

**Albuquerque Environmental Health Department
Air Quality Program
2018 Annual Network Review**

May 25, 2018

Albuquerque Environmental Health Department (EHD)
Air Quality Programs (AQP)
Ambient Air Monitoring Section
2018 Annual Network Review for Ambient Air Monitoring

Introduction

Federal regulations require the City of Albuquerque Air Quality Programs (AQP) to submit an annual monitoring network review (ANR) to the Environmental Protection Agency (EPA) regional office in Dallas, Texas. AQP's objective, when reviewing the network and, if appropriate, proposing changes, is to optimally apply limited monitoring resources, while maximizing its effectiveness by choosing monitoring sites to capture places where air quality is likely to be most heavily impacted by certain criteria pollutants.

The network plan describes the framework of the local air quality surveillance system, presents monitoring results over the past three years, provides comparisons to National Ambient Air Quality Standards, and discusses AQP's future plans. The annual monitoring network plan must be made available for public inspection for at least 30 days prior to formal submission to EPA. (Anticipated dates are May 25 – June 25, 2018.) All City of Albuquerque State and Local Air Monitoring Stations (SLAMS) meet EPA guidance under 40 CFR, Part 58, Appendix E.

This document shows the network configuration since the 2017 Annual Network Review and proposed changes for the 2018 calendar year. It represents the commitment of the AQP to effectively measure air pollution in Albuquerque-Bernalillo County¹ through ambient air monitoring, by using the best affordable technology, and by communicating the data collected as quickly and accurately as possible.

The City of Albuquerque Air Quality Program operates its air monitoring network in accordance with the quality assurance requirements of 40 CFR Part 58, Appendix A and B, makes use of the methodology given for each monitor in accordance with Appendix C, implements and designs its monitoring network in accordance with Appendix D, and follows siting criteria provided in Appendix E.

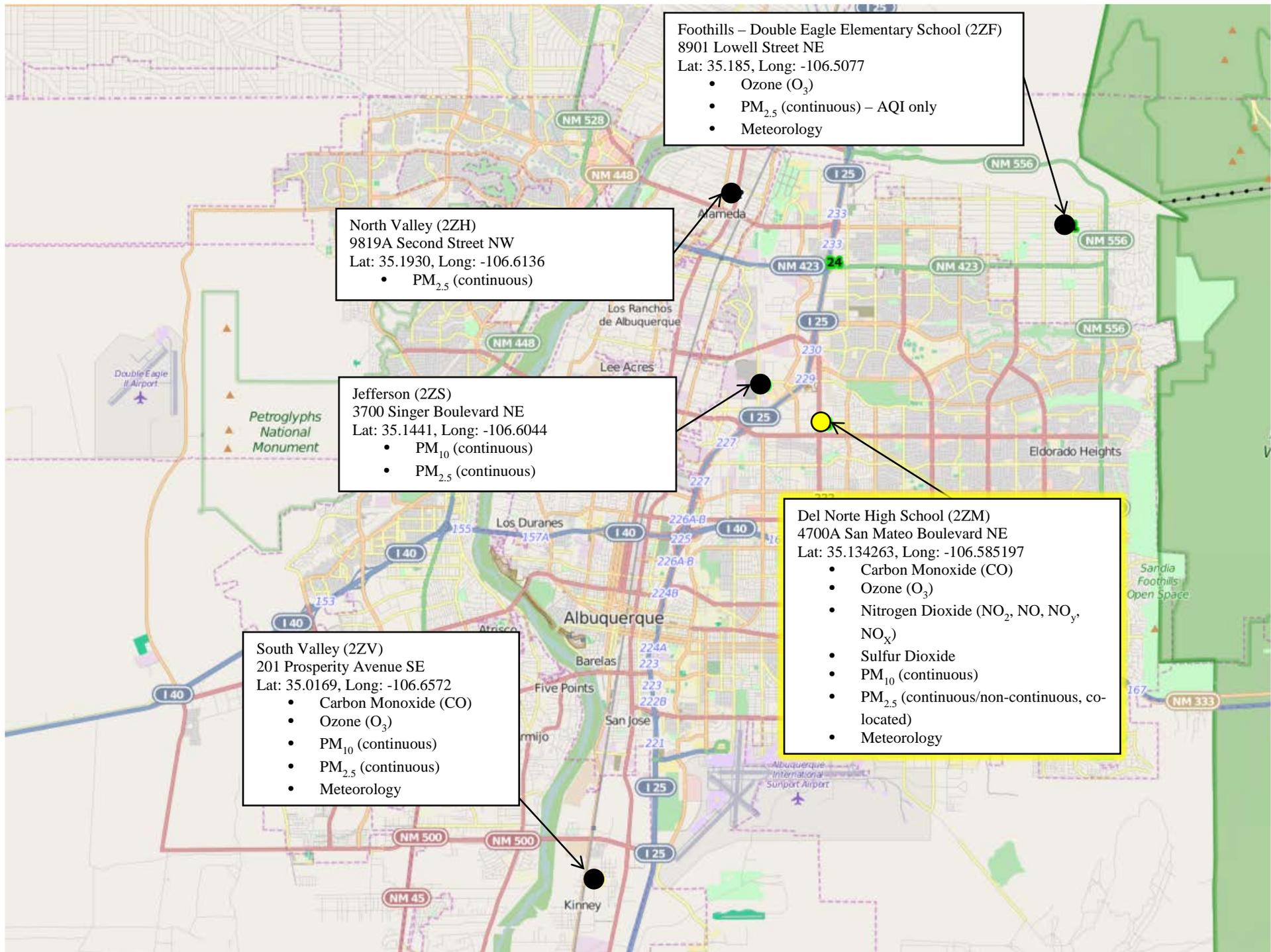
Population Statistics

The counties of Bernalillo, Sandoval, Valencia and Torrance make up the State's largest Metropolitan Statistical Area (MSA). The MSA contains 910,726 people as of 2017, which is almost half (43.6%) of the State's total population of 2,088,070.

As the regional center for employment, advanced education, retail commerce, and medical treatment, Albuquerque experiences non-local commuter traffic. The junction of major Interstate 25 (north/south) and Interstate 40 (east/west), adds significant heavy transport traffic between the port of Los Angeles and the East Coast, and between Denver, El Paso, and the US-Mexico Border.

¹ Excluding Native American and Pueblo Lands within the County which are overseen by EPA rather than AQP.

The map in Figure 1 shows the physical location of all current monitoring sites operated by the AQP. Three sites are within the city limits of Albuquerque (2ZM – Del Norte, 2ZS – Jefferson, and 2ZH – North Valley). Two other sites (2ZV - South Valley and 2ZF - Foothills) are in Bernalillo County.



Foothills – Double Eagle Elementary School (2ZF)
8901 Lowell Street NE
Lat: 35.185, Long: -106.5077

- Ozone (O₃)
- PM_{2.5} (continuous) – AQI only
- Meteorology

North Valley (2ZH)
9819A Second Street NW
Lat: 35.1930, Long: -106.6136

- PM_{2.5} (continuous)

Jefferson (2ZS)
3700 Singer Boulevard NE
Lat: 35.1441, Long: -106.6044

- PM₁₀ (continuous)
- PM_{2.5} (continuous)

South Valley (2ZV)
201 Prosperity Avenue SE
Lat: 35.0169, Long: -106.6572

- Carbon Monoxide (CO)
- Ozone (O₃)
- PM₁₀ (continuous)
- PM_{2.5} (continuous)
- Meteorology

Del Norte High School (2ZM)
4700A San Mateo Boulevard NE
Lat: 35.134263, Long: -106.585197

- Carbon Monoxide (CO)
- Ozone (O₃)
- Nitrogen Dioxide (NO₂, NO, NO_y, NO_x)
- Sulfur Dioxide
- PM₁₀ (continuous)
- PM_{2.5} (continuous/non-continuous, co-located)
- Meteorology

Table 1, found on the next page, shows the network configuration as EPA acknowledged it in the 2017 ANR and lists the monitoring equipment operated at each site. Column 1 is the “AQS Site ID#,” a unique identification number assigned to each monitoring site in the network. The Air Quality System (AQS) is a national air monitoring database maintained by the EPA. Data collected from monitoring sites are quality assured and input into the AQS database within 90 days following the end of each calendar quarter. <https://www.epa.gov/outdoor-air-quality-data>.

Column 2 gives the local site designation, name, location, and “affiliation.” Site longitude and latitude are in columns 3 and 4. Columns 5 through 9 list the monitors at each site and their associated parameters. During the public review period monitoring site photographs can be downloaded from the City of Albuquerque – Air Quality Programs website <http://www.cabq.gov/airquality/annual-network-review-for-ambient-air-monitoring>

Table 1 Albuquerque 2018 Ambient Air Monitoring Network

AQS Site ID#	Address/ Location	Longitude	Latitude	Pollutants Measured	Monitor Type	Sampling Method	Sampling Method	AQS Analysis	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	MSA
35-001-1012	2ZF Foothills - 8901 Lowell NE	-106.508	35.1852	O ₃	SLAMS	44201-1 087	UV Photometric	Ultra Violet Absorption	Continuous	Highest Concentration	Urban	Yes	ABQ
				PM _{2.5}	AQI Only	88502-1 170	Beta Absorption	Beta Attenuation Internal Only	Continuous	General Background	Neighborhood	Not in AQS	ABQ
35-001-1013	2ZH North Valley - 9819A Second Street, NW	-106.614	35.19324	PM _{2.5} *	SLAMS	88101 170	Beta Absorption	Beta Attenuation	Continuous	Population Exposure	Neighborhood	Not in AQS	ABQ
35-001-0023	2ZM Del Norte - 4700A San Mateo NE Affiliation: NCore	-106.586	35.13426	O ₃	SLAMS	44201-1 087	UV Photometric	Ultra Violet Absorption	Continuous	Population Exposure	Neighborhood	Yes	ABQ
				HS CO	SLAMS	42101-1 593	Non Dispersive IR	Gas Filter Correlation Teledyne T300U	Continuous	Population Exposure	Neighborhood	Yes	ABQ
				NO ₂	SLAMS	42602-1 099	Chemiluminescence	Gas Phase Chemiluminescence	Continuous	Population Exposure	Neighborhood	Yes	ABQ
				NO _y	SLAMS	42600 699	Chemiluminescence	Chemiluminescence Teledyne API T200U/501	Continuous	Population Exposure	Neighborhood	NA	ABQ
				HS SO ₂	SLAMS	42406 600	UV fluorescence	UV Fluorescence T100U	Continuous	General Background	Population Exposure	Yes	ABQ
				PM ₁₀ LC & PM ₁₀ STD *	SLAMS	81102-1 122/85101-1 122	Beta Absorption	Beta Attenuation	Continuous	Population Exposure	Neighborhood	Yes	ABQ
				PM _{2.5} *	SLAMS	88101 170	Beta Absorption	Beta Attenuation	Continuous	Population Exposure	Neighborhood	Yes	ABQ
				PM _{2.5} collocated	SLAMS	88101-2 145	Gravimetric	Gravimetric	Daily 1/3	Population Exposure	Neighborhood	Yes	ABQ
				Metals Speciation	Special Purpose	68103	Multiple	810-MetOne SASS 811MetOne SASS Teflon 812-MetOne SASS Nylon	Daily 1/3	Population Exposure	Mixture of Other, Population Exposure, General Background	NA	ABQ
				Carbon Speciation	Special Purpose	88320 88321	Multiple	826, 831, 839, 840, 841, 842 URG 300N w/Pall Quartz filter and cyclone inlet	Daily 1/3	Population Exposure	Mixture of Other, Population Exposure, General Background	NA	ABQ
PM ₁₀ -PM _{2.5} *	SLAMS	86101-185	Beta Absorption	Beta Attenuation	Continuous	Population Exposure	Neighborhood	No	ABQ				
35-001-0026	2ZS Jefferson - 3700 Singer NE	-106.605	35.1443	PM ₁₀	SLAMS	88102-1 239	Broadband Spectroscopy	Broadband Spectroscopy	Continuous	Significant Source	Middle	Yes	ABQ
				PM _{2.5}	AQI Only	88502-3 238	Broadband Spectroscopy	Broadband Spectroscopy	Continuous	Significant Source	Middle	Yes	ABQ
35-001-0029	2ZV South Valley - 201 Prosperity SE	-106.657	35.01708	O ₃	SLAMS	44201-1 087	UV Photometric	Ultra Violet Absorption	Continuous	Regional Transport	Regional	Yes	ABQ
				HS CO	SLAMS	42101-1 093	Non Dispersive IR	Gas Filter Correlation Teledyne T300U	Continuous	Regional Transport	Regional	Yes	ABQ
				PM ₁₀	SLAMS	88102-1 239	Broadband Spectroscopy	Broadband Spectroscopy	Continuous	Population Exposure	Neighborhood	Yes	ABQ
				PM _{2.5}	SLAMS	88102-2 179	Gravimetric	Gravimetric	1/1	Population Exposure	Neighborhood	Yes	ABQ
				PM _{2.5}	SLAMS	88101 183	Broadband Spectroscopy	Broadband Spectroscopy	Continuous	Population Exposure	Neighborhood	Yes	ABQ

* MetOne BAM 2.5 and MetOne BAM 10 at the NCore site are used to calculate PM Coarse (PM_{10-2.5})

Summary of changes:

Table 2, represents changes made to the AQP since the 2017 ANR was approved. In addition it includes proposed changes we would like to make to the existing network. These changes, as well as reasoning behind the changes, will be discussed further below under the heading for each pollutant.

Table 2 Albuquerque 2018 Ambient Air Monitoring Network Proposed Site Changes

AQS Site ID#	Address/ Location	Longitude	Latitude	Pollutants Measured	Monitor Type	Sampling Parameter & Method	Sampling Method	AQS Analysis	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	MSA	Change
TBD	San Jose Neighborhood	TBD	TBD	PM _{2.5}	SPM	88101-1 170	Beta Attenuation	Beta Attenuation	Continuous	Significant Source	Middle	Yes	ABQ	Add*
				Aethalometer BC/EC	SPM	88313 861	Optical Asorption	Optical Absorption	Continuous	Significant Source	Middle	No	ABQ	Add*
35-001-0023	2ZM	-106.586	35.13426	PM ₁₀	SLAMS	88102-1 239	Broadband Spectroscopy	Broadband Spectroscopy	Continuous	Significant Source	Middle	Yes	ABQ	Add*
				PM _{2.5}	SLAMS	88502-3 238	Broadband Spectroscopy	Broadband Spectroscopy	Continuous	Significant Source	Middle	Yes	ABQ	Add*
				PM _{10.2.5}	SLAMS	86101 236	Broadband Spectroscopy	Broadband Spectroscopy	Continuous	Significant Source	Middle	Yes	ABQ	Add*

Add* The intention of the AQP is to add this monitor to the indicated monitoring station during the 2018 calendar year, once proper resources and information become available.

DISCUSSION OF INDIVIDUAL CRITERIA POLLUTANTS

Below, AQP discusses each criteria pollutant monitored at its various monitoring stations, how the concentration of each pollutant compares to the National Ambient Air Quality Standards (NAAQS), why AQP believes its monitoring network provides a fair assessment of the concentration for each pollutant in its jurisdiction or, if not, how AQP plans to modify its monitoring network to improve its assessment.

Ground Level Ozone (O3):

Based on population, Table D-2 of Appendix D to Part 58, 40 CFR requires a minimum of two (2) State and Local Air Monitoring Stations (SLAMS) ozone monitors.

Current – Per 40 CFR Part 58, Appendix D Section 4.1, the AQP exceeds EPA network design requirements for ambient air quality monitoring for Ozone. The AQP has three (3) ozone monitors, all categorized as SLAMS.

Table 3: Ozone Design Value by site, part per million (ppm)

Site Name AQS #	2015	2016	2017	3-year Design Value
	4th highest 8-hr avg.	4th highest 8-hr avg.	4th highest 8-hr avg.	
Del Norte 0023	0.065	0.067	.069	0.067
Foothills 1012	0.067	0.064	.071	0.067
South Valley 0029	0.068	0.063	.066	0.065

Table 4: Ozone Design Value, parts per million (ppm)

Site	2015 4 th Highest 8- hr (ppm)	2016 4 th Highest 8- hr (ppm)	2017 4 th Highest 9- hr (ppm)	3 year Design Value part per million (ppm)	2015 Federal Standard part per million (ppm)	% of the 2015 Federal Standard
Foothills 1012	.067	.064	.071	.067	.070	95.7

AQP considers the three ozone monitoring locations appropriate for its jurisdiction. AQP monitoring results show that the location of the maximum concentration of ozone changes over the year. Sometimes peak concentrations are observed at the Foothills station, sometimes down in the South Valley and sometimes at Del Norte. The AQP meets EPA requirements for ozone monitoring.

Fine Particulate Matter (PM_{2.5}):

According to Table D-5 of Appendix D to Part 58, 40 CFR one SLAMS PM_{2.5} site (2 monitors are needed to accomplish collocation requirements) is required in Albuquerque-Bernalillo County. Between the requirement needs of the NCore site and the desire for the COA to have a PM_{2.5} monitor in its highest PM_{2.5} concentration site, the COA believes that a minimum of 2 sites (3 monitors) should be considered. This highest concentration site would fulfill the requirement stated in 40 CFR Part 58 Appendix D, 4.7.1 (b).

Current – AQP operates six PM_{2.5} monitors at four monitoring stations in Albuquerque-Bernalillo County.

- The Del Norte 2ZM site (AQS 35-001-0023) operates a continuous Met One Beta Attenuation Monitor (BAM) 1020 as the Primary monitor and a Partisol 2025 sequential sampler with 2.5 micron inlet cutoff to record 24-hour averages PM_{2.5} on a 1/1 schedule as a co-located sampler.
- The South Valley 2ZV site (AQS 35-001-0029) operates a Partisol 2025 sequential sampler with 2.5 micron inlet to record 24-hour averages with a sampling frequency of 1/1 (daily) and a PM_{2.5} Teledyne/API T640X FEM sampler.
- The Foothills 2ZF site (AQS 35-001-1012) operates Met One BAM and is classified for Air Quality Index (AQI) only. This monitor is not required by EPA but is maintained by the AQP to better understand PM_{2.5} trends as prevailing westerly winds cross the City of Albuquerque and for AQI purposes.
- The Jefferson 2ZS site (AQS 35-001-0026) operates a continuous PM_{2.5} API T640X FEM sampler.

Table 5: PM_{2.5} Design Value, microgram per cubic meter (ug/m³)

Site Name AQS #	Sampling Schedule	24-hour design value	Annual Design Value	Design Value (% Daily NAAQS)	Design Value (% Annual NAAQS)	Collocated with continuous PM _{2.5}
Del Norte 0023	Continuous	18	5.8	51.4%	48.3%	Yes
South Valley 0029	Continuous	18	7.2	51.4%	60%	Yes

Future – The AQP will be adding an API T640X continuous analyzer to monitor for PM_{2.5} at the Del Norte 2ZM site (AQS 35-001-0023). The Met One BAM PM_{2.5} monitor will be discontinued.

PM₁₀:

PM data is used by the AQP to accurately measure PM in neighborhoods, to enforce our local fugitive dust control regulation, and to issue high wind advisory and health alerts. High PM values are the most common cause of AQI warning days in Albuquerque.

Current – AQP currently operates three PM₁₀ monitors at three sites, which are all NAAQS comparable.

The Del Norte 2ZM NCore site (AQS 35-001-0023) operates a continuous Federal Equivalent Method (FEM) for PM₁₀.

The Jefferson 2ZS site (AQS 35-001-0026) operates a continuous FEM for PM₁₀.

The South Valley 2ZV site (AQS 35-001-0029) operates a continuous FEM for PM₁₀.

Table 6 shows the calculation of the design values for each NAAQS comparable PM₁₀ site.

Table 6. 2017 PM₁₀ 24 Hour Design Value

Site	COA-2017 24 Hour Design Value*	NAAQS	Is the average # of exceedance values >1
Del Norte 2ZM	0	≥1	No
Jefferson 2ZS	0	≥1	No
South Valley 2ZV	0	≥1	No

*PM₁₀ Design Value is considered to be the number of expected exceedances based off of the last three years values. The AQP is expecting 0 exceedances of the PM₁₀ standard.

Future: The AQP will be adding an API T640X continuous FEM analyzer to monitor for PM₁₀ at the Del Norte 2ZM site (AQS 35-001-0023). The Met One BAM PM10 monitor will be discontinued.

Sulfur Dioxide (SO₂):

Current – AQP operates an SO₂ monitor at site Del Norte 2ZM site (AQS 35-001-0023), the NCore location. Table 5 shows that the SO₂ monitor is measuring only trace levels, less than 10% of the NAAQS.

Table 7: 2016 SO₂ Design Value, part per billion (ppb)

2ZM Del Norte	Year	99th percentile
35-001-0023	2015	5
35-001-0023	2016	6
35-001-0023	2017	4
Design Value		5

Future –No changes are planned in the coming year.

SO₂ Data Requirement Rule- The EPA Fact Sheet “Final Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO₂) Primary National Air Quality Standards (NAAQS) states:

This final rule establishes that, at a minimum, air agencies must characterize air quality around sources that emit 2,000 tons per year (tpy) or more of SO₂. An air agency may avoid

the requirement for air quality characterization near a source by adopting enforceable emission limits that ensure that the source will not emit more than 2,000 tpy of SO₂.

Bernalillo County does not have any sources that are over the 2,000 tons per year minimum therefore no characterization is necessary. The AQP will continue to follow this issue and adjust our plans as further information becomes available from the EPA.

The AQP is meeting the network design requirements for ambient air quality monitoring for SO₂ required by 40 CFR Part 58, App. D, § 4.4.

Oxides of Nitrogen (NO):

Current – The AQP monitors NO, NO₂, NO_x, and NO_{2y} at the Del Norte 2ZM site (AQS 35-001-0023, the NCore location) and is currently meeting the network design requirement for ambient air quality monitoring for NO₂ based on 40 CFR Part 58, Appendix D Section 4.3.3. Table 6 shows that NO₂ levels are low. (Annual 98th percentile 1-hour values averaged over 3 years = 44 ppb compared to a standard of 100.)

Table 8: NO₂ Design Value, ppb

2ZM Del Norte site 35-001-0023

	2016	2017	3 year Design Value
98th Percentile			
1-Hr Concentration (PPB)	44.4	44.6	44

Future –No changes are planned in the coming year.

Carbon Monoxide (CO):

Current –The AQP currently operates two (2) CO monitors. The COA is currently meeting the network design requirement for ambient air quality monitoring for CO per 40 CFR Part 58, Appendix D Section 4.2.

Table 9: 2017 CO Design Value, ppm

2ZM Del Norte 35-001-0023					
1 Hour			8 Hour		
Year	1st Max	2nd Max	Year	1st Max	2nd Max
2016	2.1	1.8	2016	1.4	1.2
2017	1.7	1.5	2017	1.1	1.0
2ZV South Valley 35-001-0029					
1 Hour			8 Hour		
Year	1st Max	2nd Max	Year	1st Max	2nd Max
2016	2.2	2.2	2016	2	1.9
2017	2.4	2.2	2017	1.1	1.0

The 1-hour high average value over the past 2 years is 2.4 ppm (South Valley 2ZV site, 2017) which is 6.9% of the hourly NAAQS (35 ppm). The 8-hour high average is 1.9 ppm (Del Norte 2ZM site, 2016) which is 21.1% of the 8-hour NAAQS (9 ppm). Because of the low CO concentrations, both monitors are now ‘high sensitivity.’

Future –No changes are planned in the coming year.

PM_{2.5} Chemical Speciation

Current – CFR Part 58 regulations require the operation of a speciation sampler at approved NCore sites. The Del Norte 2ZM site (AQS 35-001-0023) site in Albuquerque operates a Met One Super Sass and a URG sampler for EC/OC (Elemental and Organic Carbon). Speciation filters are sent to the EPA national analysis contractor, and data is reported by the contractor to the AQS. The AQP also uses this data in local studies to correlate with data from other samplers.

Both samplers now operate on one-in-three day sampling schedule.

Community Scale Air Toxics Monitoring (CSM)

Current – The AQP has participated previously in CSM studies, but there were none in the past year. In March 2017, the AQP applied for a 2017 CSM grant. Based on scoring, the City of Albuquerque was not selected to receive a grant.

National Core Monitoring Network (NCore)

The NCore site has been fully operational and compliant since the 2010 start-up date. Individual NCore instruments have been discussed in the appropriate sections above. The Del Norte 2ZM site also has NCore compliant meteorology.

Proposed New Site:

The AQP proposes a monitoring site in the San Jose Neighborhood that will operate a PM_{2.5} continuous analyzer and an Aethalometer for elemental and black carbon and will be designated as SPM. Due to several environmental justice concerns brought to the attention of the AQP, we would like to assist the community by providing additional data regarding PM_{2.5} related issues. The addition of this site would allow more in depth review of particulate matter trends.

Albuquerque – Bernalillo County Network

Table 11: Albuquerque-Bernalillo Co 2017 Air Monitoring Network as approved.

Station Name (Site Code), AQS #	Gases					PM10		PM2.5		Other			
	Ozone	CO	NO ₂	NO _y	HS-SO ₂	Sequential	Continuous	Continuous	Sequential	Speciation	Nephelometer	Aethalometer	
Foothills (2ZF), 35-001-1012	API T400							BAM 1020				McGee AE33	
Del Norte HS (2ZM), 35-001-0023	API T400	API T300U	API T200	API T200U	API T100U		Met One BAM ** 1020 LC & STD	Met One BAM ** 1020	Thermo 2025 Col 1/3	Met One Super SASS & URG Carbon 1/3	Optec NGN-2	McGee AE21	MET*
Jefferson (2ZS), 35-001-0026							Met One BAM 1020, API T640	API T640X					
South Valley (2ZV), 35-001-0029	API 400E	API T300U					API T640X	API T640X				McGee AE21	
	SLAMS/NCORE			SLAMS									

- * MET includes Wind Speed, Wind Direction, Solar Radiation, 2M Temp, 10M Temp, Precipitation, and Relative Humidity.
- ** Met One BAM PM_{2.5} and Met One BAM PM₁₀ at the NCore site are used to calculate PM Coarse (PM_{10-2.5})