2020 Annual Network Plan

On the Cover: Sacramento-Del Paso Manor Air Monitoring Station, 2020, with more than a dozen sampling inlets and low-cost sensors

Below: Sacramento-Del Paso Manor Air Monitoring Station, 1991, with only several sampling inlets

Contents

List of Abbreviations and Acronyms

Abbreviation	Definition
µg/m3	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
NO_2	Nitrogen dioxide
NOX	Oxides of nitrogen
NOY	Reactive Oxides of Nitrogen
O_3	Ozone
PAMS	Photochemical Assessment Monitoring Station
Pb	Lead
PM	Particulate matter
PM_{10}	Particulate matter, 10 micrometers or smaller
$PM_{2.5}$	Particulate matter, 2.5 micrometers or smaller
PM_{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
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_2	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

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 1st 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 August 19, 2020 through September 18, 2020. No public comment was received. This ANP covers the time period: January 1, 2019 – December 31, 2019. It focuses on the monitors that operate within Sacramento County, which is a part of Sacramento-Arden Arcade-Roseville Metropolitan Statistical Area (Sacramento MSA).

Due to the 2020 COVID-19 health crisis in the United States, Sacramento Metropolitan Air Quality Management District ("Sac Metro Air District" or "District") is doing its part to help stop the spread of the virus. Since March 2020, it has implemented health guidelines recommended by the local state and county officials, which include shelter in place, social distancing, etc. That, in turn, has delayed a number of projects, including the release of this annual network plan.

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).

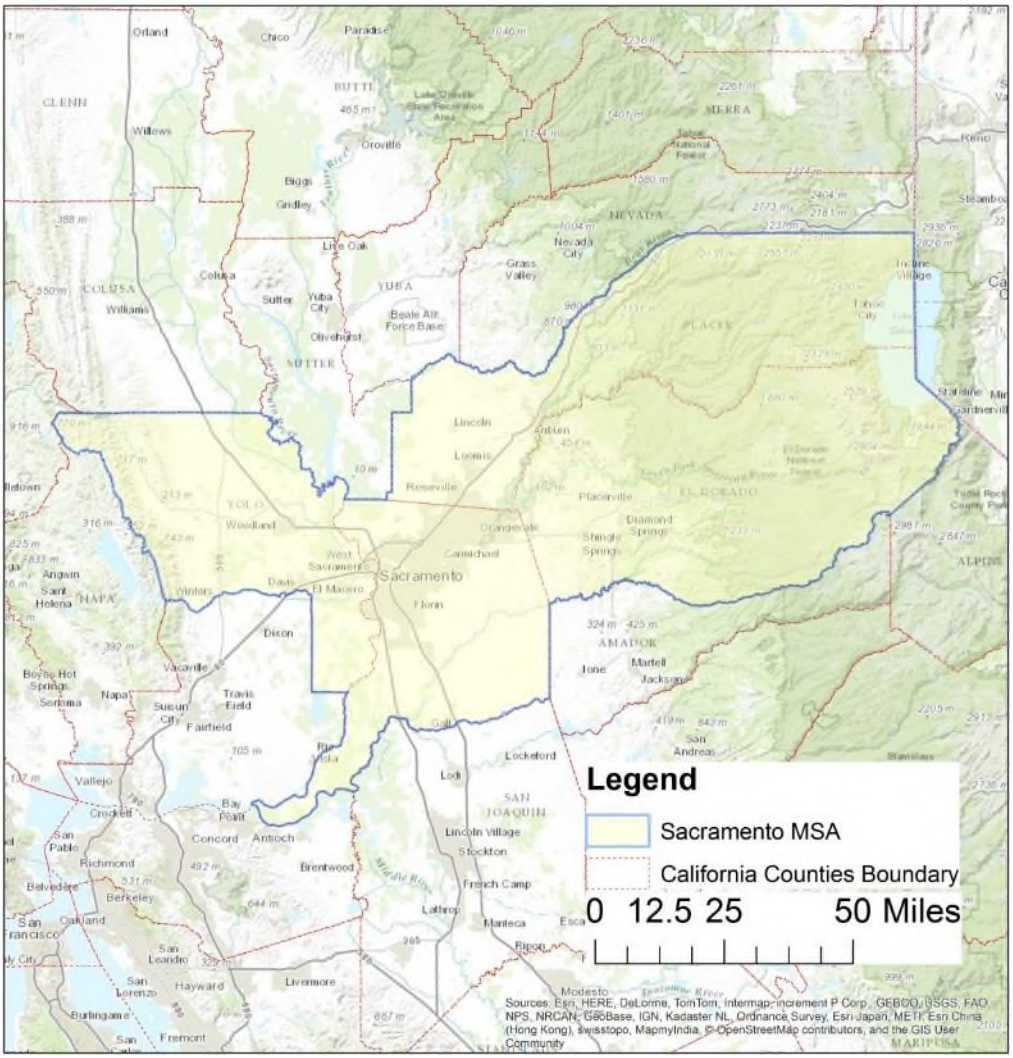
This report is not an extensive analysis of the design of the local air monitoring network. The extensive analysis of the air monitoring network is provided in a network assessment report, which is required every five years. The network assessment report analyzes and determines if the air monitoring 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. The District is currently drafting the 2020 Air Monitoring Network Assessment, and the report will be posted on the District's website when completed.

Any shared monitoring responsibilities between the District and neighboring monitoring organizations in the Sacramento MSA are discussed in Section 3, Minimum Monitoring Requirements. 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 27th in population among all MSA's in the United States[1]. Figure 2-1 shows a map of Sacramento MSA.

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

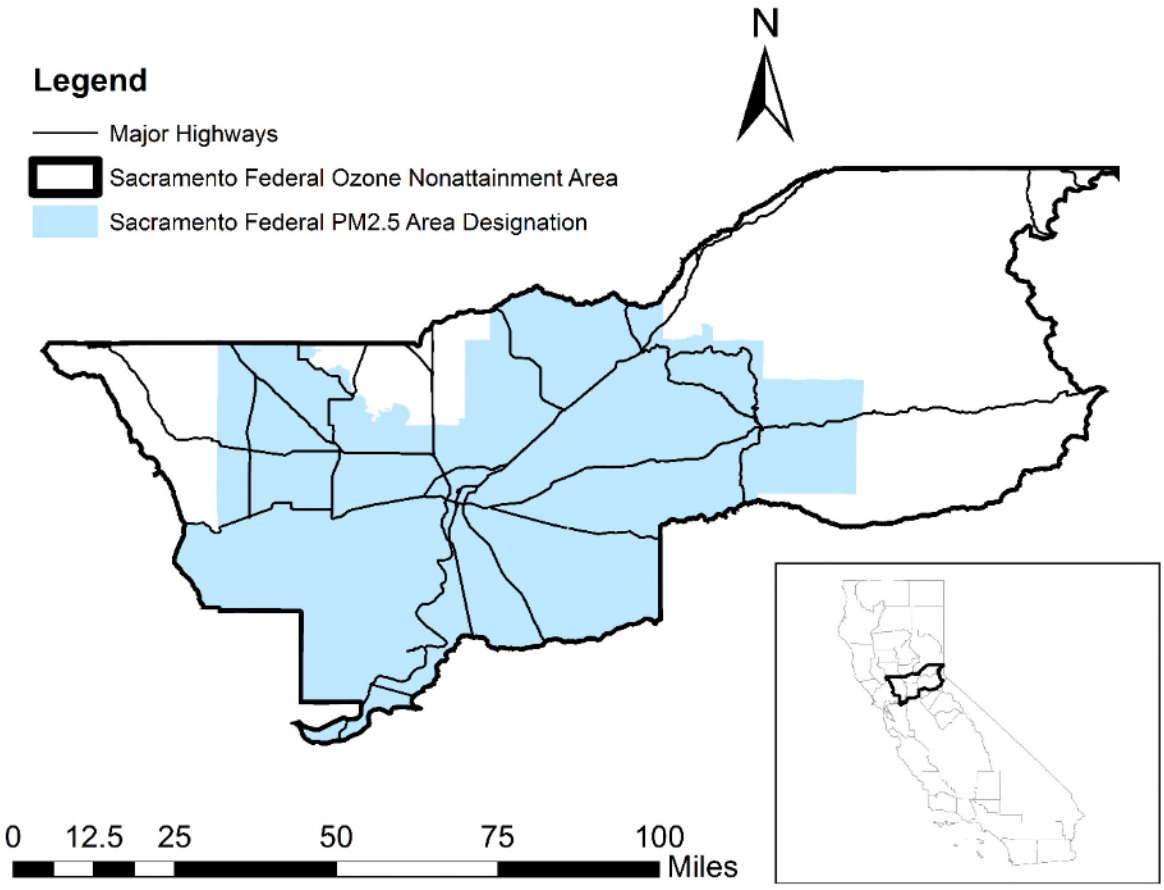


A portion of the Sacramento MSA is a nonattainment area for the federal 2015 8-hr ozone (O_3) standard and is referred to as the Sacramento Federal Ozone Nonattainment Area[2]. This area includes all of Sacramento and Yolo Counties and portions of Placer, El Dorado, Solano, and Sutter Counties. The Sacramento 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

[1] United States Census Bureau, Population Division, 2018 Population Estimates (accessed 6 Mar 2020)
[2] https://www.epa.gov/sites/production/files/2018-04/documents/placeholder.pdf

matter with size of 10 microns or smaller (PM_{10}) air quality standard since 2002[3]. 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[4].

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



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. Table 2-1 through Table 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 a 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). Unless otherwise noted, all monitors listed in Table 2-1 through Table 2-3 are SLAMS monitor type. Each of the tables are color coded to identify network affiliations, if any.

[3] The 2018 Camp Fire caused PM_{10} exceedance, and the District is submitting to U.S. EPA an exceptional event demonstration to exclude the data from air quality standard comparison

[4] https://www.epa.gov/lead-designations/lead-designations-final-nonattainment-designations-rounds-1-and-2; 70 FR 72097

Figure 2-3 Air Monitoring Sites in Sacramento County

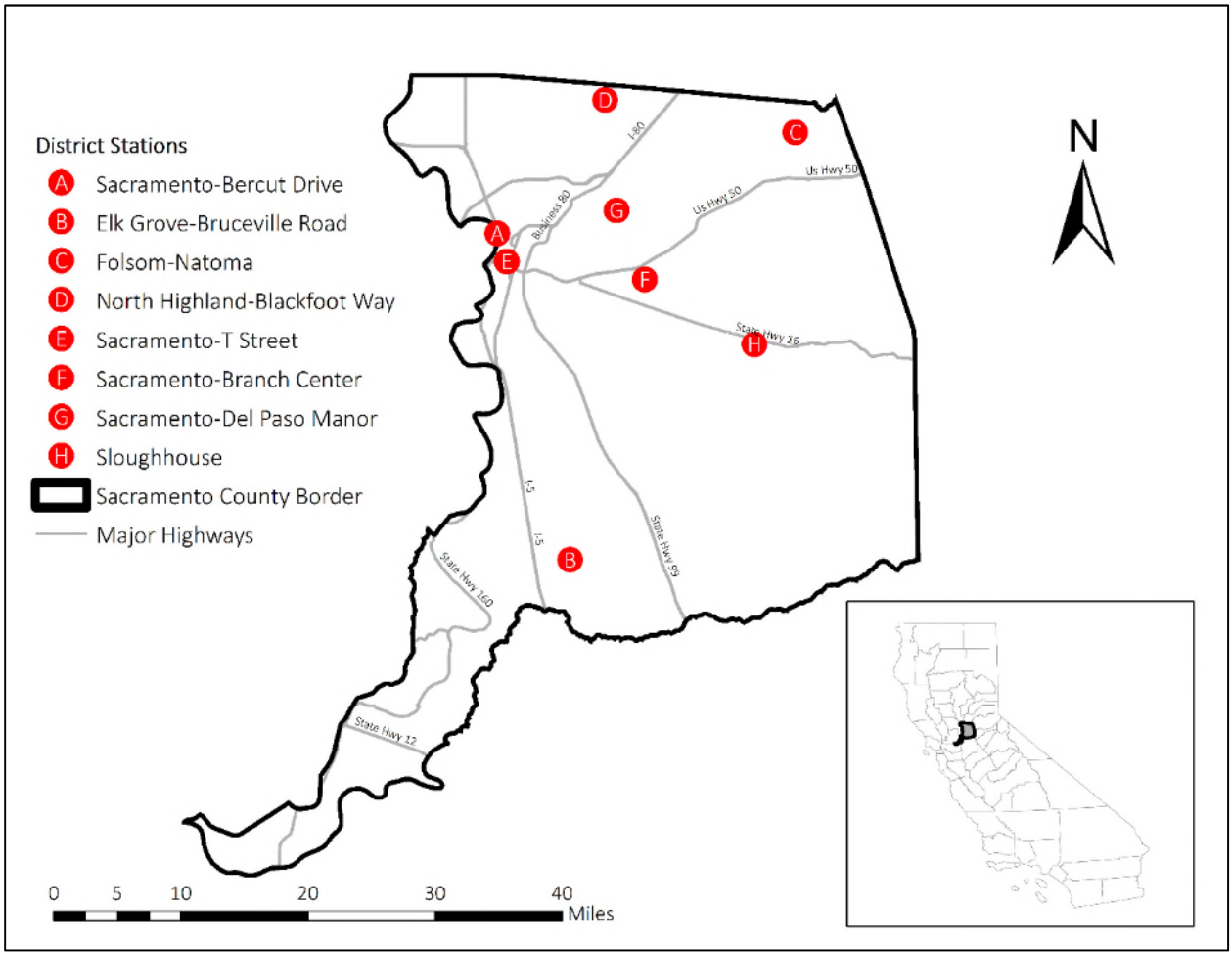


Table 2-1 Criteria Pollutants Measured by Stations

Station Name	O_3	CO	NO_2	SO_2	Pb	PM_{10} (Hourly)	PM_{10} (24-hr)	$PM_{2.5}$ (Hourly)	$PM_{2.5}$ (24-hr)
Sacramento-Bercut Dr.		✓	✓						✓
Sacramento-Branch Center #2							✓		
Elk Grove-Bruceville	✓		✓					✓	
Sacramento-Del Paso Manor	✓	✓	✓	✓	✓		✓	✓	✓
Folsom-Natoma St.	✓		✓					✓	
North Highlands-Blackfoot Way	✓(a)	✓(a)	✓(a)				✓		
Sloughhouse	✓							✓	
Sacramento-T Street	✓		✓			✓		✓	✓

Note: All monitors are SLAMS monitor type unless otherwise noted

(a) SPM monitor type

No affiliation or not applicable

Near Road

Photochemical Assessment Monitoring Station (PAMS)

National Core Multi-pollutant Monitoring Stations (NCORE)

Multiple affiliation types (Includes SLAMS, PAMS & NCORE)

Table 2-2 Non-Criteria Pollutants Measured by Stations

	Reactive Nitrogen Compound (NO_Y)	Non-methane hydrocarbon (NMHC)	Volatile Organic Compound (VOC)	Carbonyl	$PM_{10-2.5}$	Speciated $PM_{2.5}$	Black Carbon (BC)
Sacramento-Bercut Dr.							✓
Sacramento-Branch Center #2							
Elk Grove-Bruceville		✓	✓				
Sacramento-Del Paso Manor	✓	✓	✓	✓	✓	✓	✓(a)
Folsom-Natoma St.	✓	✓	✓				
North Highlands-Blackfoot Way							
Sloughhouse							
Sacramento-T Street						✓	

Note: All monitors are SLAMS monitor type unless otherwise noted
(a) SPM monitor type
No affiliation or not applicable
Near Road
Photochemical Assessment Monitoring Station (PAMS)
National Core Multi-pollutant Monitoring Stations (NCORE)
Carbon Speciation Network (CSN)
Multiple affiliation types (Includes SLAMS, NCORE and CSN)

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	✓	✓	✓	✓	✓	✓	✓
Sacramento-Del Paso Manor	✓	✓	✓				✓
Folsom-Natoma St.	✓	✓	✓				✓
North Highlands-Blackfoot Way							
Sloughhouse							✓(a)
Sacramento-T Street	✓(a)	✓(a)					✓(a)

Note: All monitors are SLAMS monitor type unless otherwise noted
(a) "Other" monitor type
No affiliation or not applicable
Near Road
Photochemical Assessment Monitoring Station (PAMS)
National Core Multi-pollutant Monitoring Stations (NCORE)
Multiple affiliation types (includes SLAMS, PAMS and NCORE)

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 2-4.

Table 2-4 Monitoring Objectives of Criteria Pollutants

Station Name	O_3	CO	NO_2	SO_2	Pb	PM_{10} (Hourly)	PM_{10} (24-hr)	$PM_{2.5}$ (Hourly)	$PM_{2.5}$ (24-hr)
Sacramento-Bercut Dr.		N,P,R	N,P,R						N,P,R
Sacramento-Branch Center #2							N,P		
Elk Grove-Bruceville	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(A)	P,R	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,R							N,P,R	
Sacramento-T Street	N,P		N,P			N,P		N,P	N,P

(A)There are three PM_{10} 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_{10} monitor with parameter code 85101, used in the calculation of Particulate Matter with size between 10 and 2.5 micrometers (PMCoarse), 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). Table 2-5 and Table 2-6 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, which 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 $PM_{2.5}$ 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 2-5 Type of Site

Station Name	O_3	CO	NO_2	SO_2	Pb	PM_{10}	$PM_{2.5}$	BC
Sacramento-Bercut Dr.		SO	SO				SO	SO
Sacramento-Branch Center #2						HC		
Elk Grove-Bruceville	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	UB		PE			PE	PE	

Site type abbreviation
GB – General/Background
HC – Highest concentration
MO – Maximum O_3 concentration
PE – Population Exposure
SO – Source oriented
UB – upwind/background

Table 2-6 Spatial Scale

Station Name	O_3	CO	NO_2	SO_2	Pb	PM_{10}	$PM_{2.5}$	BC
Sacramento-Bercut Dr.		MC	MC				MC	NA
Sacramento-Branch Center #2						NB		
Elk Grove-Bruceville	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
NA – Not applicable

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_3, $PM_{2.5}$ (manual and continuous methods), PM_{10}, NO_2, SO_2, 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 available upon request. 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. Appendix B lists the number of monitors operated by CARB and different air districts in 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 $PM_{2.5}$ concentrations exceeded the NAAQS. The design value in Table 3-1 reflects (1) as-is measurement with wildfire impact and (2) exclusion of air quality measurements with wildfire impact. Sac Metro Air District worked with other monitoring organizations 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 2019 Sacramento MSA Design Value and SLAMS Monitoring Site Requirement, Part 1

Pollutant and Type (if applicable)		Sites Required	Sites in Sacramento MSA	Additional sites needed	2019 design value and location[A]
O_3		2	16	0	(1) 0.086 ppm at Auburn (06-061-0003) (2) 0.081 ppm at Auburn (06-061-0003)
$PM_{2.5}$	FRM/FEM	3	8	0	24-hr standard: (1) 54 µg/m^3 at Woodland (06-113-1003) (2) 34 µg/m^3 at Sacramento-T Street (06-067-0006) Annual standard: (1) 10.2 µg/m^3 at Sacramento-Del Paso Manor (06-067-0006) (2) 9.3 µg/m^3 at Sacramento-Del Paso Manor (06-067-0006)
	Continuous	2	8	0	
PM_{10}		2-4[B]	8	0	Expected number of exceedance (3-yr average): (1) 4.1 days at multiple sites[C] (2) 0.0 days
$PM_{10-2.5}$		1	1	0	Not applicable

Source: U.S. EPA Air Quality System (AQS) Raw Data Report (AMP 350), Extract Site/Monitor Report (AMP 500), and Design Value Report (AMP 480), accessed on 16 Apr 2020

Units abbreviation: ppm – part per million; µg/m^3 – microgram per cubic meter

[A] The Sacramento Valley was impacted by a number of wildfires in 2018; the design values are noted with (1) include all data collected in 2018 and (2) exclude data with wildfire impacted data as outline in the exception event demonstration package the District submitted to U.S. EPA

[B] 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 PM10 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.

[C] North Highlands (06-067-0002), Sacramento-Del Paso Manor (06-067-0006), West Sacramento (06-113-2001)

Table 3-2 2019 Sacramento MSA Design Value and SLAMS Monitoring Site Requirement, Part 2

Pollutant and Type (if applicable)		Sites Required	Sites in Sacramento MSA	Additional sites needed	Notes
NO_2	Near-road	2	1	1	• Highest AADT: 277,000 (U.S. Highway 50 east of 15/16th Street) [A][B] • NO_2 monitor at Sacramento-Del Paso Manor (06-067-0006) serves as both PAMS and area-wide monitor
	Area-wide	1	6	0	
SO_2		1	1	0	• Total SO_2: 940 tons[C] • Population Weighted Emission Index: 2,162 million persons-tons per year[D] • Monitor at Sacramento-Del Paso Manor satisfy NCore requirement
CO	Near-road	2	1	1	• Monitor at Sacramento-Bercut Dr. satisfies the near-road monitoring requirement. The trace monitor at Sacramento-Del Paso satisfies the NCore requirement, which also satisfies the monitor requirement in the CO Maintenance Plan
	Non-near-road	1	1	0	
Pb	NCORE	0	1	0	• Located at Sacramento-Del Paso Manor
	Source oriented	0	0	0	• Number of non-airport source > 0.5 tons per year: 0[C] • Number of airport source >= 1.0 tons per year: 0[C]

[A] California Department of Transportation, 2018 Traffic Volumes, accessed 13 Apr 2020

[B] Sacramento MSA has surpassed the 250,000 vehicles 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

[C] 2017 National Emission Inventory (updated April 2020), accessed 19 May 2020

[D] Per 40 CFR Part 58, Appendix D, $PWEI = \frac{Total\ SO_2 \times MSA\ population}{1{,}000{,}000}$

[E] 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 available upon request. 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. Table 3-3 lists the instruments operating at each PAMS site and the current number of monitors required.

Table 3-3 PAMS Minimum Monitoring Requirement

Site Name (PAMS Site Type)	O_3	NO_2	NO_Y	VOC	Carbonyl	Surface Meteorology	Upper air Meteorology
Elk Grove-Bruceville Rd. (Type I)	✓	✓				✓	✓
Sacramento-Del Paso Manor (Type II)	✓	✓	✓(A)	✓	✓	✓	
Folsom-Natoma St. (Type III)	✓	✓	✓	✓		✓	
Number of monitors required	3(B)	2	1	2	1	3(B)	1
Number of monitors active	3	3	1	2	1	3	1

(A) Per 40 CFR Part 58, Appendix D, this monitor does not count toward PAMS requirement but is required for NCore; reactive oxides of nitrogen (NOY) for PAMS must be at Type I or III site. This requirement is fulfilled by the Folsom-Natoma St. site

(B) 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

Pollutant	Site	Sampling Schedule	Note
PM_{10}[A]	Sacramento-Branch Center #2	1 in 6 days	Max. 24-hr concentration: 53 µg/m3; ratio to standard: 0.35
PM_{10}	Sacramento-Del Paso Manor	1 in 6 days	Max. 24-hr concentration: 53 µg/m3; ratio to standard: 0.35
PM_{10}	North Highlands - Blackfoot Way	1 in 6 days	Max. 24-hr concentration: 53 µg/m3; ratio to standard: 0.35
PM_{10}	Sacramento-T Street	Continuous	
$PM_{2.5}$[B][C]	Sacramento-Bercut Dr	1 in 3 days	
$PM_{2.5}$	Elk Grove-Bruceville	Continuous	Non-FRM/FEM
$PM_{2.5}$	Sacramento-Del Paso Manor	Daily	
$PM_{2.5}$	Folsom-Natoma St	Continuous	
$PM_{2.5}$	Sloughhouse	Continuous	This monitor was reverted to SLAMS as of 5/1/2019, after a two-year operation as a SPM monitor
$PM_{2.5}$	T Street	Continuous	Special Purpose Monitor
$PM_{10\text{-}2.5}$[D]	Sacramento-Del Paso Manor	1 in 3 days	
Pb	Sacramento-Del Paso Manor	1 in 6 days	
PAMS	Sacramento-Del Paso Manor	1 in 3 days	July through September
PAMS	Elk Grove-Bruceville	Episodic	Episodic sampling July through September
PAMS	Folsom-Natoma St	1 in 3 days	July through September

Source: Design values from U.S. EPA Air Quality System Design Value Report (AMP 480), accessed on 15 Apr 2020

[A] Per 40 CFR Part 58.12(e), PM_{10} (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_{10} 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 $PM_{2.5}$ 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 $PM_{2.5}$ standard."

[C] Per 40 CFR Part 58.12 (d)(1)(i), "manual $PM_{2.5}$ samplers at required SLAMS stations without a collocated continuously operating $PM_{2.5}$ 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 $PM_{10\text{-}2.5}$ samplers at NCore stations must operate on at least a 1 in 3 days schedule at sites without a collocated continuously operating federal equivalent $PM_{10\text{-}2.5}$ method."

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 2019 calendar year and may occur within the next 18 months following this annual network plan submittal. Unless specifically noted below, Sac Metro Air District is not formally requesting approval for modification through this network plan from CARB or U.S EPA. 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 PM_{10} filter based method to a PM_{10} continuous monitoring at this site. PM_{10} 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[5]. As mentioned in Section 3, the District will evaluate with CARB the necessity of this site in the PAMS Enhanced Monitoring Plan (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 $PM_{2.5}$ beta attenuation monitor (BAM) monitor with a new one in Fiscal Year 2021-2022. The parameter code for $PM_{2.5}$ will remain unchanged as the new monitor will operate as a non-FEM monitor.

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. Thus, the District submitted a discontinuation request to the U.S. EPA, and it was approved on April 20, 2020. The District discontinued the lead monitor on May 31, 2020. A copy of the U.S. EPA approval letter is provided in Appendix D.

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 to begin in 2021 and will allow the station to accommodate additional equipment required by PAMS 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

[5] A copy is available upon request

auto gas chromatography (Auto-GC) instrument. An ultraviolet radiation sensor, precipitation gauge, and barometric pressure sensor will also be installed per PAMS requirement.

The District is evaluating replacing the PM_{10} filter based method to a PM_{10} continuous monitoring at this site. PM_{10} 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 in 2017. On July 3, 2019, the District submitted a temporary site termination request to facilitate construction. After receiving approval from U.S. EPA[6], the District temporarily suspended monitoring for ozone, nitrogen dioxide, non-methane hydrocarbon, reactive oxides of nitrogen, $PM_{2.5}$, speciated volatile organic compound, and all meteorological parameters on July 23, 2019. Construction is expected to be completed by the end of Summer 2020.

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 and reactive oxides of nitrogen (NO_Y) measurements at this site since it no longer a requirement per 80 FR 65292. The U.S. EPA finalized a rule in early 2020 to delay the PAMS requirement until June 1, 2021. The rule provides states 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.

In the meantime, the District submitted a letter to the U.S. EPA for the discontinuation of the CO monitor, and it was approved by U.S. EPA on April 20, 2020. The District discontinued the CO monitor on May 20, 2020. A copy of this letter is provided in Appendix D. The District is also evaluating replacing the PM_{10} filter based method to a PM_{10} continuous monitoring at this site. PM_{10} 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 15th/16th 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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Section 5 Quality Assurance and Other Monitoring Requirements for the PQAO

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 (PQAO) level. Sac Metro Air District is a part of the CARB's PQAO and works with the PQAO to meet the quality assurance requirements. Currently, there are collocated $PM_{2.5}$ FRM and PM_{10} FRM monitors at Sacramento-Del Paso Manor. There is a collocated $PM_{2.5}$ 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.

After receiving an approval from U.S. EPA in April 2020, the District has discontinued the Pb monitor at Del Paso Manor in May 2020. Thus, collocation for lead will not be conducted at this location.

40 CFR Part 58, Appendix D, 4.7.3, requires "each State shall install and operate at least one $PM_{2.5}$ site to monitor for regional background and at least one $PM_{2.5}$ site to monitor regional transport." In CARB's 2018 Annual Monitoring Network Report, 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 $PM_{2.5}$. Please refer to the CARB's 2018 Annual Monitoring Network Report for updates or more information.

Section 6 Process to Review Changes to $PM_{2.5}$ Monitoring Network

40 CFR Part 58.10(c) requires this annual network plan to "provide for the review of changes to a $PM_{2.5}$ monitoring network that impact the location of a violating $PM_{2.5}$ monitor." There is no current plan to relocate or discontinue any $PM_{2.}5$ monitor suitable for NAAQS comparison. Any changes to the $PM_{2.5}$ monitoring network with impact to the location of a violating $PM_{2.5}$ 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 until the end of 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 $PM_{2.5}$ 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.

- 2019 Annual data certification submitted: April 29, 2020
- 2019 Annual data certification ($PM_{2.5}$ FRM and PM Coarse only) submitted: April 15, 2020
- 2019 Annual data certification (lead only) submitted: May 27, 2020

Appendix A Detailed Site and Monitor Information

Detailed site information covered in this appendix reflects air monitoring operation from January 1, 2019-December 31, 2019.

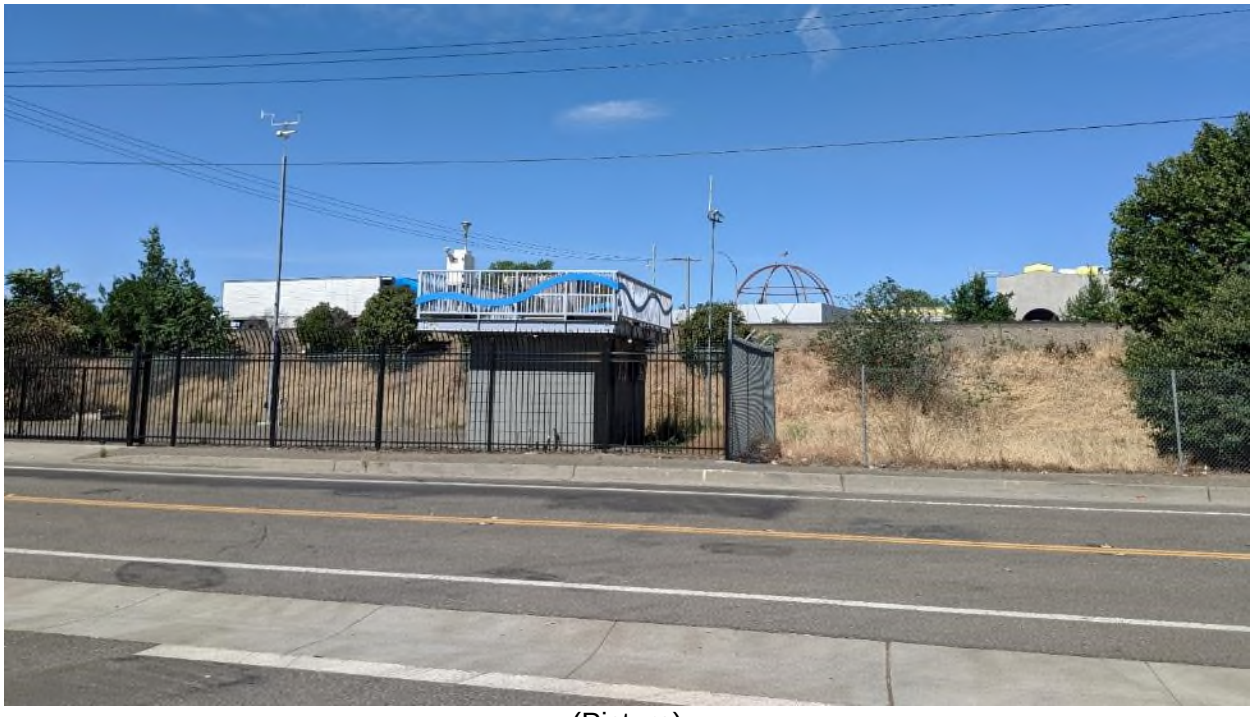
A.1 Sacramento-Bercut Dr.

This is an approved near-road monitoring site. Located one mile from Downtown Sacramento, this site is expected to measure the highest NO_2 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 Dr.
AQS Site Number	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 95811
County	Sacramento
Metropolitan Statistical Area	Sacramento-Arden Arcade-Roseville
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

Figure A-1 Sacramento-Bercut Dr. Site Photo



(Picture)

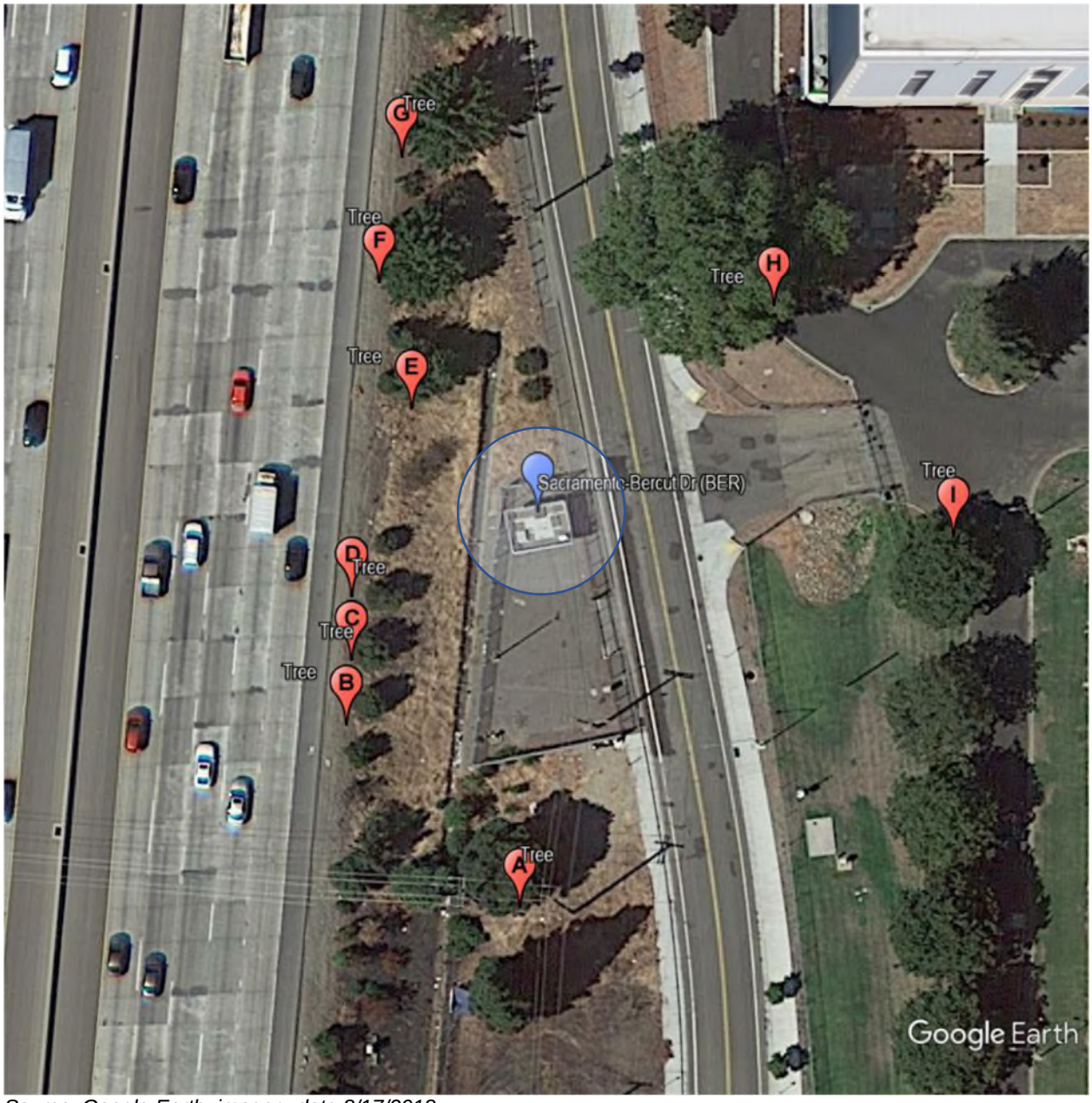
Figure A-2 Panoramic Photo Looking North from Sacramento-Bercut Dr.

Figure A-3 Panoramic Photo Looking East from Sacramento-Bercut Dr.

Figure A-4 Panoramic Photo Looking South from Sacramento-Bercut Dr.

Figure A-5 Panoramic Photo Looking West from Sacramento-Bercut Dr.

Figure A-6 Google Earth Satellite Image of Sacramento-Bercut Dr.



Source: Google Earth, imagery date 8/17/2018

The circle in Figure A-6 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 6/8/2020 and are provided in Table A-2 thru Table 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[7].

[7] Per email correspondence with Elfego Felix, U.S. EPA Region 9, on August 6, 2013

Table A-2 Distance between Object and Probe or Inlet at Sacramento-Bercut Dr.

	Gaseous Probe	Black Carbon Inlet	$PM_{2.5}$ Inlet
Object A (Tree)	37.8	35.7	37.8
Object B (Tree)	20.9	22.9	21.9
Object C (Tree)	18.0	21.0	19.0
Object D (Tree)	16.0	21.0	17.0
Object E (Tree)	12.0	18.0	13.0
Object F (Tree)	19.3	20.5	19.3
Object G (Tree)	25.3	30.3	25.3
Object H (Tree)	28.2	28.2	27.9
Object I (Tree)	44.3	41.2	43.3

All units are in meter

Table A-3 Object Protrusion Above Probe or Inlet at Sacramento-Bercut Dr.

	Gaseous Probe	Black Carbon Inlet	$PM_{2.5}$ Inlet
Object A (Tree)	9.2	9.0	9.4
Object B (Tree)	1.3	1.0	1.5
Object C (Tree)	1.1	0.5	1.3
Object D (Tree)	-0.2	-0.6	0.0
Object E (Tree)	0.6	0.0	0.9
Object F (Tree)	5.0	3.8	5.2
Object G (Tree)	5.7	5.9	5.9
Object H (Tree)	18.8	18.4	19.5
Object I (Tree)	7.6	7.4	7.7

All units are in meter' negative value indicates inlet or probe is taller than the object; thus, airflow is not obstructed no matter the distance

Table A-4 Distance vs. Protrusion Ratio at Sacramento-Bercut Dr.

	Gaseous Probe	Black Carbon Inlet	$PM_{2.5}$ Inlet
Object A (Tree)	4.1	4.0	4.0
Object B (Tree)	16.4	22.6	14.2
Object C (Tree)	16.8	41.1	14.2
Object D (Tree)	N/A	N/A	N/A
Object E (Tree)	18.5	N/A	14.1
Object F (Tree)	3.9	5.4	3.7
Object G (Tree)	4.5	5.2	4.3
Object H (Tree)	1.5[(A)]	1.5[(A)]	1.4[(A)]
Object I (Tree)	5.8	5.6	5.7

Must be greater than or equal to 2 to meet U.S. EPA siting criteria
N/A indicates inlet or probe is taller than the object and airflow is not obstructed; refer to the note in the previous table
[(A)] 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	NO_2	CO
Parameter Code	42602	42101
Parameter Occurrence	1	1
Manufacturer/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 Roof	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)	12	12
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, agl)	4.6	4.6
Probe material	Teflon	Teflon
Residence time (seconds)	17.9	18.6
Changes in next 18 months?	No	No
Frequency of 1-pt QC Check	Every other day	Every other day
Last Performance Evaluation	4/8/19	4/8/19

Site	Sacramento-Bercut Dr	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	1	1
Manufacturer/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 Roof	1.6	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)	11	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 flow rate verification	Monthly	Monthly
Last Performance Evaluation	Not applicable	4/8/19, 10/16/19

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	1	1	1
Manufacturer/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 Roof	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 1-pt QC Check	Not applicable	Not applicable	Not applicable
Last Performance Evaluation	4/8/19	4/8/19	4/8/19

A.2 Sacramento-Branch Center #2

Sacramento-Branch Center #2 is a PM_{10} 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_{10} concentration, as documented in the original site initiation reports filed in the late 1980s.

Table A-5 Sacramento-Branch Center #2 Metadata

Site Name	Sacramento-Branch Center #2
AQS Site Number	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
Metropolitan Statistical Area	Sacramento--Arden-Arcade--Roseville, CA
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

Figure A-7 Sacramento-Branch Center #2 Site Photo

Figure A-8 Panoramic Photo Looking North from Sacramento-Branch Center #2

Figure A-9 Panoramic Photo Looking East from Sacramento-Branch Center #2

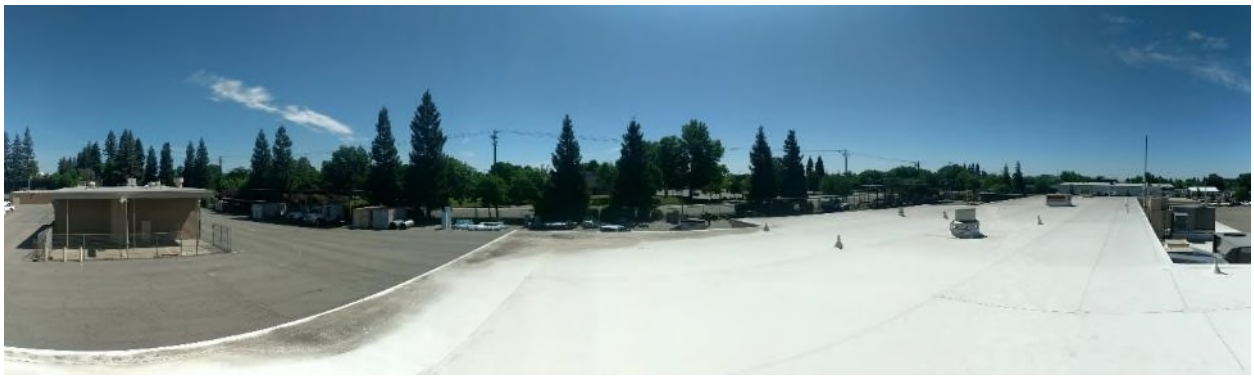
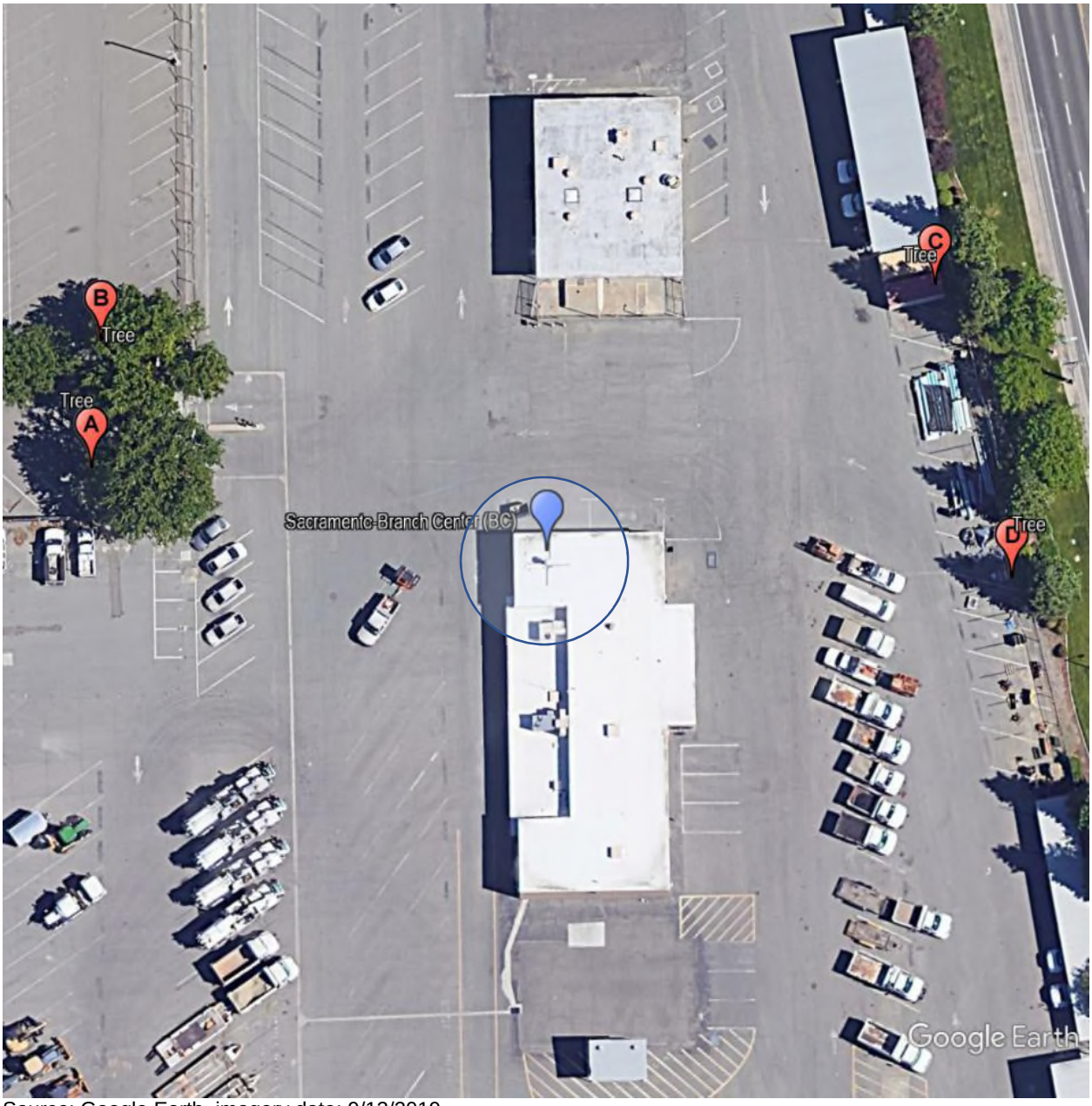


Figure A-10 Panoramic Photo Looking South from Sacramento-Branch Center #2

Figure A-11 Panoramic Photo Looking West from Sacramento-Branch Center #2

Figure A-12 Google Earth satellite image of Sacramento-Branch Center #2



Source: Google Earth, imagery date: 9/13/2019

The circle in Figure A-12 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 6/4/2020. Object C and D marks the tallest tree northeast and southeast of the station, respectively. Analyses in Table A-6 Distance between Object and Probe or Inlet at Sacramento-Branch Center #2Table A-6 through Table A-8 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-6 Distance between Object and Probe or Inlet at Sacramento-Branch Center #2

	PM_{10} Inlet
Object A (Tree)	41.5
Object B (Tree)	48.9
Object C (Tree)	53.4
Object D (Tree)	53.2

All units in meter

Table A-7 Object Protrusion Above Probe or Inlet at Sacramento- Branch Center #2

	PM_{10} Inlet
Object A (Tree)	6.2
Object B (Tree)	3.0
Object C (Tree)	12.9
Object D (Tree)	9.0

All units in meter

Table A-8 Distance vs. Protrusion Ratio at Sacramento- Branch Center #2

	PM_{10} Inlet
Object A (Tree)	6.7
Object B (Tree)	16.1
Object C (Tree)	4.1
Object D (Tree)	5.9

Must be greater than or equal to 2 to meet U.S. EPA siting criteria

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	PM_{10}
Parameter Code	81102
Parameter Occurrence	1
Manufacturer/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 PM_{10} 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 Roof	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)	37
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?	Yes
Frequency of flow rate verification	Monthly
Last Performance Evaluation	4/8/19, 10/16/19

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_3 monitoring site.

This site is the upwind O_3 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.

Site Name	Elk Grove-Bruceville
AQS Site Number	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
Metropolitan Statistical Area	Sacramento--Arden-Arcade--Roseville, CA
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

Figure A-13 Elk Grove-Bruceville Site Photo

Figure A-14 Panoramic Photo Looking North from Elk Grove-Bruceville

Figure A-15 Panoramic Photo Looking East from Elk Grove-Bruceville

Figure A-16 Panoramic Photo Looking South from Elk Grove-Bruceville

Figure A-17 Panoramic Photo Looking West from Elk Grove-Bruceville

Figure A-18 Google Earth satellite image of Elk Grove-Bruceville

Source: Google Earth, imagery date: 9/13/2019

The circle in Figure A-18 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 3/17/2020. Analyses in Table A-9 through Table 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 Probe or Inlet at Elk Grove-Bruceville

	Gaseous Probe	VOC Probe	$PM_{2.5}$ Inlet
Object A (Tree)	24.0	24.0	24.0
Object B (Tree)	39.0	39.0	39.0
Object C (Tree)	48.8	48.8	48.8
Object D (Building)	37.9	37.9	37.9

All units are in meter

Table A-10 Object Protrusion Above Probe or Inlet at Elk Grove-Bruceville

	Gaseous Probe	VOC Probe	$PM_{2.5}$ Inlet
Object A (Tree)	0.4	-0.5	0.0
Object B (Tree)	1.7	0.9	1.3
Object C (Tree)	4.6	3.8	4.2
Object D (Building)	-1.6	-2.5	-2.1

All units are in meter; 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

	Gaseous Probe	VOC Probe	$PM_{2.5}$ Inlet
Object A (Tree)	57.2	N/A	N/A
Object B (Tree)	22.4	45.5	30.1
Object C (Tree)	10.5	13.0	11.6
Object D (Tree)	N/A	N/A	N/A

Must be greater than or equal to 2 to meet U.S. EPA siting criteria; 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	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	O_3	NO_2	Total NMHC	Speciated VOC
Parameter Code	44201	42602	43102	43102
Parameter Occurrence	1	1	1	2
Manufacturer/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-Chemiluminescenc	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 O_3 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 Sept.
Distance from Supporting Structure or Roof	1.2	1.2	1.2	1.7
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 1-pt QC Check	Every other day	Every other day	Every other day	Pre- and post-seasonally check
Last Performance Evaluation	4/11/19	5/21/19	Temporary shutdown[A]	Not applicable

[A] 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	$PM_{2.5}$
Parameter Code	88501
Parameter Occurrence	3
Manufacturer/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 [A]
Statement of Purpose	Measures background concentration and transport of $PM_{2.5}$ from San Joaquin Valley for $PM_{2.5}$ 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 Roof	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?	Yes
Frequency of flow rate verification	Bi-monthly
Last Performance Evaluation	4/11/19, 10/15/19

[A] This $PM_{2.5}$ 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	1	1	1	1
Manufacturer/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 Roof	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 1-pt QC Check	N/A	N/A	N/A	N/A
Last Performance Evaluation	Temporary shutdown[(A)]	Not applicable	Temporary shutdown[(A)]	Not applicable

[(A)] U.S. EPA Region 9 approved the temporary shut down on 4/15/16; monitoring was restarted on 5/1/20

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	1	1	1	1
Manufacturer/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 Roof	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 1-pt QC Check	N/A	N/A	N/A	N/A
Last Performance Evaluation	Not applicable	Not applicable	Temporary shutdown[(A)]	Temporary shutdown[(A)]

[(A)] U.S. EPA Region 9 approved the temporary shut down on 4/15/16; monitoring was restarted on 5/1/20

Site	Elk Grove-Bruceville	Elk Grove-Bruceville
Start Date	1/17/2018	6/1/1996
Collecting Agency	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	N/A
Reporting Agency	N/A	N/A
Pollutant	Mixing Height	Upper Level Wind and Virtual Temperature
Parameter Code	Not applicable	Not applicable
Parameter Occurrence	Not applicable	Not applicable
Manufacturer/Model	Vaisala Ceilometer CL51	Radian LAP-3000 with RASS option
Sampling Method	Not applicable	Not applicable
Method Code	Not applicable	Not applicable
Analysis Method	Light Detection and Ranging	915 MHz Radar Wind Profiler, with RASS
FRM/FEM/ARM/Other	Other	Other
Monitoring Objective	Public info, research	Public info, research
Statement of Purpose	Measures representative upper level meteorology	Measures representative upper level meteorology
Monitor Type	Other	Other
Affiliation	PAMS	PAMS (Type I)
Site Type	Not applicable	Not applicable
Spatial Scale	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous
Sampling Season	Year Round	Year Round
Distance from Supporting Structure or Roof	No supporting structure	No supporting structure
Distance from flow obstructions on roof (m)	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions
Distance from nearest tree drip line (m)	> 20 m	> 20 m
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	Not applicable
Unrestricted airflow (deg)	360	360
Probe height (m, agl)	Not applicable	Not applicable
Probe material	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable
Changes in next 18 months?	No	No
Frequency of 1-pt QC Check	N/A	N/A
Last Performance Evaluation	N/A	Malfunctioned[(A)]

[(A)] 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 $PM_{2.5}$, which means that this site has the highest $PM_{2.5}$ design value in the $PM_{2.5}$ 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 Number	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
Metropolitan Statistical Area	Sacramento--Arden-Arcade--Roseville, CA
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

Figure A-19 Sacramento-Del Paso Manor Site Photo

Figure A-20 Panoramic Photo Looking North from Sacramento-Del Paso Manor

Figure A-21 Panoramic Photo Looking East from Sacramento-Del Paso Manor

Figure A-22 Panoramic Photo Looking South from Sacramento-Del Paso Manor

Figure A-23 Panoramic Photo Looking West from Sacramento-Del Paso Manor

Figure A-24 Google Earth Satellite Image of Sacramento-Del Paso Manor

Source: Google Earth, imagery date: 9/13/19

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 are constructed in the grassy field south of the site. During the construction period, the District reviewed and will continue to 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. An onsite survey conducted on 6/8/2020 shows there are no flow obstacle. Details are provided in Table A-13 through Table A-18.

Table A-13 Distance between Object and Probe or Inlet at Sacramento-Del Paso Manor

	Gaseous Probe	NO_Y Probe	PM_{10} Inlet (Primary)	PM_{10} Inlet (Collocated)	Black Carbon Inlet	VOC Inlet
Object A (Tree)	27.0	24.0	24.0	26.0	29.0	29.0
Object B (Tree)	41.1	41.1	41.1	43.2	41.1	42.1
Object C (Tree)	27.0	24.0	24.0	26.0	29.0	29.0
Object D (Building)	40.8	36.8	36.8	37.8	39.8	40.8
Object E (Tree)	29.3	27.3	27.3	29.3	29.3	31.4

All units are in meter

Table A-14 Distance between Object and Probe or Inlet at Sacramento-Del Paso Manor

	$PM_{2.5}$ Inlet (Primary)	$PM_{2.5}$ Inlet (Collocated)	$PM_{10\text{-}2.5}$ Inlet	$PM_{2.5}$ Inlet (Continuous)	$PM_{2.5}$ Speciation	Carbon Speciation
Object A (Tree)	31.0	31.0	29.0	27.0	27.0	31.0
Object B (Tree)	39.0	41.1	39.0	42.1	43.0	41.1
Object C (Tree)	31.0	31.0	29.0	27.0	27.0	31.0
Object D Building)	41.8	41.8	39.8	40.8	39.8	41.8
Object E (Tree)	30.4	32.4	28.4	30.3	30.4	32.4

All units are in meter

Table A-15 Object Protrusion Above Probe or Inlet at Sacramento-Del Paso Manor

	Gaseous Probe	NO_Y Probe	PM_{10} Inlet (Primary)	PM_{10} Inlet (Collocated)	Black Carbon Inlet	VOC Inlet
Object A (Tree)	-0.4	-8.4	-0.4	-0.4	-0.3	-0.6
Object B (Tree)	8.3	0.3	8.3	8.0	8.4	8.4
Object C (Tree)	-0.4	-8.4	-0.4	-0.4	-0.3	-0.6
Object D (Building)	3.2	-4.5	3.5	3.6	3.2	3.0
Object E (Tree)	5.8	-2.1	5.9	5.8	5.9	5.5

All units are in meter; negative value indicates inlet or probe is taller than the object; thus, airflow is not obstructed no matter the distance

Table A-16 Object Protrusion Above Probe or Inlet at Sacramento-Del Paso Manor

	$PM_{2.5}$ Inlet (Primary)	$PM_{2.5}$ Inlet (Collocated)	$PM_{10\text{-}2.5}$ Inlet	$PM_{2.5}$ Inlet (Continuous)	$PM_{2.5}$ Speciation	Carbon Speciation
Object A (Tree)	-0.5	-0.5	-0.5	-0.4	-0.5	-0.5
Object B (Tree)	8.5	8.2	8.5	8.6	8.7	8.2
Object C (Tree)	-0.5	-0.5	-0.5	-0.4	-0.5	-0.5
Object D (Building)	3.2	3.2	3.0	3.2	3.0	3.2
Object E (Tree)	5.4	5.8	5.5	6.1	5.4	5.8

All units are in meter; negative value indicates inlet or probe is taller than the object; thus, airflow is not obstructed no matter the distance

Table A-17 Distance vs. Protrusion Ratio at Sacramento-Del Paso Manor

	Gaseous Probe	NO_Y Probe	PM_{10} Inlet (Primary)	PM_{10} 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)	4.9	119.7	4.9	5.4	4.9	5.0
Object C (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object D (Building)	12.8	N/A	10.6	10.5	12.5	13.7
Object E (Tree)	5.0	N/A	4.6	5.0	4.9	5.7

Must be greater than or equal to 2 to meet U.S. EPA siting criteria; N/A indicates inlet or probe is taller than the object and airflow is not obstructed; refer to the note in the previous table

Table A-18 Distance vs. Protrusion Ratio at Sacramento-Del Paso Manor

	$PM_{2.5}$ Inlet (Primary)	$PM_{2.5}$ Inlet (Collocated)	$PM_{10\text{-}2.5}$ Inlet	$PM_{2.5}$ Inlet (Continuous)	$PM_{2.5}$ Speciation	Carbon Speciation
Object A (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object B (Tree)	4.6	5.0	4.6	4.9	5.0	5.0
Object C (Tree)	N/A	N/A	N/A	N/A	N/A	N/A
Object D (Building)	13.2	13.2	13.3	12.8	13.3	13.2
Object E (Tree)	5.6	5.6	5.1	5.0	5.6	5.6

Must be greater than or equal to 2 to meet U.S. EPA siting criteria; 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	Sacramento-Del Paso Manor			
Start Date	1/1/1981	1/1/1981	1/1/1980	1/1/1983
Collecting Agency	Sac Metro Air	Sac Metro Air	Sac Metro Air	Sac Metro Air
Analytical Lab	Sac Metro Air	Sac Metro Air	Sac Metro Air	Sac Metro Air
Reporting Agency	Sac Metro Air	Sac Metro Air	Sac Metro Air	Sac Metro Air
Pollutant	O_3	CO	NO_2	NOY
Parameter Code	44201	42101	42602	42600
Parameter Occurrence	1	1	1	1
Manufacturer/Model	TAPI 400E	TAPI 300EU	TAPI200UP	TEI 42I-Y
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	087	593	200	574
Analysis Method	Ultraviolet Absorption	Gas Filter Correlation	Photolytic-Chemiluminescenc	Chemiluminescenc e
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 O_3levels near the downwind edge of the central business district	Measures representative wintertime CO concentration in populated area	Measures O_3precursor emission near downwind edge of central business	Measures representative concentration in populated area
Monitor Type	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	NCORE, PAMS (Type II)	NCORE	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 Roof	2.0	2.0	2.0	Not applicable
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)	26	26	26	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)	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 1-pt QC Check	Every fourth day	Every fourth day	Every fourth day	Every fourth day
Last Performance Evaluation	11/7/19	2/11/19	11/7/19	Not applicable

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

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	SO_2	Total NMHC	Speciated VOC	Carbonyl
Parameter Code	42401	43102	43102	Multiple
Parameter Occurrence	1	2	1	1
Manufacturer/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 O_3 precursor emission near downwind edge of central business district	Measures O_3 precursor emission near downwind edge of central business district	Measures O_3 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 Roof	2.0	2.0	2.2	2.2
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)	26	26	26	26
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	Yes	No
Frequency of 1-pt QC Check	Every fourth day	Every fourth day	Pre- and post-seasonally check	Pre- and post-seasonally check
Last Performance Evaluation	2/11/19	Temporary shutdown[(A)]	Not applicable	Not applicable

[(A)] 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	PM_{10} (Primary monitor)	PM_{10} (Audit monitor)
Parameter Code	84313	81102	81102
Parameter Occurrence	1	1	2
Manufacturer/Model	Magee Scientific	Sierra Anderson	Sierra Anderson
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, research	NAAQS comparison, public info
Statement of Purpose	Installed for CRPAQS study in 1999[(A)]	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 Roof	1.9	2.0	2.0
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)	25	22	22
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	Yes	Yes
Frequency of flow rate verification	Monthly	Monthly	Monthly
Last Performance Evaluation	Not applicable	4/24/19, 11/7/19	4/24/19, 11/7/19

[(A)] 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	$PM_{2.5}$ (Primary monitor)	$PM_{2.5}$ (Audit monitor)	$PM_{2.5}$	$PM_{2.5}$ Mass Speciated
Parameter Code	88101	88101	88502	88502
Parameter Occurrence	1	2	3	5
Manufacturer/Model	R & P 2025	R & P 2025	Met One 1020	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[(A)]	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,
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	Daily	1 in 12 days	Continuous	1 in 3 days
Sampling Season	Year Round	Year Round	Year Round	Year Round
Distance from Supporting Structure or Roof	2.1	2.1	2.0	2.0
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)	28	27	26	25
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	4/24/19, 11/7/19	4/24/19, 11/7/19	4/24/19, 11/7/19	9/19/19

[(A)] This $PM_{2.5}$ 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)[A]	85101	85129
Parameter Occurrence	5	7	4
Manufacturer/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 $PM_{10-2.5}$ 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 Roof	2.1	2.1	2.1
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)	27	26	26
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	Yes
Frequency of flow rate verification	Monthly	Monthly	Monthly
Last Performance Evaluation	6/26/18	4/24/19, 11/7/19	4/24/19, 11/7/19

[A] 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	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Sac Metro Air District	Sac Metro Air	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Reporting Agency	Sac Metro Air District	Sac Metro Air	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Pollutant	Outdoor Temperature	Relative	Solar Radiation	Wind Direction	Wind Speed
Parameter Code	62101	62201	63301	61104	61103
Parameter Occurrence	1	1	1	1	1
Manufacturer/Model	Climatronics 100093	Climatronics	Climatronics	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 representati ve meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology
Monitor Type	SLAMS	SLAMS	Other	Other	Other
Affiliation	NCORE, PAMS (TYPE II)				
Site Type	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Spatial Scale	Not applicable	Not	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 Roof	No supporting structure	No supporting	No supporting structure	No supporting structure	No supporting structure
Distance from flow ob-structions on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow ob-structions 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 collo-cated 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	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No	No
Frequency of 1-pt QC Check	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Last Performance Evaluation	11/15/18	Not	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_3 monitoring site within Sacramento County, for days with prevailing afternoon southwesterly winds. This is a PAMS Type III site.

Table A-19 Folsom-Natoma St. Metadata

Site Name	Folsom-Natoma Street
AQS Site Number	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
Metropolitan Statistical Area	Sacramento--Arden-Arcade--Roseville, CA
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

Figure A-25 Google Earth Satellite Image of Folsom-Natoma St.

Source: Google Earth, imagery date: 9/13/19

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). Note that a site survey was not conducted in 2020 because the site was under construction.

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	O_3	NO_2	NOY	Total NMHC	Speciated VOC
Parameter Code	44201	42602	42600	43102	43102
Parameter Occurrence	1	1	1	1	2
Manufacturer/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-Chemiluminesc	Chemiluminesc ence	Flame Ionization	Dual Flame Ionization
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 O_3 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 O_3 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 Roof	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	Yes
Frequency of 1-pt QC Check	Every other day	Every other day	Every other day	Every other day	Pre- and post-seasonally
Last Performance Evaluation	4/9/19	4/9/19	Not applicable	Temp. shutdown[(A)]	Not applicable

[(A)] 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	$PM_{2.5}$ (Primary monitor)	$PM_{2.5}$ (Audit monitor)
Parameter Code	88101	88101
Parameter Occurrence	3	4
Manufacturer/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 Roof	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	4/9/19[(A)]	4/9/19[(A)]

[(A)] A second audit was not completed because the site temporarily shut down on 7/23/19 for shelter demolition and rebuild

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	1	1	1	1	1
Manufacturer/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 Roof	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 1-pt QC Check	N/A	N/A	N/A	N/A	N/A
Last Performance Evaluation	4/9/19	Not applicable	Not applicable	4/9/19	4/9/19

A.6 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_2 and PM_{10} to meet minimum monitoring requirements. Thus, the designation of those monitors were changed to SLAMS. The SO_2 monitor was terminated in late 2010.

Table A-20 North Highlands-Blackfoot

Site Name	North Highlands-Blackfoot
AQS Site Number	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
Metropolitan Statistical Area	Sacramento--Arden-Arcade--Roseville, CA
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)

Figure A-26 North Highlands-Blackfoot Site Photo

Figure A-27 Panoramic Photo Looking North from North Highlands-Blackfoot

Figure A-28 Panoramic Photo Looking East from North Highlands-Blackfoot

Figure A-29 Panoramic Photo Looking South from North Highlands-Blackfoot

Figure A-30 Panoramic Photo Looking West from North Highlands-Blackfoot

Figure A-31 Google Earth Satellite Image of North Highlands-Blackfoot

Source: Google Earth, imagery date: 9/13/19

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 6/8/2020. 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 Probe or Inlet at North Highlands-Blackfoot

	Gaseous Probe	PM_{10} Inlet
Object A (Tree)	65.8	66.5
Object B (Tree)	39.9	40.9
Object C (Tree)	23.9	23.9
Object D (Tree)	20.1	20.1
Object E (Tree)	50.1	49.1
Object F (Tree)	47.3	46.3

All units are in meter

Table A-22 Object Protrusion Above Probe or Inlet at North Highlands-Blackfoot

	Gaseous Probe	PM_{10} Inlet
Object A (Tree)	12.5	13.7
Object B (Tree)	8.9	9.1
Object C (Tree)	1.4	1.3
Object D (Tree)	5.9	5.8
Object E (Tree)	9.4	9.2
Object F (Tree)	8.0	7.8

All units are in meter

Table A-23 Distance vs. Protrusion Ratio at North Highlands-Blackfoot

	Gaseous Probe	PM_{10} Inlet
Object A (Tree)	5.3	4.8
Object B (Tree)	4.5	4.5
Object C (Tree)	17.3	18.6
Object D (Tree)	3.4	3.5
Object E (Tree)	5.3	5.4
Object F (Tree)	5.9	6.0

Must be greater than or equal to 2 to meet U.S. EPA siting criteria

Site	North Highlands-Blackfoot		
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	O_3	CO	NO_2
Parameter Code	44201	42101	42602
Parameter Occurrence	1	1	1
Manufacturer/Model	TAPI 400E	TEI 48C	TEI 42I
Sampling Method	Instrumental	Instrumental	Instrumental
Method Code	087	054	200
Analysis Method	Ultraviolet Absorption	Nondispersive Infrared	Photolytic-Chemiluminescenc
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 Roof	1.9	1.9	1.9
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)	14	14	14
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)	14.8	13.1	16.4
Changes in next 18 months?	Yes	Yes	Yes
Frequency of 1-pt QC Check	Every Other Day	Every Other Day	Every Other Day
Last Performance Evaluation	4/12/19	4/12/19	4/28/2016[A]

[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	PM_{10}
Parameter Code	81102
Parameter Occurrence	1
Manufacturer/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 Roof	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)	14
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	4/12/19, 10/14/19

A.7 Sloughhouse

Located in a rural area 16.5 miles southeast of Downtown Sacramento, Sloughhouse was established in 1997 as a seasonal (April-October) O_3 special purpose monitoring site to measure elevated afternoon O_3 concentrations, under northwesterly winds, in support of Sac Metro Air District's summer Spare the Air (O_3 episodic control measure) program. It was sited to cover “data gaps” in the O_3 monitoring network, which is used for forecasting summer AQI levels.

A tree 10 m southeast of the O_3 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_3 monitor was re-classified from SPM to SLAMS and began continuous monitoring year-round.

From November 2008 through February 2013, seasonal (November–February) $PM_{2.5}$ data was collected with a special purpose monitor (Met One Instruments e-BAM). In November 2013, a non-FEM $PM_{2.5}$ 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 $PM_{2.5}$ sampler replaced the non-FEM sampler. Subsequently, the parameter code associated with the $PM_{2.5}$ sampler was changed from 88501 ($PM_{2.5}$ raw data) to 88101 ($PM_{2.5}$ at local condition).

Table A-24 Sloughhouse Metadata

Site Name	Sloughhouse
AQS Site Number	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
Metropolitan Statistical Area	Sacramento--Arden-Arcade--Roseville, CA
Distance from Roadway	27 m
Annual Average Daily Traffic (Vehicles/Day)	Sloughhouse Rd south of Jackson Rd: 1,000 (Estimated)
Ground Cover	Vegetated

Figure A-32 Sloughhouse Site Photo

Figure A-33 Panoramic Photo Looking North from Sloughhouse

Figure A-34 Panoramic Photo Looking East from Sloughhouse

Figure A-35 Panoramic Photo Looking South from Sloughhouse

Figure A-36 Panoramic Photo Looking West from Sloughhouse

Figure A-37 Google Earth Satellite Image of Sloughhouse

Source: Google Earth, imagery date: 9/13/19

The circle in Figure A-37 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 6/1/2020. Analyses in Table A-25 through Table A-27 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-25 Distance between Object and Probe or Inlet at Sloughhouse

	Gaseous Probe	$PM_{2.5}$ Inlet
Object A (Tree)	53.8	54.8
Object B (Tree)	20.8	21.7
Object C (Building)	14.7	15.2
Object D (Tree)	25.9	24.9

All units are in meter

Table A-26 Object Protrusion Above Probe or Inlet at Sloughhouse

	Gaseous Probe	$PM_{2.5}$ Inlet
Object A (Tree)	11.3	11.1
Object B (Tree)	7.1	6.9
Object C (Building)	-3.2	-3.8
Object D (Tree)	1.7	1.2

All units are in meter; 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

	Gaseous Probe	$PM_{2.5}$ Inlet
Object A (Tree)	4.7	5.0
Object B (Tree)	2.9	3.2
Object C (Building)	N/A	N/A
Object D (Tree)	15.0	21.6

Must be greater than or equal to 2 to meet U.S. EPA siting criteria; 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	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	O_3	Wind Direction	Wind Speed
Parameter Code	44201	61104	61103
Parameter Occurrence	1	1	1
Manufacturer/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 O_3 concentration under northwesterly wind	Measures representative meteorology	Measures representative meteorology
Monitor Type	SLAMS	Other	Other
Affiliation	None	None	None
Site Type	Max O_3 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 Roof	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 1-pt QC Check	Every other day	N/A	N/A
Last Performance Evaluation	4/10/19	4/10/19	4/10/19

Site	Sloughhouse-Sloughhouse Rd.
Start Date	5/1/2017
Collecting Agency	Sac Metro Air District
Analytical Lab	N/A
Reporting Agency	CARB
Pollutant	$PM_{2.5}$
Parameter Code	88101
Parameter Occurrence	3
Manufacturer/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 $PM_{2.5}$ concentration
Monitor Type	SLAMS[(A)]
Affiliation	None
Site Type	Upwind/Background
Spatial Scale	Urban
Sampling Frequency	Continuous
Sampling Season	Year Round
Distance from Supporting Structure or Roof	2.2
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)	17
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?	No
Frequency of flow rate verification	Bi-monthly
Last Performance Evaluation	4/10/19, 10/16/19

[(A)] This monitor was reverted to SLAMS as of 5/1/2019, after a two-year operation as a SPM monitor

A.8 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 has been in existence since 1989. Monitor details provided in the remainder of Section A.10 are provided by CARB's Monitoring and Laboratory Division.

Table A-28 Sacramento-T Street Metadata

Site Name	Sacramento-1309 T Street
AQS Site No.	06-067-0010
Geographic Coordinates	38.568440°N, 121.4931190°W
Location	Residential area located in downtown Sacramento
Address	1309 T Street, Sacramento, CA 95814
County	Sacramento
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA
Distance from roadway	30 m
Annual Average Daily Traffic (Vehicles/Day)	T St. east of 11th St.: 3,102 (City of Sacramento, 2009)
Ground Cover	Rooftop site (residential area is paved)

Site	Sacramento-1309 T St.	
Start Date	12/1/1998	5/15/2013
Collecting Agency	CARB	CARB
Analytical Lab	N/A	N/A
Reporting Agency	CARB	CARB
Pollutant	O3	NO2
Parameter Code	44201	42602
Parameter Occurrence	1	3
Manufacturer/Model	TAPI 400E	TAPI 200 EU/501
Sampling Method	Instrumental	Instrumental
Method Code	087	599
Analysis Method	Ultraviolet Absorption	Chemiluminescence
FRM/FEM/ARM/Other	FEM	FEM
Monitoring Objective	NAAQS comparison, public info	NAAQS comparison, public info
Statement of Purpose	Measures representative concentration in urban area	Measures representative concentration in urban area
Monitor Type	SLAMS	SLAMS
Affiliation	None	None
Site Type	Upwind/Background	Population Exposure
Spatial Scale	Urban	Neighborhood
Sampling Frequency	Continuous	Continuous
Sampling Season	Year Round	Year Round
Distance from Supporting Structure or Roof	3.0	3.0
Distance from flow obstructions on roof (m)	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions
Distance from nearest tree drip line (m)	50.0	50.0
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)	1.0 - 2.0 m	1.0 - 2.0 m
Unrestricted airflow (deg)	360	360
Probe height (m, agl)	11.7	11.7
Probe material	FEP Teflon	FEP Teflon
Residence time (seconds)	5.4	6.0
Changes in next 18 months?	No	No
Frequency of 1-pt QC Check	Daily	Daily
Last Performance Evaluation	11/06/2019	11/06/2019

Site	Sacramento-1309 T Street			
Start Date	5/1/2013	12/13/1998	5/1/2004	4/1/2007
Collecting Agency	CARB	CARB	CARB	CARB
Analytical Lab	CARB	CARB	N/A	CARB
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	PM10	PM2.5 (Primary	PM2.5	PM2.5 Mass
Parameter Code	81102	88101	88502	88502
Parameter Occurrence	4	1	3	5
Manufacturer/Model	Met One 4 Models	Thermo 2025i	Met One 1020	Met One 5
Sampling Method	Instrumental	Low volume with VSCC	Sharp cut cyclone	Sharp cut cyclone
Method Code	122	145	731	810
Analysis Method	Beta Attenuation	Gravimetric	Beta Attenuation	Gravimetric
FRM/FEM/ARM/Other	FEM	FRM	Other	Other
Monitoring Objective	NAAQS comparison, public info	NAAQS comparison, public info	Public info[(A)]	Research
Statement of Purpose	Measures representative concentration in urban area	Measures representative concentration in urban area	Measures representative concentration in urban area	Provide speciation data of urban emission
Monitor Type	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	None	None	None	None
Site Type	Population Exposure	Highest concentration,	Highest concentration,	Highest concentration,
Spatial Scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling Frequency	Continuous	1 in 3 days	Continuous	1 in 3 days
Sampling Season	Year Round	Year Round	Year Round	Year Round
Distance from Supporting Structure or Roof	2.0	2.0	2.0	2.0
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)	50.0	50.0	50.0	50.0
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)	1.0 - 2.0 m	1.0 - 2.0 m	1.0 - 2.0 m	1.0 - 2.0 m
Distance with nearest PM monitor (m)	1.0 - 2.0 m	1.0 - 2.0 m	1.0 - 2.0 m	1.0 - 2.0 m
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	Yes	Yes	No
Frequency of flow rate verification	Bi-Monthly	Monthly	Bi-monthly	Monthly
Last Performance Evaluation	4/25/19, 11/6/19	4/25/19, 11/6/19	4/25/19, 11/6/19	Not applicable

Site	Sacramento-1309 T Street			
Start Date	7/1/2015	7/1/2015	2/1/1992	2/1/1992
Collecting Agency	CARB	CARB	CARB	CARB
Analytical Lab	N/A	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	Outdoor	Relative Humidity	Wind Direction	Wind Speed
Parameter Code	62101	62201	61104	61103
Parameter Occurrence	2	2	1	1
Manufacturer/Model	Vaisala OT/RH	Vaisala OT/RH	RM Young Model	RM Young Model
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	059	059	066	066
Analysis Method	Vaisala HMP155	Vaisala HMP155	Ultrasonic Anemometer	Ultrasonic Anemometer
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	None	None	None	None
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 Roof	9.0	9.0	9.0	9.0
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)	50.0	50.0	50.0	50.0
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)	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	15.0	15.0	15.0	15.0
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 flow rate verification	N/A	N/A	N/A	N/A
Last Performance Evaluation	Not applicable	Not applicable	Not applicable	Not applicable

Appendix B Minimum Monitoring Requirement Assessment

Table B-1 Number of SLAMS Monitoring Site Within Sacramento MSA

Pollutant/Type (if applicable)		Required in MSA[A]	CARB[B]	EDCAQMD[C]	PCAPCD[D]	SMAQMD[E]	YSAQMD[F]	Total
O_3		2	6	0	4	5	1	16
CO		2	0	0	0	2	0	2
NO_2	Area-wide	1	3	0	0	3	0	6
	Near-road	1	0	0	0	1	0	1
SO_2		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_{10}		2-4[G]	3	0	0	3	2	8
$PM_{2.5}$	FEM/FRM	3	2	0	1	4	1	8
	Continuous	2	2	0	3	3	0	8
$PM_{10-2.5}$		1	0	0	0	1	0	1

Source: U.S. EPA Air Quality System Extract Site/Monitor Report (AMP 500), access on 19 Apr 2020

[A] Number of monitors required in Sacramento MSA

[B] CARB – California Air Resources Board

[C] EDCAQMD – El Dorado County Air Quality Management District

[D] PCAPCD – Placer County Air Pollution Control District

[E] SMAQMD – Sacramento Metropolitan Air Quality Management District

[F] YSAQMD – Yolo-Solano Air Quality Management District

[G] 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_{10} 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.

Appendix C Copy of Annual Data Certification Letters

Figure C-1 SMAQMD Data Certification Letter, Page 1

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

April 29, 2020

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

RE: 2019 Data Certification

Dear Mr. Busterud:

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 and certifying 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 2019 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_2 5-minute average data.

Sac Metro Air District is concurring with most of the AQS recommendation found in AMP600. Exceptions are noted in Table 1 in this letter; Sac Metro Air District recommends certifying these data despite findings in AMP600. Table 2 lists the parameters not recommended for certification. Please note that this letter does not include a certification for lead data at this time; it will be certified once we have received December 2019 results from our analysis laboratory, it has been delayed due to unforeseen circumstances.

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 weighed and analyzed by CARB's laboratory. Namely, these are the $PM_{2.5}$ filters collected at Sacramento-Del Paso Manor (DPM) and Sacramento-Bercut. It also includes the PM_{10} filters collected at DPM for determining $PM_{10-2.5}$.

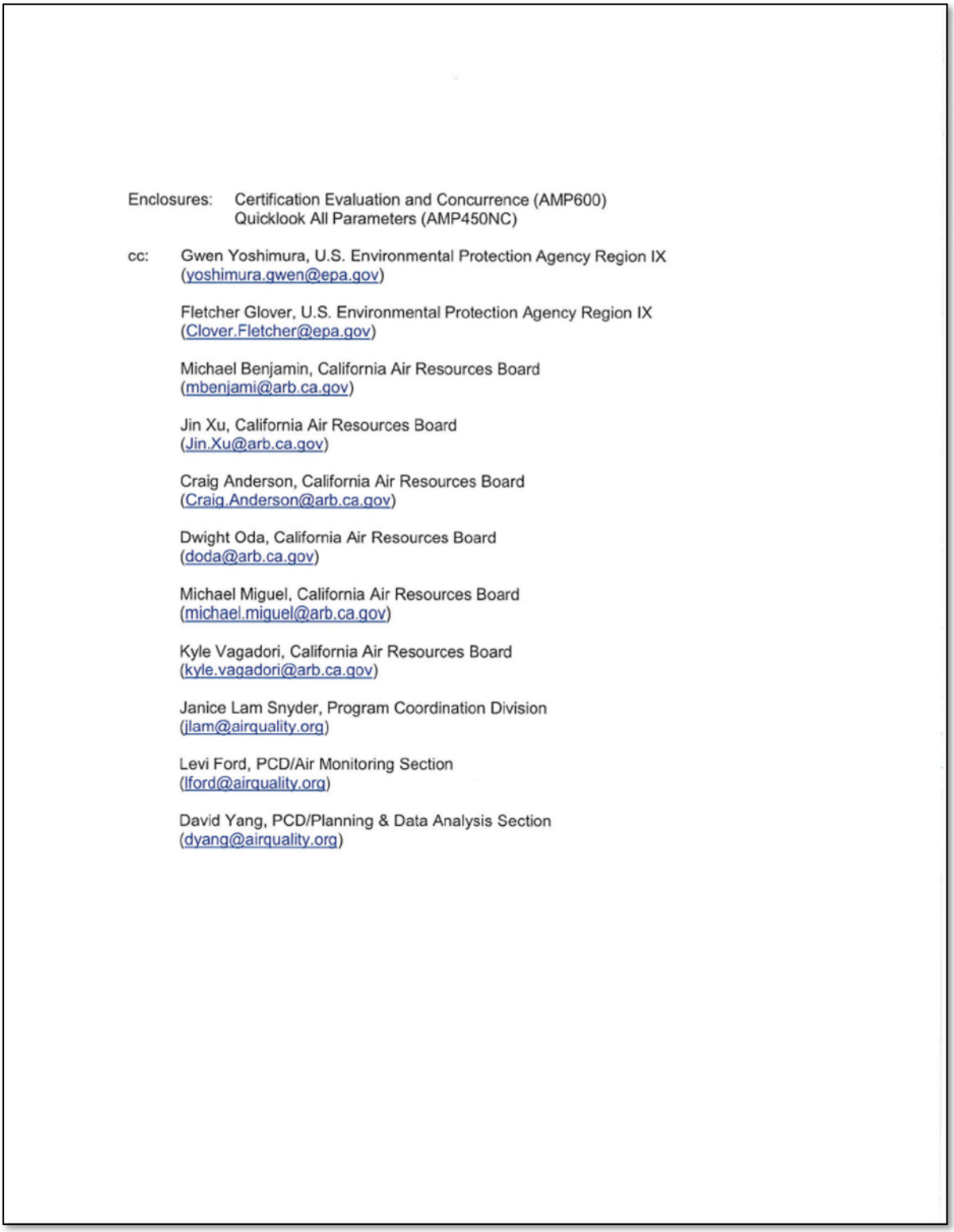
If you have any questions regarding Sac Metro Air District's data or certification report, please contact Ms. Janice Lam Snyder, Program Manager of Air Monitoring, Planning & Data Analysis, at 916-874-4835 or jlam@airquality.org.

Sincerely,

Mark Loutzenhiser
Division Manager, Program Coordination Division

777 12th Street, 3rd Floor ▮ Sacramento, CA 95814-1908
916/874-4800 ▮ 916/874-4899 fax
www.airquality.org

Figure C-2 SMAQMD Data Certification Letter, Page 2



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

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

Fletcher Glover, U.S. Environmental Protection Agency Region IX
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Kyle Vagadori, California Air Resources Board
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Janice Lam Snyder, Program Coordination Division
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Levi Ford, PCD/Air Monitoring Section
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David Yang, PCD/Planning & Data Analysis Section
(dyang@airquality.org)

Figure C-3 SMAQMD Data Certification Letter, Page 3

Table 1: Exception to AMP600's Recommendation

Site	Parameter & POC	Reason for AQS' Recommendation	District Comments
Folsom 06-067-0012	PM2.5 88101-3	Flow Rate Audit completeness < 65%.	This air monitoring station was temporarily discontinued on July 31, 2020, for site renovation. Thus, a second audit could not be completed. The discontinuation date is properly noted in the sampler's "sample period" in EPA's Air Quality System.
Folsom 06-067-0012	PM2.5 88101-4	Flow Rate Audit completeness < 65%.	(same as above)
North Highlands 06-067-0002	CO 42101-1	Annual Summary completeness <70%	This analyzer operated and collected data in January-March, and part of April and June 2019. The analyzer malfunctioned afterward and could not be repaired. The District anticipated discontinuing CO monitoring at this location, therefore did not replace the broken analyzer. On April 20, 2020, the EPA agreed that CO could be discontinued at the North Highlands station.

Table 2: Parameters not Recommended for Certification

Site	Parameter & POC	Reason for AQS' Recommendation	District Comments
North Highlands 06-067-0002	NO_2 42602-1	Annual Summary completeness <70% 1-Point QC Completeness < 65% Annual Performance Evaluation Audit Missing or 1 Level	This special purpose NO2 analyzer was moved to a higher priority, near-road site because that analyzer had storm damage.

Figure C-4 SMAQMD Data Certification Letter for Lead, Page 1

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

May 27, 2020

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

RE: 2019 Data Certification of Lead Data

Dear Mr. Busterud:

On April 29, 2020, the Sacramento Metropolitan Air Quality Management District (Sac Metro Air District) submitted a data certification letter for 2019 criteria pollutant data. The letter noted, lead data would be certified at a later date. This letter certifies that Sac Metro Air District's 2019 lead data 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).

Sac Metro Air District is concurring with most of the AQS recommendation found in AMP600. Exceptions are noted in Table 1 in this letter; Sac Metro Air District recommends certifying these data despite findings in AMP600.

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.

Sincerely,

Mark Loutzenhiser
Division Manager, Program Coordination Division

Enclosures: Certification Evaluation and Concurrence (AMP600)

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

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

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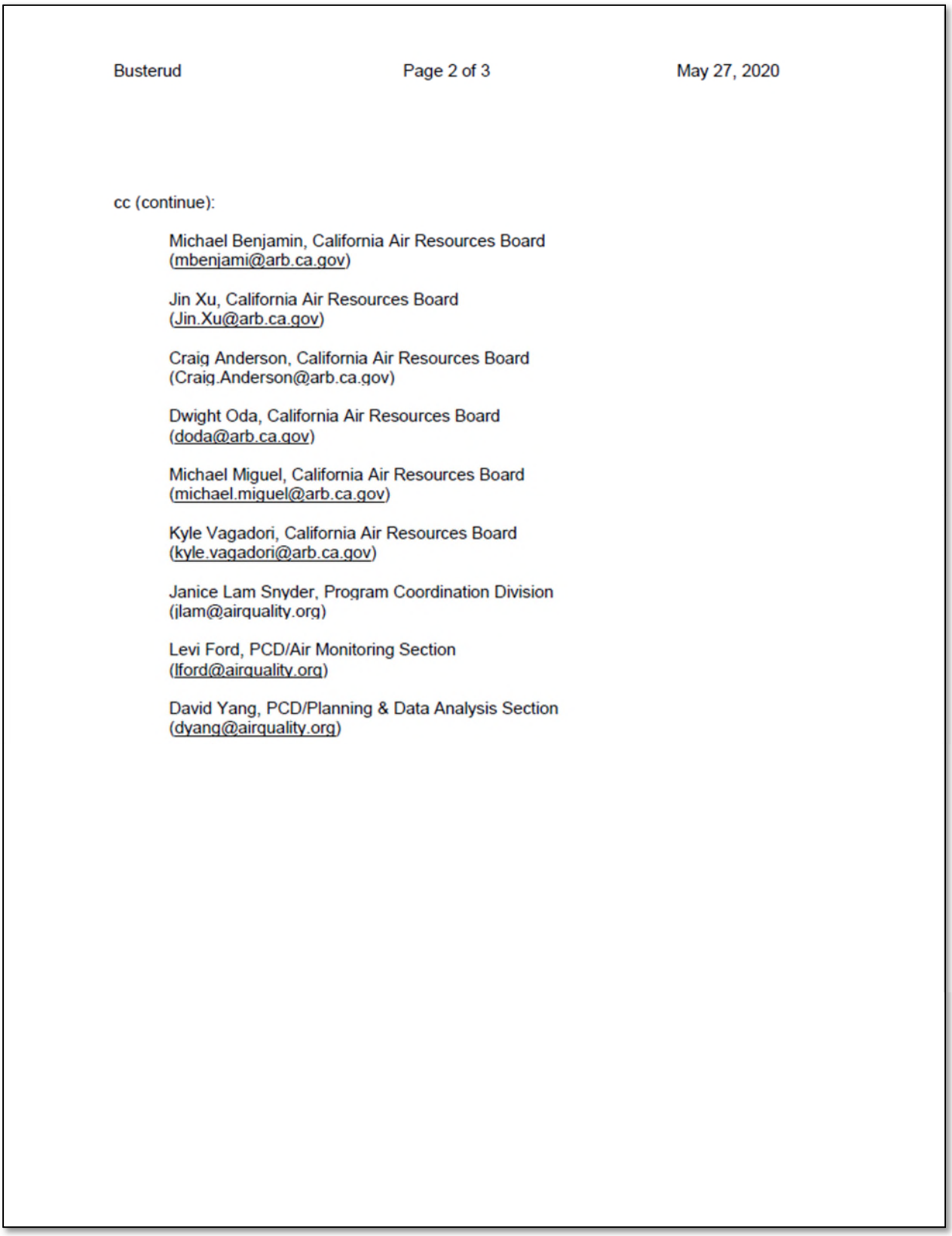
Figure C-5 SMAQMD Data Certification Letter for Lead, Page 2



Busterud Page 2 of 3 May 27, 2020

cc (continue):

Michael Benjamin, California Air Resources Board
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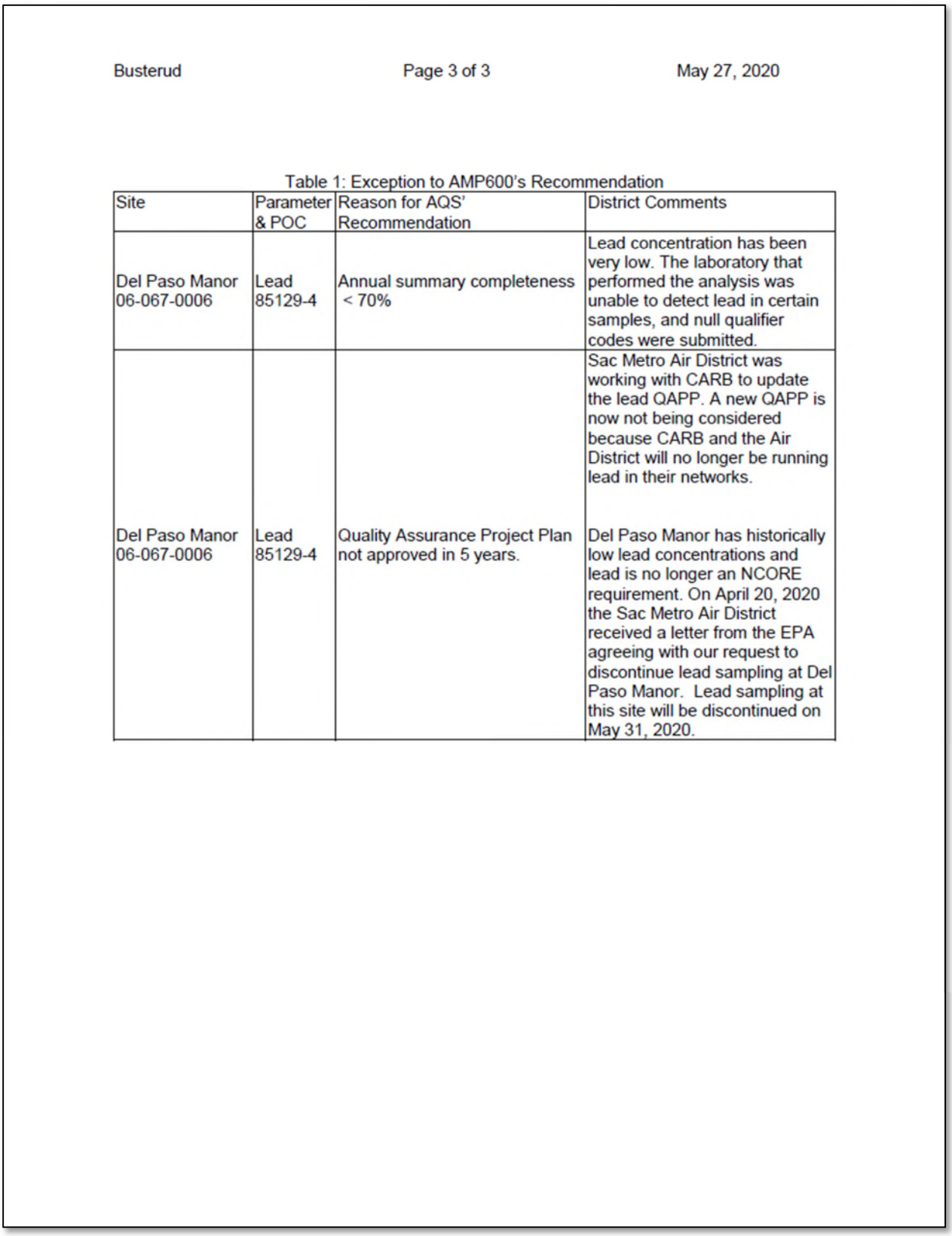
Figure C-6 SMAQMD Data Certification Letter for Lead, Page 3



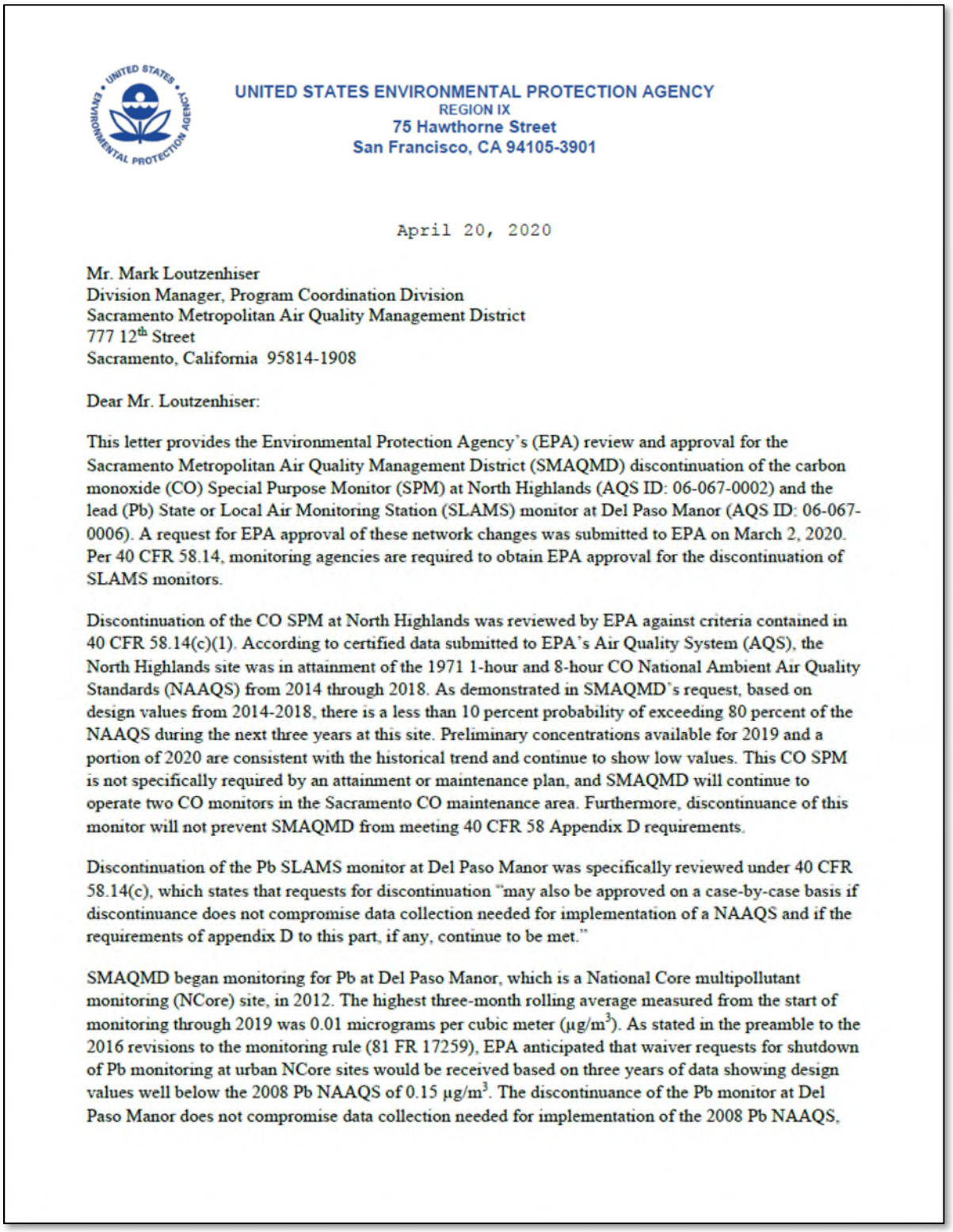
Busterud Page 3 of 3 May 27, 2020

Table 1: Exception to AMP600's Recommendation

Site	Parameter & POC	Reason for AQS' Recommendation	District Comments
Del Paso Manor 06-067-0006	Lead 85129-4	Annual summary completeness < 70%	Lead concentration has been very low. The laboratory that performed the analysis was unable to detect lead in certain samples, and null qualifier codes were submitted.
Del Paso Manor 06-067-0006	Lead 85129-4	Quality Assurance Project Plan not approved in 5 years.	Sac Metro Air District was working with CARB to update the lead QAPP. A new QAPP is now not being considered because CARB and the Air District will no longer be running lead in their networks. Del Paso Manor has historically low lead concentrations and lead is no longer an NCORE requirement. On April 20, 2020 the Sac Metro Air District received a letter from the EPA agreeing with our request to discontinue lead sampling at Del Paso Manor. Lead sampling at this site will be discontinued on May 31, 2020.

Appendix D Monitors Discontinuation Approval Letter

Figure D-1 Monitors Discontinuation Approval Letter, Page 1



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

April 20, 2020

Mr. Mark Loutzenhiser
Division Manager, Program Coordination Division
Sacramento Metropolitan Air Quality Management District
777 12th Street
Sacramento, California 95814-1908

Dear Mr. Loutzenhiser:

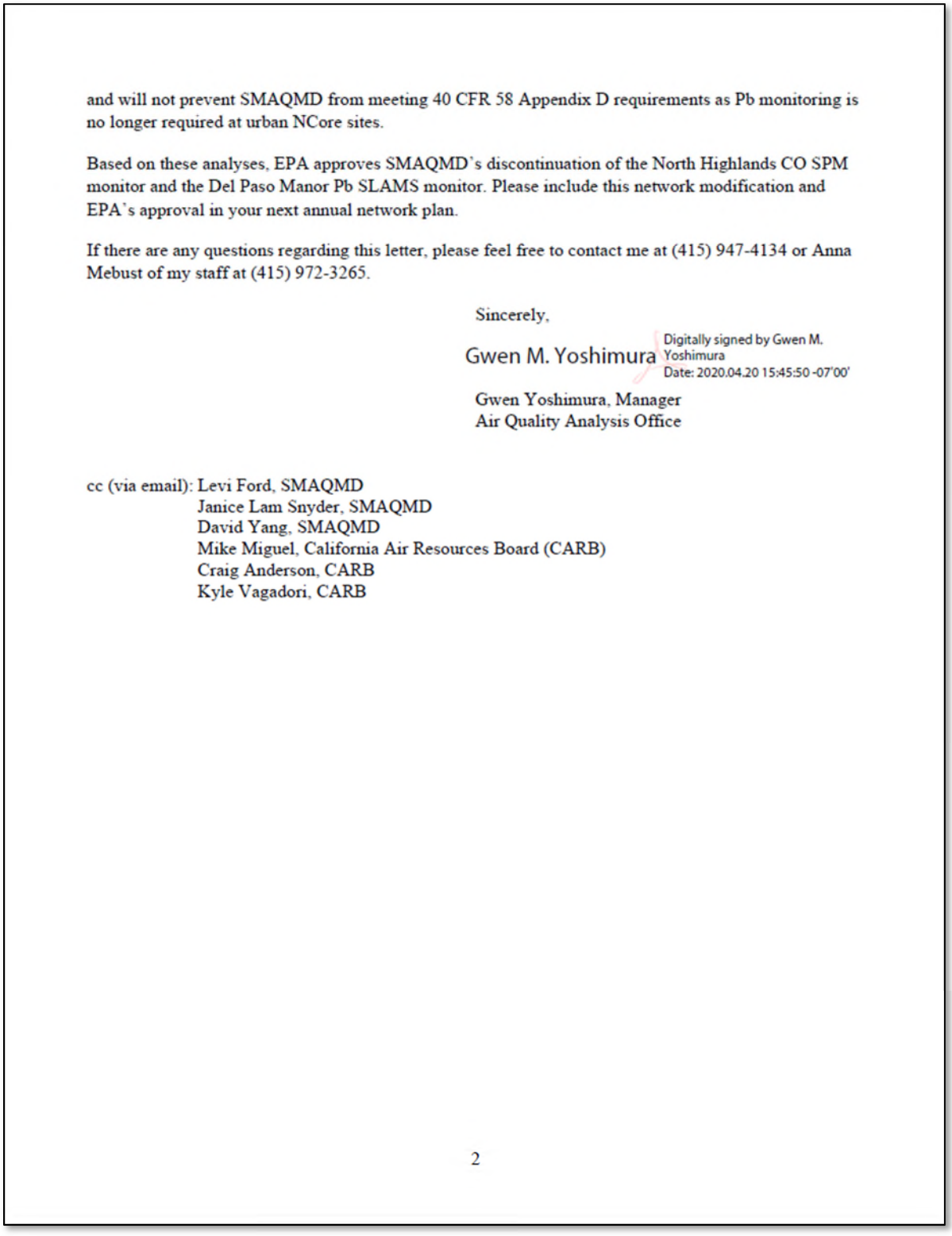
This letter provides the Environmental Protection Agency's (EPA) review and approval for the Sacramento Metropolitan Air Quality Management District (SMAQMD) discontinuation of the carbon monoxide (CO) Special Purpose Monitor (SPM) at North Highlands (AQS ID: 06-067-0002) and the lead (Pb) State or Local Air Monitoring Station (SLAMS) monitor at Del Paso Manor (AQS ID: 06-067-0006). A request for EPA approval of these network changes was submitted to EPA on March 2, 2020. Per 40 CFR 58.14, monitoring agencies are required to obtain EPA approval for the discontinuation of SLAMS monitors.

Discontinuation of the CO SPM at North Highlands was reviewed by EPA against criteria contained in 40 CFR 58.14(c)(1). According to certified data submitted to EPA's Air Quality System (AQS), the North Highlands site was in attainment of the 1971 1-hour and 8-hour CO National Ambient Air Quality Standards (NAAQS) from 2014 through 2018. As demonstrated in SMAQMD's request, based on design values from 2014-2018, there is a less than 10 percent probability of exceeding 80 percent of the NAAQS during the next three years at this site. Preliminary concentrations available for 2019 and a portion of 2020 are consistent with the historical trend and continue to show low values. This CO SPM is not specifically required by an attainment or maintenance plan, and SMAQMD will continue to operate two CO monitors in the Sacramento CO maintenance area. Furthermore, discontinuance of this monitor will not prevent SMAQMD from meeting 40 CFR 58 Appendix D requirements.

Discontinuation of the Pb SLAMS monitor at Del Paso Manor was specifically reviewed under 40 CFR 58.14(c), which states that requests for discontinuation "may also be approved on a case-by-case basis if discontinuance does not compromise data collection needed for implementation of a NAAQS and if the requirements of appendix D to this part, if any, continue to be met."

SMAQMD began monitoring for Pb at Del Paso Manor, which is a National Core multipollutant monitoring (NCore) site, in 2012. The highest three-month rolling average measured from the start of monitoring through 2019 was 0.01 micrograms per cubic meter ($\mu g/m^3$). As stated in the preamble to the 2016 revisions to the monitoring rule (81 FR 17259), EPA anticipated that waiver requests for shutdown of Pb monitoring at urban NCore sites would be received based on three years of data showing design values well below the 2008 Pb NAAQS of 0.15 $\mu g/m^3$. The discontinuance of the Pb monitor at Del Paso Manor does not compromise data collection needed for implementation of the 2008 Pb NAAQS,

Figure D-2 Monitors Discontinuation Approval Letter, Page 2



and will not prevent SMAQMD from meeting 40 CFR 58 Appendix D requirements as Pb monitoring is no longer required at urban NCore sites.

Based on these analyses, EPA approves SMAQMD's discontinuation of the North Highlands CO SPM monitor and the Del Paso Manor Pb SLAMS monitor. Please include this network modification and EPA's approval in your next annual network plan.

If there are any questions regarding this letter, please feel free to contact me at (415) 947-4134 or Anna Mebust of my staff at (415) 972-3265.

Sincerely,

Gwen M. Yoshimura

Digitally signed by Gwen M. Yoshimura
Date: 2020.04.20 15:45:50 -07'00'

Gwen Yoshimura, Manager
Air Quality Analysis Office

cc (via email): Levi Ford, SMAQMD
Janice Lam Snyder, SMAQMD
David Yang, SMAQMD
Mike Miguel, California Air Resources Board (CARB)
Craig Anderson, CARB
Kyle Vagadori, CARB

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