

Air Quality Monitoring Group

2017-2018 Annual Monitoring Network Plan - Mecklenburg County Air Quality



Mecklenburg County Air Quality
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CERTIFICATION

By the signatures below, Mecklenburg County Air Quality (MCAQ) certifies that the information contained in the "2017-2018 Annual Monitoring Network Plan for Mecklenburg County Air Quality" is complete and accurate, to the best of our knowledge, at the time of submittal to USEPA Region 4. However, due to circumstances that may arise during the sampling year, network information may change. A notification of change and a request for approval will be submitted to USEPA Region 4 at that time.

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**2017 - 2018 ANNUAL MONITORING NETWORK PLAN
MECKLENBURG COUNTY AIR QUALITY
Table of Contents**

I. INTRODUCTION.....	7
National Ambient Air Quality Standards	8
II. SITE DESCRIPTION BACKGROUND INFORMATION AND DEFINITIONS.....	10
1. Site Description.....	10
2. Date Established.....	10
3. Site Approval Status	10
4. Monitoring Objectives	10
5. Monitoring Station Designations	11
6. Monitoring Methods	12
(A) Particulate Matter 10 microns in size (PM ₁₀)	12
(B) Particulate Matter 2.5 microns in size and coarse (PM _{2.5} , PM _C)	12
(C) PM _{2.5} Speciation sampling and analysis	12
(D) Sulfur Dioxide (SO ₂)	13
(E) Carbon Monoxide(CO)	13
(F) Ozone (O ₃).....	13
(G) Nitrogen Dioxide (NO ₂).....	13
(H) Reactive Oxides of Nitrogen (NO _y).....	13
(I) Lead (Pb)	14
7. Quality Assurance Status	14
8. Scale of Representativeness.....	14
9. Data Processing and Reporting.....	16
III. NETWORK SUMMARY.....	16
1. Site Table and Criteria Pollutants Monitored	16
2. Site Map.....	17
3. Monitoring Methods	18
4. Network Modifications, Waiver Requests, and MOA’s.....	20
(A) Monitoring Station Siting Modifications	20
(B) Instrumentation Operation Modifications	20
(C) Waivers	21
(D) Memorandum of Agreement.....	22
IV. AIR MONITORING STATION DESCRIPTIONS	23
1. Garinger	23
(A) Garinger Site Table	23
(B) Garinger Site Description and Statement of Purpose.....	24
(C) Garinger Aerial Photograph.....	28
(D) Garinger Site Photographs	29
2. Montclair	30
(A) Montclair Site Table.....	30
(B) Montclair Site Description and Statement of Purpose	30
(C) Montclair Aerial Photograph.....	32
(D) Montclair Site Photographs.....	33
3. Remount	34

(A) Remount Site Table	34
(B) Remount Site Description and Statement of Purpose	35
(C) Remount Aerial Photograph.....	36
(D) Remount Site Photographs.....	37
4. University Meadows	38
(A) University Meadows Site Table.....	38
(B) University Meadows Site Description and Statement of Purpose	38
(C) University Meadows Aerial Photograph.....	40
(D) University Meadows Site Photographs.....	41
V. REFERENCES	42
VI. APPENDIX A	43
VII. APPENDIX B	48

I. INTRODUCTION

The Mecklenburg County Air Quality (MCAQ) monitoring program, a division of the Mecklenburg County Land Use and Environmental Services Agency (LUESA); provides air quality monitoring services in Mecklenburg County, North Carolina. Mecklenburg County Air Quality is a state “certified local air pollution program” whose purpose is to improve and maintain ambient air quality and reduce exposure to unhealthy levels of air pollution.

MCAQ has operated an air quality monitoring program since the 1960’s. The air monitoring services provided by the program are conducted to measure concentrations of criteria air pollutants (carbon monoxide - CO, nitrogen dioxide - NO₂, sulfur dioxide - SO₂, particulate matter - PM, lead - Pb, and ozone - O₃) in accordance with USEPA regulatory requirements.

The Clean Air Act, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards or NAAQS (40 CFR part 50) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. *Primary standards* set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. *Secondary standards* set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

The EPA Office of Air Quality Planning and Standards (OAQPS) has set National Ambient Air Quality Standards (NAAQS) for six principal pollutants, known as "criteria" pollutants. The NAAQS are listed in Table 1:

National Ambient Air Quality Standards

Pollutant	Primary/Secondary	Averaging Time	Level	Form	
Carbon Monoxide (CO)	Primary	8 hours	9 ppm	Not to be exceeded more than once per year	
		1 hour	35 ppm		
Lead (Pb)	Primary/Secondary	Rolling 3 month average	0.15 (1)	Not to be exceeded	
Nitrogen Dioxide (NO ₂)	Primary	1 hour	100 ppb	98 th percentile of 1-hour daily maximum concentrations	
	Primary and Secondary	1 year	53 ppb (2)	Annual Mean	
Ozone (O ₃)	Primary and Secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years	
Particle Pollution (PM)	PM _{2.5}	Primary	1 year	12.0 mg/m ³	Annual mean, averaged over 3 years
		Secondary	1 year	15.0 mg/m ³	Annual mean, averaged over 3 years
		Primary and Secondary	24 hours	35 mg/m ³	98 th percentile, averaged over 3 years
	PM ₁₀	Primary and Secondary	24 hours	150 mg/m ³	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO ₂)	Primary	1 hour	75 ppb (4)	99 th percentile of 1-hour daily maximum concentrations, averaged over 3 years	
	Secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year	

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m³ as a calendar quarter average) also remain in effect.

(2) The level of the annual NO₂ standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O₃ standards additionally remain in effect in some areas. Revocation of the previous (2008) O₃ standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO₂ standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO₂ standards or is not meeting the requirements of a SIP call under the previous SO₂ standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

Table 1.

The MCAQ air monitoring program operates a network of state and local air monitoring stations (SLAMS) in Mecklenburg County. The current network configuration consists of four monitoring stations that measure concentrations of criteria air pollutants. The SLAMS network operated by MCAQ includes monitoring for criteria pollutants, meteorological parameters, NCORE multi-pollutant parameters, and speciation trends network (STN) monitoring. Occasionally, special purpose monitoring (SPM) is conducted.

The annual monitoring network plan, as stated in 40 CFR Part 58.10(b)(1-13), *Annual Monitoring Network Plan and Periodic Network Assessment*; must contain the following information for each existing and proposed site:

- (1) The AQS site identification number.
- (2) The location, including street address and geographical coordinates.
- (3) The sampling and analysis method(s) for each measured parameter.
- (4) The 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) The monitoring objective and spatial scale of representativeness for each monitor as defined in appendix D to this part.
- (7) The identification of any sites that are suitable and sites that are not suitable for comparison against the annual PM_{2.5} NAAQS as described in §58.30.
- (8) The MSA, CBSA, 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 CFR 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 paragraph 4.5(a)(ii) of Appendix D to 40 CFR 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-PM₁₀ monitoring in lieu of Pb-TSP monitoring as allowed for under paragraph 2.10 of Appendix C to 40 CFR part 58.
- (12) The identification of required NO₂ monitors as near-road, area-wide, or vulnerable and susceptible population monitors in accordance with Appendix D, section 4.3 of this part.
- (13) The identification of any PM_{2.5} FEMs and/or ARMs used in the monitoring agency's network where the data are not of sufficient quality such that data are not to be compared to the NAAQS. For required SLAMS where the agency identifies that the PM_{2.5} Class III FEM or ARM does not produce data of sufficient quality for comparison to the NAAQS, the monitoring agency must ensure that an operating FRM or filter-based FEM meeting the sample frequency requirements described in §58.12 or other Class III PM_{2.5} FEM or ARM with data of sufficient quality is operating and reporting data to meet the network design criteria described in appendix D to this part.

This report constitutes the Mecklenburg County Air Quality “annual monitoring network plan” and continues in the following sections as outlined below:

II. Site Description Background Information and Definitions: This section provides an overview of the designations, parameters, monitoring methods, and the basis for site selection.

III. Network Summary: This section presents an overview of the sites and monitors in Mecklenburg County. Also included is a **listing of proposed changes to the current network**.

IV. Air Monitoring Station Description: In this section each air monitoring station is described in detail.

II. SITE DESCRIPTION BACKGROUND INFORMATION AND DEFINITIONS

1. Site Description

Specific information is provided to show the location of the monitoring equipment at the site, if the site is in a combined statistical area (CSA), Core-based Statistical Area (CBSA), or Metropolitan Statistical Area (MSA), the AQS identification number, the GPS coordinates, and evidence that monitors and monitor probes conform to the siting criteria.

2. Date Established

The date when each existing monitoring station was established is shown in the description. For those stations, which are proposed, an expected startup date is provided.

3. Site Approval Status

Each monitoring station in the existing network has been reviewed with the purpose of determining whether it meets all design criteria for inclusion in the SLAMS network.

4. Monitoring Objectives

Per 40 CFR 58 Appendix D, Section 1.1: “The ambient air monitoring networks must be designed to meet three basic monitoring objectives. These basic objectives are listed below. The appearance of any one objective in the order of this list is not based upon a prioritized scheme. Each objective is important and must be considered individually.” The objectives are listed below:

(a) Provide air pollution data to the general public in a timely manner. Data can be presented to the public in a number of attractive ways including through air quality maps, newspapers, internet sites, and as part of weather forecasts and public advisories.

(b) Support compliance with ambient air quality standards and emissions strategy development. Data from FRM (Federal Reference Method), FEM (Federal Equivalent Method), and ARM (Approved Regional Method) monitors for NAAQS pollutants will be used for comparing an area’s air pollution levels against the NAAQS. Data from monitors of various types can be used in the development of attainment and maintenance plans. SLAMS, and especially NCORE station data, will be used to evaluate the regional air quality models used in developing emission strategies, and to track trends in air pollution abatement control measures' impact on improving air quality. In monitoring locations near major air pollution sources, source-oriented monitoring

data can provide insight into how well industrial sources are controlling their pollutant emissions.

(c) Support for air pollution research studies. Air pollution data from the NCORE network can be used to supplement data collected by researchers working on health effects assessments and atmospheric processes, or for monitoring methods development work.

5. Monitoring Station Designations

Most stations described in the air quality surveillance network are designated as State and Local Air Monitoring Stations (SLAMS). The SLAMS include the ambient air quality monitoring sites and monitors that are required by 40 CFR 58 Appendix D. The SLAMS includes NCORE, PAMS, CSN, and all other state or locally operated criteria pollutant monitors. In addition, some of these stations fulfill other requirements, which must be identified. In the description of the network, designations may also be made for Special Purpose Monitors (SPM). The following are descriptions of the SLAMS (including NCORE, PAMS, and STN) and SPM station designations.

(A) SLAMS: The SLAMS make up the ambient air quality monitoring sites that are primarily needed for NAAQS comparisons, but may serve other data purposes. SLAMS exclude special purpose monitor (SPM) stations and include NCORE, PAMS, and all other State or locally operated stations that have not been designated as SPM stations. These stations must meet requirements that relate to four major areas: quality assurance, monitoring methodology, sampling interval, and siting of instruments and instrument probes.

(B) SPM: Not all monitors and monitoring stations in the air quality surveillance network are included in the SLAMS network. In order to allow the capability of providing monitoring for various reasons such as: special studies, modeling verification and compliance status, and other objectives; certain monitors are designated as Special Purpose Monitors (SPM). These monitors are not committed to any one location or for any specified time period. They may be located as separate monitoring stations or be included at SLAMS locations. Monitoring data may be reported to AQS, provided that the monitors and stations conform to all requirements of the SLAMS network. Specific regulations regarding SPM's are contained in 40 CFR 58 §58.20.

(C) NCORE: The NCORE multipollutant sites are a subset of SLAMS. NCORE sites measure multiple pollutants to provide support to integrated air quality management data needs. NCORE sites include both neighborhood and urban scale measurements in a select number of metropolitan areas and a limited number of rural locations.

NCORE sites must measure, at a minimum, PM_{2.5} particle mass using continuous and integrated/filter-based samplers, speciated PM_{2.5}, PM_{10-2.5} particle mass, O₃, SO₂, CO, NO/NO_y, wind speed, wind direction, relative humidity, and ambient temperature.

(D) Speciation Trends Network (STN): Speciation Trends Network stations are those stations designated to be part of the speciation trends network. These stations collect samples that are analyzed to determine the chemical makeup of PM_{2.5}. The STN is part of the chemical speciation network (CSN).

6. Monitoring Methods

Sampling and analytical procedures for criteria air pollutant monitoring performed in the MCAQ ambient air monitoring network are conducted in accordance with applicable USEPA Designated Federal Reference Methods (FRM) or Federal Equivalent Methods (FEM) unless otherwise noted. Analytical techniques for non-criteria air pollutant monitoring (methods employed that are not USEPA Designated Federal Reference Methods (FRM) or Federal Equivalent Methods (FEM)) are documented in the applicable MCAQ Quality Assurance Project Plan (QAPP) and/or the applicable MCAQ Standard Operating Procedure (SOP). Methods used by MCAQ for criteria pollutant monitoring and selected non-criteria monitoring are listed below:

(A) Particulate Matter 10 microns in size (PM₁₀)

PM₁₀ samplers operated by MCAQ are operated as federal equivalent method (FEM) samplers and are operated according to the requirements set forth in 40 CFR 50, 40 CFR 58, and 40 CFR 53. Listed below is the USEPA Designated Reference or Equivalent Method used in the MCAQ monitoring network:

<u>Method</u>	<u>Designation Number</u>	<u>Method Code</u>
Met One BAM 1020 (PM ₁₀)	EQPM-0798-122	122

(B) Particulate Matter 2.5 microns in size and coarse (PM_{2.5}, PM_c)

PM_{2.5} and PM_c (coarse) samplers operated by MCAQ are either FRM or FEM samplers. Listed below are the applicable USEPA Designated Reference or Equivalent Method used in the MCAQ monitoring network:

<u>Method</u>	<u>Designation Number</u>	<u>Method Code</u>
R & P Partisol-Plus 2025 PM-2.5 Seq.	RFPS-0498-118	145
Met One BAM 1020 (PM _{2.5})	EQPM-0308-170	733
Met One BAM 1022 (PM _{2.5})	EQPM-1013-209	733
Met One BAM 1020 (PM _{10-2.5})	EQPM-0709-185	185

(C) PM_{2.5} Speciation sampling and analysis

In addition to operating PM_{2.5} samplers that determine only PM_{2.5} mass values, MCAQ operates PM_{2.5} speciation samplers which collect samples that are analyzed to determine the chemical makeup of PM_{2.5}. Data collected using these methods cannot be compared to the NAAQS. Listed below is the method used in the MCAQ monitoring network:

<u>Method</u>	<u>Designation Number</u>	<u>Method Code</u>
MetOne SuperSASS	NA	810
URG-3000N (Carbon Channel)	NA	Various

(D) Sulfur Dioxide (SO₂)

Instruments used to continuously monitor sulfur dioxide levels in the atmosphere employ the pulsed UV fluorescence method. Listed below is the USEPA Designated Reference or Equivalent Method used in the MCAQ monitoring network:

<u>Method</u>	<u>Designation Number</u>	<u>Method Code</u>
Thermo Electron 43A, 43C-TLE, 43i, 43i-TLE	EQSA-0486-060	560

(E) Carbon Monoxide(CO)

Continuous monitoring for carbon monoxide is performed using the non-dispersive infrared (gas filter correlation) method. Listed below is the USEPA Designated Reference or Equivalent Method used in the MCAQ monitoring network:

<u>Method</u>	<u>Designation Number</u>	<u>Method Code</u>
Thermo Electron or Thermo Environmental Instruments 48, 48C, 48i, 48i-TLE	RFCA-0981-054	554

(F) Ozone (O₃)

Ozone is monitored using the UV photometry method. Listed below is the USEPA Designated Reference or Equivalent Method used in the MCAQ monitoring network:

<u>Method</u>	<u>Designation Number</u>	<u>Method Code</u>
Thermo Electron or Thermo Environmental Instruments 49, 49C, 49i	EQOA-0880-047	047

(G) Nitrogen Dioxide (NO₂)

The chemiluminescence method is used to monitor the nitrogen dioxide level in ambient air. Listed below are the USEPA Designated Reference or Equivalent Methods used in the MCAQ monitoring network:

<u>Method</u>	<u>Designation Number</u>	<u>Method Code</u>
Thermo Environmental Instr. 42, 42C, 42i, 42i-TLE	RFNA-1289-074	074
Teledyne API, T200UP	EQNA-0512-200	200

(H) Reactive Oxides of Nitrogen (NO_y)

The chemiluminescence method is used to monitor the reactive oxides of nitrogen levels in ambient air. Listed below is the instrumentation used in the MCAQ monitoring network:

<u>Method</u>	<u>Designation Number</u>	<u>Method Code</u>
Thermo Environmental Instr. 42C-Y, 42i-Y	NA	674

(I) Lead (Pb)

Pb monitoring is not currently being conducted. The most recent Pb monitoring was conducted from January 1, 2012 through April 30, 2016. Lead (Pb) monitoring at the Garinger High School NCORE monitoring station (37-119-0041) was discontinued on April 30, 2016 in accordance with revisions to 40 CFR 58, Appendix D(3). Concentrations of Pb measured at the station were well below the NAAQS (0.15 µg/m³). The maximum rolling three (3) month average for the period January 1, 2012 through December 31, 2015 was 0.003 µg/m³, approximately 2% of the NAAQS.

The Pb-PM₁₀ lo-vol method was used for monitoring lead in the MCAQ monitoring network for the period from January 1, 2012 through April 30, 2016. Analysis for lead in PM₁₀ collected on the filters was conducted in accordance with 40 CFR 50, Appendix Q. Listed below is the method used in the MCAQ monitoring network during the period:

<u>Method</u>	<u>Designation Number</u>	<u>Method Code</u>
R & P Partisol-Plus 2025 PM-10 Seq.	RFPS-1298-127	811

7. Quality Assurance Status

MCAQ operates according to EPA approved Quality Assurance Project Plans (QAPP) and Standard Operating Procedures. The MCAQ QAPP was approved by US EPA on October 17, 2016. The MCAQ Quality Management Plan (QMP) was approved by US EPA on January 23, 2012. A revised QMP was submitted to US EPA on November 23, 2016. US EPA Region 4 submitted comments on the revised QMP to MCAQ on March 2, 2017. MCAQ revised the QMP based on the March 2, 2017 comments and re-submitted the QMP to US EPA on May 2, 2017.

MCAQ has an extensive quality assurance program to ensure that all air monitoring data collected meets established criteria for precision and bias. Staff members perform independent audits of instrumentation on a regularly scheduled basis to ensure that each instrument is calibrated and operating properly. Data validation is performed monthly to ensure data reported by each instrument is recorded accurately in the air quality monitoring database.

8. Scale of Representativeness

Each station in the monitoring network must be described in terms of the physical dimensions of the air parcel nearest the monitoring station throughout which actual pollutant concentrations are reasonably similar. Area dimensions or scales of representativeness used in the network description are:

(a) Microscale - defines the concentration in air volumes associated with area dimensions ranging from several meters up to about 100 meters.

(b) Middle scale - defines the concentration typical of areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometers.

(c) Neighborhood scale – defines concentrations within an extended area of a city that has relatively uniform land use with dimensions ranging from about 0.5 to 4.0 kilometers.

(d) Urban scale - defines an overall citywide condition with dimensions on the order of 4 to 50 kilometers.

(e) Regional Scale - defines air quality levels over areas having dimensions of 50 to hundreds of kilometers.

Closely associated with the area around the monitoring station where pollutant concentrations are reasonably similar are the basic monitoring exposures of the station. There are six basic exposures:

(a) Sites located to determine the highest concentrations expected to occur in the area covered by the network.

(b) Sites located to determine representative concentrations in areas of high population density.

(c) Sites located to determine the impact on ambient pollution levels of significant sources or source categories.

(d) Sites located to determine general background concentration levels.

(e) Sites located to determine the extent of regional pollutant transport among populated areas; and in support of secondary standards.

(f) Sites located to measure air pollution impacts on visibility, vegetation damage, or other welfare-based impacts.

The design intent in siting stations is to correctly match the area dimensions represented by the sample of monitored air with the area dimensions most appropriate for the monitoring objective of the station. The following relationship of the six basic objectives and the scales of representativeness are appropriate when siting monitoring stations:

Site Type	Appropriate Siting Scales
1. Highest concentration.....	Micro, middle, neighborhood (sometimes urban or regional for secondarily formed pollutants).
2. Population oriented.....	Neighborhood, urban.
3. Source impact.....	Micro, middle, neighborhood.
4. General/background & regional transport.....	Urban, regional.
5. Welfare-related impacts...	Urban, regional.

Table 2.

9. Data Processing and Reporting

MCAQ ambient air quality monitoring data are stored in the Agilaire AirVision SQL database and on the MCAQ local area network (LAN) server located at 2145 Suttle Avenue, Charlotte, North Carolina. On a weekly basis the AirVision SQL database is backed up to the Mecklenburg County Land Use and Environmental Services Agency LAN server. After all monthly data validation procedures are successfully completed, data is transmitted to the US EPA's national Air Quality System (AQS) database. The AQS database is maintained by US EPA as the official repository of the fully quality assured ambient air quality dataset.

III. NETWORK SUMMARY

1. Site Table and Criteria Pollutants Monitored

Station Name	EPA AQS ID	CO	NO ₂	O ₃	Pb-PM ₁₀	PM _{2.5} FRM Cont ¹	PM ₁₀ Cont ²	SO ₂	PM _{10-2.5} Cont ³
Garinger	37-119-0041	X	X Area-wide	X		X	X	X	X
Montclair	37-119-0042					X	X		
Remount	37-119-0045	X	X Near-road			X			
University Meadows	37-119-0046			X					

- 1) PM_{2.5} FRM Cont: PM_{2.5} Federal Reference Method and Continuous.
- 2) PM₁₀ Cont: PM₁₀ Continuous.
- 3) PM_{10-2.5} Cont: PM_{10-2.5} Continuous.

Table 3.

2. Site Map

AIR QUALITY MONITORING STATIONS MECKLENBURG COUNTY, NC 2016

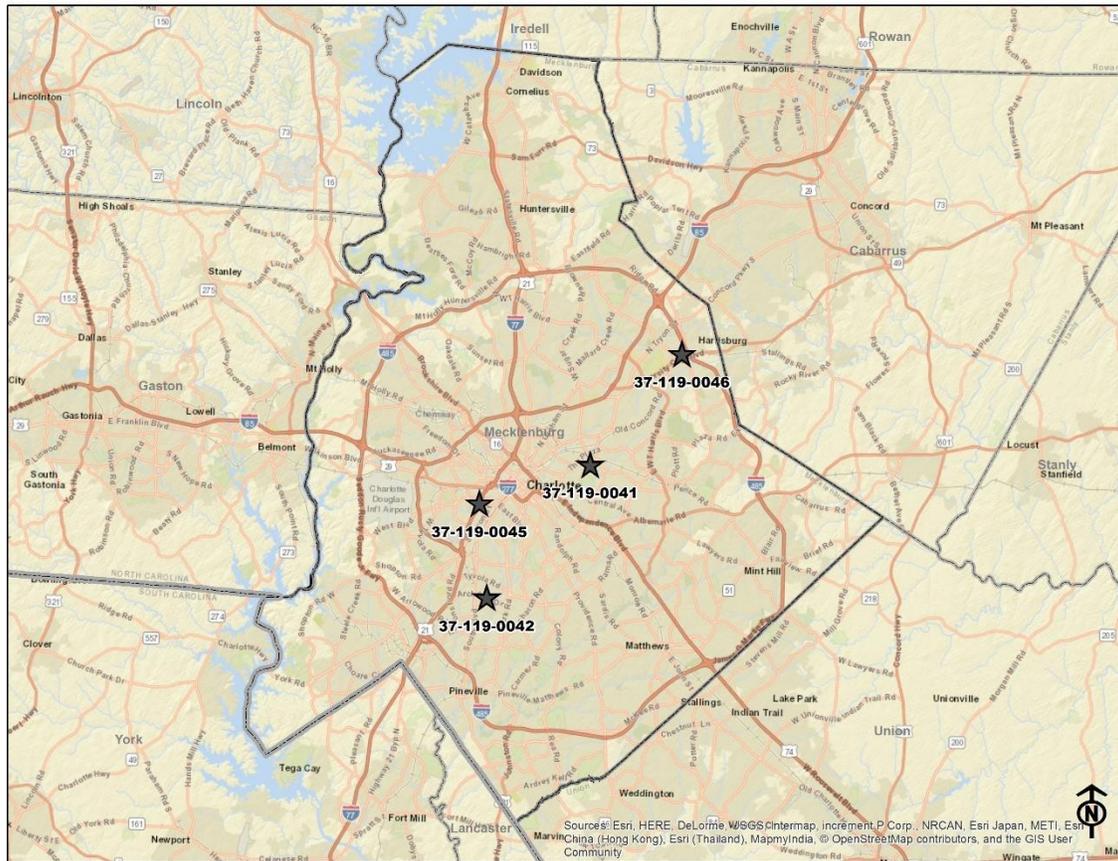


Figure 1.

3. Monitoring Methods

Site	Parameter	Instrument / Method	Meth. Num. ¹	Param. Num. ²	MT ³
37-119-0041	SO ₂ , POC 2	Pulsed UV Fluorescent	560	42401	SLAMS NCORE
37-119-0041	CO, POC 4	Gas Filter Correlation	554	42101	SLAMS NCORE
37-119-0041	NO-NO ₂ -NO _x Area-wide	Chemi-luminescence	074	42601, 42602, 42603	SLAMS
37-119-0041	NO-Dif-NO _y POC 2	Chemi-luminescence	674	42601, 42612, 42600	SLAMS NCORE
37-119-0041	PM _{10-2.5} Coarse	BAM 1020 System (LC)	185	86101	SLAMS NCORE
37-119-0041	PM ₁₀	BAM 1020 (LC)	122	85101	SLAMS
37-119-0041	PM ₁₀	BAM 1020 (STP)	122	81102	SLAMS
37-119-0041	PM _{2.5} , POC 4	MetOne (BAM 1020)	733	88502	SPM
37-119-0041	Ozone	UV Photometric	047	44201	SLAMS NCORE
37-119-0041	PM _{2.5}	FRM	145	88101	SLAMS NCORE
37-119-0041	PM _{2.5}	Speciation-MetOne/URG	810	Multiple	CSN NCORE
37-119-0041	Barometric Pressure	R. M. Young	011	64101	SLAMS
37-119-0041	Outdoor Temperature	R. M. Young	020	62101	SLAMS NCORE
37-119-0041	Precipitation	R. M. Young	011	65102	SLAMS
37-119-0041	Relative Humidity	MetOne	012	62201	SLAMS NCORE
37-119-0041	Solar Radiation	Matrix	011	63301	SLAMS
37-119-0041	Wind Direction-Resultant	MetOne	061	61104	SLAMS NCORE
37-119-0041	Wind Speed-Resultant	MetOne	061	61103	SLAMS NCORE

Site	Parameter	Instrument / Method	Meth. Num. ¹	Param. Num. ²	MT ³
37-119-0041	Wind Direction-Scalar	MetOne	061	61101	SLAMS NCORE
37-119-0041	Wind Speed-Scalar	MetOne	061	61102	SLAMS NCORE
37-119-0042	PM10	BAM 1020 (STP)	122	81102	SLAMS
37-119-0042	PM2.5	MetOne (BAM 1022)	733	88502	SPM
37-119-0042	PM2.5	FRM	145	88101	SLAMS
37-119-0045	NO-NO2-NO _x Near-road	FEM	200	42601, 42602, 42603	SLAMS
37-119-0045	CO	Gas Filter Correlation	554	42101	SLAMS
37-119-0045	PM2.5	MetOne (BAM 1022)	733	88502	SPM
37-119-0045	PM2.5	FRM	145	88101	SLAMS
37-119-0045	Relative Humidity	MetOne	012	62201	SLAMS
37-119-0045	Outdoor Temperature	R. M. Young	020	62101	SLAMS
37-119-0045	Wind Direction-Resultant	MetOne	061	61104	SLAMS
37-119-0045	Wind Speed-Resultant	MetOne	061	61103	SLAMS
37-119-0045	Wind Direction-Scalar	MetOne	061	61101	SLAMS
37-119-0045	Wind Speed-Scalar	MetOne	061	61102	SLAMS
37-119-0046	Ozone	UV Photometric	047	44201	SLAMS

Table 4.

1- Meth. Num. = Method Number

2- Param. Num. = Parameter Number

3- MT = Monitor Type: SLAMS – State and Local Air Monitoring Station, NCORE – National Core, SPM – Special Purpose, NON – Non-regulatory, CSN – Chemical Speciation Network

4. Network Modifications, Waiver Requests, and MOA's

(A) Monitoring Station Siting Modifications

There are no proposed monitoring station siting modifications at this time.

(B) Instrumentation Operation Modifications

1. Integration of Continuous Particulate Matter (PM) Monitoring Methods:

MCAQ installed continuous PM monitoring instruments at filter-based (FRM) PM_{2.5} and filter-based PM₁₀ monitoring stations during the first and second quarter of 2017 as specified in the approved 2016-2017 Annual Monitoring Network Plan.

The purpose of the collocated operation of PM_{2.5} FRM and PM_{2.5} continuous monitors (Class III PM_{2.5} FEMs) at each site is to assess data from the PM_{2.5} continuous monitors using the performance criteria described in table C-4 to subpart C of 40 CFR 53 to determine if the PM_{2.5} continuous monitors operating in the MCAQ network are appropriate for comparison to the PM_{2.5} NAAQS. The comparability assessment is being conducted during the first year of operation and pending the collection of the required number of collocated samples (23/quarter/site). During the assessment period (2017-2018) PM_{2.5} data collected using continuous methods are not to be compared to the NAAQS.

Continuous PM₁₀ monitoring instruments are designated federal equivalent methods (FEMs) for PM₁₀. A comparability assessment of continuous PM₁₀ instrumentation is not a prerequisite to determine if data is acceptable for NAAQS comparison. Filter-based PM₁₀ sampling was discontinued per the 2016-2017 Annual Monitoring Network Plan.

The following table summarizes currently operating PM_{2.5} FRM and PM_{2.5} continuous monitors:

Site	Primary PM _{2.5} Instrument Model (filter-based sampling frequency)	Filter-based Collocation Requirements	Continuous PM _{2.5} Instrument Model	Continuous PM ₁₀ Instrument Model
Garinger 37-119-0041 (NCORE)	Thermo (R&P) 2025 (1/3) PM _{2.5} – 88101 Sampling began 7/29/1999.	Not Applicable (NA)	Met One BAM 1020 PM _{2.5} – 88502 Sampling began 3/6/2017.	Met One BAM 1020 PM ₁₀ – 85101 PM ₁₀ – 81102 PM _{10-2.5} – 86101 Sampling began 3/6/2017.
Montclair 37-119-0042	Thermo (R&P) 2025 (1/3) PM _{2.5} – 88101 Sampling began 9/12/2000.	Thermo (R&P) 2025 (1/12) Sampling began 9/15/2000.	Met One 1022 PM _{2.5} – 88502 Sampling began 4/3/2017.	Met One BAM 1020 PM ₁₀ – 81102 Sampling began 3/20/2017.
Remount 37-119-0045 (near-road)	Thermo (R&P) 2025 (1/3) PM _{2.5} - 88101 Sampling began 1/1/2017.	NA	Met One 1022 PM _{2.5} – 88502 Sampling began 1/20/2017.	NA

Table 5.

(C) Waivers

1. Photochemical Assessment Monitoring Station (PAMS) Meteorological Measurement Waiver Request for “hourly averaged mixing height”:

NCORE Station: 37-119-0041

Current regulatory requirements (40 CFR 58.13(h) and 40 CFR 58 Appendix D §5) require a Photochemical Assessment Monitoring Station (PAMS) to be operational by June 1, 2019 at the Garinger NCORE monitoring station (37-119-0041) operated by Mecklenburg County Air Quality (MCAQ).

40 CFR 58 Appendix D §5(b)(11) requires collection of “hourly averaged mixing height” at the PAMS location unless a waiver is requested and granted.

Per 40 CFR 58 Appendix D §5(e) states that, “The EPA Regional Administrator may grant a waiver to allow representative meteorological data from nearby monitoring stations to be used to meet the meteorological requirements in paragraph 5(b) where the monitoring agency can demonstrate the data is collected in a manner consistent with EPA quality assurance requirements for these measurements.”

The EPA proposed analytical technique for measurement of hourly averaged mixing height is through the use of a ceilometer. The National Weather Service (NWS) operates a ceilometer at Charlotte-Douglas International Airport (Latitude 35.21333, Longitude -80.94861).

The NWS airport station is located 9.4 miles (Figure 2) west of the Garinger NCORE monitoring station (37-119-0041). The NWS station is located at an elevation of 748 ft. The Garinger station is located at an elevation of 761 ft. Ceilometer data collected at the NWS airport station in Charlotte, NC would be typical of data collected at the Garinger station. The NWS station operates in accordance with NWS quality assurance requirements and in accordance with the instrument manufacturer’s “User’s Guide” and in conformance with the Automated Surface Observing System (ASOS) User’s Guide.

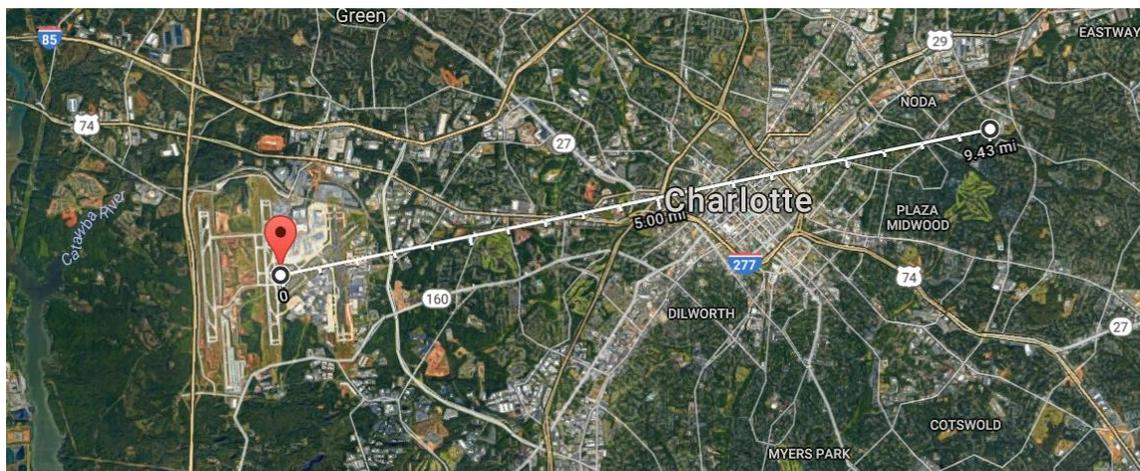


Figure 2.

MCAQ requests a waiver from collection of hourly averaged mixing height data at the Garinger PAMS location and to allow the use of data collected by the NWS at the NWS airport monitoring location to meet the requirements of 40 CFR 58 Appendix D §(5)(b)(11).

(D) Memorandum of Agreement

1. A Memorandum of Agreement (MOA) dated July 1, 2016 was established forming the Charlotte-Concord-Gastonia Metropolitan Statistical Area (MSA) Criteria Pollutant Air Quality Monitoring Agreement among North Carolina Division of Air Quality (NCDAQ), South Carolina Division of Health and Environmental Control (SCDHEC), and Mecklenburg County Air Quality (MCAQ). The MOA was established to collectively meet the US EPA minimum monitoring requirements for criteria pollutant monitoring deemed necessary to meet the needs of the MSA as determined by all parties.

MCAQ is submitting the MOA as an attachment to the monitoring plan to provide notification to US EPA of the purpose, agency roles and responsibilities, and limitations of the MOA. A copy of the agreement is attached as Appendix B to this plan.

IV. AIR MONITORING STATION DESCRIPTIONS

1. *Garinger*

(A) *Garinger* Site Table

Site Name: <i>Garinger</i>				
AQS Site Identification Number: 37-119-0041				
Location: 1130 Eastway Drive				
Charlotte, NC 28205				
Latitude:	N35.240100°		Datum: WGS84	
Longitude:	W80.785683°			
Elevation:	232 meters			
Parameter	Method	Method Number	Probe Height (m)	Sampling Schedule
Ozone	UV Photometry	47	5	Continuous
PM _{2.5}	FRM Gravimetric	145	5	1 in 3 day
PM _{2.5}	MetOne, Speciation	810	5	1 in 3 day
PM _{2.5}	URG-3000n, Carbon Speciation	Various	5	1 in 3 day
PM _{2.5}	BAM 1020 Coarse	733	5	Continuous
PM ₁₀ (STP)	BAM 1020 Coarse	122	5	Continuous
PM ₁₀ (LC)	BAM 1020 Coarse	122	5	Continuous
PM _{10-2.5}	BAM 1020 Coarse	185	5	Continuous
NO ₂	Chemiluminescence	74	5	Continuous
CO	NDIR, GFC	554	5	Continuous
SO ₂ Pre-cursor Gas	UV Pulsed Fluorescence	560	5	Continuous
NO _y Pre-cursor Gas	Chemiluminescence	674	5	Continuous
Wind Speed	MetOne	61	10	Continuous
Wind Direction	MetOne	61	10	Continuous
Pressure	R. M. Young	11	2	Continuous
Outdoor Temperature	R. M. Young	20	4	Continuous
Solar Radiation	Matrix	11	4	Continuous
Precipitation	R. M. Young	11	4	Continuous
Relative Humidity	MetOne	12	4	Continuous

Date Monitor Established:	Ozone	March 3, 2000
Date Monitor Established:	PM _{2.5} FRM	July 30, 1999
Date Monitor Established:	PM _{2.5} Speciation (MetOne)	January 13, 2001
Date Monitor Established:	PM _{2.5} Speciation (URG)	February 27, 2009
Date Monitor Established:	PM _{2.5} BAM 1020	March 6, 2017
Date Monitor Established:	PM ₁₀ BAM 1020	March 6, 2017
Date Monitor Established:	PM _{10-2.5} BAM Coarse	March 6, 2017
Date Monitor Established:	NO ₂	November 12, 1999
Date Monitor Established:	CO	November 11, 1999
Date Monitor Established:	SO ₂ Precursor Gas	January 1, 2006
Date Monitor Established:	CO Precursor Gas	January 1, 2006
Date Monitor Established:	NO _y Precursor Gas	May 4, 2007
Date Monitor Established:	Meteorological Parameters	January 1, 2003 (latest)
Nearest Road:	Shamrock Drive	Distance to Road: 298 meters
Traffic Count:	9700	Year of Count: 2014
MSA:	Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area (2012)	MSA #: 16740
2016 Population (15 census block groups within 1 mile of property)		Projected 2020 Population (15 census block groups within 1 mile of property)
31028		33119

Table 6.

(B) Garinger Site Description and Statement of Purpose

The Garinger High School site is an NCORE multi-pollutant site. The monitoring site is located at 1130 Eastway Drive. The site is located in a grassy area at the rear of Garinger High School near the left field line of the baseball field.

The site is located 5.6 kilometers ENE of the Charlotte, NC central business district at latitude N35.240100° and longitude W80.785683°. The site elevation is 232 meters above sea level. All sampler inlet probes are located at a height of 5 meters except for meteorological parameters and reactive oxides of nitrogen (NO_y). There is unrestricted airflow in at least a 270° arc of exposure, including the predominant southwest wind direction. Sample inlets are >20 meters from the nearest trees. The nearest road, Shamrock Drive, is 298 meters from the inlets and has a daily traffic flow of 9700 (ADT 2014). The station is generally oriented along the primary summer wind vector (SW to NE), downwind of the central business district of Charlotte, NC.

The site is an NCORE multi-pollutant monitoring site. NCORE parameters monitored include trace-level CO, trace-level SO₂, trace-level NO and NO_y, ozone, PM_{2.5}, PM_{10-2.5}, and meteorological parameters.

The PM_{2.5}-FRM, meteorological parameters, NO₂, trace-level SO₂, trace-level NO_y, and trace-level CO are SLAMS. The trace-level SO₂, trace-level NO_y, and trace-level CO are also NCORE. The SLAMS PM_{2.5}-FRM, NO₂ and SO₂ monitors are used for NAAQS determination. The NCORE gas instruments operate year round.

A 1/3 day PM_{2.5} sequential monitor (est. 07/30/1999), a PM_{2.5} Speciation monitor (MetOne SuperSASS, est. 01/13/2001), and a URG-3000n carbon sampler (est. 04/01/2009) are located on the roof of the monitoring shelter.

The NO₂ monitor is designated as the area-wide NO₂ monitor for the CBSA. A meteorological station is also located at the site. The meteorological station monitors wind speed (est. 04/12/2000), wind direction (04/12/2000), pressure (04/14/2000), temperature (10/06/2000), solar radiation (09/26/2000), precipitation (1/11/2002), and relative humidity (1/11/2002).

A MetOne BAM PM_{2.5} monitor (BAM-1020) began operation on 1/1/2010 and was configured to FEM mode on 4/1/2016. The MetOne BAM PM_{2.5} monitor was replaced with a MetOne BAM PM_{2.5} Coarse System (BAM 1020c) on 3/6/2017. PM_{2.5} data from the MetOne BAM PM_{2.5} Coarse System will be reported as parameter 88502 and is designated as a SPM for AQI determination and forecasting purposes. PM₁₀ (STP), PM₁₀ (LC), and PM_{10-2.5} reported from the BAM 1020c coarse system are designated as SLAMS.

The continuous PM_{2.5} instrument was installed to facilitate a planned transition from filter-based PM_{2.5} sampling to continuous PM_{2.5} sampling over the next 2 years. The PM_{2.5} BAM 1020 is currently reported as parameter 88502 and is not being reported for NAAQS compliance.

The continuous PM₁₀ BAM 1020c (81102) sampler serves as the primary PM₁₀ monitor at the station. The continuous PM₁₀ sampler will operate as one of two required PM₁₀ monitoring stations in the MSA.

The PM_{2.5} speciation monitors are part of the speciation trends network (STN). Data from these monitors (STN – MetOne SuperSASS and URG-3000n) are not used for compliance determination.

The Garinger site is an NCORE site and as such must meet additional probe siting criteria. The meteorological tower at this site does not comply with the 10x rule for spacing from obstructions for meteorological measurements. Due to terrain features in the Mecklenburg County region it is difficult to locate a site that meets the requirements of the EPA Volume 4 QA/QC guidance for wind speed and wind direction measurements. Large trees are a dominant landscape feature in the area. The closest terrain feature is 2.6x and is to the southeast of the WS/WD instrument. The next closest obstructions (trees) are to the west of the sensor at 3.4x. MCAQ's 2009 NCORE Plan was approved as acceptable for WS/WD and included documentation noting the deviation from 10x siting criteria. Therefore, WS/WD monitoring is conducted at the current location as documented in the 2009 NCORE Plan as approved by USEPA Region 4 and USEPA Office of Air Quality Planning and Standards (OAQPS).

NCORE probe siting guidance for NO_y is a probe height of 10 meters. The NO_y probe inlet is currently mounted at a height of 8 meters.

The site complies with the siting requirements of 40 CFR 58 for criteria air pollutants. There are no proposed changes for the siting of this station. It is recommended that the current site status be maintained.

Additional Monitoring at Garinger High School

Monitoring for air toxics is conducted at the Garinger High School site. The North Carolina Division of Air Quality (NCDAQ) maintains a Xontech 911 sampling device at the Garinger High School site. MCAQ operates the sampler on a 1/6 day sampling schedule as specified by NCDAQ. The sampler operates on standard time.

Whole air samples are collected in stainless steel 6 liter- pressurized canisters supplied by NCDAQ. Analysis of samples is conducted by NCDAQ. Samples are analyzed by NCDAQ using cryogenic pre-concentration gas chromatography with mass spectrometric detection (GC/MS) via the Compendium Method for Toxic Organics 15 (TO-15). The list of compounds is shown in Table 7.

Parameter	Parameter Code	Parameter	Parameter Code
Carbon Disulfide	42153	Bromodichloromethane	43828
Propene	43205	1,2 Dichloropropane (propylene dichloride)	43829
Freon 114	43208	trans-1,3 Dichloropropene	43830
Isobutene	43218	cis-1,3 Dichloropropene	43831
1,3-Butadiene	43220	1,2-Dichloroethene (ethylene dichloride)	43838
Pentane	43231	Ethylene dibromide	43843
Hexane	43242	Vinyl chloride	43860
Cyclopentane	43243	m- & p-Xylene	45109
Isoprene	43248	Benzene	45201
Cyclohexane	43270	Toluene	45202
Freon 22	43359	1,2-Dichloroethane	43815
MTBE	43372	Tetrachloro ethylene (perchloroethylene)	43817
Vinyl Acetate	43447	1,1,2,2-Tetrachloroethane	43818
Acrolein	43505	Bromomethane	43819
Methacrolein	43515	1,1,2-Trichloroethane (vinyl trichloride)	43820
Methyl Ethyl Ketone	43552	Freon 113	43821
3-Pentanone	43553	Ethylbenzene	45203
Ethylpropylketone (3-hexanone)	43557	o-Xylene	45204
Methyl Vinyl Ketone	43558	Bromodichloromethane	43828
Methyl Butyl Ketone	43559	1,2 Dichloropropane (propylene dichloride)	43829
Methyl Isobutyl Ketone	43560	trans-1,3 Dichloropropene	43830
2-Pentanone	43562	cis-1,3 Dichloropropene	43831
Acetonitrile	43702	1,2-Dichloroethene (ethylene dichloride)	43838
Methyl chloride (chloroMethane)	43801	Ethylene dibromide	43843
Methylene chloride	43802	Vinyl chloride	43860
Chloroform	43803	m- & p-Xylene	45109
Carbon tetrachloride	43804	Benzene	45201
Bromoform	43806	1,3,5-Trimethyl-benzene (mesitylene)	45207
Methyl Iodide	43808	1,2,4-Trimethyl-benzene (pseudocumene)	45208
Freon 11	43811	Styrene	45220
Chloroethane	43812	1,2,3-Trimethyl Benzene	45225
1,1-Dichloroethane (Ethylidene Chloride)	43813	Chlorobenzene (phenylchloride)	45801
1,1,1-Trichloroethane (Methyl chloroform)	43814	o-Dichlorobenzene	45805
1,2-Dichloroethane	43815	m-Dichlorobenzene	45806
Tetrachloro ethylene (perchloroethylene)	43817	p-Dichlorobenzene	45807
1,1,2,2-Tetrachloroethane	43818	Benzyl chloride	45809
Bromomethane	43819	1,2,4-Trichlorobenzene	45810
1,1,2-Trichloroethane (vinyl trichloride)	43820	1,4-Dioxane	46201
Freon 113	43821		
Freon 12	43823		
Trichloroethylene	43824		
1,1-Dichloroethene (Vinylidene chloride)	43826		

Table 7.

OBJECTIVE AND SPATIAL SCALE

The monitoring objective of the Garinger ozone, CO, NO₂, SO₂, PM₁₀, and PM_{2.5} (FRM) monitors is to determine representative concentrations in areas of high population density (population exposure). Maximum concentrations for ozone and PM_{2.5} may be measured under stagnant meteorological conditions. The site is a neighborhood scale site for all parameters. Data from this site is used to assess compliance with the NAAQS for ozone, CO, NO₂, SO₂, PM₁₀, and PM_{2.5} (FRM only).

The site is located in the Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area. The principal cities and counties in the MSA are Charlotte, NC; Gastonia, NC; Concord, NC; Rock Hill, SC and Cabarrus County, NC; Gaston County, NC; Iredell County, NC; Lincoln County, NC; Mecklenburg County, NC; Rowan County, NC; Union County, NC; Chester County, SC; Lancaster County, SC; and York County, SC.

STATUS AND RECOMMENDATION

The Garinger NCORE station meets required monitoring objectives and siting criteria of 40 CFR 58 Appendix D.

(C) Garinger Aerial Photograph

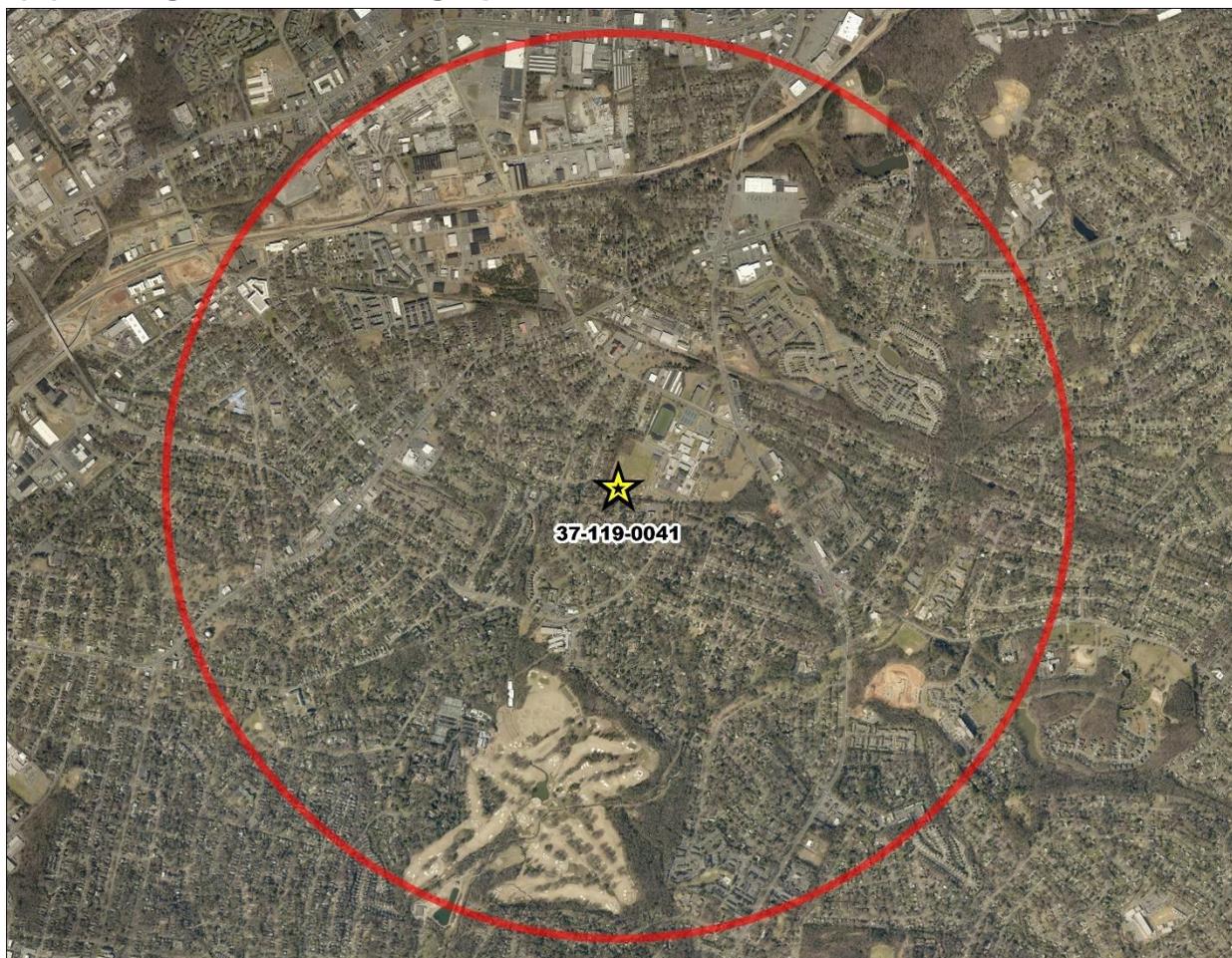


Figure 4. Garinger aerial photograph with 4 km diameter circle.

(D) Garinger Site Photographs



NORTH



NORTHEAST



EAST



SOUTHEAST



SOUTH



SOUTHWEST



WEST



NORTHWEST

2. Montclair

(A) Montclair Site Table

Site Name:	Montclair			
AQS Site Identification Number:	37-119-0042			
Location:	1935 Emerywood Drive			
	Charlotte, NC 28210			
Latitude:	N35.151283°	Datum: WGS84		
Longitude:	W80.866983°			
Elevation:	209 meters			
Parameter	Method	Method Number	Probe Height (m)	Sampling Schedule
PM _{2.5}	FRM Gravimetric	145	2	1 in 3 day
PM _{2.5}	FRM Gravimetric - Collocated	145	2	1 in 12 day
PM _{2.5}	BAM 1022	733	2	Continuous
PM ₁₀ (STP)	BAM 1020	122	2	Continuous
Date Site Established:	PM _{2.5}	September 12, 2000		
Date Site Established:	PM _{2.5} Collocated	September 15, 2000		
Date Site Established:	PM _{2.5} BAM 1022	April 4, 2017		
Date Site Established:	PM ₁₀ BAM 1020	March 20, 2017		
Nearest Road:	Emerywood Drive	Distance to Road:	70 meters	
Traffic Count:	1700	Year of Count:	2014	
MSA:	Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area (2012)		MSA #:	16740
2016 Population (13 census block groups within 1 mile of property)	22273		Projected 2020 Population (13 census block groups within 1 mile of property)	26047

Table 8.

(B) Montclair Site Description and Statement of Purpose

A federal reference method (FRM) PM_{2.5} sampler and a collocated FRM sampler have been located at 1935 Emerywood Drive since 09/12/2000. The distance between the official and collocated PM_{2.5} FRM samplers is 2.7 meters. A BAM-1022 continuous PM_{2.5} sampler was established on 4/3/2017. A BAM 1020 PM₁₀ was established on 3/20/2017.

The monitors are situated in a grassy area between the school and a ball field. The site is located 8.6 kilometers SW of the central business district at latitude N35.151283° and longitude W80.866983°. The site elevation is 209 meters above sea level. The nearest road is Emerywood Drive (ADT=1700, 2014) at a distance of 70 meters from the sample inlets. The PM_{2.5} inlets are 2 meters above the ground. The PM_{2.5} FRM is designated as a SLAMS. The PM_{2.5}-BAM 1022 is designated as a SPM for AQI determination and forecasting purposes. PM₁₀ BAM 1020 is designated as a SLAMS.

OBJECTIVE AND SPATIAL SCALE

The Montclair PM₁₀ and PM_{2.5} sites are classified as neighborhood scale and the monitoring objective is population exposure in an area of potentially poor air quality. PM_{2.5} FRM data and PM₁₀ data are used to assess compliance with the particulate NAAQS.

The site is located in the Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area. The principal cities and counties in the MSA are Charlotte, NC; Gastonia, NC; Concord, NC; Rock Hill, SC and Cabarrus County, NC; Gaston County, NC; Iredell County, NC; Lincoln County, NC; Mecklenburg County, NC; Rowan County, NC; Union County, NC; Chester County, SC; Lancaster County, SC; and York County, SC.

STATUS AND RECOMMENDATIONS

The site complies with the siting requirements of 40 CFR 58 for criteria air pollutants. The continuous PM₁₀ sampler serves as the primary PM₁₀ monitor at the station. The continuous PM₁₀ sampler operates as one of two required PM₁₀ monitoring stations in the MSA.

The continuous PM_{2.5} instrument was installed to facilitate a planned transition from filter-based PM_{2.5} sampling to continuous PM_{2.5} sampling over the next 2 years. The PM_{2.5} BAM 1022 is currently reported as parameter 88502 and is not being reported for NAAQS compliance.

(C) Montclair Aerial Photograph

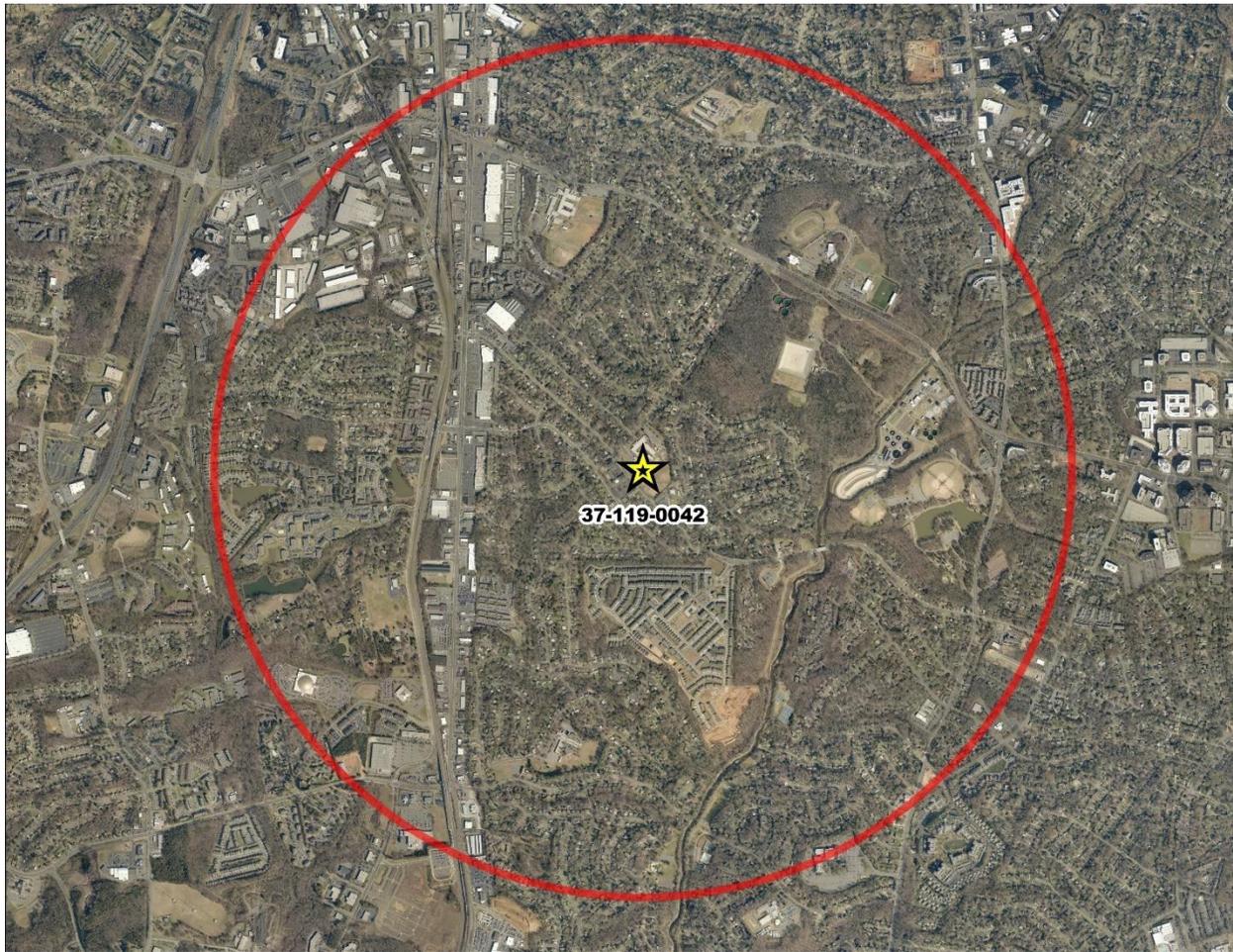


Figure 5. Montclair aerial photograph with 4 km diameter circle.

(D) Montclair Site Photographs



NORTH



NORTHEAST



EAST



SOUTHEAST



SOUTH



SOUTHWEST



WEST



NORTHWEST

3. Remount

(A) Remount Site Table

Site Name: Remount				
AQS Site Identification Number:		37-119-0045		
Location:		1030 Remount Road		
		Charlotte, NC 28208		
Latitude:	N35.213171°		Datum: WGS84	
Longitude:	W80.874084°			
Elevation:	194 meters			
Parameter	Method	Method Number	Probe Height (m)	Sampling Schedule
NO2	FEM	200	5	Continuous
CO	NDIR, GFC	554	5	Continuous
PM _{2.5}	FRM - Gravimetric	145	2	1 in 3 day
PM _{2.5}	BAM 1022	733	2	Continuous
Wind Speed	MetOne	61	10	Continuous
Wind Direction	MetOne	61	10	Continuous
Outdoor Temperature	R. M. Young	20	3	Continuous
Relative Humidity	MetOne	12	3	Continuous
Date Site Established:	NO2	July 17, 2014		
Date Site Established:	CO	January 1, 2017		
Date Site Established:	PM _{2.5} FRM	January 1, 2017		
Date Site Established:	PM _{2.5} BAM 1022	January 20, 2017		
Nearest Road:	I-77 South	Distance to Road:	31 meters	
Traffic Count:	153,000	Year of Count:	2015	
MSA:	Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area (2013)		MSA #:	16740
2016 Population (18 census block groups within 1 mile of property)		Projected 2020 Population (18 census block groups within 1 mile of property)		
16788		21335		

Table 9.

(B) Remount Site Description and Statement of Purpose

The Remount monitoring station is located in a field adjacent to the edge of Interstate 77 South (I-77S) between NC Highway 160 and mile marker 8. The site is located 3.2 kilometers SW of the central business district of Charlotte, NC at latitude N35.213171° and longitude W80.874084°. The site elevation is 194 meters above sea level. The nearest road is I-77S (Annual Average Daily Traffic (AADT) 153,000 (2015)) at 31 meters.

A federal equivalent method (FEM) NO₂ analyzer is located at the Remount monitoring site. The sampler has been in operation at 1030 Remount Road since 07/17/2014. The NO₂ inlet is 5 meters above the ground and 31 meters from the edge of the roadway. The NO₂ analyzer monitor type is SLAMS.

A federal reference method (FRM) CO analyzer began operation at the Remount station on January 1, 2017. The CO monitor type is SLAMS.

A federal reference method (FRM) PM_{2.5} sampler began operation at the Remount station on January 1, 2017. The FRM PM_{2.5} monitor type is SLAMS.

A continuous PM_{2.5} BAM 1022 configured as an FEM began operation at the Remount station on January 20, 2017. The PM_{2.5} BAM 1022 monitor type is SPM. The continuous PM_{2.5} instrument was installed to facilitate a planned transition from filter-based PM_{2.5} sampling to continuous PM_{2.5} sampling over the next 2 years. The PM_{2.5} BAM 1022 is currently reported as parameter 88502 and is not being reported for NAAQS compliance.

The site complies with the siting requirements of 40 CFR 58 for criteria air pollutants. The NO₂ monitor located at this station is designated as a near-road monitoring station for the CBSA. There are no proposed changes for this site. It is recommended that the current site status be maintained.

OBJECTIVE AND SPATIAL SCALE

The monitoring objective of the Remount NO₂ site is to determine the highest concentrations expected to occur in the area covered by the network. The NO₂ site is classified as a microscale site. The Remount site is representative of nitrogen dioxide concentrations in the near-road environment. Data is used to assess compliance with the nitrogen dioxide NAAQS. The NO₂, CO, and FRM-PM_{2.5} monitors are designated as SLAMS.

The site is located in the Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area. The principal cities and counties in the MSA are Charlotte, NC; Gastonia, NC; Concord, NC; Rock Hill, SC and Cabarrus County, NC; Gaston County, NC; Iredell County, NC; Lincoln County, NC; Mecklenburg County, NC; Rowan County, NC; Union County, NC; Chester County, SC; Lancaster County, SC; and York County, SC.

STATUS AND RECOMMENDATIONS

The site complies with the siting requirements of 40 CFR 58 for criteria air pollutants operating at the station.

(C) Remount Aerial Photograph

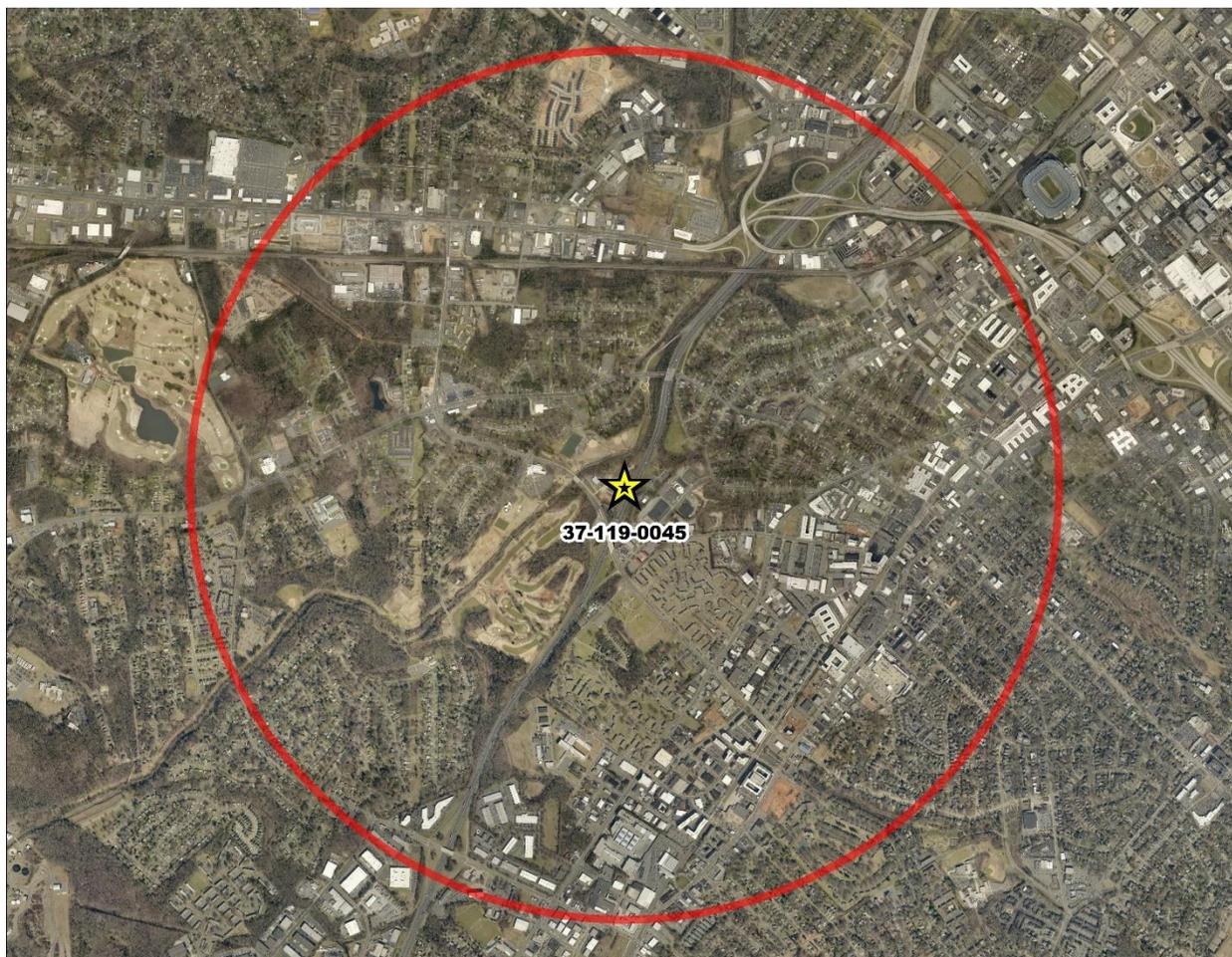


Figure 7. Aerial Photograph (green arrow denotes site location)

(D) Remount Site Photographs



NORTH



NORTHEAST



EAST



SOUTHEAST



SOUTH



SOUTHWEST



WEST



NORTHWEST

4. University Meadows

(A) University Meadows Site Table

Site Name: University Meadows				
AQS Site Identification Number: 37-119-0046				
Location: 1660 Pavilion Boulevard				
Charlotte, NC 28262				
Latitude: N 35.314158°		Datum: WGS84		
Longitude: W 80.713469°				
Elevation: 216 meters				
Parameter	Method	Method Number	Probe Height (m)	Sampling Schedule
Ozone	UV Photometry	47	5	March 1 – Oct. 31, Continuous
Date Monitor Established:		Ozone	April 1, 2016	
Nearest Road:	Pavilion Blvd.	Distance to Road:	50 meters	
Traffic Count:	8000	Year of Count:	2012	
MSA: Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area (2013)			MSA #:	16740
2016 Population (11 census block groups within 1 mile of property)		Projected 2020 Population (11 census block groups within 1 mile of property)		
27548		28324		

Table 10.

(B) University Meadows Site Description and Statement of Purpose

The University Meadows site is located approximately 325 meters north of the intersection of Highway 49 and Pavilion Boulevard in Mecklenburg County. Ozone monitoring at the station began on 4/1/2016.

The site is located 15 kilometers NE of the central business district at latitude N 35.314158° and longitude W 80.713469°. The site elevation is 216 meters. The nearest road is Pavilion Boulevard, which is 50 meters from the probe and has a daily traffic count (AADT) of 8000 (2012). The monitoring shelter is located in a large grass field at University Meadows Park. The probe inlet is 5.0 meters above the ground and 2.0 meters from the roof of the monitoring building. There are no obstructions to air flow near the probe.

The site is located 15 kilometers (9.3 miles) downwind of the central business district of Charlotte, NC. It is oriented along the primary summer wind vector (SW to NE) which intersects

the central business district. The site should measure peak ozone concentrations in Mecklenburg County.

The ozone monitor is a SLAMS monitoring station. Data is used to assess compliance with the NAAQS.

The ozone instrument is operated during the North Carolina ozone monitoring season which begins March 1st and ends October 31st. The ozone instrument operates continuously during the seasonal period.

OBJECTIVE AND SPATIAL SCALE

The monitoring objective of the University Meadows ozone station is to determine the highest concentrations expected to occur in the area covered by the network. The site is an urban scale site which represents ozone levels over several kilometers. Data from this site is used to assess compliance with the NAAQS for ozone. The station is located along the primary summer wind vector in the Charlotte area which is predominated by winds from the southwest (prevailing wind direction).

The site is located in the Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area. The principal cities and counties in the MSA are Charlotte, NC; Gastonia, NC; Concord, NC; Rock Hill, SC and Cabarrus County, NC; Gaston County, NC; Iredell County, NC; Lincoln County, NC; Mecklenburg County, NC; Rowan County, NC; Union County, NC; Chester County, SC; Lancaster County, SC; and York County, SC.

STATUS AND RECOMMENDATIONS

The site complies with the siting requirements of 40 CFR 58 for criteria air pollutants.

(C) University Meadows Aerial Photograph

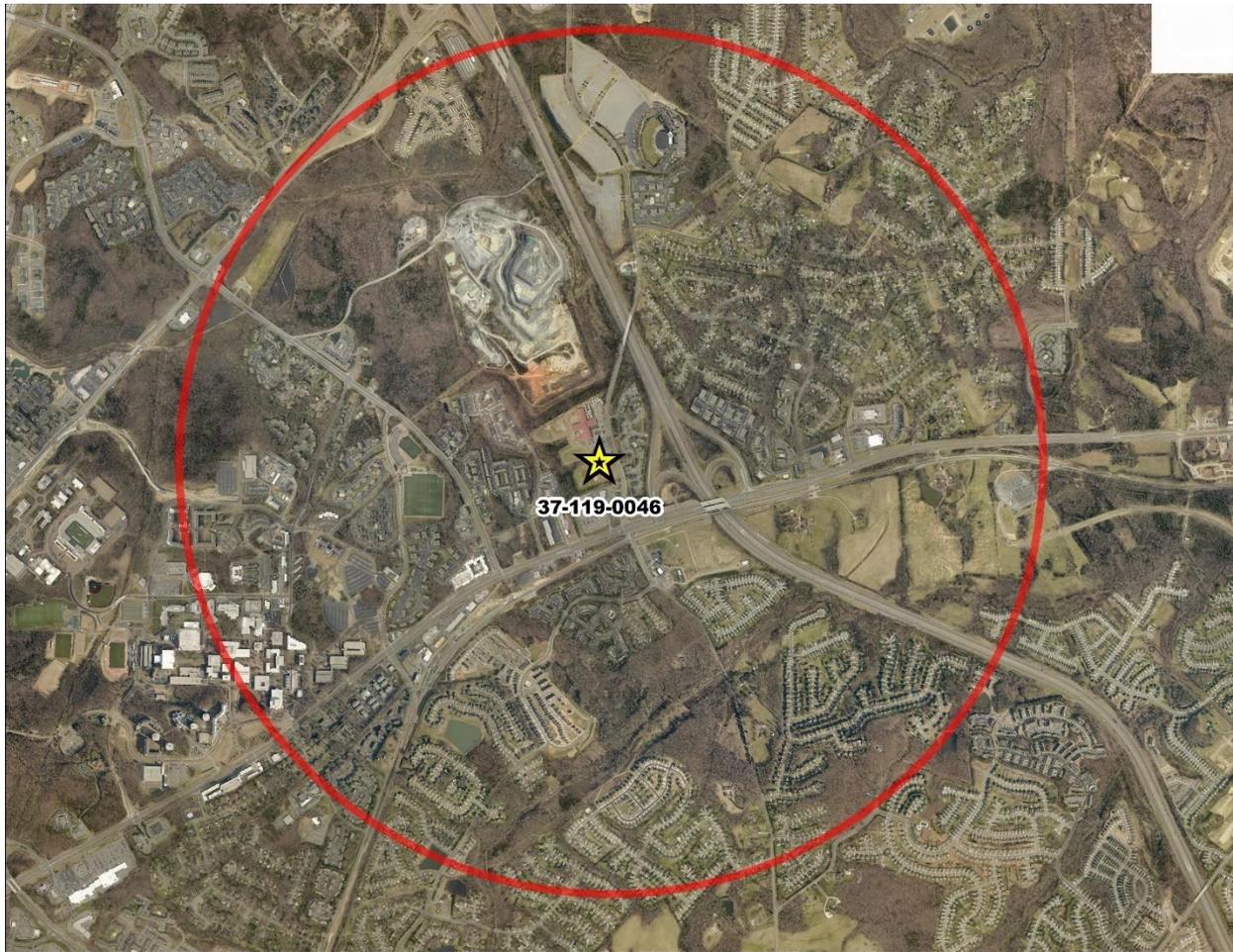


Figure 8. University Meadows aerial photograph with 4 km diameter circle.

(D) University Meadows Site Photographs



NORTH



NORTHEAST



EAST



SOUTHEAST



SOUTH



SOUTHWEST



WEST



NORTHWEST

V. REFERENCES

1. TITLE 40—Protection of Environment CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY, SUBCHAPTER C—AIR PROGRAMS, PART 58—AMBIENT AIR QUALITY SURVEILLANCE, April 18, 2017.
2. Charlotte Department of Transportation. Traffic Counts 2012-2015.
<http://www.charmeck.org/Departments/Transportation/Traffic/Traffic+Counts.htm>
Charlotte, NC. 2014.
3. QA Handbook for Air Pollution Measurement Systems:"Volume IV: Meteorological Measurements Version 2.0" EPA-454/B-08-002, March 2008(PDF)
4. QA Handbook for Air Pollution Measurement Systems:"Volume II: Ambient Air Quality Monitoring Program" EPA-454/B-17-001, January 2017 - Full Document (PDF)

VI. APPENDIX A

Monitoring Equipment Replacement Tables

Type Equip.	Asset Number	Description	Manufacturer / Model #	Serial Number	Location	Date Purchased	Notes	Condition
PM10 FEM Continuous	63263	MetOne BAM 1020	1020	H1935	Montclair	Mar-08	Refurbished by MetOne 12/2015.	Good
Dynamic Calibrator	68014	Thermo Calibrator	146i	0717821846	Suttle Ave	Dec-06	Spare	Good
Dynamic Calibrator	72399	EnviroNics Calibrator	6100	6527	Garinger	Apr-15		Good
Dynamic Calibrator	64608	Teledyne Calibrator	T700U	182	Remount	Oct-13		Good
Dynamic Calibrator	67771	EnviroNics Calibrator	6103	3170	Suttle Ave	Oct-03		Good
Dynamic Calibrator	63226	EnviroNics Calibrator	6100	4202	Suttle Ave	Apr-08		Good
PM2.5 FEM Continuous	69784	MetOne BAM 1020	1020	U20336	Garinger	Nov-16		Good
PM2.5 FEM Continuous	69785	MetOne BAM 1020	1020	U20337	Garinger	Nov-16		Good
NOy	72314	Thermo NOy	42i-Y	1213152833	Garinger	May-12		Good
NO2	69870	Thermo NOx	42i	1153170016	Garinger	Dec-15		Good
NO2	69969	Teledyne NOx	T200UP	81	Remount	Oct-13		Good
Data Logger	67773	ESC Data Logger	8832	A0409	Garinger	Oct-03		Good
Data Logger	67667	ESC Data Logger	8832	A0064	Suttle Ave	Mar-02		Good
Data Logger	64603	ESC Data Logger	8832	A4829K	Remount	Apr-14		Good
Data Logger	67729	ESC Data Logger	8832	A0304	Suttle Ave	Mar-03		Good

Type Equip.	Asset Number	Description	Manufacturer / Model #	Serial Number	Location	Date Purchased	Notes	Condition
Data Logger	67860	ESC Data Logger	8832	A0896	Suttle Ave	Jan-05		Good
Data Logger	67967	ESC Data Logger	8832	A0160	University Meadows	Oct-02		Good
Data Logger	63292	ESC Data Logger	8832	A2333K	Montclair	Jul-07		Good
O3		Thermo O3	49i	1152660035	Garinger	Dec-15		Good
O3	68048	Thermo O3	49i	0728225131	Garinger	Jul-07		Spare
O3	67966	Thermo O3	49i	0636319877	Suttle Ave	Dec-06		Spare
O3	99068	Thermo O3	49i-PS	0734726810	Suttle Ave	Aug-07	Laboratory QA L2TS	Good
O3	67965	Thermo O3	49i	49i-0636319876	University Meadows	Sep-05		Good
O3 Calibrator		Thermo O3 Calibrator	49i-PS	1027444721	Garinger	Sep-10		Good
O3 Calibrator	67842	Thermo O3 Calibrator	49cps	0432209352	Suttle Ave	Sep-04	Laboratory L2TS	Poor
O3 Calibrator	67658	Thermo O3 Calibrator	49cps	49cps-73996-375	Suttle Ave	Feb-02	Audit L3TS to be replaced.	Poor
O3 Calibrator	72256	Thermo O3 Calibrator	49i-PS	1153380012	University Meadows	Dec-15		Good
CO	72356	Thermo CO	48i-TLE	1220753779	Garinger	Oct-12		Good
CO	67861	Teledyne CO	300eu	068	Suttle Ave	Mar-05		Spare
CO	201077 (State)	Thermo CO	48i-TLE	64047	Suttle Ave		On loan from NCDQA-Near-road CO	Good
SO2	72361	Thermo SO2	43i-TLE	1213152834	Garinger	May-12		Good
Zero Air System	64822	Teledyne Zero Air	M701H	2809	Garinger	Sep-08	Spare	Good

Type Equip.	Asset Number	Description	Manufacturer / Model #	Serial Number	Location	Date Purchased	Notes	Condition
Zero Air System	64609	Teledyne Zero Air	M701H	793	Remount	Apr-14		Good
Zero Air System	67370	Teledyne Zero Air	M701H	3033	Suttle Ave	Sep-08		Good
Zero Air System	67371	Teledyne Zero Air	M701H	3035	University Meadows	Sep-08		Good
Zero Air System	72991	Teledyne Zero Air	M701H	0098	Suttle Ave	Oct-11	Audit Zero Air System	Good
Outdoor Shelters		Shelter One Shelter	C1152095 20053	20053-01	Garinger	Dec-11		Good
Outdoor Shelters	66088	Shelter One	C101695 23053	23053-01	Remount	Apr-14		Good
Outdoor Shelters		EKTO Enclosure	432sp	3278-7	Suttle Ave	Nov-01		Good
Outdoor Shelters	67847	EKTO Enclosure	432SP	3577-8	Montclair	Nov-04		Good
PM2.5 FRM		Thermo 2025	2025B	2025B219590706	Garinger	May-08	Transition to continuous - spare	Good
PM2.5 FRM	66044	Thermo 2025	2025B	2025B226221002	Garinger	May-10		Good
PM2.5 FRM	67701	Thermo 2025	2025a	2025a202869805	Montclair	Oct-98		Good
PM2.5 FRM	68066	Thermo 2025	2025b	2025b221720804	Suttle Ave	Jul-07	Transition to continuous - spare	Good
PM2.5 FRM	67843	Thermo 2025	2025b	2025b217200408	Oakdale	Nov-04	End use 12/31/2016 - Spare	Good
PM2.5 FRM	67844	Thermo 2025	2025b	2025b217230408	Montclair	Nov-04		Good

Type Equip.	Asset Number	Description	Manufacturer / Model #	Serial Number	Location	Date Purchased	Notes	Condition
PM2.5 FRM	67700	Thermo 2025	2025a	2025a202879805	Montclair	Oct-98	End use 12/31/2016 - Spare	Good
PM2.5 FRM	72358	Thermo 2025	2025i	2025i2 02341205	Suttle Ave	Jun-12	Spare	Good
PM2.5 FRM	67702	2025a	2025a	2025A204679807	Suttle Ave	Oct-98	Spare	Good
Speciation	72214	MetOne Speciation	Super SASS	N1099	Garinger	Mar-12		Good
Speciation		URG Speciation	URG-3000N	3N-B0400	Garinger	Feb-09		Good
Balance	61749	Sartorius Balance	AC2105	20902085	Suttle Ave	1992		Spare
PM2.5 FEM Continuous	69787	MetOne BAM 1022	1022	U16175	Remount	Nov-16		Good
PM2.5 FEM Continuous	69786	MetOne BAM 1022	1022	U13546	Montclair	Nov-16		Good
Laboratory Compressor		Jun-Air	546919		Suttle Ave	Apr-04	Laboratory zero air compressor.	Good
AirVision Software		Agilair			Suttle Ave	Nov-10		Good
Alicat-PCU		Alicat	PCU	111448-111449-111450	Suttle Ave	Apr-15		Good
Outdoor Shelter	72258	Shelter One Shelter	MMS8 25040	25040-01	University Meadows	Oct-15		Good

VII. APPENDIX B

Memorandum of Agreement

MEMORANDUM OF AGREEMENT
ON AIR QUALITY MONITORING FOR CRITERIA POLLUTANTS FOR
THE CHARLOTTE-CONCORD-GASTONIA
METROPOLITAN STATISTICAL AREA (MSA)

July 1, 2016

Participating Agencies:

North Carolina
Department of Environmental Quality (NCDEQ)
Division of Air Quality (NCDAQ)

South Carolina
Department of Health and Environmental Control (SCDHEC)
Bureau of Air Quality

Mecklenburg County, North Carolina
Land Use and Environmental Services Agency
Air Quality (MCAQ)

RECEIVED
JUL 01 2016
BUREAU OF AIR QUALITY

I. PURPOSE/OBJECTIVES/GOALS

The purpose of this Memorandum of Agreement (MOA) is to establish the Charlotte-Concord-Gastonia Metropolitan Statistical Area (MSA) Criteria Pollutant Air Quality Monitoring Agreement among NCDAQ, SCDHEC, and the MCAQ (collectively referred to as the "affected agencies") to collectively meet United States Environmental Protection Agency (EPA) minimum monitoring requirements for criteria pollutants deemed necessary to meet the needs of the MSA as determined reasonable by all parties. This MOA will renew the terms and conditions of this collective agreement to provide adequate criteria pollutant monitoring for the Charlotte-Concord-Gastonia MSA as required by 40 CFR 58 Appendix D, Section 2(e).

II. BACKGROUND

The Charlotte-Concord-Gastonia MSA consists of

Cabarrus County, NC
Gaston County, NC
Iredell County, NC
Lincoln County, NC
Mecklenburg County, NC
Rowan County, NC
Union County, NC
Chester County, SC
Lancaster County, SC

York County, SC

NCDAQ has jurisdiction over Cabarrus, Gaston, Iredell, Lincoln, Rowan, and Union Counties; SCDHEC has jurisdiction over Chester, Lancaster, and York Counties; MCAQ has jurisdiction over Mecklenburg County.

The NCDAQ, SCDHEC, and MCAQ are required by the Clean Air Act to measure for certain criteria pollutants in the ambient air in the Charlotte-Concord-Gastonia MSA. The EPA has established minimum monitoring requirements based on the size of the MSA and the quality of the air in the MSA.

40 CFR 58 Appendix D, Section 2 (e) states (in part):

“... The EPA recognizes that State or local agencies must consider MSA/CSA boundaries and their own political boundaries and geographical characteristics in designing their air monitoring networks. The EPA recognizes that there may be situations where the EPA Regional Administrator and the affected State or local agencies may need to augment or to divide the overall MSA/CSA monitoring responsibilities and requirements among these various agencies to achieve an effective network design. Full monitoring requirements apply separately to each affected State or local agency in the absence of an agreement between the affected agencies and the EPA Regional Administrator.”

Currently each air pollution control agency (affected agency) conducts monitoring in its respective jurisdiction and coordinates monitoring with the other air pollution control agencies within the MSA.

III. ROLES AND RESPONSIBILITIES

The parties agree to the following terms and conditions:

- NCDAQ, SCDHEC, and MCAQ (the “affected agencies”) commit to conducting appropriate monitoring in their respective jurisdictions of the MSA; as needed, to collectively meet EPA minimum monitoring requirements for the entire MSA for criteria air pollutant monitoring deemed necessary to meet the needs of the MSA as determined reasonable by all affected agencies. The minimum air quality monitoring requirements for the MSA shall apply to the MSA in its entirety and shall not apply to any sole affected agency within the MSA unless agreed upon by all affected agencies.
- The affected agencies commit to coordinating monitoring responsibilities and requirements to achieve an effective network design regarding criteria air pollutant monitoring conducted in the MSA and commit to communicate unexpected or unplanned changes in monitoring activities within their jurisdictions to the other affected agencies. As conditions warrant, the affected agencies may conduct telephone conference calls, meetings, or other communications to discuss monitoring activities for the MSA. Each affected party shall inform the others via telephone or e-mail of any monitoring changes occurring in its jurisdiction of the MSA at its earliest convenience after learning of the need for the change or making the changes. Such unforeseen changes may include evictions from monitoring sites, destruction of monitoring sites due to

natural disaster, or similar occurrences that result in extended change (greater than one quarter) or permanent change in the monitoring network. At least once a year in the second quarter or before June 15th, each agency shall make available to the other agency a copy of its proposed monitoring plan for its jurisdiction with the MSA for the next year.

- Each party reserves the right to revoke or terminate this MOA at any time for any reason by giving thirty (30) days written notice prior to the date of termination.

IV. LIMITATIONS

A. All commitments made in this MOA are subject to the availability of funds and each party's budget priorities. Nothing in this MOA, in and of itself, obligates NCDAQ, SCDHEC, or MCAQ to expend funds or to enter into any contract, assistance agreement, interagency agreement, or other financial obligation.

B. This MOA is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement or contribution of funds between parties to this MOA will be handled in accordance with applicable laws, regulations, and procedures, and will be subject to separate subsidiary agreements what will be effected in writing by representatives of the parties.

C. Except as provided in Section III, this MOA does not create any right or benefit, substantive or procedural, enforceable by law or equity against NCDAQ, SCDHEC, or MCAQ, their officers or employees, or any other person. This MOA does not direct or apply to any person outside NCDAQ, SCDHEC, or MCAQ.

V. PROPRIETARY INFORMATION AND INTELLECTUAL PROPERTY

No proprietary information or intellectual property is anticipated to arise out of this MOA.

VI. POINTS OF CONTACT

The following individuals are designated points of contact for the MOA:

NCDEQ DAQ: Joette Steger
NC DENR Division of Air Quality
1641 Mail Service Center
Raleigh, NC 27699-1641

joette.steger@ncdenr.gov
Voice/fax: 919-707-8449

SCDHEC: Scott Reynolds
SCDHEC Bureau of Environmental Health Services
2600 Bull Street
Columbia, SC 29201

reynolds@dhec.sc.gov
Voice: 803-896-0902

MCAQ: Jeff Francis
Mecklenburg County Land Use and Environmental Services Agency –
Air Quality
2145 Suttle Avenue
Charlotte, NC 28208-5237

Jeff.Francis@mecklenburgcountync.gov
Phone 704-336-5430
Fax 704-336-4391

In the event that a point of contact needs to be changed, notification may be made via email to the other parties.

VII. MODIFICATION/DURATION/TERMINATION

This MOA will be effective when signed by all parties. This MOA may be amended at any time by the mutual written consent of all parties. The parties will review this MOA at least once every 10 years to determine whether it should be revised, renewed, or cancelled. This MOA may be revoked or terminated by an affected party at any time and for any reason by giving thirty (30) days written notice prior to the date of termination.

VIII. REFERENCE

United States Environmental Protection Agency, Title 40 Code of Federal Regulations, Part 58, Appendix D, "Network Design Criteria for Ambient Air Quality Monitoring", Section 2 (e), "General Monitoring Requirements"

IX. APPROVALS

North Carolina Department of Environmental Quality
Division of Air Quality (NCDAQ)

BY: Shirley C. Helman

TITLE: Director, Division of Air Quality

DATE: 6/27/2016

South Carolina Department of Health and Environmental Control (SCDHEC)
Bureau of Air Quality

BY: Keith Dyer

TITLE: Chief, Bureau of Air Quality

DATE: 07/05/2016

Mecklenburg County Land Use and Environmental Services Agency – Air Quality (MCAQ)
Mecklenburg County Air Quality

BY: Shawn H. Rhoads

TITLE: Director, Air Quality

DATE: 6/29/2014



Catherine E. Heigel, Director

Promoting and protecting the health of the public and the environment

MEMORANDUM

July 5, 2016

Subject: Change of Point of Contact for South Carolina

Memorandum of Agreement on Air Quality Monitoring for Criteria Pollutants for the Charlotte-Concord-Gastonia Metropolitan Statistical Area (MSA)

From: Rhonda B. Thompson, SC DHEC
Chief, Bureau of Air Quality

A handwritten signature in blue ink, appearing to read 'Rhonda B. Thompson', is written over the typed name and title.

As of July 5, 2016, the Point of Contact for South Carolina will be Micheal Mattocks, instead of Scott Reynolds.

Micheal's contact information is below:

Micheal Mattocks
SC DHEC – Bureau of Environmental Health Services
2600 Bull Street
Columbia, SC 29201
(803)896-0856
mattock@dhec.sc.gov