air District will also include CO and ultrafine particulate matter (UFP) monitoring at the site, and probably toxics monitoring. Figure 6 shows the general location of the proposed monitoring site. A specific site within the area of the rectangle has not been determined.

Figure 6. Proposed near-road air monitoring site in Berkeley along Interstate 80.

Figure 7 is a wind rose diagram showing the prevailing winds at the Oakland sewage treatment plant meteorological site in 2011. The meteorological site is 2-3 miles south of the proposed near-road monitoring site along Interstate 80 in Berkeley.

Figure 7. Wind rose for 2011 at the Oakland sewage treatment plant.



Proposed Site #2

The Air District must operate two near-road NO_2 monitoring sites within the San Francisco-Oakland-Fremont CBSA to comply with 40 CFR Part 58, Appendix D. Because the first site is proposed in the eastern side of the CBSA, the Air District is proposing a monitoring site in San Francisco, along Highway 101 in the western side of the CBSA. EPA requirements for a 2nd site in a CBSA state that the site must be differentiated from the first by one or more of the following factors: fleet mix, congestion patterns, terrain, or geographic area.

The Air District is proposing monitoring along Highway 101 in San Francisco because the area is geographically different (west side of San Francisco Bay), is in a different county, is along a different freeway corridor, has a high AADT (200,000 or more), and is in a city with a very high population density. The site will be on the east side of the roadway because the

prevailing winds are westerly. The Air District will also monitor CO and ultrafine particulate matter (UFP) at this site, and probably monitor for toxics.

As of late May 2012, the Air District has been in contact with staff from the City of San Francisco regarding the operation of a monitoring site on city property but no firm agreement has been reached. Figure 8 shows the general location of the proposed monitoring site. A specific site within the area of the rectangle has not been determined.

Figure 8. Proposed near-road air monitoring site in San Francisco along Highway 101.

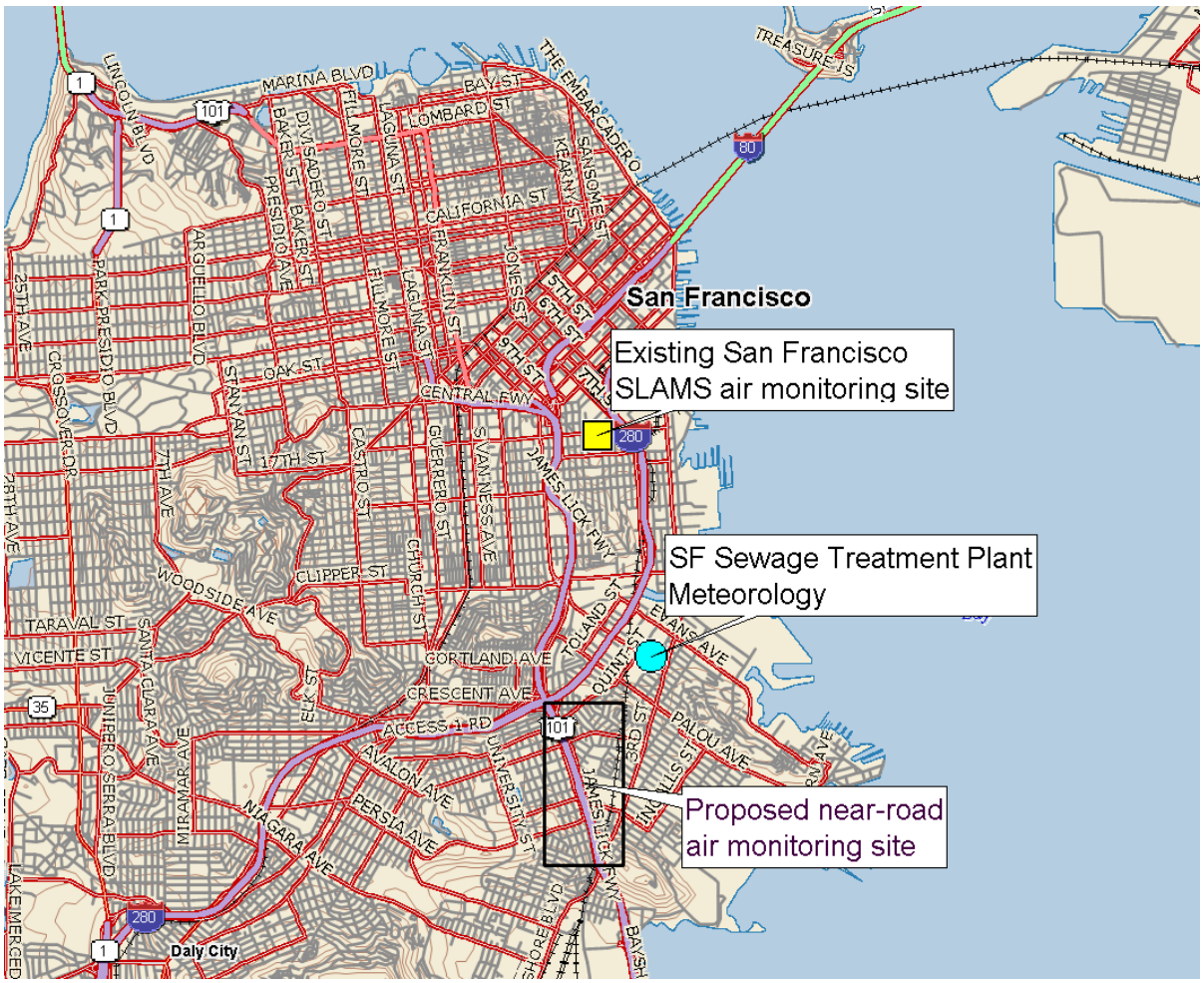
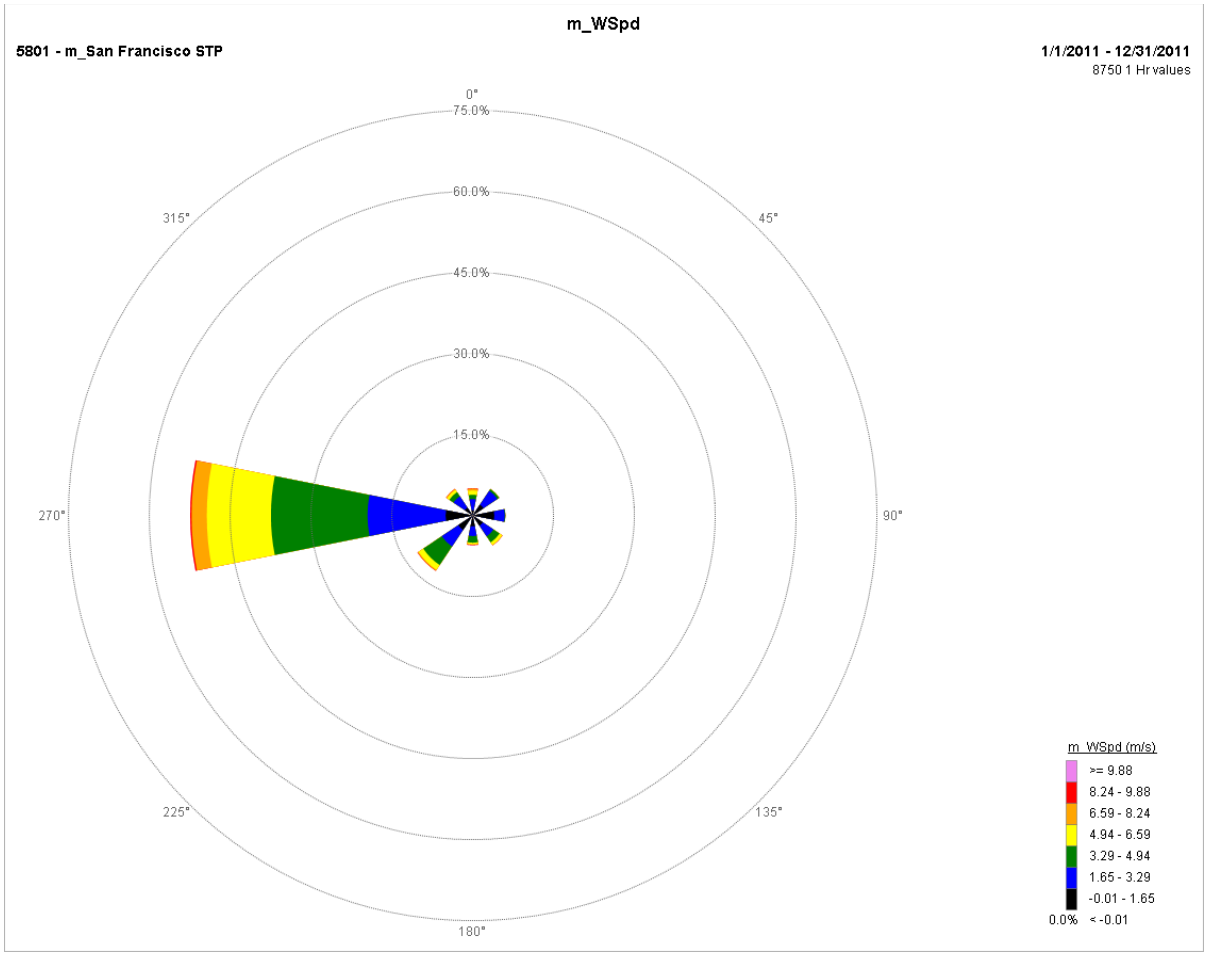


Figure 9 is a wind rose diagram showing the prevailing winds at the San Francisco sewage treatment plant meteorological site in 2011. The meteorological site is 2-3 miles northeast of the proposed near-road monitoring site along US Highway 101 in San Francisco.

Figure 9. Wind rose for 2011 at the San Francisco sewage treatment plant.



Proposed Site #3

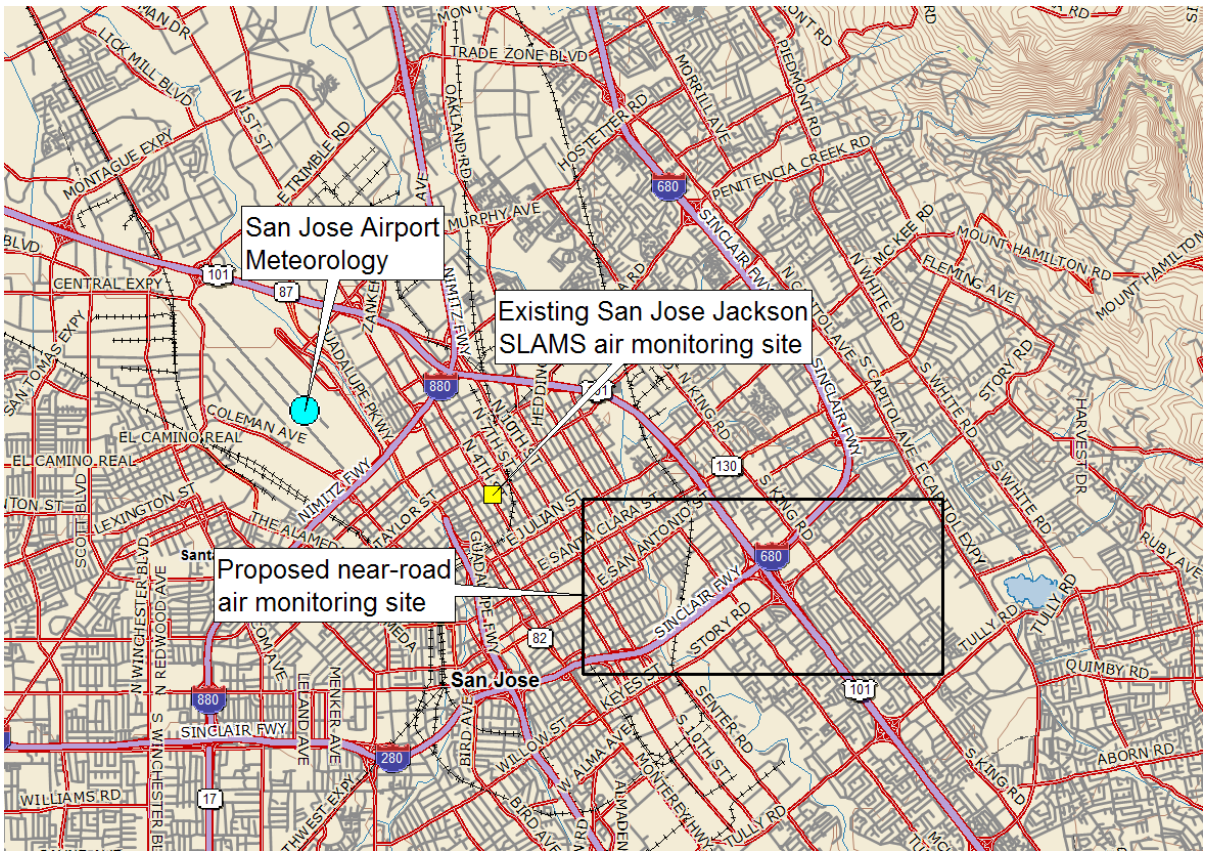
The San Jose-Sunnyvale-Santa Clara CBSA has a population well over 500,000 persons. Therefore, one near-road monitoring site is required, focused on highest AADT in that region to meet the minimum near-road NO_2 monitoring requirements in 40 CFR, Part 58. The Air District is proposing a monitoring site south of the intersection of Interstate 280/680 and US Highway 101 in San Jose where the AADT is slightly over 200,000. Considering that San Jose is the most populated city in the Bay Area, approaching one million persons, this site is the most suitable if other siting considerations can be achieved, such as:

- an unobstructed path from the roadway to the monitoring site (an absolute need)
- grade of the road (will a monitoring site be at the same level as the roadway)

- electrical availability (how far a run is needed and are studies or permits needed)
- security requirements (fencing if on private property or construct fencing if not)

As of late May 2012, the Air District is obtaining property owner information and conducting visual surveys of the land in the area before moving forward with contract negotiations to use private or public property for near-road monitoring. Prevailing winds in this area are northwesterly. Consequently, the monitoring site will be south of the roadway. Compared to the proposed monitoring locations in Berkeley and San Francisco, this monitoring location is the least firm and subject to change. The rectangle in Figure 10 shows the area where the Air District is evaluating sites for near-road monitoring.

Figure 10. Proposed near-road air monitoring site in San Jose near the intersection of Interstate 280/680 and Highway 101.


San Jose Airport Meteorology
Existing San Jose Jackson SLAMS air monitoring site
Proposed near-road air monitoring site
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CENTRAL EXPY
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COLEMAN AVE
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SINCLAIR FWY
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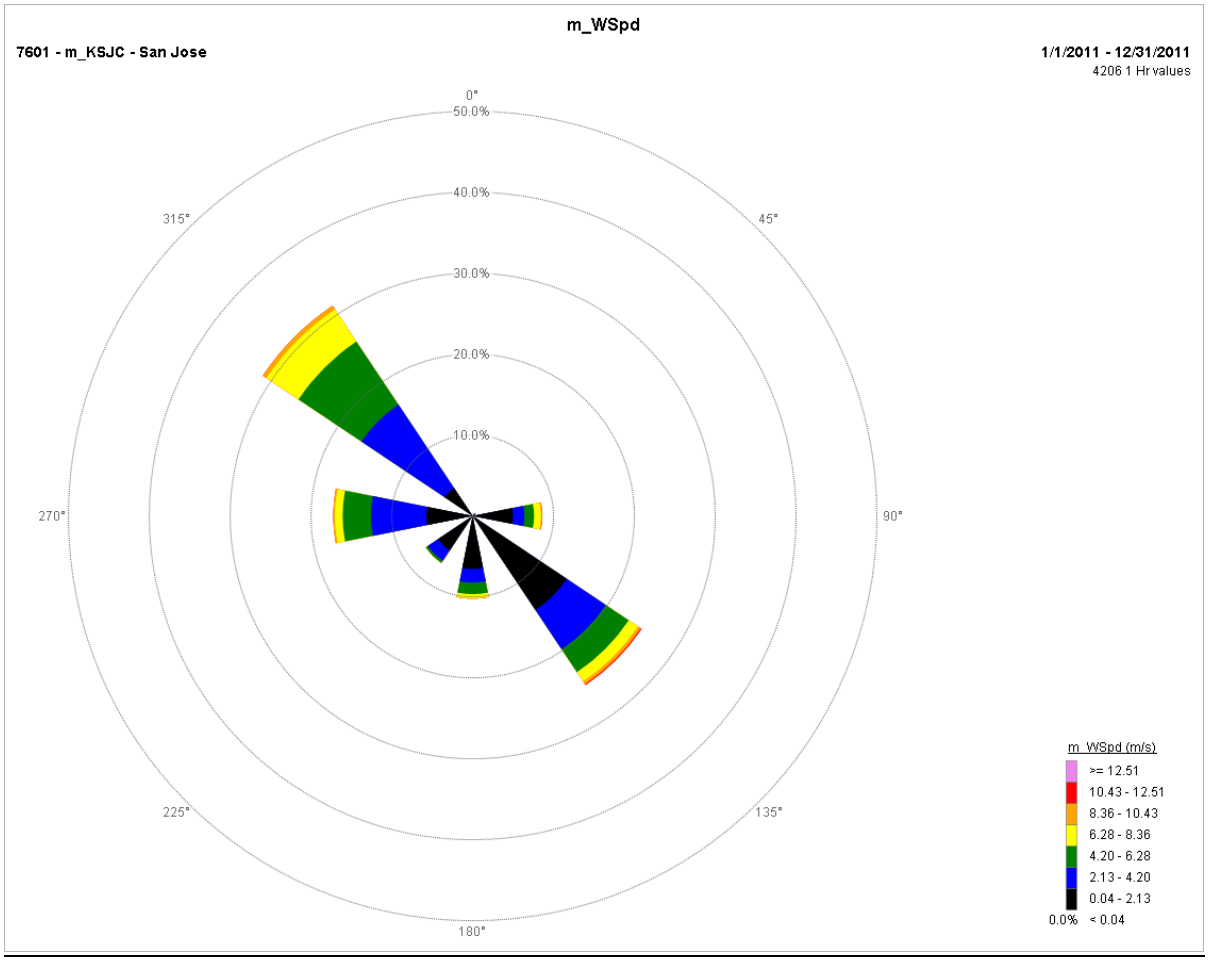
Figure 11 is a wind rose diagram showing the prevailing winds at the San Jose Airport meteorological site in 2011. The meteorological site is 2-3 miles northwest of the proposed near-road monitoring site near the intersection of Interstate 280/680 and US Highway 101 in San Jose.

Figure 11. Wind rose for 2011 at the San Jose Airport.



<u>Summary of the three proposed sites</u>

Collectively the three proposed sites for near-road NO_2 monitoring will meet the minimum monitoring requirements in 40 CFR Part 58. Figure 12 shows the three proposed sites. Additionally, the Air District is committed to monitoring near-road CO and Ultrafine Particles (UFP) at the three monitoring sites. The Air District, depending on funding and staff resource availability, may also include toxics monitoring at one or all of the sites.

The Air District is not presenting additional details about specific siting locations (such as owner of property) at this time because specific locations of the monitoring sites are not 100% firm. Therefore, details as may be included in a tabular or matrix format are too encompassing to present in this document. A matrix of specific details may be posted on the Air District web site at a later date when detailed information of each site is known.

As of late May 2012, the Air District understands that EPA is considering changing the required operational date for near-road monitoring. The Air District intends to meet the January 1, 2013 deadline, whether the EPA revises the operational deadline or not.

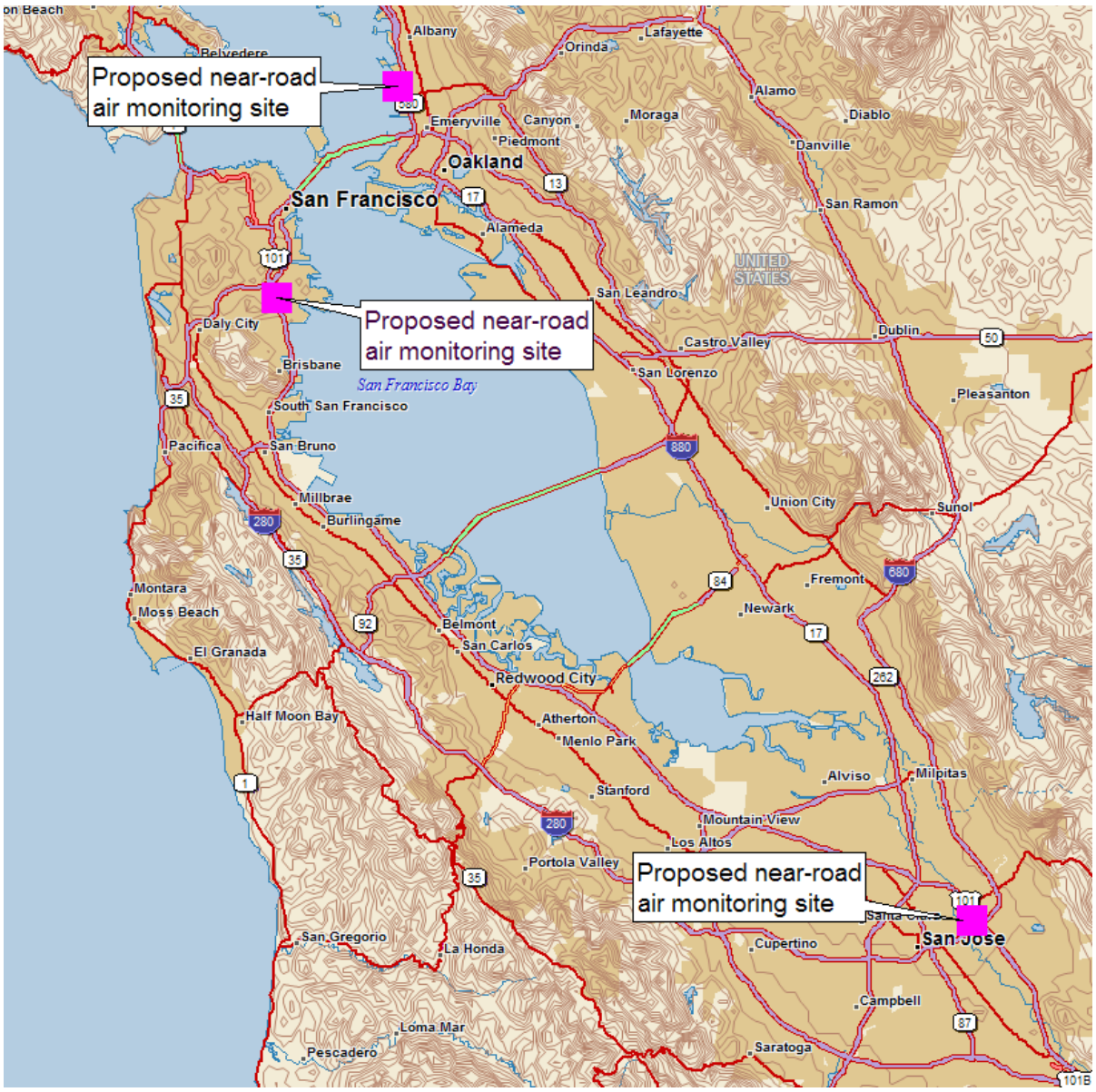



Figure 12. The three proposed near-road air monitoring sites in the Bay Area.