

Puerto Rico Air Monitoring Network Plan 2021



Commonwealth of Puerto Rico
Department of Natural and Environmental Resources
Air Quality Area



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ACRONYMS AND ABBREVIATIONS

AQS: Air Quality System
CFR: Code of Federal Regulations
CPR: Commonwealth of Puerto Rico
CBSA: Core-based Statistical Area
DNER: Department Natural and Environmental Resources
EPA: Environmental Protection Agency
FEM: Federal Equivalent Method
FRM: Federal Reference Method
MSA: Metropolitan Statistical Area
NAAQS: National Air Ambient Quality Standards
NAMS: National Air Monitoring Stations
NCore: National Core Multi-Pollutant Monitoring Stations
NO₂: Nitrogen Dioxide
O₃: Ozone
OSI: Information System Office
PAMS: Photochemical Assessment Monitoring Stations
Pb: Lead
PM₁₀: Particulate Matter
PM_{2.5}: Fine Particulate Matter
ppm: parts per million
PR: Puerto Rico
PRAMN: Puerto Rico Air Monitoring Network
PREPA: Puerto Rico Power Electrical Authority
QAMP: Quality Assurance Monitoring Plan
QAPP: Quality Assurance Project Plan
RCAP: Regulation for the Control of Atmospheric Pollution of Puerto Rico
SLAMS: State and Local Air Monitoring Stations
SO₂: Sulfur Dioxide
SO₄: Sulfate
SPM: Special Purpose Monitor
TEOM: Tapered Element Oscillating Microbalance
TSD: Temporary Shutdown
TSP: Total Suspended Particulate



2.0 INTRODUCTION

The Commonwealth of Puerto Rico (CPR), through the 2021 –Puerto Rico Air Monitoring Network (PRAMN), provides evidence that meets current federal air monitoring requirements. The PRAMN Plan details any proposed changes for the next 18 months after publication, provides specific information for each of the existing and proposed monitoring stations, and offers to the public the opportunity to comment on air sampling activities made by the DNER.

The air quality data of the PRAMN is used to determine compliance with the National Environmental Air Quality Standards (NAAQS). In 1970, the Clean Air Act (CAA) established NAAQS for the six pollutants: Lead (Pb), Particulates (PM₁₀ and PM_{2.5}), Ozone (O₃), Sulfur dioxide (SO₂), Nitrogen dioxide (NO₂) and Carbon monoxide (CO). The CAA requires to the Commonwealth of Puerto Rico monitor these pollutants, called criteria pollutants, and report the collected data to the Environmental Protection Agency (EPA).

The operation of the ambient air monitoring network by PRDNER is a critical component for the protection of public health and the environment. The operation of the network is to meet the following requirements necessary to demonstrate:

Infrastructure SIP requirements: Clean Air Act Section (CAA) 110(a)(2)(B) provides for the establishment and operation of monitoring systems for ambient air quality and that the air quality data collected be available.

Nonattainment Areas: Ambient air monitoring is crucial for the nonattainment areas for determining whether the areas are meeting the National Ambient Air Quality Standards (NAAQS). Air monitoring is also vital in providing air quality information about areas not meeting the NAAQS to the public because their health may be directly impacted Providing air quality information to the public.

Providing air quality information to the public: The air monitoring network is crucial in providing air quality information to the public. This information helps the public make air quality-based decisions about what activities they can participate in or whether they are exposed to pollutant concentrations above healthy AQI levels.

The PRAMN plan describes the Puerto Rico Air Sampling Network and include updates and modifications to the network. The air sampling network is reviewed annually as part of federal regulation under Title 40, Part 58, Section 10 of the Code of Federal Regulations (40 CFR § 58.10) to identify changes in accordance with regulations or incorporate revisions to the National Air Quality Standards (NAAQS). In addition, it includes a review of the measures adopted during fiscal year 2020 and the action plans for next year. This plan will be presented to the Environmental Protection Agency (EPA) on or before July 1 of each year, after a public comment period of 30 days.



The revision to the plan focuses on the current and future strategies of the air sampling network. The network modifications are made in consultation with the EPA. In addition, it evaluates the operating cost of the network in accordance with the available budget for 2021 fiscal year.

3.0 PUBLIC COMMENTS

In accordance with federal regulations, the plan will be available for public review and comment period for 30 days before submitting the final plan to the EPA. Comments received during the public consultation period will be forwarded to the Environmental Protection Agency (EPA) at the same time the plan is submitted. Due the COVID-19 Pandemic, this plan will be only available at the DNER website, <http://www.drna.pr.gov/acai/muestreo/>. Written comments should be sent to aire@jca.pr.gov. The final document will be submitted to the EPA on or before July 1, 2021, along with the public comments received to comply with the federal regulatory requirements.

4.0 MONITORING DATA QUALITY ASSURANCE

The purpose of the Quality and Certainty Program (QA / QC) is to ensure the degree of data obtained from air monitoring networks. The PRAMN meets or exceeds the requirements defined in 40 CFR Part 58 and all applicable appendices.

The Quality and Certainty program includes, but is not limited to, the following activities:

- Instrument performance audits
- Monitor siting evaluations
- Precision and span checks
- Bias determinations
- Flow rate audits
- Leak checks
- Data validation

The National Performance Audit Program (NPAP) and the Performance Evaluation Program (PEM) are independent activities where the PR participates to ensure the quality of the criteria pollutant monitoring data.

The Agency operates under a Quality Management Plan (QMP) approved by the EPA and develops a Quality Assurance Project Plan (QAPP) for the PRAMN. The Management and Quality Assurance Plan (QAMP) was prepared by the CPR and approved by EPA Region 2. The air monitoring network complies with the criteria identified in the QAMP.



Each sampling site is evaluated to ensure that all EPA location requirements are met, as part of the performance audit of the instruments. In addition, it includes a safety inspection to guarantee a work environment for the personnel who work the stations.

5.0 NETWORK STATUS

Given that resources were limited the efforts will be used to complete pending activities from previous plans (2019 and 2020).

Network Plan 2019 plan:

- Complete the installation of the Salinas station.
- Select the new PM_{2.5} Guayanilla location.

Network Plan 2020 plan:

- Repair the Guaynabo station (Metropista).
- reestablish operation of stations closed due to lack of personnel

Since the Puerto Rico Environmental Laboratory (PREL) has not resumed analysis of PM_{2.5} and Lead, the AQA will use the services of the EPA national laboratory to carry out the analysis. The AQA maintain continuous communication with EPA Region 2, all the changes are done in coordination with EPA.

Table 1 Puerto Rico Network Status

| PR Id | AQS Num. | County | Parameter | Active | Comments |
|-------|-------------|----------|-------------------|--------|-------------------------------|
| 5 | 72-033-0008 | Cataño | O ₃ | √ | |
| 7 | 72-061-0001 | Guaynabo | PM ₁₀ | √ | |
| | | | SO ₄ | | Waiting PREL resume analysis |
| 8 | 72-077-0001 | Juncos | O ₃ | √ | |
| 13 | 72-001-0002 | Adjuntas | PM _{2.5} | √ | |
| 15 | 72-057-0012 | Guayama | PM _{2.5} | √ | |
| | | | PM ₁₀ | √ | |
| | | | SO ₄ | TSS | Waiting PREL resume analysis |
| 18 | 72-123-0002 | Salinas | SO ₂ | P | To be Established at New Site |
| 20 | 72-061-0006 | Guaynabo | CO | √ | TSS Traffic Accident |
| | | | NO ₂ | √ | TSS Traffic Accident |
| 21 | 72-025-0007 | Caguas | PM _{2.5} | √ | |
| | | | NO ₂ | √ | |
| | | | CO | √ | |
| 22 | 72-053-0003 | Fajardo | PM _{2.5} | √ | |
| | | | PM ₁₀ | √ | Waiting PREL resume analysis |
| | | | SO ₄ | TSS | Waiting PREL resume analysis |



| PR Id | AQS Num. | County | Parameter | Active | Comments |
|-------|-------------|------------|-------------------------|--------|-------------------------------|
| 24 | 72-061-0005 | Guaynabo | PM _{2.5} | √ | |
| | | | PM _{2.5} QA | √ | |
| | | | PM ₁₀ | √ | |
| | | | PM ₁₀ QA | √ | |
| | | | SO ₄ | TSS | Waiting PREL resume analysis. |
| 30 | 72-127-0003 | San Juan | CO | √ | |
| 37 | 72-021-0010 | Bayamon | PM _{2.5} | √ | |
| | | | PM ₁₀ | √ | |
| | | | SO ₂ | √ | |
| | | | CO | √ | |
| | | | NO _x | √ | |
| | | | PM _{2.5} Spec. | TSS | Waiting for the new equipment |
| | | | AQI PM _{2.5} | TSS | Waiting for the new equipment |
| 40 | 072-33-0004 | Cataño | O ₃ | √ | |
| | | | AQI PM _{2.5} | √ | |
| | | | AQI PM ₁₀ | √ | |
| 56 | 72-113-0004 | Ponce | CO | √ | |
| | | | PM _{2.5} | √ | |
| | | | PM ₁₀ | √ | |
| | | | AQI PM ₁₀ | √ | |
| 57 | 72-059-0016 | Guayanilla | AQI PM _{2.5} | √ | |
| | | | PM _{2.5} | TSS | Select the new location |
| 59 | 072-97-0007 | Mayagüez | O ₃ | √ | |
| | | | PM _{2.5} | √ | |
| 69 | 72-057-0009 | Guayama | SO ₂ | √ | |
| 74 | 72-013-0001 | Arecibo | Pb | √ | Restarted on May 5, 2021 |
| 75 | 72-013-0002 | Arecibo | Pb | √ | Restarted on May 5, 2021 |
| | | | Pb-QA | √ | Restarted on May 5, 2021 |

- TSS: Temporary Shutdown
- P: To be install

5.1 *Network Equipment*

The PRAMN uses the equipment recommended and approved in the *List of Designated Reference and Equivalent Method* of Title 40, Part 53 of the Code of Federal Regulations (40 CFR Part 53) to carry out the sampling according to each parameter being sampled. These consist of two types, continuous and intermittent (manual) sampling.

- Intermittent or manual sampling is used for the particulate stations (PM₁₀, PM_{2.5} and Pb). They take samples for 24-hours, with different frequencies, PM₁₀ and Lead every six days (1-6 days) and PM_{2.5} every three days (1-3 days). These



equipment uses filters that are analyzed through chemical processes either in the DNER environmental laboratory or by EPA national contract laboratory.

- Continuous sampling is used for NO₂, CO, SO₂, O₃, PM₁₀, and PM_{2.5}. The continuous equipment takes samples continuously 24-hours every day. This equipment calculates averages of five (5) minutes and hourly averages from the values taken.

Both types of equipment are calibrated, and have preventive maintenance according with the *QA Handbook Vol. II App D Measurement Quality Objectives and Validation Templates*. All the equipment has and meet the specifications of certainty and quality control; and the captured data is reliable for comparison with the NAAQS. Table 2 list the equipment used in the PRAMN by parameter.

Table 2: List of equipment used in the Puerto Rico air monitoring network by parameter.

| Parameter | Equipment | Type |
|---|---|------------|
| Particulate Matter (PM ₁₀) | Thermo Scientific Hi-Vol SA/GMW-321B | manual |
| | Thermo Scientific TEOM 1405 _AVF 246-B Inlet | continuous |
| Particulate Matter (PM _{2.5}) | Met-One E-Seq-FRM PM _{2.5} / VSCC | manual |
| | Thermo Scientific TEOM 1405F AVF PM _{2.5} VSCC | continuous |
| | Met-One Beta Attenuation Particulate Monitor | continuous |
| Sulfur Dioxide (SO ₂) | Teledyne T-100 Pulsed Fluorescence | continuous |
| Nitrogen Dioxide (NO ₂) | Teledyne T-200 Chemiluminescence | continuous |
| Ozone (O ₃) | Teledyne T-400 Instrumental Ultra Violet Abs. | continuous |
| Lead (Pb) | Thermo Scientific Hi-Vol ICP-MS | manual |
| Carbon Monoxide (CO) | Teledyne T-300 Gas Filter Corr. CO Analyzer | continuous |
| PM _{2.5} Speciation | Met-One SASS Teflon Energy Dispersive XRF | manual |

6.0 NETWORK BUDGET AND LIMITATIONS

The air monitoring network has several limitations that affect its development, operation and maintenance. Although the sampling network has new equipment, maintenance will be affected if the following limitations are not resolved.

- The lack of personnel for the maintenance, checks and data handling of the air monitoring network. The staff responsible of these functions are only two (2) field technicians, one (1) electronics technicians and two (2) statisticians.
- Streamline the allocation of funds for the operation and purchase of materials have been approved and are available for the period needed. Since the PRAMN is funded with federal funds under Section 103 and Section 105 of the Clean Air Act, the PRAMN must be approved by EPA Region 2. After the funds are allocated cannot immediately



be used. The funds require state funds match, DNER requires approval of external government agencies.

- To make the purchasing process more flexible, since all PR Government purchases are made by the General Services Administration regardless of the amount of the purchase and the urgency of the purchase. The Air Quality Area does not know the status of the orders. In addition, if the amount of the order exceeds \$10,000, authorization from another External Agency, Office of Management and Budget, is also required. All these new administrative requirements delay the orders and therefore the operation of the sampling network.
- Also, make the purchasing process more flexible in terms of the purchase of equipment, since the sampling equipment used in the network is not manufactured in PR. This requirement delays ordering by not being able to purchase directly from the manufacturer, and sometimes increases the cost of parts. PR Government regulation even limits the amount of money for purchases and requires prior approval from the Office of Management and Budget.
- Increase cooperation between Government Agencies to facilitate processes when establishing a new site. Any new site is complicated as it depends on the topography of the area, available electrical utility infrastructure, use permit and site owner approval.

7.0 NETWORK DESIGN

The PRAMN has nineteen (19) locations with forty-two (42) monitors around the island where the air quality for criteria pollutants (gaseous and particulate) is measured. The goal of the network is, almost instantaneously, to maintain information about pollution. The information is available on maps, Internet sites, and / or public notices. The PRAMN is a backbone for air quality management programs, provide the public with information on current conditions and the progress in improving air quality, and are used by health researchers, business interests, environmental groups, and others.

The air sampling network has the collection of pollutant data such as particles with a diameter of 2.5 micrometers or less ($PM_{2.5}$), particles with a diameter of 10 micrometers or less (PM_{10}), ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen oxide (NO_2), PM_{10} - sulfates (SO_4) and lead (Pb). In addition, meteorological data are also collected, the network has an NCore station with a $PM_{2.5}$ speciation monitor and, two NO_2 stations near roads. These last one with the purpose of analyzing and describing the nature of air quality problems to the population on the Island.

The data obtained from the FRM and FEM monitors for the criteria pollutants are compared with NAAQS, in order to develop achievement and maintenance plans. Sites classified as SLAMS, and especially NCore, are used to evaluate air quality prototypes used in the development of strategies and explore trends in the impact of control measures. Air



sampling near major emission sources can give an idea of how these sources control their pollutants as a result of their operations.

The characteristic data of an NCore station and / or of SLAMS stations are comparable with the data collected by research on the effects on health and atmospheric events, or very well for the work of method development.

Currently, Puerto Rico meets all minimum air monitoring requirements. The EPA in Appendix D of 40 CFR Part 58, establishes the minimum number of monitoring sites necessary to meet the environmental monitoring objectives. The minimum monitoring requirements are specific for each of the pollutants or based on objectives (NCore, ozone, PM_{2.5}, NO₂ near roads). Generally, the monitoring requirements of the population and the air emissions of the area.

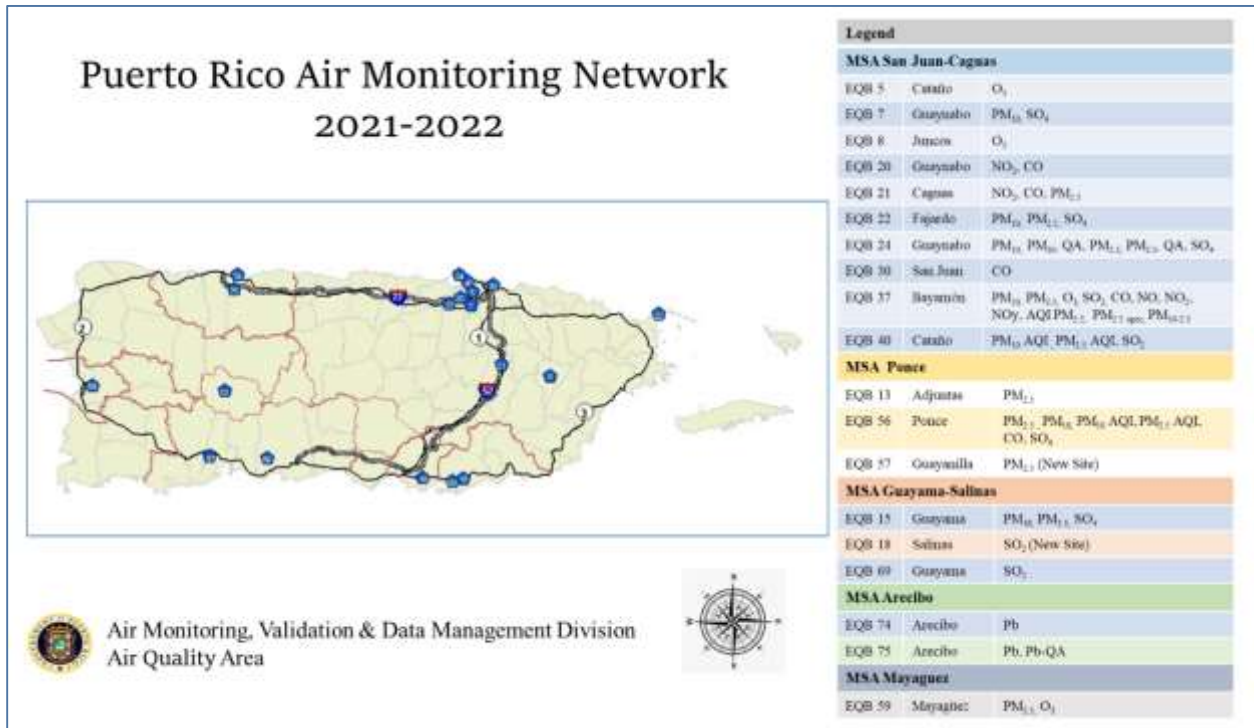
Table 3: Site Information – Puerto Rico Sites

| PR Id. | AQS Num. | County | Coordinates | | Parameter |
|--|-------------|----------------------|-------------|-------------|--|
| | | | Latitude | Longitude | |
| Metropolitan Area San Juan - Caguas | | | | | |
| EQB 5 | 72-033-0008 | Cataño | 18.438132 | -66.126658 | O ₃ |
| EQB 7 | 72-061-0001 | Guaynabo | 18.177318 | -66.115845 | PM ₁₀ , SO ₄ |
| EQB 8 | 72-077-0001 | Juncos | 18.17793873 | -65.916041 | O ₃ |
| EQB 20 | 72-061-0006 | Guaynabo | 18.4218472 | -66.1206861 | CO, NO ₂ |
| EQB 21 | 72-025-0007 | Caguas | 18.198092 | -66.052719 | PM _{2.5} , NO ₂ , CO |
| EQB 22 | 72-053-0003 | Fajardo | 18.381414 | -65.617799 | PM _{2.5} , PM ₁₀ , SO ₄ |
| EQB 24 | 72-061-0005 | Guaynabo | 18.432122 | -66.114702 | PM _{2.5} , PM ₁₀ , PM ₁₀ QA PM _{2.5} - QA, SO ₄ |
| EQB 30 | 72-127-0003 | San Juan | 18.4478145 | -66.0525095 | CO |
| EQB 37 | 72-021-0010 | Bayamón | 18.419231 | -66.150429 | NCore (PM _{2.5} , SO ₂ , CO, NO _x , O ₃ , PM ₁₀ , PM _{2.5} Spec, AQI) |
| EQB 40 | 72-33-0004 | Cataño | 18.428427 | -66.141648 | SO ₂ , AQI (PM _{2.5} , PM ₁₀) |
| Metropolitan Area Ponce | | | | | |
| EQB 13 | 72-001-0002 | Adjuntas | 18.17537759 | -66.725988 | PM _{2.5} |
| EQB 56 | 72-113-0004 | Ponce | 18.0095583 | -66.6272249 | CO, PM _{2.5} , PM ₁₀ , AQI |
| EQB 57 | 72-059-0016 | Guayanilla | New | | PM _{2.5} |
| Metropolitan Area Guayama - Salinas | | | | | |
| EQB 15 | 72-057-0012 | Guayama | 17.955378 | -66.162122 | PM _{2.5} , PM ₁₀ , SO ₄ |
| EQB 18 | 72-123-0002 | Salinas ¹ | 17.968352 | -66.261365 | SO ₂ |
| EQB 69 | 72-057-0009 | Guayama | 17.965713 | -66.186803 | SO ₂ |
| Metropolitan Area Mayaguez | | | | | |
| EQB 59 | 072-97-0007 | Mayagüez | 18.21428 | -67.14461 | O ₃ , PM _{2.5} |
| Metropolitan Area Arecibo | | | | | |
| EQB 74 | 72-013-0001 | Arecibo | 18.457166 | -66.696468 | Pb |
| EQB 75 | 72-013-0002 | Arecibo | 18.453062 | -66.695688 | Pb, Pb-QA |

¹ Salinas site will be established in the next 18 months.



Figure 1: Puerto Rico Air Monitoring Network



The network design proposed in this document is according to the Clean Air Act, the 40 Code of the Federal Regulations (CFR) Part 58, which presents a balance between the desired number of monitors, the sampling frequency, the available budget and the employees necessary for its management and operation.

The recommended changes in this network will be implemented during the period from July 2020 to December 2021, depending on the available budget. The operation of the network may change over the years without public notification based on unexpected circumstances. Examples of unexpected circumstances include catastrophic equipment failures, construction or demolition activities, and loss of access to the site, monitor obstructions or natural events (hurricanes or storms).

7.1 PM_{2.5} Air-Monitoring Network

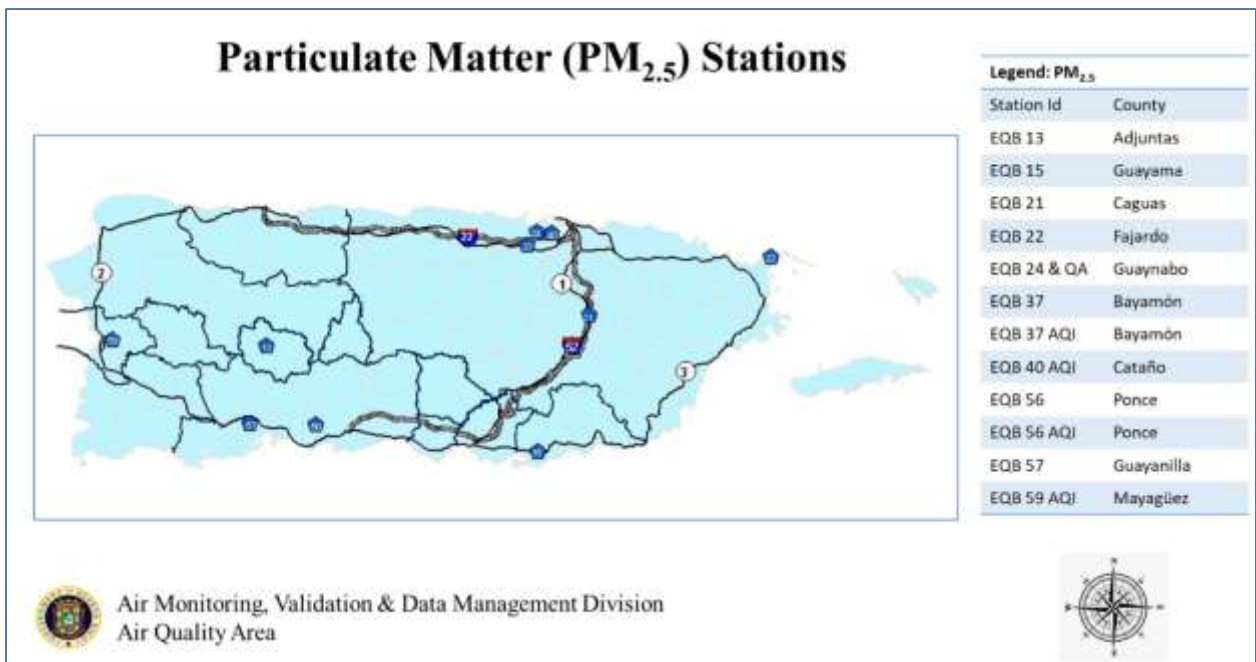
The PRAMN operates twelve (12) sites of PM_{2.5} in the air sampling network, eight (8) use the FRM, four (4) continuous FEM sampling and one (1) collocated (QA) PM_{2.5}



The FRM PM_{2.5} sampling equipment was changed for a reference sampling equipment included in the EPA-Designated Reference List as Met One E-SEQ-FRM PM_{2.5}/ VSCC. All FRM sites operate one every three days (1-3). The monitor placed FRM QA operate one day every 6 days.

The PM_{2.5} continuous monitors operate throughout the year and the data is sent to the EPA AQMS system database in one hour values. The continuous sampling of PM_{2.5} uses the TEOM 1405F-AVF PM_{2.5} VSCC and the Met-One Beta Attenuation Particulate Monitor at the NCore site. The continuous monitors of PM_{2.5} are used to report the AQI. The details of these sites are included in Appendix I and Figure 2.

Figure 2: PM_{2.5} Network



7.2 PM₁₀ Air-Monitoring Network

The PRAMN operates seven (7) PM₁₀ sites and is broken down into five (5) intermittent FRM monitors and two (2) PM₁₀ continuous monitors in the air sampling network.

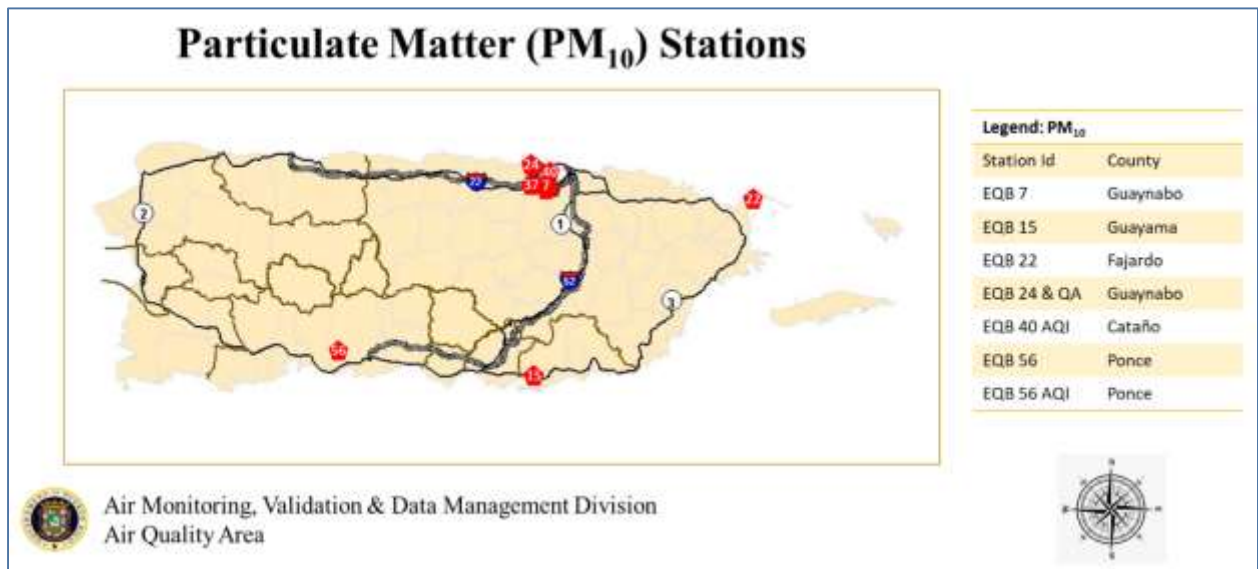
The FRM PM₁₀ sampling equipment used in the network are the Hi-Vol SA/GMW-321B. The site located at Guaynabo operate every three days (1 in 3) and the others



four (4) sites operated every six days (1 in 6). In addition, the CPR operates one (1) PM₁₀ FRM monitor as collocated (QA) with frequency of 1 in 6 days.

The continuous PM₁₀ monitors take samples throughout the year and the concentrations are sent to the AQS system of the EPA and are used for AQI purposes. The equipment used are a TEOM 1405F-AVF. The details of the sites are included in Appendix I and Figure 3

Figure 3: PM₁₀ Network

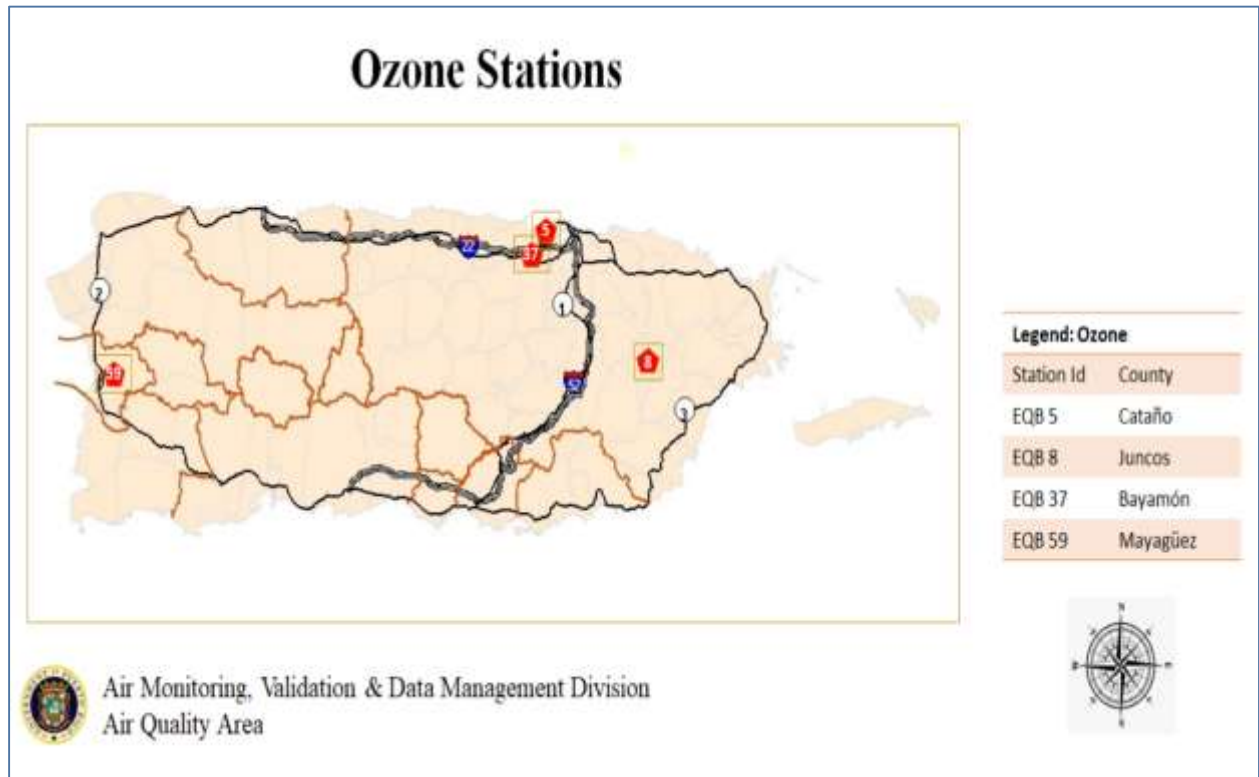


7.3 Ozone Air-Monitoring Network

The PRAMN operates four (4) ozone sites in the air sampling network with one (1) monitor located at the NCore site. The ozone monitors operate throughout the year and the concentrations are sent in one hour values to AQS of the EPA. The monitors are classified as SLAMS and the equipment used are Teledyne T-400 Instrumental Ultra Violet Abs. The details of the location of the sites are included in Appendix I and Figure 4.



Figure 4: O₃ Network



7.4 SO₂ Air-Monitoring Network

The PRAMN operates four (4) sites of sulfur dioxide (SO₂) in the air sampling network; one of these monitors is at the NCore station. All SO₂ monitors are operated throughout the year. The concentrations are sent in one hour values to AQS of the EPA, also five minutes' concentrations. All SO₂ monitors are oriented to the sources. The equipment used are Teledyne T-100 Pulsed Fluorescence.

The Salinas station will be located near an area where maximum SO₂ concentrations. The location has already been approved by the EPA. The station will be inside the Syngenta Company. The map below shows the area and the details of the new location.

The details of the location of the sites are included in Appendix I and Figure 6.



Figure 5: Salinas New location

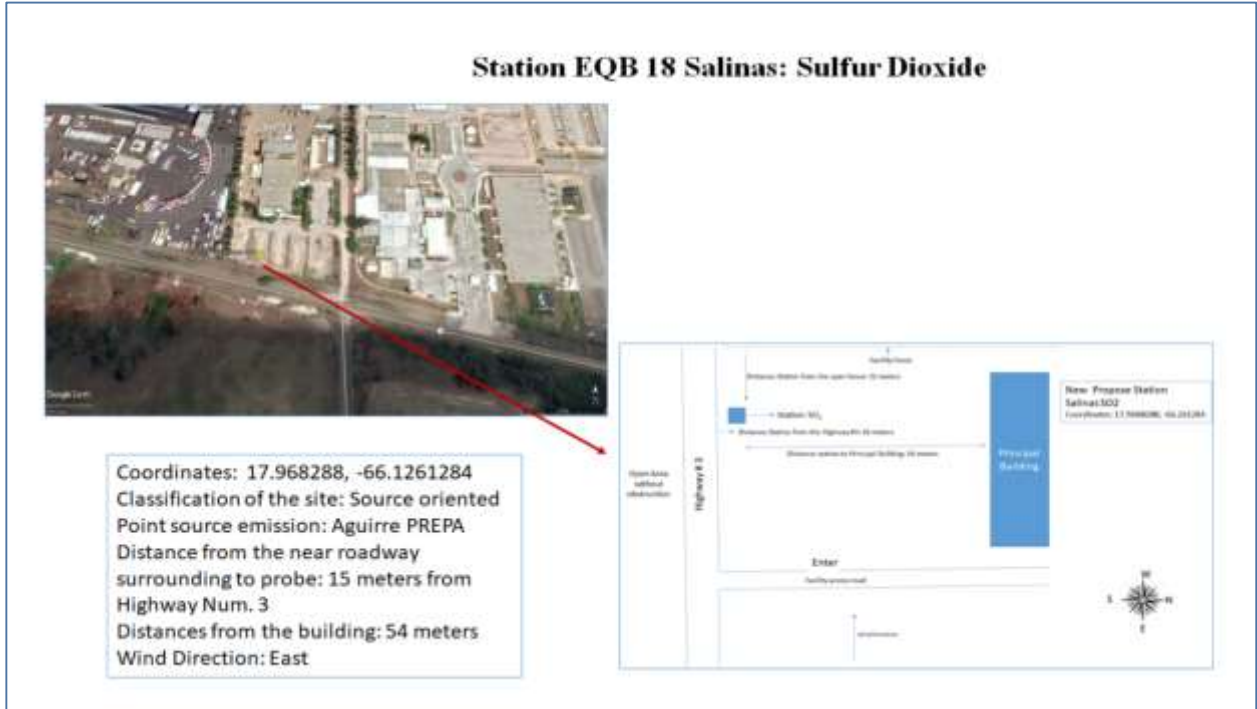
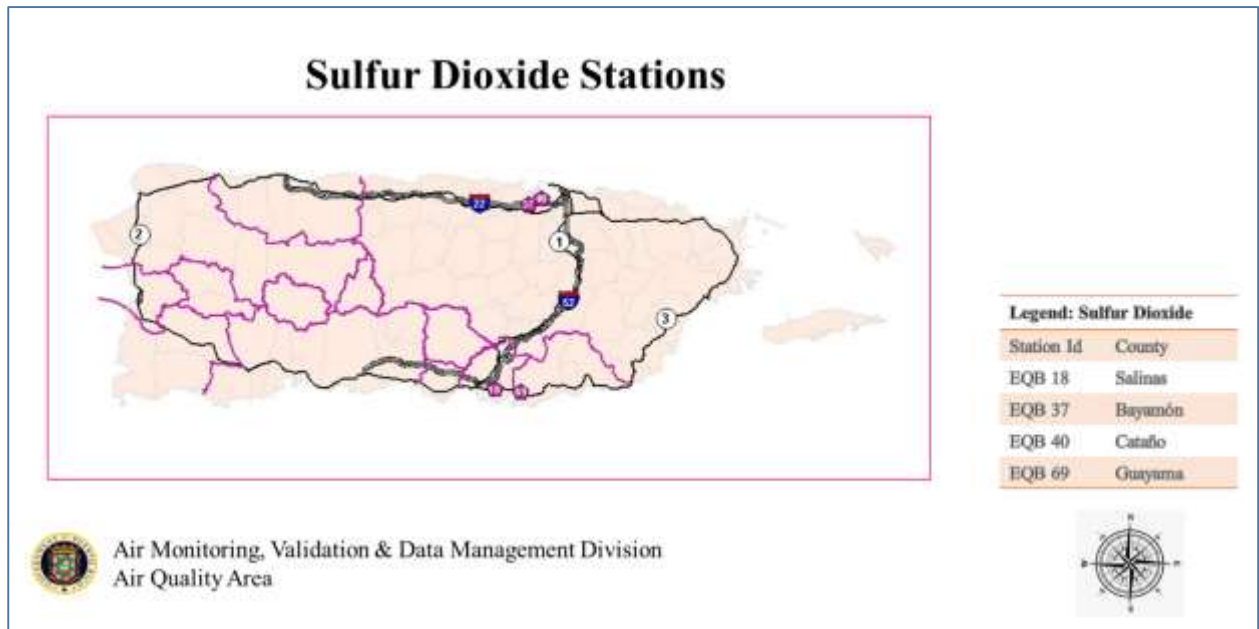


Figure 6: SO₂ Network





7.5 Lead Air-Monitoring Network

The PRAMN operates two (2) Lead sites (Pb) in the air sampling network, both in Arecibo, the monitoring concentrations obtained by industries that handle lead. All Pb monitors, including the collocate(QA) are operated one (1) in every six (6) days (1-6) throughout the year and the concentrations are sent in day values to EPA AQS.

The monitors for lead are SLAMS and use the method (FRM). The sampler used is a Hi-Vol ICP-MS. The details of the sites are included in Appendix I and in Figure 7.

Figure 7: Lead Network

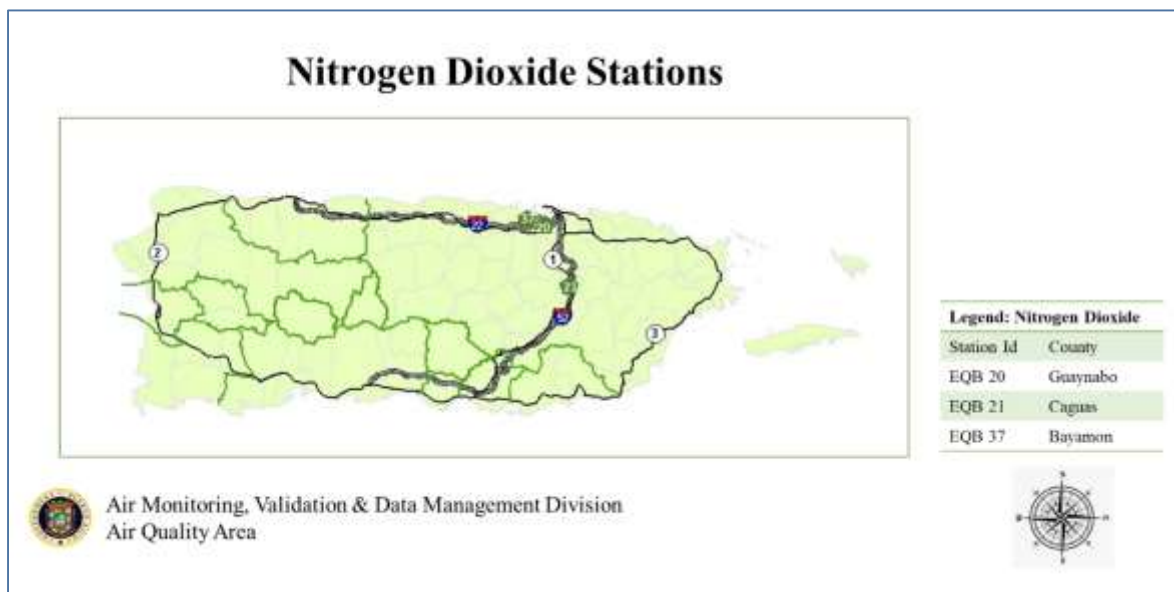




7.6 NO₂ Air-Monitoring Network

The PRAMN operates three (3) nitrogen oxide (NO₂) sites in the air-monitoring network, two (2) as parts of the near roads program, (at Guaynabo and Caguas); and one (1) at Bayamón NCore site. The NO₂ samplers are operated year-round and the measurements are sent to the EPA AQS on an hourly basis. The SLAMS NO₂ sites are used as a FRM; and the equipment used are Teledyne T-200 Chemiluminescence. The details of the sites are included in Appendix 1 and Figure 8.

Figure 8: NO₂ Network



7.7 CO Air-Monitoring Network

The PRAMN operates five (5) carbon monoxide (CO) sites in the air-monitoring network, one (1) of them at Bayamón NCore site. All CO samplers are operated year-round and the measurements are sent to the EPA AQS on an hourly basis. The SLAMS CO sites use FRM monitors. The equipment used are Teledyne T-300 Gas Filter Corr. CO Analyzer. The details of these sites are included in Appendix 1 and Figure 9.



Figure 9: CO Network



7.8 PM Sulfate Air Monitoring Network

The PRAMN operates four (4) sulfate sites (SO_4) in the air sampling network. The sulfate particulate sampling network analyzes the PM_{10} filters by atomic absorption analysis to generate the sulfate concentrations. The sulfate monitors are operated throughout the year and the concentrations are sent in 24-hour values to EPA AQS. The details of the location of the sites are included in Appendix I.

7.9 NCore – Air Monitoring Network

In PR an NCore site was established for March 2011. This site is part of the sampling network that uses various advanced equipment for measuring particles, gases and meteorology. The EPA requires each state at least one NCore site. The parameters sampled are: CO, O_3 , NO_2 , NO_y , NO, SO_2 , $PM_{2.5}$, PM_{10} , $PM_{10-2.5}$, $PM_{2.5}$ Speciation and basic meteorology.

Puerto Rico is required to have an NCore site. Bayamon (AQS: 72-021-0010) was established as the NCore site for Puerto Rico. The monitor of $PM_{2.5}$ continuous is temporary shutdown to be replaced by a new equipment. The replacement depends on the budget available. The details of the monitors are in the Appendix I and in the previous sections.



Figure 9: NCore Site





8.0 NETWORK CHANGES

After the impact of Hurricanes Irma and María in September 2017, it has been an invaluable challenge to restore the air monitoring network. Finally, in 2020 with almost 100% of the monitors operating, minimal changes are planned in the next eighteen (18) months (from July 1, 2020 to December 31, 2021). The Agency will continue its efforts and resources to reestablish the entire sampling network to continue maximize the data capture over 75% and; complete the selection and installation of the new sites approved by the EPA, that are still pending from previous sampling plans (2019 and 2020).

Network Plan 2019 plan:

- Complete the installation of the SO₂ Salinas station. The location has already been approved by the EPA. The details of the proposed site for the new location can be found in Section 7.4 SO₂ Air-Monitoring Network and Figure 5.
- Select the new PM_{2.5} Guayanilla location. The old location was closed by the owner of the site.

Network Plan 2020 plan:

- Repair the Guaynabo station (Metropista).
- reestablish operation of stations closed due to lack of personnel

All changes involving the relocation, closure, and/or establishment of a new site will require approval by EPA. Each change request will be submitted to EPA when additional details regarding the sites are available.

Activities to be carried out as part of the 2021 Plan:

- Close the Cataño O₃ monitor EQB 5 (72-033-0008) and re-locate to the south or south-east

The south and south-east area (Ponce & Guayama-Salinas) of Puerto Rico are areas without ozone data. The Cataño area have two (2) O₃ monitor. If the EQB 5 is closed, the area will be covered by the Bayamon (72-033-0010) monitor. The Cataño EQB 5 equipment would be used either for the Ponce or Salinas-Guayama area. The decision where located the monitors will be determined according with the modeling results, is possible located the monitors at existing sites or a new site.

- Add a new NO₂ monitors at the south or south-east of PR.



The south and south-east area of Puerto Rico are areas without NO₂ data; but according with the emissions inventory these areas are areas with high concentrations of NO₂. According to the emissions inventory, this area emits approximately more than 5,000 tons per year. The decision where located the monitors will be determined according with the modeling results, is possible located the monitors at existing sites or a new site.

- Add monitors of lead at San Juan and Guayanilla Areas

According with the emissions inventory Puerto Rico have areas with more than 0.5 ton/yr. of lead, such as San Juan and south-east area. According with the lead regulation, is possible establish monitors in the following are San Juan and Guayanilla, these areas have sources that emit 0.5 tons or more of lead.

- Change the type of equipment used for sampling PM₁₀

Puerto Rico has problems and difficulties in obtaining the necessary maintenance parts for the HI-Vol used for PM₁₀ sampling.

8.1 Limitations to Implement the Proposed Changes.

In order to implement all the proposed changes, it is necessary to comply with the following:

- A request to EPA for approval of changes and posting to news sites is required.
- PR must have the budget to purchase the necessary equipment to establish the station
- PR must have the personnel requested for the maintenance, operation and management of the network and the data handling
- Have the required sitting criteria to establish the sampling sites. That is, the topography and infrastructure of the area allows it with access to the site, the area have electricity service for the operation of the equipment.

9.0 NETWORK MODIFICATIONS FORMS

Network modifications forms will be prepared for submit to EPA Region 2 to implement the network changes identified in this plan.



10.0 SUMMARY AND CONCLUSIONS

The air monitoring network of Puerto Rico presented in this plan meets the monitoring requirements of federal regulations. The procedures that are used and the instruments that are operated meet the standards that has been established by EPA.

The only significant network changes are complete the installation of the SO₂ monitor in Salinas and; select a new site to PM_{2.5} at Guayanilla. The other changes are proposed changes that requires the EPA approval and identify previously the budget available.

APPENDIX I: Site Description

| Site Name | | EQB 13 | | | | |
|---|----------------|--------------------------------|----------|---------------|-------------------|------------|
| Address | | Road #123 | | | | |
| City | | Adjuntas | | | | |
| AQS Code | | 72-001-0002 | | | | |
| PR County | | Adjuntas | | | | |
| MSA/CSA | | N/A | | | | |
| Latitude | | +18.172695 | | | | |
| Longitude | | -66.726262 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | Yes | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| Ambient Average Temperature | Instrumental | Electronic | 1 in 3 | Urban | Extreme Downwind | 2005/01/01 |
| Sample Average Barometric Pressure | Instrumental | Barometric Sensor | 1 in 3 | Urban | Extreme Downwind | 2005/01/01 |
| PM _{2.5} | E-Seq-FRM/VSCC | Gravimetric | 1 in 3 | Urban | Upwind Background | 2005/01/01 |
| Site Purpose | | Reference for Extreme downwind | | | | |
| Plans for the next 18 months | | No Changes | | | | |
| Others Comments | | | | | | |



APPENDIX I: Site Description

| Site Name | | EQB 74 | | | | |
|---|--------------|-----------------------------|----------|---------------|-----------------|------------|
| Address | | Victor Santoni Cordero Road | | | | |
| City | | Arecibo | | | | |
| AQS Code | | 72-013-0001 | | | | |
| PR County | | Arecibo | | | | |
| MSA/CSA | | Arecibo | | | | |
| Latitude | | 18.457166 | | | | |
| Longitude | | -66.696468 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | N/A | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| Ambient Average Temperature | Instrumental | Offsite Avg. Pressure | 1 in 6 | Micro | Source Oriented | 2010/01/02 |
| Sample Average Barometric Pressure | Instrumental | Offsite Avg. Pressure | 1 in 6 | Micro | Source Oriented | 2010/01/02 |
| Lead | Hi-Vol | ICP-MS | 1 in 6 | Micro | Source Oriented | 2010/01/02 |
| Site Purpose | | Population Protection | | | | |
| Plans for the next 18 months | | No Changes | | | | |
| Others Comments | | | | | | |



APPENDIX I: Site Description

| Site Name | | EQB #75 | | | | |
|---|--------------|-----------------------|----------|---------------|-----------------|------------|
| Address | | PR Road #2 | | | | |
| City | | Arecibo | | | | |
| AQS Code | | 72-013-0002 | | | | |
| PR County | | Arecibo | | | | |
| MSA/CSA | | Arecibo | | | | |
| Latitude | | +18.453062 | | | | |
| Longitude | | -66.695688 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | N/A | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| Ambient Average Temperature | Instrumental | Offsite Avg. Pressure | 1 in 6 | Micro | Source Oriented | 2012/08/19 |
| Sample Average Barometric Pressure | Instrumental | Offsite Avg. Pressure | 1 in 6 | Micro | Source Oriented | 2012/08/19 |
| Lead | Hi-Vol | ICP-MS | 1 in 6 | Micro | Source Oriented | 2012/08/19 |
| Site Purpose | | Population Protection | | | | |
| Plans for the next 18 months | | No Changes | | | | |
| Others comments | | Pb collocated. | | | | |



APPENDIX I: Site Description

| Site Name | | EQB 21 | | | | |
|---|------------------------------|------------------------------|------------|---------------|--------------------|------------|
| Address | | Highway 22 Caguas South Toll | | | | |
| City | | Caguas | | | | |
| AQS Code | | 72-013-0002 | | | | |
| PR County | | Caguas | | | | |
| MSA/CSA | | San Juan-Caguas | | | | |
| Latitude | | +18.198712 | | | | |
| Longitude | | -66.052237 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | N/A | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| NO ₂ | Teledyne T200U | Chemiluminescence | Continuous | Urban | High Concentration | 2016/12/19 |
| Teledyne T300u | Gas Filter Corr. CO Analyzer | Teledyne T300u | Continuous | Urban | High concentration | 2017/02/06 |
| PM _{2.5} | Met-One E-Seq FRM/VSCC | Gravimetric | 1 in 3 | Urban | High concentration | 2017/06/01 |
| Ambient Average Temperature | Instrumental | Electronic | 1 in 3 | Urban | High concentration | 2017/06/01 |
| Sample Average Barometric Pressure | Instrumental | Barometric Sensor | 1 in 3 | Urban | High concentration | 2017/06/01 |
| Site Purpose | | Near Roads | | | | |
| Plans for the next 18 months | | No Changes | | | | |
| Others comments | | | | | | |



APPENDIX I: Site Description

| Site Name | | EQB 40 | | | | |
|---|-----------------------------|--|------------|---------------|---------------------|------------|
| Address | | 11 Final St. Las Vegas | | | | |
| City | | Cataño | | | | |
| AQS Code | | 72-033-0004 | | | | |
| PR County | | Cataño | | | | |
| MSA/CSA | | San Juan-Caguas | | | | |
| Latitude | | +18.428427 | | | | |
| Longitude | | -66.141648 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | N/A | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| SO ₂ | Teledyne T100u | Ultraviolet Fluorescent | Continuous | Neighborhood | Population Exposure | 1993/12/07 |
| PM ₁₀ Continuous | THERMO SA246B-Inlet | TEOM Gravimetric | Continuous | Urban | Population Exposure | 2000/07/13 |
| PM _{2.5} Continuous | TEOM PM _{2.5} VSCC | FDMS Gravimetric | Continuous | Urban | Population Exposure | 2015/01/01 |
| Site Purpose | | Population Protection | | | | |
| Plans for the next 18 months | | No Changes | | | | |
| Others comments | | AQI (PM ₁₀ , PM _{2.5}) PM _{2.5} continuous monitor | | | | |



APPENDIX I: Site Description

| Site Name | | EQB 5 | | | | |
|---|----------------|--------------------------------|------------|---------------|---------------------|------------|
| Address | | PR Rd. 165 | | | | |
| City | | Cataño | | | | |
| AQS Code | | 72-033-0008 | | | | |
| PR County | | Cataño | | | | |
| MSA/CSA | | San Juan-Caguas | | | | |
| Latitude | | +18.438132 | | | | |
| Longitude | | -66.126658 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | N/A | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| Ozone | Teledyne T-400 | Ultra violet | Continuous | Urban | Population Exposure | 2004/07/22 |
| Site Purpose | | Population Protection | | | | |
| Plans for the next 18 months | | Close and relocate the monitor | | | | |
| Others comments | | AQI (O ₃) | | | | |



APPENDIX I: Site Description

| Site Name | EQB 22 | | | | | |
|---|---------------------------------|----------------------|----------|---------------|-----------------------|------------|
| Address | Fajardo Lighthouse | | | | | |
| City | Fajardo | | | | | |
| AQS Code | 72-053-0003 | | | | | |
| PR County | Fajardo | | | | | |
| MSA/CSA | San Juan-Caguas | | | | | |
| Latitude | +18.381414 | | | | | |
| Longitude | -66.617799 | | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | Yes | | | | | |
| Monitor Type | SLAMS | | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| PM ₁₀ | Hi-Vol SA/GMW- 1200 | Gravimetric | 1 in 6 | neighborhood | Regional Transport | 1989/03/05 |
| PM _{2.5} | Met-One E-Seq FRM/VSCC | Gravimetric | 1 in 3 | Regional | Background | 1999/04/20 |
| PM ₁₀ Sulfate | Hi-Vol SA/GMW- 321B | Colorimetric | 1 in 6 | neighborhood | Background | |
| Ambient Temperature Average | Instrumental | Electronic | 1 in 3 | Regional | Background | 1999/04/20 |
| Ambient Pressure Average | Instrumental | Barometric Sensor | 1 in 3 | Regional | Background | 1999/04/20 |
| Site Purpose | Background / Regional Transport | | | | | |
| Plans for the next 18 months | No Changes | | | | | |
| Others comments | | | | | | |



APPENDIX I: Site Description

| Site Name | | EQB 15 | | | | |
|---|--------------------------------------|-------------------------------|----------|---------------|------------------------|------------|
| Address | | PR Rd. 3 | | | | |
| City | | Guayama | | | | |
| AQS Code | | 72-057-0012 | | | | |
| PR County | | Guayama | | | | |
| MSA/CSA | | Guayama-Salinas | | | | |
| Latitude | | 17.955378 | | | | |
| Longitude | | -66.617792 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | Yes | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| PM ₁₀ | Hi-Vol SA/GMW- 1200 | Gravimetric | 1 in 6 | neighborhood | Population Exposure | 2019/10/30 |
| PM _{2.5} | E-Seq-FRM PM _{2.5} /VSCC | Gravimetric | 1 in 3 | neighborhood | Population Exposure | 2019/10/03 |
| PM ₁₀ Sulfate | Hi-Vol SA/GMW- 321B | Colorimetric | 1 in 6 | neighborhood | Population Exposure | 2019/10/03 |
| Ambient Temperature Average | Instrumental | Electronic | 1 in 3 | neighborhood | Population Exposure | 2019/10/03 |
| Ambient Pressure Average | Instrumental | Barometric Sensor | 1 in 3 | neighborhood | Population Exposure | 2019/10/03 |
| Site Purpose | | Protection for the Population | | | | |
| Plans for the next 18 months | | No Changes | | | | |
| Others comments | | | | | | |



APPENDIX I: Site Description

| Site Name | | EQB 69 | | | | |
|---|----------------|---|------------|---------------|-----------------|------------|
| Address | | PR Police Station, Stolen Vehicles Division | | | | |
| City | | Guayama | | | | |
| AQS Code | | 72-057-0011 | | | | |
| PR County | | Guayama | | | | |
| MSA/CSA | | Guayama-Salinas | | | | |
| Latitude | | +17.965713 | | | | |
| Longitude | | -66.186803 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | N/A | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| SO ₂ | Teledyne T100u | Ultraviolet Fluorescent | continuous | neighborhood | Source oriented | 2017/04/06 |
| Site Purpose | | Protection for the population | | | | |
| Plans for the next 18 months | | No Changes | | | | |
| Others comments | | | | | | |



APPENDIX I: Site Description

| Site Name | | EQB 57 | | | | |
|---|--------------------------------------|-------------------------------|----------|---------------|------------------------|------------|
| Address | | | | | | |
| City | | Guayanilla | | | | |
| AQS Code | | 72-059-0017 | | | | |
| PR County | | Guayanilla | | | | |
| MSA/CSA | | Ponce | | | | |
| Latitude | | | | | | |
| Longitude | | | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | Yes | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| PM _{2.5} | E-Seq-FRM PM _{2.5} /VSCC | Gravimetric | 1 in 3 | Neighborhood | Population Exposure | new |
| Ambient Average Temperature | Instrumental | Electronic | 1 in 3 | Neighborhood | Population Exposure | new |
| Sample Average Barometric Pressure | Instrumental | Barometric Sensor | 1 in 3 | Neighborhood | Population Exposure | new |
| Site Purpose | | Protection for the population | | | | |
| Plans for the next 18 months | | Select a new location | | | | |
| Others comments | | | | | | |

APPENDIX I: Site Description

| Site Name | | EQB 7 | | | | |
|---|--------------------|------------------------------|----------|---------------|-----------------------|------------|
| Address | | USGS & Water Resources Bldg. | | | | |
| City | | Guaynabo | | | | |
| AQS Code | | 72-061-0001 | | | | |
| PR County | | Guaynabo | | | | |
| MSA/CSA | | San Juan- Caguas | | | | |
| Latitude | | +18.423559 | | | | |
| Longitude | | -66.114453 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | No | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| PM ₁₀ | Hi-Vol SA/GMW-1200 | Volumetric | 1 in 6 | Micro Scale | Highest Concentration | 1999/02/28 |
| PM ₁₀ Sulfate | Hi-Vol SA/GMW-321B | Volumetric | 1 in 6 | Neighborhood | Highest Concentration | 1998/01/05 |
| Site Purpose | | Determine High Concentration | | | | |
| Plans for the next 18 months | | Add a Lead Monitor | | | | |
| Others comments | | | | | | |



APPENDIX I: Site Description

| Site Name | | EQB 24 | | | | |
|---|---------------------------|---|----------|---------------|------------------------|------------|
| Address | | Electrical Substation | | | | |
| City | | Guaynabo | | | | |
| AQS Code | | 72-061-0005 | | | | |
| PR County | | Guaynabo | | | | |
| MSA/CSA | | San Juan- Caguas | | | | |
| Latitude | | +18.432122 | | | | |
| Longitude | | -66.114702 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | yes | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| PM _{2.5} | E-Seq FRM/ VSCC | Gravimetric | 1 in 3 | Neighborhood | Population Exposure | 1999/01/15 |
| PM ₁₀ | Hi-Vol SA/GMW- 321B | Volumetric | 1 in 3 | Neighborhood | Population Exposure | 1988/01/05 |
| PM ₁₀ Sulfate | Hi-Vol SA/GMW- 321B | Colorimetric | 1 in 6 | Neighborhood | Population Exposure | 1988/01/05 |
| Ambient Average Temperature | Instrumental | Electronic | 1 in 3 | Neighborhood | Population Exposure | 1999/01/15 |
| Average Barometric Pressure | Instrumental | Barometric Sensor | 1 in 3 | Neighborhood | Population Exposure | 1999/01/15 |
| Site Purpose | | Population Protection | | | | |
| Plans for the next 18 months | | No Changes | | | | |
| Others comments | | PM ₁₀ & PM _{2.5} collocate (QA) | | | | |



APPENDIX I: Site Description

| Site Name | | EQB 20 | | | | |
|---|----------------|--|------------|---------------|--------------------|------------|
| Address | | Highway 22 Buchanan Toll | | | | |
| City | | Guaynabo | | | | |
| AQS Code | | 72-061-0006 | | | | |
| PR County | | Guaynabo | | | | |
| MSA/CSA | | San Juan- Caguas | | | | |
| Latitude | | +18.422595 | | | | |
| Longitude | | -66.120012 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | n/a | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| CO | Teledyne T300U | Gas Filter Corr. CO Analyzer | Continuous | Urban | High concentration | 2014/07/08 |
| NO ₂ | Teledyne T200U | Chemiluminescence | Continuous | Urban | High concentration | 2015/02/20 |
| Site Purpose | | Near Roads | | | | |
| Plans for the next 18 months | | Re- Start, site TSS , the site was affected by traffic accident in Jan. 2020 | | | | |
| Others comments | | | | | | |



APPENDIX I: Site Description

| Site Name | EQB 59 | | | | | |
|---|-------------------------------------|---------------------|------------|---------------|---------------------|------------|
| Address | University of PR Mayaguez Campus | | | | | |
| City | Mayagüez | | | | | |
| AQS Code | 72-097-0007 | | | | | |
| PR County | Mayagüez | | | | | |
| MSA/CSA | Mayagüez | | | | | |
| Latitude | 18.21428 | | | | | |
| Longitude | -67.14461 | | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | No | | | | | |
| Monitor Type | SLAMS | | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| PM _{2.5} | TEOM 1405 PM _{2.5} VSCC | FDMS Gravimetric | Continuous | neighborhood | Population exposure | 2019/06/11 |
| O ₃ | Teledyne T-400 | Ultra violet | Continuous | Urban | Population exposure | 2019/06/11 |
| Site Purpose | AQI purpose | | | | | |
| Plans for the next 18 months | No Changes | | | | | |
| Others comments | PM _{2.5} & Ozone (AQI) | | | | | |



APPENDIX I: Site Description

| Site Name | | EQB 8 | | | | |
|---|----------------|------------------------------------|------------|---------------|---------------------|------------|
| Address | | Road 183 | | | | |
| City | | Juncos | | | | |
| AQS Code | | 72-077-0001 | | | | |
| PR County | | Juncos | | | | |
| MSA/CSA | | San Juan - Caguas | | | | |
| Latitude | | +18.177318 | | | | |
| Longitude | | -65.916041 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | No | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| Ozone | Teledyne T-400 | Ultra violet | Continuous | Neighborhood | Population exposure | 2007/10/03 |
| Site Purpose | | AQI purpose, Population Protection | | | | |
| Plans for the next 18 months | | No Changes | | | | |
| Others comments | | Ozone (AQI) | | | | |



APPENDIX I: Site Description

| Site Name | | EQB56 | | | | |
|---|-----------------------------|--|------------|---------------|---------------------|------------|
| Address | | Civil Defense Bldg. Urb. San Antonio | | | | |
| City | | Ponce | | | | |
| AQS Code | | 72-113-0004 | | | | |
| PR County | | Ponce | | | | |
| MSA/CSA | | Ponce | | | | |
| Latitude | | +18.009558 | | | | |
| Longitude | | -66.627249 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | yes | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| PM _{2.5} | E-Seq VSCC | Gravimetric | 1 in 3 | Neighborhood | Population Exposure | 1999/01/15 |
| PM ₁₀ | Hi-Vol SA/GMW-1200 | Volumetric | 1 in 6 | Neighborhood | High Concentration | 1999/01/06 |
| CO | Teledyne T300u | Gas Filter Corr. CO Analyzer | Continuous | Neighborhood | Population Exposure | 2011/10/01 |
| PM ₁₀ continuous | TEOM 1405 246-B Inlet | TEOM Continuous | Continuous | Neighborhood | Source oriented | 2011/10/05 |
| PM _{2.5} continuous | TEOM PM _{2.5} VSCC | FDMS Gravimetric | Continuous | Neighborhood | Source Oriented | 2017/07/05 |
| Ambient Average Temperature | | Barometric Sensor | | Neighborhood | Source Oriented | 1999/01/15 |
| Sample Average Barometric Pressure | | Electronic | | Neighborhood | | 1999/01/15 |
| Site Purpose | | AQI purpose, Population Protection | | | | |
| Plans for the next 18 months | | No Changes | | | | |
| Others comments | | AQI (PM _{2.5} & PM ₁₀). | | | | |



APPENDIX I: Site Description

| Site Name | | EQB 18 | | | | |
|---|----------------|--|------------|---------------|--------------------|------------|
| Address | | PR Rd. 3 (Inside Syngenta Company área) | | | | |
| City | | Salinas | | | | |
| AQS Code | | 72-123-0002 | | | | |
| PR County | | Salinas | | | | |
| MSA/CSA | | Guayama - Salinas | | | | |
| Latitude | | +17.968352 | | | | |
| Longitude | | -66.261365 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | N/A | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| SO ₂ | Teledyne T100u | Ultraviolet Fluorescent | Continuous | Neighborhood | High Concentration | new |
| Site Purpose | | Population Protection & High Concentration | | | | |
| Plans for the next 18 months | | No changes | | | | |
| Others comments | | | | | | |



APPENDIX I: Site Description

| Site Name | | EQB 30 | | | | |
|---|----------------|---|------------|---------------|--------------------|------------|
| Address | | Baldorioty de Castro Ave. | | | | |
| City | | San Juan | | | | |
| AQS Code | | 72-127-0003 | | | | |
| PR County | | San Juan | | | | |
| MSA/CSA | | San Juan- Bayamón | | | | |
| Latitude | | +18.449814 | | | | |
| Longitude | | -66.052510 | | | | |
| Suitable for Comparison to PM _{2.5} NAAQS? | | No | | | | |
| Monitor Type | | SLAMS | | | | |
| Parameter | Method | Analysis Method | Schedule | Spatial Scale | Objective | Begin Date |
| CO | Teledyne T300u | Gas Filter Corr. CO Analyzer | Continuous | Middle | High Concentration | 1995/04/01 |
| Site Purpose | | Determine High Concentration and protection of population | | | | |
| Plans for the next 18 months | | No changes | | | | |
| Others comments | | | | | | |



APPENDIX I: Site Description

| | |
|---|--------------------------|
| Site Name | EQB #37 NCore Station |
| Address | Regional Jail of Bayamón |
| City | Bayamón |
| AQS Code | 72-021-0010 |
| PR County | Bayamón |
| MSA/CSA | San Juan - Bayamón |
| Latitude | +18.420089 |
| Longitude | -66.150615 |
| Suitable for Comparison to PM _{2.5} NAAQS? | yes |

| Parameter | Sampling Instrument | Analysis Method | Schedule | Spatial Scale | Monitoring Objective | Begin Date |
|----------------------|---|------------------------------|------------|---------------|----------------------|------------|
| SO ₂ | Teledyne T100u | Ultraviolet Fluorescent | Continuous | Neighborhood | Population Exposure | 2011/03/16 |
| CO | Teledyne T300u | Gas Filter Corr. CO Analyzer | Continuous | Neighborhood | Population Exposure | 2011/03/16 |
| NO | Teledyne T200u | Chemiluminescence | Continuous | Neighborhood | Population Exposure | 2014/05/21 |
| NOy | Teledyne T200u | Chemiluminescence | Continuous | Neighborhood | Population Exposure | 2014/05/21 |
| NOy-NO | Teledyne T200u | Chemiluminescence | Continuous | Neighborhood | Population Exposure | 2014/05/21 |
| PM ₁₀ | E-FRM PM ₁₀ | Gravimetric | 1-3 | Neighborhood | Population Exposure | 2015/05/09 |
| PM _{2.5} | E-Seq FRM PM _{2.5} /VSCC | Gravimetric | 1-3 | Neighborhood | Population Exposure | 2015/04/12 |
| PM _{10-2.5} | E-FRM PM _{10-2.5} Sampler Pair | Paired Gravimetric | 1-3 | Neighborhood | Population Exposure | 2015/05/09 |

APPENDIX I: Site Description

| Parameter | Sampling Method | Analysis Method | Schedule | Spatial Scale | Monitoring Objective | Begin Date |
|------------------------------|---------------------|--|------------|---------------|----------------------|------------|
| O ₃ | Teledyne T-400 | Ultra violet | Continuous | Neighborhood | Population Exposure | 2014/05/21 |
| Wind Speed Resultant | Instrumental | RM Young Ultrasonic Anemometer Model 81000 | Continuous | Neighborhood | Population Exposure | 2014/05/21 |
| Wind Direction Resultant | Instrumental | RM Young Ultrasonic Anemometer Model 81000 | Continuous | Neighborhood | Population Exposure | 2014/05/21 |
| Outdoor Temperature | Instrumental | Met One o83D | Continuous | Neighborhood | Population Exposure | 2014/05/21 |
| Relative Humidity | Instrumental | Met One o83D | Continuous | Neighborhood | Population Exposure | 2014/05/21 |
| Barometric Pressure | Instrumental | Barometric sensor | Continuous | Neighborhood | Population Exposure | 2014/05/21 |
| PM _{2.5} | Met-One Beta | Attenuation Particulate Monitor | Continuous | Neighborhood | Population Exposure | TSS |
| PM _{2.5} Speciation | Met One SASS Teflon | Energy Dispersive XRF | 1-3 | Neighborhood | Population Exposure | 2015/11/20 |

| Parameter | Monitor Type |
|-------------------------------------|--------------|
| Sulfur Dioxide | SLAMS |
| Carbon Monoxide | SLAMS |
| Oxide Nitrogen | SLAMS |
| Oxide Nitrogen (NO _y) | SLAMS |
| Ozone | SLAMS |
| PM _{2.5} | SLAMS |
| PM ₁₀ | SLAMS |
| PM _{2.5} /PM ₁₀ | SLAMS |
| PM _{2.5} Speciation | SLAMS |

| Site Purpose | NCore Site |
|------------------------------|---|
| Plans for the next 18 months | Replace with a new PM _{2.5} continuous equipment |
| Comments | |