



# **2019 ANNUAL MONITORING NETWORK PLAN**

**Sacramento Metropolitan  
Air Quality Management District**

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*On the cover: Pyrocumulus cloud from Carr Fire rose over the hazy reflection of Shasta Lake on August 12, 2018. Carr Fire was one of the several wildfires simultaneously burning and affecting northern California. Photo by Danny Kam*

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## List of Abbreviations and Acronyms

Abbreviation	Definition
$\mu\text{g}/\text{m}^3$	Microgram per cubic meter
AAC Lab	Atmospheric Analysis and Consulting, Inc.
AADT	Annual average daily traffic
AGL	Above ground level
ANP	Annual Network Plan
ARM	Approved regional monitor
AQI	Air Quality Index
AQS	Air Quality System
BAM	Beta attenuation monitor
CAP III	California Alternative Plan III
CARB	California Air Resources Board
CBSA	Core-based Statistical Area
CSN	Chemical Speciation Network
CFR	Code of Federal Regulation
CO	Carbon monoxide
District	Sacramento Metropolitan Air Quality Management District
DV	Design Value
EMP	Enhanced Monitoring Plan
ERG	Eastern Research Group, Inc.
FEM	Federal equivalent method
FR	Federal Register
FRM	Federal reference method
m	Meter(s)
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NCore	National Core Multiple-pollutant Monitoring Stations
NEI	National Emission Inventory
NMHC	Non-methane hydrocarbon
$\text{NO}_2$	Nitrogen dioxide
$\text{NO}_x$	Oxides of nitrogen
$\text{NO}_y$	Reactive Oxides of Nitrogen
$\text{O}_3$	Ozone
PAMS	Photochemical Assessment Monitoring Station
Pb	Lead
PM	Particulate matter
$\text{PM}_{10}$	Particulate matter, 10 micrometers or smaller
$\text{PM}_{2.5}$	Particulate matter, 2.5 micrometers or smaller
$\text{PM}_{\text{Coarse}}$	Particulate matter, between 10 and 2.5 micrometers
ppb	Parts per billion
ppm	Parts per million
PQAO	Primary quality assurance organization
PWEI	Population weighted emission index
QA	Quality assurance

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QC	Quality control
RASS	Radio acoustic sounding system
RTI	Research Triangle Institute
RWP	Radar wind profiler
SACDOT	Sacramento County Department of Transportation
Sac Metro Air District	Sacramento Metropolitan Air Quality Management District
SASS	Speciated air sampling system
SCC	Sacramento City Code
SIP	State Implementation Plan
SLAMS	State and local air monitoring stations
SO <sub>2</sub>	Sulfur dioxide
SPM	Special purpose monitor
STN	Speciation Trends Network
TAPI	Teledyne Advanced Pollution Instrumentation
TEI	Thermo Environmental Instruments
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile organic compound
VSCC	Very sharp cut cyclone

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## Section 1 Introduction

State and local agencies that conduct ambient air monitoring for regulatory purposes are required by Title 40, Code of Federal Regulations (40 CFR), Part 58.10 to submit an Annual Network Plan (ANP) to the United States Environmental Protection Agency (U.S. EPA) no later than July 1<sup>st</sup> of each year. The report must contain specific monitoring network information and must be presented for a 30-day public review period prior to submittal to the U.S. EPA. This ANP was posted on Sacramento Metropolitan Air Quality Management District's ('Sac Metro Air District's' or 'District's') website for public review and comment from October 10, 2019 through November 12, 2019. No public comment was received. This ANP covers the time period: January 1, 2018 – December 31, 2018. It focuses on the monitors that operate within Sacramento County, which is a part of Sacramento-Arden Arcade-Roseville Metropolitan Statistical Area (Sacramento MSA).

The primary purpose of this ANP is to document the existing Sacramento County air monitoring network and to discuss proposed changes in the ambient air monitoring network that may occur within 18 months following the submittal of this report. The plan includes information on monitors that are a part of State and Local Air Monitoring Stations (SLAMS) network, National Core Multi-pollutant Monitoring Stations (NCORE), Chemical Speciation Network (CSN), Speciation Trends Network (STN), Special Purpose Monitor (SPM) sites, and Photochemical Assessment Monitoring Station (PAMS) network. The plan states whether each monitor in the ambient air monitoring network meets the requirements of 40 CFR Part 58, including Appendix A, C, D, and E, where applicable. 40 CFR Part 58, Appendix B, does not apply to the District's monitoring network because the District does not operate any air monitors regulated by Appendix B, which pertains only to Prevention of Significant Deterioration monitors. This report includes Federal Reference Method (FRM) and Federal Equivalent Method (FEM).

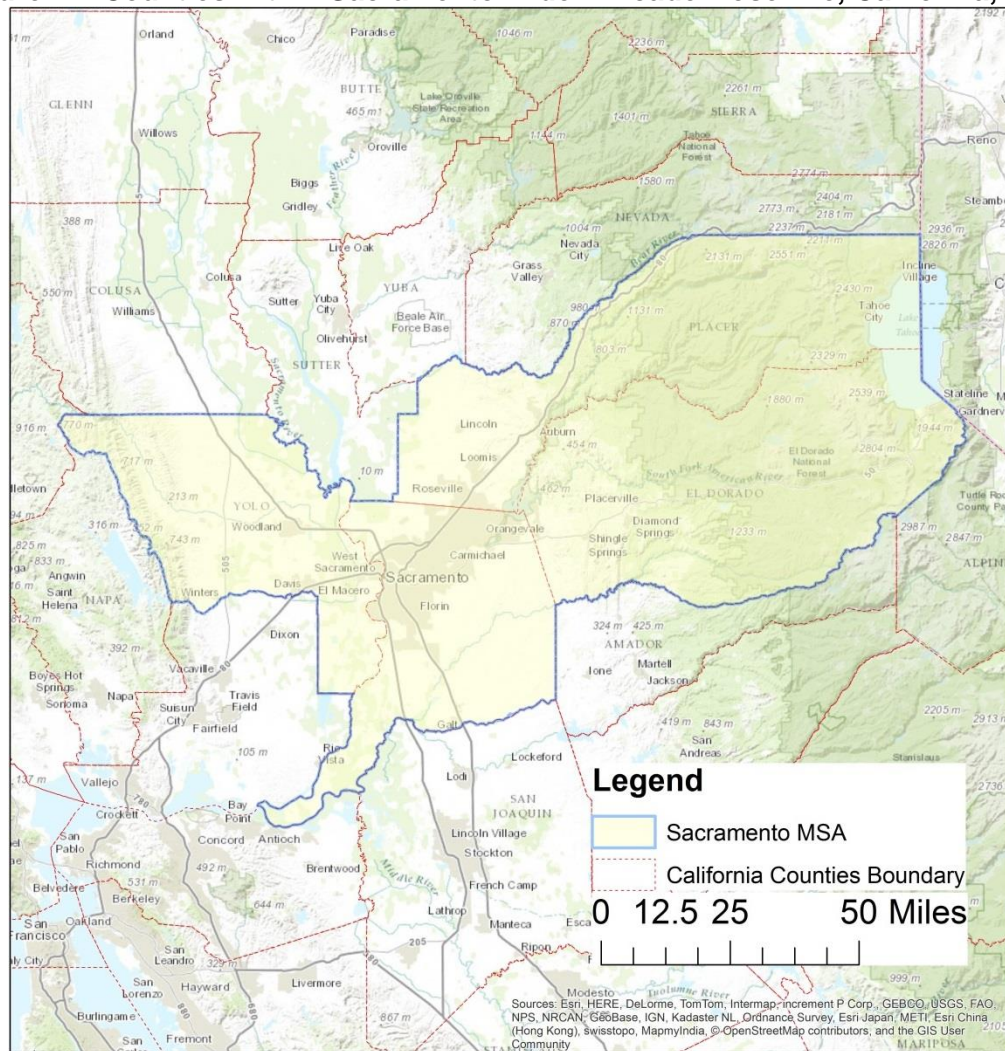
This report is not an extensive analysis of the design of the local air monitoring network. The extensive analysis of the air monitoring network is provided in a network assessment report, which is required every five years. The network assessment report analyzes and determines if the air monitoring network meets the monitoring objectives as defined in 40 CFR Part 58, Appendix D. It also provides recommendations to determine "whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network" (40 CFR Part 58.10). The most recent network assessment report (2015 Air Monitoring Network Assessment) was completed and submitted to U.S. EPA Region 9 on April 22, 2016. The report is available on the District's website at <http://www.airquality.org/Air-Quality-Health/Air-Monitoring>.

Any shared monitoring responsibilities between the District and neighboring monitoring organizations in the Sacramento MSA are discussed in Section 3, Minimum Monitoring Requirement. For details on monitors in neighboring counties within the Sacramento MSA, please refer to the latest Annual Monitoring Network Plan published by California Air Resources Board (CARB).

## Section 2 Network Operations

Sac Metro Air District is the local air quality regulatory and monitoring organization with jurisdiction in Sacramento County, California. Sacramento County is located in the middle of California's Central Valley and is a part of the Sacramento-Arden Arcade-Roseville Metropolitan Statistical Area. Sacramento MSA also includes Placer, El Dorado and Yolo Counties. Sacramento MSA has an estimated population of 2.3 million, including 1.5 million in Sacramento County. It ranks 27<sup>th</sup> in population among all MSA's in the United States<sup>1</sup>. Figure 2-1 shows a map of Sacramento MSA.

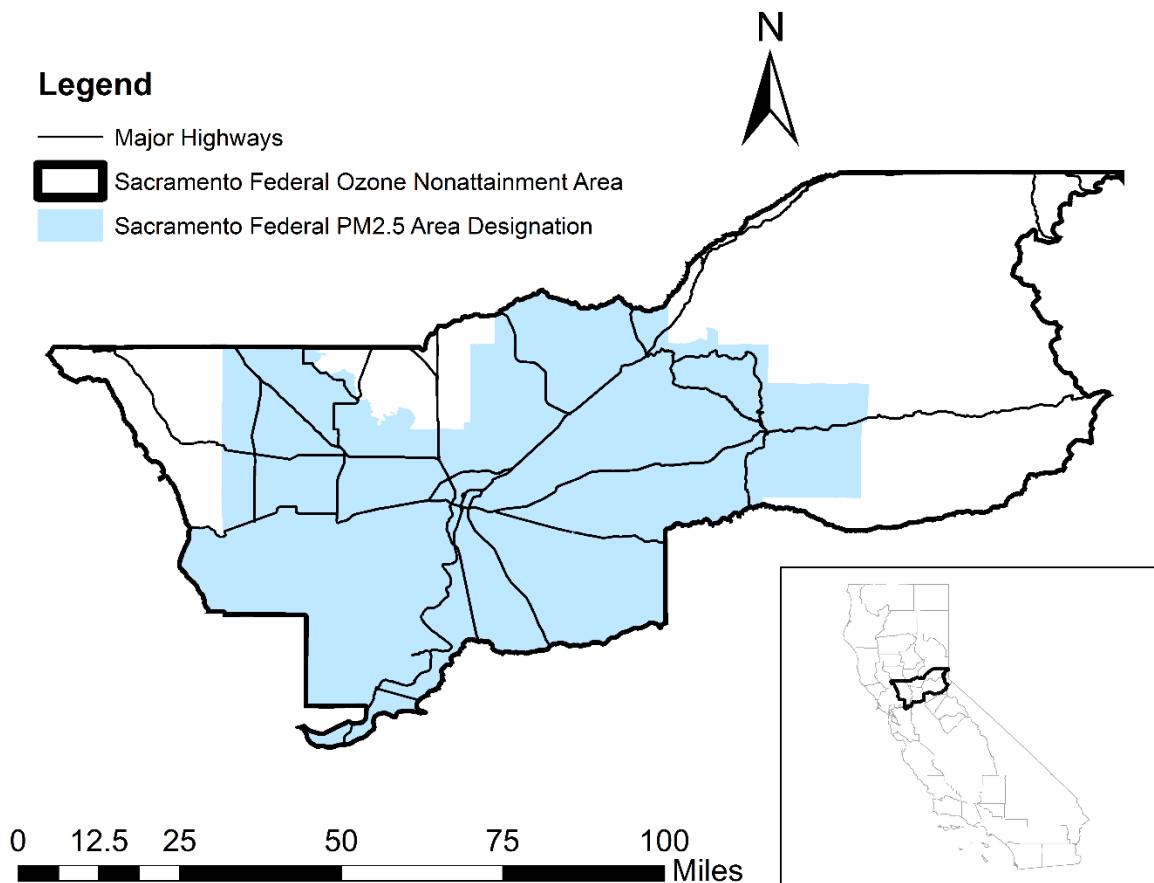
**Figure 2-1 Counties within Sacramento-Arden Arcade-Roseville, California, MSA**



<sup>1</sup> United States Census Bureau, Population Division, 2017 Population Estimates (accessed 1 Jul 2019)

A portion of the Sacramento MSA is a nonattainment area for the federal 2015 8-hr ozone ( $O_3$ ) standard and is referred to as the Sacramento Federal Ozone Nonattainment Area<sup>2</sup>. This area includes all of Sacramento and Yolo Counties and portions of Placer, El Dorado, Solano, and Sutter Counties. The Sacramento region was also designated as nonattainment for the 2006 24-hour particulate matter with size of 2.5 microns or smaller ( $PM_{2.5}$ ) standard (Figure 2-2). The region met the 2006 24-hour  $PM_{2.5}$  standard in 2015 (82 FR 21711) and will continue to reduce  $PM_{2.5}$  levels through various programs and strategies. Sacramento County has met the particulate matter with size of 10 microns or smaller ( $PM_{10}$ ) air quality standard since 2002. Sacramento County is designated as attainment for the most recent federal health standards for carbon monoxide (CO), nitrogen dioxide ( $NO_2$ ), and sulfur dioxide ( $SO_2$ ). U.S. EPA has designated Sacramento County as unclassifiable/attainment for the 2008 federal lead (Pb) standard<sup>3</sup>.

**Figure 2-2 Sacramento Federal  $O_3$  and  $PM_{2.5}$  Nonattainment Area**

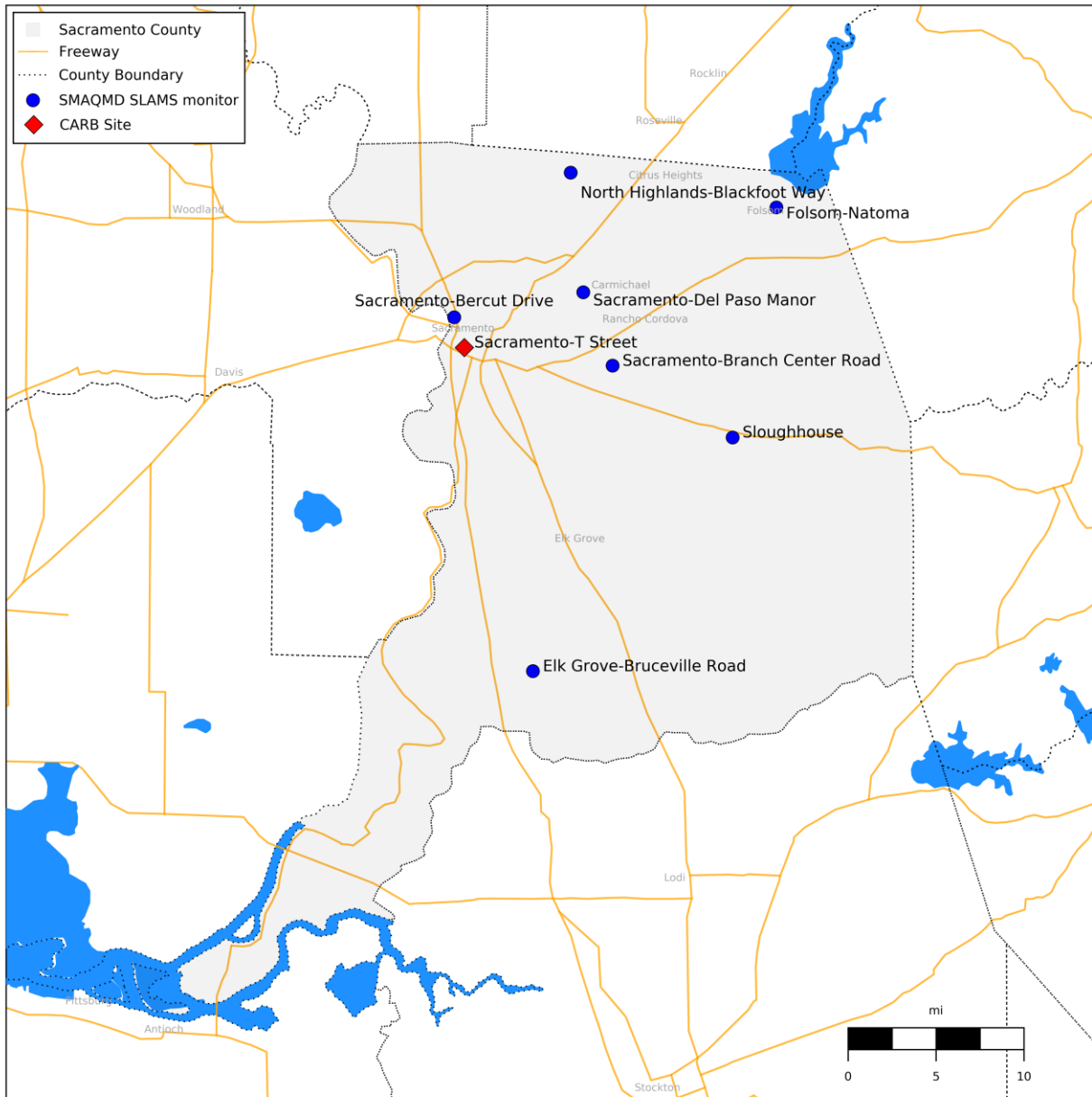


<sup>2</sup> <https://www.epa.gov/sites/production/files/2018-04/documents/placeholder.pdf>

<sup>3</sup> <https://www.epa.gov/lead-designations/lead-designations-final-nonattainment-designations-rounds-1-and-2>; 70 FR 72097

Sac Metro Air District operates seven air monitoring sites within Sacramento County. CARB operates the eighth site at the Sacramento-T Street location. Figure 2-3 provides the location of air monitoring sites in Sacramento County. Sac Metro Air District monitors all criteria air pollutants as designated by the U.S. EPA. The District also monitors for non-criteria air pollutants and meteorological parameters. Tables 2-1 through 2-3 list the criteria pollutants, non-criteria pollutants and meteorological parameters measured at each station located in Sacramento County. Each monitoring instrument is categorized by monitor type: SLAMS or SPM. A SLAMS monitor may be further sub-divided into one or more network affiliations (e.g. PAMS, NCore, near-road, CSN STN). Tables 2-4 through 2-7 identify the monitor type and network affiliation at each air monitoring site.

**Figure 2-3 Air Monitoring Sites in Sacramento County**



**Table 2-1 Criteria Pollutants Measured by Stations**

	O <sub>3</sub>	CO	NO <sub>2</sub>	SO <sub>2</sub>	Pb	PM <sub>10</sub> Hourly	PM <sub>10</sub> 24-Hr	PM <sub>2.5</sub> Hourly	PM <sub>2.5</sub> 24-Hr
Sacramento-Bercut Dr.		✓	✓						✓
Sacramento-Branch Center #2							✓		
Elk Grove-Bruceville Rd.	✓		✓					✓	
Sacramento-Del Paso Manor	✓	✓	✓	✓	✓		✓	✓	✓
Folsom-Natoma St.	✓		✓					✓	
North Highlands-Blackfoot Way	✓	✓	✓				✓		
Sloughhouse	✓							✓	
Sacramento-T Street	✓		✓			✓		✓	✓

**Table 2-2 Non-Criteria Pollutants Measured by Stations**

	Reactive Nitrogen Compound (NO <sub>Y</sub> )	Non-methane hydrocarbon (NMHC)	Volatile Organic Compound (VOC)	Carbonyl	PM <sub>10-2.5</sub>	Speciated PM <sub>2.5</sub>	Black Carbon (BC)
Sacramento-Bercut Dr.							✓
Sacramento-Branch Center #2							
Elk Grove-Bruceville Rd.		✓	✓				
Sacramento-Del Paso Manor	✓	✓	✓	✓	✓	✓	✓
Folsom-Natoma St.	✓	✓	✓				
North Highlands-Blackfoot Way							
Sloughhouse							
Sacramento-T Street						✓	

**Table 2-3 Meteorology Measured by Stations**

	Outdoor Temperature	Relative Humidity	Solar Radiation	Ultraviolet Radiation	Barometric Pressure	Precipitation	Wind Direction & Speed
Sacramento-Bercut Dr.	✓						✓
Sacramento-Branch Center #2							
Elk Grove-Bruceville Rd.	✓	✓	✓	✓	✓	✓	✓
Sacramento-Del Paso Manor	✓	✓	✓				✓
Folsom-Natoma St.	✓	✓	✓				✓
North Highlands-Blackfoot Way							
Sloughhouse							✓
Sacramento-T Street							✓

**Table 2-4 Monitor Type of Criteria Pollutants**

	O <sub>3</sub>	CO	NO <sub>2</sub>	SO <sub>2</sub>	Pb	PM <sub>10</sub> Hourly	PM <sub>10</sub> 24-Hr	PM <sub>2.5</sub> Hourly	PM <sub>2.5</sub> 24-Hr
Sacramento-Bercut Dr.		SLAMS	SLAMS						SLAMS
Sacramento-Branch Center #2							SLAMS		
Elk Grove-Bruceville Rd.	SLAMS		SLAMS					SLAMS	
Sacramento-Del Paso Manor	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS		SLAMS	SLAMS	SLAMS
Folsom-Natoma St.	SLAMS		SLAMS					SLAMS	
North Highlands-Blackfoot Way	SPM	SPM	SPM				SLAMS		
Sloughhouse	SLAMS							SLAMS	
Sacramento-T Street	SLAMS		SLAMS			SLAMS		SLAMS	SLAMS

Legend:

SLAMS – State/Local Air Monitoring Stations

SPM – Special Purpose Monitor

**Table 2-5 Monitor Type of Non-criteria Pollutants**

	NO <sub>y</sub>	NMHC	VOC	Carbonyl	PM <sub>10-2.5</sub>	Speciated PM <sub>2.5</sub>	BC
Sacramento-Bercut Dr.							SLAMS
Sacramento-Branch Center #2							
Elk Grove-Bruceville Rd.		SLAMS	SLAMS				
Sacramento-Del Paso Manor	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS	SPM
Folsom-Natoma St.	SLAMS	SLAMS	SLAMS				
North Highlands-Blackfoot Way							
Sloughhouse							
Sacramento-T Street						SLAMS	

Legend:

SLAMS – State/Local Air Monitoring Stations

SPM – Special Purpose Monitor

**Table 2-6 Network Affiliation of Criteria Pollutants**

	O <sub>3</sub>	CO	NO <sub>2</sub>	SO <sub>2</sub>	Pb	PM <sub>10</sub> Hourly	PM <sub>10</sub> 24-Hr	PM <sub>2.5</sub> Hourly	PM <sub>2.5</sub> 24-Hr
Sacramento-Bercut Dr.		NR	NR						NR
Sacramento-Branch Center #2							NA		
Elk Grove-Bruceville Rd.	PAMS		PAMS					NA	
Sacramento-Del Paso Manor	NCore PAMS	NCore PAMS	NCore PAMS	NCore	NCore		NA	NCore	NCore
Folsom-Natoma St.	PAMS		PAMS					NA	
North Highlands-Blackfoot Way	NA	NA	NA				NA		
Sloughhouse	NA							NA	
Sacramento-T Street	NA		NA			NA		NA	NA

Legend:

NA – No affiliation

NCore – National Core Multi-pollutant Network

NR – Near-road

PAMS – Photochemical Assessment Monitoring Station

**Table 2-7 Network Affiliation of Non-criteria Pollutants**

	Reactive Nitrogen Compound	Non-methane hydro-carbon	Volatile Organic Compound	Carbonyl	PM <sub>10-2.5</sub>	Speciated PM <sub>2.5</sub>	Black Carbon
Sacramento-Bercut Dr.							NR
Sacramento-Branch Center #2							
Elk Grove-Bruceville Rd.		PAMS	PAMS				
Sacramento-Del Paso Manor	NCORE	PAMS	PAMS	PAMS	NCORE	CSN NCORE	NA
Folsom-Natoma St.	PAMS	PAMS	PAMS				
North Highlands-Blackfoot Way							
Sloughhouse							
Sacramento-T Street						CSN	

Legend:

CSN – Chemical Speciation Network

NA – No affiliation

NCORE – National Core Multi-pollutant Network

NR – Near-road

PAMS – Photochemical Assessment Monitoring Station

The primary focus of the current ambient air monitoring network is the data collection of criteria pollutants. The data collected from the air monitoring stations supports State Implementation Plan (SIP) development, attainment/nonattainment decisions, public notification, and air quality modeling and research efforts. The network is designed to meet three basic monitoring objectives as required by 40 CFR Part 58, Appendix D: (1) provide air pollution data to the general public in a timely manner; (2) support compliance with ambient quality standards and emissions strategy development; and (3) support air pollution research studies. An overview of monitoring objectives is in Table 2-8.

**Table 2-8 Monitoring Objective of Criteria Pollutants**

	O <sub>3</sub>	CO	NO <sub>2</sub>	SO <sub>2</sub>	Pb	PM <sub>10</sub>	PM <sub>2.5</sub>
Sacramento-Bercut Dr.		N, P, R	N, P, R				N, P, R
Sacramento-Branch Center #2						N, P	
Elk Grove-Bruceville Rd.	N, P		N, P				P
Sacramento-Del Paso Manor	N, P, R	N, P, R	N, P, R	N, P, R	N, P, R	N, P, R <sup>(A)</sup>	N, P, R
Folsom-Natoma St.	N, P		N, P				N, P, R
North Highlands-Blackfoot Way	N, R	N, R	N, R			N, P	
Sloughhouse	N, P						N, P, R
Sacramento-T Street	N, P		N, P			N, P	N, P

<sup>(A)</sup>There are three PM<sub>10</sub> monitors at Sacramento-Del Paso Manor; the primary monitor for NAAQS comparison and its collocated (audit) monitor with parameter code 88102 have objectives of N, P; the last PM<sub>10</sub> monitor with parameter code 85101, used in the calculation of Particulate Matter with size between 10 and 2.5 micrometers (PM<sub>Coarse</sub>), has objectives of P, R.

Monitoring objective abbreviation:

N – National Ambient Air Quality Standards (NAAQS) Comparison

P – Public Info

R – Research



There are different types of monitoring sites to support these monitoring objectives. Examples of these are: sites that are located in highest pollutant concentration area, sites that are located in area of high population density to monitor for population exposure, sites that determines general background concentration levels, etc. A list of different types of monitoring sites is listed in 40 CFR Part 58, Appendix D. In addition, a spatial scale of representative is assigned to the air monitors to identify “the link between general monitoring objectives, sites types and the physical location of a particular monitor” (40 CFR Part 58, Appendix D). Tables 2-9 and 2-10 summarize the site type and spatial scale. Description and further explanation on site type and spatial scale can be found in 40 CFR Part 58, Appendix D.

For in-depth details on individual monitors, see Appendix A, Detailed Site Information. Appendix A documents the monitor type, affiliation, monitoring objectives, type of site, and spatial scale by each monitor. It also provides a statement of purpose and pollutant specific information, such as whether a PM<sub>2.5</sub> monitor is suitable for comparison to the national ambient air quality standard, 1-point quality control (QC) check frequency and distance to other PM monitors. All monitors operated in the District’s ambient air monitoring network meet the requirements of 40 CFR Part 58, including Appendices A, C, D, and E.

**Table 2-9 Type of Site**

	O <sub>3</sub>	CO	NO <sub>2</sub>	SO <sub>2</sub>	Pb	PM <sub>10</sub>	PM <sub>2.5</sub>	BC
Sacramento-Bercut Dr.		SO	SO				SO	SO
Sacramento-Branch Center #2						HC		
Elk Grove-Bruceville Rd.	UB		UB				GB	
Sacramento-Del Paso Manor	PE	PE	PE	PE	PE	PE	PE, HC	PE
Folsom-Natoma St.	MO PE		HC				PE	
North Highlands-Blackfoot Way	PE	PE	PE			PE		
Sloughhouse	MO						UB	
Sacramento-T Street	GB		PE			PE	HC, PE	

Site Type abbreviation

GB – General/background

HC – Highest concentration

MO – Maximum O<sub>3</sub> concentration

PE – Population exposure

SO – Source oriented

UB – Upwind/background

**Table 2-10 Spatial Scale**

	O <sub>3</sub>	CO	NO <sub>2</sub>	SO <sub>2</sub>	Pb	PM <sub>10</sub>	PM <sub>2.5</sub>
Sacramento-Bercut Dr.		MC	MC				MC
Sacramento-Branch Center #2						NB	
Elk Grove-Bruceville Rd.	UB		UB				UB
Sacramento-Del Paso Manor	NB	NB	NB	UB	UB	NB	NB
Folsom-Natoma St.	NB		NB				NB
North Highlands-Blackfoot Way	UB	NB	NB			NB	
Sloughhouse	NB						UB
Sacramento-T Street	UB		NB			NB	NB

Spatial Scale abbreviation

MC – Microscale

NB – Neighborhood scale

UB – Urban scale

### **Section 3            Minimum Monitoring Requirements**

The minimum number of monitoring sites required for each pollutant is based on one or more applicable factors, as described in 40 CFR Part 58, Appendix D. Examples of these factors include: MSA population, core-based statistical area (CBSA) population, pollutant design value, pollutant maximum concentration, attainment status, annual average daily traffic (AADT), SIP, maintenance plan, population weighted emission index (PWEI), and U.S. EPA's national emission inventory (NEI) data.

Sacramento MSA meets or exceeds minimum monitoring requirement for all criteria pollutants – O<sub>3</sub>, PM<sub>2.5</sub> (manual and continuous methods), PM<sub>10</sub>, NO<sub>2</sub>, SO<sub>2</sub>, CO, and Pb. Details of the monitors representing Sacramento MSA (or CBSA, ID#40900) are provided in Tables 3-1 and 3-2. As mentioned in Section 2, Sacramento MSA has 2.3 million residents and covers all of El Dorado, Placer, Sacramento, and Yolo Counties.

Sac Metro Air District has an agreement with CARB to share specific portions of the monitoring responsibility in the Sacramento MSA. A copy of this agreement is provided in Appendix B. Placer County Air Pollution Control District, the air quality agency for Placer County, and Yolo-Solano Air Quality Management District, the air quality agency for Yolo County, also operate air monitoring stations within the Sacramento MSA.

In 2018, northern California had a number of devastating wildfires, including Camp Fire, which is the most destructive and deadliest wildfire in California history according to California Department of Forestry and Fire Protection. Smoke from these wildfires caused unprecedented air quality impacts. Ozone and PM<sub>2.5</sub> concentrations exceeded the NAAQS. The design value in Table 3-1 reflects the (1) as-is measurement with wildfire impact and (2) exclusion of air quality measurements with wildfire impact. Sac Metro Air District is working with other monitoring organization in the Sacramento Federal Non-attainment Area to submit to U.S. EPA an exceptional event demonstration, which excludes air quality measurements with wildfire impact from NAAQS comparison.

**Table 3-1 2018 Sacramento MSA Design Value and Monitoring Site Requirement, Part 1**

Pollutant	Type (if applicable)	Number of SLAMS sites required	Active SLAMS sites in Sacramento MSA <sup>(A)</sup>	Active SLAMS sites in Sacramento County <sup>(A)</sup>	Additional SLAMS sites needed	2018 design value <sup>(B)(C)</sup> and location
O <sub>3</sub>		2	16	6	0	(1) 0.088 parts per million (ppm) at Placerville (06-017-0010) (2) 0.084 ppm at Placerville (06-067-0010)
PM <sub>2.5</sub>	FRM/FEM	3	7	4	0	24-hr: (1) 50 micrograms per cubic meters (µg/m <sup>3</sup> ) at Woodland (06-113-1003) (2) 35 µg/m <sup>3</sup> at Sacramento-Del Paso Manor (06-067-0006)
	Continuous	2	6	3	0	Annual: (1) 10.4 µg/m <sup>3</sup> at Sacramento-Del Paso Manor (06-067-0006) (2) 9.4 µg/m <sup>3</sup> at Sacramento-Del Paso Manor (06-067-0006)
PM <sub>10</sub>		2-4 <sup>4</sup>	8	4	0	3-year average expected number of exceedance: (1) 4.1 days at multiple sites <sup>(D)</sup> (2) 0.0 days
PM <sub>10-2.5</sub>		1	1	1	0	Not applicable

<sup>(A)</sup> U.S. EPA Air Quality System (AQS) Raw Data Report (AMP 350) and Monitor Description Report (AMP 390), accessed on 1 Jul 2019

<sup>(B)</sup> Design values from U.S. EPA Air Quality System Design Value Report (AMP 480), accessed 25 Apr. 2018, and Raw Data Report (AMP350), accessed on 1 Jul 2019

<sup>(C)</sup> The Sacramento Valley was impacted by a number of wildfires in 2018; the District will be submitting an exceptional event demonstration request to EPA; the design value noted with (1) includes all data collected in 2018; the design value noted with (2) excludes data with wildfire impacted data as outline in the exception event demonstration package the District will submit to U.S. EPA

<sup>(D)</sup> North Highlands (06-067-0002), Sacramento-Del Paso Manor (06-067-0006), West Sacramento (06-113-2001)

<sup>4</sup> Wildfire smoke in 2017 and 2018 impacted multiple air monitoring stations. While the District is addressing some impacts under the Exceptional Event Rule (81 FR 68216), other smoke impacts are short of the rule threshold and could not be addressed and/or does not meet the Exceptional Event Rule requirements. Without any smoke impacts, historical data from 2009 through 2018 shows the maximum PM<sub>10</sub> ambient concentration in Sacramento MSA is 70% of the NAAQS. Therefore, existing monitors meet the monitoring requirements in 40 CFR 58, Appendix D, as well as the needs of communities in local air districts. The District is committed to working with U.S. EPA, CARB, and other local air districts to ensure that monitoring levels continue to protect public health and safety.

**Table 3-2 2018 Sacramento MSA Design Value and Monitoring Site Requirement, Part 2**

Pollutant	Type (if applicable)	Number of SLAMS sites required	Active SLAMS sites in Sacramento MSA	Active SLAMS sites in Sacramento County	Additional SLAMS sites Needed	Notes
NO <sub>2</sub>	Near-road	1	1	1	0	Highest AADT: 260,000 (U.S. Highway 50 east of 15/16 <sup>th</sup> Street) <sup>(A)(B)</sup>
	Area-wide	1	6	4	0	NO <sub>2</sub> monitor at Sacramento-Del Paso Manor (06-067-0006) serves as both PAMS and area-wide monitor
SO <sub>2</sub>		1	1	1	0	Total SO <sub>2</sub> : 4,213 tons <sup>(C)</sup> Population Weighted Emission Index: 9,795 million persons-tons per year <sup>(D)</sup> Monitor at Sacramento-Del Paso Manor satisfy NCore requirement
CO	Near-road	1	1	1	0	Monitor at Sacramento-Bercut Dr. satisfy the near-road monitoring requirement
	Non-near-road	1	1	1	0	Trace monitor at Sacramento-Del Paso satisfy the NCore requirement, which also satisfy the monitor requirement in the CO Maintenance Plan
Pb	NCore	0 <sup>(E)</sup>	1	1	0	Located at Sacramento-Del Paso Manor
	Source oriented	0	0	0	0	Number of non-airport source > 0.5 tons per year: 0 <sup>(C)</sup> Number of airport source >= 1.0 tons per year: 0 <sup>(C)</sup>

<sup>(A)</sup> California Department of Transportation, 2016 Traffic Volumes, accessed 1 Jul 2019 (2017 data became inaccessible due to website "updates for digital accessibility")

<sup>(B)</sup> Sacramento MSA has surpassed the 250,000 threshold for a second near-road monitoring site per 40 CFR Part 58 Appendix D, 4.3.2(a); the District is working with U.S. EPA and CARB to determine the appropriate timing and location for a second near-road monitoring site

<sup>(C)</sup> Source: 2014 National Emission Inventory, accessed 24 Apr. 2018

<sup>(D)</sup> Per 40 CFR Part 58, Appendix D,  $PWEI = \frac{Total\ SO_2 \times MSA\ population}{1,000,000}$

<sup>(E)</sup> Revisions to Ambient Monitoring Quality Assurance and Other Requirements promulgated on April 27, 2016, revokes the lead monitoring requirement at NCore sites

The District also meets the current minimum PAMS monitoring requirements. PAMS monitoring is required for the Sacramento MSA because the region is designated as a nonattainment area for the federal ozone standard. The PAMS network is operated in accordance with the California Alternative Plan III (CAP III), which is provided in Appendix D. The 2015 review of National Ambient Air Quality Standards for Ozone (80 FR 65292) requires the State to draft an Enhanced Monitoring Plan (EMP) for enhanced ozone monitoring activities. The District will work with CARB to evaluate the current PAMS operations in the EMP.

Currently, the District operates three PAMS sites: one Type I, one Type II, and one Type III sites. The site requirements and definitions can be found in 40 CFR Part 58, Appendix D. Tables 3-3 and 3-4 list the instruments operating at each PAMS site and the current number of monitors required.

**Table 3-3 PAMS Minimum Monitoring Requirement, Table 1**

	PAMS Site Type	O <sub>3</sub>	CO	NO <sub>2</sub>	NO <sub>y</sub>	VOC	Carbonyl	Surface Meteorology	Upper Air Meteorology
Elk Grove-Bruceville Rd.	I	✓		✓				✓	✓
Sacramento-Del Paso Manor	II	✓	✓	✓	✓ <sup>(A)</sup>	✓	✓	✓	
Folsom-Natoma St.	III	✓		✓	✓	✓		✓	
Number of monitors required		3 <sup>(B)</sup>	1	2	1	2	1	3 <sup>(B)</sup>	1
Number of monitors active		3	1	3	1	2	1	3	1

<sup>(A)</sup> Per 40 CFR Part 58, Appendix D, this monitor does not count toward PAMS requirement but is required for NCore; reactive oxides of nitrogen (NO<sub>y</sub>) for PAMS must be at Type I or III site. This requirement is fulfilled by the Folsom-Natoma St. site

<sup>(B)</sup> This requirement is dependent on the number of PAMS sites; see 40 CFR Part 58, Appendix D

All instruments operated by the District meet the operating schedule requirements as specified in 40 CFR Part 58.12. All continuous monitors report hourly data and monitor air pollutant year-round, unless otherwise specified in Appendix A. Non-continuous monitors are operated by following the sampling schedule in Table 3-4 and are operated year-round, except: Speciated volatile organic compound (VOC) and carbonyl samplers related to PAMS that are operated from July through September.

**Table 3-4 Sampling Schedule for PM, Pb, and VOC Monitors in Sacramento County**

Pollutant	Site	Sampling Schedule	Note
PM <sub>10</sub> <sup>(A)</sup>	Sacramento-Branch Center #2	1 in 6 days	(1) Max. 24-hr concentration: 200 µg/m <sup>3</sup> ; ratio to standard: 1.33 (2) Max. 24-hr concentration: 148 µg/m <sup>3</sup> ; ratio to standard: 0.98
PM <sub>10</sub> <sup>(A)</sup>	Sacramento-Del Paso Manor	1 in 6 days	(1) Max. 24-hr concentration: 212 µg/m <sup>3</sup> ; ratio to standard: 1.41 (2) Max. 24-hr concentration: 42 µg/m <sup>3</sup> ; ratio to standard: 0.28
PM <sub>10</sub> <sup>(A)</sup>	North Highlands-Blackfoot Way	1 in 6 days	(1) Max. 24-hr concentration: 222 µg/m <sup>3</sup> ; ratio to standard: 1.48 (2) Max. 24-hr concentration: 50 µg/m <sup>3</sup> ; ratio to standard: 0.33
PM <sub>10</sub> <sup>(A)</sup>	Sacramento-T Street	Continuous Monitor	
PM <sub>2.5</sub> <sup>(B)</sup> (C)	Sacramento-Bercut Dr.	1 in 3 days	
PM <sub>2.5</sub> <sup>(B)</sup> (C)	Elk Grove-Bruceville	Continuous Monitor	Non-FEM
PM <sub>2.5</sub> <sup>(B)</sup> (C)	Sacramento-Del Paso Manor	Daily	
PM <sub>2.5</sub> <sup>(B)</sup> (C)	Folsom-Natoma St.	Continuous Monitor	
PM <sub>2.5</sub> <sup>(B)</sup> (C)	Sloughhouse	Continuous Monitor	Special purpose monitor
PM <sub>2.5</sub> <sup>(B)</sup> (C)	Sacramento-T Street	Continuous Monitor	Special purpose monitor
PM <sub>10-2.5</sub> <sup>(D)</sup>	Sacramento-Del Paso Manor	1 in 3 days	
Pb	Sacramento-Del Paso Manor	1 in 6 days	
PAMS	Elk Grove-Bruceville	N/A	Episodic sampling only between Jul-Sep
PAMS	Sacramento-Del Paso Manor	1 in 3 days	Jul-Sep
PAMS	Folsom-Natoma St.	1 in 3 days	Jul-Sep

(A) Per 40 CFR Part 58.12(e), PM<sub>10</sub> (non-continuous) operates on a minimum of 1 in 6 days sampling schedule. More frequent sampling may be required if ratio to the 24-hr PM<sub>10</sub> NAAQS (standard) exceeds 0.8

(B) Per 40 CFR Part 58.12(d)(1)(iii), "required SLAMS stations whose measurements determine the 24-hour design value for their area and whose data are within ±5 percent of the level of the 24-hour PM<sub>2.5</sub> NAAQS must have an FRM or FEM operate on a daily schedule if that area's design value for the annual NAAQS is less than the level of the annual PM<sub>2.5</sub> standard."

(C) Per 40 CFR Part 58.12 (d)(1)(i), "manual PM<sub>2.5</sub> samplers at required SLAMS stations without a collocated continuously operating PM<sub>2.5</sub> monitor must operate on at least a 1-in-3 day schedule unless a waiver for an alternative schedule has been approved per paragraph (d)(1)(ii) of this section.

(D) Per 40 CFR Part 58.12(f)(1), "manual PM<sub>10-2.5</sub> samplers at NCore stations must operate on at least a 1 in 3 days schedule at sites without a collocated continuously operating federal equivalent PM<sub>10-2.5</sub> method."

Source: Design values from U.S. EPA Air Quality System Design Value Report (AMP 480), accessed on 2 May 2018, and Raw Data Report (AMP350) on Pb (85129), accessed on 1 Jul 2019

## Section 4 Recent and Proposed Modifications to the Network

This section discusses recent and proposed modifications to the Sacramento County air monitoring network. It includes modifications that occurred within the 2018 calendar year and may occur within the next 18 months following this annual network plan submittal. Unless specifically noted below with approval received from CARB and U.S. EPA, Sac Metro Air District is not formally requesting approval for modification through this network plan. Prior to a network modification, the District will work with the CARB to submit to U.S. EPA the required documentation for official review and approval of proposed system modifications. Sac Metro Air District is a part of the CARB's primary quality assurance organization and works with CARB to ensure air monitoring requirements are met.

### **Sacramento-Bercut Dr.**

No change anticipated.

### **Sacramento-Branch Center #2**

The District is evaluating replacing the PM10 filter based method to a PM10 continuous monitoring at this site. PM10 continuous monitoring provides a real-time air quality information to the public.

### **Elk Grove-Bruceville Rd.**

The District is considering discontinuing the speciated VOC episodic measurements at this site. Speciated VOC concentrations collected at this site are low, indicative of robust representations of background concentrations. Speciated VOC measurements at this site are not specifically required by 40 CFR Part 58, Appendix D, but are included as a measurement in Sacramento's portion of the California Alternative Plan<sup>5</sup>. As mentioned in Section 3, the District will evaluate with CARB the necessity of this site in the EMP, which is a PAMS requirement in 40 CFR Part 58, Appendix D. As of spring 2019, U.S. EPA is proposing to delay the PAMS implementation requirement.

The District is planning to upgrade the old Elk Grove-Bruceville PM<sub>2.5</sub> beta attenuation monitor (BAM) monitor to a newer version in Spring 2020. The parameter code for PM<sub>2.5</sub> will be changed accordingly based on the AQS coding manual.

The District anticipates installing a sonic detecting and ranging (SODAR) instrument to determine upper air wind speed when resources become available.

### **Sacramento-Del Paso Manor**

In Revisions to Ambient Monitoring Quality Assurance and Other Requirements promulgated on March 28, 2016 (81 FR 17248), U.S. EPA removed the lead monitoring requirement at urban NCore sites, provided that the sampler has collected sufficient data to calculate a design value. Sacramento-Del Paso is an NCore site, and the lead sampler at this site meets the condition to discontinue. The District is evaluating the discontinuation of this lead sampler.

Sacramento-Del Paso Manor was established in the 1970s with a small number of monitoring equipment. The number of equipment has steadily increased due to PAMS and NCore requirements, and the station cannot accommodate any more equipment. Renovation and site expansion are expected in 2020 and will allow the station to accommodate additional equipment required by PAMS requirements in 40 CFR Part 58, Appendix D. After the station expansion project is completed, the District will replace the existing PAMS VOC canister sampling with a continuous auto gas chromatography (Auto-GC) instrument. An ultraviolet radiation sensor, precipitation gauge, and barometric pressure sensor will also be installed per PAMS requirement.

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<sup>5</sup> A copy is provided in Appendix D.

The District is evaluating replacing the PM10 filter based method to a PM10 continuous monitoring at this site. PM10 continuous monitoring provides a real-time air quality information to the public.

### **Folsom-Natoma St**

The District started work to replace the air monitoring shelter and has worked with CARB and U.S. EPA to minimize the loss of ozone data during construction. The District submitted a temporary request for shutdown for this site on July 3, 2019. On July 19, 2019, the District received notice from the U.S. EPA to move forward with the scheduled temporary shutdown of the Sacramento-Folsom Air Monitoring Site (AMS).<sup>6</sup> On July 23, 2019, the District temporarily suspended monitoring for ozone, nitrogen dioxide, non-methane hydrocarbon, reactive oxides of nitrogen, PM<sub>2.5</sub>, speciated volatile organic compound, outdoor temperature, relative humidity, solar radiation, wind direction, and wind speed during construction, which is expected to be completed by the end of 2019. U.S. EPA will approve the temporary request for shut down submitted on July 3, 2019 as part of this annual network plan.

As mentioned in Section 3, the District will evaluate with CARB, the necessity of PAMS operation at this site in the EMP, which is a PAMS requirement in 40 CFR Part 58, Appendix D. The District is considering discontinuing the speciated VOC measurements at this site since it no longer a requirement per 80 FR 65292. The U.S. EPA published a proposed rule on May 31, 2019 to delay the PAMS requirement until June 1, 2021 to give the state two additional years to acquire necessary equipment and expertise to successfully make the required PAMS measurements by the start of 2021 PAMS season.

### **North Highlands-Blackfoot Way**

The District has been negotiating a lease with the new property manager at North Highlands-Blackfoot Way. If an agreement is not reached, the District will evaluate its options to relocate or discontinue the monitoring station. Additionally, the District will submit a letter to the EPA for the discontinuation of the CO monitor in Spring 2020.

The District is evaluating replacing the PM10 filter based method to a PM10 continuous monitoring at this site. PM10 continuous monitoring provides a real-time air quality information to the public.

### **Sloughhouse-Sloughhouse Rd.**

No change anticipated.

### **Near-road site #2**

40 CFR Part 58 requires state or local air monitoring organization to operate a second near-road monitoring site if any traffic count in the metropolitan area surpasses 250,000 in annual average daily traffic. Sacramento MSA has surpassed the threshold and triggered the requirement. The location of the exceedance is on U.S. Highway 50 east of 15<sup>th</sup>/16<sup>th</sup> Street. The District is working with U.S. EPA and CARB to determine the appropriate timing, location, and funding for a second near-road monitoring site.

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<sup>6</sup> Refer to Appendix E and F for email correspondence from U.S. EPA Region 9 to move forward to move forward with the Folsom Construction Project.



## **Section 5            Quality Assurance Requirement and Other Monitoring Requirement for the PQA0**

40 CFR Part 58, Appendix A, requires monitoring activities to satisfy quality assurance criteria. Most of these activities are required and met on a primary quality assurance organization (PQA0) level. Sac Metro Air District is a part of the CARB's PQA0 and works with the PQA0 to meet the quality assurance requirements. Currently, there are collocated PM<sub>2.5</sub> FRM and PM<sub>10</sub> FRM monitors at Sacramento-Del Paso Manor. There is a collocated PM<sub>2.5</sub> FEM monitor at Folsom-Natoma St. For the aforementioned collocated monitors, the primary monitor and audit monitor use the same U.S. EPA FRM/FEM method designation.

The District operates a Pb-PM<sub>10</sub> at its Sacramento-Del Paso Manor NCore site. However, it does not have any Pb-PM<sub>10</sub> collocated monitor as required by 40 CFR Part 58. As mentioned in Section 4, Recent and Proposed Modification to the Network, the District does not currently have any space at Sacramento-Del Paso Manor to operate a collocation monitor. In addition, the District is evaluating whether it will continue to operate the Pb monitor. If the District continues to operate this monitor, the District will consider installing a collocation monitor after the station has been renovated to a larger footprint and ensure that the monitor meets Pb-PM<sub>10</sub> collocation requirements. For complete details on PM and Pb collocation, please refer to the latest edition of Annual Monitoring Network Report published by CARB<sup>7</sup>.

40 CFR Part 58, Appendix D, 4.7.3, requires "each State shall install and operate at least one PM<sub>2.5</sub> site to monitor for regional background and at least one PM<sub>2.5</sub> site to monitor regional transport." In CARB's 2018 Annual Monitoring Network Report<sup>6</sup>, it identified Point Reyes National Seashore and San Rafael Wilderness sites as the state's regional background sites and Vallejo as the regional transport site for PM<sub>2.5</sub>. Please refer to the CARB's 2018 Annual Monitoring Network Report for updates or more information.

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<sup>7</sup> <https://www.arb.ca.gov/aqd/amnr/amnr.htm>

## **Section 6            Process to Review Changes to PM<sub>2.5</sub> Monitoring Network**

40 CFR Part 58.10(c) requires this annual network plan to “provide for the review of changes to a PM<sub>2.5</sub> monitoring network that impact the location of a violating PM<sub>2.5</sub> monitor.” There is no current plan to relocate or discontinue any PM<sub>2.5</sub> monitor suitable for NAAQS comparison. Any changes to the PM<sub>2.5</sub> monitoring network with impact to the location of a violating PM<sub>2.5</sub> monitor will be documented in this section of future annual network plans.

## **Section 7            Data Submission Requirements**

CARB submitted precision, accuracy, and raw data for all District operated monitors for and before 2017. Starting in 2018, Sac Metro Air District submitted its air monitoring data directly to AQS after conducting its data validation process. The quarterly data submittal process also includes Quality Assurance (QA) data required by 40 CFR Part 58. In an agreement with CARB, Sac Metro Air District will also certify all Sac Metro Air District generated data. Since CARB continues weighing and analyzing the PM<sub>2.5</sub> FRM filters for Sac Metro Air District, CARB will continue to submit and certify that data. CARB will also submit and certify the PM coarse data. Copies of the annual data certification provided to U.S. EPA are provided in Appendix C.

- 2018 Annual data certification submitted: April 25, 2019
- 2018 Annual data certification (PM<sub>2.5</sub> FRM and PM Coarse only) submitted: April 25, 2019

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## Appendix A Detailed Site and Monitor information

Detailed site information covered in this appendix reflects air monitoring operation from January 1, 2018-December 31, 2018.

### A.1 Sacramento-Bercut Dr.

This is an approved near-road monitoring site. Located one mile from Downtown Sacramento, this site is expected to measure the highest NO<sub>2</sub> concentration due to the emissions from mobile sources on Interstate 5, which is about 20 meters (m) from the site. The site started operation on October 13, 2015.

**Table A-1 Sacramento-Bercut Dr. Metadata**

Site Name	Sacramento-Bercut
AQS Site No.	06-067-0015
Geographic Coordinates	38.593328°N, 121.503728°W
Location	On the downwind side of Interstate 5, one mile north-northwest of downtown Sacramento.
Address	100 Bercut Dr., Sacramento, CA
County	Sacramento
Distance from roadway	Interstate 5: 20 m Bercut Dr.: 5 m
Annual Average Daily Traffic (Vehicles/Day)	Interstate 5: 202,000 (California Department of Transportation, 2017) Bercut Dr. south of Richards Blvd.: 2,709 (City of Sacramento, 2012)
Ground Cover	Pavement, with vegetation
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

**Figure A-1 Panoramic view toward north from air monitoring station roof**



**Figure A-2 Panoramic view toward east from air monitoring station roof**



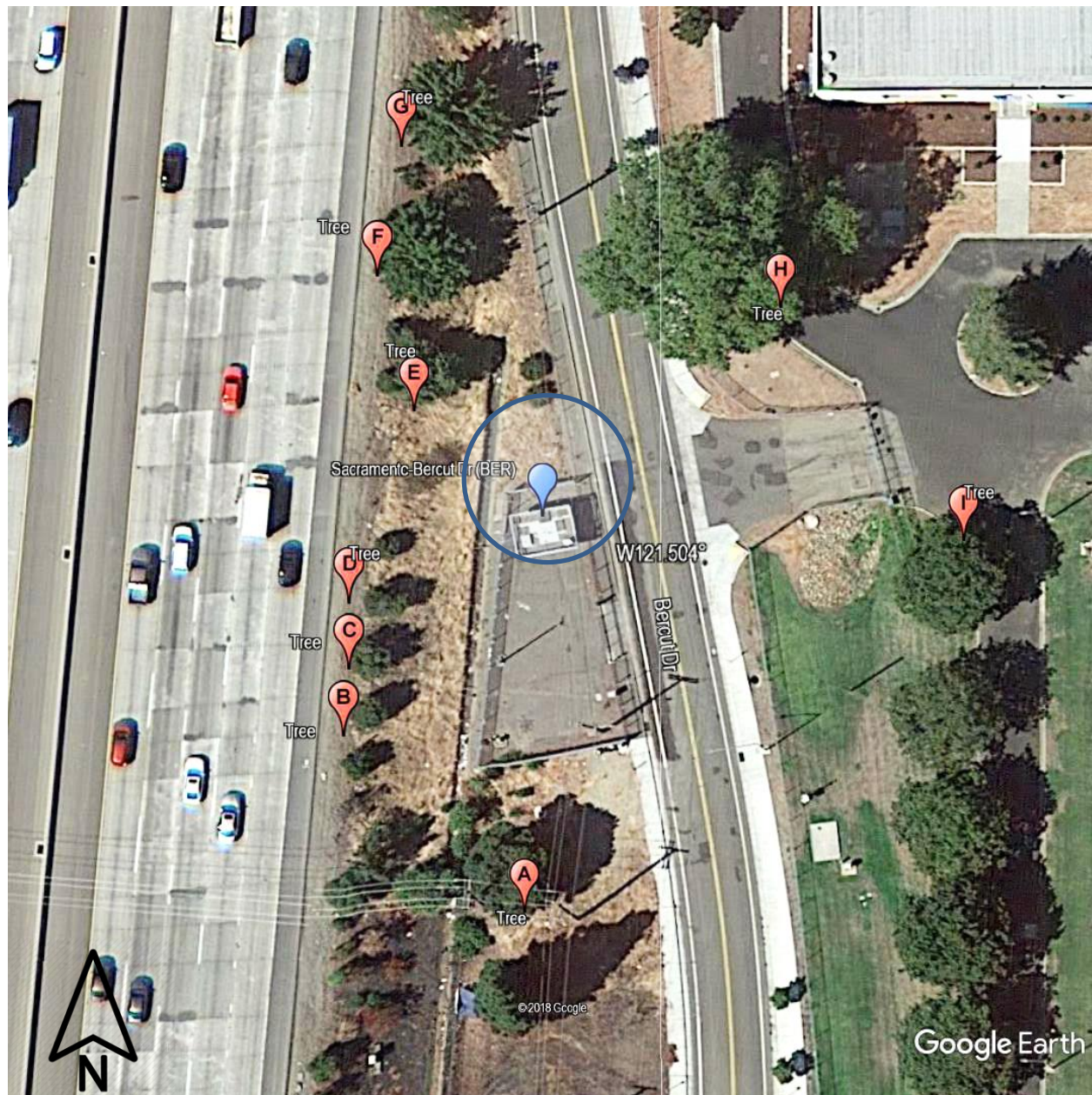
**Figure A-3 Panoramic view toward south from air monitoring station roof**



**Figure A-4 Panoramic view toward west from air monitoring station roof**



Figure A-5 Google Earth satellite image of Sacramento-Bercut Dr.



Source: Google Earth, imagery date: 8/16/18

The circle in figure A-5 indicates there are no trees within a 10 m radius, which satisfy the siting criterion that requires drip lines of trees to be at least 10 m away from probes and inlets (40 CFR Part 58, Appendix E). Also, heights of potential flow obstacles were calculated on-site with trigonometry on 6/3/19 and are provided in Tables A-2 thru A-4. With the exception of tree “H,” each inlet and sampler have 360° of unrestricted airflow. Tree H is an old growth heritage tree, as defined by Chapter 12.64 of Sacramento City Code (SCC). It is protected by SCC from removal or significant pruning. Since the tree is directly downwind of the emission source, it has limited scavenging effect and does not interfere with the emission source being monitored. Before the air monitoring site was established, U.S. EPA staff had approved for this tree to remain in place<sup>8</sup>.

<sup>8</sup> Per email correspondence with Elfego Felix, U.S. EPA Region 9, on August 6, 2013

**Table A-2 Distance between Object and Inlet or Probe at Sacramento-Bercut Dr.  
All units in meter**

	Gaseous Probe	PM <sub>2.5</sub> Inlet
Object A (Tree)	36.58	32.00
Object B (Tree)	24.69	25.60
Object C (Tree)	21.95	22.86
Object D (Tree)	18.29	20.12
Object E (Tree)	15.54	20.12
Object F (Tree)	18.29	22.86
Object G (Tree)	25.60	30.18
Object H (Tree)	34.75	34.75
Object I (Tree)	41.15	39.32

**Table A-3 Object Protrusion above Inlet or Probe at Sacramento-Bercut Dr.  
All units in meter**

	Gaseous Probe	PM <sub>2.5</sub> Inlet
Object A (Tree)	7.9	8.1
Object B (Tree)	1.31	1.41
Object C (Tree)	1.46	1.6
Object D (Tree)	0.94	0.73
Object E (Tree)	4.05	3.82
Object F (Tree)	5.82	6.11
Object G (Tree)	8.20	8.16
Object H (Tree)	19.5	19.6
Object I (Tree)	7.6	7.29

	Gaseous Probe	PM <sub>2.5</sub> Inlet
Object A (Tree)	4.6	4.0
Object B (Tree)	18.8	18.2
Object C (Tree)	15.0	14.3
Object D (Tree)	19.5	27.6
Object E (Tree)	3.8	5.3
Object F (Tree)	3.1	3.7
Object G (Tree)	3.1	3.7
Object H (Tree)	1.8 <sup>(A)</sup>	1.8 <sup>(A)</sup>
Object I (Tree)	5.4	5.4

<sup>(A)</sup> See discussion on page 23



Site	Sacramento-Bercut Dr	Sacramento-Bercut Dr
Start Date	10/13/2015	10/13/2015
Collecting Agency	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air District
Reporting Agency	Sac Metro Air District	Sac Metro Air District
Pollutant	NO2	CO
Parameter Code	42602	42101
Parameter Occurrence Code	1	1
Manufacturer and model	TAPI200UP	TAPI 300U
Sampling Method	Instrumental	Instrumental
Method Code	200	593
Analysis Method	Photolytic-Chemiluminescence	Gas Filter Correlation
FRM/FEM/ARM/Other	FEM	FRM
Monitoring objective	NAAQS comparison, public info, research	NAAQS comparison, public info, research
Statement of Purpose	Monitors near road emission at region's highest fleet equivalent AADT roadway	Monitors near road emission at region's highest fleet equivalent AADT roadway
Monitor type	SLAMS	SLAMS
Affiliation	Near Road	Near Road
Site type	Source Oriented	Source Oriented
Spatial scale	Microscale	Microscale
Sampling Frequency	Continuous	Continuous
Sampling season	Year Round	Year Round
Distance from supporting structure or rooftop (m)	1.8	1.8
Distance from flow obstructions on roof (m)	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	34.8	34.8
Distance from nearest tree drip line (m)	11	11.9
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable
Distance with nearest PM monitor (m)	4.6 m (lo vol)	4.6 m (lo vol)
Unrestricted airflow (deg)	336	336
Probe height (m, gal)	4.6	4.6
Probe material	Teflon	Teflon
Residence time (seconds)	17.9	18.6
Changes in next 18 months?	No	No
Frequency of one-point quality control check	Every other day	Every other day
Last Performance Evaluation	5/25/2018	5/25/2018

Site	Sacramento-Bercut Dr	
Start Date	10/30/2015	11/1/2016
Collecting Agency	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	CARB
Reporting Agency	Sac Metro Air District	CARB
Pollutant	Black Carbon	PM2.5
Parameter Code	84313	88101
Parameter Occurrence Code	1	1
Manufacturer and model	Magee Scientific M633	R & P 2025
Sampling Method	Aethalometer	Low volume with VSCC
Method Code	894	145
Analysis Method	Optical Absorption	Gravimetric
FRM/FEM/ARM/Other	Other	FRM
Monitoring objective	Public info, research	NAAQS comparison, public info, research
Statement of Purpose	Determines component of PM emission at region's highest fleet equivalent AADT roadway	Monitors near road emission at region's highest fleet equivalent AADT roadway
Monitor type	SLAMS	SLAMS
Affiliation	Near Road	Near Road
Site type	Source Oriented	Source Oriented
Spatial scale	Not applicable	Micro
Sampling Frequency	Continuous	1 in 3 days
Sampling season	Year Round	Year Round
Distance from supporting structure or rooftop (m)	1.8	2.2
Distance from flow obstructions on roof (m)	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	34.8	34.8
Distance from nearest tree drip line (m)	12	16
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable
Distance with nearest PM monitor (m)	Not applicable	No other PM monitors
Unrestricted airflow (deg)	336	336
Probe height (m, agl)	4.6	5.0
Probe material	Aluminum	Aluminum
Residence time (seconds)	Not applicable	Not applicable
Changes in next 18 months?	No	No
Frequency of one-point quality control check	Monthly	Monthly
Last Performance Evaluation	Not applicable	5/25/2018, 11/5/2018

Site	Sacramento-Bercut Dr		
Start Date	10/30/2015	10/30/2015	10/30/2015
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Reporting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Pollutant	Outdoor Temperature	Wind Direction	Wind Speed
Parameter Code	62101	61104	61103
Parameter Occurrence Code	1	1	1
Manufacturer and model	Climatronics 100093	Climatronics F-460	Climatronics F-460
Sampling Method	Instrumental	Instrumental	Instrumental
Method Code	042	020	020
Analysis Method	Machine Average	Vector Summation	Vector Summation
FRM/FEM/ARM/Other	Other	Other	Other
Monitoring objective	Public info, research	Public info, research	Public info, research
Statement of Purpose	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology
Monitor type	Other	Other	Other
Affiliation	Near Road	Near Road	Near Road
Site type	Not applicable	Not applicable	Not applicable
Spatial scale	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	No supporting structure	No supporting structure	No supporting structure
Distance from flow obstructions on roof (m)	Not applicable	Not applicable	Not applicable
Distance from flow obstructions not on roof (m)	Not applicable	Not applicable	Not applicable
Distance from nearest tree drip line (m)	Not applicable	Not applicable	Not applicable
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	336	336	336
Probe height (m, agl)	10.0	10.0	10.0
Probe material	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No
Frequency of one-point quality control check	Not applicable	Not applicable	Not applicable
Last Performance Evaluation	5/25/18	5/25/18	5/25/18

## A.2 Sacramento-Branch Center #2

Sacramento-Branch Center #2 is a PM<sub>10</sub> monitoring site. This site was established in 2006 to replace the former Sacramento-Branch Center site, which was approximately one-quarter mile to the north. The site was moved because nearby trees at the previous location obstructed the airflow, and the former monitoring site did not meet siting requirements.

The objective of this site is to measure the representative PM<sub>10</sub> concentration, as documented in the original site initiation reports filed in the late 1980s.

**Table A-4 Sacramento-Branch Center #2 Metadata**

Site Name	Sacramento-Branch Center #2
AQS Site No.	06-067-0284
Geographic Coordinates	38.551290°N, 121.336590°W
Location	Rooftop of building in the middle of County Maintenance Yard, located 10 miles east-southeast of downtown Sacramento.
Address	3847 Branch Center Road, Sacramento, CA 95827
County	Sacramento
Distance from roadway	62 m
Annual Average Daily Traffic (Vehicles/Day)	Bradshaw Rd South of Old Placerville Rd.: 42,381 (SACDOT, 7/13/2017)
Ground Cover	Paved
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

**Figure A-6 Panoramic view toward north from air monitoring station roof**



**Figure A-7 Panoramic view toward east from air monitoring station roof**

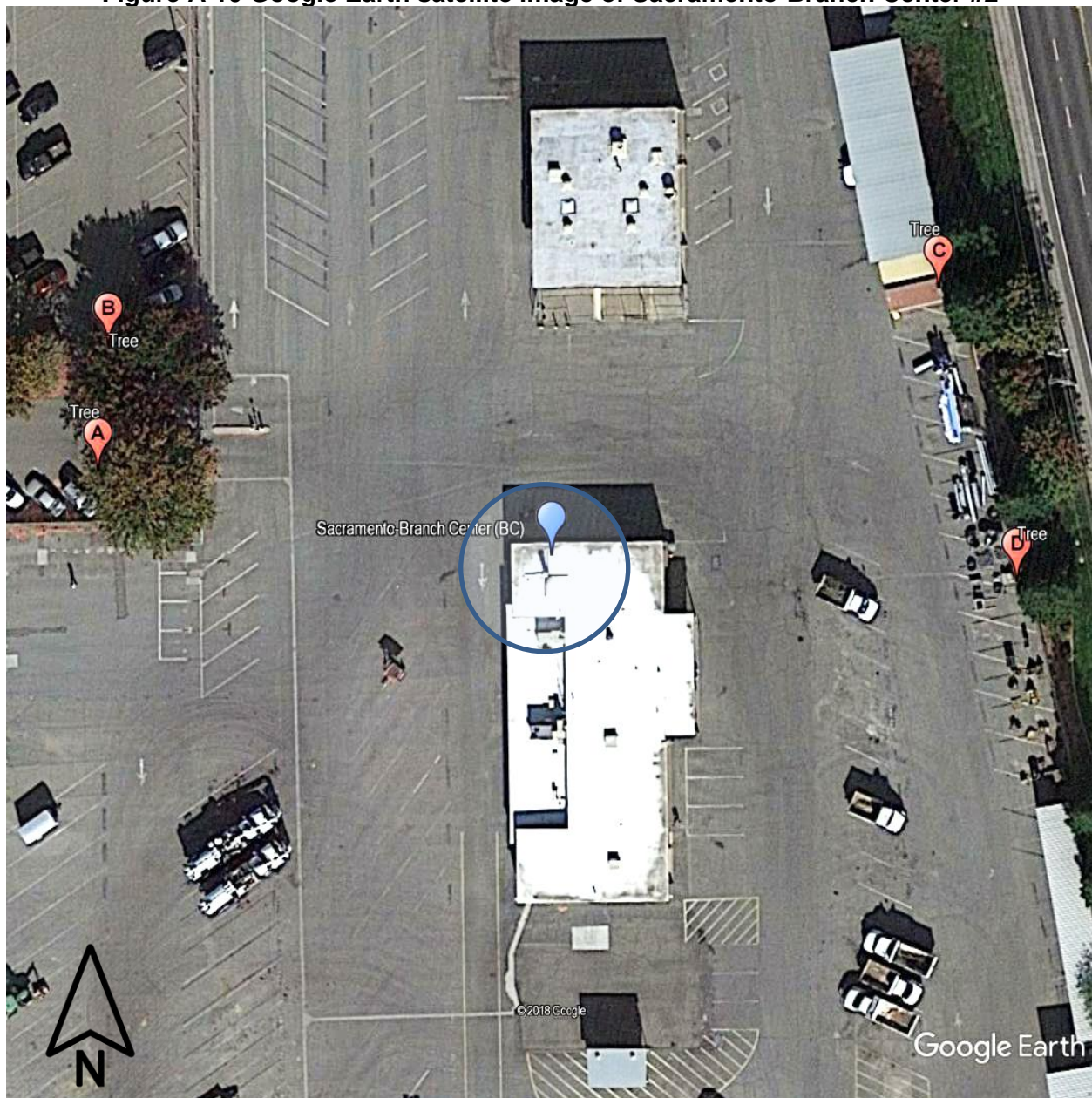


**Figure A-8 Panoramic view toward south from air monitoring station roof**



**Figure A-9 Panoramic view toward west from air monitoring station roof**



**Figure A-10 Google Earth satellite image of Sacramento-Branch Center #2**

Source: Google Earth, imagery date: 10/31/18

The circle in Figure A-10 indicates no trees exist within a 10 m radius, which satisfy a siting criterion that requires drip lines of trees to be at least 10 m away from probes and inlets (40 CFR Part 58, Appendix E). Also, heights of the trees were calculated on-site with trigonometry on 6/16/19. Object C and D marks the tallest tree northeast and southeast of the station, respectively. Analyses in Tables A-5 thru A-7 show the objects identified above do not restrict air flow to the roof top inlets and samplers. Therefore, each inlet and sampler have 360° of unrestricted airflow.

**Table A-5 Distance between Object and Inlet or Probe at Sacramento-Branch Center #2**  
**All units in meter**

	PM <sub>10</sub> Inlet
Object A (Tree)	37.0
Object B (Tree)	41.0
Object C (Tree)	50.0
Object D (Tree)	50.0

**Table A-6 Object Protrusion above Inlet or Probe at Sacramento-Branch Center #2**  
**All units in meter**

	PM <sub>10</sub> Inlet
Object A (Tree)	6.7
Object B (Tree)	2.5
Object C (Tree)	13.0
Object D (Tree)	7.8

**Table A-7 Distance vs. Protrusion Ratio at Sacramento-Branch Center #2**  
**(must be  $\geq 2$ )<sup>9</sup>**

	PM <sub>10</sub> Inlet
Object A (Tree)	5.5
Object B (Tree)	16.4
Object C (Tree)	3.8
Object D (Tree)	6.4

<sup>9</sup> Per Appendix E to 40 CFR Part 58, "the distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path."

Site	Sacramento-Branch Center
Start Date	4/1/2006
Collecting Agency	Sac Metro Air District
Analytical Lab	Sac Metro Air District
Reporting Agency	Sac Metro Air District
Pollutant	PM10
Parameter Code	81102
Parameter Occurrence Code	1
Manufacturer and model	Sierra Anderson 1200
Sampling Method	Hi Volume
Method Code	063
Analysis Method	Gravimetric
FRM/FEM/ARM/Other	FRM
Monitoring objective	NAAQS comparison, public info
Statement of Purpose	Measures PM10 concentration
Monitor type	SLAMS
Affiliation	None
Site type	Highest concentration
Spatial scale	Neighborhood
Sampling Frequency	1 in 6 days
Sampling season	Year Round
Distance from supporting structure or rooftop (m)	2.0
Distance from flow obstructions on roof (m)	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions
Distance from nearest tree drip line (m)	36.6
Distance to furnace or incinerator flue (m)	No furnace/flue
Distance between collocated PM monitors (m)	Not collocated
Distance with nearest PM monitor (m)	No other PM monitors
Unrestricted airflow (deg)	360
Probe height (m, agl)	6.5
Probe material	Not applicable
Residence time (seconds)	Not applicable
Changes in next 18 months?	No
Frequency of flow rate verification	Monthly
Last Performance Evaluation	5/21/2018, 11/5/2018



### A.3 Elk Grove-Bruceville

Bruceville air monitoring site is located in a rural area 4 miles south of Elk Grove, CA, and 20 miles south of Downtown Sacramento. It was initiated in 1992 to replace the former Sacramento-Meadowview Road O<sub>3</sub> monitoring site.

This site is the upwind O<sub>3</sub> and ozone precursor monitoring site for the Sac Metro Air District's network, also known as a PAMS Type I site. Adjacent to the air monitoring site is the Franklin Field radar wind profiler (RWP) and radio acoustic sounding system (RASS). These instruments measure wind and temperature in the upper meteorological levels and are operated year-round. Collection of upper air meteorology data is a requirement for the PAMS program. Because the RWP and RASS instruments malfunctioned in October 2016, the District installed a ceilometer at Elk Grove-Bruceville in January 2018 after receiving approval from U.S. EPA.

**Table A-8 Elk Grove-Bruceville Metadata**

Site Name	Elk Grove-Bruceville
AQS Site No.	06-067-0011
Geographic Coordinates	38.302560°N, 121.420830°W
Location	Rural area located 4 miles south of Elk Grove, CA.
Address	12490 Bruceville Rd, Elk Grove, CA 95758
County	Sacramento
Distance from roadway	76 m
Annual Average Daily Traffic (Vehicles/Day)	Bruceville Rd south of Lambert Rd.: 2,340 (SACDOT, 9/21/2017)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

**Figure A-11 Panoramic view toward north from air monitoring station roof**



**Figure A-12 Panoramic view toward east from air monitoring station roof**



**Figure A-13 Panoramic view toward south from air monitoring station roof**



**Figure A-14 Panoramic view toward west from air monitoring station roof**



**Figure A-15 Google Earth satellite image of Elk Grove-Bruceville**

Source: Google Earth, imagery date: 10/31/18

The circle in Figure A-15 indicates no trees exist within a 10 m radius, which satisfy the siting criterion that requires drip lines of trees to be at least 10 m away from probes and inlets (40 CFR Part 58, Appendix E). Also, heights of the trees were calculated on-site with trigonometry on 6/17/19. Analyses in Tables A-9 thru A-11 show the objects identified above do not restrict air flow to the roof top inlets and samplers. Therefore, each inlet and sampler have 360° of unrestricted airflow.

**Table A-9 Distance between Object and Inlet or Probe at Elk Grove-Bruceville**  
**All units in meter**

	Gaseous Probe	VOC Probe	PM <sub>2.5</sub> Inlet
Object A (Tree)	24.0	24.0	24.0
Object B (Tree)	38.0	38.0	38.0
Object C (Tree)	47.0	47.0	47.0
Object D (Building)	36.0	36.0	36.0

**Table A-10 Object Protrusion above Inlet or Probe at Elk Grove-Bruceville**  
**All units in meter**

	Gaseous Probe	VOC Probe	PM <sub>2.5</sub> Inlet
Object A (Tree)	-0.25	-0.7	-1.2
Object B (Tree)	1.8	1.4	0.9
Object C (Tree)	4.8	4.5	4.0
Object D (Building)	-1.2	-1.59	-2.1

Note: negative value indicates inlet or probe is taller than the object; thus, airflow is not obstructed no matter the distance

**Table A-11 Distance vs. Protrusion Ratio at Elk Grove-Bruceville**  
**(must be  $\geq 2$ )<sup>10</sup>**

	Gaseous Probe	VOC Probe	PM <sub>2.5</sub> Inlet
Object A (Tree)	N/A	N/A	N/A
Object B (Tree)	21.1	27.1	42.2
Object C (Tree)	9.8	10.4	11.8
Object D (Building)	N/A	N/A	N/A

Note: N/A indicates inlet or probe is taller than the object and airflow is not obstructed; refer to the note in the previous table

<sup>10</sup> Per Appendix E to 40 CFR 58, “the distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path.”

Site	Elk Grove-Bruceville			
Start Date	7/1/1992	7/1/1992	7/1/1996	6/1/1994
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	AAC Lab
Reporting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Pollutant	O3	NO2	Total NMHC	Speciated VOC
Parameter Code	44201	42602	43102	43102
Parameter Occurrence Code	1	1	1	2
Manufacturer and model	TAPI 400E	TAPI200UP	TEI 55C	Xontech 910A/912
Sampling Method	Instrumental	Instrumental	Instrumental	6L Pressurized Canister
Method Code	087	200	164	177
Analysis Method	Ultraviolet Absorption	Photolytic-Chemiluminescence	Flame Ionization Detector	Dual Flame Ionization Detector
FRM/FEM/ARM/Other	FEM	FEM	Other	Other
Monitoring objective	NAAQS comparison, public info	NAAQS comparison, public info	Public info, research	Research
Statement of Purpose	Measures background O3 concentration at upwind site	Measures background ozone precursor concentration	Measures background ozone precursor concentration	Measures background ozone precursor concentration
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	PAMS (Type I)	PAMS (Type I)	PAMS (Type I)	PAMS (Type I)
Site type	Upwind/Background	Upwind/Background	Upwind/Background	Upwind/Background
Spatial scale	Urban	Urban	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Episodic Sampling
Sampling season	Year Round	Year Round	Year Round	July thru Sep
Distance from supporting structure or rooftop (m)	1.3	1.2	1.2	1.2
Distance from flow obstructions on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	22	22	22	22
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.1 m (lo vol)	1.1 m (lo vol)	1.1 m (lo vol)	1.1 m (lo vol)
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	4.5	4.5	4.5	4.9
Probe material	FEP Teflon	FEP Teflon	FEP Teflon	Stainless Steel
Residence time (seconds)	18.1	16.9	16.9	2.0
Changes in next 18 months?	No	No	No	Yes
Frequency of one-point quality control check	Every other day	Every other day	Every other day	Pre- and post-seasonally check
Last Performance Evaluation	5/22/18	5/22/18	Temporary shutdown <sup>(A)</sup>	Not applicable

<sup>(A)</sup> U.S. EPA Region 9 approved the temporary shut down on 12/1/17

Site	Elk Grove-Bruceville
Start Date	1/30/2003
Collecting Agency	Sac Metro Air District
Analytical Lab	Sac Metro Air District
Reporting Agency	Sac Metro Air District
Pollutant	PM2.5
Parameter Code	88501
Parameter Occurrence Code	3
Manufacturer and model	Met One 1020 BAM
Sampling Method	Very sharp cut cyclone
Method Code	731
Analysis Method	Beta Attenuation
FRM/FEM/ARM/Other	Other
Monitoring objective	Public info <sup>(A)</sup>
Statement of Purpose	Measures background concentration and transport of PM2.5 from San Joaquin Valley for PM2.5 forecasting
Monitor type	SPM
Affiliation	None
Site type	General/Background
Spatial scale	Urban
Sampling Frequency	Continuous
Sampling season	Year Round
Distance from supporting structure or rooftop (m)	2.1
Distance from flow obstructions on roof (m)	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions
Distance from nearest tree drip line (m)	21.0
Distance to furnace or incinerator flue (m)	No furnace/flue
Distance between collocated PM monitors (m)	Not collocated
Distance with nearest PM monitor (m)	Not applicable
Unrestricted airflow (deg)	360
Probe height (m, agl)	5.4
Probe material	Not applicable
Residence time (seconds)	Not applicable
Changes in next 18 months?	No
Frequency of flow rate verification	Bi-monthly
Last Performance Evaluation	5/22/2018, 11/9/2018

<sup>(A)</sup> This PM2.5 monitor is not comparable to NAAQS because it does not meet reference method or equivalent method designation requirements

Site	Elk Grove-Bruceville			
Start Date	8/1/1996	8/1/1996	7/1/1997	8/1/1997
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Reporting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Pollutant	Outdoor Temperature	Relative Humidity	Barometric Pressure	Precipitation
Parameter Code	62101	62201	64101	65102
Parameter Occurrence Code	1	1	1	1
Manufacturer and model	Climatronics 100093	Climatronics 101669	Climatronics 101448	Climatronics 100508
Sampling Method	Instrumental	Instrumental	Instrumental	Bucket
Method Code	042	012	011	011
Analysis Method	Machine Average	Hygroscopic Plastic Film	Aneroid	Continuous or Incremental
FRM/FEM/ARM/Other	Other	Other	Other	Other
Monitoring objective	Public info	Public info	Public info	Public info
Statement of Purpose	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology
Monitor type	Other	Other	Other	Other
Affiliation	PAMS (Type I)	PAMS (Type I)	PAMS (Type I)	PAMS (Type I)
Site type	Not applicable	Not applicable	Not applicable	Not applicable
Spatial scale	Not applicable	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	No supporting structure	No supporting structure	No supporting structure	No supporting structure
Distance from flow obstructions on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	10.0	10.0	10.0	2.3
Probe material	Not applicable	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No
Frequency of one-point quality control check	N/A	N/A	N/A	N/A
Last Performance Evaluation	Temporary shutdown <sup>(A)</sup>	Not applicable	Temporary shutdown <sup>(A)</sup>	Not applicable

<sup>(A)</sup> U.S. EPA Region 9 approved the temporary shut down on 4/15/16

Site	Elk Grove-Bruceville			
Start Date	8/1/1996	8/1/1997	8/1/1996	8/1/1996
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Reporting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Pollutant	Solar Radiation	UV Radiation	Wind Direction	Wind Speed
Parameter Code	63301	63302	61104	61103
Parameter Occurrence Code	1	1	1	1
Manufacturer and model	Climatronics 100848	Climatronics 100TUVR	Climatronics F-460	Climatronics F-460
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	011	011	020	020
Analysis Method	Pyranometer	UV Radiometer (Photometer)	Vector Summation	Vector Summation
FRM/FEM/ARM/Other	Other	Other	Other	Other
Monitoring objective	Public info	Public info	Public info, research	Public info, research
Statement of Purpose	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology
Monitor type	Other	Other	Other	Other
Affiliation	PAMS (Type I)	PAMS (Type I)	PAMS (Type I)	PAMS (Type I)
Site type	Not applicable	Not applicable	Not applicable	Not applicable
Spatial scale	Not applicable	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	No supporting structure	No supporting structure	No supporting structure	No supporting structure
Distance from flow obstructions on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	10.0	10.0	10.0	10.0
Probe material	Not applicable	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No
Frequency of one-point quality control check	N/A	N/A	N/A	N/A
Last Performance Evaluation	Not applicable	Not applicable	Temporary shutdown <sup>(A)</sup>	Temporary shutdown <sup>(A)</sup>

<sup>(A)</sup> U.S. EPA Region 9 approved the temporary shut down on 4/15/16



Site	Elk Grove-Bruceville
Start Date	6/1/1996
Collecting Agency	Sac Metro Air District
Analytical Lab	N/A
Reporting Agency	N/A
Pollutant	Upper Level Wind and Virtual Temperature
Parameter Code	Not applicable
Parameter Occurrence Code	Not applicable
Manufacturer and model	Radian LAP-3000 with RASS option
Sampling Method	Not applicable
Method Code	Not applicable
Analysis Method	915 MHz Radar Wind Profiler, with RASS
FRM/FEM/ARM/Other	Other
Monitoring objective	Public info, research
Statement of Purpose	Measures representative upper level meteorology
Monitor type	Other
Affiliation	PAMS (Type I)
Site type	Not applicable
Spatial scale	Not applicable
Sampling Frequency	Continuous
Sampling season	Year Round
Distance from supporting structure or rooftop (m)	No supporting structure
Distance from flow obstructions on roof (m)	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions
Distance from nearest tree drip line (m)	> 20 m
Distance to furnace or incinerator flue (m)	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable
Distance with nearest PM monitor (m)	Not applicable
Unrestricted airflow (deg)	360
Probe height (m, agl)	Not applicable
Probe material	Not applicable
Residence time (seconds)	Not applicable
Changes in next 18 months?	No
Frequency of one-point quality control check	N/A
Last Performance Evaluation	Malfunctioned <sup>(A)</sup>

<sup>(A)</sup> According to the PAMS Network Operations report submitted to U.S. EPA on 9/15/17 and internal District QC document, the radar wind profiler malfunctioned starting 10/25/16

## A.4 Sacramento-Del Paso Manor

This air monitoring site was initiated in 1979 and eventually became the largest air monitoring site in the Sacramento Valley Air Basin. This site is also one of the largest in Northern California, in terms of number of parameters measured. In October 2009, U.S. EPA Region 9 approved Sacramento-Del Paso Manor as an NCore site. This is one of six NCore sites operating in California. Also, Sacramento-Del Paso Manor is a design value site for PM<sub>2.5</sub>, which means that this site has the highest PM<sub>2.5</sub> design value in the PM<sub>2.5</sub> non-attainment area.

Located just downwind of Downtown Sacramento, Sacramento-Del Paso Manor is a PAMS Type II primary site. It monitors for NMHC year-round and speciated VOC and carbonyl during the summer.

Speciation monitors at this site are part of the Chemical Speciation Network and Speciated Trends Network. A URG3000N sampler was installed in April 2009. The Met One Spiral Aerosol Speciation Sampler has been in service for many years.

**Table A-12 Sacramento-Del Paso Manor Metadata**

Site Name	Sacramento-Del Paso Manor
AQS Site No.	06-067-0006
Geographic Coordinates	38.613740°N, 121.368040°W
Location	Neighborhood park located 7 miles east-northeast of downtown Sacramento.
Address	2701 Avalon Drive, Sacramento, CA 95821
County	Sacramento
Distance from roadway	56 m
Annual Average Daily Traffic (Vehicles/Day)	Avalon Dr. south of Annette St.: 1,000 (estimated, two-lanes suburban local residential road)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

**Figure A-16 Panoramic view toward north from air monitoring station roof**



**Figure A-17 Panoramic view toward east from air monitoring station roof**



**Figure A-18 Panoramic view toward south from air monitoring station roof**



**Figure A-19 Panoramic view toward west from air monitoring station roof**



**Figure A-20 Google Earth satellite image of Sacramento-Del Paso Manor**

Source: Google Earth, imagery date: 10/31/18 before tree removal

The latest satellite photo showed construction activities at Sacramento-Del Paso Manor due to remodeling of a nearby elementary school. On September 13, 2018, a construction contractor began preparing a staging area approximately 30 meters east of the air monitoring site. New buildings for the elementary school will be constructed in the grassy field south of the site. A construction crew had removed four trees (Trees A, B, J, and K) within a 50-meter radius of the monitoring site to facilitate construction activities and these tree removals are not reflected in the Google Earth image above. During the construction period, the District will review its air monitoring data for construction related impact and apply the appropriate information qualifier code to the data. Construction is expected to be completed in Fall 2020.

**Table A-13 Distance between Object and Inlet or Probe at Sacramento-Del Paso Manor**  
All units in meter

	Gaseous Probe	NO <sub>y</sub> Probe	PM <sub>10</sub> Inlet (Primary)	PM <sub>10</sub> Inlet (Collocated)	Black Carbon Inlet	VOC Inlet
Object A (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object B (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object C (Tree)	27.43	22.86	23.00	23.00	25.00	27.43
Object D (Tree)	42.06	35.66	35.66	36.58	39.32	41.15
Object E (Tree)	55.78	53.04	53.04	53.95	54.86	56.69
Object F (Tree)	31.09	29.26	29.26	30.18	30.18	32.00
Object G (Tree)	46.63	44.81	44.81	45.72	46.63	47.55
Object H (Building)	17.40	16.50	19.20	16.50	16.50	17.40
Object I (Tree)	40.23	42.06	41.15	43.89	41.15	41.15
Object J (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object K (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
	PM <sub>2.5</sub> Inlet (Primary)	PM <sub>2.5</sub> Inlet (Collocated)	PM <sub>10-2.5</sub> Inlet (Primary)	PM <sub>2.5</sub> Inlet (Continuous)	PM <sub>2.5</sub> Inlet (Speciation)	Carbon Speciation Inlet
Object A (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object B (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object C (Tree)	28.00	28.00	26.00	28.00	28.00	26.00
Object D (Tree)	42.06	42.06	41.15	42.06	41.15	42.06
Object E (Tree)	55.78	55.78	54.86	55.78	55.78	57.61
Object F (Tree)	30.18	30.18	30.18	32.00	31.09	31.09
Object G (Tree)	47.55	47.55	47.55	48.46	49.38	49.38
Object H (Building)	16.50	15.50	15.50	17.40	20.10	18.30
Object I (Tree)	39.32	38.40	39.32	41.15	43.89	41.15
Object J (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object K (Tree)	N/A	N/A	N/A	N/A	N/A	N/A

Note: N/A indicates the object has been removed and is no longer an obstruction due to the new construction.

**Table A-14 Object Protrusion above Inlet or Probe at Sacramento-Del Paso Manor**

	Gaseous Probe	NO <sub>y</sub> Probe	PM <sub>10</sub> Inlet (Primary)	PM <sub>10</sub> Inlet (Collocated)	Black Carbon Inlet	VOC Inlet
Object A (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object B (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object C (Tree)	2.64	-2.06	2.64	2.64	2.54	2.84
Object D (Tree)	3.97	-0.73	3.97	3.97	3.87	4.10
Object E (Tree)	8.37	-3.67	8.37	8.37	8.27	8.57
Object F (Tree)	5.72	1.02	5.72	5.72	5.62	5.93
Object G (Tree)	6.90	-2.20	6.90	6.90	6.80	7.10
Object H (Building)	-0.78	-8.78	-0.78	-0.78	-0.68	-0.88
Object I (Tree)	4.10	-0.64	4.10	4.10	4.00	4.30
Object J (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object K (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
	PM <sub>2.5</sub> Inlet (Primary)	PM <sub>2.5</sub> Inlet (Collocated)	PM <sub>10-2.5</sub> Inlet (Primary)	PM <sub>2.5</sub> Inlet (Continuous)	PM <sub>2.5</sub> Inlet (Speciation)	Carbon Speciation Inlet
Object A (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object B (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object C (Tree)	2.74	2.74	2.74	2.64	2.64	2.74
Object D (Tree)	4.00	4.00	4.00	3.97	3.97	4.00
Object E (Tree)	8.47	8.47	8.47	8.37	8.37	8.47
Object F (Tree)	5.83	5.83	5.83	5.72	5.72	5.83
Object G (Tree)	7.00	7.00	7.00	6.90	6.90	7.00
Object H (Building)	-0.88	-0.88	-0.88	-0.78	-0.78	-0.88
Object I (Tree)	4.20	4.20	4.20	4.10	4.10	4.20

Object J (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object K (Tree)	N/A	N/A	N/A	N/A	N/A	N/A

Note: Negative value indicates inlet or probe is taller than the object; thus, airflow is not obstructed no matter the distance. N/A indicates the object has been removed and is no longer an obstruction due to the new construction.

**Table A-15 Distance vs. Protrusion Ratio at Sacramento-Del Paso Manor  
(must be  $\geq 2$ )<sup>11</sup>**

	Gaseous Probe	NO <sub>y</sub> Probe	PM <sub>10</sub> Inlet (Primary)	PM <sub>10</sub> Inlet (Collocated)	Black Carbon Inlet	VOC Inlet
Object A (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object B (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object C (Tree)	10.4	N/A	8.7	8.7	8.9	9.6
Object D (Tree)	7.0	N/A	9.0	9.0	6.5	10.0
Object E (Tree)	8.2	N/A	6.3	6.3	7.9	6.6
Object F (Tree)	3.8	28.7	5.1	5.1	3.7	5.4
Object G (Tree)	6.3	N/A	6.5	6.5	6.3	6.6
Object H (Building)	N/A	N/A	N/A	N/A	N/A	N/A
Object I (Tree)	9.8	N/A	10.0	10.0	4.3	9.6
Object J (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object K (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
	PM <sub>2.5</sub> Inlet (Primary)	PM <sub>2.5</sub> Inlet (Collocated)	PM <sub>10-2.5</sub> Inlet (Primary)	PM <sub>2.5</sub> Inlet (Continuous)	PM <sub>2.5</sub> Inlet (Speciation)	Carbon Speciation Inlet
Object A (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object B (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object C (Tree)	10.2	10.2	9.5	10.6	10.6	9.5
Object D (Tree)	10.5	10.5	10.3	10.6	10.4	10.5
Object E (Tree)	6.6	6.6	6.5	6.7	6.7	6.8
Object F (Tree)	5.2	5.2	5.2	5.6	5.4	5.3
Object G (Tree)	6.8	6.8	6.8	7.0	7.2	7.1
Object H (Building)	N/A	N/A	N/A	N/A	N/A	N/A
Object I (Tree)	9.4	9.4	9.4	10.0	10.7	9.8
Object J (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object K (Tree)	N/A	N/A	N/A	N/A	N/A	N/A

Note: N/A indicates inlet or probe is taller than the object and airflow is not obstructed; refer to the note in the previous table

<sup>11</sup> Per Appendix E to 40 CFR 58, “the distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path.”

Site	Sacramento-Del Paso Manor			
Start Date	1/1/1981	1/1/1981	1/1/1980	1/1/1983
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Reporting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Pollutant	O3	CO	NO2	NOY
Parameter Code	44201	42101	42602	42600
Parameter Occurrence Code	1	1	1	1
Manufacturer and model	TAPI 400E	TAPI 300EU	TAPI200UP	TEI 421-Y
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	087	593	200	574
Analysis Method	Ultraviolet Absorption	Gas Filter Correlation	Photolytic-Chemiluminescence	Chemiluminescence
FRM/FEM/ARM/Other	FEM	FRM	FEM	Other
Monitoring objective	NAAQS comparison, public info, research	NAAQS comparison, public info, research	NAAQS comparison, public info, research	Public info, research
Statement of Purpose	Measures elevated summer O3 levels near the downwind edge of the central business district	Measures representative wintertime CO concentration in populated area	Measures O3 precursor emission near downwind edge of central business district	Measures representative concentration in populated area
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	NCORE, PAMS (Type II)	NCORE, PAMS (Type II)	NCORE, PAMS (Type II)	NCORE
Site type	Population Exposure	Population Exposure	Population Exposure	Population Exposure
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	2.0	2.0	2.0	Not applicable
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	26.0	26.0	26.0	23.0
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.1 m (lo vol)	1.1 m (lo vol)	1.1 m (lo vol)	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	5.3	5.3	5.3	10.0
Probe material	FEP Teflon	FEP Teflon	FEP Teflon	FEP Teflon
Residence time (seconds)	15.2	13.4	15.0	4.0
Changes in next 18 months?	No	No	No	No
Frequency of one-point quality control check	Every fourth day	Every fourth day	Every fourth day	Every fourth day
Last Performance Evaluation	11/15/18	11/14/18	2/5/2018, 11/15/2018	Not applicable

Site	Sacramento-Del Paso Manor			
Start Date	1/1/1980	8/1/1994	9/22/2000	1/1/2001
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air District	AAC Lab	AAC Lab
Reporting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Pollutant	SO2	Total NMHC	Speciated VOC	Carbonyl
Parameter Code	42401	43102	43102	Multiple
Parameter Occurrence Code	1	2	1	1
Manufacturer and model	TAPI 100EU	TEI 55C	Xontech 910A/912	Xontech 925
Sampling Method	Instrumental	Instrumental	6L Pressurized Canister	DNPH Silica gel
Method Code	600	164	123	202
Analysis Method	Ultraviolet Fluorescence	Flame Ionization Detector	Dual Flame Ionization Detector	(multiple)
FRM/FEM/ARM/Other	FEM	Other	Other	Other
Monitoring objective	NAAQS comparison, public info, research	Public info, research	Research	Research
Statement of Purpose	Measures representative concentration in populated area	Measures O3 precursor emission near downwind edge of central business district	Measures O3 precursor emission near downwind edge of central business district	Measures O3 precursor emission near downwind edge of central business district
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	NCORE	PAMS (Type II)	PAMS (Type II)	PAMS (Type II)
Site type	Population Exposure	Population Exposure	Population Exposure	Population Exposure
Spatial scale	Urban	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	1 in 3 days	1 in 3 days
Sampling season	Year Round	Year Round	July thru Sep	July thru Sep
Distance from supporting structure or rooftop (m)	2.0	2.0	2.2	2.2
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	26.0	26.0	26.0	26.0
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.1 m (lo vol)	1.1 m (lo vol)	1.0 m (lo vol)	1.0 m (lo vol)
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	5.3	5.3	5.5	5.5
Probe material	FEP Teflon	FEP Teflon	Stainless Steel	Stainless Steel
Residence time (seconds)	14.7	17.0	3.0	3.0
Changes in next 18 months?	No	No	No	No
Frequency of one-point quality control check	Every fourth day	Every fourth day	Pre- and post-seasonally check	Pre- and post-seasonally check
Last Performance Evaluation	11/14/18	Temporary shutdown <sup>(A)</sup>	Not applicable	Not applicable

<sup>(A)</sup> U.S. EPA Region 9 approved the temporary shut down on 12/1/17



Site	Sacramento-Del Paso Manor		
Start Date	1/1/1998	1/1/1986	1/1/1986
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Reporting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Pollutant	Black Carbon	PM10 (Primary monitor)	PM10 (Audit monitor)
Parameter Code	84313	81102	81102
Parameter Occurrence Code	1	1	2
Manufacturer and model	Magee Scientific M633	Sierra Anderson 1200	Sierra Anderson 1200
Sampling Method	Aethalometer	Hi Volume	Hi Volume
Method Code	894	063	063
Analysis Method	Optical Absorption	Gravimetric	Gravimetric
FRM/FEM/ARM/Other	Other	FRM	FRM
Monitoring objective	Research	NAAQS comparison, public info	NAAQS comparison, public info
Statement of Purpose	Installed for CRPAQS <sup>(A)</sup> study in 1999	Measures wintertime elevated PM level from motor vehicles and residential wood combustion	Collocated for QA purpose and provides substitute data if necessary
Monitor type	SPM	SLAMS	SLAMS
Affiliation	None	None	None
Site type	Population Exposure	Population Exposure	Population Exposure
Spatial scale	Not applicable	Neighborhood	Neighborhood
Sampling Frequency	Continuous	1 in 6 days	1 in 6 days
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	1.9	2.0	2.0
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	25.0	23.0	23.0
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	2.2 m	2.2 m
Distance with nearest PM monitor (m)	1.8 m (lo vol)	2.1 m (lo vol)	2.2 m (hi vol)
Unrestricted airflow (deg)	360	360	360
Probe height (m, agl)	5.2	5.3	5.3
Probe material	Aluminum	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No
Frequency of flow rate verification	Monthly	Monthly	Monthly
Last Performance Evaluation	Not applicable	4/25/18, 11/15/18	4/25/18, 11/15/18

<sup>(A)</sup> California Regional Particulate Air Quality Study

Site	Sacramento-Del Paso Manor			
Start Date	1/1/1999	2/1/1999	5/1/2000	2/1/2000
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	CARB	CARB	N/A	RTI
Reporting Agency	CARB	CARB	CARB	RTI
Pollutant	PM2.5 (Primary monitor)	PM2.5 (Audit monitor)	PM2.5	PM2.5 Mass Speciated
Parameter Code	88101	88101	88502	88502
Parameter Occurrence Code	1	2	3	5
Manufacturer and model	R & P 2025	R & P 2025	Met One 1020 BAM	Met One SASS
Sampling Method	Low volume with VSCC	Low volume with VSCC	Very sharp cut cyclone	Sharp cut cyclone
Method Code	145	145	731	810
Analysis Method	Gravimetric	Gravimetric	Beta Attenuation	Gravimetric
FRM/FEM/ARM/Other	FRM	FRM	Other	Other
Monitoring objective	NAAQS Comparison, research, public info	NAAQS Comparison, research	Public info, research <sup>(A)</sup>	Research
Statement of Purpose	Measures wintertime elevated PM level from motor vehicles and residential wood combustion	Collocated for QA purpose and provides substitute data if necessary	Provides real time PM Measurement from motor vehicles and residential wood combustion	Provides speciation data on urban PM emission
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	NCORE	NCORE	NCORE	CSN STN, NCORE
Site type	Highest concentration, population exposure	Highest concentration, population exposure	Highest concentration, population exposure	Highest concentration, population exposure
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling Frequency	1 in 3 days	1 in 12 days	Continuous	1 in 3 days
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	2.1	2.1	2.0	2.0
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	28.0	28.0	28.0	26.0
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	1.6 m	1.6 m	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.5 m (lo vol)	1.6 m (lo vol)	1.4 (lo vol)	2.2 m (hi vol)
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	5.4	5.4	5.3	5.3
Probe material	Not applicable	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No
Frequency of flow rate verification	Monthly	Monthly	Bi-monthly	Monthly
Last Performance Evaluation	4/25/18, 11/15/18	4/25/18, 11/15/18	4/25/18, 11/15/18	3/30/17

<sup>(A)</sup> This PM2.5 monitor is not comparable to NAAQS because it does not meet reference method or equivalent method designation requirements

Site	Sacramento-Del Paso Manor		
Start Date	4/1/2009	4/1/2012	4/1/2012
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	RTI	CARB	Eastern Research Group
Reporting Agency	RTI	CARB	Sac Metro Air District
Pollutant	OC & EC	PM10	Pb
Parameter Code	(multiple) <sup>(A)</sup>	85101	85129
Parameter Occurrence Code	5	7	4
Manufacturer and model	URG 3000N	R & P 2025	R & P 2025
Sampling Method	Quartz filter and cyclone inlet	Low volume with VSCC	Low volume with VSCC
Method Code	842, 826	127	811
Analysis Method	(multiple)	Gravimetric	X-Ray Fluorescence (EDXRF)
FRM/FEM/ARM/Other	Other	FRM	FRM
Monitoring objective	Research	Public info, research	NAAQS comparison, public info, research
Statement of Purpose	Provides speciation data on urban PM emission	Measures PM mass to provide PM10-2.5 data	Measures representative Pb concentration
Monitor type	SLAMS	Other	SLAMS
Affiliation	CSN STN, NCORE	None	NCORE (Non-source)
Site type	Highest concentration	Population Exposure	Population Exposure
Spatial scale	Neighborhood	Neighborhood	Urban
Sampling Frequency	1 in 3 days	1 in 3 days	1 in 6 days
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	2.1	2.1	2.1
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	28.0	26.0	26.0
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.7 m (lo vol)	1.9 m (lo vol)	1.9 (lo vol)
Unrestricted airflow (deg)	360	360	360
Probe height (m, agl)	5.4	5.4	5.4
Probe material	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No
Frequency of flow rate verification	Monthly	Monthly	Monthly
Last Performance Evaluation	3/30/17	4/25/18, 11/15/18	4/25/18, 11/15/18

<sup>(A)</sup> 88355, 88357, 88370, 88374, 88375, 88376, 88377, 88378, 88380, 88383, 88384, 88385, 88388

Site	Sacramento-Del Paso Manor				
Start Date	8/1/1994	8/1/1994	9/1/1994	8/1/1994	8/1/1994
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Reporting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Pollutant	Outdoor Temperature	Relative Humidity	Solar Radiation	Wind Direction	Wind Speed
Parameter Code	62101	62201	63301	61104	61103
Parameter Occurrence Code	1	1	1	1	1
Manufacturer and model	Climatronics 100093	Climatronics 101669	Climatronics 100848	Climatronics F-460	Climatronics F-460
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	042	012	011	020	020
Analysis Method	Machine Average	Hygroscopic Plastic Film	Pyranometer	Vector Summation	Vector Summation
FRM/FEM/ARM/Other	Other	Other	Other	Other	Other
Monitoring objective	Public info, research	Public info, research	Public info	Public info, research	Public info, research
Statement of Purpose	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology
Monitor type	SLAMS	SLAMS	Other	Other	Other
Affiliation	NCORE, PAMS (Type II)	NCORE, PAMS (Type II)	NCORE, PAMS (Type II)	NCORE, PAMS (Type II)	NCORE, PAMS (Type II)
Site type	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Spatial scale	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	No supporting structure	No supporting structure	No supporting structure	No supporting structure	No supporting structure
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360	360
Probe height (m, agl)	10.0	10.0	10.0	10.0	10.0
Probe material	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No	No
Frequency of one-point quality control check	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Last Performance Evaluation	11/15/18	Not applicable	Not applicable	11/15/18	11/15/18

## A.5 Folsom-Natoma St

This site has been in operation since 1996. This site replaced the former Folsom-Leidesdorff Street site. Approximately 20 miles northeast of Downtown Sacramento, Folsom-Natoma site is the maximum summertime O<sub>3</sub> monitoring site within Sacramento County, for days with prevailing afternoon southwesterly winds. This is a PAMS Type III site.

**Table A-16 Folsom-Natoma St. Metadata**

Site Name	Folsom-Natoma Street
AQS Site No.	06-067-0012
Geographic Coordinates	38.683304°N, 121.164457°W
Location	Folsom City Hall (parking lot), located 20 miles east-northeast of downtown Sacramento.
Address	50 Natoma Street, Folsom, CA 95630
County	Sacramento
Distance from roadway	206 m
Annual Average Daily Traffic (Vehicles/Day)	Natoma St. at Coloma St (intersection total): 14,628 (City of Folsom, 2017)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

**Figure A-21 Panoramic view toward north from air monitoring station roof**



**Figure A-22 Panoramic view toward east from air monitoring station roof**

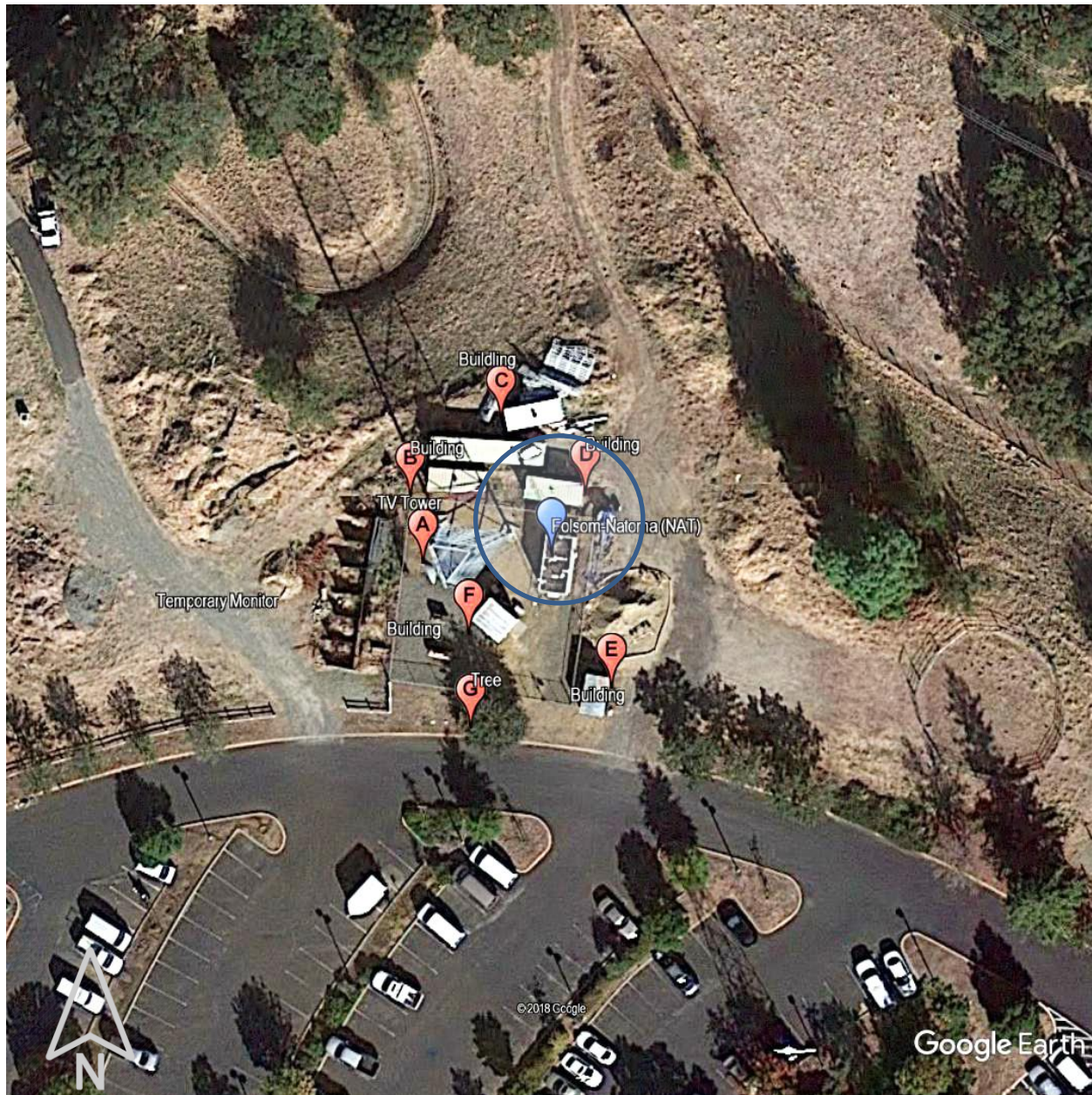


**Figure A-23 Panoramic view toward south from air monitoring station roof**



**Figure A-24 Panoramic view toward west from air monitoring station roof**



**Figure A-25 Google Earth satellite image of Folsom-Natoma St.**

Source: Google Earth, imagery date: 10/31/18

The circle over Folsom-Natoma in Figure A-25 indicates no trees exist within a 10 m radius, which satisfy the siting criterion that requires drip lines of trees to be at least 10 m away from probes and inlets (40 CFR Part 58, Appendix E). Also, height of the tree and building were calculated on-site with trigonometry on 6/16/19. Analyses in Tables A-17 thru A-19 show the objects identified above do not restrict air flow to the roof top inlets and samplers. Therefore, each inlet and sampler has 360° of unrestricted airflow.

**Table A-17 Distance between Object and Inlet or Probe at Folsom-Natoma St.**  
All units in meter

	Gaseous Probe	NO <sub>y</sub> Probe	VOC	PM2.5 (Primary)	PM2.5 (Collocation)
Object A (TV Tower)	7.32	5.49	5.00	7.00	6.00
Object B (Building)	10.0	10.97	10.97	12.00	11.00
Object C (Building)	14.0	12.00	15.54	16.00	16.00
Object D (Building)	6.40	5.49	6.40	9.14	10.06
Object E (Building)	12.80	14.63	12.80	11.89	10.97
Object F (Building)	7.32	9.14	7.32	7.32	5.49
Object G (Tree)	16.46	18.29	16.46	16.00	15.00

**Table A-18 Object Protrusion above Inlet or Probe at Folsom-Natoma St.**  
All units in meter

	Gaseous Probe	NO <sub>y</sub> Probe	VOC	PM2.5 (Primary)	PM2.5 (Collocation)
Object A (TV Tower)	19.75	19.75	19.8	19.50	19.50
Object B (Building)	-3.05	-3.05	-3.1	-3.30	-3.30
Object C (Building)	-3.05	-3.05	-3.1	-3.30	-3.30
Object D (Building)	-3.05	-3.05	-3.1	-3.30	-3.30
Object E (Building)	-2.95	-2.95	-2.95	-3.20	-3.20
Object F (Building)	-2.45	-2.45	-2.45	-2.70	-2.70
Object G (Tree)	4.7	4.7	4.7	4.5	4.5

Note: negative value indicates inlet or probe is taller than the object; thus, airflow is not obstructed no matter the distance

**Table A-19 Distance vs. Protrusion Ratio at Folsom-Natoma St.**  
(must be  $\geq 2$ )<sup>12</sup>

	Gaseous Probe	NO <sub>y</sub> Probe	VOC	PM2.5 (Primary)	PM2.5 (Collocation)
Object A (TV Tower)	0.4 <sup>(A)</sup>	0.3 <sup>(A)</sup>	0.3 <sup>(A)</sup>	0.4 <sup>(A)</sup>	0.3 <sup>(A)</sup>
Object B (Building)	N/A	N/A	N/A	N/A	N/A
Object C (Building)	N/A	N/A	N/A	N/A	N/A
Object D (Building)	N/A	N/A	N/A	N/A	N/A
Object E (Building)	N/A	N/A	N/A	N/A	N/A
Object F (Building)	N/A	N/A	N/A	N/A	N/A

<sup>12</sup> Per Appendix E to 40 CFR 58, "the distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path."



Object G (Tree)	3.5	3.9	3.5	3.6	3.3
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<sup>(A)</sup> Object A is a broadcast tower with open frame structure. Even though it does not meet the ratio require, it does not block air flow to any probe or inlet

Note: N/A indicates inlet or probe is taller than the object and airflow is not obstructed; refer to the note in the previous table

Site	Folsom-Natoma St.				
Start Date	7/1/1996	7/1/1996	7/1/2011	7/1/1996	7/1/1996
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	AAC
Reporting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Pollutant	O3	NO2	NOY	Total NMHC	Speciated VOC
Parameter Code	44201	42602	42600	43102	43102
Parameter Occurrence Code	1	1	1	1	2
Manufacturer and model	TAPI 400E	TAPI200UP	TEI 42I-Y	TEI 55C	Xontech 910A/912
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental	6L Pressurized Canister
Method Code	087	200	674	164	123
Analysis Method	Ultraviolet Absorption	Photolytic-Chemiluminescence	Chemiluminescence	Flame Ionization Detector	Dual Flame Ionization Detector
FRM/FEM/ARM/Other	FEM	FEM	Other	Other	Other
Monitoring objective	NAAQS comparison, public info	NAAQS comparison, public info	Public info, research	Public info, research	Research
Statement of Purpose	Measure highest summer O3 level downwind of urban area	Measures concentration downwind of urban area	Measures representative concentration	Measures concentration downwind of urban area	Measures concentration downwind of urban area
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	PAMS (Type III)	PAMS (Type III)	PAMS (Type III)	PAMS (Type III)	PAMS (Type III)
Site type	Max O3 Concentration, Population Exposure	Highest concentration	Population Exposure	Highest concentration	Highest concentration
Spatial scale	Neighborhood	Neighborhood	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Continuous	1 in 3 days
Sampling season	Year Round	Year Round	Year Round	Year Round	July thru Sep
Distance from supporting structure or rooftop (m)	1.9	1.9	Not applicable	1.9	1.9
Distance from flow obstructions on roof (m)	No obstruction	No obstruction	No obstruction	No obstruction	No obstruction
Distance from flow obstructions not on roof (m)	No obstruction	No obstruction	No obstruction	No obstruction	No obstruction
Distance from nearest tree drip line (m)	15.5	15.5	14.6	15.5	15.5
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	2.2 (lo vol)	2.2 (lo vol)	2.2 (lo vol)	2.2 (lo vol)	2.2 (lo vol)
Unrestricted airflow (deg)	360	360	360	360	360
Probe height (m, agl)	5.5	5.5	10.0	5.5	5.5
Probe material	FEP Teflon	FEP Teflon	FEP Teflon	FEP Teflon	Stainless Steel
Residence time (seconds)	13.9	12.7	9.0	13.7	3.0
Changes in next 18 months?	No	No	No	No	No
Frequency of one-point quality control check	Every other day	Every other day	Every other day	Every other day	Pre- and post-seasonally check
Last Performance Evaluation	1/30/18, 11/2/18	1/30/18, 2/22/18, 11/2/18	Not applicable	Temporary shutdown <sup>(A)</sup>	Not applicable

<sup>(A)</sup> U.S. EPA Region 9 approved the temporary shut down on 12/1/17

Site	Folsom-Natoma St.	
Start Date	4/1/2013	7/1/2015
Collecting Agency	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air District
Reporting Agency	Sac Metro Air District	Sac Metro Air District
Pollutant	PM2.5 (Primary monitor)	PM2.5 (Audit monitor)
Parameter Code	88101	88101
Parameter Occurrence Code	3	4
Manufacturer and model	Met One 1020 BAM	Met One 1020 BAM
Sampling Method	Very sharp cut cyclone	Very sharp cut cyclone
Method Code	170	170
Analysis Method	Beta Attenuation	Beta Attenuation
FRM/FEM/ARM/Other	FEM	FEM
Monitoring objective	NAAQS comparison, public info, research	NAAQS comparison, public info, research
Statement of Purpose	Measures representative concentration	Collocated for QA purpose and provides substitute data if necessary
Monitor type	SLAMS	SLAMS
Affiliation	None	None
Site type	Population Exposure	Population Exposure
Spatial scale	Neighborhood	Neighborhood
Sampling Frequency	Continuous	Continuous
Sampling season	Year Round	Year Round
Distance from supporting structure or rooftop (m)	2.1	2.1
Distance from flow obstructions on roof (m)	No obstruction	No obstruction
Distance from flow obstructions not on roof (m)	No obstruction	No obstruction
Distance from nearest tree drip line (m)	13.0	12.0
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	2.0	2.0
Distance with nearest PM monitor (m)	2.0 m (lo vol)	2.0 m (lo vol)
Unrestricted airflow (deg)	360	360
Probe height (m, agl)	5.7	5.7
Probe material	Aluminum	Aluminum
Residence time (seconds)	Not applicable	Not applicable
Changes in next 18 months?	No	No
Frequency of flow rate verification	Bi-monthly	Bi-monthly
Last Performance Evaluation	1/30/18, 7/30/18, 11/2/18	1/30/18, 7/30/18, 11/2/18

Site	Folsom-Natoma St.				
Start Date	7/1/1996	7/1/1996	7/1/1996	7/1/1996	7/1/1996
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Reporting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Pollutant	Outdoor Temperature	Relative Humidity	Solar Radiation	Wind Direction	Wind Speed
Parameter Code	62101	62201	63301	61104	61103
Parameter Occurrence Code	1	1	1	1	1
Manufacturer and model	Climatronics 100093	Climatronics 101669	Climatronics 100848	Climatronics F-460	Climatronics F-460
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	042	012	011	020	020
Analysis Method	Machine Average	Hygroscopic Plastic Film	Pyranometer	Vector Summation	Vector Summation
FRM/FEM/ARM/Other	Other	Other	Other	Other	Other
Monitoring objective	Public info	Public info	Public info	Public info, research	Public info, research
Statement of Purpose	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	PAMS (Type III)	PAMS (Type III)	PAMS (Type III)	PAMS (Type III)	PAMS (Type III)
Site type	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Spatial scale	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	No supporting structure	No supporting structure	No supporting structure	No supporting structure	No supporting structure
Distance from flow obstructions on roof (m)	No obstruction	No obstruction	No obstruction	No obstruction	No obstruction
Distance from flow obstructions not on roof (m)	No obstruction	No obstruction	No obstruction	No obstruction	No obstruction
Distance from nearest tree drip line (m)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360	360
Probe height (m, agl)	10.0	10.0	10.0	10.0	10.0
Probe material	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No	No
Frequency of one-point quality control check	N/A	N/A	N/A	N/A	N/A
Last Performance Evaluation	1/30/18, 11/2/18	Not applicable	Not applicable	1/30/18, 11/2/18	1/30/18, 11/2/18

## A.7 North Highlands-Blackfoot

North Highlands-Blackfoot has been in operation since 1979. The objective of the original site was to collect data in support of a proposed power plant project at McClellan Air Force Base, which was located 3 miles southwest of the site. The proposed power plant project was canceled in the early 1980's; and the air force base was closed in 2001. This entire site was designated as SPM upon its establishment. During an annual review of network design in the mid-1990s, Sac Metro Air District needed additional SLAMS (which was known as National Air Monitoring Stations) sites for SO<sub>2</sub> and PM<sub>10</sub> to meet minimum monitoring requirements. Thus, the designation of those monitors were changed to SLAMS. The SO<sub>2</sub> monitor was terminated in late 2010.

**Table A-20 North Highlands-Blackfoot Metadata**

Site Name	North Highlands-Blackfoot
AQS Site No.	06-067-0002
Geographic Coordinates	38.71209°N, 121.38109°W
Location	Residential area located 11 miles north-northeast of downtown Sacramento.
Address	7823 Blackfoot Way, Antelope, CA 95843
County	Sacramento
Distance from roadway	100 m
Annual Average Daily Traffic (Vehicles/Day)	Navaho Dr. east of Aztec Way: <100 (estimated, two-lanes suburban circular local residential road)
Ground Cover	Paved (to north), vegetated (to south)
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

**Figure A-26 Panoramic view toward north from air monitoring station roof**



**Figure A-27 Panoramic view toward east from air monitoring station roof**



**Figure A-28 Panoramic view toward south from air monitoring station roof**



**Figure A-29 Panoramic view toward west from air monitoring station roof**



**Figure A-30 Google Earth satellite image of North Highlands-Blackfoot Way**

Source: Google Earth, imagery date: 10/31/18

The circle in Figure A-34 indicates no trees exist within a 10 m radius, which satisfy the siting criterion that requires drip lines of trees to be at least 10 m away from probes and inlets (40 CFR Part 58, Appendix E). Each of the markers identifies the tallest tree in its local cluster of vegetation. Also, height of the tree was calculated on-site with trigonometry on 6/16/19. Analyses in Tables A-21 thru A-23 show objects identified above do not restrict air flow to the roof top inlets and samplers.

**Table A-21 Distance between Object and Inlet or Probe at North Highlands-Blackfoot Way**  
**All units in meter**

	Gaseous Probe	PM <sub>10</sub> Inlet
Object A (Tree)	55.78	54.86
Object B (Tree)	40.23	39.32
Object C (Tree)	22.86	22.86
Object D (Tree)	21.03	21.03
Object E (Tree)	49.38	50.29
Object F (Tree)	44.81	45.72

**Table A-22 Object Protrusion above Inlet or Probe at North Highlands-Blackfoot Way**  
**All units in meter**

	Gaseous Probe	PM <sub>10</sub> Inlet
Object A (Tree)	12.97	12.57
Object B (Tree)	8.31	7.91
Object C (Tree)	1.53	1.13
Object D (Tree)	6.18	5.78
Object E (Tree)	9.92	9.52
Object F (Tree)	7.35	6.92

**Table A-23 Distance vs. Protrusion Ratio at North Highlands**  
**(must be  $\geq 2$ )<sup>13</sup>**

	Gaseous Probe	PM <sub>10</sub> Inlet
Object A (Tree)	4.3	4.4
Object B (Tree)	4.8	5.0
Object C (Tree)	14.9	20.2
Object D (Tree)	3.4	3.6
Object E (Tree)	5.0	5.3
Object F (Tree)	6.1	6.6

<sup>13</sup> Per Appendix E to 40 CFR 58, “the distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path.”



Site	North Highlands-Blackfoot Way		
Start Date	12/1/1979	12/1/1979	12/1/1979
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Reporting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Pollutant	O3	CO	NO2
Parameter Code	44201	42101	42602
Parameter Occurrence Code	1	1	1
Manufacturer and model	TAPI 400E	TEI 48C	TEI 42I
Sampling Method	Instrumental	Instrumental	Instrumental
Method Code	087	054	200
Analysis Method	Ultraviolet Absorption	Nondispersive Infrared	Photolytic-Chemiluminescence
FRM/FEM/ARM/Other	FEM	FRM	FRM
Monitoring objective	NAAQS comparison, research	NAAQS comparison, research	NAAQS comparison, research
Statement of Purpose	Measures representative concentrations	Measures representative concentrations	Measures representative concentrations
Monitor type	SPM	SPM	SPM
Affiliation	None	None	None
Site type	Population Exposure	Population Exposure	Population Exposure
Spatial scale	Urban	Neighborhood	Neighborhood
Sampling Frequency	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	1.6	1.6	1.6
Distance from flow obstructions on roof (m)	No obstruction	No obstruction	No obstruction
Distance from flow obstructions not on roof (m)	No obstruction	No obstruction	No obstruction
Distance from nearest tree drip line (m)	12.8	12.8	12.8
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.1 (hi vol)	1.1 (hi vol)	1.1 (hi vol)
Unrestricted airflow (deg)	360	360	360
Probe height (m, agl)	5.0	5.0	5.0
Probe material	FEP Teflon	FEP Teflon	FEP Teflon
Residence time (seconds)	14.1	13.1	16.4
Changes in next 18 months?	Yes	Yes	Yes
Frequency of one-point quality control check	Every Other Day	Every Other Day	Every Other Day
Last Performance Evaluation	5/24/18	5/24/18	4/28/2016 <sup>(A)</sup>

(A) Analyzer malfunction since 1/10/17

Site	North Highlands-Blackfoot Way
Start Date	1/1/1989
Collecting Agency	Sac Metro Air District
Analytical Lab	Sac Metro Air District
Reporting Agency	Sac Metro Air District
Pollutant	PM10
Parameter Code	81102
Parameter Occurrence Code	1
Manufacturer and model	Sierra Anderson 1200
Sampling Method	Hi Volume
Method Code	063
Analysis Method	Gravimetric
FRM/FEM/ARM/Other	FRM
Monitoring objective	NAAQS comparison, public info
Statement of Purpose	Measures representative concentrations
Monitor type	SLAMS
Affiliation	None
Site type	Population Exposure
Spatial scale	Neighborhood
Sampling Frequency	1 in 6 days
Sampling season	Year Round
Distance from supporting structure or rooftop (m)	2.0
Distance from flow obstructions on roof (m)	No obstruction
Distance from flow obstructions not on roof (m)	No obstruction
Distance from nearest tree drip line (m)	12.8
Distance to furnace or incinerator flue (m)	No furnace/flue
Distance between collocated PM monitors (m)	Not collocated
Distance with nearest PM monitor (m)	Not applicable
Unrestricted airflow (deg)	360
Probe height (m, agl)	5.4
Probe material	Not applicable
Residence time (seconds)	Not applicable
Changes in next 18 months?	Yes
Frequency of flow rate verification	Monthly
Last Performance Evaluation	5/24/818, 11/5/18

## A.8 Sloughhouse

Located in a rural area 16.5 miles southeast of Downtown Sacramento, Sloughhouse was established in 1997 as a seasonal (April-October) O<sub>3</sub> special purpose monitoring site to measure elevated afternoon O<sub>3</sub> concentrations, under northwesterly winds, in support of Sac Metro Air District's summer Spare the Air (O<sub>3</sub> episodic control measure) program. It was sited to cover "data gaps" in the O<sub>3</sub> monitoring network, which is used for forecasting summer AQI levels.

A tree 10 m southeast of the O<sub>3</sub> inlet was removed in May 2011 in order to comply with 40 CFR Part 58, Appendix E (Probe and Monitoring Path Siting Criteria). After the tree removal, the O<sub>3</sub> monitor was re-classified from SPM to SLAMS and began continuous monitoring year round.

From November 2008 through February 2013, seasonal (November–February) PM<sub>2.5</sub> data was collected with a special purpose monitor (Met One Instruments e-BAM). In November 2013, a non-FEM PM<sub>2.5</sub> sampler was relocated to this location to improve data quality. Sampling season was also increased to year-round. The monitor non-FEM sampler met quality assurance criteria and siting criteria in 40 CFR Part 58, Appendices A and E. In June 2017, a FEM PM<sub>2.5</sub> sampler replaced the non-FEM sampler. Subsequently, the parameter code associated with the PM<sub>2.5</sub> sampler was changed from 88501 (PM<sub>2.5</sub> raw data) to 88101 (PM<sub>2.5</sub> at local condition).

**Table A-24 Sloughhouse Metadata**

Site Name	Sloughhouse
AQS Site No.	06-067-5003
Geographic Coordinates	38.494475°N, W121.211131°
Location	Fire Station in rural area located 16.5 miles east-southeast of downtown Sacramento.
Address	7250 Sloughhouse Road, Sloughhouse, CA 95683
County	Sacramento
Distance from roadway	27 m
Annual Average Daily Traffic (Vehicles/Day)	Sloughhouse Rd south of Jackson Rd: 1,000 (Estimated)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

**Figure A-31 Panoramic view toward north from air monitoring station roof**



**Figure A-32 Panoramic view toward east from air monitoring station roof**



**Figure A-33 Panoramic view toward south from air monitoring station roof**



**Figure A-34 Panoramic view toward west from air monitoring station roof**



**Figure A-35 Google Earth satellite image of Sloughhouse**

The circle in Figure A-40 indicates no trees exist within a 10 m radius, which satisfy the siting criterion that requires drip lines of trees to be at least 10 m away from probes and inlets (40 CFR Part 58, Appendix E). Also, height of the tree and building was calculated on-site with trigonometry on 6/16/19. Analyses in Tables A-25 thru A-27 show the objects identified above do not restrict air flow to the roof top inlets and samplers. Therefore, each inlet and sampler has 360° of unrestricted airflow.

**Table A-25 Distance between Object and Inlet or Probe at Sloughhouse**  
**All units in meter**

	Gaseous Probe	PM <sub>2.5</sub> Inlet
Object A (Tree)	53.9	54.9
Object B (Tree)	20.1	21.0
Object C (Building)	15.5	15.5
Object D (Tree)	21.0	22.9

**Table A-26 Object Protrusion above Inlet or Probe at Sloughhouse**  
**All units in meter**

	Gaseous Probe	PM <sub>2.5</sub> Inlet
Object A (Tree)	11.01	10.81
Object B (Tree)	7.1	6.9
Object C (Building)	-3.46	-3.94
Object D (Tree)	1.7	1.5

Note: negative value indicates inlet or probe is taller than the object; thus, airflow is not obstructed no matter the distance

**Table A-27 Distance vs. Protrusion Ratio at Sloughhouse**  
**(must be  $\geq 2$ )<sup>14</sup>**

	Gaseous Probe	PM <sub>2.5</sub> Inlet
Object A (Tree)	4.9	5.1
Object B (Tree)	2.8	3.0
Object C (Building)	N/A	N/A
Object D (Tree)	12.4	15.2

Note: N/A indicates inlet or probe is taller than the object and airflow is not obstructed; refer to the note in the previous table

<sup>14</sup> Per Appendix E to 40 CFR 58, "the distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path."

Site	Sloughhouse-Sloughhouse Rd.		
Start Date	7/1/1997	7/1/1997	7/1/1997
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Reporting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Pollutant	O3	Wind Direction	Wind Speed
Parameter Code	44201	61104	61103
Parameter Occurrence Code	1	1	1
Manufacturer and model	TAPI 400E	Climatronics F-460	Climatronics F-460
Sampling Method	Instrumental	Instrumental	Instrumental
Method Code	087	020	020
Analysis Method	Ultraviolet Absorption	Vector Summation	Vector Summation
FRM/FEM/ARM/Other	FEM	Other	Other
Monitoring objective	NAAQS comparison, public info	Public info	Public info
Statement of Purpose	Measures elevated O3 concentration under northwesterly wind	Measures representative meteorology	Measures representative meteorology
Monitor type	SLAMS	Other	Other
Affiliation	None	None	None
Site type	Max O3 concentration	Not applicable	Not applicable
Spatial scale	Neighborhood	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	1.7	2.8	2.8
Distance from flow obstructions on roof (m)	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	18.3	18.0	18.0
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.5 m (lo vol)	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360
Probe height (m, agl)	5.0	6.1	6.1
Probe material	FEP Teflon	Not applicable	Not applicable
Residence time (seconds)	3.9	Not applicable	Not applicable
Changes in next 18 months?	No	No	No
Frequency of one-point quality control check	Every other day	N/A	N/A
Last Performance Evaluation	5/21/18	5/21/18	5/21/18

Site	Sloughhouse-Sloughhouse Rd.
Start Date	5/1/2017
Collecting Agency	Sac Metro Air District
Analytical Lab	N/A
Reporting Agency	CARB
Pollutant	PM2.5
Parameter Code	88101
Parameter Occurrence Code	3
Manufacturer and model	Met One 1020 BAM
Sampling Method	Very sharp cut cyclone
Method Code	170
Analysis Method	Beta Attenuation
FRM/FEM/ARM/Other	FEM
Monitoring objective	NAAQS comparison, public info, research
Statement of Purpose	Measures rural, background PM2.5 concentration
Monitor type	Other
Affiliation	None
Site type	Upwind/Background
Spatial scale	Urban
Sampling Frequency	Continuous
Sampling season	Year Round
Distance from supporting structure or rooftop (m)	2.3
Distance from flow obstructions on roof (m)	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions
Distance from nearest tree drip line (m)	19.0
Distance to furnace or incinerator flue (m)	No furnace/flue
Distance between collocated PM monitors (m)	Not collocated
Distance with nearest PM monitor (m)	Not applicable
Unrestricted airflow (deg)	360
Probe height (m, agl)	5.2
Probe material	Not applicable
Residence time (seconds)	Not applicable
Changes in next 18 months?	Yes
Frequency of flow rate verification	Bi-monthly
Last Performance Evaluation	5/21/18, 11/7/18

<sup>(A)</sup> A new Met One 1020 was installed on 5/1/17, which led to the changes with parameter code, method code, etc.



## A.9 Sacramento-1309 T Street

The Sacramento-1309 T Street site is operated by the California Air Resources Board/Monitoring and Laboratory Division/Special Purpose Monitoring Section. This site was established in 1989. Details of this air monitoring site can be found in CARB's annual network plan<sup>15</sup>.

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<sup>15</sup> <https://ww3.arb.ca.gov/aqd/amnr/amnr.htm>

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## Appendix B Minimum Monitoring Requirement Assessment


**Table B-1 Number of SLAMS Monitoring Site within Sacramento MSA**

Pollutant	Required Monitors in Sacramento MSA	California Air Resources Board (CARB)	El Dorado County AQMD	Placer County APCD	Sacramento Metropolitan AQMD	Yolo-Solano AQMD	Total Monitors in Sacramento MSA	
O <sub>3</sub>	2	6	0	4	5	1	16	
CO	2	0	0	0	2	0	2	
NO <sub>2</sub>	Area Wide	1	3	0	0	3	0	6
	Near-Road	1	0	0	0	1	0	1
SO <sub>2</sub>	1	0	0	0	1	0	1	
Pb	NCore	1	0	0	0	1	0	1
	Source Oriented	0	0	0	0	0	0	0
PM <sub>10</sub>	2-4 <sup>16</sup>	3	0	0	3	2	8	
PM <sub>2.5</sub>	FEM/FRM	3	2	0	1	3	1	7
	Continuous	2	2	0	2	2	0	6
PM <sub>10-2.5</sub>	1	0	0	0	1	0	1	

Source: U.S. EPA Air Quality System Monitor Description Report (AMP 390), accessed on 1 Jul 2019

<sup>16</sup> Wildfire smoke in 2017 and 2018 impacted multiple air monitoring stations. While the District is addressing some impacts under the Exceptional Event Rule (81 FR 68216), other smoke impacts are short of the rule threshold and could not be addressed. Without any smoke impacts, historical data from 2009 through 2018 shows the maximum PM<sub>10</sub> ambient concentration in Sacramento MSA is 70% of the NAAQS. Therefore, existing monitors meet the monitoring requirements in 40 CFR 58, Appendix D, as well as the needs of communities in local air districts. The District is committed to working with U.S. EPA, CARB, and other local air districts to ensure that monitoring levels continue to protect public health and safety.


## Figure B-1 MOU on Shared Monitoring Responsibility with CARB, Page 1



**Matthew Rodriguez**  
Secretary for  
Environmental Protection

## Air Resources Board

**Mary D. Nichols, Chairman**  
1001 I Street • P.O. Box 2815  
Sacramento, California 95812 • [www.arb.ca.gov](http://www.arb.ca.gov)



**Edmund G. Brown Jr.**  
Governor

August 8, 2014


Ms. Brigette Tollstrup  
Sacramento Metropolitan Air Quality Management District  
777 12<sup>th</sup> Street, Third Floor  
Sacramento, California 95814-1908

Dear Ms. Tollstrup:

The purpose of this letter is to formalize an agreement between the California Air Resources Board (ARB) and the Sacramento Metropolitan Air Quality Management District (SMAQMD) to share monitoring responsibilities to meet minimum monitoring requirements for the Sacramento – Arden Arcade Metropolitan Statistical Area requirements. In response to your request, ARB will continue the operation of the 1309 T Street, Sacramento, air monitoring station (AQS# 060670010) for the purpose of meeting 40 CFR Part 58, Appendix D minimum monitoring requirements. ARB's intention is to continue operation of the State and local air monitoring stations Federal Reference Method and/or the Federal Equivalent Method for PM2.5 indefinitely. Should ARB need to revisit this agreement in the future, we will coordinate with SMAQMD prior to making changes.

If you have any questions please contact your ARB liaison, Ms. Carissa Ganapathy at (916) 322-7105 or [carissa.ganapathy@arb.ca.gov](mailto:carissa.ganapathy@arb.ca.gov) of the Quality Management Section, or myself at (916) 324-7630 or [kenneth.stroud@arb.ca.gov](mailto:kenneth.stroud@arb.ca.gov).

Sincerely,



Kenneth Stroud, Chief  
Air Quality Surveillance Branch  
Monitoring and Laboratory Division

cc. see next page

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: <http://www.arb.ca.gov>.

---

California Environmental Protection Agency

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**Figure B-2 MOU on Shared Monitoring Responsibility with CARB, Page 2**

Ms. Brigette Tollstrup  
August 8, 2014  
Page 2 of 2

cc. Meredith Kurpius, Ph.D.  
U.S. EPA Region 9  
Air Quality Analysis Office, Manager  
75 Hawthorne Street, AIR-7  
San Francisco, California 94105

Gwen Yoshimura  
U.S. EPA Region 9  
Air Quality Analysis Office, Air Monitoring Team Lead  
75 Hawthorne Street, AIR-7  
San Francisco, California 94105

Elfego Felix  
U.S. EPA Region 9  
Air Quality Analysis Office, District Liaison  
75 Hawthorne Street, AIR-7  
San Francisco, California 94105

Dr. Michael T. Benjamin, Chief  
Monitoring and Laboratory Division

Michael Miguel, Chief  
Quality Management Branch  
Monitoring and Laboratory Division

Gayle Sweigert, Manager  
Air Quality Analysis Section  
Air Quality Planning and Science Division

Patrick Rainey, Manager  
Quality Management Section  
Monitoring and Laboratory Division

Carissa Ganapathy  
Monitoring and Laboratory Division

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## Appendix C Copy of Annual Data Certification Letters

### Figure C-1 Copy of Sac Metro Air District Data Certification Letters, Page 1



April 25, 2019

Mike Stoker  
Regional Administrator  
Region IX  
U.S. Environmental Protection Agency  
Mail Code: ORA-1  
75 Hawthorne Street  
San Francisco, CA 94105

RE: 2018 Data Certification

Dear Mr. Stoker:

Sacramento Metropolitan Air Quality Management District (Sac Metro Air District) operates Federal Reference Method and Federal Equivalent Method monitors at its State and Local Air Monitoring Stations and Special Purpose Monitor sites. We are responsible for submitting our air quality data to the U.S. Environmental Protection Agency Air Quality System in accordance with Title 40, Code of Federal Regulation, Part 58.

This letter certifies Sac Metro Air District's 2018 data on criteria air pollutants is complete and accurate to the best of our knowledge, taking into consideration the quality assurance findings. Along with this letter, we are submitting the Certification Evaluation and Concurrence report (AMP600) and Quicklook report (AMP450NC) with focus on the SO<sub>2</sub> 5-minute average data.

Note that California Air Resources Board (CARB) continues to support Sac Metro Air District by submitting and certifying data for all particulate matter (PM) gravimetric filters weighted and analyzed by CARB's laboratory. Namely, these are the PM<sub>2.5</sub> filters collected at Sacramento-Del Paso Manor (DPM) and Sacramento-Bercut. It also includes the PM<sub>10</sub> filters collected at DPM for determining PM<sub>10-2.5</sub>.

The AMP600 report notes that certain PM<sub>2.5</sub> monitors did not meet collocation requirement, which falls under the responsibility of the primary quality assurance organization (PQAO). Since CARB is the PQAO for 22 local California air districts, including Sac Metro Air District, CARB will be addressing the collocation requirement in their 2018 data certification process.

777 12th Street, 3rd Floor | Sacramento, CA 95814-1908  
916/874-4800 | 916/874-4899 fax  
[www.airquality.org](http://www.airquality.org)

**Figure C-2 Copy of Sac Metro Air District Data Certification Letters, Page 2**

Stoker

April 25, 2019

Comments and justifications for certification for monitors not recommended for concurrence by the AMP600 reports' finding are listed in Table 1 (attached). If you have any questions regarding Sac Metro Air District's data or certification report, please contact Ms. Janice Lam Snyder, Program Manager of Air Monitoring, Planning & Data Analysis, at 916-874-4835 or [jlam@airquality.org](mailto:jlam@airquality.org).

Sincerely,



Mark Loutzenhiser  
Division Manager, Program Coordination Division

Enclosures: Certification Evaluation and Concurrence (AMP600)  
Quicklook All Parameters (AMP450NC)

cc: Gwen Yoshimura, U.S. Environmental Protection Agency Region IX  
([yoshimura.gwen@epa.gov](mailto:yoshimura.gwen@epa.gov))

Michael Flagg, U.S. Environmental Protection Agency Region IX  
([Flagg.MichaelA@epa.gov](mailto:Flagg.MichaelA@epa.gov))

Fletcher Glover, U.S. Environmental Protection Agency Region IX  
([Clover.Fletcher@epa.gov](mailto:Clover.Fletcher@epa.gov))

Michael Benjamin, California Air Resources Board  
([mbenjami@arb.ca.gov](mailto:mbenjami@arb.ca.gov))

Jin Xu, California Air Resources Board  
([Jin.Xu@arb.ca.gov](mailto:Jin.Xu@arb.ca.gov))

Craig Anderson, California Air Resources Board  
([Craig.Anderson@arb.ca.gov](mailto:Craig.Anderson@arb.ca.gov))

Dwight Oda, California Air Resources Board  
([doda@arb.ca.gov](mailto:doda@arb.ca.gov))

Michael Miguel, California Air Resources Board  
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Kyle Vagadori, California Air Resources Board  
([kyle.vagadori@arb.ca.gov](mailto:kyle.vagadori@arb.ca.gov))

Janice Lam Snyder, Program Coordination Division  
([jlam@airquality.org](mailto:jlam@airquality.org))

Levi Ford, PCD/Air Monitoring Section  
([lford@airquality.org](mailto:lford@airquality.org))

David Yang, PCD/Planning & Data Analysis Section  
([dyang@airquality.org](mailto:dyang@airquality.org))

Page 2 of 3



**Figure C-3 Copy of Sac Metro Air District Data Certification Letters, Page 3**

Stoker

April 25, 2019

Table 1: Comments on AMP600 & AMP450NC Review

Site	Parameter & POC	Reason for AQS' Recommendation	District Comments
North Highlands 06-067-0002	PM <sub>10</sub> 81102-1	Quality Assurance Project Plan not approved in 10 years	CARB is currently updating the QAPP for PM. Sac Metro Air District looks forward to working with CARB on the update.
Del Paso Manor 06-067-0006	PM <sub>10</sub> 81102-1		
Del Paso Manor 06-067-0006	PM <sub>10</sub> 81102-2		
Branch Center 06-067-0284	PM <sub>10</sub> 81102-1		
Folsom 06-067-0012	PM <sub>2.5</sub> 88101-3		
Folsom 06-067-0012	PM <sub>2.5</sub> 88101-4		
Sloughosue 06-067-5003	PM <sub>2.5</sub> 88101-3		
Del Paso Manor 06-067-0006	Pb 85129-4	Quality Assurance Project Plan not approved in 10 years	Sac Metro Air District will work with CARB to update the QAPP.
North Highlands 06-067-0002	NO <sub>2</sub> 42602-1	Annual summary completeness < 70%	The NO <sub>2</sub> analyzer did not operate in 2018 due to malfunction
North Highlands 06-067-0002	NO <sub>2</sub> 42602-1	1-pt QC completeness < 65%	
North Highlands 06-067-0002	NO <sub>2</sub> 42602-1	Annual performance valuation audit missing or 1 level	

*The enclosure to this letter is not reproduced in this annual network plan. Please contact Sac Metro Air District for a copy of this letter in its entirety.*

**Figure C-4 Copy of Sac Metro Air District Data Certification Letters, Page 4**

April 25, 2019

Jin Xu  
Manager, Air Quality Analysis Section  
California Air Resources Board  
Air Quality Planning and Science Division  
P.O. Box 2815  
Sacramento, CA 95812

RE: 2018 Data Certification

Dear Mr. Xu:

Sacramento Metropolitan Air Quality Management District (Sac Metro Air District) and California Air Resources Board (CARB) shares responsibility in collecting and analyzing particulate matter (PM) gravimetric filters in Sacramento County, California. It includes PM<sub>2.5</sub> filters collected at Sacramento-Del Paso Manor (DPM) and Sacramento-Bercut. It also includes the PM<sub>10</sub> filters collected at DPM for determining PM<sub>10-2.5</sub>.

In support of the U.S. Environmental Protection Agency (U.S. EPA) data certification requirements, Sac Metro Air District reviewed the Certification Evaluation and Concurrence report (AMP600) and Quicklook report (AMP450NC) from U.S. EPA Air Quality System. Despite findings in AMP600, the District recommend certification of the 2018 PM<sub>2.5</sub> and PM<sub>10-2.5</sub>. Comments to the reports' finding are listed in Table 1 (attached).

If you have any questions, please contact Ms. Janice Lam Snyder, Program Manager of Air Monitoring, Planning & Data Analysis, at 916-874-4835 or [jam@airquality.org](mailto:jam@airquality.org).

Sincerely,

A handwritten signature in blue ink, appearing to read "Mark Loutzenhiser".

Mark Loutzenhiser  
Division Manager, Program Coordination Division

Enclosures: Certification Evaluation and Concurrence (AMP600)  
Quicklook All Parameters (AMP450NC)

777 12th Street, 3rd Floor | Sacramento, CA 95814-1908  
916/874-4800 | 916/874-4899 fax  
[www.airquality.org](http://www.airquality.org)

**Figure C-5 Copy of Sac Metro Air District Data Certification Letters, Page 5**

Xu

April 25, 2019

cc: Craig Anderson, California Air Resources Board  
([Craig.Anderson@arb.ca.gov](mailto:Craig.Anderson@arb.ca.gov))

Dwight Oda, California Air Resources Board  
([doda@arb.ca.gov](mailto:doda@arb.ca.gov))

Michael Miguel, California Air Resources Board  
([michael.miguel@arb.ca.gov](mailto:michael.miguel@arb.ca.gov))

Kyle Vagadori, California Air Resources Board  
([kyle.vagadori@arb.ca.gov](mailto:kyle.vagadori@arb.ca.gov))

Janice Lam Snyder, Program Coordination Division  
([jlam@airquality.org](mailto:jlam@airquality.org))

Levi Ford, PCD/Air Monitoring Section  
([lford@airquality.org](mailto:lford@airquality.org))

David Yang, PCD/Planning & Data Analysis Section  
([dyang@airquality.org](mailto:dyang@airquality.org))

Page 2 of 3

**Figure C-6 Copy of Sac Metro Air District Data Certification Letters, Page 6**

Xu

April 25, 2019

Table 1: Comments on AMP600 & AMP450NC Review


Site	Parameter & POC	Reason for AQS' Recommendation	District Comments
Del Paso Manor 06-067-0006	PM <sub>2.5</sub> 88101-1	Quality Assurance Project Plan not approved in 10 years	CARB is currently updating the QAPP for PM. Sac Metro Air District looks forward to working with CARB on the update.
Del Paso Manor 06-067-0006	PM <sub>2.5</sub> 88101-2		
Bercut 06-067-0015	PM <sub>2.5</sub> 88101-1		

*The enclosure to this letter is not reproduced in this annual network plan. Please contact Sac Metro Air District for a copy of this letter in its entirety.*

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## Appendix D California Alternative Plan (CAP III)

### Figure D-1 California Alternative Plan, Page 1




**Winston H. Hickox**  
Agency Secretary

## Air Resources Board

**Alan C. Lloyd, Ph.D.**  
Chairman

1001 I Street • P.O. Box 2815 • Sacramento, California 95812 • [www.arb.ca.gov](http://www.arb.ca.gov)



**Gray Davis**  
Governor

June 20, 2001

Mr. Emmanuel Aquitania  
U.S. EPA, Region IX  
75 Hawthorne Street  
San Francisco, CA 94105-3901

Dear Mr. Aquitania:

On behalf of the air pollution control and air quality management districts operating PAMS and the ARB, I am pleased to transmit to you the Photochemical Assessment Monitoring Station California Alternative Plan (CAP III) for the 2001 monitoring season.

Of the six air districts which operate PAMS, three will maintain their existing programs for this 2001 season, which begins July 3, 2001. The others intend to modify their programs by shifting some resources from sample collection and analysis to data analysis and use. The intent is to continue to meet the data acquisition goals of the program while significantly increasing the use of the data record to improve air quality. These changes are consistent with the new directions suggested for the PAMS program at the March 2000 STAPPA/ALAPCO PAMS workshop, to reduce field operations and use resources to do data analyses.

The South Coast Air Quality Management District will continue to operate their stations under the full U. S. EPA plan. The San Diego Air Pollution Control District and the Santa Barbara Air Pollution Control District will be operating their stations as they have under CAP II (See Table 1).

The Sacramento Metropolitan Air Quality Management District, San Joaquin Valley Air Pollution Control District, and Ventura County Air Pollution Control District are making some changes to their monitoring schedules in the 2001 CAP plan. These changes are illustrated in Table 2.

**Overview of Monitoring Changes**

The Sacramento Metropolitan Air Quality Management District will be eliminating PAMS monitoring at the type II site at Airport Road. The justification for this change can be found in Attachment A. We support their decision to eliminate this site and to reassign the Del Paso Manor site as a type II (primary) site.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Website: <http://www.arb.ca.gov>.

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California Environmental Protection Agency

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**Figure D-2 California Alternative Plan, Page 2**

Mr. Emmanuel Aquitania  
June 20, 2001  
Page 2

The district is also reducing speciated hydrocarbon monitoring at the type III Folsom-Natoma site (see Attachment B-information provided by the Sacramento Metropolitan district).

The San Joaquin Valley and Ventura County districts will be conducting sentinel monitoring on episode days only at their type I sites (Madera and Shafter in San Joaquin Valley, and Emma Wood in Ventura County). In addition, the Ventura County District is reducing speciated hydrocarbon monitoring at the type III Simi Valley site (see Attachments C, from the San Joaquin Valley District and D, from the Ventura County District).

There are several points in the plan that were clarified in response to U.S. EPA comments:

- 1) Trend day definition: for all districts, a trend day is every third day during the months of July-September.
- 2) Episode day definition: The Sacramento Metropolitan and Ventura County Districts are changing the criterion for an episode day. An episode is any day that the maximum eight-hour average ozone concentration exceeds 0.0845 PPM. These Districts made these changes in an effort to better represent the levels of ozone that they are testing for in their districts. The Sacramento Metropolitan and Ventura County Districts have a goal of capturing five episodes per PAMS season. The San Joaquin Valley district is maintaining the episode criterion that was applicable under CAP II, which is any day in which the maximum one-hour average ozone concentration exceeds 0.125 PPM. The San Joaquin Valley District has a goal of capturing three episodes per PAMS season.
- 3) Canister sampling times: In response to the district modeler's requests for more episode data during the early morning hours, the Sacramento Metropolitan, San Joaquin Valley and Ventura County Districts changed the 2300-0200 PST sampling time to an 0800-1100 PST sampling time. Because three of the four sampling times match, data comparisons between trend and episode days can still be done.

**Overview of "Add Backs"**

Implementing the modifications to monitoring schedules will allow districts the opportunity to 'add-back' resources to other areas of the PAMS program, primarily data analysis and use. In this regard, the Sacramento Metropolitan, San Joaquin Valley, and Ventura County Districts have committed to the following short-term data analysis activities and target dates:

- 1) Determine one-hour and eight-hour ozone trends; long-term trends, weekend ozone effect, any shifts in location of ozone peaks (December 31, 2001).
- 2) Conduct exploratory PAMS data analysis on 1998-2000 VOC data (species fingerprint, time series, scatterplots for each PAMS site, and time of day (May 31, 2002).

**Figure D-3 California Alternative Plan, Page 3**

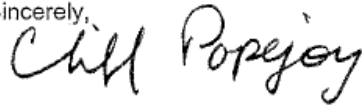
Mr. Emmanuel Aquitania  
June 20, 2001  
Page 3

- 3) Develop methodologies for determining VOC and NOx ratios and limitations for each site (September 30, 2002).
- 4) Evaluate early morning NMHC reactivity (San Joaquin Valley District only).

In addition, the Sacramento Metropolitan and San Joaquin Valley Districts have proposed to perform Central California Ozone Study (CCOS) data analysis work. These data analysis projects will be determined jointly by California Air Resources Board (ARB) and the districts during the spring of 2001. Data analysis will begin when CCOS releases the data for use by the study participants (September 30, 2002). In response to your comments, one other change proposed by the Sacramento Metropolitan District includes establishing NOy monitoring at two sites within the district (sites not yet determined).

We appreciate the time and effort that you and John Silvasi expended in reviewing and commenting on the CAP III proposals, and we welcome Sharon Nizich and John Lutz to the PAMS team. We have substantively addressed the informal comments regarding this plan provided by you and John. By implementing monitoring reductions and adding back resources into data analysis and new programs (e.g., NOy monitoring), these efforts will enhance the usefulness of the PAMS program. All of the districts and ARB are committed to support the new emphasis on data analysis and data use while maintaining the data acquisition goals of the program. We look forward to working with you this 2001 PAMS season. If you have any questions, please contact me at (916) 322-6202.

Sincerely,



Cliff Popejoy, Manager  
Program Evaluation and Standards Section  
Monitoring and Laboratory Division

**Attachments**

cc: John Ching, SMAQMD ✓  
Corie Choa, SCAQMD  
Rudy Eden, SCAQMD  
Tom Parsons, SCAQMD  
Joel Cordes, SBAPCD  
John Gallup, SJVAPCD  
Rich Milhorn, SJVAPCD  
Mahmood Hossain, SDAPCD  
Doug Tubbs, VCAPCD  
David Lutz, U. S. EPA  
Sharon Nizich, U. S. EPA  
Jeff Cook ARB  
Donald Hammond ARB  
Karen Buckley ARB

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Figure D-4 California Alternative Plan, Page 4

Table 1: California PAMS Network 2000

Station	AIRS #	O3	NOx	CSGC	HCS	NMOC	MTGC	C=O	UA	W	T	RH	SR	UV	BP	R	V
Ventura County APCD																	
Simi Valley- Cochran #3	061112002	X	X		X	X				X	X	X	X				
El Rio #2	061113001	X	X		Xparallel	X		X-split		X	X	X	X				
Ventura- Emma Wood #1	061112003	X	X		X					X	X	X	X				
Simi Valley- landfill	061110008								X	X	X	X	X	X	X		
Santa Barbara APCD																	
Goleta #2	06832011	X	X							X	X						
Split station in Goleta	060832015			X				X		X	X	X	X				
Santa Barbara Airport	none								X	X	X	X	X				
San Diego APCD																	
El Cajon #2	060730003	X	X		X	X		X-split		X	X	X	X				
S.D. Overland #2	060730006	X	X		X			X-split		X	X	X	X				
Alpine #3	060731006	X	X		X					X	X	X	X				
Camp Pendleton #1	060731008	X	X		X					X	X	X	X				
Point Loma / Miramar	none								X	X	X	X	X				
Sacramento M-AQMD																	
Sac- Del Paso Manor #2	060670006	X	X		X	X		X		X	X	X	X				
Folsom-50 Natoma #3	060670012	X	X		X	X		X		X	X	X	X				
Elk Grove- Bruceville #1	060670011	X	X		X	X			X	X	X	X	X				X
Sac- Airport Rd. #2	060670013	X	X		X	X		X		X	X	X	X				
San Joaquin YU-APCD																	
Bakersfield- Golden #2 (ARB)	060290010	X	X		X	X		X		X	X	X	X				
Fresno- Clovis #2	060195001	X	X		X	X		X		X	X	X	X				
Arvin #3.1 #1 (ARB)	060295001	X	X		X	X		X		X	X	X	X				
Parlier # 3	060194001	X	X		X	X		X		X	X	X	X				
Madera #1	060380004	X	X		X	X		X		X	X	X	X				
Sheffer #1 (ARB)	060296001	X	X		X	X		X		X	X	X	X				
Visalia-airport	061073000								X	X	X	X	X				
South Coast AQMD																	
Pico Rivera #2	060371601	X	X	X				X-split		X	X	X	X	X	X		
Azusa #3	060370002	X	X		X					X	X	X	X	X	X		X
Banning-Airport #2	060650012	X	X		X			X		X	X	X	X	X	X		
Upland #4 / #1	060711004	X	X		X					X	X	X	X	X	X		
Hawthorne #1	060375001	X	X		X					X	X	X	X	X	X		
Burbank #2	060371002	X	X		X					X	X	X	X	X	X		
Santa Clarita #2	060376002	X	X		X					X	X	X	X	X	X		
LAX / Ontario X /	none																
Riverside / Orange Co. New!									X	X	X	X	X	X	X		
PAMS Value Added Sites																	
Fresno- 1st (ARB)	060190008	X	X		X-colloc.	X	X-colloc.	X-split		X	X	X	X				
LA- North Main	060371103	X	X		X		X			X	X	X	X	X			

New! - New station for 2000.  
 O3- Ozone  
 NOx- Oxides of Nitrogen  
 CSGC- Continuous 3 hour Speciated hydrocarbon Gas Chromatography  
 HCS- HC Species by canister GC  
 NMOC- Total Non-Methane Organic Compounds, continuous, hourly monitoring  
 RH- Relative Humidity  
 MTGC- Measured TNMOC, GC, canister, (PDFID)  
 HC- HC Species by canister GC  
 X-colloc. X  
 X-split X  
 C=O- Carbonyls, 3 hour cartridges  
 UA- Upper Air monitoring  
 W- Wind speed /direction  
 T- Temperature, ambient  
 SR- Solar Radiation, total  
 UV- UltraViolet radiation  
 BP- Barometric Pressure  
 R- Rain  
 V- Visibility  
 arb/mf/pe&s/dsh/2-9-01

Figure D-5 California Alternative Plan, Page 5

**TABLE 2: CALIFORNIA ALTERNATIVE PLAN III OVERVIEW**

SITE	TYPE	VOC SAMPLING	CARBONYLS
<b>SACRAMENTO AIR QUALITY MANAGEMENT DISTRICT</b>			
ELK GROVE-BRUCEVILLE * 060970011	I	(4) 3-Hr Canisters-July-Sept (Episode Only)** 5-8AM, 8-11AM, 12-3PM AND 4-7PM	NONE
AIRPORT ROAD * 060670013	II	NONE	NONE
DEL PASO MANOR* 060670006	II	(4) 3-Hr Canisters-July-Sept TREND DAYS (Every 3 <sup>rd</sup> day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS** 5-8AM, 8-11AM, 12-3PM AND 4-7PM (2) 3-Hr Canisters-July-Sept TREND DAYS (Every 3 <sup>rd</sup> day): 5-8AM AND 4-7PM	(4) 3-Hr Cartridges every three days-July-Sept TREND DAYS (Every 3 <sup>rd</sup> day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS** 5-8AM, 8-11AM, 12-3PM AND 4-7PM
NATOMA STREET * 060670012	III	EPISODE DAYS** 5-8AM, 8-11AM, 12-3PM AND 4-7PM (4) 3-Hr Canisters	NONE
<b>SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT</b>			
MADERA * 060390004	I	(4) 3-Hr Canisters-July-Sept (Episode Only)*** 5-8AM, 8-11AM, 12-3PM AND 4-7PM	NONE
SHAFTER * 060290001	I	(4) 3-Hr Canisters-July-Sept (Episode Only)*** 5-8AM, 8-11AM, 12-3PM AND 4-7PM	NONE
BAKERSFIELD-GOLDEN STATE* 060290010	II	(4) 3-Hr Canisters-July-Sept TREND DAYS (Every 3 <sup>rd</sup> day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS*** 5-8AM, 8-11AM, 12-3PM AND 4-7PM (4) 3-Hr Canisters-July-Sept TREND DAYS (Every 3 <sup>rd</sup> day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS*** 5-8AM, 8-11AM, 12-3PM AND 4-7PM	(4) 3-Hr Cartridges every three days-July-Sept TREND DAYS (Every 3 <sup>rd</sup> day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS*** 5-8AM, 8-11AM, 12-3PM AND 4-7PM (4) 3-Hr Cartridges every three days-July-Sept TREND DAYS (Every 3 <sup>rd</sup> day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS*** 5-8AM, 8-11AM, 12-3PM AND 4-7PM
CLOVIS-VILLA * 060195001	II	(4) 3-Hr Canisters-July-Sept TREND DAYS (Every 3 <sup>rd</sup> day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS*** 5-8AM, 8-11AM, 12-3PM AND 4-7PM	(4) 3-Hr Cartridges every three days-July-Sept TREND DAYS (Every 3 <sup>rd</sup> day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS*** 5-8AM, 8-11AM, 12-3PM AND 4-7PM
ARVIN * 060295001	III	TREND DAYS (Every 3 <sup>rd</sup> day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS*** 5-8AM, 8-11AM, 12-3PM AND 4-7PM (4) 3-Hr Canisters-July-Sept	NONE
PARLIER * 060194001	III	TREND DAYS (Every 3 <sup>rd</sup> day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS*** 5-8AM, 8-11AM, 12-3PM AND 4-7PM	NONE
<b>VENTURA COUNTY AIR POLLUTION CONTROL DISTRICT</b>			
EMMA WOOD 061112003	I	(4) 3-Hr Canisters-July-Sept (Episode Only)** 5-9AM, 8-11AM, 12-3PM AND 4-7PM (4) 3-hr Canisters July-Sept:	NONE
EL RIO * 061113001	II	TREND DAYS (Every 3 <sup>rd</sup> day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS** 5-8AM, 8-11AM, 12-3PM AND 4-7PM (2) 3-hr Canisters July-Sept:	(4) 3-hr Cartridges July-Sept: TREND DAYS (Every 3 <sup>rd</sup> day) 2-5AM, 5-8AM, 12-3PM and 4-7PM EPISODE DAYS** 5-8AM, 8-11AM, 12-3PM and 4-7PM
SIMI VALLEY * 061112002	III	TREND DAYS (Every 3 <sup>rd</sup> day): 5-8AM and 4-7PM (4) 3-hr Canisters: EPISODE DAYS** 5-8AM, 8-11AM, 12-3PM and 4-7PM	NONE

\* SITES OPERATE TECOS5 MONITORS  
 \*\* MAX 8-HR OZONE AVE. 0.0845 PPM OR HIGHER  
 \*\*\* MAX 1-HR OZONE AVE. 0.125 PPM OR HIGHER  
 \*\*\*\* 3 EPISODES PER YEAR  
**ALL SAMPLING TIMES ARE PST**


The enclosure to this letter is not reproduced in this annual network plan. Please contact Sac Metro Air District for a copy of this letter in its entirety.

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## Appendix E Letters to U.S. EPA

### Figure E-1 Notice of Temporary Shut Down for Sacramento-Folsom Ambient Air Monitoring Site, Page 1

SACRAMENTO METROPOLITAN



AIR QUALITY  
MANAGEMENT DISTRICT

Alberto Ayala, Ph.D., M.S.E.  
AIR POLLUTION CONTROL OFFICER

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July 3, 2019  
Ms. Gwen Yoshimura  
U.S. Environmental Protection Agency  
Air Quality Analysis Office (AIR-7)  
75 Hawthorne Street  
San Francisco, CA 94105-3901

**Subject: Notice of Temporary Shutdown for the Sacramento-Folsom (AQS ID: 06-067-0012) Ambient Air Monitoring Site**

Dear Ms. Yoshimura:

The Sacramento Metropolitan Air Quality Management District (District) is submitting a temporary shutdown notice to the United States Environmental Protection Agency (EPA) for the temporarily closure of Folsom Air Monitoring Station (AMS) (AQS ID: 06-067-0012) for all parameters at the site due to the shelter replacement between July, 2019 to December, 2019.

This request was first submitted to the EPA on February 12, 2018 and a conference call was conducted on March 27, 2018 with the District, EPA Region 9, and California Air Resources Board (CARB) to discuss this matter further. On April 5, 2018, an email from EPA staff<sup>1</sup> stated that EPA's preference would be to setup a nearby trailer to run ozone and NO<sub>x</sub> analyzers while Folsom AMS is being replaced, or delay construction until the end of the ozone season to ensure there is no gap in the regulatory record. The District elected to delay construction until the end of 2018 ozone season to ensure there are no gaps in the regulatory record.

Due to circumstances beyond the District's control, the replacement of Folsom AMS has not started and the structure continues to deteriorate. The bolts connecting the roof access ladder to the wall of the building have started to pull away from the structure. A storm during the weekend of March 2<sup>nd</sup> and 3<sup>rd</sup>, 2019 pulled guy wire bolts out of the NO<sub>y</sub> instrument reactor mast forcing the district to remove the mast. The structure is rapidly deteriorating and needs replacement without any further delay.

Since the District will be using data from 2016 to 2018 to determine attainment in 2019 for the 1997 ozone National Ambient Air Quality Standard (NAAQS), it is not anticipated to impact the attainment decision for the 1997 ozone NAAQS. Additionally, the Folsom monitor has not been the "peak ozone design value" site for Sacramento Federal Ozone Nonattainment Area since 2015. Over the years, the ozone peak design value site has shifted to the foothills to the Placerville and Auburn stations. The District has worked with EPA Region 9 staff, Michael Flagg, who anticipates that a temporary shut down during peak summertime O<sub>3</sub> monitoring season would have no foreseeable regulatory significance.

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<sup>1</sup> Flagg, Michael, "Conference call with SMAQMD and EPA", Message to Janice Lam Snyder, 5 Apr. 2018, Email.

777 12th Street, 3rd Floor | Sacramento, CA 95814-1908  
916/874-4802 | 916/874-4805 fax  
www.airquality.org

**Figure E-2 Notice of Temporary Shut Down for Sacramento-Folsom Ambient Air Monitoring Site, Page 2**

During July, 2019, the District will cease operation of the station until the structure can be replaced and the instrumentation can be reinstalled. The District is working to limit the downtime of the station. It is anticipated that the new station will be operational by winter of 2019. The District will continue to work with CARB and EPA on more affirmative dates as construction dates are confirmed.

If you have any other questions, please contact me.

Sincerely,



Janice Lam Snyder  
Program Manager, Air Monitoring, Planning and Data Analysis  
Sacramento Metropolitan Air Quality Management District

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## Appendix F U.S. EPA Response to Letter

### Figure F-1 Response to Notice of Temporary Shut Down for Sacramento-Folsom Ambient Air Monitoring Site, Page 1

**From:** YOSHIMURA, GWEN <Yoshimura.Gwen@epa.gov>  
**Sent:** Friday, July 19, 2019 2:44 PM  
**To:** Janice Lam Snyder  
**Cc:** Levi Ford; Flagg, MichaelA; Vallano, Dena  
**Subject:** Folsom relocation / moving forward with planned shut down

\*\*\* THIS EMAIL ORIGINATED OUTSIDE AIRQUALITY.ORG \*\*\*

Hi Janice,

Our apologies for not having the official correspondence back to you regarding your temporary shutdown of Folsom. We are working on the approval and hope to get it to you shortly. In the meantime, please feel free to move forward with your shutdown as planned.

Much thanks,  
Gwen

---

Gwen M. Yoshimura  
Manager, Air Quality Analysis Office  
Environmental Protection Agency, Region 9  
Phone: 415.947.4134  
Email: yoshimura.gwen@epa.gov

mailing address:  
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75 Hawthorne Street  
San Francisco, CA 94105

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