District of Columbia
2013 Annual Ambient Air Monitoring Network Plan

June 26, 2013

DISTRICT DEPARTMENT OF THE ENVIRONMENT
green forward

Monitoring and Assessment Branch
Air Quality Division
District Department of the Environment
1200 First Street, NE, Fifth Floor
Washington, DC 20002

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Acronyms and Definitions

AQI	Air Quality Index
AQS	Air Quality Subsystem
AQD	Air Quality Division
BAM/BAMM	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
DDOE	District Department of the 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

In October 2006, the U.S. Environmental Protection Agency (EPA) amended the ambient air monitoring regulations codified in 40 Code of Federal Regulations (C.F.R.) Part 58. The amendments require state and local monitoring agencies to conduct a periodic assessment of ambient air monitoring networks and propose any changes in an annual air monitoring network plan. Annual network plans are due to the Regional Administrator by July 1st. The District Department of the Environment (DDOE) conducted a review of the District of Columbia's (District's) air monitoring network and the annual assessment is presented in this 2013 Annual Ambient Air Monitoring Network Plan ("Network Plan").

The revised 2010 nitrogen dioxide (NO_2) standards require establishment of a new network of near-roadway monitors. DDOE recently received federal grant funds for establishing a near-roadway NO_2 ambient monitoring station in the District by January 1, 2015. Additional details about the District's new near-roadway NO2 ambient monitoring station will be presented in the the District's 2014 network plan.

DDOE is proposing additions and changes to the District's ambient air monitoring network as below and seeks the EPA Regional Administrator's approval.

1. PM_{10} FRM/FEM Monitors:

   DDOE currently operates two PM_{10} FRM (filter-based manual) Low-Volume Andersen samplers – a primary and a secondary monitor. DDOE also operates a continuous PM_{10} FEM at the same location.

   DDOE is proposing to discontinue both the primary and secondary manual filter-based samplers currently in operation. The expected date of shut-down for these aging monitors is January 31, 2014.

   DDOE is proposing to co-designate the NCore station's BAMM PM_{10} FEM automated sampler as the primary monitor to fulfill the PM_{10} network monitoring requirements in the District.

2. Air Toxics – Hexavalent Chromium Monitor:

   DDOE has been operating a hexavalent chromium sampler at the District's air toxics monitoring station. EPA evaluated the ambient concentrations of hexavalent chromium in the District and found that the levels were consistently below the method detection limit. Based on EPA's advice, DDOE will discontinue hexavalent chromium sampling beginning in July 2013.

As required by 40 C.F.R. § 58.10, the District's draft 2013 Network Plan was made available to the public on the DDOE website for a 30-day public examination. This plan is being submitted to EPA Region III for EPA's concurrence and Regional Administrator's approval.

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" for that pollutant.

Air pollution comes from many sources including on-road vehicles (cars, trucks, buses, motorcycles), off-road equipment (locomotives, boats, construction equipment, lawn mowers), area sources (gas stations, auto maintenance facilities, painting operations, consumer products usage), 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. DDOE 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 pollution 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. As required by federal air monitoring regulations, the District's current 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 monitoring 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 $PM_{10-2.5}$ 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 document is an annual revision of the District's Ambient Air Monitoring Network Plan. It contains a description of the District's monitoring network, various parameters within the network, and monitoring station information. It also confirms that the District's air monitoring program continues to meet federally established monitoring and data assessment criteria.

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 have many uses throughout this process, such as helping to:

- 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 20 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), and VOC concentrations. There is also less formation of problematic ozone, $PM_{2.5}$, and PM_{10} levels, 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 DDOE'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, air toxics, $PM_{2.5}$ mass and chemical speciation, and enhanced monitoring for ozone and its precursor pollutants with a photochemical assessment monitoring station (PAMS) for measuring speciated VOCs, NOx, carbonyls, 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. DDOE established an ambient Pb monitor at the NCore site on January 1, 2012, to fulfill the monitoring requirements of the 2008 Pb NAAQS.

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

Table 2-1: 2013 Ambient Air Monitoring Network and Monitor Details

Site Name, AQS ID	Street Address	City, County, ZIP	Latitude, Longitude	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°55'18.81"N 77° 0'47.58"W	Urban	First Street NW	7,400	2010	50	DC-Arlington-Alexandria
River Terrace 11-001-0041	420 34th Street N.E.	Washington, DC, 20019	38°53'44.06"N 76°57'29.06"W	Urban	Benning Rd.	43,100	2010	100	DC-Arlington-Alexandria
Verizon 11-001-0023	2055 L St., N.W.	Washington, DC, 20036	38°54'13.94"N 77° 2'45.03"W	City Center	L St.	14,100	2010	5	DC-Arlington-Alexandria
Hains Point 11-001-0042	1100 Ohio Drive, S.W.	Washington, DC, 20242	38°52'34.40"N 77° 2'3.78"W	Urban	I-395	175,400	2010	250	DC-Arlington-Alexandria
Takoma Recreation Center 11-001-0050	301 Van Buren St., N.W.	Washington, DC, 20012	38°.970092"N 77° .016715W	Urban	Blair Rd., N.W.	15,200	2010	200	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)	Scale of Representative	Monitoring Objective	Type	Sample Schedule
McMillan 11-001-0043	Nitrogen Dioxide, Nitric Oxide	06/01/1994	074	3	Urban	Population Exposure/Max Precursor	PAMS/SLAMS	Hourly
	NOy (Total reactive nitrogen oxides)	1/1/2011	090	3	Urban	General/Background	NCore/PAMS	Hourly
	SO2 (trace)	1/1/2011	592	3	Urban	General/Background	NCore	Hourly
	CO (trace)	1/1/2011	588	3	Urban	General/Background	NCore/PAMS	Hourly
	PM10-2.5 coarse	1/1/2011	185	3	Urban	General/Background	NCore	Hourly
	Type 2 PAMS	06/01/1994	000	3	Urban	General/Background	PAMS	Hourly
	Ozone	06/01/1994	047	3	Urban	Population Exposure/Max Precursor	PAMS/SLAMS/NCore	Hourly
	PM2.5 Continuous	01/01/2003	170	4	Urban	Population Exposure/Max Precursor	SLAMS	Hourly
	PM10 Continuous	1/1/2011	170	4	Urban	Population Exposure/Max Precursor	SLAMS	Hourly
	PM10 Low-Vol	01/04/2012		4	Urban	Population Exposure/Max Precursor	SLAMS	Daily
	PM2.5	01/01/1999	118	4	Urban	Population Exposure/Max Precursor	NCore/SLAMS	Daily
	PM2.5 Chemical Speciation	01/01/2002	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
	PM10 High-Vol	1/1/2001	065	4	Urban	Population Exposure/Trends	NATTS	Every 6 Days
	Pb	01/01/2012	189	4	Neighborhood	Population Exposure/Trends	NCore/SLAMS	Every 6 Days
	Black Carbon	1/1/2001	862	4	Urban	Population Exposure/Trends	SLAMS	Hourly
	Organic/Elemental Carbon	02/02/2012	N/A	4	Urban	Population Exposure/Trends	Special Study	Hourly
River Terrace 11-001-0041	Carbon Monoxide	5/1/1993	054	10	Neighborhood	Population Exposure	SLAMS	Hourly
	Nitric Oxide	5/1/1993	074	10	Neighborhood	Population Exposure	SLAMS	Hourly
	Nitrogen Dioxide	5/1/1993	074	10	Neighborhood	Population Exposure	SLAMS	Hourly
	Oxides of Nitrogen	5/1/1993	074	10	Neighborhood	Population Exposure	SLAMS	Hourly
	Ozone	5/1/1993	047	10	Neighborhood	Population Exposure	SLAMS	Hourly
	PM2.5	01/01/1999	118	10	Neighborhood	Population Exposure	SLAMS	Daily
	Sulfur Dioxide	5/1/1993	060	10	Neighborhood	Population Exposure	SLAMS	Hourly
Verizon 11-001-0023	Carbon Monoxide	10/1/1980	054	3	Urban	Population Exposure	SLAMS/NAMS	Hourly
Hains Point 11-001-0042	PM2.5	03/01/1999	118	10	Urban	Population Exposure	SLAMS	Every 3 Days
Takoma Recreation Center 11-001-0050	Nitric Oxide	1/1/2013	074	10	Neighborhood	Population Exposure	SLAMS	Hourly
	Nitrogen Dioxide	1/1/2013	074	10	Neighborhood	Population Exposure	SLAMS	Hourly
	Oxides of Nitrogen	1/1/2013	074	10	Neighborhood	Population Exposure	SLAMS	Hourly
	Ozone	1/1/2013	047	10	Neighborhood	Population Exposure	SLAMS	Hourly

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

Site Name	Pollutant Parameter / Pollutant Group																								
	Pb TSP	Air Toxics	Black Carbon, OC,EC	Chromium-6 (Air Toxics)	PAH Compounds (Air Toxics)	CO	NO	NO2	NOx	NOy	O3	PAMS VOCs /Carbonyls	PAMS VOCs Continuous (Auto-GC)	PM2.5	PM2.5 Elemental/Organic Carbon	PM2.5 (Continuous)	Air Toxics Metals (PM10)	PM10	PM10 -2.5 (Continuous) PMcoarse	Speciated PM2.5	SO2	Trace CO	Trace SO2	NCore – Surface Meteorology	PAMS – Surface Meteorology	**TOTALS***
McMillan	1	1	2	1	1		1	1	1	1	1	1	1	2	1	1	1	2	1	1		1	1	1	1	**26**
River Terrace School						1	1	1	1		1			1							1					**7**
Verizon Building						1																				**1**
Takoma Recreation Center							1	1	1		1															**4**
Hains Point														1												**1**
																										39

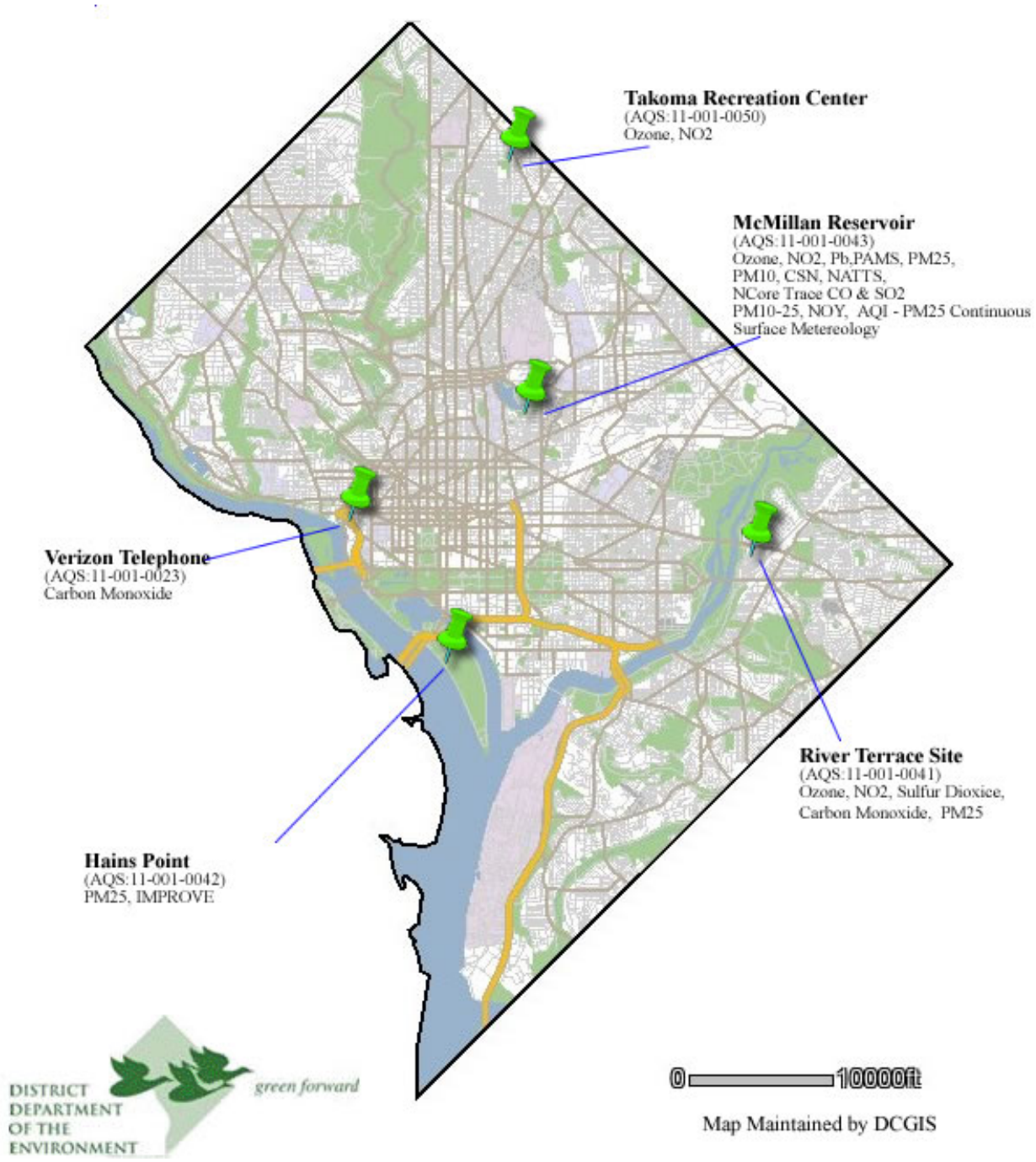
Table 2-4: Monitoring Methods and AQS Codes

Parameter	Method Code	Sample Analysis Description
Air Toxics	150	Capillary GC ITD Mass Spectrometer
Carbon Monoxide	054	Nondispersive Infrared Photometry
Carbon Monoxide, Trace	588	Nondispersive Infrared Photometry
Nitric Oxide and Nitrogen Dioxide	074	Chemiluminescence
Total Reactive Nitrogen Oxides	090	Chemiluminescence
PAMS VOCs	128	Gas Chromatograph with 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 Low-Vol		Gravimetric
PM10 High-Vol	065	Gravimetric
PM2.5	118	Gravimetric
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	Using quartz filter – Thermo-Optical Transmittance
PM10-2.5 Coarse	185	Dual BAM-1020 monitors
PM2.5 Continuous	170	Beta Attenuation Mass Monitor - PM2.5 FEM with glass fiber filter tape
PM2.5 - Elemental and Organic Carbon	862	BC/EC, Self-contained Non-dispersive Infrared (NDIR) Detector System
Sulfur Dioxide	060	Pulsed Fluorescence
Sulfur Dioxide, trace	592	Pulsed Fluorescence
Pb (Lead) TSP	189	ICP-MS Extracted on a hot plate with 3M HNO3 according to SW-846 Meth 6020A

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
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

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



2.1 Air Monitoring Networks

The District's monitoring stations individually are 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:

The state and local ambient monitoring stations (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 five SLAMS.

National Air Monitoring Station Network:

The NAMS network is a subset of the SLAMS network and was developed in the 1970s. 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 $PM_{2.5}$ 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 minimum monitoring requires establishment of a network with at least two near-roadway NO_2 monitors in the Washington DC-MD-VA metropolitan area. DDOE recently received federal grant funds for establishing a near-roadway NO_2 ambient monitoring station in the District by January 1, 2015. Details about the District's new near-roadway NO_2 monitoring station will be presented in the 2014 annual network plan.

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 a 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 is also required at NCore sites by January 1, 2012.

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 BAMM

FEM monitors to measure $PM_{10-2.5}$. A TSP-Pb FRM monitor was added at the McMillan NCore station in January 2012.

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 75 sites in 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 one PAMS Type 2 station at the McMillan site. In 2011, DDOE deployed Viasala WXT 520 meteorological monitoring sensors on a new 10-meter tower at the McMillan PAMS/NCore site.

Special Purpose Monitoring Networks:

Special Purpose Monitoring (SPM) networks include National Air Toxic Trends Stations (NATTS), $PM_{2.5}$ Chemical Speciation Network (CSN), and Air Quality Index (AQI) and other special purpose monitors. Currently, the District's SPM network consists of: one NATTS, one CSN station, one continuous $PM_{2.5}$ AQI station, and one OC/EC Sunset semi-continuous carbon analyzer at the McMillan site.

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) operates one IMPROVE site along with a nephelometer at the Hains Point station in the District. DDOE operates a $PM_{2.5}$ FRM monitor at the District's IMPROVE site. This site may be one of the very few IMPROVE sites in an urban area.

2.2 Pollutant Parameters

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

Fine Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ FRM Monitors: DDOE operates four Partisol 2025 $PM_{2.5}$ FRM monitors in its air monitoring network – one each at the River Terrace and Hains Point stations, and two $PM_{2.5}$ FRMs collocated at the McMillan site. The McMillan and River Terrace primary monitors are

daily sampling sites while the Hains Point monitor is on a 1-in-3 day sampling schedule. The collocated secondary $PM_{2.5}$ monitor at McMillan is operated on a 1-in-6 day sampling schedule.

$PM_{2.5}$ Chemical Speciation Network: DDOE 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. NPS operates an IMPROVE $PM_{2.5}$ speciation monitor and a nephelometer at the Hains Point site.

Continuous $PM_{2.5}$ Monitoring: DDOE designated the BAM $PM_{2.5}$ continuous FEM monitor at the McMillan (11-001-0043) site as the $PM_{2.5}$ AQI monitor. DDOE shut down the old TEOM non-FEM $PM_{2.5}$ AQI monitor in June 2012. The old TEOM $PM_{2.5}$ monitor is being converted as a PM_{10} continuous FEM for future use.

Particulate Matter (PM_{10})

In January 2012, DDOE implemented a network change and relocated the PM_{10} sampling from the River Terrace (11-001-0041) site to the McMillan (11-001-0043) site. As approved by EPA, DDOE discontinued the Hi-Vol PM_{10} monitors at the River Terrace station and established two Low-Vol PM_{10} monitors at the McMillan Reservoir station by converting the old Andersen FRM monitors. DDOE also operates a continuous BAMM PM_{10} FEM sampler at the McMillan site.

Ozone (O_3)

Ozone is not emitted directly from a pollution source but is formed in the lower atmosphere by the reaction of NO_x and VOCs in the presence of sunlight and warm temperatures. Sources of NO_x include automobiles, power plants, and other fuel combustion equipment. VOCs can come from automobiles, gasoline vapors, and a variety of large and small commercial and industrial sources that use chemical solvents, paint thinners, and other chemical compounds. These compounds or "precursors of ozone" can travel for many miles before chemical reactions in the atmosphere form ozone.

DDOE currently operates Thermo-49i series ozone analyzers at three 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. Even though 40 C.F.R. Part58 Appendix D requires ozone monitoring primarily during the ozone season (April 1 to September 30), DDOE is committed to year-round measurements and collects ozone data on an hourly basis.

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.

DDOE operates two Thermo-48i series CO analyzers year-round, one each at the River Terrace and Verizon sites. In January 2011, DDOE deployed an Ecotech EC9830T trace-CO analyzer at the McMillan site to meet NCore monitoring requirements.

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 the 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 that burn fossil fuels, such as power plants and industrial boilers.

DDOE currently operates NO_2 monitors at three 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.

Total Reactive Nitrogen Oxides (NO_y): In January 2011, DDOE installed an Ecotech EC9841A model NO_y analyzer at the McMillan NCore station. This is a chemiluminesence-based analyzer that uses a high-performance NO_y converter to measure trace levels of NO_y and NO.

Near-road NO_2 network: The 2010 NO_2 NAAQS requires establishment of a new network of near-roadway NO_2 monitors. In February 2013, DDOE received a federal grant for establishing a near-roadway monitoring station in the District by January 1, 2015. Details about the District's new near-roadway NO_2 monitoring will be presented in the 2014 annual network plan.

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. The main sources of SO_2 are combustion of coal and oil (mostly from electrical generating units, refineries, smelters, and industrial boilers).

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

Air Toxics

Air toxics, or hazardous air pollutants (HAPs), are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive or birth defects, or adverse environmental effects. Toxics are released from automobiles, gasoline vapors, and a large variety of large and small commercial and industrial sources that use chemical solvents, paint thinner, and other chemical compounds.

DDOE operates one 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 include: hexavalent chromium (ERG Cr+6 analyzer), PAH (Tisch Puf+ analyzer), heavy metals (PM_{10} High-Vol), and VOCs and carbonyls (Model 910A, Environmental Systems Inc). 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).

EPA evaluated the ambient concentrations of hexavalent chromium in the District and found that the levels were generally below the method detection limit. Hence, based on EPA's advice, DDOE will discontinue sampling for hexavalent chromium beginning in July 2013.

PAMS Ozone Precursors

VOCs and nitrogen oxides are precursor pollutants for ground-level O_3 formation. VOCs are released from automobiles, gasoline vapors, and a vast variety of large and small commercial and industrial sources that use chemical solvents, paint thinners, and other chemical compounds.

DDOE operates one 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 core ozone season (June to August), three-hour canister air samples are collected on a 1-in-3 day schedule by using a XonTech Model 910A sampler. Additionally, 24-hour canister air samples are collected on a 1-in-6 day sampling schedule with a XonTech Model 910A sampler. 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 detectors (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 for sample collection. The analyses are performed with high performance liquid chromatography. Three-hour sample cartridges are collected on a 1-in-3 day schedule.

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

Lead (Pb)

Beginning in January 2012, DDOE has been operating a TSP-Pb monitor at its McMillan NCore site on a 1-in-6 day sampling schedule. Samples are sent to the West Virginia Department of Environmental Protection's Air Monitoring Laboratory for chemical analysis.

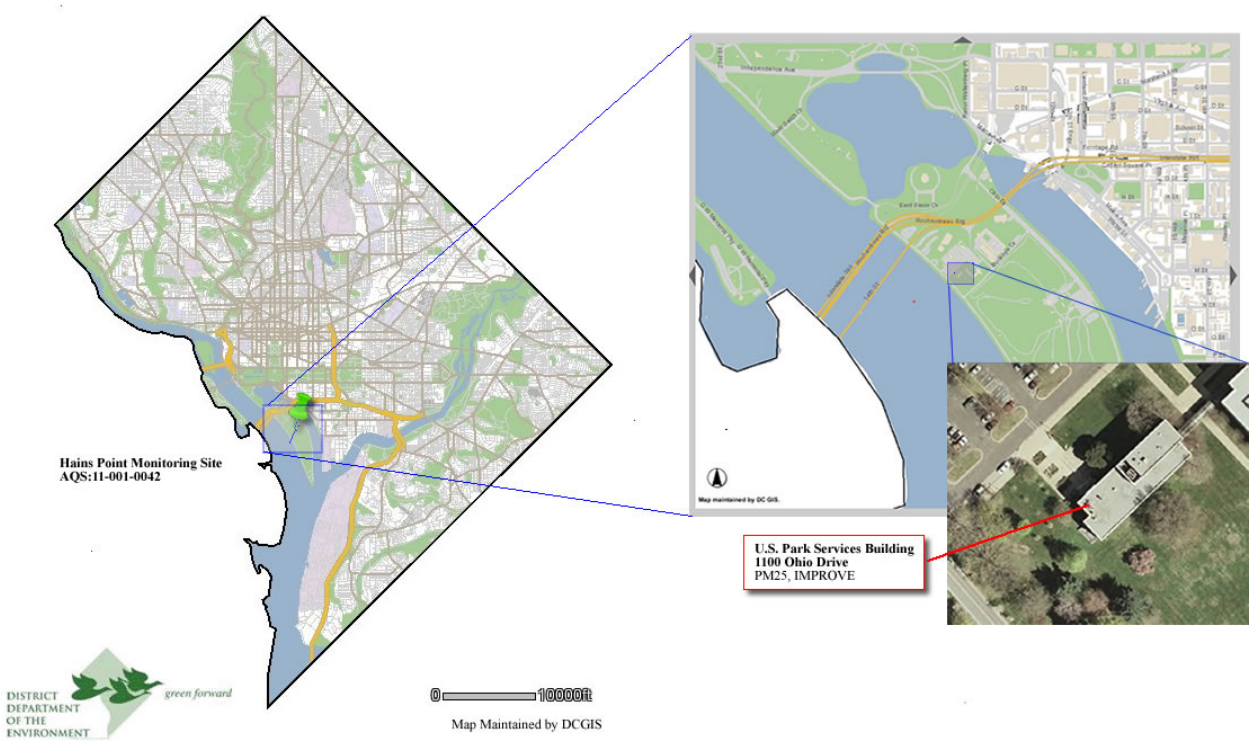
3.0 District of Columbia's Air Monitoring Stations

DDOE currently maintains a network of five ambient air monitoring stations. Hains Point, McMillan, River Terrace, Takoma Recreation Center, and Verizon are the descriptive names of these stations. The following sections provide additional information. Maps for the individual sites are shown in Figures 3-1 to 3-5.

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 operates IMPROVE $PM_{2.5}$ mass and speciation and PM_{10} monitors at this site. DDOE operates a $PM_{2.5}$ FRM monitor at this location. This is also one of the very few urban IMPROVE sites in the nation.

Figure 3-1: Hains Point Monitoring Station Locator Maps

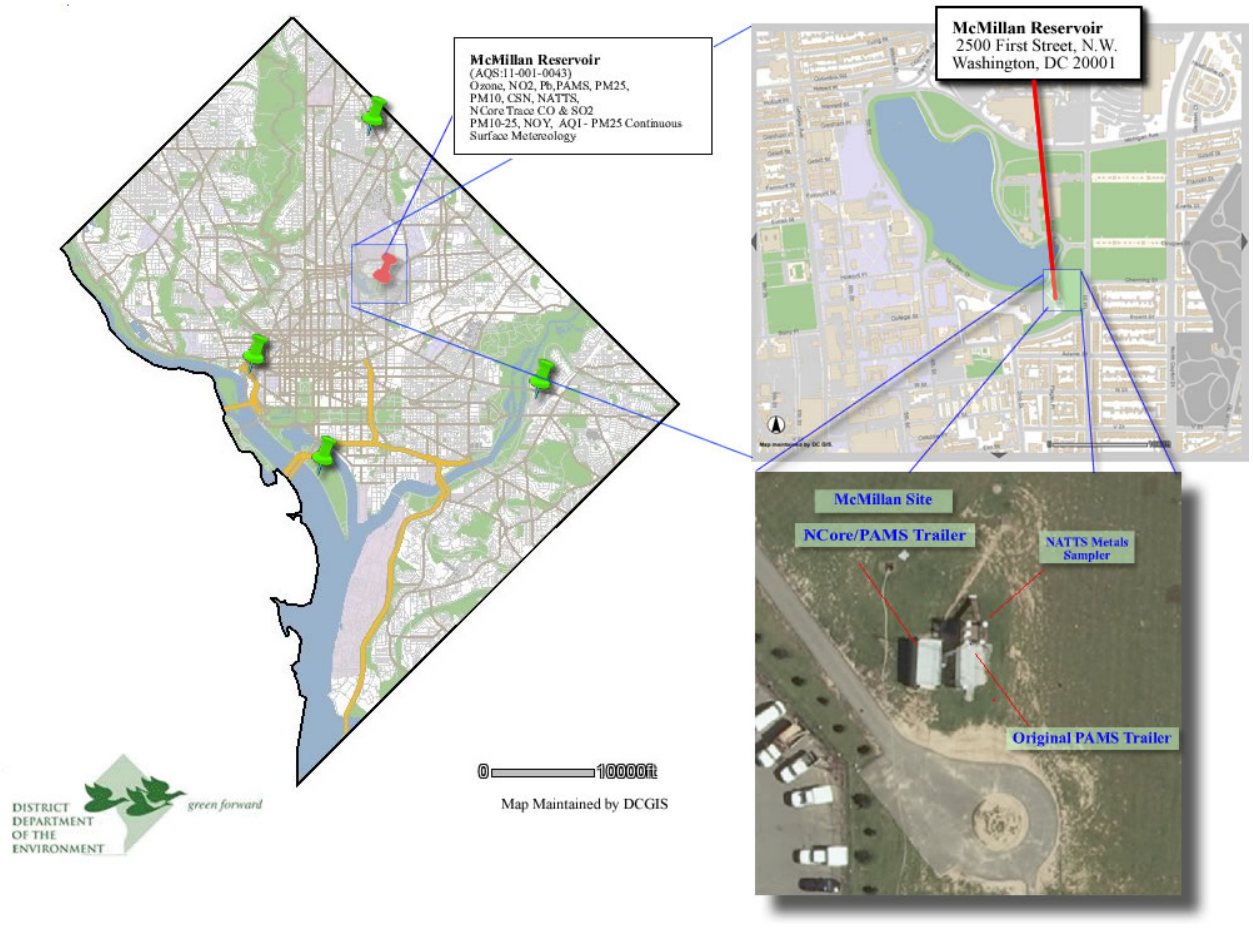


3.2 McMillan Station

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. TSP Pb monitor was added in January 2012. Additionally, as part of the national pilot study, a Sunset Model 4 Semi-Continuous OC/EC monitor was deployed at McMillan station under EPA Office of Air Quality Planning and Standards (OAQPS) guidance.

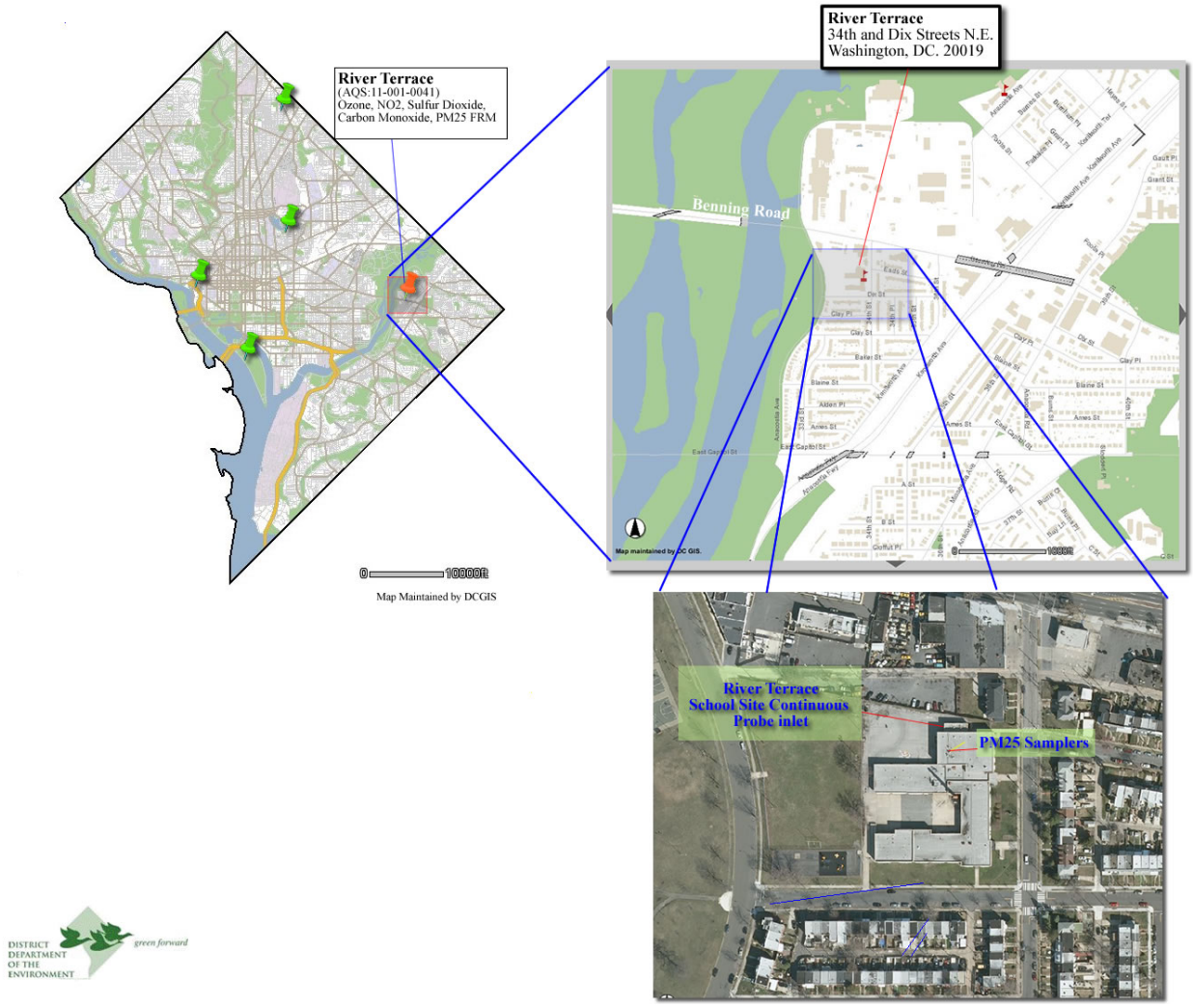
Figure 3-2: McMillan Reservoir Site Locator Maps



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, CO, NO_x, and $PM_{2.5}$.

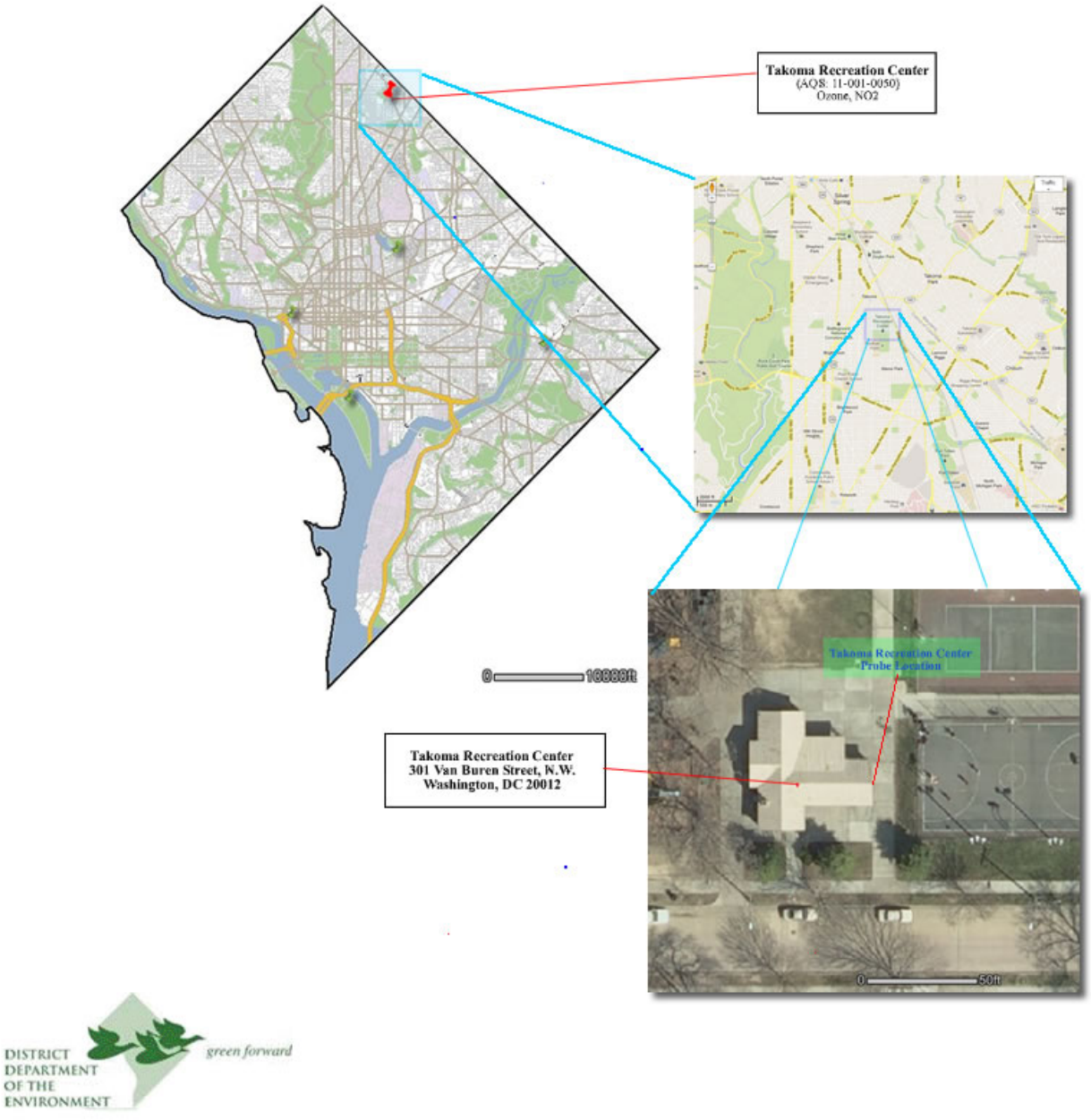
Figure 3-3: River Terrace Site Locator Maps



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.

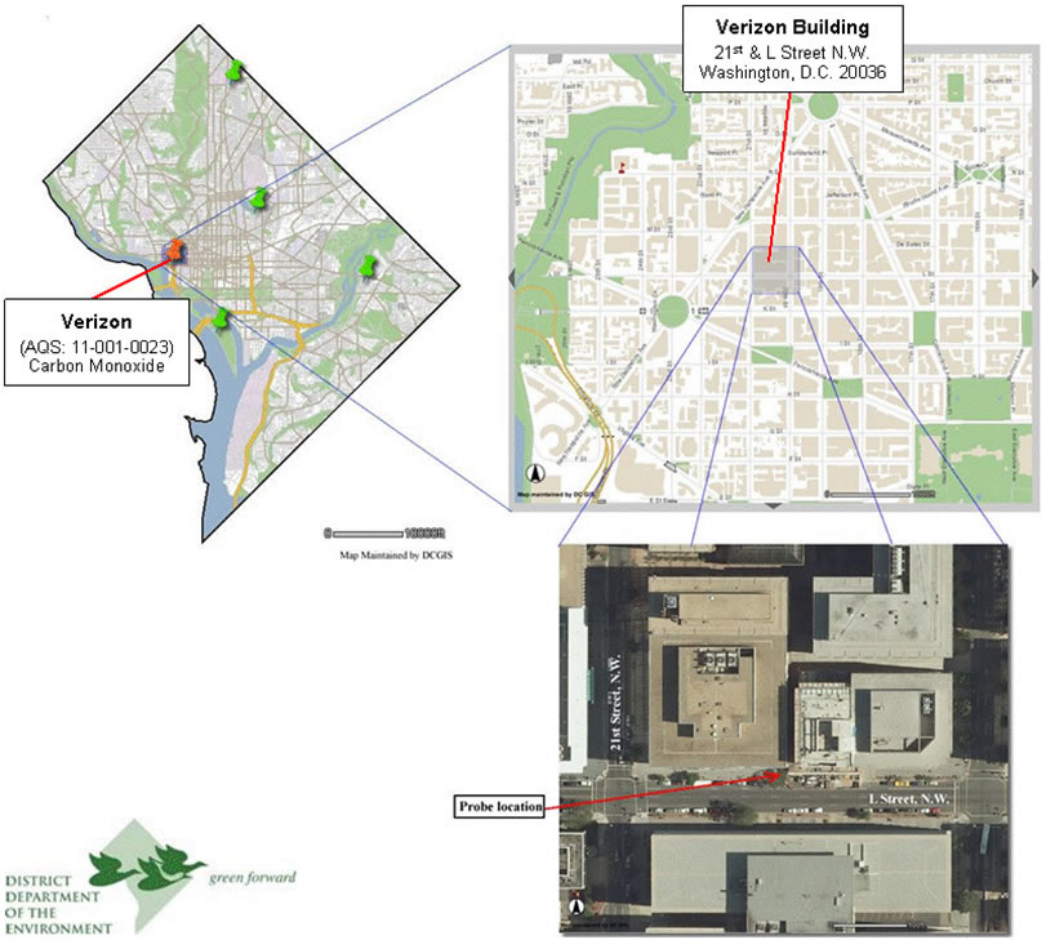
Figure 3-4: Takoma Recreation Center Site Locator Maps



3.5 Verizon Station

The Verizon station was launched in 1980 and it houses a CO measurement sensor. This measuring component is important for the District because it is located in the core business district where there is a significant component of pedestrian traffic as well as traffic congestion. Classified as a "micro-scale" site, the Verizon station is in a "city canyon" type of environment.

Figure 3-5: Verizon Monitoring Site Locator Maps



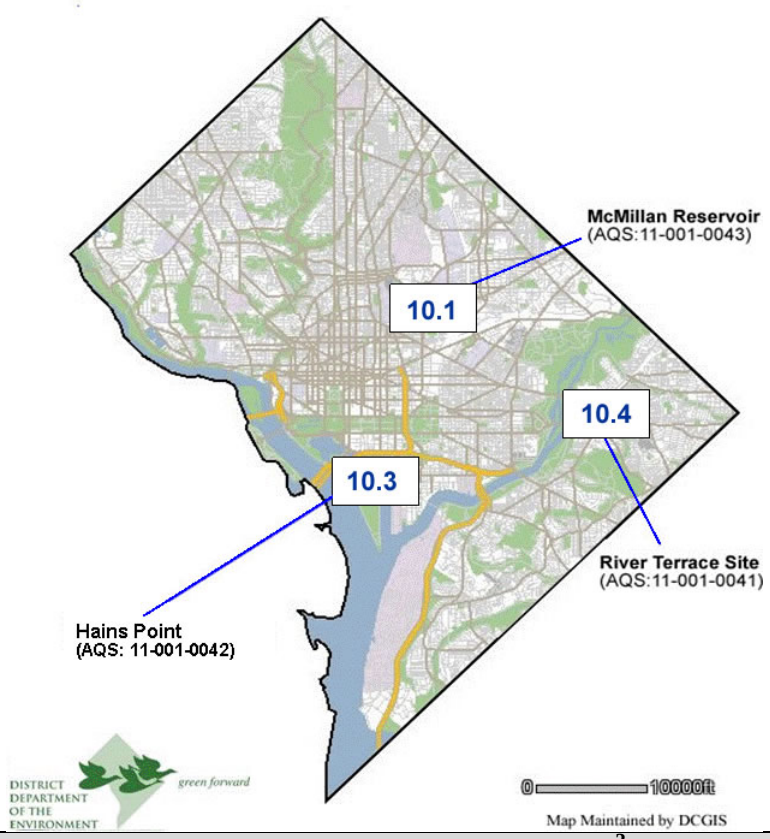
4.0 Ozone and $PM_{2.5}$ Air Quality

Ambient air quality for criteria pollutants as given by design value concentrations a 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 values are typically 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 EPA regional offices.

4.1 Annual $PM_{2.5}$ Design Concentrations

The figure and table below give 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 2012 ambient data indicate that the District is in attainment for the annual $PM_{2.5}$ NAAQS of 15 µg/m^3.

Figure 3-6: Annual PM2.5 Design Values

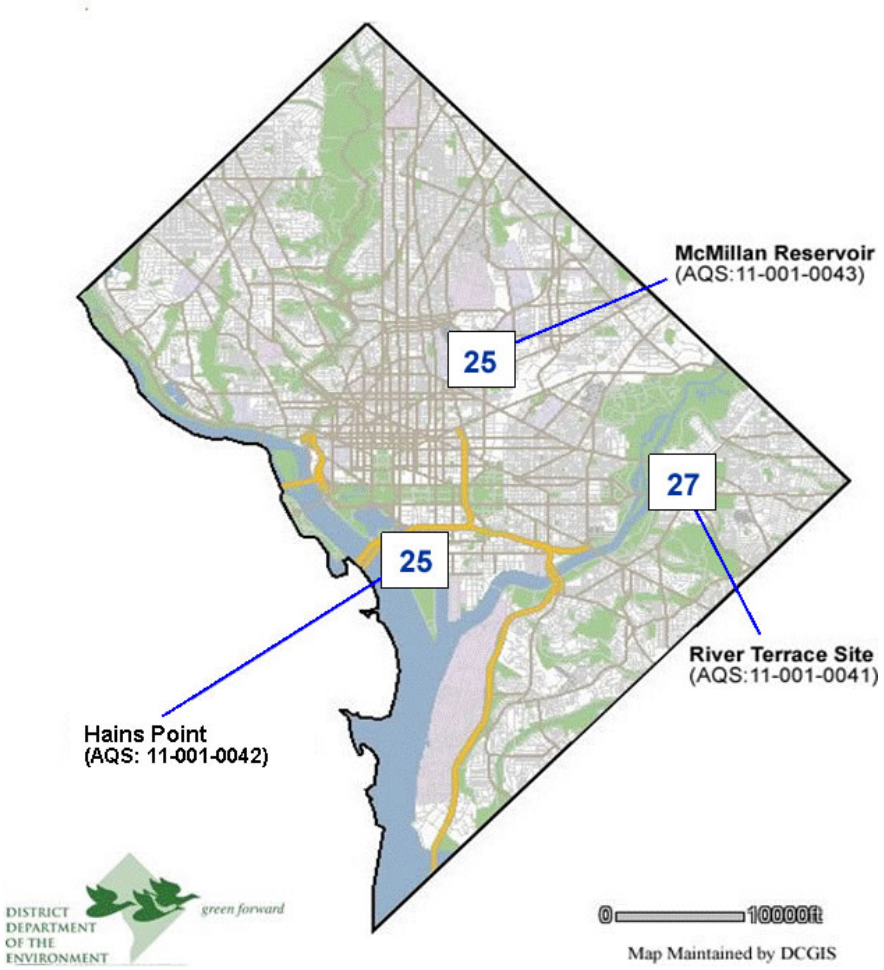


Annual PM2.5 Design Values (µg/m^3)					
Site	**AIRS ID**	**2009**	**2010**	**2011**	**2012**
Hains Point	110010042	12.0	11.2	10.5	10.3
McMillan	110010043	11.6	10.8	10.3	10.1
River Terrace	110010041	12.1	11.2	10.6	10.4

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. The table below 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 µg/m^3.

Figure 3-7: Daily PM2.5 Design Values

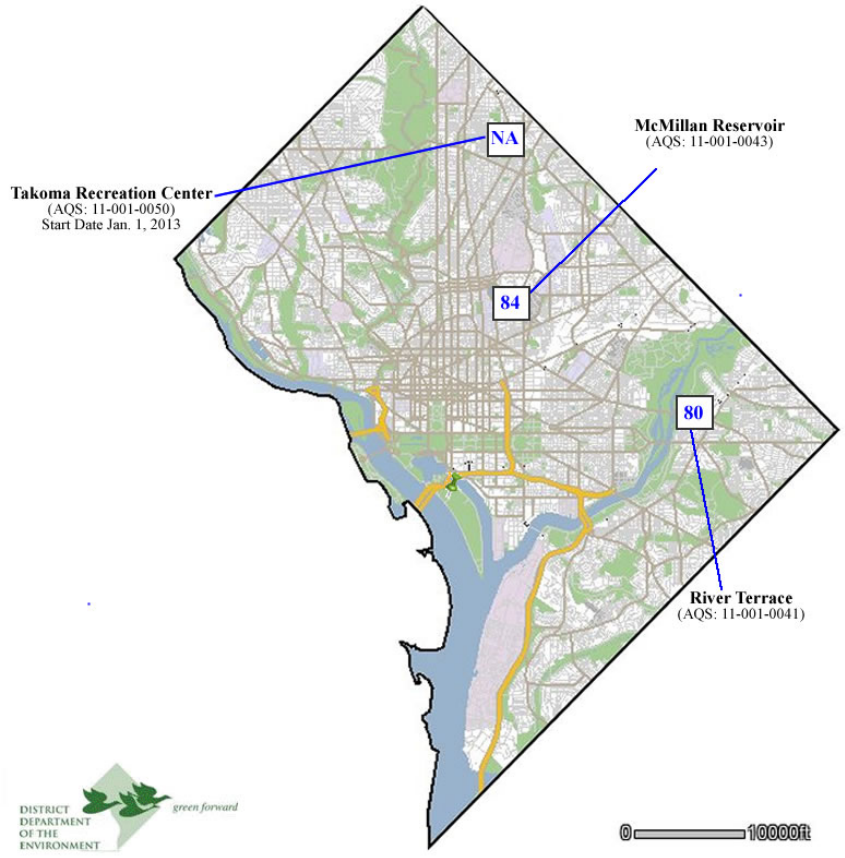


Daily PM2.5 Design Values (µg/m3)					
Site	**AIRS ID**	**2009**	**2010**	**2011**	**2012**
Hains Point	110010042	28	26	24	25
McMillan	110010043	29	26	25	25
River Terrace	110010041	29	27	26	27

4.3 Ozone Design Concentrations

The table below includes current design values for ground-level ozone using data from 2007 to 2012. The ozone design values are calculated by taking the three-year average of the annual 4th highest daily maximum 8-hr average concentrations. The 2008 8-hr ozone NAAQS is 0.075 ppm, or 75 ppb. Monitored data indicate that the ambient air quality is in violation of the NAAQS at O_3 monitoring sites in the District. Monitoring at the Takoma School (11-001-0025) station was discontinued in 2011 because of a fire incident, so the design value for Takoma School is based on two years of data. The new Takoma Recreation Center O3 monitoring site (11-001-0050) was deployed in January 2013 and there is inadequate data for this monitor.

Figure 3-8: Ozone Design Values



Design Values (ppb)						
Site	**AIRS ID**	**2008**	**2009**	**2010**	**2011**	**2012**
McMillan	11-001-0043	87	**80**	**79**	**79**	**84**
River Terrace	11-001-0041	86	**78**	**77**	**76**	**80**
Takoma	11-001-0025	80	**77**	**75**	**75***	N/A
Takoma Recreation Center	11-001-0050	-	-	-	-	N/A

**Takoma School monitor shut down in 2011 because of a fire incident.*
The 2011 design value for Takoma School monitor was based on two years (2009 and 2010) data.
***Takoma Recreation Center station started in January 2013*

5.0 Network Changes and Upgrades

The District supports EPA's efforts to protect public health and natural resources under the CAA. DDOE 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 2010 NO_2 NAAQS revisions require the establishment of at least two near-roadway NO_2 monitors in the Washington DC-MD-VA metropolitan area. The District received federal funding for the establishment of a new near-road NO_2 monitoring station. DDOE is working with the District's Department of Transportation (DDOT) and U.S. Department of Interior's National Park Service (NPS) to identify a suitable location for a near-roadway NO_2 monitoring site in the District. DDOE expects to establish a near-roadway NO_2 station for operation by January 1, 2015. Details about the new near-roadway NO_2 monitoring station will be presented in the 2014 annual network plan.

The sections below describe proposed changes to the District's monitoring network. DDOE seeks EPA's concurrence and Region III Regional Administrator's approval for these proposed changes.

5.1 McMillan (Site ID 11-001-0043)

- PAMS monitors: No changes planned.
- NCore monitors: No changes planned.
- Pb monitors: No changes planned
- $PM_{2.5}$ FRM monitors: No changes planned.
- $PM_{2.5}$ CSN: No changes planned.

- PM_{10} FRM/FEM Monitors:
  DDOE currently operates two PM_{10} FRM (filter-based manual) Low-Volume Anderson samplers- a primary and a secondary monitor. DDOE also operates a BAMM PM_{10} FEM for the NCore station at this location.

  DDOE is proposing to discontinue both the primary and secondary manual filter-based samplers currently in operation at the McMillan station. Expected date of shut down for these aging monitors is January 31, 2014.

  DDOE is proposing to co-designate the McMillan NCore station's BAMM PM_{10} FEM automated sampler for PM_{10} network to fulfill the PM_{10} monitoring requirements in the District.

- NATTS monitors:
  DDOE has been operating a hexavalent chromium sampler at its air toxics monitoring station. EPA evaluated the ambient concentrations of hexavalent chromium in the District and found that the levels were below the method detection limit. Based on

EPA's advice and earlier communications with EPA Region III offices, DDOE will discontinue hexavalent chromium sampling beginning in July 2013.

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

- No changes are planned.

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

- No changes are planned.

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

- No changes are planned.

5.5 Verizon (Site ID 11-001-0023)

- No changes are planned.

6.0 Air Monitoring Program and Data Contacts

The Monitoring and Assessment Branch in DDOE'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 DDOE transmits to the national database. Annual data reports are generated from AQS and data certifications are prepared by DDOE, 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:

Dr. Rama Seshu Tangirala
Branch Chief, Monitoring and Assessment Branch
Air Quality Division
District Department of the Environment
1200 First Street, N.E., Fifth Floor
Washington, D.C. 20002
Phone: (202) 535-2989
E-mail: rama.tangirala@dc.gov

Draft 2013 Ambient Air Monitoring Network Assessment and Network Plan

PUBLIC NOTICE

Input welcomed on District of Columbia's 2013 Ambient Air Monitoring Network Assessment and Network Plan

The U.S. Environmental Protection Agency (EPA) revised ambient air monitoring regulations in October 2006. The revisions are expected to help the EPA, states, tribes and local air quality agencies improve public health protection and better inform the public about air quality in their communities. The requirements are outlined in 40 CFR §58.10. The monitoring regulations require the District of Columbia to adopt and to submit to the EPA an annual monitoring network plan which provides for establishing and/or maintaining an air quality surveillance system. The annual monitoring network plan must be made available for public inspection for at least 30 days prior to submission to EPA. The District of Columbia's annual ambient air monitoring network plan is available for a 30-day public inspection. *The review period begins on **Monday, May 13, 2013** and ends on **Thursday, June 13, 2013**.*

Please view and/or download the **Draft District of Columbia's 2013 Ambient Air Monitoring Network Plan** (attached below).

Please submit your comments/input on the District of Columbia's air monitoring network plan to:

Ms. Khin Sann Thaung
Environmental Specialist

Monitoring and Assessment Branch - Air Quality Division
District Department of the Environment
1200 First Street, N.E., Fifth Floor
Washington, DC 20002

Email: khinsann.thaung@dc.gov

Background Information

In 1970, Congress passed the Clean Air Act that authorized the EPA to establish National Ambient Air Quality Standards (NAAQS) for pollutants shown to threaten human health and welfare. Primary standards were set according to criteria designed to protect public health, including an adequate margin of safety to protect sensitive populations such as children and asthmatics. Secondary standards were set according to criteria designed to protect public welfare (decreased visibility, damage to crops, vegetation, and buildings).

EPA established NAAQS for six pollutants- ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead (Pb), and particulate matter less than 10 microns aerodynamic diameter, (PM_{10}) and less than 2.5 microns ($PM_{2.5}$). These are commonly known as the "criteria" pollutants. When air quality does not meet the NAAQS, the area is said to be in "non-attainment" with the NAAQS. For more information on air quality and the federal NAAQS, please visit EPA's National Ambient Air Quality Standards.

Attachment(s):

Draft District of Columbia's 2013 Ambient Air Monitoring Network Plan 1.37 MB

Related Content:

- Archives - Public Notices & Hearings

GOVERNMENT OF THE DISTRICT OF COLUMBIA

District Department of the Environment

Air Quality Division

June 26, 2013

Xiao Zhang
Legal Fellow
Natural Resources Defense Council
Email: xizhang@nrdc.org

Re: District of Columbia 2013 Annual Ambient Air Monitoring Network Plan

Dear Xiao Zhang:

The District Department of the Environment (DDOE) prepared the District of Columbia 2013 Annual Ambient Air Monitoring Network Plan (Network Plan) for submission to the U.S. Environmental Protection Agency (EPA). As required at 40 Code of Federal Regulations (C.F.R.) § 58.10, the draft Network Plan was made available to the public on the DDOE website for a 30-day public examination. DDOE received input on the District of Columbia's (District) 2013 Network Plan submitted by you via email on behalf of the Natural Resources Defense Council (NRDC) on Thursday, June 13, 2013 and I would like to thank you for the input.

DDOE evaluated NRDC's input and incorporated suggestions as deemed necessary. Please see below for DDOE's response to the three specific items you indicated in your letter.

I. The proposed NO_2 site is not sufficiently documented

EPA allocated grant funds for establishing two near-road NO_2 monitoring stations in the Washington-Arlington-Alexandria, DC-VA-MD-WV CBSA – one station in Virginia and a second station in the District.

The first of the two NO_2 stations is expected to be in the Virginia portion of CBSA. For additional information about Virginia's near-road NO_2 station, please refer to the Virginia Annual Monitoring Network Review submitted to EPA by Virginia Department of Environmental Quality on June 14, 2013.

According to Title 40 of the C.F.R., Part 58 Appendix D, section 4.3.2, a plan for establishing a second near-road NO2 monitor in any Core Based Statistical Area (CBSA) with a population of 2,500,000 or more persons, or with a population of 500,000 or more persons that has one or more roadway segments with 250,000 or greater average annual daily traffic (AADT) counts, shall be submitted as part of a Network Plan to the EPA Regional Administrator by July 1, 2014. The

plan shall provide for these required monitors to be operational by January 1, 2015. *40 C.F.R. § 58.10(a)(5)(iv)*

The near-road NO_2 station anticipated in the District will be the second in the CBSA. DDOE is not required to include the new station in its Network Plan until July 1, 2014. Near-road station information will be reflected in the annual monitoring plan to be made available for public examination in the spring of 2014. Currently, DDOE is following the guidance in the EPA-issued near-road NO_2 Technical Assistance Document (TAD) for establishing a near-road monitoring station and is planning to engage EPA's ambient monitoring program staff during the site selection process. DDOE has noted NRDC's interest in providing input for selecting a suitable near-road NO_2 monitoring site in the District.

II. DDOE must Justify Discontinuation of the Two PM_{10} FRM Stations and Indicate that enough PM_{10} Stations will Operate in the MSA.

In 2011, as part of the District's annual monitoring network review, DDOE proposed to relocate the PM_{10} monitors from the River Terrace station (ID: 11-001-0041) to the McMillan Reservoir station (ID: 11-001-0043). After receiving EPA's approval, in January 2012, DDOE implemented the PM_{10} network changes. The very old PM_{10} high-volume samplers at the River Terrace station were decommissioned. As a replacement, Andersen PM_{10} Low-Volume Federal Reference Method (FRM) samplers were deployed at the McMillan Reservoir station. Important to note is that the Andersen PM samplers were purchased during the 1998 to1999 timeframe; it is becoming increasingly difficult to maintain the aging equipment and replacement parts are not easily available. Additionally, DDOE operates two other PM_{10} monitors at the McMillan Reservoir site for meeting the requirements of the NCore and National Air Toxics Trends network of stations.

In January 2011, DDOE deployed a MetOne BAM 1020 PM_{10} continuous Federal Equivalent Method (FEM) sampler at the McMillan site. The continuous sampling offers the advantage of collecting hourly concentration data and providing real-time air quality data to the public for Air Quality Index (AQI) reporting.

In the 2013 Network Plan, with the goal of maximizing the value of the continuous PM_{10} measurement technology, DDOE has proposed to co-designate the existing continuous PM_{10} FEM monitor to fulfill the requirements for a PM_{10} network in the District. Also, an extensive network of PM_{10} monitors is currently maintained in the CBSA. Given below is a list of PM_{10} monitors in the CBSA obtained from EPA's Air Quality Subsystem (AQS):

- 11-001-0043 - McMillan Reservoir (2500 First St., NW, DC)
- 24-033-0030 - Howard University Beltsville Lab (12003 Old Baltimore Pike, Beltsville, MD)
- 51-510-0020 - Alexandria, VA (435 Ferdinand Day Drive, Alexandria, VA)
- 51-630-0004 - Fredericksburg, VA (Hugh Mercer Elementary School, 2100 Cowan Blvd, Fredericksburg, VA)
- 51-187-0004 – Front Royal, VA (1000 Shenandoah Avenue, Front Royal, VA)

Because of the very low PM_{10} concentrations measured in the District and CBSA, the existing network meets or exceeds all the requirements for a PM_{10} network of monitors.

III. DDOE must Monitor all Required Pollutants at its Photochemical Assessment Monitoring Stations (PAMS)

DDOE operates one PAMS Type 2 station at the McMillan Reservoir site (ID: 11-001-0043) that measures O_3, NO, NO_x, NO_2, speciated VOCs, carbonyls, and surface meteorology. DDOE has been measuring carbonyls at its PAMS site since the inception of the District's PAMS air monitoring program in 1994. Chapter 2 of the Network Plan provides details. As suggested by NRDC, the tables in the Network Plan have been updated to correct omissions. Specifically, tables in Chapter 2 have been updated to include the missing details on carbonyls at the District's PAMS site.

With regards to high sensitivity carbon monoxide (CO) measurements, reliable analyzers were not available in the 1990s, at the startup of PAMS program. NO_y was not measured in the District either. However, DDOE understands that a NO_y monitor has been in operation at another PAMS site in the Washington DC-MD-VA metropolitan area to fulfill the pertinent requirement. Also, in 2006, PAMS monitoring requirements were revised. Conventional NO_2/NO_x monitors can now meet the minimum monitoring requirements at a Type 2 PAMS site. As noted above, DDOE operates a Type 2 PAMS site that measures both NO_2 and NOx. High sensitivity NO_y monitors are required at only one site per PAMS area, at either a Type 1 or Type 3 site, so the requirement is met elsewhere in the region. However, in 2011, DDOE added a trace-CO analyzer and a NO_y analyzer at its McMillan Reservoir site as part of an NCore station. The District's network meets all the requirements for PAMS and NCore monitoring.

With regards to PAMS upper air meteorology measurements, during the planning phase for the District of Columbia-Baltimore PAMS Area Network in the 1993 to 1994 timeframe, many regional meetings involving EPA Region III, EPA Headquarters, Maryland, the District, and Virginia were held. EPA Region III decided in concordance with EPA headquarters staff, and the State and Local air monitoring agencies agreed, that the upper air meteorological site for the District of Columbia-Baltimore PAMS area would be sited at a different PAMS site outside of the District. Funding allocations for the PAMS program were distributed accordingly for the required upper air meteorology measurements.

Should you have any questions or need additional information, please contact me at (202) 535-2989 or rama.tangirala@dc.gov, or Ms. Khin Sann Thaung at (202) 369-3596 or khinsann.thaung@dc.gov.

Thank you again for your input.

Sincerely,

June 26, 2013

Rama S. Tangirala
Chief, Monitoring and Assessment Branch
Air Quality Division

cc: Alice Chow, Air Protection Division, EPA Region III
David Krask, Air & Radiation Management, Maryland Department of the Environment
Charles Turner, Air Monitoring, Virginia Department of Environmental Quality

NRDC
THE EARTH'S BEST DEFENSE

NATURAL RESOURCES DEFENSE COUNCIL

June 13, 2013

Ms. Khin Sann Thaung
Environmental Specialist
Monitoring and Assessment Branch - Air Quality Division
District Department of the Environment
1200 First Street, N.E., Fifth Floor
Washington, D.C. 20002
khinsann.thaung@dc.gov

Re: Comments on the District of Columbia 2013 Annual Ambient Air Monitoring Network Plan

Dear Ms. Khin Sann Thaung,

The Natural Resources Defense Council writes regarding the District of Columbia 2013 Annual Ambient Air Monitoring Network Plan ("Plan"). As your agency is intimately aware, the air monitoring network is of paramount importance in determining compliance with federal clean air standards. We are particularly concerned with the deployment of near roadway monitors in appropriate locations that will provide the necessary data and information to address the serious issue of high pollution levels near major roadways. In reviewing the Plan, we are alarmed to find that the District Department of the Environment ("DDOE") failed to meet the requirements of 40 C.F.R. § 58.10(a)(5) by providing no evidence that a near-road NO_2 monitor will meet monitoring requirements, and not planning to operate such a monitor until January 1, 2015. We are also concerned that DDOE is proposing to close two PM_{10} stations without demonstrating the network will meet the requirements for EPA approval. Lastly, DDOE does not meet the minimum requirements for photochemical assessment monitoring stations ("PAMS"), which are critical to the D.C. area because the District is in non-attainment for ozone.

I. The proposed NO_2 site is not sufficiently documented.

By July 1, 2013, EPA requires a plan for establishing a near-road NO_2 monitor in Core Based Statistical Area ("CBSAs") with 1,000,000 or more persons pursuant to 40 C.F.R Part 58, Appendix D, section 4.3.2. The plan must provide for the monitor to be operational by January 1, 2014.[1] 40 C.F.R. Part 58 requires the following:

[1] 40 C.F.R. § 58.10 (a)(5)(iii) (2013).

1. One microscale near-road NO_2 monitoring station in each CBSA with 500,000 persons or more, to monitor expected maximum hourly concentrations near a high major road with high Annual Average Daily Traffic ("AADT"). To select near-road NO_2 monitoring stations, agencies must rank all road segments within a CBSA by AADT, identify a location or locations near the highest ranked road segments, considering fleet mix, roadway design, congestion patterns, terrain, and meteorology, where maximum hourly NO_2 concentrations are expected to occur and siting criteria in Appendix E can be met. Where there are multiple candidate sites where maximum hourly NO_2 concentrations are expected to occur, the agency must consider the potential for population exposure in the criteria for final site selection. Where a CBSA must have two near-road NO_2 monitoring stations, the sites must be differentiated from each other by one of more of these factors: fleet mix; congestion patterns; terrain; geographic area within the CBSA; or a different route, interstate, or freeway designation.[2]

2. A second near-road NO_2 monitoring station is required for any CBSA with population over 2,500,000 persons or more, or in any CBSA with 500,000 or more persons that has at least one road segment with AADT over 250,000. A plan for establishing this second monitor for each applicable CBSA is due by July 1, 2014, and must provide for the monitor to be operation by January 1, 2015.[3]

DDOE is required to include in each plan "a statement of purposes for each monitor and *evidence* that siting and operation of each monitor meets the requirements of Appendices A, C, D, and E."[4] DDOE fails to provide such evidence in the areas listed above.

The Plan acknowledges the near-roadway NO_2 monitoring requirement on pages on pages 1 and 11. However, the DDOE plans to establish a near-roadway NO_2 station using federal grant funds by January 1, 2015, and notes that "[d]etails about the District's new near-roadway NO_2 monitoring station will be presented in next year's annual network plan."[5]

While we are glad that DDOE has obtained grant funding to promote its near-roadway NO_2 monitoring work, it is our understanding that this 2013 monitoring plan will be the last monitoring plan before the monitors must come into operation by the 2014 deadline. As such, the complete lack of information on potential sites where the public can provide input is discouraging. Given the lack of detail on proposed sites and the methodology for selecting sites, we respectfully request that DDOE produce a supplemental plan for public review once this

[2] 40 C.F.R. § 58.10 (a)(5)(iii); 40 C.F.R. § 58 Appx. D, §4.3.2(a) (2013).
[3] 40 C.F.R. § 58.10 (a)(5)(iv); 40 C.F.R. § 58 Appx. D, §4.3.2(a).
[4] 40 C.F.R. § 58.10 (a)(1) (2013) (emphasis added).
[5] District Department of the Environment, District of Columbia 2013 Annual Ambient Air Monitoring Network Plan at 13 (May 13, 2013) [hereafter "2013 Air Monitoring Network Plan"].

information can be released. We encourage that this take place quickly given the imminent 2014 deadline for the initial batch of near roadway NO_2 monitors.

In the supplemental plan, DDOE should fully document its decision according to the EPA's Near-Road NO_2 Technical Assistance Document. EPA recommends a four-step process for ranking road segments for evaluation as near-roadway NO_2 monitors. The steps are as follows:

> STEP 1 – Generate a list of road segments in the CBSA in descending order, where the segment with the highest AADT is ranked first. This list should include at a minimum the road segment ID, location information, road information, and AADT value.
> STEP 2 – Link the total volume of heavy-duty vehicles to the AADT list generated in Step 1, matching the two data sets by segment.
> STEP 3 – Calculate the Fleet-Equivalent AADT values for each road segment, re-prioritize the candidate list based on the FE-AADT.
> STEP 4 – Add the congestion indicator to the candidate site list. This data is to be used as a qualitative metric to aid in site selection over other similarly ranked candidates.[6]

After a few potential sites are identified, EPA recommends that state and local agencies collect all the data to be considered in a "candidate site comparison matrix," which is useful for agency decision-makers to use to select sites, and for public dissemination.[7] This matrix is should be included in the supplemental plan. We look forward to partnering with the DDOE in helping implement this vital network of near roadway monitors in the D.C. area.

II. DDOE must Justify Discontinuation of the Two PM_{10} FRM Stations and Indicate that enough PM_{10} Stations will Operate in the MSA.

DDOE must show that the proposed discontinuation of the two PM_{10} FRM Low-Volume Anderson samplers meets the criteria for EPA approval.[8] "In January 2012, DDOE … relocated the PM_{10} sampling from the River Terrace (11-001-0041) site to the McMillan (11-001-0043) site … [by discontinuing] the Hi-Vol PM_{10} monitors at the River Terrace station and establish[ing] two Low-Vol PM_{10} monitors at the McMillan Reservoir station by converting the old Andersen FRM monitors."[9] Now, "DDOE is proposing to discontinue both the primary and secondary manual filter-based samplers currently in operation [at the McMillan Reservoir site by] … January 31, 2014."[10]

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[6] EPA, NEAR-ROAD NO_2 MONITORING TECHNICAL ASSISTANCE DOCUMENT 21-35 (June 2012) [hereafter "EPA NO_2 TAD"].
[7] EPA NO_2 TAD at 12, 71.
[8] 40 C.F.R. § 58.14(c) (2013).
[9] 2013 Air Monitoring Network Plan at 13.
[10] 2013 Air Monitoring Network Plan at 1.

"All proposed additions and discontinuations of SLAMS monitors in annual monitoring network plans and periodic network assessments are subject to approval according to § 58.14."[11] EPA can approve a discontinuation if any of these criteria are met and if the requirements of Appendix D continue to be met:

> (1) Any $PM_{2.5}$, O_3, CO, PM_{10}, SO_2, Pb, or NO_2 SLAMS monitor which has shown attainment during the previous five years, that has a probability of less than 10 percent of exceeding 80 percent of the applicable NAAQS during the next three years based on the levels, trends, and variability observed in the past, and which is not specifically required by an attainment plan or maintenance plan. In a nonattainment or maintenance area, if the most recent attainment or maintenance plan adopted by the State and approved by EPA contains a contingency measure to be triggered by an air quality concentration and the monitor to be discontinued is the only SLAMS monitor operating in the nonattainment or maintenance area, the monitor may not be discontinued.
>
> (2) Any SLAMS monitor for CO, PM_{10}, SO_2, or NO_2 which has consistently measured lower concentrations than another monitor for the same pollutant in the same county (or portion of a county within a distinct attainment area, nonattainment area, or maintenance area, as applicable) during the previous five years, and which is not specifically required by an attainment plan or maintenance plan, if control measures scheduled to be implemented or discontinued during the next five years would apply to the areas around both monitors and have similar effects on measured concentrations, such that the retained monitor would remain the higher reading of the two monitors being compared.
>
> (3) For any pollutant, any SLAMS monitor in a county (or portion of a county within a distinct attainment, nonattainment, or maintenance area, as applicable) provided the monitor has not measured violations of the applicable NAAQS in the previous five years, and the approved SIP provides for a specific, reproducible approach to representing the air quality of the affected county in the absence of actual monitoring data.
>
> ***(5) A SLAMS monitor that is designed to measure concentrations upwind of an urban area for purposes of characterizing transport into the area and that has not recorded violations of the relevant NAAQS in the previous five years, if discontinuation of the monitor is tied to start-up of another station also characterizing transport.

[11] 40 C.F.R. § 58.10(e) (2013).

(6) A SLAMS monitor not eligible for removal under any of the criteria in paragraphs (c)(1) through (c)(5) of this section may be moved to a nearby location with the same scale of representation if logistical problems beyond the State's control make it impossible to continue operation at its current site.[12]

DDOE has not indicated whether it meets any criteria for EPA approval. DDOE cannot discontinue its PM_{10} stations unless one criterion is satisfied and EPA has approved the discontinuation.

In addition, DDOE has not indicated that enough PM_{10} stations will exist to comply with 40 C.F.R. § 58 appendix D. "The number of PM_{10} stations in areas where MSA populations exceed 1,000,000 must be in the range from 2 to 10 stations."[13] "The entire Washington-Arlington-Alexandria, DC-VAMSA has a population of 5.4 million and is the ninth largest MSA in the nation,"[14] thus requiring at least two PM_{10} stations. Two PM_{10} FRM Low-Volume Andersen samplers and a continuous PM_{10} FEM sampler are operating at the McMillan station.[15] DDOE proposes to discontinue the two PM_{10} FRM Low-Volume Anderson samplers,[16] leaving just one PM_{10} sampler in Washington, D.C. The monitoring plan does not specify the number of PM_{10} stations required nor indicate whether or not enough PM_{10} stations will operate to comply with 40 C.F.R. § 58 appendix D. Thus, EPA may not approve the discontinuation unless DDOE can show that it will comply with Appendix D.

III. DDOE must Monitor all Required Pollutants at its Photochemical Assessment Monitoring Stations (PAMS)

PAMS provide more comprehensive data on ozone air pollution, and is valuable since D.C. is in nonattainment for ozone. At least two PAMS are required for each area, one of which must be a Type 2 site.[17] At a minimum, DDOE must monitor speciated VOCs, carbonyl, NO_x, NO_y, carbon monoxide, ozone, surface meteorology, and upper air meteorology, at PAMS.[18] If all required measurements cannot be taken in two sites, then additional sites are required.[19] "For example, if a design includes two Type 2 sites [which do not measure NO_y], then a third site will be necessary to capture the NO_y measurement."[20]

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[12] 40 C.F.R. § 58.14(c) (2013).
[13] 40 C.F.R. § 58 Appx. D subpart 4.6 (2013).
[14] Virginia Economic Development Partnership, *Community Profile Washington-Arlington-Alexandria MSA*, at 1 (2013) (available at http://virginiascan.yesvirginia.org/communityprofiles/MapSearch.aspx?type=MSA).
[15] 2013 Air Monitoring Network Plan at 1, 13.
[16] 2013 Air Monitoring Network Plan at 1.
[17] 40 C.F.R. § 58 Appx. D subpart 5.3 (2013).
[18] 40 C.F.R. § 58 Appx. D subpart 5 (2013).
[19] 40 C.F.R. § 58 Appx. D subpart 5.3 (2013).
[20] Id.

DDOE "operates one PAMS Type 2 station at the McMillan site … [which measures] O_3, NO, NO_x, NO_2, speciated VOCs, and surface meteorology." DDOE does not indicate whether measurements are taken for carbonyl, NO_y, CO, or upper air meteorology at a PAMS. NO_y measurements allow for better analysis of reactive nitrogen species involved in the photochemical reactions which lead to ozone formation.[21] DDOE must monitor the above photochemical pollutants at a minimum.[22] Carbonyl, CO, and upper air meterology may be measured at the Type 2 station at the McMillan site, but NOy must be measured at a Type 1 or Type 3 site.[23] DDOE must meet the PAMS minimum monitoring requirements.

IV. Conclusion

For the reasons above, we respectfully request that DDOE revise its monitoring network plan to fully comply with the requirements of 40 C.F.R. Part 58 by establishing near-road NO_2 monitors by the appropriate deadline, complying with PM_{10} requirements, and complying with PAMS requirements. Since these comments are forwarded to EPA, if DDOE fails to address these comments, we respectfully request that EPA disapprove the Monitoring Plan and request that the agency provide a response to the comments provided. We are more than happy to work with DDOE and EPA to address these concerns. Please do not hesitate to contact us.

Sincerely,

/s/ Xiao Zhang
Xiao Zhang
Legal Fellow
Natural Resources Defense Council

[21] Revisions to Ambient Air Monitoring Regulations, 71 Fed. Reg. 61236-01 (Oct. 17, 2006).
[22] 2013 Air Monitoring Network Plan at 12.
[23] 40 C.F.R. 58 Appx. D Table D-6.