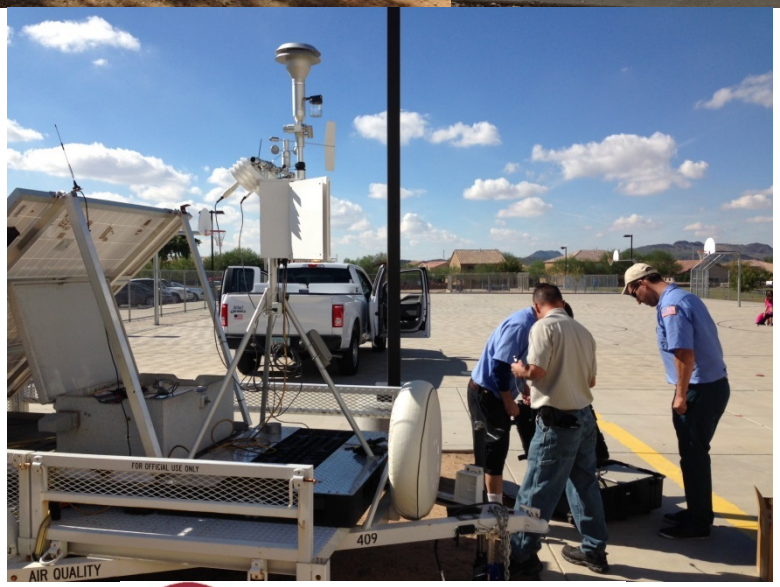
FINAL

2015 AIR MONITORING NETWORK PLAN



Publication Date: June 30, 2016

Maricopa County
Air Quality Department

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ACKNOWLEDGEMENTS

In 2015, the Maricopa County Air Quality Department's Air Monitoring Division maintained 26 ambient air monitoring sites throughout Maricopa County. The division has eighteen team members including: one manager, two technician supervisors, two engineers, one quality assurance officer, one data analyst, and eleven technicians.

The division would especially like to thank all of its personnel and the department's atmospheric scientist for their excellent job in helping to maintain Maricopa County's air monitoring program. They are: Ben Davis, Gary Ensminger, Robert Dyer, Ceresa Stewart, Nikki Peterson, John Neff, Tom Shorb, Chris Hernandez, Hugh Tom, Steve Sample, Daniel Daniels, Robert Sawicki, Reynaldo Santillano, Larry Seals, Alex Herrera, Freddie Alejandro, Tom Dubishar, David Dubiel, and Ron Pope, respectfully.

In addition, the department gratefully acknowledges the assistance of other agencies, which provided data and helpful comments to this review. These may include the Arizona Department of Environmental Quality, Pinal County Air Quality Control District, the Maricopa Association of Governments, and the Tribal air monitoring organizations adjacent to Maricopa County.

Last, we would like to thank the United States Environmental Protection Agency's Region 9 personnel for their guidance and support regarding our air monitoring program. The department respectfully submits this 2015 Air Monitoring Network Plan to Region 9 for review.

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ABSTRACT

In 2015, the Maricopa County Air Quality Department (MCAQD) Air Monitoring Division (AMD) successfully operated a robust air quality surveillance system that monitored for regulated ambient air pollutants as per *40 CFR Parts 50 and 58*. This Annual Monitoring Network Plan (AMNP) documents how the system performed during 2015. The data generated by the system are intended for regulatory compliance determinations regarding regulated ambient air pollutants. Data met EPA's requirements of quality; therefore, it can be used in this capacity.

The plan proposes changes to the current monitoring network as supported by data analysis presented in MCAQD's 2015 Network Assessment. In 2015, there were no request waivers from air monitoring regulations, except when access to a site prevented data collection for an extended period of time. When data collection interruptions occurred due to temporary or permanent site shutdowns, we made personnel at the Environmental Protection Agency's Region 9 (EPA R9) office aware of the situation immediately.

In 2015, air monitoring was suspended at two sites due to inaccessibility:

1. The Higley site's location has been closed since November 2014 due to the landowner needing use of their property. The AMD is working on securing a suitable replacement location as close as possible to the previous geographic location so the same population is represented.
2. The Tempe site was temporarily shutdown from April until October due to the landowner making significant infrastructure upgrades. No other waivers were requested to suspend air monitoring from regulatory requirements in 2015.

During 2015, some notable accomplishments were:

- the startup of the second NO_2 near-road air monitoring station at the new "Thirty-Third" site;
- performing specialized particulate air monitoring for chemical speciation from the 2015 Thanksgiving through the 2016 New Year's holiday season;
- conducting a temporary air monitoring network for the 2015 Superbowl;
- establishing temporary monitoring for emergency events;
- decommissioning the AMD gravimetric laboratory in order to use a commercial laboratory for processing and analyzing PM filter samples; and,
- assisting the Fort McDowell Yavapai Nation by temporarily loaning air monitors to prevent PM_{10} and O_3 data interruption.

Department personnel maintained successful working relationships with regulatory agency representatives, customers, and stakeholders. We provided our data to personnel from these groups as requested, and we responded to calls from the public regarding air monitoring questions. We continued to enhance our air monitoring website for the public's benefit as well.

INTRODUCTION TO THE AIR MONITORING NETWORK PLAN

Each year, MCAQD produces a comprehensive Air Monitoring Network Plan (AMNP) that provides vital information regarding the air monitoring surveillance system in-place for Maricopa County. The EPA requires each air monitoring organization (MO) operating within the U.S. and its territories to submit their plan on July 1st following a 30-day public comment period by way of *40 CFR Part 58, Subpart B §58.10(a)(1).* The 2015 AMNP is scheduled for submission to EPA R9 before the end of June 2016.

The AMNP is preliminary to our annual data certification for EPA R9, and it helps us review and assess the quality of our data before submitting it for certification. The plan's secondary purpose is to inform the public of air pollutants that can potentially affect human health; thereby empowering our citizens and visitors with the ability to make informed decisions regarding their daily activities and lifestyles. The AMNP also describes MCAQD's anticipated changes to the monitoring network in 2016.

The MCAQD's monitoring network is a conglomeration of six "criteria pollutant" (CP) networks, into a single, broad network that includes 26 monitoring sites. The AMNP includes an abundance of information regarding each pollutant monitor, pollutant data findings, as well as brief information regarding special purpose and/or research-driven air monitoring if conducted. The plan's information includes, but is not limited to:

- Descriptions of air monitoring sites, i.e., basic monitoring objective, monitor type, monitoring scale (spatial scale represented), geographic coordinates, and the Air Quality System (AQS) site identification number;
- Information showing how well each monitor's siting and operating criteria met applicable regulatory requirements found in *40 CFR Part 58 - Appendices A (quality assurance), C (special purpose monitors), D (comparability of data to the NAAQS), and E (currently reserved)*;
- Confirmation that data generated are or are not of suitable quality for comparison to the NAAQS, i.e., regulations that establish the ambient level(s) for each CP;
- Required design value criteria, which are metrics used to determine how many pollutant monitors are required to operate within each CP network;
- Three years of data from each monitor plus required statistical analyses;
- The NAAQS compliance status of each CP and how MCAQD plans to review and address a violating monitor;
- Any proposed changes, i.e., additions, relocations, and discontinuations to monitors, stations, and/or sites within the next 18 months;
- Any proposed changes to the monitoring or analytical methods employed by the county's surveillance system;
- Any requests for waivers from specific air monitoring requirements; and
- Public comments received regarding the draft AMNP and information regarding how MCAQD responded to the comments.

The MCAQD first produces a draft AMNP and solicits public comments on the draft. Following the public comment period, the MCAQD amends the draft as needed. Then, the AMNP is sent to EPA R9 for review and approval, or disapproval. The EPA R9 completes the review process within 120 days of receiving the plan, and the EPA R9 Administrator, or their representative, must specifically approve the requests for network changes and waivers. If the plan is not approved, then the MCAQD addresses the concerns presented by EPA R9 personnel, and resubmits the revised plan. Once the plan is approved, MCAQD posts it on our website, and the EPA makes it available to other MOs through the EPA's Ambient Monitoring Technology Information Center (AMTIC) website.

The map below shows the location of MCAQD's air monitoring sites discussed in this year's plan (see Figure 1).

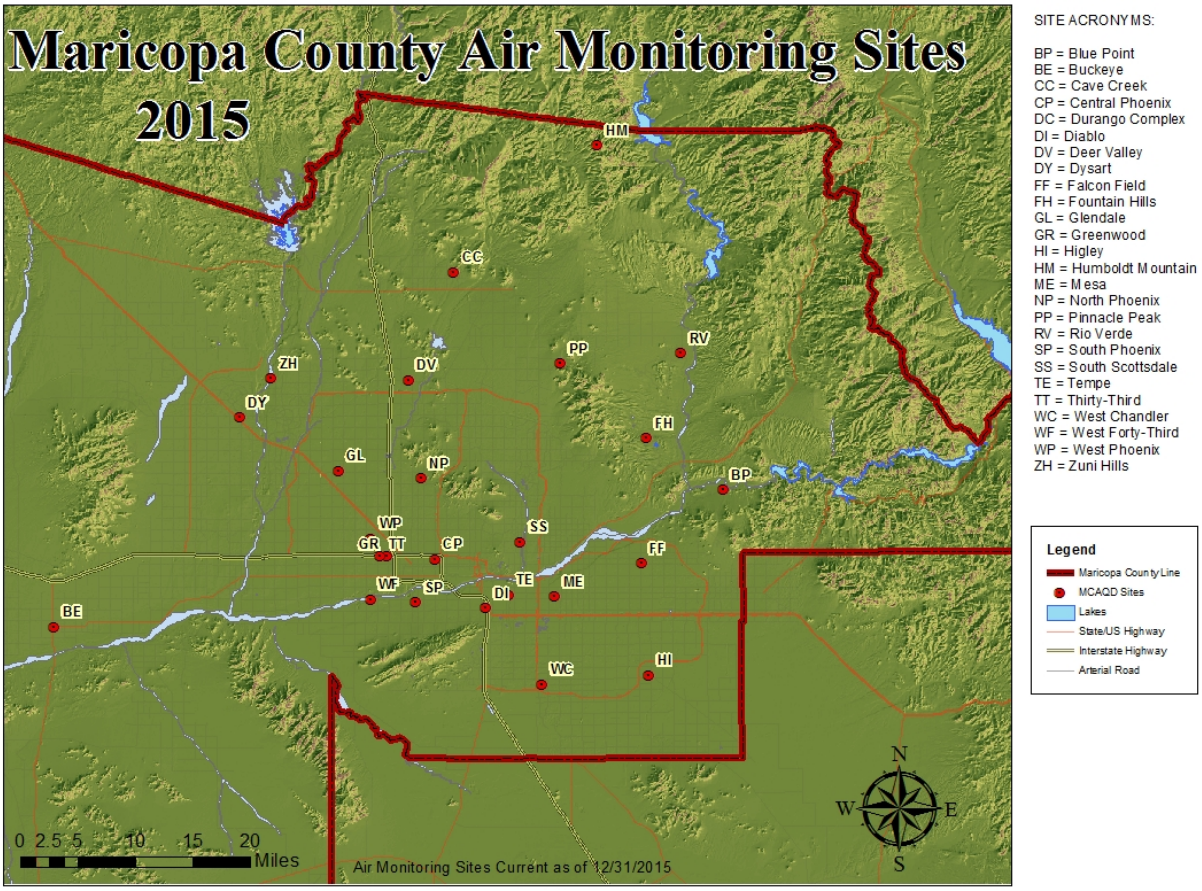


Figure 1. 2015 Air Monitoring Site Map

Overview of the Clean Air Act and Criteria Pollutants

Between the years 1900 and 1970, the emission of the six criteria ambient air pollutants increased significantly. These pollutants occur throughout the U.S., and are known to cause health problems, property damage, and harm to the environment. This led to the Clean Air Act (CAA) being signed into law in 1970. The CAA, and its amendments, provides the framework for pertinent State/Local/Tribal (S/L/T) agencies to assess and protect air quality through an air monitoring program. The MCAQD monitors for all six CPs, which are:

1. Carbon monoxide (CO)
2. Lead (Pb)
3. Nitrogen oxides (NO_x) with nitrogen dioxide (NO_2) used as the indicator compound
4. Ozone (O_3)
5. Particulate matter $\leq$10 micrometers (PM_{10}) and $\leq$2.5 micrometers ($PM_{2.5}$)
6. Sulfur dioxide (SO_2)

The U.S. EPA regulates CPs using the National Ambient Air Quality Standards (NAAQS), which establish ambient levels for each CP using health and welfare-based criteria. There are two sets of standards. As per the *CAA §109(b)*, the "primary" NAAQS are designed to provide an adequate margin of safety that is requisite to protecting public health. The "secondary" NAAQS are designed to protect public welfare from any known or anticipated adverse effects associated with the presence of a CP in the ambient air. The primary standards protect public health and secondary standards protect public welfare by preventing damage to property such as farm crops and buildings, visibility impairment in national parks and wilderness areas, and the protection of ecosystems.

The NAAQS are not static. The CAA requires that they undergo periodic review using the most recent medical, epidemiological, physiological, and ecosystem research available. Historically, when a NAAQS level is changed; it is lowered and becomes more stringent, or "conservative". Lowering a NAAQS level occurs when it is considered necessary to meet the CAA standards for protecting public health and welfare:

The NAAQS review is a lengthy process that assesses the science upon which each NAAQS is based as well as the standard itself. The Clean Air Scientific Advisory Committee (CASAC) provides independent advice to EPA concerning the need to change a standard. In addition, comments are solicited from the public. More information regarding the NAAQS review process is available at EPA's website.

The U.S. EPA's Regional Offices oversee the enforcement of the CAA, and MCAQD falls under the jurisdiction of EPA R9. The U.S. EPA Office of Air Quality Planning and Standards (OAQPS) oversees the air monitoring program at a national level, leads regulatory and/or policy changes affecting air monitoring operations and quality requirements, and engages in the review of the NAAQS.

The National Ambient Air Quality Standards

The NAAQS are geared toward improving air quality in geographical areas where the current quality is unacceptable as well as preventing air quality deterioration in geographical areas where the air is relatively free of pollution. Table 1 shows a summary of the current primary and secondary standards for each CP. Since each CP has different health effects and environmental damage potential, the NAAQS level(s) are different for each pollutant. Some pollutants have standards for both long-term and short-term averaging times. The short-term standards are designed to protect against acute health effects, while the long-term standards are designed to protect against chronic health effects.

Table 1. National Ambient Air Quality Standards

Pollutant		Standard Type	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3-month average	0.15 $\mu g/m^3$	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb	Annual Mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	primary	1 year	12.0 $\mu g/m^3$	annual mean, averaged over 3 years
		secondary	1 year	15.0 $\mu g/m^3$	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 $\mu g/m^3$	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 $\mu g/m^3$	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		primary	1 hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Source: Adapted from the table shown: https://www.epa.gov/criteria-air-pollutants/naaqs-table.

The Air Quality Index

To better communicate current CP health risks to the public, EPA developed the Air Quality Index (AQI), a health risk communication tool that converts CP concentrations into six health-impact related color-coded indices based upon the NAAQS. The AQI communicates air quality conditions using the graduated color scheme shown on Table 2. The AQI can be used to provide an overall air quality value by combining multiple CP concentrations as well as an air quality value for each CP. The AQI values change throughout the day based on the current data. Historically, NO_2 did not have an AQI association; however, in 2015, we found that EPA has added an NO_2 scale to the AQI calculator. The MCAQD website now shows AQI values for NO_2.

Developing AQIs was furthered over the past few years by continuous analyzers replacing many of their sampler predecessors; thereby making data available electronically as it is generated. Currently, many MOs, including MCAQD, provide near real-time CP data to their agency's website and/or the EPA's website. It is worth noting that the AQI and air quality forecasts are based on preliminary data, i.e., data that have not passed quality assurance (QA) tests. Occasionally, preliminary data may contain some error.

Continuous air monitoring data helps air quality professionals gauge current, local air quality conditions. Air quality forecasters may provide projected AQI values for the next 24 to 48 hours so the public can better prepare for expected air quality conditions. For instance, members of the public may use the AQI values to reduce their exposure to air pollution and its associated health effects by modifying their daily activities.

Table 2. The Air Quality Index

Index	Color Designation	Air Quality	Health Impact
0 – 50	Green	Good	No harmful effects expected.
51 – 100	Yellow	Moderate	Unusually sensitive people should consider limiting prolonged outdoor exertion.
101 – 150	Orange	Unhealthy for Sensitive Groups	Active children & adults, people with respiratory disease, e.g., asthma, should limit prolonged outdoor exertion.
151 – 200	Red	Unhealthy	Everyone should observe caution. Avoid prolonged outdoor exertion.
201 – 300	Purple	Very Unhealthy	Avoid all outdoor exertion. Use extreme caution outdoors.
301 – 500	Maroon	Hazardous	Everyone should avoid all outdoor exertion.

Source: *40 CFR Part 58, Appendix G – Uniform Air Quality Index (AQI) and Daily Reporting*

The AQI is used throughout the U.S. and the EPA AIRNow website provides air pollution forecast maps for O_3 and $PM_{2.5}$, plus real-time air pollution maps with CO, O_3, PM_{10}, and $PM_{2.5}$ data for major metropolitan areas, including the Phoenix metropolitan area. Again, different colors on the map indicate health risks using pollutant concentrations. Figure 2 shows there is a moderate health risk due to O_3 and $PM_{2.5}$ within the yellow area and an increased risk for unhealthy or sensitive groups within the orange area.

The MCAQD has participated in the AIRNow AQI program since 2001. The MCAQD, in cooperation with ADEQ and PCAQCD, expanded the area that the maps cover. This area now includes sites as far east as Queen Creek, as far south as Casa Grande, and as far west as Palo Verde.

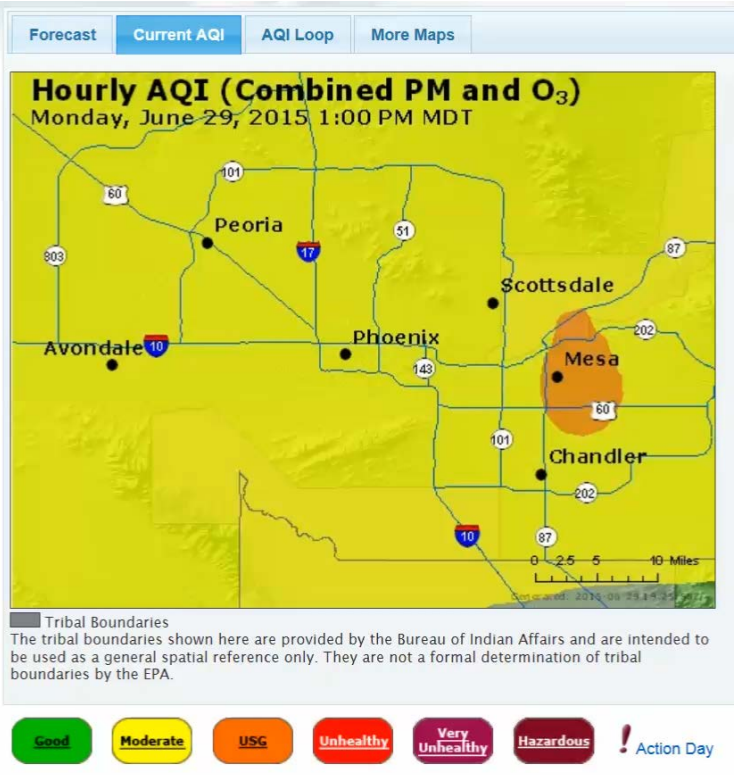


Figure 2. AIRNow AQI Forecast Map

Source: EPA AIRNow Website

Figure 3 shows the MCAQD website, which also provides AQI values for our local air monitoring sites in colored circles.

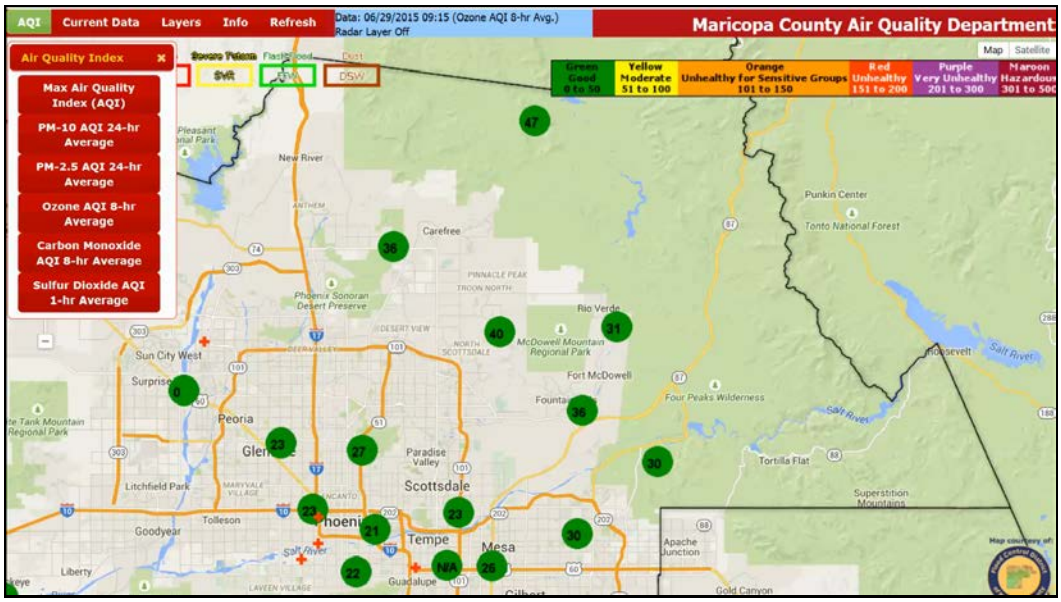


Figure 3. Maricopa County's AQI Map

Source: MCAQD's Air Quality Website

Information Regarding the Causes, Characteristics, and Compliance of Criteria Pollutants

Unless otherwise noted, the information regarding air pollutants in this section was compiled from various pages at the EPA's Air and Radiation website.

Carbon Monoxide (CO)

Carbon monoxide is a colorless, odorless gas found in both outdoor and indoor air. Carbon monoxide is primarily formed by the incomplete combustion of fossil fuels, e.g., carbon-containing fuels, and the photochemical reactions of gases in the atmosphere. Concentrations of CO tend to peak in the colder, winter months. Carbon monoxide is produced by both natural and anthropogenic sources, aka, human activities. One of the more significant anthropogenic sources of CO is automobile exhaust. Concentrations of CO from motorized vehicles lowered considerably over the last two decades partly due to replacing carburetors with fuel injectors, which results in a more complete combustion of fuel. Natural, or biogenic, sources of CO emissions include volcanic emissions and smoke from wildfires. Smoke from tobacco, cooking, fireplaces, and woodstoves contribute to indoor exposure to CO. In Arizona, the primary sources of CO are exhaust from motor vehicles, electricity generation, industrial and commercial boilers, and household natural gas burning. Carbon monoxide can be a minor contributor to the formation of ground-level O_3.

Carbon monoxide enters the body through inhalation, and the body eliminates CO primarily through exhalation and to a lesser extent through metabolic activity. After being inhaled, CO enters the bloodstream and binds to the blood's hemoglobin; thereby forming carboxy-hemoglobin that displaces oxygen (O_2) in the blood. This reduces the blood's capacity to carry O_2 to organs and tissues and causes the body to become O_2 deprived. This deprivation of O_2 is called hypoxia. This can adversely affect those with anemia, because anemia already reduces the blood's ability to carry O_2. Exposure to CO can result in a type of cardiovascular disease called ischemic heart disease, especially for those with existing heart problems. The central nervous system is adversely affected by CO as well. Acute exposure to severely high levels of CO is toxic and potentially fatal, and its effects on the body are well-known and widely studied. According to the Agency for Toxic Substances and Disease Registry, severe acute poisoning can cause cardiac arrest, heart attack, seizers, hypotension, respiratory arrest, noncardiogenic pulmonary edema, and coma. Moderate exposure may include many symptoms such as: confusion, chest pain, and weakness. Mild exposure may lead to symptoms that include headache, nausea, vomiting, dizziness, and blurred vision.

In 1971 EPA established identical primary and secondary standards for CO: an 8-hour primary standard at 9 parts per million (ppm) and 1-hour primary standard at 35 ppm. The EPA has reviewed the CO NAAQS several times since 1971, which led to the secondary standard being revoked in 1985. The primary standard levels have not changed to date, and currently, CO concentrations nationwide are substantially lower than the CO NAAQS. In 2015, Maricopa County achieved its 20th consecutive year of compliance with the 8-hour CO standard.

This general information was supplemented by the EPA OAQPS Health and Environmental Impacts Division's publication the *Quantitative Risk and Exposure Assessment for Carbon Monoxide – Amended July 2010*, which was produced for the 2010 CO NAAQS review.

Lead (Pb)

Lead is a heavy metal that occurs naturally in the environment and it is used in manufactured products. The major sources of Pb emissions have historically been motor vehicles and industrial sources. In the early 1970s, EPA established national regulations to reduce the Pb content in gasoline, gradually. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. The EPA banned the use of leaded gasoline in "highway motor vehicles" in December 1995. A highway vehicle includes, but is not necessarily limited to passenger vehicles propelled by their own motor, whether such motor is powered by gasoline, diesel fuel, special motor fuels, electricity, or otherwise.

As a result of EPA's regulatory efforts to remove Pb from gasoline, levels of Pb into the air decreased by 94 percent between 1980 and 1999. Levels of airborne Pb in Maricopa County were drastically reduced starting with the introduction of unleaded gasoline. Since Pb concentrations were consistently well below the NAAQS, Maricopa County was allowed to discontinue monitoring for airborne Pb in 1997; although monitoring has resumed today, see below.

Due to the phase-out of leaded gasoline, metals processing is the major source of lead emissions to the air today. The highest levels of Pb in air are generally found near lead smelters. General aviation airports are also a significant source of Pb, as general aviation fuel still contains Pb additives. Other stationary sources include waste incinerators, utilities, and Pb-acid battery manufacturers.

Exposure to Pb has an array of adverse health effects. Once taken into the body, Pb distributes throughout the body in the blood and accumulates in the bones. Depending on the level of exposure, Pb can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems, and the cardiovascular system. Lead exposure also affects the O_2 carrying capacity of the blood. Currently, the foremost health effects associated with Pb exposure to children are neurological and for adults cardiovascular, e.g., high blood pressure and heart disease. Infants and young children are especially sensitive to even low levels of Pb, which may contribute to behavioral problems, learning deficits, and lowered IQ.

Lead is persistent in the environment and accumulates in soils and sediments through deposition from air sources, direct discharge of waste streams to water bodies, mining, and erosion. Ecosystems near Pb point-sources demonstrate a wide range of adverse effects including losses in biodiversity, changes in community composition, decreased growth and reproductive rates in plants and animals, and neurological effects in vertebrates.

In 2008, the Pb primary standard was revised to better protect public health, especially for "sensitive" populations, which include asthmatics, children, and the elderly. Initially, Pb monitoring was required near sources that emitted more than one ton of Pb per year. With the introduction of the revised NAAQS, Pb monitoring was initially required at NCORE stations around the U.S. and near other potential sources of Pb. ADEQ operates the local NCORE station, the JLG Supersite. In July 2010, MCAQD opened a new Pb monitoring site at Deer Valley Airport, one of the busiest general aviation airports in Maricopa County and the largest expected source of Pb emissions. Results from more than five years of monitoring have shown that ambient levels of Pb at the airport are still well below the current Pb NAAQS.

Nitrogen Oxides (NO_X) with Nitrogen Dioxide (NO_2) as the Indicator Compound

Nitrogen dioxide belongs to a family of reactive gases called NO_x. These gases are formed when fuel is burned at high temperatures, and they are primarily emitted from motor vehicle exhaust and power plants. Nitrogen oxides are key compounds in the production of ground-level ozone (O_3).

Nitrogen dioxide has been selected by EPA as the "indicator" compound for NO_x. Unlike the other gaseous CPs, we measure the ambient levels of NO_x indirectly. The analytical process involves determining the concentration of NO_2, then nitric oxide (NO). The NO_2 and NO concentrations are summed to determine the NO_X concentration.

For most of the population, the primary route of NO_2 entry into the body is inhalation. Current scientific evidence links short-term NO_2 exposures, ranging from 30 minutes to 24 hours, with adverse respiratory effects including airway inflammation in healthy people and increased respiratory symptoms in people with asthma. Studies show a connection between breathing elevated short-term NO_x concentrations and increased visits to emergency rooms and hospital admissions for respiratory issues, especially asthma. Additionally, NO_2 reacts with ammonia, moisture, and other compounds to form small nitrate particles. These small particles penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease, such as emphysema and bronchitis. They can aggravate existing heart disease, leading to increased hospital admissions and premature death, too.

In 1971, EPA established the first primary and secondary standards for NO_2 at 53 ppb, averaged annually. EPA reviewed the standards in 1985 and 1996, and chose not to revise either standard. In January 2010, EPA retained the 1971 standards and added a 1-hour average limit of 100 ppb to the primary standard, determined as a three-year average of the annual 98th percentile value.

Research indicates that individuals who spend time on or near major roadways can experience acute exposures to NO_2 concentrations that are considerably higher than those measured by the NO_2 network are. Research by the EPA shows that NO_2 concentrations inside vehicles can be 2-3 times higher than those measured at nearby area-wide monitors. "Near-roadway" e.g., within about 50 meters, NO_2 concentrations have been found to be approximately 30 to 100% higher than ambient concentrations away from roadways.

For this reason, in February 2010 the EPA revised 1-hour NO_2 NAAQS and promulgated requirements for monitoring NO_2 at near-roadway stations in larger urban areas. To ensure compliance with the new 1-hour NO_2 standard, AMD now operates two required NO_2 near-road monitoring stations: one at the Diablo site and the other at the Thirty-Third site, which is located off I-10 and 33rd Avenue, west of downtown Phoenix. The Thirty-Third site opened in September of 2015.

There were no exceedances of the 1-hour or annual NO_2 NAAQS standards in 2015. Maricopa County is currently in attainment for the NO_2 1971 and 2010 NAAQS. In fact, no area within the U.S. is in nonattainment with the NO_2 NAAQS.

Ozone (O_3)

Ozone is a colorless, slightly odorous, reactive gas containing three oxygen atoms. Ozone occurs naturally in the Earth's upper atmosphere, or the stratosphere, where it has a beneficial effect of protecting us from the Sun's harmful ultraviolet rays. However, at ground-level, it is the main component of smog, can harm our health, and affect vegetation and ecosystems.

Ozone is not directly emitted into the air, but is formed by a complex photochemical reaction that involves sunlight, heat, and a "soup" of pollutants, especially volatile organic compounds (VOC) and NO_x. Ozone is continually going through a rapid, natural cycle of being formed, then converted back to the more stable, or "normal", "diatomic" oxygen molecule (O_2). Anthropogenic activities have been a leading cause of ground-level O_3 due to VOC and NO_x emissions from industrial facilities, electric utilities, motor vehicles, gasoline and chemical solvent vapors. Ozone is likely to reach unhealthy levels on hot, sunny days in urban environments, but it can affect rural areas by being transported long distances by wind. Although the Phoenix metropolitan area has sunshine most of the year, there is a seasonal pattern to O_3 concentrations with lower concentrations occurring in the winter months.

Ozone causes significant physiological and pathological changes in both animals and humans at concentrations present in many urban environments. Ozone affects the respiratory system in people and animals, and it also affects the growth of plants. The primary route of entry into the body is inhalation. Symptoms of O_3 exposure generally involve the lungs, and can include coughing, a sore or scratchy throat, shortness of breath, chest pain on deep inhalations, increases in asthma attacks, and damage to the lungs. The population at the greatest risk is children. This is because their lungs are still developing, they are more likely to be active outdoors when O_3 levels are high, and they are more likely to have asthma than adults are. It has been widely documented that O_3 even at low concentrations causes damage to plants and reduces crop yields, resulting in it being considered by plant scientists as the most important phytotoxic air pollutant.

In 1979, EPA reduced the 1971 1-hour primary and secondary O_3 NAAQS level of 0.08 ppm to 0.012 ppm. In 1997, EPA revised the O_3 NAAQS establishing an 8-hour NAAQS at a level of 0.08 ppm. Since Maricopa County has attained the 1979 1-hour standard, EPA revoked the 1979 1-hour NAAQS for the Phoenix-Mesa nonattainment area in 2005. In addition, the Phoenix-Mesa nonattainment area for the 1997 8-hour O_3 NAAQS is now in attainment and was redesignated as "attainment" by EPA for this standard effective October 17, 2014.

In March 2008, the NAAQS were lowered again to better protect public health and welfare. The EPA reduced the primary and secondary 8-hour O_3 NAAQS from 0.080 to 0.075 ppm (75 ppb). Compliance with the standard is determined by averaging the fourth highest 8-hour average over a 3-year period, which must be less than or equal to 0.075 ppm. When the 2008 NAAQS became effective in May 2008, O_3 concentrations in the County had improved, but exceeded the new level. This led to EPA designating portions of Maricopa and Pinal Counties as nonattainment for the 2008 O_3 NAAQS in 2012. Excluding portions of Maricopa and Pinal Counties, Arizona is currently in attainment for the 2012 O_3 NAAQS.

In December 2015, the O_3 NAAQS levels were lowered to 0.070 ppm. More information regarding how this lower level may affect the number of O_3 exceedances experienced in Maricopa County can be found in the 2015 NAAQS Exceedance and Violation Summary section.

Particulate Matter (PM)

Particulate matter is a collective term describing very small solid or liquid particles that vary considerably in size, geometry, chemical composition, and physical properties. Numerous chemical components may be present in particle pollution including acids, nitrates, sulfates, organic chemicals, metals, soils, and finer dust particles. Particulates can be formed by natural processes, such as pollen production and wind erosion, and anthropogenic activities, such as commercial/industrial/agricultural operations and motor vehicle use. Particulates contribute to visibility reduction, pose a threat to public health, and cause economic damage.

The EPA currently regulates PM pollution using two size categories:

- "PM_{10}", particles with size range ≤10 micrometers (μm) in aerometric diameter; and
- "$PM_{2.5}$", aka "fine particles", particles with a size range of ≤2.5 μm in aerometric diameter.

The larger particles that make up PM_{10} form through mechanical processes such as the grinding of matter and the atomization of liquids, natural weathering processes, and anthropogenic activities that disturb soil. In Arizona, elevated concentrations of PM_{10} are associated with people driving on unpaved roads, dusty industries, and dust storms related to high wind events.

Fine particulates are formed by the incomplete combustion of fossil fuels, the condensation of vapors, and photochemical processes. Fine particulates are further classified as "primary", meaning they are produced within and emitted directly from a source such as exhaust from a diesel engine or smoke from a fire. "Secondary" particulates form in the atmosphere from gaseous pollutants. Nitrates and sulfates are formed by the photochemical oxidation of gaseous NO_2 and SO_2, respectively. In addition, secondary organic carbon particles form through a photochemical transformation of gaseous organic compounds.

The primary route of entry for PM_{10} into the body is through inhalation. The size, shape, and chemical composition of particulates determine the health effects that may result from PM exposures. The potential for causing health problems is directly linked to particle size. Smaller particles are more toxic than larger particles because of the higher relative content of toxic metals and ions combined with the increase of particle surface area. The EPA is concerned about particles ≤10 μm in diameter, because those are the particles that generally pass through the throat and nose and enter the lungs. Coarser particles are deposited in the upper parts of the respiratory system, but finer particles are deposited deeper into the respiratory system. Fine particles are small enough to be deposited in the lung's alveoli, which are tiny air sacks deep inside the lungs. Some research shows that the smallest of particles may enter the bloodstream as well. Currently, research is underway to better understand the health effects of ultrafine particles.

The populations most at risk from particulate exposure are older adults, diabetics, and children; because children tend to be more physically active and that causes them to breath faster and deeper. Once inhaled, these particles can cause serious heart and lung health effects that affect both humans and animals. Epidemiological studies show that long-term, chronic exposures, i.e., years of exposure to high levels of particulates, are associated with reduced lung function, the development of chronic bronchitis, and premature death. Studies show that short-term, acute exposures, i.e., hours to days of exposure to high levels of particulates, can aggravate lung disease, asthma attacks, acute bronchitis, and may increase susceptibility of respiratory infections. For those with heart disease, it can induce

heart attacks. Exposure to acidic aerosols, i.e., acidic particles with an aerometric diameter of about 0.01 – 100 µm, have been linked to the upper respiratory tract and pulmonary system's inability to remove harmful particles.

In 1987, the EPA replaced the 1971 Total Suspended Particulates (TSP), i.e., particles around 40 µm and less in aerometric diameter, with the primary and secondary NAAQS for PM_{10}. The EPA revoked the annual PM_{10} NAAQS in 2006. Currently, the 24-hour primary and secondary levels for PM_{10} are both 150 $\mu g/m^3$. In 2012, the PM_{10} NAAQS underwent review with exposure to $PM_{10-2.5}$ also being considered. This review resulted in EPA retaining the existing primary and secondary 24-hour PM_{10} NAAQS, which is considered to provide for protection against effects associated with acute exposure to $PM_{10-2.5}$.

In 1997, the EPA reviewed and updated the $PM_{2.5}$ NAAQS levels. Since then, these NAAQS have been reviewed in 2006 and 2012 with some levels being made more stringent. On December 14, 2012, EPA retained the primary 24-hour $PM_{2.5}$ standard of 35.0 $\mu g/m^3$, but reduced the primary and secondary NAAQS annual $PM_{2.5}$ level to 12.0 $\mu g/m^3$ and 15.0 $\mu g/m^3$, respectively. While Maricopa County is currently in attainment for $PM_{2.5}$, we tend to experience 24-hour exceedances during the colder, winter months, especially from Thanksgiving into January. In colder months, smoke from residential fireplaces coupled with the temperature inversions tends to drive up $PM_{2.5}$ concentrations throughout the metropolitan area.

To address this problem, ADEQ and Maricopa County worked together on a public outreach campaign to reduce wood burning within the county around the fall/winter holidays. Maricopa County's umbrella dust abatement rule, *Rule 310 – Fugitive Dust From Dust-Generating Operations*, has been revised many times through the years. *Rule 310* regulates construction dust, trackout dust, and dust from unpaved parking and vacant lots. The recent PM_{10} State Implementation Plan (SIP) includes seventy-seven new measures to enhance enforcement of the rule, implementation of agricultural best management practices, diesel engine replacement and retirement programs, and requirements for cleaner burning fireplaces to further reduce $PM_{2.5}$ emissions.

The western U.S. has a unique problem with respect to exceedances of the PM NAAQS. It has been acknowledged for decades that exceedances of the PM NAAQS due to blowing dust and smoke from massive wildfires may be "exceptional" in nature, i.e., not expected to recur or caused by acts of nature that overwhelm emission controls. Initially by policy, and later by rule, EPA established procedures and standards for documenting whether an exceedance of the NAAQS is the result of an "exceptional event" (EE) and if the pollutant data should be excluded from NAAQS compliance determinations. In 2007, EPA adopted the *Treatment of Data Influenced by Exceptional Events* *(EER)* rule that covers how to prepare an EE package for EPA's review and how to manage event-related data. In the past few years, most exceedances of the PM_{10} NAAQS within Maricopa County have been successfully shown to meet the EE requirements. Exceptional event information for 2013-2015 is shown in the 2015 Summary of Network Results and Required Information section.

Sulfur Dioxide (SO_2)

Sulfur dioxide is a colorless gas with a pungent irritating odor at elevated concentrations. It is emitted primarily from the burning high-sulfur coal, oil, and diesel fuel, and the smelting of metals like copper. Most fuels contain trace quantities of sulfur. When fuels burn, both gaseous SO_2 and sulfate particles are released into the air due to incomplete combustion of the fuel. Consequently, separating the health effects of these two chemicals is difficult. Together, SO_2 and $PM_{2.5}$ act separately and together to threaten public health and can make up a major portion of pollution in many cities. Sulfur dioxide is removed from the atmosphere through dry deposition on plants, and it is converted to sulfuric acid, and eventually sulfate particles. Both contribute to public health problems and negatively affect the environment. The SO_2 and sulfate from vehicular emissions have been significantly reduced over the years through lowering the sulfur content in diesel fuel and gasoline.

Sulfur dioxide's primary route of entry into the body is by inhalation. It contributes to respiratory illness, particularly in children and the elderly, and aggravates existing heart and lung diseases. Sulfur dioxide contributes to the formation of acid rain, and it contributes to the formation of atmospheric particles that cause visibility impairment, most notably in national parks. Sulfur dioxide and the pollutants formed from SO_2, such as sulfate particles, can be transported over long distances and deposited far from the point of origin. This means that problems associated with SO_2 are not confined to areas where it is emitted.

The EPA 2011 National Emissions Inventory (NEI) report shows the estimated quantity of SO_2 emitted from various sources in Arizona and in Maricopa County. The majority of statewide SO_2 emissions occurs in eastern Arizona and is produced by coal-based electricity generation, the smelting of non-ferrous sulfide copper ore, and smoke from wildfires. Major controls were installed in Arizona's copper smelters in the 1980s, which reduced SO_2 emissions substantially. In addition, most of the copper ore smelters that used to operate have been shutdown, which reduced SO_2 emissions in localized areas around the state. As of 2013, the only regulated smelters operating in Arizona are located about 90 miles east of downtown Phoenix, in Miami and Hayden, Arizona. In Maricopa County, the majority of SO_2 is emitted from mobile and industrial sources.

Currently, Maricopa County is in attainment for SO_2. The AMD operates two year-round SO_2 monitoring stations, and the siting of SO_2 monitors meets EPA requirements.

AIR MONITORING STRATEGIES AND SURVEILLANCE SYSTEM DESIGN

Overview of the Criteria Pollutant Networks

The AMD monitors for the six CPs by operating and maintaining 26 ambient air monitoring sites located throughout Maricopa County. The sites' startup dates range from 1961 for Central Phoenix to 2015 for Thirty-Third. Land use patterns around the sites vary from densely populated urban areas to sparsely populated rural settings. The sites' elevations range from 845 feet above sea level at Buckeye to 5190 feet above sea level at the top of Humboldt Mountain. Each site and its pollutant monitors were chosen based on specific EPA requirements as described below, special requests from EPA, and/or specific needs of the County. Some sites measure many pollutants, while others may only measure one or two.

The requirements for operating the ambient air monitoring program are found in both *40 CFR Parts 50 & 58*. The MCAQD has been designated as a Primary Quality Assurance Organization (PQAO) by EPA R9 for the ambient air monitoring program, which basically means that we do not share QA roles and/or responsibilities with another MO. The MCAQD is fully responsible for designing and operating the air monitoring surveillance system and managing the pollutant data generated. However, MOs within Arizona may provide support to each other by exchanging technical services and/or knowledge when problems arise with instrumentation or special studies are conducted.

This section details how each pollutant's air monitoring network is designed to obtain "representative" data. In addition to producing this AMNP, EPA now requires a five-year network assessment as per *40 CFR § 58.10*. The 5-year assessment is best served by collaborating with EPA, ADEQ, and other local and/or tribal agencies. The first assessment was produced in 2010 and the second was produced in 2015. The assessment process continues to improve, and MCAQD works with other MOs regarding CP network design issues as needed.

Basic Monitoring Objectives

Each ambient air monitor must have a designated basic monitoring objective from the list below. The three objectives are not listed based on importance or priority. Each objective is important and must be considered individually.

1. ***Provide air pollution data to the general public*** in a timely manner. Data can be presented to the public in a number of attractive ways including: air quality maps, newspapers, MOs and EPA websites, and as part of weather forecasts and public advisories.

2. ***Support compliance with the NAAQS*** and developing emission control strategies. To determine compliance with the NAAQS and to develop state and/or federal attainment and maintenance plans, only data collected by EPA-approved methods can be used. The EPA classifies approved methods into one of three categories: a federal reference method (FRM), a federal equivalent method (FEM), or an approved regional method (ARM). The MCAQD only uses FRM and FEM instruments. This practice ensures high-quality data of like kind are used for compliance-driven decisions. However, additional data from research monitors can be provided to further evaluate regional air quality models used in developing emission control strategies, tracking trends in air pollution, and evaluating the impact control measures are having on improving air quality.

3. ***Support air pollution research studies*** geared toward assessing health effects, atmospheric processes, or future monitoring methods in development. In addition to data collected by FRM and FEM monitors, MCAQD may produce other data for special studies as well. These data can be made available for decision makers; but they are not reported to AQS. In Maricopa County, EPA R9 has charged ADEQ with collecting the majority of research data at JLG Supersite via the following networks: National Core multi-pollutant site (NCORE), Photochemical Ambient Monitoring Stations (PAMS), Chemical Speciation Network (CSN), and National Air Toxics Trends Stations (NATTS). The ADEQ also collects air toxics samples for the Urban Air Toxics Monitoring Program (UATMP) at MCAQD's South Phoenix site. The data from these networks should be available in AQS.

Monitor Type

The monitor type is based upon how the data will be used and how long the monitor will remain in operation. There are three basic monitor types:

1. State and Local Air Monitoring Stations (SLAMS) monitors
2. Special Purpose Monitors (SPM)
3. Potentially Significant Deterioration (PSD) monitors

State and Local Air Monitoring Station (SLAMS)

The vast majority of MCAQD's air monitoring network is comprised of SLAMS, which gather data for comparison to the NAAQS. The SLAMS are ambient air monitors that generate data needed for NAAQS comparisons, but may serve other data purposes as well. The SLAMS include near-road, NCORE, and PAMS air monitors. Data from SPM or PSD monitors may be used toward compliance if exceedances of the NAAQS are recorded. Currently, AMD does not operate any PSD monitors.

Special Purpose Monitor (SPM)

As defined by *40 CFR Part 58*, an SPM means a monitor included in an MO's network that has been designated as a special purpose in its monitoring network plan and in the AQS. The MO does not count an SPM toward showing compliance with the minimum quantity of pollutant monitors needed within the network, nor must they meet rigorous QA, siting, or other requirements as needed for a SLAMS monitor. Often SPMs are used to quickly gather and report preliminary information regarding air quality in a local area.

It is important to reference EPA's requirements regarding the operation of an SPM monitor. If an SPM station uses an FRM, FEM, or an ARM method and meets the SLAMS siting requirements in *40 CFR Part 58 Appendix E*, then the removal may require EPA approval. Removal depends upon the particular CP concentrations recorded and how long the monitor has been operating. Usually, if the SPM operates for more than two years, removing it will need prior approval by EPA. In the event of a geographical area's population increasing or data indicating a SLAMS is more appropriate, an SPM may be reclassified to SLAMS and potentially outfitted with a different method.

In 2015, MCAQD operated two SPMs in support of the winter holiday $PM_{2.5}$ chemical speciation study. A CO and $PM_{2.5}$ SPM operated from September through December 2015 at the Thirty-Third monitoring site.

Site Type

To support the three basic monitor objectives, a CP network must be designed with a variety of air monitoring "site types". Although site types vary within each pollutant's network, they must be identified as one of the six types shown below. The site type is key to informing air quality professionals and the public about the peak air pollution levels. The site types are shown on Table 3.

Table 3. General Site Types

Determine the ***highest concentrations*** expected to occur in the area covered by the network.
Measure typical concentrations in areas of ***high population density (population exposure)***.
Determine the impact of significant ***sources*** or source categories on air quality.
Determine general ***background concentration*** levels.
Determine the extent of ***regional pollutant transport*** among populated areas and in support of secondary standards.
Measure air pollution ***impacts on visibility, vegetation damage, or other welfare-based impacts***.

Source: Adapted from *40 CFR Part 58, Appendix D*

Monitoring Scale (Spatial Scales of Representativeness)

The concept of the "spatial scale of representativeness" was created to help link the monitoring objective and the site type with the physical location of a monitor. As per *40 CFR Part 58, Appendix D 1.2 (a) and (b),*

> "*The goal in locating air monitors is to correctly match the spatial scale represented by the sample of monitored air with the spatial scale most appropriate for the monitoring site type, air pollutant to be measured and the monitoring objective. Spatial Scale of representativeness is described in terms of physical dimension of the air parcel nearest to a monitoring site throughout which actual pollutant concentrations are reasonably similar"*.

There are six scales of representativeness that are of most interest for air monitoring site types (see Table 4).

Table 4. Monitoring Scales (Spatial Scales of Representativeness)

Name	Distance
Micro Scale	0 to 100 meters
Middle Scale	100 to 500 meters
Neighborhood Scale	0.5 to 4 kilometers
Urban Scale	4 to 50 kilometers
Regional Scale	10 to 100s of kilometers
National and Global Scales	Characterizing the nation and the globe as a whole.

Source: Adapted from *40 CFR Part 58, Appendix D, 1.2*

Locating Air Monitoring Sites

Since it is physically and fiscally impossible to monitor air quality in every location, the goal in locating monitors is to correctly integrate each monitor's objective and corresponding site type with the spatial scale of representativeness most appropriate for the air pollutant to be measured. For example, consider the case where the objective is to determine NAAQS compliance by understanding the maximum O_3 concentrations for an area. Such areas would most likely be located downwind of a metropolitan area in a suburban residential area where children and other susceptible individuals are likely to be outdoors. Sites located in these areas are most likely to represent an urban scale of measurement. In this example, the site and monitor's physical location was selected by considering O_3 precursor emission patterns, public activity, and meteorological characteristics that affect O_3 formation and dispersion. Thus, spatial scale of representativeness was not used in the site selection process, but was a result of the selection process.

When applying these principles, the total quantity of monitoring sites that will serve the variety of data needs is often substantially higher than federal minimum requirements. The optimal size of each pollutant's network involves compromises among data needs and available resources; and, a network's size can change over time. Each pollutant's network must be dynamic enough to maintain a current representative sampling of the air quality.

Overview of the Air Monitoring Sites

Maricopa County has a population of over 3.9 million people based on the 2012 U.S. Census estimate. As per *40 CFR Part 58*, the EPA mandates the minimum quantity of monitors required by a pollutant's network to properly represent the County's population. As previously mentioned, the MCAQD pollutant networks are designed using the concept of spatial scale representativeness and monitoring objectives. This has resulted in CP networks that meet, and in most cases exceed, the minimum quantity of monitors required by EPA (see "Required General Information on Monitoring Network" in Appendix II). The 26 monitoring sites operating in 2015 are shown again on Figure 4.

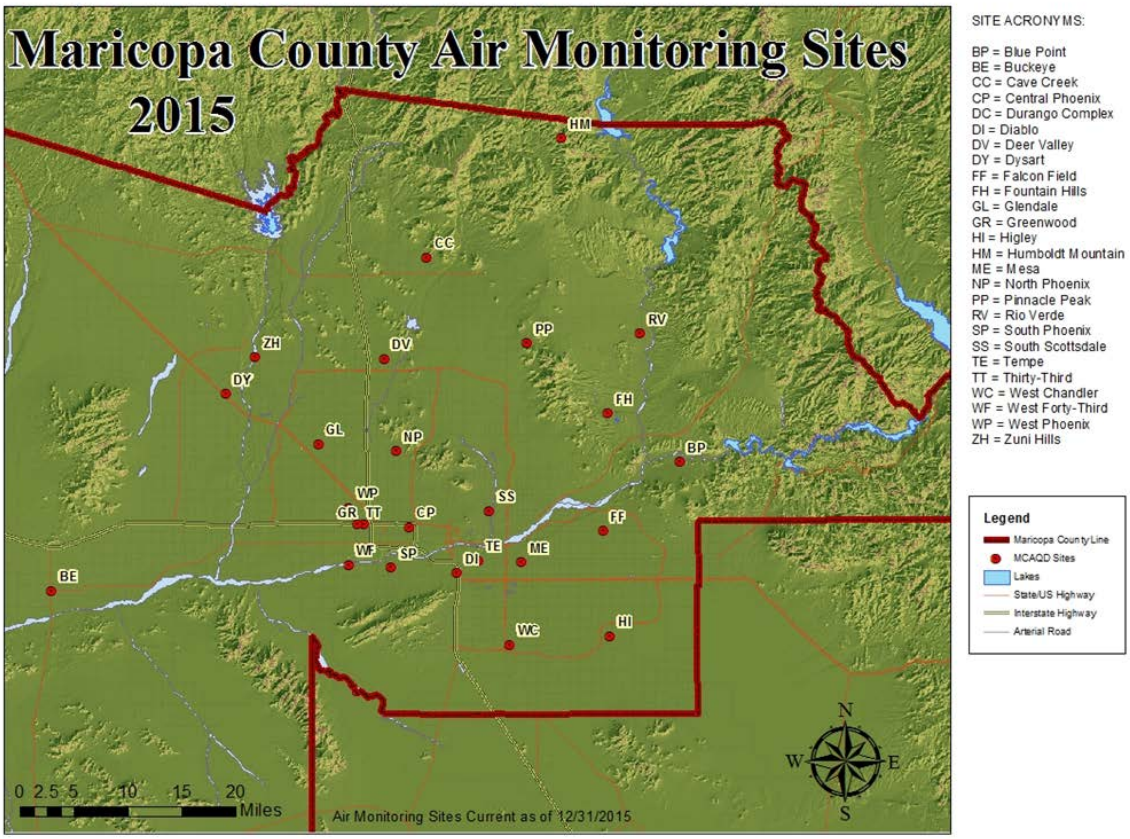


Figure 4. 2015 Air Monitoring Site Map

The following tables show details regarding each site's MCAQD name and abbreviation, EPA's AQS identification number, geographic coordinates, and the full complement of air monitors and/or sensors at each site. Table 5 shows the MCAQD's site names, abbreviations, and the AQS identification number.

Table 5. Maricopa County Ambient Air Monitoring Sites for 2015.

Name	AMD Abbreviation	AQS ID
Blue Point	BP	04-013-9702
Buckeye	BE	04-013-4011
Cave Creek	CC	04-013-4008
Central Phoenix	CP	04-013-3002
Deer Valley	DV	04-013-4018
Diablo	DI	04-013-4019
Durango Complex	DC	04-013-9812
Dysart	DY	04-013-4010
Falcon Field	FF	04-013-1010
Fountain Hills	FH	04-013-9704
Glendale	GL	04-013-2001
Greenwood	GR	04-013-3010
*Higley	HI	04-013-4006
Humboldt Mountain	HM	04-013-9508
Mesa	ME	04-013-1003
North Phoenix	NP	04-013-1004
Pinnacle Peak	PP	04-013-2005
Rio Verde	RV	04-013-9706
South Phoenix	SP	04-013-4003
South Scottsdale	SS	04-013-3003
*Tempe	TE	04-013-4005
Thirty-Third	TT	04-013-4020
West Chandler	WC	04-013-4004
West 43rd Ave.	WF	04-013-4009
West Phoenix	WP	04-013-0019
Zuni Hills	ZH	04-013-4016

* This site experienced an extended monitoring interruption in 2015.

Table 6 shows the specific geographic coordinates for the location of each site.

Table 6. Location of Air Monitoring Sites

Site	AQS Code	Latitude	Longitude	Location
BP	04-013-9702	33.54549	-111.60925	Usery Pass & Bush Hwy
BE	04-013-4011	33.37005	-112.62070	MC Hwy 85 & AZ Hwy 85
CC	04-013-4008	33.82169	-112.01739	32nd St. & Carefree Hwy
CP	04-013-3002	33.45793	-112.04601	19th St & Roosevelt St.
DV	04-013-4018	33.684627	-112.08635	10th Ave. & Deer Valley Rd.
DC	04-013-9812	33.42650	-112.11814	27th Ave. & Durango St.
DY	04-013-4010	33.63713	-112.34184	Bell Rd. & Dysart Rd.
DI	04-013-4019	33.39625	-111.96797	Fairmont Dr. & Diablo Way
FF	04-013-1010	33.45223	-111.73331	McKellips Rd. & Greenfield Rd.
FH	04-013-9704	33.61103	-111.72529	E. Palisades Blvd. & Fountain Hills Blvd.
GL	04-013-2001	33.57454	-112.19196	59th Ave & W. Olive Ave.
GR	04-013-3010	33.46093	-112.11748	27th Ave. & Interstate 10
HI	04-013-4006	33.31074	-111.72255	Higley Rd. & Chandler Blvd.
HM	04-013-9508	33.98280	-111.79870	Top of Humboldt Mountain
ME	04-013-1003	33.41045	-111.86507	Broadway Rd. & Alma School Rd.
NP	04-013-1004	33.56033	-112.06626	7th Street & Dunlap Ave.
PP	04-013-2005	33.70632	-111.85556	Alma School Rd. & Happy Valley Rd.
RV	04-013-9706	33.71881	-111.67183	Forest Rd. & Del Ray Ave.
SP	04-013-4003	33.40316	-112.07533	Central Ave. & Broadway Rd.
SS	04-013-3003	33.47968	-111.91721	Scottsdale Rd. & Miller Rd.
TE	04-013-4005	33.4124	-111.93473	College Ave. & Apache Blvd.
TT	04-013-4020	33.46155	-112.12815	Interstate 10 & 33rd Avenue
WC	04-013-4004	33.29898	-111.88431	Ellis St. & Frye Rd.
WF	04-013-4009	33.40642	-112.14434	43rd Ave. & Broadway Rd.
WP	04-013-0019	33.48385	-112.14257	39th Ave. & Earll Dr.
ZH	04-013-4016	33.68673	-112.29417	109th Ave & Deer Valley Rd.

Source: AQS Report - *AMP 380 "Site Description Report"*

Table 7 provides the complement of air monitoring instruments operating at each site in 2015.

Table 7. Air Monitoring Instruments by Site

Maricopa County - 2015 Air Monitoring Site Instrumentation

Site	AQS Code	CO	NO_2	O_3	SO_2	PM_{10}	$PM_{2.5}$	$PM_{2.5}$ Filter	Pb Filter	H_2S	WS / WD	Baro Press	Delta T	Amb Temp	Rel Hum	Rain	Solar Rad	Room	Multi-Gas Cal	Active Instruments
BE	04-013-4011	1 *	1	1		1					1	1		1	1			1	1	10
BP	04-013-9702			1							1			1	1			1		5
CC	04-013-4008			1							1			1	1	1		1		6
CP	04-013-3002	1	1	1	1	1					1	1		1				1	1	10
DC	04-013-9812				1	1	1				1	1		1	1			1	1	9
DI	04-013-4019	1	1				1				1			1	1			1	1	8
DV	04-013-4017								2		1	1		1	1			1		7
DY	04-013-4010	1 *		1		1					1	1		1	1			1		8
FF	04-013-1010			1							1			1	1			1		5
FH	04-013-9704			1							1	1		1	1			1		6
GL	04-013-2001	1 *		1		1	1				1	1		1	1			1		9
GR	04-013-3010	1	1			1					1	1		1				1	1	8
HI	04-013-4006					1					1	1	1	1				1		6
HM	04-013-9508			1							1			1	1			1		5
ME	04-013-1003	1 *		1		1	1				1	1		1	1			1		9
MM#	Not Applicable	1	1		1	1	1			1	1	1		1	1		1	1	1	13
NP	04-013-1004	1 *		1		1	1				1	1	1	1			1	1		10
PP	04-013-2005			1							1	1		1	1			1		6
RV	04-013-9706			1														1		2
SP	04-013-4003	1 *		1		1	1				1	1		1	1			1		9
SS	04-013-3003	1 *		1		1					1	1		1	1			1		8
TE	04-013-4005	1 *		1		1	1				1		1	1		1		1		9
TT	04-013-4020	1	1				1				1			1				1	1	7
WC	04-013-4004	1 *		1		1					1	1		1	1			1		8
WF	04-013-4009					1					1	1	1	1				1		6
WP	04-013-0019	1	1	1		1	1	1			1	1	1	1				1	1	12
ZH	04-013-4016					1					1			1						3
Active Instruments		15	7	18	3	17	10	1	2	1	26	18	5	26	17	2	2	26	8	

Total # of Criteria Pollutant Monitors 73
Total # of Active Instruments 204
Number of Active Sites 26
Mobile Truck 1

* = seasonal monitor
special purpose monitor
temporarily closed
MM# = Mobile Monitoring Truck (Intermittent Monitoring)

Determining Data Quality and Acceptability

This sections details the results obtained from our 2015 monitoring year. The EPA has established data quality and measurement quality objectives for CP data. In addition to *40 CFR Part 58*, the EPA *QA Handbook for Air Pollution Measurement Systems: "Volume II: Ambient Air Quality Monitoring Program* provides extensive information regarding the quality system and its components. There are seven data quality indicators (DQI) established by the EPA to determine the quality of ambient air data. Data must meet each indicator's requirement to be certified and acceptable for use by decision makers for NAAQS compliance determinations, researchers, and the public.

These indicators are precision, bias, completeness, comparability, detectability, representativeness, and sensitivity. "Timeliness" of data collection, validation, and upload to AQS is important as well. "Accuracy" is now defined as a measure of the overall agreement of a measurement to a known value and includes a combination of random error (precision) and systematic error (bias) components of both sampling and analytical operations. The AMD's personnel evaluate data using these indicators, with precision, bias, and completeness being the most crucial to evaluate on an ongoing basis.

Data Completeness

Before any data set can be considered valid, it must first pass a data recovery, or completeness, test. The test requirements begin with checking completeness at hourly and 24-hour concentration values. These values may be referred to as "samples". The CP pollutant data measurements from continuous analyzers are based on a valid hour, while filter samples from manual samplers are based on a 24-hour sampling period from midnight to midnight. Equation 1 shows the calculation for the data completeness percentage, which is the quantity of valid measurements divided by the quantity of scheduled measurements multiplied by one-hundred. For CP data, completeness must be greater than 75% for a data set to pass the first validity test. Furthermore, CP data completeness requirements may vary and use multiple levels of data aggregation, e.g., 1-hour, 3-hour, 8-hour, 24-hour, quarterly, annual, and multiple years.

Equation 1:

$$\textbf{Data Completeness Percentage} = \frac{\textbf{Qty. of Valid Measurements}}{\textbf{Qty. of Measurements Scheduled}} \textbf{ X 100}$$

The 2015 annual data completeness is shown in Table 8.

Table 8. 2015 Criteria Pollutant Data Completeness for SLAMS

	CO	Pb	O_3	NO_2	SO_2	$PM_{2.5}$	PM_{10}	TOTAL
Percent Complete	98.8	88.5	98.6	98.0	98.0	97.1	98.4	98.0

Source: EPA AQS database - *2015 AQS Data Completeness Report (AMP 430)*

Increasing Data Volumes

Due to increasing data requirements and the availability of FEM analyzers, the amount of data the AMD produces increased considerably over the past few years. Operating and maintaining the various components of each air monitoring network is an ongoing challenge. To remain current with EPA's requirements and to meet decision makers and researchers' data needs, AMD personnel adjust standard operating procedures according to EPA's latest requirements and/or guidance to ensure only high-quality data are being produced. In addition to the increased amount of CP data generated and managed, supporting components of the surveillance system such as the communications system to the sites and the database used for data management also need continuing upgrades. So far, AMD has managed to make significant program changes to keep up with the increasing demand for data. By automating some processes, we have been able to successfully respond to data needs without increases to personnel. The following information summarizes a few notable changes that have been implemented to date.

- The commercial database, AirVision™, has enhanced our ability to manage the increase in data volume. It has helped to advance data validation and dissemination, as well as data retrieval/storage/security. The database must be maintained and updated regularly to keep up with software changes involving data collection, validation, and reporting to AQS.

- AirVision™ also allows AMD personnel to perform multiple data checks throughout the workday to help prevent bad data from being released to the public via the County and EPA's websites. In addition, it is used to upload preliminary data to the MC website as close as possible to real-time.

- A Rapid Response Notification System (RRNS) was implemented to better manage quickly-developing pollution events. The RRNS uses automated alarms to monitor instrument performance and incoming pollutant concentrations. The triggering instrument warning and pollutant concentration levels can be adjusted as needed for each alarm. The AirVision™ database is programmed to automatically generate these alerts.

Table 9 shows the amount of 1-hour data AMD has been producing per year, plus the near eightfold increase of data produced when AMD started collecting 5-minute data.

Table 9. Approximate Amount of 2015 Data Produced

Type	1-Hour CP Data	1-Hour CP and Met Data	1-Hour, 5-minute and 24-hour CP and Met Data
Amount	550,000	1,010,000	14,650,000

Summary of Data Produced by the Criteria Pollutant Networks

This section covers the 2015 data generated by each CP's network.

Carbon Monoxide (CO)

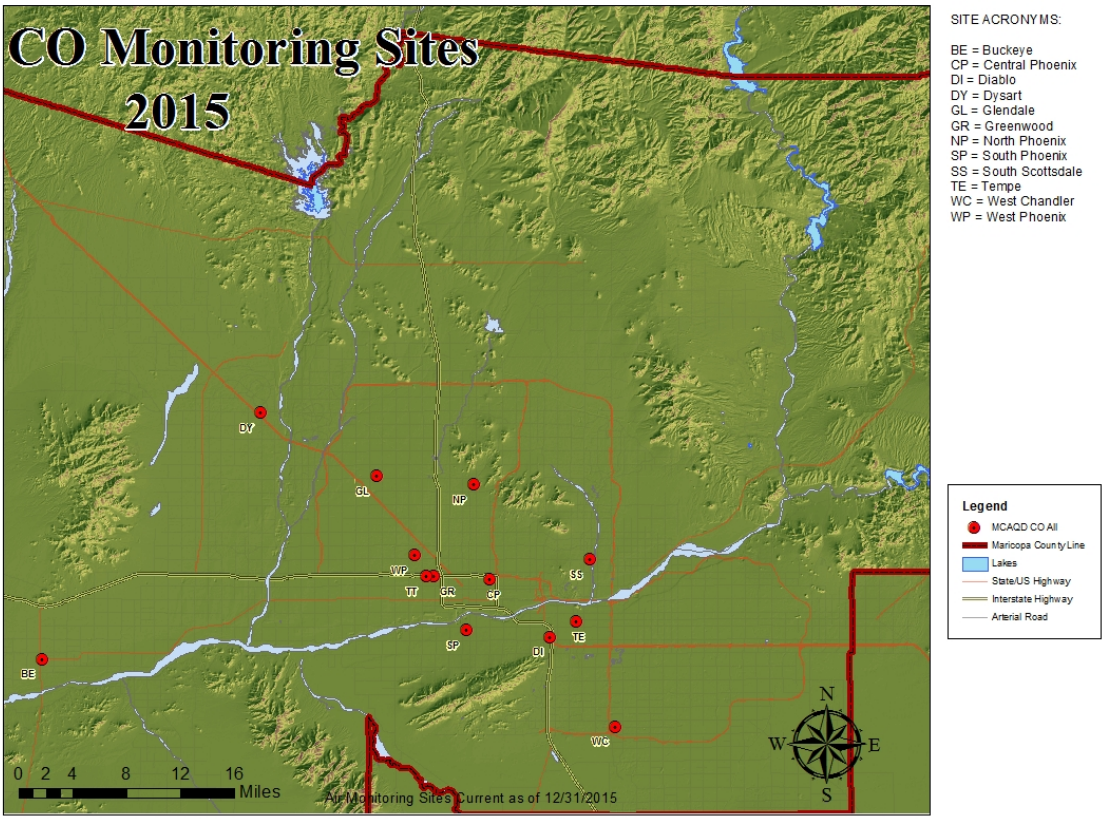


Figure 5. 2015 CO Monitoring Site Map

There are two primary standard levels for CO: an 8-hour average of 9 ppm and a 1-hour average of 35 ppm. A violation of either standard is based on two exceedances in a calendar year. Since CO concentrations have been significantly lower than the 1-hour level for many years, we have not included this metric on Table 10. It is worth noting that the area has not exceeded the CO NAAQS since 1996.

The Phoenix metropolitan area was once designated as being in moderate nonattainment for CO for the 1971 primary NAAQS. A nonattainment SIP was developed by ADEQ that covered how to reduce and maintain CO concentrations. The area failed to reach attainment by the end of 1995, which caused EPA to reclassify the area to serious nonattainment in 1996, with a new attainment date of December 31, 2000. In response, the Governor's Office, Legislature, Maricopa County, and other entities worked cooperatively to find ways to reduce CO that included implementing innovative programs such as a nationally recognized, enhanced vehicle emissions inspection program, a cleaner burning gasoline program, pollution reduction measures for commercial and industrial sources, and woodburning

restrictions. As a result, CO concentrations declined and data showed that the area had reached attainment with the 8-hour primary NAAQS.

In April 2005, the EPA redesignated the Phoenix metropolitan area to attainment for CO and approved the attainment demonstration and maintenance plan, which shows how the area will maintain compliance with the CO NAAQS through 2015. However, Maricopa County must continue to show that the air quality is maintaining compliance with the NAAQS for a period of 20 years from the attainment determination. The area is now covered by a 10-year maintenance SIP that is renewed in its 8th year for the next 10-year maintenance SIP. Since we are now in maintenance/attainment, the majority of CO monitors can operate seasonally rather than year-round.

In 2015, the quantity of active CO monitors temporarily increased from 14 to 15 with the addition of the Thirty-Third monitor on September 1st. All CO monitors are classified as SLAMS except for TT, which is classified as an SPM. Data from all monitors were reported to the AQS and are suitable for NAAQS comparison (see Figure 5). For calendar year 2015, no exceedances of either CO level were recorded at any MCAQD monitoring sites (Table 10).

Table 10. 2015 8-hour Average CO Data Summary

Site	CO 8-hour Average Max. (ppm)	CO 8-hour Average 2nd Highest (ppm)	Number of 8-Hour NAAQS Exceedances
Buckeye	0.5	0.5	0
Central Phoenix	2.0	1.9	0
Diablo	1.6	1.4	0
Dysart	0.7	0.7	0
Glendale	1.6	1.3	0
Greenwood	2.4	2.3	0
Mesa	1.5	1.3	0
North Phoenix	1.4	1.3	0
South Phoenix	2.1	2.1	0
South Scottsdale	1.4	1.4	0
Tempe	1.4	1.4	0
***Thirty-Third**	2.8	2.6	0
West Chandler	1.6	1.3	0
West Phoenix	2.8	2.5	0

* Thirty-Third operated as an SPM temporarily in 2015.

Additional information required by EPA is shown in Table 11.

Table 11. CO Data Required by EPA

CBSA	Population & Census Year (2012)	Required Near-Road Monitors	Active Near-Road Monitors	Additional Near-Road Monitors Needed
38060	4,329,534	1	2	0

Lead (Pb)

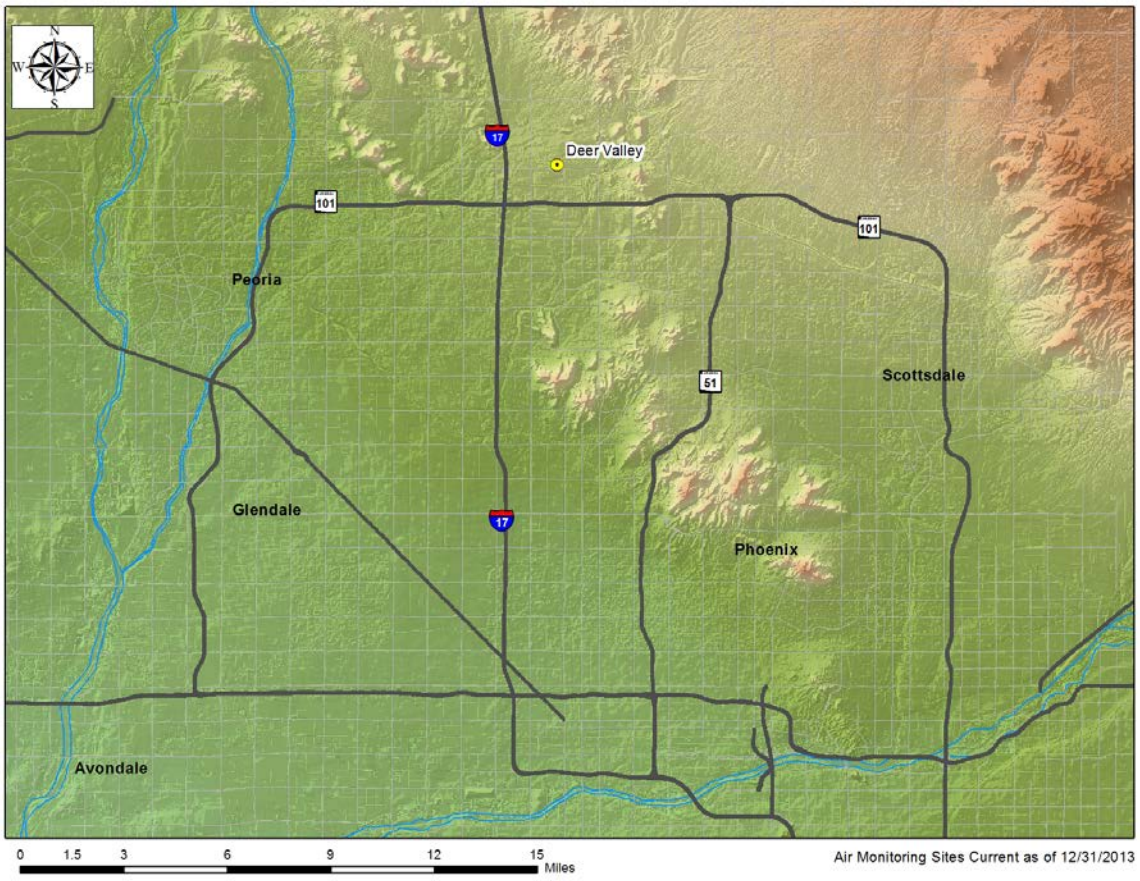


Figure 6. 2015 Pb Monitoring Site Map

In July 2010, this Pb monitoring site was opened near the Deer Valley Airport in north Phoenix. This airport is one of the busiest general aviation airports in the region, and it serves a significant number of propeller-driven aircraft, which still use Pb-containing general aviation fuel unlike jet engine-driven aircraft.

Figure 6 shows the Deer Valley site, which is the only site monitoring for Pb. Two Pb monitors are required at the Deer Valley Airport for QA purposes and both monitors are classified as SLAMS. The primary and secondary Pb NAAQS standards are identical. The rolling 3-month average is violated by an exceedance of 0.15 $\mu g/m^3$. A summary of the 2015 Pb data required by EPA is shown in Table 12**.**

Table 12. 2015 Pb Data Summary

Site	24-hour Max. (μg/m^3)	24-hour 2nd Highest (μg/m^3)	Max. 3-month Rolling Quarterly Average (μg/m^3)	Number of Samples
Deer Valley	0.104	0.087	0.050	54

Source: AQS *AMP 450 NC Report – Quicklook All Parameters*

According to the 2011 EPA's National Emission Inventory, Deer Valley Airport remains the largest point-source of Pb within Maricopa County that triggers the EPA 1.0 ton per year (tpy) threshold for Pb emissions, which are shown on Table 13.

Table 13. Pb Data Required by EPA

Source Name	Location	2011 Pb Emission (tpy)	Emissions Inventory Source & Data Year	Max 3-Month Design Value (μg/m^3)	Design Value Date	Required Monitors	Active Monitors	Additional Monitors Needed
Deer Valley Airport	Phoenix, AZ	1.16	General Aviation Airport 2011	0.05	January 2015	1	1	0

Source: The EPA 2011 National Emissions Inventory (NEI) Report

Nitrogen Dioxide (NO_x)

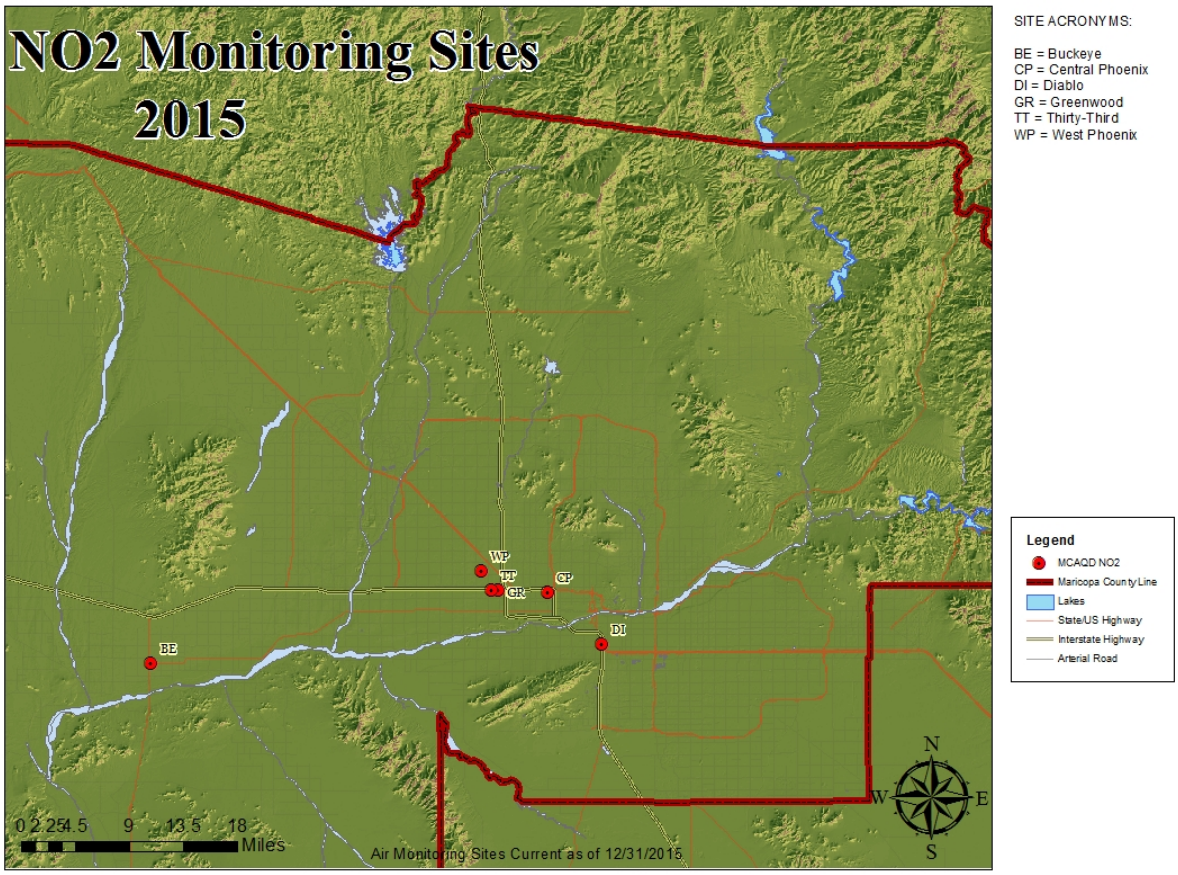


Figure 7. 2015 NO_2 Monitoring Site Map

All parts of Maricopa County are in attainment for NO_2. Compliance with the NO_2 standard is achieved when the annual arithmetic mean concentration in a calendar year is less than or equal to 53 ppb. A new hourly standard for NO_2 began in 2010; this regulation states that the 3-year average of the 98th percentile cannot exceed 100 ppb. For calendar year 2015, no exceedances of the NO_2 annual or 1-hour NAAQS were recorded at Maricopa County monitoring sites.

In 2015, the quantity of active NO_2 monitors increased from five to six once Thirty-Third, the second near-road NO_2 station, became active in September. Data from all six monitors were reported in AQS (see Figure 7). All NO_2 monitors are designated as SLAMS and data are suitable for comparison to the NAAQS (see Table 14).

Table 14. 2015 NO_2 1-hour Data Summary

Site Name	NO_2 Maximum (ppb)	NO_2. 98th Percentile (ppb)	NO_2 3-Year Average of the 98th Percentiles (ppb)	NO_2 Annual Average (ppb)
Buckeye	44.0	33.0	34.6	7.14
Central Phoenix	63.0	59.0	59.6	17.85
Diablo	59.0	53.0	56.0†	21 .41
Greenwood	71.0	61 .0	62.6	21.91
Thirty-Third	69.0	64.0	64.0†	31.86‡
West Phoenix	64.0	55.0	56.0	16.39

† The 3-Year 98th Percentile Average does not meet minimum data criteria. DI based on two years of data; TT based on one year of data.

‡ Data do not meet summary criteria.

Source: AQS *AMP 450 NC Report – Quicklook All Parameters*

Additional information required by EPA is shown in Table 15. The annual average daily traffic (AADT) is based on 2011 modeling data. The maximum traffic count location is just south of the Broadway Curve, before Southern Avenue, on the I-10.

Table 15. NO_2 Data Required by EPA

CBSA	Population & Census Year (2012)	Max AADT Counts	Required Near-Road Monitors	Active Near-Road Monitors	Additional Near-Road Monitors Needed	Required Area-Wide Monitors	Active Area-Wide Monitors	Additional Area-Wide Monitors Needed
38060	4,329,534	287,481	2	2	0	1	4	0

Ozone (O_3)

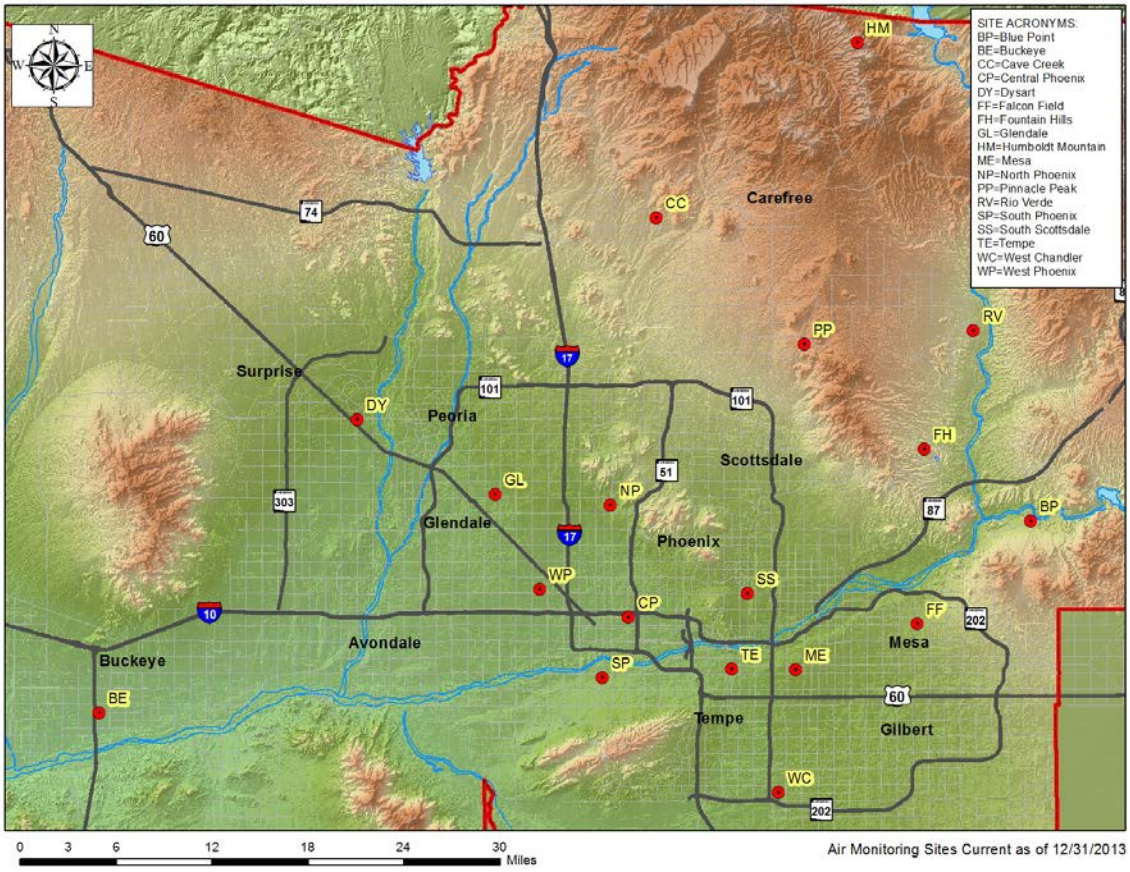


Figure 8. 2015 O_3 Monitoring Site Map

As stated in the O_3 summary, compliance with the NAAQS is determined by averaging the 4th highest 8-hour average over a 3-year period. Currently, this 3-year average must be less than or equal to 0.070 ppm. During 2015, there were eighteen SLAMS O_3 monitors in operating within the network. The data were reported to AQS, and data are suitable for use with NAAQS comparisons (see Figure 8).

In 2015, seven days exceeded the 2008 8-hour primary standard for O_3. The data for one exceedance day, June 20th, have been flagged as an EE in AQS and the submittal package is being developed. Table 16 presents the 2015 data summary for 2008 8-hour O_3 at MCAQD monitoring sites. In addition, there were three violations of the 2008 8-hour primary standard. The 8-hour standard is violated when a 3-year average using the 4th highest concentration measured in each year exceeds 0.075 ppm (see Table 16).

Table 16. 2015 8-hour Average O_3 Data Summary

Site	8-hr Max. (ppm)	2nd Highest (ppm)	3rd Highest (ppm)	4th Highest (ppm)	Qty. of Days > 0.075 ppm
Blue Point	0.077*	0.077*†	0.074	0.073	2
Buckeye	0.064	0.060	0.060	0.060	0
Cave Creek	0.072	0.071	0.071	0.069	0
Central Phoenix	0.075	0.075	0.074	0.071	0
Dysart	0.069	0.068	0.067	0.067	0
Falcon Field	0.084*	0.080*†	0.079*	0.072	3
Fountain Hills	0.075	0.073	0.070	0.069	0
Glendale	0.071	0.068	0.068	0.067	0
Humboldt Mt.	0.076*	0.073	0.073	0.073	1
Mesa	0.082*	0.080*	0.079*†	0.077*	4
North Phoenix	0.078*	0.078*	0.075	0.074	2
Pinnacle Peak	0.083*	0.080*	0.078*†	0.077*	4
Rio Verde	0.070	0.069	0.069	0.068	0
South Phoenix	0.073	0.073	0.072	0.070	0
South Scottsdale	0.074	0.070	0.069	0.068	0
Tempe	0.055	0.053	0.053	0.051	0
West Chandler	0.072	0.070	0.070	0.070	0
West Phoenix	0.076*	0.076*	0.075	0.074	2

* Indicates an exceedance of the standard
† Data flagged in AQS as an EE
Source: AQS *2015 AMP 450 NC Report – Quicklook All Parameters*

Additional information required by EPA is shown in Table 17.

Table 17. O_3 Data Required by EPA

CBSA	County	Population & Census Year (2012)	8-Hr Design Value (ppm)	Design Value Site	Required Monitors	Active Monitors	Additional Monitors Needed
38060	Maricopa	4,329,534	0.078	04-013-1003 and 04-013-2005	3	18	0

Source: AQS *2015 AMP 480 Report – Preliminary Design Value*

Particulate Matter ≤10 Micrometers (PM_{10})

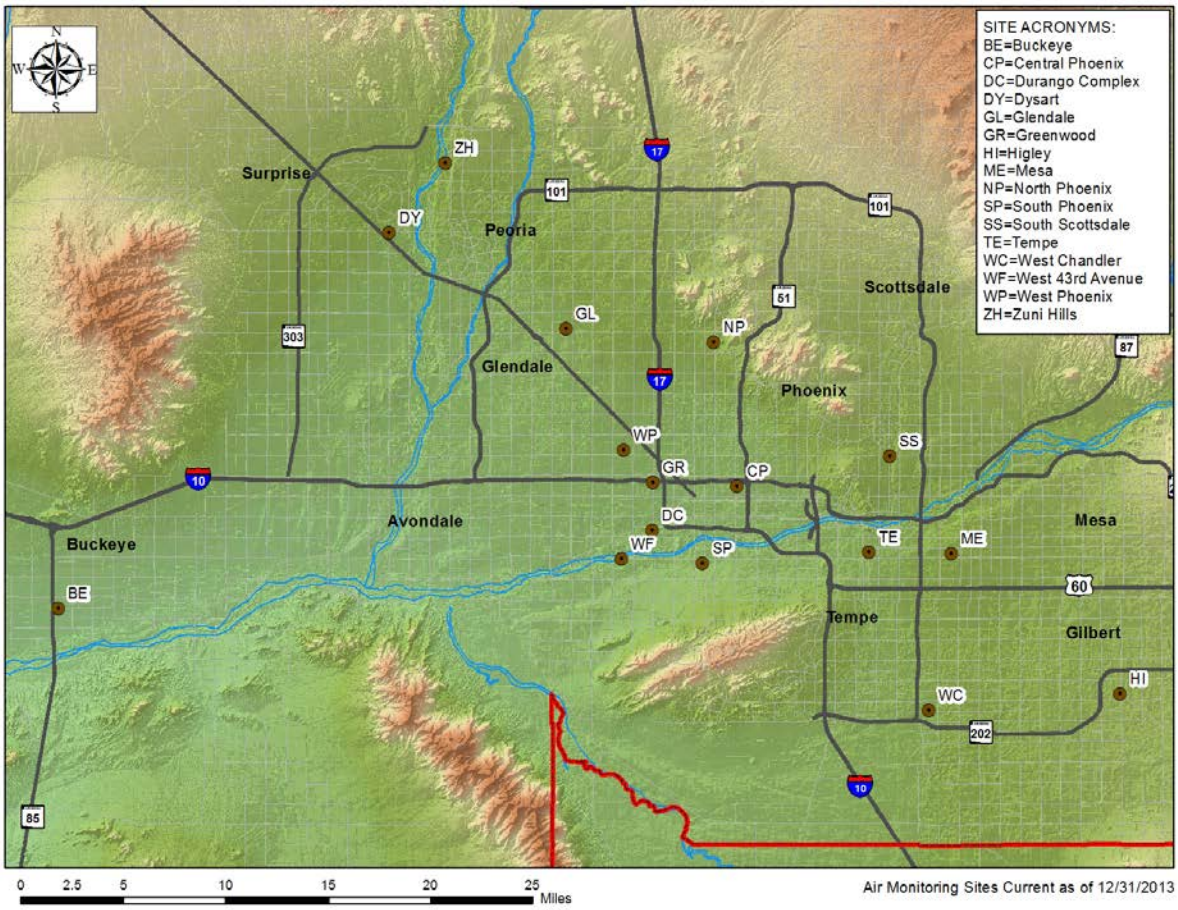


Figure 9. 2015 PM_{10} Monitoring Site Map

During 2015, sixteen PM_{10} monitors were reported as operational in AQS (see Figure 9). All PM_{10} monitors are classified as SLAMS, and data are suitable for comparison to the NAAQS. The Zuni Hills monitor classification was changed from SPM to a SLAMS beginning on January 1, 2015. All PM_{10} monitoring stations now operate continuous PM_{10} analyzers that collect hourly-averaged data. It is worth noting that EPA does not require PM_{10} analyzers to be collocated at the PQAO level or the national level.

This NAAQS is violated when the expected number of exceedances at a monitor is more than one per year on average over three years. The expected number of exceedances is estimated using a formula provided in *40 CFR Part 50 Appendix K*. The formula takes into account the number of days sampling occurs and the number of valid samples that can be collected. A 3-year average of these estimated days is then used to determine compliance. Effective December 18, 2006, EPA revoked the PM_{10} annual primary standard; however, the annual weighted average is displayed for informational purposes (see Table 18).

In recent years, some PM_{10} exceedances occurring in the Maricopa County CBSA have been successfully attributed to an EE. Again, as per the EPA's *EER*, an EE is an uncontrollable event that was caused by natural sources of pollution or an event that is not expected to recur at a given location. ADEQ makes the determination of which events to classify as exceptional; then, they submit documentation to EPA supporting the contention that the exceedance(s) was due to an EE. If EPA R9

concurs, the PM_{10} concentrations measured during the event are not used to determine compliance with the NAAQS. The EE counts below are current as of this review's publishing. Table 18 shows the 2015 PM_{10} 24-hour NAAQS status and data summary, including EE data values.

Table 18. 2015 PM_{10} 24-Hour Data Summary Including EE Data

Site Name	24-hr Avg. Max ($\mu g/m^3$)	24-hr Avg. 2nd High ($\mu g/m^3$)	24-hour NAAQS Exceedances	Expected Exceedances	Annual Weighted Average ($\mu g/m^3$)	Quantity of EEs
Buckeye	124	103	0	0	34.4	0
Central Phoenix	114	85	0	0	26.2	0
Durango Complex	100	97	0	0	26.3	0
Dysart	99	71	0	0	22.4	0
Glendale	78	71	0	0	18.3	0
Greenwood	106	90	0	0	34.8	0
Higley	***Note: No data available due to this site remaining temporarily shutdown in 2015.***					
Mesa	66	48	0	0	17.2	0
North Phoenix	79	55	0	0	18.5	0
South Phoenix	86	80	0	0	25.5	0
South Scottsdale	86	67	0	0	24.1	0
Tempe	52	48	0	0	18.4†	0
West Chandler	121	87	0	0	23.7	0
West 43rd Avenue	132	124	0	0	36.5	0
West Phoenix	72	70	0	0	23.2	0
Zuni Hills	81	77	0	0	21.5	0

† Data do not meet completeness criteria.
Source: AQS *2015 AMP 450 NC Report - Quicklook All Parameters*

Additional information required by EPA is shown in Table 19. Data include measurements submitted as EEs.

Table 19. PM_{10} Data Required by EPA

CBSA	County	Population & Census Year (2012)	2015 Max Concentration	Max Concentration Site	Required Monitors	Active Monitors	Additional Monitors Needed
38060	Maricopa	4,329,534	132 µg/m3	04-013-4009	6-10	16	0

Source: *40 CFR Part 58, Appendix D, 4.6 (a) and Table D-4*

Particulate Matter ≤2.5 Micrometers ($PM_{2.5}$)

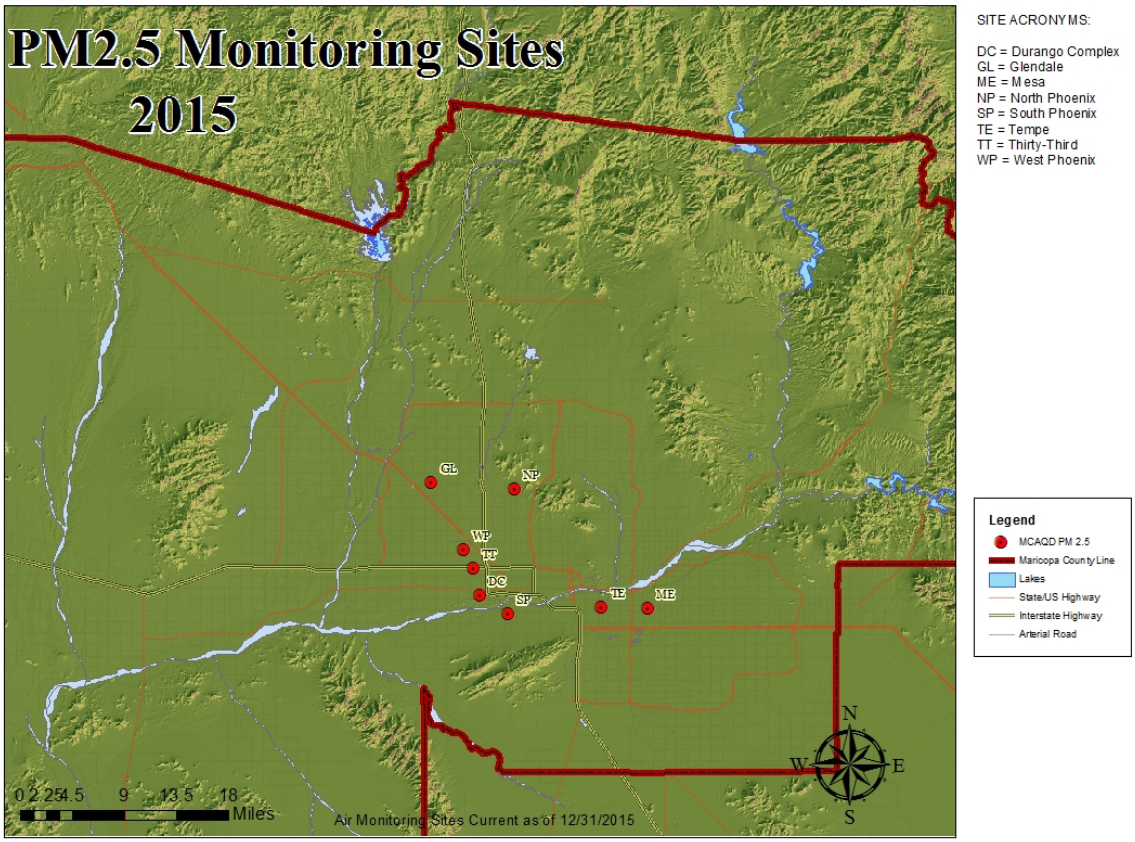


Figure 10. 2015 $PM_{2.5}$ Monitoring Site Map

Figure 10 shows the sites monitoring for $PM_{2.5}$. In 2015 the department operated nine continuous Federal Equivalency Methods (FEM) $PM_{2.5}$ analyzers that are representative of area-wide air quality. All $PM_{2.5}$ monitors, except for the Thirty-Third monitor, are identified as SLAMS. The Thirty-Third monitor was classified as a SPM, because it temporarily supported the $PM_{2.5}$ chemical speciation study. Data are suitable for comparison to the NAAQS.

Beginning in January 2015, all $PM_{2.5}$ primary monitors are FEMs; therefore, 2014 was the last year to report data from the West Phoenix FRM sampler for comparison to the NAAQS. At the end of 2014, the AMD reduced the quantity of FRM $PM_{2.5}$ samplers in operation throughout the network from two to one. The primary monitoring method at the West Phoenix station officially changed from an FRM to an FEM beginning on January 1, 2015. The West Phoenix site remains our "collocated" site for $PM_{2.5}$, which means that we will operate one FEM continuous analyzer designated as the "primary monitor" and one FRM filter-based $PM_{2.5}$ sampler designated as the "secondary monitor". The secondary monitor is required to meet the EPA's QA collocation requirements for the $PM_{2.5}$ network.

Although data from the secondary monitor are intended for QA usage, if necessary, they can be substituted in place of the primary monitor's data as per *40 CFR Part 50 Appendix N*. This secondary monitor collects a 24-hour, e.g., midnight-to-midnight, filter sample on the designated 1:12 day as required for collocated QA samples. The EPA OAQPS produces the annual sampling calendar each year and posts it on the AMTIC website.

The $PM_{2.5}$ network is smaller than the PM_{10} network, and Maricopa County is currently in attainment for $PM_{2.5}$. The MCAQD continually assesses the existing network to ensure it adequately represents air quality in Maricopa County with regard to $PM_{2.5}$. Maricopa County operates more than the required minimum number of $PM_{2.5}$ monitors for the core-based statistical area (CBSA) as shown on Table 24 and in Appendix II.

To determine compliance with the annual $PM_{2.5}$ NAAQS requires that three years of the 24-hour annual average data be used from each monitor. To determine compliance with the 24-hour NAAQS requires that three years of the 98th percentile data be used from each $PM_{2.5}$ monitor. For data to be acceptable for comparison to the annual and the 24-hour NAAQS, a site's $PM_{2.5}$ monitor must meet all EPA operating and QA requirements.

2015 $PM_{2.5}$ Data Summary

Table 20 summarizes the 2015 data from the FEM analyzers as well as the FRM sampler at West Phoenix. All $PM_{2.5}$ analyzers were classified as SLAMs, except for Thirty-Third, which temporarily operated as an SPM in 2015.

Table 20. 2015 $PM_{2.5}$ 24-Hour Averages and Annual Means

Site Name	2015 24-hr Avg. Max (µg/m^3)	2015 24-hr Avg. 2nd High (µg/m^3)	2015 98th Percentile Value (µg/m^3)	2015 Annual Mean (µg/m^3)
Diablo	22.5	20.7	17.0	7.9
Durango Complex	32.4	31.2	27.1	9.0
Glendale	26.9	24.3	18.9	7.0
Mesa	23.2	20.5	16.6	6.7
North Phoenix	21.4	20.8	17.8	6.7
South Phoenix	44.6‡	36.6‡	27.7	8.9
Tempe	19.1†	18.0†	16.9†	8.9†
Thirty-Third	35.3†	34.8†	34.0†	10.5†
West Phoenix	40.5‡	37.8‡	27.5	8.6

‡Indicates an exceedance of the standard.
† Indicates that the mean does not satisfy data completeness criteria
Source: AQS *2015 AMP 450 NC Report - Quicklook All Parameters*

The Annual $PM_{2.5}$ NAAQS Status

Compliance with the primary and secondary annual NAAQS is determined by averaging three consecutive years of a site's annual mean value, which is derived using the 24-hour, or daily, concentrations. The annual $PM_{2.5}$ NAAQS is met when three-year annual average concentration is less than or equal to 12.0 µg/m^3 at each eligible monitoring site. All 3-year averages were below the annual NAAQS. Table 21 summaries the 3-year 24-hour annual average data.

Table 21. $PM_{2.5}$ 3-Year Annual Averages

Site Name	2013 Annual Avg. (µg/m^3)	2014 Annual Avg. (µg/m^3)	2015 Annual Avg. (µg/m^3)	3-Year Annual Avg. (µg/m^3)
Diablo	Not operating	9.71†	7.86	8.8†
Durango Complex	10.54	10.12	8.97	9.9
Glendale	7.52	7.73	7.0	7.4
Mesa	5.69	8.28	6.68	6.9
North Phoenix	8.0	8.02	6.73	7.6
South Phoenix	9.59	10.27	8.99	9.6
Tempe	8.69	8.63	8.88†	8.7†
***Thirty-Third**	Not operating	Not operating	10.48†	N/A
West Phoenix	10.6†	10.9	8.6	10.0†

† Indicates that the mean does not satisfy data completeness criteria.
*Monitor only operated from September to December in 2015
Source: AQS *2013 – 2015 AMP 450 NC Report – Quicklook All Parameters*

2015 24-Hour $PM_{2.5}$ NAAQS Status

Compliance with the primary and secondary 24-hour $PM_{2.5}$ NAAQS is determined by averaging 3-consecutive years of the 24-hour 98th percentile concentration values from all eligible sites. The 24-hour NAAQS is met when 3-year average concentration values is less than or equal to 35 $\mu g/m^3$. In 2015, there were three exceedance days, but no violations of the primary or secondary 24-hour NAAQS of 35 $\mu g/m^3$. Table 22 summaries the 3-year 24-hour 98th percentile data from the FEM analyzers.

Table 22. $PM_{2.5}$ 3-Year 24-Hour Averages of the 98th Percentile

Site Name	2013 98th Percentile ($\mu g/m^3$)	2014 98th Percentile ($\mu g/m^3$)	2015 98th Percentile ($\mu g/m^3$)	3-Year Average 98th Percentile ($\mu g/m^3$)
Diablo	Not operating	21.4†	17.0	19†
Durango Complex	27.2	24.1	27.1	26
Glendale	16.6	18.6	18.9	18
Mesa	12.8	19.4	16.6	16
North Phoenix	17.2	20.3	17.8	18
South Phoenix	25.8	26.5	27.7	27
Tempe	17.9	17.4	16.9	17
***Thirty-Third**	Not operating	Not operating	34.0†	N/A
West Phoenix	29.0†	28.9	27.5	28†

† Indicates that the mean does not satisfy data completeness criteria.
* Monitor operated from September to December in 2015 only
Source: AQS *2013 – 2015 AMP 480 Report – Preliminary Design Value Report*

Additional information required by EPA is shown in Table 23. The required data shown below include any measurements that were submitted as an EE for EPA's concurrence. However, in 2015, there were no EEs submitted for $PM_{2.5}$ exceedances.

Table 23. $PM_{2.5}$ Data Required by EPA

CBSA	County	Population & Census Year (2012)	Annual Design Value ($\mu g/m^3$)	Annual Design Value Site	Daily Design Value ($\mu g/m^3$)	Daily Design Value Site	Required Monitors	Active Monitors	Additional Monitors Needed
38060	Maricopa	4,329,534	10.0	04-013-0019	28	04-013-0019	3	7	0

Source: AQS *2013 – 2015 AMP 480 Report – Preliminary Design Value Report*

Sulfur Dioxide (SO_2)

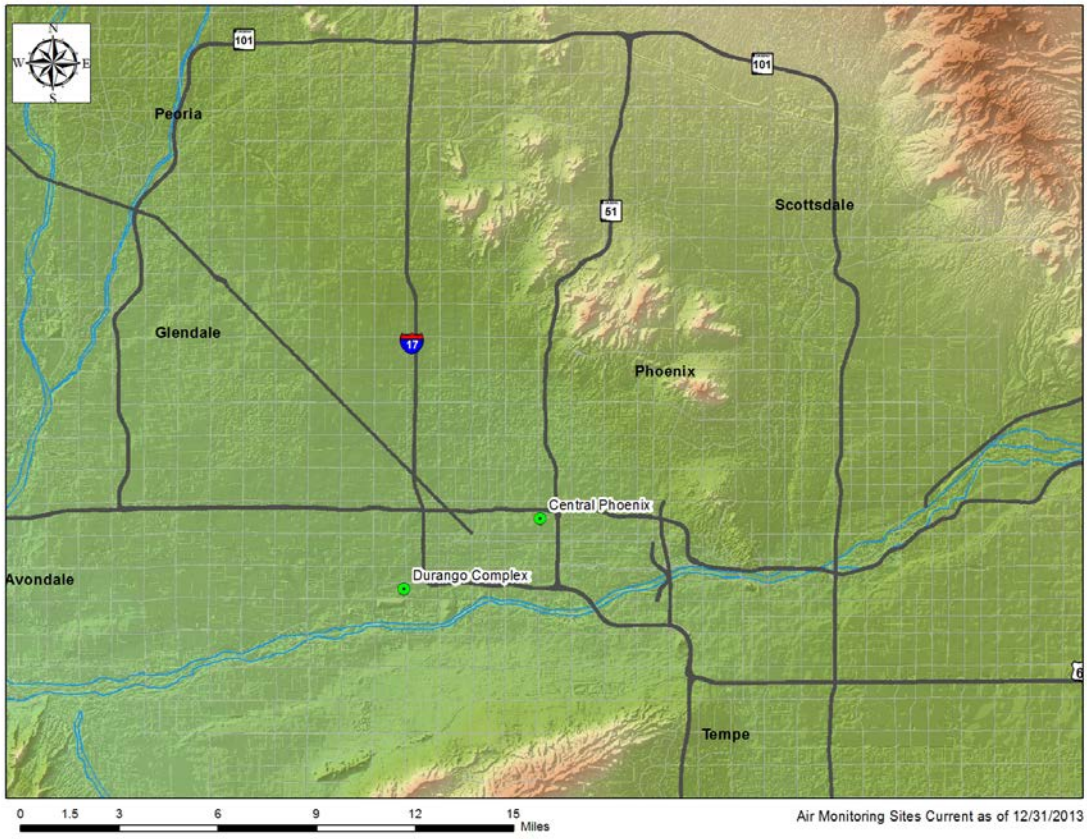


Figure 11. 2015 SO_2 Monitoring Site Map

During 2015, two SO_2 SLAMS monitors were operational and reported data into AQS that are suitable for NAAQS comparison (see Figure 11). Sulfur dioxide has a 1-hour primary standard and a 3-hour secondary standard. The 24-hour and annual average standards were revoked in a June 2010 rulemaking. A violation of the primary standard occurs when the 3-year average of the 99th percentile of the daily maximum 1-hour average exceeds 75 ppb. A violation of the secondary standard occurs when a 3-hour average of 500 ppb is exceeded more than once per year. Maricopa County is in attainment for SO_2.

For calendar year 2015, no exceedances of the SO_2 1-hour or 3-hour standard were recorded at Maricopa County monitoring sites. The EPA now requires that the highest 5-minute average per hour per day be reported to AQS; however, there is not a 5-minute SO_2 NAAQS level. The EPA no longer requires the reporting of 3-hour values for the SO_2 secondary NAAQS. Table 24 shows the 2015 SO_2 data summary.

Table 24. 2015 SO_2 Data Summary

Site	1-hour Max. (ppb)	1-hour 2nd High (ppb)	1-hour 99th Percentile (ppb)
Central Phoenix	9.0	8.0	7.0
Durango Complex	18.0	11.0	9.0

Source: AQS *2015 AMP 450 NC Report – Quicklook All Parameters*

The minimum required quantity of SO_2 monitors operating within the MCAQD's network is based on either the Population Weighted Emissions Index (PWEI) and/or the EPA R9 Administrator input (see *40 CFR Part 58 - Appendix D 4.4.3).*

Table 25 shows additional information required by EPA.

Table 25. SO_2 Data Required by EPA

CBSA	County	Population & Census Year (2012)	Total SO_2 Emitted in 2011 (tpy)	Population Weighted Emission Index	Required Monitors	Active Monitors	Additional Monitors Needed
38060	Maricopa	4,329,534	1468	6355	0	2	0

Source: The EPA's Clearinghouse for Inventories & Emissions Factors database

2015 NAAQS Exceedance and Violation Summary

The following is a summary of the 2015 NAAQS exceedances and violations (see Table 26).

Table 26. 2015 NAAQS Exceedances and Violation Summary

CO	There were no exceedances or violations of the 1-hour or 8-hour NAAQS standard.
NO_2	There were no exceedances or violations of the 1-hour NAAQS standard.
O_3	There were seven unique days when at least one monitor exceeded the standard. There were three violations of the 2008 8-hour NAAQS standard.
Pb	There were no exceedances or violations of NAAQS.
PM_{10}	There were no exceedances of the 24-hour standard. No sites violated the standard.
$PM_{2.5}$	There were three unique days when at least one monitor exceeded the 24-hour standard. There were no violations of the 24-hour or annual NAAQS standards.
SO_2	There were no exceedances or violations of NAAQS.

2015 O_3 Exceedance and Violation Information

Table 27 shows the dates and values for the 2008 primary and secondary 8-hour O_3 NAAQS exceedances. The NAAQS level of 0.075 ppm for a rolling 8-hour average, and an exceedance occurs when the 8-hour average is greater than 0.075 ppm, e.g., 0.076 ppm or higher.

Table 27. 2015 O3 8-hour Average Exceedance Details

Ozone Exceedance Days 2015
8/16/2015

Ozone 8-hr avg. (ppm)
Ozone NAAQS > 0.075 ppm

	Buckeye	Blue Point	Cave Creek	Central Phoenix	Dysart	Falcon Field	Fountain Hills	Glendale	Humboldt Mt.	Mesa	North Phoenix	Pinnacle Peak	Rio Verde	South Phoenix	South Scotts.	Tempe	West Chandler	West Phoenix
6/7/15									0.076									
6/12/15		0.077				0.079				0.082	0.078	0.083						
6/16/15										0.077								
6/20/15		0.077				0.080				0.079		0.078						
6/29/15						0.084				0.080								
8/1/15											0.078	0.080						0.076
8/15/15												0.077						0.076
Exceedance Days		2				3			1	4	2	4						2
Maximum Value		0.077				0.084			0.076	0.082	0.078	0.083						0.076
4th High Value> 0.075										0.077		0.077						

All sites are located in or near the Ozone Nonattainment Area
Please see ADEQ for information on additional statewide ozone sites

Total Number of Days where at least one monitor exceeded the NAAQS Ozone Standard	7

Table 28 shows the O_3 NAAQS violations. A site violates the NAAQS when its 3-year average of the 4th-highest annual 8-hour concentration exceeds 0.075 ppm. Data shown below are the 2013 to 2015 3-year averages of the 4th highest 8-hour O_3 concentrations. The concentrations shown include EE data.

Table 28. 2015 O_3 NAAQS Violations

Site	Concentration (ppm)
Mesa	0.078
North Phoenix	0.077
Pinnacle Peak	0.078

Figure 12 shows a graph of the 2015 violations. The graph includes exceptional event data from June 20th.

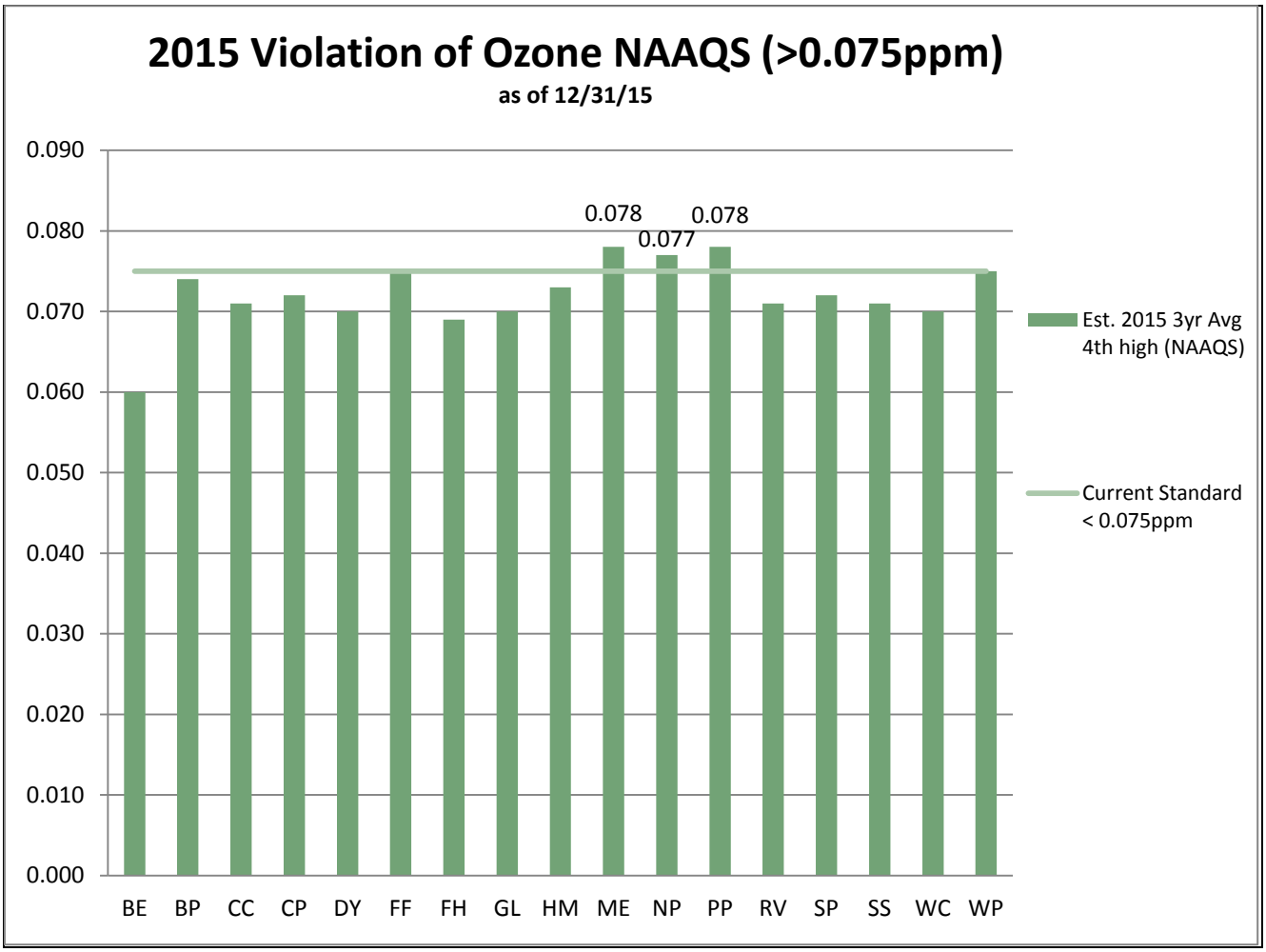


Figure 12. 2015 O_3 Violations by Site based on 2008 NAAQS

If we compare the 2013 – 2015 data to the newly lowered O_3 NAAQS of 0.070 ppm, then most sites operated by MCAQD would violate the 2016 standard as shown on
Figure 13. Exceptional event data are included as well.

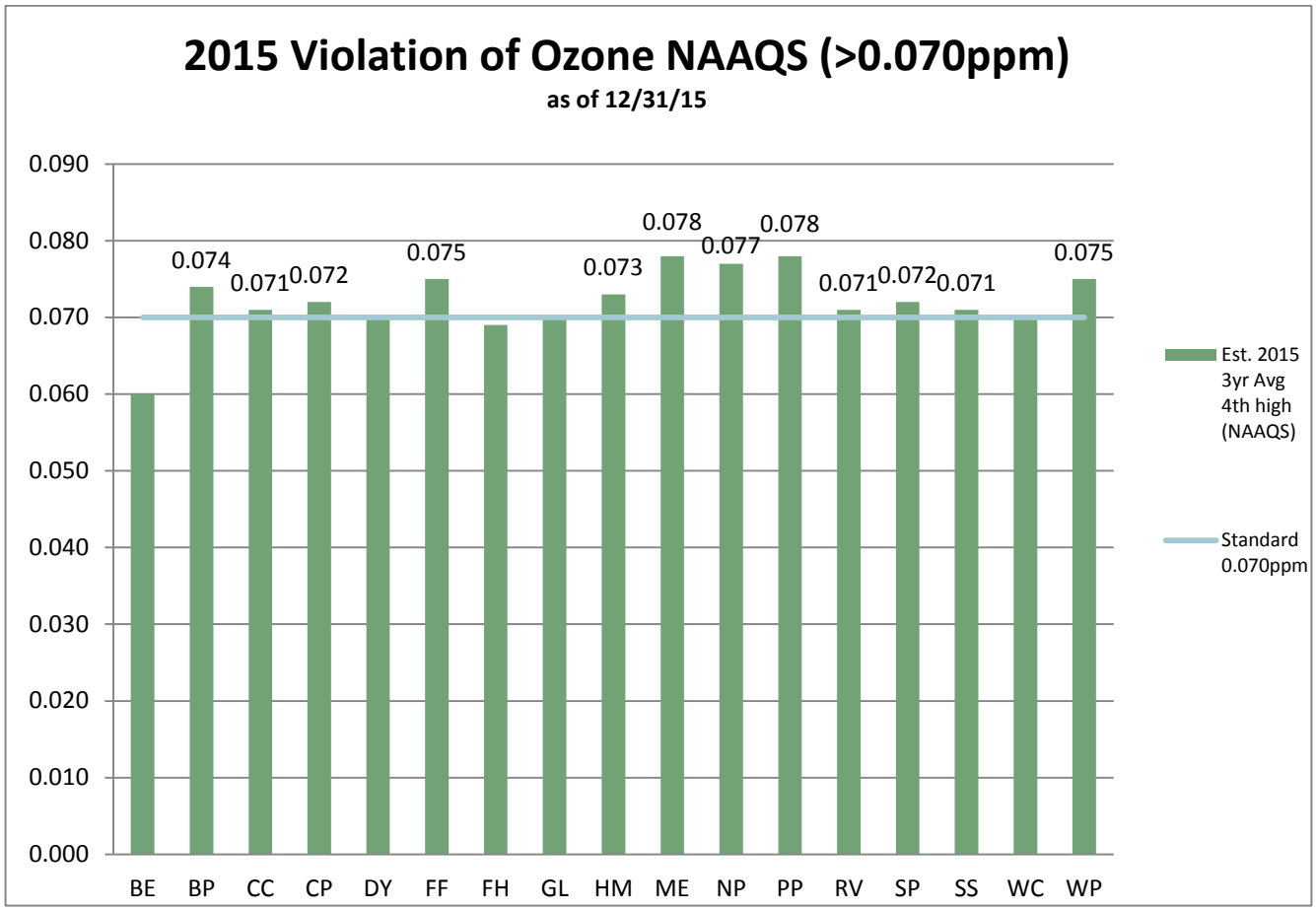


Figure 13. O_3 Violations by Site based on 2015 NAAQS

2015 Particulate Matter Exceedance and Violation Status

2015 24-Hour PM_{10} NAAQS Exceedances

There were no 24-hour exceedances of the PM_{10} NAAQS; nor were there any EE packages submitted to EPA.

2015 24-Hour PM_{10} Primary and Secondary NAAQS Violation Status

As per *40 CFR Part 50.6 (a),* a site violates the PM_{10} NAAQS when the calculated "rate of expected exceedances" is >1 when averaged over three consecutive years. Please note that the EPA has yet to concur with the 2013 and 2014 EE demonstration submittals. (See Table 29)

Table 29. 2015 Violations of the PM_{10} 24-Hour NAAQS without EE Data Holding EPA-Concurrence

Site	2013		2014		2015		Rate of Expected Exceedances
	24-hr Max. (µg/m^3)	Expected Exceedances	24-hr Max. (µg/m^3)	Expected Exceedances	24-hr Max. (µg/m^3)	Expected Exceedances	
Buckeye	298‡	2.21	271‡	2.0	124	0	1.40
Central Phoenix	328‡	2	182‡	1.0	114	0	1.00
Durango Complex	303‡	4.02	172‡	2.0	100	0	2.00
Dysart	147	0	163‡	1.0	99	0	0.33
Glendale	210‡	2	205‡	1.011	78	0	1.00
Greenwood	273‡	3.01	208‡	2.011	106	0	1.67
Higley	211‡	1	179‡	2.0	Not operating	0	1.5†
Mesa	151	0	155‡	1.034	66	0	0.34
North Phoenix	153	0	199‡	1.0	79	0	0.33
South Phoenix	294‡	2.045	170‡	3.0	86	0	1.68
South Scottsdale	195‡	1.05	193‡	2.045	86	0	1.03
Tempe	227‡	1	175‡	1.011	52	0	0.67†
West Chandler	234‡	3.04	163‡	1.0	121	0	1.34
West 43rd	301‡	4.19	171‡	1.0	132	0	1.73
West Phoenix	255‡	2.03	210‡	2.022	72	0	1.35
Zuni Hills	165‡	1.011	166‡	1.247	81	0	0.75

† Indicates <75% data available, i.e., does not meet data completeness requirements
‡ Indicates value was flagged as an EE
Source: AQS *2013 - 2015 AMP 450 NC Report – Quicklook All Parameters*

2015 24-Hour PM_{10} NAAQS Violation Status without Exceptional Events

The ADEQ submitted EE packages to EPA R9 for six of the seven PM_{10} exceedance days that occurred in 2014 and the six exceedance days that occurred in 2013. There were no exceedance days in 2015 at Maricopa County sites. If the EPA concurs with all of the packages submitted for 2013 and 2014, the number of sites that violated the PM_{10} standard in 2015 will be zero. All 2013 – 2015 data considered the result of an EE have been excluded from the calculations in Table 30, regardless of EPA concurrence status.

Table 30. 2015 Violations of the PM_{10} NAAQS with All EE Flagged Data Excluded Regardless of EPA Concurrence

Site	2013		2014		2015		Rate of Expected Exceedances
	24-hour Max. ($\mu g/m^3$)	Expected Exceedances	24-hour Max. ($\mu g/m^3$)	Expected Exceedances	24-hour Max. ($\mu g/m^3$)	Expected Exceedances	
Buckeye	112	0	175	1.00	124	0	0
Central Phoenix	114	0	135	0	114	0	0
Durango Complex	110	0	107	0	100	0	0
Dysart	147	0	90	0	99	0	0
Glendale	90	0	86	0	78	0	0
Greenwood	119	0	125	0	106	0	0
Higley	143	0	137	0	Not Operating	0†	0†
Mesa	151	0	101	0	66	0	0
North Phoenix	153	0	107	0	79	0	0
South Phoenix	118	0	109	0	86	0	0
South Scottsdale	142	0	98	0	86	0	0
Tempe	146	0	88	0	52†	0†	0†
West Chandler	144	0	146	0	121	0	0
West 43rd Avenue	121	0	121	0	132	0	0
West Phoenix	114	0	148	0	72	0	0
Zuni Hills	80	0	86	0	81	0	0

† Indicates <75% data available, i.e., does not meet data completeness requirements

2015 24-Hour $PM_{2.5}$ NAAQS Exceedances and Violation Status

The 24-hour primary and secondary NAAQS for $PM_{2.5}$ are 35 µg/m^3. If the 24-hour, midnight-to-midnight block-average concentration at a site is 35.5 µg/m^3 or higher, then it is counted as an exceedance. If the 24-hour 3-year average of the 98th percentile exceeds 35 µg/m^3, then the 24-hour NAAQS are violated. Table 31 shows there were three exceedance days in 2015 for $PM_{2.5}$; but there were no violations.

Table 31. 2015 $PM_{2.5}$ Exceedances

Site	Date	24-hr Avg. $PM_{2.5}$ Concentration (µg/m^3)
South Phoenix	12/25/15	44.6
	12/31/15	36.6
West Phoenix	01/04/15	40.5
	12/31/15	37.8
Number of Days where at least one monitor exceeded the 24-hour $PM_{2.5}$ Standard		3

Supplemental Exceptional Event Information

The June 20, 2015 O_3 exceedance is currently being reviewed as a potential EE. If found suitable for submittal to EPA R9, then, it will be the first O_3 exceedance classified as an EE for Maricopa County. Copies of EE submittals can be viewed online at ADEQ's website.

Changes to the Criteria Pollutant Air Monitoring Networks

The MCAQD's AMD strives to provide the most reliable and relevant air monitoring data to the public. Air quality issues are diverse and are of great interest to the citizens of Maricopa County. High-quality data are a cornerstone of developing and implementing effective SIPs, EE packages, and permits for new and existing sources. The following describes projects that have occurred during 2015 and changes that are proposed for 2016, or as resources become available.

2015 Network Assessment Recommendations

In 2015, the MCAQD completed a 5-Year Network Assessment as required by *40 CFR Part 58*. The "Assessment" evaluated the performance of the monitoring network for the years 2010 – 2014 and identified:

- unnecessary or redundant monitors for CPs that could be removed;
- potential reconfigurations to the network to deemphasize the collection of data for CPs that are steadily becoming less problematic (such as CO); and
- potential reconfigurations to the network to refine the monitoring of CPs presenting persistent challenges such as ground level O_3 and its precursors, or to address new monitoring initiatives.

The Assessment identified potential changes for most CP networks, except for Pb. Proposed changes to the network in 2016 are summarized below. Please see the 2015 Network Assessment for details concerning the recommendations.

Summary of 2015 Network Assessment Recommendations

The proposed changes are subject to public comment and the EPA's concurrence.

A. Proposed Monitor Closings
   1) CO – Dysart, Glendale, Greenwood, North Phoenix, South Phoenix, South Scottsdale, and Tempe
   2) NO_2 – Greenwood
   3) O_3 – Rio Verde
   4) SO_2 – none
   5) $PM_{2.5}$ - none
   6) PM_{10} – Greenwood
   7) Pb - none

Supplemental information from the Assessment regarding the above changes follows.

CO: Maricopa County is currently in attainment of the CO NAAQS. The last violation of the 8-hour standard was in 1996 and the last violation of the one-hour standard was in 1984. Many CO monitors have a design value close to zero.

O_3: There are three other O_3 monitors in close proximity to Rio Verde. The Fountain Hill's monitor is 12.8 km away to the southwest, Pinnacle Peak's is 16.9 km away to the west, and Yuma Frank's on the Fort McDowell Yavapai Nation's Reservation is 9.7 km away to the south. The area is well represented

by these monitors. Closing the Rio Verde site would not have an adverse impact on the network's representativeness.

Furthermore, construction to the Rio Verde site structure several years ago required that the monitor's sample line be reconfigured. Now, the sample residence time is nearly 20 seconds, and we cannot feasibly shorten the sample line without extensive rewiring to the structure, which we do not own. The sample line inlet has been repositioned a couple of times to prevent the effects of heat from the metal roof and outgassing from biomass inside the adjacent landscaper's compound from effecting O_3 measurements. We believe that data reported by the RV monitor are not as consistent as in the past and that data may be biased high or low depending upon the time of day, year, and/or meteorological conditions. This further supports closing of this monitor.

PM_{10}: The Assessment shows that there is a cluster of redundant PM_{10} sites near downtown Phoenix including Central Phoenix, Durango Complex, Greenwood, West 43rd, and West Phoenix. Greenwood is the most highly correlated PM_{10} site in the network, with correlation scores of 85% with West Phoenix, 79% with Central Phoenix, and 77% with Durango Complex. Therefore, we believe that this area will be adequately represented by the PM_{10} monitors at West Phoenix, Durango Complex, Central Phoenix, and West 43rd, and closing the Greenwood monitor does not compromise PM_{10} monitoring coverage.

B. Potential Monitor Moves

1) CO – none
2) NO_2 – none
3) O_3 – none
4) SO_2 - none
5) $PM_{2.5}$ - none
6) PM_{10} – none
7) Pb - none

Supplemental information from the Assessment regarding the above changes follows.

NO_2: The NO_2 monitors at the Thirty-Third and Greenwood sites are highly correlated and redundant. The Thirty-Third site is located approximately 1.2 km to the west of Greenwood and serves the same purpose of monitoring emissions from the I-10 highway. Since the NO_2 monitor is specifically required at the new near-road NO_2 Thirty-Third site, we would like to close the Greenwood monitor.

C. Potential Changes to Site Types/Objectives

1) CO
    a. West Phoenix from 'Population Exposure' to 'Highest Concentration'
    b. Buckeye from 'Population Exposure' to 'Upwind Background'
2) NO_2 Buckeye from 'Population Exposure' to 'Upwind Background'
3) O_3
    a. North Phoenix from 'Population Exposure' to 'Max Ozone Concentration'
    b. Fountain Hills from 'Max Ozone Concentration' to 'Population Exposure'
    c. Humboldt Mountain from 'Max Ozone Concentration' to 'Extreme Downwind'
    d. Buckeye from 'Population Exposure' to 'Upwind Background'
4) SO_2 none
5) $PM_{2.5}$ none
6) PM_{10} Durango Complex from 'Highest Concentration' to 'Population Exposure'
7) Pb none

D. Potential Changes to Monitoring Scales (Spatial Scale Represented)

1) CO none
2) NO none
3) O_3 Buckeye from 'Neighborhood' to 'Urban'
4) SO_2 none
5) $PM_{2.5}$ Durango Complex from 'Middle' to 'Neighborhood'
6) PM_{10} Durango Complex from 'Middle' to 'Neighborhood'
7) Pb none

Other 2015 Station and Site Reclassifications, Relocations, and/or Shutdowns

1. Higley site (04-013-4006) – this site was temporarily closed on November 4, 2014 due to the property owner asking us to vacate the property. The owner was no longer able to provide housing for our air monitoring operations. Therefore, we discontinued monitoring and decommissioned the site in early November. We are still working with the site owner and trying to secure the new location. The new location is expected to be close enough to the previous location that the same AQS site identification number can be used. We are targeting startup by the end of 2016 or as soon as feasible.

2. Tempe site (04-103-4005) - this site was temporarily shut down from April through September 2015 due to the property owner making significant infrastructure upgrades. It reopened in October 2015.

3. Thirty-Third site (04-013-4020) – this second near-road NO_2 station opened September 1, 2015.

New Monitoring Sites

1. Thirty-Third site (04-013-4020) – this second near-road NO_2 station opened September 1, 2015.

Seasonal Air Monitoring

The CO network is the only network operating monitors seasonally. There were no changes requested for the seasonal CO network in 2015; however, we are requesting changes for this network in 2016 based on the Assessment results. Changes may include reducing the quantity of seasonal CO monitors, changing year-round CO monitors to seasonal or vice versa, and/or changing the spatial scales of representation for some CO monitors.

Currently, the AMD operates nine out of thirteen CO monitors on a seasonal basis (see Table 32). During the off-season, the quantity of CO monitors operating still exceeds the EPA's minimum requirements. Operating the CO network seasonally has allowed AMD to conserve resources that have helped to upgrade and/or increase preventive maintenance to monitors. Preventative maintenance helps to extend the life expectancy of the monitors; thereby, reducing replacement costs. This practice also reduces the quantity of QC/QA check performed on the seasonal monitors.

Please note that the 2015 Site Metadata Tables in Appendix II do not show these proposed changes to sites and/or monitors. The metadata reflects changes requested in 2015. The proposed changes will be shown on the 2016 tables.

Table 32. Seasonal Monitors

Seasonal CO Monitoring Sites (Operational Sept. 1 – Apr. 1)
Buckeye
Dysart
Glendale
Mesa
North Phoenix
South Phoenix
South Scottsdale
Tempe
West Chandler

Daily Uses of Criteria Pollutant Data

Air Quality Forecasting

The ADEQ, in conjunction with MCAQD, has developed a year-round air quality forecasting capability for the Phoenix metropolitan area. ADEQ takes the lead on air quality forecasting and the issuing of High Pollution Advisories (HPA), while the MCAQD provides monitoring data and designates No-Burn Days. In 2015, AMD continued to supply CP and meteorological data to the ADEQ forecasters on a daily basis. In 2015, we began supplying CP and meteorological data to MAG on a daily basis as well.

Maricopa County's Air Monitoring Website

The department continued distributing 1-hour and 5-minute continuous CP data for the "Maricopa County Interactive Pollution Map". The website provides each pollutant's concentrations as well as AQI values. By having easy access to this information, the public can better plan their daily activities.

EPA's AIRNow Website

The department continued distributing 1-hour and 5-minute continuous CP data for the EPA's AIRNow website, which serves the same purpose as that of the Maricopa County's website.

Information Regarding Maricopa County's Supplementary Air Monitoring Programs

Personnel who work mobile monitoring and emergency response meet the Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) training and medical monitoring requirements as per the U.S. Occupational Safety and Health Administration (OSHA) *29 CFR 1910.120*. Personnel are recertified annually through refresher training**.**

The Mobile Monitoring Program

The department received approval in late 2006 from the Maricopa County Board of Supervisors to start a "mobile monitoring" program. This program enables us to better respond to emergencies affecting air quality, to identify sources of air pollutants by performing localized air monitoring, and to collect and analyze hazardous air pollutant (HAP) samples. In addition, the program allows us to assist the Maricopa County Air Quality Compliance and Enforcement Division (MCAQCED) with the investigation and enforcement of air pollution control regulations.

In 2015, the mobile monitoring unit responded to air quality emergencies throughout Maricopa County such as heavy smoke from fires or toxic releases that threatened air quality (see Figure 14).

Figure 14. 2015 Jomax Fire

Superbowl 2015

On February 1, 2015, the Phoenix metropolitan area hosted the National Football League's (NFL) 49th Superbowl at the University of Phoenix (Cardinal) Stadium in Glendale. The MCAQD was involved with the planning of air monitoring for the public's safety and security. In 2015, activities primarily included monitoring for various air pollutants and/or toxics before, during, and after the Superbowl game as well as at NFL events occurring in downtown Phoenix. Figure 15 shows the mobile monitoring truck.

Figure 15. Mobile Monitoring Truck

Rapid Response Notification System (RRNS)

Maricopa County enjoys many days with clean air; however, there are days when PM_{10}, $PM_{2.5}$, or O_3 pollution levels approach or exceed the NAAQS. In particular, PM_{10} and $PM_{2.5}$ concentrations can build up quickly due to a high wind speed or a fire, respectively. Curtailing PM pollution from natural events is challenging; it requires advanced planning and implementation of control mechanisms to reduce the likelihood of an exceedance. However, anthropogenic activities that cause high PM concentrations near a site can often be addressed. If a quickly developing PM event is not addressed, it could result in a NAAQS exceedance that may have been avoidable.

To help reduce PM concentrations, the MCAQD implemented an automated alarm system that triggers email notifications and/or telephone calls to subscribers when concentrations of PM_{10} and $PM_{2.5}$ escalate. Subscribers include, but are not limited to: MCAQD's compliance and air monitoring personnel as well as industrial source representatives who can take action to reduce PM emissions caused by their work activities. The AirVision™ database is programmed to trigger alerts for elevated PM_{10} five-minute and hourly concentrations, and high $PM_{2.5}$ five-minute concentrations. Immediately following an hourly or five-minute PM concentration surpassing an assigned notification level, a high importance alert is sent out via email, text, and/or telephone to employees, stakeholders, and/or customers. In addition, Maricopa County enforces a "no burn restriction" when a $PM_{2.5}$ High Pollution Advisory (HPA) is issued by ADEQ.

The RRNS serves as a tool to manage high pollution events using a three-part system:

1. dissemination of as near real-time as possible air quality data to the community;
2. a notification system to alert MCAQD personnel, stakeholders, and customers of a pollution problem; and,
3. onsite response from department inspectors and stakeholders to identify and discourage pollution activity and to reduce the risk of pollution impacts.

The alerts requests that dust control permit holders inspect their sites as soon as possible and employ Best Available Control Measures to stabilize all disturbed soils to reduce blowing dust following the notification. The MCAQCED inspectors also review the data and current circumstances, make site visits, or take other appropriate actions to help stop PM concentrations from increasing. To better expedite response actions, meteorological data such as wind speed and direction are also available in five-minute increments.

There are little to no immediate actions that can be taken to reduce high concentrations of gaseous CPs. Currently, no RRNS triggers have been established for gaseous pollutants. In general, gaseous pollutant concentrations are decreased through planning and implementing long-term emission controls on sources. Depending on local sources of gaseous pollutants, it may be feasible to have a source stop operating at such times to reduce emissions. For instance, SO_2 is prone to spiking during certain industrial activities, and at such a time, temporarily shutting down an operation may be a viable control measure. Although a short-term increase or spike may occur for a particular gas, we rarely see them unless they are associated with out-of-the-ordinary activities near the site.

Emergency Response

The MCAQD is equipped to respond to certain air quality emergencies throughout Maricopa County upon request. In responding to emergencies, MCAQD has a wide variety of specialized equipment to assess air quality and meteorological conditions. These include several specially equipped trailers and a large self-powered van equipped with CP monitors and meteorological instruments. In addition, AMD has purchased several portable monitors, including a FTIR to monitor air toxics and an Area-Rae system to monitor chlorine and ammonia.

When emergencies such as fires, chemical spills, or pipeline breaches occur, the air in the surrounding community can be adversely affected. The fire department with jurisdiction over the area is the designated authority to respond and mitigate such incidents. Most, if not all of the fire departments serving the metropolitan area have hazmat units and are prepared to identify and monitor for toxic chemicals resulting from the incident. Typically, the fire department's mission is to monitor the air until the incident is under control, which may take several hours. The MCAQD's response is intended to provide monitoring of air quality impacts to sensitive receptors or facilities, e.g., schools, hospitals, etc., during and following an incident to ensure air quality impacts are understood and to inform public health messaging.

$PM_{2.5}$ Speciation Monitoring

Occasionally, the AMD operates $PM_{2.5}$ speciation monitors at certain monitoring sites. Sampling locations and duration vary from year-to-year, depending on prior data findings, current air monitoring needs, and resource availability. Speciation samples are used to identify select chemical components of $PM_{2.5}$, which may help to identify $PM_{2.5}$ sources as well. Speciation samples are usually collected from midnight-to-midnight using the Met One SuperSASS™ samplers. An EPA-contracted commercial laboratory that supports the Chemical Speciation Network (CSN) prepares the pre-exposed filter for sampling and analyzes the filter samples following collection.

In late 2015, we conducted a special study at the West Phoenix site and a temporary location in Laveen, AZ, approximately eight miles away to the south. These sites were chosen in an effort to quantify the sources of $PM_{2.5}$ from biomass combustion over the holiday season. West Phoenix is located in an older neighborhood that presumably has many wood-burning fireplaces and has a history of high $PM_{2.5}$ values on the holidays. The location chosen in Laveen is a newer neighborhood built after the adoption of county ordinances that ban the use of non-EPA certified fireplaces in new construction. We hope that by measuring the gradient between these two sites, supported by $PM_{2.5}$ monitors located in between, and analyzing the chemical species from samples at each site, we will be able to better clarify the amount of $PM_{2.5}$ emissions apportioned to non-EPA certified fireplaces. We also collaborated with ADEQ's Air Monitoring Unit, who supported the study by temporarily loaning us a SuperSASS™ and by collecting additional samples at JLG Supersite, which is an official CSN site. The period monitored is from late November to early January with a 1-in-3 day sample period, coinciding with the normal sample days of the CSN. This was supplemented with additional samples taken on Thanksgiving, Christmas, and New Year's Eve and Day. We also collected continuous $PM_{2.5}$ measurements at the new TT site to gain additional data as well.

Information Regarding Additional Air Monitoring within Maricopa County

The ADEQ operates its own air monitoring surveillance system within the State of Arizona, which includes the JLG Supersite in central Phoenix. The JLG Supersite is part of the national air monitoring surveillance system, and CP data are collected at this site. In addition, ADEQ collects air quality data for research programs at both the JLG Supersite and MCAQD's South Phoenix site. These research air monitors are primarily geared toward a variety of EPA-required air pollution trends research programs. Specifically, ADEQ performs air monitoring in Maricopa County for the Chemical Speciation Network (CSN), the Interagency Monitoring of Protected Visual Environments (IMPROVE), the National Air Toxics Trends Stations (NATTS), the National Core multi-pollutant monitoring stations (NCORE), the Photochemical Assessment Monitoring Stations (PAMS), the Urban Air Toxics Monitoring Program (UATMP). They also operate visibility cameras and meteorological monitors within the County. Occasionally, ADEQ may temporarily use other sites for special projects.

For more information about ADEQ's network, consult their annual network plan located on the ADEQ website.

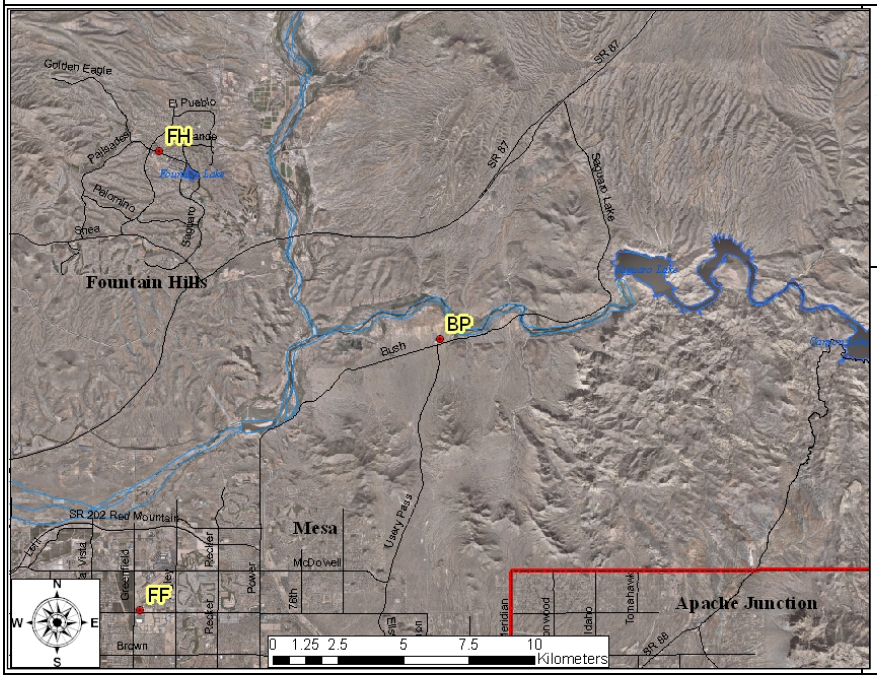
REFERENCES

1. eCFR Title 40, Parts 50, 53, and 58
2. EPA's AirData (AQS) information: http://www.epa.gov/airdata
3. EPA's NAAQS Info: https://www.epa.gov/criteria-air-pollutants/naaqs-table
4. SIP Information: http://www.azdeq.gov/environ/air/plan/index.html
5. EPA Region 9 Air Program Information: http://www.epa.gov/region9/air/index.html
6. Maricopa County Air Quality Map: http://alert.fcd.maricopa.gov/alert/Google/v3/air.html
7. AirNow: http://airnow.gov/
8. Criteria Pollutant Information: https://www.epa.gov/criteria-air-pollutants
9. Maricopa County Air Quality Department Prior Network Reviews: http://www.maricopa.gov/aq/divisions/monitoring/network.aspx
10. Arizona Department of Environmental Quality Natural and Exceptional Events Information: https://www.azdeq.gov/environ/air/plan/nee.html
11. Maricopa County Rule 310 – Fugitive Dust From Dust-Generating Operations document: https://www.maricopa.gov/aq/divisions/planning_analysis/rules/docs/310-1001.pdf
12. EPA Exceptional Events webpage: https://www.epa.gov/air-quality-analysis/treatment-data-influenced-exceptional-events
13. EPA OAQPS QA Webpage: https://www3.epa.gov/ttn/amtic/qalist.html

APPENDIX I –2015 AIR MONITORING DATA BY SITE

Site information includes photographs, site type and spatial scale, and population represented.

Blue Point (BP) (04-013-9702)



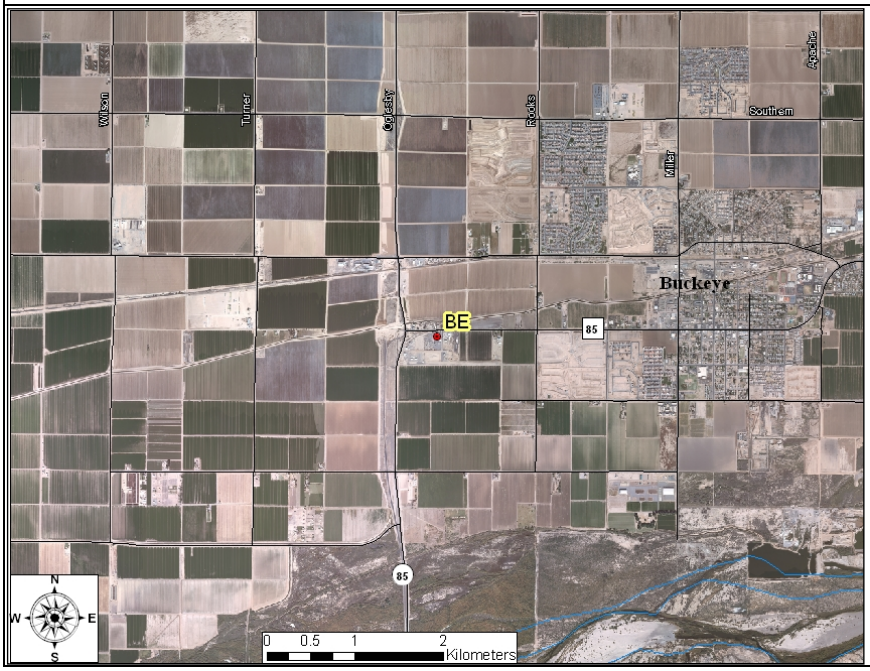
Location: Bush Highway & Usery Pass Rd., Maricopa County
Spatial Scale: Urban
Site Type: Max. Ozone Conc.

Site Description: The Blue Point site began operating in July 1995. It is located in a Maricopa County Sheriff's Sub-Station in Tonto National Forest. This site represents the maximum O_3 concentration and urban-scale downwind transport conditions. This site is located approximately 40 miles east of the Phoenix metropolitan area. This SLAMS location monitors for O_3. Meteorological monitors operating at this site include ambient temperature and wind speed/direction.

		2013	2014	2015
O_3	Max. 8-hr O_3 Avg. (ppm)	0.077*	0.088*	0.077*
	Number of O_3 Daily Exceedances (>0.075 ppm)	3	2	2
	3-year O_3 Avg. of 4th Highest Value (ppm)	0.077#	0.075	0.074

*Indicates an exceedance of the standard
#Indicates a violation of the standard

Buckeye (BE) (04-013-4011)



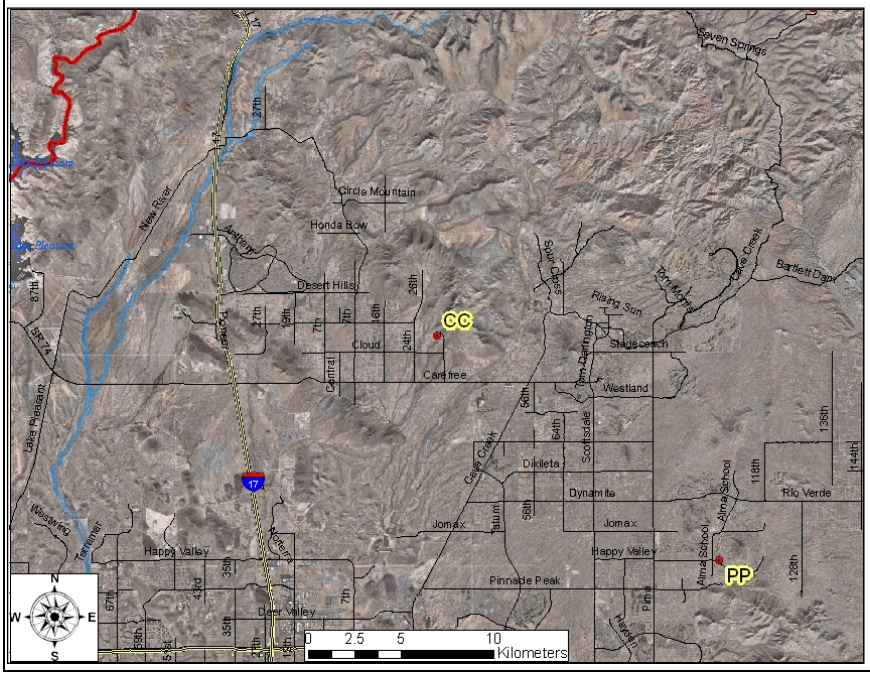
Site Location: US HWY. 85 & MC HWY. 85, Buckeye
Spatial Scale: Neighborhood & Urban (NO_2)
Site Type: Population Exposure

Site Description: The Buckeye site was established on August 1, 2004. The site is located in the Maricopa County Department of Transportation - Southwest Facility. The immediate area is agriculture and encroaching residential development. This SLAMS location monitors for CO seasonally, NO_2, O_3, and PM_{10}. Meteorological monitors operating at this site include ambient temperature, barometric pressure, relative humidity, and wind speed/direction.

		2013	2014	2015
CO	Max. 8-hr CO Avg. (ppm)	0.4	0.6	0.5
	Number of 8-hr CO Exceedances	0	0	0
NO_2	Annual NO_2 Avg. (ppb)	8.42	8.65	7.14
	NO_2 1-hr Avg. 98th Percentile (ppb)	40.0	37.0	34.0
O_3	Max. 8-hr O_3 Avg. (ppm)	0.062	0.068	0.064
	Number of O_3 Daily Exceedances (>0.075 ppm)	0	0	0
	3-year Avg. of O_3 4th Highest Value (ppm)	0.065	0.062	0.060
PM_{10}	Max. 24-hr PM_{10} Avg. (µg/m^3)	298*‡	271*‡	124
	Number of 24-hr PM_{10} Exceedances	2	2	0
	Annual PM_{10} Avg. (µg/m^3)	40.8	43.4	34.4

*Indicates an exceedance of the standard
‡Indicates EE at this site - listed value is the highest official current AQS reading.

Cave Creek (CC) (04-013-4008)



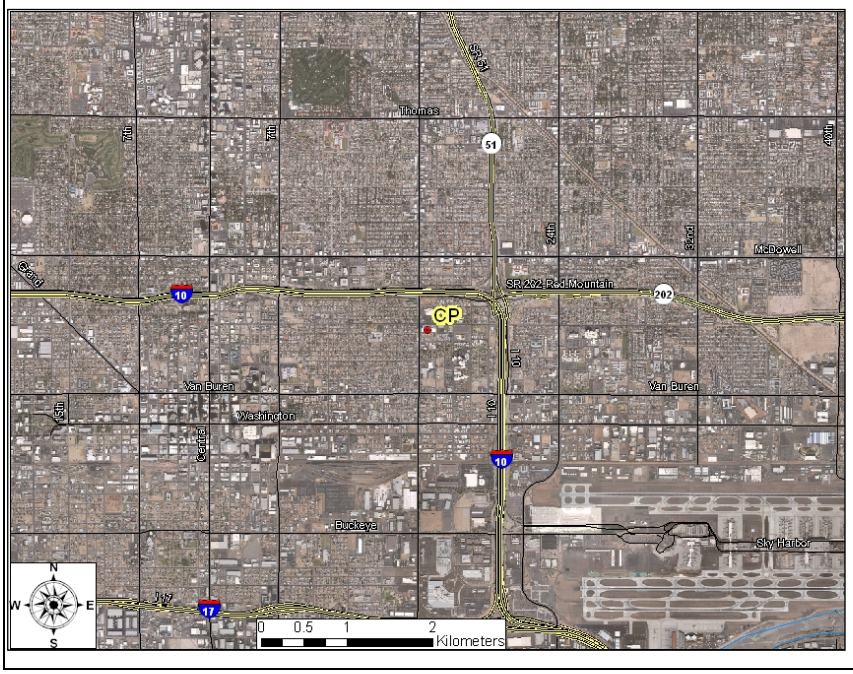
Site Location: 32nd St. & Carefree Hwy., Cave Creek
Spatial Scale: Urban
Site Type: Max. Ozone Conc.

Site Description: The Cave Creek site began operating in August 2001. It is located in the Maricopa County Cave Creek Recreation Area (Park Office). This site was chosen through discussions on modifying the O_3 network for the 2005 8-hr O_3 standard. This SLAMS location only monitors for O_3. Meteorological monitors operating at this site include ambient temperature, barometric pressure, rain, relative humidity, and wind speed/direction.

		2013	2014	2015
O_3	Max. 8-hr O_3 Avg. (ppm)	0.076*	0.081*	0.072
	Number of O_3 Daily Exceedances (>0.075 ppm)	1	2	0
	3-year average O_3 of 4th Highest Value (ppm)	0.077#	0.074	0.071

*Indicates an exceedance of the standard
#Indicates a violation of the standard

Central Phoenix (CP) (04-013-3002)



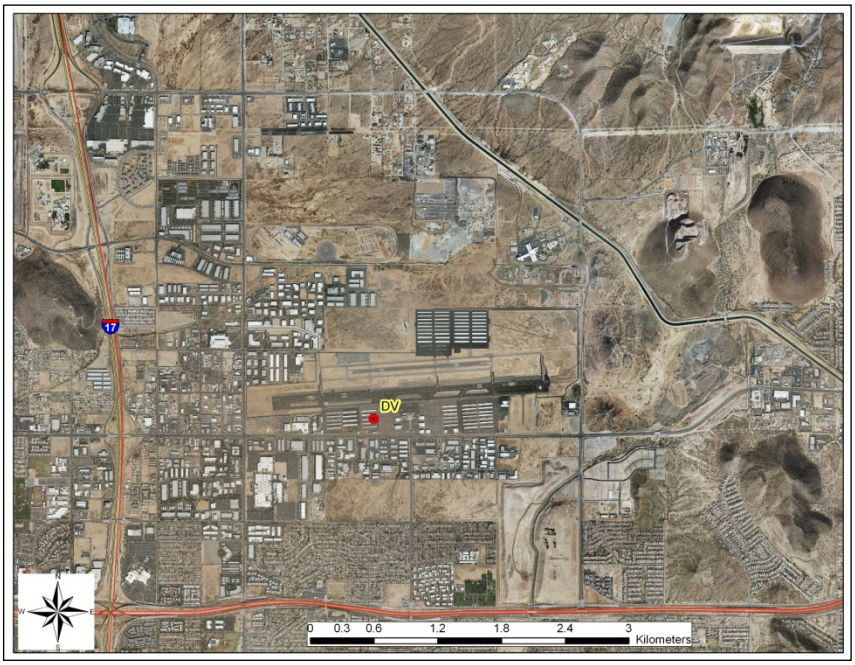
Site Location: 19th St. & Roosevelt St., Phoenix
Spatial Scale: Neighborhood
Site Type: Population Exposure (CO, O_3, and PM_{10}) and Highest Concentration (NO_2 and SO_2)

Site Description: The Central Phoenix site has been in existence for over four decades and has provided a long-term historical database with a high rate of data recovery. The site is representative of high population exposure (greater than 5000 people per square mile) in the central Phoenix area. This SLAMS location monitors for CO, PM_{10}, NO_2, O_3, and SO_2. Meteorological monitors operating at this site include ambient temperature, barometric pressure, and wind speed/direction.

		2013	2014	2015
CO	Max. 8-hr CO Avg. (ppm)	2.1	2.5	2.0
	Number of 8-hr CO Exceedances	0	0	0
NO_2	Annual NO_2 Avg. (ppb)	19.71	19.44	17.85
	NO_2 1-hour Average 98th Percentile (ppb)	60	60.0	59.0
O_3	Max. 8-hr O_3 Avg. (ppm)	0.079*	0.077*	0.075
	Number of O_3 Daily Exceedances (>0.075 ppm)	3	1	0
	3-year Avg. of O_3 4th Highest Value (ppm)	0.075	0.074	0.072
PM_{10}	Max. 24-hr PM_{10} Avg. (µg/m^3)	328*‡	182*‡	114
	Number of 24-hr PM_{10} Exceedances	2	1	0
	Annual PM_{10} Avg. (µg/m^3)	31.8	32.0	26.2
SO_2	SO_2 1-hour 99th Percentile (ppb)	8.0	7.0	7.0
	Number of SO_2 Exceedances	0	0	0
	Annual SO_2 Avg. (ppb)	1.19	1.28	1.04

*Indicates an exceedance of the standard
‡Indicates EEs at this site - listed value is the highest official current AQS reading.

Deer Valley (DV) (04-013-4018)

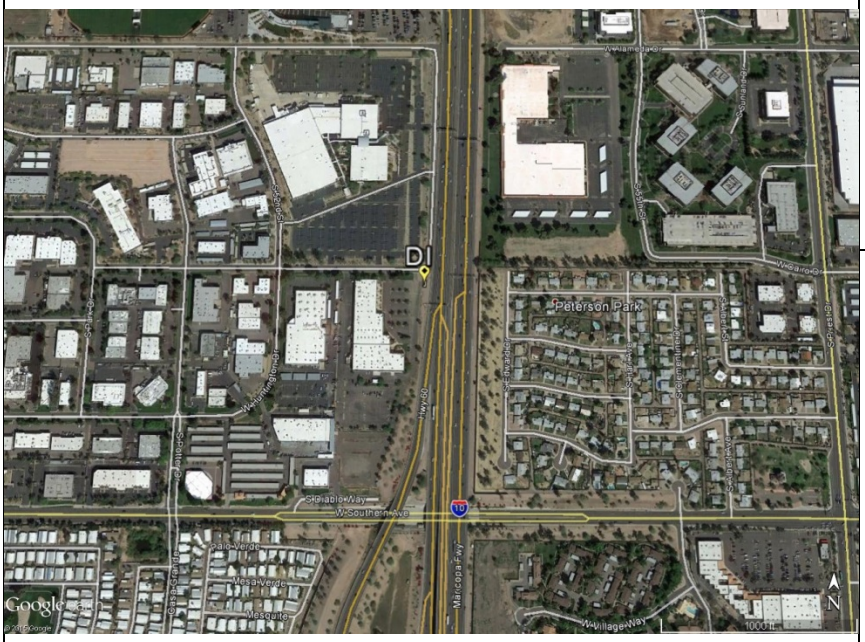


Site Location: 7th Ave. & Deer Valley Rd.
Spatial Scale: Middle
Site Type: Source-Oriented

Site Description: The Deer Valley site is located on the grounds of the Deer Valley Airport in north Phoenix. This site was started in July 2010, because changes in the Pb NAAQS necessitated that MCAQD begin Pb monitoring once again. All ambient Pb monitoring had been discontinued in 1997, because concentrations were consistently much lower than the NAAQS at that time. The source of Pb emissions is the general aviation fuels used in the propeller-driven aircraft, and Deer Valley Airport is one of the busiest general aviation airports in Maricopa County. This SLAMS location monitors for Pb only. Meteorological monitors operating at this site include ambient temperature, barometric pressure, relative humidity, and wind speed/direction.

		2013	2014	2015
Pb	Max. 24-hr Pb Avg. (µg/m^3)	0.071	0.087	0.104
	Number of Pb 24-hr Exceedances (>0.15µg/m^3)	0	0	0
	Pb Max.3-month Rolling Quarterly Average (µg/m^3)	0.04	0.05	0.05

Diablo (DI) (04-013-4019)



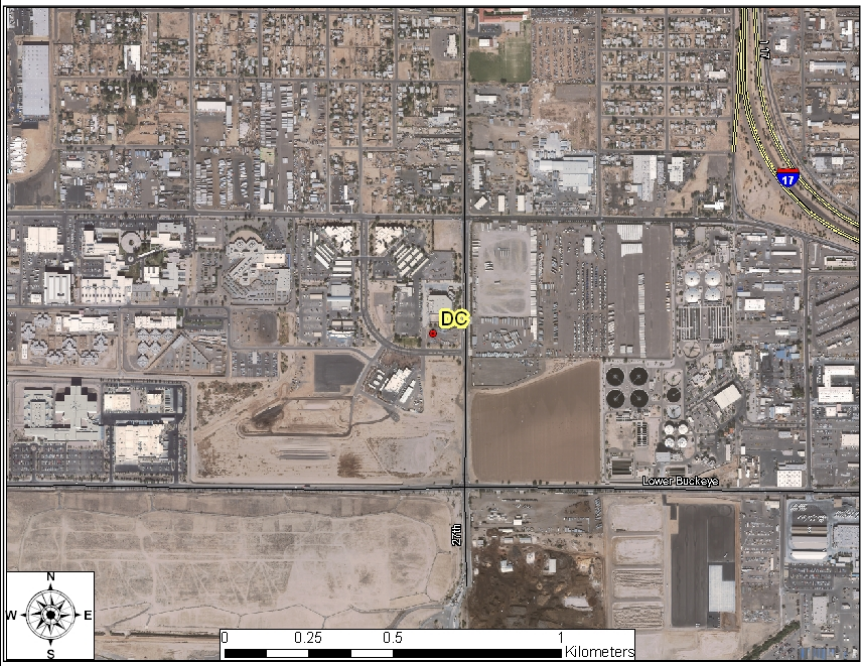
Site Location: Fairmont Dr. & Diablo Way
Spatial Scale: Micro
Site Type: Source-Oriented

Site Description: The Diablo site was the first near-road air monitoring site established by MCAQD on the west side of the I-10 highway just south of the Fairmont/Diablo Way intersection. There is a concrete barrier between the highway and the frontage road, offering safety, and we have erected a secure shelter for housing the monitoring instruments. In February 2014, we began reporting CO and NO_2 data, with $PM_{2.5}$ data soon following in May 2014. This SLAMS location monitors for CO, NO_2, and $PM_{2.5}$. Meteorological monitors operating at this site include ambient temperature, relative humidity, and wind speed/direction.

		2013	2014	2015
CO	Max. 8-hr CO Avg. (ppm)	N/A	1.4	1.6
	Number of 8-hr CO Exceedances		0	0
NO_2	Annual NO_2 Avg. (ppb)		20.83	21.41
	NO_2 1-hr Avg. 98th Percentile (ppb)		59.0	53.0
$PM_{2.5}$	Max. 24-hr $PM_{2.5}$ Avg. (µg/m^3)		29.2+	22.5
	Number of 24-hr $PM_{2.5}$ Exceedances		0	0
	Annual $PM_{2.5}$ Avg. (µg/m^3)		9.71+	7.86
	$PM_{2.5}$ 98th Percentile Value (µg/m^3)		21.4+	17.0

+Represents <75% of a data completeness due to May startup (238 daily observations in 2014)

Durango Complex (DC) (04-013-9812)



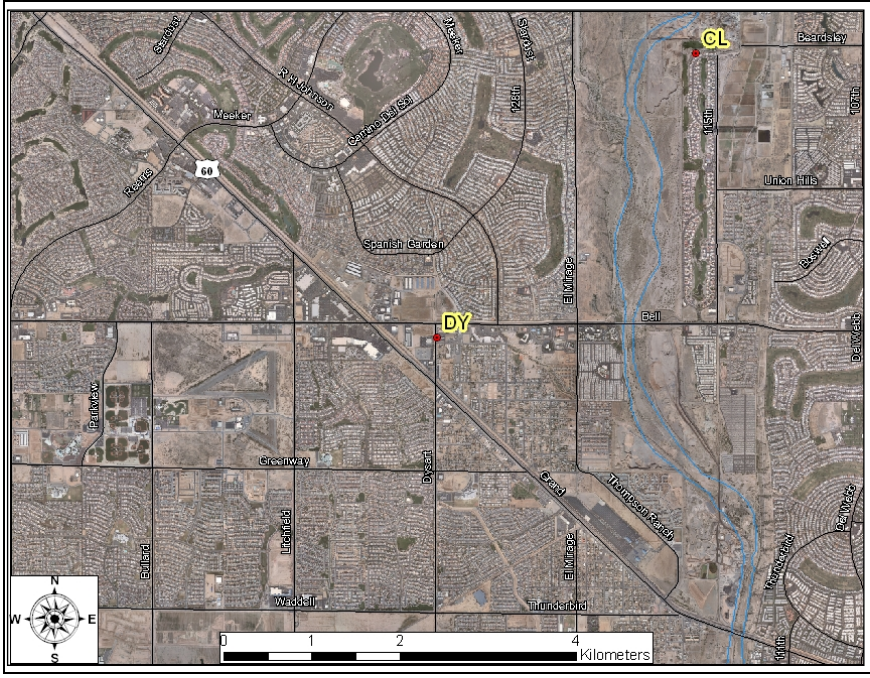
Site Location: 27th Ave & Durango St., Phoenix
Spatial Scale: Middle
Site Type: Highest Concentration

Site Description: This site is located in the Maricopa County Flood Control District storage yard. Monitoring began on January 6, 1999 with the intent to replace the old maximum highest concentration site. However, in 2000 the EPA determined that the site is not equivalent to that old site, which prompted the establishment of a new highest concentration site (West 43rd). This SLAMS location monitors for PM_{10}, $PM_{2.5}$, and SO_2. Meteorological monitors operating at this site include ambient temperature, barometric pressure, relative humidity, and wind speed/direction.

		2013	2014	2015
PM_{10}	Max. 24-hr PM_{10} Avg. ($\mu g/m^3$)	303*‡	172*‡	100
	Number of 24-hr PM_{10} Exceedances	4	2	0
	Annual PM_{10} Avg. ($\mu g/m^3$)	40.1	42.1	26.3
$PM_{2.5}$	Max. 24-hr $PM_{2.5}$ Avg. ($\mu g/m^3$)	66.9*	56.4*	32.4
	Number of $PM_{2.5}$ 24-hr Exceedances	3	1	0
	Annual $PM_{2.5}$ Avg. ($\mu g/m^3$)	10.54	10.12	8.97
	98th Percentile $PM_{2.5}$ Value ($\mu g/m^3$)	27.2	24.1	27.1
SO_2	SO_2 1-hour 99th Percentile (ppb)	9.0	8.0	9.0
	Number of SO_2 Exceedances	0	0	0
	Annual SO_2 Avg. (ppb)	1.15	0.87	1.04

*Indicates an exceedance of the standard
‡Indicates EEs at this site

Dysart (DY) (04-013-4010)



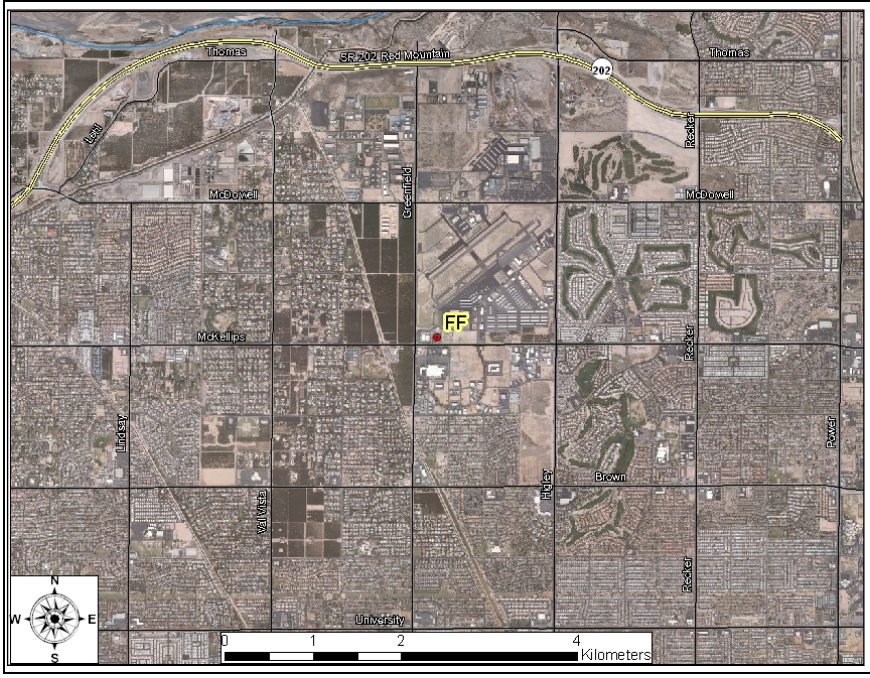
Site Location: Bell Rd. & Dysart Rd., Surprise
Spatial Scale: Neighborhood
Site Type: Population Exposure

Site Description: The Dysart site was established in July 2003. It is located at the Maricopa County Facility Maintenance Yard at the corner of Bell Rd. and Dysart Rd. The site is in a growing population area in the northwest valley. The land use around the site consists of subdivisions of single family homes, commercial, and industrial. The location is approximately one mile west of the Agua Fria riverbed. This SLAMS location monitors for CO seasonally, O_3, and PM_{10}. Meteorological monitors operating at this site include: ambient temperature, barometric pressure, relative humidity, and wind speed/direction.

		2013	2014	2015
CO	Max. 8-hr CO Avg. (ppm)	0.7	0.6	0.7
	Number of 8-hr CO Exceedances	0	0	0
O_3	Max. 8-hr O_3 Avg. (ppm)	0.075	0.075	0.069
	Number of Daily O_3 Exceedances (>0.075 ppm)	0	0	0
	3-year Avg. of O_3 4th Highest Value (ppm)	0.072	0.072	0.070
PM_{10}	Max. 24-hr PM_{10} Avg. (µg/m^3)	147	163*‡	99
	Number of 24-hr PM_{10} Exceedances	0	1	0
	Annual PM_{10} Avg. (µg/m^3)	24.9	26.7	22.4

*Indicates an exceedance of the standard
‡Indicates EEs at this site - listed value is the highest official current AQS reading.

Falcon Field (FF) (04-013-1010)



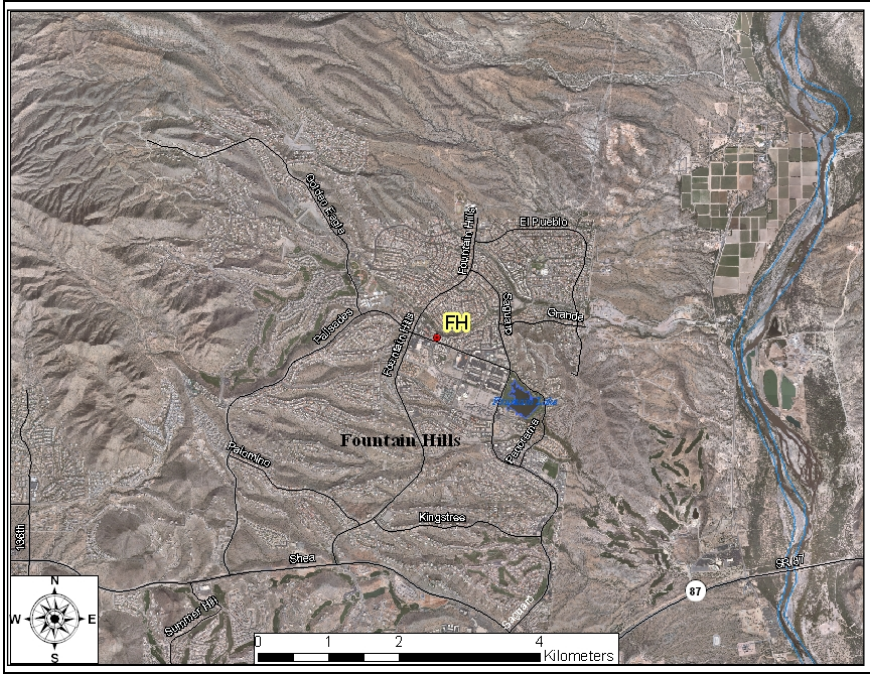
Site Location: Greenfield & McKellips Rd., Mesa
Spatial Scale: Neighborhood
Site Type: Population Exposure

Site Description: Monitoring began in June of 1989. The site is located at a fire station near an airfield within a growing residential area. This SLAMS location monitors for O_3 only. Meteorological monitors operating at this site include ambient temperature, relative humidity, and wind speed/direction.

		2013	2014	2015
O_3	Max. 8-hr O_3 Avg. (ppm)	0.082*	0.088*	0.084*
	Number of O_3 Daily Exceedances (>0.075 ppm)	5	4	3
	3-year Avg. of O_3 4th Highest Value (ppm)	0.072	0.074	0.075

*Indicates an exceedance of the standard

Fountain Hills (FH) (04-013-9704)



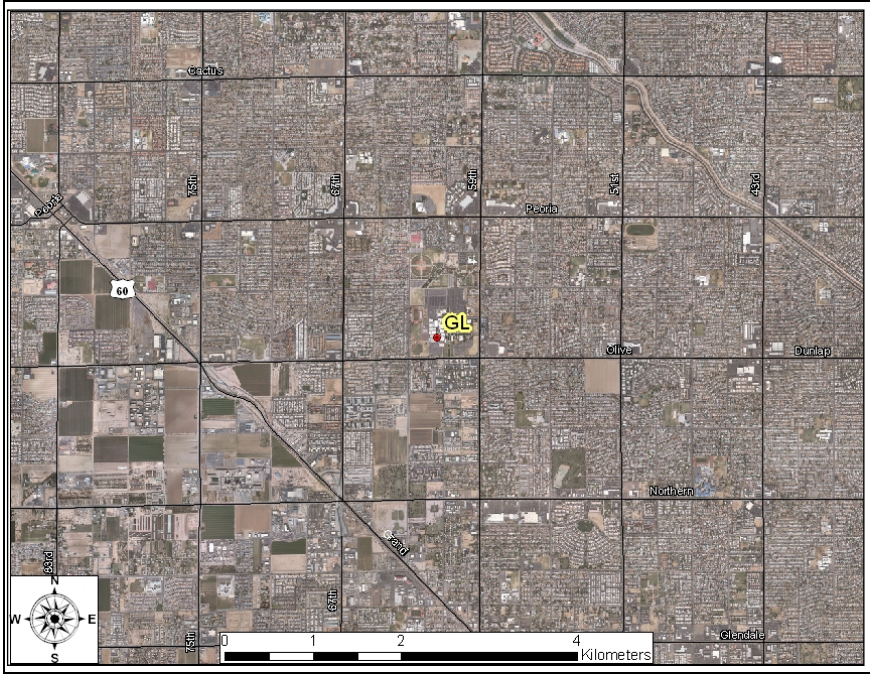
Site Location: Fountain Hills Blvd. & Palisades Blvd., Fountain Hills
Spatial Scale: Neighborhood
Site Type: Max. Ozone Conc.

Site Description: The site is located at a Fountain Hills fire station, and it became operational in April of 1996. The site is located approximately 15 miles downwind from the Phoenix metropolitan area and represents the high downwind O_3 concentrations on the fringes of the central basin district along the predominant summer/fall daytime wind direction. The site was shutdown from August 27, 2013 through May 14, 2014 for complex renovation. This SLAMS location monitors for O_3 only. Meteorological monitors operating at this site include ambient temperature, barometric pressure, relative humidity, and wind speed/direction.

		2013	2014	2015
O_3	Max. 8-hr O_3 Avg. (ppm)	0.072@	0.075@	0.075
	Number of O_3 Daily Exceedances (>0.075 ppm)	0	0	0
	3-year Avg. of O_3 4th Highest Value (ppm)	0.074@	0.071@	0.069

*Indicates an exceedance of the standard
#Indicates a violation of the standard
@ = <75% data completeness (223 valid daily observations in 2014)

Glendale (GL) (04-013-2001)



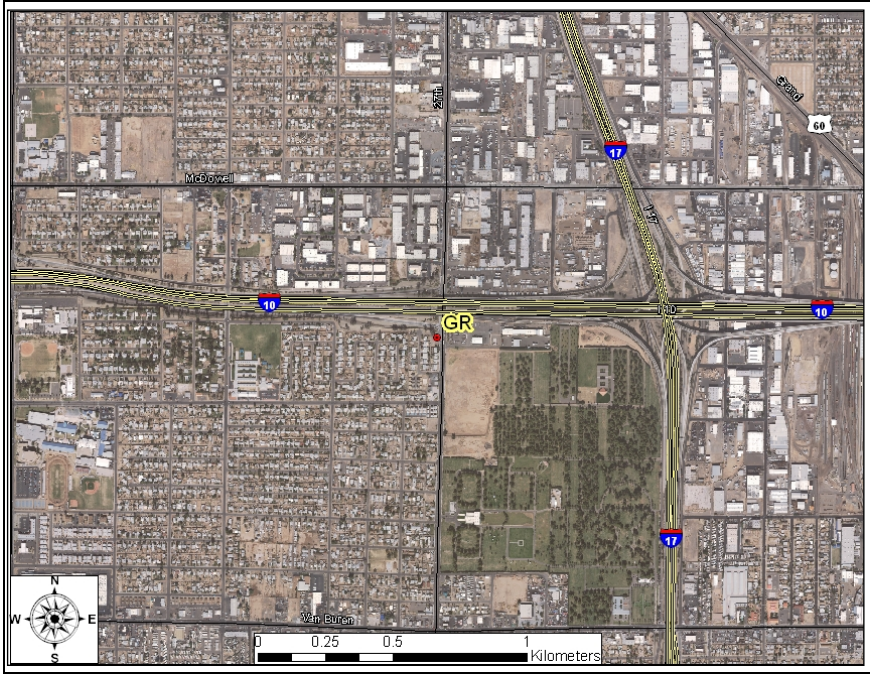
Site Location: 59th Ave. & Olive Ave., Glendale
Spatial Scale: Neighborhood
Site Type: Population Exposure

Site Description: The site is located on the grounds of Glendale Community College in a populous residential area. Homes, various strip malls, food establishments, and parks surround the site. This SLAMS location monitors for CO seasonally, O_3, PM_{10}, $PM_{2.5}$. Meteorological monitors operating at this site include ambient temperature, barometric pressure, relative humidity, and wind speed/direction.

		2013	2014	2015
CO	Max. 8-hr CO Avg. (ppm)	1.6	1.4	1.6
	Number of 8-hr CO Exceedances	0	0	0
O_3	Max. 8-hr O_3 Avg. (ppm)	0.077*	0.079*	0.071
	Number of O_3 Daily Exceedances (>0.075 ppm)	2	2	0
	3-year Avg. of O_3 4th Highest Value (ppm)	0.076#	0.074	0.070
PM_{10}	Max. 24-hr PM_{10} Avg. (µg/m^3)	210*‡	205*‡	78
	Number of 24-hr PM_{10} Exceedances	2	1	0
	Annual PM_{10} Avg. (µg/m^3)	27.5	27.4	18.3
$PM_{2.5}$	Max. 24-hr $PM_{2.5}$ Avg. (µg/m^3)	90.0*	50.0*	26.9
	Number of 24-hr $PM_{2.5}$ Exceedances	1	1	0
	Annual $PM_{2.5}$ Avg. (µg/m^3)	7.52	7.73	6.96
	$PM_{2.5}$ 98th Percentile Value (µg/m^3)	16.6	18.6	18.9

*Indicates an exceedance of the standard
#Indicates a violation of the standard
‡Indicates EEs at this site - listed value is the highest official current AQS reading.

Greenwood (GR) (04-013-3010)



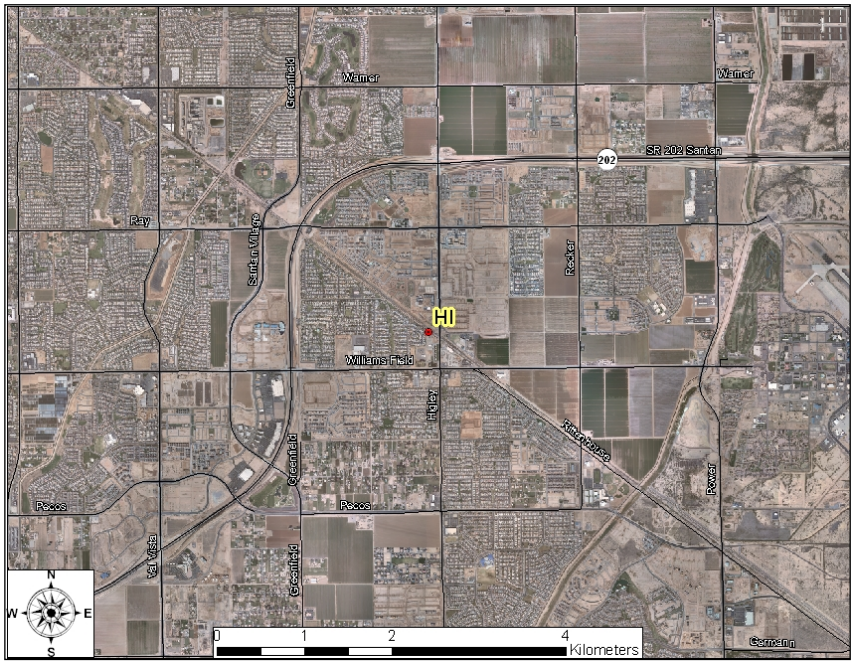
Site Location: 27th Ave. & I-10, Phoenix
Spatial Scale: Middle
Site Type: Population Exposure

Site Description: Monitoring began at this site in December 1993. The station is bordered by I-10, homes, and the Greenwood Cemetery. Interstate-17 is approximately one mile to the east of the site. This SLAMS location monitors for CO, NO_2, and PM_{10}. Meteorological monitors operating at this site include ambient temperature, barometric pressure, and wind speed/direction.

		2013	2014	2015
CO	Max. 8-hr CO Avg. (ppm)	2.5	2.6	2.4
	Number of 8-hr CO Exceedances	0	0	0
NO_2	Annual NO_2 Avg. (ppb)	24.58	24.55	21.91
	NO_2 1-hour Average 98th Percentile (ppb)	64.3	64.0	61.0
PM_{10}	Max. 24-hr PM_{10} Avg. (µg/m^3)	273*‡	208*‡	106
	Number of 24-hr PM_{10} Exceedances	3	2	0
	Annual PM_{10} Avg. (µg/m^3)	41.5	44.0	34.8

*Indicates an exceedance of the standard
‡Indicates EEs at this site - listed value is the highest official current AQS reading.

Higley (HI) (04-013-4006)



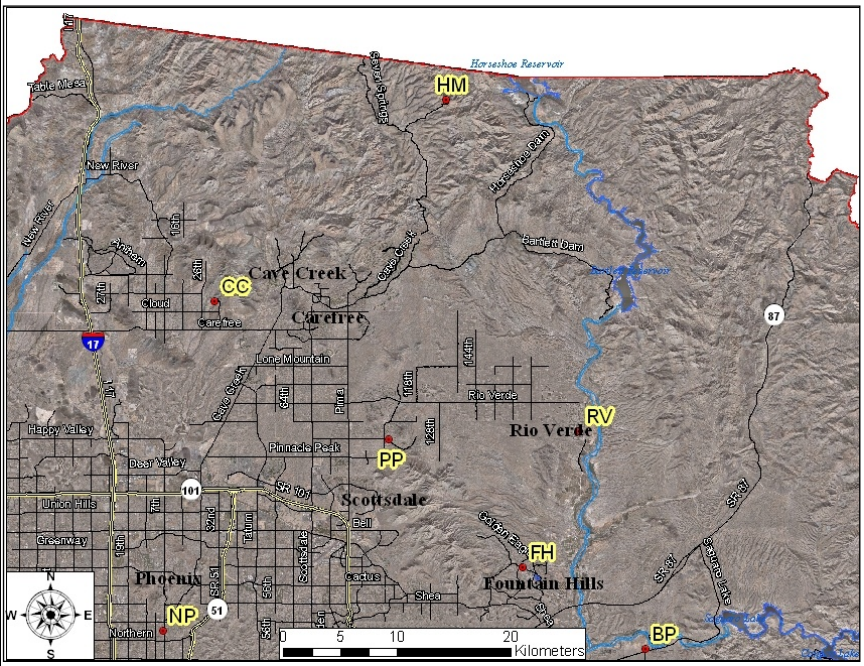
Site Location: Higley Rd. & Williams Field Rd., Gilbert
Spatial Scale: Neighborhood
Site Type: Population Exposure

Site Description: Originally, in 1994, ADEQ setup this site to monitor for background particulate concentrations near the urban limits of Maricopa County. Since then, urban expansion has enveloped the site, so it no longer serves its original intended purpose. The AMD has monitored for PM_{10} since the second quarter of 2000. This is a neighborhood scale station with a monitoring type of high population exposure. The Roosevelt Water District asked us to remove the site from their property by end 2014, because they could no longer house the station. The station was shutdown on November 4, 2014, prior to a new location being identified, and approved by EPA. The AMD plans to relocate the station to a nearby geographical area as soon as possible. This SLAMS location monitored for $PM_{10,}$ only. Meteorological monitors operating at this site included: ambient temperature, barometric pressure, and wind speed/direction.

		2013	2014	2015
PM_{10}	Max. 24-hr PM_{10} Avg. ($\mu g/m^3$)	211*‡	179*‡	Not Operating
	Number exceedances 24-hr PM_{10}	1	2	
	Annual PM_{10} Avg. ($\mu g/m^3$)	34.6	34.8	

*Indicates an exceedance of the standard
‡Indicates EEs at this site - listed value is the highest official current AQS reading

Humboldt Mountain (HM) (04-013-9508)



Site Location: Humboldt Mountain Summit
Spatial Scale: Regional
Site Type: Max. Ozone Conc.

Site Description: This site became operational in August 1995. The Humboldt Mountain site is located on Federal Aviation Agency property, in a National Forest Service building within the Tonto National Forest. This site is located approximately 40 miles north-northeast of the Phoenix metropolitan area at an elevation of 5190 feet. This SLAMS location monitors for O_3 only. Meteorological monitors operating at this site include ambient temperature and relative humidity.

		2013	2014	2015
O_3	Max. 8-hr O_3 Avg. (ppm)	0.078*	0.082*	0.076*
	Number of O_3 Daily Exceedances (>0.075 ppm)	1	3	1
	3-year Avg. of O_3 4th Highest Value (ppm)	0.076#	0.075	0.073

*Indicates an exceedance of the standard
#Indicates a violation of the standard

Mesa (ME) (04-013-1003)

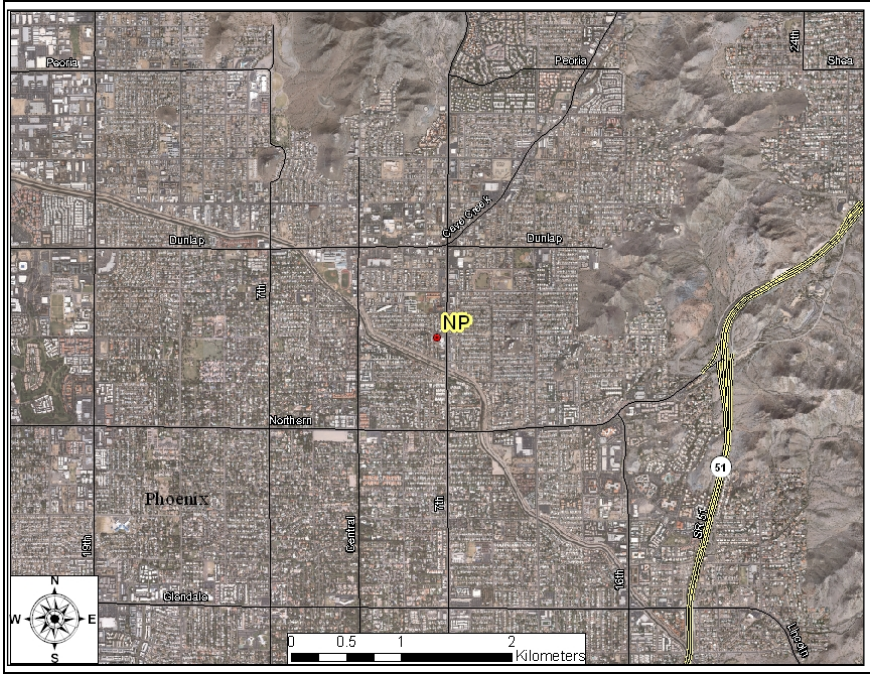
Site Location: Broadway Rd. & Brooks Ave., Mesa
Spatial Scale: Neighborhood
Site Type: Population Exposure

Site Description: This site is located at the City of Mesa - Brooks Reservoir, which is located in an area that contains residential, commercial, and industrial properties. In December 2012, following a ten-month site construction by the City of Mesa, the site began operation again with new continuous PM_{10}, $PM_{2.5,}$ and O_3 monitors. This SLAMS location monitors for CO seasonally, O_3, PM_{10}, and $PM_{2.5}$. Meteorological monitors operating at this site include ambient temperature, barometric pressure, relative humidity, and wind speed/direction.

		2013	2014	2015
CO	Max. 8-hr CO Avg. (ppm)	1.2	4.2	1.5
	Number of 8-hr CO Exceedances	0	0	0
O_3	Max. 8-hr O_3 Avg. (ppm)	0.086*	0.086*	0.082*
	Number of O_3 Daily Exceedances (>0.075 ppm)	6	6	4
	3-year Avg. of O_3 4th Highest Value (ppm)	NA	NA	0.078
PM_{10}	Max. 24-hr PM_{10} Avg. (µg/m^3)	151	155*‡	66
	Number of 24-hr PM_{10} Exceedances	0	1	0
	Annual PM_{10} Avg. (µg/m^3)	28.8	30.4	17.2
$PM_{2.5}$	Max. 24-hr $PM_{2.5}$ Avg. (µg/m^3)	(31.9)	33.9	23.2
	Number of 24-hr $PM_{2.5}$ Exceedances	0	0	0
	Annual $PM_{2.5}$ Avg. (µg/m^3)	(5.69)	8.02	6.68
	$PM_{2.5}$ 98th Percentile Value (µg/m^3)	(12.8)	20.3	16.6

*Indicates an exceedance of the standard
‡Indicates EEs at this site - listed value is the highest official current AQS reading.

North Phoenix (NP) (04-013-1004)



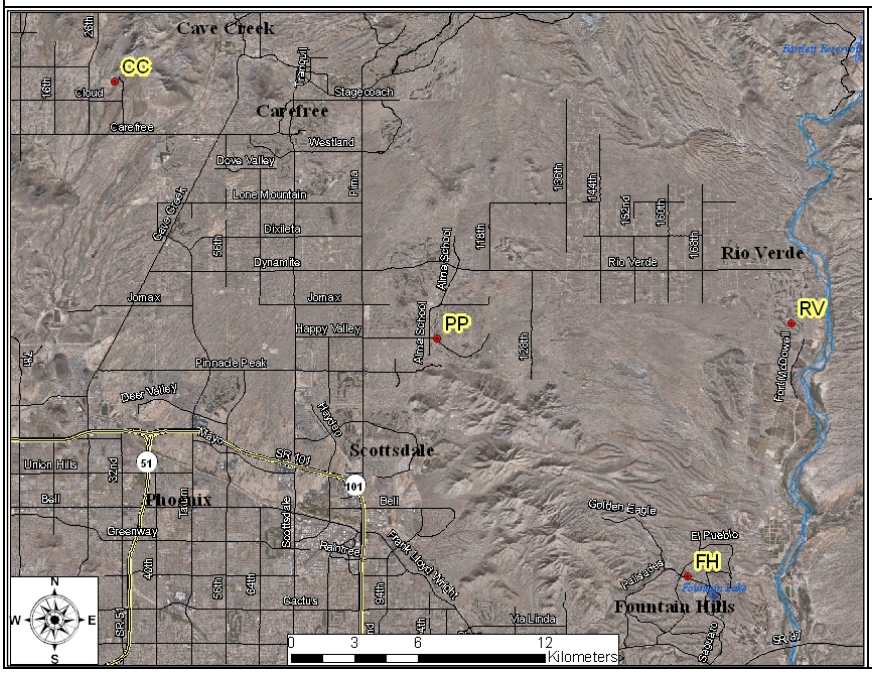
Site Location: 7th St. & Butler Ave., Phoenix
Spatial Scale: Neighborhood
Site Type: Population Exposure

Site Description: This site is located in the Sunnyslope area of North Phoenix. The site is surrounded by residential and commercial properties. This SLAMS location monitors for CO seasonally, O_3, and PM_{10}, $PM_{2.5}$. Meteorological monitors operating at this site include ambient temperature, delta T (temperature inversion), barometric pressure, solar radiation, and wind speed/direction.

		2013	2014	2015
CO	Max. 8-hr CO Avg. (ppm)	1.3	1.4	1.4
	Number of 8-hr CO Exceedances	0	0	0
O_3	Max. 8-hr O_3 Avg. (ppm)	0.080*	0.082*	0.078*
	Number of O_3 Daily Exceedances (>0.075 ppm)	7	6	2
	3-year Avg. of 4th Highest Value (ppm)	0.081#	0.080#	0.077#
PM_{10}	Max. 24-hr PM_{10} Avg. (µg/m^3)	151	199*‡	79
	Number of 24-hr PM_{10} Exceedances	0	1	0
	Annual PM_{10} Avg. (µg/m^3)	28.8	27.9	18.5
$PM_{2.5}$	Max. 24-hr $PM_{2.5}$ Avg. (µg/m^3)	57.3*	33.9	21.4
	Number of 24-hr $PM_{2.5}$ Exceedances	1	0	0
	Annual $PM_{2.5}$ Avg. (µg/m^3)	8.00	8.02	6.73
	$PM_{2.5}$ 98th Percentile Value (µg/m^3)	17.2	20.3	17.8

*Indicates an exceedance of the standard
#Indicates a violation of the standard
‡Indicates EEs at this site - listed value is the highest official current AQS reading.

Pinnacle Peak (PP) (04-013-2005)



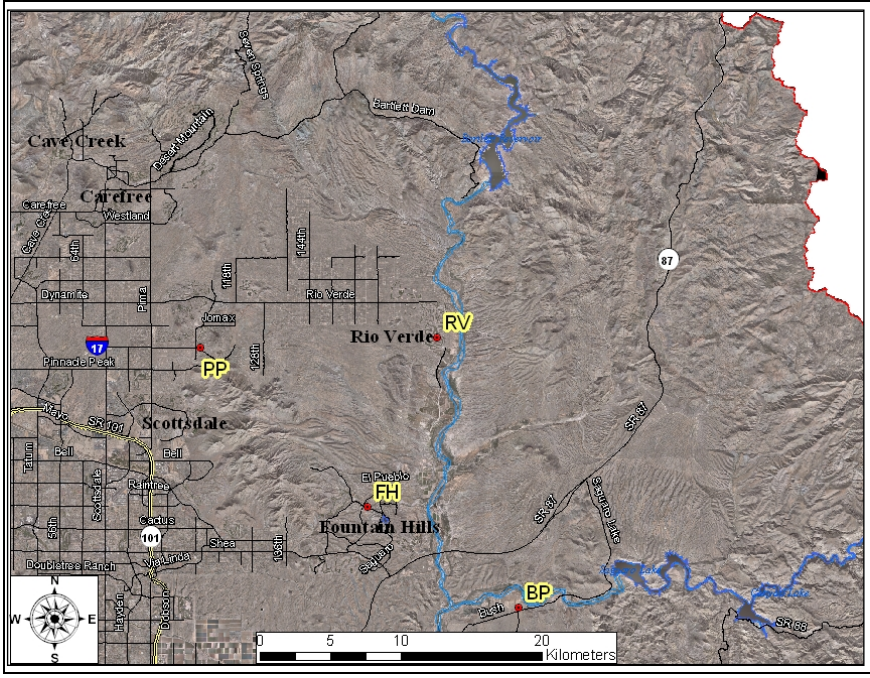
Site Location: Alma School & Happy Valley Rd., Scottsdale
Spatial Scale: Urban
Site Type: Max. Ozone Conc.

Site Description: The site is located in a geographic area of low-density population (less than 2500 people per square mile). In the current and previous years, O_3 exceedances have been recorded due to transport of O_3 and precursors from more urbanized areas of metropolitan Phoenix. This SLAMS location monitors for O_3 only. Meteorological monitors operating at this site include ambient temperature, barometric pressure, relative humidity, and wind speed/direction.

		2013	2014	2015
O_3	Max. 8-hr O_3 Avg. (ppm)	0.080*	0.088*	0.083*
	Number of O_3 Daily Exceedances (>0.075 ppm)	5	6	4
	3-year Avg. of O_3 4th Highest Value (ppm)	0.077#	0.078#	0.078#

*****Indicates an exceedance of the standard
#Indicates a violation of the standard

Rio Verde (RV) (04-013-9706)



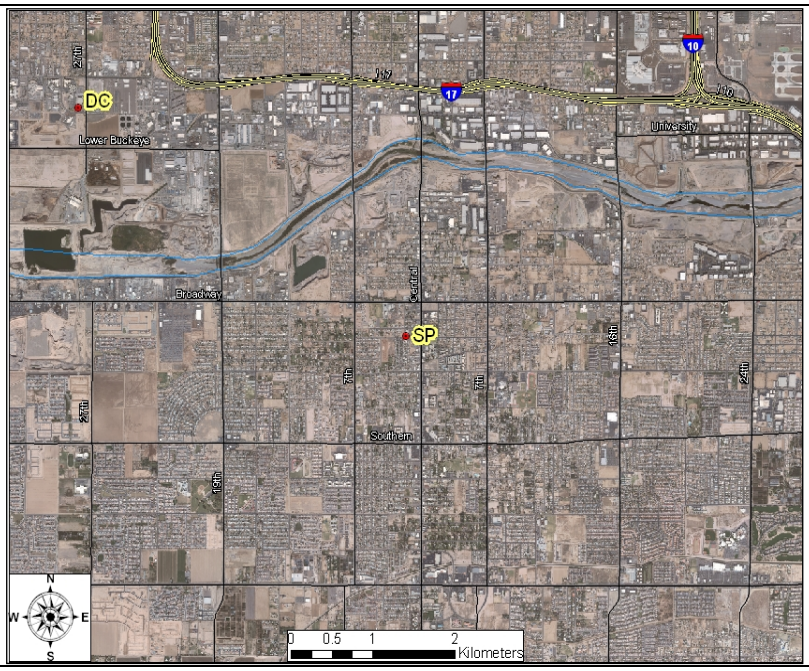
Site Location: Forest Rd. & Del Ray Ave., Rio Verde
Spatial Scale: Urban
Site Type: Max. Ozone Conc.

Site Description: This site has been in operation since the spring of 1997. The monitor is located at the fire station / County Sheriff's Office Sub-Station located in a residential area surrounded by the desert of Tonto National Forest. The site is on the edge of a Class I Wilderness Area. This SLAMS location monitors for O_3 only. No meteorological monitors operate at this site.

		2013	2014	2015
O_3	Max. 8-hr O_3 Avg. (ppm)	0.074	0.085*	0.070
	Number of O_3 Daily Exceedances (>0.075 ppm)	0	2	0
	3-year Avg. of O_3 4th Highest Value (ppm)	0.075	0.072	0.071

*****Indicates an exceedance of the standard

South Phoenix (SP) (04-013-4003)



Site Location: Central Ave. & Broadway Rd., Phoenix
Spatial Scale: Neighborhood
Site Type: Population Exposure

Site Description: The site has operated at its current location since October 1999. The site borders a mixture of high population density residential and commercial properties. This SLAMS location monitors for CO seasonally, O_3, PM_{10}, and $PM_{2.5}$. Meteorological monitors operating at this site include ambient temperature, barometric pressure, relative humidity, and wind speed/direction.

		2013	2014	2015
CO	Max. 8-hr CO Avg. (ppm)	2.3	2.0	2.1
	Number of 8-hr CO Exceedances	0	0	0
O_3	Max. 8-hr O_3 Avg. (ppm)	0.081*	0.080*	0.073
	Number of O_3 Daily Exceedances (>0.075 ppm)	3	2	0
	3-year Avg. of O_3 4th Highest Value (ppm)	0.076#	0.075	0.072
PM_{10}	Max. 24-hr PM_{10} Avg. (µg/m^3)	294*‡	170*‡	86
	Number of 24-hr PM_{10} Exceedances	2	3	0
	Annual PM_{10} Avg. (µg/m^3)	38.6	40.6	25.5
$PM_{2.5}$	Max. 24-hr $PM_{2.5}$ Avg. (µg/m^3)	97.3*	101.7*	44.6
	Number of 24-hr $PM_{2.5}$ Exceedances	4	1	2
	Annual $PM_{2.5}$ Avg. (µg/m^3)	9.59	10.27	8.99
	$PM_{2.5}$ 98th Percentile value (µg/m^3)	25.8	26.5	27.7

*Indicates an exceedance of the standard
#Indicates a violation of the standard
‡Indicates EEs at this site

South Scottsdale (SS) (04-013-3003)

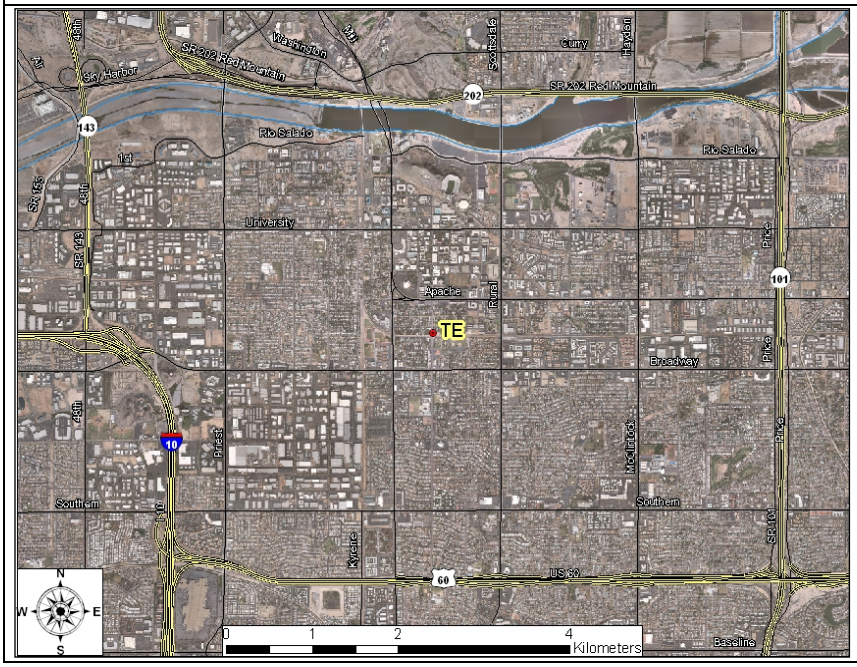
Site Location: Thomas Rd. & Miller Rd., Scottsdale
Spatial Scale: Neighborhood
Site Type: Population Exposure

Site Description: The South Scottsdale site is located at a City of Scottsdale fire station. The area surrounding the site is residential with a density of 2500 to 5000 persons per square mile. Previously, SO_2 was monitored here, but was discontinued in 2010 due to extremely low values being recorded. The SO_2 monitor was moved to the DC site, which is closer to SO_2 point sources. In addition, NO_2 was monitored here, but this was discontinued in 2011. The last year for reporting NO_2 data in the ANMP was 2014. This SLAMS location monitors for CO seasonally, O_3, and PM_{10}. Meteorological monitors operating at this site include ambient temperature, barometric pressure, relative humidity, and wind speed/direction.

		2013	2014	2015
CO	Max. 8-hr CO Avg. (ppm)	1.4	1.4	1.4
	Number of 8-hr CO Exceedances	0	0	0
O_3	Max. 8-hr O_3 Avg. (ppm)	0.079*	0.078*	0.074
	Number of O_3 Daily Exceedances (>0.075 ppm)	2	1	0
	3-year Avg. of O_3 4th Highest Value (ppm)	0.076#	0.075	0.071
PM_{10}	Max. 24-hr PM_{10} Avg. (µg/m^3)	195*‡	193*‡	86
	Number of 24-hr PM_{10} Exceedances	1	2	0
	Annual PM_{10} Avg. (µg/m^3)	26.0	31.0	24.1

*Indicates an exceedance of the standard
#Indicates a violation of the standard
‡Indicates EEs at this site

Tempe (TE) (04-013-4005)



Site Location: Apache Blvd. & College Ave., Tempe
Spatial Scale: Neighborhood
Site Type: Population Exposure

Site Description: The site began operating in 2000 and it is located near the ASU Tempe Campus. The site is surrounded by residential homes, some high-density residential properties, and a railroad track. In spring 2015, the site was temporarily shutdown due to the owner, Arizona Public Service – a power provider, needing to make infrastructure upgrades to the site. This SLAMS location monitors for CO seasonally, O_3, PM_{10}, and $PM_{2.5}$. Meteorological monitors operating at this site include ambient temperature, delta T (temperature inversion), rain, and wind speed/direction.

		2013	2014	2015
CO	Max. 8-hr CO Avg. (ppm)	1.3	1.4	1.4
	Number of 8-hr CO Exceedances	0	0	0
O_3	Max. 8-hr O_3 Avg. (ppm)	0.077*	0.077*	0.055
	Number of O_3 Daily Exceedances (>0.075 ppm)	1	1	0
	3-year Avg. of O_3 4th Highest Value (ppm)	0.071	0.071	0.064
PM_{10}	Max. 24-hr PM_{10} Avg. (µg/m^3)	227*‡	175*‡	52
	Number of 24-hr PM_{10} Exceedances	1	1	0
	Annual PM_{10} Avg. (µg/m^3)	28.3	28.7	18.4
$PM_{2.5}$	Max. 24-hr $PM_{2.5}$ Avg. (µg/m^3)	51.1*	44.0*	19.1
	Number of 24-hr $PM_{2.5}$ Exceedances	1	1	0
	Annual $PM_{2.5}$ Avg. (µg/m^3)	8.69	8.63	8.88
	$PM_{2.5}$ 98th Percentile Value (µg/m^3)	17.9	17.4	16.9

*****Indicates an exceedance of standard
‡Indicates EEs at this site

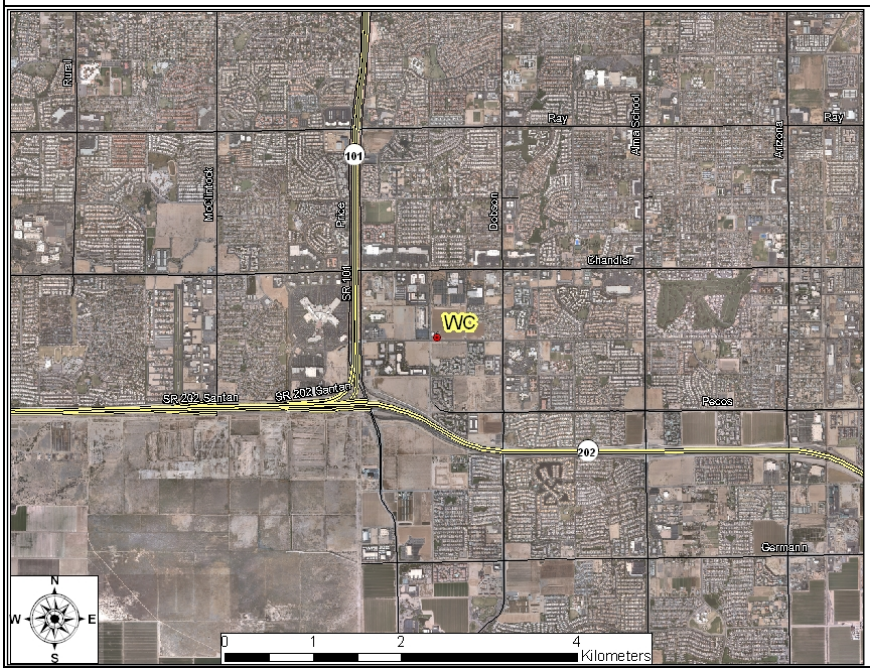
Thirty-Third (TT) (04-013-4020)

Site Location: Interstate-10 & 33rd Ave., Phoenix
Spatial Scale: Neighborhood
Site Type: Source-Oriented

Site Description: The Thirty-Third site was the second near-road air monitoring site established by MCAQD on the south side of the I-10 highway just east of 33rd Avenue. The site is oriented east-west and is located about three meters (midway) downslope from 33rd Avenue toward the I-10. It is assessable from the frontage road, offering safety, and we have erected a secure shelter for housing the monitoring instruments. In September 2015, we began reporting CO, NO_2, and $PM_{2.5}$ data. The only SLAMS monitor is NO_2; the CO and $PM_{2.5}$ were SPMs. The SPMs collected CO and PM2.5 data from September through March 2016 to support the wintertime speciation study. Meteorological monitors operating at this site include ambient temperature and wind speed/direction.

		2013	2014	2015
CO	Max. 8-hr CO Avg. (ppm)	N/A	N/A	2.8
	Number of 8-hr CO Exceedances			0
NO_2	Annual NO_2 Avg. (ppb)			31.86
	NO_2 1-hr 98th Percentile Avg. (ppb)			64.0
$PM_{2.5}$	Max. 24-hr $PM_{2.5}$ Avg. (µg/m^3)			35.3
	Number of 24-hr $PM_{2.5}$ Exceedances			0
	Annual $PM_{2.5}$ Avg. (µg/m^3)			10.48
	$PM_{2.5}$ 98th Percentile Value (µg/m^3)			34.0

West Chandler (WC) (04-013-4004)



Site Location: Frye Rd. & Ellis St., Chandler
Spatial Scale: Neighborhood (CO and O_3), Middle (PM_{10})
Site Type: Population Exposure

Site Description: This site was established in January 1995. Wide ranges of land uses surround the site including residential, agriculture, and heavy industry (semiconductor manufacturing plants and liquid air storage). This SLAMS location monitors for CO seasonally, O_3, and PM_{10}. Meteorological monitors operating at this site include ambient temperature, barometric pressure, relative humidity, and wind speed/direction.

		2013	2014	2015
CO	Max. 8-hr CO Avg. (ppm)	1.3	1.7	1.6
	Number of 8-hr CO Exceedances	0	0	0
O_3	Max. 8-hr O_3 Avg. (ppm)	0.081*	0.074	0.072
	Number of O_3 Daily Exceedances (>0.075 ppm)	1	0	0
	3-year Avg. of the O_3 4th Highest Value (ppm)	0.072	0.071	0.070
PM_{10}	Max. 24-hr PM_{10} Avg. (µg/m^3)	234*‡	163*‡	121
	Number of 24-hr PM_{10} Exceedances	3	1	0
	Annual PM_{10} Avg. (µg/m^3)	28.5	29.3	23.7

*Indicates an exceedance of the standard
‡Indicates EEs at this site

West 43rd Avenue (WF) (04-013-4009)

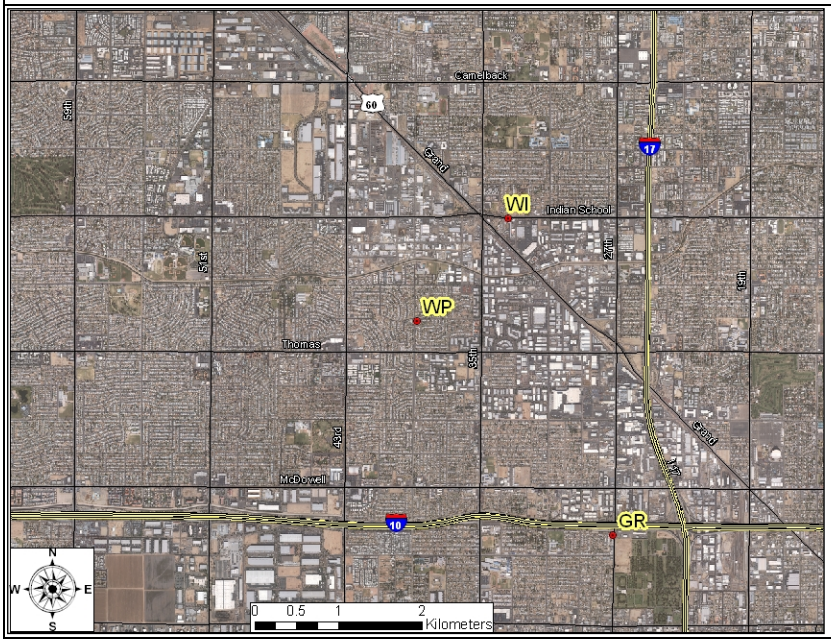
Site Location: 43rd Ave. & Broadway Rd., Phoenix
Spatial Scale: Middle
Site Type: Highest Concentration

Site Description: Monitoring began at the site in the 2nd quarter of 2002. This site is located at a Maricopa County Department of Transportation storage lot and is surrounded by a combination of heavy industry and residential homes. The main purpose of the site is to measure maximum PM_{10} concentration. The sources around the site include sand and gravel operations, automobile and metal recycling facilities, landfills, paved and unpaved haul roads, and cement casting. This SLAMS location monitors for PM_{10}. Meteorological monitors operating at this site include ambient temperature, barometric pressure, delta T (temperature inversion), and wind speed/direction.

		2013	2014	2015
PM_{10}	Max. 24-hr PM_{10} Avg. ($\mu g/m^3$)	301*‡	171*‡	132
	Number of 24-hr PM_{10} Exceedances	4	1	0
	Annual PM_{10} Avg. ($\mu g/m^3$)	42.5	45.9	36.5

*Indicates an exceedance of the standard
‡Indicates EEs at this site

West Phoenix (WP) (04-013-0019)



Site Location: 39th Ave. & Earll Dr., Phoenix
Spatial Scale: Neighborhood
Site Type: Population Exposure (CO, NO_2, O_3, PM_{10}), Highest Concentration ($PM_{2.5}$)

Site Description: This site has been operational since 1984. The spatial scale for the West Phoenix site is Neighborhood. It is located in an area of stable, high-density residential properties. This SLAMS location monitors for CO, NO_2, O_3, PM_{10}, and $PM_{2.5}$. In addition, this is a QA collocation site for $PM_{2.5}$ where the MCAQD operates one filter-based $PM_{2.5}$ FRM sampler along with one continuous $PM_{2.5}$ FEM analyzer as per *40 CFR Part 58 Appendix A.* Meteorological monitors operating at this site include ambient temperature, barometric pressure, delta T (temperature inversion), and wind speed/direction.

		2013	2014	2015
CO	Max. 8-hr CO Avg. (ppm)	2.7	4.2	2.8
	Number exceedances 8-hr CO	0	0	0
NO_2	Annual NO_2 Avg. (ppb)	17.97	17.97	16.39
	NO_2 1-hr Avg. 98th Percentile (ppb)	69.0	57.0	55.0
O_3	Max. 8-hr O_3 Avg. (ppm)	0.083*	0.079*	0.076*
	Number of O_3 Daily Exceedances (>0.075 ppm)	4	4	2
	O_3 3-year Avg. of 4th High (ppm)	0.079#	0.078#	0.075
PM_{10}	Max. 24-hr PM_{10} Avg. (µg/m^3)	255*‡	210*‡	72
	Number of 24-hr PM_{10} Exceedances	2	2	0
	Annual PM_{10} Avg. (µg/m^3)	35.7	38.8	23.2
$PM_{2.5}$	Max. 24-hr $PM_{2.5}$ Avg. (µg/m^3)	76.0* (53.0*)	170.7*	40.5
	Number of 24-hr $PM_{2.5}$ Exceedances	1 (3)	3	2
	Annual $PM_{2.5}$ Avg. (µg/m^3)	10.16 (10.57)	11.13	8.6
	$PM_{2.5}$ 98th Percentile Value	28.0	28.9	27.5

*Indicates an exceedance of the standard
#Indicates a violation of the standard
‡Indicates EEs at this site - listed value is the highest official current AQS reading.
NOTE: For 2013, the first value is from the filter-based monitor; second value shown in parenthesis is from continuous monitor.

Zuni Hills (ZH) (04-013-4016)

Site Location: 109th Ave. & Deer Valley Rd., Phoenix
Spatial Scale: Neighborhood
Site Type: Population Exposure

Site Description: This site opened in December 2009 and is located on the campus of the Zuni Hills Elementary School, which is approximately 1.7 miles to the northeast from the now closed Coyote Lakes monitor. Coyote Lakes was a source-oriented, middle-scale PM_{10} site that was situated in the Agua Fria River bottom adjacent to sand and gravel mines. Zuni Hills replaced this with a population-oriented, neighborhood-scale site that is situated on the higher-elevation riverbank. This site will theoretically be able to represent the air quality for a larger area and a greater number of people. The site was temporarily shutdown for construction occurring in the area June 2014 - August 2014. This SLAMS location monitors for PM_{10}, only. Meteorological monitors operating at this site include ambient temperature and wind speed/direction.

		2013	2014	2015
PM_{10}	Max. 24-hr PM_{10} Avg.(µg/m^3)	165*‡	166*‡	81
	Number of 24-hr PM_{10} Exceedances	1	1	0
	Annual PM_{10} Avg.(µg/m^3)	23.5	24.0	21.5

*Indicates an exceedance of the standard
‡Indicates EEs at this site - listed value is the highest official current AQS reading.

APPENDIX II - EPA-REQUIRED SITE METADATA

Detailed information includes compliance information regarding air monitoring technical specifications found in *40 CFR §58.10 and Appendices A, C, D, and E*
(QA, monitoring methods, network design, and monitor siting)

Required General Statement Regarding Changes to the $PM_{2.5}$ Network

In the event the department needed to move or change a violating $PM_{2.5}$ monitor, this procedure would be followed. The department would hold a public hearing regarding the requested change. Details and documentation of the requested change, as well as all public comments, would then be forwarded to the EPA R9 for approval. Any action on the department's part will be dependent on EPA R9 approval.

Please note that the previous statement is general in nature and required in this annual network review by *40 CFR Part 58*. The department does not currently have any violating $PM_{2.5}$ monitors, nor does it have any proposals to move any $PM_{2.5}$ monitors.

Appendix II Site Schematic Descriptions

Analysis Method (filter samples only) refers to the method used to process and analyze PM and Pb filter samples.

Distance from Supporting Structure refers to those sample probes that are attached to a supporting structure, such as the side of a building. In most cases, the sample probe is located above the supporting structure, in which case the entry will show as "N/A", aka, not applicable.

Distance from Obstructions refers to those obstructions, both on the roof and off the roof, which are located higher than the probe. In the case of a nearby obstruction being higher than the probe, details of its location will be listed in the entry. If there are no obstructions higher than the probe, then the entry will be N/A.

Accuracy Audits Include:

> **Dates of Annual Performance Evaluation** refers to the 2015 QA audits on the gaseous analyzers. These evaluations are performed by the AMD's QA team. Twenty-five percent of the monitors operating within each gaseous pollutant's network are evaluated quarterly; thereby, each monitor is evaluated at least once per year as per *40 CFR Part 58, Appendix A, §3.2.2*.
>
> **Dates of Semi-Annual Flow Rate Audit** refers to the 2015 QA audits on PM monitors as per *40 CFR Part 58, Appendix A, §§ 3.2.4 and 3.3.4,* respectively. These evaluations are performed by the AMD's QA team at least once every six months.
>
> **Dates of Quarterly Flow Rate Audit** refers to the 2015 QA audits on the Pb monitors as per *40 CFR Part 58, Appendix A § 3.4*. These evaluations are performed by the AMD's QA team at least once per quarter beginning in 2106.

Probe Sample Line Material refers to the material makeup of the intake sample lines.

Pollutant Sample Residence Time refers to the amount of time that it takes a sample of air to travel between the probe inlet and the bulkhead of the analyzer. This residence time is calculated by a formula that is based on the sample line's diameter and length, and the flow rate of the air intake. It is important to keep residence time low to prevent gases in the air sample from reacting with the sample line material or with other gases in the sample; i.e., O_3 could react with nitrogen oxides in the sample if the residence time exceeds 20 seconds. This measurement applies to CO, NO_2, SO_2, and O_3 sample lines.

BLUE POINT
County ID: BP
AQS ID: 04-013-9702
Address: Bush Highway & Usery Pass Road, Maricopa County
Coordinates: 33.54549N, -111.60925W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information	
Pollutant	**O_3**
Parameter Code	44201
Parameter Occurrence Code	1
Collection Frequency	Continuous
Analysis Method (sample filters only)	N/A
Any Proposal to Remove or Move Monitor?	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A
Appendix A Requirements - Quality Assurance Requirements for SLAMS and SPMs	
Number of Precision Checks Performed Annually	32
Number of Accuracy Audits Performed Annually	4
Dates of Accuracy Audits on the Gaseous Analyzer	05/06/15 05/22/15 06/17/15 11/04/15
All Precision/Accuracy Reports Submitted to AQS?	Yes
Annual Data Certification Submitted?	04/25/16
Frequency of One-Point QC Check	Bi-Weekly
Frequency of Flow Rate Verification	N/A
Appendix C Requirements - Monitoring Methodology	
Date Established	01/01/1993
Monitor Type	SLAMS
Monitor Make - Model	Teledyne API - M400
Method Code	087
Method Type (FRM, FEM, ARM)	FEM
Appendix D Requirements - Network Design Criteria	
Site Type	Max Ozone Concentration
Basic Monitoring Objective	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Urban
Monitoring Season	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria	
Distance between collocated samplers	N/A
Probe Inlet Height	8.9 meters
Airflow Arc	360º
Probe Sample Line Material	Teflon™
Pollutant Sample Residence Time	7.6 seconds
Distance from Supporting Structure	3 meters

Distance from Obstructions	3.5 meters
Distance to Furnace Flue	None
Spacing from Trees	6 meters
Nearest Major Roadway	Bush Highway
Distance and Direction to Road	160 meters, S
Traffic Count (ADT)	1,000
Groundcover	Paved

BUCKEYE
County ID: BE
AQS ID: 04-013-4011
Address 26453 W MC85
Coordinates: 33.37005N, -111.62070W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information				
Pollutant	**CO**	**NO_2**	**O_3**	**PM_{10}**
Parameter Code	42101	42602	44201	81102
Parameter Occurrence Code	1	1	1	1
Collection Frequency	Continuous	Continuous	Continuous	Continuous
Analysis Method (sample filters only)	N/A	N/A	N/A	N/A
Any Proposal to Remove or Move Monitor?	No	No	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A	N/A	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs				
Number of Precision Checks Performed Annually	15	*27	*34	21
Number of Accuracy Audits Performed Annually	2	3	6	3
Dates of Accuracy Audits on Gaseous & PM Analyzers	03/17/15 09/30/15	04/14/15 05/12/15 06/23/15	02/18/15 04/14/15 05/01/15 6/09/15 08/18/15 11/10/15	02/03/15 07/07/15 10/13/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	Bi-Weekly	Bi-Weekly	Bi-Weekly	N/A
Frequency of Flow Rate Verification	N/A	N/A	N/A	Bi-Weekly
Appendix C Requirements – Monitoring Methodology				
Date Established	08/01/2004	08/01/2004	08/01/2004	08/01/2004
Monitor Type	SLAMS	SLAMS	SLAMS	SLAMS
Monitor Make - Model	Teledyne API – M300	Teledyne API – M200	Teledyne API – M400	Thermo – TEOM 1405-S
Method Code	093	099	087	079
PM Monitor Flow Type	N/A	N/A	N/A	Low Volume
PM Monitor Collection Type	N/A	N/A	N/A	Size Specific
Method Type (FRM, FEM, ARM)	FRM	FRM	FEM	FEM
Appendix D Requirements - Network Design Criteria				
Site Type	Population Exposure	Population Exposure	Population Exposure	Population Exposure

Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Neighborhood	Urban	Neighborhood	Neighborhood
Monitoring Season	Sep-Mar	Jan-Dec	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes	Yes	Yes	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria				
Distance between collocated samplers	N/A	N/A	N/A	N/A
Probe Inlet Height	4 meters	4 meters	4 meters	4.5 meters
Airflow Arc	360º	360º	360º	360º
Distance from Supporting Structure	2 meters	2 meters	2 meters	2.1 meters
Probe Sample Line Material	Teflon™	Teflon	Teflon™	N/A
Pollutant Sample Residence Time	7.12 seconds	7.12 seconds	7.12 seconds	N/A
Distance from Obstructions	None	None	None	None
Distance to Furnace Flue	None	None	None	None
Spacing from Trees	14 meters, N	14 meters, N	14 meters, N	14 meters, N
Nearest Major Roadway	US Hwy 85	US Hwy 85	US Hwy 85	US Hwy 85
Distance and Direction to Road	31 meters, N	31 meters, N	31 meters, N	31 meters, N
Traffic Count (ADT)	3,000	3,000	3,000	3,000
Groundcover	Paved	Paved	Paved	Paved

* The number of precision checks is 32. Several reports with date errors were entered into AQS; but this has no impact on the percent completeness. A corrective action plan is being developed.

CAVE CREEK
County ID: CC
AQS ID: 04-013-4008
Address: 37019 N Lava Lane, Phoenix
Coordinates: 33.82169N, -112.01739W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information	
Pollutant	**O_3**
Parameter Code	44201
Parameter Occurrence Code	1
Collection Frequency	Continuous
Analysis Method (sample filters only)	N/A
Any Proposal to Remove or Move Monitor?	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs	
Number of Precision Checks Performed Annually	24
Number of Accuracy Audits Performed Annually	5
Dates of Accuracy Audits on the Gaseous Analyzer	03/24/15 05/05/15 09/25/15 10/06/15 10/20/15
All Precision/Accuracy Reports Submitted to AQS?	Yes
Annual Data Certification Submitted?	04/25/16
Frequency of One-Point QC Check	Bi-weekly
Frequency of Flow Rate Verification	N/A
Appendix C Requirements - Monitoring Methodology	
Date Established	07/20/2001
Monitor Type	SLAMS
Monitor Make - Model	Teledyne - API M400
Method Code	087
Method Type (FRM, FEM, ARM)	FEM
Appendix D Requirements - Network Design Criteria	
Site Type	Max Ozone Concentration
Basic Monitoring Objective	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Urban
Monitoring Season	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria	
Distance between collocated samplers	N/A
Probe Inlet Height	4.8 meters
Airflow Arc	360º
Probe Sample Line Material	Teflon™
Pollutant Sample Residence Time	11.4 seconds

Distance from Supporting Structure	2.5 meters
Distance from Obstructions	None
Distance to Furnace Flue	None
Spacing from Trees	14.9 meters
Nearest Major Roadway	32nd Street
Distance and Direction to Road	240 meters, NE
Traffic Count (ADT)	1,000
Groundcover	Paved

CENTRAL PHOENIX
County ID: CP
AQS ID: 04-013-3002
Address: 1645 E Roosevelt, Phoenix
Coordinates: 33.45793N, -112.04601W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information					
Pollutant	**CO**	**NO_2**	**O_3**	**SO_2**	**PM_{10}**
Parameter Code	42101	42602	44201	42401	81102
Parameter Occurrence Code	1	6	1	4	4
Collection Frequency	Continuous	Continuous	Continuous	Continuous	Continuous
Analysis Method (sample filters only)	N/A	N/A	N/A	N/A	N/A
Any Proposal to Remove or Move Monitor?	No	No	No	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A	N/A	N/A	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs					
Number of Precision Checks Performed Annually	29	30	29	30	21
Number of Accuracy Audits Performed Annually	5	4	8	7	3
Dates of Accuracy Audits on Gaseous & PM Analyzers	05/05/15 08/12/15 09/02/15 12/01/15 12/29/15	02/24/15 04/22/15 06/10/15 07/16/15 08/12/15 09/02/15 09/10/15 12/01/15	04/06/15 05/05/15 06/02/15 08/12/15 09/02/15 11/03/15 11/17/15 12/01/15	01/27/15 07/16/15 08/12/15 09/02/15 10/06/15 12/01/15 12/31/15	06/30/15 07/16/15 10/06/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	Bi-Weekly	Bi-Weekly	Bi-Weekly	Bi-Weekly	N/A
Frequency of Flow Rate Verification	N/A	N/A	N/A	N/A	Bi-Weekly
Appendix C Requirements - Monitoring Methodology					
Date Established	10/01/1966	01/01/1967	06/01/1967	01/01/1965	04/01/1985
Monitor Type	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS
Monitor Make - Model	Teledyne API - M300	Teledyne API - M200	Teledyne API - M400	Teledyne API - M100	Thermo - TEOM 1405-S
Method Code	093	099	087	100	079
PM Monitor Flow Type	N/A	N/A	N/A	N/A	Low Volume
PM Monitor Collection Type	N/A	N/A	N/A	N/A	Size Specific

Method Type (FRM, FEM, ARM)	FRM	FRM	FEM	FEM	FEM
Appendix D Requirements - Network Design Criteria					
Site Type	Population Exposure	Highest Concentration	Population Exposure	Highest Concentration	Population Exposure
Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Monitoring Season	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes	Yes	Yes	Yes	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria					
Distance between collocated samplers	N/A	N/A	N/A	N/A	N/A
Probe Inlet Height	10.3 meters	10.3 meters	10.3 meters	10.3 meters	10.3 meters
Airflow Arc	360º	360º	360º	360º	360º
Probe Sample Line Material	Teflon™	Teflon™	Teflon™	Teflon™	N/A
Pollutant Sample Residence Time	7.5 seconds	7.5 seconds	7.5 seconds	7.5 seconds	N/A
Distance from Supporting Structure	2.5 meters	2.5 meters	2.5 meters	2.5 meters	2.1 meters
Distance from Obstructions	None	None	None	None	None
Distance to Furnace Flue	None	None	None	None	None
Spacing from Trees	None	None	None	None	None
Nearest Major Roadway A	16th Street	16th Street	16th Street	16th Street	16th Street
Distance and Direction to Road	88 meters, W	88 meters, W	88 meters, W	88 meters, W	91 meters, W
Traffic Count (ADT)	24,00	24,000	24,000	24,000	24,000
Nearest Major Roadway B	Roosevelt St.	Roosevelt St.	Roosevelt St.	Roosevelt St.	Roosevelt St.
Distance and Direction to Road	75 meters, N	75 meters, N	75 meters, N	75 meters, N	75 meters, N
Traffic Count (ADT)	Unknown	Unknown	Unknown	Unknown	Unknown
Groundcover	Paved	Paved	Paved	Paved	Paved

DEER VALLEY
County ID: DV
AQS ID: 04-013-4018
Address: 1030 West Deer Valley Road, Phoenix
Coordinates: 33.684627N, -112.08635W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information		
Pollutant	**Pb Primary**	**Pb Secondary**
Note: This is a collocated site for Pb.		
Parameter Code	14129	14129
Parameter Occurrence Code	1	2
Collection Frequency	1 in 6 days	1 in 12 days
Analysis Method (sample filters only)	EQL-0510-191	EQL-0510-191
Analytical Laboratory	Pima County Regional Wastewater Reclamation Department (RWRD) Compliance and Regulatory Affairs Office (CRAO) Laboratory	
Any Proposal to Remove or Move Monitor?	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs		
Number of Precision Flow Rate Checks Performed Annually	28 collocated QA filter samples In 2016, precision flow checks will be conducted quarterly at minimum.	
Number of Accuracy Audits Performed Annually	2	2
Date of Accuracy Audits on Samplers	03/05/15 12/16/15	03/05/15 12/16/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16
Frequency of One-Point QC Check	Quarterly	Quarterly
Frequency of Flow Rate Audits	Semi-Annual	Semi-Annual
Appendix C Requirements - Monitoring Methodology		
Date Established	07/21/2010	07/21/2010
Monitor Type	SLAMS	SLAMS
Monitor Make - Model	Thermo / Hi-Q TSP Sampler	Thermo / Hi-Q TSP Sampler
Note: Current monitor is shown first.		
Method Code	802	802
Pb Monitor Flow Type	High Volume	High Volume
Pb Monitor Collection Type	Total Suspended Particulates	Total Suspended Particulates
Method Type (FRM, FEM, ARM)	FRM	FRM
Appendix D Requirements - Network Design Criteria		
Site Type	Source-Oriented	Source-Oriented
Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison

Monitoring Scale (Spatial Scale Represented)	Middle Scale	Middle Scale
Monitoring Season	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria		
Distance between collocated samplers	2.7 meters	2.7 meters
Probe Inlet Height	4.1 meters	4.1 meters
Airflow Arc	360º	360º
Probe Sample Line Material	N/A	N/A
Pollutant Sample Residence Time	N/A	N/A
Filter Sample Material	Glass	Glass
Distance from Supporting Structure	1.1 meters	1.1 meters
Distance from Obstructions	None	None
Distance to Furnace Flue	None	None
Spacing from Trees	None	None
Nearest Major Roadway	Deer Valley Road	Deer Valley Road
Distance and Direction to Road	300 meters, S	300 meters, S
Traffic Count (ADT)	6,452	6,452
Groundcover	Paved	Paved

DIABLO
County ID: DI
AQS ID: 04-013-4019
Address: 1919 W. Fairmount Dr., Tempe
Coordinates: 33.39625N, -111.96797W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information			
Pollutant	**CO**	**NO_2**	**$PM_{2.5}$**
Parameter Code	42101	42602	88101
Parameter Occurrence Code	1	1	3
Collection Frequency	Continuous	Continuous	Continuous
Analysis Method (sample filters only)	N/A	N/A	N/A
Any Proposal to Remove or Move Monitor?	No	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A	Yes
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs			
Number of Precision Checks Performed Annually	30	30	22
Number of Accuracy Audits Performed Annually	8	9	3
Dates of Accuracy Audits on Gaseous & PM Analyzers	01/30/15 02/26/15 03/27/15 04/22/15 07/21/15 09/03/15 11/10/15 11/17/15	01/27/15 01/30/15 02/26/15 03/18/15 03/27/15 07/15/16 09/03/15 09/09/15 11/10/15	04/07/15 07/14/16 11/17/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	Bi-Weekly	Bi-Weekly	N/A
Frequency of Flow Rate Verification	N/A	N/A	Bi-Weekly
Appendix C Requirements - Monitoring Methodology			
Date Established	2/13/2014	02/13/2014	05/01/2014
Monitor Type	SLAMS	SLAMS	SLAMS
Monitor Make - Model	Teledyne API - M300	Teledyne API - M200	Thermo - TEOM 1405-DF
Method Code	093	099	182
PM Monitor Flow Type	N/A	N/A	Low Volume
PM Monitor Collection Type	N/A	N/A	Dichotomous
Method Type (FRM, FEM, ARM)	FRM	FRM	FEM
Appendix D Requirements - Network Design Criteria			
Site Type	Source-Oriented	Source-Oriented	Source-Oriented

Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Micro	Micro	Micro
Monitoring Season	Jan-Dec	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes	Yes	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria			
Distance between collocated samplers	N/A	N/A	N/A
Probe Inlet Height	5 meters	5 meters	5 meters
Airflow Arc	360º	360º	360º
Probe Sample Line Material	Teflon™	Teflon™	N/A
Pollutant Sample Residence Time	7.14 seconds	7.14 seconds	N/A
Distance from Supporting Structure	2.6 meters	2.6 meters	2.4 meters
Distance from Obstructions	None	None	None
Distance to Furnace Flue	No Furnace	No Furnace	No Furnace
Spacing from Trees	None	None	None
Nearest Major Roadway A	Interstate-10	Interstate-10	Interstate-10
Distance and Direction to Road	30 meters, E	30 meters, E	30 meters, E
Traffic Count (ADT)	275,000	275,000	275,000
Nearest Major Roadway B	Fairmount Dr.	Fairmount Dr.	Fairmount Dr.
Distance and Direction to Road	18 meters, N	18 meters, N	18 meters, N
Traffic Count (ADT)	3,000	3,000	3,000
Groundcover	Paved/Gravel	Paved/Gravel	Paved/Gravel

DURANGO COMPLEX
County ID: DC
AQS ID: 04-013-9812
Address: 2702 RC Esterbrooks Blvd, Phoenix
Coordinates: 33.42650N, -112.11814W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information - NAAQS Air Monitoring			
Pollutant	**PM_{10}**	**$PM_{2.5}$**	**SO_2**
Parameter Code	81102	88101	42401
Parameter Occurrence Code	1	3	1
Collection Frequency	Continuous	Continuous	Continuous
Analysis Method (sample filters only)	N/A	N/A	N/A
Any Proposal to Remove or Move Monitor?	No	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	Yes	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs			
Number of Precision Checks Performed Annually	11	17	30
Number of Accuracy Audits Performed Annually	11	3	6
Dates of Accuracy Audits on Gaseous & PM Analyzers	01/16/15 02/11/15 04/17/15 05/01/15 07/15/15 07/30/15 08/25/15 09/25/15 10/09/15 11/18/15 12/16/15	01/16/15 07/30/15 10/09/15	04/07/15 04/10/15 06/04/15 09/17/15 09/24/15 12/02/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	N/A	N/A	Bi-Weekly
Frequency of Flow Rate Verification	Bi-Weekly	Bi-Weekly	N/A
Appendix C Requirements - Monitoring Methodology			
Date Established	07/01/1999	07/01/2005	01/01/2011
Monitor Type	SLAMS	SLAMS	SLAMS
Monitor Make - Model	Thermo - TEOM 1405-DF	Thermo - TEOM 1405-DF	Teledyne API - M100
Note: PM_{10} and $PM_{2.5}$ are measured by the same monitor. The TEOM 1405-DF collects air for both PM_{10} and $PM_{2.5}$ measurements through the same inlet.			
Method Code	079	182	100
PM Monitor Flow Type	Low Volume	Low Volume	N/A

PM Monitor Collection Type	Dichotomous	Dichotomous	N/A
Method Type (FRM, FEM, ARM)	FEM	FEM	FRM
Appendix D Requirements - Network Design Criteria			
Site Type	Highest Concentration	Highest Concentration	Highest Concentration
Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Middle	Middle	Middle
Monitoring Season	Jan-Dec	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes	Yes	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria			
Distance between collocated samplers	N/A	N/A	N/A
Distance between PM monitor inlets?	0 meters	0 meters	N/A
Note: PM_{10} and $PM_{2.5}$ are measured by the same monitor. The TEOM 1405-DF collects air for both PM_{10} and $PM_{2.5}$ measurements through the same inlet.			
Probe Inlet Height	3.8 meters	3.8 meters	3.9 meters
Airflow Arc	360º	360º	360º
Probe Sample Line Material	N/A	N/A	Teflon™
Pollutant Sample Residence Time	N/A	N/A	6.61 sec
Distance from Supporting Structure	3.7 meters	2 meters	2 meters
Distance from Obstructions	8 meters	8 meters	2 meters
Distance to Furnace Flue	None	None	None
Spacing from Trees	8 meters, S	8 meters, S	8 meters, S
Nearest Major Roadway	27th Ave	27th Ave	27th Ave
Distance and Direction to Road	78 meters, E	76 meters, E	76 meters, E
Traffic Count (ADT)	16,000	16,000	16,000
Groundcover	Paved	Paved	Paved

DYSART
County ID: DY
AQS ID: 04-013-4010
Address: 16825 N Dysart Rd, Surprise
Coordinates: 33.63713N, -112.34184W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information			
Pollutant	**CO**	**O_3**	**PM_{10}**
Parameter Code	42101	44201	81102
Parameter Occurrence Code	1	1	1
Collection Frequency	Continuous	Continuous	Continuous
Analysis Method (sample filters only)	N/A	N/A	N/A
Any Proposal to Remove or Move Monitor?	No	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs			
Number of Precision Checks Performed Annually	15	30 *	22
Number of Accuracy Audits Performed Annually	2	5	3
Dates of Accuracy Audits on Gaseous & PM Analyzers	03/05/15 09/01/15	01/07/15 04/01/15 05/01/15 06/25/15 10/15/15	06/25/15 07/09/15 10/15/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	Bi-Weekly	Bi-Weekly	N/A
Frequency of Flow Rate Verification	N/A	N/A	Bi-Weekly
Appendix C Requirements - Monitoring Methodology			
Date Established	09/01/2003	7/21/2003	07/14/2003
Monitor Type	SLAMS	SLAMS	SLAMS
Monitor Make - Model	Teledyne API - M300	Teledyne API - M400	Thermo - TEOM 1405-S
Method Code	093	087	079
PM Monitor Flow Type	N/A	N/A	Low Volume
PM Monitor Collection Type	N/A	N/A	Size Specific
Method Type (FRM, FEM, ARM)	FRM	FEM	FRM
Appendix D Requirements - Network Design Criteria			
Site Type	Population Exposure	Population Exposure	Population Exposure
Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison

Monitoring Scale (Spatial Scale Represented)	Neighborhood	Neighborhood	Neighborhood
Monitoring Season	Sep-Mar	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes	Yes	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria			
Distance between collocated samplers	N/A	N/A	N/A
Probe Inlet Height	3.8 meters	3.8 meters	3.6 meters
Airflow Arc	360º	360º	360º
Probe Sample Line Material	Teflon™	Teflon™	N/A
Pollutant Sample Residence Time	5.3 seconds	5.3 seconds	N/A
Distance from Supporting Structure	2 meters	2 meters	2 meters
Distance from Obstructions	None	None	7.7 meters
Distance to Furnace Flue	None	None	None
Spacing from Trees	None	None	None
Nearest Major Roadway A	Dysart	Dysart	Dysart
Distance and Direction to Road	17 meters, W	17 meters, W	12 meters, W
Traffic Count (ADT)	12,000	12,000	12,000
Nearest Major Roadway B	Bell Rd	Bell Rd	Bell Rd
Distance and Direction to Road	495 meters, N	495 meters, N	460 meters, N
Traffic Count (ADT)	43,000	43,000	43,000
Groundcover	Paved/Gravel	Paved/Gravel	Paved/Gravel

* The number of precision checks is 27. Several reports with date errors were entered into AQS; but this has no impact on the percent completeness. A corrective action plan is being developed.

FALCON FIELD
County ID: FF
AQS ID: 04-013-1010
Address: 4530 E McKellips Rd, Mesa
Coordinates: 33.45223N, -111.73331W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information	
Pollutant	**O_3**
Parameter Code	44201
Parameter Occurrence Code	1
Collection Frequency	Continuous
Analysis Method (sample filters only)	N/A
Any Proposal to Remove or Move Monitor?	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs	
Number of Precision Checks Performed Annually	*29
Number of Accuracy Audits Performed Annually	4
Dates of Accuracy Audits on Gaseous Analyzer	01/15/15 03/11/15 05/06/15 09/08/15
All Precision/Accuracy Reports Submitted to AQS?	Yes
Annual Data Certification Submitted?	04/25/16
Frequency of One-Point QC Check	Bi-Weekly
Frequency of Flow Rate Verification	N/A
Appendix C Requirements - Monitoring Methodology	
Date Established	06/01/1989
Monitor Type	SLAMS
Monitor Make - Model	Teledyne API - M400
Method Code	087
Method Type (FRM, FEM, ARM)	FEM
Appendix D Requirements - Network Design Criteria	
Site Type	Population Exposure
Basic Monitoring Objective	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Neighborhood
Monitoring Season	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria	
Distance between collocated samplers	N/A
Probe Inlet Height	9.3 meters
Airflow Arc	360º
Probe Sample Line Material	Teflon™
Pollutant Sample Residence Time	18.8 seconds
Distance from Supporting Structure	2.5 meters

Distance from Obstructions	None
Distance to Furnace Flue	None
Spacing from Trees	25+ meters
Nearest Major Roadway	McKellips
Distance and Direction to Road	58 meters, S
Traffic Count (ADT)	29,000
Groundcover	Paved

* The number of precision checks is 24. Several reports with date errors were entered into AQS; but this has no impact on the percent completeness. A corrective action plan is being developed.

FOUNTAIN HILLS
County ID: FH
AQS ID: 04-013-9704
Address: 16426 E. Palisades Blvd., Fountain Hills
Coordinates: 33.61103N, -111.72529W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information	
Pollutant	**O_3**
Parameter Code	44201
Parameter Occurrence Code	1
Collection Frequency	Continuous
Analysis Method (sample filters only)	N/A
Any Proposal to Remove or Move Monitor?	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs	
Number of Precision Checks Performed Annually	30 *
Number of Accuracy Audits Performed	4
Dates of Accuracy Audits on Gaseous Analyzer	01/26/15 05/04/15 07/21/15 09/01/15
All Precision/Accuracy Reports Submitted to AQS?	Yes
Annual Data Certification Submitted?	04/25/16
Frequency of One-Point QC Check	Bi-Weekly
Frequency of Flow Rate Verification	N/A
Appendix C Requirements - Monitoring Methodology	
Date Established	04/01/1996
Monitor Type	SLAMS
Monitor Make - Model	Teledyne API - M400
Method Code	087
Method Type (FRM, FEM, ARM)	FEM
Appendix D Requirements - Network Design Criteria	
Site Type	Max Ozone Concentration
Basic Monitoring Objective	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Neighborhood
Monitoring Season	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria	
Distance between collocated samplers	N/A
Probe Inlet Height	4.3 meters
Airflow Arc	360º
Probe Sample Line Material	Teflon™

Pollutant Sample Residence Time	4.2 seconds
Distance from Supporting Structure	2 meters
Distance from Obstructions	Canopy 1 meter higher than probe, located 9 meters to the south
Distance to Furnace Flue	None
Spacing from Trees	15 meters, W
Nearest Major Roadway	Palisades Blvd
Distance and Direction to Road	70 meters, SW
Traffic Count (ADT)	8,000
Groundcover	Paved

* The number of precision checks is 28. Several reports with date errors were entered into AQS; but this has no impact on the percent completeness. A corrective action plan is being developed.

GLENDALE
County ID: GL
AQS ID: 04-013-2001
Address: 6001 W Olive, Glendale
Coordinates: 33.57454N, -112.19196W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information				
Pollutant	**CO**	**O_3**	**PM_{10}**	**$PM_{2.5}$**
Parameter Code	42101	44201	81102	88101
Parameter Occurrence Code	1	1	1	3
Collection Frequency	Continuous	Continuous	Continuous	Continuous
Analysis Method (sample filters only)	N/A	N/A	N/A	N/A
Any Proposal to Remove or Move Monitor?	No	No	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A	N/A	Yes
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs				
Number of Precision Checks Performed Annually	15	25 *	16	20
Number of Accuracy Audits Performed Annually	2	6	14	3
Dates of Accuracy Audits on Gaseous and PM Analyzers	03/05/15 09/03/15	01/20/15 04/01/15 04/29/15 05/15/15 10/15/15 11/24/15	01/07/15 01/20/15 02/15/15 02/19/15 03/05/15 04/01/15 04/14/15 04/28/15 06/25/15 07/09/15 10/15/15 11/09/15 11/24/15 12/11/15	06/25/15 07/09/15 10/15/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	Bi-Weekly	Bi-Weekly	N/A	N/A
Frequency of Flow Rate Verification	N/A	N/A	Bi-Weekly	Bi-Weekly
Appendix C Requirements - Monitoring Methodology				
Date Established	01/01/1974	01/01/1974	07/01/1987	6/1/2011

Monitor Type	SLAMS	SLAMS	SLAMS	SLAMS
Monitor Make - Model	Teledyne API – M300	Teledyne API - M400	Thermo - TEOM 1405-DF	Thermo - TEOM 1405-DF
Note: PM_{10} and $PM_{2.5}$ are measured by the same monitor. The TEOM 1405-DF collects air for both PM_{10} and $PM_{2.5}$ measurements through the same inlet.				
Method Code	093	087	079	182
PM Monitor Flow Type	N/A	N/A	Low Volume	Low Volume
PM Monitor Collection Type	N/A	N/A	Dichotomous	Dichotomous
Method Type (FRM, FEM, ARM)	FRM	FEM	FEM	FEM
Appendix D Requirements - Network Design Criteria				
Site Type	Population Exposure	Population Exposure	Population Exposure	Population Exposure
Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Monitoring Season	Sep-Mar	Jan-Dec	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes	Yes	Yes	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria				
Distance between collocated samplers	N/A	N/A	N/A	N/A
Probe Inlet Height	3.7 meters	3.7 meters	3.4 meters	4.0 meters
Airflow Arc	360º	360º	360º	360º
Probe Sample Line Material	Teflon™	Teflon™	N/A	N/A
Pollutant Sample Residence Time	4.5 seconds	4.5 seconds	N/A	N/A
Distance from Supporting Structure	2 meters	2 meters	2.1 meters	3.1 meters
Distance from Obstructions	2.5m	2.5m	None	None
Distance to Furnace Flue	None	None	None	None
Spacing from Trees	None	None	None	None
Nearest Major Roadway A	Olive Ave	Olive Ave	Olive Ave	Olive Ave
Distance and Direction to Road	225 meters, S	225 meters, S	227 meters, S	227 meters, S
Traffic Count (ADT)	25,000	25,000	25,000	25,000
Nearest Major Roadway B	59th Ave	59th Ave	59th Ave	59th Ave
Distance and Direction to Road	475 meters, E	475 meters, E	430 meters, E	430 meters, E
Traffic Count (ADT)	30,500	30,500	30,500	30,500
Groundcover	Paved	Paved	Paved	Paved

* The number of precision checks is 22. Several reports with date errors were entered into AQS; but this has no impact on the percent completeness. A corrective action plan is being developed.

GREENWOOD
County ID: GR
AQS ID: 04-013-3010
Address: 1128 N 27th Ave., Phoenix
Coordinates: 33.46093N, -112.11748W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information			
Pollutant	**CO**	**NO_2**	**PM_{10}**
Parameter Code	42101	42602	81102
Parameter Occurrence Code	1	1	1
Collection Frequency	Continuous	Continuous	Continuous
Analysis Method (sample filters only)	N/A	N/A	N/A
Any Proposal to Remove or Move Monitor?	No	Yes	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs			
Number of Precision Checks Performed Annually	27*	26	22
Number of Accuracy Audits Performed Annually	3	3	3
Dates of Accuracy Audits on Gaseous and PM Analyzers	02/05/15 09/30/15 11/12/15	07/09/15 11/12/15 11/23/15	01/21/15 08/04/15 11/12/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	Bi-Weekly	Bi-Weekly	N/A
Frequency of Flow Rate Verification	N/A	N/A	Bi-Weekly
Appendix C Requirements - Monitoring Methodology			
Date Established	11/01/1993	11/01/1993	11/01/1993
Monitor Type	SLAMS	SLAMS	SLAMS
Monitor Make - Model	Teledyne API - M300	Teledyne API - M200	Thermo - TEOM 1405-S
Method Code	093	099	079
PM Monitor Flow Type	N/A	N/A	Low Volume
PM Monitor Collection Type	N/A	N/A	Size Specific
Method Type (FRM, FEM, ARM)	FRM	FRM	FEM
Appendix D Requirements - Network Design Criteria			
Site Type	Population Exposure	Population Exposure	Population Exposure
Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Middle	Middle	Middle
Monitoring Season	Jan-Dec	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors	Yes	Yes	Yes

Required?			
Appendix E Requirements - Probe and Monitoring Path Siting Criteria			
Distance between collocated samplers	N/A	N/A	N/A
Probe Inlet Height	4.2 meters	4.2 meters	4.4 meters
Airflow Arc	360º	360º	360º
Probe Sample Line Material	Teflon™	Teflon™	N/A
Pollutant Sample Residence Time	5.3 seconds	5.3 seconds	N/A
Distance from Supporting Structure	2 meters	2 meters	2 meters
Distance from Obstructions	25+ meters	25+ meters	25+ meters
Distance to Furnace Flue	None	None	None
Spacing from Trees	20 meters, NW	20 meters, NW	20 meters, NW
Nearest Major Roadway A	27th Ave	27th Ave	27th Ave
Distance and Direction to Road	10 meters, E	10 meters, E	10 meters, E
Traffic Count (ADT)	18,500	18,500	18,500
Nearest Major Roadway B	I-10	I-10	I-10
Distance and Direction to Road	85 meters, N	85 meters, N	85 meters, N
Traffic Count (ADT)	229,000	229,000	229,000
Groundcover	Paved	Paved	Paved

* The number of precision checks is 26. Several reports with date errors were entered into AQS; but this has no impact on the percent completeness. A corrective action plan is being developed.

HIGLEY
County ID: HI
AQS ID: 04-013-4006
Address: To be announced
Coordinates: 33.31074N, -111.72255W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information	
Pollutant	**PM_{10}**
Parameter Code	81102
Parameter Occurrence Code	1
Collection Frequency	Continuous
Analysis Method (sample filters only)	N/A
Any Proposal to Remove or Move Monitor?	Yes
Note: In progress of reestablishing site near original location.	
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs	
Number of Precision Checks Performed Annually	Not operating
Number of Accuracy Audits Performed Annually	Not operating
Dates of Accuracy Audits on PM Analyzer	Not operating
All Precision/Accuracy Reports Submitted to AQS?	No checks
Annual Data Certification Submitted?	No data
Frequency of One-Point QC Check	N/A
Frequency of Flow Rate Verification	Bi-Weekly
Appendix C Requirements - Monitoring Methodology	
Date Established	07/01/2000
Monitor Type	SLAMS
Monitor Make - Model	Thermo – TEOM 1405-S
Method Code	079
PM Monitor Flow Type	Low Volume
PM Monitor Collection Type	Size Specific
Method Type (FRM, FEM, ARM)	FEM
Appendix D Requirements - Network Design Criteria	
Site Type	Population Exposure
Basic Monitoring Objective	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Neighborhood
Monitoring Season	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria	
Distance between collocated samplers	N/A
Probe Inlet Height	3.4 meters
Airflow Arc	360º
Probe Sample Line Material	N/A
Pollutant Sample Residence Time	N/A

Distance from Supporting Structure	2.2 meters
Distance from Obstructions	10 meters
Distance to Furnace Flue	None
Spacing from Trees	10 meters
Nearest Major Roadway A	Higley Rd
Distance and Direction to Road	117 meters, E
Traffic Count (ADT)	11,500
Nearest Major Roadway B	Williams Field Rd
Distance and Direction to Road	410 meters, S
Traffic Count (ADT)	11,500
Groundcover	Paved

HUMBOLDT MOUNTAIN
County ID: HM
AQS ID: 04-013-9508
Address: Seven Springs Rd-FAA Radar Station, Tonto National Forest
Coordinates: 33.98280N, -111.79870W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information	
Pollutant	**O_3**
Parameter Code	44201
Parameter Occurrence Code	1
Collection Frequency	Continuous
Analysis Method (sample filters only)	N/A
Any Proposal to Remove or Move Monitor?	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs	
Number of Precision Checks Performed Annually	24*
Number of Accuracy Audits Performed Annually	3
Dates of Accuracy Audits on Gaseous Analyzer	04/16/15 04/30/15 08/24/15
All Precision/Accuracy Reports Submitted to AQS?	Yes
Annual Data Certification Submitted?	04/25/16
Frequency of One-Point QC Check	Bi-Weekly
Frequency of Flow Rate Verification	N/A
Appendix C Requirements - Monitoring Methodology	
Date Established	01/01/1993
Monitor Type	SLAMS
Monitor Make - Model	Teledyne API - M400
Method Code	087
Method Type (FRM, FEM, ARM)	FEM
Appendix D Requirements - Network Design Criteria	
Site Type	Max Ozone Concentration
Basic Monitoring Objective	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Regional
Monitoring Season	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria	
Distance between collocated samplers	N/A
Probe Inlet Height	3.4 meters
Airflow Arc	360º
Probe Sample Line Material	Teflon™
Pollutant Sample Residence Time	6.9 seconds

Distance from Supporting Structure	2.8 meters
Distance from Obstructions	9 meters
Distance to Furnace Flue	None
Spacing from Trees	None
Nearest Major Roadway	N/A (Remote mountaintop is site reached by access road, E. State Hwy 562)
Distance and Direction to Road	N/A
Traffic Count (ADT)	N/A
Groundcover	Dirt/Vegetated

* The number of precision checks is 23. Several reports with date errors were entered into AQS; but this has no impact on the percent completeness. A corrective action plan is being developed.

MESA
County ID: ME
AQS ID: 04-013-1003
Address: 310 S. Brooks, Mesa
Coordinates: 33.41045N, -111.86507W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information				
Pollutant	**CO**	**O_3**	**PM_{10}**	**$PM_{2.5}$**
Parameter Code	42101	44201	81102	88101
Parameter Occurrence Code	1	1	1	3
Collection Frequency	Continuous	Continuous	Continuous	Continuous
Analysis Method (sample filters only)	N/A	N/A	N/A	N/A
Any Proposal to Remove or Move Monitor?	No	No	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A	N/A	Yes
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs				
Number of Precision Checks Performed Annually	14	25	4	22
Number of Accuracy Audits Performed Annually	2	4	4	4
Dates of Accuracy Audits on Gaseous & PM Analyzers	03/11/15 09/09/15	04/09/15 04/23/15 05/07/15 11/04/15	02/25/15 04/08/15 08/12/15 11/03/15	02/25/15 04/08/15 08/12/15 11/03/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	Bi-Weekly	Bi-Weekly	N/A	N/A
Frequency of Flow Rate Verification	N/A	N/A	Bi-Weekly	Bi-Weekly
Appendix C Requirements - Monitoring Methodology				
Date Established	01/01/1978	11/1/2012	11/1/2012	11/1/2012
Monitor Type	SLAMS	SLAMS	SLAMS	SLAMS
Monitor Make - Model	Teledyne API - M300	Teledyne API - M400	Thermo - TEOM 1405-DF	Thermo - TEOM 1405-DF
Note: PM_{10} and $PM_{2.5}$ are measured by the same monitor. The TEOM 1405-DF collects air for both PM_{10} and $PM_{2.5}$ measurements through the same inlet.				
Method Code	093	087	079	182
PM Monitor Flow Type	N/A	N/A	Low Volume	Low Volume
PM Monitor Collection Type	N/A	N/A	Dichotomous	Dichotomous
Method Type (FRM, FEM, ARM)	FRM	FEM	FEM	FEM
Appendix D Requirements - Network Design Criteria				
Site Type	Population Exposure	Population Exposure	Population Exposure	Population Exposure
Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Neighborhood	Neighborhood	Neighborhood	Neighborhood

Monitoring Season	Sep-Mar	Jan-Dec	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes	Yes	Yes	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria				
Distance between collocated samplers	N/A	N/A	N/A	N/A
Probe Inlet Height	5 meters	5 meters	6.2 meters	6.9 meters
Airflow Arc	360º	360º	360º	360º
Probe Sample Line Material	Teflon™	Teflon™	N/A	N/A
Pollutant Sample Residence Time	6.3 seconds	6.3 seconds	N/A	N/A
Distance from Supporting Structure	2 meters	2 meters	2.5 meters	3 meters
Distance from Obstructions	25+ meters	25+ meters	25+ meters	25+ meters
Distance to Furnace Flue	None	None	None	None
Spacing from Trees	25+ meters	25+ meters	25+ meters	25+ meters
Nearest Major Roadway	Broadway Rd.	Broadway Rd.	Broadway Rd.	Broadway Rd.
Distance and Direction to Road	305 meters, S	305 meters, S	305 meters, S	305 meters, S
Traffic Count (ADT)	33,000	33,000	33,000	33,000
Groundcover	Paved/Gravel	Paved/Gravel	Paved/Gravel	Paved/Gravel

NORTH PHOENIX
County ID: NP
AQS ID: 04-013-1004
Address: 601 E Butler Dr., Phoenix
Coordinates: 33.56033N, -112.06626W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information				
Pollutant	**CO**	**O_3**	**PM_{10}**	**$PM_{2.5}$**
Parameter Code	42101	44201	81102	88101
Parameter Occurrence Code	1	1	1	3
Collection Frequency	Continuous	Continuous	Continuous	Continuous
Analysis Method (sample filters only)	N/A	N/A	N/A	N/A
Any Proposal to Remove or Move Monitor?	No	No	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A	N/A	Yes
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs				
Number of Precision Checks Performed Annually	14	25	7	24
Number of Accuracy Audits Performed Annually	2	5	4	4
Dates of Accuracy Audits on Gaseous & PM Analyzers	03/09/15 09/08/15	03/23/15 05/05/15 06/16/15 09/08/15 11/16/15	03/09/15 06/15/15 08/10/15 10/19/15	03/09/15 06/15/15 08/10/15 10/16/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	Bi-Weekly	Bi-Weekly	N/A	N/A
Frequency of Flow Rate Verification	N/A	N/A	Bi-Weekly	Bi-Weekly
Appendix C Requirements - Monitoring Methodology				
Date Established	01/01/1974	01/01/1975	9/1/2011	9/1/2011
Monitor Type	SLAMS	SLAMS	SLAMS	SLAMS
Monitor Make - Model	Teledyne API - M300	Teledyne API - M400	Thermo - TEOM 1405-DF	Thermo - TEOM 1405-DF
Note: PM_{10} and $PM_{2.5}$ are measured by the same monitor. The TEOM 1405-DF collects air for both PM_{10} and $PM_{2.5}$ measurements through the same inlet.				
Method Code	093	087	079	182
PM Monitor Flow Type	N/A	N/A	Low Volume	Low Volume
PM Monitor Collection Type	N/A	N/A	Dichotomous	Dichotomous

Method Type (FRM, FEM, ARM)	FRM	FEM	FEM	FEM
Appendix D Requirements - Network Design Criteria				
Site Type	Population Exposure	Population Exposure	Population Exposure	Population Exposure
Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Monitoring Season	Sep-Mar	Jan-Dec	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes	Yes	Yes	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria				
Distance between collocated samplers	N/A	N/A	N/A	N/A
Probe Inlet Height	4.6 meters	4.6 meters	4.5 meters	4.5 meters
Airflow Arc	360º	360º	360º	360º
Probe Sample Line Material	Teflon™	Teflon™	N/A	N/A
Pollutant Sample Residence Time	4.5 seconds	4.5 seconds	N/A	N/A
Distance from Supporting Structure	2.1 meters	2.1 meters	2.1 meters	3.3 meters
Distance from Obstructions	4 meters	4 meters	4 meters	5 meters
Distance to Furnace Flue	None	None	None	None
Spacing from Trees	None	None	None	None
Nearest Major Roadway	7th Street	7th Street	7th Street	7th Street
Distance and Direction to Road	75 meters, E	75 meters, E	75 meters, E	75 meters, E
Traffic Count (ADT)	32,000	32,000	32,000	32,000
Groundcover	Gravel	Gravel	Gravel	Gravel

PINNACLE PEAK

County ID: PP

AQS ID: 04-013-2005

Address: 24295 N Alma School Rd, Scottsdale

Coordinates: 33.70632N, -111.85562W

Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information	
Pollutant	**O_3**
Parameter Code	44201
Parameter Occurrence Code	1
Collection Frequency	Continuous
Analysis Method (sample filters only)	N/A
Any Proposal to Remove or Move Monitor?	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs	
Number of Precision Checks Performed Annually	27
Number of Accuracy Audits Performed	5
Dates of Accuracy Audits on Gaseous Analyzer	01/29/15 05/04/15 06/01/15 07/08/15 12/08/15
All Precision/Accuracy Reports Submitted to AQS?	Yes
Annual Data Certification Submitted?	04/25/16
Frequency of One-Point QC Check	Bi-Weekly
Frequency of Flow Rate Verification	N/A
Appendix C Requirements - Monitoring Methodology	
Date Established	02/01/1988
Monitor Type	SLAMS
Monitor Make - Model	Teledyne API – M400
Method Code	087
Method Type (FRM, FEM, ARM)	FEM
Appendix D Requirements - Network Design Criteria	
Site Type	Max Ozone Concentration
Basic Monitoring Objective	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Urban
Monitoring Season	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes
-Appendix E Requirements - Probe and Monitoring Path Siting Criteria	
Distance between collocated samplers	N/A
Probe Inlet Height	6.1 meters
Airflow Arc	360º
Probe Sample Line Material	Teflon™
Pollutant Sample Residence Time	4.3 seconds

Distance from Supporting Structure	3 meters
Distance from Obstructions	4.2 meters
Distance to Furnace Flue	None
Spacing from Trees	None
Nearest Major Roadway	Happy Valley Rd.
Distance and Direction to Road	61 meters, S
Traffic Count (ADT)	16,000
Groundcover	Paved/Grass

RIO VERDE
County ID: RV
AQS ID: 04-013-9706
Address: 25608 N Forest Rd., Rio Verde
Coordinates: 33.71881N, -111.67183W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information	
Pollutant	**O_3**
Parameter Code	44201
Parameter Occurrence Code	1
Collection Frequency	Continuous
Analysis Method (sample filters only)	N/A
Any Proposal to Remove or Move Monitor?	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs	
Number of Precision Checks Performed Annually	27*
Number of Accuracy Audits Performed Annually	3
Dates of Accuracy Audits on Gaseous Analyzer	04/06/15 05/04/15 11/10/15
All Precision/Accuracy Reports Submitted to AQS?	Yes
Annual Data Certification Submitted?	04/25/16
Frequency of One-Point QC Check	Bi-Weekly
Frequency of Flow Rate Verification	N/A
Appendix C Requirements - Monitoring Methodology	
Date Established	01/01/1997
Monitor Type	SLAMS
Monitor Make - Model	Teledyne API - M400
Method Code	087
Method Type (FRM, FEM, ARM)	FEM
Appendix D Requirements - Network Design Criteria	
Site Type	Max Ozone Concentration
Basic Monitoring Objective	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Urban
Monitoring Season	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria	
Distance between collocated samplers	N/A
Probe Inlet Height	6.2 meters
Airflow Arc	360º
Probe Sample Line Material	Teflon™
Pollutant Sample Residence Time	19.95 seconds
Distance from Supporting Structure	3 meters
Distance from Obstructions	3 meters

Distance to Furnace Flue	None
Spacing from Trees	None
Nearest Major Roadway	Forest Rd
Distance and Direction to Road	43 meters, E
Traffic Count (ADT)	Unknown
Groundcover	Paved

* The number of precision checks is 26. Several reports with date errors were entered into AQS; but this has no impact on the percent completeness. A corrective action plan is being developed.

SOUTH PHOENIX
County ID: SP
AQS ID: 04-013-4003
Address: 33 W Tamarisks, Phoenix
Coordinates: 33.40316N, -112.07533W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information				
Pollutant	**CO**	**O_3**	**PM_{10}**	**$PM_{2.5}$**
Parameter Code	42101	44201	81102	88101
Parameter Occurrence Code	1	1	1	3
Collection Frequency	Continuous	Continuous	Continuous	Continuous
Analysis Method (sample filters only)	N/A	N/A	N/A	N/A
Any Proposal to Remove or Move Monitor?	No	No	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A	N/A	Yes
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs				
Number of Precision Checks Performed Annually	16	28*	23	23
Number of Accuracy Audits Performed Annually	2	4	3	3
Dates of Accuracy Audits on Gaseous & PM Analyzers	03/04/15 09/03/15	04/17/15 05/01/15 06/24/15 11/25/15	05/13/15 08/05/15 11/25/15	05/13/15 08/05/15 11/25/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	Bi-Weekly	Bi-Weekly	N/A	N/A
Frequency of Flow Rate Verification	N/A	N/A	Bi-Weekly	Bi-Weekly
Appendix C Requirements - Monitoring Methodology				
Date Established	10/01/1999	10/01/1999	7/1/2007	05/01/2010
Monitor Type	SLAMS	SLAMS	SLAMS	SLAMS
Monitor Make - Model	Teledyne API – M300	Teledyne API – M400	Thermo - TEOM 1405-DF	Thermo - TEOM 1405-DF
Note: PM_{10} and $PM_{2.5}$ are measured by the same monitor. The TEOM 1405-DF collects air for both PM_{10} and $PM_{2.5}$ measurements through the same inlet.				
Method Code	093	087	079	182
PM Monitor Flow Type	N/A	N/A	Low Volume	Low Volume
PM Monitor Collection Type	N/A	N/A	Dichotomous	Dichotomous

Method Type (FRM, FEM, ARM)	FRM	FEM	FEM	FEM
Appendix D Requirements - Network Design Criteria				
Site Type	Population Exposure	Population Exposure	Population Exposure	Population Exposure
Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Monitoring Season	Sep-Mar	Jan-Dec	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes	Yes	Yes	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria				
Distance between collocated samplers	N/A	N/A	N/A	N/A
Probe Inlet Height	5.5 meters	5.5 meters	4.3 meters	4.3 meters
Airflow Arc	360º	360º	360º	360º
Probe Sample Line Material	Teflon™	Teflon™	N/A	N/A
Pollutant Sample Residence Time	4.7 seconds	4.7 seconds	N/A	N/A
Distance from Supporting Structure	2.2 meters	2.2 meters	2 meters	2 meters
Distance from Obstructions	25+m	25+m	25+m	25+m
Distance to Furnace Flue	None	None	None	None
Spacing from Trees	9 meters	9 meters	7 meters	7 meters
Nearest Major Roadway A	Central Ave	Central Ave	Central Ave	Central Ave
Distance and Direction to Road	168 meters, E	168 meters, E	165 meters, E	165 meters, E
Traffic Count (ADT)	24,000	24,000	24,000	24,000
Nearest Major Roadway B	Broadway Rd	Broadway Rd	Broadway Rd	Broadway Rd
Distance and Direction to Road	385 meters, N	385 meters, N	385 meters, N	385 meters, N
Traffic Count (ADT)	18,000	18,000	18,000	18,000
Groundcover	Paved	Paved	Paved	Paved

* The number of precision checks is 27. Several reports with date errors were entered into AQS; but this has no impact on the percent completeness. A corrective action plan is being developed.

SOUTH SCOTTSDALE
County ID: SS
AQS ID: 04-013-3003
Address: 2857 N Miller Rd., Scottsdale
Coordinates: 33.47968N, -111.91721W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information			
Pollutant	**CO**	**O_3**	**PM_{10}**
Parameter Code	42101	44201	81102
Parameter Occurrence Code	1	1	1
Collection Frequency	Continuous	Continuous	Continuous
Analysis Method (sample filters only)	N/A	N/A	N/A
Any Proposal to Remove or Move Monitor?	No	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs			
Number of Precision Checks Performed Annually	15	30*	22
Number of Accuracy Audits Performed Annually	3	11	3
Dates of Accuracy Audits on Gaseous & PM Analyzers	02/11/15 03/11/15 09/09/15	01/20/15 01/28/15 02/04/15 04/08/15 04/23/15 05/07/15 07/16/15 08/04/15 09/24/15 12/02/15 12/10/15	04/08/15 08/13/15 11/04/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	Bi-Weekly	Bi-Weekly	N/A
Frequency of Flow Rate Verification	N/A	N/A	Bi-Weekly
Appendix C Requirements - Monitoring Methodology			
Date Established	01/01/1974	01/01/1974	09/01/2012
Monitor Type	SLAMS	SLAMS	SLAMS
Monitor Make - Model	Teledyne API - M300	Teledyne API - M400	Thermo - TEOM 1405-S
Method Code	093	087	079
PM Monitor Flow Type	N/A	N/A	Low Volume
PM Monitor Collection Type	N/A	N/A	Size Specific
Method Type (FRM, FEM, ARM)	FRM	FEM	FEM
Appendix D Requirements - Network Design Criteria			
Site Type	Population Exposure	Population Exposure	Population Exposure

Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Neighborhood	Neighborhood	Neighborhood
Monitoring Season	Sep-Mar	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes	Yes	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria			
Distance between collocated samplers	N/A	N/A	N/A
Probe Inlet Height	5.8 meters	5.8 meters	6.1 meters
Airflow Arc	360º	360º	360º
Probe Sample Line Material	Teflon™	Teflon™	N/A
Pollutant Sample Residence Time	8.0 seconds	8.0 seconds	N/A
Distance from Supporting Structure	2.5 meters	2.5 meters	2.5 meters
Distance from Obstructions	2.5 meters	2.5 meters	3 meters
Distance to Furnace Flue	None	None	None
Spacing from Trees	10 meters	10 meters	10 meters
Nearest Major Roadway A	Thomas	Thomas	Thomas
Distance and Direction to Road	66 meters, N	66 meters, N	62 meters, N
Traffic Count (ADT)	33,000	33,000	33,000
Nearest Major Roadway B	Miller	Miller	Miller
Distance and Direction to Road	32 meters, W	32 meters, W	35 meters, W
Traffic Count (ADT)	13,000	13,000	13,000
Groundcover	Paved	Paved	Paved

* The number of precision checks is 29. Several reports with date errors were entered into AQS; but this has no impact on the percent completeness. A corrective action plan is being developed.

TEMPE

County ID: TE

AQS ID: 04-013-4005

Address: 1525 S College, Tempe

Coordinates: 33.4124N, -111.93473W

Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information				
Pollutant	**CO**	**O_3**	**PM_{10}**	**$PM_{2.5}$**
Parameter Code	42101	44201	81102	88101
Parameter Occurrence Code	1	1	1	3
Collection Frequency	Continuous	Continuous	Continuous	Continuous
Analysis Method (sample filters only)	N/A	N/A	N/A	N/A
Any Proposal to Remove or Move Monitor?	No	No	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A	N/A	Yes
Appendix A Requirements - Quality Assurance Requirements for SLAMS and SPMs				
Number of Precision Checks Performed Annually	12	12	4	10
Number of Accuracy Audits Performed Annually	2	2	2	2
Dates of Accuracy Audits on Gaseous & PM Analyzers	03/17/15 10/14/15	10/15/15 11/12/15	10/14/15 11/12/15	10/14/15 11/12/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	Bi-Weekly	Bi-Weekly	N/A	N/A
Frequency of Flow Rate Verification	N/A	N/A	Bi-Weekly	Bi-Weekly
Appendix C Requirements - Monitoring Methodology				
Date Established	07/01/2000	07/01/2000	3/1/2012	3/1/2012
Monitor Type	SLAMS	SLAMS	SLAMS	SLAMS
Monitor Make - Model	Teledyne API - M300	Teledyne API - M400	Thermo - TEOM 1405-DF	Thermo - TEOM 1405-DF
Note: PM_{10} and $PM_{2.5}$ are measured by the same monitor. The TEOM 1405-DF collects air for both PM_{10} and $PM_{2.5}$ measurements through the same inlet.				
Method Code	093	087	079	182
PM Monitor Flow Type	N/A	N/A	Low Volume	Low Volume
PM Monitor Collection Type	N/A	N/A	Dichotomous	Dichotomous
Method Type (FRM, FEM, ARM)	FRM	FEM	FEM	FEM
Appendix D Requirements - Network Design Criteria				
Site Type	Population Exposure	Population Exposure	Population Exposure	Population Exposure
Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Monitoring Season	Sep-Mar	Jan-Dec	Jan-Dec	Jan-Dec
Network Meets Minimum Number of	Yes	Yes	Yes	Yes

Monitors Required?				
Appendix E Requirements - Probe and Monitoring Path Siting Criteria				
Distance between collocated samplers	N/A	N/A	N/A	N/A
Probe Inlet Height	4.4 meters	4.4 meters	2.7 meters	3.7 meters
Airflow Arc	360º	360º	360º	360º
Probe Sample Line Material	Teflon™	Teflon™	N/A	N/A
Pollutant Sample Residence Time	4.7 seconds	4.7 seconds	N/A	N/A
Distance from Supporting Structure	2.5 meters	2.5 meters	2 meters	3 meters
Distance from Obstructions	2.5 meters	2.5 meters	7.5 meters	7.5 meters
Distance to Furnace Flue	None	None	None	None
Spacing from Trees	None	None	None	None
Nearest Major Roadway A	College Ave	College Ave	College Ave	College Ave
Distance and Direction to Road	11 meters, W	11 meters, W	11 meters, W	11 meters, W
Traffic Count (ADT)	Unknown	Unknown	Unknown	Unknown
Nearest Major Roadway B	Apache	Apache	Apache	Apache
Distance and Direction to Road	370 meters, N	370 meters, N	370 meters, N	370 meters, N
Traffic Count (ADT)	25,000	25,000	25,000	25,000
Groundcover	Gravel	Gravel	Gravel	Gravel

THIRTY-THIRD
County ID: TT
AQS ID: 04-013-4020
Address: 3248 W. Moreland Ave., Phoenix
Coordinates: 33.46155N, -112.12815W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information			
Pollutant	**CO**	**NO_2**	**$PM_{2.5}$**
Parameter Code	42101	42602	88101
Parameter Occurrence Code	1	1	3
Collection Frequency	Continuous	Continuous	Continuous
Analysis Method (sample filters only)	N/A	N/A	N/A
Any Proposal to Remove or Move Monitor?	No	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A	Yes
Appendix A Requirements - Quality Assurance Requirements for SLAMS and SPMs			
Number of Precision Checks Performed Annually	8	9	7
Number of Accuracy Audits Performed Annually	2	1	2
Dates of Accuracy Audits on Gaseous & PM Analyzers	09/25/15 11/04/15	09/25/15	09/25/15 12/31/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	Bi-Weekly	Bi-Weekly	N/A
Frequency of Flow Rate Verification	N/A	N/A	Bi-Weekly
Appendix C Requirements - Monitoring Methodology			
Date Established	09/01/2015	09/01/2015	09/01/2015
Monitor Type	SPM	SLAMS	SPM
Monitor Make - Model	Teledyne API - M300	Teledyne API - M200	Thermo - TEOM 1405-DF
Method Code	093	099	182
Method Type (FRM, FEM, ARM)	FRM	FRM	FEM
Appendix D Requirements - Network Design Criteria			
Site Type	Source-Oriented	Source-Oriented	Source-Oriented
Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Micro	Micro	Micro
Monitoring Season	Jan-Dec	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes	Yes	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria			
Distance between collocated samplers	N/A	N/A	N/A
Probe Inlet Height	4.3 meters	4.3 meters	3.6 meter

Airflow Arc	360º	360º	360º
Probe Sample Line Material	Teflon™	Teflon™	N/A
Pollutant Sample Residence Time	4.4	4.4 sec	N/A
Distance from Supporting Structure	none	none	none
Distance from Obstructions	none	none	none
Distance to Furnace Flue	No Furnace	No Furnace	No Furnace
Spacing from Trees	none	none	none
Nearest Major Roadway	I-10	I-10	I-10
Distance and Direction to Road	13.5 meters, N	13.5 meters, N	13.5 meters, N
Traffic Count (ADT)	245,632	245,632	245,632
Groundcover	Gravel	Gravel	Gravel

WEST CHANDLER
County ID: WC
AQS ID: 04-013-4004
Address: 275 S Ellis, Chandler
Coordinates: 33.29898N, -111.88431W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information			
Pollutant	**CO**	**O_3**	**PM_{10}**
Parameter Code	42101	44201	81102
Parameter Occurrence Code	1	1	1
Collection Frequency	Continuous	Continuous	Continuous
Analysis Method (sample filters only)	N/A	N/A	N/A
Any Proposal to Remove or Move Monitor?	No	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs			
Number of Precision Checks Performed Annually	18	30*	22**
Number of Accuracy Audits Performed Annually	4	6	4
Dates of Accuracy Audits on Gaseous & PM Analyzers	01/06/15 02/11/15 03/04/15 09/03/15	01/15/15 04/17/15 04/29/15 05/13/15 08/19/15 10/29/15	01/15/15 06/24/15 09/30/15 11/10/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	Bi-Weekly	Bi-Weekly	N/A
Frequency of Flow Rate Verification	N/A	N/A	Bi-Weekly
Appendix C Requirements - Monitoring Methodology			
Date Established	07/01/2000	07/01/2000	07/01/2000
Monitor Type	SLAMS	SLAMS	SLAMS
Monitor Make - Model	Teledyne API - M300	Teledyne API - M400	Thermo - TEOM 1405-S
Method Code	093	087	079
PM Monitor Flow Type	N/A	N/A	Low Volume
PM Monitor Collection Type	N/A	N/A	Size Specific
Method Type (FRM, FEM, ARM)	FRM	FEM	FRM
Appendix D Requirements - Network Design Criteria			
Site Type	Population Exposure	Population Exposure	Population Exposure
Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison

Monitoring Scale (Spatial Scale Represented)	Neighborhood	Neighborhood	Middle
Monitoring Season	Sep-Mar	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes	Yes	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria			
Distance between collocated samplers	N/A	N/A	N/A
Probe Inlet Height	4.4 meters	4.4 meters	4.4 meters
Airflow Arc	360º	360º	360º
Probe Sample Line Material	Teflon™	Teflon™	N/A
Pollutant Sample Residence Time	4.5 seconds	4.5 seconds	N/A
Distance from Supporting Structure	1.5 meters	1.5 meters	2.5 meters
Distance from Obstructions	3.5 meters	3.5 meters	3.5 meters
Distance to Furnace Flue	None	None	None
Spacing from Trees	14 meters, E	14 meters, E	14 meters, E
Nearest Major Roadway A	Frye Rd	Frye Rd	Frye Rd
Distance and Direction to Road	3.5 meters, S	3.5 meters, S	3.5 meters, S
Traffic Count (ADT)	Unknown (secondary street)	Unknown (secondary street)	Unknown (secondary street)
Nearest Major Roadway B	Ellis St	Ellis St	Ellis St
Distance and Direction to Road	73 meters, W	73 meters, W	71 meters, W
Traffic Count (ADT)	Unknown (secondary street)	Unknown (secondary street)	Unknown (secondary street)
Groundcover	Paved/Gravel	Paved/Gravel	Paved/Gravel

* The number of precision checks is 26. Several reports with date errors were entered into AQS; but this has no impact on the percent completeness. A corrective action plan is being developed.

** The number of precision checks is 20. Several reports with date errors were entered into AQS; but this has no impact on the percent completeness. A corrective action plan is being developed.

Note: The 2014 AMNP indicated that these monitors might need to be moved; however, no actions have been taken to date.

WEST 43RD AVENUE
County ID: WF
AQS ID: 04-013-4009
Address: 3940 W Broadway, Phoenix
Coordinates: 33.40642N, -112.14434W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information	
Pollutant	**PM_{10}**
Parameter Code	81102
Parameter Occurrence Code	1
Collection Frequency	Continuous
Analysis Method (sample filters only)	N/A
Any Proposal to Remove or Move Monitor?	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs	
Number of Precision Checks Performed Annually	22
Number of Accuracy Audits Performed Annually &	5
Dates of Accuracy Audits on the PM Analyzer	02/19/15 05/12/15 09/02/15 11/03/15 11/18/15
All Precision/Accuracy Reports Submitted to AQS?	Yes
Annual Data Certification Submitted?	04/25/16
Frequency of One-Point QC Check	N/A
Frequency of Flow Rate Verification	Bi-Weekly
Appendix C Requirements - Monitoring Methodology	
Date Established	04/01/2002
Monitor Type	SLAMS
Monitor Make - Model	Thermo - TEOM 1405-S
Method Code	079
PM Monitor Flow Type	Low Volume
PM Monitor Collection Type	Size Specific
Method Type (FRM, FEM, ARM)	FEM
Appendix D Requirements - Network Design Criteria	
Site Type	Highest Concentrations
Basic Monitoring Objective	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Middle
Monitoring Season	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria	
Distance between collocated samplers	N/A
Probe Inlet Height	5 meters
Airflow Arc	360º
Probe Sample Line Material	N/A

Pollutant Sample Residence Time	N/A
Distance from Supporting Structure	2.6 meters
Distance from Obstructions	None
Distance to Furnace Flue	None
Spacing from Trees	None
Nearest Major Roadway	Broadway Road
Distance and Direction to Road	37 meters, SE
Traffic Count (ADT)	Unknown
Groundcover	Gravel

WEST PHOENIX
County ID: WP
AQS ID: 04-013-0019
Address: 3847 W Earll, Phoenix
Coordinates: 33.48385N, -112.14257W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information						
Pollutant	**CO**	**NO_2**	**O_3**	**PM_{10}**	**$PM_{2.5}$ Primary**	**$PM_{2.5}$ Secondary**
Note: This is a collocated site for $PM_{2.5}$.						
Parameter Code	42101	42602	44201	81102	88101	88101
Parameter Occurrence Code	1	1	1	1	3	2
Collection Frequency	Continuous	Continuous	Continuous	Continuous	Continuous	1 in 12 days
Analysis Method (filter samples only)	N/A	N/A	N/A	N/A	N/A	*As per 40 CFR Part 50, Appendix L*
Analytical Laboratory (filter samples only)	N/A	N/A	N/A	N/A	N/A	Inter-Mountain Labs, Inc.
Any Proposal to Remove or Move Monitor?	No	No	No	No	No	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A	N/A	N/A	N/A	Yes	Yes
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs						
Number of Precision Checks Performed Annually	25	26	25	3	21	12
Number of Collocated Assessments (QA Filter Samples)	N/A	N/A	N/A	N/A	N/A	30
Number of Accuracy Audits Performed Annually	3	5	4	3	4	2
Dates of Accuracy Audits on Gaseous & PM Analyzers / Sampler	06/16/15 07/21/15 11/17/15	01/27/15 04/20/15 07/14/15 07/30/15 09/08/15	01/27/15 05/05/15 07/15/15 11/02/15	01/27/15 06/29/15 09/02/15	01/27/15 06/30/15 08/25/15 09/08/15	05/05/15 11/17/15
All Precision/Accuracy Reports Submitted to AQS?	Yes	Yes	Yes	Yes	Yes	Yes
Annual Data Certification Submitted?	04/25/16	04/25/16	04/25/16	04/25/16	04/25/16	04/25/16
Frequency of One-Point QC Check	Bi-Weekly	Bi-Weekly	Bi-Weekly	N/A	N/A	N/A
Frequency of Flow Rate Verification	N/A	N/A	N/A	Bi-Weekly	Bi-Weekly	Bi-weekly
Appendix C Requirements - Monitoring Methodology						

Date Established	01/01/84	05/24/90	01/01/84	02/01/88	09/01/05	06/13/00
Monitor Type	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS
Monitor Make - Model	Teledyne - API M300	Teledyne - API M200	Teledyne - API M400	Thermo - TEOM 1405-DF	Thermo - TEOM 1405-DF	Thermo - Partisol 2025
Note: PM_{10} and $PM_{2.5}$ continuous concentrations are measured by the same monitor. The TEOM 1405-DF collects air for both PM_{10} and $PM_{2.5}$ measurements through the same inlet. The Partisol 2025 collects the collocated QA filter samples once every 12 days.						
Method Code	093	099	087	079	182	145
PM Monitor Flow Type	N/A	N/A	N/A	Low Volume	Low Volume	Low Volume
PM Monitor Collection Type	N/A	N/A	N/A	Dichotomous	Dichotomous	Size Specific & Sequential
Method Type (FRM, FEM, ARM)	FRM	FRM	FEM	FEM	FEM	FRM
Appendix D Requirements - Network Design Criteria						
Site Type	Population Exposure	Population Exposure	Population Exposure	Population Exposure	Highest Concentration	Highest Concentration
Basic Monitoring Objective	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Monitoring Season	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes	Yes	Yes	Yes	Yes	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria						
Distance between collocated samplers	N/A	N/A	N/A	7.6 meters	7.6 meters	7.6 meters
Note: We are in the process of making site improvements that will allow us to move the secondary monitor to within 2 meters EPA specifications.						
Probe Inlet Height	4.3 meters	4.3 meters	4.3 meters	4.3 meters	4.3 meters	2.8 meters
Airflow Arc	360º	360º	360º	360º	360º	360º
Probe Sample Line Material	Teflon™	Teflon™	Teflon™	N/A	N/A	Teflon™
Pollutant Sample Residence Time	5.0 seconds	5.0 seconds	5.0 seconds	N/A	N/A	N/A
Filter Sample Material	N/A	N/A	N/A	N/A	N/A	Teflon™
Distance from Supporting Structure	1.3 meters	1.3 meters	1.3 meters	3 meters	2.5 meters	2.6 meters
Distance from Obstructions	None	None	None	None	None	11 meters
Distance to Furnace Flue	None	None	None	None	None	None
Spacing from Trees	None	None	None	None	None	None
Nearest Major Roadway	Thomas	Thomas	Thomas	Thomas	Thomas	Thomas
Distance and Direction to Road	360 meters, S	360 meters, S	360 meters, S	360 meters, S	360 meters, S	360 meters, S
Traffic Count (ADT)	29,000	29,000	29,000	29,000	29,000	29,000
Groundcover	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel

ZUNI HILLS
County ID: ZH
AQS ID: 04-013-4016
Address: 10851 West Williams Rd., Sun City
Coordinates: 33.68674N, -112.29417W
Metropolitan Statistical Area (MSA): 6200 Phoenix-Mesa

General Information	
Pollutant	**PM_{10}**
Parameter Code	81102
Parameter Occurrence Code	1
Collection Frequency	Continuous
Analysis Method (sample filters only)	N/A
Any Proposal to Remove or Move Monitor?	No
Is site suitable for comparison to $PM_{2.5}$ NAAQS per Part 58.30?	N/A
Appendix A Requirements- Quality Assurance Requirements for SLAMS and SPMs	
Number of Precision Checks Performed Annually	23
Number of Accuracy Audits Performed Annually	4
Dates of Accuracy Audits on the PM Analyzer	03/05/15 06/11/15 09/15/15 12/11/15
All Precision/Accuracy Reports Submitted to AQS?	Yes
Annual Data Certification Submitted?	04/25/16
Frequency of One-Point QC Check	N/A
Frequency of Flow Rate Verification	Bi-Weekly
Appendix C Requirements - Monitoring Methodology	
Date Established	12/01/09
Monitor Type	SLAMS
Monitor Make - Model	Thermo - TEOM 1405-S
Method Code	079
PM Monitor Flow Type	Low Volume
PM Monitor Collection Type	Size Specific
Method Type (FRM, FEM, ARM)	FEM
Appendix D Requirements - Network Design Criteria	
Site Type	Population Exposure
Basic Monitoring Objective	NAAQS Comparison
Monitoring Scale (Spatial Scale Represented)	Neighborhood Scale
Monitoring Season	Jan-Dec
Network Meets Minimum Number of Monitors Required?	Yes
Appendix E Requirements - Probe and Monitoring Path Siting Criteria	
Distance between collocated samplers	N/A
Probe Inlet Height	2.3 meters
Airflow Arc	360º
Probe Sample Line Material	N/A

Pollutant Sample Residence Time	N/A
Distance from Supporting Structure	2.3 meters
Distance from Obstructions	None
Distance to Furnace Flue	None
Spacing from Trees	None
Nearest Major Roadway	Williams Rd
Distance and Direction to Road	200 meters, N
Traffic Count (ADT)	Unknown (residential street)
Groundcover	Lawn/Dirt

APPENDIX III – NEAR-ROAD NO_2 MONITOR SITE SELECTION

Near-Road NO_2 Monitor Site Selection

By

Ronald Pope

Air Monitoring Data Coordinator

Maricopa County Air Quality

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1.0 Background

In 2010, the Environmental Protection Agency (EPA) implemented a new National Ambient Air Quality Standard for 1-hour nitrogen dioxide (NO_2). This new standard specifies new monitoring requirements which have NO_2 monitoring stations located in a near-road environment where peak NO_2 concentrations are expected to occur. Air agencies are required to consider traffic volumes; fleet mix, i.e. the ratio of heavy-duty to light duty vehicles; roadway design; traffic congestion patterns; local terrain and topography; and meteorology in determining where a required near-road NO_2 monitor should be placed. There are also other factors to be considered when siting a near-road monitor, including population exposure, stationary NO_2 sources, and site logistics (access, security, safety, and availability of power).

This report details the analysis process that Maricopa County Air Quality Department (MCAQD) performed, which considered all of these variables while choosing the best locations to site a near-road NO_2 monitor. This report will detail the analysis procedure, list general information about the areas under consideration, and then list detailed information on likely sites. Finally, the proposed locations will be noted with details on site logistics.

2.0 Initial Analyses

This section will describe general analyses results for the five study areas (which are described in section 2.1.1 and displayed in Figure 1). A more detailed analysis will follow in section 3.0 for each candidate road segment.

2.1 Traffic Count Data

Modeled traffic count data from the TransCAD travel demand model for the entire Maricopa County metropolitan region were obtained from the Maricopa Association of Government's (MAG) Transportation Division. MAG in turn collected actual traffic count data from the various municipal and county transportation agencies within the region and used those to validate its model. Modeled traffic count data have the advantage of complete coverage of all road segments within the metropolitan area, unlike actual traffic count data. The count data were from 2008, which was the most recent year available with complete data.

The data were in the format of shapefiles which were then entered into a Geographical Information System (GIS). The traffic data contained information on the Average Weekday Traffic (AWT) count for both heavy and light duty vehicles (modeled AWT represent daily traffic count, Monday-Friday). It also contained information on traffic congestion with a Level of Service (LOS) rating from A-F with F being the most congested; the most congested lane of traffic was used in the case of multiple road lanes. LOS data represent the peak afternoon traffic period of 3:00-6:00 PM. The data contained road segments from all arterial roads in the metropolitan area as well as freeways and highways.

Spatial AWT data were tabulated and ranked for both total traffic counts and heavy duty vehicle traffic counts. Road segments which had the same AWT were assigned the same rank. Fleet mix, which takes into account that heavy-duty vehicles emit more NO_x than light-duty vehicles, was calculated using the Fleet-Equivalent AWT (FE-AWT) equation:

$$FE\ AWT = (AWT - HD_c) + (10 * HD_c) \qquad (1)$$

where AWT is the total traffic volume count for a particular road segment and HD_c is the count of heavy-duty vehicles for a particular road segment. The multiplier of 10 represents the heavy-duty to light-duty NO_x emission ratio for a particular road segment, as suggested by the EPA as a national default.

The FE-AWT count was ranked and a table of candidate sites was created and sorted by FE-AWT rank. Table 1 lists the first 30 candidate road segments from this list. Notice that LOS has also been added to the table for each candidate. Figure 1 displays a map of these segments and Figure 2 shows the top 100 segments with LOS symbolized. A list of the top 100 candidates can be found in Appendix I.

Table 1. List of the top 30 candidate road segments.

Roadway	LENGTH (miles)	Total AWT	AWT Rank	Heavy Duty Vehicle AWT	Heavy Duty Vehicle Rank	Fleet Equivalent-AWT	**FE-AWT Rank**	LOS
I-10	0.39	320,138	1	33,797	3	624,315	1	F
I-10	0.33	320,138	1	33,797	3	624,315	1	F
I-10	0.01	301,178	3	34,864	1	614,953	2	E
I-10	0.48	301,178	3	34,864	1	614,953	2	E
I-10	0.53	301,178	3	34,864	1	614,953	2	E
I-10	0.32	308,452	2	33,301	4	608,161	3	F
I-10	0.33	290,026	5	34,027	2	596,270	4	D
I-10	0.21	283,658	9	33,161	5	582,105	5	F
I-10	0.2	283,658	9	33,161	5	582,105	5	F
I-10	0.14	289,986	6	32,106	6	578,938	6	F
I-10	0.35	276,549	11	31,412	8	559,257	7	F
I-10	0.24	276,549	11	31,412	8	559,257	7	F
I-10	0.43	264,346	15	32,071	7	552,988	8	F
I-10	0.19	248,446	31	29,264	9	511,821	9	D
I-10	0.26	263,459	16	27,186	11	508,129	10	F
I-10	0.14	268,637	14	25,078	15	494,335	11	D
I-10	0.24	268,637	14	25,078	15	494,335	11	D
I-10	0.52	272,776	13	24,230	18	490,848	12	E
I-10	0.13	260,136	17	25,634	12	490,839	13	F
I-10	0.23	260,136	17	25,634	12	490,839	13	F
US 60	0.07	284,657	8	22,697	29	488,934	14	E
US 60	0.14	284,657	8	22,697	29	488,934	14	E
US 60	0.08	290,124	4	21,820	37	486,500	15	E
US 60	0.05	290,124	4	21,820	37	486,500	15	E
I-10	0.3	234,017	39	27,886	10	484,994	16	E
I-10	0.19	255,076	24	25,365	13	483,366	17	E
I-10	0.21	255,076	24	25,365	13	483,366	17	E
I-10	0.19	252,538	28	24,392	17	472,062	18	E
I-10	0.05	252,187	29	24,392	17	471,711	19	E
I-10	0.59	253,339	25	24,108	20	470,309	20	D

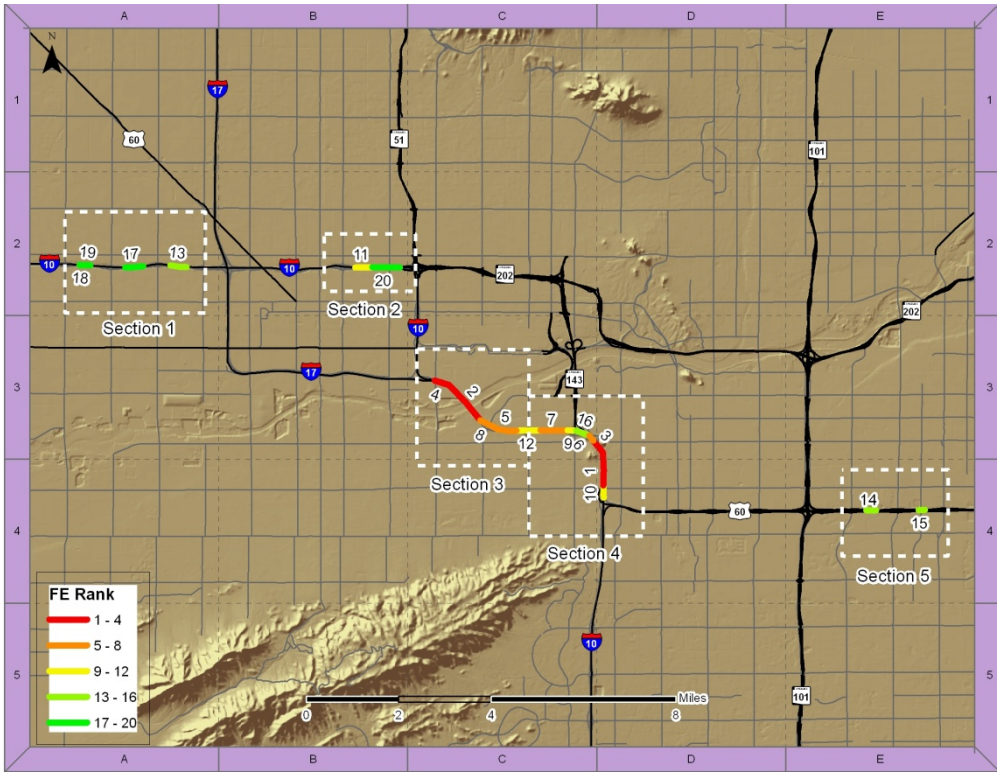


Figure 1. Map displaying the top 30 candidate road segments labeled with the fleet-equivalency rank. Note that there are only 20 ranks because of ties. Five study sections, based on geographical location, have been added to the map.

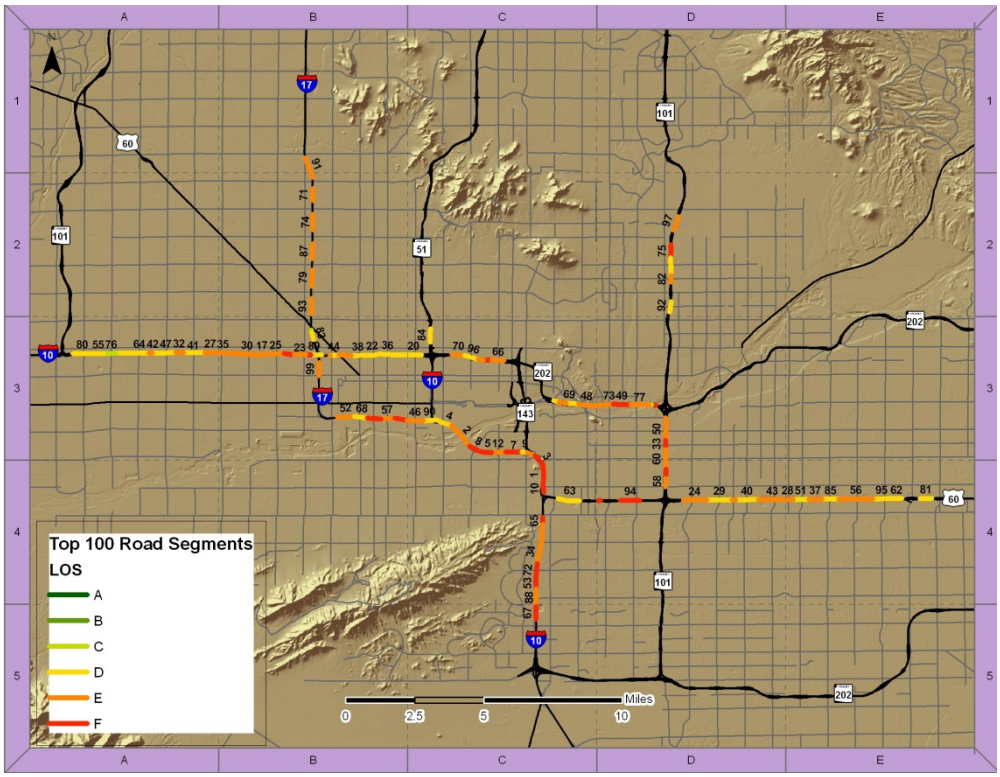


Figure 2. Traffic congestion levels in Phoenix. The top 100 road segments are color symbolized by their LOS rating.

2.1.1 Candidate Road Segments and Study Areas

Figure 1 demonstrates that the majority of the candidate road segments with the top 30 FE-AWT rankings occur on the I-10 between the US 60 and I-17 interchanges. These segments also have high congestion rankings with LOS ratings of D or greater. Several other locations along the I-10 in central and western Phoenix ranked in the top 30; in addition these locations have very high LOS rating of D through F. Two locations along US 60 in Mesa made the Top 30 and their LOS ratings both were E.

These top 30 locations will be explored further with other analysis. The areas around the top 30 locations were divided into the following study areas, which are labeled on Figure 1:

1. Western Phoenix I-10 (grid A2)
2. Central Phoenix I-10 (grid B2)
3. I-10 between 40th Street and I-17 (grid C3)
4. I-10 between US 60 and 40th Street (grid C3 and D4)
5. Mesa US 60 (grid E4)

2.2 Physical Considerations for Candidate Sites

2.2.1 Terrain

All candidate road segments are located within the Salt River basin, which consists of relatively flat terrain with similar elevation. An exception to this are the candidate road segments located in the Broadway curve section of I-10 (the southeastern portion of grid C3 in Figure 1). Bell Butte, located northeast of the Broadway curve, is about 200 feet higher in elevation than the interstate. The Twin Buttes, located to the southwest of the curve, are about 180 feet higher (Figure 3).

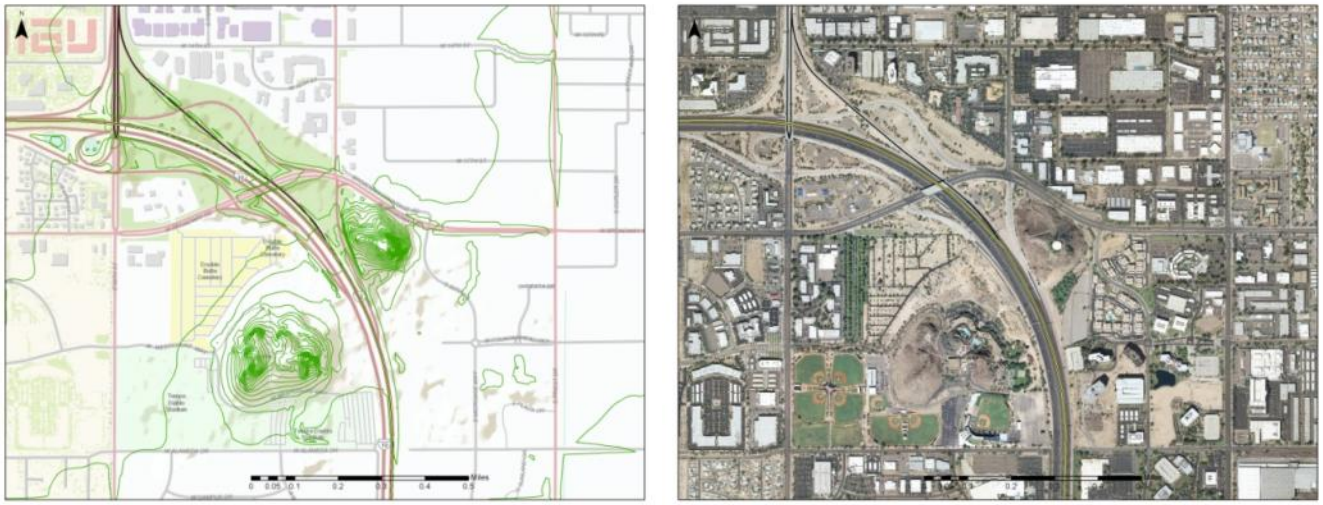


Figure 3. Topographic and aerial photograph maps of the Broadway curve section of the I-10 freeway.

2.2.2 Roadway Design

This analysis will note the design features (grade) of freeways. Analysis results are by study section.

1. Study Section 1: Western Phoenix I-10 (grid A2)

The three road segment locations within section 1 are located on freeway that is approximately 20' below-grade from the surrounding area (Figure 4). The roadside to the north and south of the freeway is sloped.

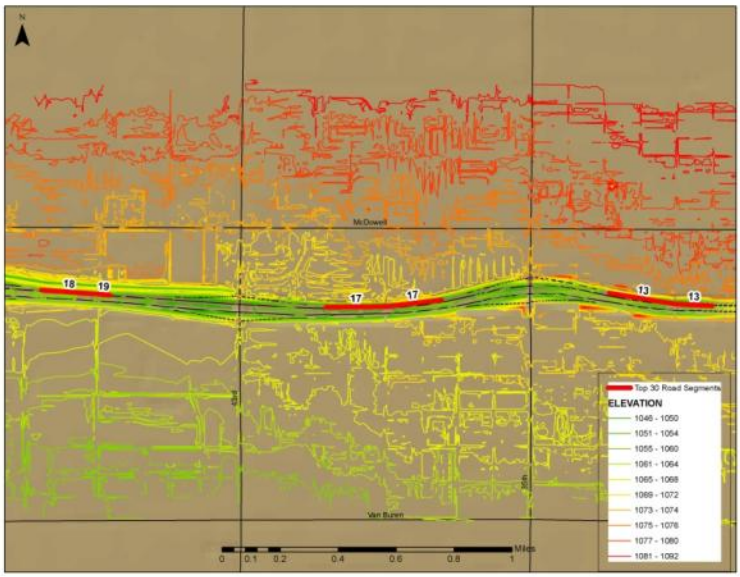


Figure 4. Topographic map of the I-10 area between 51st and 27th Avenues showing contours of elevation. Colors note the elevation, with lowest-to-highest elevation symbolized as green-yellow-red. The I-10 freeway itself is approximately 20' below-grade.

2. Study Section 2: Central Phoenix I-10 (grid B2)
   The two road segment candidates in this section are approximately 20-30' below-grade from the surrounding area with steeply sloped walls (Figure 5).

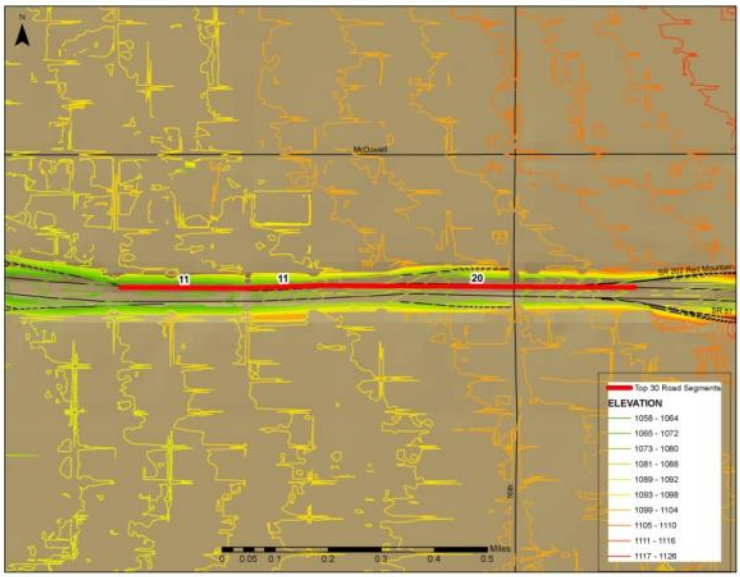


Figure 5. Topographic map of the Central I-10 area between the Deck Park tunnel and the SR 51 interchange. The I-10 freeway itself is approximately 20-30' below-grade.

3. Study Section 3: I-10 between 40th Street and I-17 (grid C3).

With the exception of the portion crossing the Salt River, most of the freeway in this portion is at or above grade with the surrounding terrain. The above-grade areas are approximately 5-10 feet higher (Figure 6).

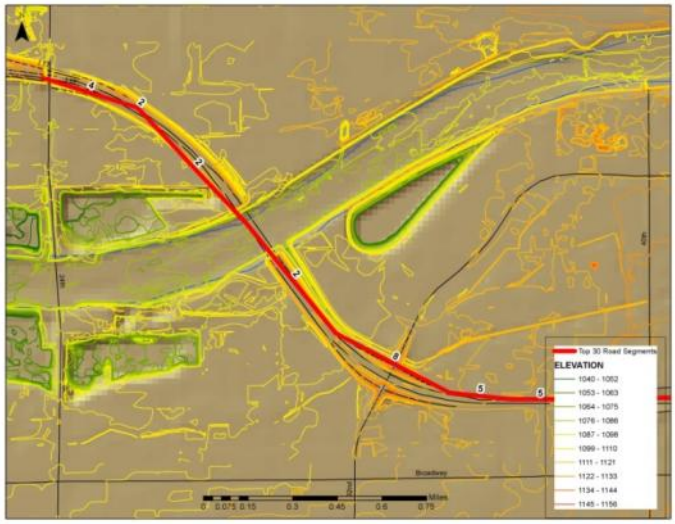


Figure 6. Topographic map of the western portion of the I-10 between 24th and 40th streets. The I-10 freeway itself is approximately 5-10 feet above-grade.

4. Study Section 4: I-10 between US 60 and 40th Street (grid C3 and D4).

This portion is also at or above grade with the surrounding terrain, with the exception of the Broadway curve area which passes between Bell Butte and the Twin Buttes. The above-grade areas are approximately 0-5 feet higher (Figure 7).

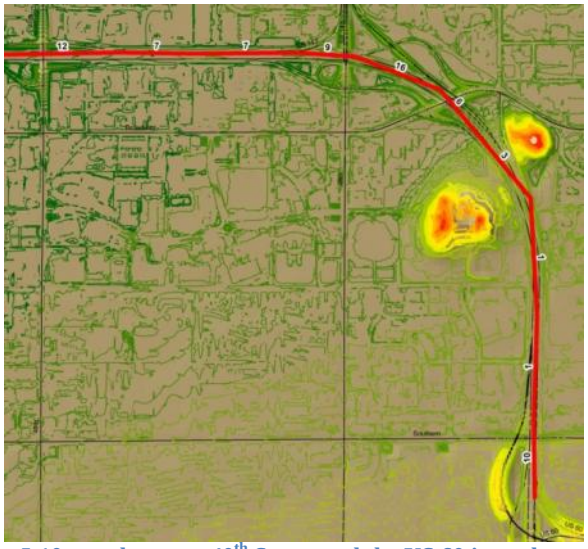


Figure 7. Topographic map of the I-10 area between 40th Street and the US 60 interchange.. The I-10 freeway itself is approximately 0-5' above grade from the surrounding terrain.

5. Study Section 5: Mesa US 60 (grid E4)

This two candidate road segments in this section are approximately 10 feet below-grade from the surrounding terrain (Figure 8).

Figure 8. Topographic map of the US 60 freeway between Dobson Rd and Country Club Rd. The freeway is approximately 10' below-grade from the surrounding terrain.

2.2.3 Roadside Structures

1. Study Section 1: Western Phoenix I-10 (grid A2)

   This section of the I-10, running from 51st to 27th Avenues, has sound walls that begin at 43rd Avenue and continue to the east. The sound walls are both on the north and south side of the freeway. The walls are located from 30 to 100 feet from the edge of the freeway, and are located at the top of the slope. There is usually vegetation (trees) between the sound wall and the freeway (Figure 9).

   To the west of 43rd Avenue the sound wall stops, but there is a canal 130' to the north of the freeway.

Figure 9. Oblique aerial view of slope and sound wall on the I-10 at 33rd Avenue.

2. Study Section 2: Central Phoenix I-10 (grid B2)

   This section of the I-10, running from 7th Street to just past 16th Street, has sound walls on both the north and south sides of the freeway, though there are some gaps (Figure 10). The sound walls are located at the top of a steep slope leading down to the freeway.

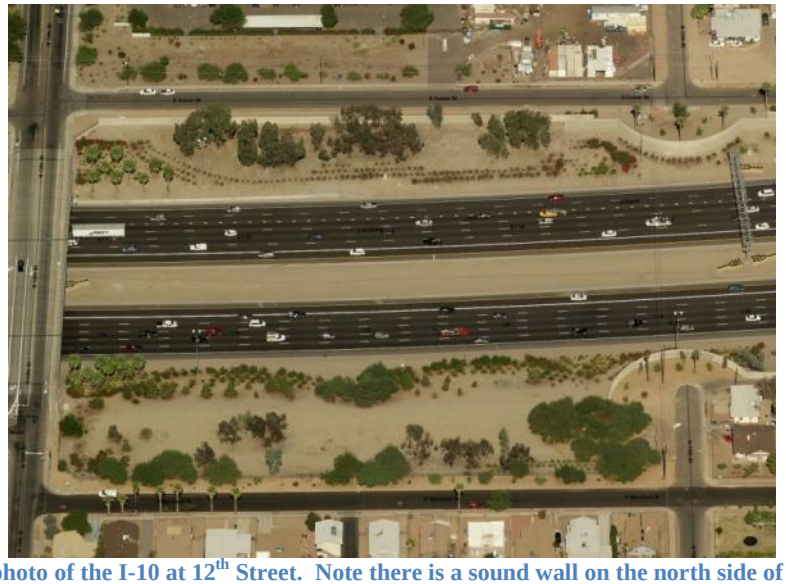


Figure 10. Oblique aerial photo of the I-10 at 12th Street. Note there is a sound wall on the north side of the freeway, but not the south side. There is a steep slope on the south side, however.

3. Study Section 3: I-10 between I-17 and 40th Street (grid C3).

   This section of freeway does not have any sound walls. There are few structures to the west of the Salt River bridge; the structures to the east of the bridge are set back an average of 100 feet.

   There are ditches which drain to the Salt River to the north and south of the freeway at various points, but these ditches are not continuous along the entire freeway section and access points exist.

4. Study Section 4: I-10 between 40th Street and US 60 (grid C3 and D4).

There is a sound wall on the south side of the freeway between 44th and 48th Streets; but there are few such structures along the other portions. There are buildings at various places along this stretch, but these buildings are usually set back more than 100 feet.

There are many locations along this portion of freeway with empty lots or parking lots abutting the freeway.

6. Study Section 5: Mesa US 60 (grid E4):

There is a sound wall on the south portion of freeway which extends through the entire section. The north side does not have a sound wall, but a canal located at the top of the slope extends through the entire length of freeway at this section.

Figure 11. US 60 freeway just to the west of Longmore Avenue. There is a sound wall to the south and a canal to the north. These structures are typical along this portion of freeway in Study Section 5.

2.2.4 Meteorology

Meteorology of the region was analyzed by using wind roses which show the proportional wind speed and direction for all of 2011. The wind towers located at MCAQD monitoring sites were used as sources for scalar wind data.

Figure 12 displays a map of the central urban area with the wind roses superimposed over the monitoring sites. This graphic shows that, on average, wind direction across the Salt River basin is most often from west to east and the next most frequent is east to west. On a smaller time scale, wind direction is often diurnal, with the wind usually from the east in the morning and from the west in the afternoon, though this pattern often changes in the summer monsoon season with winds from the south-southeast in the afternoon. The more open terrain to the west of the basin has higher wind speeds, while the Tempe area (which is surrounded by hilly terrain) has the slowest.

Because of these regional characteristics, a near-road monitoring site located on a north-south oriented freeway would be most desirable. A monitoring site on an east-west oriented freeway might be impacted by traffic emission being transported from downwind.

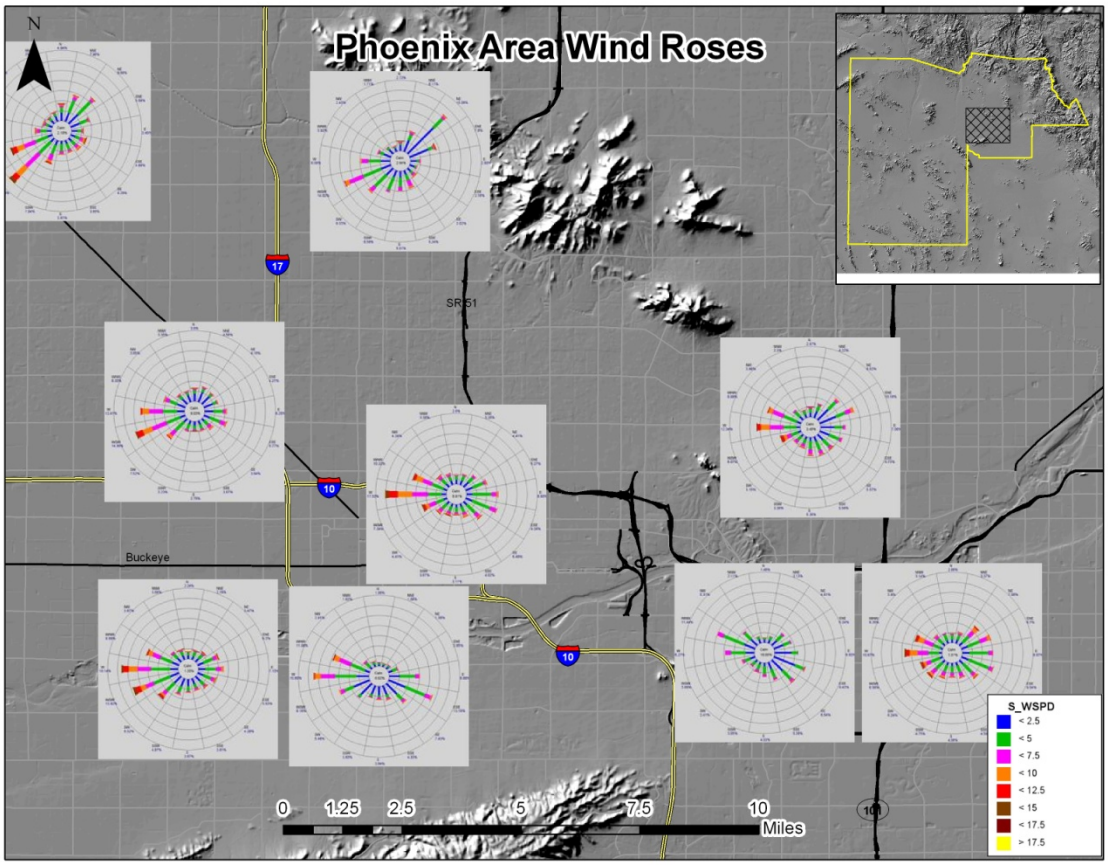


Figure 12. Wind roses for each of the MCAQD monitoring sites. Scalar wind speed and direction for 2011 was analyzed in the chart. The length of each stem on the chart notes the proportional time that wind was out of that direction. The colors on each stem symbolized wind speeds; the width of the color symbolizes the proportion of time the wind is at that speed.

2.3 Population Exposure

To estimate the population exposure in the five study areas, census tract data were obtained from the 2010 U.S. Census and added to the GIS map. A one-mile buffer around each candidate road segment was created and tract centroids that fell within that buffer were counted for total population. Results were aggregated by study section (Table 2).

Areas having the higher population exposure were given greater weight in the site selection process.

Table 2. Population estimates for the five study areas, source is the 2010 U.S. Census.

Map Study Section	Population
1	67,000
2	48,000
3	8,000
4	30,000
5	32,000

2.4 Surrounding Land Use

In addition to the population exposure analysis, the land use types surrounding the candidate road segments were determined. Data for this analysis came from the Maricopa County Assessor's Office. Parcel data were analyzed within the GIS and parcels within a one-mile buffer of each candidate road segment were selected. The various land use codes from the parcel data were then aggregated into five general types: Agricultural, Commercial, Industrial, Residential, and Vacant. Statistics for each study area were then generated and tabulated. Candidate road segments having greater proximity to residential areas were given greater weight in the site selection process.

Study Section 1:

Land Use Type	#Parcels	%Parcels	Area (Acres)	%Area
Agricultural	3	0.03%	98.15	2.61%
Commercial	1079	11.45%	1778.09	47.24%
Industrial	77	0.82%	243.61	6.47%
Residential	7955	84.39%	1461.02	38.82%
Vacant	313	3.32%	182.86	4.86%
Total	9427	100.00%	3763.72	100.00%

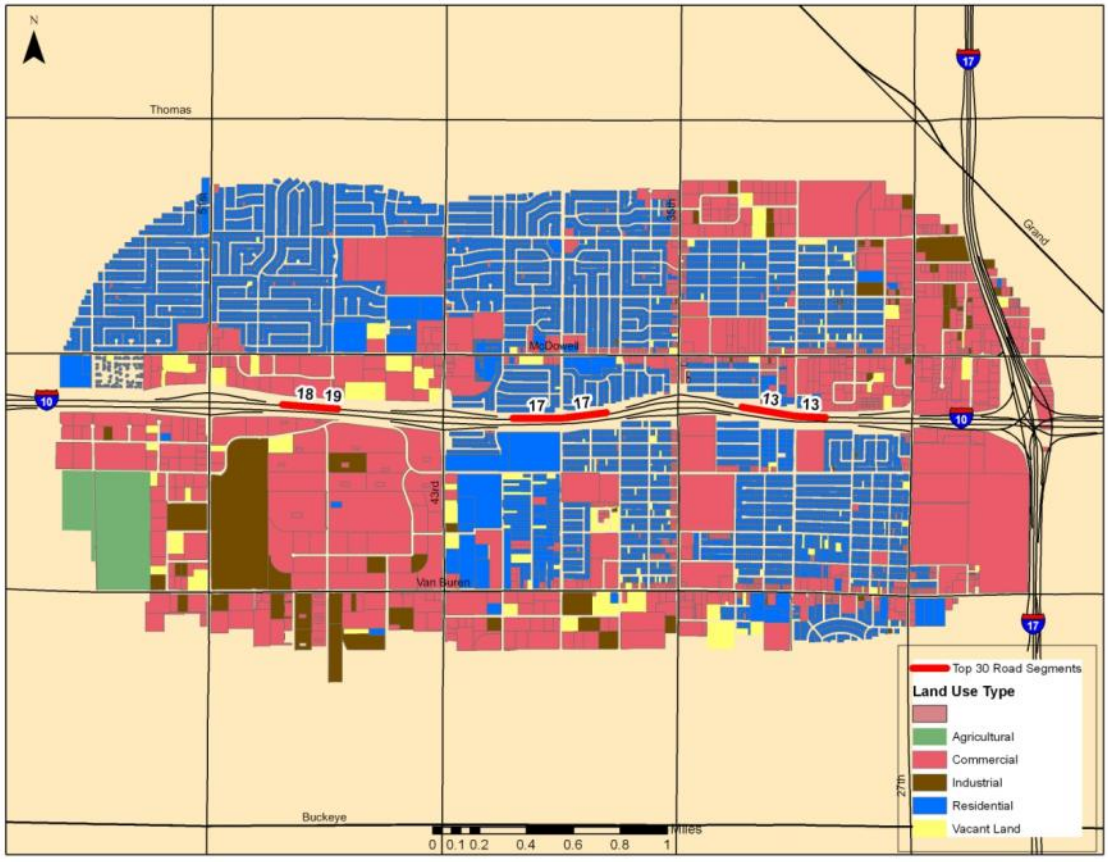


Figure 13. Map of property land use type from Study Section 1 of the candidate road segments.

Study Section 2:

Land Use Type	#Parcels	%Parcels	Area (Acres)	%Area
Agricultural	1	0.01%	2.07	0.09%
Commercial	1529	17.89%	1098.31	47.15%
Industrial	30	0.35%	15.72	0.67%
Residential	6217	72.74%	1055.09	45.29%
Vacant	770	9.01%	158.19	6.79%
Total	8547	100.00%	2329.38	100.00%

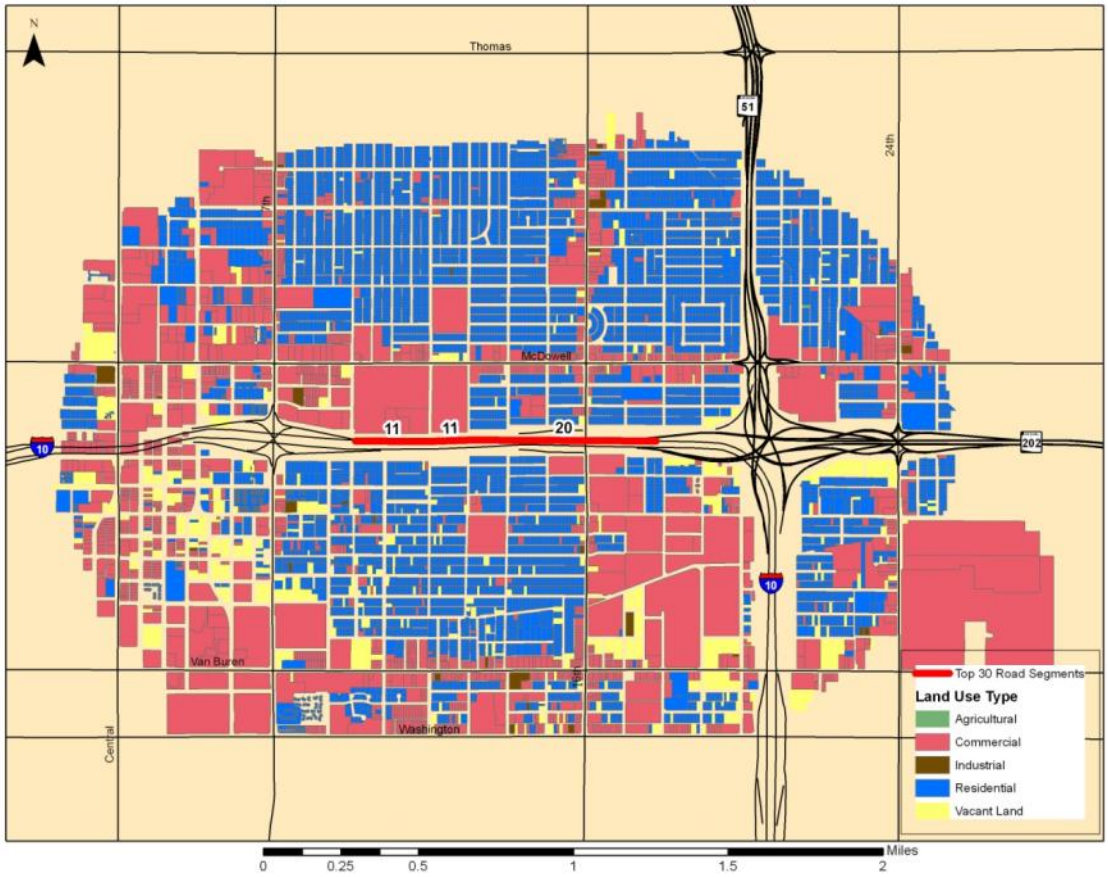


Figure 14. Map of property land use type from Study Section 2 of the candidate road segments.

Study Section 3:

Land Use Type	#Parcels	%Parcels	Area (Acres)	%Area
Agricultural	2	0.08%	11.57	0.30%
Commercial	1001	41.94%	2531.31	65.26%
Industrial	102	4.27%	339.71	8.76%
Residential	824	34.52%	152.91	3.94%
Vacant	458	19.19%	843.09	21.74%
Total	2387	100.00%	3878.59	100.00%

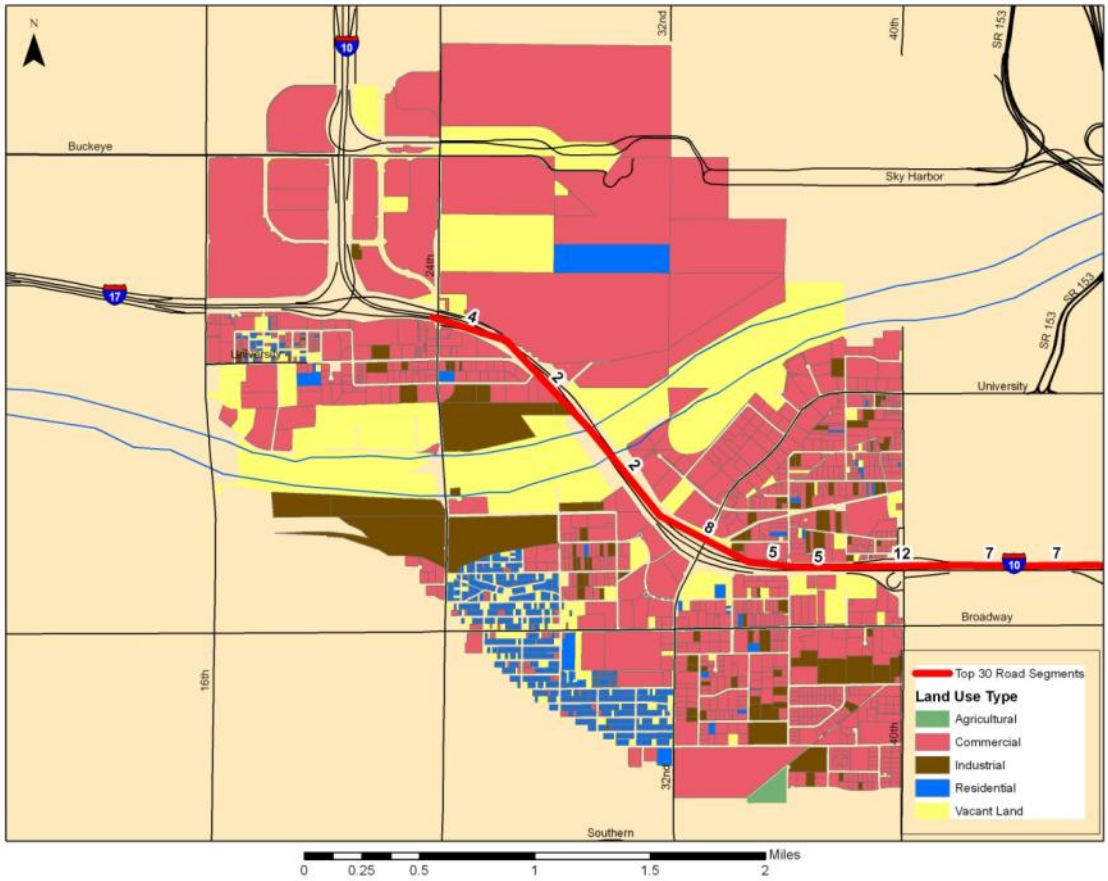


Figure 15. Map of property land use type from Study Section 3 of the candidate road segments.

Study Section 4:

Land Use Type	#Parcels	%Parcels	Area (Acres)	%Area
Agricultural	5	0.09%	21.27	0.60%
Commercial	1292	22.58%	2318.88	65.85%
Industrial	97	1.70%	214.94	6.10%
Residential	4156	72.64%	782.80	22.23%
Vacant	171	2.99%	183.32	5.21%
Total	5721	100.00%	3521.21	100.00%

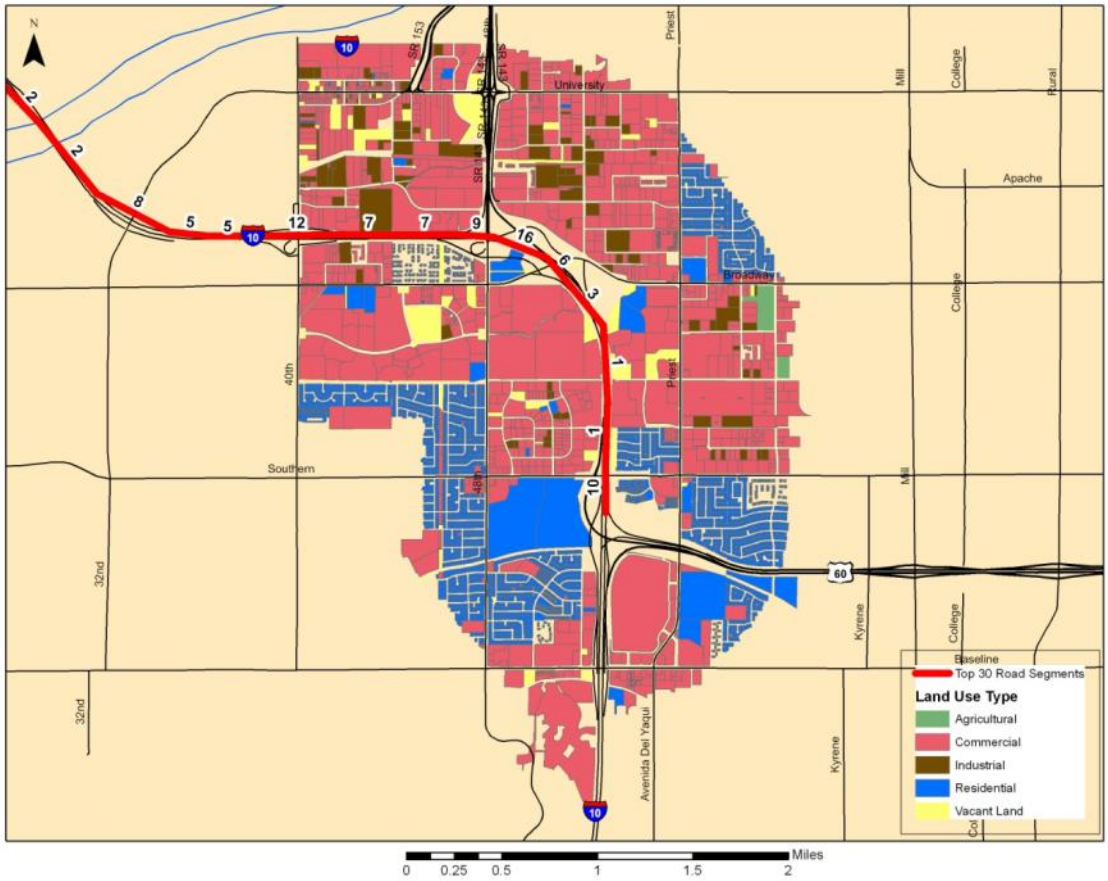


Figure 16. Map of property land use type from Study Section 4 of the candidate road segments.

Study Section 5:

Land Use Type	#Parcels	%Parcels	Area (Acres)	%Area
Agricultural	0	0.00%	0.00	0.00%
Commercial	638	7.33%	1474.98	51.74%
Industrial	1	0.01%	4.66	0.16%
Residential	7664	88.01%	1212.05	42.52%
Vacant	405	4.65%	159.01	5.58%
Total	8708	100.00%	2850.69	100.00%

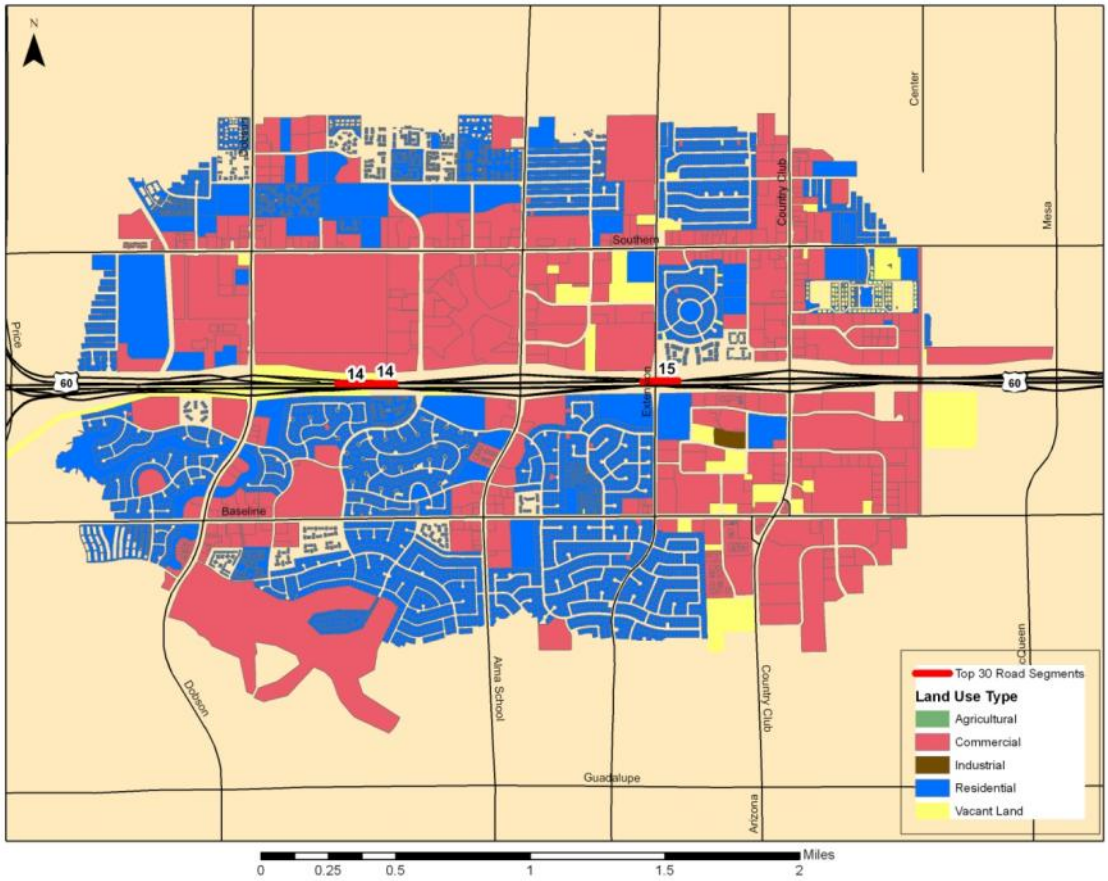


Figure 17. Map of property land use type from Study Section 5 of the candidate road segments.

2.5 Influence of Background Non-Road Sources

Stationary sources of NO_2, such as power generating plants, can unfavorably influence the background concentration of NO_2 at a near-road monitoring site. Because of this, candidate road segments with the least amount of influence from background NO_2 sources were given more weight in the site selection process.

Stationary source NO_x data came from the 2008 Maricopa County Annual Emissions Inventory. Emissions from permitted sources that are reported on the inventory were spatially aggregated by township, range, and section. These spatial data were then added to the GIS to create a map of estimated NO_x emissions (Figure 18). NOx emissions were also aggregated by study section (Table 3). The site

selection process then used the total background NOx emissions within the candidate road segment's study area, and also its orientation to major sources based on average meteorological conditions.

Table 3. Approximate NOx emissions within 1 mile of each candidate section. Emission estimates are from the Maricopa County 2008 Annual Emissions Inventory and point sources were aggregated by township, range, and section.

Study Section	NOx Emissions (lbs per year)
1	917,916
2	75,754
3	117,088
4	124,173
5	61,550

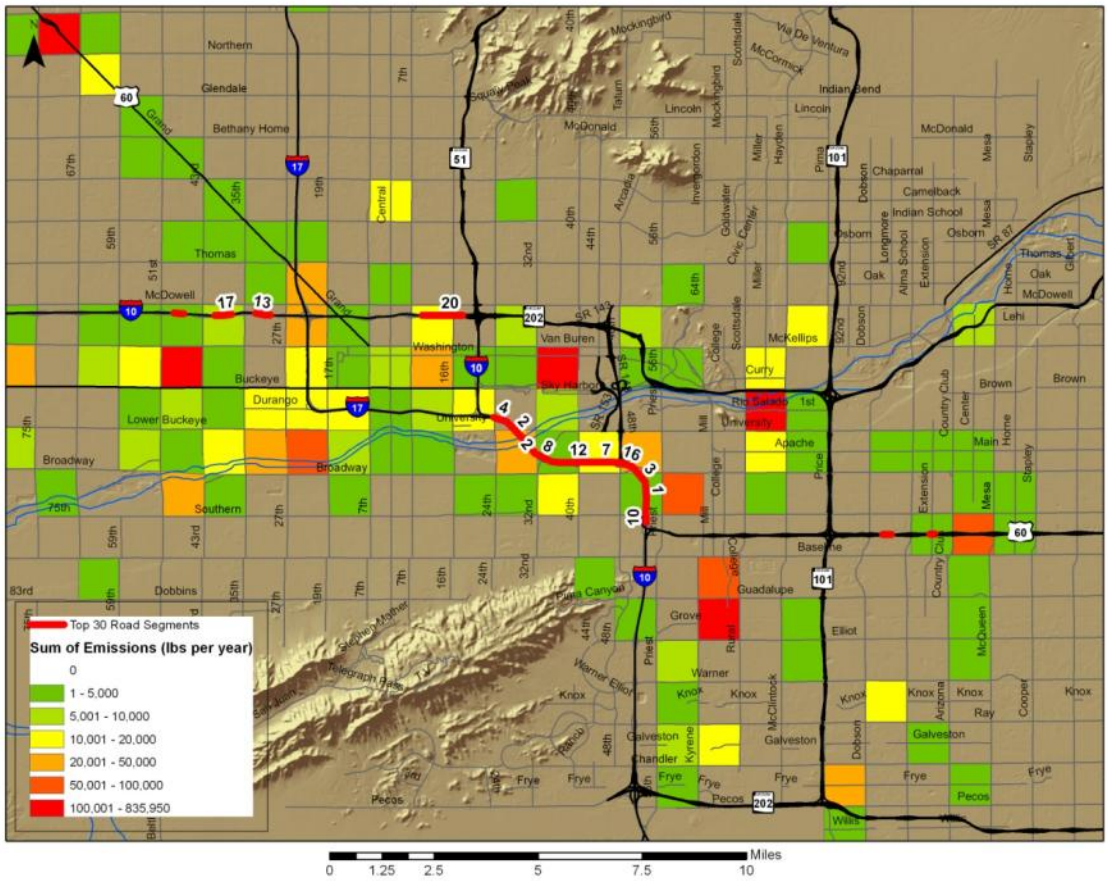


Figure 18. Map of estimated NOx emissions by location. Point NOx sources from the Maricopa County 2008 Annual Emissions Inventory were aggregated by township, range and section and displayed as color-coded squares above. Sections that did not have any reportable NOx emissions were left uncolored.

3.0 Site Selection

The top 30 candidate road segments, from Table 1, were individually analyzed for a number of parameters. As noted on Table 1, there are several tied segments in the FE-AWT rank; these tied road

segments are all adjacent to each other (as the traffic counts are generated by modeled data), so ties were combined, making a total of 20 segments analyzed. The candidate road segments were labeled Candidate #1-20, based upon their fleet equivalency rank.

Much of the general, large scale, data generated in the Section 2.0 initial analyses were used to evaluate the individual road segments; however, these Section 3.0 analyses go into much greater detail and take into account characteristics surrounding the segment. The characteristics that were analyzed for each candidate road segment are detailed in Appendix II, while Appendix III contains an aerial photo of each segment.

Following these analyses, a matrix score table was created using selected supporting features (Table 4). Scores were numbered 1-5, with 5 being the highest possible, and was based upon an arbitrary decision where the most desirable qualities of the feature were perceived. Note that site selection was not based solely on these scores, they are only supporting information.

Table 4. Matrix of analysis scores of supporting features. Scores are from 1-5; where a 5 means the feature has the most desirable qualities.

Candidate #	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Study Section	4	3	4	3	3	4	4	3	4	4
FE-AWT Count	624,315	614,953	608,161	596,270	582,105	578,938	559,257	552,988	511,821	508,129
Congestion	5	4	5	3	5	5	5	5	3	5
Terrain Ranking	3	3	1	5	5	3	5	5	4	4
Roadway Design	5	4	1	4	5	4	5	4	5	5
Roadside Structures	5	5	5	5	5	5	3	5	5	3
Meteorology	5	3	1	1	2	1	2	1	2	5
Population Exposure	3	1	3	1	1	3	3	1	3	3
Surrounding Land Use	3	1	3	1	1	3	3	1	3	3
Background Sources	4	3	4	5	4	4	4	4	3	5
Average of supporting features	**4.13**	**3.00**	**2.88**	**3.13**	**3.50**	**3.50**	**3.75**	**3.25**	**3.50**	**4.13**

Candidate #	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Study Section	2	3/4	1	5	5	4	1	1	1	2
FE-AWT Count	494,335	490,848	490,839	488,934	486,500	484,994	483,366	472,062	471,711	470,309
Congestion	3	4	5	4	4	4	4	4	4	3
Terrain Ranking	5	5	5	5	5	4	5	5	5	5
Roadway Design	1	5	2	3	3	4	2	2	2	1
Roadside Structures	1	5	2	1	1	5	2	3	3	1
Meteorology	1	2	2	2	2	2	2	2	2	1
Population Exposure	4	2	5	3	3	3	5	5	5	4
Surrounding Land Use	5	2	5	5	5	3	5	5	5	5
Background Sources	4	4	4	5	4	3	3	3	3	4
Average of supporting features	**3.00**	**3.63**	**3.75**	**3.50**	**3.38**	**3.50**	**3.50**	**3.63**	**3.63**	**3.00**

The site selection process consisted of going through the candidates individually. Sites with a higher fleet equivalency rank had priority, with Level of Service (congestion) data and the supporting feature data modifying that on a case-by-case basis. Each of the top 20 candidate road segments were then inspected to see if a monitoring site was feasible, i.e., were there locations available that granted access, safety, and power.

4.0 Final Selections

4.0.1 Site #1

Following these analyses, it was decided that Candidate #1 was the first choice for the near-road NO_2 monitoring site. Not only was this site first in fleet equivalency rank, but it passed all of our tests. Specifically, the reasons for choosing this location are:

- #1 in fleet-equivalency rank, #1 in average weekday traffic rank, and #3 in heavy duty vehicle traffic (Table 1). Traffic congestion is extreme, with an LOS of 'F'.
- This candidate had the highest score in the supporting features with the features being either average or higher on the scale (Table 4). Though most of the adjacent area is commercial property, there are considerable residential parcels nearby (see Figure 16).
- There are locations alongside this road segment with access, safety, security, and power available. The Arizona Department of Transportation (ADOT), which owns these frontage spaces, is willing to work with us in establishing a monitoring site.
- Though major road construction is planned on this freeway in 2019 (freeway widening), we've discussed the issue with ADOT and believe that we'll be able to move the monitoring site back far enough to accommodate it (during and after construction). In the event that such a move is not possible, we would have to prepare another assessment to relocate the monitoring site; there are other possibilities on the I-10 freeway, though the entire freeway is undergoing major road construction from the US60/I-10 split to the I-17/I-10 split beginning in 2019.

The specific location that we are considering is located on the west side of the I-10 freeway just south of the Fairmont/Diablo way intersection (Figure 19). The coordinates are 33.396250, -111.967967. There is a concrete barrier between the freeway and the frontage, offering safety. We will erect a secure shelter for housing the monitoring instruments, and power can be brought in.

Figure 19. Aerial photograph and street view of proposed monitoring Site #1.

4.0.2 Site #2

For the second near-road site, it was decided to find a location farther away from the Site #1 so as to represent a different area. We also wanted to locate the monitor near a high-density population source. Many of the top-ranked candidates (based on fleet-equivalency) are located in study sections 3 and 4, which is not only close to Site #1, but is surrounded mostly by commercial and industrial parcels.

The next most desirable location was Candidate #13, located in western Phoenix in study section 1. This location was chosen for Site #2 for the following reasons:

- #13 in FE-AWT rank, #17 in AWT traffic, and #12 in heavy-duty vehicle traffic (Table 1).
- Extreme traffic congestion with a LOS of 'F' (Table 1).
- Many residential parcels nearby (see Figure 13).
- The supporting feature score (Table 4) is second highest among the candidates.
- The frontage space is owned by ADOT, who will work with us to establish a site.

The site does have drawbacks: it located in an east-west orientation, which is parallel to the average wind direction; the freeway is also approximately 20' below grade; there is an overpass at 35th Avenue; and there are sound walls located along the freeway. However, we propose that the positive aspects outweigh the negative, and features alongside this road segment will allow us access while avoiding the sound walls.

The location that we are considering is at 34th Avenue on the south side of the I-10 freeway, in a sound wall gap following the 35th Avenue on-ramp. The coordinates are 33.462103, -112.130393. It is proposed to place a secure monitoring shelter at the top of the grade; safety features consist of the setback from the on-ramp and the grade of the slope (note that concrete barricades could be put in place around the shelter). Availability of power has not yet been verified at this location, though it appears feasible.

If power is unavailable at this location, alternative sites are being considered on the south side of I-10 near 33rd Avenue or on the south side of I-10 near 28th Avenue, though this latter location is on the road segment ranked #23 in fleet equivalency rank.

Figure 20. Aerial photograph and street view of proposed monitoring Site #2.

Appendix I

List of Top 100 Candidate Road Segments

Table 5. Top 100 Road Segment Candidates based on the Fleet-Equivalent Equation. See Figure 21, following this table, for a map of road segment locations.

Roadway	LENGTH (miles)	Total AWT	AWT Rank	Heavy Duty Vehicle AWT	Heavy Duty Vehicle Rank	Fleet Equivalent-AWT	**FE-AWT Rank**	LOS
I-10	0.39	320,138	1	33,797	3	624,315	1	F
I-10	0.33	320,138	1	33,797	3	624,315	1	F
I-10	0.01	301,178	3	34,864	1	614,953	2	E
I-10	0.48	301,178	3	34,864	1	614,953	2	E
I-10	0.53	301,178	3	34,864	1	614,953	2	E
I-10	0.32	308,452	2	33,301	4	608,161	3	F
I-10	0.33	290,026	5	34,027	2	596,270	4	D
I-10	0.21	283,658	9	33,161	5	582,105	5	F
I-10	0.2	283,658	9	33,161	5	582,105	5	F
I-10	0.14	289,986	6	32,106	6	578,938	6	F
I-10	0.35	276,549	11	31,412	8	559,257	7	F
I-10	0.24	276,549	11	31,412	8	559,257	7	F
I-10	0.43	264,346	15	32,071	7	552,988	8	F
I-10	0.19	248,446	31	29,264	9	511,821	9	D
I-10	0.26	263,459	16	27,186	11	508,129	10	F
I-10	0.14	268,637	14	25,078	15	494,335	11	D
I-10	0.24	268,637	14	25,078	15	494,335	11	D
I-10	0.52	272,776	13	24,230	18	490,848	12	E
I-10	0.13	260,136	17	25,634	12	490,839	13	F
I-10	0.23	260,136	17	25,634	12	490,839	13	F
US 60	0.07	284,657	8	22,697	29	488,934	14	E
US 60	0.14	284,657	8	22,697	29	488,934	14	E
US 60	0.08	290,124	4	21,820	37	486,500	15	E
US 60	0.05	290,124	4	21,820	37	486,500	15	E
I-10	0.3	234,017	39	27,886	10	484,994	16	E
I-10	0.19	255,076	24	25,365	13	483,366	17	E
I-10	0.21	255,076	24	25,365	13	483,366	17	E
I-10	0.19	252,538	28	24,392	17	472,062	18	E
I-10	0.05	252,187	29	24,392	17	471,711	19	E
I-10	0.59	253,339	25	24,108	20	470,309	20	D
I-10	0.25	256,094	22	23,661	24	469,040	21	E
I-10	0.18	256,094	22	23,661	24	469,040	21	E
I-10	0.23	252,723	27	23,832	21	467,213	22	D
I-10	0.27	252,723	27	23,832	21	467,213	22	D

I-10	0.43	244,818	33	24,519	16	465,491	23	E
US 60	0.43	259,843	18	21,814	38	456,169	24	E
I-10	0.58	238,690	37	24,159	19	456,122	25	E
US 60	0.07	279,610	10	19,016	62	450,755	26	E
US 60	0.08	279,610	10	19,016	62	450,755	26	E
I-10	0.3	240,571	36	23,196	26	449,339	27	E
I-10	0.04	240,571	36	23,196	26	449,339	27	E
I-10	0.06	240,571	36	23,196	26	449,339	27	E
US 60	0.2	285,720	7	18,156	79	449,122	28	E
US 60	0.19	285,720	7	18,156	79	449,122	28	E
US 60	0.92	256,318	21	21,109	43	446,302	29	D
I-10	0.75	233,436	40	23,006	27	440,492	30	E
I-17	0.17	208,903	60	25,336	14	436,927	31	F
I-17	0.28	208,903	60	25,336	14	436,927	31	F
I-10	0.02	231,149	42	22,652	30	435,013	32	E
I-10	0.1	231,149	42	22,652	30	435,013	32	E
I-10	0.15	231,149	42	22,652	30	435,013	32	E
Loop 101	0.12	242,836	34	21,238	42	433,976	33	F
Loop 101	0.18	242,836	34	21,238	42	433,976	33	F
I-10	0.77	235,798	38	21,865	36	432,587	34	E
I-10	0.66	235,798	38	21,865	36	432,587	34	E
I-10	0.51	227,679	44	22,350	32	428,825	35	E
I-10	0.55	224,903	49	22,352	31	426,068	36	D
US 60	0.24	275,839	12	16,557	115	424,852	37	E
US 60	0.24	275,839	12	16,557	115	424,852	37	E
I-10	0.55	226,137	47	21,981	34	423,963	38	D
Loop 101	0.1	241,635	35	19,891	49	420,653	39	F
Loop 101	0.17	241,635	35	19,891	49	420,653	39	F
US 60	0.82	256,439	20	18,213	78	420,356	40	D
I-10	0.77	221,601	51	22,008	33	419,674	41	D
I-10	0.16	221,426	52	21,675	39	416,499	42	D
US 60	0.12	221,426	52	21,675	39	416,499	42	E
I-10	0.72	257,770	19	17,195	99	412,529	43	E
I-10	0.31	228,110	43	20,378	44	411,512	44	D
I-10	0.03	228,110	43	20,378	44	411,512	44	E
I-17	0.48	192,401	88	23,813	22	406,716	45	F
I-17	0.12	190,791	92	23,778	23	404,797	46	E
I-17	0.48	190,791	92	23,778	23	404,797	46	E
I-10	0.67	211,046	58	21,250	41	402,296	47	D
Loop 202	0.45	224,779	50	19,721	51	402,269	48	E
Loop 202	0.54	224,779	50	19,721	51	402,269	48	E
Loop 202	0.3	226,767	45	19,418	55	401,528	49	F

Loop 202	0.33	226,767	45	19,418	55	401,528	49	F
Loop 101	0.57	216,872	54	20,070	45	397,499	50	E
Loop 101	0.26	216,872	54	20,070	45	397,499	50	E
US 60	0.57	252,945	26	15,871	122	395,781	51	D
I-17	0.26	184,139	109	23,299	25	393,835	52	E
I-17	0.35	184,139	109	23,299	25	393,835	52	E
I-10	0.17	211,676	57	19,712	52	389,083	53	F
I-10	0.23	211,676	57	19,712	52	389,083	53	F
Loop 202	0.29	208,265	61	20,000	47	388,269	54	F
Loop 202	0.21	208,265	61	20,000	47	388,269	54	E
I-10	0.22	205,938	63	19,957	48	385,549	55	D
I-10	0.17	205,938	63	19,957	48	385,549	55	D
US 60	0.32	255,266	23	14,449	155	385,306	56	E
US 60	0.2	255,266	23	14,449	155	385,306	56	E
US 60	0.22	255,266	23	14,449	155	385,306	56	E
US 60	0.48	255,266	23	14,449	155	385,306	56	E
I-17	0.51	179,008	115	22,879	28	384,921	57	E
Loop 101	0.36	218,318	53	18,475	71	384,591	58	E
I-10	0.16	200,164	72	20,068	46	380,776	59	D
I-10	0.18	200,164	72	20,068	46	380,776	59	D
Loop 101	0.76	209,677	59	18,720	68	378,153	60	E
US 60	0.02	212,852	56	17,908	87	374,025	61	F
US 60	0.03	212,852	56	17,908	87	374,025	61	F
US 60	0.24	251,596	30	13,570	175	373,721	62	D
US 60	0.18	251,596	30	13,570	175	373,721	62	D
US 60	0.43	206,717	62	18,376	73	372,101	63	D
US 60	0.35	206,717	62	18,376	73	372,101	63	D
I-10	0.72	193,445	87	19,733	50	371,038	64	D
I-10	0.26	194,336	83	19,511	54	369,938	65	F
Loop 202	0.44	195,759	76	19,104	59	367,691	66	E
I-10	0.27	198,383	73	18,721	67	366,869	67	F
I-10	0.19	198,383	73	18,721	67	366,869	67	F
I-17	0.48	168,531	140	21,975	35	366,303	68	D
Loop 202	0.44	200,442	71	18,264	77	364,817	69	D
Loop 202	0.27	200,442	71	18,264	77	364,817	69	E
Loop 202	0.29	195,353	77	18,828	65	364,806	70	E
Loop 202	0.15	195,353	77	18,828	65	364,806	70	E
I-17	0.19	204,220	64	17,795	90	364,371	71	E
I-17	0.23	204,220	64	17,795	90	364,371	71	E
I-10	0.51	193,831	86	18,917	64	364,081	72	F
Loop 202	0.27	197,906	74	18,390	72	363,413	73	E
I-17	0.25	201,534	69	17,961	85	363,187	74	E

I-17	0.3	201,534	69	17,961	85	363,187	74	E
Loop 101	0.29	190,735	93	19,113	58	362,756	75	F
Loop 101	0.19	190,735	93	19,113	58	362,756	75	F
I-10	0.59	187,806	99	19,245	56	361,010	76	C
Loop 202	0.08	203,041	66	17,478	95	360,345	77	F
Loop 202	0.16	203,041	66	17,478	95	360,345	77	F
Loop 202	0.01	203,041	66	17,478	95	360,345	77	C
Loop 202	0.66	203,041	66	17,478	95	360,345	77	E
US 60	0.06	200,533	70	17,746	92	360,248	78	F
US 60	0.01	200,533	70	17,746	92	360,248	78	F
I-17	0.29	195,130	78	18,303	75	359,860	79	E
I-17	0.29	195,130	78	18,303	75	359,860	79	E
I-10	0.72	189,044	97	18,804	66	358,275	80	D
US 60	0.16	245,333	32	12,533	198	358,127	81	D
US 60	0.27	245,333	32	12,533	198	358,127	81	D
Loop 101	0.12	186,614	104	19,047	61	358,033	82	E
Loop 101	0.13	186,614	104	19,047	61	358,033	82	E
I-17	0.12	187,375	101	18,962	63	358,029	83	C
I-17	0.23	187,375	101	18,962	63	358,029	83	D
SR 51	0.29	202,477	68	17,166	100	356,974	84	D
SR 51	0.2	202,477	68	17,166	100	356,974	84	D
US 60	0.61	232,429	41	13,796	170	356,597	85	D
Loop 202	0.21	194,588	80	17,955	86	356,183	86	D
I-17	0.29	194,477	82	17,963	84	356,147	87	E
I-17	0.24	194,477	82	17,963	84	356,147	87	E
I-10	0.64	189,648	96	18,496	69	356,108	88	E
I-10	0.4	188,216	98	18,477	70	354,512	89	D
I-10	0.17	188,216	98	18,477	70	354,512	89	F
I-17	0.48	159,592	167	21,560	40	353,631	90	D
I-17	0.22	159,592	167	21,560	40	353,631	90	D
I-17	0.38	195,057	79	16,803	110	346,286	91	E
I-17	0.36	195,057	79	16,803	110	346,286	91	E
Loop 101	0.15	182,978	111	18,124	80	346,091	92	D
Loop 101	0.22	182,978	111	18,124	80	346,091	92	D
I-17	0.28	184,435	107	17,821	89	344,828	93	E
I-17	0.27	184,435	107	17,821	89	344,828	93	E
US 60	0.65	194,538	81	16,603	114	343,961	94	F
US 60	0.64	225,135	48	12,866	190	340,928	95	D
Loop 202	0.52	178,952	116	17,973	83	340,704	96	D
Loop 101	0.27	176,072	124	18,100	82	338,971	97	E
Loop 101	0.24	176,072	124	18,100	82	338,971	97	E
US 60	0.21	191,007	91	16,426	117	338,844	98	E

I-17	0.27	165,719	150	19,228	57	338,767	99	E
I-17	0.2	165,719	150	19,228	57	338,767	99	E
Loop 101	0.63	173,432	129	18,329	74	338,396	100	D

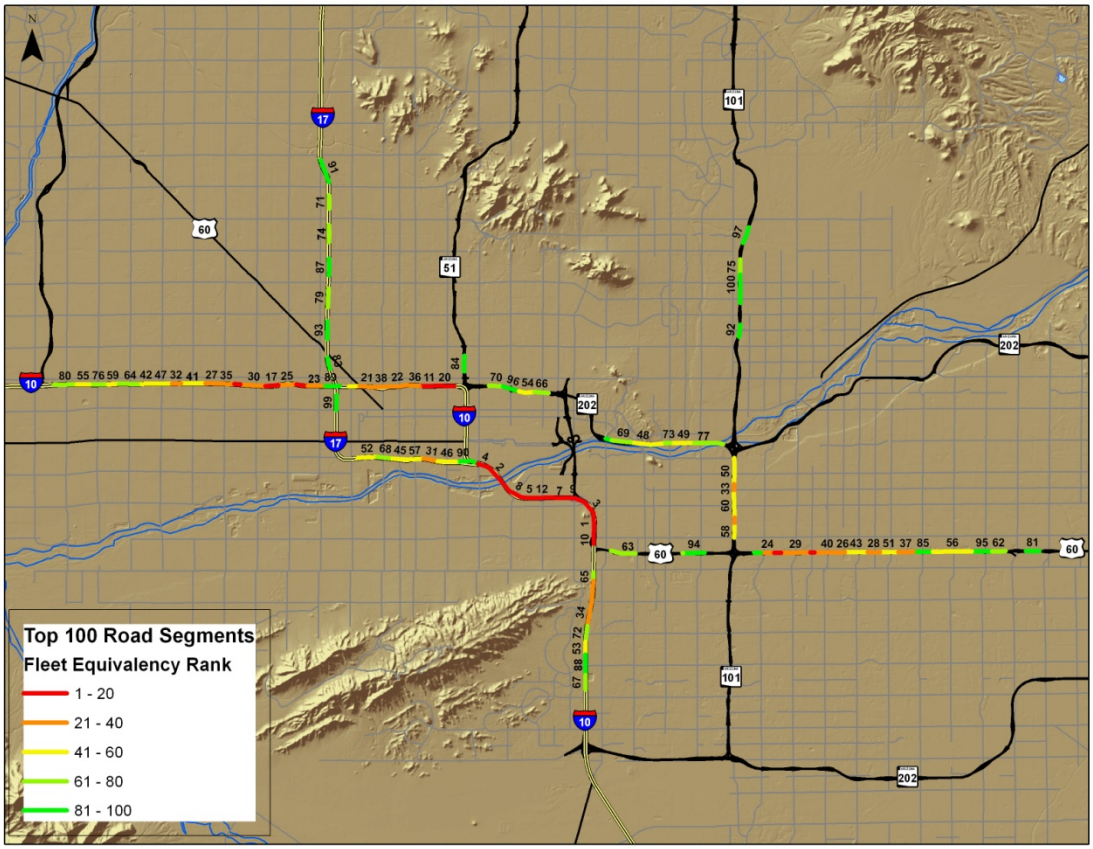


Figure 21. Map of the metropolitan region of Phoenix showing the top 100 road segments ranked by the fleet-equivalency traffic count rank.

Appendix II

Analysis Parameters for Candidate Road Segments

#	Parameters	Candidate #1	Candidate #2
1	**Study Section**	4	3
2	**Location**	This location is representative of a whole road segment. The segment is the I-10 Freeway between Southern and Broadway roads. There are two segments which tie in rank.	This location is representative of a whole road segment. The segment is the I-10 Freeway between 24th street and University Drive, including the bridge over the Salt River. There are three road segments which tie in rank.
3	**Road segment name**	I-10	I-10
4	**Road segment length**	0.7 Miles	0.5 mile
5	**Road type**	Controlled access highway	Controlled access highway
6	**Road segment end points**	North end just south of the Broadway curve: 33.404037, -111.968061 South end near Southern Ave: 33.393808, -111.967309	Northwest end just east of the 24th Street: 33.424916, -112.025423 Southeast end just west of University Drive: 33.413868, -112.013546
7	**Fleet Equivalent Rank**	1	2
8	**AWT**	320,138	301,178
9	**HD Vehicle counts**	33,797	34,864
10	**FE-AWT**	624,315	624,315
11	**Congestion information**	LOS = F	LOS= E
12	**Roadway design**	Flat, roadway is at or slightly above grade with surrounding area (0-5 ft elevated).	Flat, roadway is above-grade with surrounding area (5-10 feet elevated).
13	**Roadside Structures**	No sound walls, just low concrete barriers. There are mostly access roads, parking lots, or vacant lots adjacent to freeway. The onramp for US60 begins near the southern end of this segment on the western side of the freeway.	No sound walls or concrete barriers. There are guard rails on the freeways. There are few structures adjacent to the freeway in this area; mostly it is vacant land and some access roads. The Salt River bridge is in the middle of this segment.
14	**Terrain**	Surrounding area is flat, except for two hills at north end of segment (Bell Butte and Twin Buttes).	Surrounding area is flat, but the Salt River is located in the middle of this 1-mile segment. The Salt river bed is 20-25 feet lower than surrounding terrain.
15	**Meteorology**	Annual wind averages have wind direction most often from WNW or ESE. Freeway is crosswind to annual patterns.	Annual wind averages have wind direction most often from the West. Next most frequent wind direction is ESE. Freeway is crosswind to annual patterns.
16	**Population exposure**	Surrounding area is mostly commercial, though there are housing communities to the south. There are approx. 30,000 people living nearby.	Surrounding area is mostly commercial. There are approx. 8,000 people living nearby.
17	**Safety features**	Cement guardrail height = 3ft width = 1ft length = along entire road segment	Metal Guardrail only. Length = along entire road segment
18	**Interchanges**	Jct US60 at I-10 interchange is at the southern end of the candidate road segment	Jct I-17 at I-10 interchange is 0.75 miles from the western end of this road segment.
19	**Surrounding land use**	Agricultural: 1%, Commercial: 66%, Industrial 6%, Residential: 22%, Vacant: 5%	Agricultural: 0.3%, Commercial: 65%, Industrial 9%, Residential: 4%, Vacant: 22%
20	**Nearby sources**	Nearby point sources contribute approx. 124,000 lbs/year of NOX emissions, most point sources are to the east	Nearby point sources contribute approx. 117,000 lbs/year of NOX emissions, most point sources are nearby to the west.
21	**Current road construction**	None	None
22	**Future road construction**	Major freeway widening in 2019	Major freeway widening in 2019
23	**Frontage roads**	Frontage road present; not included as part of the target road segment	A few frontage roads for access to commercial areas exist. Not included as part of the target road segment.

#	Candidate #3	Candidate #4	Candidate #5
1	4	3	3
2	This location is representative of a whole road segment. The segment is the I-10 Freeway just south of Broadway road.	This location is representative of a whole road segment. The 0.3 mile segment is the I-10 Freeway just east of 24th Street.	This location is representative of a whole road segment. The segment is the I-10 Freeway in between University Drive and 40th Street. There are two road segments which tie in rank.
3	I-10	I-10	I-10
4	0.3 mile	0.3 mile	0.4 mile
5	Controlled access highway	Controlled access highway	Controlled access highway
6	North end just east of Broadway Road: 33.407766, -111.971386 South end 0.3 miles to the southeast of the north end : 33.404118, -111.968013	West end at 24th Street: 33.426621, -112.030803 Southeast end just west of University Drive: 33.425146, -112.025326	West end east of University Drive: 33.411086, -112.007068 East end west of 40th Street: 33.410919, -111.999922
7	3	4	5
8	308,452	290,026	283,658
9	33,301	34,027	33,161
10	608,161	596,270	582,105
11	LOS = F	LOS = D	LOS = F
12	Roadway passes between two hills, so it is below the grade of the surrounding terrain.	Flat, roadway is above-grade with surrounding area (5-10 feet elevated).	Flat, roadway is above-grade with surrounding area (0-5 feet elevated).
13	No sound walls, just low concrete barriers. There are no structures near the freeway at this point	No sound walls and few concrete barriers. There are guard rails on the freeways. There is a commercial park to the south of the segment, it is set back 100-150' from the freeway. Sky Harbor airport is located to the north, along with an access road that runs around the outside of the airport. The I-10 overpasses 24th street.	No sound walls, concrete barriers, or guard rails on the edge of the freeway. There are commercial properties and access roads on either side of the freeway, but structures do not come closer than 100 feet.
14	This road segment passes between Bell Butte, to the NE, and Twin Buttes, to the SW. These two hills are approx. 180-200 feet above the surrounding flat terrain.	Surrounding area is flat.	Surrounding area is flat.
15	Annual wind averages have wind direction most often from WNW or ESE. Freeway is crosswind to annual patterns.	Annual wind averages have wind direction most often from the West. Next most frequent wind direction is ESE. Freeway is crosswind to annual patterns.	Annual wind averages have wind direction most often from the West. Next most frequent wind direction is ESE. Freeway is parallel to annual patterns.
16	Surrounding area is mostly commercial, though there are housing communities to the south. There are approx. 30,000 people living nearby.	Surrounding area is mostly commercial. There are approx. 8,000 people living nearby.	Surrounding area is mostly commercial. There are approx. 8,000 people living nearby.
17	Cement guardrail height = 3ft width = 1ft length = along entire road segment	Metal Guardrail only. Length = along entire road segment	None
18	Jct SR143 at I-10 interchange is 0.5 miles from the western end of the road segment	Jct I-17 at I-10 interchange is 0.75 miles from the western end of this road segment.	None
19	Agricultural: 1%, Commercial: 66%, Industrial 6%, Residential: 22%, Vacant: 5%	Agricultural: 0.3%, Commercial: 65%, Industrial 9%, Residential: 4%, Vacant: 22%	Agricultural: 0.3%, Commercial: 65%, Industrial 9%, Residential: 4%, Vacant: 22%
20	Nearby point sources contribute approx. 124,000 lbs/year of NOX emissions, most point sources are to the east	Nearby point sources contribute approx. 117,000 lbs/year of NOX emissions, most point sources are nearby to the west.	Nearby point sources contribute approx. 117,000 lbs/year of NOX emissions, most point sources are nearby to the west.
21	None	None	None
22	Major freeway widening in 2019	Major freeway widening in 2019	Major freeway widening in 2019
23	None	A few frontage roads for access to commercial areas exist. Not included as part of the target road segment.	A few frontage roads for access to commercial areas exist. Not included as part of the target road segment.

#	Candidate #6	Candidate #7	Candidate #8
1	4	4	3
2	This location is representative of a whole road segment. The segment is the I-10 Freeway intersecting with Broadway road.	This location is representative of a whole road segment. The segment is the I-10 Freeway between 40th and 48th streets	This location is representative of a whole road segment. The segment is the I-10 Freeway intersecting with University Drive.
3	I-10	I-10	I-10
4	0.1 mile	0.6 mile	0.4 miles
5	Controlled access highway	Controlled access highway	Controlled access highway
6	North end just west of Broadway Road: 33.409290, -111.972890 South end just east of Broadway Road : 33.407852, -111.971250	West end just east of 40th Street: 33.410920, -111.991011 East end just west of 48th Street: 33.410926, -111.980930	West end west of University Drive: 33.414133, -112.013719 East end east of University Drive: 33.411194, -112.007078
7	6	7	8
8	289,986	276,549	264,346
9	32,106	31,412	32,071
10	578,938	559,257	552,988
11	LOS = F	LOS = F	LOS = F
12	Roadway is just north of a pass between two hills, but most of it is at grade-level elevation with the surrounding terrain.	Flat, roadway is at or slightly above grade with surrounding area (0-5 ft elevated).	Flat, roadway is above-grade with surrounding area (5-10 feet elevated).
13	No sound walls, though some low concrete barriers. Most of the length is open to the Broadway off-ramps. There are no structures near the freeway at this point. Broadway road overpasses the freeway .	There is a sound wall on south side between 44th and 48th Street. There are commercial buildings on both sides of freeway, but they are set back at least 100'. There are parking lots and easements adjacent to freeway.	No sound walls or concrete barriers. There are guard rails on the freeways. There are few structures adjacent to the freeway in this area; mostly it is vacant land and some access roads. University Drive overpasses the freeway in the middle of this segment.
14	Surrounding area is flat, except for two hills at south end of segment (Bell Butte and Twin Buttes).	Surrounding area is flat.	Surrounding area is flat.
15	Annual wind averages have wind direction most often from WNW or ESE. Freeway is diagonal to annual patterns.	Annual wind averages have wind direction most often from the West. Next most frequent wind direction is ESE. Freeway is parallel to annual patterns.	Annual wind averages have wind direction most often from the West. Next most frequent wind direction is ESE. Freeway curves to a diagonal of annual patterns.
16	Surrounding area is mostly commercial, though there are housing communities to the south. There are approx. 30,000 people living nearby.	Surrounding area is mostly commercial, though there are housing communities to the south. There are approx. 30,000 people living nearby.	Surrounding area is mostly commercial. There are approx. 8,000 people living nearby.
17	Some cement guardrails, mostly open.	None	None
18	Jct SR143 at I-10 interchange is 0.3 miles from the western end of the road segment	None	None
19	Agricultural: 1%, Commercial: 66%, Industrial 6%, Residential: 22%, Vacant: 5%	Agricultural: 1%, Commercial: 66%, Industrial 6%, Residential: 22%, Vacant: 5%	Agricultural: 0.3%, Commercial: 65%, Industrial 9%, Residential: 4%, Vacant: 22%
20	Nearby point sources contribute approx. 124,000 lbs/year of NOX emissions, most point sources are to the east	Nearby point sources contribute approx. 124,000 lbs/year of NOX emissions, most point sources are to the east	Nearby point sources contribute approx. 117,000 lbs/year of NOX emissions, most point sources are nearby to the west.
21	None	None	None
22	Major freeway widening in 2019	Major freeway widening in 2019	Major freeway widening in 2019
23	None	None	None

#	Candidate #9	Candidate #10	Candidate #11
1	4	4	2
2	This location is representative of a whole road segment. The segment is the I-10 Freeway which intersects 48th Street/SR143 interchange.	This location is representative of a whole road segment. The segment is the I-10 Freeway at the intersection of the US 60.	This location is representative of a whole road segment. The segment is the I-10 Freeway in between 7th and 16th Streets
3	I-10	I-10	I-10
4	0.2 mile	0.26 mile	0.38 mile
5	Controlled access highway	Controlled access highway	Controlled access highway
6	West end west of 48th Street: 33.411049, -111.980890 East end east of 48th Street: 33.410870, -111.977709	North end north of Southern Avenue: 33.393763, -111.967401 South end at the US 60 interchange: 33.390004, -111.967488	West end is at 10th Street: 33.462152, -112.060676 East end is at 13th Street: 33.462059, -112.054066
7	9	10	11
8	248,446	263,459	268,637
9	29,264	27,186	25,078
10	511,820	508,129	494,335
11	LOS = D	LOS = F	LOS = D
12	Flat, roadway is at grade with surrounding terrain.	Flat, roadway is at grade with surrounding terrain.	Freeway is 20-30' below grade from surrounding terrain with steeply sloped walls.
13	No sound walls or concrete barriers. This road segment is bordered on both north and south by the SR 143 interchange, including ramps and access loops and vacant median property. The SR143/48th Street bridge overpasses the freeway in this segment.	This segment has housing on the east side of the freeway, with sound walls. The west side of the freeway is part of the ramp interchange with US60, including the vacant median areas with no sound walls or barriers. The elevated bridge/ramp structure from the US 60 interchange takes up most of this segment.	There are soundwalls on both the north and south sides of the freeway. The soundwall is at the top of the sloped side. There are residential and commercial buildings and access roads on the backsides of the sound walls. The 12th Street bridge overpasses the freeway in the middle of this segment.
14	Surrounding area is flat.	Surrounding area is flat.	Surrounding area is flat.
15	Annual wind averages have wind direction most often from the West. Next most frequent wind direction is ESE. Freeway is parallel to annual patterns.	Annual wind averages have wind direction most often from WNW or ESE. Freeway is crosswind to annual patterns.	Annual wind averages have wind direction most often from the West. Next most frequent wind direction is ESE. Freeway is parallel to annual patterns.
16	Surrounding area is mostly commercial, though there are housing communities to the south. There are approx. 30,000 people living nearby.	Surrounding area is mostly commercial, though there are housing communities to the south. There are approx. 30,000 people living nearby.	Surrounding area is a mix of residential and commercial properties. There are approx. 48,000 people living nearby.
17	None	None	None (between sound walls and edge of freeway)
18	Segment intersects with the SR143 interchange	Segment intersects with the US60/I-10 interchange	None
19	Agricultural: 1%, Commercial: 66%, Industrial 6%, Residential: 22%, Vacant: 5%	Agricultural: 1%, Commercial: 66%, Industrial 6%, Residential: 22%, Vacant: 5%	Agricultural: 0%, Commercial: 47%, Industrial 1%, Residential: 45%, Vacant: 7%
20	Nearby point sources contribute approx. 124,000 lbs/year of NOX emissions, most point sources are to the east	Nearby point sources contribute approx. 124,000 lbs/year of NOX emissions, most point sources are to the east	Nearby point sources contribute approx. 75,754 lbs/year of NOX emissions, most point sources are to the south.
21	None	None	None
22	Major freeway widening in 2019	Major freeway widening in 2019	None
23	None	None	None

#	Candidate #12	Candidate #13	Candidate #14
1	3/4	1	5
2	This location is representative of a whole road segment. The segment is the I-10 Freeway from 38th to 42nd Streets and is bisected by the 40th street overpass.	This location is representative of a whole road segment. The segment is the I-10 Freeway from 33rd to 30th Avenues and is bisected by the 31st Avenue overpass.	This location is representative of a whole road segment. The segment is the US 60 Freeway Between Longmore Road and Dobson Road
3	I-10	I-10	US60
4	0.5 mile	0.4 mile	0.2 mile
5	Controlled access highway	Controlled access highway	Controlled access highway
6	West end is at 38th Street: 33.410944, -111.999913 East end is at 42nd Street: 33.411074, -111.991037	West end is at 33rd Avenue: 33.462663, -112.129827 East end is at 30th Avenue: 33.462235, -112.123632	West end is east of Dobson Road: 33.385902, -111.869206 East end is is west of Longmore Road: 33.385882, -111.865395
7	12	13	14
8	272,776	260,136	284,657
9	24,230	25,634	22,697
10	490,848	490,838	488,934
11	LOS = E	LOS = F	LOS = E
12	Flat, roadway is at or slightly above grade with surrounding area (0-5 ft elevated).	Freeway is approximately 20' below-grade from surrounding terrain.	Freeway is approximately 10' below-grade from surrounding terrain.
13	This segment is bordered on the north and south by the on and off-ramps for the 40th Street overpass, including the median vacant areas	This segment is bordered on the north by sound walls. The south side also has sound walls, but there is a section, from 31st avenue to 33rd avenue, that has low walls and/or elevated terrain instead of the high sound walls.	There is a sound wall on the south portion of freeway which extends through the entire section. The north side does not have a sound wall, but a canal located at the top of the slope extends through the entire length of freeway at this section.
14	Surrounding area is flat.	Surrounding area is flat.	Surrounding area is flat.
15	Annual wind averages have wind direction most often from the West. Next most frequent wind direction is ESE. Freeway is parallel to annual patterns.	Annual wind averages have wind direction most often from the west-southwest. Freeway is parallel to annual patterns.	Annual wind averages have wind direction most often from WNW or ESE. Freeway is Parrallel to annual patterns.
16	Surrounding area is mostly commercial, though there are housing communities to the south. There are approx. 19,000 people living nearby.	Surrounding area is a mix of commercial and residential. There are approx. 67,000 people living nearby.	Surrounding area is a mix of commercial and residential. There are approx. 32,000 people living nearby.
17	None	None	None
18	Segment bisects the 40th street overpass, there are no on- or off-ramps.	Segment bisects the 31st Avenue overpass, there are no on- or off-ramps.	Segment is in between the on/off ramps of Dobson and Alma School Roads.
19	Agricultural: 0.5%, Commercial: 66%, Industrial 7%, Residential: 13%, Vacant: 13%	Agricultural: 3%, Commercial: 47%, Industrial 6%, Residential: 39%, Vacant: 5%	Agricultural: 0%, Commercial: 52%, Industrial 0.2%, Residential: 43%, Vacant: 6%
20	Nearby point sources contribute approx. 120,630 lbs/year of NOX emissions, most point sources are to the east.	Nearby point sources contribute approx. 917,916 lbs/year of NOX emissions, most point sources are to the southwest.	Nearby point sources contribute approx. 61,550 lbs/year of NOX emissions, most point sources are to the east.
21	None	None	None
22	Major freeway widening in 2019	None	None
23	None	None	None

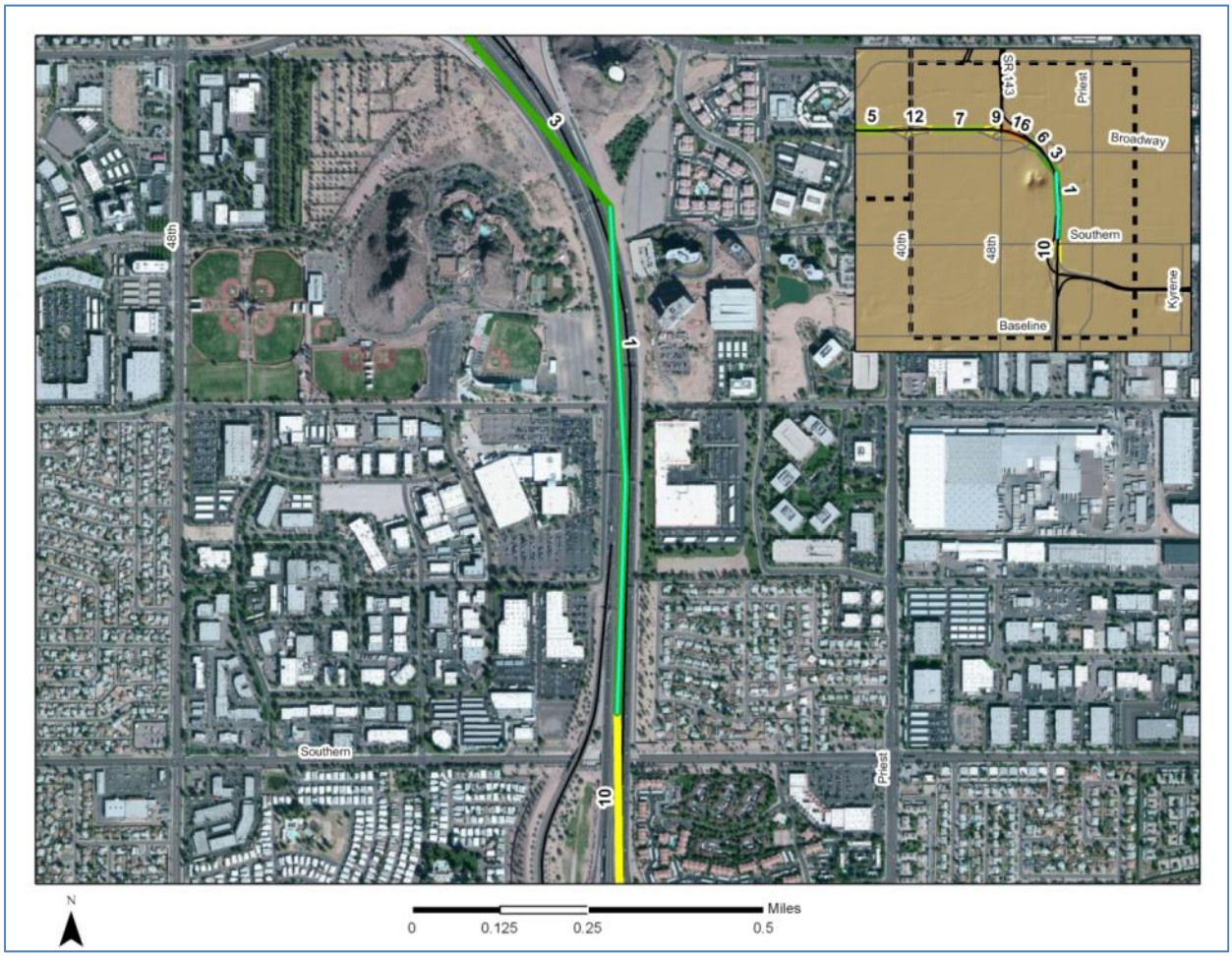
#	Candidate #15	Candidate #16	Candidate #17
1	5	4	1
2	This location is representative of a whole road segment. The segment is the US 60 Freeway and is bisected by the Extension Road overpass.	This location is representative of a whole road segment. The segment is the I-10 Freeway between the Broadway Road overpass and the SR 143 Overpass	This location is representative of a whole road segment. The segment is the I-10 Freeway from 40th to 37th Avenues and is bisected by the 39th Avenue overpass.
3	US60	I-10	I-10
4	0.1 mile	0.3 mile	0.4 mile
5	Controlled access highway	Controlled access highway	Controlled access highway
6	West end is west of Extension Road: 33.386017, -111.849549 East end is east of Extension Road: 33.386026, -111.847194	Northwest end just east of the SR 143 overpass: 33.410908, -111.977679 Southeast end just west of the Broadway Road overpass: 33.409348, -111.972871	West end is at 40th Avenue: 33.462007, -112.146703 East end is at 37th Avenue: 33.462354, -112.139796
7	15	16	17
8	290,124	234,016	255,076
9	21,820	27,886	25,365
10	486,500	484,994	483,366
11	LOS = E	LOS = E	LOS = E
12	Freeway is approximately 10' below-grade from surrounding terrain.	Road segment is in between two overpasses, it is at-grade with the surrounding terrain, though there are elevated on- and off-ramps north and south of the segment.	Freeway is approximately 20' below-grade from surrounding terrain.
13	There is a sound wall on the south portion of freeway which extends through the entire section. The north side does not have a sound wall, but a canal located at the top of the slope extends through the entire length of freeway at this section.	No sound walls, though there are low concrete barriers. Most of the segment length is open to the vacant median ground around the interchange. There are no structures near the freeway at this point. Broadway road and SR 143 overpasses the freeway.	This segment is bordered on the north and south by sound walls. There is 50-100' of vacant, sloped space between the edge of the freeway and the sound walls.
14	Surrounding area is flat.	Surrounding area is flat, except for two hills at southeast of the segment (Bell Butte and Twin Buttes).	Surrounding area is flat.
15	Annual wind averages have wind direction most often from WNW or ESE. Freeway is Parallel to annual patterns.	Annual wind averages have wind direction most often from WNW or ESE. Freeway is diagonal to annual patterns.	Annual wind averages have wind direction most often from the west-southwest. Freeway is parallel to annual patterns.
16	Surrounding area is a mix of commercial and residential. There are approx. 32,000 people living nearby.	Surrounding area is mostly commercial, though there are housing communities to the south. There are approx. 30,000 people living nearby.	Surrounding area is a mix of commercial and residential. There are approx. 67,000 people living nearby.
17	None	Cement guardrail height = 3ft width = 1ft length = along entire road segment	None
18	Segment bisects the Extension Road overpass, there are no on- or off-ramps.	Jct SR143 at I-10 interchange is at the western end of the road segment	Segment bisects the 39th Avenue overpass, there are no on- or off-ramps.
19	Agricultural: 0%, Commercial: 52%, Industrial 0.2%, Residential: 43%, Vacant: 6%	Agricultural: 1%, Commercial: 66%, Industrial 6%, Residential: 22%, Vacant: 5%	Agricultural: 3%, Commercial: 47%, Industrial 6%, Residential: 39%, Vacant: 5%
20	Nearby point sources contribute approx. 61,550 lbs/year of NOX emissions, most point sources are to the east.	Nearby point sources contribute approx. 124,000 lbs/year of NOX emissions, most point sources are to the east	Nearby point sources contribute approx. 917,916 lbs/year of NOX emissions, most point sources are to the southwest.
21	None	None	None
22	None	Major freeway widening in 2019	None
23	None	None	None

#	Candidate #18	Candidate #19	Candidate #20
1	1	1	2
2	This location is representative of a whole road segment. The segment is the I-10 Freeway from 48th to 47th Avenues just east of the 51st Avenue on/off ramps.	This location is representative of a whole road segment. The segment is the I-10 Freeway at 47th Avenue. This short segment is a continuation of the segment ranked #18.	This location is representative of a whole road segment. The segment is the I-10 Freeway from 13th to 18th street and is bisected by the 16th street overpass
3	I-10	I-10	I-10
4	0.2 mile	0.05 mile	0.6 mile
5	Controlled access highway	Controlled access highway	Controlled access highway
6	West end is at 48th Avenue: 33.462846, -112.163767 East end is at 37th Avenue: 33.462604, -112.160464	West end is at 47th Avenue: 33.462618, -112.160448 East end is at 47th Avenue: 33.462559, -112.159624	West end is at 13th Street: 33.462127, -112.054091 East end is at 18th Street: 33.462107, -112.043728
7	18	19	20
8	252,538	252,187	253,338
9	24,392	24,391	24,107
10	472,062	471,711	470,308
11	LOS = E	LOS = E	LOS = D
12	Freeway is approximately 20' below-grade from surrounding terrain.	Freeway is approximately 20' below-grade from surrounding terrain.	Freeway is 20-30' below grade from surrounding terrain with steeply sloped walls.
13	There are no sound walls around this segment, but there is a sloped edges from the freeway. Buildings are set back from the top of this sloped edge on the south side, the north side has a canal running the entire length of the segment.	There are no sound walls around this segment, but there is a sloped edges from the freeway. Buildings are set back from the top of this sloped edge on the south side, the north side has a canal running the entire length of the segment.	There are sound walls on both the north and south sides of the freeway. The sound wall is at the top of the sloped side. There are residential and commercial buildings and access roads on the backsides of the sound walls. There are on/off ramps for the 16th street overpass, which is in the middle of this section.
14	Surrounding area is flat.	Surrounding area is flat.	Surrounding area is flat.
15	Annual wind averages have wind direction most often from the west-southwest. Freeway is parallel to annual patterns.	Annual wind averages have wind direction most often from the west-southwest. Freeway is parallel to annual patterns.	Annual wind averages have wind direction most often from the West. Next most frequent wind direction is ESE. Freeway is parallel to annual patterns.
16	Surrounding area is a mix of commercial and residential. There are approx. 67,000 people living nearby.	Surrounding area is a mix of commercial and residential. There are approx. 67,000 people living nearby.	Surrounding area is a mix of residential and commercial properties. There are approx. 48,000 people living nearby.
17	None	None	None (between sound walls and edge of freeway)
18	none	none	The SR 51/Loop 202/I-10 Stack interchange is 0.3 miles east of this road segments. The on/off ramps for the interchange begin at the eastern end of this segment.
19	Agricultural: 3%, Commercial: 47%, Industrial 6%, Residential: 39%, Vacant: 5%	Agricultural: 3%, Commercial: 47%, Industrial 6%, Residential: 39%, Vacant: 5%	Agricultural: 0%, Commercial: 47%, Industrial 1%, Residential: 45%, Vacant: 7%
20	Nearby point sources contribute approx. 917,916 lbs/year of NOX emissions, most point sources are to the southwest.	Nearby point sources contribute approx. 917,916 lbs/year of NOX emissions, most point sources are to the southwest.	Nearby point sources contribute approx. 75,754 lbs/year of NOX emissions, most point sources are to the south.
21	None	None	None
22	None	None	None
23	None	None	None

Appendix III

Aerial Photographs of Candidate Road Segments

Candidate #1 – Study Section 4

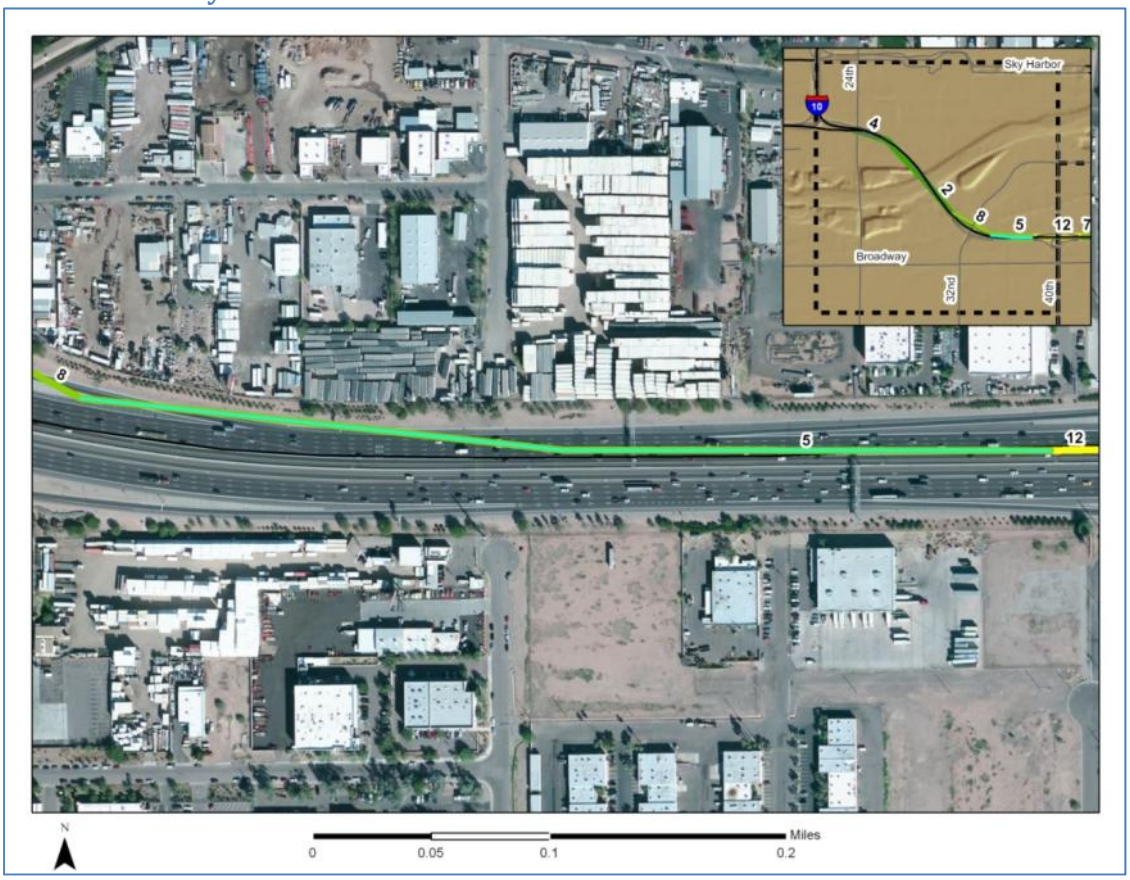


Candidate #2 – Study Section 3

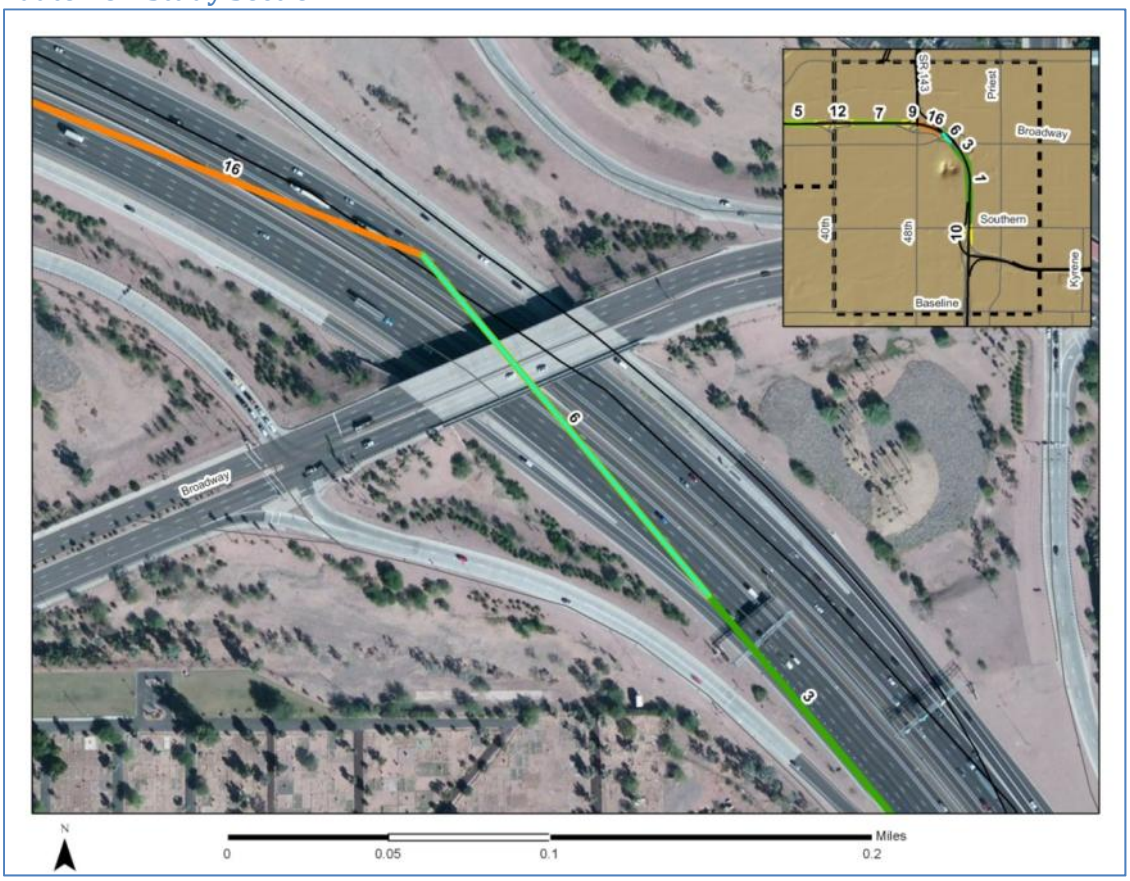
Candidate #3 – Study Section 4

Candidate #4 – Study Section 3

Candidate #5 – Study Section 3

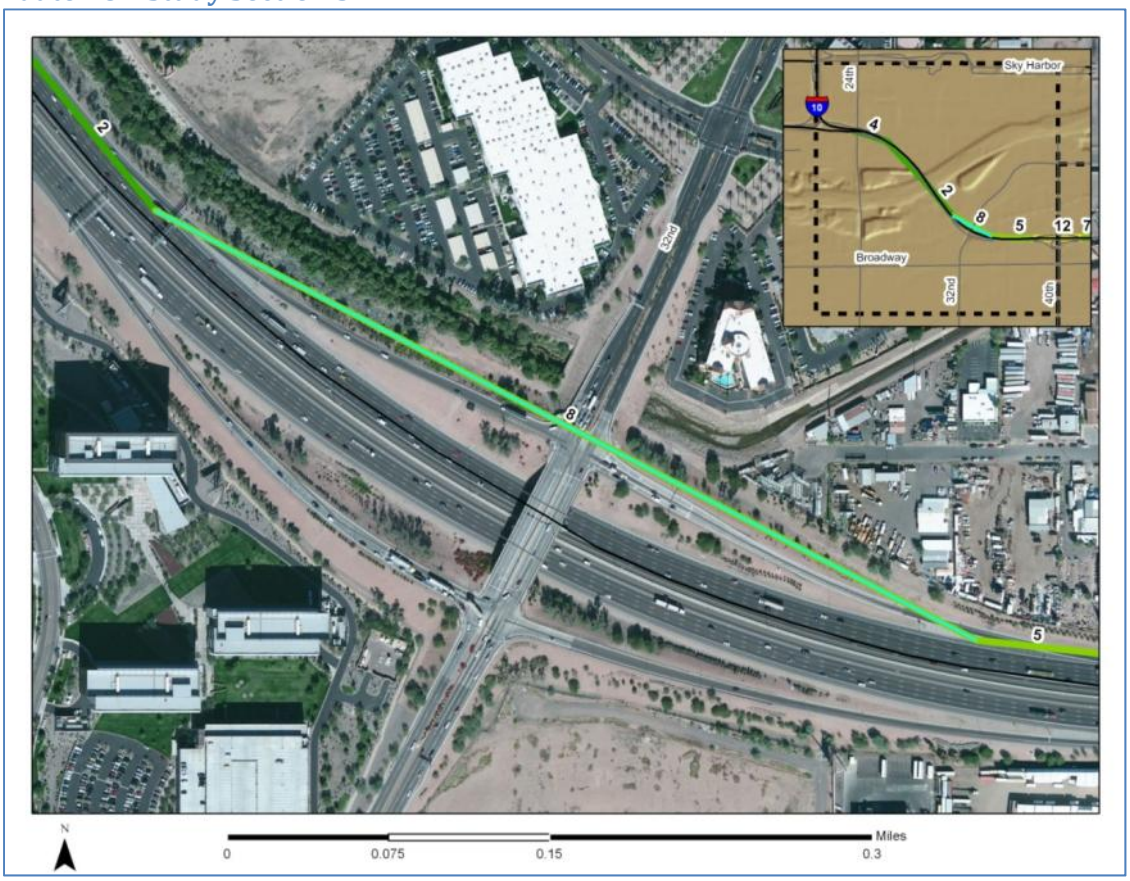


Candidate #6 – Study Section 4

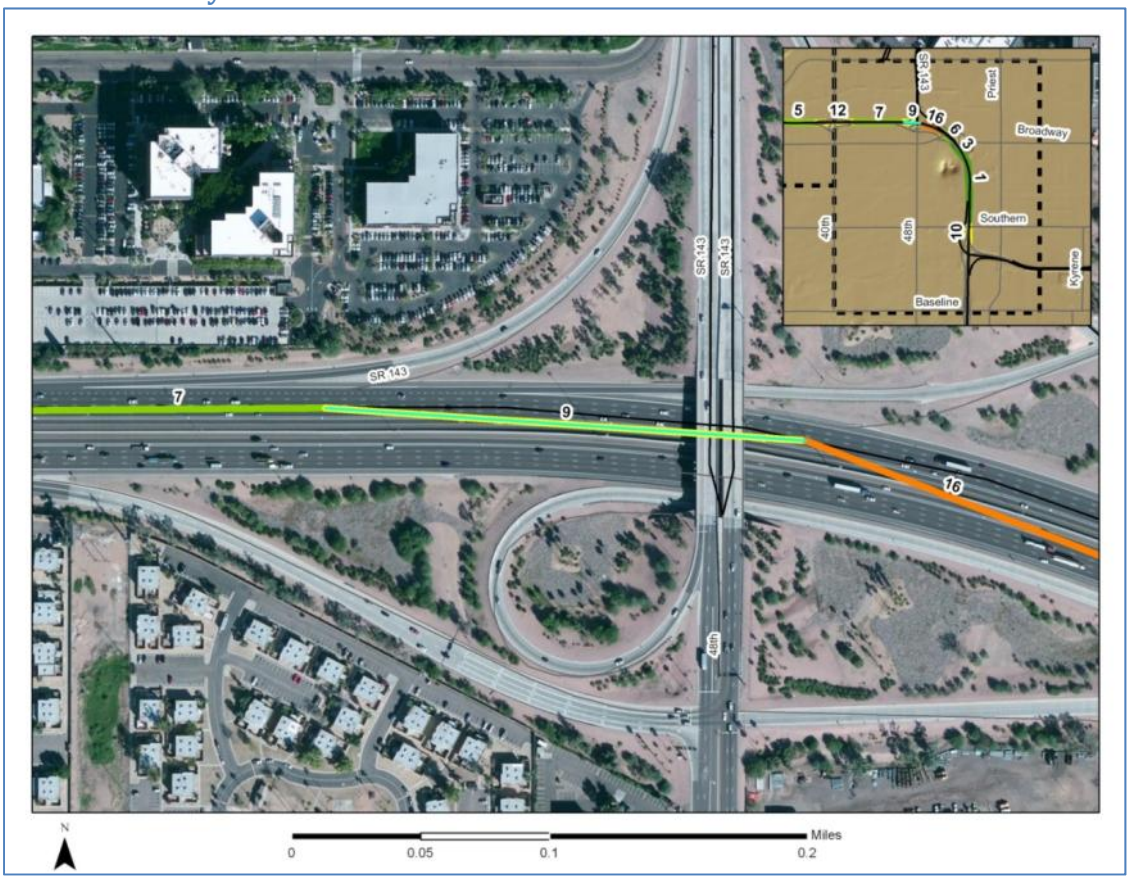


Candidate #7 – Study Section 4

Candidate #8 – Study Section 3



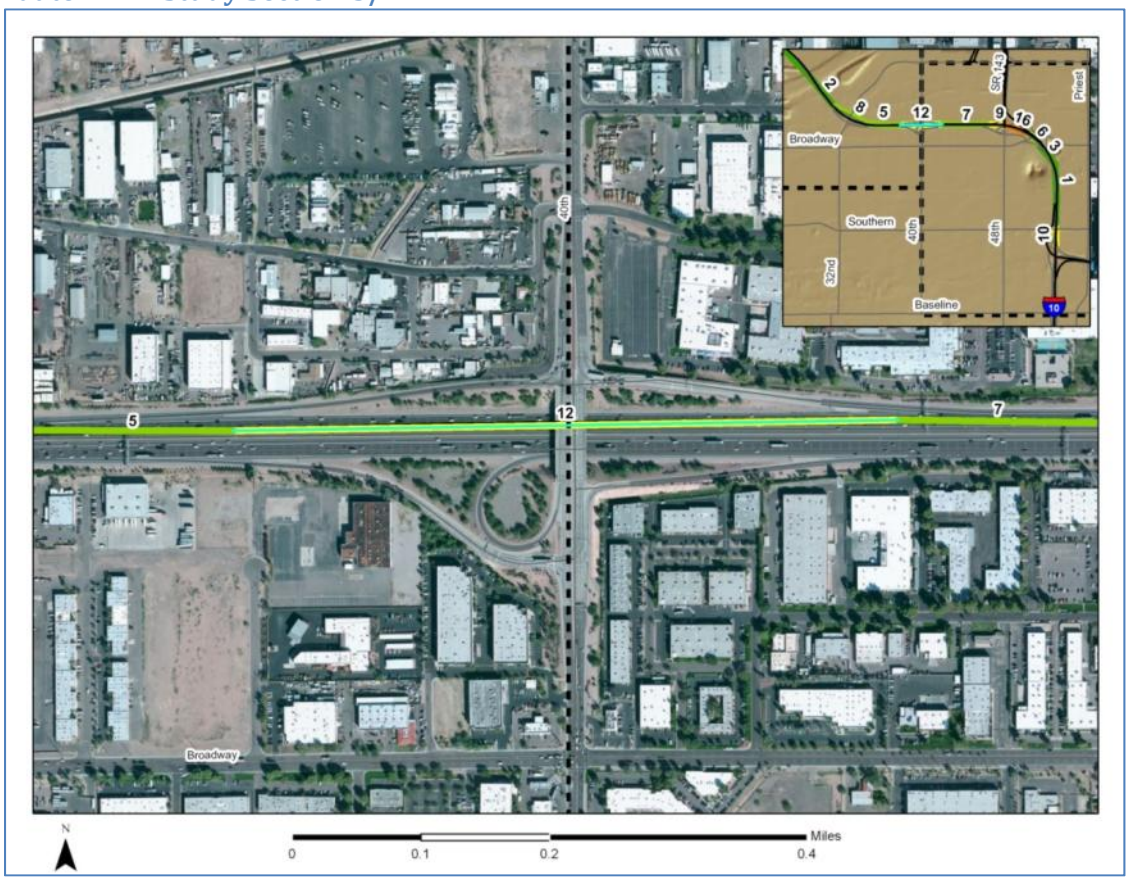
Candidate #9 – Study Section 4



Candidate #10 – Study Section 4

Candidate #11 – Study Section 2

Candidate #12 – Study Section 3/4

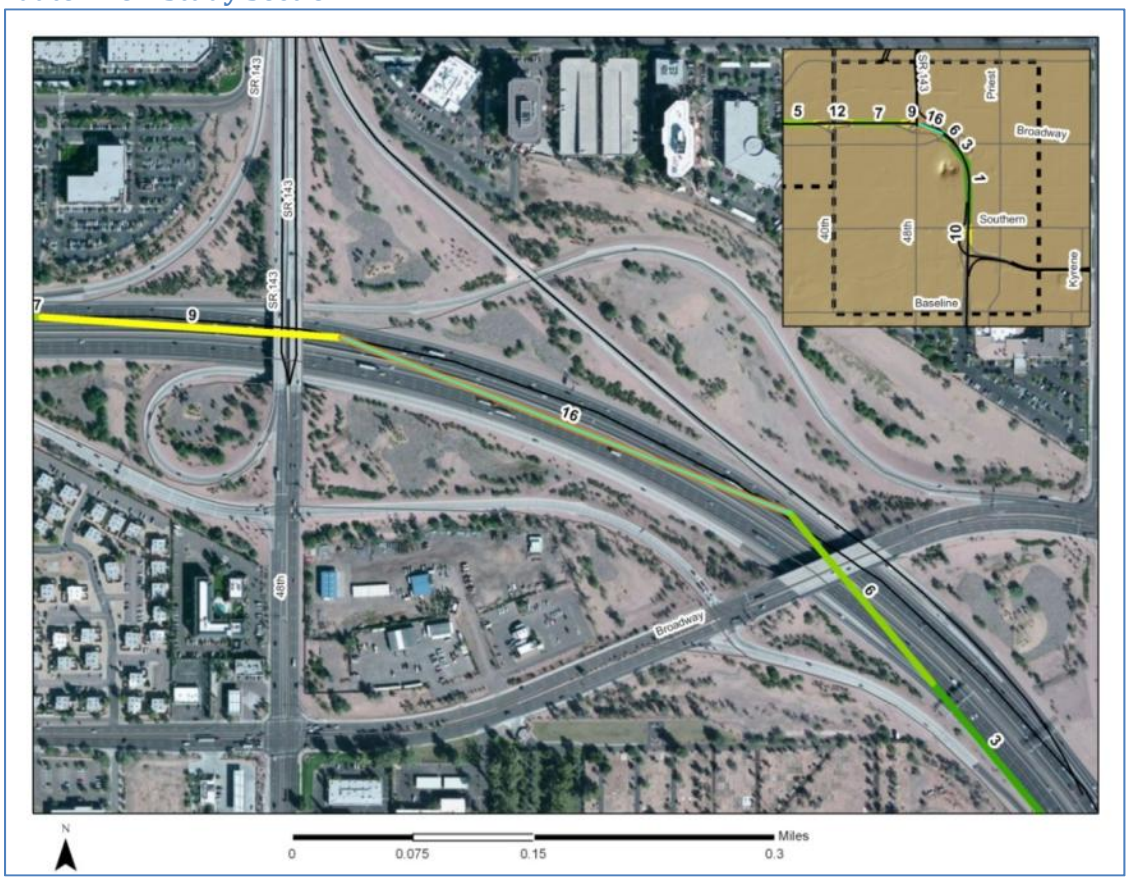


Candidate #13 – Study Section 1

Candidate #14 – Study Section 5

Candidate #15 – Study Section 5

Candidate #16 – Study Section 4



Candidate #17 – Study Section 1

Candidate #18 – Study Section 1

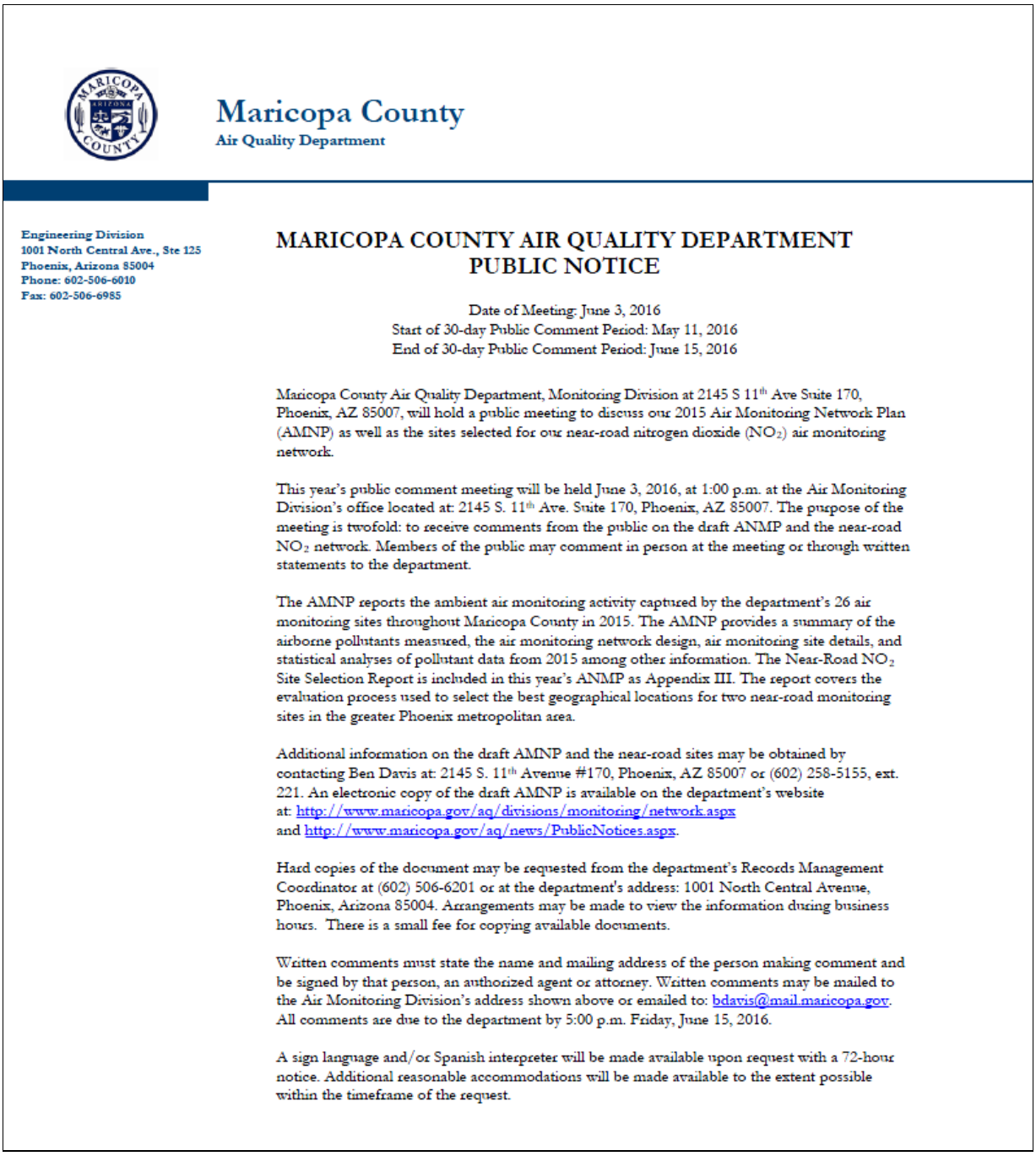
Candidate #19 – Study Section 1

Candidate #20 – Study Section 2

APPENDIX IV - PUBLIC NOTICE AND COMMENT INFORMATION

Public Notice

The public notice and news release information is shown below in Figure 16.



Maricopa County
Air Quality Department

Engineering Division
1001 North Central Ave., Ste 125
Phoenix, Arizona 85004
Phone: 602-506-6010
Fax: 602-506-6985

MARICOPA COUNTY AIR QUALITY DEPARTMENT
PUBLIC NOTICE

Date of Meeting: June 3, 2016
Start of 30-day Public Comment Period: May 11, 2016
End of 30-day Public Comment Period: June 15, 2016

Maricopa County Air Quality Department, Monitoring Division at 2145 S 11th Ave Suite 170, Phoenix, AZ 85007, will hold a public meeting to discuss our 2015 Air Monitoring Network Plan (AMNP) as well as the sites selected for our near-road nitrogen dioxide (NO_2) air monitoring network.

This year's public comment meeting will be held June 3, 2016, at 1:00 p.m. at the Air Monitoring Division's office located at: 2145 S. 11th Ave. Suite 170, Phoenix, AZ 85007. The purpose of the meeting is twofold: to receive comments from the public on the draft ANMP and the near-road NO_2 network. Members of the public may comment in person at the meeting or through written statements to the department.

The AMNP reports the ambient air monitoring activity captured by the department's 26 air monitoring sites throughout Maricopa County in 2015. The AMNP provides a summary of the airborne pollutants measured, the air monitoring network design, air monitoring site details, and statistical analyses of pollutant data from 2015 among other information. The Near-Road NO_2 Site Selection Report is included in this year's ANMP as Appendix III. The report covers the evaluation process used to select the best geographical locations for two near-road monitoring sites in the greater Phoenix metropolitan area.

Additional information on the draft AMNP and the near-road sites may be obtained by contacting Ben Davis at: 2145 S. 11th Avenue #170, Phoenix, AZ 85007 or (602) 258-5155, ext. 221. An electronic copy of the draft AMNP is available on the department's website at: http://www.maricopa.gov/aq/divisions/monitoring/network.aspx and http://www.maricopa.gov/aq/news/PublicNotices.aspx.

Hard copies of the document may be requested from the department's Records Management Coordinator at (602) 506-6201 or at the department's address: 1001 North Central Avenue, Phoenix, Arizona 85004. Arrangements may be made to view the information during business hours. There is a small fee for copying available documents.

Written comments must state the name and mailing address of the person making comment and be signed by that person, an authorized agent or attorney. Written comments may be mailed to the Air Monitoring Division's address shown above or emailed to: bdavis@mail.maricopa.gov. All comments are due to the department by 5:00 p.m. Friday, June 15, 2016.

A sign language and/or Spanish interpreter will be made available upon request with a 72-hour notice. Additional reasonable accommodations will be made available to the extent possible within the timeframe of the request.

Figure 16. 2015 Public Announcement

Public Meeting Attendance

This year, no one attended the Public Meeting.

Public Comments Received

This year, we received public comments from MAG, which follow in Figure 17.

Comments on MCAQD Draft 2015 Air Monitoring Network Plan
Maricopa Association of Governments

Page	Comment
5	Change the title of Figure 13 to read, "2015 O_3 Violations by Site based on 2015 NAAQS".
7	In the last bullet, replace "now" with "how".
16	Recommend revising the fourth paragraph to read, "In 1979, EPA promulgated a one-hour ozone standard of 0.12 part per million (ppm). EPA revised the ozone standard in 1997, establishing an eight-hour standard at a level of 0.08 ppm. EPA subsequently revoked the one-hour standard in 2005, which was less stringent than the eight-hour standard. Maricopa County has attained and currently meets both the one-hour and the 1997 eight-hour ozone standard."
17	In the fifth sentence of the fourth paragraph, replace "form" with "formed".
21	In the last sentence, recommend revising "Thirty-Third" to "the Thirty-Third monitoring site".
23	In the first sentence of the second paragraph, replace "if" with "is".
26	Recommend removing "Error! Not a valid bookmark self-reference" from the first sentence.
29	In the third sentence of the first paragraph, revise "according EPA's" to "according to EPA's".
30	In the first sentence of the second paragraph, replace "were" with "was".
31	In Table 11, revise the number of "Required Near-Road Monitors" from 11 to 1.
35	In Table 15, remove the "*" symbol from "*AADT".
36	In the first, fourth and fifth sentences of the second paragraph, include "2008" before "8-hour".
38	In the first sentence of the second paragraph, replace "155.0" with "154.4".
39	In Table 18, suggest increasing row heights for North Phoenix, South Phoenix and West Phoenix.
42	In the last sentence of the third paragraph, recommend removing the sentence beginning, "In addition, data generated..." as this sentence appears to contradict procedures in 40 CFR Part 50, Appendix N; specifically the definition of "Combined site data record" in Appendix N and the procedures specified in section 3.0(d) of Appendix N.
42	In Table 20, remove "3-Year" from the title and the "‡" symbol from the "35.3‡" max reading at the Thirty-Third monitor. The 2015 annual mean value for Glendale should be revised to "7.0" from "6.69" according to EPA's Monitor Values Report.

Page 1 of 2
June 14, 2016

Comments on MCAQD Draft 2015 Air Monitoring Network Plan
Maricopa Association of Governments

Page	Comment
43	In Table 21, round values to the nearest tenth of a $\mu g/m^3$ in the 3-year average column, in keeping with the rounding conventions of 40 CFR Part 50, Appendix N, section 4.3. Revise the 2015 annual mean value for Glendale to 7.0. Revise the 3-year average value for Glendale to 7.4. Recommend including the following footnote to Table 21, "The 3-year annual average value of 10.1 at the West Phoenix monitor is an average of FEM data only and does not include data from collocated West Phoenix FRM monitors. Applicable data from the FRM monitors must be combined with the FEM data before the resulting PM-2.5 value can be compared against the PM-2.5 NAAQS according to the procedures in Appendix N of 40 CFR Part 50."
44	In the first paragraph, replace "35.0" with "35" to match rounding conventions of 24-hour PM-2.5 standard.
44	In Table 22, round values to the nearest 1 $\mu g/m^3$ in the 3-year average column, in keeping with the rounding conventions of 40 CFR Part 50, Appendix N, section 4.3. Recommend including the following footnote to Table 22, "The 3-year annual average value of 28 at the West Phoenix monitor is an average of FEM data only and does not include data from collocated West Phoenix FRM monitors. Applicable data from the FRM monitors must be combined with the FEM data before the resulting PM-2.5 value can be compared against the PM-2.5 NAAQS according to the procedures in Appendix N of 40 CFR Part 50."
46	In Table 26, include "2008" before "8-hour" in the row for ozone.
47	Table 27 includes values from exceedance days in 2016. Replace with values from exceedance days in 2015.
51	In the first sentence, insert "six of" in front of "the seven".
51	In Table 30, replace "0" with "0.33" for the rate of expected exceedances at the Buckeye monitor.
52	In the first paragraph replace "35.0" with "35", and "35.1" with "35.5".
54	In the last sentence of the third paragraph revise "and, the closing" to "and closing the".
54	Under bullet point "B", recommend removing "Greenwood monitor went to Thirty-Third in 2015", as NO2 is still currently being monitored at Greenwood as of the date of these comments.
54	In the last paragraph, recommend deleting the last two sentences as NO2 is still currently being monitored at Greenwood as of the date of these comments.
56	Recommend removing bullet point 4, as NO2 is still currently being monitored at Greenwood as of the date of these comments.
150	In the second sentence of the EE definition, revise "historical" to "historically".
151	Revise "Federal Equivalency Method" to "Federal Equivalent Method".

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June 14, 2016

Figure 17. Comments Received from the Maricopa Association of Governments

Maricopa County Response to Public Comments

Table 33 shows how the plan was amended based on public comments as well as other minor revisions.

Table 33. Maricopa County Response to Public Comments Received

Page	Maricopa Association of Governments (MAG) Comments	MC Response
5	Change the title of Figure 13 to read, "2015 O_3 Violations by Site based on 2015 NAAQS".	year in title corrected
7	In the last bullet, replace "now" with "how".	revised as suggested
16	Recommend revising the fourth paragraph to read, "In 1979, EPA promulgated a one-hour ozone standard of 0.12 part per million (ppm). EPA revised the ozone standard in 1997, establishing an eight-hour standard at a level of 0.08 ppm. EPA subsequently revoked the one-hour standard in 2005, which was less stringent than the eight-hour standard. Maricopa County has attained and currently meets both the one-hour and the 1997 eight-hour ozone standard."	Revised to read – "In 1979, EPA reduced the 1971 1-hour primary and secondary O_3 NAAQS level of 0.08 ppm to 0.012 ppm. In 1997, EPA revised the O_3 NAAQS establishing an 8-hour NAAQS at a level of 0.08 ppm. Since Maricopa County has attained the 1979 1-hour standard, EPA revoked the 1979 1-hour NAAQS for the Phoenix-Mesa nonattainment area in 2005. In addition, the Phoenix-Mesa nonattainment area for the 1997 8-hour O_3 NAAQS is now in attainment and was redesignated as "attainment" by EPA for this standard effective October 17, 2014."
17	In the fifth sentence of the fourth paragraph, replace "form" with "formed".	revised as suggested
21	In the last sentence, recommend revising "Thirty-Third" to "the Thirty-Third monitoring site".	revised as suggested
23	In the first sentence of the second paragraph, replace "if" with "is".	revised as suggested
26	Recommend removing "Error! Not a valid bookmark self-reference" from the first sentence.	fixed error code

29	In the third sentence of the first paragraph, revise “according EPA’s” to “according to EPA’s”.	revised as suggested
30	In the first sentence of the second paragraph, replace “were” with “was”.	revised as suggested
31	In Table 11, revise the number of “Required Near-Road Monitors” from 11 to 1.	corrected number
35	In Table 15, remove the “*” symbol from “*AADT”.	revised as suggested
36	In the first, fourth and fifth sentences of the second paragraph, include “2008” before “8-hour”.	revised as suggested
38	In the first sentence of the second paragraph, replace “155.0” with “154.4”.	The sentence was deleted, because it was not be needed.
39	In Table 18, suggest increasing row heights for North Phoenix, South Phoenix and West Phoenix.	revised as suggested
42	In the last sentence of the third paragraph, recommend removing the sentence beginning, “In addition, data generated...” as this sentence appears to contradict procedures in 40 CFR Part 50, Appendix N; specifically the definition of “Combined site data record” in Appendix N and the procedures specified in section 3.0(d) of Appendix N.	Sentence was deleted as suggested. Revised the last sentence of third paragraph to read…"For data to be acceptable for comparison to the annual and the 24-hour NAAQS, a site’s $PM_{2.5}$ monitor must meet all EPA operating and QA requirements." Last paragraph revised to read, Table 20“Table 20 summarizes the 2015 data from the FEM analyzers as well as the FRM sampler at West Phoenix.” Last sentence on page 41, removed "will continue to collect" and replaced with "collects".

42	In Table 20, remove “3-Year” from the title and the “‡” symbol from the “35.3‡” max reading at the Thirty-Third monitor. The 2015 annual mean value for Glendale should be revised to “7.0” from “6.69” according to EPA’s Monitor Values Report.	Revised as suggested Removed the "FEM Analyzer" from Table 20 title due to data combining at the West Phoenix site.
43	In Table 21, round values to the nearest tenth of a µg/m3 in the 3-year average column, in keeping with the rounding conventions of 40 CFR Part 50, Appendix N, section 4.3. Revise the 2015 annual mean value for Glendale to 7.0. Revise the 3-year average value for Glendale to 7.4. Recommend including the following footnote to Table 21, “The 3-year annual average value of 10.1 at the West Phoenix monitor is an average of FEM data only and does not include data from collocated West Phoenix FRM monitors. Applicable data from the FRM monitors must be combined with the FEM data before the resulting PM-2.5 value can be compared against the PM-2.5 NAAQS according to the procedures in Appendix N of 40 CFR Part 50.”	Corrected the annual mean value for GL in Table 21. Corrected by including data from the FRM using site data combining process. Removed the "FEM Analyzer" from Table 21 title by removing "FEM Analyzers" due to data combining at the West Phoenix site.
44	In the first paragraph, replace “35.0” with “35” to match rounding conventions of 24-hour PM-2.5 standard.	corrected number
44	In Table 22, round values to the nearest 1 µg/m3 in the 3-year average column, in keeping with the rounding conventions of 40 CFR Part 50, Appendix N, section 4.3. Recommend including the following footnote to Table 22, “The 3-year annual average value of 28 at the West Phoenix monitor is an average of FEM data only and does not include data from collocated West Phoenix FRM monitors. Applicable data from the FRM monitors must be combined with the FEM data before the resulting PM-2.5 value can be compared against the PM-2.5 NAAQS according to the procedures in Appendix N of 40 CFR Part 50.”	Corrected by including data from the FRM using site data combining process. Removed the "FEM Analyzer" from Table 22 title by removing "FEM Analyzers" due to data combining at the West Phoenix site.
46	In Table 26, include “2008” before “8-hour” in the row for ozone.	revised as suggested
47	Table 27 includes values from exceedance days in 2016. Replace with values from exceedance days in 2015.	corrected

51	In the first sentence, insert “six of” in front of “the seven”.	revised as suggested
51	In Table 30, replace “0” with “0.33” for the rate of expected exceedances at the Buckeye monitor.	corrected
52	In the first paragraph replace “35.0” with “35”, and “35.1” with “35.5”.	revised as suggested - also changed 35.0 to 35 in the second sentence.
54	In the last sentence of the third paragraph revise “and, the closing” to “and closing the”.	revised as suggested
54	Under bullet point “B”, recommend removing “Greenwood monitor went to Thirty-Third in 2015”, as NO_2 is still currently being monitored at Greenwood as of the date of these comments.	Revised as suggested AND added the Greenwood NO_2 monitor to the Proposed Monitor Closings.
54	In the last paragraph, recommend deleting the last two sentences as NO_2 is still currently being monitored at Greenwood as of the date of these comments.	Revised to state that we would like to close the GR NO_2 monitor, added it to the Proposed Monitor Closing list on page 53, and removed that EPA approved this in 2015.
56	Recommend removing bullet point 4, as NO_2 is still currently being monitored at Greenwood as of the date of these comments.	revised as suggested
150	In the second sentence of the EE definition, revise “historical” to “historically”.	revised as suggested
151	Revise “Federal Equivalency Method” to “Federal Equivalent Method”.	revised as suggested

Additional Revision Information

Page	
53	Added the SS CO monitor to the list of Proposed Monitor Closing
138- 139	For WC, changed Row 5 by changing "Yes" to a "No" for proposed monitor removal or move question and added a note at the end of table saying “The 2014 AMNP indicated that these monitors might need to be moved; however, no actions have been taken to date.”

APPENDIX V – GLOSSARY

Key to Acronyms and Terms

98th percentile The 98th percentile is defined in *40 CFR Part 50 Appendix N* as "the smallest daily value out of a year of $PM_{2.5}$ mass monitoring data below which no more than 98 percent of all daily values fall using the ranking and selection method specified in section 4.5(a) of this appendix".

ADEQ: Arizona Department of Environmental Quality

ADT: Average Daily Traffic count

aka: Also known as

AMD: Air Monitoring Division

AMNP: Air Monitoring Network Plan - an annual report produced for EPA each calendar year that provides comprehensive information regarding the performance of the County's air quality surveillance system, e.g., network of SLAMS and SPM monitoring stations and / or sites, and the data collected and reported to EPA. The plan includes proposed future changes to the system as well.

Analyzer: A monitor that samples the air and produces near real-time data without collecting a sample that must be laboratory analyzed.

ANSI: American National Standards Institute

AQI: Air Quality Index - the index that applies to each criteria pollutant and shows the concentration of each pollutant relative to its respective standard. When the AQI reaches 101, the pollutant's concentration has exceeded the NAAQS.

AQS: Air Quality System, sometimes defined as the Air Quality Subsystem. The AQS is the U.S. EPA's ambient air database.

ASQ: American Society for Quality

Attainment: Attainment refers to a geographical area as being "in compliance" with a NAAQS and the U.S. Clean Air Act. After several years of no violations of a NAAQS, the EPA can classify a geographic area as in attainment for a particular CP.

AWT: Average Weekday Traffic count

BAM: Beta Attenuation Monitor. A continuous particulate measuring instrument used previously by MCAQD to measure PM_{10}.

CAA: Clean Air Act

CASAC: Clean Air Scientific Advisory Committee

CBSA: Core-Based Statistical Area – is defined by the U.S. Office of Management and Budget as a statistical geographic entity consisting of the county or counties associated with at least one urbanized area/urban cluster of at least 10,000 in population, plus adjacent counties having a high degree of social and economic integration.

CFR: The *Code of Federal Regulations* is published annually and contains the codification of the general and permanent rules published in the *Federal Register* by the executive departments and agencies of the Federal Government. An *eCFR* is a free electronic version; however, it is not the legal version.

Class I Area: Federally designated parks or wilderness areas with mandated visibility protection.

CP: Criteria Pollutant, or the Central Phoenix site, depending upon context

CO: Carbon monoxide, a criteria pollutant

Collocated: The practice of establishing a second pollutant monitor within a specified distance and of a specified type at a monitoring site for quality assurance purposes.

Continuous monitor: A method of monitoring air pollutants that is continually measuring the quantity of the pollutant, either gaseous or particulate. Continuous monitors are analyzers that can obtain real-time or short-term averages of pollutants. Continuous monitors may also be referred to as "automated" monitors.

Criteria Pollutants: Six pollutants (CO, O_3, NO_2, Pb, PM, and SO_2) that have NAAQS established by the U.S. EPA.

CSA: Combined Statistical Area - is defined by the U.S. Office of Management and Budget as when very large cities combine two or more CBSAs, these larger areas are referred to as combined statistical areas

CSN: The chemical speciation network - a nationwide, research air monitoring network designed to ferret-out the chemical constitutes of and to discern trends in $PM_{2.5}$ pollution. This program is managed by the U.S. EPA Office of Air Quality Planning and Standards (OAQPS).

Delta T: Difference between two levels of temperature measurements - Delta T is measured in the MCAQD network at heights of 2 and 10 meters. A higher temperature at the upper level indicates a temperature inversion.

Design Value: A design value is a statistic that describes the air quality status of a given area relative to the level of the NAAQS. For a concentration-based standard, the air quality design value is simply the standard-related test statistic. The design value of a pollutant monitoring network is the highest sample value in the network used to compare to the NAAQS; i.e., the 24-hour $PM_{2.5}$ design value for the network is the monitor with the highest 3-year average of the 98^{th} percentile.

EBAM: E-Beta Attenuation Monitor - is a rugged, portable, battery or solar-operated analyzer that is suitable for obtaining and reporting continuous measurements of particulate matter in remote locations. EBAMs are often equipped with wind speed and direction instrumentation as well. EBAMs are particularly useful for temporary measurements of PM related to an event.

EPA R9: Environmental Protection Agency Region 9

EE: Exceptional Event – a high CP pollution event that is considered to be uncontrollable and caused by natural sources of pollution or an event that is not expected to recur at a given location. An EE can apply to any CP, but historically in Maricopa County, almost all EEs are related to high PM_{10} events.

Event: Generally refers to a high pollution day where a NAAQS was exceeded.

Exceedance: Generally refers to a high pollution day where a NAAQS was exceeded.

FDMS-TEOM: Filter Dynamics Measurement System-Tapered Element Oscillating Microbalance - a continuous particulate analyzer used by MCAQD to measure $PM_{2.5}$.

FEM: Federal Equivalent Method - an EPA-approved method of sampling and analyzing the ambient air for an air pollutant, i.e., includes the monitor and its operating firmware and procedure(s). An FEM must pass required testing found in *40 CFR Part 53* and show CP data produced are similar to the Federal Reference Method (FRM). Continuous particulate matter and some gaseous analyzers are FEMs.

Filter-based sampler: A method of monitoring particulate pollution that involves exposing a pre-weighed filter to a specific flow rate for a prescribed period of time, usually midnight to midnight, or 1440 minutes. The filters are then post-weighed to determine the mass of particulates per volume, e.g., $\mu g/m^3$. Filter samples are stored for a period and can be referenced later if needed.

FRM: Federal Reference Method - an EPA-approved method of sampling and/or analyzing the ambient air for an air pollutant, i.e., includes the monitor and its operating firmware and procedure(s). An FRM must pass required testing found in *40 CFR Part 53* and show CP data produced are accurate based on acceptable precision and bias limits. These methods are the baseline that all other methods reference, e.g., Federal Equivalency Methods (FEM).

HAPs: Hazardous Air Pollutants - airborne chemicals that are been listed in the federal Clean Air Act and have an associated standard or process requirement determined for it.

MAG: Maricopa Association of Governments

MCAQCED: Maricopa County Air Quality Compliance and Enforcement Division

MCAQD: Maricopa County Air Quality Department

MO: monitoring organization

Monitor: Monitor is a term that refers to an instrument, sampler, analyzer, or other device that measures or assists in the measurement of atmospheric air pollutants and which is acceptable for use in ambient air surveillance under the applicable provisions of *40 CFR Part 58 Appendix C*.

$\mu g/m^3$: micrograms per cubic meter

µm: micrometers

MSA: Metropolitan Statistical Area is designated by the U.S. Office of Management and Budget as a geographical area based on the concept of a core area with a large population nucleus, plus adjacent communities having a high degree of economic and social integration within that core.

Metropolitan and micropolitan statistical areas are the two categories of CBSAs. Metropolitan areas have populations greater than 50,000, and micropolitan areas have populations between 10,000 and 50,000. The AMD operates air monitoring

stations within the Phoenix-Mesa MSA, which includes portions of Maricopa and Pinal County.

NAAQS: National Ambient Air Quality Standards - health and welfare-based standards established by the U.S. EPA that set permissible airborne concentration levels for the CPs.

NATTS: National Air Toxics Trend Stations - a nationwide, research air monitoring program designed to measure toxic air pollutant trends. This program is managed by the U.S. EPA Office of Air Quality Planning and Standards (OAQPS).

NCORE: National Core multi-pollutant site a national network of multi-pollutant monitoring sites used to represent the nation as a whole. There are currently ~75 NCORE sites, 1 to 3 per state plus Washington D.C., Virgin Islands, and Puerto Rico located in both urban and rural areas. This program is managed by the U.S. EPA Office of Air Quality Planning and Standards (OAQPS).

Network: All stations of a given type or types

NO_2: Nitrogen dioxide. The indicator compound used to gauge the ambient concentration of NO_x.

NO_X: Nitrogen oxide(s), a criteria pollutant. NO_x is the sum of nitric oxide (NO), NO_2, and other nitrogen-containing compounds.

Nonattainment: Means a geographical area is "not in compliance" with the NAAQS and the U.S. Clean Air Act. After several years of violating a NAAQS, the EPA can classify a geographic area as being in nonattainment for a particular criteria pollutant.

O_3: Ozone, a criteria pollutant

OAQPS: The U.S. EPA Office of Air Quality Planning and Standards located in Research Triangle Park, N.C., which serves as EPA "Headquarters" for ambient air monitoring guidance and the NAAQS reviews.

PAMS: Photochemical Ambient Monitoring Stations - a nationwide, research air monitoring program designed to measure specific airborne chemicals that are known to be "precursor pollutants" that form ozone when combined with ultraviolet light and heat. This program is managed by the U.S. EPA Office of Air Quality Planning and Standards (OAQPS).

PCAQCD: Pinal County Air Quality Control District

Pb: Lead, a criteria pollutant

PM: Particulate matter, also known as "particulates", project manager, or preventative maintenance depending on context

$PM_{2.5}$: Particulate matter 2.5 micrometers in aerometric diameter or smaller, a criteria pollutant. $PM_{2.5}$ is also referred to as "fine" particulate matter.

PM_{10}: Particulate matter 10 micrometers in aerometric diameter or smaller, a criteria pollutant

$PM_{10\text{-}2.5}$ and / or PM_c: "Coarse" particulate matter is less than 10 micrometers, but recently, has come to mean PM_{10} minus $PM_{2.5}$, not currently regulated as a lone a criteria pollutant.

ppb:	parts per billion
ppm:	parts per million
PQAO:	Primary quality assurance organization - a monitoring organization (MO) or other organization that is responsible for a set of air monitoring stations that monitor the same pollutant and for which data quality assessments can be pooled. Each criteria pollutant sampler/monitor at a monitoring station in the SLAMS and SPM networks must be associated with one, and only one, primary quality assurance organization.
Primary Standard:	The portion of the NAAQS designed to protect public health.
QA:	Quality assurance – generally refers to the administrative or managerial processes in place to verify that quality control activities are successfully carried out by personnel and that data produced meet specified quality requirements prior to use, i.e., written guidance documents, program oversight activities, etc.
QC:	Quality control – generally refers to the technical activities in place to produce high quality data, i.e., air monitoring instruments operate within specified criteria, data collection from sites, etc.
Quality System:	The overall system of technical activities that measure the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer. (see *ANSI/ASQ E4-2004)*
RRNS:	Rapid Response Notification System - a communication tool used by MCAQD to manage high pollution events by alerting residents, intergovernmental personnel, and stakeholders of increasing PM concentrations.
Sampler:	A type of air monitor that collects a physical sample for analysis. Air samples may be collected onto a filter, cartridge, or other medium, or into a device such as a canister.
Secondary Standard:	The portion of the NAAQS designed to protect public welfare and the environment.
SIP:	State Implementation Plan - a SIP is a plan produced by state and/or local regulatory agencies that specifies obligations that will be taken for a geographic area in nonattainment to meet the NAAQS for a criteria pollutant. SIPs are also developed for maintaining compliance with the NAAQS.
Site:	A site is a geographic location. One or more air monitoring stations can be located at a site.
SLAMS:	State and Local Air Monitoring Station - the SLAMS network consist of approximately 5,000 monitoring stations nationwide whose size and distribution is largely determined by the needs of State and local air pollution control agencies to meet their respective SIP requirements. Other types of monitoring stations include: NCORE (national core) and SPM (special purpose). Currently, the AMD

operates SLAMS only.

SO_2: Sulfur dioxide, a criteria pollutant

SPM: Special Purpose Monitor - a special purpose monitor provides data for special studies needed by the State and local agencies to support SIPs and other air program activities. The SPMs are not permanently established as part of a particular pollutant's monitoring station(s); their location can be adjusted easily to accommodate changing needs and priorities.

SSI: Size Selective Inlet - the inlet used on high- and low volume particulate samplers and analyzers to determine the size of particles sampled or measured by the monitor. The particle size separation process usually employs impaction, filtration, or cyclonic flow.

Station: A station may comprise a single CP monitor, or a group of monitors with a shared objective, located at a particular site.

TEOM: Tapered Element Oscillating Microbalance - a automated, continuous FEM PM analyzer used by MCAQD to measure PM_{10} and/or $PM_{2.5}$ concentrations, depending upon the instrument model and air sample inlet configuration(s).

tpy: tons per year

UATMP: Urban Air Toxics Monitoring Program - a nationwide research air monitoring program designed to measure toxic air pollutants within urban areas. This program is managed by the U.S. EPA Office of Air Quality Planning and Standards (OAQPS).

U.S. EPA: United States Environmental Protection Agency

VOC: Volatile Organic Compound - VOCs are chemical compounds that can easily vaporize and enter the atmosphere. There are many natural and artificial sources of VOCs; solvents and gasoline make up some of the largest artificial sources. VOCs will react with NO_x in the presence of sunlight to create ground-level O_3 pollution.

Volume:

a. The amount of air sampled for analysis. Volume is calculated by multiplying a monitor's flowrate by the collection time, usually in minutes.

Volume = flowrate X minutes

b. The amount of data in a file or database.