District of Columbia
2019 Annual Ambient Air Monitoring Network Plan

June 2018

Monitoring and Assessment Branch
Air Quality Division
Department of Energy & Environment
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Washington, DC 20002

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Acronyms and Definitions

AQI	Air Quality Index
AQS	Air Quality System
AQD	Air Quality Division
BAM	Beta Attenuation (Mass) Monitor – used for continuous measurements of particulate matter
CAA	Clean Air Act
C.F.R.	Code of Federal Regulations
CSN	$PM_{2.5}$ Chemical Speciation Network
CO	Carbon Monoxide
DOEE	Department of Energy and Environment
EPA	U.S. Environmental Protection Agency
FEM	Federal Equivalent Method
FID	Flame Ionization Detector
FRM	Federal Reference Method
GC	Gas Chromatograph
HAPs	Hazardous Air Pollutants
IMPROVE	Interagency Monitoring of Protected Visual Environments
IR	Infrared (radiation)
MAB	Monitoring and Assessment Branch, Air Quality Division
MSA	Metropolitan Statistical Area
NAA	Non-Attainment Area
NAAQS	National Ambient Air Quality Standard
NATTS	National Air Toxic Trends Stations
NAMS	National Air Monitoring Station
NCore	National Core Monitoring Network
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen (ozone precursor)
NOy	Total Reactive Nitrogen Species (ozone precursor)
O_3	Ozone
OC/EC	Organic Carbon/Elemental Carbon
PAHs	Polycyclic Aromatic Hydrocarbons
PAMS	Photochemical Assessment Monitoring network Stations
Pb	Lead
$PM_{2.5}$	Particulate matter with an equivalent diameter less than or equal to 2.5 µm
PM_{10}	Particulate matter with an equivalent diameter less than or equal to 10 µm
QA	Quality Assurance
SIP	State Implementation Plan
SLAMS	State and Local Air Monitoring Stations
SO_2	Sulfur Dioxide
TSP	Total Suspended Particles
TEOM	Tapered Element Oscillating Microbalance – used for continuous measurements of PM_{10} or $PM_{2.5}$
UV	Ultraviolet (radiation)
VOCs	Volatile Organic Compounds

Executive Summary

The Clean Air Act mandates an ambient air quality surveillance system in state and local jurisdictions including the District of Columbia (District). The U.S. Environmental Protection Agency (EPA) codified the national ambient air monitoring regulations in Title 40 Code of Federal Regulations (C.F.R.) Part 58. The regulations require state and local monitoring agencies to conduct a periodic assessment of ambient air monitoring networks and propose any changes in an annual ambient air monitoring network plan. Annual network plans need to be submitted to EPA by July 1st of every year. This document is the District's Annual Ambient Air Network Plan (Network Plan) for calendar year 2019.

District of Columbia Department of Energy and Environment (DOEE) is not proposing any changes to the District's ambient air monitoring network in calendar year 2019 and the ambient monitoring network will be maintained as described in the subsequent sections of this Network Plan.

1.0 Introduction

In 1970, Congress passed the Clean Air Act (CAA) and authorized the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) for pollutants that threaten human health and welfare. Primary standards are set according to criteria designed to protect public health, including sensitive populations such as children and the elderly. Secondary standards are set to minimize harm to public welfare and the environment (*e.g.*, decreased visibility, damage to crops, vegetation, and buildings).

Six pollutants currently have NAAQS: ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter (less than 10 microns, PM_{10}; and less than 2.5 microns aerodynamic diameter, $PM_{2.5}$), and lead (Pb). These are commonly known as "criteria" air pollutants. When air quality does not meet the NAAQS for one of the criteria pollutants, the area is said to be in "nonattainment" of the standard for that pollutant.

Air pollution comes from many sources including on-road vehicles (cars, trucks, buses, and motorcycles), off-road equipment (locomotives, boats, construction equipment, lawn mowers), area sources (small stationary sources that cumulatively impact air quality such as gas stations, auto maintenance facilities, painting operations, consumer products usage), large stationary sources (factories, power plants), and even fires. The CAA requires that state and local air agencies operate and maintain ambient air surveillance networks to measure pollutant concentrations. DOEE uses its ambient monitoring network to track changes in the District's ambient air and to evaluate the District's compliance with the NAAQS.

Ambient air quality monitoring in the District began in the late 1950s, prior to the establishment of EPA. The first monitors were simple mechanisms or passive collectors such as dust-fall buckets and tape samplers. These were followed in the 1960s by wet-chemistry instruments, which were soon replaced by more advanced electronic automated instruments. The addition of computer technology in the late 1970s and early 1980s to operate monitoring systems and collect air data was critical to the development of the core monitoring network that exists today.

Over the years, monitoring goals have shifted based on changes in the NAAQS. On October 1, 2015, EPA strengthened the NAAQS for ground-level ozone to 70 parts per billion (ppb), based on extensive scientific evidence about ozone's effects on public health and welfare. The updated standards will improve public health protection, particularly for at-risk groups including children, older adults, people of all ages who have lung diseases such as asthma, and people who are active outdoors, especially outdoor workers. EPA designated the District as a marginal nonattainment area for the 2015 ozone NAAQS, based on 2014-2016 air quality data. Formal attainment plans for the 2015 standards, if needed, are not anticipated to be due until 2021. Note that the District attained the old 2008 ozone NAAQS and recently submitted a redesignation request and maintenance plan for that old NAAQS for EPA's review and approval.

In 2014, EPA redesignated (79 Fed. Reg. 60081) the District from nonattainment to attainment of the 1997 annual NAAQS for $PM_{2.5}$ (15 $\mu g/m^3$). Also, in 2014, the District was designated as an attainment area for the more stringent 2012 annual NAAQS (12 $\mu g/m^3$). The District is in compliance with the 2012 $PM_{2.5}$ NAAQS and continues to maintain the standards.

As required by federal air monitoring regulations, the District's monitoring network is designed to study expected high pollutant concentrations, high population density, significant sources, general background concentrations, and regional transport.

In October 2006, EPA issued final regulations that require periodic assessment of monitoring networks. As described in 40 C.F.R. § 58.10, the following information for existing and proposed site(s) must be included in a Network Plan:

1. Air Quality System (AQS) site identification number;
2. Site location, including street address and geographical coordinates;
3. Sampling and analysis method(s) for each measured parameter;
4. Operating schedules for each monitor;
5. Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal;
6. Monitoring objective and spatial scale of representativeness for each monitor;
7. The identification of any sites that are suitable and sites that are not suitable for comparison against the annual $PM_{2.5}$ NAAQS or 24-hour $PM_{10\text{-}2.5}$ NAAQS as described in § 58.30;
8. Metropolitan Statistical Area (MSA), Core Based Statistical Area (CBSA), Combined Statistical Area (CSA), or other area represented by the monitor;
9. The designation of any Pb monitors as either source-oriented or non-source-oriented according to Appendix D to 40 C.F.R. Part 58;
10. Any source-oriented monitors for which a waiver has been requested or granted by the EPA Regional Administrator as allowed for under § 4.5(a)(ii) of Appendix D to 40 C.F.R. Part 58;
11. Any source-oriented or non-source-oriented site for which a waiver has been requested or granted by the EPA Regional Administrator for the use of Pb-PM_{10} monitoring in lieu of Pb-TSP monitoring as allowed in § 2.10 of Appendix C to 40 C.F.R. Part 58; and
12. The identification of required NO_2 monitors as either near-road or area-wide sites in accordance with Appendix D, Section 4.3 of 40 C.F.R. Part 58.

This Annual Ambient Air Monitoring Network Plan for the District for calendar year 2019 contains a description of the District's monitoring program, various parameters within the network, and additional monitoring station information. It also confirms that the District's air monitoring program continues to meet federally established monitoring and data assessment criteria.

To meet EPA requirements at 40 C.F.R. § 58.10(a)(1), revised in April 2016, the Network Plan is being made available for public inspection and comment for at least 30 days prior to submission to the EPA.

1.1 The District's Ambient Air Monitoring Strategy

Ambient air monitoring systems are a critical part of the District's air quality management program. Air quality management involves a cycle of monitoring the quality of the ambient air,

setting air quality standards and objectives, identifying and implementing control strategies, and measuring progress. Air monitoring data is used throughout this process to help:

- Determine compliance with the NAAQS;
- Characterize air quality and pollutant trends;
- Estimate health risks and ecosystem impacts;
- Develop and evaluate emission control strategies;
- Evaluate source-receptor relationships;
- Provide input data for models and evaluating models;
- Measure overall progress of air pollution control programs; and
- Inform air quality forecasts and other public outreach air quality reports.

Over the last 25 years, ambient levels of criteria pollutants have decreased significantly in the District due to the implementation of various control measures. In the 1980s, the introduction of automobiles equipped with catalytic converters resulted in significant reductions in NO_2, carbon monoxide (CO), and volatile organic compounds (VOCs). The phasing out of leaded gasoline led to a significant drop in ambient lead (Pb) levels. Since then, various control strategies for stationary sources, on-road and off-road vehicles, and non-point area sources have reduced sulfur dioxide (SO_2), nitrogen oxide (NO_x), $PM_{2.5}$, and PM_{10} levels in the ambient air. There is also less formation of problematic ozone, although the District still remains in nonattainment of 8-hour ground-level ozone standards.

2.0 District's Ambient Air Network

The Monitoring and Assessment Branch (MAB) in DOEE's Air Quality Division operates, maintains, and performs all functions of the ambient air monitoring program required by the CAA. The District's network currently consists of five (5) monitoring sites. Sampling covers criteria air pollutants, $PM_{2.5}$ mass and chemical speciation, and enhanced monitoring for ozone and its precursor pollutants with a photochemical assessment monitoring station (PAMS) for measuring speciated VOCs, NO_x, carbonyls, air toxics, and surface and meteorological parameters.

One of the significant elements of the October 2006 monitoring regulations was the establishment of a multi-pollutant National Core (NCore) monitoring network to provide trace-level air quality measurements. The District launched an NCore station at its McMillan site (11-001-0043) in January 2011. Then, to fulfill the monitoring requirements of the 2008 Pb NAAQS, DOEE established an ambient Pb monitor at the NCore site in January 2012, which was later terminated at the end of 2016 after monitoring requirements were revised.

During the calendar year 2015, the District's network expanded with the addition of a new Anacostia Freeway Near-Road air monitoring station. Also, in early 2015, an experimental Village Green park bench air monitoring station with low-cost emerging air sensor technology was established in the District. The park bench air monitoring station is primarily for technology demonstration and public education purposes and it is not part of the District's regulatory network of air monitoring stations.

District's 2018 Annual Network Plan was approved by EPA on November 17, 2017. No changes to the District's network were proposed in that plan.

Figure 2-1 and Tables 2-1 through Table 2-5 below include information about the District's five air monitoring sites used for regulatory purposes and the measured pollutant parameters.

Figure 2-1: The District's Ambient Air Monitoring Network

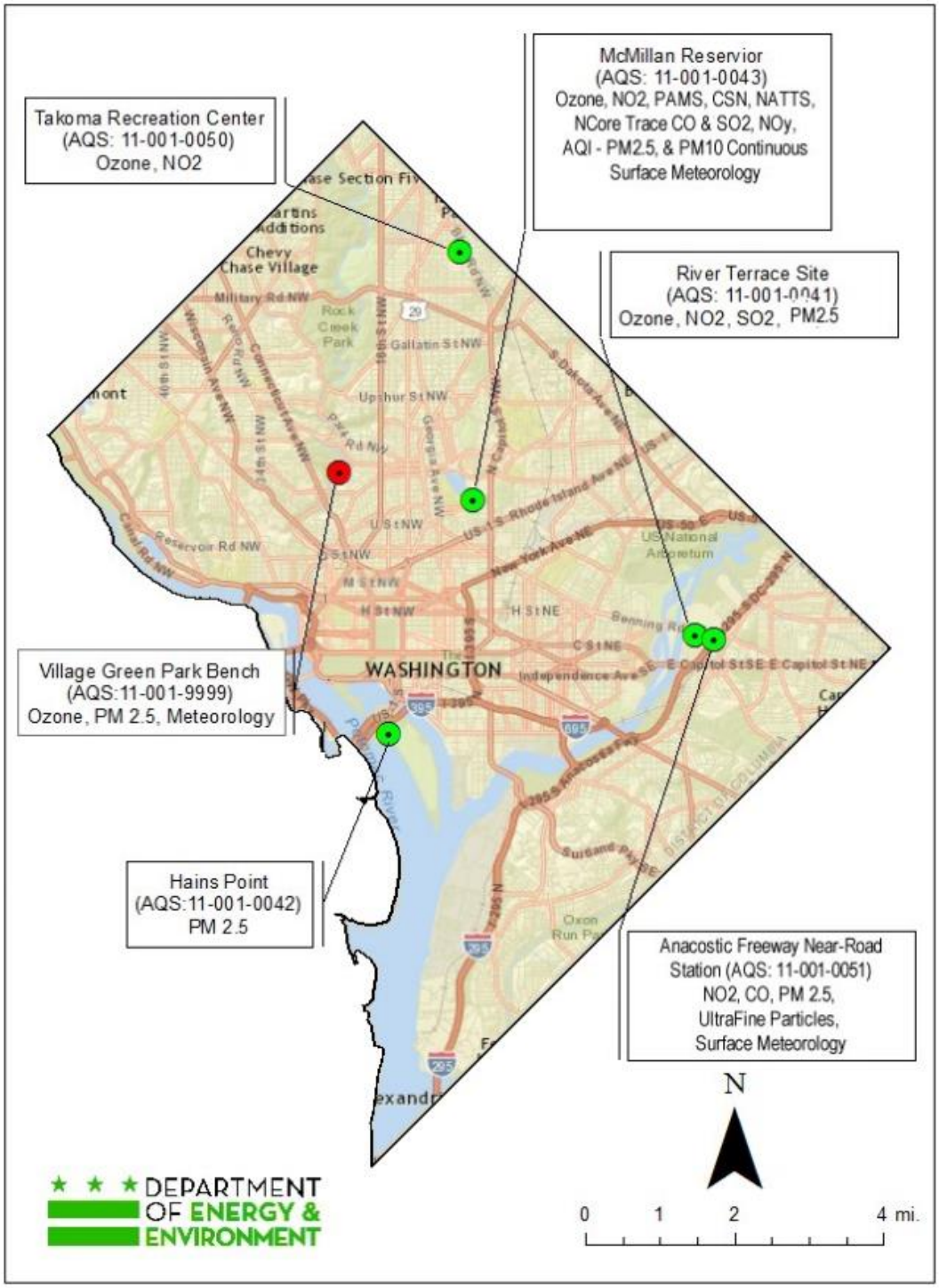


Table 2-1: 2016 Ambient Air Monitoring Network and Monitor Details

Site Name, AQS ID	Street Address	City, County, ZIP	Latitude, Longitude (UTM)	Location Setting	Nearest Road	Traffic Count	Traffic Count Year	Distance From nearest road (m)	Metro Statistical Area (MSA)
McMillan 11-001-0043	2500 1st St., N.W.	Washington DC 20001	+38.921847 -77.013178	Urban	Michigan Ave. NW	27,500	2014	100	DC-Arlington-Alexandria
River Terrace 11-001-0041	420 34th Street N.E.	Washington, DC 20019	+38.895572 -76.958072	Urban	Benning Rd.	31,000	2014	100	DC-Arlington-Alexandria
Hains Point 11-001-0042	1100 Ohio Drive, S.W.	Washington, DC 20242	+38.876255 -77.034059	Urban	I-395	226,100	2014	250	DC-Arlington-Alexandria
Takoma Recreation Center 11-001-0050	301 Van Buren St., N.W.	Washington, DC 20012	+38.970092 -77.016715	Urban	Blair Rd., N.W.	18,300	2014	200	DC-Arlington-Alexandria
Anacostia Freeway Near-Road Station 11-001-0051	3600 Benning Road NE @ Anacostia Freeway	Washington, DC 20019	+38.894770 -76.953426	Urban	Anacostia Freeway I-295	125,300	2014	10	DC-Arlington-Alexandria

Table 2-2: Monitoring Sites and Parameters of Each Monitor

Site Name, AQS ID	Parameter	Start Date	Method Code	Probe Height (m)	Measurement Scale	Monitoring Objective	MonitorNetwork/ Type	Sample Schedule
McMillan 11-001-0043	Nitrogen Dioxide, Nitric Oxide	6/1/1994	074	3	Urban	Population Exposure/Max Precursor	SLAMS/PAMS	Hourly
	NOy (Total reactive nitrogen oxides)	1/1/2011	691	3	Urban	PopulationExposure General/Background	SLAMS/NCore	Hourly
	SO2 (trace)	1/1/2011	592	3	Urban	Population Exposure General/Background	SLAMS/NCore	Hourly
	CO (trace)	1/1/2011	588	3	Urban	Population Exposure General/Background	SLAMS/NCore	Hourly
	PM10-2.5 coarse	1/1/2011	185	3	Urban	General/Background	SLAMS/NCore	Hourly
	Type 2 PAMS	6/1/1994	000	3	Neighborhood/ Urban	General/Background,Max Precursor	PAMS	Hourly/ Every 6 Days
	Ozone	6/1/1994	047	3	Neighborhood/ Urban	Population Exposure/Highest Concentration	SLAMS/PAMS NCore	Hourly
	PM2.5 Continuous	1/1/2003	209	4	Urban	Population Exposure	SLAMS	Hourly
	PM10 Continuous	1/1/2003	170/240	4	Urban	Population Exposure	SLAMS	Hourly
	PM10-2.5 Continuous	1/1/2003	170/240	4	Urban	Population Exposure	SLAMS/Ncore	Hourly
	PM2.5	1/1/1999	145	4	Urban	Population Exposure	SLAMS/NCore	Every 3 Days
	PM2.5 Chemical Speciation	1/1/2002	810	4	Urban	Population Exposure/Trends	CSN	Every 3 days
	Air Toxics	1/1/2001	150	4	Urban	Population Exposure/Trends	NATTS	Every 6 Days

Site Name, AQS ID	Parameter	Start Date	Method Code	Probe Height (m)	Measurement Scale	Monitoring Objective	MonitorNetwork/ Type	Sample Schedule
	PM10 High-Vol	1/1/2001	162	4	Urban	Population Exposure/Trends	NATTS	Every 6 Days
	Black Carbon	1/1/2001	862	4	Urban	Population Exposure/Trends	SLAMS	Hourly
	Organic/Elemental Carbon	2/2/2012	867	4	Urban	Population Exposure/Trends	Special Study	Hourly
River Terrace 11-001-0041	Nitric Oxide	5/1/1993	074	4	Neighborhood	Population Exposure	SLAMS	Hourly
	Nitrogen Dioxide	5/1/1993	074	4	Neighborhood	Population Exposure	SLAMS	Hourly
	Oxides of Nitrogen	5/1/1993	074	4	Neighborhood	Population Exposure	SLAMS	Hourly
	Ozone	5/1/1993	047	4	Neighborhood	Population Exposure/Highest Concentration	SLAMS	Hourly
	PM2.5	1/1/1999	209	4	Neighborhood	Population Exposure	SLAMS	Hourly
	Sulfur Dioxide	5/1/1993	060	4	Neighborhood	Population Exposure	SLAMS	Hourly
Hains Point 11-001-0042	PM2.5	3/1/1999	209	4	Urban	Population Exposure	SLAMS	Hourly
Takoma Recreation Center 11-001-0050	Nitric Oxide	1/1/2013	074	4	Neighborhood	Population Exposure	SLAMS	Hourly
	Nitrogen Dioxide	1/1/2013	074	4	Neighborhood	Population Exposure	SLAMS	Hourly
	Oxides of Nitrogen	1/1/2013	074	4	Neighborhood	Population Exposure	SLAMS	Hourly
	Ozone	1/1/2013	047	4	Neighborhood	Population Exposure/Max Ozone Concentration	SLAMS	Hourly
Anacostia Freeway Near-Road Station 11-001-0051	Nitric Oxide	1/1/2015	599	4	Microscale	Source Oriented/Highest Concentration	Near-Road SLAMS	Hourly
	Nitrogen Dioxide	1/1/2015	599	4	Microscale	Source Oriented/Highest Concentration	Near-Road SLAMS	Hourly
	Oxides of Nitrogen	1/1/2015	599	4	Microscale	Source Oriented/Highest Concentration	Near-Road SLAMS	Hourly
	Carbon Monoxide	1/1/2015	593	4	Middlescale	Source Oriented/Highest Concentration	Near-Road SLAMS	Hourly
	PM2.5	1/1/2015	209	4	Microscale	Source Oriented/Highest Concentration	Near-Road SLAMS	Hourly
	Ultrafine Particle Counter		173	4	Microscale	Source Oriented/Highest Concentration	Near-Road SLAMS	

Table 2-3: Monitor Count for the District's Network

Pollutant Parameter/ Pollutant Group	Site					
	McMillan Reservoir	River Terrace School	Takoma Recreation Center	Hains Point	Anacostia Freeway Near-Road	Monitor Count Totals
CO					1	1
O3	1	1	1			3
PM2.5 (FRM)	1					1
NO	1	1	1		1	4
NO2	1	1	1		1	4
NOx	1	1	1		1	4
NOy	1					1
SO2		1				1
Trace CO	1					1
Trace SO2	1					1
PM2.5 (Continuous)	1	1		1	1	4
PM10 (continuous)	1					1
PM10-2.5 (Continuous) PM_{coarse}	1					1
Speciated PM2.5	1					1
PM2.5 Black Carbon (OC/EC)-URG	1					1
Air Toxics	1					1
PAH Compounds (Air Toxics)	1					1
Air Toxics Metals (PM10)	1					1
OC/EC - Aethalometer	1					1
Ultrafine Particle counter					1	1
PAMS VOCs /Carbonyls	1					1
PAMS VOCs Continuous (Auto-GC)	1					1
Surface Meteorology	1				1	2
Total	20	6	4	1	7	38

Table 2-4: Monitoring Methods and AQS Codes

Parameter	Method Code	Sample Analysis Description
Air Toxics	150	Cryogenic Pre-concentration: GC/MS Solid Phase Micro Extraction: GC/MS
Carbon Monoxide	054	Nondispersive Infrared Photometry
Carbon Monoxide, Trace	588	Gas Filter correlation EcoTech EC9830T
Carbon Monoxide, Trace	593	Gas Filter correlation API T300U
Nitric Oxide and Nitrogen Dioxide	074	Chemiluminescence
Nitric Oxide and Nitrogen Dioxide	599	Chemiluminescence
Total Reactive Nitrogen Oxides	691	Chemiluminescence EcoTech EC9843
PAMS VOCs	142	Gas Chromatograph with Flame; GC FID
PAMS Carbonyls	102	High Performance Liquid Chromatography
PAMS VOCs	126	Cryogenic Pre-concentration Trap GC/FID
Ozone	047	Ultra Violet Photometry
PM10 Continuous	170	Beta Attenuation Mass Monitor – PM10 FEM with glass fiber filter tape
PM10 High-Vol	162	Gravimetric Hi Vol SSI EcoTech 3000
PM2.5	145	Gravimetric R&P Model 2025
PM2.5 Speciation: Trace Elements	821	Energy Dispersive XRF using Teflon Filter
PM2.5 Species Constituents: Ions	812	Ion Chromatography using Nylon Filter
PM2.5 Species Constituents: Organics	813	Thermo-Optical Transmittance using Quartz Filter
PM10-2.5 Coarse	185	Paired Gravimetric difference, MET ONE BAM-1020 system
PM2.5 Continuous	209	Met One BAM-1022 Monitor – PM2.5 FEM
PM2.5 - Elemental and Organic Carbon	894	BC/EC, UVDetector System McGee Scientific
Sulfur Dioxide	060	Pulsed Fluorescence
Sulfur Dioxide, Trace	592	Ultraviolet Pulsed Fluorescence EC9850T
Ultrafine Particle Counter	173	Ultrafine Particle Counter

Table 2-5: Constituent Compounds and Species Measured in the District

Constituent Group	Compounds in the Constituent Group
Air Toxics	Dichlorodifluoromethane, Chloromethane, 1,2-Dichloro-1,1,2,2,tetrafluoroleth, Chloroethene, 1,3-Butadiene, Bromomethane, Chloroethane, Trichlorofluoromethane, Acrolein, Acetone, 1,1-Dichloroethene, Methylene Chloride, Carbon disulfide, Isopropyl Alcohol, 1,1,2-Trichloro-1,2,2-trifluoroethane, Trans-1,2-Dichloroethene, 1,1-Dichloroethane, 2-methoxy-2-methyl-Propane, Methyl ethyl Ketone (2-butanone), Cis-1,2-Dichloroethene, Hexane, Chloroform, Ethyl Acetate, Tetrahydrofuran, 1,2-Dichloroethane, 1,1,1-Trichloroethane, Benzene, Carbon tetrachloride, Cyclohexane, 1,2-Dichloropropane, Bromodichloromethane, Trichloroethylene, Heptane, Cis-1,3-Dichloro-1-Propene, Methyl Isobutyl Ketone , Trans-1,3-Dichloro-1-Propene, 1,1,2-Trichloroethane, Toluene, Dibrochloromethane, Methyl butyl Ketone, (2-Hexanone), 1,2-Dibromoethane, Tetrachloroethylene, Chlorobenzene, Ethyl benzene, m & p- Xylene, Bromoform (Tribromomethane), Styrene, 1,1,2,2-Tetrachloroethane, o-Xylene, 1-Ethyl-4-Methylbenzene, 1,3,5-Trimethylbenzene, 1,2,4-Trimethylbenzene, Benzyl Chloride, 1,3-dichlorobenzene,1,4-Dichlorobenzene, 1,2-Dichlorobenzene, 1,2,4-Trichlorobenzene, and Hexachloro-1,3-Butadiene
PAMS VOCs	Acetone, Ethane, Acetylene, Propane, 2,2-dimethylbutane, Benzene, i-Butane, n-Butane, i-Pentane, n-Pentane, 2,2,4-trimethylpentane, i-Propylbenzene, n-hexane, 2-methylpentane, 2,3-dimethylbutane, Cyclopentane, Ethylbenzene, n-Propylbenzene, 3-methylpentane, Toluene, Styrene, n-Heptane, 2-methylhexane, 2,4-dimethylpentane, 2,3,4-trimethylpentane, o-Xylene, 3-methylhexane, 2,3-dimethylpentane, Formaldehyde, n-Octane, 2-methylheptane, Cyclohexane, 3-methylheptane, n-Nonane, m&p-Xylenes, Methylcyclohexane, Methylcyclopentane, n-Decane, n-Undecane, Acetaldehyde, 1,2,3-Trimethylbenzene, 1,2,4-Trimethylbenzene, 3-methyl-1-butene, 1-Butene, Propene, 1-Pentene, 1,3,5-Trimethylbenzene, 2-methyl-1-pentene, 2-methyl-2-butene, c-2-hexene, c-2-pentene, c-2-Butene, Cyclopentene, 4-methyl-1-pentene, t-2-hexene, t-2-Butene, t-2-pentene, Isoprene
PAMS Carbonyls	Acetaldehyde, Formaldehyde, Acetone,Acrolein,Methyl Isobutyl Ketone,Methyl Ethyl Ketone,Propionaldehyde, Benzaldehyde
Speciated PM2.5 Mass	Aluminum, Ammonium, Antimony, Arsenic, Barium, Bromine, Cadmium, Calcium, Carbonate carbon, Cerium, Cesium, Chlorine, Chromium, Cobalt, Copper, Elemental carbon, Europium, Gallium, Gold, Hafnium, Indium, Iridium, Iron, Lanthanum, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Niobium, Nitrate, OCX, OCX2, Organic carbon, Phosphorus, Pk1_OC, Pk2_OC, Pk3_OC, Pk4_OC, Potassium, PyrolC, Rubidium, Samarium, Scandium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfate, Sulfur, Tantalum, Terbium, Tin, Titanium, Total carbon, Vanadium, Wolfram, Yttrium, Zinc, and Zirconium

2.1 Ambient Air Monitoring Networks

Each of the District's monitoring stations is individually part of one or more of the national ambient air monitoring networks. The following sections describe each monitoring network type.

State and Local Air Monitoring Station (SLAMS):

SLAMS measure ambient levels of gaseous and particulate air pollutants. SLAMS represent the majority of all criteria pollutant (SO_2, NO_2, CO, O_3, Pb, $PM_{2.5}$, PM_{10}) monitoring across the nation. These stations use federal reference or federal equivalent methods (FRM/FEM) for direct comparison to the NAAQS to determine whether areas are in attainment or nonattainment of the air quality standards. There are approximately 4,000 SLAMS monitoring stations nationwide. The distribution of stations in the SLAMS Network is determined in large part by the needs of state and local air pollution control agencies to meet State Implementation Plan (SIP) requirements.

The District's network consists of <u>five</u> (5) SLAMS.

National Air Monitoring Station (NAMS) Network:

The NAMS network, developed in the 1970s, is a subset of the SLAMS network. NAMS stations use FRM/FEM for direct comparison to the NAAQS. In the early 1980s, the networks began to add PM_{10} monitors, and then expanded to include $PM_{2.5}$ monitors, beginning in 1999, to assess attainment with the 1997 $PM_{2.5}$ NAAQS. The network consists of ambient monitoring sites that measure $PM_{2.5}$ mass. The NAMS are designated as national trends sites and, in some cases, also serve as design value sites for Metropolitan Statistical Areas (MSAs).

Near-Roadway Monitoring Network:

The 2010 NO_2 NAAQS required establishment of a network with at least two (2) near-roadway NO_2 monitors in the Washington DC-MD-VA-WV MSA. Measurements for pollutants such as NO_2, CO, $PM_{2.5}$ and surface meteorological measurements for wind direction and wind speed are required at primary near-road sites.

The District established a near-road station along the Anacostia Freeway in River Terrace community (site ID: 11-001-0051) in April 2015. The near-road station consists of NO_2 and CO trace gas analyzers, BAM FEM continuous monitor to measure $PM_{2.5}$, Ultrafine Particle Counter, and surface meteorological measurements for wind speed, wind direction, relative humidity, barometric pressure and ambient temperature.

NCore Monitoring Network:

In October 2006, EPA revised the national air quality monitoring regulations (40 C.F.R. Part 58). The most significant element of the revised regulations was to establish an NCore multi-pollutant monitoring network by January 1, 2011. Measurements for pollutants such as ozone, trace SO_2,

trace CO, total reactive nitrogen oxides (NO_y) and PM_{coarse} ($PM_{10-2.5}$; PM between 10 microns and 2.5 microns in diameter), and surface meteorological measurements for wind speed, wind direction, relative humidity, and ambient temperature are required at NCore sites. Ambient Pb monitoring was also required at NCore sites beginning in January 2012. In April 2016, EPA revised the national air quality monitoring regulations (40 C.F.R. Part 58 Appendix D) section 3(b) and section 4.5(b)(c) to remove the requirements for NCore sites to measure Lead (Pb) as well as the speciated components of PM_{coarse} ($PM_{10-2.5}$).

The District established an NCore station at the McMillan site (11-001-0043) in January 2011. The NCore station consists of SO_2 and CO trace gas analyzers, a NO_y analyzer, and a BAM FEM monitor to measure $PM_{10-2.5}$. A TSP-Pb FRM monitor was added at the McMillan NCore station in January 2012. DOEE shut down the Pb monitor under the provisions of the revised 40 C.F.R. Part 58, at the end of 2016 monitoring period.

Photochemical Assessment Monitoring Stations Network:

The Photochemical Assessment Monitoring Stations (PAMS) network was developed in the 1990s to provide an air quality database that will assist in evaluating and modifying control strategies for attaining the ozone NAAQS. The measured parameters include ozone, VOCs, carbonyls and NO_x. The national PAMS network consists of seventy-five (75) sites in twenty-five (25) metropolitan areas. PAMS was a major addition to state and local networks, with near-research grade measurements for over 56 VOC compounds during the core part of the ozone season (June to August).

The District operates <u>one</u> (1) PAMS Type 2 station at the McMillan site. In 2011, DOEE deployed Viasala WXT 520 meteorological monitoring sensors on a new 10-meter tower at the McMillan PAMS/NCore site.

The 2015 amendments to the national ambient monitoring regulations (40 C.F.R. Part 58, Appendix D, Section 5) revised the PAMS monitoring requirements in conjunction with the promulgation of the 2015 8-hour ozone NAAQS of 70 ppb. These amendments require changes to PAMS monitoring and implementation of an enhanced monitoring plan (EMP) by 2019 in certain areas of the nation, including the District. The new requirements are as follows:

- Hourly averaged speciated volatile organic compounds (VOCs);
- Three 8-hour averaged carbonyl samples per day on a 1 in 3 schedule;
- Hourly averaged Ozone (O_3), nitrogen oxide (NO), true nitrogen dioxide (NO_2), and total reactive nitrogen (NO_y);
- Hourly averaged of ambient temperature, vector-averaged wind direction and wind speed, atmospheric pressure, relative humidity, precipitation, solar radiation and ultraviolet radiation; and
- Hourly averaged of mixing-height.

For the District, this requirement may be met by collecting PAMS measurements at the McMillan NCore station. This site is already designated as a PAMS site under the existing PAMS regulatory requirements. The District plans to adopt the national PAMS QAPP and SOPs and follow the guidance presented in the PAMS TAD. These documents have not been finalized

at this time and DOEE reserves the right to implement deviations or procedural differences upon review of the completed documents, subject to EPA approval. Any such deviations or procedural differences will be addressed in subsequent amendments to this plan or future Annual Network Plans and other supporting documentation (DC-specific QAPPs, SOPs , etc.).

District's PAMS site will start collecting samples no later than June 1, 2019, with the following sampling equipment:

Hourly Speciated VOCs
Hourly averaged speciated VOCs will be measured from June through August with Markes-Agilent Auto GC system.

Carbonyls
Carbonyls will be sampled at a frequency of three 8-hour samples on a 1-in-3 day basis during the core ozone season (i.e., June through August) using an ATEC Model 8000-2 Eight Channel Automated Carbonyl sampler with co-located independent channel. Samples will be analyzed by EPA Method TO-11A.

Nitrogen Oxides
Hourly averaged NO, NOy and true NO2 will be measured at a minimum, from June through August. True NO2 will be measured using Teledyne API Model 500U CAPS NO2 analyzer. NO and NOy will be measured using a Teledyne API Model T200U.

Ozone
Hourly averaged ozone will be measured year round using a Thermo 49i.

Meteorological Parameters
Hourly averaged of ambient temperature, vector-averaged wind direction and wind speed, atmospheric pressure, relative humidity, precipitation will be measured using Viasala WXT 520, solar radiation using Viasala 441A Pyronometer.

Hourly averaged of mixing-height will be measured with a Viasala Model CL51 ceilometer.

As a jurisdiction in the Ozone Transport Region (OTR), the District is required to adopt an EMP no later than October 1, 2019. Appendix A of this plan gives information on the District's EMP.

Special Purpose Monitoring Networks:

Special Purpose Monitoring (SPM) networks include National Air Toxic Trends Stations (NATTS), $PM_{2.5}$ Chemical Speciation Network (CSN), and other special purpose monitors.

Currently, the District's SPM network consists of: one (1) NATTS, and one (1) CSN station at the McMillan site.

Through a partnership with DOEE, EPA installed a Village Green station at the Smithsonian National Zoological Park (National Zoo) in the District in 2015. The Village Green park bench stations are intended for research and education on air quality and they are not meant for use as regulatory monitors.

Interagency Monitoring of Protected Visual Environments Network:

The Interagency Monitoring of Protected Visual Environments (IMPROVE) program was established in 1985 to help implement plans to reduce visibility impairment in Class I areas (large federally-protected national parks and wilderness areas) as stipulated in the CAA. There are about 110 IMPROVE sites in Class I visibility protection areas. These sites collect aerosol samples and analyze the filters for trace elements, major ions, and carbon fractions. Most of the IMPROVE sites are operated by federal agencies within the U.S. Department of the Interior.

The U.S. National Park Service (NPS) operated one (1) IMPROVE site along with a nephelometer at the Hains Point station in the District until June of 2015.

DOEE operates a $PM_{2.5}$ FEM monitor at the Hains Point location.

2.2 Pollutant Parameters

DOEE operates a comprehensive air monitoring network covering a range of pollutants. This section presents descriptions segregated by pollutant parameter.

Fine Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ FEM Monitors: DOEE operates four (4) automated BAM 1022 $PM_{2.5}$ monitors in its air monitoring network – one (1) each at the Anacostia Freeway Near Road, River Terrace, Hains Point stations and McMillan site. The McMillan, Anacostia Freeway Near-Road, River Terrace and Hains Point primary monitors are continuous hourly sampling schedule. The required collocated secondary $PM_{2.5}$ FRM monitor at McMillan is operated on a 1-in-6 day sampling schedule.

DOEE replaced the $PM_{2.5}$ network FRM monitors at McMillan, River Terrace, and Hains Point air monitoring stations with continuous FEM monitors beginning of the calendar year 2017.

Table 2-6: Number of $PM_{2.5}$ SLAMS Sites Required (based on Table D–5, Appendix D, 4.7.1(a) to 40 CFR Part 58, $PM_{2.5}$ Minimum Monitoring Requirements)

MSA Name	Population	Annual Design Value 2013-2015	Daily Design Value 2013-2015	Required SLAMS Monitors	Monitors Active in DC/Total[A,B]	Required ≥ 85% NAAQS
Washington-Arlington-Alexandria, DC-VA-MD-WV	5,860,342	9.2	22	2	4/10	3

A - Based on tables available at http://www.epa.gov/airtrends/values.html.
B- Total number of monitors includes those located in other States.

$PM_{2.5}$ Chemical Speciation Network (CSN): DOEE currently operates one $PM_{2.5}$ CSN (MetOne SASS) monitor at the McMillan site. The District implemented the carbon channel upgrade (URG 3000N) for the CSN monitor during 2007. The CSN monitor at the McMillan site operates on a 1-in-3 day sampling schedule to measure $PM_{2.5}$ chemical species.

Particulate Matter (PM_{10})

DOEE operates one (1) continuous BAM PM_{10} FEM sampler at the McMillan site for reporting PM_{10} mass measurements. In 2013, EPA approved co-designation of the McMillan NCore station's BAM PM_{10} FEM automated sampler for PM_{10} network to fulfill the PM_{10} NAAQS monitoring requirements in the District. Subsequent to receiving EPA's approval, DOEE decommissioned the two (2) very old and aging filter-based manual PM_{10} FRM samplers (primary and secondary monitors), in January 2014.

Additionally, DOEE operates a High-Vol PM_{10} sampler for NATTS toxic metals analysis.

Ozone (O_3)

DOEE currently operates Thermo-49i series ozone analyzers at three (3) sites in the District: River Terrace, McMillan Reservoir, and Takoma Recreation Center.

Ozone is measured by ultraviolet absorption photometry. Air is drawn continuously through a sample cell where ultraviolet light passes through it. Ozone molecules in the air absorb part of the ultraviolet light, reducing the intensity of the light reaching a light sensor. The light is converted into an electric signal related to the concentration of ozone in the sample cell.

The 2015 Ozone NAAQS adds one month to the ozone season in the District. Starting in 2017, ozone season will begin on March 1 and continue through October 31. DOEE already conducts year-round ozone measurements and collects ozone data on an hourly basis, so no additional changes are necessary.

Ozone monitoring requirements are determined by the MSA population and design value, as specified in Table D-2 of 40 CFR Part 58 Appendix D. Table 2-1 shows that the DOEE monitoring network meets or exceeds the minimum requirements.

Table 2-7: Number of Ozone SLAMS Sites Required (based on Table D–2, Appendix D,4.1(a) to 40 CFR Part 58, Ozone Minimum Monitoring Requirements)

MSA Name	Population	Monitors Deployed by State[A]						Total Monitors	Required ≥ 85% NAAQS
			DC	MD	VA	WV			
Washington-Arlington-Alexandria, DC-VA-MD-WV	5,860,342		3	7	7	0		17	3
Total			3	7	7	0		17	3

A - Based on tables available at http://www.epa.gov/airtrends/values.html. All areas had their maximum site >= 85% Ozone NAAQS.

Within an O_3 network, at least one O_3 site for each MSA must be designed to record the maximum concentration for that particular metropolitan area. More than one maximum concentration site may be necessary in some areas. Since O_3 requires appreciable formation time, the mixing of reactants and products occurs over large volumes of air, and this reduces the importance of monitoring small-scale spatial variability. The appropriate spatial scales for O_3 sites are neighborhood, urban, and regional.

The prospective maximum concentration monitor site should be selected in a direction from the city that is most likely to observe the highest O_3 concentrations, more specifically, downwind during periods of photochemical activity. For the Washington-Arlington-Alexandria, DC-MD-VA-WV MSA, the ozone monitor at the Takoma Recreation Center site is assigned this designation for the District portion of the MSA.

Carbon Monoxide/Trace-CO

CO is measured by infrared absorption photometry. Air is drawn continuously through a sample cell where infrared light passes through it. CO molecules in the air absorb part of the infrared light, reducing the intensity of the light reaching a light sensor. The light is converted into an electric signal related to the CO concentration in the sample cell. The CO trace analyzer is designed to measure background concentrations of CO with a lower detection limit less than 4 ppb and uses a high performance modified vacuum pump. CO concentrations are highest along heavily traveled roadways and decreases significantly with distance from traffic. Therefore, CO monitors are usually located close to roadways or in urban areas.

One CO monitor is required to be collocated with a near-road NO_2 monitor. EPA revised the minimum monitoring requirements for CO on August 12, 2011. Since one (1) CO monitor is collocated with a near-road NO_2 monitor as required, DOEE proposed to discontinue two CO

monitors (one at the River Terrace station and one at the Verizon station) at the end of 2016 in our 2017 network plan. DOEE's 2017 Annual Network Plan was approved by EPA on November 10, 2016. In January 2011, DOEE deployed an Ecotech EC9830T trace-CO analyzer at the McMillan Reservoir NCore station and in April 2015 deployed an API T300U trace CO analyzer at the Anacostia Freeway Near-Road station.

DOEE will continue maintaining two remaining CO monitors: one at the NCore station and one at the near-road station.

Nitrogen Dioxide (NO_2)

NO_2 is measured indirectly. First, nitrogen oxide (NO) is measured using the chemiluminescence reaction of NO with O_3. Air is drawn into a reaction chamber where it is mixed with a high concentration of ozone from an internal ozone generator. Any NO in the air reacts with ozone to produce NO_2. Light emitted from this reaction is detected with a photomultiplier tube and converted to an electrical signal proportional to the NO concentration. Next, NO_x is measured by passing the air through a converter where any NO_2 in the air is reduced to NO before the air is passed to the reaction chamber. By alternately passing the air directly to the reaction chamber and through the converter before the reaction chamber, the analyzer alternately measures NO and NO_x. The NO_2 concentration is equal to the difference between NO_x and NO.

NO_x emissions are produced during high-temperature burning of fuels. Sources of NO_x include motor vehicles and stationary sources such as power plants and industrial boilers.

DOEE currently operates NO_2 monitors at <u>three</u> (3) sites collocated with ozone measurement sensors. The NO-NO_2-NO_x Thermo-42i analyzers are operated year-round and are located at the River Terrace, McMillan, and Takoma Recreation Center sites.

RA-40: The monitoring regulations for the 2010 NO_2 NAAQS say that the EPA Regional Administrator can require a minimum of forty (40) monitors to be sited inside or outside of CBSAs nationwide in locations with "susceptible and vulnerable" populations. The community-level NO_2 network monitors are called "RA-40" designated monitors. DOEE and EPA assigned a RA-40 designation to the NO_2 monitor at the River Terrace station.

Total Reactive Nitrogen Oxides (NO_y): In January 2011, DOEE installed an Ecotech EC9843 model NO_y analyzer at the McMillan NCore station. DOEE replaced an EcoTech EC9843 analyzer with Teledyne API model T200U in July 2017. These samplers are a chemiluminesence-based analyzers that uses a high-performance NO_y converter to measure trace levels of NO_y and NO.

Near-Road NO_2 Network: In January 2015, DOEE established one (1) NO_2 near-road monitoring station collocated with trace CO measurement along the Anacostia Freeway (Site: 11-001-0051). Valid data collection began in June 2015. Data is uploaded to EPA's AQS.

Sulfur Dioxide/Trace-SO_2

SO_2 is measured with a fluorescence analyzer. Air is drawn through a sample cell, where it is subjected to high intensity ultraviolet light. This causes the SO_2 molecules in the air to fluoresce and release light. The fluorescence is detected with a photo multiplier tube and converted to an electrical signal proportional to the SO_2 concentration. The SO_2 trace analyzer is a high performance UV fluorescence analyzer designed to measure background concentration of SO_2 with a lower detection limit less than 200 parts per trillion.

DOEE operates one (1) Thermo 43i continuous SO_2 monitor at the River Terrace station and collects hourly data year-round. In January 2011, DOEE deployed an EcoTech EC9850T trace-SO_2 analyzer at the McMillan NCore station.

Air Toxics

DOEE operates one (1) NATTS station at the McMillan site. Air toxics samples are collected for 24 hours with a model 910A Environmental Systems Inc. canister sampler on a 1-in-6 day schedule.

NATTS monitors at the McMillan site capture PAH (Tisch Puf+ analyzer), toxic heavy metals (PM_{10} High-Vol), and VOCs and carbonyls (Model 2200-1 and Model 8000 Atmospheric Technology Inc. ATEC). The sampled canisters and carbonyls sep-paks are returned to the laboratory for analysis on an Entech/Agilent gas chromatograph (GC) mass spectrometer system. The District's NATTS site also includes an Aethalometer (Magee Scientific) for continuous sampling of black carbon (OC/EC).

PAMS Ozone Precursors

DOEE operates one (1) PAMS Type 2 station at the McMillan site. The parameters measured are O_3, NO, NO_x, NO_2, speciated VOCs, carbonyls and surface meteorology.

During the peak ozone season (June to August), 24-hour canister air samples are collected on a 1-in-6 day sampling schedule with a ATEC Model 8000sampler. The canisters are returned to the laboratory for analysis on an EnTech/Agilent GC/FID system for speciated VOCs. During core ozone season, hourly measurements for a set of 56 target hydrocarbons are made on-site using a Perkin Elmer VOC Air Analyzer with dual flame ionization detector (Perkin-Elmer 350ATD ozone precursor sampler and Clarus 500 PAMS Gas Chromatograph sampling system). The measurement method for carbonyls is based on EPA's Compendium Method TO-11A, which incorporates the use of sorbent cartridges coated with 2,4-dinitrophenylhydrazine and ATEC model 2200-1 for sample collection. The analyses are performed with high performance liquid chromatography.

DOEE also operates continuous O_3 and NO_x analyzers complemented with surface meteorological measurements at the McMillan PAMS site. In 2011, DOEE deployed Viasala WXT 520 meteorological monitoring sensors on a new 10-meter tower at the McMillan PAMS/NCore site.

Lead (Pb)

In January 2012, DOEE began operating a TSP-Pb monitor at its McMillan NCore site on a 1-in-6 day sampling schedule. Four years of data have been collected with low concentrations recorded. DOEE discontinued the Pb monitor at the end of 2016, under the provisions of 40 C.F.R.

3.0 District of Columbia's Air Monitoring Stations

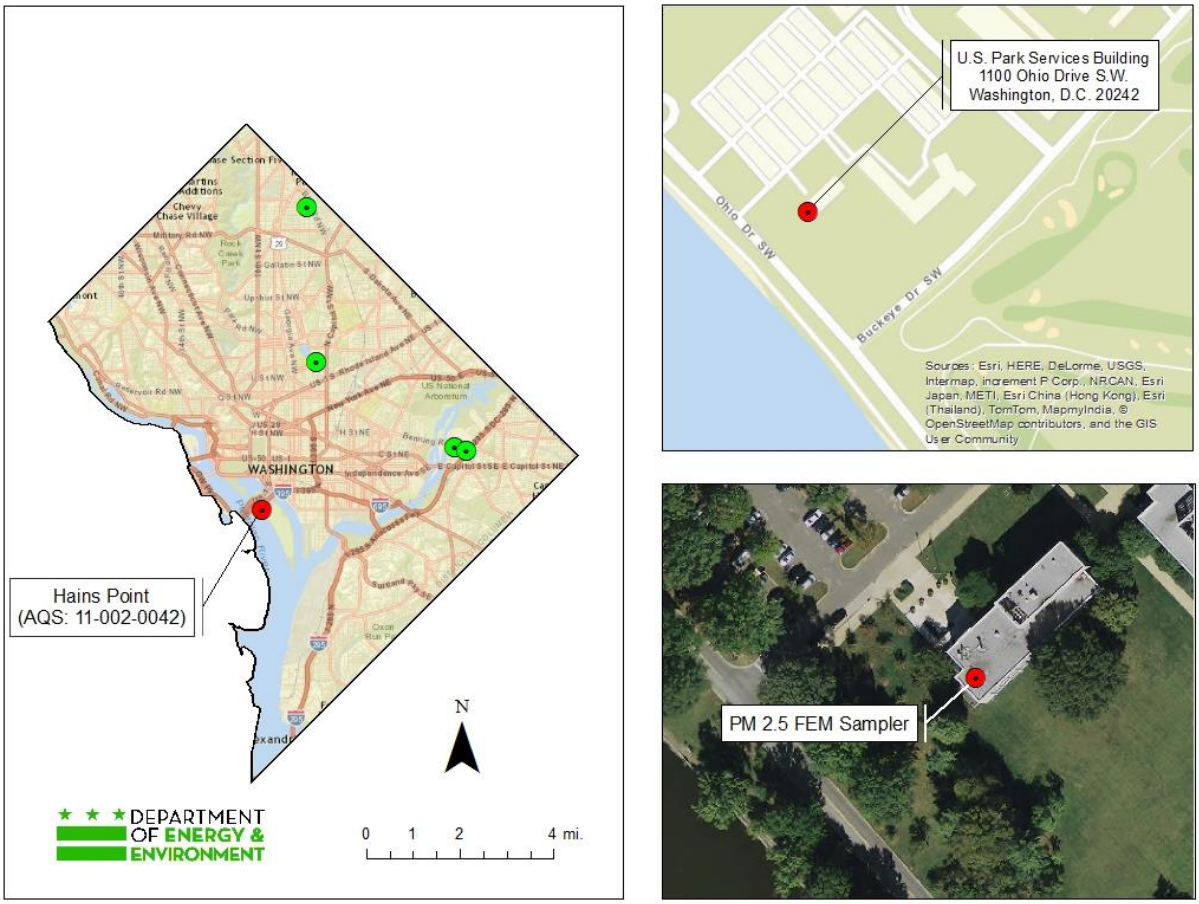
DOEE currently maintains a network of five (5) ambient air monitoring stations: Hains Point, McMillan, River Terrace, Takoma Recreation Center, and Anacostia Freeway near-road station. The following sections provide additional information. Maps for the individual sites are shown in Figures 3-1 to 3-6.

3.1 Hains Point Station

The Hains Point monitoring station has been operational since January 1988, and the measurement sensors are perched on the rooftop of a NPS Park Police building. NPS operated IMPROVE $PM_{2.5}$ mass and speciation and PM_{10} monitors at this site until June of 2015. DOEE operates a $PM_{2.5}$ FEM monitor at this location. This is also one of the very few urban IMPROVE sites in the nation. The station temporarily shut down from July 10, 2017 to present due to NPS Park Police building renovation.

Starting calendar year 2017, the $PM_{2.5}$ FRM monitor was replaced with a FEM monitor.

Figure 3-1: Hains Point Monitoring Station Locator Maps



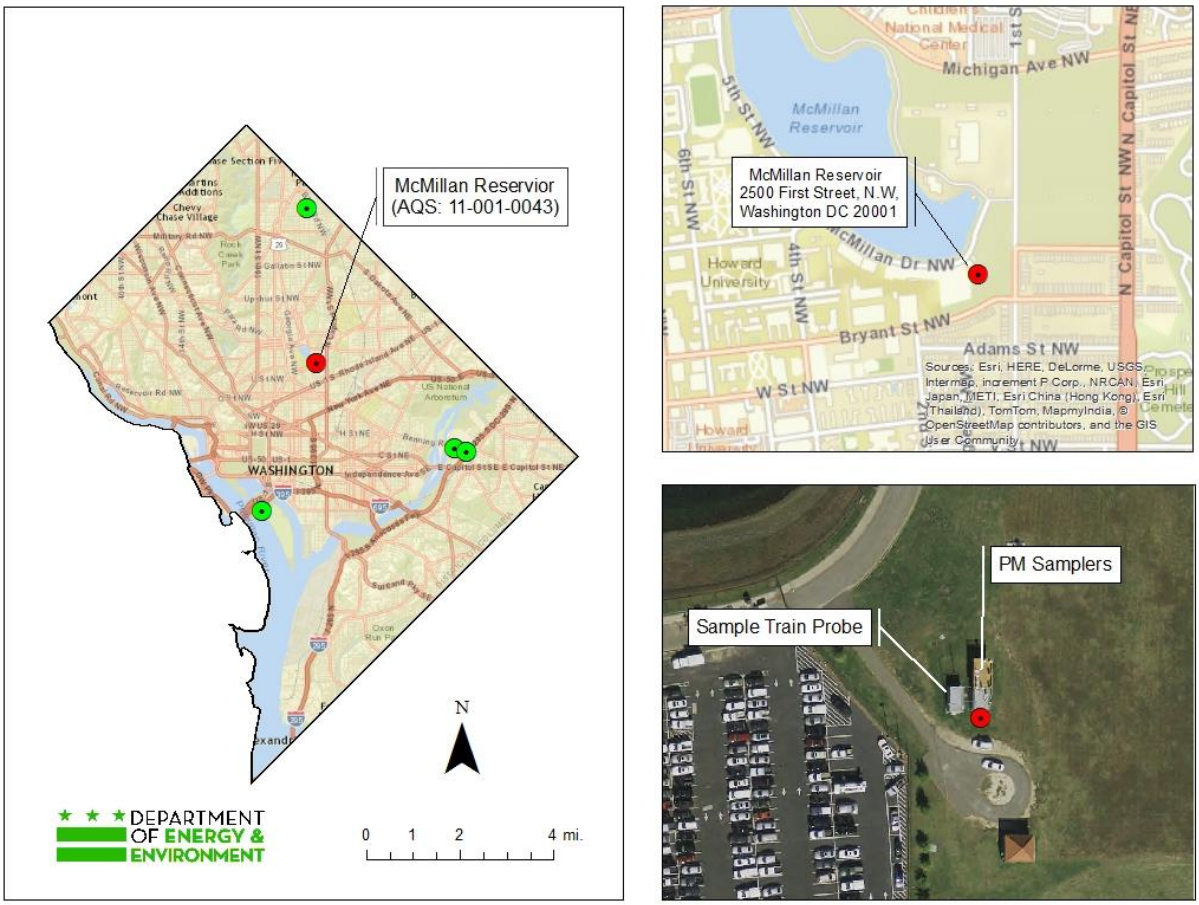
3.2 McMillan Station

The McMillan monitoring station is the most comprehensive ambient air station in the District. It was launched in 1994 as a PAMS Type 2 station. Measurements for 56 target hydrocarbons are conducted with a PAMS automatic GC ambient air sampling system. The station was expanded in 2000 and 2001 with the addition of $PM_{2.5}$ FRM, $PM_{2.5}$ CSN monitoring, $PM_{2.5}$ continuous, NATTS and BC/EC sensors. Surface meteorological measurements are carried out at the McMillan Reservoir site as part of PAMS monitoring.

Also, the McMillan was the first NATTS site in EPA Region III. In January 2011, the McMillan site has expanded into an NCore network monitoring station. A TSP-Pb monitor was added in January 2012 and terminated at the end of 2016 after monitoring requirements were revised. Additionally, as part of the EPA Office of Air Quality Planning and Standards (OAQPS) national pilot study, a Sunset Model 4 Semi-Continuous OC/EC monitor was deployed at McMillan station from January 2012 to August 2016.

Starting calendar year 2017, the $PM_{2.5}$ FRM monitor was replaced with a FEM monitor.

Figure 3-2: McMillan Reservoir Site Locator Maps

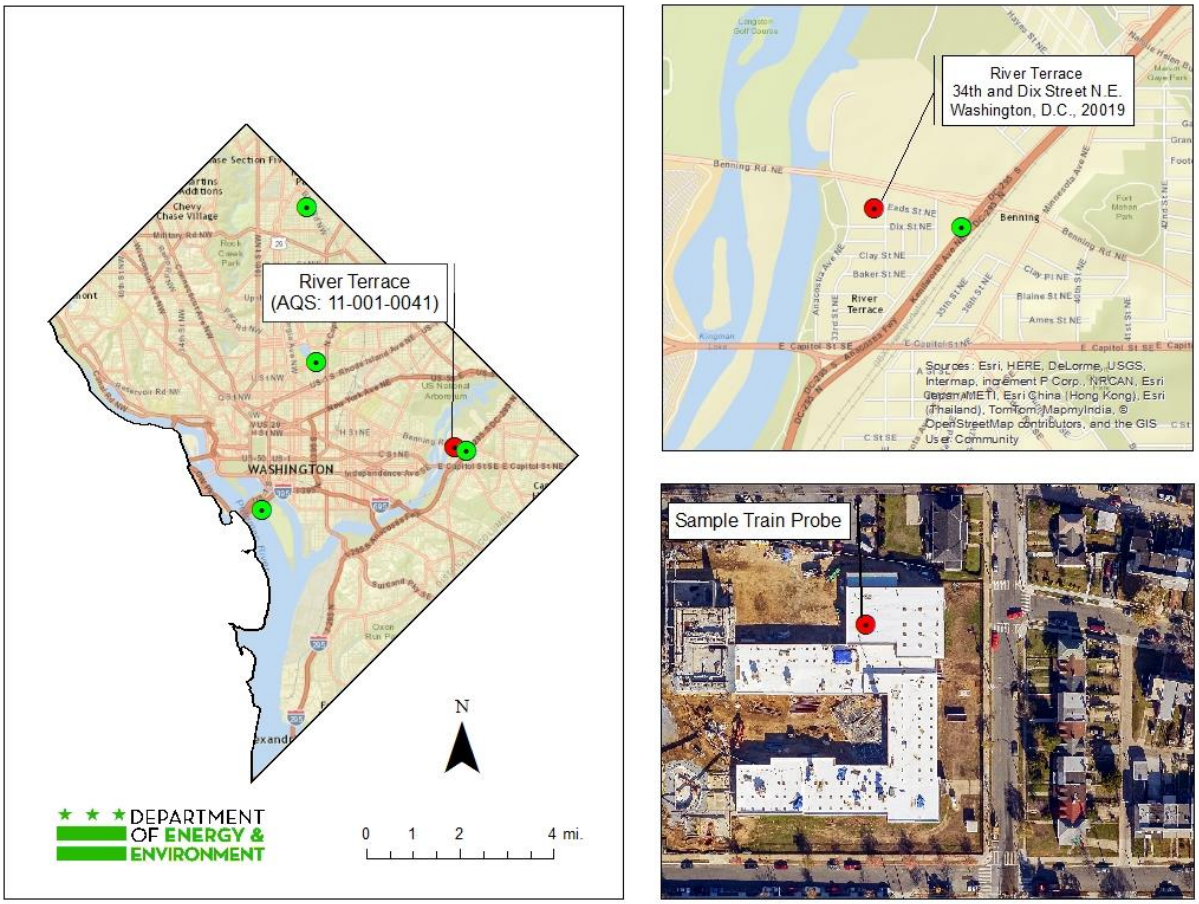


3.3 River Terrace Station

The River Terrace monitoring station has been in operation since 1993. The site consists of measurement analyzers for O_3, SO_2,NO_x, and $PM_{2.5}$.

Starting calendar year 2017, the PM2.5 FRM monitor was replaced with a FEM monitor and the CO monitor was discontinued.

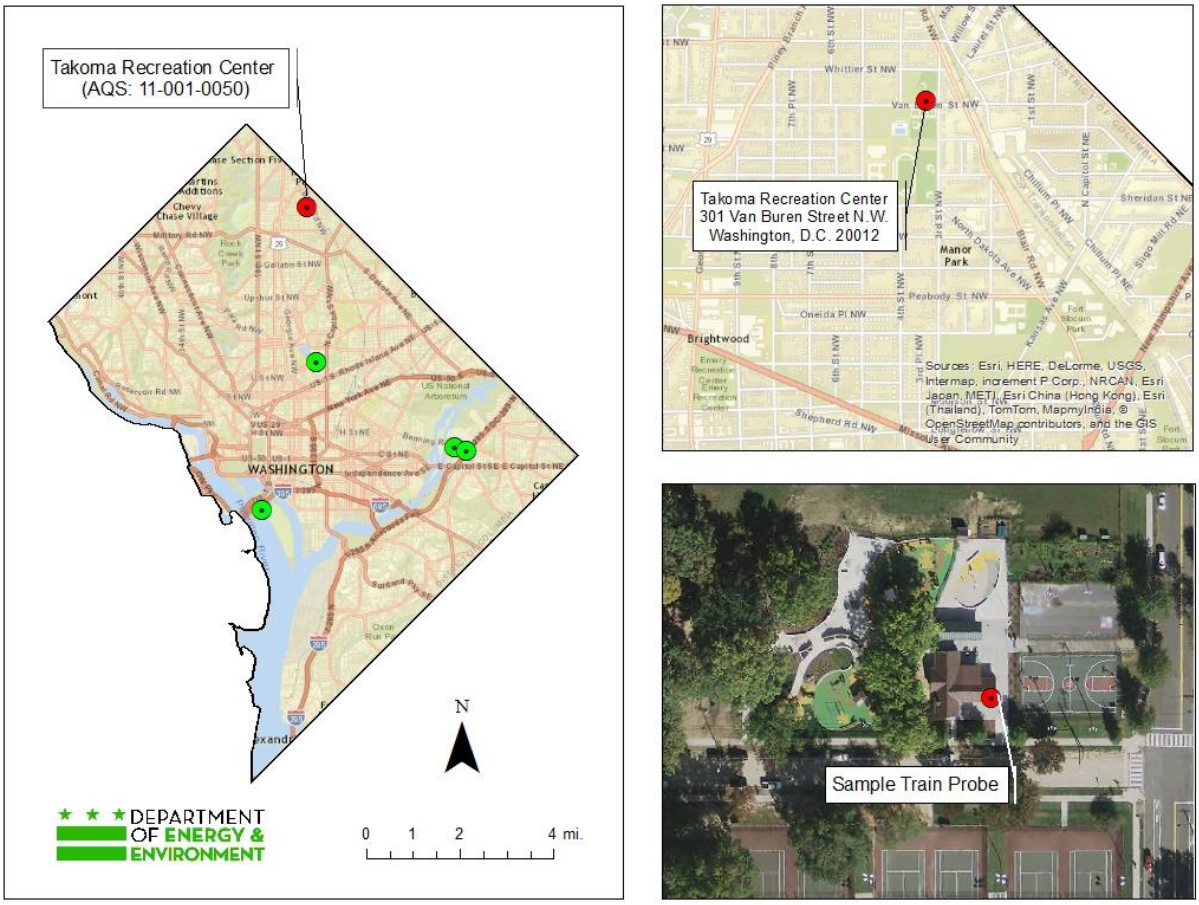
Figure 3-3: River Terrace Site Locator Maps



3.4 Takoma Recreation Center Station

The Takoma Recreation Center monitoring station has been in operation since January 2013. The station consists of measurement analyzers for O_3 and NO_x. This station was established as a replacement site for Takoma School station (11-001-0025), where operations ceased in 2011 because of a fire incident.

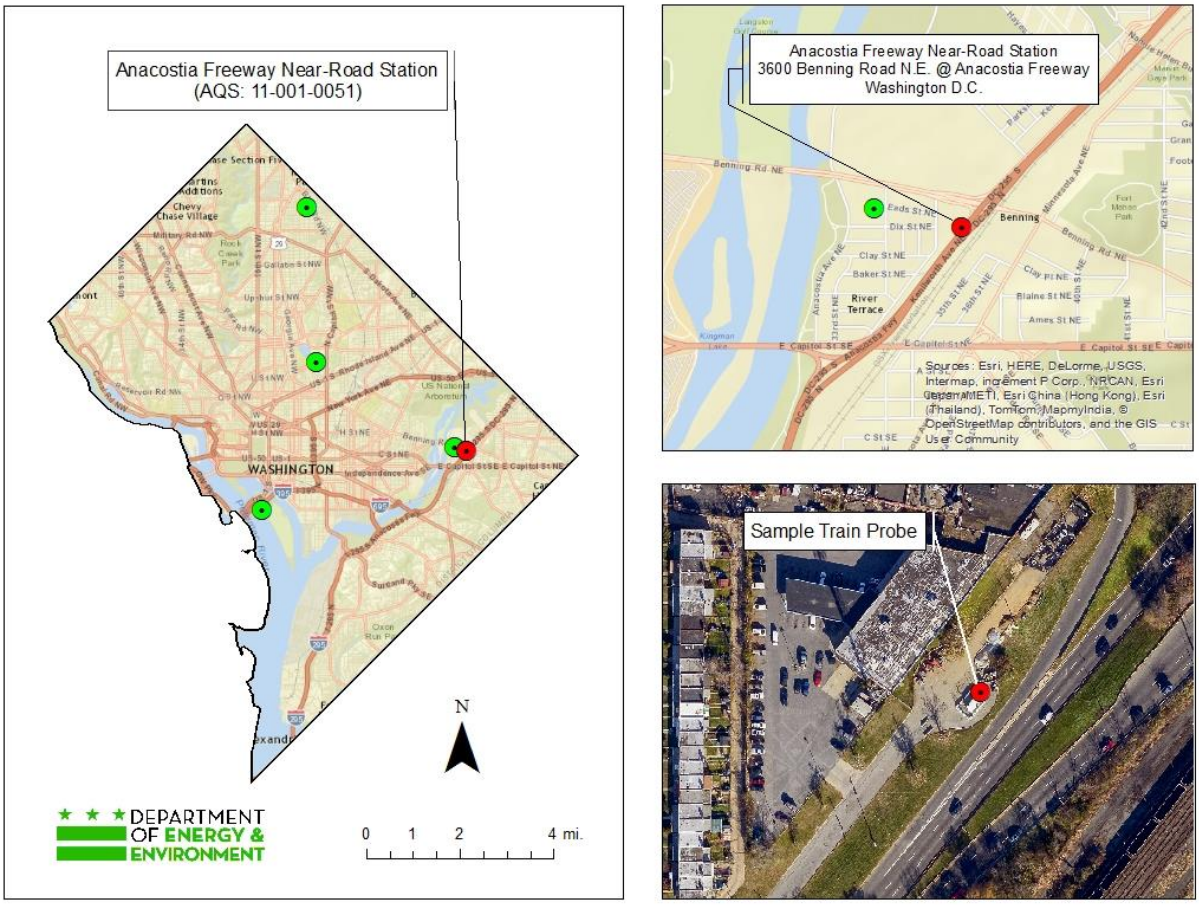
Figure 3-4: Takoma Recreation Center Site Locator Maps



3.5 Anacostia Freeway Near-Road station

The Anacostia Freeway Near-Road Station was launched in January 2015 and it houses NO_2, CO, $PM_{2.5}$ continuous measurement, and Ultrafine Particle Counter sensors. This station is going to be important in the metropolitan area and the District because of its location for capturing peak 1-hour NO_2 and CO concentrations expected in the near-road environment.

Figure 3-5: Anacostia Freeway Near-Road Station Locator Maps



4.0 Ozone and $PM_{2.5}$ Air Quality

Ambient data for criteria pollutants as given by design value concentrations are used to determine if the monitored air quality in the District is in compliance with the NAAQS. Design values are defined in CAA guidance and are often based on multiple years of data to ensure a stable indicator. Design value data is used to classify nonattainment areas, assess progress towards meeting the NAAQS, and develop control strategies. Design values are computed and published annually by EPA's OAQPS and reviewed in conjunction with the regional offices.

4.1 Annual $PM_{2.5}$ Design Concentrations

Figure 4-1 below gives the design concentrations for $PM_{2.5}$ at the District's sites for the recent period. The annual $PM_{2.5}$ design values were calculated using the average of the annual arithmetic mean for a consecutive three-year period. Design values based on 2009 to 2014 data indicate that the District is in attainment for the 2012 annual $PM_{2.5}$ NAAQS of 12 $\mu g/m^3$.

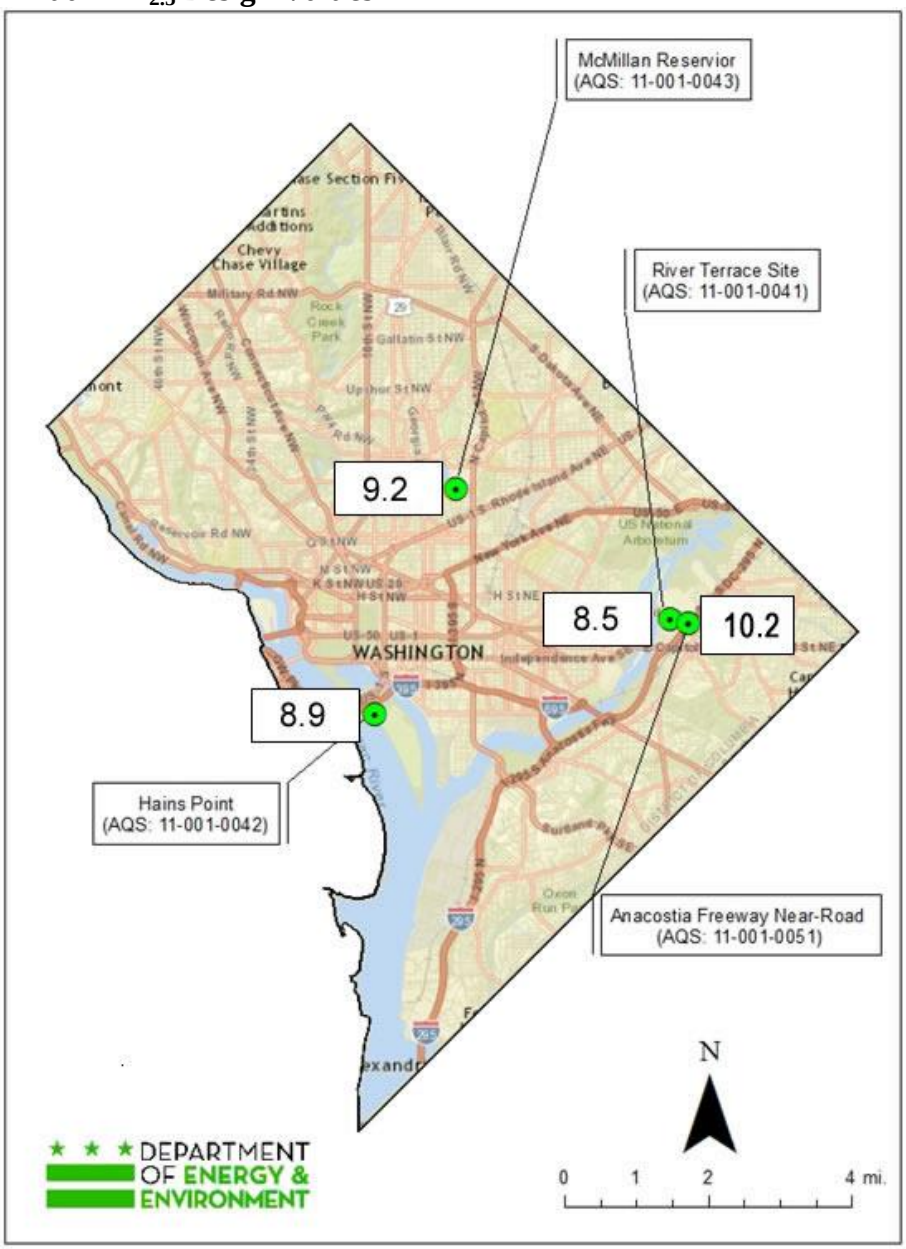
4.2 Daily $PM_{2.5}$ Design Concentrations

Daily $PM_{2.5}$ design concentrations are calculated using the 98th percentile ambient concentration value from each year for a given consecutive three-year period. The design value is the average of the three 98th percentile data. Figure 4-2 gives the design values for daily $PM_{2.5}$ using data from 2008 to 2012. Design values based on the recent data indicate that the District is in attainment for the 2006 daily $PM_{2.5}$ NAAQS of 35 $\mu g/m^3$.

4.3 Ozone Design Concentrations

Figure 4-3 includes current design values for ground-level ozone using data from 2009 to 2016. The ozone design values are calculated by taking the three-year average of the annual 4th highest daily maximum 8-hr average concentrations. The 2015 8-hr ozone NAAQS is 0.070 ppm, or 70 ppb. Monitored data indicate that the ambient air quality is in violation of the NAAQS at O_3 monitoring sites in the District. The Takoma Recreation Center O_3 monitoring site (11-001-0050) was deployed in January 2013.

Figure 4-1: Annual $PM_{2.5}$ Design Values



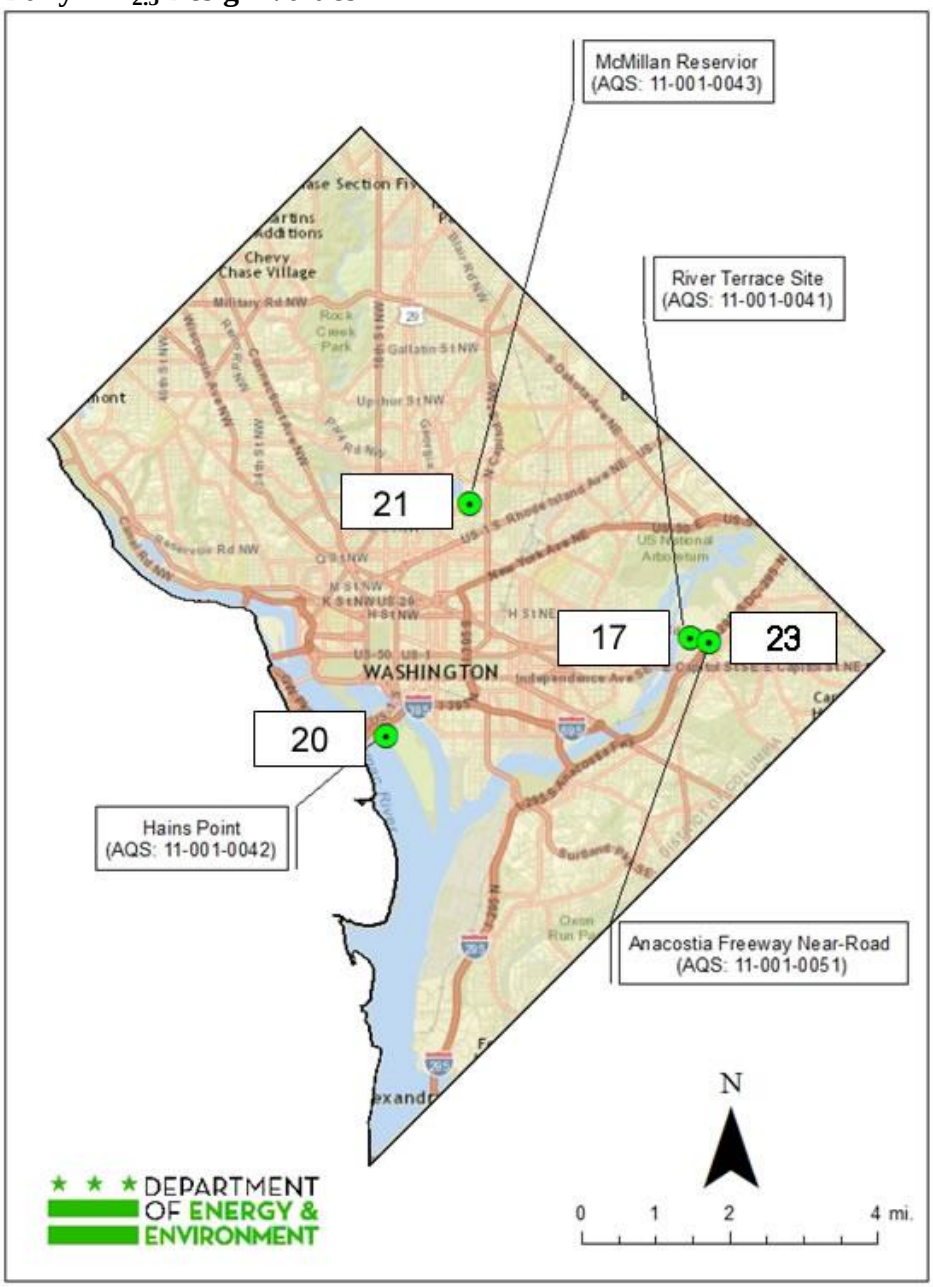
Annual $PM_{2.5}$ Design Values ($\mu g/m^3$)									
Site	**AQS ID**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Hains Point	11-001-0042	11.2	10.5	10.3	9.4	8.9	8.8	8.7*	8.9
McMillan	11-001-0043	10.8	10.3	10.1	9.7	9.4	9.2	9.0	9.2
River Terrace	11-001-0041	11.2	10.6	10.4	9.8	9.8**	N/A	N/A	8.5
Anacostia Fwy Near-Road	11-001-0051	-	-	-	-	-	-	10.1***	10.2

***** *Hains Point temporarily shut down from August 2016 to December 2016 for the building renovation. The 2016 Design Value was based on 2014, 2015 and half year of 2016.*

*****River Terrace temporarily shut down from March 2014 to April 2016 for school renovation. The 2014 Design Value was based on two years of data (2012 and 2013). The 2015 and 2016 Design Values were not valid due to not meeting data completeness criteria.*

****Near-Road 2016Design Value was based on two years of data (2015 and 2016).*

Figure 4-2: Daily $PM_{2.5}$ Design Values



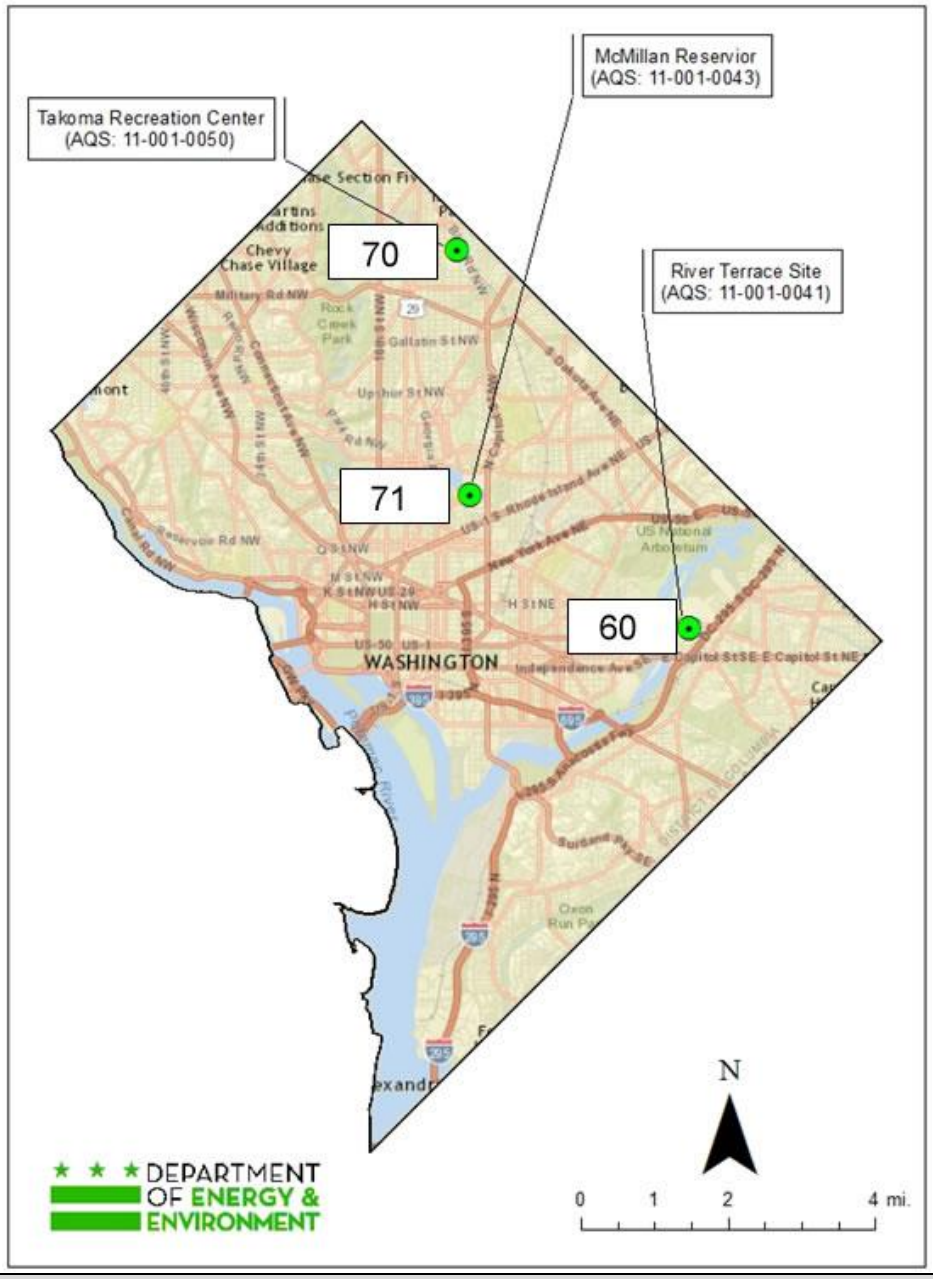
Daily PM2.5 Design Values (µg/m3)									
Site	**AQS ID**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Hains Point	11-001-0042	26	24	25	23	20	20	21*	20
McMillan	11-001-0043	26	25	25	24	22	22	21	21
River Terrace	11-001-0041	27	26	27	25	25**	N/A	N/A	17
Anacostia Fwy Near-Road	11-001-0051	-	-	-	-	-	-	25***	23

***** *Hains Point temporarily shut down from August 2016 to December 2016 for the building renovation. The 2016 Design Value was based on 2014, 2015 and half year of 2016.*

*****River Terrace temporarily shut down from March 2014 to April 2016 for school renovation. The 2014 Design Value was based on two years of data (2012 and 2013). The 2015 and 2016 Design Values were not valid due to not meeting data completeness criteria.*

****Near-Road 2016Design Value was based on two years of data (2015 and 2016).*

Figure 4-3: Ozone Design Values



Ground-level Ozone Design Values (ppb)									
Site	**AQS ID**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
McMillan	11-001-0043	79	79	84	79	73	68	70	71
River Terrace	11-001-0041	77	76	80	72	61	N/A*	N/A*	60**
Takoma Recreation Center	11-001-0050	-	-	N/A	N/A	67***	69	70	70

**River Terrace temporarily shut down from March 2014 to April 2016 for school renovation. The 2015 and 2016 Design Values were not valid due to not meeting data completeness criteria.*
***The 2017 Design Value was based on two years of data (2016 and 2017)*
****Takoma Recreation Center station started in January 2013. The 2014 Design Value was based on two years of data (2013 and 2014).*

5.0 Network Changes and Upgrades

The District supports EPA's efforts to protect public health and natural resources under the CAA. DOEE is working with EPA Region III and EPA's OAQPS to evaluate potential modifications to the District's network, including changes to the monitoring sites, sampling schedules, sampling equipment, and technologies, to ensure that the District's ambient air monitoring program meets all regulatory requirements.

The sections below describe proposed changes to the District's monitoring network in calendar year 2019. DOEE seeks EPA's concurrence and Region III Regional Administrator's approval for these proposed changes, if any.

5.1 McMillan (Site ID 11-001-0043)

- PAMS monitors: No changes planned, strictly follow Revised PAMS Monitoring Rule (October 1, 2015) for PAMS measurements
- NATTS monitors: No changes planned
- NCore monitors: No changes planned
- Pb monitors: Discontinued
- $PM_{2.5}$ monitors: All FEM monitors, except for the collocated monitor FRM. No changes planned
- $PM_{2.5}$ CSN: No changes planned
- PM_{10} FEM Monitors: No changes planned

5.2 River Terrace School (Site ID 11-001-0041)

- SLAMS monitors: No changes planned
- $PM_{2.5}$ FEM monitors: No changes planned
- CO monitor shutdown end of December 2016 as planned and approved by EPA

5.3 Takoma Recreation Center Site ID 11-001-0050)

- No changes are planned

5.4 Hains Point (Site ID 11-001-0042)

- $PM_{2.5}$ FEM monitors: No changes planned

5.5 Verizon (Site ID 11-001-0023)

- Station shutdown end of December 2016 as planned and approved by EPA

5.6 Anacostia Freeway Near-Road station (Site ID 11-001-0051)

- No changes are planned

6.0 Air Monitoring Program and Data Contacts

The Monitoring and Assessment Branch in DOEE's Air Quality Division maintains the District's ambient air monitoring network and quality assures and quality controls the ambient air quality data. Data is stored locally for use by staff and for preparation of special reports, data charts, and special requests such as Freedom of Information Act requests.

Data is delivered to EPA's AQS database and reported on a schedule set forth in 40 C.F.R. Part 58. EPA controls access to the raw ambient air quality data that DOEE transmits to the national database. Ambient air quality monitoring data must be certified on an annual basis as accurate and complete. The certification process begins with the complete submittal of all SLAMS data to the federal AQS for the calendar year. State and local air monitoring agencies are required to transmit and certify the collected data for the previous calendar year by May 1.

DOEE has developed ambient monitoring guidelines in order to ensure that ambient air quality data collected, at regulated facilities in the State, are of the highest quality and conform to federal requirements for quality assurance under 40 C.F.R. 58.3.

DOEE uploaded fully quality assured calendar year 2017 data for the District's network to EPA's AQS national database. Submittal of precise and accurate data into AQS for calendar year 2017 was accomplished by April 2018. A formal certification of calendar year 2017 data was transmitted to EPA on April 30, 2018.

Annual data reports are generated from AQS and data certifications are prepared by DOEE, according to the reporting requirements in 40 C.F.R. Part 58. Data requests can be directed via email to: robert.day@dc.gov.

The main contact for the District's air monitoring program is:

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Branch Chief, Monitoring and Assessment Branch
Air Quality Division
Department of Energy & Environment
1200 First Street, N.E., Fifth Floor
Washington, D.C. 20002
Phone: (202) 535-2989
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Appendix A

District of Columbia's Enhanced Monitoring Plan

U.S. Environmental Protection Agency (EPA) developed a Technical Note "Guidance for Photochemical Assessment Monitoring Stations (PAMS) Required Network Implementation Plans and Enhanced Monitoring Plans (EMP)" that recommends monitoring organizations submit the EMP by July 1, 2018 along with the jurisdiction's annual network plan. The actual regulatory requirement for EMP contained in 50 C.F.R. 58, Appendix D.5(h) states that "the EMP shall be submitted to the EPA Regional Administrator no later than October 1, 2019" for states in the Ozone Transport Region (OTR).

Currently there is very limited information or data for understanding the medium-range and short range transport of ozone and precursors in to the Washington DC-MD-VA area or the southern portions of OTR. There is a critical need for special measurement studies in DC area and southern end of the OTR utilizing ozonesondes, unmanned aerial vehicles (UAVs), and other research measurement platforms.

Federal guidance is recommending an earlier EMP submittal by the District and other OTR states; however, EPA has not made any funding commitment at this time. Hence, District will not be able to initiate any special studies for such EMP activities without additional federal funding.

District is volunteering for the providing platform for measurements with Pandora spectrometer at its McMillan Reservoir PAMS site. EPA's Office of Research and Development (ORD) and NASA jointly developed this instrument. The Pandora spectrometer operates during daylight hours and records 20-second average measurements every 2 minutes of Nitrogen Oxides (NO, NO2, NOx) and Formaldehyde. NASA and EPA-ORD are responsible for installing, overseeing the routine operation, and calibration of the Pandora spectrometer instrument. NASA and EPA-ORD personnel will routinely review the data and perform validation activities on the Pandora data. DOEE staff may perform on-site corrective action with instruction from EPA-ORD personnel. Additional EPA funding directed towards EMP special projects and related activities is critical.