dhec
Healthy People. Healthy Communities

July 10, 2018

Ms. Beverly Banister
Director, APTMD, U.S. EPA, Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-8960

RE: Annual Air Monitoring Network Plan for 2019

Dear Ms. Banister:

In accordance with the requirements of 40 Code of Federal Regulations Part 58, Subpart B, the South Carolina Department of Health and Environmental Control (DHEC) respectfully submits the Annual Air Monitoring Network Plan for calendar year 2019. The DHEC is required by 40 CFR 58.10 to adopt and submit to the Regional Administrator an Annual Monitoring Network Plan which provides for the establishment and maintenance of an air quality surveillance system. This system is a network of State and Local Air Monitoring Stations (SLAMS) including Federal Reference Method (FRM) and Federal Equivalent Method (FEM) monitors that are part of SLAMS, National Core Monitoring Network (NCore) stations, Speciation Trends Network (STN) stations, and Special Purpose Monitor (SPM) monitoring stations. This plan is required to include a statement of purpose for each monitor and evidence that siting and operation of each monitor meets the requirements of 40 CFR 58, Appendices A, C, D and E.

The DHEC received one comment during the public comment period, which was held from May 21, 2018 through June 22, 2018. A complete package, including the Department's response to comments received is being sent to Gregg Worley of your office. Should you have any questions or need additional information regarding this matter, please contact Robert Brown of my staff at (803) 898-4105.

Sincerely,

Rhonda B. Thompson, PE, Chief
Bureau of Air Quality
SCDHEC

cc: Gregg Worley, US EPA Region 4 (w/attachments)
ec: Ryan Brown, US EPA Region 4 (w/attachments)
Todd Rinck, USEPA Region 4 (w/o attachments)
Robert J. Brown, Jr., BAQ (w/o attachments)
Renee' Shealy, BEHS (w/o attachments)
Micheal Mattocks, BEHS (w/o attachments)

State of South Carolina

Annual Ambient Air Monitoring Network Plan

Calendar Year 2019

S.C. Department of Health and Environmental Control

2600 Bull Street ● South Carolina 29201 ● Phone: 803-898-3432 ● Website: www.scdhec.gov

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Certification

This document contains the planned changes and final description of the sites and monitors of the South Carolina Ambient Air Monitoring Network (Monitoring Network) for criteria pollutants and related parameters for calendar year 2019. The South Carolina Department of Health and Environmental Control (Department) certifies that the network described herein meets or exceeds the minimum requirements needed to support the State Implementation Plan, national air quality assessments, and policy decisions as required in 40 Code of Federal Regulations (CFR) Part 58, Ambient Air Quality Surveillance, at the time of submittal to the United States Environmental Protection Agency (EPA), Region 4. Due to circumstances that may arise during the implementation of the plan in 2018 and during the 2019 monitoring year, some elements of the network may require modification. A notification of modifications will be posted on the Department website and provided to the EPA Region 4 office. Where necessary, a request for approval of deviations from this plan and supporting documentation will be submitted to the EPA Region 4 office.

Micheal Mattocks Signature: _____ Date: 7/10/18
Director, Division of Air Quality Analysis, Bureau of Environmental Health Services
South Carolina Department of Health and Environmental Control

Renee G. Shealy Signature: _____ Date: 7/10/18
Bureau Chief, Bureau of Environmental Health Services
South Carolina Department of Health and Environmental Control

Robert J. Brown, Jr. Signature: _____ Date: 7/10/18
Director, Division of Air Assessment & Regulations, Bureau of Air Quality
South Carolina Department of Health and Environmental Control

Rhonda B. Thompson Signature: _____ Date: 07/10/18
Bureau Chief, Bureau of Air Quality
South Carolina Department of Health and Environmental Control

Acronyms

AQI – Air Quality Index
AQS – Air Quality System
BAQ – Bureau of Air Quality
CBSA – Core-Based Statistical Area
CFR – Code of Federal Regulation
CO – Carbon Monoxide
CSA – Combined Statistical Area
CBSA – Core Based Statistical Area
CSN – Chemical Speciation Network
CMS – Continuous Monitoring Site
DAQA – Division of Air Quality Analysis
Department – South Carolina Department of Health and Environmental Control
DNPH – Analysis method using 2,4-dinitrophenylhydrazine
EPA – Environmental Protection Agency
FEM – Federal Equivalent Method
FRM – Federal Reference Method
GC/MS – Gas Chromatography / Mass Spectroscopy
GFAA – Graphite Furnace Atomic Absorption Spectrometry
HPLC – High Performance Liquid Chromatography
IC – Ion Chromatography
IMPROVE – Interagency Monitoring of Protected Visual Environments
ICP/MS – Inductively Coupled Plasma Mass Spectroscopy
ID – Site Identification
MET – Meteorology
MOA – Memorandum of Agreement
MSA – Metropolitan Statistical Area
mSA – Micropolitan Statistical Area
$\mu g/m^3$ – Micrograms per cubic meter
NAAQS – National Ambient Air Quality Standards
NATTS – National Air Toxics Trends Site
NCore – National Core Monitoring Network
NO – Nitric oxide
NO_2 – Nitrogen Dioxide
NO_x – Nitrogen Oxides
NO_y – NO_x and other oxidized species
NPAP – National Performance Audit Program
OMB – Office of Management and Budget
PEP – Performance Evaluation Program
$PM_{2.5}$ – Particulate Matter < 2.5 microns
PM_{10} – Particulate Matter < 10 microns
PPB – Parts Per Billion
PPM – Parts Per Million
PSD – Prevention of Significant Deterioration
PTFE – Polytetrafluoroethylene
PUF – Polyurethane Foam
QA – Quality Assurance
QAPP – Quality Assurance Project Plan
QC – Quality Control
SLAMS – State and Local Air Monitoring Station
SO_2 – Sulfur Dioxide
SPM – Special Purpose Monitor
STN – Speciation Trends Network
SVOC – Semi-volatile Organic Compound
TEOM – Tapered Element Oscillating Microbalance
TPY – Tons Per Year
TSP – Total Suspended Particulate
UV – Ultraviolet
VOC – Volatile Organic Compound
WGS84 – World Geodetic System of 1984 revised in 2004

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Introduction

The Department or its predecessors have operated an air quality monitoring network in South Carolina since 1959. During that time, the network has continually evolved to meet the requirements and needs of the Department's Air Program and to comply with federal requirements. In 2019, the network will be comprised of 93 monitors and samplers at 30 sites.

In October, 2006, the EPA published revisions to the ambient monitoring regulations (71 FR 61236, October 17, 2006) requiring quality assurance (QA), monitor designations, minimum requirements for both number and distribution of monitors among metropolitan statistical areas (MSAs), and probe siting changes. The regulation also included the requirement for an annual monitoring network plan and periodic network assessments.

This South Carolina Annual Air Monitoring Network Plan (Network Plan) covers the eighteen-month period from July 1, 2018 through December 31, 2019. This period includes a six-month implementation period during which sites indicated as 'New' will be identified, secured, and prepared for the installation of monitoring equipment. It is expected that any monitoring indicated as 'New' or 'To be established' will be installed, calibrated, and operating in 2019, with the exception of some Ozone monitors, which may begin operation at the start of the South Carolina Ozone monitoring season (March 1-October 31). This Network Plan, as required and described in 40 CFR Part 58.10, and Periodic Network Assessment, must contain the following information for each monitoring station in the network:

- The Air Quality System (AQS) site identification number (ID) for existing stations,
- Location of each monitoring station, including street address and geographical coordinates,
- The sampling and analysis method used for each measured parameter,
- The operating schedule for each monitor,
- Any proposal to remove or relocate a monitoring station within a period of eighteen months following the network plan submittal,
- The monitoring objective and spatial scale of representativeness for each monitor,
- The identification of any sites that are suitable for comparison against the Particulate Matter < 2.5 microns ($PM_{2.5}$) National Ambient Air Quality Standard (NAAQS), and
- The MSA, Core-Based Statistical Area (CBSA), Combined Statistical Area (CSA), or other area represented by the monitor.

This document constitutes the 2019 South Carolina Annual Ambient Air Monitoring Network Plan. The site pages are organized into two main parts:

- Network Summaries: A table which presents the total number of sites and monitors for the State, including a list of all proposed changes to the current network, and
- Air Monitoring Station Descriptions: An outline of the designations, parameters, monitoring methods, and the purpose for each monitor at the site.

The Monitoring Network is reviewed annually. Planned changes are described in this Network Plan and provided for public review and comment prior to submission to the EPA Region 4 Administrator.

Public Participation Opportunities

In response to public interest and the potential impact of the monitoring regulation changes, the Department's Air Program solicits involvement from both internal (to the Department) and external workgroups. Opportunities for public involvement include:

- A webpage maintained for publication and access to current and draft monitoring plan reference documents and announcements[1].
- Availability of the proposed 2019 Network Plan for public review and comment ran from May 21, 2018 through June 21, 2018. All public comments received will be summarized and addressed in Appendix A before submitting the final network plan to the EPA. A complete set of comments will be submitted to the EPA with the 2019 Network Plan.

The Department is committed to continuing the opportunities for input and participation in the development of the annual revisions of the Network Plan and the periodic assessments of the air quality surveillance system.

Network Operation

The primary responsibility for the operation of the Monitoring Network is assigned to the Division of Air Quality Analysis (DAQA) in the Bureau of Environmental Health Services (Division). The Division establishes, maintains, and operates the sites and instruments that make up the network and performs the analysis of samples collected as part of routine monitoring or special projects. Data generated by the network for comparison to the NAAQS is verified to be accurate and reported by the Division to the national AQS database for storage and public access.

Criteria pollutant monitoring for the purpose of comparison to the NAAQS is performed using the EPA designated Federal Reference Methods (FRM) or Federal Equivalent Methods (FEM) to ensure the precision and accuracy of the measurements across the air quality surveillance system.

Regular calibration and audits of the measurement systems are performed to verify that the instruments are operating correctly and data being collected is accurate. All monitors and samplers are calibrated at least once a year. Calibration is also performed whenever the monitor/sampler fails a bi-weekly Quality Control (QC)/precision check or multi-point audit, when maintenance is performed that may affect the monitor response, or if the monitor is located away from the building in which it was calibrated. If possible, a QC/precision check or flow check should precede any maintenance that would affect monitor response.

The QA activities supporting the Monitoring Network meet or exceed the QA requirements defined in 40 CFR Part 58, Appendix A (Quality Assurance Requirements

[1]http://www.scdhec.gov/HomeAndEnvironment/Air/AmbientAir/

for SLAMS and SPM Air Monitoring). Raw data is collected hourly from sites across the state and provided to internal data users (forecasters and data analysts) and to the AIRNow database for presentation to the public. Ozone monitors provide hourly data during Ozone Season (March 1-October 31).

Before the data is submitted to AQS, it is verified to be accurate through review of the instrument QC and QA performance documentation. Instrument QA/QC alone is not sufficient to assure monitoring data quality. In addition to periodic site assessments, the Department conducts additional visits to monitoring sites to document comparisons with applicable siting criteria.

It is the Department's intent that all criteria pollutant monitors and samplers be sited and operated in accordance with the requirements of 40 CFR Part 58. As required in 40 CFR Part 58, Appendix A, the DAQA in the Division establishes, maintains, and operates the sites and instruments and performs the analysis of samples collected. Data generated by the network for comparison to the NAAQS is verified to be accurate and reported by the Division to the national AQS database for storage and public access. Regular calibration and audits are performed to verify that the instruments are operating correctly and data being collected is accurate. As required in 40 CFR Part 58, Appendix C, all criteria pollutant monitoring in the Monitoring Network for the purpose of comparison to the NAAQS is performed using the EPA designated FRM or FEM. Also, all criteria pollutant monitoring in the Monitoring Network meets the monitoring objectives, spatial scales, and design criteria as described in 40 CFR Part 58, Appendix D. Finally, in this document, each site page contains a statement addressing compliance to 40 CFR Part 58, Appendix E for SLAMS monitors. If the site is not in compliance, a plan is presented to address the deficiency. For SPM monitors, the 40 CFR Part 58.20 states that compliance is optional, but monitoring organizations are encouraged to meet as many of the Appendix E requirements as possible.

An element of the Quality System[2] employed by the Division is periodic assessments of systems and monitor performance. As the primary QA organization for ambient air monitoring activities, the Division operates under the approved Environmental Quality Control Quality Assurance Management Plan, the Ambient Air Quality Monitoring Quality Assurance Project Plan, and approved plans for specific projects. The EPA Region 4 office may conduct audits of any component of the operation of the network or quality management system. The Division also participates in the National Performance Audit Program (NPAP) and the Performance Evaluation Program (PEP) administered by the EPA to provide independent audits.

Station Description Content

Specific siting information for each site and monitor is stored in the EPA's AQS, the national ambient air database. The AQS Site Description includes the exact location of the site, local and regional population, and description of the site location, monitor types, and monitoring objectives. This site and monitor information is routinely updated

[2] The Quality System is the means by which the Department implements the quality management process through the Quality Assurance Management Plan for SC DHEC, March, 2014.

whenever there is a change in site characteristics or pollutants monitored. Pictures for each monitoring site can be viewed at: https://gis.dhec.sc.gov/monitors/

The AQS is used as the primary repository for all South Carolina ambient air monitoring information, including site descriptions. All ambient air monitoring data is stored in AQS, including criteria pollutants, non-NAAQS parameters, ambient air toxics, total suspended particulate (TSP), and supporting QA data.

Each network station description contained in this document includes a Site Description and Monitor Details. An explanation of the information in each station description is presented below.

Site Description – The site description includes specific information about each ambient air monitoring site. The site description header includes the following:

1) Site Name – The name that is given to the site.
2) CSA/MSA – The area where the site is located as defined by the United States Census. (July, 2017).[3]
3) AQS Site ID – The unique site ID used in AQS is in the form of 45-cc-ssss where:
    a. 45 is the federal identification code for South Carolina,
    b. ccc is the county identification code, and
    c. ssss is the site identification code within the county.
4) Location – Typically, the street address of the site, where available.
5) County – County in which the site is located.
6) Coordinates – Latitude (N), then Longitude (W) listed in decimal degrees using WGS84 projection.
7) Date Established – The date when each existing monitoring station was established is shown in the description. For new stations proposed in this Monitoring Plan, a date is provided when it is expected for the station to be in operation. Individual monitors at a site may have differing start and stop dates.
8) Site Evaluation (most recent date visited) – Each monitoring station in the network is periodically visited to determine whether all required probe exposure criteria for monitors are met. If necessary, corrective action is scheduled to address deficiencies. If a new monitoring site has not yet been evaluated, it will be denoted with the word “PENDING”.

Monitor Details – Each station description has a table that lists the parameter(s) and the descriptive information associated with that particular parameter. An explanation of the information in the tables is presented below.

[3] The US Census Bureau periodically adjusts CBSA names and boundaries. This plan uses the latest available revision.

1) Parameter – Criteria (compounds for which a NAAQS has been established), non-criteria, and/or supporting parameters (primarily meteorological measurements) measured at the site are listed.

2) Scale – Each monitor or sampler in the monitoring network is described in terms of the approximate physical dimensions of the air parcel nearest the monitoring station throughout which pollutant concentrations are expected to be reasonably similar. This is most often referred to as the "Scale" of the monitor. Different pollutants monitored at the same location may represent different scales depending on the characteristics of the pollutant. Area dimensions or scales of representativeness used in the network description are:

    a. Microscale – Air volumes associated with area dimensions ranging from several meters up to about 100 meters.

    b. Middle scale – Areas up to several city blocks in size with dimensions ranging from approximately 100 meters to 0.5 kilometers.

    c. Neighborhood scale – Extended areas of a city that have relatively uniform land use with dimensions ranging from 0.5 to 4.0 kilometers.

    d. Urban scale – Citywide or equivalent rural areas with dimensions ranging from 4 to 50 kilometers.

    e. Regional scale – Areas ranging from 50 to hundreds of kilometers in diameter.

    The true representative area may best be described by an irregular shape of the approximate dimensions indicated above to account for local sources, topography, and differing land use.

    The representative scale of a monitor is closely associated with the monitoring objective.

3) Objective – The ambient air monitoring network is designed to meet three primary objectives:

    a. Provide air pollution data to the public in a timely manner. Near real-time data is made available on the internet through AIRNow and Air Quality Index (AQI) reporting and forecasting in the major metropolitan areas.

    b. Support compliance with ambient air quality standards and emissions strategy development. Monitors are operated to measure concentrations for comparison to NAAQS and to provide information to aid in the development of strategies to improve air quality.

    c. Support air pollution research studies. Data from the monitoring network support greater understanding of the impacts and effects of ambient air pollution.

    Individual monitors within a monitoring network that support these basic objectives generally serve one or more of the following purposes:

        i. Determine highest concentrations of pollutants,

ii. Determine representative concentrations in areas of high population density,

iii. Determine impact on air quality of significant sources or source categories,

iv. Determine general background concentrations,

v. Determine extent of regional pollutant transport, and

vi. Determine welfare-related impacts in more rural and remote areas (ex. visibility impairment and impacts to vegetation).

The design intent in siting stations is to correctly match the area represented by the sample of monitored air with the scale most appropriate to meet the monitoring objective of the monitor. The relationship of appropriate scale to the six basic purposes as follows:

Monitoring Purpose	**Siting Scale**
Highest concentration	Micro, Middle, Neighborhood
Population exposure	Neighborhood, Urban
Source impact	Micro, Middle, Neighborhood
General/background	Neighborhood, Urban, Regional
Regional transport	Urban, Regional
Welfare-related impacts	Urban, Regional

Monitor and sampler data is regularly reviewed to assure the assigned scale is correct and appropriate for the intended objective.

4) Designation – Monitor designations that may be found in the tables include the State and Local Air Monitoring Station (SLAMS), special purpose monitor (SPM), National Core Monitoring Network (NCore), non-regulatory, QA collocated, and IMPROVE monitoring. Definitions of these designations are:

   a. SLAMS – Monitors for which NAAQS have been established. These stations must meet requirements that relate to four major areas: QA, monitoring methodology, sampling interval, and siting of instruments and instrument probes.

   b. SPM – Monitors which support investigations addressing complaints, areas and pollutants of concern, network refinement, modeling verification, and compliance. These monitors are committed to investigation and projects as described in the associated Quality Assurance Project Plan (QAPP). They may be located as separate monitoring stations or be included at existing monitoring locations. The SPM may also monitor for air toxics, particulate, criteria pollutants, precipitation, and meteorology.

Supplemental speciation is a type of SPM monitor that operates according to Chemical Speciation Network (CSN) protocols, but is not contained in the STN Network. This monitoring data will be reported to AQS where possible. Although siting and probe exposure will conform to all requirements for SLAMS monitors whenever possible, the 40 CFR Part 58.20 states that compliance for SPM monitors is optional.

c. NCore – NCore is a national multi-pollutant network that utilizes advanced measurement systems for particles, pollutant gases, and meteorology. It provides data for long-term trends of criteria and non-criteria pollutants, and supports air quality model evaluation, scientific studies, and ecosystem assessments. Most NCore monitors are SLAMS.

d. Non-regulatory Monitor – A monitor that measures data on a pollutant that will not be used for regulatory purposes.

e. Collocated QA Sampler – A particulate matter sampler that is paired with but operated independent of a similar sampler. It is used to indicate measurement accuracy.

f. IMPROVE – The Interagency Monitoring of Protected Visual Environments (IMPROVE) network collects visibility related data. These monitors are operated in the State of South Carolina in cooperation with the federal government, and are listed in the Site Description, but are not included in the Site Tables.

The SLAMS and SPM data may be used in the reporting of an area's AQI. The AQI is a method of reporting that converts concentration levels of pollution to a simple number scale of 0-500. Index reporting is required for all urban areas with a population exceeding 350,000. Intervals on the AQI scale are related to potential health effects of the daily measured concentration of the measured pollutants. All stations in a metropolitan area provide data for daily index reporting. Data collected from continuous Ozone and $PM_{2.5}$ monitors is collected hourly and reported as AQI maps on the EPA's AIRNow website. A daily AQI is provided for the areas in and around Aiken, Charleston, Columbia, Florence/Darlington, Greenville-Spartanburg, Myrtle Beach, and York/Chester/Lancaster.

5) Probe Height – The monitor or sampler probe is the point where ambient air enters the analytical or sample collection system. Ideally, air would be sampled approximately at nose height, but due to operational, exposure, and security considerations, air may be sampled further from ground level. Proper probe height is specified in the monitoring regulations (typically between 2 and 15 meters) and is checked as part of the periodic site evaluations.

6) Analysis Methods – All sampling and analytical procedures used to determine ambient concentrations of criteria pollutants for comparison to the NAAQS will use either Federal Reference or Equivalent Methods (FRM or FEM). For the reactive gases, borosilicate glass or FEP Teflon are used in the sampling train.

Where appropriate for specific monitoring objectives, well characterized, non-equivalent methods may be used. The analysis method for the parameters most commonly measured and listed in the station descriptions are described below.

a) Particulate Matter less than 10 microns (PM_{10}) – PM_{10} samplers operated by the Department are designated as either FRM or FEM and are operated consistent with the requirements in 40 CFR Part 50, Appendix J and 40 CFR Part 58. Intermittent samplers collect a 24-hour sample no less than every sixth day on a filter. The filter is conditioned and weighed before and after the sample run. The weight of material collected on the filter and the volume of air sampled is used to calculate the average concentration, expressed as micrograms per cubic meter ($\mu g/m^3$) for the sample period. The filters are equilibrated before each weighing for a minimum of 24 hours at a mean temperature between 15 - 30°C and a mean relative humidity between 25 and 45 percent.

   Continuous PM_{10} samplers provide 24-hour concentration measurements every day. During sampling, ambient air passes through an inlet designed to pass only particles smaller than 10 microns in diameter. The flow rate, critical to precise particle size separation, is monitored and controlled constantly. Particulate in the sample stream is collected on a Teflon-coated glass fiber filter. The mass collected on the filter is also continuously monitored. The difference between the current filter weight and the previous weight gives the total mass of the collected particulate for that period. The mass concentration is calculated by dividing the mass gained by the flow through the filter for the period. The concentration measurements are averaged over 1-hour and 24-hour periods. Data is stored locally on redundant data acquisition systems and recovered hourly by a central office computer system (AirVision). Only 24-hour daily averages are used for comparison to the ambient standards.

b) Particulate Matter less than 2.5 microns ($PM_{2.5}$) – All $PM_{2.5}$ samplers operated by the Department for comparison to the NAAQS are designated FRM samplers. Manual samplers are operated consistent with the requirements in 40 CFR Part 50, Appendix L. Samples are collected on 46.2-millimeter polytetrafluoroethylene (PTFE) filters over a 24-hour sampling period. Air flow through the filter is maintained at 16.7 liters per minute at local ambient temperature and pressure. The flow rate must be maintained within ±5 percent throughout the sample period. Sample filters are collected within 96 hours of the end of the sample run and are kept cooled during transit to minimize potential sample loss.

   The PTFE filters are equilibrated before each weighing for a minimum of 24 hours at a mean temperature between 20°C and 23°C and 30 to 40 percent mean relative humidity. Filters are weighed before and after the sample period. Filters are used within thirty days of initial weighing. Collected samples are typically weighed within two weeks of sampling. If the samples are maintained below 4°C after collection, they can be held for up to thirty days from the end of the sample period. The mass collected and the volume sampled are used to calculate the concentration, expressed in $\mu g/m^3$.

Unless designated a FEM, continuous $PM_{2.5}$ monitors do not provide concentration data suitable for comparison to the NAAQS. Non-FEM continuous monitors that provide reasonably comparable measurements may be used to provide data for calculation of an area Air Quality Index (AQI). Continuous $PM_{2.5}$ samplers provide 24-hour concentration measurements every day. During sampling, ambient air passes through an inlet system designed to pass only particles smaller than 2.5 microns in diameter. The flow rate, critical to precise particle size separation, is monitored and controlled constantly. Particulate in the sample stream is collected on a Teflon-coated glass fiber filter. The mass collected on the filter is also continuously monitored. The difference between the current filter weight and the previous weight gives the total mass of the collected particulate for that period. The mass concentration is calculated by dividing the mass gained by the flow through the filter for the period. The concentration measurements are averaged over 1-hour and 24-hour periods. Data is stored locally on redundant data acquisition systems and recovered hourly by a central office computer system (AirVision). Only 24-hour daily averages from FEM monitors are used for comparison to the ambient standards.

c) $PM_{2.5}$ Speciation sampling – In addition to operating $PM_{2.5}$ samplers that provide measurement of only the $PM_{2.5}$ mass concentration, the Department also operates $PM_{2.5}$ Speciation samplers to collect samples for analysis to determine the chemical makeup of the particulate. Speciation sample collections are part of the national CSN. Samples are collected on a set of two cartridges on the Met-One SASS sampler for nitrates, sulfates, and metals and on a single cartridge in the URG 3000N sampler for carbon containing material. The samples are collected over a 24-hour sampling period. The individual cartridges contain denuders and filters designed to efficiently capture the major components of $PM_{2.5}$.

   After collection, the samples are shipped cold to an EPA contract laboratory for analysis. At the laboratory, the samples are analyzed using thermal optical analysis (for carbon), ion chromatography (IC) for nitrates and sulfates, and x-ray fluorescence for metals to determine the presence and concentration of specific compounds. Sample results are available on the EPA website.

d) Sulfur Dioxide (SO_2) – Instruments used to continuously monitor SO_2 concentrations in the atmosphere use the Ultraviolet (UV) Fluorescence Federal Reference Method. The continuous data output from the instrument is stored locally on redundant data acquisition systems and recovered hourly by central office computer system (AirVision).

   Calibration of these instruments and audits of their performance are done using the EPA protocol gas mixtures containing a certified concentration of

SO_2 in nitrogen. This gas is diluted to provide known concentrations of SO_2. These known concentrations are supplied to the instrument, which is adjusted so the instrument output corresponds with the specific concentrations. Calibration curves are prepared for each instrument and each measurement is automatically compared to this curve before entry into the data acquisition system.

e) Carbon Monoxide (CO) – Continuous monitoring for CO is performed using the FRM non-dispersive infrared correlation method. Data is stored locally on redundant data acquisition systems and recovered hourly by the DAQA central office computer system (AirVision).

   Calibration of the instrument and audits of its performance are done using the EPA Protocol gas mixtures containing a certified concentration of CO in air. The gas is diluted to provide known concentrations of CO. Known concentrations are supplied to the instrument, which is adjusted so the instrument output corresponds with the specific concentrations. Calibration curves are prepared for each instrument which are used to calculate concentration measurements for storage in the data acquisition system.

f) Ozone – Ozone is monitored using the FEM UV photometry method. The continuous data output from the instrument is stored locally on redundant data acquisition systems and recovered hourly by the central office computer system (AirVision).

   Monitors are routinely calibrated and their performance audited using portable ozone transfer standards. Calibration curves are prepared for each instrument which are used to calculate the concentration measurements stored in the data acquisition system.

g) Nitrogen Dioxide (NO_2) – The FRM UV chemiluminescence method is used for measurement of NO_2 concentration in the ambient air. The continuous data output from the instrument is stored locally on redundant data acquisition systems and recovered hourly by a central office computer system (AirVision).

   Calibration of the instrument and audits of their performance are done using the EPA protocol gas mixtures containing a known concentration of Nitric Oxide (NO) and Nitrogen Oxides (NO_x) in nitrogen. The gas is diluted to present several known concentrations of the oxides. A converter is used to convert NO_2 to NO for reaction with internally generated ozone and measurement of the light produced by the reaction of NO and Ozone. Known concentrations are supplied to the instrument, which is adjusted so the instrument output corresponds with the supplied concentrations. Calibration curves are prepared for each instrument which are then used to provide concentration measurements for storage in the data acquisition system.

h) Lead – Lead concentrations are determined by the analysis of TSP collected using high volume particulate samplers as described in 40 CFR Part 50, Appendix G. Particulate samples are acid extracted from a portion of the filter

to dissolve metals from the collected materials. The lead content is determined using Flameless (Graphite Furnace) Atomic Absorption Spectrometry or may be analyzed by an EPA national contract laboratory using Inductively Coupled Plasma Mass Spectroscopy (ICP/MS).

i) Meteorology – Meteorology consists of wind direction, wind speed, precipitation, temperature, and pressure. Collection and/or analysis methods are discussed below.

   a. Wind Direction and Speed – Wind data is collected using systems that incorporate high precision 'Air Quality' systems. The systems use separate or combined wind vanes and anemometers mounted 10 meters above ground. The systems provide supporting information about the local meteorology.

   b. Precipitation – Precipitation is measured by tipping bucket gauges that provide a signal indicating the occurrence, rate, and amount of precipitation. The gauges are not heated, so they may not accurately provide the time and rate for frozen precipitation events. The monitors are checked periodically for operation and accuracy using a known volume of water and compared with actual volumes of collected precipitation where there are collocated samplers.

   c. Ambient Temperature and Pressure – Ambient temperature is available from sensors that are part of the sampling systems for the FRM $PM_{2.5}$ samplers. Ambient temperature measurement is necessary for the systems to maintain the required flow rate used to reproducibly separate the desired particulate size fractions as conditions change. Although the primary use of the measurement is for sampler flow control, the sensors are accurate and regularly audited. Temperature and pressure sensors are compared to reference systems at least once per month.

j) Volatile Organic Compounds – Volatile organic compounds (VOCs) are collected into passivated or silica lined stainless steel canisters. The canisters are cleaned, tested, and evacuated at the laboratory prior to installation at the sampling site. At the sampling location, the canisters are filled and pressurized with ambient air throughout the sampling period (typically 24 hours). Measured portions of the captured air are concentrated at low temperature and analyzed using gas chromatography with a mass spectrometer detector (GC/MS) to identify and quantitate target compounds. The collection and analysis method is based on the EPA Method TO-15.

k) Semi-volatile Organic Compounds – Semi-volatile organic compounds (SVOCs) are collected using polyurethane foam (PUF) and a solid adsorbent to trap the compounds from air pulled through the material by a high-volume sampler. The SVOCs are extracted from the collection cartridge using a solvent, and the rinses are concentrated for analysis. Measured portions of the extract are analyzed using GC/MS to identify and quantitate the collected compounds. The collection and analysis method is based on the EPA Method TO-13.

l) Carbonyls – Carbonyls (including aldehydes and ketones) are extracted from ambient air by reaction with a compound that stabilizes them enough to capture and hold. The reaction of the target compounds with Dinitrophenyl hydrazine (DNPH) removes them from the sampled air and concentrates them in the sample cartridge. Solvent extraction of the DNPH derivatives from the cartridge is followed by analysis using High Pressure Liquid Chromatograph to identify and quantitate the collected Carbonyls. The collection and analysis method is based on the EPA Method TO-11.

m) Metals – Metals in particulate are collected on filters using the TSP or PM_{10} High Volume samplers. Metals are extracted from a portion of the filter using sonication in an acid solution. Detection, identification, and quantitation of the target metals use Graphite Furnace AA or inductively coupled plasma with a mass spectrometer (ICP/MS). The collection and analysis method is based on the EPA Method IO-3.

n) Precipitation Chemistry – A portion of the precipitation sample collected each week is analyzed for pH and conductivity. To determine concentrations of dissolved material that contributes to acid rain, the collected material is analyzed for cations and anions using ion chromatography (IC).

o) Sulfate – Sulfate in particulate is measured by collecting samples on the species-specific denuders used in the CSN and are analyzed for anions (SO_4= and NO_3-) using ion chromatography for separation and quantification of the species. Samples are analyzed for anions at the DAQA lab. All other speciation analyses are performed by Amec-Forte-Wheeler.

7) Sampling frequency – Sampling frequency indicates how often a measurement is made. Sampling typically involves collection of a sample over a period (typically 24 hours, midnight to midnight EST) and the delivery of the sample to the laboratory for preparation and analysis. Samples are collected every day (1:1), every third day (1:3), every sixth day (1:6), every twelfth day (1:12), or weekly, depending on the data quality objectives of the project. Results are reported as averages for the sample period. The EPA publishes the 1:3 and 1:6 day sampling schedules used by the South Carolina Ambient Air Monitoring Network and nationwide[4].

Monitoring typically uses on-site analyzers that continuously sample the air and measure the pollutant of interest. Results of the analysis are reported as hourly averages. Five-minute averages are also reported for SO_2 concentrations. One-minute averages are collected from many of the continuously monitored parameters for use in verification and validation of the reported monitoring data.

[4] http://www.epa.gov/ttn/amtic/calendar.html

Changes for 2019

Any planned changes in parameters monitored, the configuration, or operations at the site planned for 2019 are described herein and summarized in the Summary of 2019 Network Changes. Unless otherwise indicated, changes at a site including the beginning of new monitoring activity will be effective January 1, 2019. Ozone monitoring for 2019 at new or special project sites may start at the beginning of the Ozone monitoring season (March 1-October 31).

2018 Network Summary

This summary table presents the elements of the South Carolina monitoring network as of May 1, 2018.

Network Summary: Calendar Year 2018 Air Monitoring Stations																
Region	Sites	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	TSP/Lead	Ozone	SO_2	NO_2/NO/NO_y	CO	Carbonyls	SVOC	VOC	Precip. Chem.	Precipitation	*MET
Augusta-Richmond County, GA-SC MSA	2	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0
Charleston-N. Charleston MSA	5	2	2	0	1	0	2	2	2	0	0	0	0	0	1	1
Charlotte-Concord-Gastonia, NC-SC MSA	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Columbia MSA	6	3	2	1	2	1	3	3	2	1	2	3	0	2	2	1
Florence MSA	5	1	1	0	0	**7	1	0	0	0	0	0	0	0	0	0
Greenville-Anderson-Mauldin MSA	5	3	1	0	1	0	4	1	1	0	0	0	0	0	0	1
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Spartanburg MSA	2	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Remainder of State	4	1	3	1	3	0	3	1	0	0	2	2	2	0	2	0
TOTALS	31	13	11	2	7	8	18	8	5	1	4	5	2	2	5	3

*MET data includes wind speed and wind direction. **There are identical samplers at each JCI site that run consecutively which allows better utilization of staff visits.

2019 Network Summary

This summary table presents the elements of the 2019 Monitoring Plan after implementation of changes described in this plan.

Network Summary: Calendar Year 2019 Air Monitoring Stations																
Region	Sites	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	TSP/Lead	Ozone	SO_2	$NO_2/NO/NO_y$	CO	Carbonyls	SVOC	VOC	Precip. Chem.	Precipitation	*MET
Augusta-Richmond County, GA-SC MSA	2	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0
Charleston-N. Charleston MSA	5	2	2	0	1	0	2	2	2	0	0	0	0	0	1	1
Charlotte-Concord-Gastonia, NC-SC MSA	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Columbia MSA	6	3	2	1	2	1	3	3	2	1	2	3	0	2	2	1
Florence MSA	5	1	1	0	0	**7	1	0	0	0	0	0	0	0	0	0
Greenville-Anderson-Mauldin MSA	4	3	1	0	1	0	3	1	1	0	0	0	0	0	0	1
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Spartanburg MSA	2	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Remainder of State	4	1	3	1	3	0	3	1	0	0	2	2	2	0	2	0
TOTALS	30	13	11	2	7	8	17	8	5	1	4	5	2	2	5	3

2017 Criteria Pollutant Design Values

This section presents the 2017 design values for the South Carolina criteria pollutant monitoring network.

Site ID	County	Site Name	Ozone (ppm)	$PM_{2.5}$ Annual ($\mu g/m^3$)	$PM_{2.5}$ 24-hour ($\mu g/m^3$)	PM_{10} (# Expect-ed Exceed-ances)	SO_2 1-hour (ppb)	NO_2 1-hour (ppb)	NO_2 Annual (ppb)	CO 8-hour (ppm)	CO 1-hour (ppm)	Lead ($\mu g/m^3$) (2017-NOT 3 yr. DV)
003-0003	Aiken	Jackson Middle School	0.059									
007-0005	Anderson	Big Creek	0.059									
015-0002	Berkeley	Bushy Park	0.057									
019-0003	Charleston	Jenkins Avenue				0	*11	*32	*7			
019-0046	Charleston	Cape Romain	0.059				*4	*9	1			
019-0048	Charleston	FAA		7.3	16							
019-0049	Charleston	Charleston Public Works		7.1	15							
025-0001	Chesterfield	Chester-field	0.060	7.2	15	0						
029-0002	Colleton	Ashton	0.056									
031-0003	Darlington	Pee Dee	0.061									
037-0001	Edgefield	Trenton	0.061	8.3	18							
041-0003	Florence	Williams		8.0	17							

Site ID	County	Site Name	Ozone (ppm)	$PM_{2.5}$ Annual ($\mu g/m^3$)	$PM_{2.5}$ 24-hour ($\mu g/m^3$)	PM_{10} (# Expect-ed Exceed-ances)	SO_2 1-hour (ppb)	NO_2 1-hour (ppb)	NO_2 Annual (ppb)	CO 8-hour (ppm)	CO 1-hour (ppm)	Lead ($\mu g/m^3$) (2017-NOT 3 yr. DV)
041-8001	Florence	JCI Railroad										*0.04
041-8002	Florence	JCI Entrance										*0.08
041-8003	Florence	JCI River										*0.03
043-0011	Georgetown	Howard High #3				0						
045-0015	Greenville	Greenville ESC		9.1	23	0	*2	*42	8			
045-0016	Greenville	Hillcrest	0.065	8.2	17							
063-0008	Lexington	Irmo		8.8	19		*9					
063-0010	Lexington	Cayce City Hall				0						
073-0001	Oconee	Long Creek	0.063	5.7	14		*2					
077-0002	Pickens	Clemson	0.063									
077-0003	Pickens	Wolf Creek	0.061									
079-0007	Richland	Parklane	0.060	8.1	17	*	*4			1	1	*0
079-0019	Richland	Bates House		7.9	18	0						
079-0021	Richland	Congaree Bluff	0.055				*4					
079-	Richland	Sandhill	0.064						4			

Site ID	County	Site Name	Ozone (ppm)	$PM_{2.5}$ Annual ($\mu g/m^3$)	$PM_{2.5}$ 24-hour ($\mu g/m^3$)	PM_{10} (# Expect-ed Exceed-ances)	SO_2 1-hour (ppb)	NO_2 1-hour (ppb)	NO_2 Annual (ppb)	CO 8-hour (ppm)	CO 1-hour (ppm)	Lead ($\mu g/m^3$) (2017-NOT 3 yr. DV)
1001												
083-0009	Spartanburg	North Spartan-burg	0.066									
083-0011	Spartanburg	T.K. Gregg		8.3	16							
* denotes design values that did not meet data completeness requirements.												

Required Monitoring

The EPA regulation 40 CFR Part 58, Appendix D requires that each State maintain a minimum number of monitors to properly characterize air quality and to meet any required objectives of the monitoring network[5]. In general, these minimum requirements are based on the MSA population and current ambient air monitoring design values. The following sections discuss the minimum monitoring criteria for each of the criteria pollutants (Ozone, Particulate Matter ($PM_{2.5}$ and PM_{10}), Lead, SO_2, NO_2, and CO), the CBSAs, and the MSA population. The final section shows the current South Carolina minimum monitoring requirements.

Minimum Monitoring for Ozone – The Ozone minimum monitoring criteria has two requirements:

1) Required Ozone SLAMS sites – A minimum number of required Ozone SLAMS sites for each CBSA that is determined by CBSA population and the peak Ozone concentrations.
2) NCore Requirement – Each NCore site must include an Ozone monitor. The Parklane (45-079-0007) site in Columbia, South Carolina is the NCore site for South Carolina.

Minimum Monitoring for $PM_{2.5}$ – The $PM_{2.5}$ minimum monitoring criteria has six requirements:

1) Required $PM_{2.5}$ SLAMS sites – A minimum number of required $PM_{2.5}$ SLAMS sites for each CBSA.
2) Continuous Requirement – A continuous $PM_{2.5}$ monitoring requirement which is equal to at least one-half (round up) the minimum required $PM_{2.5}$ SLAMS sites. Also, at least one required continuous analyzer in each CBSA must be collocated with one of the required FRM or FEM monitors, unless at least one of the required FRM/FEM monitors is itself a continuous FEM monitor, in which case, no collocation requirement applies.
3) Regional Background and Transport – At least one $PM_{2.5}$ site must be established in each state to monitor for regional background and at least one $PM_{2.5}$ site to monitor regional transport. The Cape Romain (45-019-0046) site in Charleston County is the regional background site and the Chesterfield (45-025-0001) site in Chesterfield County is the regional transport site.
4) NCore Requirement – Each state is required to operate at least one NCore site which measures $PM_{2.5}$ using both continuous and integrated/filter-based samplers. The Parklane (45-079-0007) site in Columbia, South Carolina is the NCore site for South Carolina.
5) Near-road $PM_{2.5}$ Monitoring – The EPA required the collocation of one $PM_{2.5}$ monitor with a near-road NO_2 monitor in urban areas having populations of 1,000,000 or more by January 1, 2017. The Charlotte-Concord-Gastonia, NC-SC MSA is the only MSA in South Carolina that met the population requirement for a collocated $PM_{2.5}$ monitor. The near-road monitoring requirement for the Charlotte-Concord-Gastonia,

[5] 40 CFR Part 58.11 paragraph (a)(3)(c) and Appendix D to 40 CFR Part 58.

NC-SC MSA is being fulfilled at the Remount Road (37-119-0045) site by the Mecklenburg County Air Quality Commission.

6) Speciation Monitoring – Chemical speciation monitoring is conducted at the Parklane (45-079-0007) site and is funded as part of the $PM_{2.5}$ Speciation Trends Network (STN). Speciation Monitoring is also conducted at the Chesterfield (45-025-0001) site and is funded by South Carolina.

Minimum Monitoring for PM_{10} – The PM_{10} minimum monitoring criteria has one requirement that is based on the CBSA population, the number of exceedances of the NAAQS, and the percentage of PM_{10} concentrations over or under the NAAQS. Unlike other criteria pollutants, the minimum monitoring requirements for PM_{10} is given as a range of required monitoring sites for a CBSA.

Minimum Monitoring for Lead – The Lead minimum monitoring criteria has one requirement that any facility with annual Lead emissions exceeding 0.5 tpy will be required to have a Lead sampler. Based on the state-submitted 2014 National Emissions Inventory, there are no facilities in South Carolina with Lead emissions greater than 0.5 tpy.

On May 7, 2010, the Department issued an air synthetic minor construction permit to Johnson Controls Battery Group for the Florence Recycling Center (Permit No. 1040-0129-CA). Under a settlement agreement[6] with several petitioners, the Florence Recycling Center supports source-oriented ambient Lead monitoring being conducted by the Department at several sites around the facility. Additional details of the monitoring of this facility can be found in the Florence MSA section of this Monitoring Plan under the site name "Johnson Controls."

Minimum Monitoring for SO_2 – The SO_2 minimum monitoring criteria has three requirements:

1) Requirement for Monitoring by the Population Weighted Emissions Index – The population weighted emissions index (PWEI) is determined using the most current population of each CBSA and the most recent level of SO_2 emissions for each county within the CBSA. The emissions data is available from the National Emissions Inventory. For any CBSA with a calculated PWEI value equal to or greater than 1,000,000, a minimum of three SO_2 monitors are required. For any CBSA with a calculated PWEI value equal to or greater than 100,000, but less than 1,000,000, a minimum of two SO_2 monitors are required. For any CBSA with a calculated PWEI value equal to or greater than 5,000, but less than 100,000, a minimum of one SO^2 monitor is required.

   The following table presents each CBSA's 2017 population, 2014 SO_2 emissions, calculated index, and minimum monitoring requirements. The process for calculating the index can be found at the bottom of the table.

[6] http://www.scdhec.gov/HomeandEnvironment/docs/JCI/JCI-Settlement%20Agreement_07142010.pdf

CBSA	2017 CBSA Population	2014 CBSA SO_2 Emissions (Tons)	PWEI	SO_2 Minimum Monitors Required
*Charlotte-Concord-Gastonia, NC-SC MSA	2,525,305	7,624	19,253	1
Greenville-Anderson-Mauldin MSA	895,923	3,098	2,776	0
Columbia MSA	825,033	17,706	14,608	1
Charleston-North Charleston MSA	775,831	15,796	12,255	1
*Augusta-Richmond County, GA-SC MSA	600,151	3,353	2,012	0
*Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	464,165	4,837	2,245	0
Spartanburg MSA	334,391	398	133	0
Florence MSA	205,831	3,797	782	0
Hilton Head Island-Bluffton-Beaufort MSA	215,302	908	195	0
Sumter MSA	106,847	182	19	0

The PWEI is calculated using US Census population data and state emission inventory data at the CBSA level. The population for each CBSA (based on the most recent US Census or Census estimate) is multiplied by the CBSA total SO_2 emissions (reported in tons using the latest National Emissions Inventory data). This product is divided by 1,000,000 to derive the index.

CBSA with index greater than 1,000,000 will require 3 monitors.
CBSA with index less than 1,000,000 but greater than 100,000 will require 2 monitors.
CBSA with index less than 100,000 but greater than 5,000 will require 1 monitor.
CBSA with index less than 5,000 will require no monitors.

*Monitors may be operated in the non-South Carolina portion of the CBSA.

2) Regional Administrator Required Monitoring – The Regional Administrator may require additional SO_2 monitoring sites above the minimum number of monitors required by the PWEI in areas that have the potential to have high SO_2 concentrations, in areas impacted by sources which are not conducive to modeling, or in locations with susceptible and vulnerable populations that are not otherwise being monitored. South Carolina does not have any SO_2 Regional Administrator Required Monitoring.

3) NCore Requirement – Each NCore site must include a SO_2 monitor. The Parklane (45-079-0007) site in Columbia, South Carolina is the NCore site for South Carolina.

Minimum Monitoring for NO_2 – The NO_2 minimum monitoring criteria has four requirements:

1) Near-road NO_2 Monitors – Each state must have one microscale near-road NO_2 monitoring site in each CBSA with a population of at least 1,000,000 or more persons. An additional near-road NO_2 monitoring site is required for any CBSA with a population of 2,500,000 or more, or in any CBSA with a population of 1,000,000 or more that has one or more roadway segments with 250,000 or greater Annual Average Daily Traffic (AADT) counts. The Charlotte-Gastonia-Concord NC-SC MSA meets the population requirement of at least 1,000,000 or more persons. The Remount Road site is located in Charlotte, North Carolina and has a near-road NO_2 monitor.
2) Requirements for Area-wide NO_2 Monitoring – Each state must have one monitoring site in each CBSA with a population of 1,000,000 or more persons which will monitor a location of expected highest NO_2 concentrations representing the neighborhood or larger spatial scales. The Garinger High School (37-119-0041) site in Charlotte, North Carolina also operates an area-wide NO_2 monitor.
3) Regional Administrator Required Monitoring – The Regional Administrators, in collaboration with states, require a minimum of forty additional NO_2 monitoring sites above the minimum monitoring requirements (nationwide) in any area, with a primary focus on siting these monitors in locations to protect susceptible and vulnerable populations. The Greenville ESC (45-045-0015) site is a Regional Administrator Required Monitoring site.
4) NCore Requirement (NO/NO_y Monitoring) – Each NCore site must include a NO/NO_y monitor that will collect data to be used to produce conservative estimates for NO_2 and further Ozone research. The Parklane (45-079-0007) site in Columbia, South Carolina is the NCore site for South Carolina.

Minimum Monitoring for CO – The CO minimum monitoring criteria has two requirements:

1) Near-road CO Monitors – Each state with CBSAs having a population of 1,000,000 or more people must have one CO monitor collocated with one required near-road NO_2 monitor to be operational by January 1, 2017. The Charlotte-Concord-Gastonia, NC-SC MSA is the only CBSA in South Carolina that meets the population requirement for a collocated CO monitor. The Mecklenburg County Air Quality office operates a CO monitor at the Remount Road (37-119-0045) near road site in Charlotte, North Carolina that became operational on January 1, 2017.
2) NCore Requirement – Each NCore site in a CBSA with a population of 500,000 or more must include a CO monitor. The Parklane (45-079-0007) monitoring site in the Columbia, SC MSA is the NCore site for South Carolina and supports one

CO monitor. The Garinger (37-119-0041) monitoring site in Mecklenburg County is also an NCore site and supports a CO monitor.

Minimum Monitoring for the Photochemical Assessment Monitoring Stations (PAMS) – South Carolina is not subject to the PAMS requirement.

The CBSAs and the Minimum Monitoring Requirements – The term CBSA is a collective term for the defined MSAs and Micropolitan Statistical Areas (mSA). A MSA area contains a core urban area of 50,000 or more population, and a mSA contains an urban core of at least 10,000 but less than 50,000 population. Each metropolitan or micropolitan area consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core[7].

A MSA or mSA geographic composition, or list of geographic components at a particular point in time, is referred to as its "delineation". The MSA or mSA are delineated by the U.S. Office of Management and Budget (OMB) and are the result of the application of published standards based on Census Bureau data. The standards for delineating the areas are reviewed and revised once every ten years, prior to each decennial census. Generally, the areas are delineated using the most recent set of standards following each decennial census. Between censuses, the delineations are updated annually to reflect the most recent Census Bureau population estimates. Areas based on the 2010 standards and Census Bureau data were delineated in July of 2017[8,9].

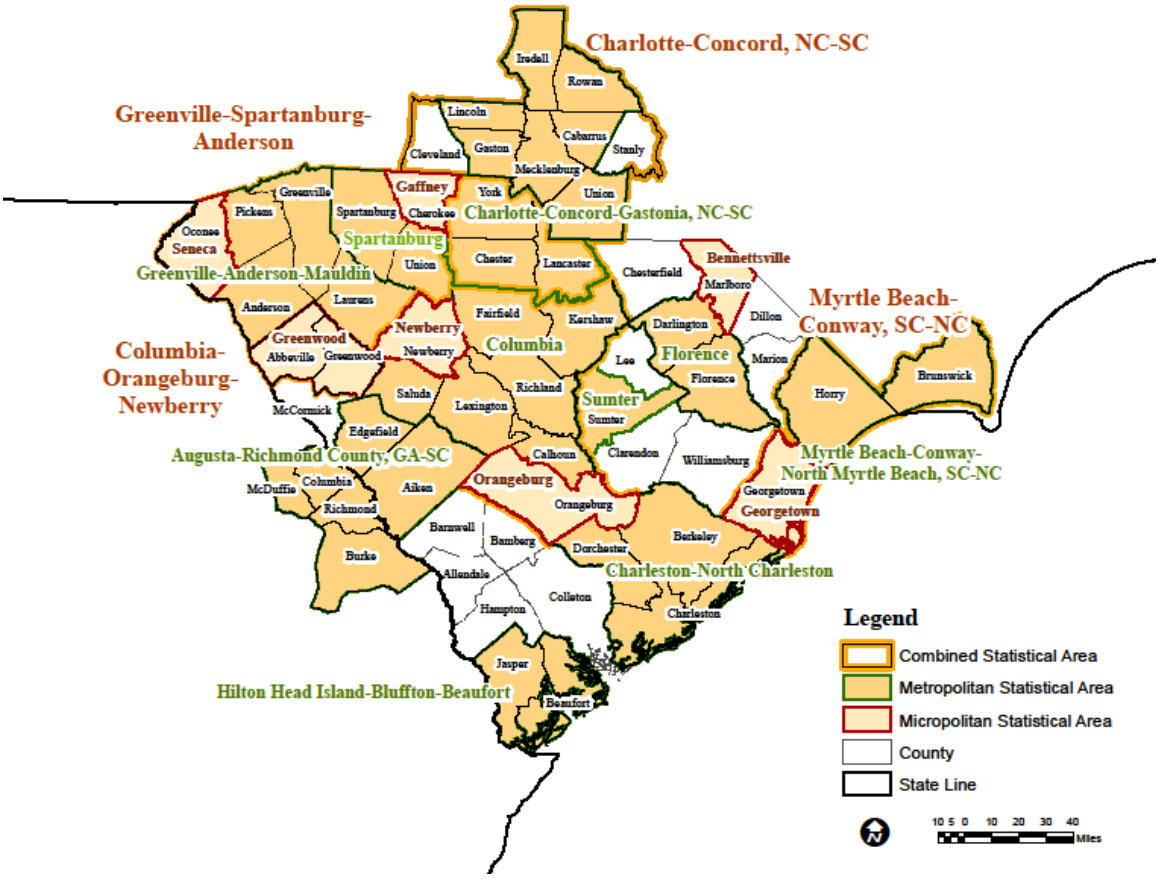
While the Department understands the need for establishing minimum monitoring requirements, the EPA appropriately has mechanisms within the network plan approval and network assessment process to allow states the flexibility to implement a monitoring network that meets the three basic monitoring objectives and addresses National and State needs. The recent changes in the MSA definitions are an example of the reasons for the incorporation of flexibility in the regulations and illustrate the necessity that the EPA uses the discretion available in the monitoring regulations to afford states flexibility and regulatory certainty.

Per 40 CFR Part 58, Appendix D, paragraph 2 (e), minimum monitoring requirements in multi-state MSAs can be met through a cooperative agreement. In the absence of an agreement between states, the minimum monitoring requirements must be met independently in each portion of the MSA. South Carolina has established a memorandum of agreement (MOA) with the Georgia Department of Natural Resources, Environmental Protection Division[10], North Carolina Department of Environmental and

[7] https://www.census.gov/programs-surveys/metro-micro.html
[8] https://www.census.gov/programs-surveys/metro-micro.html
[9] OMB Bulletin No. 15-01-"Revised Delineations of Metropolitan Statistical Areas, Micropolitan Statistical Areas, and Combined Statistical Areas, and Guidance on Uses of the Delineations of These Areas", August 15, 2017.
[10] The Memorandum of Agreement on Air Quality Monitoring for Criteria Pollutants for the Augusta-Richmond County Metropolitan Statistical Area (MSA) was signed on March 6, 2017 by the South Carolina DHEC Bureau of Air Quality and the Georgia Environmental Protection Division-Air Protection Branch.

Natural Resources Division of Air Quality, and Mecklenburg County, North Carolina[11,12] which specifies the responsibilities of each party to develop a monitoring network that meets the appropriate monitoring objectives for the MSA.

The map below presents South Carolina's CBSAs based on the latest available definitions published in July, 2017.



Population and the Minimum Monitoring Requirements – The minimum monitoring criteria only applies to MSAs. The table below presents the latest 2017* population estimates for each MSA in South Carolina and the total population of MSAs shared with North Carolina and Georgia.

[11] The Memorandum of Agreement on Air Quality Monitoring for Criteria Pollutants for the Myrtle Beach-Conway-North Myrtle Beach, SC-NC Metropolitan Statistical Area (MSA) was signed on July 1, 2015 by the South Carolina DHEC Bureau of Air Quality and the North Carolina Department of Environmental and Natural Resources-Division of Air Quality.

[12] The Memorandum of Agreement on Air Quality Monitoring for Criteria Pollutants for the Charlotte-Gastonia-Concord Metropolitan Statistical Area (MSA) was signed on July 1, 2016 by the South Carolina DHEC Bureau of Air Quality, the North Carolina Department of Environmental and Natural Resources-Division of Air Quality and the Mecklenburg County, North Carolina Land Use and Environmental Service Agency-Air Quality.

MSA	2017 Population
Charlotte-Concord-Gastonia, NC-SC MSA	2,525,305
Greenville-Anderson-Mauldin MSA	895,923
Columbia MSA	825,033
Charleston-North Charleston MSA	775,831
Augusta-Richmond County, GA-SC MSA	600,151
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	464,165
Spartanburg MSA	334,391
Florence MSA	205,831
Hilton Head Island-Bluffton-Beaufort MSA	215,302
Sumter MSA	106,847
*United States Census Bureau and CFR 40 Part 58, Appendix D	

South Carolina Minimum Monitoring Requirements – Based on the *latest available United States Census population estimates and the 2017 ambient air quality design values (page 16), the minimum monitoring requirements for each MSA are:

MSA	Ozone	$PM_{2.5}$	$PM_{2.5}$ Cont.	PM_{10}	Lead	SO_2	$NO/NO_y/NO_2$	CO
**Augusta-Richmond County, GA-SC MSA	2	1	1	1-2	0	0	0	0
Charleston-North Charleston, MSA	1	1	1	1-2	0	1	0	0
**Charlotte-Concord-Gastonia, NC-SC MSA	2	2	1	2-4	0	1	2	2
Columbia MSA (NCore)	2	1	1	1-2	0	1	2	1
Florence MSA	1	0	0	0	0	0	0	0
Greenville-Anderson-Mauldin MSA	2	1	1	1-2	0	0	1	0
Hilton Head Island-Bluffton-Beaufort MSA	0	0	0	0	0	0	0	0
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	1	0	0	0-1	0	0	0	0
Spartanburg MSA	1	0	0	0-1	0	0	0	0
Sumter MSA	0	0	0	0	0	0	0	0

*United States Census Bureau http://www.census.gov/population/metro/data/def.html and CFR 40 Part 58, Appendix D.

** Minimum ambient air monitoring requirements are met cooperatively with the States of Georgia and North Carolina.

Summary of 2019 Network Changes

Augusta-Richmond County, GA-SC MSA (South Carolina portion includes Aiken and Edgefield Counties)

No changes planned for 2019.

Charleston-North Charleston MSA

No changes planned for 2019.

Charlotte-Concord-Gastonia, NC-SC MSA

No changes planned for 2019.

Columbia MSA

No changes planned for 2019.

Florence MSA

No changes planned for 2019.

Greenville-Anderson-Mauldin MSA

Garrison Arena (45-007-0006) Site – This Site will be established in 2019.

Big Creek (45-007-0005) Site – This Site will be terminated after the 2019 Ozone season.

Hilton Head Island-Bluffton-Beaufort MSA

No changes planned for 2019.

Myrtle Beach-Conway-North Myrtle Beach SC-NC MSA

No changes planned for 2019.

Spartanburg MSA

No changes planned for 2019.

Sumter MSA

No changes planned for 2019.

Remainder of State

No changes planned for 2019.

Summary of 2018 Network Changes

Augusta-Richmond County, GA-SC MSA (South Carolina portion includes Aiken and Edgefield Counties)

No changes planned for 2018.

Charleston-North Charleston MSA

Moncks Corner National Guard (45-015-1002) Site – This Site will be established in 2018.

FAA (45-019-0048) Site – The $PM_{2.5}$ sampler was discontinued in May, 2018.

Bushy Park (45-015-0002) Site – This Site will be terminated at the end of the 2018 Ozone season.

Cape Romain (45-019-0046) Site – This site was designated as the required regional background for $PM_{2.5}$. The $PM_{2.5}$ monitoring designation was changed from SPM to SLAMS.

Charlotte-Concord-Gastonia, NC-SC MSA

York Landfill (45-091-0008) Site – A SO_2 monitor will be added.

Columbia MSA

No changes planned for 2018.

Florence MSA

No changes planned for 2018.

Greenville-Anderson-Mauldin MSA

Clemson (45-077-0002) Site – This site will be terminated at the end of the 2018 Ozone season.

Wolf Creek (45-077-0003) Site – This site will be terminated at the end of the 2018 Ozone season.

Hilton Head Island-Bluffton-Beaufort MSA

No changes planned for 2018.

Myrtle Beach-Conway-North Myrtle Beach SC-NC MSA

No changes planned for 2018.

Spartanburg MSA

T. K. Gregg (45-083-0011) Site – This site had a collocated $PM_{2.5}$ sampler added on May, 2018.

Sumter MSA

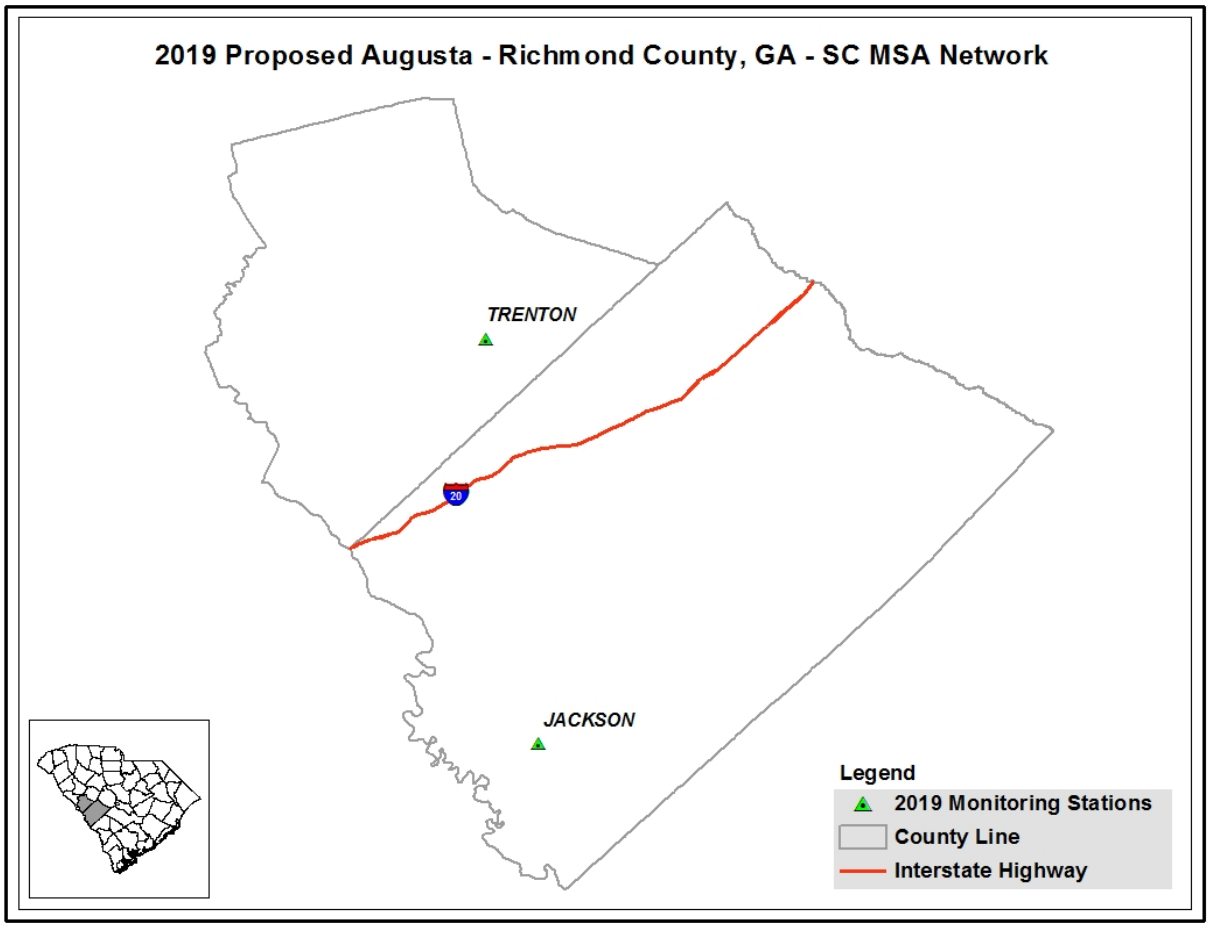
No changes planned for 2018.

Remainder of State

Ashton (45-029-0002) Site – The $PM_{2.5}$ monitoring designation will be changed from SLAMS to SPM.

Site Descriptions

Augusta-Richmond County, GA-SC MSA (part)



Classification of Monitoring Type by Site

Site ID	Site Name	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	Lead	Ozone	SO_2	NO_2	CO
45-003-0003	Jackson Middle School						●			
45-037-0001	Trenton	O	O				●			
TOTAL		1	1	0	0	0	2	0	0	0
O SPM / Other ● SLAMS ●●/OO duplicate / QA monitors										

Jackson Middle School

CSA/MSA: none/Augusta-Richmond County MSA
AQS Site ID: 45-003-0003
Location: 8217 Atomic Road, Jackson
County: Aiken
Coordinates: +33.34219, -81.78872
Date Established: October 24, 1985
Site Evaluation: January 10, 2018

The Jackson Middle School site is located in southwestern Aiken County, within the town limits of Jackson at the Jackson Middle School. Jackson is located in a suburban setting to monitor concentrations upwind of the Augusta urbanized area. The Jackson site monitors for Ozone. The sample inlet is 128 meters from the nearest road.

This site meets siting criteria found in 40 CFR Part 58 Appendix E. The Northeast tree does not meet the requirements for tree height in the 40 CFR Part 58 Appendix E, Section 4 (Spacing from Obstructions), but there is still more than 270° unobstructed air flow around the probe.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Ozone 44201-2	Urban	Upwind Background	SLAMS	3.4	Ultraviolet Absorption (087)	Continuous

Trenton

CSA/MSA: none/Augusta-Richmond County MSA
AQS Site ID: 45-037-0001
Location: 660 Woodyard Road (Hwy 121)
County: Edgefield
Coordinates: +33.73993, -81.85362
Date Established: March 28, 1980
Site Evaluation: January 10, 2018

The Trenton site is located in southeastern Edgefield County. Trenton was originally established to monitor for Ozone crossing into South Carolina from Georgia. The Trenton site monitors for Ozone, intermittent $PM_{2.5}$, and continuous $PM_{2.5}$. The sample inlets are 30 meters from the nearest road.

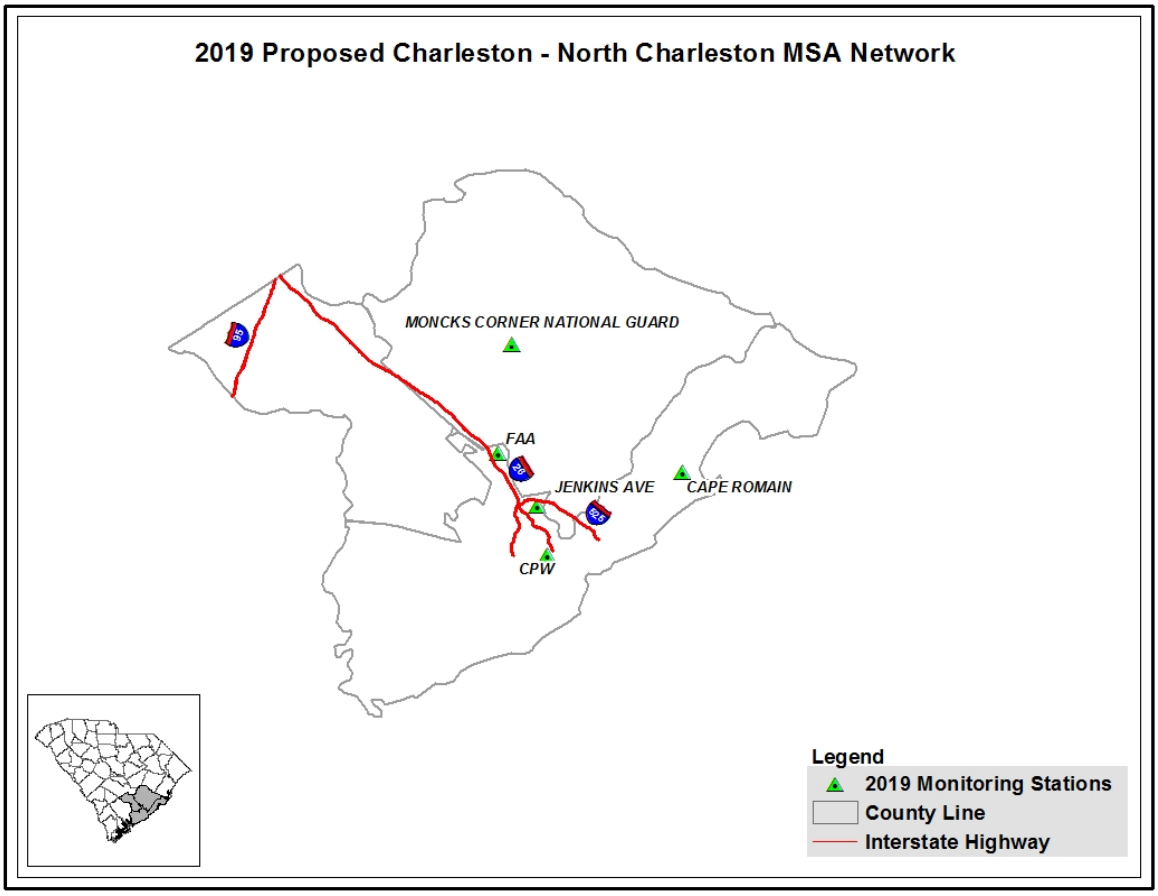
This site meets all 40 CFR Part 58, Appendix E requirements.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
$PM_{2.5}$ 88101-1	Urban	Extreme Downwind	SPM	4.76	Gravimetric (145)	1:3
Continuous $PM_{2.5}$ 88502-3	Urban	Extreme Downwind	SPM	4.53	TEOM Gravimetric 50°C (702)	Continuous
Ozone 44201-1	Urban	Maximum Ozone Concentration/ Extreme Downwind	SLAMS	3.45	Ultraviolet Absorption (087)	Continuous

Charleston-North Charleston MSA



Classification of Monitoring Type by Site

Site ID	Site Name	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	Lead	Ozone	SO_2	NO_2	CO	Precip.	MET
45-015-1002	Moncks Corner National Guard						●					
45-019-0003	Jenkins Ave. Fire Station				●			●	O			
45-019-0046	Cape Romain		●				●	O	O		O	●
45-019-0048	FAA	O										
45-019-0049	CPW	●	O									
TOTAL		2	2	0	1	0	2	2	2	0	1	1
O SPM / Other ● SLAMS ●●/OO duplicate / QA monitors												

Moncks Corner National Guard

CSA/MSA: none/Charleston-North Charleston MSA
AQS Site ID: 45-015-1002
Location: Airport Drive and Wal Flo Lane
County: Berkeley
Coordinates: 33.18, -80.03
Date Established: PENDING
Site Evaluation: PENDING

The Moncks Corner National Guard site is located in Moncks Corner downwind from the Charleston urban area. This site monitors for Ozone and the monitoring objective is maximum Ozone concentration. The sample inlet is XX meters from the nearest road.

This site will meet 40 CFR Part 58, Appendix E requirements.

Changes for 2019:
This site is expected to be established by the beginning of the 2019 Ozone season.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Ozone 44201-1	Urban	Max Ozone Concentration	SLAMS		Ultraviolet Absorption (087)	Continuous

Jenkins Ave. Fire Station

CSA/MSA: none/Charleston-North Charleston MSA
AQS Site ID: 45-019-0003
Location: 4830 Jenkins Ave.
County: Charleston
Coordinates: +32.88228, -79.97755
Date Established: February 14, 1969
Site Evaluation: April 19, 2018

The Jenkins Ave. Fire Station site is located in the city of North Charleston behind a fire station in an urban and central city setting. The Jenkins Ave. Fire Station site supports monitors for PM_{10}, SO_2, and NO_2. The sample inlets are 33.5 meters from the nearest road.

This site meets all 40 CFR Part 58, Appendix E requirements.

Changes for 2019:

The Department is planning on consolidating several of the sites including the Jenkins Ave. Site into a single monitoring site in North Charleston.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
PM_{10} 81102-3	Neighbor-hood	Highest Concentration	SLAMS	4.15	TEOM-Gravimetric (079)	Continuous
Sulfur Dioxide 42401-1	Neighbor-hood	Population Exposure	SLAMS	4.66	Pulsed Fluorescent (560)	Continuous
Nitrogen Dioxide 42602-2	Neighbor-hood	Highest Concentration Source Oriented	SPM	4.66	Chemilumi-nescence (599)	Continuous

Cape Romain

CSA/MSA: none/Charleston-North Charleston MSA
AQS Site ID: 45-019-0046
Location: 390 Bulls Island Road (Awendaw)
County: Charleston
Coordinates: +32.94101, -79.65719
Date Established: July 11, 1983
Site Evaluation: April 18, 2017

The Cape Romain site is located in Charleston County at the Cape Romain National Wildlife Refuge (NWR) near Moore's Landing. The Cape Romain NWR is a Class I area about 20 miles northeast of Charleston. The majority of the Refuge area is offshore, extending from Bull Island 20 miles northeast to Cape Romain. The Refuge is bordered on the west by the Intracoastal Waterway. Inland are large tracts of forests with scattered residences. Several miles inland, a primary coastal route, US Highway (Hwy) 17, parallels the coast, with some development along the section of highway that is closest to the Refuge.

The Cape Romain site has continuous monitors for SO_2, NO_2, Ozone, Continuous $PM_{2.5}$, and meteorological parameters. This site also serves as a required regional background for $PM_{2.5}$. The sample inlets are 86 meters from the nearest road.

This site meets siting criteria found in 40 CFR Part 58 Appendix E. The East tree does not meet the requirements for tree height in the 40 CFR Part 58 Appendix E Section 4 (Spacing from Obstructions), but there is still more than 270° unobstructed air flow around the probe.

Changes for 2019:
There are no changes planned for 2019.

Monitors:
(Table continues on next page)

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
$PM_{2.5}$ 88502-3	Regional	General / Background	SLAMS	4.75	FDMS (183)	Continuous
Ozone 44201-1	Regional	General / Background	SLAMS	4.10	Ultraviolet (047)	Continuous
Sulfur Dioxide 42401-2	Regional	Source Oriented	SPM	4.10	Pulsed Fluorescent (560)	Continuous
Nitrogen Dioxide	Regional	General / Background	SPM	4.10	Chemilumine-scence	Continuous

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
42602-1					(599)	
Wind Speed, Wind Direction and Precipita-tion	Neighbor-hood	Local Conditions	SLAMS	10.0	Instruments for wind speed, direction, and precipitation (020)	Continuous

FAA Beacon

CSA/MSA: none/Charleston-North Charleston MSA
AQS Site ID: 45-019-0048
Location: 2670 Elms Plantation Blvd
County: Charleston
Coordinates: +32.98024, -80.06502
Date Established: April 9, 1999
Site Evaluation: April 26, 2017

The Charleston FAA Beacon site is located in Charleston County approximately five miles northwest of the Charleston International Airport near Charleston Southern University. This site has a SPM $PM_{2.5}$ sampler. The sample inlet is 160 meters from the nearest road.

Although the 40 CFR Part 58.20 states that compliance to the siting regulations is optional, it is the Department's intent to meet as many of the Appendix E requirements as possible.

Changes for 2019:
The Department is planning on consolidating several of the sites including the FAA Site into a single monitoring site in North Charleston. The collocated $PM_{2.5}$ was temporarily moved to the T. K. Gregg monitoring site. When the new monitoring site is established, the $PM_{2.5}$ sampler will be moved back to the Charleston-North Charleston MSA.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
$PM_{2.5}$ 88101-1	Neighbor-hood	Population Exposure	SPM	2.35	Gravimetric (145)	1:1

Charleston Public Works (CPW)

CSA/MSA: none/Charleston-North Charleston MSA
AQS Site ID: 45-019-0049
Location: 360 Fishburne Street
County: Charleston
Coordinates: +32.79097, -79.95871
Date Established: November 20, 1998
Site Evaluation: April 26, 2017

The Charleston Public Works (CPW) site is located on the western side of the Charleston peninsula near downtown Charleston. The CPW site supports the required $PM_{2.5}$ monitors for the MSA. The sample inlets are 24.8 meters from the nearest road.

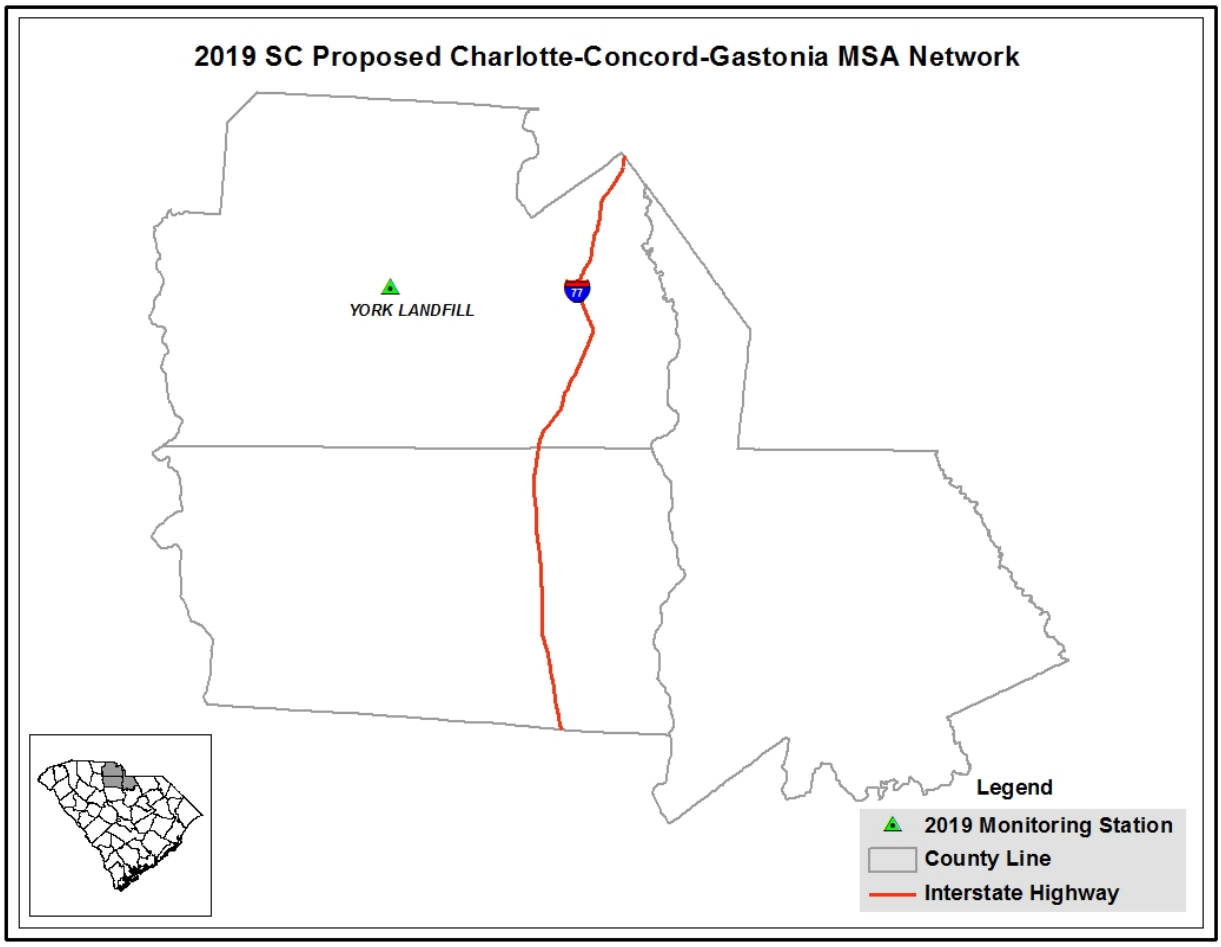
This site meets siting criteria found in 40 CFR Part 58 Appendix E. The Northeast tree does not meet the requirements for tree height or drip line in the 40 CFR Part 58 Appendix E, but there is still more than 270° unobstructed air flow around the probe. The Department is currently working with the land owners to have the trees obstructions removed or trimmed.

Changes for 2019:
The Department is planning on consolidating several of the sites including the CPW Site into a single monitoring site in North Charleston.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method & (Method Code)	Sampling Frequency
$PM_{2.5}$ 88101-1	Neighbor-hood	Population Exposure	SLAMS	2.25	Gravimetric (145)	1:1
$PM_{2.5}$ 88502-3	Neighbor-hood	Population Exposure	SPM	2.74	TEOM Gravimetric 50°C (702)	Continuous

Charlotte-Concord-Gastonia MSA



Classification of Monitoring Type by Site

Site ID	Site Name	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	Lead	Ozone	SO_2	NO_2	CO	MET
45-091-0008	York Landfill						●	O			
TOTAL		0	0	0	0	0	1	1	0	0	0
O SPM / Other ● SLAMS ●●/OO duplicate / QA monitors											

York Landfill

CSA/MSA: Charlotte-Concord CSA / Charlotte-Concord-Gastonia MSA
AQS Site ID: 45-091-0008
Location: 310 Langrum Branch Rd.
County: York
Coordinates: +34.9776, -81.2074
Date Established: February 27, 2017
Site Evaluation: February 27, 2018

The York Landfill site is located in south central York County in a rural setting. This site was established to replace the York Continuous Monitoring Site (45-091-0006) and represents background levels near the Charlotte urban area. The York Landfill Site currently operates monitors for Ozone and SO_2. The sample inlets are 34.8 meters from the nearest road

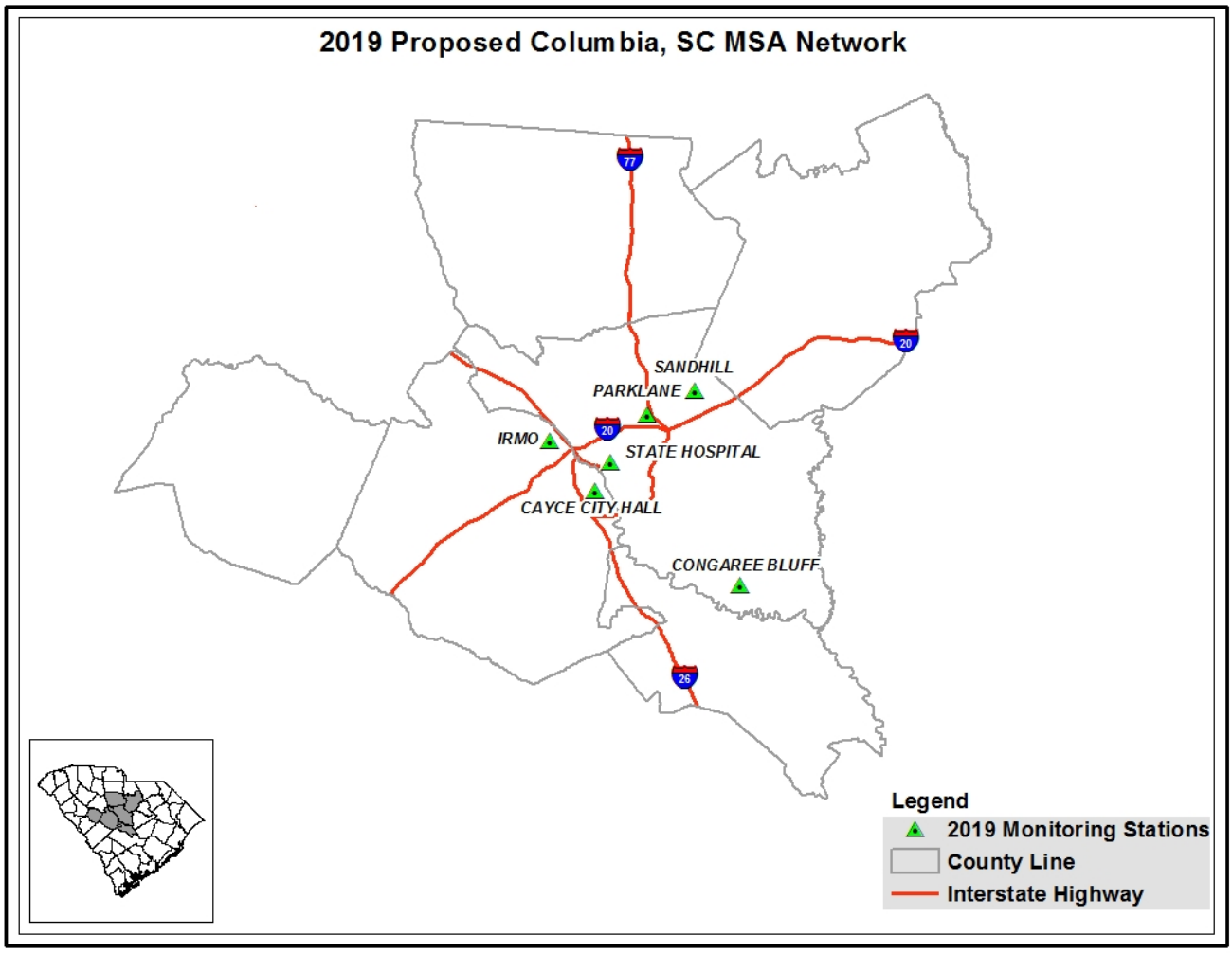
This site meets all 40 CFR Part 58, Appendix E requirements.

Changes for 2019:
This site is a replacement for the York Continuous Monitoring Site (45-091-0006).

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Ozone 44201-1	Urban	Upwind Background	SLAMS	4.55	Ultraviolet Absorption (087)	Continuous
Sulfur Dioxide	Urban	Upwind Background	SPM	4.55	Pulsed Fluorescence (560)	Continuous

Columbia MSA



Classification of Monitoring Type by Site

Site ID	Site Name	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	Lead	Ozone	SO_2	NO_2/NO/NO_y	CO	Carbonyls	SVOC	Precip. Chem.	Precip.	MET
45-063-0008	Irmo	●	O					O			O	O			
45-063-0010	Cayce City Hall				●										
45-079-0007	Parklane (NCore)	●●	●	●	O	●	●	●	●	●		O	O	O	●
45-079-0020	State Hospital										O	O			
45-079-0021	Congaree Bluff						O	O					O	O	
45-079-1001	Sandhill						●		O						
TOTAL		3	2	1	2	1	3	3	2	1	2	3	2	2	1
O SPM / Other ● SLAMS ●●/OO duplicate / QA monitors															

Irmo

CSA/MSA: Columbia-Orangeburg-Newberry CSA / Columbia MSA
AQS Site ID: 45-063-0008
Location: 200 Leisure Lane
County: Lexington
Coordinates: +34.051017, -81.15492
Date Established: April 7, 1989
Site Evaluation: November 28, 2017

The Irmo site is located in Lexington County near the Town of Irmo. This site has a sampler for $PM_{2.5}$ and continuous monitors for SO_2 and $PM_{2.5}$. Additionally, this site has samplers collecting Carbonyl and SVOC samples on a 1:6 schedule. The sample inlets are 39 meters from the nearest road.

This site meets all 40 CFR Part 58, Appendix E requirements.

Changes for 2019:
The landowner has requested that we relocate the site. We are working with the landowner to secure a new site on the same property. We will submit a request to the EPA to approve the site relocation once it has been identified.

Monitors:
(Table continues on next page)

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
$PM_{2.5}$ 88101-1	Neighbor-hood	Population Exposure	SLAMS	4.9	Gravimetric (145)	1:1
$PM_{2.5}$ 88101-3	Neighbor-hood	Population Exposure	SPM	4.4	FDMS Gravimetric (581)	Continuous
Sulfur Dioxide 42401-1	Neighbor-hood	Source-Oriented	SPM	3.33	Pulsed Fluorescent (560)	Continuous
Carbonyls	Neighbor-hood	Population Exposure/ General / Background	Non-regulatory	2.7	HPLC Ultraviolet Absorption (102)	1:6
SVOC	Neighbor-hood	Population Exposure/ General / Background	Non-regulatory	2.7	TO-13-EPA610-EPA625 (106)	1:6

Cayce City Hall

CSA/MSA: Columbia-Orangeburg-Newberry CSA / Columbia MSA
AQS Site ID: 45-063-0010
Location: 1 830 Morlaine Rd.
County: Lexington
Coordinates: +33.96914, -81.06629
Date Established: December 6, 2007
Site Evaluation: November 28, 2017

The Cayce City Hall site is located in the City of Cayce and measures PM_{10}. This site was established to measure PM_{10} concentrations in populated areas and to determine the potential impact of occasional high concentrations on neighborhoods surrounding the industrialized area. The sample inlet is 24 meters from the nearest road.

This site meets all 40 CFR Part 58, Appendix E requirements.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
PM_{10} 81102-1	Neighbor-hood	Population Exposure	SLAMS	2.42	TEOM-Gravimetric (079)	Continuous

Parklane (NCore)

CSA/MSA: Columbia-Orangeburg-Newberry CSA / Columbia MSA
AQS Site ID: 45-079-0007
Location: 8311 Parklane Road
County: Richland
Coordinates: +34.09398, -80.96230
Date Established: April 3, 1980
Site Evaluation: December 19, 2017

The Parklane site is located in north central Richland County within the city limits of Columbia. Parklane was originally sited to provide downwind population exposure measurements at the edge of the Columbia urban area population and has been expanded to support the full complement of NCore parameters. The suite of samplers measure $PM_{2.5}$, speciated $PM_{2.5}$, Lead, precipitation chemistry, precipitation, and SVOC. The suite of continuous monitors measure $PM_{2.5}$, Ozone, SO_2, CO, NO/NO_y. The site also provides support for demonstration, training, and equipment evaluation convenient to the Department's Columbia air laboratory. The sample inlets are 131 meters from the nearest road.

This site meets all 40 CFR Part 58, Appendix E requirements.

In 2017, the Bates House (45-079-0019) site, which operated the required collocated $PM_{2.5}$ sampling, was terminated. The collocated $PM_{2.5}$ sampling was moved to Parklane to fulfill duplicate sampling requirements found in 40 CFR Part 58, Appendix A.

Changes for 2019:
There are no changes planned for 2019.

Monitors:
*Bolded parameters are an NCore requirement.
(Table continues on next page)

Parameter *Required	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
$PM_{2.5}$ 88101-1	Neighbor-hood	Population Exposure	NCore SLAMS	4.9	Gravimetric (145)	1:3
$PM_{2.5}$ 88502-3	Neighbor-hood	Population Exposure	SLAMS	4.72	FDMS Gravimetric (183)	Continuous
Collocated $PM_{2.5}$ 88101-2	Neighbor-hood	Population Exposure	QA Collocated SLAMS	5.3	Gravimetric (145)	1:3
Speciated $PM_{2.5}$	Neighbor-hood	Population Exposure	NCore SLAMS	2.4	CSN Protocol	1:3

Parameter *Required	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
					(811,812,826,838,839,841, 842)	
PM_{10} 85101-1	Urban	Population Exposure	SPM	5.3	Gravimetric (127)	1:3
$PM_{10-2.5}$ 86101-1	Neighbor-hood	Population Exposure	NCore SLAMS	4.4	Gravimetric FRM Pair (176)	1:3
Lead 14129-2	Neighbor-hood	Population Exposure	NCore SLAMS	1.6	GFAA (191)	1:6
Ozone 44201-1	Urban	Max Ozone Concentra-tion	NCore SLAMS	4.45	Ultraviolet Absorption (087)	Continuous
Sulfur Dioxide 42401-1	Neighbor-hood	Population Exposure/ Other	NCore SLAMS	4.45	Pulsed Fluorescent (560)	Continuous
Nitric Oxide /NO_y 42600-2 42601-2	Neighbor-hood	Population Exposure	NCore SLAMS	10.0	Chemi-luminesence (674)	Continuous
Carbon Monoxide 42101-1	Neighbor-hood	Population Exposure	NCore SLAMS	4.45	Gas filter Correlation (593)	Continuous
SVOC	Neighbor-hood	Population Exposure	SPM	1.4	PUF-GC/MS	1:6
Precipitation chemistry	Neighbor-hood	Regional Transport	Non-regulatory	1.4	Not applicable	Weekly-Tues-Tues
Precipitation	Neighbor-hood	General / Background	SPM	1.1	Tipping bucket (011)	Continuous and Sample
Wind Speed / Direction	Neighbor-hood	Local Conditions	SLAMS	10.0	Instruments for wind speed/wind direction (020)	Continuous

State Hospital

CSA/MSA: Columbia-Orangeburg-Newberry CSA / Columbia MSA
AQS Site ID: 45-079-0020
Location: 2100 Bull Street
County: Richland
Coordinates: +34.01549, -81.03418
Date Established: January 7, 1999
Site Evaluation: November 28, 2017

The State Hospital site is located in Columbia near the intersection of Elmwood Avenue and Bull Street on the grounds of the South Carolina State Hospital. State Hospital has samplers for Carbonyls and SVOC. The sample inlets are 10 meters from the nearest road.

Access to this site may be lost due to recent sale and expected redevelopment of the property.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Carbonyls	Middle	Highest Concentration	Non-regulatory	4.2	HPLC Ultraviolet Absorption (102)	1:6
SVOC	Microscale	Highest Concentration	Non-regulatory	4.3	EPA610-EPA625	1:6

Congaree Bluff

CSA/MSA: Columbia-Orangeburg-Newberry CSA / Columbia MSA
AQS Site ID: 45-079-0021
Location: 1850 South Cedar Creek Road
County: Richland
Coordinates: +33.81467, -80.78113
Date Established: December 27, 1999
Site Evaluation: February 8, 2018

The Congaree Bluff site is located in southern Richland County. The site is located in a rural setting within the boundaries of the Congaree National Park. The Congaree Bluff monitoring continues a data record begun in 1981 with the establishment of the Congaree Swamp site (45-079-1006). The original site was established in cooperation with the Department of the Interior and the support of the General Assembly to provide long term monitoring in this unique area. The Congaree Swamp site was located in the flood plain and had to be relocated to the current Congaree Bluff site in 2001. Monitoring activities at this site are intended to represent conditions found in the National Park only. The Congaree Bluff site has monitors for Ozone, SO_2, precipitation, and precipitation chemistry. The sample inlets are 188 meters from the nearest road.

On May 26, 2016, the EPA issued a waiver for 40 CFR Part 58, Appendix E, Section 4-Spacing from Obstructions and Section 11-Summary for tree obstructions. This site meets all other siting criteria found in CFR 40 Part 58, Appendix E. Furthermore, there is a dripline issue with a large long-leaf pine to the east of the monitoring site. The drip line is approximately 7 meters away from the probe inlet. However, the branches of the tree are approximately 80 feet above the probe inlet. Due to the height of the branches and the fact that it is a pine tree (with little surface area for pollutants to collect on the leaves and branches), the Department does not believe that it impacts measurements of ambient air pollutant concentrations.

Changes for 2019:
There are no changes planned for 2019.

Monitors:
(Table continues on next page)

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Ozone 44201-1	Neighbor-hood	General / Background	SPM	4.15	Ultraviolet (047)	Continuous
Sulfur Dioxide	Neighbor-hood	General / Background	SPM	4.15	Pulsed Fluorescent	Continuous

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
42401-1					(560)	
Precipita-tion Chemistry	Regional	Regional Transport	Non-regulatory	1.70	IC	Weekly-Tue-Tue
Precipita-tion	Neighbor-hood	General/ Background	SPM	1.6	Tipping Bucket (011)	Continuous and Sample

Sandhill Experimental Station

CSA/MSA: Columbia-Orangeburg-Newberry CSA / Columbia MSA
AQS Site ID: 45-079-1001
Location: 900 Clemson Road
County: Richland
Coordinates: +34.13126, -80.86832
Date Established: January 1, 1959
Site Evaluation: December 19, 2017

The Sandhill Experimental Station site is located in northeastern Richland County, downwind from the Columbia metropolitan area. This site is located in a rapidly urbanizing portion of the city of Columbia. The Sandhill site measures Ozone and NO_2. The sample inlets are 31 meters from the nearest road.

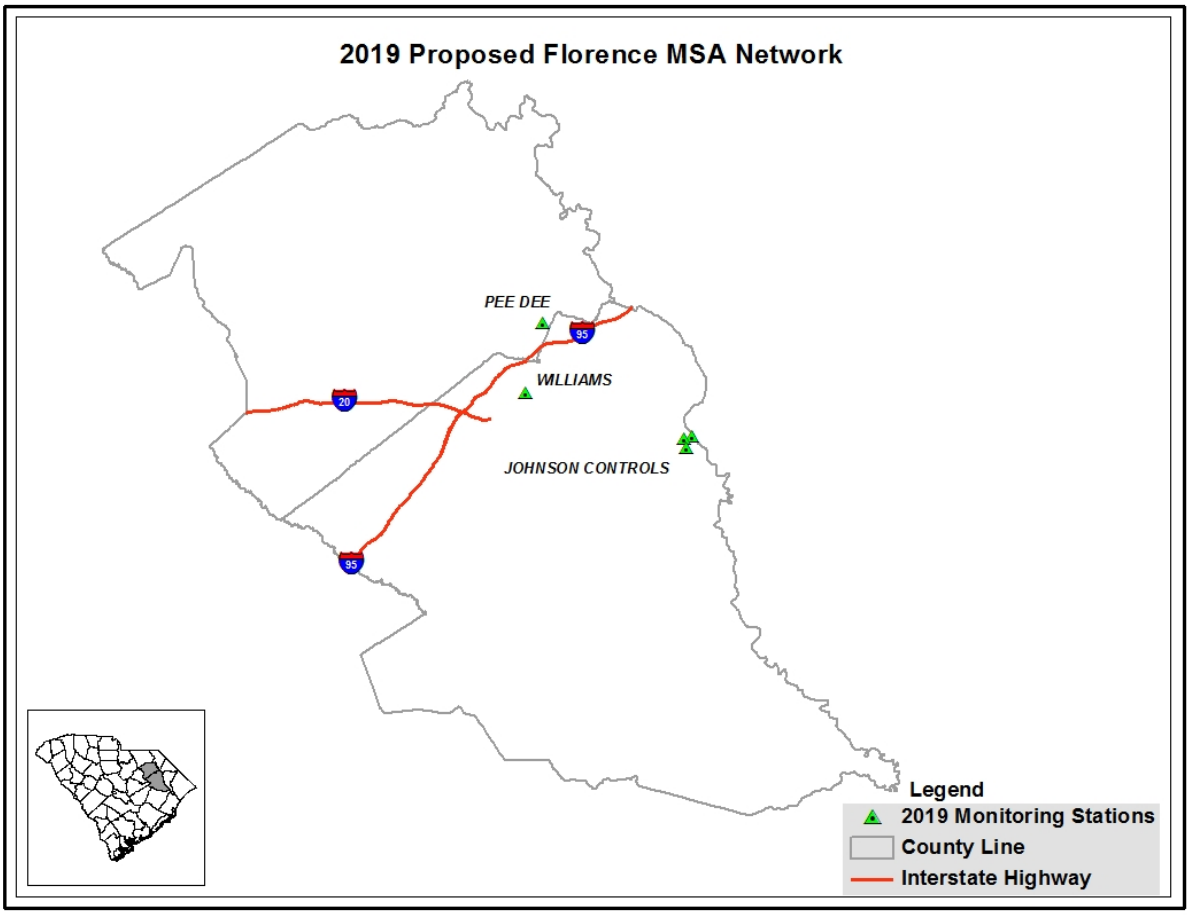
This site meets all 40 CFR Part 58, Appendix E requirements.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Ozone 44201-1	Urban	Max Ozone Concentration	SLAMS	4.12	Ultraviolet Absorption (087)	Continuous
Nitrogen Dioxide 42602-1	Urban	General / Background Max Precursor Emissions	SPM	4.12	Chemi-luminesence (599)	Continuous

Florence MSA



Classification of Monitoring Type by Site

Site ID	Site Name	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	Lead	Ozone	SO_2	NO_2	CO
45-031-0003	Pee Dee Exp. Station						●			
45-041-0003	Williams Middle School	●	●							
45-041-8001, 8002, 8003	Johnson Controls					O *				
TOTAL		1	1	0	0	*7	1	0	0	0

O SPM / Other ● SLAMS ●●/OO duplicate / QA monitors
* See details on site page for number of samplers

Pee Dee Experimental Station

CSA/MSA: none/Florence MSA
AQS Site ID: 45-031-0003
Location: 2200 Pocket Road (Darlington)
County: Darlington
Coordinates: +34.28569, -79.74485
Date Established: February 25, 1993
Site Evaluation: April 4, 2017

The Pee Dee Experimental Station site is located in northeastern Darlington County. This site serves as the required Ozone monitor in the Florence MSA. The sample inlets are 215.8 meters from the nearest road.

This site meets all 40 CFR Part 58, Appendix E requirements.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Ozone 44201-1	Urban	Max Ozone Concentration/ General / Background	SLAMS	4.14	Ultraviolet Absorption (087)	Continuous

Williams Middle School

CSA/MSA: none/Florence MSA
AQS Site ID: 45-041-0003
Location: 1119 N. Irby Street
County: Florence
Coordinates: +34.21427, -79.76735
Date Established: August 4, 2008
Site Evaluation: April 4, 2017

The Williams Middle School site is located in Florence County. The Department established the Williams site to meet the 40 CFR Part 58 Appendix D requirements for objective, collocated continuous monitoring, and reporting. The Florence MSA has one $PM_{2.5}$ sampler. A collocated continuous monitor is also required to provide timely reporting of concentrations to the public. The sample inlets are 110 meters from the nearest road.

This site meets all 40 CFR Part 58, Appendix E requirements.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
$PM_{2.5}$ 88101-1	Neighbor-hood	Population Exposure/ Highest Concentration	SLAMS	2.65	Gravimetric (145)	1:3
$PM_{2.5}$ 88502-3	Neighbor-hood	Population Exposure	SLAMS	2.43	TEOM Gravimetric 30° C (704)	Continuous

Johnson Controls (3 Sites-JCI Railroad, JCI Entrance, JCI Woods)

CSA/MSA: none/Florence MSA
AQS Site ID: 45-041-8001, 8002, 8003
Location: Liberty Chapel @ Bethel Rd., Liberty Chapel @ Paper Mill Rd., Liberty Chapel @ Paper Mill Rd.
County: Florence
Coordinates: +34.15567, -79.56981; +34.16413, -79.572330; +34.16747, -79.56266
Dates Established: January 4-10, 2012
Site Evaluation: June 1, 2017

Johnson Controls Incorporated (JCI) is located in Florence County. On May 7, 2010, the Department issued an air synthetic minor construction permit to Johnson Controls Battery Group for the Florence Recycling Center (Permit No. 1040-0129-CA). Under a settlement agreement with several petitioners[13], the Florence Recycling Center will conduct source-oriented ambient Lead monitoring at three locations around the facility.
* The JCI samplers are set on a 1:6 sampling schedule. In order to reduce the amount of time that staff must collect the filters, additional samplers have been added to each site. Sampling frequency may be increased if needed for special investigations.

The 40 CFR Part 58.20 states that compliance to the siting regulations is optional, but it is the Department's intent to meet as many of the Appendix E requirements as possible. The JCI Railroad (45-041-8001) site has one sampler. There is also a second sampler that runs consecutively. The JCI Railroad (45-041-8001) site meets 40 CFR Part 58, Appendix E requirements.

The JCI Entrance (45-041-8002) site has two samplers. There is also a third sampler that runs consecutively. The JCI Entrance (45-041-8002) site meets all 40 CFR Part 58, Appendix E requirements.

The JCI Woods (45-041-8003) site has one sampler. There is also a second sampler that runs consecutively. The JCI Woods (45-041-8003) site meets 40 CFR Part 58, Appendix E requirements except Section 4-Spacing from Obstructions and Section 11-Summary siting requirements due to tree obstructions. However, the tree obstructions in the predominant wind direction toward the source have been removed.

[13] Coastal Conservation League and League of Women Voters of South Carolina vs South Carolina Department of Health and Environmental Control and Johnson Controls Battery Group, Inc., (State of SC, 2010).

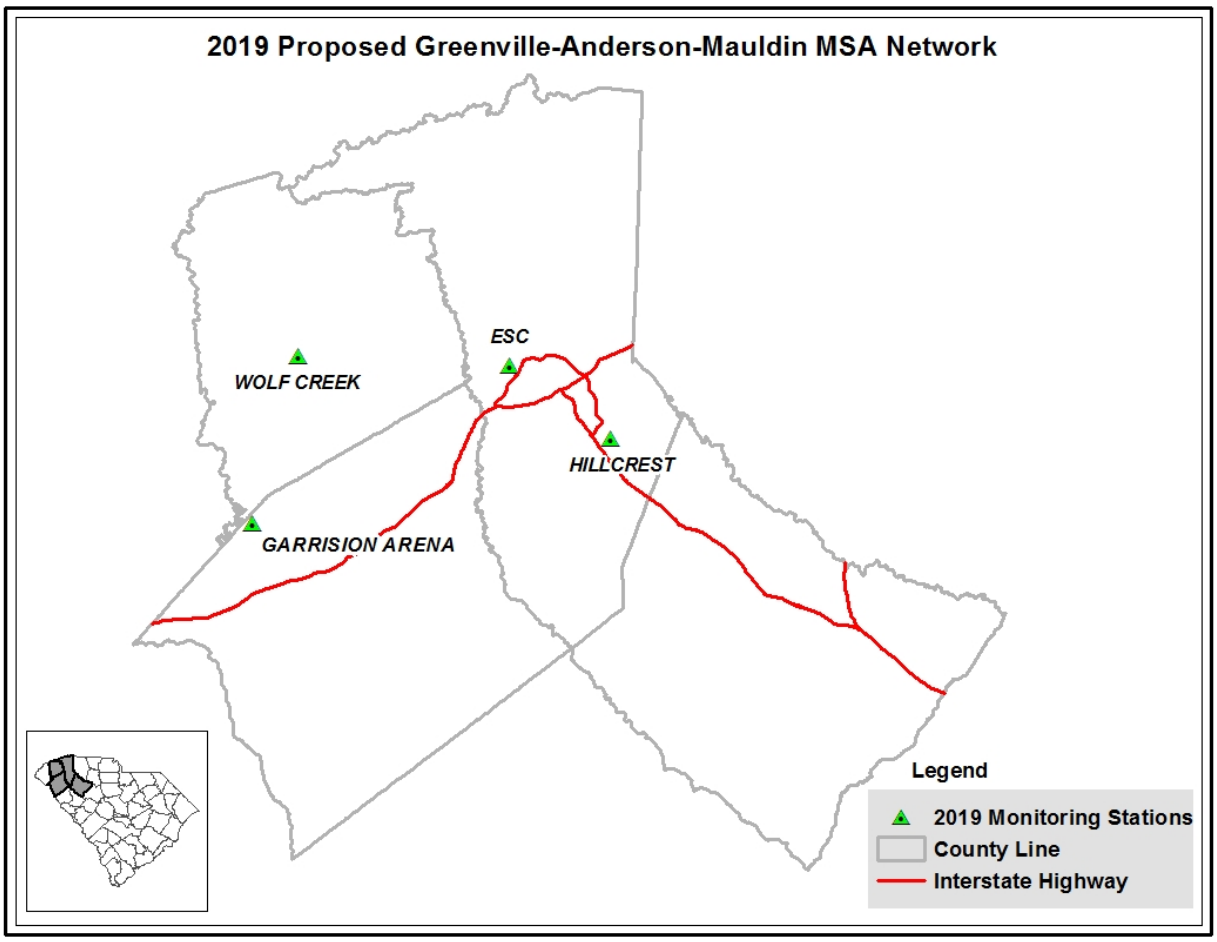
Changes for 2019:
There are no changes planned for 2019.

Monitors:

Site ID	Parameter	Scale	Objective	Desig-nation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
041-8001	Lead 14129	Middle	Source oriented	SPM	2.42	ICP/MS (193)	1:6
*041-8001	Lead 14129	Middle	Source oriented	SPM	2.62	ICP/MS (193)	1:6
041-8002	Lead 14129	Middle	Source oriented	SPM	2.3	ICP/MS (193)	1:6
041-8002	Lead 14129	Middle	Source oriented	SPM	2.3	ICP/MS (193)	1:6
*041-8002	Lead 14129	Middle	Source oriented	SPM	2.6	ICP/MS (193)	1:6
041-8003	Lead 14129	Middle	Source oriented	SPM	2.42	ICP/MS (193)	1:6
*041-8003	Lead 14129	Middle	Source oriented	SPM	2.74	ICP/MS (193)	1:6

*duplicate samplers for better staff utilization

Greenville-Anderson-Mauldin MSA



Classification of Monitoring Type by Site

Site ID	Site Name	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	Lead	Ozone	SO_2	NO_2	CO	Met
45-007-0005	Big Creek						●				
45-007-0006	Garrison Arena						●				
45-045-0015	Greenville ESC	●	O		●			●	●		
45-045-0016	Hillcrest	●●					●				●
TOTAL		3	1	0	1	0	3	1	1	0	1
O SPM / Other ● SLAMS ●●/OO duplicate / QA monitors											

Big Creek

CSA/MSA: Greenville-Spartanburg-Anderson CSA / Greenville-Anderson-Mauldin MSA
AQS Site ID: 45-007-0005
Location: 215 McAlister Road
County: Anderson
Coordinates: +34.62324, -82.53206
Date Established: June 4, 2008
Site Evaluation: February 15, 2018

The Big Creek site is located northeast of the City of Anderson. The site was established to represent maximum Ozone concentrations in the Anderson MSA, downwind of Anderson and upwind background for the Greenville MSA. In February 2013, the MSA definitions were changed, and this site is now contained within the Greenville-Anderson-Mauldin MSA. The sample inlet is 43.9 feet from the nearest road.

This site meets all 40 CFR Part 58, Appendix E requirements.

Changes for 2019:
In 2019, this site will run concurrently with the Garrison Arena Site and will be terminated after the Ozone season.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Ozone 44201-1	Urban	Max Ozone Concentration / Upwind Background	SLAMS	4.1	Ultraviolet Absorption (087)	Continuous

Garrison Arena

CSA/MSA: Greenville-Spartanburg-Anderson CSA / Greenville-Anderson-Mauldin MSA
AQS Site ID: 45-007-0006
Location: Woodburn Road, Pendleton
County: Anderson
Coordinates: 34.63, -82.81
Date Established: PENDING
Site Evaluation: PENDING

The Garrison Arena site is located on the grounds of Clemson University at the T. Ed Garrison Arena near the northern border of Anderson County. This monitor measures Ozone concentrations upwind of the Greenville-Spartanburg urbanized area.

This site is XX.X meters from the nearest road.

This site will meet siting criteria found in 40 CFR Part 58 Appendix E.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Ozone 44201-1	Urban	General / Background	SLAMS		Ultraviolet Absorption (087)	Continuous

Employment Security Commission (ESC)

CSA/MSA: Greenville-Spartanburg-Anderson CSA / Greenville-Anderson-Mauldin MSA
AQS Site ID: 45-045-0015
Location: 133 Perry Avenue
County: Greenville
Coordinates: +34.84389, -82.41458
Date Established: April 11, 2008
Site Evaluation: November 14, 2017

The Greenville ESC site is located in the city of Greenville and was established on April 11, 2008. This site supports a $PM_{2.5}$ sampler and continuous monitoring for $PM_{2.5}$. It also supports PM_{10}, SO_2, NO_2, and measurements for wind speed and wind direction. The sample inlets are 15. meters from the nearest road. The EPA Region 4 has selected this site as one of the locations for a Regional Administrator required NO_2 monitor to help protect susceptible and vulnerable populations, as required by 40 CFR, Part 58, Appendix D, Section 4.3.4.

This site meets siting criteria found in 40 CFR Part 58 Appendix E except Section 4-Spacing from Obstructions. The site has a Site Waiver from the EPA for trees located to the Southeast and Southwest of the site. There is still 270° of airflow around the probes.

Changes for 2019:
There are no changes planned for 2019.

Monitors:
(Table continues on next page)

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
$PM_{2.5}$ 88101-1	Neighbor-hood	Population Exposure / Welfare Related Impacts/ Collocated	SLAMS	3.5	Gravimetric (145)	1:1
$PM_{2.5}$ 88101-3	Neighbor-hood	Population Exposure/ Welfare Related Impacts	SPM	4.55	FDMS Gravimetric (581)	Continuous
PM_{10} 81102-1	Neighbor-hood	Population Exposure	SLAMS	4.26	TEOM Gravimetric (079)	Continuous
Sulfur	Neighbor-	Population	SLAMS	4.54	Pulsed	Continuous

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Dioxide 42401-1	hood	Exposure			fluorescent (560)	
Nitrogen Dioxide 42602-1	Neighbor-hood	Population Exposure	SLAMS	4.54	Chemilumin escence (599)	Continuous

Hillcrest Middle School

CSA/MSA: Greenville-Spartanburg-Anderson CSA / Greenville-Anderson-Mauldin MSA
AQS Site ID: 45-045-0016
Location: 510 Garrison Road
County: Greenville
Coordinates: +34.75185, -82.25670
Date Established: February 17, 2009
Site Evaluation: November 14, 2017

The Hillcrest Middle School site represents suburban areas near the interstate corridors in the Greenville MSA. Initiated in 2008, this site was selected as a monitoring location based on results of the Greenville MSA Ozone study. This site supports an Ozone monitor, a $PM_{2.5}$ sampler, and a collocated $PM_{2.5}$ sampler. The sample inlets are 54 meters from the nearest road.

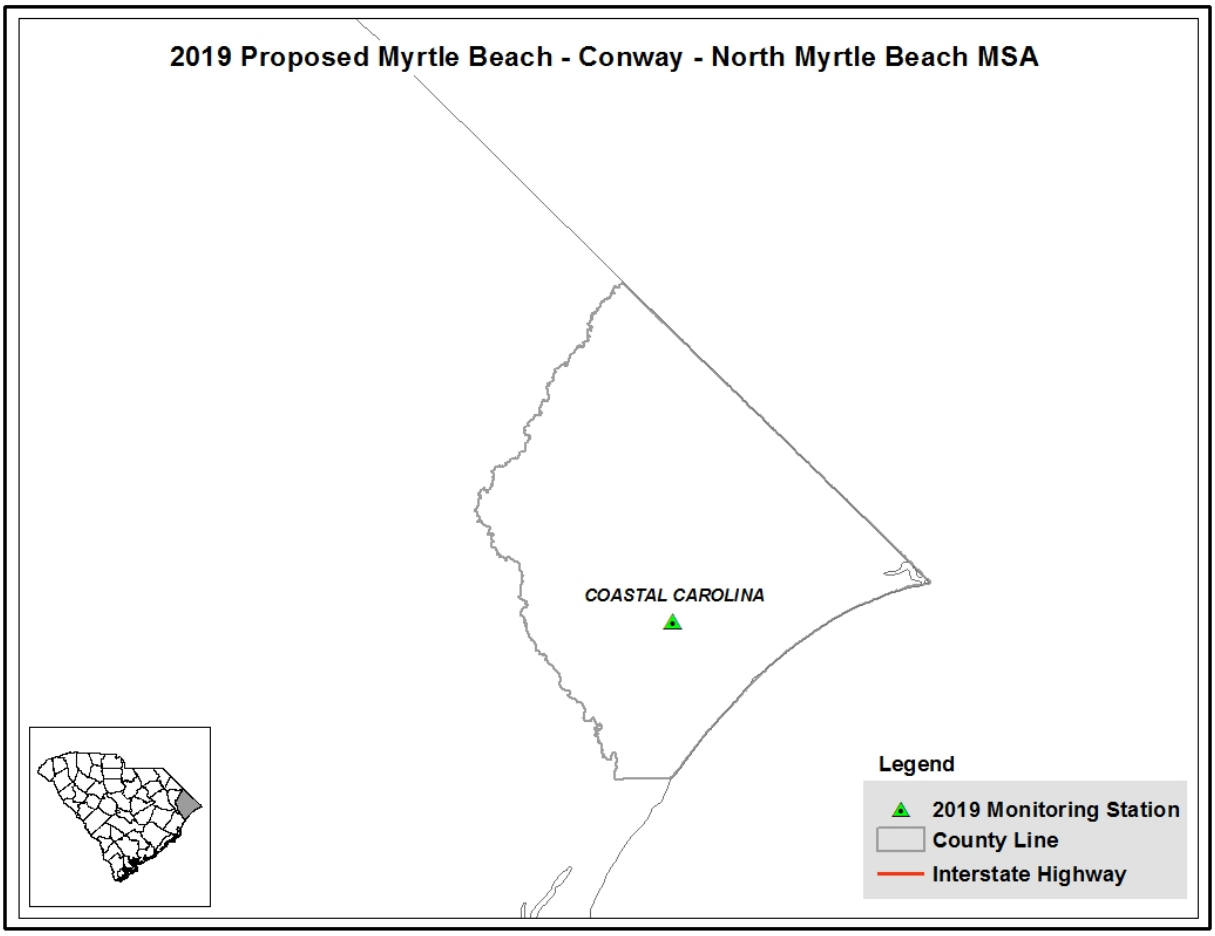
This site meets all 40 CFR Part 58, Appendix E requirements.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
$PM_{2.5}$ 88101-1	Urban	Population Exposure	SLAMS	3.41	Gravimetric (145)	1:3
Collocated $PM_{2.5}$ 88101-2	Urban	Population Exposure	QA Collocated SLAMS	3.5	Gravimetric (145)	1:3
Ozone 44201-1	Urban	Population Exposure	SLAMS	3.83	Ultraviolet Adsorption (087)	Continuous
Wind Speed / Direction	Neigh bor-hood	Local Conditions	SLAMS	10.0	Instruments for wind speed/wind direction (020)	Continuous

Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA



Classification of Monitoring Type by Site

Site ID	Site Name	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	Lead	Ozone	SO_2	NO_2	CO	MET
45-051-0008	Coastal Carolina						●				
TOTAL		0	0	0	0	0	1	0	0	0	0
O SPM / Other ● SLAMS ●●/OO duplicate / QA monitors											

Coastal Carolina

CSA/MSA: Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA
AQS Site ID: 45-051-0008
Location: Century Circle
County: Horry
Coordinates: 33.8007, -78.9939
Date Established: June 27, 2016
Site Evaluation: February 22, 2018

In February 2013, OMB combined Horry County with Brunswick County, NC to establish the Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA. In order to meet the minimum monitoring criteria in 40 CFR Part 58, Appendix D, at least one Ozone monitor is required in the MSA. In conjunction with the State of North Carolina, local government, and stakeholders, Department established the Coastal Carolina monitoring site to be representative of expected maximum Ozone concentrations in northeast South Carolina. The sample inlet is 18.3 meters from the nearest road.

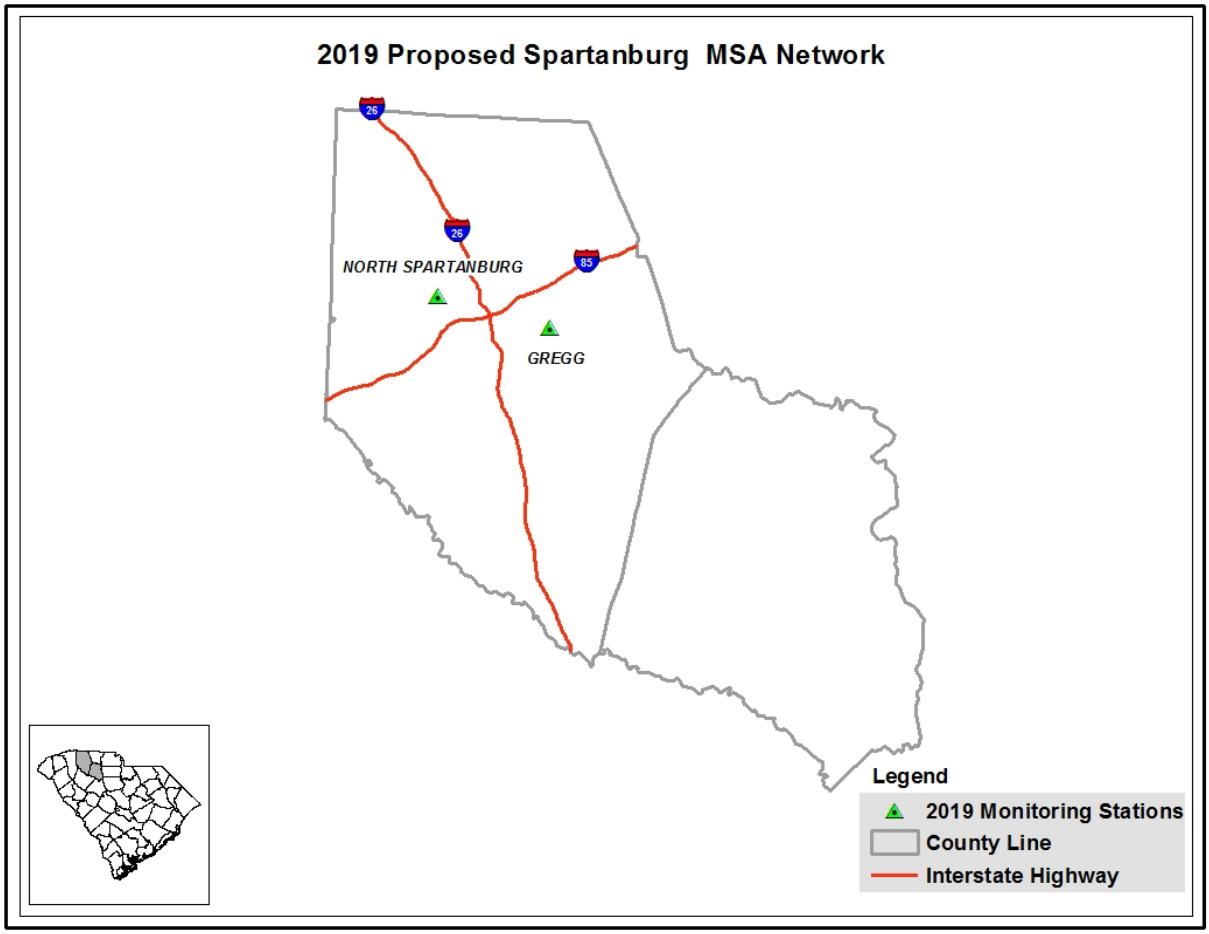
This site meets all 40 CFR Part 58, Appendix E requirements.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Ozone 44201-1	Urban	Population Exposure	SLAMS	4.1	Ultraviolet (047)	Continuous

Spartanburg MSA



Classification of Monitoring Type by Site

Site ID	Site Name	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	Lead	Ozone	SO_2	NO_2	CO
45-083-0009	North Spartanburg Fire Station #2						●			
45-083-0011	T.K. Gregg	●●	O							
TOTAL		2	1	0	0	0	1	0	0	0
O SPM / Other ● SLAMS		●●/OO duplicate / QA monitors								

North Spartanburg Fire Station #2

CSA/MSA: Greenville-Spartanburg-Anderson CSA / Spartanburg MSA
AQS Site ID: 45-083-0009
Location: 1556 John Dodd Road
County: Spartanburg
Coordinates: +34.98874, -82.07573
Date Established: April 4, 1990
Site Evaluation: November 4, 2017

The North Spartanburg Fire Station #2 site is located in rural Spartanburg County, northwest of the City of Spartanburg. This site supports an Ozone monitor and was established as a maximum Ozone concentration monitor for the Greenville-Spartanburg-Anderson urban area on April 4, 1990. This monitor is designated SLAMS and fulfills the requirement for a maximum concentration site for the Spartanburg MSA. The sample inlet is 92.5 meters from the nearest road.

This site meets siting criteria found in 40 CFR Part 58 Appendix E except Section 4-Spacing from Obstructions. There is a Northwest tree that does not meet the requirements for tree height but there is still more than 270° unobstructed air flow around the probe.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Ozone 44201-1	Urban	Max Ozone Concentration	SLAMS	4.2	Ultraviolet Absorption (047)	Continuous

T.K. Gregg Recreation Center

CSA/MSA: Greenville-Spartanburg-Anderson CSA / Spartanburg MSA
AQS Site ID: 45-083-0011
Location: 267 Northview Street
County: Spartanburg
Coordinates: +34.95557, -81.92480
Date Established: December 29, 2008
Site Evaluation: November 4, 2017

The T. K Gregg Recreation Center site is located in Spartanburg County. With the cooperation of local government and stakeholders, the Department established this $PM_{2.5}$ site in the downtown Spartanburg area to meet the 40 CFR Part 58, Appendix D requirements for monitoring objective, collocated continuous monitoring, and reporting. This site also supports a collocated $PM_{2.5}$ continuous monitor for the Spartanburg MSA. The sample inlets are 48.2 meters from the nearest road.

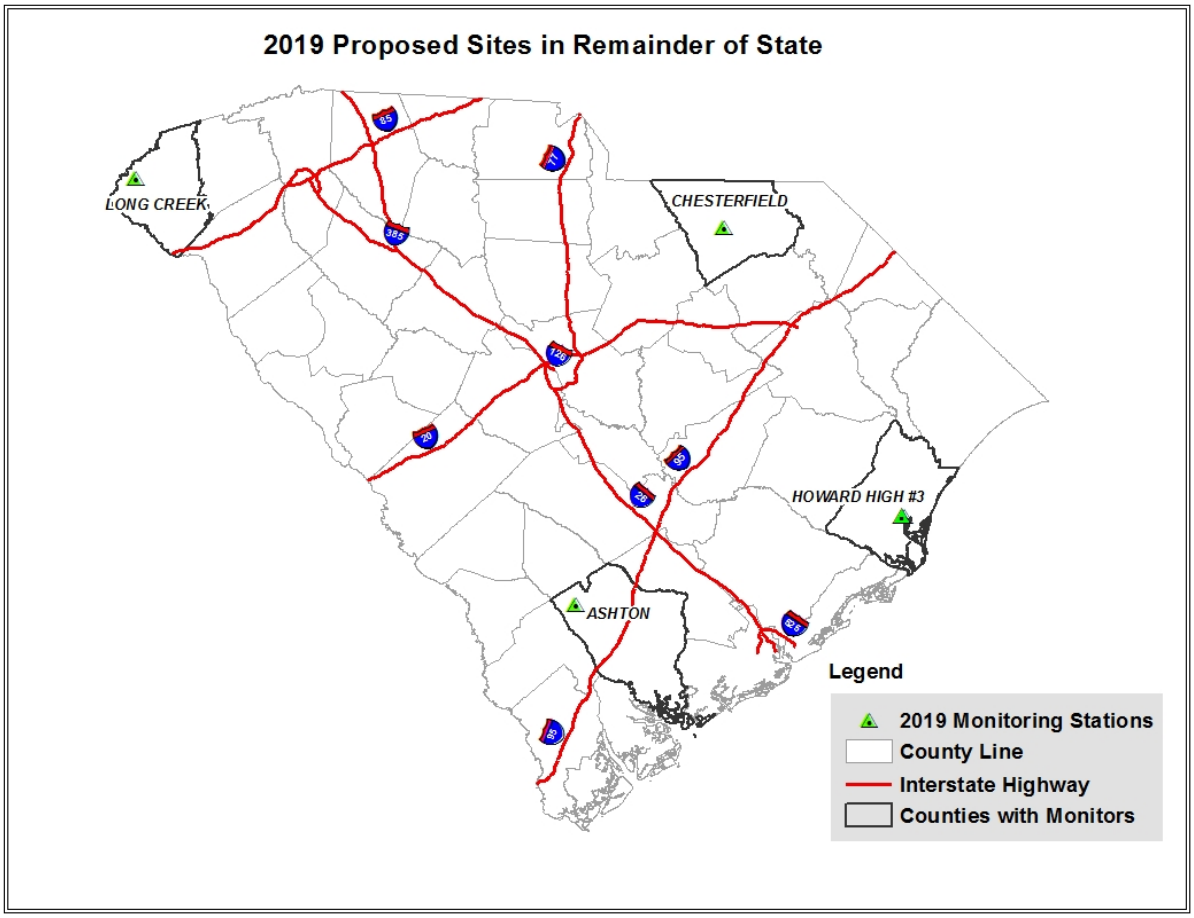
This site meets all 40 CFR Part 58, Appendix E requirements.

Changes for 2019:
There are no changes planned for 2019. The PM2.5 sampler was moved temporarily to this site to fulfill the collocation requirements. Once the new monitoring site is established in the Charleston-North Charleston MSA, this monitor will be moved back to that MSA.

Monitors:

Parameter	Scale	Objective	Designa-tion	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
$PM_{2.5}$ 88101-1	Neighbor-hood	Highest Concentration	SLAMS	2.4	Gravimetric (145)	1:1
$PM_{2.5}$ 88502-3	Neighbor-hood	Highest Concentration	SPM	2.5	TEOM Gravimetric 50°C (702)	Continuous
Collocated $PM_{2.5}$ 88101-2	Neighbor-hood	Population Exposure	QA Collocated SLAMS	2.5	Gravimetric (145)	1:6

Remainder of State



Classification of Monitoring Type by Site

Site ID	Site Name	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	Lead	Ozone	SO_2	NO_2	CO	Carbonyls	SVOC	VOCs	Precipitation
45-025-0001	Chesterfield	●	●	●	O O		O				O O	O O	O O	O
45-029-0002	Ashton		O				O							
45-043-0011	Howard High School #3				O									
45-073-0001	Long Creek		O				O	O						O
TOTAL		1	3	1	3	0	3	1	0	0	2	2	2	2
O SPM / Other ● SLAMS ●●/OO duplicate / QA monitors														

Chesterfield (NATTS)

CSA/MSA: none/none
AQS Site ID: 45-025-0001
Location: SC Hwy 145, McBee (Route 2 Box 100)
County: Chesterfield
Coordinates: +34.61538, -80.19878
Date Established: January 6, 2000
Site Evaluation: March 22, 2018

The Chesterfield site is located in central Chesterfield County. The Chesterfield site has continuous monitors for $PM_{2.5}$, Ozone, and meteorological parameters. Sampling is done for $PM_{2.5}$ and PM_{10}. This site also serves as the required regional transport site for $PM_{2.5}$. In addition to the CSN protocol $PM_{2.5}$ speciation sampling, this site is a precision site with collocated samplers for PM_{10}. The sample inlets are 43.9 meters from the nearest road.

The Chesterfield site is also a rural National Air Toxics Trends Site (NATTS) which includes Carbonyls, VOC, SVOC, and metals sampling. Federal funding for speciation sampling at this site was eliminated in 2015. Speciation sampling will continue as long as state resources are available. Also, there was a correction in the designation of Continuous $PM_{2.5}$ from SPM to SLAMS.

This site meets all 40 CFR Part 58, Appendix E requirements.

Changes for 2019:
There are no changes planned for 2019.

Monitors:
(Table continues on next page)

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
$PM_{2.5}$ 88101-1	Regional	Regional Transport	SLAMS	2.9	Gravimetric (145)	1:3
$PM_{2.5}$ 88502-3	Regional	Population Exposure	SLAMS	4.8	FDMS Gravimetric (183)	Continuous
Speciated $PM_{2.5}$	Regional	Regional Transport	SLAMS	2.0	CSN Protocol	1:6
PM10 81102-1	Regional	General / Background	SPM	2.4	Gravimetric (063)	1:6
Collocated PM_{10} 81102-2	Regional	General / Background	QA Collocated SPM	2.4	Gravimetric (063)	1:6

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Ozone 44201-1	Regional	General / Background	SPM	4.8	Ultraviolet Absorption (087)	Continuous
Carbonyls	Urban	NATTS	SPM	4.78	DNPH/IC	1:6
Carbonyls	Urban	NATTS	SPM	4.78	DNPH/IC	1:6
SVOC	Urban	NATTS	SPM	1.9	PUF/GCMS	1:6
SVOC	Urban	NATTS	SPM	1.9	PUF/GCMS	1:6
Volatile Organic Compounds	Urban	NATTS	Non-regulatory	3.23	Canister/ GCMS	1:6
Volatile Organic Compounds	Urban	NATTS	Non-regulatory	3.28	Canister/ GCMS	1:6
Wind speed / direction	Neighbor-hood	Local Conditions	Non-regulatory	10.0	Instruments for wind speed/wind direction (020)	Continuous
Precipita-tion	Neighbor-hood	General/ Background	SPM	1.73	Tipping Bucket (011)	Continuous and Sample

Ashton

CSA/MSA: none/none
AQS Site ID: 45-029-0002
Location: Ashton Road (S-13-18) Islandton
County: Colleton
Coordinates: +33.00784 -80.96504
Date Established: March 7, 1990
Site Evaluation: March 13, 2018

The Ashton site is located in northwestern Colleton County and was established on March 7, 1990. It monitors for concentrations of $PM_{2.5}$ and Ozone. The sample inlets are 8.4 meters from the nearest road.

The 40 CFR Part 58.20 states that compliance to the siting regulations is optional, but it is the Department's intent to meet as many of the Appendix E requirements as possible. This site does not meet 40 CFR Part 58, Appendix E, Section 4-Spacing from Obstructions, Section 5-Spacing from Trees, and Section 11-Summary requirements due to tree obstructions and drip line requirements.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
$PM_{2.5}$ 88502-3	Regional	General / Background	SPM	4.3	TEOM Gravimetric 50°C (702)	Continuous
Ozone 44201-2	Urban	General / Background	SPM	4.7	Ultraviolet (047)	Continuous

Howard High School #3

CSA/MSA: Myrtle Beach-Conway SC, NC CSA/none
AQS Site ID: 45-043-0011
Location: 594 Gilbert Street
County: Georgetown
Coordinates: +33.36892, -79.29662
Date Established: July 15, 2008
Site Evaluation: March 29, 2018

The Howard High #3 site is located in Georgetown County on the grounds of Howard High School and supports a PM_{10} monitor. PM_{10} monitoring in this area of Georgetown has been ongoing since 1970, when the original Howard High site was established. The sample inlet is 49.7 meters from the nearest road.

This site meets all 40 CFR Part 58, Appendix E requirements.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
PM_{10} 81102-1	Neighbor-hood	Population Exposure/ Highest Concentration	SPM	2.22	TEOM Gravimetric (079)	Continuous

Long Creek

CSA/MSA: Greenville-Spartanburg-Anderson CSA/ none
AQS Site ID: 45-073-0001
Location: Round Mountain Tower Rd.
County: Oconee
Coordinates: +34.805333, -83.23777
Date Established: August 1, 1983
Site Evaluation: May 2, 2017

The Long Creek site is located on Round Mountain in northwest Oconee County. The Long Creek site was also established as part of the Southern Oxidant Study. It provides a unique vantage point for monitoring the impacts of transported pollutants. Long Creek has continuous monitors for Ozone, SO_2, and $PM_{2.5}$. The sample inlets are 30 meters from the nearest road.

Due to the importance of measuring region-wide SO_2, $PM_{2.5}$, and Ozone concentrations, the unique location, and collocated monitoring activity, the Department has determined that current monitoring at this site should be continued.

The 40 CFR Part 58.20 states that compliance to the siting regulations is optional, but it is the Department's intent to meet as many of the Appendix E requirements as possible. This site does not meet the 40 CFR Part 58, Appendix E requirements. Tree cutting has occurred since the last monitoring plan, improving site exposure. However, there are still trees that the Department needs to evaluate for distance from probe relative to height.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

Parameter	Scale	Objective	Designa-tion	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
$PM_{2.5}$ 88101-3	Urban	General / Background	SPM	4.0	FDMS Gravimetric (581)	Continuous
Ozone 44201-1	Regional	General / Background	SPM	4.18	Ultraviolet (047)	Continuous
Sulfur Dioxide 42401-1	Regional	Regional Transport	SPM	4.18	Pulsed Fluorescent (560)	Continuous
Precipita-tion	Neighbor-hood	General/ Background	SPM	1.73	Tipping Bucket	Continuous and

Parameter	Scale	Objective	Designa-tion	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
					(011)	Sample

Network Development

The Monitoring Network provides data to support an array of decisions ranging from development of emissions strategies to protect and improve air quality to the level of activity appropriate for individuals in sensitive populations. To support these varied data users, the network must provide both stable, long-term measures to document trends and rapid reporting of conditions to the public. In response to land use, population, and urban areas growth, the network must be evaluated and adjusted to meet the changing conditions and needs.

The Monitoring Network described in this plan continues to build upon a significant transition from the network that has evolved over the last thirty-five years. It reflects the successes in reducing ambient concentrations of TSP, Lead, CO, NO_2, and SO_2, and the increasing concern about the impact of fine particles and Ozone on public health and the environment.

A series of studies are planned for the major urban areas, as resources permit, to gain better understanding of the air quality, and provide information to improve the monitoring network. In addition to the intensive studies that provide a detailed 'snapshot,' it is intended that SPM sites be established and monitored in rotation to provide regular checks and long term tracking of the trends in air quality in all areas of the state including smaller cities, towns, and rural areas. The implementation of this long term strategy is contingent on sufficient federal funding to support the core-required monitoring and will be developed and evaluated as resources become available. Project plans will be developed for the monitoring and data analysis activity to better define the scope of these strategies prior to implementation. These studies are long term needs the Department has identified and are important tools for evaluating and improving the representativeness of the ambient air monitoring network and our knowledge of air quality in the State.

Areas where long term strategies are being considered include:

- Irmo Monitoring Site – the owner has requested that the Irmo Monitoring Site be moved to another location on the property.

- Charleston Port Monitoring – the Charleston Port Expansion project has a projected completion date now delayed to 2020-2021. The Department will work with local stakeholders to identify and establish an appropriate $PM_{2.5}$ monitoring site to measure ambient pollutant levels before and after port activities commence.

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APPENDIX A: Summary of Public Comments Received

Below is a summary of the comments received and the Department's response. A copy of the actual comments (emails and mail) received will be submitted to the EPA Region 4 staff along with the final 2019 Monitoring Plan.

Comments from EPA Region 4: EPA Region 4 stated that the Department needs to provide more site information before EPA would be able to fully evaluate the requested network modifications for Garrison Arena (45-007-0006), Moncks Corner National Guard (45-015-1002), Big Creek (45-007-0005), Clemson (45-077-0002), and Wolf Creek (45-077-0003) monitoring sites. They also recommended that site photos for each monitoring site be available on the Department's web page. Finally, EPA requested to review the site evaluations for each monitoring site.

DHEC Response: The Department will submit to EPA Region 4 an addendum to the 2019 Network Plan that addresses the requested information. Site data from each Site Evaluation is provided in Appendix D: Site Evaluations Summary for CFR 40 Part 58, Appendix E Table and the Site Evaluations will be forwarded to EPA. Also, the Department is currently working to provide site photos of all monitoring sites on the DHEC web page at: https://gis.dhec.sc.gov/monitors/

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APPENDIX B: Termination Requests

The Table below contains information on the monitoring sites the Department has scheduled for discontinuance.

Site	ID	Date Established	Notes
Clemson	45-077-0002	July 14, 1979	The Department has determined that the Ozone monitoring at this site is duplicative and will be discontinued immediately.
Wolf Creek	45-077-0003	August 10, 2010	The Department has determined that the SPM Ozone monitoring at this site is duplicative. The Department is notifying EPA of the termination of this site at the end of the 2018 Ozone season.

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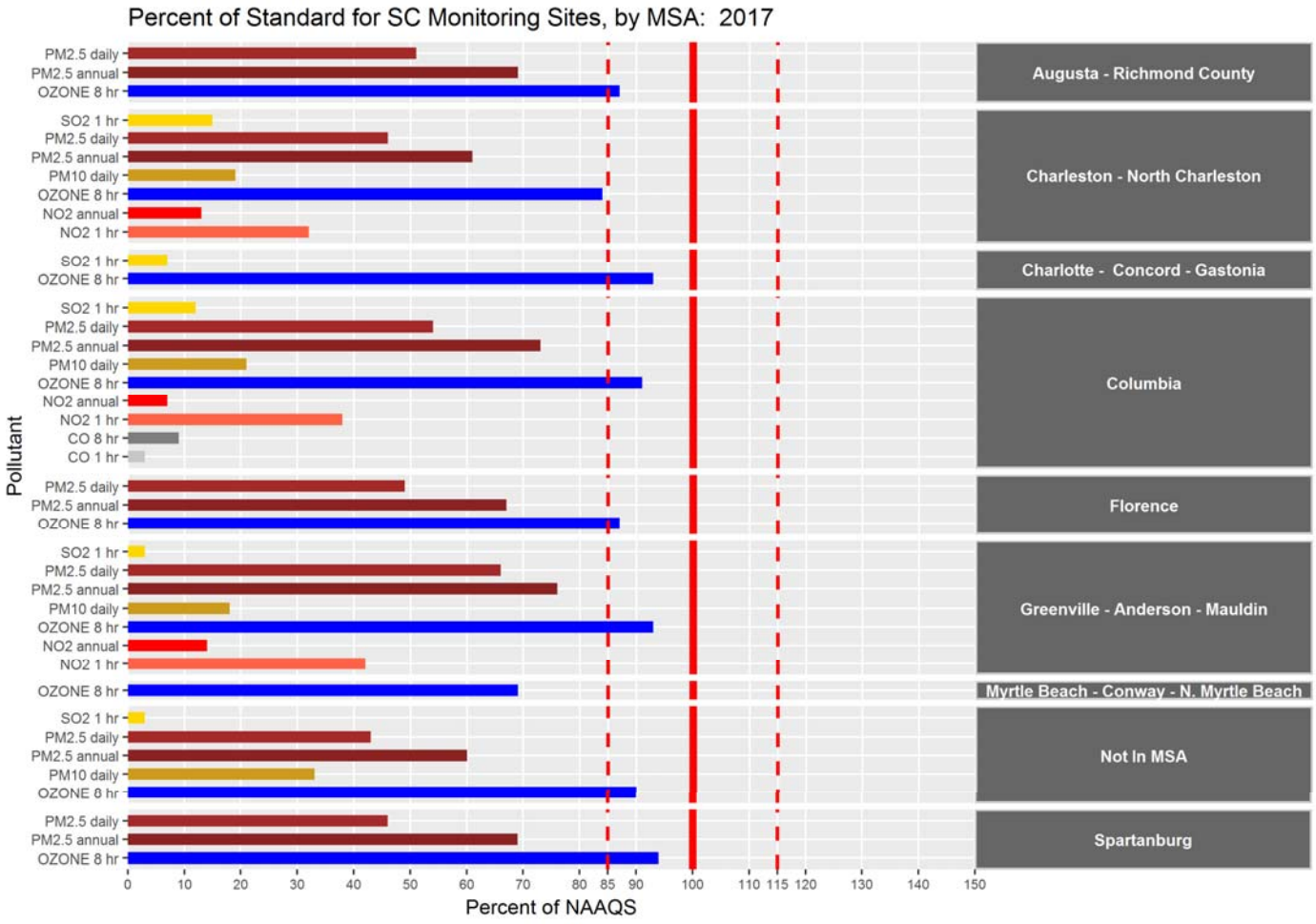
APPENDIX C: Design Value Graphs

The following graph demonstrates the highest design value for each criteria pollutant in each MSA in comparison with its NAAQS. The MSAs are listed on the far right. Each individual criteria pollutant and averaging time are listed on the far left. The colored bar after the criteria pollutant's name shows the highest 2017 design value. The solid red vertical line is the NAAQS standard. The red dash lines show 15 percent of the Standard (85% and 115%).



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APPENDIX D: Site Evaluations Summary for CFR 40 Part 58, Appendix E Table

Site Evaluations are conducted yearly on each monitoring site to ensure compliance to requirements found in CFR 40 Part 58, Appendix E. After appropriate administrative review, the Site Evaluations are sent to the EPA Region 4. The following tables summarize information about the latest Site Evaluations for each monitoring site.

The first table gives the column number and the shortened Column Name listed in the columns of the second table. It also gives the Section number and the regulatory requirement it represents from the CFR 40, Part 58, Appendix E. The second table lists each monitoring site, their individual criteria pollutant monitors, and the fulfillment and/or measurements of the CFR 40 Part 58, Appendix E requirements. For brevity, the column titles in the second table have been shortened as follows:

Column	Column Name	CFR 40 Part 58, Appendix E Requirements
Column 1:	Site ID, Site Name and Date Visited	Site Identification information and date the Site Evaluation was conducted.
Column 2:	Parameter	Criteria Pollutant
Column 3:	Sampling Train	Section 9. For reactive gases, is sampling train made of borosilicate glass, FEP Teflon® or their equivalent?
Column 4:	Sampling Time*	Section 9. For reactive gases, is sampling time <20 seconds?
Column 5:	Probe Height	Section 2. Horizontal and Vertical Placement: Height from ground to probe must be 2-15 meters
Column 6:	Support Structure	Section 2. Horizontal and Vertical Placement: Is Horizontal and vertical distance from supporting structure >1 meter.
Column 7:	Collocation Placement	Section 11. Horizontal and Vertical Placement: Collocated monitors must be within 4 meters of each other.
Column 8:	Flow Rates	Section 11. Horizontal and Vertical Placement: For PM collocation, flow rates greater than 200 liters/min must be at least 2 meters apart or at least 1 meter flow rates for less than 200 liters/min.
Column 9:	Minor Sources	Section 3. Spacing from Minor Sources: Probe should be away from minor sources.
Column 10:	Obstructions**	Section 4. Spacing from Obstructions: Distance from probe to obstacle must be at least twice the height the obstacle protrudes above the probe.
Column 11:	Airflow	Section 4. Spacing from Obstructions: Must have unrestricted airflow 270 degrees

		around probe.
Column 12:	Dripline	Section 5. Spacing from Trees: Distance from dripline of trees to probe must be <10 meters.
Column 13:	Roadway	Section 6. Spacing from Roadways: Does it meet distance from roadway to probe?

*Sampling Residence Time for all monitors is currently being tested. Only the tests that have been completed as of June 26, 2018 are reported here.

**The monitor is still considered in compliance if the distance from probe to obstacle is not at least twice the height the obstacle protrudes above the probe but there is still 270° of airflow around probe.

Site ID, Site Name and Date Visited	Param-eter	Samp-ling Train	Samp-ling Time	Probe Height (m)		Support Structure	Colloca-tion Place-ment (m)		Flow Rate	Minor Sources	**Obstru ctions	Air-flow	Dripline (m)		Roadway (m)	
003-0003 Jackson 1/10/2018	Ozone	Yes	Yes	Yes	3.4	Yes	N/A		N/A	Yes	**No	Yes	Yes	11.5	Yes	128.0
037-0001 Trenton 1/10/2018	$PM_{2.5}$	N/A	N/A	Yes	4.76	Yes	Yes	1.9	Yes	Yes	Yes	Yes	Yes	No trees	Yes	30.3
037-0001 Trenton 1/10/2018	$PM_{2.5}$ C	N/A	N/A	Yes	4.53	Yes	Yes	1.9	Yes	Yes	Yes	Yes	Yes	No trees	Yes	30.3
037-0001 Trenton 1/10/2018	Ozone	Yes	Yes	Yes	3.45	Yes	N/A		N/A	Yes	Yes	Yes	Yes	No trees	Yes	30.3
015-0002 Bushy Park 6/21/2018	Ozone	Yes	Yes	Yes	3.15	Yes	N/A		N/A	Yes	No	No	No	4.34	Yes	15.2
019-0003 Jenkins Ave. 4/19/2018	PM_{10}	N/A	N/A	Yes	4.15	Yes	N/A		Yes	Yes	Yes	Yes	Yes	16.0	Yes	33.5
019-0003 Jenkins Ave.	SO_2	Yes	Yes	Yes	4.66	Yes	N/A		N/A	Yes	Yes	Yes	Yes	16.0	Yes	33.5

Site ID, Site Name and Date Visited	Param-eter	Samp-ling Train	Samp-ling Time	Probe Height (m)		Support Structure	Colloca-tion Place-ment (m)		Flow Rate	Minor Sources	**Obstru ctions	Air-flow	Dripline (m)		Roadway (m)	
4/19/2018																
019-0003 Jenkins Ave. 4/19/2018	NO_2	Yes	Yes	Yes	4.66	Yes	N/A		N/A	Yes	Yes	Yes	Yes	16.0	Yes	33.5
019-0046 Cape Romain 6/21/2018	$PM_{2.5}$	N/A	N/A	Yes	4.75	Yes	N/A		Yes	Yes	**No	Yes	Yes	11.0	Yes	86.0
019-0046 Cape Romain 6/21/2018	Ozone	Yes	Not compl eted	Yes	4.1	Yes	N/A		N/A	Yes	**No	Yes	Yes	11.4	Yes	86.0
019-0046 Cape Romain 6/21/2018	SO_2	Yes	Yes	Yes	4.1	Yes	N/A		N/A	Yes	**No	Yes	Yes	11.4	Yes	86.0
019-0046 Cape Romain 6/21/2018	NO_2	Yes	Not compl eted	Yes	4.1	Yes	N/A		N/A	Yes	**No	Yes	Yes	11.4	Yes	86.0
019-0048 FAA 6/7/2018	$PM_{2.5}$	N/A	N/A	Yes	2.35	Yes	Yes	1.7	Yes	Yes	**No	Yes	No	5.9	Yes	160.0
019-0048 FAA 6/7/2018	$PM_{2.5}$	N/A	N/A	Yes	2.35	Yes	Yes	1.7	Yes	Yes	**No	Yes	No	5.8	Yes	160.0
019-0049 CPW 6/7/2018	$PM_{2.5}$	N/A	N/A	Yes	2.25	Yes	Yes	1.2	Yes	Yes	**No	Yes	No	4.43	Yes	24.8
019-0049 CPW	$PM_{2.5}$ C	N/A	N/A	Yes	2.74	Yes	Yes	1.2	Yes	Yes	**No	Yes	No	5.63	Yes	24.8

Site ID, Site Name and Date Visited	Param-eter	Samp-ling Train	Samp-ling Time	Probe Height (m)		Support Structure	Colloca-tion Place-ment (m)		Flow Rate	Minor Sources	**Obstru ctions	Air-flow	Dripline (m)		Roadway (m)	
6/7/2018																
091-0008 York Landfill 6/14/2018	Ozone	Yes	Not compl eted	Yes	4.55	Yes	N/A		N/A	Yes	Yes	Yes	Yes	27.4 0	Yes	34.8
091-0008 York Landfi6/14/ 2018	SO_2	Yes	Not compl eted	Yes	4.55	Yes	N/A		N/A	Yes	Yes	Yes	Yes	27.4 0	Yes	34.8
063-0008 Irmo 11/27/2017	$PM_{2.5}$ C	N/A	N/A	Yes	4.4	Yes	Yes	1.6	Yes	Yes	Yes	Yes	Yes	14.4	Yes	39.0
063-0008 Irmo 11/27/2017	$PM_{2.5}$	N/A	N/A	Yes	4.9	Yes	Yes	1.6	Yes	Yes	Yes	Yes	Yes	14.4	Yes	39.0
063-0008 Irmo 11/27/2017	SO_2	Yes	Not compl eted	Yes	3.33	Yes	N/A		N/A	Yes	Yes	Yes	Yes	14.4	Yes	39.0
063-0010 Cayce CH 11/27/2017	PM_{10}	N/A	N/A	Yes	2.42	Yes	N/A		Yes	Yes	Yes	Yes	Yes	10.8	Yes	24.0
079-0007 Parklane 12/19/2017	$PM_{2.5}$	N/A	N/A	Yes	4.9	Yes	Yes	2.4	Yes	Yes	Yes	Yes	Yes	16.7	Yes	131.0
079-0007 Parklane 12/19/2017	$PM_{2.5}$	N/A	N/A	Yes	5.3	Yes	Yes	2.4	Yes	Yes	Yes	Yes	Yes	16.7	Yes	131.0
079-0007 Parklane 12/19/2017	$PM_{2.5}$ C	N/A	N/A	Yes	4.72	Yes	N/A		Yes	Yes	Yes	Yes	Yes	22.9	Yes	131.0
079-0007 Parklane	Speciate d $PM_{2.5}$	N/A	N/A	Yes	2.4	Yes	N/A		N/A	Yes	Yes	Yes	Yes	15.3	Yes	145.8

Site ID, Site Name and Date Visited	Param-eter	Samp-ling Train	Samp-ling Time	Probe Height (m)		Support Structure	Colloca-tion Place-ment (m)		Flow Rate	Minor Sources	**Obstru ctions	Air-flow	Dripline (m)		Roadway (m)	
12/19/2017																
079-0007 Parklane 12/19/2017	PM_{10} C	N/A	N/A	Yes	5.3	Yes	N/A		Yes	Yes	Yes	Yes	Yes	17.9	Yes	131.0
079-0007 Parklane 12/19/2017	Ozone	Yes	Yes	Yes	4.45	Yes	N/A		N/A	Yes	Yes	Yes	Yes	22.3	Yes	131.0
079-0007 Parklane 12/19/2017	SO_2	Yes	Not compl eted	Yes	4.45	Yes	N/A		N/A	Yes	Yes	Yes	Yes	22.3	Yes	131.0
079-0007 Parklane 12/19/2017	CO	Yes	Yes	Yes	4.45	Yes	N/A		N/A	Yes	Yes	Yes	Yes	22.3	Yes	131.0
079-0007 Parklane 12/19/2017	NO/NO_y	Yes	Not compl eted	Yes	10.0	Yes	N/A		N/A	Yes	Yes	Yes	Yes	22.3	Yes	131.0
079-0007 Parklane 12/19/2017	Lead	N/A	N/A	Yes	1.6	Yes	N/A		N/A	Yes	Yes	Yes	Yes	15.3	Yes	145.8
079-0021 Congaree Bluff 02/08/2018	Ozone	Yes	Yes	Yes	4.15	Yes	N/A		N/A	Yes	No	Yes	No	7.4	Yes	187.5
079-0021 Congaree Bluff 02/08/2018	SO_2	Yes	Yes	Yes	4.15	Yes	N/A		N/A	Yes	No	Yes	No	7.4	Yes	187.5
079-1001 Sandhill 12/19/2017	Ozone	Yes	Yes	Yes	4.12	Yes	N/A		N/A	Yes	Yes	Yes	Yes	16.4	Yes	31.1
079-1001 Sandhill	NO_2	Yes	Yes	Yes	4.12	Yes	N/A		N/A	Yes	Yes	Yes	Yes	16.4	Yes	31.1

Site ID, Site Name and Date Visited	Param-eter	Samp-ling Train	Samp-ling Time	Probe Height (m)		Support Structure	Colloca-tion Place-ment (m)		Flow Rate	Minor Sources	**Obstru ctions	Air-flow	Dripline (m)		Roadway (m)	
12/19/2017																
031-0003 Pee Dee 6/5/2018	Ozone	Yes	Yes	Yes	4.14	Yes	N/A		N/A	Yes	Yes	Yes	Yes	No trees	Yes	193.3
041-0003 Williams MS 4/4/2017	$PM_{2.5}$ C	N/A	N/A	Yes	2.43	Yes	Yes	1.6	Yes	Yes	Yes	Yes	Yes	19.4	Yes	110.0
041-0003 Williams MS 4/4/2017	$PM_{2.5}$	N/A	N/A	Yes	2.65	Yes	Yes	1.6	Yes	Yes	Yes	Yes	Yes	20.4	Yes	110.0
041-8001 JCI Railroad 7/11/2018	Lead POC 1	N/A	N/A	Yes	2.4	Yes	Yes	3.0 2	N/A	Yes	Yes	Yes	Yes	17.4	Yes	99.0
041-8001 JCI Railroad 7/11/2018	Lead POC 2	N/A	N/A	Yes	2.62	Yes	Yes	3.1	N/A	Yes	Yes	Yes	Yes	17.4	Yes	99.0
041-8002 JCI Entrance 7/11/2018	Lead POC 1	N/A	N/A	Yes	2..54	Yes	Yes	3.0	N/A	Yes	Yes	Yes	Yes	17.2	Yes	37.0
041-8002 JCI Entrance 7/11/2018	Lead POC 2	N/A	N/A	Yes	2.32	Yes	Yes	3.0	N/A	Yes	Yes	Yes	Yes	19.3	Yes	37.0
041-8002 JCI Entrance 7/11/2018	Lead POC 3	N/A	N/A	Yes	2.3	Yes	Yes	3.0	N/A	Yes	Yes	Yes	Yes	19.3	Yes	37.0

Site ID, Site Name and Date Visited	Param-eter	Samp-ling Train	Samp-ling Time	Probe Height (m)		Support Structure	Colloca-tion Place-ment (m)		Flow Rate	Minor Sources	**Obstru ctions	Air-flow	Dripline (m)		Roadway (m)	
041-8003 JCI Woods 7/11/2018	Lead POC 1	N/A	N/A	Yes	2.42	Yes		3.08	N/A	Yes	**No	Yes	Yes	20.4	Yes	1030.0
041-8003 JCI Woods 7/11/2018	Lead POC 2	N/A	N/A	Yes	2.4	Yes			N/A	Yes	**No	Yes	Yes	20.4	Yes	1030.0
041-8003 JCI Woods 7/11/2018	Lead #3	N/A	N/A	Yes	2.42	Yes			N/A	Yes	**No	Yes	Yes	21.4	Yes	1030.0
007-0005 Big Creek 2/15/2018	Ozone	Yes	Yes	Yes	4.10	Yes	N/A		N/A	Yes	Yes	Yes	Yes	No trees	Yes	43.9
045-0015 ESC 11/14/2017	$PM_{2.5}$	N/A	N/A	Yes	3.5	Yes	Yes	2.84	Yes	Yes	**No	Yes	Yes	19.5	Yes	15.9
045-0015 ESC 11/14/2017	$PM_{2.5}$ C	N/A	N/A	Yes	4.55	Yes	Yes	2.8	Yes	Yes	Yes	Yes	Yes	16.5	Yes	13.8
045-0015 ESC 11/14/2017	PM_{10}	N/A	N/A	Yes	4.26	Yes	N/A		Yes	Yes	Yes	Yes	Yes	20.8	Yes	12.4
045-0015 ESC 11/14/2017	SO_2	Yes	Not compl eted	Yes	4.54	Yes	N/A		N/A	Yes	Yes	Yes	Yes	16.0	Yes	13.0
045-0015 ESC 11/14/2017	NO_2	Yes	Not compl eted	Yes	4.54	Yes	N/A		N/A	Yes	Yes	Yes	Yes	16.0	Yes	13.0
045-0016 Hillcrest 11/14/2017	$PM_{2.5}$	N/A	N/A	Yes	2.05	Yes	Yes	1.7	Yes	Yes	Yes	Yes	Yes	67.0	Yes	54.0
045-0016 Hillcrest	$PM_{2.5}$	N/A	N/A	Yes	2.05	Yes	Yes	1.7	Yes	Yes	Yes	Yes	Yes	67.0	Yes	54.0

Site ID, Site Name and Date Visited	Param-eter	Samp-ling Train	Samp-ling Time	Probe Height (m)		Support Structure	Colloca-tion Place-ment (m)		Flow Rate	Minor Sources	**Obstru ctions	Air-flow	Dripline (m)		Roadway (m)	
11/14/2017																
045-0016 Hillcrest 11/14/2017	Ozone	Yes	Yes	Yes	3.83	Yes	N/A		N/A	Yes	Yes	Yes	Yes	67.0	Yes	54.0
077-0002 Clemson 11/21/2017	Ozone	Yes	Yes	Yes	4.57	Yes	N/A		N/A	Yes	**No	Yes	Yes	12.3	Yes	33.9
077-0003 Wolf Creek 11/21/2017	Ozone	Yes	Yes	Yes	4.13	Yes	N/A		N/A	Yes	Yes	Yes	Yes	26.3	Yes	56.4
051-0008 Coastal Carolina 2/21/2018	Ozone	Yes	Yes	Yes	4.1	Yes	N/A		N/A	Yes	Yes	Yes	Yes	10.6	Yes	18.3
083-0009 NSFS#2 11/07/2017	Ozone	Yes	Yes	Yes	4.2	Yes	N/A		N/A	Yes	Yes	No	Yes	25.4	Yes	92.5
083-0011 TK Gregg 11/14/2017	$PM_{2.5}$	N/A	N/A	Yes	2.5	Yes	Yes	1.6	Yes	Yes	Yes	Yes	Yes	37.0	Yes	48.2
083-0011 TK Gregg 11/14/2017	$PM_{2.5}$ C	N/A	N/A	Yes	2.5	Yes	Yes	1.6	Yes	Yes	Yes	Yes	Yes	27.7	Yes	48.2
025-0001 Chesterfiel d 3/21/2017	$PM_{2.5}$	N/A	N/A	Yes	2.9	Yes	N/A		Yes	Yes	Yes	Yes	Yes	23.0	Yes	43.9
025-0001 Chesterfiel d 3/28/2018	$PM_{2.5}$ C	N/A	N/A	Yes	4.9	Yes	N/A		Yes	Yes	Yes	Yes	Yes	25.8	Yes	33.1
025-0001	Speciate	N/A	N/A	Yes	2.0	Yes	N/A		N/A	Yes	Yes	Yes	Yes	32.8	Yes	43.9

Site ID, Site Name and Date Visited	Param-eter	Samp-ling Train	Samp-ling Time	Probe Height (m)		Support Structure	Colloca-tion Place-ment (m)		Flow Rate	Minor Sources	**Obstru ctions	Air-flow	Dripline (m)		Roadway (m)	
Chesterfiel d 3/28/2018	d $PM_{2.5}$															
025-0001 Chesterfiel d 3/28/2018	PM_{10}	N/A	N/A	Yes	2.4	Yes	Yes	2.3	Yes	Yes	Yes	Yes	Yes	27.7	Yes	43.9
025-0001 Chesterfiel d 3/28/2018	PM_{10}	N/A	N/A	Yes	2.4	Yes	Yes	2.3	Yes	Yes	Yes	Yes	Yes	25.4	Yes	43.9
025-0001 Chesterfiel d 3/28/2018	Ozone	Yes	Yes	Yes	4.8	Yes	N/A		N/A	Yes	Yes	Yes	Yes	25.0	Yes	33.1
029-0002 Ashton 3/13/2018	$PM_{2.5}$ C	N/A	N/A	Yes	4.3	Yes	N/A		Yes	Yes	**No	Yes	No	7.8	No	*8.4
029-0002 Ashton 3/13/2018	Ozone	Yes	Yes	Yes	4.7	Yes	N/A		N/A	Yes	**No	Yes	No	9.2	No	*8.4
043-0011 Howard High #3 3/29/2018	PM_{10}	N/A	N/A	Yes	2.22	Yes	N/A		Yes	Yes	Yes	Yes	Yes	No trees	Yes	49.7
073-0001 Long Creek 6/18/2018	$PM_{2.5}$ C	N/A	N/A	Yes	4.25	Yes	N/A		Yes	Yes	Yes	No	No	7.48	Yes	30.0
073-0001 Long Creek 6/18/2018	Ozone	Yes	Yes	Yes	4.18	Yes	N/A		N/A	Yes	Yes	No	No	9.08	Yes	30.0
073-0001	SO_2	Yes	Yes	Yes	4.18	Yes	N/A		N/A	Yes	Yes	No	No	9.08	Yes	30.0

Site ID, Site Name and Date Visited	Param-eter	Samp-ling Train	Samp-ling Time	Probe Height (m)		Support Structure	Colloca-tion Place-ment (m)		Flow Rate	Minor Sources	**Obstru ctions	Air-flow	Dripline (m)		Roadway (m)	
Long Creek 6/18/2018																

*Road is in very rural area with less than 100 AADT.

Appendix E: The EPA Correspondence for Addendums to Previous Monitoring Plans

Reserved

Appendix F: Alphabetical Order of Monitoring Sites

Monitoring Site Name	MSA/County	Page
Ashton	Colleton County	69
Big Creek	Greenville-Anderson-Mauldin MSA	56
Cape Romain	Charleston-North Charleston MSA	34
Cayce City Hall	Columbia MSA	43
Charleston Public Works (CPW)	Charleston-North Charleston MSA	37
Chesterfield	Chesterfield County	67
Coastal Carolina	Myrtle Beach-Conway-North Myrtle Beach SC-NC MSA	62
Congaree Bluff	Columbia MSA	47
FAA	Charleston-North Charleston MSA	36
Greenville Employment Security Commission (ESC)	Greenville-Anderson-Mauldin MSA	58
Hillcrest Middle School	Greenville-Anderson-Mauldin MSA	60
Howard High School #3	Georgetown County	70
Irmo	Columbia MSA	42
Jackson Middle School	Augusta-Richmond County, GA-SC MSA (part)	29
Jenkins Ave. Fire Station	Charleston-North Charleston MSA	33
Johnson Controls-JCI Railroad	Florence MSA	53
Johnson Controls-JCI Entrance	Florence MSA	53
Johnson Controls-JCI Woods	Florence MSA	53
Long Creek	Oconee County	71
North Spartanburg Fire Station #2	Spartanburg MSA	64
Parklane (NCore)	Columbia MSA	44
Pee Dee Experimental Station	Florence MSA	51
Sandhill Experimental Station	Columbia MSA	49
State Hospital	Columbia MSA	46
Garrison Arena	Greenville-Anderson-Mauldin MSA	57
T.K. Gregg Recreational Center	Spartanburg MSA	65
Trenton	Augusta-Richmond County, GA-SC MSA (part)	30
Williams Middle School	Florence MSA	52
York Landfill	Charlotte-Concord-Gastonia MSA	39

APPENDIX G: Memorandum of Agreements and Waivers

DHEC MOA#: 2017-429

MEMORANDUM OF AGREEMENT

ON AIR QUALITY MONITORING FOR CRITERIA POLLUTANTS FOR

THE AUGUSTA - RICHMOND COUNTY

METROPOLITAN STATISTICAL AREA (MSA)

January 2017

Participating Agencies:

Georgia
Georgia Department of Natural Resources
Environmental Protection Division
Air Protection Branch (GA EPD)

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

I. PURPOSE/OBJECTIVES/GOALS

The purpose of this Memorandum of Agreement (MOA) is to renew the Augusta - Richmond County Metropolitan Statistical Area (MSA) Criteria Pollutant Air Quality Monitoring Agreement between SCDHEC and GA EPD (collectively referred to as the "affected agencies") to collectively meet United States Environmental Protection Agency (EPA) minimum monitoring requirements for particles of an aerodynamic diameter of 10 micrometers and less (PM10), particles of an aerodynamic diameter of 2.5 micrometers and less (PM2.5), and ozone; as well as any other criteria pollutant air quality monitoring deemed necessary to meet the needs of the MSA as determined reasonable by all parties. This MOA will establish the terms and conditions of this collective agreement to provide adequate criteria pollutant monitoring for the Augusta - Richmond County MSA as required by 40 CFR 58 Appendix D, Section 2(e).

II. BACKGROUND

The Augusta - Richmond County MSA consists of the following counties: Burke, Columbia, McDuffie, Lincoln, Richmond, Aiken and Edgefield. GA EPD has jurisdiction over Burke, Columbia, McDuffie, Lincoln, and Richmond Counties in Georgia and SCDHEC has jurisdiction over Aiken and Edgefield Counties, South Carolina. The SCDHEC and GA EPD are required by the Clean Air Act to measure for certain criteria pollutants in the ambient air in the Augusta - Richmond County Metropolitan Statistical Area (MSA). The EPA has established minimum monitoring requirements based on the size of the MSA and the quality of the air in the MSA for PM10, PM2.5, and ozone.

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

> "...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 its monitoring with the other air pollution control agency within the MSA.

III. ROLES AND RESPONSIBILITIES

The parties agree to the following terms and conditions:

- SCDHEC, and GA EPD (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 PM10, PM2.5, and ozone, as well as any other 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 PM10, PM2.5, and ozone described in 40 CFR 58) 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 agency. As conditions warrant, the affected agencies may conduct telephone conference calls, meetings, or other

communications to discuss monitoring activities for the MSA. Each affected agency shall inform the other affected agency 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 disasters, or similar occurrences that result in an extended (greater than 1 quarter) or permanent change in the monitoring network. At least once a year in the second quarter of the year or before June 15th, each affected agency shall make available to the other affected agency, a copy of its proposed monitoring plan for its jurisdiction within the MSA for the next year.

- Each party reserves the right to revoke or terminate this MOA at any time and 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 appropriated funds and each party's budget priorities. Nothing in this MOA, in and of itself, obligates SCDHEC or GA EPD to expend appropriations 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 that 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 SCDHEC or GA EPD, their officers or employees, or any other person. This MOA does not direct or apply to any person outside SCDHEC or GA EPD.

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:

GA EPD: DeAnna Oser
GA EPD Ambient Monitoring Program
4244 International Parkway, Suite 120
Atlanta, GA 30354

DeAnna.Oser@dnr.ga.gov
Voice: (404) 363-7004
FAX: (404) 363-7100

SCDHEC: Micheal Mattocks
SCDHEC Bureau of Environmental Services
8231 Parklane Road
Columbia, SC 29223

mattocm@dhec.sc.gov
Voice: (803) 896-0902
FAX: (803) 896-0980

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 the 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 agency 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

Georgia Department of Natural Resources, Environmental Protection Division (GA EPD)

BY: _____

TITLE: Director

DATE: 2/21/17

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

BY: _____

TITLE: Bureau Chief

DATE: 03/01/17

THIS AGREEMENT IS NOT OFFICIAL AND BINDING UNTIL SIGNED BY THE DHEC CONTRACTS MANAGER.

_____

Francine Miller
DHEC Contracts Manager
DATE: 3-6-17

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)

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 INTELLUCTUAL 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: Sheila C. Holman

TITLE: Director, Division of Air Quality

DATE: 6/27/2016

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

BY: [signature]

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: Robin H Rhoden

TITLE: Director, Air Quality

DATE: 6/29/2016

D H E C
PROMOTE PROTECT PROSPER
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

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

STATE OF SOUTH CAROLINA
ADMINISTRATIVE LAWCOURT

Coastal Conservation League and League of Women Voters of South Carolina, Petitioners, vs. South Carolina Department of Health and Environmental Control and Johnson Controls Battery Group, Inc., Respondents.	Docket No. IO-ALJ-07-0477-CC SETTLEMENT AGREEMENT AND ORDER

SETTLEMENT AGREEMENT AND ORDER

This final Settlement Agreement and Order (the "Agreement"), made and entered into by and among Permittee Johnson Controls Battery Group, Inc. ("JCI"), and the League of Women Voters of South Carolina, the Coastal Conservation League ("Petitioners"), and the South Carolina Department of Health and Environmental Control ("DHEC") (each a "Party," and collectively, the "Parties"), is effective upon execution by all of the Parties and approval by the Administrative Law Court (the "Effective Date").

PREAMBLE

1. The DHEC staff issued to JCI a permit known as Air Synthetic Minor Construction Permit No. 1040-0129-CA in order to construct a battery recycling facility in Florence, South Carolina (the "Florence Recycling Center" or "Recycling Center");

2. The Petitioners filed timely requests for final review of DHEC's staff decision to issue the above-referenced permit and a review conference before the DHEC Board was held on April 8, 2010 under Board Docket No. IO-RFR-17;

3. The DHEC Board affirmed DHEC's staff decision to issue the above-referenced permit and issued a written Final Agency Decision in that regard on May 7, 2010;

4. Pursuant to S.c. Code Ann. § 44-1-60, Petitioners have requested a review of the Board's Final Agency Decision with the South Carolina Administrative Law Court as provided therein within thirty days after the receipt of the Final Agency Decision and;

5. The Parties wish to settle this matter and resolve all permitting issues and potential challenges concerning the issuance of Air Synthetic Minor Construction Permit No. 1040-0129-CA without further litigation and the attendant costs of the same.

TERMS AND CONDITIONS

NOW THEREFORE, for and in consideration of the mutual covenants, conditions, promises contained herein, and other valuable consideration, the receipt and sufficiency of which is expressly acknowledged, the Parties agree as follows:

1. Petitioners Will Not Pursue Appeal. As consideration for the covenants provided by ICI and DHEC (as set forth below), Petitioners hereby acknowledge and agree that they will, with consent of this Court, dismiss with prejudice the present action and will not pursue any further challenges of the Final Agency Decision issued by the DHEC Board on May 7, 2010 to the South Carolina Administrative Law Court for the issuance of Air Synthetic Minor Construction Permit No. 1040-0l29-CA.

2. Covenants by ICI and DHEC. As consideration for the covenants provided by Petitioners (as set forth above), leI and DHEC hereby acknowledge and agree;

a. that ICI will support the installation and maintenance of three (3) ambient air quality monitors ("Monitors") for lead located as identified in Attachment A with approximate coordinates provided as follows:

Coordinate System (Datnm)	Longitnde and Latitnde (WGS84)		UTM zone 17 North (NAD83)	
Location	Longitude (Degrees West)	Latitude (Degrees North)	x_proj (meters)	y_proj (meters)
Entrance	-79.572611	34.164083	631567	3781270
Southwest	-79.569833	34.155639	631837	3780337
Northeast	-79.562169	34.167414	632525	3781653

The Monitors will be operated as part of the South Carolina network and consistent with the provisions of 40 CFR Part 58.

b. that ICI will perform all the items identified at Attachment B and will incorporate, at a minimum, the items identified at Attachment B for the control of fugitive and/or dust emissions, in the standard operating procedures manual (SOP) required by condition 28 of Air Synthetic Minor Construction Permit No. 1040-0129-CA.

c. that ICI will provide Petitioners a copy of the standard operating procedures manual required by condition 28 of the Synthetic Minor Construction Permit No. 1040-0l29-CA at the time the proposed SOP is

submitted to DHEC for approval. Petitioners may submit comments to DHEC on the SOP. The Department may consider those comments and may or may not respond to the comments. However, submission of any comments will not trigger any new or additional obligations or permitting requirements for DHEC.

d. that DHEC will establish a web address where monitoring data, stack test protocols and stack test reports as well as DHEC contacts for the ICI Florence Recycling Center will be maintained. DHEC will post monitoring data from the Monitors for the Florence Recycling Center on its web address for the Recycling Center in an expeditious manner after verification of ambient concentration data, a period which should not exceed two weeks from the calculation and verification of ambient concentration data. DHEC will also provide a web link from its web address to a web address maintained by ICI for the Florence Recycling Center. ICI will also maintain monitoring data from the Monitors on its web address for the Recycling Center and will continue to post and maintain verified monitoring data for the most recent twelve month operating period for the life of the operation of the Recycling Center. DHEC and/or ICI will send a notice, in writing and/or electronically, of the existence of the above-web sites to those individuals that submitted written comments on Air Synthetic Minor Construction Permit No. 1040-0129-CA during the formal public comment period.

e. ICI will commence operation of the Recycling Center as follows:

   i. Operations will begin at up to and including 1/2 of the permitted production capacity over the initial 3 months of operation during which time the Monitors will be sampled every three days.
   ii. After the initial three months of operation, if the three month average lead value for each Monitor is at or below 0.075 ug/m^3, production may increase up to full permitted production capacity. ICI shall maintain daily records of mass of lead ingots produced. This information along with monitoring data for the Monitors shall be provided to DHEC and Petitioners at the end of the initial three month period of operation for the initial three months of operation. ICI identifies production data as confidential business information. Nothing in this Agreement shall be interpreted to obligate ICI, or constitute a waiver by ICI, to provide information to DHEC, Petitioners, or to any other parties, any information beyond the agreement to provide the specific information identified in this Agreement to DHEC and Petitioners for the specific time periods addressed. Likewise, nothing in this Agreement shall be interpreted as in any way limiting the rights of DHEC or Petitioners to otherwise request or demand

information from JCI as might be otherwise provided for under applicable permits or otherwise provided for by applicable law.

iii. If after the initial 3 months of operation, the three month average lead value from any Monitor is above 0.075 ug/m^3, JCI will investigate the reason why monitored lead values are higher than projected modeled values. JCI will not increase production rates above 1/2 of permitted production capacity until there is a three month rolling period in which average lead values for all the Monitors are at or below 0.075 ug/m'. If JCI makes a demonstration under the provisions of this subsection (iii), JCI will provide monitoring data to DHEC and Petitioners for the Monitors as well as production data for mass of lead ingots produced for any months relied upon by JCI to demonstrate that its operations satisfy the conditions of this subsection (iii), subject to the same confidentiality reservations identified in (e)(ii) above.

iv. After the facility begins operation at full production capacity as specified above, measurements from Monitors will occur every six days. The Monitors will be operated as part of the South Carolina network and consistent with the provisions of 40 CFR Part 58.

f. that after beginning operation at full production values as specified in paragraph 2(e) above, if any three month rolling average values for lead for any Monitor exceeds the 0.15 ug/m' National Ambient Air Quality Standard (NAAQS) for lead, DHEC will collect samples from that Monitor every three days until such time as there is a three month period in which the average lead value for that Monitor is at or below 0.15 ug/m', at which time sampling will revert to once every 6 days.

3. Enforcement by Parties. Any failure to comply with the conditions of the covenants as stated herein shall be enforceable by any Party to this Agreement.

4. Compromise Agreement. This Agreement is the compromise of disputed claims regarding the appropriateness of the permit issued to JCI. The Parties agree that all statements made in connection with the negotiation or execution of this Agreement shall be subject to Rule 408 of the South Carolina Rules of Evidence.

5. Binding Effect of Agreement. This Agreement shall be binding upon and inure to the benefit of the Parties and each of their respective agents, employees, representatives, officers, directors, principals, attorneys, shareholders, parent and/or subsidiary corporations, affiliates, successors, and predecessors in interest.

6. Assignment. This Agreement shall not be assigned or transferred without the express written consent of all Parties.

7. Entire Agreement. This Agreement embodies the entire agreement of the Parties and supersedes all prior written or oral agreements or understandings between the Parties on the subject matter of this Agreement. Notwithstanding, nothing in this Agreement is intended to alter or reduce the obligations of Permittee under Air Synthetic Minor Construction Permit No. 1040-0129-CA, nor to relieve Permittee of its duty to comply with all applicable laws.

8. Amendments. No amendment, modification, or other variation of any of the terms of this Agreement will be effective unless it is made in a writing signed by the Parties expressly stating that such instrument is intended to amend, modify, or otherwise supplement the Agreement, and then subsequently approved by this Court.

9. Severability. Whenever possible, each provision of this Agreement shall be interpreted so as to be valid under existing law. A finding of invalidity as to any provision of this Agreement or any portion thereof shall void only that provision or portion and no other, and this Agreement shall be interpreted as if it did not contain the invalid provision or portion.

10. Reliance on the Advice of Counsel. Each Party represents that, in the negotiating and drafting of this Agreement, it has been represented by counsel of its choice. Each Party affirms that its counsel has had a substantial role in the drafting and/or negotiating of this Agreement. Therefore, each Party agrees that no rule of construction to the effect that any ambiguities are to be resolved against the drafter shall be employed in the interpretation of the Agreement.

11. Warranty of Authority. The individuals executing this Agreement personally represent and warrant that they have the necessary power and authority to execute this Agreement on behalf of each Party identified as being represented, and that their signatures are sufficient to make this Agreement the binding and enforceable obligation of each Party identified.

12. Choice of Law. This Agreement shall be construed, interpreted, and enforced in accordance with the laws of the State of South Carolina. Any dispute, action, or proceeding arising out of or relating to this Agreement shall be within the exclusive jurisdiction of the South Carolina Administrative Law Court and, if an appeal of a decision of the Administrative Law Court is sought, the State courts of South Carolina. The Parties agree and consent to personal jurisdiction in the foregoing tribunals with respect to any dispute, action, or proceeding arising out of or relating to this Agreement.

13. Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original but all of which shall constitute one and the same document. Signatures provided by facsimile or portable document format ("PDF") shall have the same effect as original signatures.

14. Communications. Any written communications required under this Agreement shall be made by mailing a copy of the document to the following addresses:

a. Johnson Controls Battery Group, Inc.
Bernard F. Hawkins, Jr.
Nelson Mullins Riley & Scarborough
Meridian, 17th Floor
1320 Main Street
Columbia, SC 29201

b. Petitioners
Robert Guild
314 Pall Mall St.
Columbia SC 29201

c. The South Carolina Department of Health and Environmental Control
Office of General Counsel
Sara Bazemore
2600 Bull Street
Columbia, SC 29201

Finding the Agreement fair and reasonable, this Court approves the Agreement.

AND IT IS SO ORDERED.

July 14, 2010

The Honorable S. Phillip Lenski

WE CONSENT:

July 8, 2010

NELSON MULLINS RILEY & SCARBOROUGH
Bernard F. Hawkins, Jr.
Meridian, 17th Floor
1320 Main Street
Columbia, SC 29201
Atto for Johnson Controls Battery Group, Inc.

July 8 ,2010

Robe Guild
314 Pa: Mall St
Columbia, SC 29201
Attorney for the League of Women Voters of South Carolina and the Coastal Conservation League

July 7, 2010

Sara P. Bazemore

Sara Bazemore
S.C. Department of Health and Environmental Control
Office of General Counsel
2600 Bull Street
Columbia, SC 29201
Attorney for **SC** *DREC*

Map Document: (P:\Project JCBG\ArcGIS\2010\AmbientAirMonitors_06082010.mxd)
6/8/2010 -- 4:45:34 PM

LEGEND

PROPERTY BOUNDARY -APPROXIMATE

AMBIENT AIR MONITORING STATION

NOTES

AERIAL IMAGES FROM TERRASERVER (1994. BLACK AND WHITE).

ATTACHMENT A

0 1,000 2,000 3,000

Feet

JOHNSON CONTROLS, INC.
FLORENCE, SOUTH CAROLINA

AMBIENT AIR MONITORING LOCATIONS

DRAWN BY: TDT	SCALE AS NOTED	PROJECT NO: 00 07682 08
CHECKED BY: RFV		DATE: JUNE 2010
APPROVED BY: WMB		

RMT
Patewood Plaza One, Suite 100
30 Patewood Drive
Greenville, SC 29615-3535
Phone: 864-281-0030
FAX: 864-281-0288

Attachment B

Standard Operating Procedures (SOP) Manual -- Minimal Elements for Control of Fugitive and Dust Emission Sources

JCI will perform all the items identified in this Attachment B and will incorporate, at a minimum, the items identified in this Attachment for the control of fugitive and/or dust emissions, in the standard operating procedures manual required by Condition 28 of Air Synthetic Minor Construction Permit No. 1040-0129-CA.

1) Where records are generated under this Attachment, these records will be maintained for at least five years.
2) Processes will be designed with hoods that have face velocities noted below. There will be an initial verification that the hoods meet these face velocities and there will be subsequent verification every two years that the hoods continue to meet these face velocities according to the specifications of 40 CFR 63.547(d). Documentation of the verifications will be kept on file; deviations, if any, will be reported to SCDHEC semiannually. Face velocities will be as follows:
   a) furnace and dryer charging hoppers, chutes, and skip hoists (300 fpm face velocity)
   b) furnace lead taps, and molds during tapping (300 fpm face velocity)
   c) furnace slag taps and molds during tapping (300 fpm face velocity)
   d) refining kettles (250 fpm face velocity)

e) dryer transition pieces (350 fpm face velocity). Pressurized dryer breaching seals at each transition piece allowed as alternative

f) agglomerating furnace product taps (300 fpm face velocity)

3) The battery breaking area will be totally enclosed with initial and subsequent annual verifications that total enclosure criteria are met. Documentation of the verifications will be kept on file and deviations, if any, will be reported to SCDHEC semiannually.

4) The furnace area will be totally enclosed and ventilated to control devices with an initial and subsequent annual verification that total enclosure criteria are met. Documentation of the verifications will be kept on file and deviations, if any, will be reported to SCDHEC semiannually.

5) The refining and casting area will be totally enclosed and ventilated to control devices with an initial and subsequent annual verifications thattotal enclosure criteria are met. Documentation of the verifications will be kept on file and deviations, if any, will be reported to SCDHEC semiannually.

6) The materials storage and handling areas will be totally enclosed and ventilated to control devices. There will be a vehicle wash at each exit with initial and subsequent annual verifications that total enclosure criteria are met. JCI will conduct monthly inspections of vehicle wash equipment to verify proper operation. Documentation of the verifications and inspections will be kept on file and deviations, if any, will be reported to SCDHEC semiannually.

7) No source/plant shall use any method of materials handling which will generate fugitive particulate matter that is not fully described in the permit

application. Monthly inspections will be conducted to identify unpermitted material handling operations. Documentation of the inspections will be kept on file and deviations, if any, will be reported to SCDHEC semiannually.

8) Volatile organic compounds shall not be used for dust control purposes. Oil treatment is also prohibited. JCI will implement a new material MSDS review process to confirm that VOC-containing dust suppressants are not brought onsite. Records will be kept on file; deviations, if any, will be reported to SCDHEC semiannually.

9) Hoods, scrubbers, fabric filters or other dust cleaning devices will be installed and used where feasible and effective to capture and contain fugitive particulate matter while handling dusty materials.

10) A water slurry will be used to hydraulically transport materials collected by baghouses.

11) Wet vacuum sweeping will occur at plant roadways, twice per day, except on days of natural precipitation.

12) Speed limits will be imposed of not greater than 15 miles per hour for vehicular traffic on plant property.

13) Plant roadways used to deliver raw materials to or remove products from the facility will be paved and earth or other materials deposited by vehicular traffic, earth moving equipment, water erosion or other means, will be promptly removed from paved road surfaces.

14) Daily records will be maintained to verify pavement cleaning. Records of natural precipitation will also be maintained if the natural precipitation

exception (11 above) is used (see attachments). Records will be kept on file and deviations, if any, will be reported to SCDHEC semiannually.

15) Negative building pressure ventilation systems will continue to be operated during maintenance activities where dust generation potential exists. Daily records will be maintained to document operation of the building negative pressure ventilation systems to demonstrate consistent negative pressure. Records will be kept on file; deviations, if any, will be reported to SCDHEC semiannually.

16) There will be maintenance and quarterly structural integrity inspections of capture and control systems at all lead emission points *(e.g.,* baghouses, HEPA filters, capture hoods, and ductwork). Records will be maintained to document inspections and maintenance and kept on file, and deviations, if any, will be reported to SCDHEC semiannually.

17) Rain caps will be prohibited on any stack that is a lead emissions source and there will be an initial and subsequent annual verification that rain caps are not being used on such stacks. Documentation of the verifications will be kept on file and deviations, if any, will be reported to SCDHEC semiannually.

18) Materials capable of generating fugitive lead-dust will be stored in sealed containers. Examples of such materials include spent filters used in lead control devices and lead-containing waste generated from housekeeping requirements. Monthly inspections will be conducted to identify use of containers that are not sealed. Documentation of the inspections will be kept on file; deviations, if any, will be reported to SCDHEC semiannually.

19) JCI will immediately respond to any identified spills of toxic or hazardous materials. Plant personnel shall walk around the perimeter of the developed facility on a daily basis to inspect for any indication of environmental problems such as spills of any toxic or hazardous materials. Records of inspections will be maintained on file and deviations, if any, will be reported to SCDHEC semiannually.

20) Plant personnel shall inspect on a daily basis, and as necessary, empty and clean out all drums containing Personal Protective Equipment (PPE). Records of inspections will be maintained on file and deviations, if any, will be reported to SCDHEC semiannually.

21) Equipment shall be decontaminated or containerized prior to leaving a ventilated building. Records of inspections will be maintained on file and deviations, if any, will be reported to SCDHEC semiannually.

22) During any structural demolition operations, the material being demolished shall be adequately wetted down to suppress dust generation. Procedures for structural demolition activities will be developed, implemented, and documented.

23) JCI will keep adequate records to verify the following:

a) that housekeeping activities are completed, and that inspection and maintenance of emission collection system(s) and control device(s) are performed, including the name of the person performing the activity, and the dates on which specific activities were completed.

b) that readings are being taken as required from the ambient air lead monitoring stations.

24) Charge preparation furnace hoppers, chutes, and conveyors will be designed with enclosures and/or capture hoods to route the emissions to control devices. There will be an initial verification that the enclosures and/or hoods meet these design criteria and there will be a verification every two years that the enclosures and/or hoods continue to meet these design criteria. Documentation of the verifications will be kept on file and deviations, if any, will be reported to SCDHEC semiannually.

25) Rotary furnaces will be constructed with receiving hoods at charge doors, slagging points, tapping points and flue connections to route emissions to control devices. There will be an initial verification that the hoods meet these criteria and verification every two years that the hoods continue to meet these design criteria. Documentation of the verifications will be kept on file and deviations, if any, will be reported to SCDHEC semiannually.

26) Emissions from receiving hoods for all refining kettles will be routed to a control device. There will be an initial verification that the hoods meet this design and verification every two years that the hoods continue to meet this design. Documentation of the verifications will be kept on file; deviations, if any, will be reported to SCDHEC semiannually. The following practices will be included in the design of the facility:

a) All building exterior access doors used for truck traffic will be designed with wind protection. Personnel doors normally used for entrance/exit will be equipped with automatic closure mechanisms and an audible alarm that will sound if the door is open for more than one continuous

minute. Emergency exits will be equipped with an audible alarm that will sound immediately upon opening of the door. Windows will either be of a design that does not allow opening or will be maintained in a closed position at all times. Monthly integrity inspections will be conducted and records will be maintained to verify proper operation of automatic closure mechanisms, alarms, and window position.

b) Floor surfaces within process areas will be paved and there will be an initial verification that the floors are paved.

c) There will be proper staging and disposal of collected materials from vacuuming and wet sweeping equipment. There will be monthly inspections of vacuuming and wet sweeping equipment for proper operation and records of these inspections will be maintained.

d) Raw materials will be moved to charge preparation and finished goods will be handled with use of indoor vehicles only.

e) A central vacuum system will be provided for housekeeping.

f) The storm water management system will be designed to assist in removing lead that may fall on impervious surfaces at the facility.

g) The Recycling Center will be designed to minimize impervious surfaces and to maximize the use of vegetative cover where appropriate.

h) JCI recognizes the benefit of maintaining tree cover on the land adjacent to the plant as a buffer, and JCI will maintain tree cover on land adjacent to the plant consistent with good forestry practices and will remove and/or trim trees only as needed for good forestry management or as needed for current or future development of the property (examples,

including but not limited to, site clearing for buildings, parking lots, loading and unloading areas, entrance and exit ways, roads, monitoring locations and access ways, utility and utility rights of way (such as for power, gas, sewer, communication, etc.), stormwater management systems, rail spurs, etc.). JCI has no intent to clear-cut trees adjacent to the plant or harvest these trees beyond that needed to accomplish the purposes addressed above, and will minimize removal of trees with respect to accomplishing these purposes.

27) The buildings will be constructed with zone ventilation concepts that promote directing any air exchanged between buildings towards the foundry emission control equipment. There will be an initial verification that the building was designed with zone ventilation. Documentation of the verification will be kept on file and deviations, if any, will be reported to SCDHEC in the first semiannual report.

28) All truck openings will be equipped with an interlock system to prevent simultaneous opening of air lock doors. The doors will also be eqUipped with an audible alarm that will sound if a door remains open for more than 5 continuous minutes. Monthly observation of air lock operation and seals will be documented and kept on file; deviations, if any, will be reported to SCDHEC in the first semiannual report.

29) The following provisions will be incorporated into operating procedures and employee training.

a) vehicles and personnel flow patterns will be directed in a manner to minimize the potential for lead being carried from one area of the building to another.

b) entry/exit points will be established so that there are specific areas designated for the distribution, inspection and maintenance of personal protective equipment.

c) Uniforms will be collected at a centralized location and laundered at the facility.

d) There will be vacuum cleaning stations in the facility to facilitate dust removal and good housekeeping.

e) There will be designated changing areas for employees to remove uniforms and/or personal protective equipment prior to leaving the facility.

£) There will be hand wash stations to facilitate employee hygiene.

g) There will be showers to facilitate employee hygiene.

h) There will be a cafeteria to allow employees to eat within the building and minimize exit and entry into the building.

i) There will be footwear wash stations to minimize materials being transported from process areas into other areas of the facility.

30) There will be physical isolation of lead processing areas from adjacent non-lead processing areas. There will be initial verification that the lead isolation is used. Documentation of the verification will be kept on file and deviations, if any, will be reported to SCDHEC in the first semiannual report.

SOP Checklist for Plant Roadway Wet Vacuum Sweeping

Date of Wet Sweeping:.

Time of First Wet Sweeping Completion:

Name and Initials of Individual(s)
Performing the wet sweeping:

Time of Second Wet Sweeping Completion:

Name and initials of Individual(s)
Performing the wet sweeping:

If cleaning was unnecessary, check the reason below:

DRain

O Snow

DIce

O Sand of other material was applied to roadways to provide traction on ice, snow, or frozen precipitation.

Comrnents::

SOP Checklist for Vehicle Washing

(For vehicles exiting building areas where lead dust may be present!

Truck Wash Location / Description: _

Date and Time of Truck Wash: _

Name and Initials of Person
Conducting or Responsible for the Cleaning: _

Comments: _

MEMORANDUM OF AGREEMENT

ON AIR QUALITY MONITORING FOR CRITERIA POLLUTANTS FOR

THE MYRTLE BEACH-CONWAY-NORTH MYRTLE BEACH

METROPOLITAN STATISTICAL AREA (MSA)

July 1, 2015

Participating Agencies:

North Carolina
Department of Environment and Natural Resources (NCDENR)
Division of Air Quality (NCDAQ)

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

I. PURPOSE/OBJECTIVES/GOALS

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

II. BACKGROUND

The Myrtle Beach-Conway-North Myrtle Beach MSA consists of Horry County and Brunswick County. NCDAQ has jurisdiction over Brunswick County and SCDHEC has jurisdiction over Horry County. Brunswick County was previously included in the Wilmington (NC) MSA with New Hanover and Pender Counties. However, the United States Office of Management and Budget revised the geographic delineation in February 2013 to include Brunswick County in the Myrtle Beach-Conway-North Myrtle Beach MSA instead.

The NCDAQ and SCDHEC are required by the Clean Air Act to measure for certain criteria pollutants in the ambient air in the Myrtle Beach-Conway-North Myrtle Beach MSA. The EPA has established minimum monitoring requirements based on the size of the MSA and the quality of the air in the MSA for ozone.

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 with the MSA.

III. ROLES AND RESPONSIBILITIES

The parties agree to the following terms and conditions:

- NCDAQ and SCDHEC (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 ozone, as well as other criteria air pollutant monitoring deemed necessary to meet the needs of the MSA as determined reasonable by both 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 agency. 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 other 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 extend (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 deliver 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 or SCDHEC 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 or SCDHEC, their officers or employees, or any other person. This MOA does not direct or apply to any person outside NCDAQ or SCDHEC.

V. PROPRIETARY INFORMATION AND INTELLUCTUAL 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:

NC DENR DAQ: Donnie Redmond
NC DENR Division of Air Quality
1641 Mail Service Center
Raleigh, NC 27699-1641

donnie.redmond@ncdenr.gov
Voice/fax: 919-707-8468

SCDHEC: Scott Reynolds
SCDHEC Bureau of Air Quality
2600 Bull Street
Columbia, SC 29201

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

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 Environment and Natural Resources
Division of Air Quality (NCDAQ)

BY: Sheila C. Holman

TITLE: Director, Division of Air Quality

DATE: 6/12/2015

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

BY: Myra A Reece

TITLE: Bureau Chief, Air Quality Bureau

DATE: 6/22/15

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

MAY 26 2016

Ms. Rhonda Banks Thompson
Chief
Bureau of Air Quality Control
South Carolina Department of Health and
Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Dear Ms. Thompson:

On March 16, 2016, the South Carolina Department of Health and Environmental Control (SC DHEC) notified the U.S. Environmental Protection Agency Region 4 that the comment period had ended for the Network Plan Addendum to the state of South Carolina's 2015 annual ambient air monitoring network plan (Network Plan Addendum). The Network Plan Addendum provided further information and proposed changes to the 2015 annual ambient air monitoring network plan (Network Plan), which was approved with three exceptions by the EPA on November 19, 2015. The Network Plan Addendum was received as two separate documents. One document proposed changes to the SC DHEC monitoring network and the other document requested waivers for monitoring siting requirements.

The EPA understands that the SC DHEC provided the public a 30-day review period for its draft Network Plan Addendum and that no comments were received.

The Network Plan Addendum proposes a number of changes to the SC DHEC's ambient air monitoring network, including:

- shutdown of four ozone (O_3) monitoring sites,
- relocation of one O_3 monitoring site,
- startup of one O_3 monitoring site,
- shutdown of one multipollutant ($PM_{2.5}$ and PM_{10}) site,
- a waiver of siting requirements at an O_3 and SO_2 site, and
- renewal of an existing waiver at a multi-pollutant site.

The EPA approves the requests in the Network Plan Addendum, with the following exceptions:

- The EPA is deferring making a decision on the proposed shut down of the Clemson O_3 site (AQS ID 45-072-0002) in order to allow more time for consideration and discussion with the SC DHEC.
- The EPA does not approve the discontinuation of O_3 monitoring at the Bushy Park Pump Station site (AQS ID 45-015-0002), since this site is required for the Charleston area to meet the O_3 minimum monitoring requirements found in 40 CFR Part 58, Appendix D. The EPA understands that the SC DHEC is currently looking for nearby property to move this monitor to. Once a suitable replacement site is found, the SC DHEC should request a relocation of the Bushy Park Pump Station O_3 monitor.

- The EPA conditionally approves the establishment of the Coastal Carolina O_3 monitoring site, once the SC DHEC has resolved any monitor siting issues. This site will meet the requirements for O_3 monitoring in the Myrtle Beach-Conway-North Myrtle Beach, SC-NC Metropolitan Statistical Area. The SC DHEC should include in the next ambient air monitoring network plan evidence that the Coastal Carolina site meets air monitoring siting requirements found in 40 CFR Part 58, Appendix E.
- The EPA supports the proposed relocation for the York CMS O_3 monitoring site (AQS ID 45-091-0006) to the proposed York O_3 site (AQS ID 45-091-0007). However, the Network Plan Addendum does not provide sufficient information to approve the new location at the proposed York O_3 site. In addition to the information provided in the Network Plan Addendum, the SC DHEC should submit to the EPA information to demonstrate that monitoring siting criteria are met, including: zoomed in aerial photo or a site location map; site photo(s) facing from the site in each direction (N, S, E, W); applicable measurements to any obstructions, trees or roadways; and the proposed probe height for the site.

All of the approved ambient air monitoring network changes, requested in the Network Plan Addendum should also be documented in the next annual ambient air monitoring network plan, due July 1, 2016.

Details regarding the EPA's review of the Network Plan Addendum are provided in the enclosed comments.

Thank you for working with us to monitor air pollution and promote healthy air quality in South Carolina. If you have any questions or concerns, please contact Gregg Worley at (404) 562-9141 or Ryan Brown at (404) 562-9147.

Sincerely,

Carol L. Kemker
Acting Director
Air, Pesticides and Toxics Management Division

Enclosure

cc: Mr. Robert Brown
Division Director, Air Planning Development SC DHEC

Mr. Scott Reynolds
Director, Division of Air Quality Analysis, SC DHEC

The Honorable William Harris
Chief of the Catawba Indian Nation

Mr. Darin Steen
Director, Environmental Services, Catawba Indian Nation

Ms. Sheila Holman, Director, Division of Air Quality, NCDEQ

2015 State of South Carolina Ambient Air Monitoring Network Plan Addendum
The U. S. EPA Region 4 Comments and Recommendations

This document contains the U.S. Environmental Protection Agency Region 4 comments and recommendations on the state of South Carolina's 2015 ambient air monitoring network plan addendum (Network Plan Addendum). Ambient air monitoring rules, which include regulatory requirements that address network plans, data certification, and minimum monitoring requirements, among other requirements, are found in 40 CFR Part 58.

Proposed Monitoring Discontinuations

The Network Plan Addendum proposes to discontinue five monitoring sites. The EPA is deferring the decision for the proposed shut down of the Clemson O_3 site (AQS ID 45-072-0002), in order to allow more time for consideration and discussion with the SC DHEC on this issue. The EPA acknowledges the discontinuation of O_3 monitoring at the Cowpens (AQS ID 45-021-0002) site, and approves the discontinuation of O_3 monitoring at the Famoda Farms (AQS ID 45-045-1003) site, as well as the discontinuation of $PM_{2.5}$ and PM_{10} monitoring at the Bates House site (AQS ID 45-079-0019). See Table 1 for a summary of these requests with the EPA's comments.

The O_3 minimum monitoring requirements are found in 40 CFR Part 58, Appendix D, Table D-2. These minimum requirements are based on metropolitan statistical area (MSA) boundaries as defined by the U.S. Office of Management and Budget, population estimates from the U.S. Census Bureau for these MSAs, and historical ambient air monitoring data.

Table 1: Monitors Proposed for Discontinuation

AQS ID	Site Name	MSA	Pollutant	Type	Comments
45-072-0002	Clemson	Greenville-Anderson-Mauldin, SC	O_3	SLAMS	Deferred for further discussion with the SC DHEC.
45-021-0002	Cowpens National Battlefield	Gaffney, SC	O_3	SPM	Approval not required for SPM - shutdown acknowledged.[1]
45-015-0002	Bushy Park Pump Station	Charleston-North Charleston-Summerville, SC	O_3	SLAMS	Not Approved. A suitable replacement site should be found in the MSA.
45-045-1003	Famoda Farms	Greenville-Anderson-Mauldin, SC	O_3	SLAMS	Approved
45-079-0019	Bates House	Columbia, SC	$PM_{2.5}$, PM_{10}	SLAMS	Approved. The SC DHEC will lose site access. Collocated $PM_{2.5}$ sampler will be moved to Parklane site (AQS ID 45-079-0007) to meet $PM_{2.5}$ collocation requirements.

[1] The Cowpens National Battlefield O_3 site is in a MSA that meets minimum O_3 monitoring requirements and is classified as a special purpose monitor (SPM). The SC DHEC does not require EPA approval to shut down this monitor since it is a SPM. The EPA acknowledges the discontinuation of this monitor and that the monitoring requirements for O_3 in Appendix D to 40 CFR Part 58 will continue to be met after this monitor is shutdown.

The SC DHEC requested to discontinue O_3 monitoring at the Famoda Farms monitoring site (AQS ID 45-045-1003). The EPA approves the shutdown of this site. The Famoda Farms monitor is one of four O_3 monitors operating in the Greenville-Anderson-Mauldin, SC MSA. This area is required at a minimum to have two O_3 monitors. Additionally, Famoda Farms has consistently recorded lower O_3 concentrations than the Clemson and Hillcrest Middle School monitoring sites, which are also in the Greenville area. The monitoring requirements in Appendix D to 40 CFR Part 58 will continue to be met in the Greenville area after the Famoda Farms monitor is shutdown.

At this time, the EPA does not approve the shutdown of the O_3 monitor at Bushy Park Pump Station. The Charleston MSA would not meet minimum O_3 monitoring requirements if O_3 monitoring at this site were discontinued. At a minimum, the Charleston MSA is required to have two regulatory O_3 monitors and would only have one regulatory O_3 monitor if monitoring at Bushy Park Pump Station were discontinued. The EPA recommends that the SC DHEC find a suitable replacement monitoring location for Bushy Park. In the meantime, the SC DHEC should continue to flag in the Air Quality System (AQS) the Bushy Park Pump Station O_3 data as not meeting siting requirements.

The SC DHEC expects to lose access to the property where the Bates House $PM_{2.5}$ and PM_{10} monitoring site (AQS ID 45-079-0019) is located. For $PM_{2.5}$, the Bates House monitoring has recorded daily and annual $PM_{2.5}$ design values below the national ambient air quality standards (NAAQS) for the last five years. Additionally, $PM_{2.5}$ concentrations recorded at the Irmo site (AQS ID 45-063-0008), which is also in the Columbia, SC MSA, have been typically higher than Bates House. Over the last five years, Irmo has had annual design values higher than Bates House, as well. The PM_{10} levels recorded at Bates House have been well below the applicable standard for more than ten years. The EPA understands that the SC DHEC will move the collocated $PM_{2.5}$ sampler from Bates House to the Parklane site (AQS ID 45-079-0007) to still meet the $PM_{2.5}$ collocation requirements. After the Bates House monitoring site is shutdown and the $PM_{2.5}$ collocation requirements are met by establishing a collocated $PM_{2.5}$ sampler at the Parklane site, the Columbia, SC MSA will still meet monitoring requirements in Appendix D to 40 CFR Part 58 for PM_{10} and $PM_{2.5}$. Thus, EPA approves the discontinuation of monitoring at Bates House.

Proposed Monitor Startups or Relocations

The Network Plan Addendum also proposes to relocate one O_3 monitor and startup one O_3 monitor. See Table 2 for a summary of these requests.

Table 2: Monitors Proposed for Startup or Relocation

AQS ID	Site Name	MSA	Pollutant	Type	Comments
45-091-0006	York	Charlotte-Gastonia-Concord NC-SC	O_3	SLAMS	The EPA supports this relocation to the new site, but requests additional information in the next network plan.
45-051-0008	Coastal Carolina	Myrtle Beach-Conway-North Myrtle Beach, SC-NC	O_3	SLAMS	EPA Conditionally approves site startup. The Myrtle Beach MSA will the meet minimum monitoring requirements once this site is established. Site must meet siting criteria.

In its response to the 2015, Network Plan EPA approved a temporary shutdown of the York CMS monitoring site (AQS ID 45-091-0006). The SC DHEC stated in the Network Plan that it expects to lose access to the site and was looking for a replacement location. The Network Plan Addendum proposes to restart O_3 monitoring at a new site, York (AQS ID 45-091-0007), which is 3.5 miles northeast of the York CMS site. The EPA understands that the York CMS site is currently still operational even though the temporary shutdown was approved, and that The SC DHEC hopes to operate O_3 monitors concurrently at both the York CMS and York sites before discontinuing monitoring at York CMS. The York CMS monitor is an upwind location for the Charlotte-Concord-Gastonia NC-SC Core Based Statistical Area (CBSA) and typically reads lower than the other O_3 monitors in the CBSA. The EPA believes that the proposed York location would be representative of the same air shed as the previous York CMS monitoring site. The EPA supports the proposed location for the York O_3 monitoring site. However, the Network Plan Addendum does not provide sufficient information to fully approve the proposed York O_3 site. In addition to the information provided in the Network Plan Addendum, the SC DHEC should submit to the EPA information to demonstrate that monitoring siting criteria are met including: zoomed in aerial photo or a site location map; site photo(s) facing from the site in each direction (N, S, E, W); applicable measurements to any obstructions, trees or roadways; and the proposed probe height for the site. This information should be included in the next ambient air monitoring network plan.

The Network Plan Addendum proposes to establish a new O_3 monitoring site, Coastal Carolina (AQS ID 45-051-0008), in the Myrtle Beach-Conway-North Myrtle Beach, SC-NC CBSA to meet O_3 minimum monitoring requirements for this area. The SC DHEC provided 2011 Community Multiscale Air Quality (CMAQ) modeling output for this area in the Network Plan Addendum. The CMAQ model output indicates that the proposed Coastal Carolina site is in the area of the maximum predicted O_3 for the CBSA.

During the 2015 EPA technical systems audit (TSA), the EPA staff visited the proposed location for the Coastal Carolina site. The EPA noted that there was a tree dripline within ten meters of the expected monitoring probe location. This configuration would not meet the monitoring siting criteria found in 40 CFR Part 58, Appendix E, Section 5 siting requirements, "Spacing from Trees." The EPA conditionally approves the Coastal Carolina site; however, full approval is withheld until the monitoring siting criteria issue has been resolved. The SC DHEC should provide evidence that the Coastal Carolina site meets the monitoring siting criteria requirements found in Appendix E to 40 CFR Part 58 in the next ambient air monitoring network plan.

Proposed Waivers of Monitor Siting Criteria

The Network Plan Addendum requests one waiver of 40 CFR Part 58, Appendix E siting requirements and the extension of an existing waiver of siting requirements. Table 3 summarizes these requests.

Under 40 CFR Part 58, Appendix E, Section 10, waivers of siting criteria for existing sites can be granted if either of the following criteria are met:

> 10.1.1 The site can be demonstrated to be as representative of the monitoring area as it would be if the siting criteria were being met.

10.1.2 The monitor or probe cannot reasonably be located to meet the siting criteria because of physical constraints (e.g., inability to locate the required type of site the necessary distance from roadways or obstructions).

Table 3: Waivers of Siting Criteria

AQS ID	Site Name	MSA	Pollutant	Type	Comments
45-079-0021	Congaree Bluff	Columbia, SC	O_3, SO_2	SPM	Waiver of siting criteria approved for the identified trees obstructing the monitor. Waiver through 2020.
45-045-0015	Greenville ESC	Greenville-Anderson-Mauldin, SC	SO_2, NO_2, $PM_{2.5}$, PM_{10}, O_3	SLAMS	Existing waiver of siting requirements extended through 2018.

The Network Plan Addendum requests a waiver of monitoring siting requirements for the Congaree Bluff monitoring site (AQS ID 45-079-0021). The objective of the Congaree Bluff site is to measure O_3 and SO_2 within the Congaree National Park boundaries. Within the national park boundaries, this monitor cannot be reasonably located to meet the siting criteria because of physical constraints. The EPA staff visited the Congaree Bluff site on January 25, 2016, and agree that this is the best monitoring location within the park boundaries. However, there are over forty trees surrounding the probe that do not meet the spacing from obstructions discussed in 40 CFR Part 58, Appendix E, Section 4 (a)"… The distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path…"

The configuration of obstructing trees is such that the monitor probe siting does not meet Table E-4 of 40 CFR Part 58, Appendix E, Section 11, which states that monitor location "must have unrestricted airflow 270 degrees around the probe or sampler." The Congaree Bluff monitors have 180 degrees of unobstructed airflow due to the obstructing trees.

However, the EPA understands that the SC DHEC has trimmed the dripline of trees so that all tree driplines are no closer than ten meters from the monitoring probes, in order to comply with 40 CFR Part 58, Appendix E, Section 5 siting requirements, "Spacing from Trees." The SC DHEC has taken reasonable steps to meet many of the siting monitoring requirements, and the EPA believes that removing over 40 trees from a national park to meet all of the siting requirements is not necessary.

The EPA waives the requirements of 40 CFR Part 58, Appendix E, Section 4 (a) and Table E-4 to 40 CFR Part 58, Appendix E, Section 11 in regards to the trees identified by The SC DHEC in the Network Plan Addendum for the Congaree Bluff site. This site must still meet all other siting requirements found in Appendix E to 40 CFR Part 58. The EPA waives these specific requirements for a period of five years. This waiver should be re-evaluated in the 2020 South Carolina network assessment.

Similarly, the Network Plan Addendum requests to renew a waiver of siting criteria for the Greenville ESC monitoring site (AQS ID 45-045-0015). In 2009, the EPA granted a waiver of siting requirements for this site based on concurrent monitoring with the previous site. The Network Plan Addendum identifies two trees that are closer than twice the distance between the top of the tree and the height of the monitoring probe. At this time, the tree configuration and spacing at the site is close to meeting siting criteria such that the EPA believes that the monitoring data is representative of data if the siting criteria were met. Also, restrictions at the location prevent a reconfiguration of equipment or removal of trees.

The EPA waives the requirements of 40 CFR Part 58, Appendix E, Section 4 (a) and Section 11 (Table E-4) in regards to the trees identified by the SC DHEC in the Network Plan Addendum for the Greenville ESC site. The EPA waives these specific requirements for a period of two years. The EPA and the SC DHEC will continue to reevaluate the waiver of these requirements and alternative solutions in upcoming ambient air monitoring network plans. The Greenville ESC site must still meet all of the other siting requirements found in Appendix E to 40 CFR Part 58.

dhec
Healthy People. Healthy Communities.

August 16, 2018

Ms. Beverly H. Banister, Director
Air, Pesticides, and Toxics Management Division
US EPA Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth St., SW
Atlanta, GA 30303

RE: Amendments to the South Carolina 2018 Annual Air Monitoring Network Plan

Dear Ms. Banister:

On July 1, 2017, the South Carolina Department of Health and Environmental Control (Department) submitted the 2018 Annual Air Monitoring Network Plan (Network Plan) in accordance with the requirements of 40 CFR 58.10. The Network Plan approval was received on October 25, 2017. This letter is to inform you of three revisions to the Network Plan.

We request approval for the termination of the Bushy Park Pump Station (45-015-0002) Monitoring Station, the modification of the designation of the $PM_{2.5}$ at the Ashton (45-029-0002) Monitoring Station from SLAMS to SPM, and the addition of a SLAMS $PM_{2.5}$ monitor to the Cape Romain (45-019-0046) Monitoring Station.

The revisions to the Network Plan were made available to the public for a 30-day comment period that occurred from April 25, 2018 to May 25, 2018. During this time, we did not receive any comments.

These revisions to the Network Plan are expected to maintain or support improvements in ambient monitoring in the State of South Carolina. Should you have any questions or need additional information regarding this matter, please contact Robert Brown of my staff at (803) 898-4105.

Sincerely,

Rhonda Banks Thompson, P.E.,
Bureau Chief
Bureau of Air Quality

ec: Ryan Brown, US EPA Region 4 (w/attachments)
Todd Rinck, USEPA Region 4 (w/o attachments)
Robert J. Brown, Jr., BAQ (w/o attachments)
Renee Shealy, BEHS (w/o attachments)
Sandra Flemming, BEHS (w/o attachments)
Micheal Mattocks, BEHS (w attachments)

Amendments

Plan Revisions

The following pages contain revisions to the 2018 Annual Air Monitoring Network Plan. Changes to the 2018 plan are *italicized* with gray highlighting applied. Deletions to the 2018 plan are ~~*italicized*~~, struck-through and highlighted in gray. Page numbers from the original 2018 Annual Air Monitoring Network Plan are provided at the bottom of the pertinent pages as a reference.

Introduction

The Department or its predecessors have operated an air quality monitoring network in South Carolina since 1959. During that time, the network has continually evolved to meet the requirements and needs of the Department's Air Program and to comply with federal requirements. In 2018, the network will be comprised of ~~96~~ *95* monitors and samplers at ~~31~~ *30* sites.

In October, 2006, the EPA published revisions to the ambient monitoring regulations (71 FR 61236, October 17, 2006) requiring quality assurance (QA), monitor designations, minimum requirements for both number and distribution of monitors among metropolitan statistical areas (MSAs), and probe siting changes. The regulation also included the requirement for an annual monitoring network plan and periodic network assessments.

This plan covers the eighteen-month period from July 1, 2017 through December 31, 2018. This period includes a six-month implementation period during which sites indicated as 'New' will be identified, secured, and prepared for the installation of monitoring equipment. It is expected that any monitoring indicated as 'New' or 'To be established' will be installed, calibrated, and operating in 2018 with the exception of some Ozone monitors, which may begin operation at the start of the South Carolina Ozone monitoring season (March 1-October 31). The annual Network Description and Ambient Air Monitoring Network Plan, as required and described in 40 CFR Part 58.10, and Periodic Network Assessment, must contain the following information for each monitoring station in the network:

- The Air Quality System (AQS) site identification number (ID) for existing stations,
- Location of each monitoring station, including street address and geographical coordinates,
- The sampling and analysis method used for each measured parameter,
- The operating schedule for each monitor,
- Any proposal to remove or relocate a monitoring station within a period of eighteen months following the plan submittal,
- The monitoring objective and spatial scale of representativeness for each monitor,
- The identification of any sites that are suitable for comparison against the Particulate Matter < 2.5 microns **(**$PM_{2.5}$) National Ambient Air Quality Standard (NAAQS), and
- The MSA, Core-Based Statistical Area (CBSA), Combined Statistical Area (CSA), or other area represented by the monitor.

This document constitutes the 2018 South Carolina Air Monitoring Network Plan. The site pages are organized into two main parts:

- Network Summaries: A table which presents the total number of sites and monitors for the State, including a list of all proposed changes to the current network, and
- Air Monitoring Station Descriptions: An outline of the designations, parameters, monitoring methods, and the purpose for each monitor at the site.

The Monitoring Network is reviewed annually. Planned changes are described in this 2018 Monitoring Plan and provided for public review and comment prior to submission to the EPA Region 4 Administrator.

Network Summary

Network Summary: Calendar Year 2018 Air Monitoring Stations																		
Region	Sites	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	TSP/Lead	Ozone	SO_2	NO_2/NO/NO_y	CO	Sulfate	BC	Carbonyls	SVOC	VOC	Mercury	Precip Chem.	Precip.	*MET
Augusta-Richmond County, GA-SC MSA	2	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Charleston-N. Charleston MSA	~~5~~ *4*	3	2	0	1	0	~~2~~ *1*	2	2	0	0	1	0	0	0	0	0	1	1
Charlotte-Concord-Gastonia, NC-SC MSA	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
Columbia MSA	6	3	2	1	3	1	3	3	3	1	0	1	2	3	0	1	2	2	1
Florence MSA	5	1	1	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0
Greenville-Anderson-Mauldin MSA	5	3	1	0	1	0	4	1	1	0	0	1	0	0	0	0	0	0	0
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Spartanburg MSA	2	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Remainder of State	4	1	3	1	3	0	3	1	0	0	0	1	2	2	2	0	0	0	1
TOTALS	~~31~~ *30*	13	11	2	8	5	~~18~~ *17*	8	6	1	0	4	4	5	2	1	2	3	4

This summary table presents the elements of the 2018 Monitoring Plan after implementation of changes described in this plan.*MET data includes wind speed and wind direction 12

Required Monitoring

The EPA regulation 40 CFR Part 58, Appendix D requires that each State maintain a minimum number of monitors to properly characterize air quality and to meet any required objectives of the monitoring network[1]. In general, these minimum requirements are based on the MSA population and current ambient air monitoring design values. The following sections discuss the minimum monitoring criteria for each of the criteria pollutants (Ozone, Particulate Matter ($PM_{2.5}$ and PM_{10}), Lead, SO_2, NO_2, and CO), the CBSAs, and the MSA population. The final section shows the current South Carolina minimum monitoring requirements.

Minimum Monitoring for Ozone – The Ozone minimum monitoring criteria has two requirements:

1) Required Ozone SLAMS sites – A minimum number of required Ozone SLAMS sites for each CBSA that is determined by CBSA population and the peak Ozone concentrations.

2) NCore Requirement – Each NCore site must include an Ozone monitor. The Parklane (45-079-0007) site in Columbia, South Carolina is the NCore site for South Carolina.

Minimum Monitoring for $PM_{2.5}$ – The $PM_{2.5}$ minimum monitoring criteria has six requirements:

1) Required $PM_{2.5}$ SLAMS sites – A minimum number of required $PM_{2.5}$ SLAMS sites for each CBSA.

2) Continuous Requirement – A continuous $PM_{2.5}$ monitoring requirement which is equal to at least one-half (round up) the minimum required $PM_{2.5}$ SLAMS sites. Also, at least one required continuous analyzer in each CBSA must be collocated with one of the required FRM or FEM monitors, unless at least one of the required FRM/FEM monitors is itself a continuous FEM monitor, in which case, no collocation requirement applies.

3) Regional Background and Transport – At least one $PM_{2.5}$ site must be established in each state to monitor for regional background and at least one $PM_{2.5}$ site to monitor regional transport. ~~*The Ashton (45-029-0002) site in Colleton County*~~ *The Cape Romain (45-019-0046) in Charleston County is the regional background site* and the Chesterfield (45-025-0001) site in Chesterfield County is the regional transport site.

4) NCore Requirement – Each state is required to operate at least one NCore site which measures $PM_{2.5}$ using both continuous and integrated/filter-based samplers. The Parklane (45-079-0007) site in Columbia, South Carolina is the NCore site for South Carolina.

5) Near-road $PM_{2.5}$ Monitoring – The EPA requires the collocation of one $PM_{2.5}$ monitor with a near-road NO_2 monitor in urban areas having populations of 1,000,000 or more by January 1, 2017. The Charlotte-Concord-Gastonia, NC-SC MSA is the only MSA in South Carolina that meets the population requirement for a collocated $PM_{2.5}$ monitor. The near-road monitoring requirement for the Charlotte-Concord-Gastonia, NC-SC MSA is being fulfilled at the Remount Road (37-119-0045) site by the Mecklenburg County Air Quality Commission.

6) Speciation Monitoring – Chemical speciation monitoring is conducted at the Parklane (45-079-0007) site and is funded as part of the $PM_{2.5}$ Speciation Trends Network (STN). Speciation Monitoring is also conducted at the Chesterfield (45-025-0001) site.

Minimum Monitoring for PM_{10} – The PM_{10} minimum monitoring criteria has one requirement that is based on the CBSA population, the number of exceedances of the NAAQS, and the percentage of PM_{10} concentrations over or under the NAAQS. Unlike other criteria pollutants, the minimum monitoring requirements for PM_{10} is given as a range of required monitoring sites for a CBSA.

[1] 40 CFR Part 58.11 paragraph (a)(3)(c) and Appendix D to 40 CFR Part 58. 16

Summary of 2018 Network Changes

Augusta-Richmond County, GA-SC MSA (South Carolina portion includes Aiken and Edgefield Counties)

No changes planned for 2018.

Charleston-North Charleston MSA

~~*No changes planned for 2018.*~~

Bushy Park (45-015-0002) - Site will be terminated before the beginning of the 2019 Ozone season

Cape Romain (45-019-0046) - The site serves as a required regional background for $PM_{2.5.}$ The $PM_{2.5}$ monitoring designation was changed from SPM to SLAMS.

Charlotte-Concord-Gastonia, NC-SC MSA

York Landfill (45-091-0008) - This new monitor has been established to replace the York CMS (45-091-0006) site.

Columbia MSA

Parklane (45-079-0007) - $PM_{2.5}$ sampling was added to fulfill 40 CFR Part 58, Appendix A collocation requirement.

Florence MSA

No changes planned for 2018.

Greenville-Anderson-Mauldin MSA

No changes planned for 2018.

Hilton Head Island-Bluffton-Beaufort MSA

No changes planned for 2018.

Myrtle Beach-Conway-North Myrtle Beach SC-NC MSA

No changes planned for 2018.

Spartanburg MSA

No changes planned for 2018.

Sumter MSA

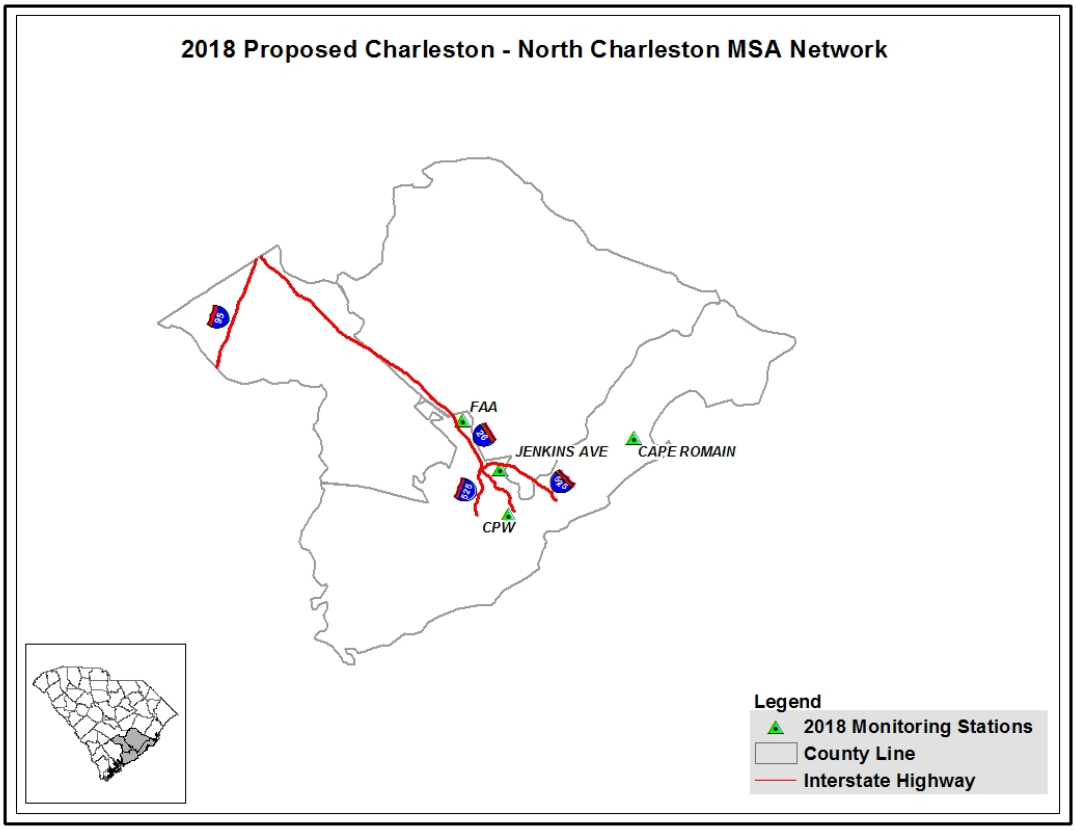
No changes planned for 2018.

Remainder of State

~~*No changes planned for 2018.*~~

Ashton (45-029-0002) - The $PM_{2.5}$ monitoring designation was changed from SLAMS to SPM.

Charleston-North Charleston MSA (map has changed)



Classification of Monitoring Type by Site

Site ID	Site Name	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	Lead	Ozone	SO_2	NO_2	CO	BC	Precip.	MET
~~*45-015-0002*~~	~~*Bushy Park Pump Station*~~						~~●~~						
45-019-0003	Jenkins Ave. Fire Station				●			●	O				
45-019-0046	Cape Romain		~~O~~ ●				●	O	O		O	O	●
45-019-0048	FAA	OO											
45-019-0049	CPW	●	O										
TOTAL		3	2	0	1	0	2	2	2	0	1	1	1
O SPM / Other ● SLAMS ●●/OO duplicate / QA monitors													

Bushy Park Pump Station
CSA/MSA: *none/Charleston-North Charleston MSA*
AQS Site ID: *45-015-0002*
Location: *River Oak Drive (Goose Creek)*
County: *Berkeley*
Coordinates: *+32.98724, -79.93671*
Date Established: *June 20, 1978*
Site Evaluation: *April 26, 2017*

The Bushy Park Pump Station site is located in southeastern Berkeley County downwind from the Charleston urban area. This site monitors for Ozone and the monitoring objective is maximum Ozone concentration. The sample inlets are 15 meters from the nearest road.
This site does not meet 40 CFR Part 58, Appendix E, Section 4, Section 5, and Section 11 requirements due to tree obstructions and drip line requirements. It is not feasible to cut or trim the trees. Currently, a suitable replacement site is being sought. Once an appropriate site has been located and established, the Bushy Park Pump Station site will be terminated.

Changes for 2018:
Due to tree encroachment, this site will be terminated when a suitable replacement site is identified and established.

Monitors:

Parameter	*Scale*	*Objective*	*Designation*	*Probe Height (m)*	*Analysis & (Method Code)*	*Sampling Frequency*
Ozone	*Urban*	*Max Ozone Concentration*	*SLAMS*	*3.8*	*Ultraviolet Absorption (087)*	*Continuous*

Cape Romain

CSA/MSA: none/Charleston-North Charleston MSA
AQS Site ID: 45-019-0046
Location: 390 Bulls Island Road (Awendaw)
County: Charleston
Coordinates: +32.94101, -79.65719
Date Established: July 11, 1983
Site Evaluation: April 18, 2017

The Cape Romain site is located in Charleston County at the Cape Romain National Wildlife Refuge (NWR) near Moore's Landing. The Cape Romain NWR is a Class I area about 20 miles northeast of Charleston. The majority of the Refuge area is offshore, extending from Bull Island 20 miles northeast to Cape Romain. The Refuge is bordered on the west by the Intracoastal Waterway. Inland are large tracts of forests with scattered residences. Several miles inland, a primary coastal route, US Highway (Hwy) 17, parallels the coast, with some development along the section of highway that is closest to the Refuge.

The Cape Romain site has continuous monitors for SO_2, NO_2, Ozone, BC, Continuous $PM_{2.5}$, and meteorological parameters. *This site also serves as a required regional background for $PM_{2.5}$.* The sample inlets are 86 meters from the nearest road.
This site meets siting criteria found in 40 CFR Part 58 Appendix E. The East tree does not meet the requirements for tree height in the 40 CFR Part 58 Appendix E Section 4 (Spacing from Obstructions), but there is still more than 270° unobstructed air flow around the probe.

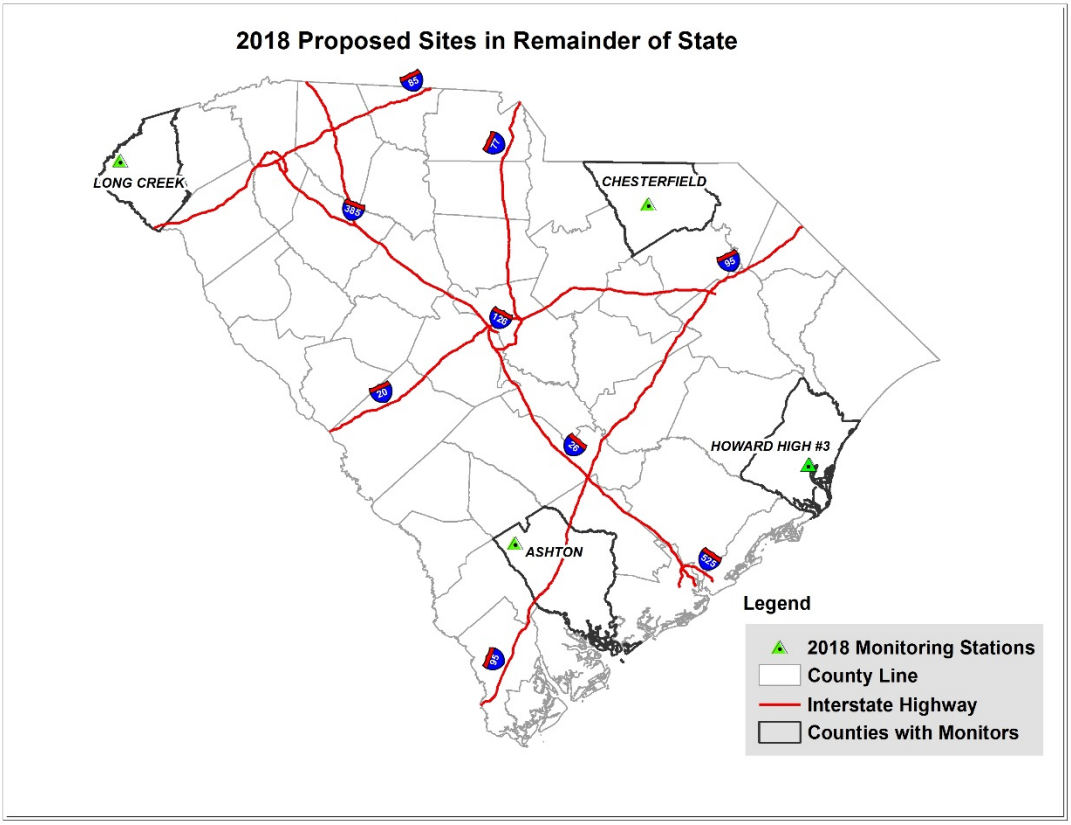
Changes for 2018:
~~*There are no changes planned for 2018.*~~
The $PM_{2.5}$ monitor has been designated as the regional background site for the State of South Carolina. This monitor has changed designation from SPM to SLAMS to accommodate this change.

Monitors:
(Table continues on next page)

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
$PM_{2.5}$	~~*Urban*~~ *Regional*	General / Background	~~*SPM*~~ *SLAMS*	4.8	FDMS (183)	Continuous
Ozone	Regional	General / Background	SLAMS	4.5	Ultraviolet (047)	Continuous
Sulfur Dioxide	Regional	Source Oriented	SPM	4.5	Pulsed Fluorescent (560)	Continuous
Nitrogen Dioxide	Regional	General / Background	SPM	4.5	Chemilumine-scence (599)	Continuous

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Black Carbon	Regional	General / Background	Non-regulatory	4.0	Optical absorption	Continuous
Wind Speed / Direction and Precipitation	Neighbor-hood	Local Conditions	SLAMS	10.0	Instruments for wind speed, direction, and precipitation (020)	Continuous

Remainder of State



Classification of Monitoring Type by Site

Site ID	Site Name	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	Lead	Ozone	SO_2	NO_2	CO	BC	Carbonyls	SVOC	VOCs	MET
45-025-0001	Chesterfield	●	●	●	OO		O				O	OO	OO	OO	O
45-029-0002	Ashton		● O				O								
45-043-0011	Howard High School #3				O										
45-073-0001	Long Creek		O				O	O							
TOTAL		0	3	1	3	0	3	1	0	0	1	2	2	2	1
O SPM / Other ● SLAMS ●●/OO duplicate / QA monitors															

Ashton

CSA/MSA: none/none
AQS Site ID: 45-029-0002
Location: Ashton Road (S-13-18) Islandton
County: Colleton
Coordinates: +33.00784 -80.96504
Date Established: March 7, 1990
Site Evaluation: May 9, 2017

The Ashton site is located in northwestern Colleton County and was established on March 7, 1990. ~~*The site serves as a required regional background for $PM_{2.5}$, representing one of two major and different physiographic regions in South Carolina. It also*~~ monitors for $PM_{2.5}$ and Ozone concentrations. The sample inlets~~s~~ are 8.4 meters from the nearest road.
This site does not meet 40 CFR Part 58, Appendix E, Section 4, Section 5, and Section 11 requirements due to tree obstructions and drip line requirements. The Department is working with the land owners to remove or trim the trees.

Changes for 2018:
There are no changes planned for 2018.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
$PM_{2.5}$	Regional	General / Background	~~*SLAMS*~~ *SPM*	4.2	TEOM 50°C (702)	Continuous
Ozone	Urban	General / Background	SPM	4.6	Ultraviolet (047)	Continuous

APPENDIX B: Termination Requests

The Table below contains information on the monitoring sites *and individual monitors* the Department has scheduled for discontinuance.

Site	ID	Date Established	Notes
Bushy Park Pump Station	*45-015-0002*	*06/20/1978*	*This monitoring station monitors for Ozone. The site does not meet the CFR 40 Part 58 Appendix E 4(a) and (b)-Spacing From Obstructions, Appendix E 5(a) and (b)-Spacing From Trees and 11-Summary because of multiple large trees that cannot be cut. After consideration of all options, the Department requests termination the Bushy Park Monitoring Station and move the Ozone monitor to a more appropriate location in Berkeley County.*
Ashton $PM_{2.5}$ monitor	*45-029-0002*	*06/24/1990*	*The $PM_{2.5}$ monitor does not meet 40 CFR Part 58, Appendix E 4(a) and (b)-Spacing From Obstructions, Appendix E 5(a) and (b)-Spacing From Trees, and Appendix E 11-Summary. The Department requests termination of the SLAMS $PM_{2.5}$ monitor. A new SLAMS $PM_{2.5}$ monitor will be established at the Cape Romain (45-019-0046) Monitoring Station as the regional background site. The $PM_{2.5}$ monitor at the Ashton (45-029-0002) Monitoring Station will continue as a SPM.*

Termination of the Bushy Park Pump Station (45-015-0002) Monitoring Station

The Department requests approval for termination of the Bushy Park Pump Station (45-019-0002) Monitoring Station in Berkeley County. Basic information on the Monitoring Station is listed in Table 1 and an aerial picture is shown in Figure 1.

Table 1: Bushy Park Pump Station (45-015-0002) Monitoring Station Information	
Item	**Description**
AQS ID	45-015-0002
Street Address	River Oak Drive, Goose Creek, South Carolina, Berkeley County
Geographic coordinates	+32.98724, -79.93671
Designation	SLAMS
Analysis method	(087) Ultraviolet Absorption
Operating schedule	Continuous
Monitoring objective	Maximum Ozone concentration
Monitoring scale	Urban
MSA represented	Charleston-North Charleston, South Carolina MSA

Figure 1: Bushy Park Pump Station (45-015-0002) Monitoring Station Location

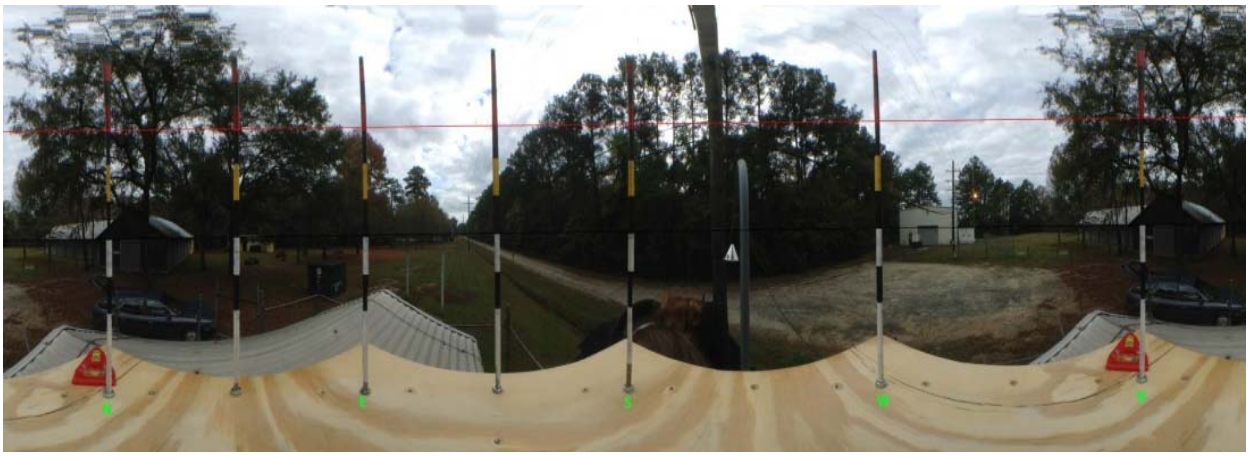
Justification for request

The Bushy Park Pump Station (45-015-0002) Monitoring Station does not meet siting criteria in accordance with 40 CFR Part 58, Appendix E because of numerous tree obstructions and a drip line issue. The Monitoring Station is located in a recreational area. Due to the number and location of the trees, there is no practical way for this location to meet the siting criteria. The minimum monitoring requirements in Table D-2 of the CFR 40 Part 58 Appendix D 4.1 indicates that the Charleston-North Charleston MSA is required to have one Ozone monitor, which is fulfilled at the Cape Romain (45-019-0046) Monitoring Station. The Department is currently carrying out the process for relocating the Bushy Park Pump Station (45-015-0002) Monitoring Station to a separate new Ozone monitoring station in northern Berkeley County in the area of maximum concentration.

Discussion of Applicable Regulations

The Department has conducted an evaluation of siting criteria in accordance with 40 CFR Part 58, Appendix E at the Bushy Park Pump Station (45-015-0002) Monitoring Station. Four of the requirements in Appendix E were not met at this Monitoring Station including: 1) 4(a) and (b)-Spacing from obstructions, 2) 5(a)-Spacing from trees, and 3) 11-Summary.

Figure 2: Bushy Park Pump Station (45-015-0002) Monitoring Station Panorama



Appendix E, Section 4(a) requires that the distance from the obstacle (such as a tree) to the probe inlet must be at least twice the height that obstacle protrudes above the probe inlet. A horizontal red line has been added to the picture above to mark an angle of approximately 26 degrees, indicating the limit of the requirement in Section 4(a) concerning spacing from obstructions and height above the monitor probe. If the top of an object is above the top red line in the picture, then it does not meet the Section 4(a) requirements. As can be seen in Figure 2, numerous trees in almost all directions do not meet this requirement. The extent of the tree growth surrounding this Monitoring Station would be too great to remedy by trimming or removing the trees.

In 40 CFR Part 58.14 System Modification (c), the regulation states that “State, or where appropriate, local agency requests for SLAMS monitor station discontinuation, subject to the

review of the Regional Administrator, will be approved if *any* of the following criteria are met and if the requirements of appendix D to this part, if any, continue to be met".

The regulation then lists six situations that a SLAMS monitor can be discontinued. The Department believes that the Bushy Park Pump Station (45-015-0002) Monitoring Station meets the criteria found in both 40 CFR Part 58.14 System Modification (c)(3) and (c)(6).

In 40 CFR Part 58.14 System Modification (c)(3), the document states, "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".

In order to show that the Bushy Park Ozone SLAMS is eligible for termination, the Department pulled the past ten years of Ozone design values from AQS for the Charleston-North Charleston MSA, of which Bushy Park is a part. No measured violations of the primary Ozone NAAQS were found for any of the monitoring stations in the MSA. A ten-year design value graph is presented in Figure 3.

Figure 3: 2008-2017 Bushy Park Pump Station (45-015-0002) Monitoring Station Ozone Design Values

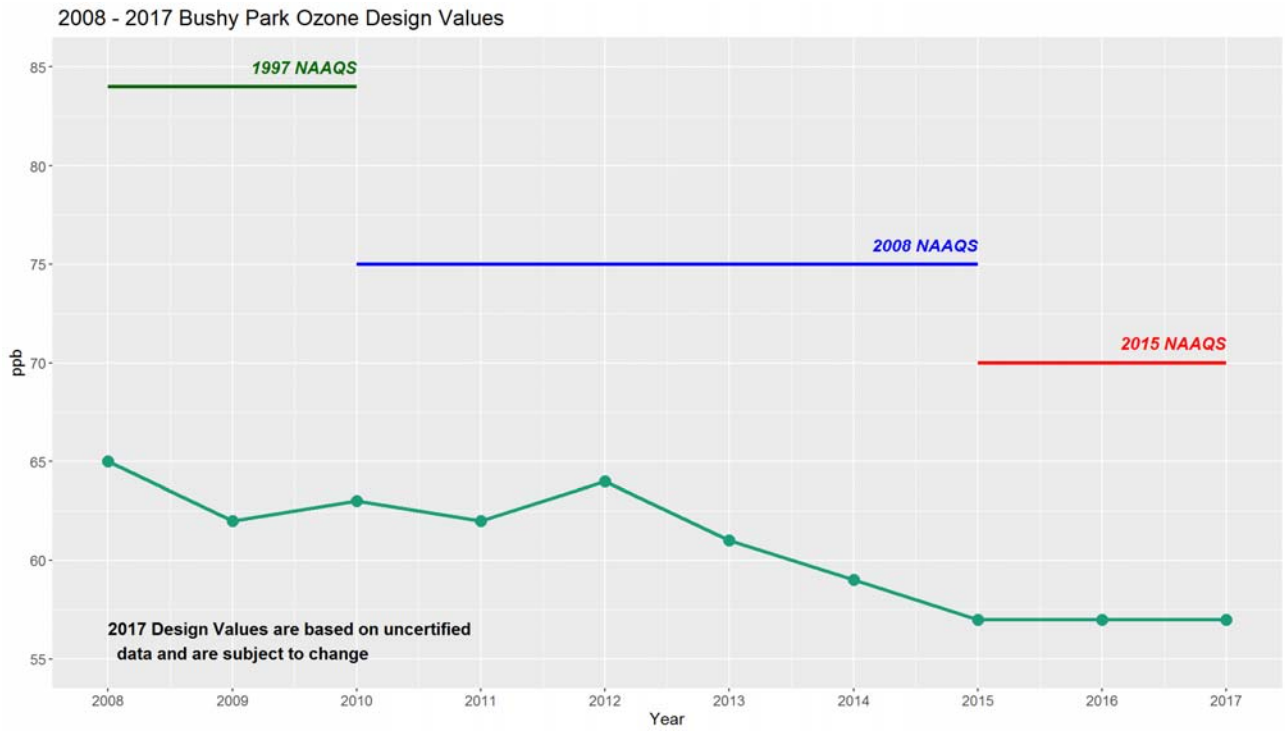


Table 2 indicates that this monitor has had no exceedances the past 5 years.

Table 2: Number of Daily Maximum Exceedance in Last 5 Years

Daily Maximum Exceedances	
Year	**Number of Exceedances**
2013	0
2014	0
2015	0
2016	0
2017	0

Also, in 40 CFR Part 58.14 System Modification (c)(6), it states, “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”.*

The Bushy Park Pump Station (45-015-0002) Monitoring Station serves as a storage and a recreational area. As shown in Figures 4, there is a drip line issue with the tree to the northeast of the Ozone probe.

Figure 4: Ozone Monitor and Drip Line

Figures 5 and Figure 6 show the extensive tree growth surrounding this Monitoring Station makes it impractical to severely trim or cut the trees to the degree necessary to meet Appendix E. The Department believes that the Monitoring Station may not be providing Ozone data consistent with the stated monitoring objective.

Figure 5: View to the Northeast of Ozone Monitor and Trees

Figure 6: Tree Line South of the Ozone Monitor

A site location that meets exposure requirements and better serves the monitoring objectives for the MSA will be established. The Department is currently seeking a replacement site within the same county that provides the same area of representativeness and will meet all Appendix E requirements.

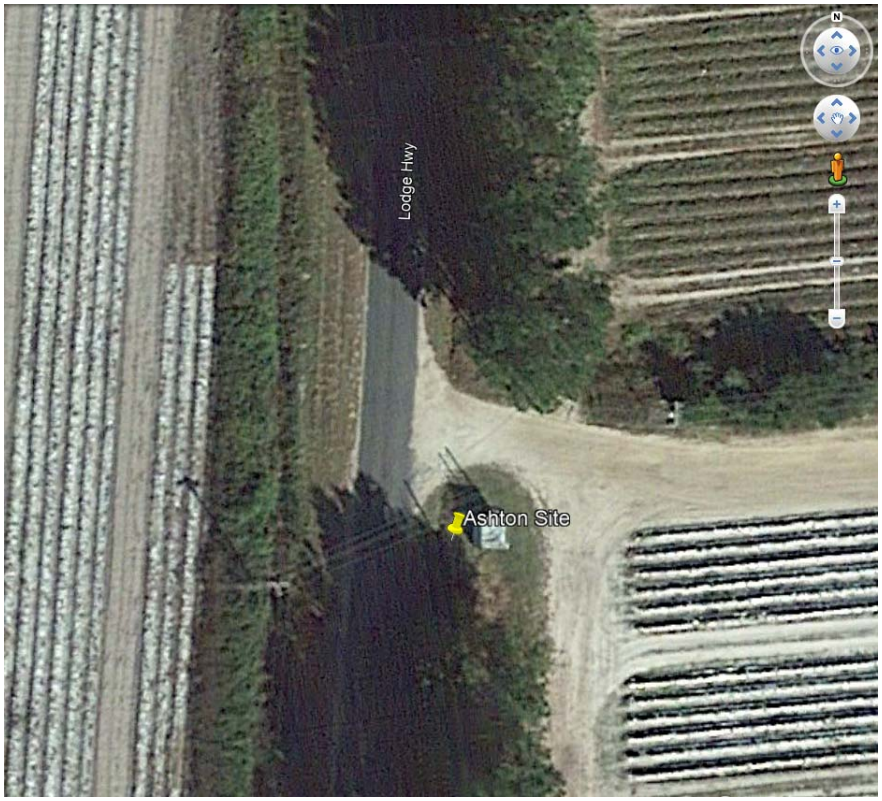
Termination of the Ashton (45-029-0002) $PM_{2.5}$ SLAMS monitor

The Department requests approval for termination of the $PM_{2.5}$ SLAMS monitor at the Ashton (45-029-0002) Monitoring Station. Basic information on the $PM_{2.5}$ monitor is listed in Table 3; an aerial picture of the Monitoring Station is shown in Figure 7 and the latest site evaluation is attached at the end of this document.

Table 3: Ashton $PM_{2.5}$ Monitor Information

Item	Description
AQS ID	45-029-0002
Street Address	Ashton Road (S-13-18) Islandton, Colleton County
Geographic coordinates	+33.00784 -80.96504
Designation	SLAMS
Analysis method	TEOM 50° C (702)
Operating schedule	Continuous
Monitoring objective	General / Background
Monitoring scale	Regional
MSA represented	None

Figure 7: 2018 Aerial Map of Ashton (45-029-0002) Monitoring Station



Justification for request

The Ashton (45-029-0002) Monitoring Station is located in a rural, southern part of South Carolina in Colleton County and is not located in an MSA. Currently, the $PM_{2.5}$ SLAMS monitor

at this Monitoring Station serves as the required regional background site. The Department has conducted an evaluation of siting criteria in accordance with the 40 CFR Part 58, Appendix E. Four of the requirements were not met at this Monitoring Station and cannot be corrected. These include Appendix E 4(a) and (b)-Spacing From Obstructions, Appendix E 5(a) and (b)-Spacing From Trees, and Appendix E 11-Summary. The Department requests that the $PM_{2.5}$ SLAMS monitor at this Monitoring Station be discontinued. The Department plans on establishing a $PM_{2.5}$ SLAMS monitor site at the Cape Romain (45-019-0046) Monitoring Station and designating this new $PM_{2.5}$ SLAMS monitor as the regional background site for the State. The Department does plan on keeping the $PM_{2.5}$ monitor at the Ashton (45-029-0002) Monitoring Station as a SPM because it does provide some level of monitoring value to the state in spite of not being able to meet the Appendix E siting requirements. The justification and analysis for moving the regional background designation to Cape Romain can be found in Appendix H.

Discussion of Applicable Regulations

The 40 CFR Part 58 Appendix E, Section 4(a) requires that the distance from the obstacle (such as a tree) to the probe inlet must be at least twice the height that obstacle protrudes above the probe inlet. In the panorama shown below in Figure 8, a horizontal red line has been added to mark an angle of approximately 26 degrees, indicating the limit of the requirement in Section 4(a) concerning spacing from obstructions and height above the monitor probe. If the top of an object is above the top red line in the picture, then it does not meet the Section 4(a) requirements. As can be seen in Figure 8, a line of trees to the North and to the South do not meet this requirement.

Figure 8: Panorama of Ashton (45-029-0002) Monitoring Station

In the 40 CFR Part 58 Appendix E, Section 4(b) requires that the probe must have unrestricted air flow in the predominant wind direction for the season of greatest pollutant concentration potential. The 2012-2016 wind rose from the Orangeburg Airport (KOBG) in Figure 9 indicates that the predominant wind direction for this Monitoring Station is from the northeast, with secondary dominant winds coming from the north and south. Therefore, the tree lines are obstructing the predominant and secondary wind flow.

Figure 9: Orangeburg Wind Rose

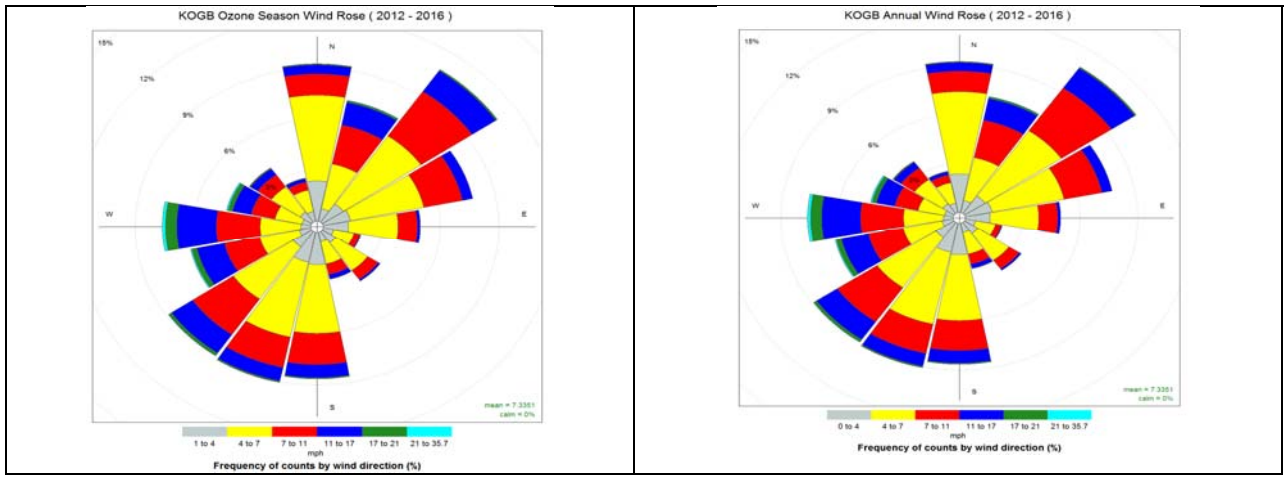


Figure 10 and Figure 11 shows the southern and northern line of trees in relation to the monitors, respectively.

Figure 10: Southern Tree Drip Line and $PM_{2.5}$ Monitor

Figure 11: Northern Tree Line and $PM_{2.5}$ Monitor

In the 40 CFR Part 58 Appendix E, Section 5(a) states, “To reduce this possible interference/obstruction, the probe, inlet, or at least 90 percent of the monitoring path must be at least 10 meters or further from the drip line of trees”. Also, 40 CFR Part 58 Appendix E, Section 11-Summary, states that the distance from the probe to the tree should be less than 10 meters or further from the trees. As shown in Figure 12, the drip line for the closest southern tree is 5.8 meters from the $PM_{2.5}$ monitor and the same tree is 9.8 meters from the $PM_{2.5}$ probe.

Figure 12: Drip Lines and Tree Distance to Southern Tree

In 40 CFR Part 58.14 System Modification (c), the regulation states that the “State, or where appropriate, local agency requests for SLAMS monitor station discontinuation, subject to the review of the Regional Administrator, will be approved if *any* of the following criteria are met and if the requirements of Appendix D to this part, if any, continue to be met”.

The regulation then lists six situations that a SLAMS monitor can be discontinued. The Department believes that the Ashton (45-029-0002) Monitoring Station meets the criteria found in 40 CFR Part 58.14 System Modification (c)(6) which states, “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”.*

The Department has reached out to the land owner on multiple occasions for a couple of years and has been unsuccessful in coming to an agreement to cut or trim the trees.

Appendix H: Establishment of New Monitors

Establishment of a SLAMS $PM_{2.5}$ monitor at the Cape Romain (45-019-0046) Monitoring Station

The Department requests approval for the establishment of a continuous SLAMS $PM_{2.5}$ monitor at the Cape Romain (45-019-0046) Monitoring Station that would serve as the required regional background monitor for the State of South Carolina. Basic information on the proposed monitor is listed in Table 4 and the latest Cape Romain (45-019-0046) Monitoring Station Site Evaluation is attached at the end of this document. This Site Evaluation report indicates that the current $PM_{2.5}$ monitor meets all 40 CFR Part 58, Appendix D and E requirements.

Table 4: Monitoring Station Information

Item	Description
AQS ID	45-019-0046
Street Address	390 Bulls Island Road (Awendaw), Charleston, South Carolina
Geographic coordinates	+32.94101, -79.65719
Designation	SLAMS
Analysis method	FDMS
Method Code	183
Operating schedule	Continuous
Monitoring objective	General/Background
Monitoring scale	Regional
MSA represented	Charleston-North Charleston, South Carolina MSA

Justification for request

The SLAMS $PM_{2.5}$ monitor will be discontinued from the Ashton (45-029-0002) Monitoring Station because it cannot meet the CFR 40 Part 58 Appendix E 4(a) and (b)-Spacing From Obstructions, 5(a)-Spacing From Trees, and 11-Summary requirements. An analysis was performed on selected $PM_{2.5}$ data across the State. The results indicated that the Cape Romain $PM_{2.5}$ data had the lowest values when compared to both State and regional $PM_{2.5}$ monitoring data, as well as a similar diel trend based on other regional background monitors and would, therefore, be the most suitable regional background site.

Applicable Regulations

In CFR 40 Part 58 Appendix D, Section 4.7.3-Requirement for $PM_{2.5}$ Background and Transport Sites, it states, "Each State shall install and operate at least one $PM_{2.5}$ site to monitor for regional background and at least one $PM_{2.5}$ site to monitor regional transport". Since the $PM_{2.5}$ monitor at the Ashton (45-029-0002) Monitoring Station does not meet the CFR 40 Part 58 Appendix E requirements, a new site for the regional background for the State of South Carolina was needed.

Data Analysis

Several rural South Carolina $PM_{2.5}$ monitors were selected to compare their trends with that of the Ashton (45-029-0002) Monitoring Station. The data used were hourly concentrations for the past full five years (2013-2017). The r values, the r value of the rolling 30-day average, and the r value of the rolling 7-day average from the Ashton $PM_{2.5}$ monitoring data were calculated and

compared to the data from the $PM_{2.5}$ monitors from Cape Romain, Chesterfield, Trenton, and Long Creek, which is a high elevation, rural site.

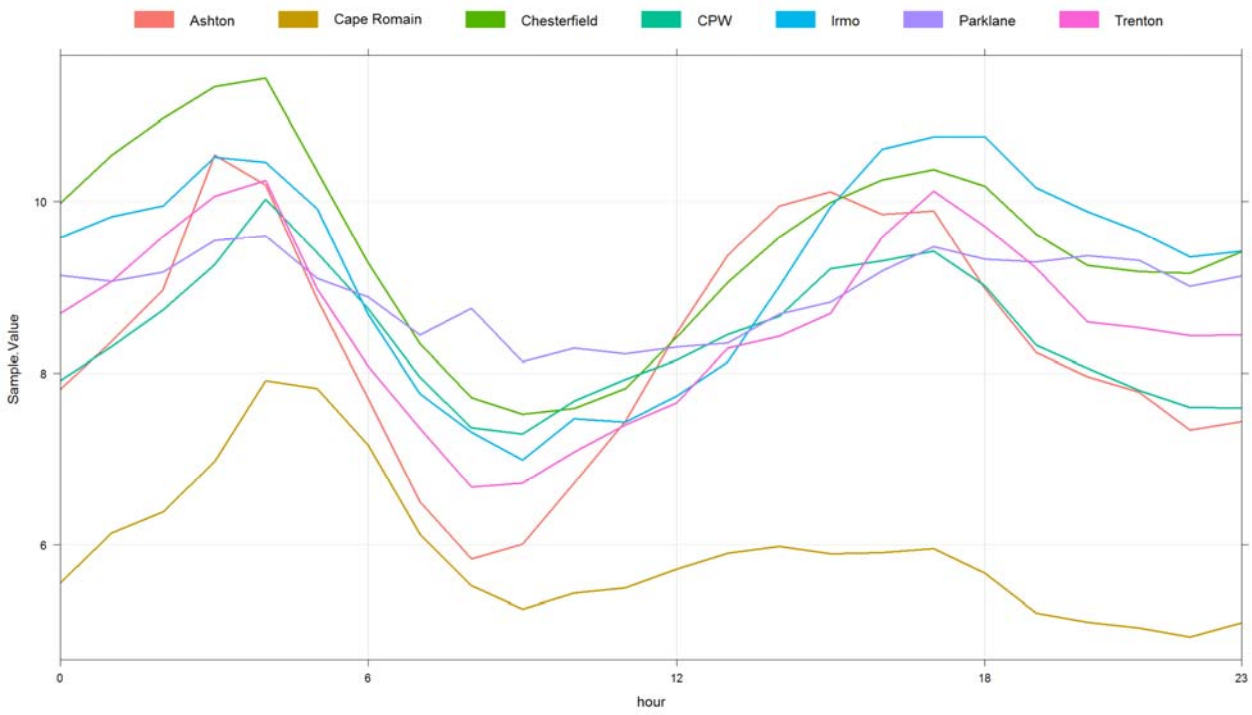
As seen in Table 5 below, regardless of the averaging time used, the Cape Romain and Trenton monitoring data had the highest correlation coefficients.

Table 5: Correlation Values for Four South Carolina Continuous $PM_{2.5}$ monitors

Site Name	Site ID	Correlation Coefficient based on the daily averages	Correlation Coefficient based on the rolling 7-day averages	Correlation Coefficient based on the rolling 30-day averages
Cape Romain	45-019-0046	0.50	0.63	0.56
Chesterfield	45-025-0001	0.35	0.42	0.31
Trenton	45-037-0001	0.56	0.64	0.63
Long Creek	45-073-0001	0.13	0.07	0.05

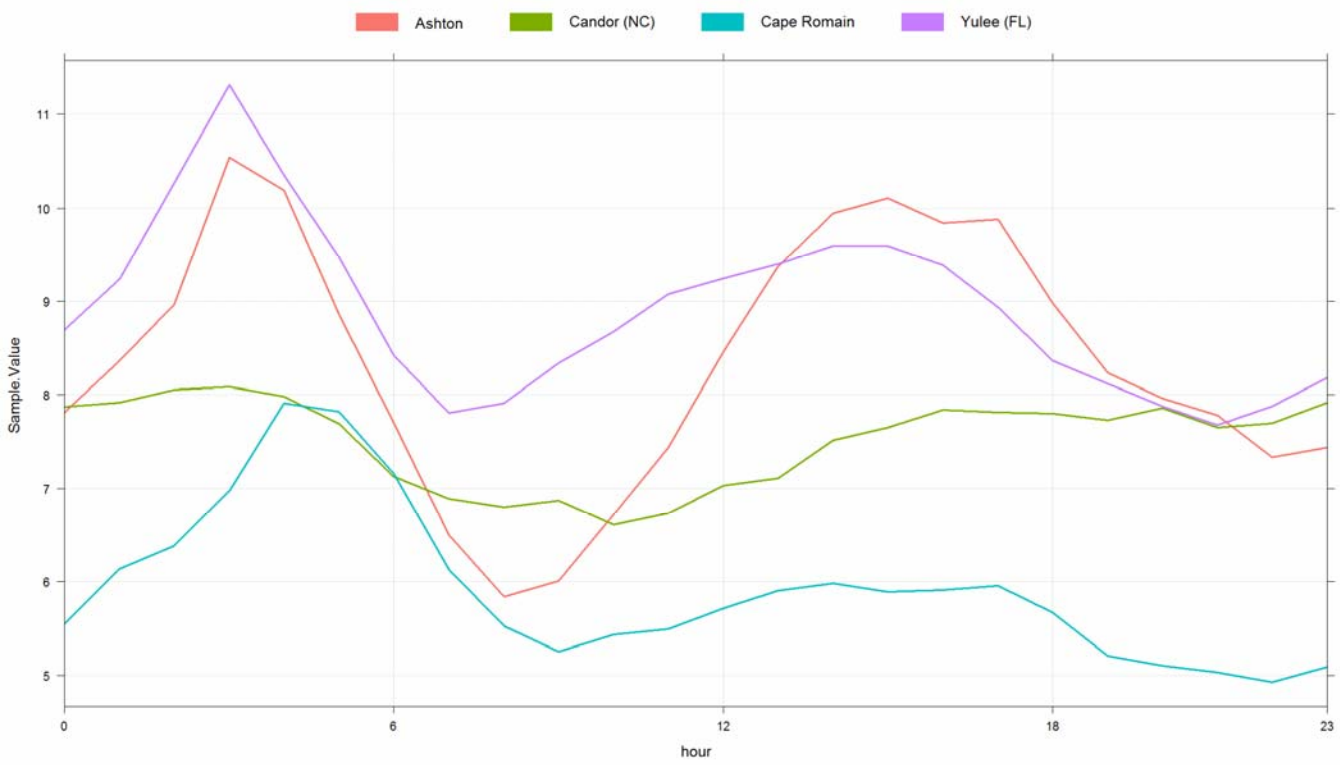
The Department then generated a plot of the diel trends for the state's continuous $PM_{2.5}$ monitors. The Long Creek monitoring data was not used because of the site's high elevation. As indicated in the graph in Figure 13, the Cape Romain $PM_{2.5}$ monitor trend line showed a spike in the morning hours similar to the other monitors, but at a consistently lower concentration. The Cape Romain data also had a smaller, prolonged "peak" in the afternoon hours, which did not occur in the other monitoring data.

Figure 13: Comparison of South Carolina $PM_{2.5}$ Continuous Monitors



To check for regional agreement, the continuous $PM_{2.5}$ monitors that are the regional background sites for Florida and North Carolina were compared to both the Ashton $PM_{2.5}$ monitor and the Cape Romain $PM_{2.5}$ monitor. As seen in Figure 14, the Cape Romain trend closely follows the same trend as Florida's Yulee monitor.

Figure 14: Three-State Comparison of Continuous $PM_{2.5}$ Monitors for Regional Transport Sites



Based on these analyses, the Department strongly believes that Cape Romain is the appropriate monitoring station for the regional background site.

Attachment:

Site Evaluation Report for:
Cape Romain Monitoring Site
(45-019-0046)

Date of Evaluation: April 18, 2017

South Carolina Department of Health and Environmental Control

Bureau of Air Quality
Data Analysis and Support Section

PREPARED BY: G. Renee' Madden DATE: October 9, 2017
NAME: G. Renee' Madden

REVIEWED BY: _____ DATE: 11/2/2017
NAME: Thomas J. Flynn III

APPROVED BY: Robert J. Brown DATE: 1/5/18
NAME: Robert J. Brown, Jr.

1

Cape Romain (45-019-0046) Site Evaluation Report

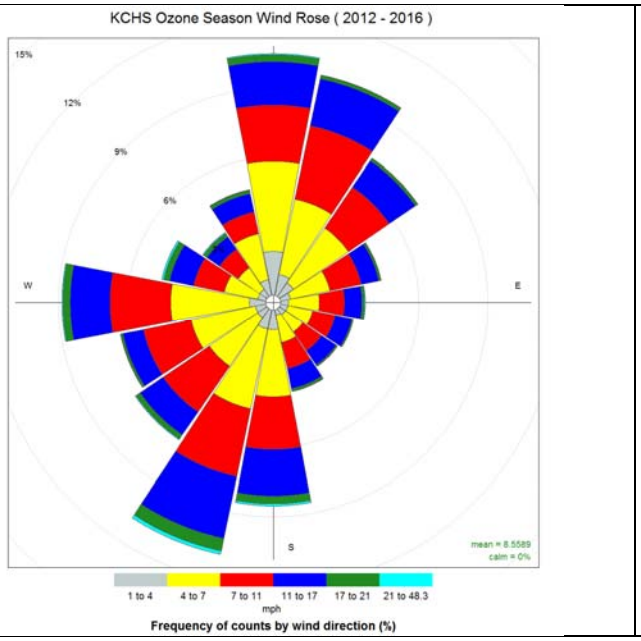
South Carolina Ambient Air Quality Monitoring Site Evaluation Report	
Name of Site: Cape Romain	Local Site ID: 45-019-0046
Personnel: G. Renee' Madden, Joel Hodges	Date Site Visited: April 18, 2017
New:	Revised: X
Summary of Site Evaluation: Summary of Site Evaluation: The monitors meet siting criteria found in 40 CFR Appendix E to Part 58. The distance from the Northeast Live Oak tree and the South Live Oak tree to the probe is not at least twice the height that the obstacle protrudes above the probe, but there is still more than 270° unobstructed air flow around the probe. Recommendations: Move the probes to the other side of the building or trim the East Live Oak tree, the South Live Oak tree, and the brush in front of it. Notes: There was no aethalometer in the monitoring building.	

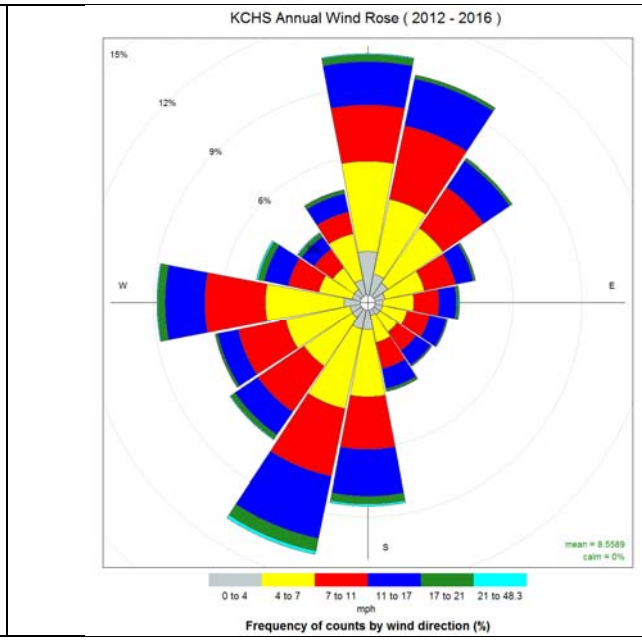
General Site Information

Date Report Started: April 17, 2017	Date Report Completed: April 19, 2017
Street Address:	390 Bulls Island Road (Awendaw)
City: Charleston	Zip Code: 29429
County:	Declination: 8.10° W ± 0.33° changing by 0.06° W per year
Date Site Established:	July 11, 1983
Latitude: +32.94101	Longitude: -79.65719
Horizontal Collection Method:	G.P.S. Carrier Phase Static Relative Position
Vertical Collection Method:	G.P.S. Carrier Phase Static Relative Position
Vertical Measure (m) (elevation): (topo map)	3.0
Pollutants Being Monitored:	SO_2, NO_2, Ozone, $PM_{2.5}$ Continuous, Black Carbon
Meteorological Parameters Being Monitored:	Wind direction and wind speed

Mobile Sources Information

Roadway Name:	Bulls Island Road	“Access” Drive	
Road Number:	S-1170	None	
Direction to Road:	Southwest	West	
Distance to Road (m):	86 (Google Earth)	8 (rolling wheel)	
Daily Traffic Count:	None given	None given	
Daily Traffic Year:	2010	2010	
Source of Traffic Count:	SCDOT	SCDOT	
Is dust re-entrained?	No	No	
Charleston Annual Wind rose:			





Field Data for Cape Romain (45-019-0046) Site			
Parking Lot Measurements (nearest the site) N/A			
Direction from Site to Parking Lot:			N/A
Distance from Site to Parking Lot (m):			N/A
Monitor Building	Building Temperature: 25º C	Building Asset Number: Not visible	
Comments: Linoleum broken and crumbling on floor between SO_2 and Ozone table.			
Dimensions	Height (m): 2.5	Width (m): 2.4	Depth (m): 5.0
Distance to Nearest Tree (m):			18.2
Direction of Nearest Tree:			Northeast Bearing 61
List pollutants on top of monitor building: Ozone, SO_2, NO_2, $PM_{2.5}$ Continuous			
Support Structure (Stand) #1 N/A			
Dimensions	Height (m): N/A	Width (m): N/A	Depth (m): N/A
Distance to Nearest Tree (m):			N/A
Direction of Nearest Tree:			N/A
List pollutants on stand: N/A			Comments:

Parameter Information – Ozone

Parameter:	Ozone
Instrument Asset #: H7131	Data Logger Asset #: F7964 & F1449, Computer Asset #: H0755
Parameter Code:	44201
POC:	1
Begin Date:	March 5, 1987
Measurement Scale:	Regional
Monitor Type:	SLAMS
Method Code and Sample Collection:	047, Instrumental
Sample Analysis:	Ultraviolet
Sample duration/frequency/time interval (hourly, etc.):	Hourly, continuous
Monitor Objective(s):	1. General/Background
Instrument Manufacturer:	Thermo Scientific Corporation
Instrument Model Number:	49i
Probe Location:	Top of monitor building
Support (stand) Height (m):	2.7
Height Above Support (m):	1.6
Probe Height Above Ground (m):	4.4
Distance from Supporting Structure (m):	1.6
Distance to Nearest Road (m):	86
Direction from Monitor to Road:	Southwest
Name of Nearest Monitor/Sampler:	$PM_{2.5}$
Distance from Nearest Monitor/Sampler (m):	2.9
Distance to Drip Line (m):	17.7 Northeast Bearing 61
Distance to Tree (m):	18.2

Sample Residency Time-Is sampling time less than 20 seconds? **(Yes/No)**	**Yes**
Probe Material-Is it borosilicate glass, FEP Teflon or equivalent? **(Yes/No)**	**Yes**
Is dust re-entrained?	**No**
Spacing from Roads-Does **distance meet requirement** of Table E-1? **(Yes/No)**	**Yes**
Height from Ground to Probe-Is probe between 2-15 m? **(Yes/No)**	**Yes**
Probe Horizontal Distance or Vertical Distance- Is probe >1m from vertically or horizontally away from supporting structures **(Yes/No)**	**Yes**
If probe is located near side of building or wall, is it on windward side of building relative to prevailing wind during season of highest concentration potential? **(Yes/No)**	**N/A**
Is probe away from incineration flues or minor sources of NO or SO_2? (Yes/No)	**Yes**
Airflow-Does monitor have unrestricted airflow 270 degrees around the probe or sampler? **(Yes/No)**	**Yes**
Spacing from Trees-Is probe greater than 10 meters away from trees? **(Yes/No)**	**Yes**
Is the probe away from obstacles? **(Yes/No)**	**No**

Potential Obstructions If the answer to 'Does the probe have **Unrestricted Air Flow** and away from obstacles?' is No, complete the following. All measurements are in meters.	Obs. 1	Obs. 2	Obs. 3
Direction from Monitor to Obstruction	East		
Obstruction Type and Description	Live Oak		
Distance from Clinometer to Potential Obstruction (D1)	18.2		
Distance from Clinometer to Probe (D2)	0		
Distance from Probe to Potential Obstruction Calculate (Dt) =(D1+D2)	18.2		
Obstruction Base (Gb) (Measure % grade- Record in decimals)	N/A		
Obstruction Top (Gt) (Measure % grade- Record in decimals)	0.75		
Height of Object Calculate (Hobj) = D1*Gt	13.65		
Height at which Clinometer Reading Was Made (eye hgt.)(H1)	1.74		
Height of Probe Above Surface (surface is what person's feet are standing on) (H2)	4.37		
Height of Probe Above Clinometer Calculate (Hap) = (H2-H1)	2.63		
Height Above Probe Calculate (Hoap) = (Hobj-Hap)	11.02		
2 * Hoap Calculate 2*Hoap?	22.04		
Is Distance (Dt) at least 2 times height above probe (Hoap)? **(Yes/No)**	**No**		
Does it meet criteria?	**No**		
Comments: The East Live Oak is an obstruction but the probe still has unrestricted airflow 270 degrees around the probe.			

Parameter Information - Nitrogen Dioxide

Parameter:	Nitrogen Dioxide
Instrument Asset #: H6618	Data Logger Asset #: F7964& F1449
Parameter Code:	42602
POC:	1
Begin Date:	January 10, 2006
Measurement Scale:	Regional
Monitor Type:	SPM
Method Code and Sample Collection:	599 Instrumental
Sample Analysis:	CHEMILUMINESCENCE
Sample duration/frequency/time interval (hourly, etc.):	Continuous, hourly
Monitor Objective(s):	1. General/Background
Instrument Manufacturer:	Teledyne
Instrument Model Number:	Teledyne API T200U
Probe Location:	Top of monitor building
Support (stand) Height (m):	2.7
Height Above Support (m):	1.6
Probe Height Above Ground (m):	4.4
Distance from Supporting Structure (m):	1.6
Distance to Nearest Road (m):	86
Direction from Monitor to Road:	Southwest
Name of Nearest Monitor/Sampler:	$PM_{2.5}$
Distance from Nearest Monitor/Sampler (m):	2.9
Distance to Drip Line (m):	17.7 Northeast Bearing 61
Distance to Tree (m):	18.2

Sample Residency Time-Is sampling time less than 20 seconds? **(Yes/No)**	**Yes**
Probe Material-Is it borosilicate glass, FEP Teflon or equivalent? **(Yes/No)**	**Yes**
Is dust re-entrained?	**No**
Spacing from Roads-Does **distance meet requirement** of Table E-1? **(Yes/No)**	**Yes**
Height from Ground to Probe-Is probe between 2-15 m? **(Yes/No)**	**Yes**
Probe Horizontal Distance or Vertical Distance- Is probe >1m from vertically or horizontally away from supporting structures **(Yes/No)**	**Yes**
If probe is located near side of building or wall, is it on windward side of building relative to prevailing wind during season of highest concentration potential? **(Yes/No)**	**N/A**
Is probe away from incineration flues or minor sources of NO or SO_2? (Yes/No)	**Yes**
Airflow-Does monitor have unrestricted airflow 270 degrees around the probe or sampler? **(Yes/No)**	**Yes**
Spacing from Trees-Is probe greater than 10 meters away from trees? **(Yes/No)**	**Yes**
Is the probe away from obstacles? **(Yes/No)**	**No**

Potential Obstructions If the answer to 'Does the probe have **Unrestricted Air Flow** and away from obstacles?' is No, complete the following. All measurements are in meters.	Obs. 1	Obs. 2	Obs. 3
Direction from Monitor to Obstruction	East		
Obstruction Type and Description	Live Oak		
Distance from Clinometer to Potential Obstruction (D1)	18.2		
Distance from Clinometer to Probe (D2)	0		
Distance from Probe to Potential Obstruction Calculate (Dt) =(D1+D2)	18.2		
Obstruction Base (Gb) (Measure % grade- Record in decimals)	N/A		
Obstruction Top (Gt) (Measure % grade- Record in decimals)	0.75		
Height of Object Calculate (Hobj) = D1*Gt	13.65		
Height at which Clinometer Reading Was Made (eye hgt.)(H1)	1.74		
Height of Probe Above Surface (surface is what person's feet are standing on) (H2)	4.37		
Height of Probe Above Clinometer Calculate (Hap) = (H2-H1)	2.63		
Height Above Probe Calculate (Hoap) = (Hobj-Hap)	11.02		
2 * Hoap Calculate 2*Hoap?	22.04		
Is Distance (Dt) at least 2 times height above probe (Hoap)? **(Yes/No)**	**No**		
Does it meet criteria?	**No**		
Comments: The East Live Oak is a potential obstruction to the Ozone/NO2/SO2 probe and needs to be trimmed but the probe still has unrestricted airflow 270 degrees around the probe.			

Parameter Information - Sulfur Dioxide

Parameter:	Sulfur Dioxide
Instrument Asset #: F1447	Data Logger Asset #: F7964 & F1449
Parameter Code:	42401
POC:	2 & 5
Begin Date:	August 31, 1983
Measurement Scale:	Regional
Monitor Type:	SPM
Method Code and Sample Collection:	*060 Instrumental
Sample Analysis:	PULSED FLUORESCENT
Sample duration/frequency/time interval (hourly, etc.):	Continuous, hourly
Monitor Objective(s):	1. SOURCE ORIENTED
Instrument Manufacturer:	Thermo Environmental Instruments, Inc.
Instrument Model Number:	43A
Probe Location:	Top of monitor building
Support (stand) Height (m):	2.7
Height Above Support (m):	1.6
Probe Height Above Ground (m):	4.4
Distance from Supporting Structure (m):	1.6
Distance to Nearest Road (m):	86
Direction from Monitor to Road:	Southwest
Name of Nearest Monitor/Sampler:	$PM_{2.5}$
Distance from Nearest Monitor/Sampler (m):	2.9
Distance to Drip Line (m):	17.7 Northeast Bearing 61 Live Oak tree
Distance to Tree (m):	18.2

Note: * The method code was changed to 560-Pulsed Fluorescent 43C-TLE/43i-TLE on June 14, 2017.

Sample Residency Time-Is sampling time less than 20 seconds? **(Yes/No)**	**Yes**
Probe Material-Is it borosilicate glass, FEP Teflon or equivalent? **(Yes/No)**	**Yes**
Is dust re-entrained?	**No**
Height from Ground to Probe-Is probe between 2-15 m? **(Yes/No)**	**Yes**
Probe Horizontal Distance or Vertical Distance- Is probe >1m from vertically or horizontally away from supporting structures **(Yes/No)**	**Yes**
If probe is located near side of building or wall, is it on windward side of building relative to prevailing wind during season of highest concentration potential? **(Yes/No)**	**N/A**
Is probe away from incineration flues or minor sources of NO or SO_2? (Yes/No)	**Yes**
Airflow-Does monitor have unrestricted airflow 270 degrees around the probe or sampler? **(Yes/No)**	**Yes**
Spacing from Trees-Is probe greater than 10 meters away from trees? **(Yes/No)**	**Yes**
Is the probe away from obstacles? **(Yes/No)**	**No**

Potential Obstructions If the answer to 'Does the probe have **Unrestricted Air Flow** and away from obstacles?' is No, complete the following. All measurements are in meters.	Obs. 1	Obs. 2	Obs. 3
Direction from Monitor to Obstruction	East		
Obstruction Type and Description	Live Oak		
Distance from Clinometer to Potential Obstruction (D1)	18.2		
Distance from Clinometer to Probe (D2)	0		
Distance from Probe to Potential Obstruction Calculate (Dt) =(D1+D2)	18.2		
Obstruction Base (Gb) (Measure % grade- Record in decimals)	N/A		
Obstruction Top (Gt) (Measure % grade- Record in decimals)	0.75		
Height of Object Calculate (Hobj) = D1*Gt	13.65		
Height at which Clinometer Reading Was Made (eye hgt.)(H1)	1.74		
Height of Probe Above Surface (surface is what person's feet are standing on) (H2)	4.37		
Height of Probe Above Clinometer Calculate (Hap) = (H2-H1)	2.63		
Height Above Probe Calculate (Hoap) = (Hobj-Hap)	11.02		
2 * Hoap Calculate 2*Hoap?	22.04		
Is Distance (Dt) at least 2 times height above probe (Hoap)? **(Yes/No)**	**No**		
Does it meet criteria?	**No**		
Comments: The East Live Oak is an obstruction to the Ozone/NO2/SO2 probe and needs to be trimmed but the probe still has unrestricted airflow 270 degrees around the probe.			

Parameter Information – $PM_{2.5}$ Continuous

Parameter:	$PM_{2.5}$ Continuous
Instrument Asset #: H7149	Data Logger Asset #: F7964 & F1449
Parameter Code:	88502
POC:	3
Begin Date:	March 26, 2003
Measurement Scale:	Urban
Monitor Type:	SPM
Method Code and Sample Collection:	183, PM2.5 Thermo Scientific 1405-F FDMS w/SCC
Sample Analysis:	FDMS
Sample duration/frequency/time interval (hourly, etc.):	Continuous, hourly
Monitor Objective(s):	1. General/Background
Instrument Manufacturer:	Thermo Scientific
Instrument Model Number:	1405-F TEOM FDMS
Probe Location:	On top of building
Support (stand) Height (m):	2.7
Height Above Support (m):	1.9
Probe Height Above Ground (m):	4.6
Distance from Supporting Structure (m):	1.0
Distance to Nearest Road (m):	86
Direction from Monitor to Road:	Southwest
Name of Nearest Monitor/Sampler:	Ozone
Distance from Nearest Monitor/Sampler (m):	2.8
Distance to Drip Line (m):	11.0
Distance to Tree (m):	16.1 to South Live Oak tree

Is dust re-entrained?	**Yes**
Spacing from Roads-Does **distance meet requirements** of Figure E-1? **(Yes/No)**	**Yes**
Height from Ground to Probe-Is probe between 2-15 m or 2-7 m $PM_{10-2.5}$ middle scale? **(Yes/No)**	**Yes**
Probe Horizontal Distance or Vertical Distance- Is probe >2m from vertically or horizontally away from supporting structures **(Yes/No)**	**Yes**
If probe is located near side of building or wall, is it on windward side of building relative to prevailing wind during season of highest concentration potential? **(Yes/No)**	**Yes**
Is probe away from incineration flues or minor sources of NO or SO_2? (Yes/No)	**N/A**
Airflow-Does monitor have unrestricted airflow 270 degrees around the probe or sampler? **(Yes/No)**	**Yes**
Spacing from Trees-Is probe greater than 10 meters away from trees? **(Yes/No)**	**Yes**
Is the **probe away from obstacles**? **(Yes/No)**	**Yes**
$PM_{2.5}$ and PM_{10} Collocated monitors (Table E-4): Must be within 4 meters of each other and at least 2 meters apart for flow rates greater than 200 liters/min or at least 1 meter apart for samplers having flow rates less than 200 liters/min. **(Yes/No)**	**Yes**

Potential Obstructions If the answer to 'Does the probe have **Unrestricted Air Flow** and away from obstacles?' is No, complete the following. All measurements are in meters.	Obs. 1	Obs. 2	Obs. 3
Direction from Monitor to Obstruction	South		
Obstruction Type and Description	Live Oak		
Distance from Clinometer to Potential Obstruction (D1)	16.10		
Distance from Clinometer to Probe (D2)	0		
Distance from Probe to Potential Obstruction Calculate (Dt) =(D1+D2)	16.10		
Obstruction Base (Gb) (Measure % grade- Record in decimals)	N/A		
Obstruction Top (Gt) (Measure % grade- Record in decimals)	0.85		
Height of Object Calculate (Hobj) = D1*Gt	13.69		
Height at which Clinometer Reading Was Made (eye hgt.)(H1)			
Height of Probe Above Surface (surface is what person's feet are standing on) (H2)	4.62		
Height of Probe Above Clinometer Calculate (Hap) = (H2-H1)	2.88		
Height Above Probe Calculate (Hoap) = (Hobj-Hap)	10.81		
2 * Hoap Calculate 2*Hoap?	21.62		
Is Distance (Dt) at least 2 times height above probe (Hoap)? **(Yes/No)**	**No**		
Does it meet criteria?	**No**		
Comments: There are shrubs growing in front of the South tree that violates drip line but it is below the PM2.5 sampler, so we did not count them. This needs to be cut back. The drip line for the PM2.5 Sampler was taken from the South Live Oak tree drip line, not the scrub. The monitor still has unrestricted airflow 270 degrees around the probe.			

Non-Criteria Pollutant Information (optional)

Parameter:	Wind speed	Wind direction	Black Carbon- Information from past Monitoring Plan. There was a probe still present but no aetholometer in the monitoring building.	
Parameter Code:	61103	61104	88313	
POC:	1	1		
Measurement Scale:	Neighborhood	Neighborhood	Regional	
Begin Date:	August 11, 1983	August 11, 1983		
Monitor Type:	SLAMS	SLAMS	nonregulatory	
Method and Code:	020, Instr.	020, Instr.		
Sample Analysis:	Vector Summation	Vector Summation		
Sample duration/frequency/time interval (hourly, etc.):	Continuous	Continuous		
Monitor Objective Type:	Other	Other	General/Background	
Field Data				
Asset Number:				
Distance to Nearest Road:				
Direction from Monitor to Road:				
Is dust re-entrained?				
Instrument Manufacturer:				
Instrument Model Number:				
Probe Location:			Top of building	
Support (stand) Height:				
Height Above Support:	10	10		
Probe Height Above Ground:				
Probe Horizontal Distance:				
Name of Nearest Monitor/Sampler:				
Distance from Nearest Monitor/Sampler:				
Distance to Drip Line:				

Comments:

Required Photographs

Photos to include looking toward and away from the four (4) primary cardinal compass points (N, S, E, W) and approaching the site.

From West	
To East	
From South	
To North	

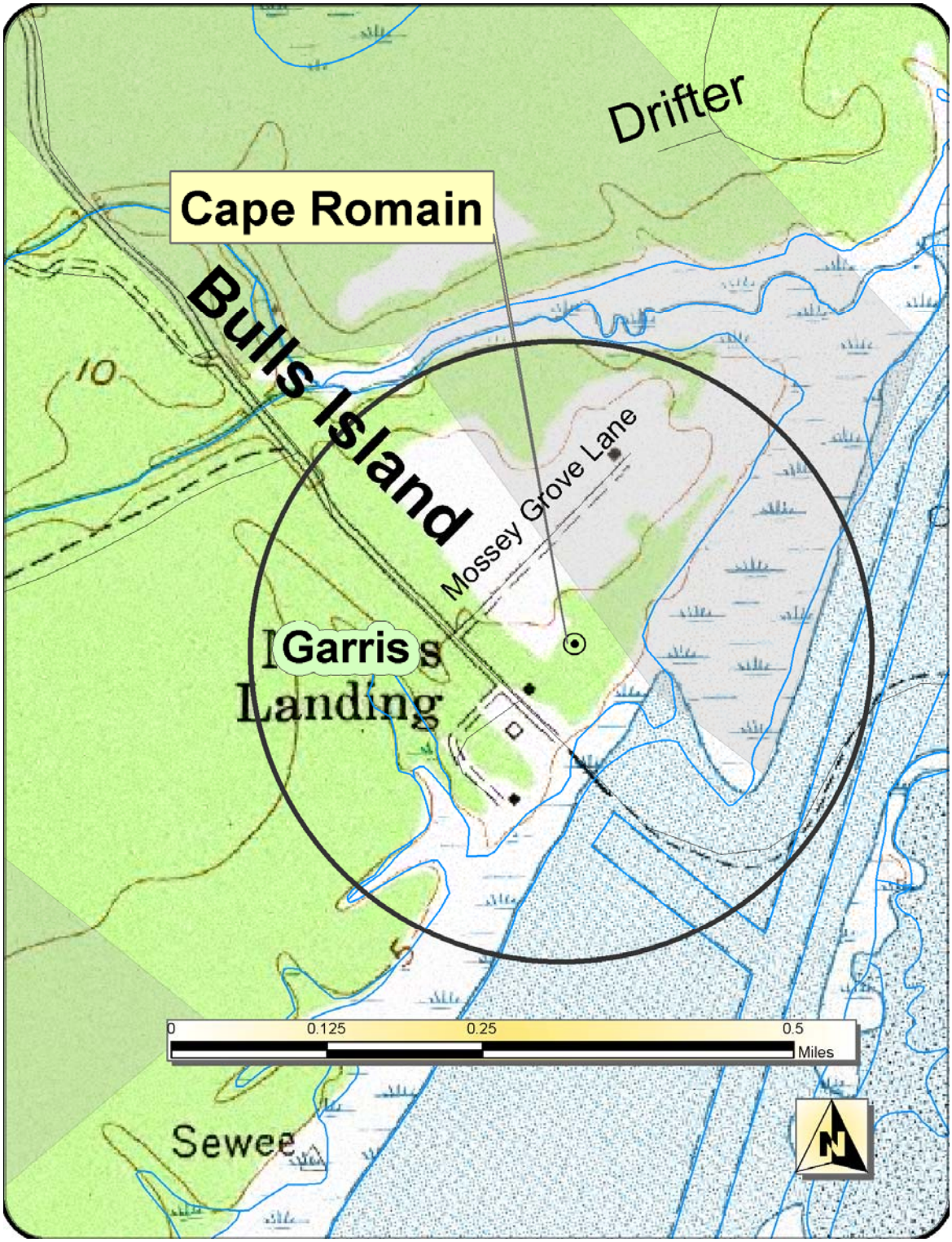
From East	
To West	
From North	
To South	

Approaching Site	

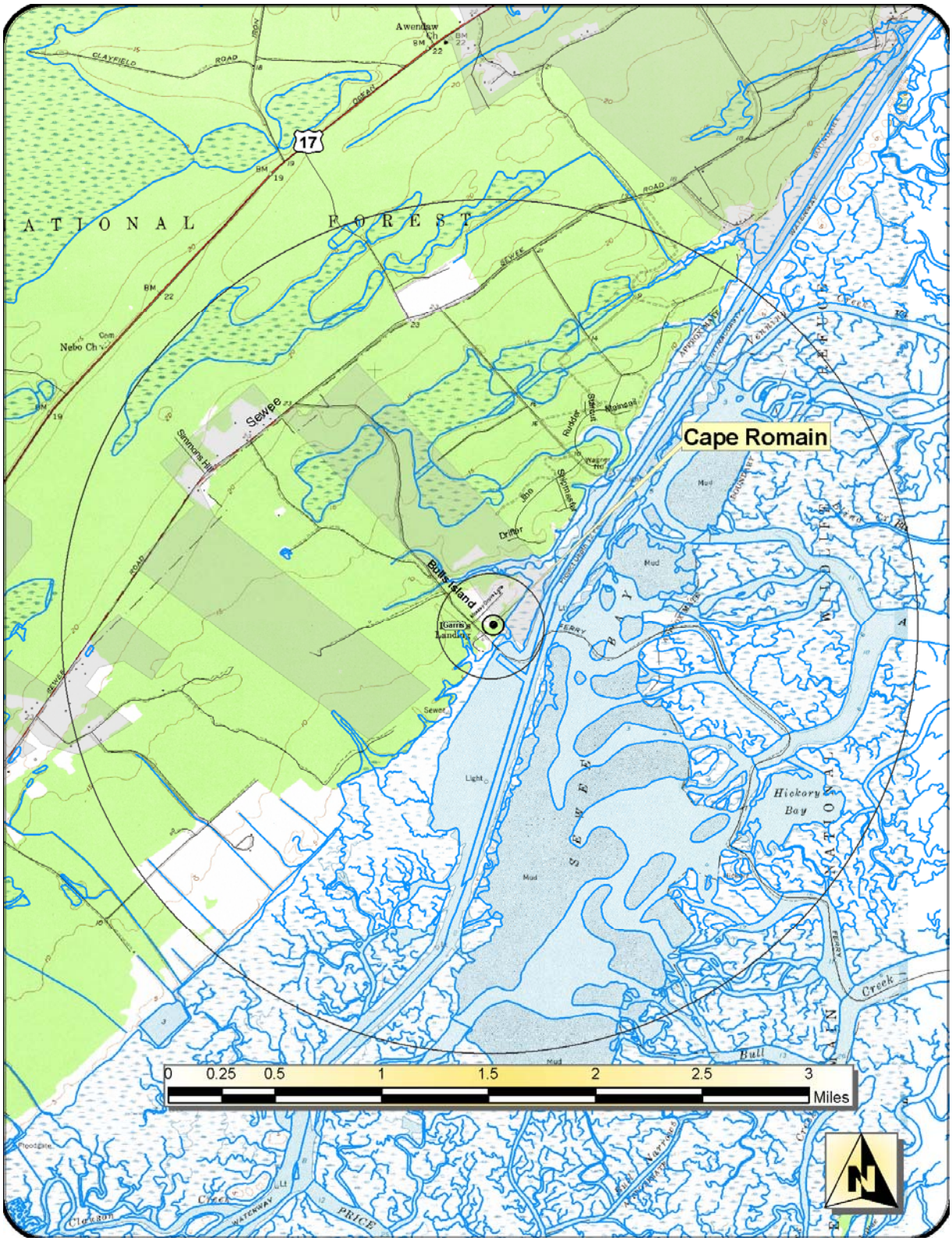
Note: When you are facing toward the monitor, it is considered “to” or “toward”. You are shooting ‘toward’ the direction you can read on the cardinal direction cards. When you are standing at the monitor facing outward, it is considered “from”. You are shooting ‘from’ the direction you can read on the cardinal direction cards.

Maps and Pictures of Site

Site Map



Topographic Map



Aerial Map


Bulls Island Rd
Mossy Grove Ln
32.94101, -79.65719
© 2016 Google
Google Earth

Close-Up Aerial Map

Monitoring Plan Page

Cape Romain
CSA/MSA: none/Charleston-North Charleston MSA
AQS Site ID: 45-019-0046
Location: 390 Bulls Island Road (Awendaw)
County: Charleston
Coordinates: +32.94101, -79.65719
Date Established: July 11, 1983
Site Evaluation: October 23, 2015

The Cape Romain site is located in Charleston County at the Cape Romain National Wildlife Refuge (NWR) near Moore's Landing. The Cape Romain NWR is a Class I area about 20 miles northeast of Charleston. The majority of the Refuge area is offshore, extending from Bull Island 20 miles northeast to Cape Romain. The Refuge is bordered on the west by the Intracoastal Waterway. Inland are large tracts of forests with scattered residences. Several miles inland, a primary coastal route, US Highway (Hwy) 17, parallels the coast, with some development along the section of highway that is closest to the Refuge.

The Cape Romain site has continuous monitors for SO_2, NO_2, Ozone, BC, $PM_{2.5}$, and meteorological parameters. The sample inlets are 18 meters from the nearest road.
All of the monitoring conducted by the DHEC meets 40 CFR Part 58 Appendix E requirements.
The IMPROVE sampler does not meet distance from obstructions criteria. This has been raised to the IMPROVE program, and they are working to either trim the trees or relocate their samplers.

Changes for 2017:
There are no changes planned for 2017.

Monitors:
(Table continues on next page)

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
$PM_{2.5}$	Urban	General Background	SPM	4.70	FDMS Gravimetric	Continuous
Ozone	Regional	General Background	SLAMS	4.51	FEM Ultraviolet Photometry	Continuous
Sulfur Dioxide	Regional	Source Oriented	SPM	4.51	FEM UV Fluorescence	Continuous
Nitrogen Dioxide	Regional	General Background	SPM	4.51	FRM Chemiluminesc	Continuous

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
					ence	
Black Carbon	Regional	General Background	Non-regulatory	4.00	Optical absorption	Continuous
Wind Speed / Direction	Neighbor-hood	Local Conditions	SLAMS	10.00	Instruments for wind speed and direction, and precipitation	Continuous

Site Evaluation Report for:
Ashton Monitoring Site
(45-029-0002)

Date of Evaluation: May 9, 2017

South Carolina Department of Health and Environmental Control

Bureau of Air Quality
Data Analysis and Support Section

PREPARED BY: G. Renee' Madden DATE: October 9, 2017
NAME: G. Renee' Madden

REVIEWED BY: [signature] DATE: 1/4/2018
NAME: Thomas J. Flynn III

APPROVED BY: [signature] DATE: 1/5/18
NAME: Robert J. Brown, Jr.

Ashton (45-029-0002) Site Evaluation Report

South Carolina Ambient Air Quality Monitoring Site Evaluation Report	
Name of Site: Ashton	Local Site ID: 45-029-0002
Personnel: G. Renee' Madden and Joel Hodges	Date Site Visited: May 9, 2017
New:	Revised: X
Summary of Site Evaluation: The monitors do not meet all siting criteria found in 40 CFR Appendix E to Part 58, but there is still more than 270° unobstructed air flow around the probes. Both probes do not meet 40 CFR Appendix E to Part 58 Section 4(a)-Spacing from Obstructions, because the distance from the North and South trees to the probes are not at least twice the height that the obstructions protrude above the probes. The drip line for the $PM_{2.5}$ probe does not meet the 40 CFR Appendix E to Part 58, Section 5-Spacing from Trees because it is less than 10 meters. Finally, both probes do not meet 40 CFR Appendix E to Part 58, Section 6-Spacing from Roadways because the road is less than 10 meters to the probes. This is a rural road with 100 ADT, according to the SC S.C. DOT. Recommendation: Site termination or removal of north and south trees.	

General Site Information

Date Report Started: May 4, 2017	Date Report Completed: May 11, 2017
Street Address:	Ashton Road
City: not in city	Zip Code: 29929
County: Colleton	Declination: 7.27° W ± 0.34° changing by 0.07° W per year
Date Site Established:	March 7, 1990
Latitude: +33.00784	Longitude: -80.96504
Horizontal Collection Method:	GPS Carrier Phase Static Relative Position
Vertical Collection Method:	Topographic Map Interpolation
Vertical Measure (m) (elevation):	35.0
Pollutants Being Monitored:	Ozone, $PM_{2.5}$
Meteorological Parameters Being Monitored:	None

Mobile Sources Information

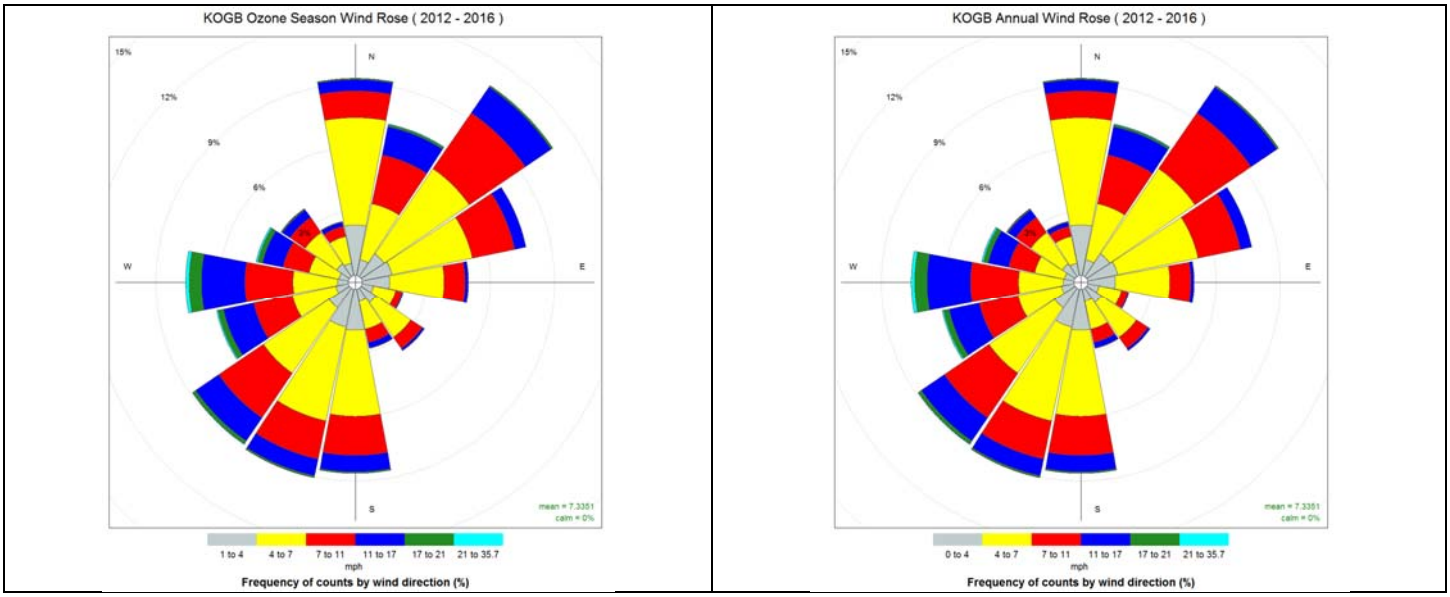
Roadway Name:	Lodge Hwy	Dirt Entrance	Dirt Road
Road Number:	S-15-18	None given	None given
Direction to Road:	West	North	East
Distance to Road (m):	8.4	7.5	6.5
Daily Traffic Count:	100	None given	None given
Daily Traffic Year:	2010	2010	2010
Source of Traffic Count:	SCDOT	SCDOT	SCDOT
Is dust re-entrained?	No	Yes	No

Field Data for (Site Name Ashton) (45-029-0002) Site	
Parking Lot Measurements (nearest the site) N/A	
Direction from Site to Parking Lot:	N/A

Distance from Site to Parking Lot (m):			N/A
Monitor Building	Building Temperature: 26º C	Building Asset Number: F1849	
Comments:			
Dimensions	Height (m): 2.4	Width (m): 2.3	Depth (m): 3.1
Distance to Nearest Tree (m):			9.8
Direction of Nearest Tree:			40º Southwest
List pollutants on top of monitor building: Ozone, $PM_{2.5}$ Continuous			
Support Structure (Stand) #1 N/A			
Dimensions	Height (m): N/A	Width (m): N/A	Depth (m): N/A
Distance to Nearest Tree (m):			N/A
Direction of Nearest Tree:			N/A
List pollutants on stand: N/A			

Comments:

Orangeburg Wind Rose:



Parameter Information – Ozone

Parameter:	Ozone
Instrument Asset #: F7998	Data Logger Asset #: D7893 Computer Asset # is G6501
Parameter Code:	44201
POC:	2
Begin Date:	March 8, 1990
Measurement Scale:	Urban
Monitor Type:	SPM
Method Code and Sample Collection:	047 Instrumental
Sample Analysis:	Ultraviolet
Sample duration/frequency/time interval (hourly, etc.):	Continuous hourly
Monitor Objective(s):	1. General Background
Instrument Manufacturer:	Thermo Electron Corporation
Instrument Model Number:	49i
Probe Location:	On top of monitor building
Support (stand) Height (m):	2.6
Height Above Support (m):	2.0
Probe Height Above Ground (m):	4.6
Distance from Supporting Structure (m):	2.0
Distance to Nearest Road (m):	8.4
Direction from Monitor to Road:	87º Northwest
Name of Nearest Monitor/Sampler:	$PM_{2.5}$
Distance from Nearest Monitor/Sampler (m):	1.1
Distance to Drip Line (m):	6.9 at 40º Southwest, (13.1 at 18º Northeast)
Distance to Tree (m):	10.9 at 40º Southwest, (17.60 at 18º Northeast)

Sample Residency Time-Is sampling time less than 20 seconds? **(Yes/No)**	**Yes**
Probe Material-Is it borosilicate glass, FEP Teflon or equivalent? **(Yes/No)**	**Yes**
Is dust re-entrained?	**No**
Spacing from Roads-Does **distance meet requirement** of Table E-1? **(Yes/No)**	**No***
Height from Ground to Probe-Is probe between 2-15 m? **(Yes/No)**	**Yes**
Probe Horizontal Distance or Vertical Distance- Is probe >1m from vertically or horizontally away from supporting structures **(Yes/No)**	**Yes**
If probe is located near side of building or wall, is it on windward side of building relative to prevailing wind during season of highest concentration potential? **(Yes/No)**	**N/A**
Is probe away from incineration flues or minor sources of NO or SO_2? (Yes/No)	**Yes**
Airflow-Does monitor have unrestricted airflow 270 degrees around the probe or sampler? **(Yes/No)**	**Yes**
Spacing from Trees-Is probe greater than 10 meters away from trees? **(Yes/No)**	**No**
Is the probe away from obstacles? **(Yes/No)**	**No**

*The distance is 8.4 m but the road has less than 100 AADT.

Potential Obstructions If the answer to 'Does the probe have **Unrestricted Air Flow** and away from obstacles?' is No, complete the following. All measurements are in meters.	Obs. 1	Obs.40º 2	Obs. 3
Direction from Monitor to Obstruction	40º Southwest	18º Northeast	
Obstruction Type and Description	Oak tree	Pine tree	
Distance from Clinometer to Potential Obstruction (D1)	10.9	17.6	
Distance from Clinometer to Probe (D2)	0	0	
Distance from Probe to Potential Obstruction Calculate (Dt) =(D1+D2)	10.9	17.6	
Obstruction Base (Gb) (Measure % grade- Record in decimals)	N/A	N/A	
Obstruction Top (Gt) (Measure % grade- Record in decimals)	1.10	1.20	
Height of Object Calculate (Hobj) = D1*Gt	11.99	21.12	
Height at which Clinometer Reading Was Made (eye hgt.)(H1)	1.74	1.74	
Height of Probe Above Surface (surface is what person's feet are standing on) (H2)	4.62	4.62	
Height of Probe Above Clinometer Calculate (Hap) = (H2-H1)	2.88	2.88	
Height Above Probe Calculate (Hoap) = (Hobj-Hap)	9.11	18.24	
2 * Hoap Calculate 2*Hoap?	18.22	36.48	
Is Distance (Dt) at least 2 times height above probe (Hoap)? **(Yes/No)**	No	No	
Does it meet criteria?	No	No	
Comments: The trees are too close and too high but the probe still has 270º of unobstructed exposure (see panorama picture below).			

Parameter Information - $PM_{2.5}$ Continuous

Parameter:	$PM_{2.5}$
Instrument Asset #: D8502	Data Logger Asset #: D7893
Parameter Code:	88502
POC:	3
Begin Date:	June 24, 1999
Measurement Scale:	Regional
Monitor Type:	SLAMS
Method Code and Sample Collection:	702 $PM_{2.5}$ SCC w/Correction Factor
Sample Analysis:	TEOM Gravimetric 50 deg C
Sample duration/frequency/time interval (hourly):	Continuous hourly
Monitor Objective(s):	1. General/Background
Instrument Manufacturer:	Rupprect & Patashnick, Co. Inc.
Instrument Model Number:	1400a TEOM
Probe Location:	On top of monitor building
Support (stand) Height (m):	2.6
Height Above Support (m):	1.7
Probe Height Above Ground (m):	4.3
Distance from Supporting Structure (m):	1.7
Distance to Nearest Road (m):	8.4
Direction from Monitor to Road:	87º Northwest
Name of Nearest Monitor/Sampler:	Ozone
Distance from Nearest Monitor/Sampler (m):	1.1
Distance to Drip Line (m):	5.8 at 40º Southwest, (6.9 at18º Northeast)
Distance to Tree (m):	9.8 at 40º Southwest, (10.9 at18º Northeast)

Is dust re-entrained?	**Yes**
Spacing from Roads-Does **distance meet requirements** of Figure E-1? **(Yes/No)**	**Yes**
Height from Ground to Probe-Is probe between 2-15 m or 2-7 m $PM_{10-2.5}$ middle scale? **(Yes/No)**	**No**
Probe Horizontal Distance or Vertical Distance- Is probe >2m from vertically or horizontally away from supporting structures **(Yes/No)**	**No***
If probe is located near side of building or wall, is it on windward side of building relative to prevailing wind during season of highest concentration potential? **(Yes/No)**	**Yes**
Is probe away from incineration flues or minor sources of NO or SO_2? (Yes/No)	**Yes**
Airflow-Does monitor have unrestricted airflow 270 degrees around the probe or sampler? **(Yes/No)**	**N/A**
Spacing from Trees-Is probe greater than 10 meters away from trees? **(Yes/No)**	**Yes**
Is the **probe away from obstacles**? **(Yes/No)**	**Yes**
$PM_{2.5}$ and PM_{10} Collocated monitors (Table E-4): Must be within 4 meters of each other and at least 2 meters apart for flow rates greater than 200 liters/min or at least 1 meter apart for samplers having flow rates less than 200 liters/min. **(Yes/No)**	**No**
	No

*The distance is 8.4 m but the road has less than 100 AADT.

Potential Obstructions If the answer to 'Does the probe have **Unrestricted Air Flow** and away from obstacles?' is No, complete the following. All measurements are in meters.	Obs. 1	Obs. 2	Obs. 3
Direction from Monitor to Obstruction	18º Northeast	40º Southwest	
Obstruction Type and Description	Pine tree	Oak tree	
Distance from Clinometer to Potential Obstruction (D1)	10.9	9.8	
Distance from Clinometer to Probe (D2)	0	0	
Distance from Probe to Potential Obstruction Calculate (Dt) =(D1+D2)	10.9	9.8	
Obstruction Base (Gb) (Measure % grade- Record in decimals)	N/A	N/A	
Obstruction Top (Gt) (Measure % grade- Record in decimals)	0.95	1.40	
Height of Object Calculate (Hobj) = D1*Gt	10.36	13.72	
Height at which Clinometer Reading Was Made (eye hgt.)(H1)	1.74	1.74	
Height of Probe Above Surface (surface is what person's feet are standing on) (H2)	4.30	4.30	
Height of Probe Above Clinometer Calculate (Hap) = (H2-H1)	2.56	2.56	
Height Above Probe Calculate (Hoap) = (Hobj-Hap)	7.8	11.16	
2 * Hoap Calculate 2*Hoap?	15.6	22.32	
Is Distance (Dt) at least 2 times height above probe (Hoap)? **(Yes/No)**	No	No	
Does it meet criteria?	No	No	
Comments: Comments: The trees are too close and too high but the probe still has 270º of unobstructed exposure (see panorama picture below).			

Required Photographs

Photos to include looking toward and away from the four (4) primary cardinal compass points (N, S, E, W) and approaching the site.

To North	
To South	
To West	
From East	

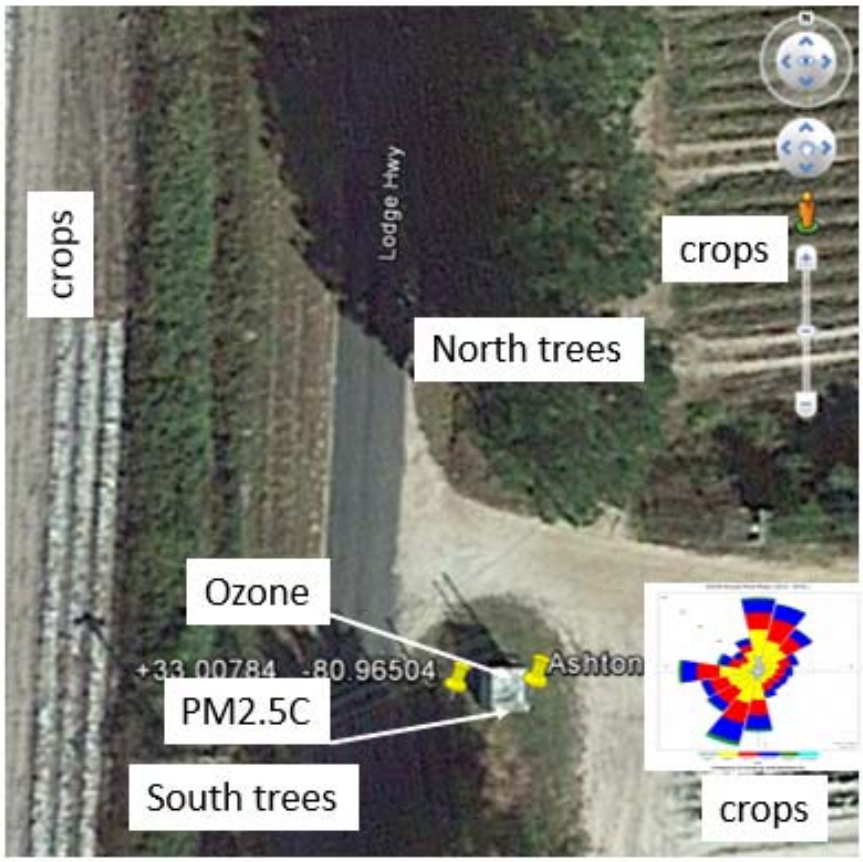
To East	
From West	
From South	
From North	

Approaching Site	

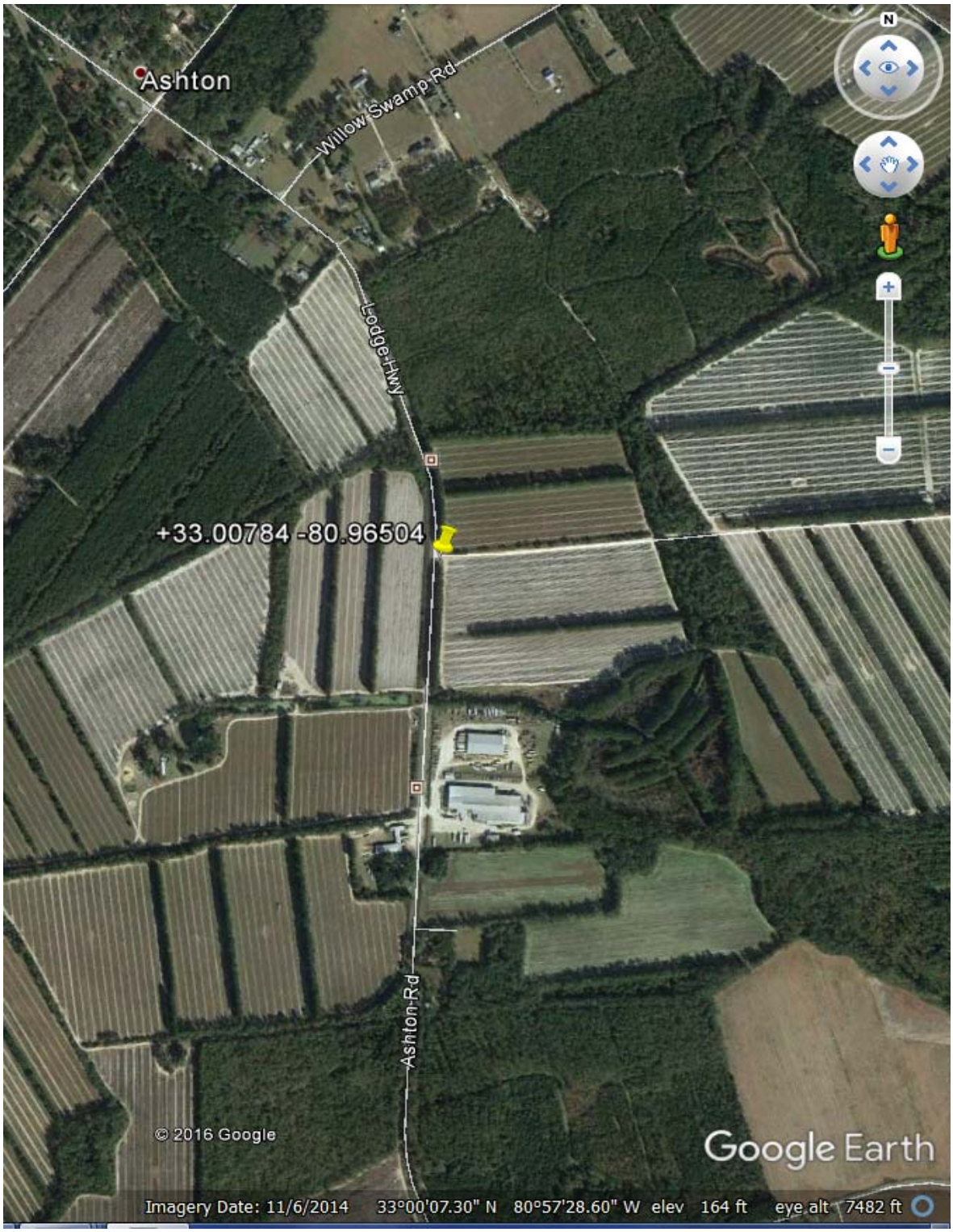
Note: When you are facing toward the monitor, it is considered “to” or “toward”. You are shooting ‘toward’ the direction you can read on the cardinal direction cards. When you are standing at the monitor facing outward, it is considered “from”. You are shooting ‘from’ the direction you can read on the cardinal direction cards.

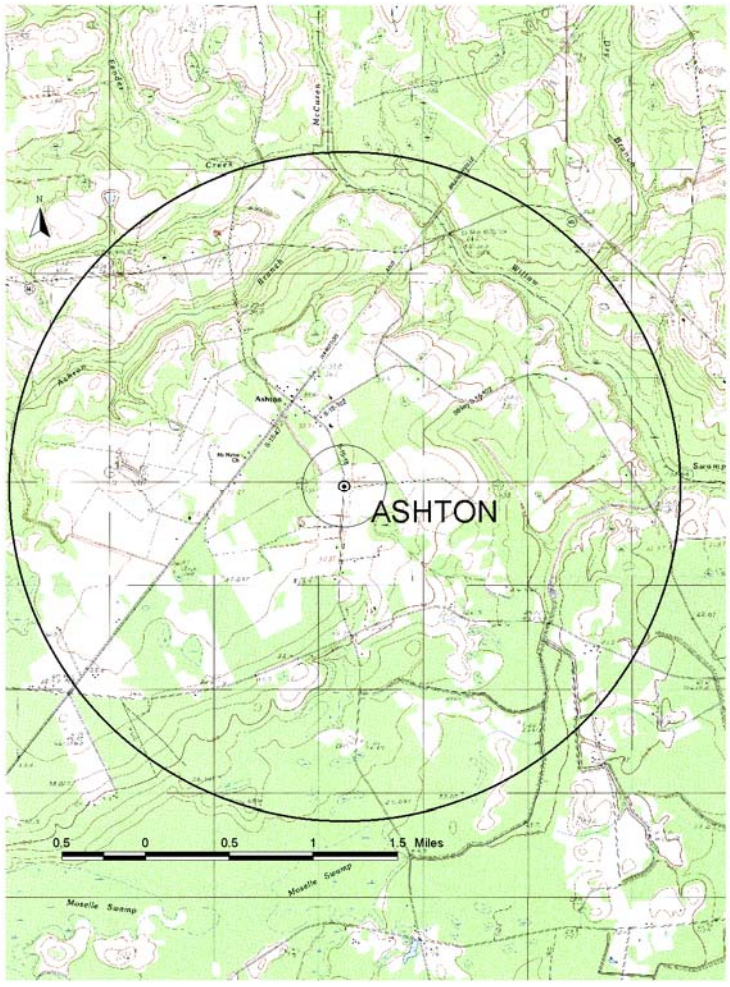
Maps and Pictures of Site

Site Photo



Aerial View Map



Site Map	
Topographic Map	

Ashton Panorama

Monitoring Plan Page

Ashton

CSA/MSA: none/none
AQS Site ID: 45-029-0002
Location: Ashton Road (S-13-18) Islandton
County: Colleton
Coordinates: +33.00784 -80.96504
Date Established: March 7, 1990
Site Evaluation: October 22, 2015

The Ashton site is located in northwestern Colleton County and was established on March 7, 1990. The site serves as a required regional background for $PM_{2.5}$, representing one of two major and different physiographic regions in South Carolina. It also monitors Ozone concentrations. The sample inlets are 8 meters from the nearest road.
This site does not meet 40 CFR Part 58 Appendix E site obstruction requirements. The DHEC is working with the land owners to remove or trim the trees.

Changes for 2017:
There are no changes planned for 2017.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
$PM_{2.5}$	Regional	General / Background	SLAMS	4.40	TEOM 50°C	Continuous

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	General / Background	SPM	4.70	FEM Ultraviolet Photometry	Continuous

Site Evaluation Report for:
Bushy Park Pump Station Monitoring Site
(45-015-0002)

Date of Evaluation: April 26, 2017

South Carolina Department of Health and Environmental Control

Bureau of Air Quality
Data Analysis and Support Section

PREPARED BY: G. Renee' Madden DATE: October 9, 2017
NAME: G. Renee' Madden

REVIEWED BY: _____ DATE: 11/7/2017
NAME: Thomas J. Flynn III

APPROVED BY: _____ DATE: 1/5/18
NAME: Robert J. Brown, Jr.

Bushy Park (45-015-0002) Site Evaluation Report

South Carolina Ambient Air Quality Monitoring Site Evaluation Report	
Name of Site: Bushy Park	Local Site ID: 45-015-0002
Personnel: Renee' Madden, Joel Hodges	Date Site Visited: April 26, 2017
New:	Revised: X
Summary of Site Evaluation: The sampler does not meet siting criteria for 40 CFR Appendix E to Part 58 Section 4-Spacing from Obstructions. This site has tall trees in the North, North East, South East and South West direction that are more than twice the height of the probe. The sampler also does not meet siting criteria for 40 CFR Appendix E to Part 58 Section 5-Spacing from Trees. The drip line is less than 10 meters from the probe. Recommendation: Terminate Site.	

General Site Information

Date Report Started: April 12, 2017	Date Report Completed: April 27, 2017
Street Address:	River Oak Drive
City: Goose Creek	Zip Code: 29445
County: Berkeley	Declination: 7.93° W ± 0.34° changing by 0.06° W per year
Date Site Established:	June 20, 1978
Latitude: +32.98724	Longitude: -79.93671
Horizontal Collection Method:	GPS Carrier Phase Static Relative Position
Vertical Collection Method:	Topographic Map Interpolation
Vertical Measure (m) (elevation):	14.0
Pollutants Being Monitored:	Ozone
Meteorological Parameters Being Monitored:	None

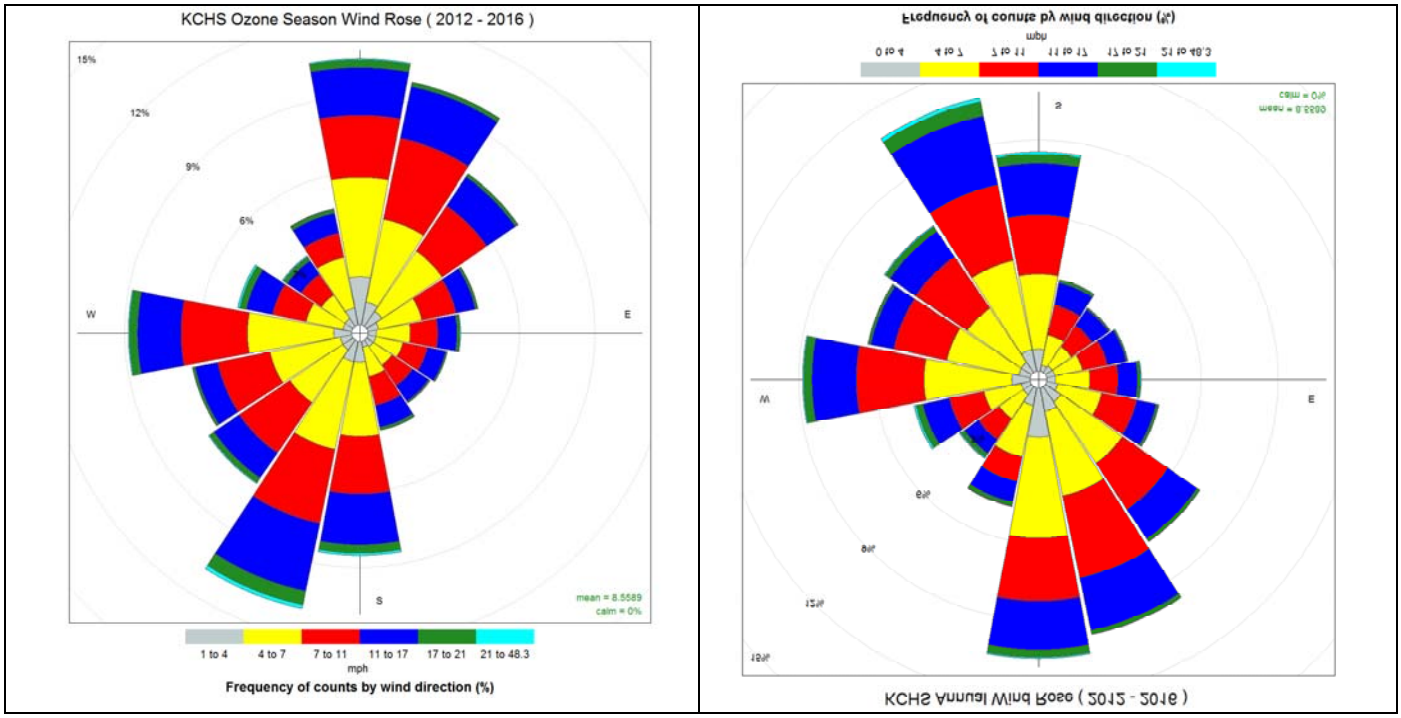
Mobile Sources Information

Roadway Name:	River Oak Drive	Bushy Park Road	B Avenue
Road Number:	None given	S-503	None given
Direction to Road:	South	East	South East
Distance to Road (m):	15.2 (rolling wheel)	330 (Google Earth)	465 (Google Earth)
Daily Traffic Count:	None listed	503	None listed
Daily Traffic Year:	2010	2010	2010
Source of Traffic Count:	2010 SC DOT	2010 SC DOT	2010 SC DOT
Is dust re-entrained?	No	No	No

Field Data for Bushy Park (45-015-0002) Site			
Parking Lot Measurements (nearest the site)			
Direction from Site to Parking Lot:			West
Distance from Site to Parking Lot (m):			14.5 (rolling wheel)
Monitor Building	Building Temperature: 78° F	Building Asset Number: A2295	
Comments:			
Dimensions	Height (m): 2.4 to top of peaked roof	Width (m): 1.8	Depth (m): 2.3
Distance to Nearest Tree (m):			13.7

Direction of Nearest Tree:			North
List pollutants on top of monitor building: Ozone			
Support Structure (Stand) #1 N/A			
Dimensions	Height (m): N/A	Width (m): N/A	Depth (m): N/A
Distance to Nearest Tree (m):			N/A
Direction of Nearest Tree:			N/A
List pollutants on stand: N/A			

Charleston Wind Rose:

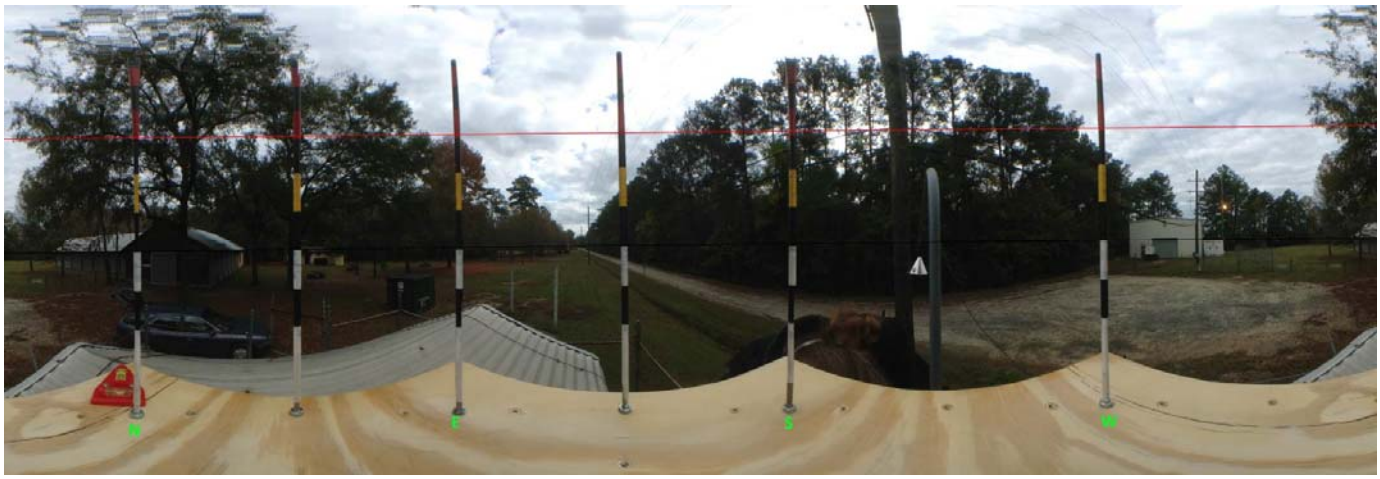


Parameter Information – Ozone

Parameter:	Ozone
Instrument Asset #: H7143	Data Logger Asset #: E2170, Computer Asset #: GK6496
Parameter Code:	44201
POC:	1
Begin Date:	June 26, 1978
Measurement Scale:	Urban
Monitor Type:	SLAMS
Method Code and Sample Collection:	087, Instrumental
Sample Analysis:	Ultra Violet Absorption
Sample duration/frequency/time interval (hourly, etc.):	Continuously hourly
Monitor Objective(s):	1. Max Ozone Concentration
Instrument Manufacturer:	Teledyne Advanced Pollution Instrumentation
Instrument Model Number:	T400
Probe Location:	Top of monitor building
Support (stand) Height (m):	2.4 to top of edge before the peak starts (this is where the probe support was mounted)
Height Above Support (m):	0.8
Probe Height Above Ground (m):	3.1
Distance from Supporting Structure (m):	1.6
Distance to Nearest Road (m):	15.2
Direction from Monitor to Road:	Bearing 10º Southwest
Name of Nearest Monitor/Sampler:	None
Distance from Nearest Monitor/Sampler (m):	N/A
Distance to Drip Line (m):	4.0
Distance to Tree (m):	13.7 Bearing 5º Northwest

Sample Residency Time-Is sampling time less than 20 seconds? **(Yes/No)**	**Yes**
Probe Material-Is it borosilicate glass, FEP Teflon or equivalent? **(Yes/No)**	**Yes**
Is dust re-entrained?	**No**
Spacing from Roads-Does **distance meet requirement** of Table E-1? **(Yes/No)**	**Yes**
Height from Ground to Probe-Is probe between 2-15 m? **(Yes/No)**	**Yes**
Probe Horizontal Distance or Vertical Distance- Is probe >1m from vertically or horizontally away from supporting structures **(Yes/No)**	**Yes**
If probe is located near side of building or wall, is it on windward side of building relative to prevailing wind during season of highest concentration potential? **(Yes/No)**	**N/A**
Is probe away from incineration flues or minor sources of NO or SO_2? (Yes/No)	**Yes**
Airflow-Does monitor have unrestricted airflow 270 degrees around the probe or sampler? **(Yes/No)**	**No**
Spacing from Trees-Is probe greater than 10 meters away from trees? **(Yes/No)**	**No**
Is the probe away from obstacles? **(Yes/No)**	**No (see panorama)**

Panorama



Required Photographs

Photos to include looking toward and away from the four (4) primary cardinal compass points (N, S, E, W) and approaching the site.

From West	
To East	

From South	
To North	
From East	
To West	

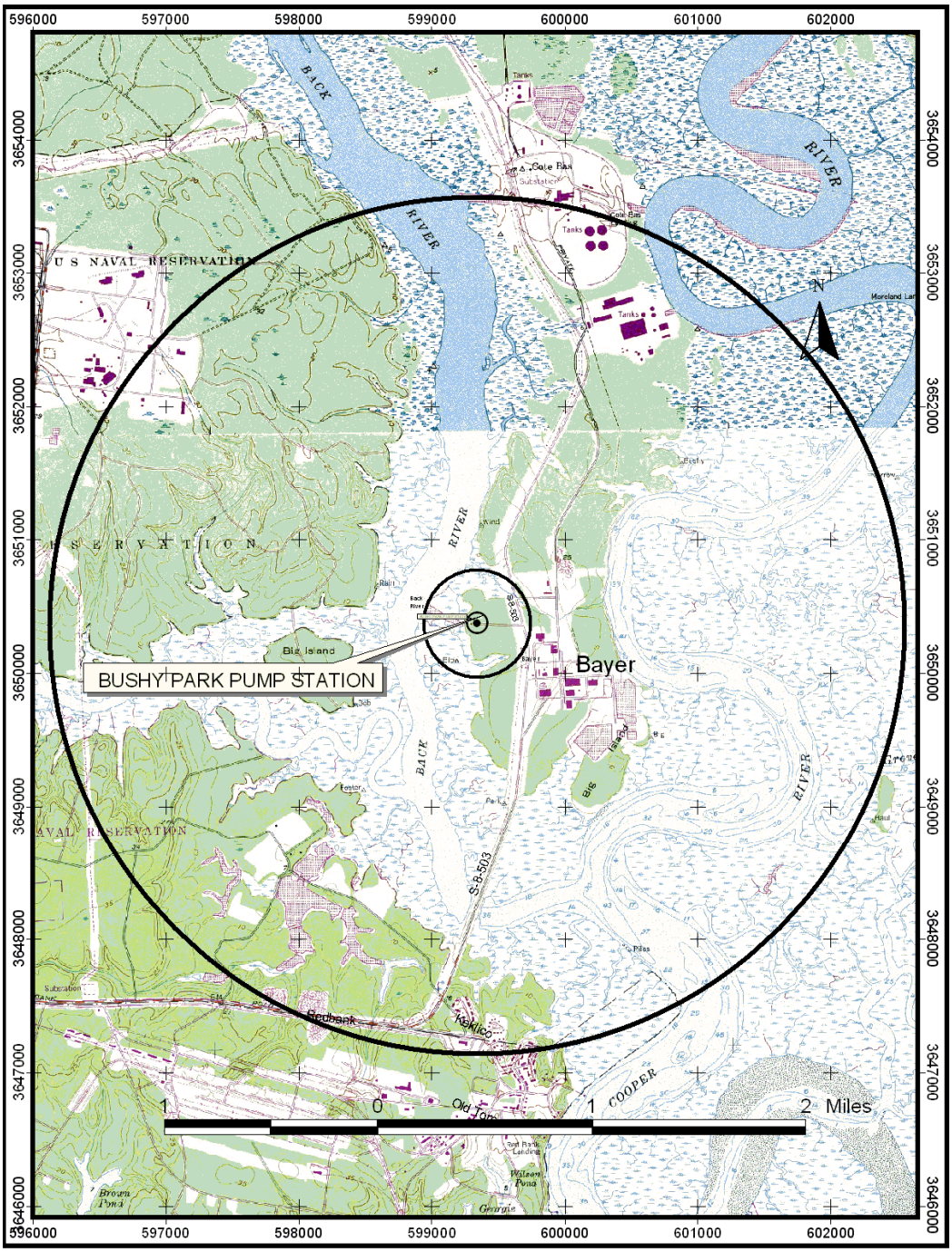
From North	
To South	No Picture
Approaching Site	

Note: When you are facing toward the monitor, it is considered “to” or “toward”. You are shooting ‘toward’ the direction you can read on the cardinal direction cards. When you are standing at the monitor facing outward, it is considered “from”. You are shooting ‘from’ the direction you can read on the cardinal direction cards.

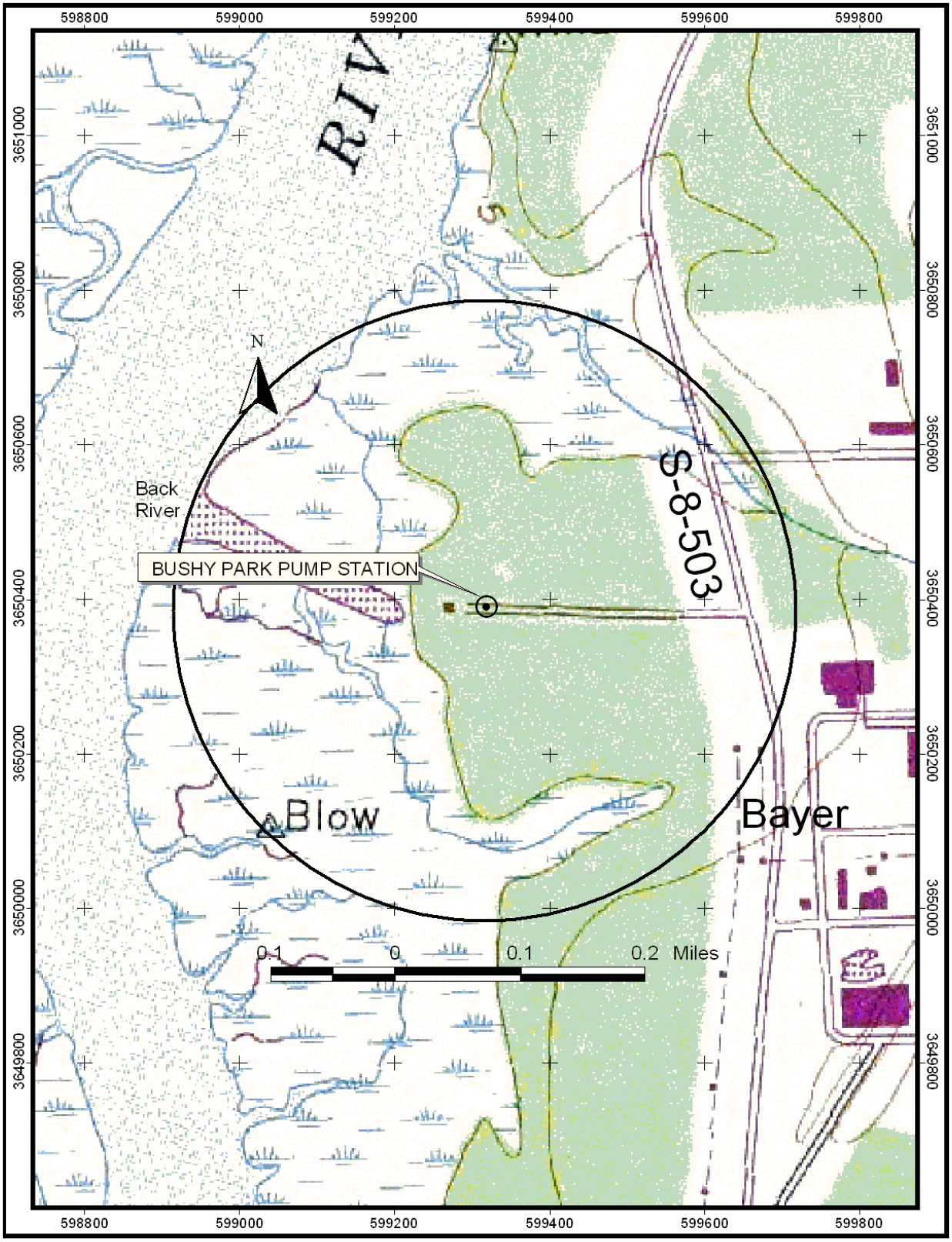
Maps and Pictures of Site

Aerial View

Topography Map - 3.23 km (2 miles)



Site Map - 0.4 km (1/4 mile)



Neighborhood Map

Monitoring Page

Bushy Park Pump Station
CSA/MSA: none/Charleston-North Charleston MSA
AQS Site ID: 45-015-0002
Location: River Oak Drive (Goose Creek)
County: Berkeley
Coordinates: +32.98724, -79.93671
Date Established: June 20, 1978
Site Evaluation: May 19, 2011

The Bushy Park Pump Station site is located in southeastern Berkeley County downwind from the Charleston urban area. This site monitors for Ozone, and the monitoring objective is maximum Ozone concentration. The sample inlets are 11 meters from the nearest road.
This site does not meet 40 CFR Part 58 Appendix E site obstruction requirements due to tree encroachment from the North, South, and East. It is not feasible to cut or trim the trees. Currently, a suitable replacement site is being sought. Once an appropriate site has been located and established, the Bushy Park Pump Station site will be terminated.

Changes for 2017:
Due to tree encroachment, this site will be terminated when a suitable replacement site is established.

Monitors:

Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis Method	Sampling Frequency
Ozone	Urban	Max Ozone Concentration	SLAMS	3.12	FEM Ultraviolet Photometry	Continuous

dhec
Healthy People. Healthy Communities

November 16, 2018

Ms. Beverly Banister
Director, APTMD, U.S. EPA, Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-8960

Re: Addendum to the South Carolina 2019 Annual Ambient Air Monitoring Network Plan

Dear Ms. Banister:

On July 16, 2018, the South Carolina Department of Health and Environmental Control (Department) submitted the State of South Carolina Ambient Air Monitoring Network Plan (Monitoring Plan) for calendar year 2019 in accordance with the requirements of 40 Code of Federal Regulations (CFR) 58.10. This letter is to inform you of modifications the Department wishes to make to the monitoring network and to the Monitoring Plan. Specifically, the Department respectfully requests approval for a correction to the Minimum Monitoring Requirements Table, the Greenville-Anderson-Mauldin MSA map, and to the objective for the Garrison Arena (45-007-0006) Site. Also, the Department requests concurrence to terminate the Clemson CMS (45-077-0002) Monitoring Site and the Wolf Creek (45-077-0003) Monitoring Site, and to establish the Garrison Arena (45-007-0006) Monitoring Site and the Moncks Corner National Guard (45-015-1002) Monitoring Site. Finally, the Department requests a waiver of drip line siting requirements for one pine tree drip line at the Congaree Bluff (45-079-0021) Monitoring Site.

The dates of the public comment period were September 28, 2018 through October 29, 2018. No comments were received.

An addendum to the Monitoring Plan reflecting the implementation of the recommended modifications can be found in Appendix H.

The revisions to the plan are expected to assist in optimizing our monitoring network while allowing more efficient use of our resources. Should you have any questions or need additional information regarding these requests, please contact Robert Brown of my staff at (803) 898-4105.

Sincerely,

Rhonda B. Thompson, PE, Chief
Bureau of Air Quality
SCDHEC

cc: Gregg Worley, US EPA Region 4 (w/attachments)
ec: Ryan Brown, US EPA Region 4 (w/attachments)
Todd Rinck, USEPA Region 4 (w/o attachments)
Robert J. Brown, Jr., BAQ (w/o attachments)
Renee Shealy, BEHS (w/o attachments)
Micheal Mattocks, BEHS (w/o attachments)

Addendum to the 2019 Annual Ambient Air Monitoring Plan

Appendix H: Plan Revisions

The following pages contain revisions to the 2019 Ambient Air Monitoring Network Plan (Monitoring Plan). Changes to the 2019 Monitoring Plan have gray highlighting applied. Page numbers from the original 2019 Monitoring Plan are provided at the bottom of the page as a reference. The changes include a correction to the Minimum Monitoring Requirements Table, the Greenville-Anderson-Mauldin MSA map, and to the objective for the Garrison Arena (45-007-0006) Site.

This addendum also includes information concerning the termination of:

- the Clemson CMS (45-077-0002) Monitoring Site, and
- the Wolf Creek (45-077-0003) Monitoring Site.

Additionally, the Department requests approval to establish:

- the Garrison Arena (45-007-0006) Monitoring Site, and
- the Moncks Corner National Guard (45-015-1002) Monitoring Site.

Finally, this addendum requests a waiver of drip line siting requirements for one pine tree at the Congaree Bluff (45-079-0021) Monitoring Site.

Public comment period

The dates of the public comment period were September 28, 2018 through October 29, 2018. All comments have been included along with the Department's response in Appendix J.

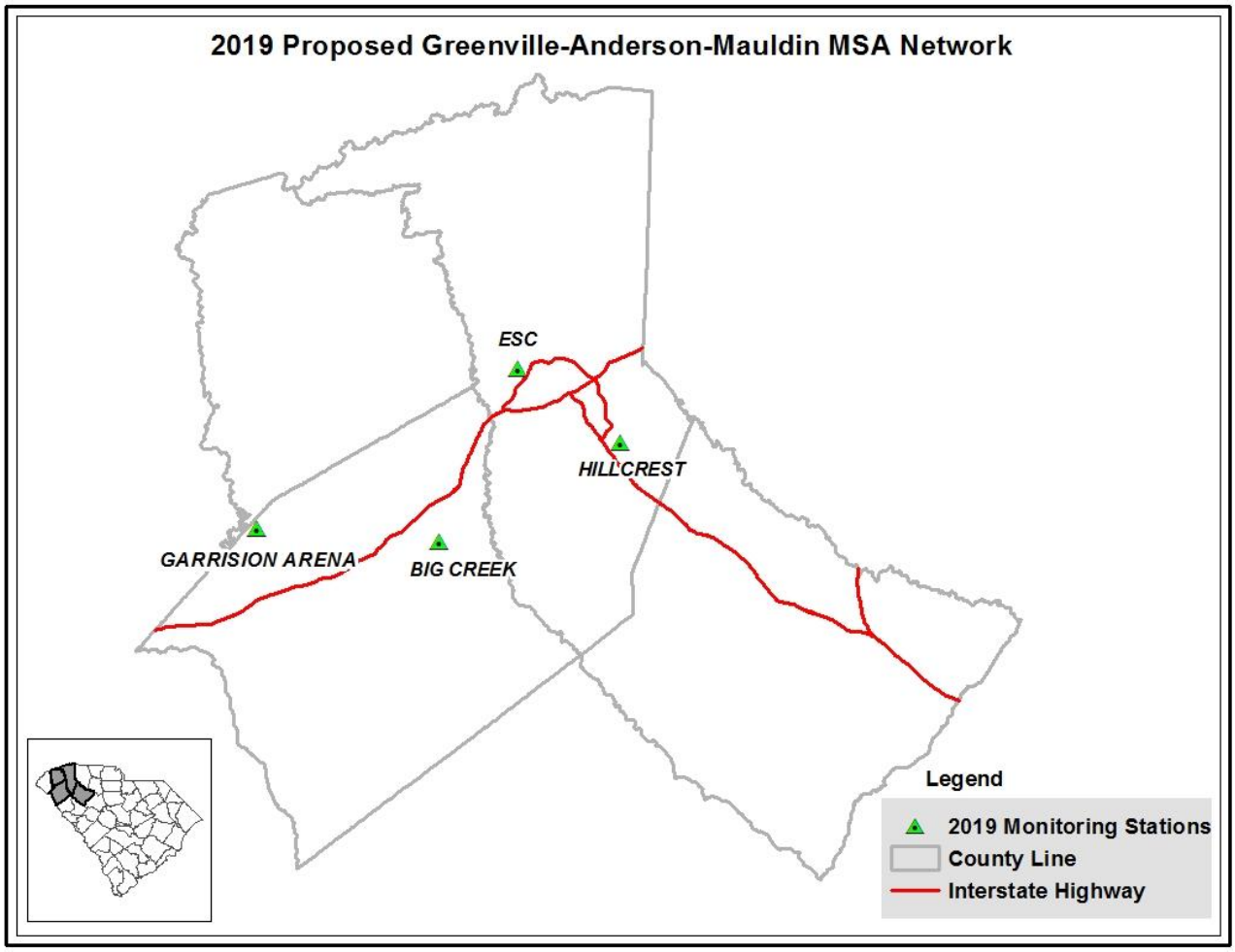
MSA	2017 Population
Charlotte-Concord-Gastonia, NC-SC MSA	2,525,305
Greenville-Anderson-Mauldin MSA	895,923
Columbia MSA	825,033
Charleston-North Charleston MSA	775,831
Augusta-Richmond County, GA-SC MSA	600,151
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	464,165
Spartanburg MSA	334,391
Florence MSA	205,831
Hilton Head Island-Bluffton-Beaufort MSA	215,302
Sumter MSA	106,847
*United States Census Bureau and 40 CFR Part 58, Appendix D	

South Carolina Minimum Monitoring Requirements – Based on the *latest available United States Census population estimates and the 2017 ambient air quality design values (page 16), the minimum monitoring requirements for each MSA are:

MSA	Ozone	$PM_{2.5}$	$PM_{2.5}$ Cont.	PM_{10}	Lead	SO_2	$NO/NO_y/NO_2$	CO
**Augusta-Richmond County, GA-SC MSA	2	1	1	1-2	0	0	0	0
Charleston-North Charleston, MSA	1	1	1	1-2	0	1	0	0
**Charlotte-Concord-Gastonia, NC-SC MSA	2	2	1	2-4	0	1	2	2
Columbia MSA (NCore)	2	1	1	1-2	0	1	~~2~~-1	1
Florence MSA	1	0	0	0	0	0	0	0
Greenville-Anderson-Mauldin MSA	2	1	1	1-2	0	0	1	0
Hilton Head Island-Bluffton-Beaufort MSA	0	0	0	0	0	0	0	0
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	1	0	0	0-1	0	0	0	0
Spartanburg MSA	1	0	0	0-1	0	0	0	0
Sumter MSA	0	0	0	0	0	0	0	0

*United States Census Bureau http://www.census.gov/population/metro/data/def.html and 40 CFR Part 58, Appendix D.
** Minimum ambient air monitoring requirements are met cooperatively with the States of Georgia and North Carolina.

Greenville-Anderson-Mauldin MSA (map replacement)



Classification of Monitoring Type by Site

Site ID	Site Name	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	Lead	Ozone	SO_2	NO_2	CO	Met
45-007-0005	Big Creek						●				
45-007-0006	Garrison Arena						●				
45-045-0015	Greenville ESC	●	O		●			●	●		
45-045-0016	Hillcrest	●●					●				●
TOTAL		3	1	0	1	0	3	1	1	0	1
O SPM / Other ● SLAMS ●●/OO duplicate / QA monitors											

Garrison Arena

CSA/MSA: Greenville-Spartanburg-Anderson CSA / Greenville-Anderson-Mauldin MSA
AQS Site ID: 45-007-0006
Location: Woodburn Road, Pendleton
County: Anderson
Coordinates: 34.63, -82.81
Date Established: PENDING
Site Evaluation: PENDING

The Garrison Arena site is located on the grounds of Clemson University at the T. Ed Garrison Arena near the northern border of Anderson County. This monitor measures Ozone concentrations upwind of the Greenville-Spartanburg urbanized area.

This site is XX.X meters from the nearest road.

This site will meet siting criteria found in 40 CFR Part 58 Appendix E.

Changes for 2019:
There are no changes planned for 2019.

Monitors:

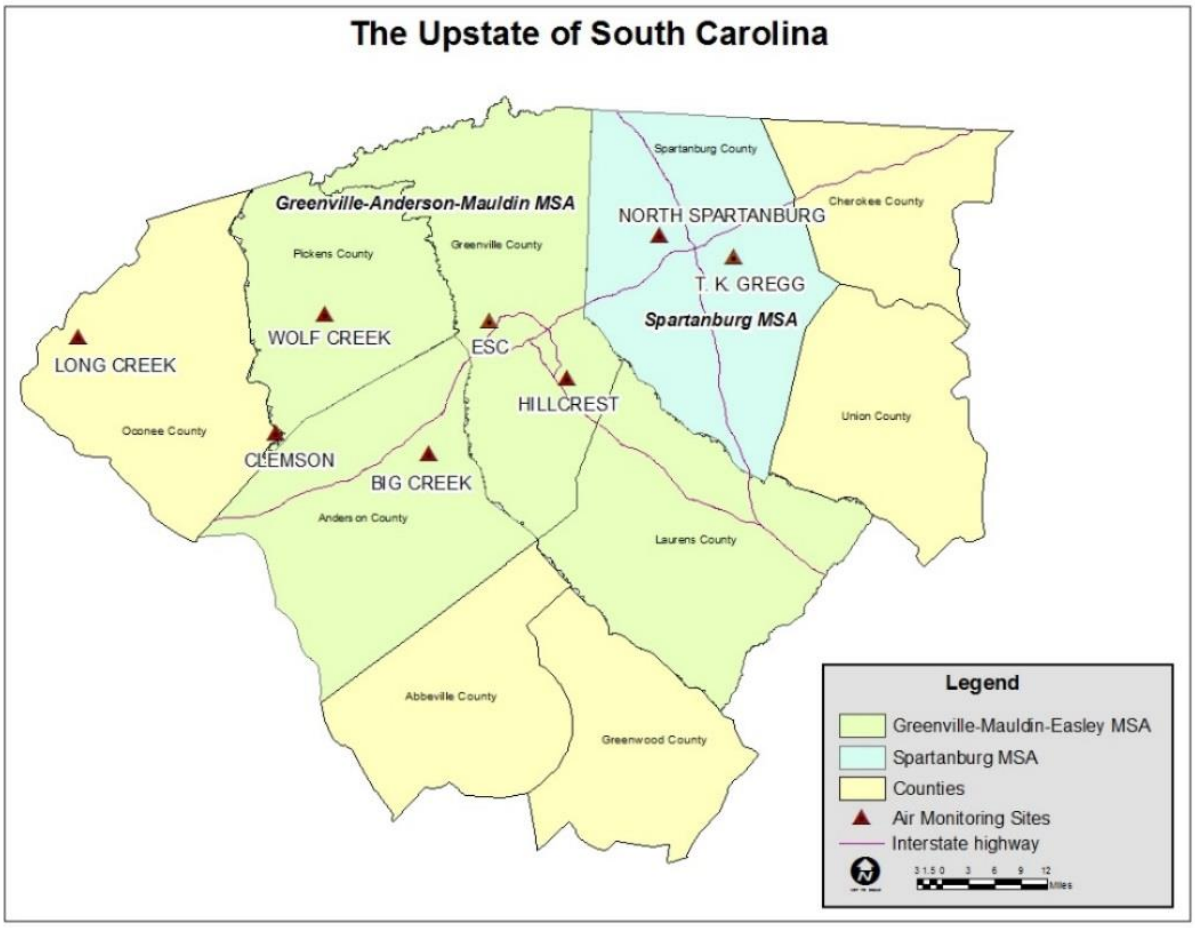
Parameter	Scale	Objective	Designation	Probe Height (m)	Analysis & (Method Code)	Sampling Frequency
Ozone 44201-1	Urban	~~General / Background~~ Max Ozone Concentra-tion / Upwind Background	SLAMS		Ultraviolet Absorption (087)	Continuous

Terminations and Establishments of Ambient Air Monitoring Sites

History of the Greenville-Anderson-Mauldin MSA Ozone Monitoring Network

The Upstate area of South Carolina consists of ten counties located in the northwestern area of the State. Within these counties are two Metropolitan Statistical Areas (MSAs): Greenville-Anderson-Mauldin and Spartanburg. Interstate 85 brings traffic in from the north and south and Interstate 26 runs east and west through the Upstate.

Map 1: The Upstate of South Carolina



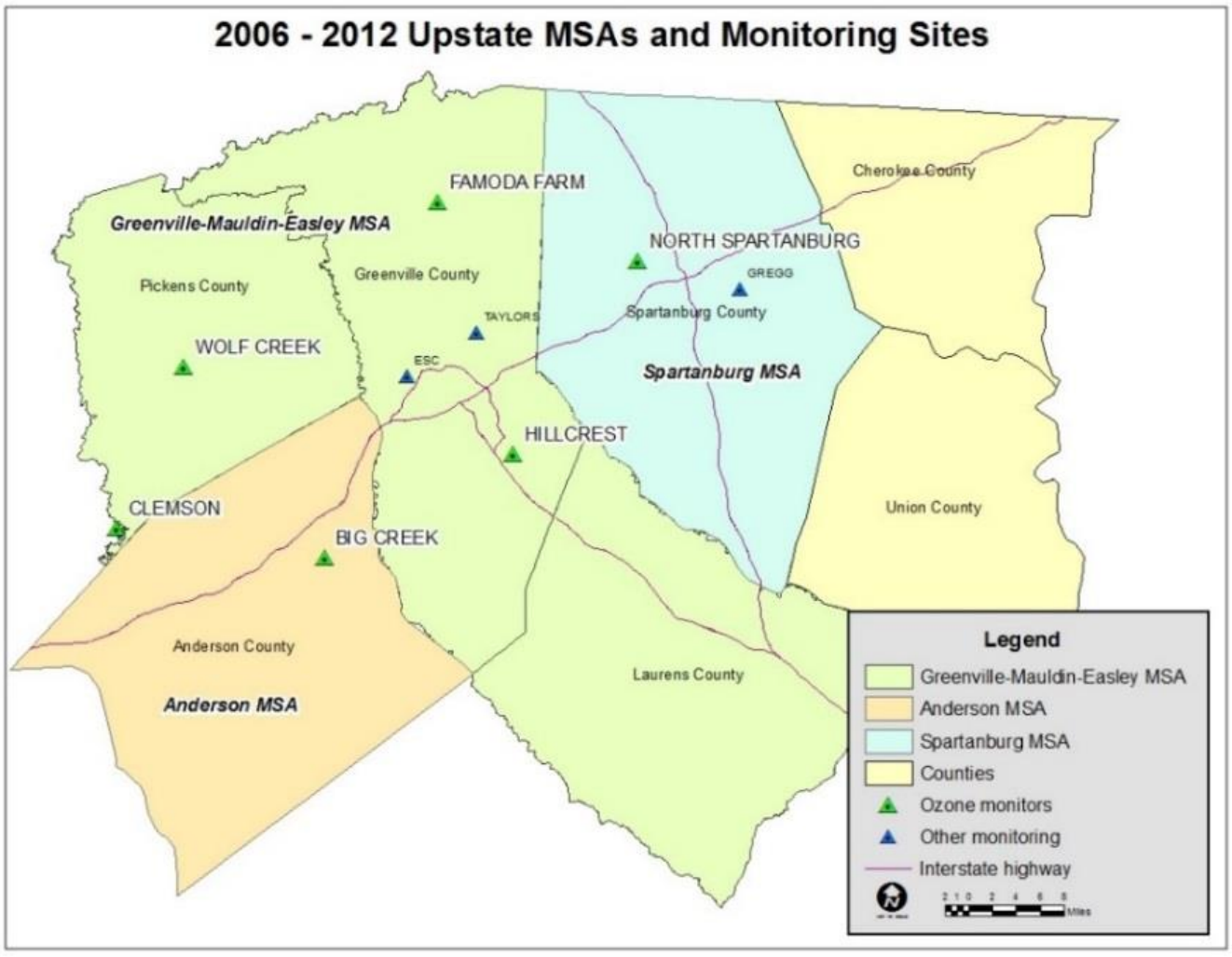
After the Clean Air Act was passed, minimum monitoring requirements for ambient air monitoring networks were established by the Environmental Protection Agency (EPA) that were based on the latest populations as reported by the United States Census Bureau, traffic emissions as reported by the latest Department of Transportation Traffic Counts and facility emissions for each MSA, as defined by the Office of Management and Budget (OMB).

From 2006 to 2012, the Anderson MSA was comprised of Anderson County, with the principal city being Anderson. It was required to have one Ozone monitor (Ozone monitors

are identified with green triangles in Map 2 below) located at the Big Creek (45-007-0005) Monitoring Site. The objective of this monitor was maximum Ozone concentration and upwind background.

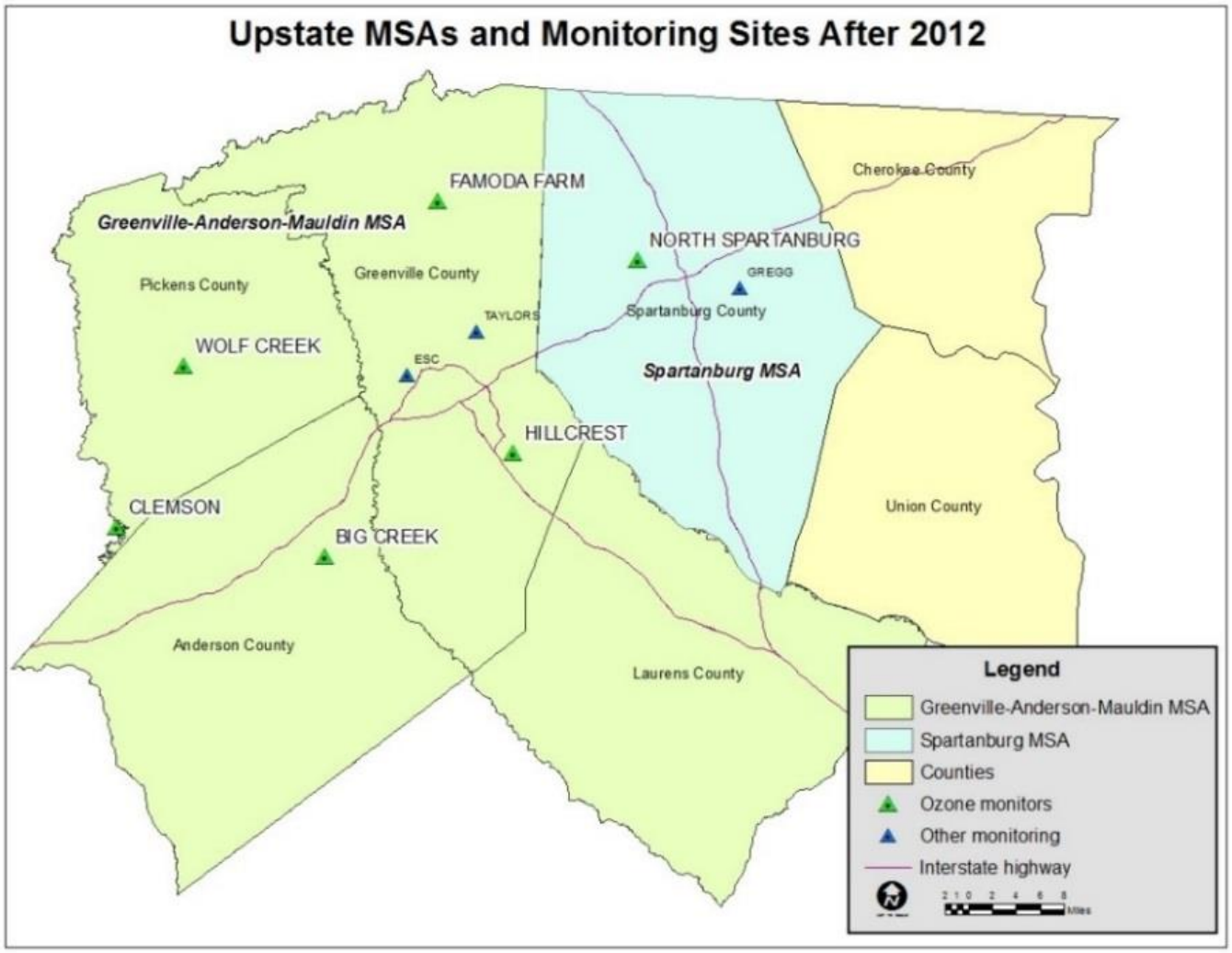
The Greenville-Mauldin-Easley MSA was comprised of the counties of Laurens, Pickens and Greenville and the principal cities were Greenville, Mauldin, and Easley. This MSA had six monitoring sites including four Ozone monitors.

Map 2: 2006-2012 Upstate MSAs and Monitoring Sites



In 2013, the Anderson and Greenville-Mauldin-Easley MSAs were combined by OMB and became the Greenville-Anderson-Mauldin MSA, which now had seven monitoring sites with five Ozone monitors.

Map 3: Upstate MSAs and Monitoring Sites After 2012



At that time, the Department discussed a reallocation of the monitoring resources in the Upstate to insure appropriate and adequate monitoring that properly characterized the air quality for the region. In 2015, the Department conducted an in-depth study of the Ozone monitors in the Upstate. In February 2016, the Department filed an Addendum to the 2015 Monitoring Plan and was approved to terminate the Ozone monitor at the Famoda Farm (45-045-1003) Monitoring Site because the Department determined that the site was duplicative.

As shown in Table 1, currently, the Greenville-Anderson-Mauldin MSA has five monitoring sites and four Ozone monitors.

Table 1: Type of monitoring at each Greenville-Anderson-Mauldin MSA site

Site ID	Site Name	$PM_{2.5}$	$PM_{2.5}$ Cont.	Speciation	PM_{10}	Lead	Ozone	SO_2	NO_2	CO		Met
45-007-0003	Wolf Creek						●					
45-007-0005	Big Creek						●					
45-007-0006	Clemson CMS						●					
45-045-0015	Greenville ESC	●	O		●			●	●			
45-045-0016	Hillcrest	●●					●					●
TOTAL		3	1	0	1	0	4	1	1	0		1
O SPM / Other ● SLAMS ●●/OO duplicate / QA monitors												

As the minimum monitoring requirements for the Greenville-Anderson-Mauldin MSA listed below in Table 2 indicate, this MSA meets or exceeds the minimum monitoring requirements. The current number of monitors operating in this MSA are in parentheses.

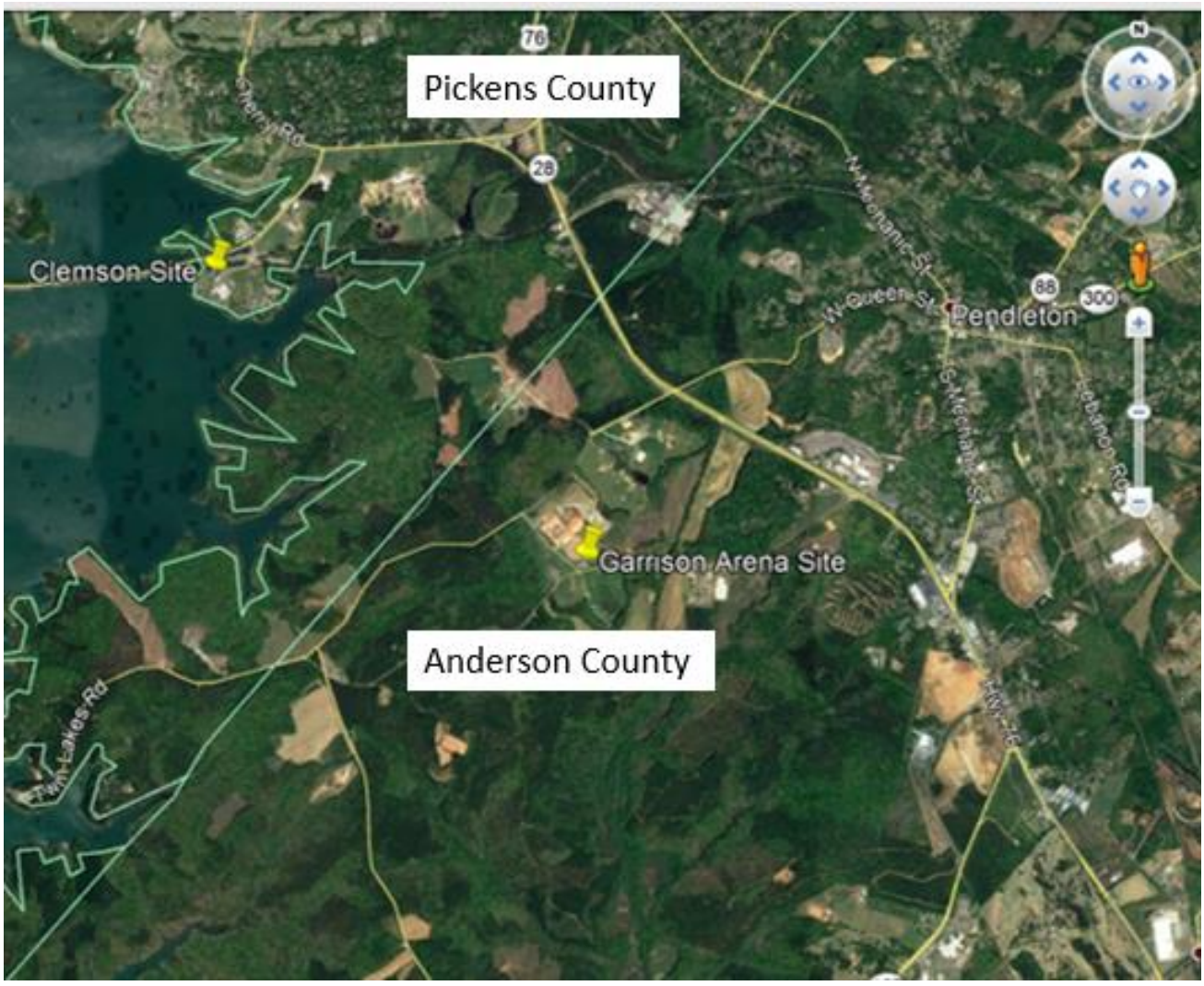
Table 2: Minimum monitoring requirements the Greenville-Anderson-Mauldin MSA

MSA	**Ozone**	**$PM_{2.5}$**	**$PM_{2.5}$ Cont.**	**PM_{10}**	**Lead**	**SO_2**	**NO_2**	**CO**
Greenville-Anderson-Mauldin MSA	2 (4)	1 (3)	1 (1)	1-2 (1)	0 (0)	0 (0)	1 (1)	0 (0)

In February 2018, the Department of Air Quality Analysis (Air Lab) received an e-mail from Clemson University (see Appendix I) asking that the Clemson CMS (45-077-0002) Monitoring Site be removed from the property. This Monitoring Site is located at Hopewell Plantation and is adjacent to a restored 19th century house that was home to three South Carolina governors and a United States congressman. The University wanted the Monitoring Site discontinued and removed from this property.

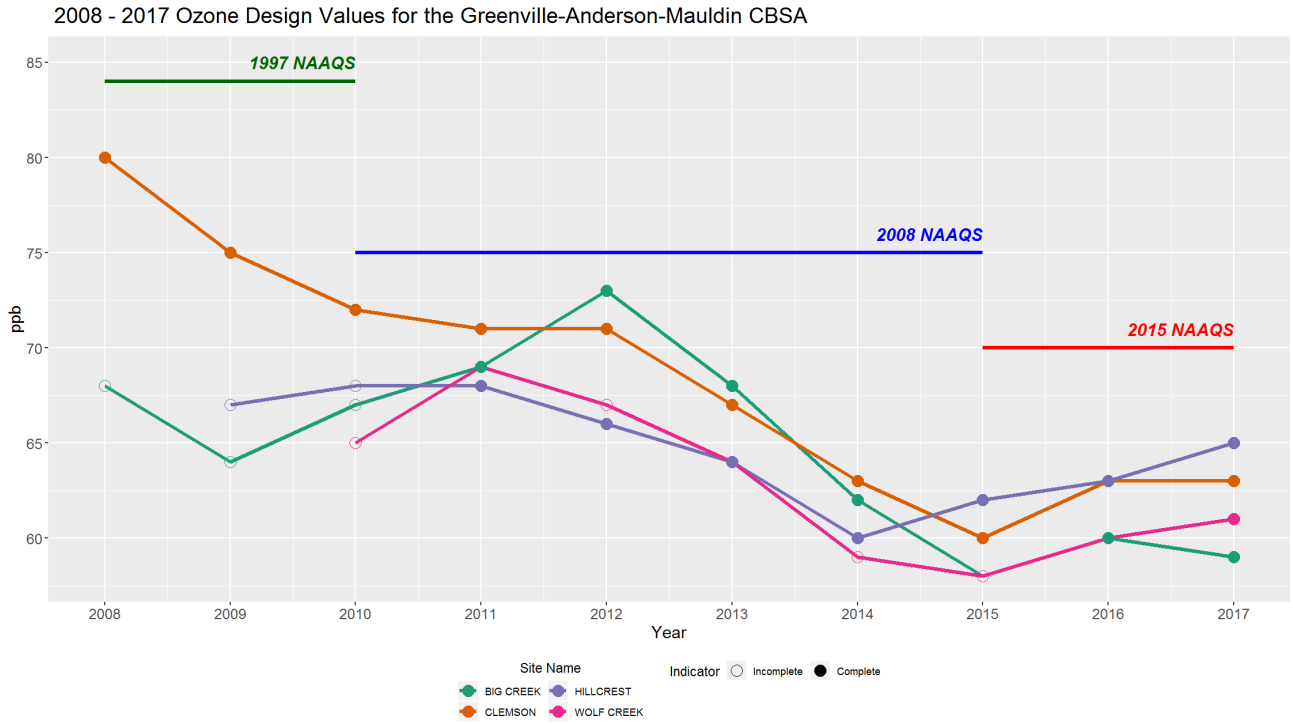
Clemson University offered another property (Garrison Arena (45-007-0006) Monitoring Site) to use as a new monitoring site that is located in neighboring Anderson County, approximately two miles away from the Clemson CMS (45-077-0002) Monitoring Site.

Map 4: Location of Clemson CMS (45-077-0002) Monitoring Site in relation to the Garrison Arena (45-007-0006) Monitoring Site



Since the Clemson CMS (45-077-0002) Monitoring Site must be terminated, the Department wanted to use this opportunity to reduce redundant Ozone monitors and realign the Ozone monitoring network to improve ambient air quality monitoring. In 2018, the Department proposes to terminate the Wolf Creek (45-007-0003) Monitoring Site and the Clemson CMS (45-077-0002) Monitoring Site and establish the Garrison Arena (45-007-0006) Monitoring Site. The Wolf Creek (45-007-0003) Monitoring Site has consistently indicated low Ozone concentrations.

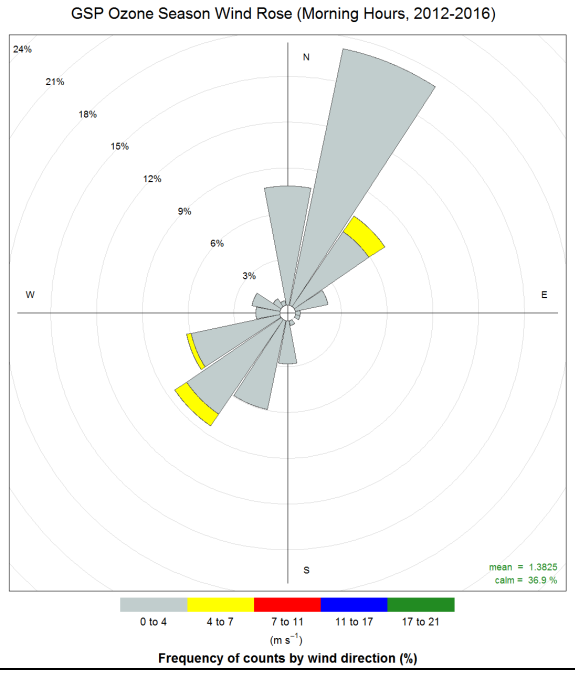
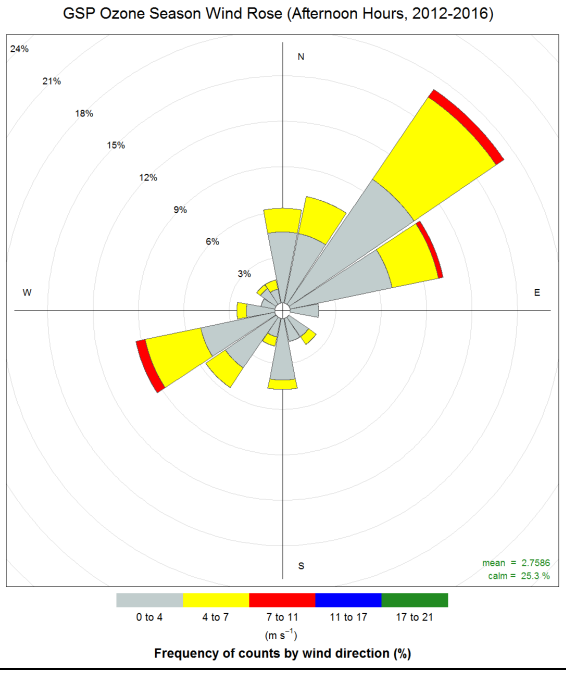
Graph 1: Ozone Design Values for the Greenville-Anderson-Mauldin MSA



The Garrison Arena (45-007-0006) Monitoring Site and the Big Creek (45-007-0005) Monitoring Site would still provide air quality monitoring to the northwest and southeast of Interstate 85.

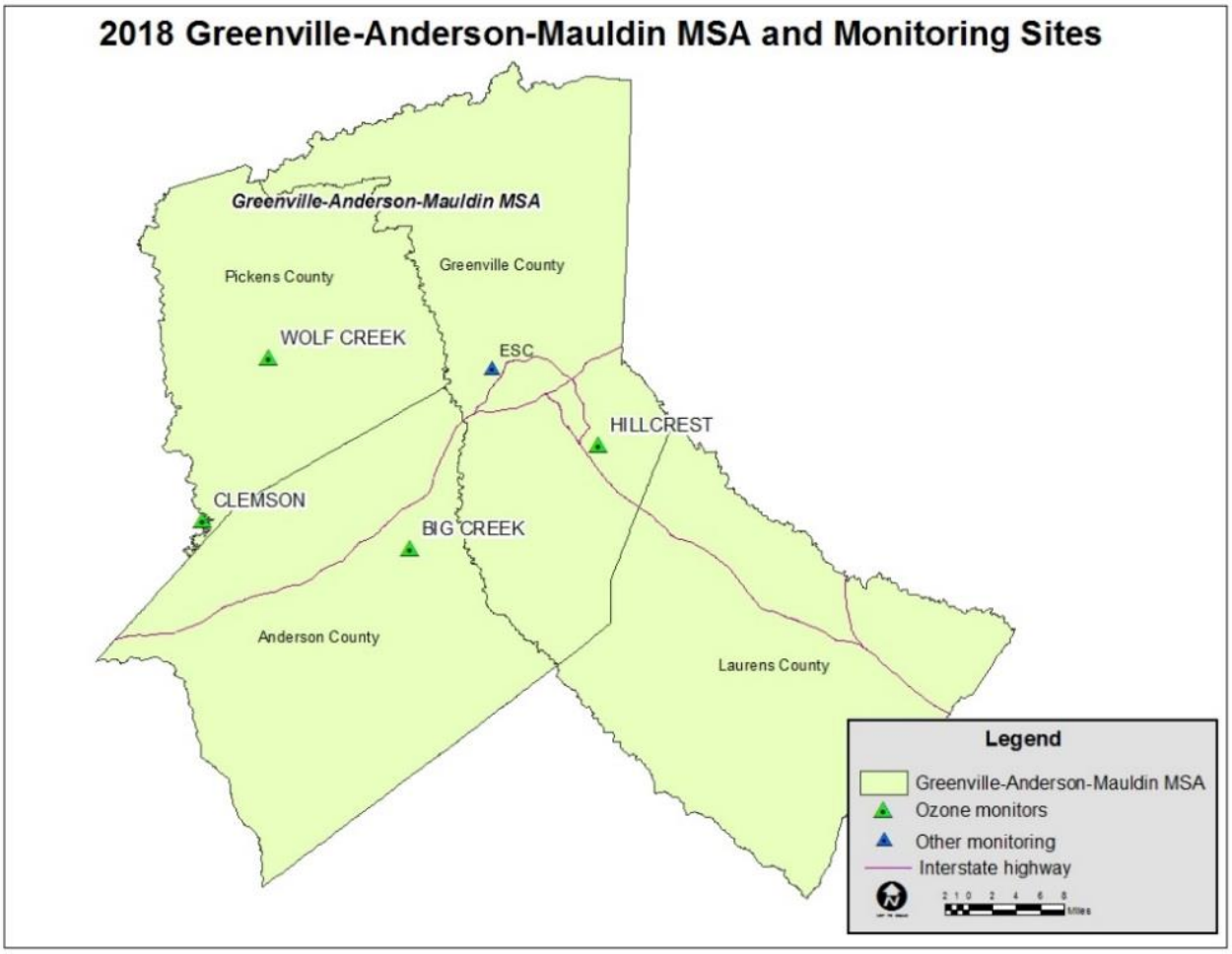
As indicated in the discussion on pages 26-33, the Garrison Arena (45-007-0006) Monitoring Site is in the area of expected maximum concentration. The wind roses show predominate northeast to southwest wind patterns during the afternoon hours.

Table 11: 7-10 A.M. wind roses and 1-4 P.M. wind roses for days of highest Ozone concentrations at the Clemson CMS (45-077-0002) Monitoring Site

Ozone season wind roses for morning hours 7-10 A.M.	Ozone season wind roses for afternoon hours 1-4 P.M.
	

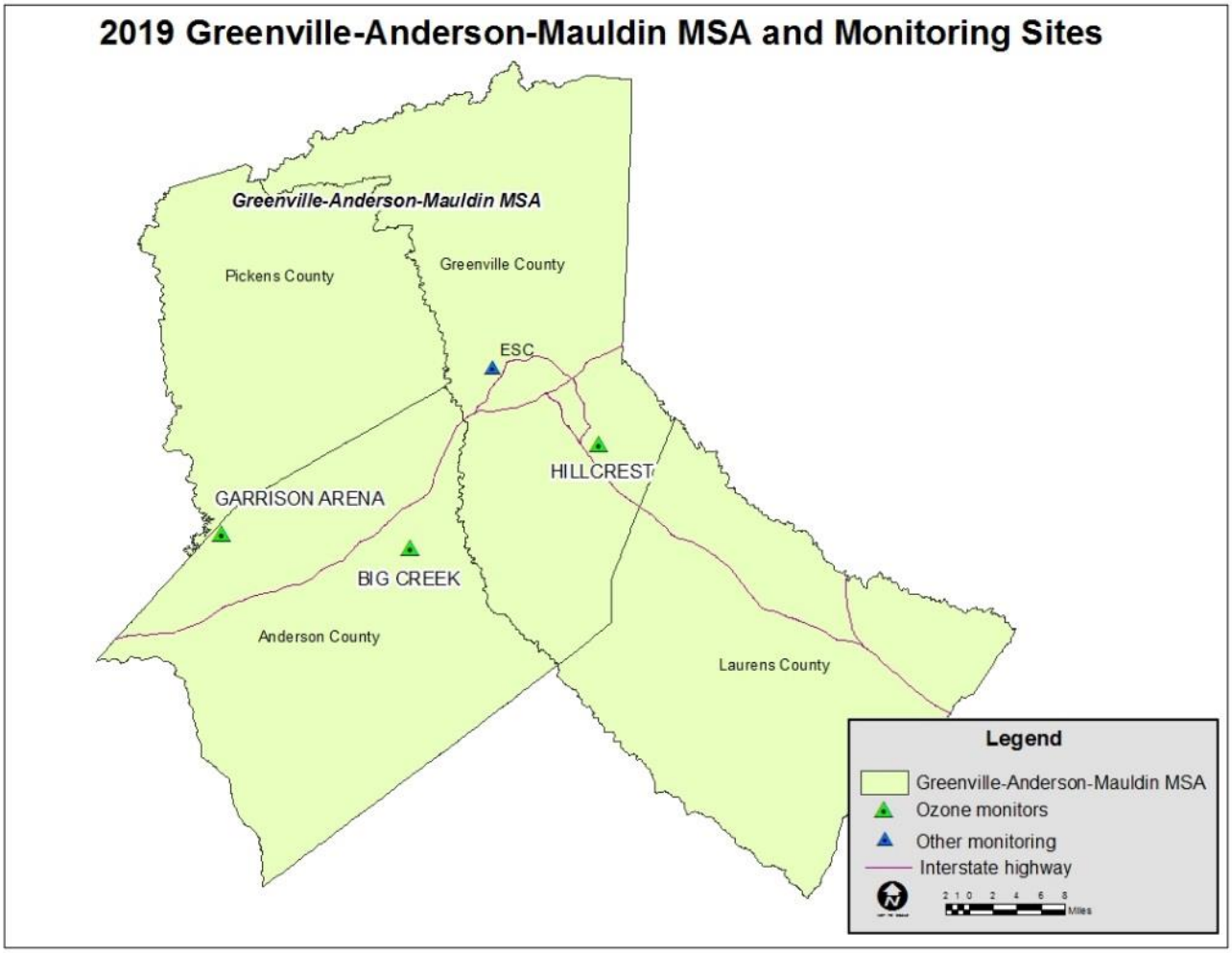
The area of the highest average annual daily traffic count is along the Interstate 85/385 corridor, with the highest annual average daily traffic counts approximately 50 kilometers away.

Map 5: 2018 Greenville-Anderson-Mauldin MSA and Monitoring Sites



In 2019, the Big Creek (45-007-0005) Monitoring Site and the Garrison Arena (45-007-0006) Monitoring Site will be operated simultaneously through the 2019 Ozone season. At the end of the Ozone season, the Department will analyze the data and consider whether to request a termination for the Big Creek (45-007-0005) Monitoring Site.

Map 6: 2019 Greenville-Anderson-Mauldin MSA and Monitoring Sites



Termination of the Clemson CMS (45-077-0002) Site

The Department requests EPA concurrence to terminate the Clemson CMS (45-077-0002) Monitoring Site at the end of the 2018 Ozone season. Staff from Clemson University has asked that the monitor be discontinued and moved off this property.

Details on the Clemson CMS (45-077-0002) Monitoring Site are given below in Table 3.

Table 3: Clemson CMS (45-077-0002) Monitoring Site information

Name	Clemson CMS
Site ID	45-077-0002
Address	106 Hope Well Road, Pendleton/Clemson, South Carolina
County	Pickens
Name of MSA	Greenville-Anderson-Mauldin MSA
Name of CSA	Greenville-Spartanburg-Anderson CSA
Coordinates	+34.65366, -82.83865
Parameter	Ozone
Scale	Urban
Begin Date	July 20, 1979
Objective	General/Background
Designation	SLAMS
Probe Height	4.57
Analysis Method and code	Ultraviolet Absorption (087)
Sampling Frequency	Continuous, hourly
Distance to road	33.9 meters
Distance to drip line	12.3 meters
Distance to nearest obstruction	16.8 meters

Under the 40 CFR Part 58.14, Subpart B-System Modification, Section (c) says, "State, or where appropriate, local agency requests for SLAMS monitor station discontinuation, subject to the review of the Regional Administrator, will be approved if **any** of the following criteria are met and if the requirements of Appendix D to this part, if **any**, continue to be met. Other requests for discontinuation may also be approved on a case-by-case basis if discontinuance does not compromise data collection needed for implementation of a NAAQS and if the requirements of Appendix D to this part, if **any**, continue to be met. The Department examined each of the following criteria.

(c)(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."

As Table 4 indicates, the Clemson CMS (45-077-0002) Monitoring Site does not meet this requirement.

Table 4: Ten percent chance of exceeding 80 percent of the applicable NAAQS

Site Name	2013	2014	2015	2016	2017	Average	Standard Deviation	Upper conf 90	O_3 NAAQS	Condition Met
Clemson CMS	67	63	60	63	63	63	2	65	56	No

(c)(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.

This is not applicable to the Clemson CMS (45-077-0002) Monitoring Site.

(c)(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.

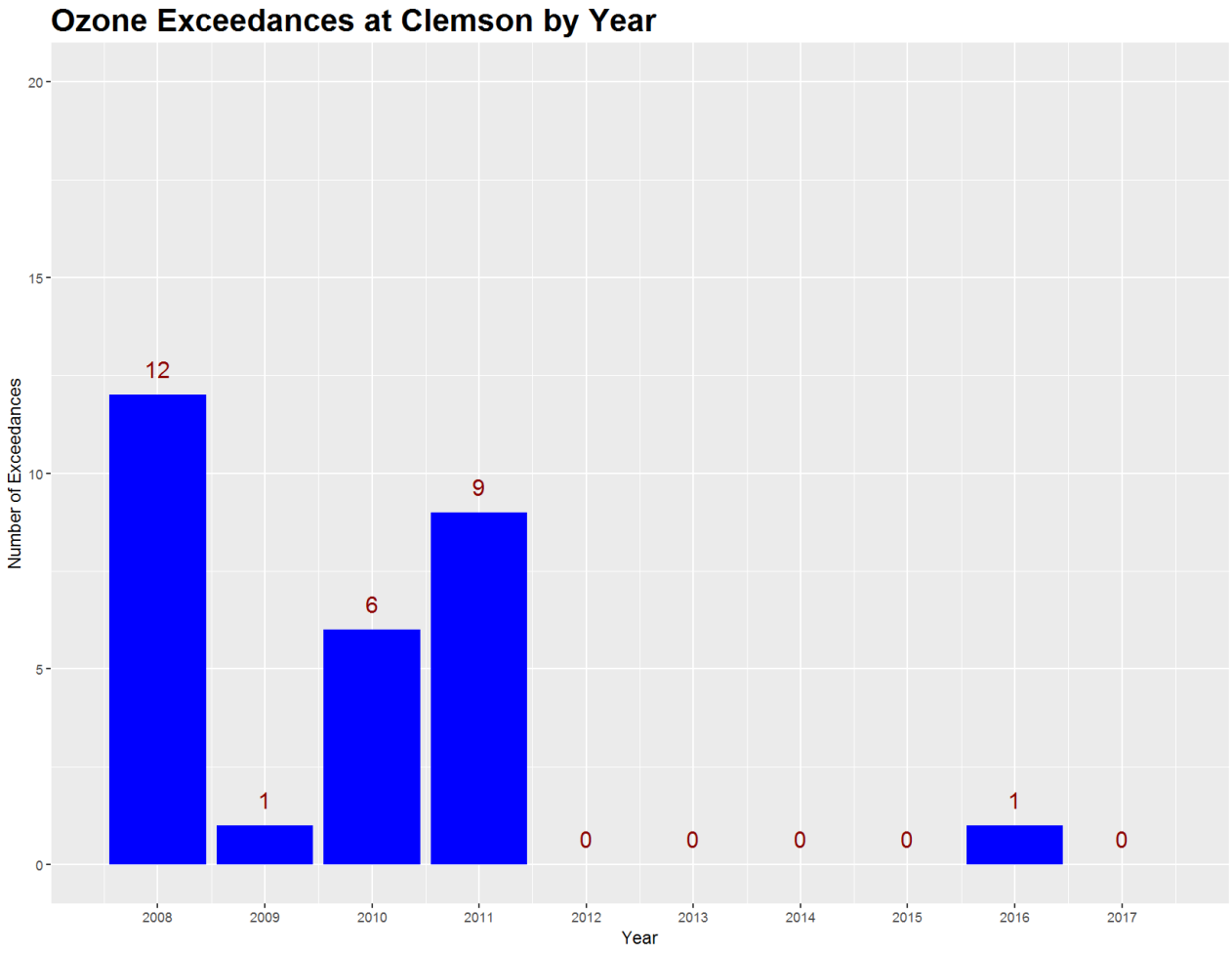
The Clemson CMS (45-077-0002) Monitoring Site does not meet this requirement. As shown in Table 5, the Clemson CMS (45-077-0002) Ozone monitor has not violated the NAAQS 3-year design value.

Table 5: 2013-2017 Ozone Design Values for the Greenville-Anderson-Mauldin MSA

Site Name	**Site ID**	**2013**	**2014**	**2015**	**2016**	**2017**
Big Creek	45-007-0005	0.068	0.062	0.058	0.060	0.059
Hillcrest	45-045-0016	0.064	0.060	0.062	0.063	0.065
Clemson	**45-077-0002**	**0.067**	**0.063**	**0.060**	**0.063**	**0.063**
Wolf Creek	45-077-0003	0.064	0.059	0.058	0.060	0.061

The Clemson CMS monitor has had a violation of daily max data in the previous ten years.

Graph 2: Ozone Exceedances by year at the Clemson CMS (45-077-0002) Monitoring Site



(c)(4) A $PM_{2.5}$ SLAMS monitor which EPA has determined cannot be compared to the relevant NAAQS because of the siting of the monitor, in accordance with §58.30.

This is not applicable to the Clemson CMS (45-077-0002) Monitoring Site.

(c)(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.

The Clemson CMS (45-077-0002) Monitoring Site and the Garrison Arena (45-007-0006) Monitoring Site do not characterize transport.

(c)(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.**

*The Clemson CMS (45-077-0002) Monitoring Site **does** meet this requirement.*

The Clemson University staff has requested that this Monitoring Site be removed from the current property and have worked with the Department to locate and provide another property to establish the Garrison Arena (45-007-0006) Monitoring Site. Therefore, the Department asks for concurrence from the EPA on termination of the Clemson CMS (45-077-0002) Monitoring Site. The replacement site is a suitable location for an Ozone monitor to measure expected maximum concentrations. A wind rose analysis suggests that this location will monitor impacts from both Clemson and Interstate 85, which is similar to the impacts which were seen from the Clemson CMS (45-077-0002) Monitoring Site. On February 8, 2016, the Department submitted a technical justification requesting concurrence to terminate the Clemson CMS (45-077-0002) Monitoring Site.

Termination of the Wolf Creek (45-077-0003) Site

The Department requests EPA concurrence to terminate monitoring at the Wolf Creek (45-077-0003) Monitoring Site at the end of the 2018 Ozone season.

Details on the Wolf Creek (45-077-0003) Monitoring Site are given in Table 6.

Table 6: Wolf Creek (45-077-0003) Monitoring Site information

Name	Wolf Creek
Site ID	45-077-0003
Address	901 Allgood Bridge Road, Pickens, South Carolina
County	Pickens
Name of MSA	Greenville-Anderson-Mauldin
Name of CSA	Greenville-Spartanburg-Anderson CSA
Coordinates	+34.85154, -82.74458
Parameter	Ozone
Scale	Urban
Begin Date	August 10, 2010
Objective	General/Background
Designation	SPM
Probe Height	4.13
Analysis Method and code	Ultraviolet absorption (087)
Sampling Frequency	Continuous, hourly
Distance to road	56.4 meters
Distance to drip line	26.3
Distance to nearest obstruction	none

The Wolf Creek (45-077-0003) Monitoring Site is in rural, central Pickens County. It is an SPM Ozone monitor and has an objective of general/background. This site was a part of the Greenville MSA Ozone study designed to investigate Ozone concentration variability across the Upstate. The Ozone study concluded that the rural, central area of Pickens County had a very low chance of exceeding the Ozone NAAQS. The Department believes that this Ozone monitor is now duplicative. This is an SPM monitor and is not needed (and cannot be used) to meet the Ozone minimum monitoring requirements. The Hillcrest (45-045-0016) and the Garrison Arena (45-007-0006) Monitoring Sites measure both upwind and downwind Ozone concentrations for the Greenville-Anderson-Mauldin MSA.

As Table 7 indicates, for four of the last five years, the Wolf Creek monitor has had the lowest design values in the Greenville-Anderson-Mauldin MSA. In 2017, it was the second lowest.

Table 7: 2013-2017 Ozone Design Values for the Greenville-Anderson-Mauldin MSA

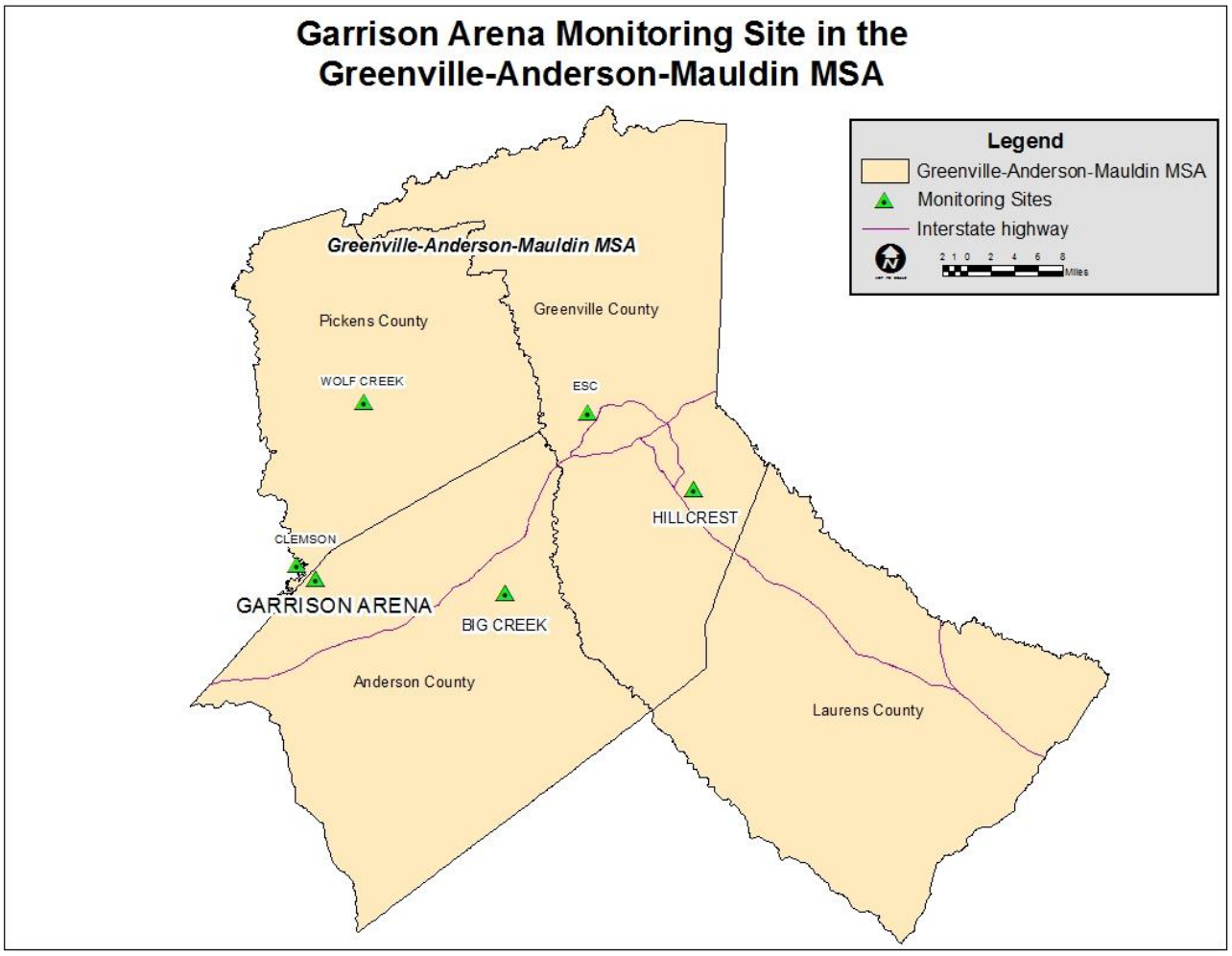
Site Name	Site ID	2013	2014	2015	2016	2017
Big Creek	45-007-0005	0.068	0.062	0.058	0.060	0.059
Hillcrest	45-045-0016	0.064	0.060	0.062	0.063	0.065
Clemson	45-077-0002	0.067	0.063	0.060	0.063	0.063
Wolf Creek	45-077-0003	**0.064**	**0.059**	**0.058**	**0.060**	0.061

Therefore, the Department is informing the EPA that the Wolf Creek (45-077-0003) Monitoring Site is considered duplicative and will be terminated at the end of the 2018 Ozone season.

Establishment of the Garrison Arena (45-007-0006) Monitoring Site

The Department requests EPA concurrence to establish the Garrison Arena (45-007-0006) Monitoring Site. The Garrison Arena (45-007-0006) Monitoring Site is located on the grounds of Clemson University at the T. Ed Garrison Arena near the northern border of Anderson County.

Map 7: Garrison Arena (45-007-0006) Monitoring Site



This Site monitors for Ozone and has an objective of maximum concentration and upwind background on the urban scale for the western Upstate. The designation of the monitor is a SLAMS. This monitor will meet all siting requirements of 40 CFR Part 58 Appendices A, C, D, and E.

Map 8: Arial map of the Garrison Arena (45-007-0006) Monitoring Site

Details on the Garrison Arena (45-007-0006) Monitoring Site are given in Table 8 below.

Table 8: Garrison Arena (45-007-0006) Monitoring Site information

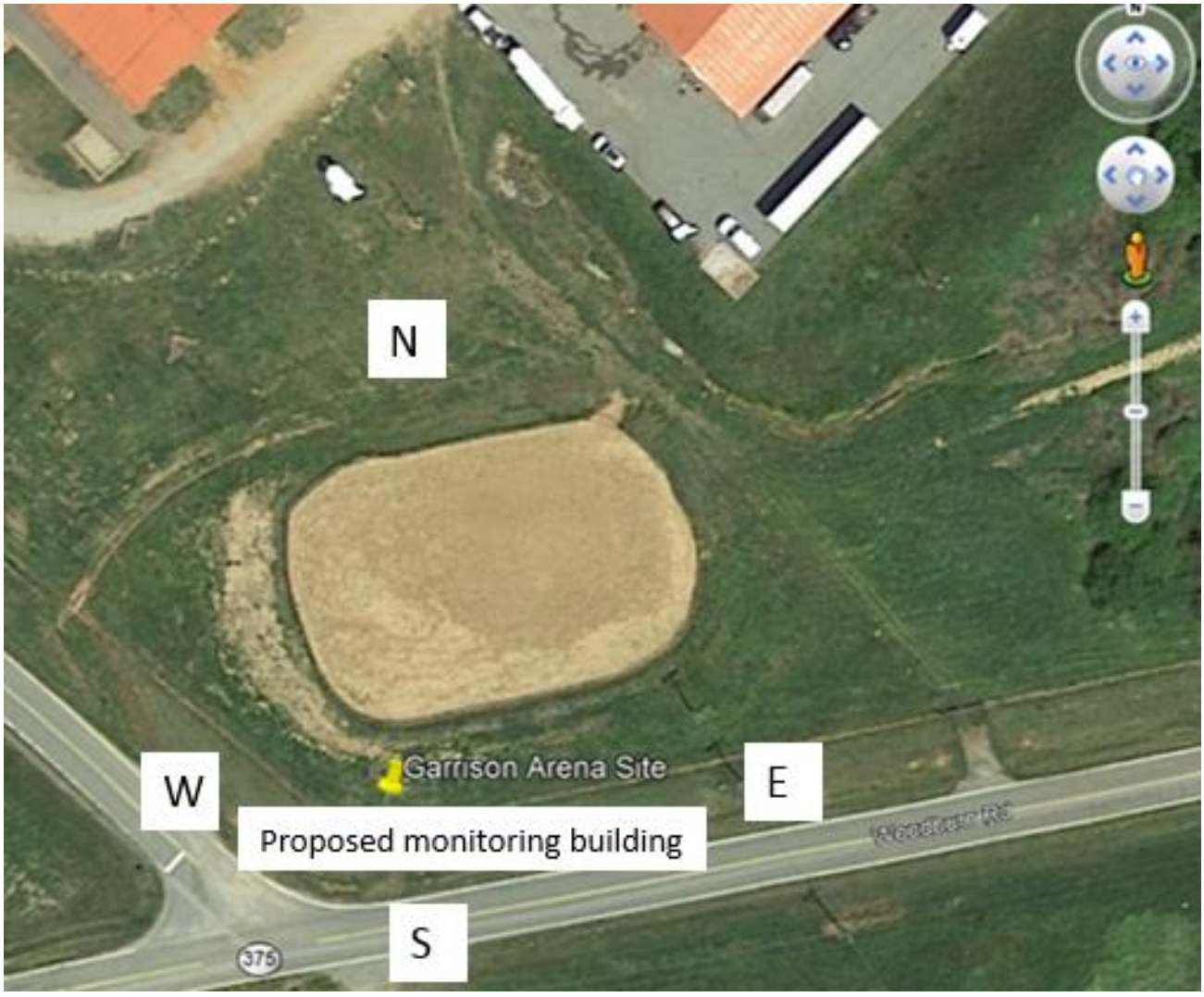
Name	Garrison Arena
Site ID	45-007-0006
Address	Woodburn Road, Pendleton, South Carolina
County	Anderson
Name of MSA	Greenville-Anderson-Mauldin MSA
Name of CSA	Greenville-Spartanburg-Anderson CSA
Coordinates	34.636, - 82.810
Parameter	Ozone

Scale	Urban
Objective	Maximum Concentration/Upwind Background
Designation	SLAMS
Probe Height	~ 4.0 meters
Analysis Method and code	Ultraviolet Absorption (087)
Sampling Frequency	Continuous
Distance to road	~ 23 meters
Distance to drip line	~ 42 meters
Distance to nearest obstruction	~ 91 meters away (~15 m tall_

Photographs and data from the proposed new Site

Map 9 below shows an aerial photograph of the Garrison Arena (45-007-0006) Monitoring Site.

Map 9: Aerial photograph of Garrison Arena (45-007-0006) Monitoring Site



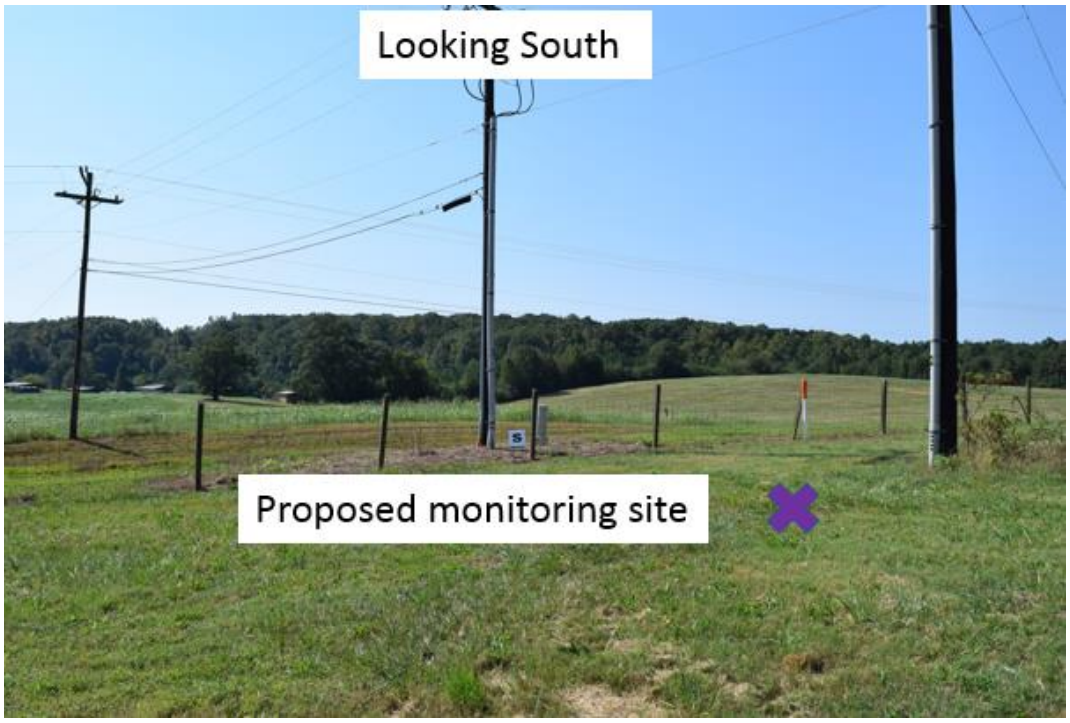
Pictures 1 and 2 show the new Site from the north and east.

Picture 1: Looking north

Picture 2: Looking east

Pictures 3 and 4 show the new Site from the south and west.

Picture 3: Looking south



Picture 4: Looking west

Picture 5 shows the closest possible obstructions.

Picture 5: Closest possible obstructions

Table 9 indicates that the northeast pine tree is not an obstruction.

Table 9: Possible Obstructions

Para-meter	Obstruction Description (include compass direction)	Obstruction Distance (m)	Obstruction Height (m)	Monitor Height (m)	Obstruction Hgt - Monitor Hgt (m) = Correction	X 2	Pass/ Fail
Ozone	83º Brush (drip line)	42.8	4.8	~4	.8	1.6	Pass
Ozone	71º Tree	91	15	~4	11	22	Pass
40 CFR Appendix E to Part 58, Part 4a-The distance from the obstacle to the probe must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path.							
If Obstruction Distance (Column 3) is greater than Obstruction Hgt-Monitor Height x 2 (Column 7), the obstruction passes. If Obstruction Distance (Column 3) is less than Obstruction Hgt-Monitor Height x 2 (Column 7), the obstruction fails.							

Choosing the Site

The required objectives for the new site are to measure the maximum Ozone concentration and the upwind background on an urban scale. To determine if this Site met those qualifications, the recommendations from the "Guideline on Ozone Monitoring Site Selection[1]" document were consulted and applied. The guidance document stated the following to find the area of maximum Ozone concentration:

- The area with the highest population taken from the latest United States Census data is used to find the area that will represent the maximum Ozone in the region.
- The monitor should be located on the urban fringe in a suburb slightly downwind of the urban area.
- Maximum Ozone concentration usually occurs 4 to 6 hours after maximum emissions, and under conditions of light winds, usually downwind of the urban region.
- For maximum Ozone concentration, use the afternoon (1-4 PM) prevailing wind direction and wind speed.

The guidance document also stated the following to find the area of upwind background exposure:

- The area with the highest population taken from the latest United States Census data is used to find the area that will represent the upwind background in the region.
- Upwind monitors should be located along the trajectory of the morning prevailing wind direction (7-10 A.M.). The prevailing wind directions should be determined from wind rose plots of days where high concentrations of Ozone are measured, or days conducive to Ozone formation.
- The most recent Traffic Counts and National Emissions Inventory are used to find the area(s) of highest emissions.

Following these guidelines, first, the predominant wind directions (wind roses) using data from the Greer and Clemson weather station were generated to see if the Monitoring Site was in the general trajectory of the predominant wind directions. Then, the 2012-2016 days with the highest Ozone concentrations from Clemson CMS (45-077-0002) Monitoring Site were pulled. Morning (7-10 A.M.) and afternoon wind roses (1-4 P.M.) were created to determine the predominant wind directions during days with the highest Ozone concentrations. After this, the latest population from the United State Census Bureau was mapped and the locations of maximum population were found. Also, the latest traffic counts from the South Carolina Department of Transportation were used to locate the areas with the highest annual average daily traffic (AADT) counts and the Title V facilities emissions were mapped to find the highest industrial NO_x emissions. The area of highest population and highest traffic emissions are located near the Interstate 85/385 exchange in Greenville County. This area of highest population and emissions is approximately 50 kilometers (31 miles as measured by Google Earth) from the Garrison Arena (45-007-0006) monitoring site and is in the prevailing direction of the wind.

[1] Environmental Protection Agency, *Guideline on Ozone Monitoring Site Selection*, Office of Air Quality Planning and Standards-Emissions, Monitoring, and Analysis Division, (Research Triangle Park, NC 27711, August 1998).

After consideration of all of the information, it has been determined that the Garrison Arena (45-007-0006) Monitoring Site is located so it will measure the maximum Ozone concentration and the upwind background on an urban scale.

Meteorology for the Greenville-Anderson-Mauldin MSA

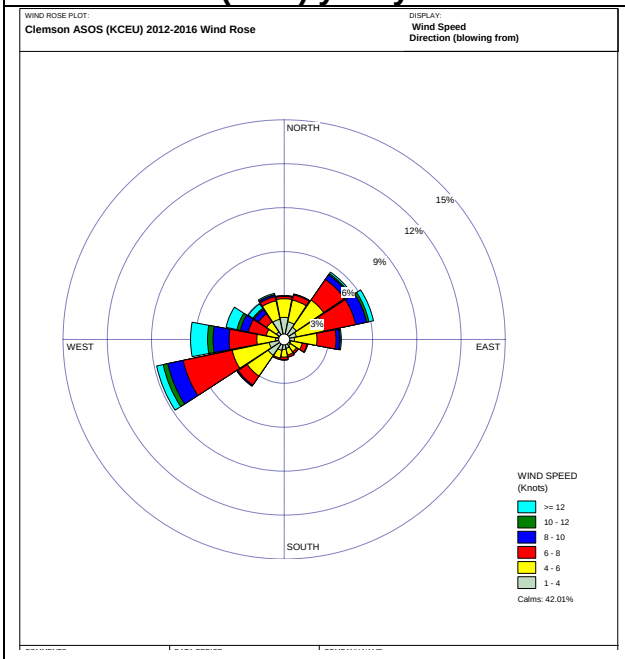
The first question asked was, “Are the Garrison Arena (45-007-0006) and the Clemson CMS (45-077-0002) Monitoring Site areas similar so the data can be compared? The existing Clemson Ozone monitor is currently situated in the lower terrain of the Upper Savannah River Valley about 100 meters from Lake Hartwell. Although the proposed location at the Garrison Arena is located further from Lake Hartwell (by about 2 kilometers), the terrain and land use upwind and in the vicinity of (the) Garrison Arena (45-007-0006) Monitoring Site are very similar to the area at the Clemson CMS (45-077-0002) Monitoring Site.

The Department’s meteorologists did a meteorological analysis for the Garrison Arena (45-007-0006) and the Clemson CMS (45-077-0002) Monitoring Sites. Using information from the Clemson (CEU), Greer (GSP), Anderson (AND), and the Downtown Greenville (GMU) weather stations, the 2012-2016 wind roses were created and compared to determine which weather station gave a more accurate depiction of the local area. As can be seen in Table 10, all of the wind roses showed similar wind patterns. Therefore, the GSP and the CEU wind roses were chosen to represent the area since these weather stations were the closest to the Garrison Arena (45-007-0006) and Clemson CMS (45-077-0002) Monitoring Sites.

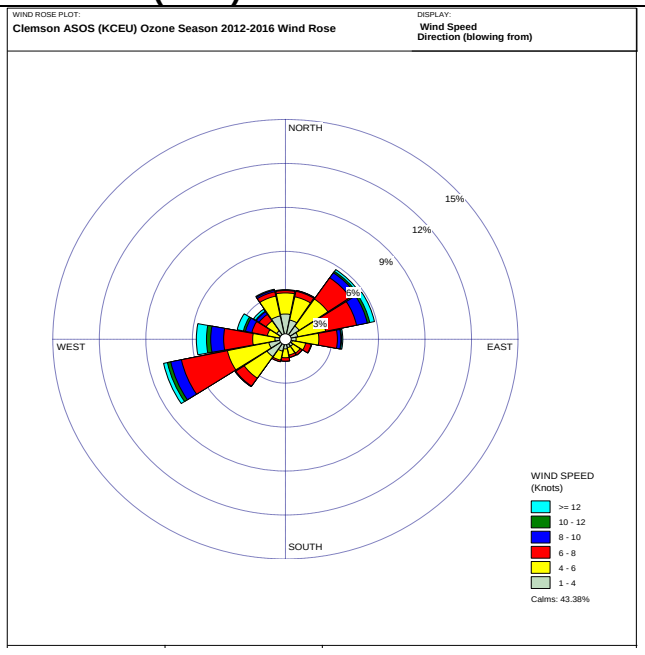
The Department's meteorological conclusions are as follows: Both the annual and Ozone season wind roses for CEU show a depiction of the airflow in the area that is similar to GSP. Wind directions, however, are slightly rotated in more of an east-northeast and west-southwest dominant orientation. This slight rotation in wind sectors is likely due to the curving of the steepest mountain terrain (escarpment) along the border or North and South Carolina, which is at the southernmost extent of the Appalachian Mountains.

Table 10: 2012-2016 wind roses for Greenville-Anderson-Mauldin MSA

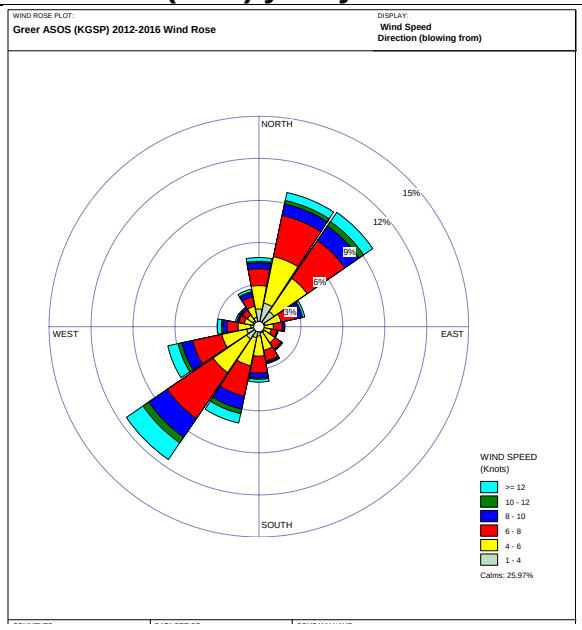
Clemson (CEU) yearly wind rose



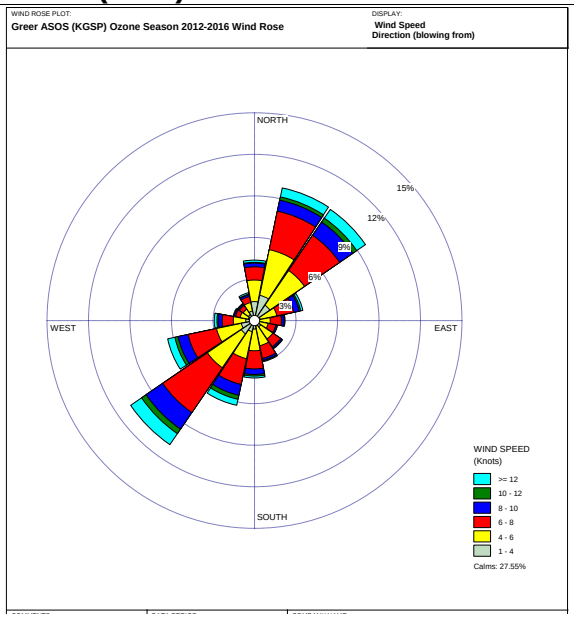
Clemson (CEU) Ozone season wind rose



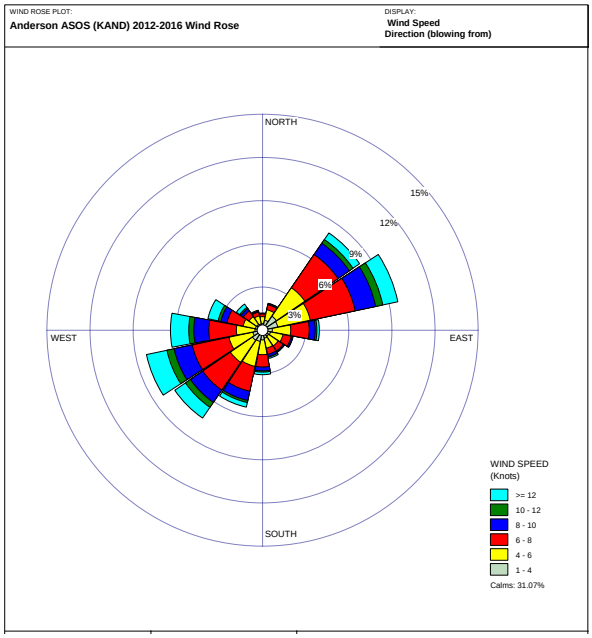
Greer (GSP) yearly wind rose



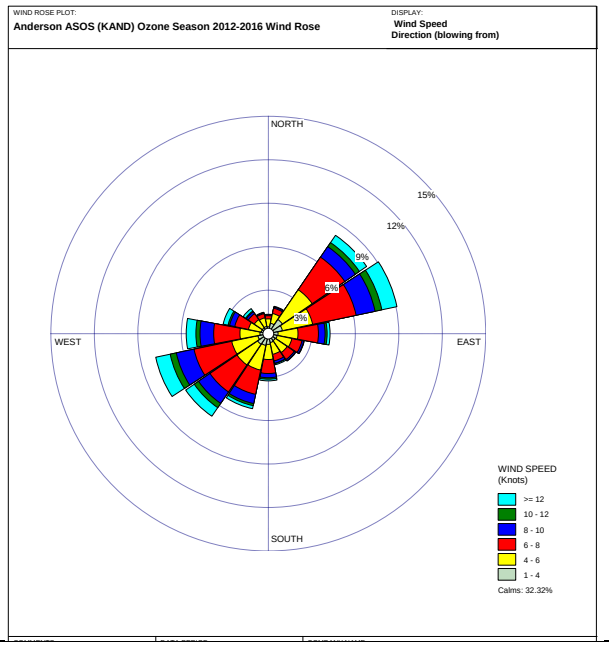
Greer (GSP) Ozone season wind rose



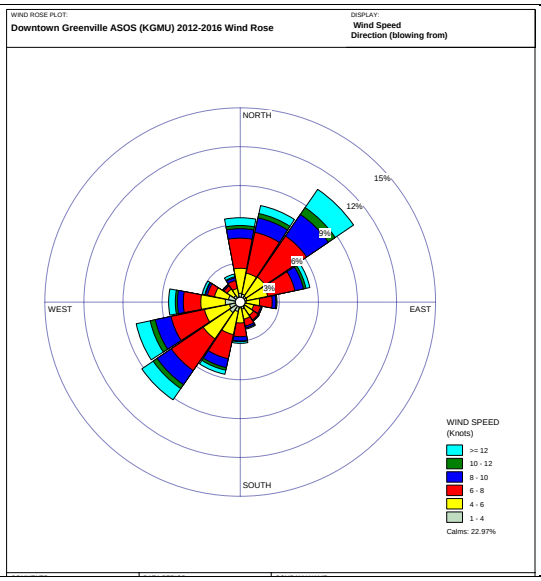
Anderson (AND) yearly wind rose



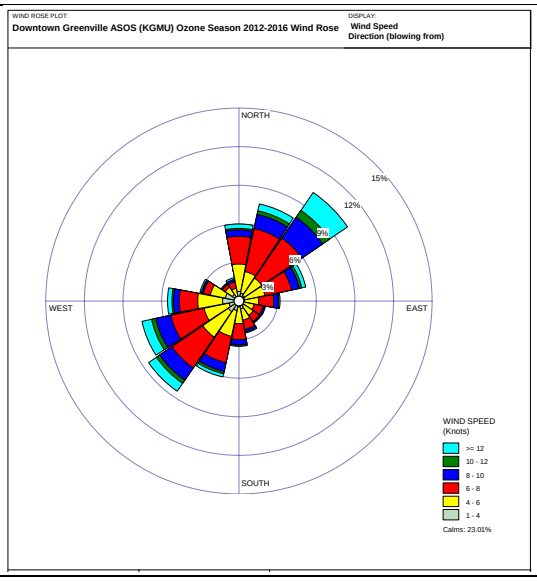
Anderson (AND) Ozone season wind rose



Downtown Greenville (GMU) yearly wind rose



Downtown Greenville (GMU) Ozone season wind rose



With terrain contours oriented more east-northeast to west-southwest at CEU, wind directions follow that same general pattern for the flow of air around the mountains. It is also important to note that the distance to the escarpment along the North and South Carolina borders are about 30 kilometers from both CEU and GSP ASOS locations. The distance of the Greenville Metro area and the Clemson Ozone monitor is likewise about 30

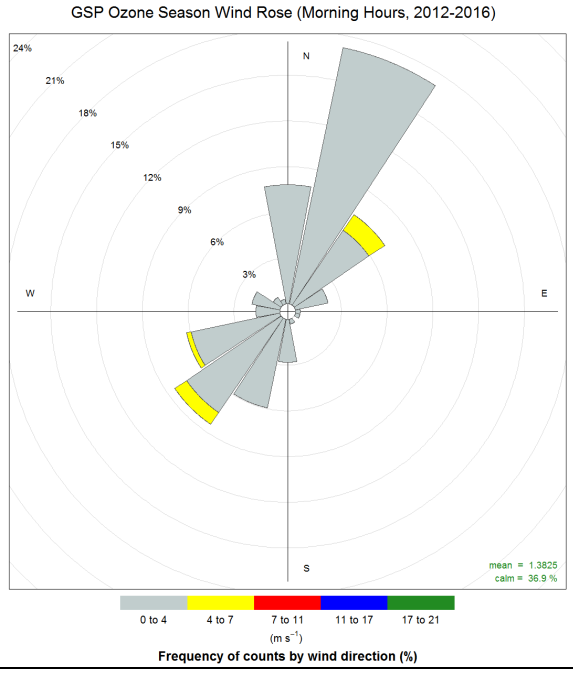
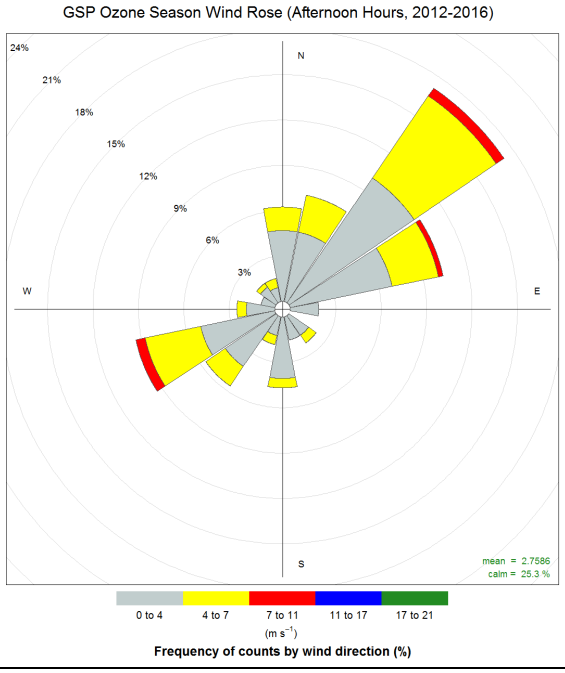
kilometers to the escarpment in the northwest and north-northwest direction at its closest point.

Wind speeds are quite a bit lower at CEU (3.38 knots average annual and 3.07 knots during Ozone season) than wind speeds at GSP. Wind speeds are reduced, and more calms are reported (slightly above 40% of the time) at CEU due to hillier terrain in the vicinity of Clemson. However, wind speeds at higher altitudes (transport wind speeds) are likely similar to transport wind speeds at GSP due to the lack of wind flow interference with terrain at higher altitudes.

Therefore, it was concluded that, although there are some minor differences between CEU and GSP, the wind roses indicate that the Garrison Arena (45-007-0006) Monitoring Site lies in the trajectory of both the general prevailing morning and afternoon wind directions (see Map 9).

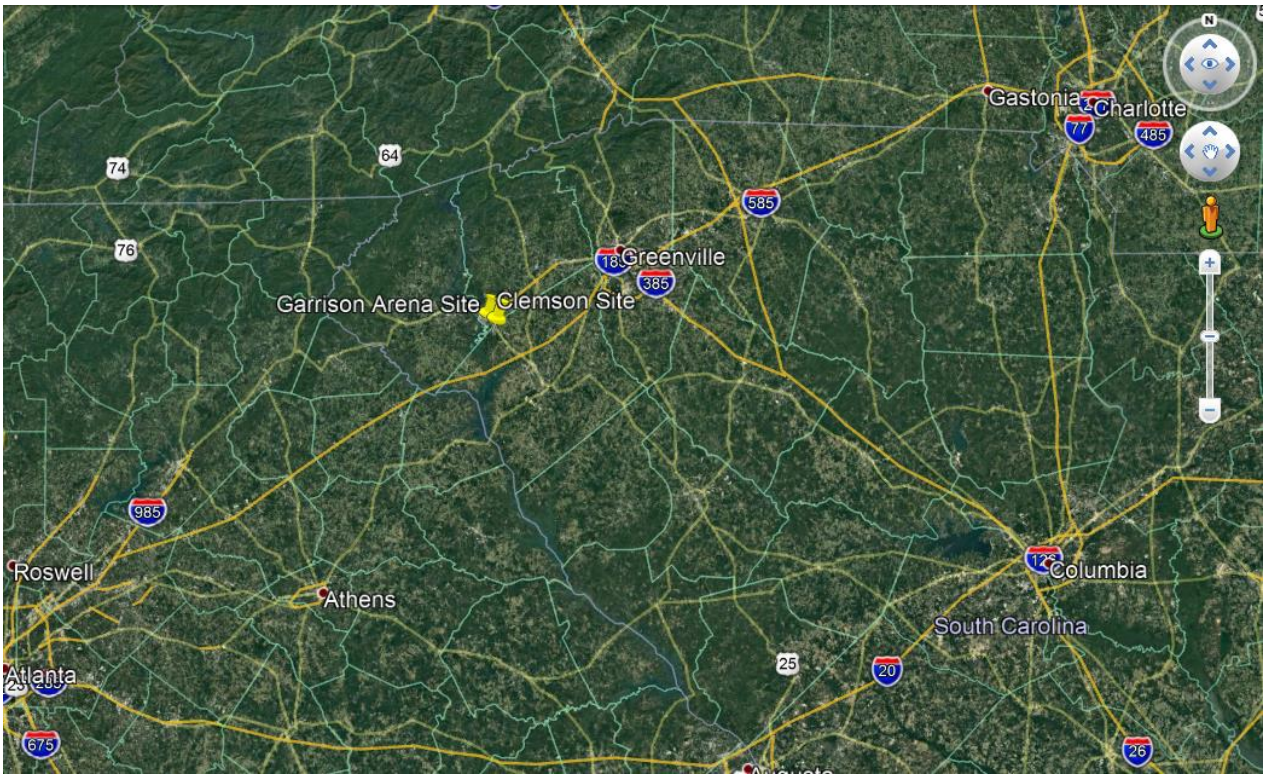
Then, the dates that had the highest concentrations of Ozone from the Clemson CMS (45-077-0002) Monitoring Site were determined and wind data from GSP was retrieved for those days. A wind rose for the morning hours from 7 to 10 A.M. (for upwind background) and one for the afternoon hours from 1 to 4 P.M. (for maximum Ozone concentration) were created (Table 11).

Table 11: 7-10 A.M. wind roses and 1-4 P.M. wind roses for days of highest Ozone concentrations at the Clemson CMS (45-077-0002) Monitoring Site

Ozone season wind roses for morning hours 7-10 A.M.	Ozone season wind roses for afternoon hours 1-4 P.M.
	

On the days that had the highest Ozone concentrations, both the morning and afternoon wind roses exhibited similar northeast to southwest wind patterns, with the morning predominant wind direction showing a more north-northeast wind direction. In the afternoon, the wind patterns slightly "flattened out". When the wind roses for the days of highest Ozone concentration (Table 11) are compared to Map 10 below, it was determined that the Garrison Arena (45-007-0006) Monitoring Site is in the prevailing trajectory of the morning and afternoon winds for the Greenville area.

Map 10: Garrison Arena Monitoring Site in relation to Atlanta and Charlotte

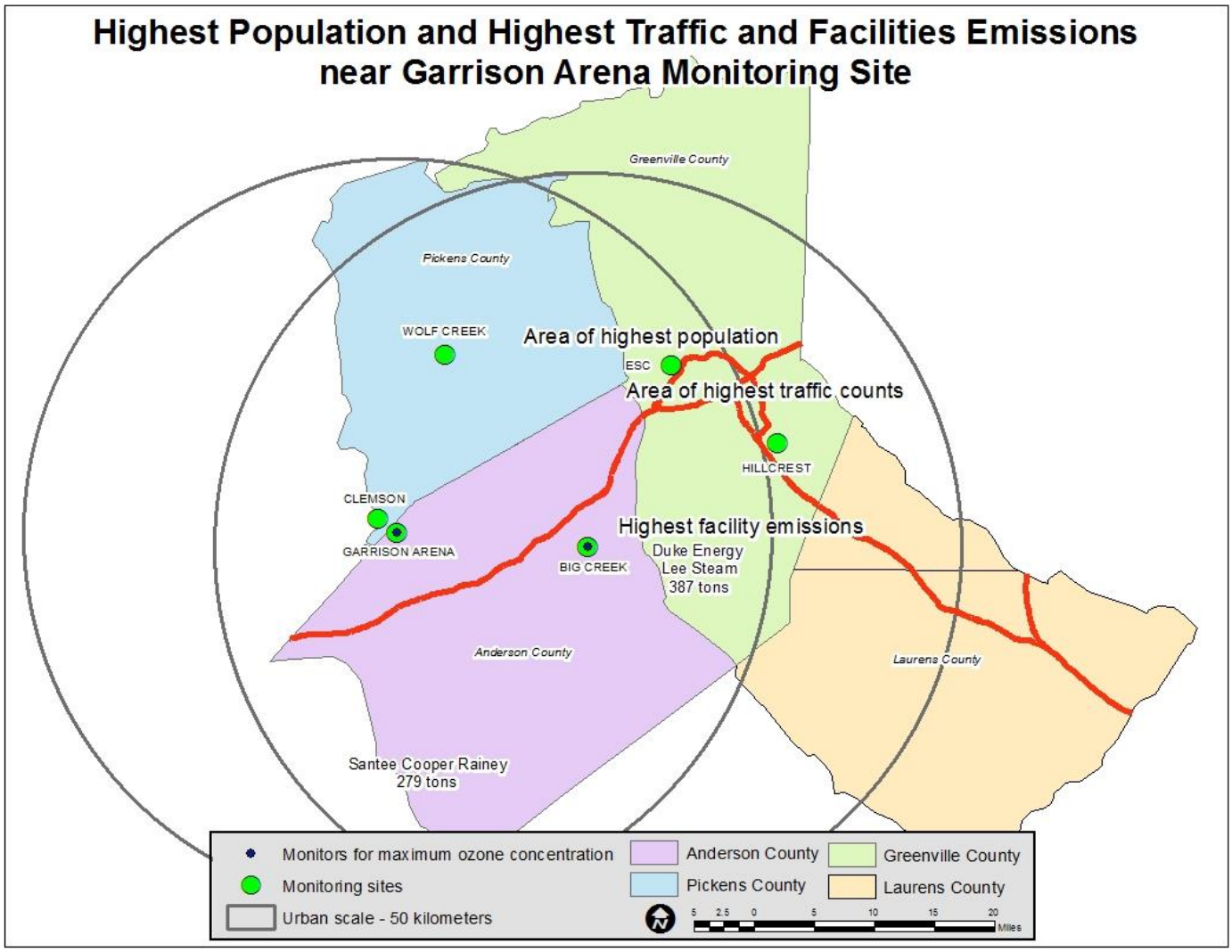


Also, since the Garrison Arena (45-007-0006) Monitoring Site is located along the trajectory of the morning prevailing wind direction, the monitor should be able to fulfill the upwind background objective.

To determine if the air mass that passes through the Garrison Arena (45-007-0006) Monitoring Site could be used to fulfill the objective of maximum Ozone concentration, the population, traffic emissions (AADT), and facility emission sources were mapped to determine the Ozone precursor concentration.

As seen in Map 11 below, the area of highest population and highest traffic emissions are located near the Interstate 85/385 exchange in Greenville County. This area of highest population and emissions is approximately 50 kilometers (31 miles as measured by Google Earth) from the Garrison Arena (45-007-0006) monitoring site and is in the prevailing direction of the wind.

Map 11: Highest population, traffic, and facilities near Garrison Arena (45-007-0006) Monitoring Site



The guidance document states that the maximum Ozone concentration usually occurs 4-6 hours after maximum emissions under a light wind. To determine if the Garrison Arena (45-007-0006) Monitoring Site would experience maximum Ozone concentrations, the average wind speed was multiplied by 4 (hours) and 6 (hours). From April through October, the majority of wind speeds were 0-4 knots or up to 4.6 miles per hour, with calm winds representing 25.3 percent of the wind speeds. This gives a range of 18.4 to 27.6 miles per

hour. The Garrison Arena (45-007-0006) Monitoring Site is approximately 31 miles southwest from the highest population and highest annual average daily traffic area. Therefore, the Garrison Arena (45-007-0006) Monitoring Site is in an area that would receive maximum Ozone concentration.

Since the Garrison Arena (45-007-0006) Monitoring Site is located along the trajectory of the morning prevailing wind direction and is able to fulfill the upwind background objective and is located in the afternoon prevailing wind direction in an area that should receive maximum Ozone concentration, the Department asks for concurrence from the EPA on the establishment of the Garrison Arena (45-007-0006) Monitoring Site.

Establishment of the Moncks Corner National Guard (45-015-1002) Monitoring Site

The Department requests EPA concurrence to establish the Moncks Corner National Guard (45-015-1002) Monitoring Site to replace the Bushy Park Pump Station (45-015-0002) Monitoring Site. The Moncks Corner National Guard site is located in Moncks Corner downwind from the Charleston urban area. This site monitors for Ozone with a designation of SLAMS and a monitoring objective of maximum Ozone concentration. This monitor will meet all siting requirements of 40 CFR Part 58 Appendices A, C, D, and E.

Details on the Moncks Corner National Guard (45-015-1002) Monitoring Site are given in Table 12.

Table 12: Moncks Corner National Guard Monitoring Site information

Name	Moncks Corner National Guard
Site ID	45-015-1002
Address	320 Airport Drive and Wal Flo Lane, Moncks Corner, South Carolina 29461
County	Berkeley
Name of MSA	Charleston-North Charleston MSA
Name of CSA	none
Coordinates	33.18, -80.03
Parameter	Ozone
Scale	Urban
Objective	Maximum Ozone Concentration
Designation	SLAMS
Probe height	~ 4.0 meters
Analysis method and code	Ultraviolet Absorption (087)
Sampling frequency	Continuous
Distance to road	~ 177 meters
Distance to drip line	~ 20.4 meters
Distance to nearest obstruction	~ 27.3 meters

History of the Bushy Park Pump Station (45-015-0002) Monitoring Site

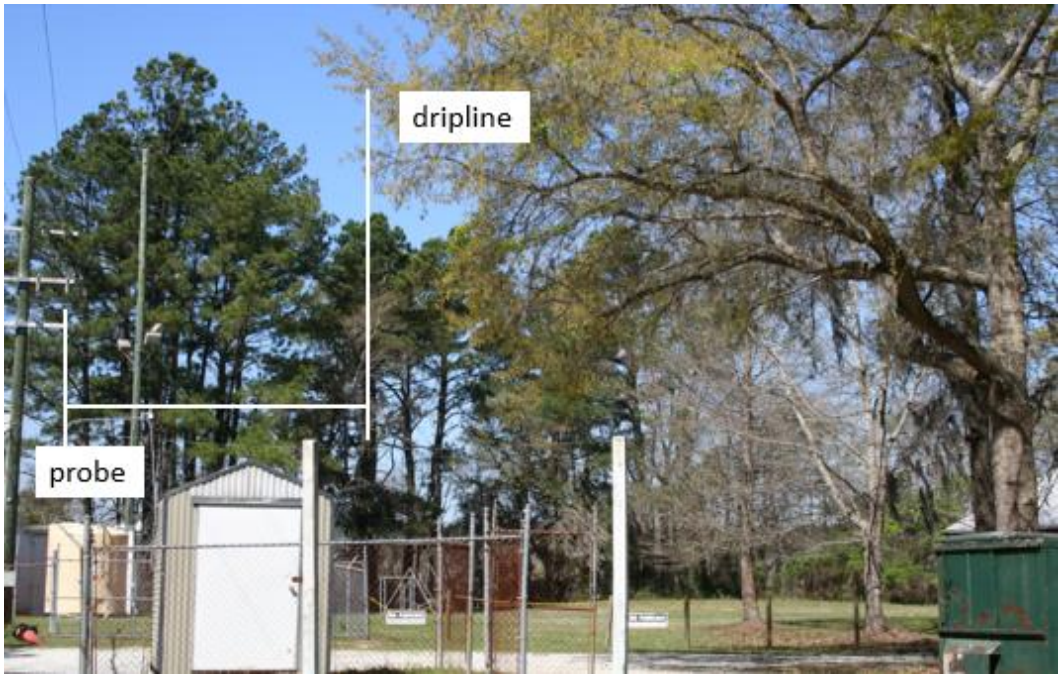
The Moncks Corner National Guard (45-015-1002) Monitoring Site is a replacement for the Bushy Park Pump Station (45-015-0002) Monitoring Site. The Bushy Park Pump Station (45-015-0002) Monitoring Site was established in Berkeley County on July 20, 1978 in a recreational area owned by the Bushy Park Industrial Complex with an objective to measure the maximum Ozone concentration.

In the last 40 years, the trees in this area have grown and are causing obstructions to the North and to the South. The owner does not want to cut or remove the trees.

Picture 6: Bushy Park Pump Station (45-015-0002) Monitoring Site picture

As Picture 7 indicates, there is a tree to the north that towers over the Monitoring Site and has a drip line 4 meters from the probe.

Picture 7: Drip line issue to the north of Bushy Park Pump Station (45-015-0002) Monitoring Site



The tree to the north is large and cannot be adequately trimmed or cut down.

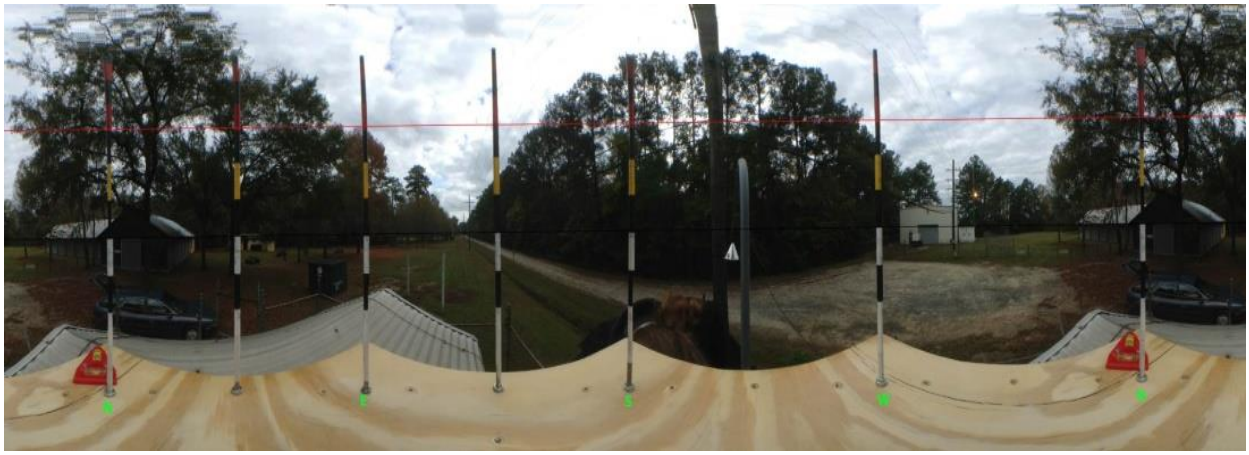
Picture 8: Tree to the north of the Monitoring Site

As seen in Picture 9, there is also a line of trees to the south that is over 275 meters long and runs toward the main highway. The closest tree drip line to the south is 11.8 meters. These trees are obstructions.

Picture 9: Line of trees to the south of the Monitoring Site

40 CFR Part 58 Appendix E, Section 4(a) requires that the distance from the obstacle (such as a tree) to the probe inlet must be at least twice the height that obstacle protrudes above the probe inlet. A horizontal red line has been added to Picture 10 (below) to mark an angle of approximately 26 degrees, indicating the limit of the requirement in Section 4(a) concerning spacing from obstructions and height above the monitor probe.

Picture 10: Bushy Park Pump Station (45-015-0002) Monitoring Station Panorama



If the top of an object is above the top red line in the picture, then it does not meet the Section 4(a) requirements. As can be seen in Picture 10, numerous trees in almost all directions do not meet this requirement. This area is a recreational park and the extent of the tree growth surrounding Bushy Park Pump Station (45-015-0002) Monitoring Site is too great to remedy by trimming or removing the trees.

Because of the obstruction and drip line issues, the Department has decided to replace the Bushy Park Pump Station (45-015-0002) Monitoring Site with a site that can meet all of the siting requirements of 40 CFR Part 58 Appendices A, C, D, and E.

Choosing the Site

The Charleston-North Charleston MSA is comprised of the Charleston, Berkeley and Dorchester Counties in South Carolina. This MSA currently has an Ozone monitor at the Bushy Park Pump Station (45-015-0002) Monitoring Site in Berkeley County with an objective of measuring the maximum Ozone concentration and an Ozone monitor at the Cape Romain (45-019-0046) Monitoring Site in Charleston County with an objective of measuring for general/background.

The number of Ozone monitors in an MSA needed to meet the minimum monitoring requirements is based on the population and emission sources. According to the estimated 2017 United States Census Bureau, the Charleston-North Charleston MSA has a population of 775,831 people. Ozone monitoring network requirements for this size population (from 350,000 to less than 4 million people) states that one monitor is needed for an area that has a most recent 3-year design value concentration less than or equal to

85 percent of any Ozone National Ambient Air Quality Standard (NAAQS) or two monitors for an area that has the most recent 3-year design value concentration greater than or equal to 85 percent of any Ozone NAAQS, which is 0.0595 ppm. The highest 2017 Ozone design values for the Charleston MSA was 0.059 ppm at the Cape Romain Monitoring Site. Since the highest 3-year Ozone design value was under 85 percent of the Ozone NAAQS, the Charleston-North Charleston MSA is required to have one Ozone monitor.

Because the Bushy Park Pump Station (45-015-0002) Monitoring Site was used to fulfill the regulatory requirement that "Within an O_3 network, at least one O_3 site for each MSA. . . must be designed to record the maximum concentration for that particular metropolitan area", the replacement station has to also fulfill this requirement. To locate the maximum Ozone concentration for the Charleston MSA, the “Guideline to Ozone Monitoring Selection” document[2] was used.

The guidance document stated the following to find the area of maximum Ozone concentration:

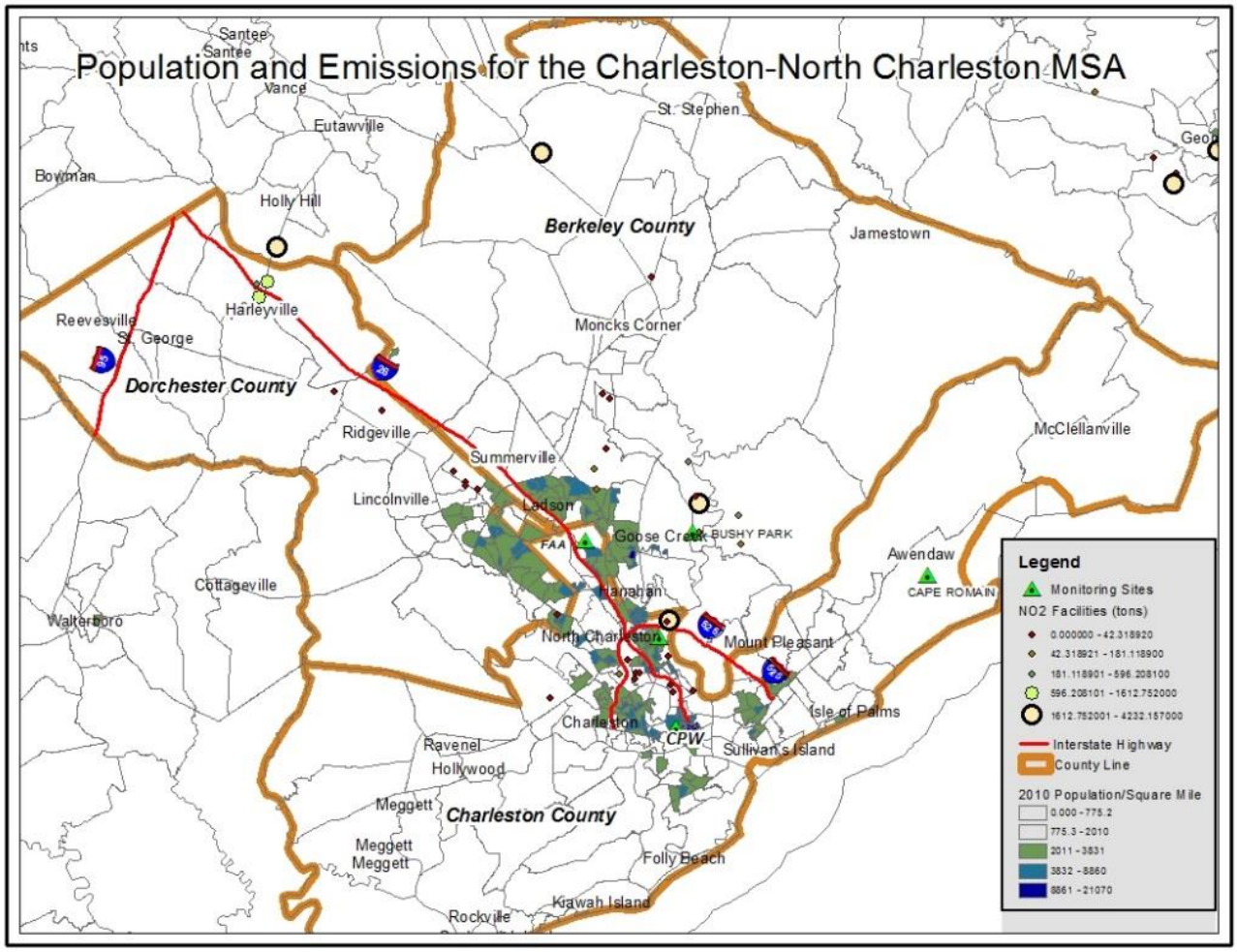
- The area with the highest population taken from the latest United States Census data is used to find the area that will represent the maximum Ozone in the region.
- The monitor should be located on the urban fringe in a suburb slightly downwind of the urban area.
- For maximum Ozone concentration, use the afternoon (1-4 PM) prevailing wind direction and wind speed.
- Maximum Ozone concentration usually occurs 4 to 6 hours after maximum emissions, and under conditions of light winds, usually downwind of the urban region.

First, the population and emissions sources were mapped. As seen on the map in Map 12 (below), the majority of the population and emissions are located around Interstate 26 (red line), south of Berkeley County. The Kapstone Kraft facility is the largest Title V facility within the heaviest populated area with the highest traffic counts.

[2] Ibid.

Also, traffic counts were considered. The areas in the southwestern border of Berkeley County along the Interstate 26 corridor (to the right of the FAA (45-019-0048) Monitoring Site) were the highest traffic counts for the county.

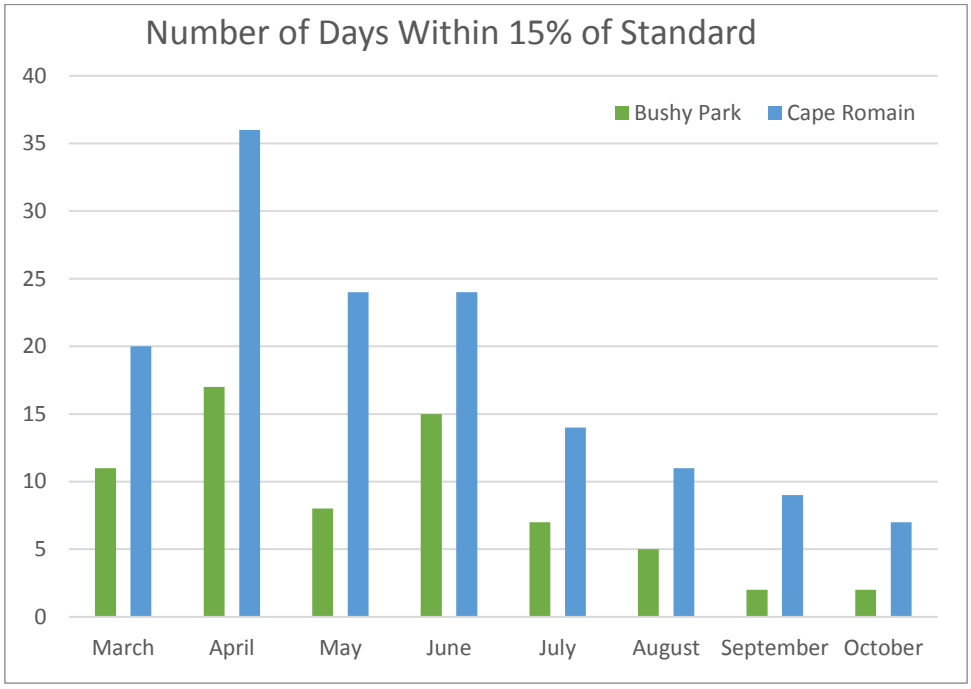
Map 12: Population and Emissions



Then, the days of highest Ozone concentration were determined to create the afternoon wind rose. The number of days in the last ten years that were within 15 percent of the Standard for the Bushy Park Pump Station (45-015-0002) Monitoring Site in Berkeley County and the Cape Romain (45-019-0046) Monitoring Site in Charleston County were examined.

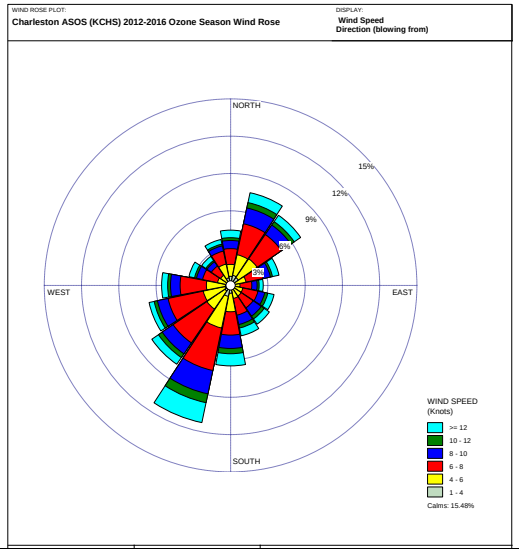
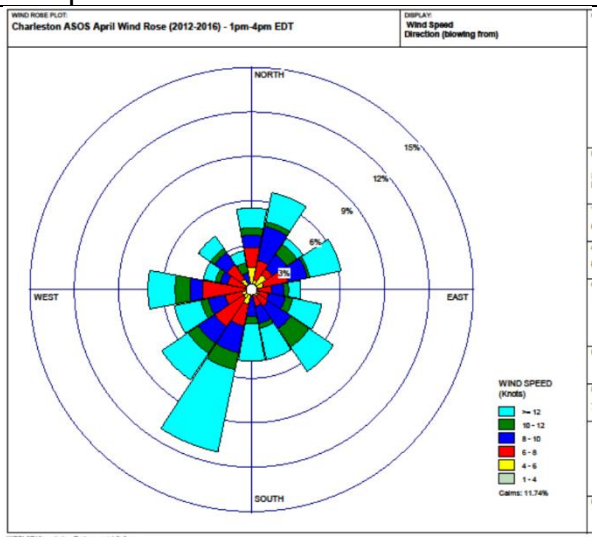
As Graph 3 indicates, April was the month that had the most days within 15 Percent of the Standard for both monitors.

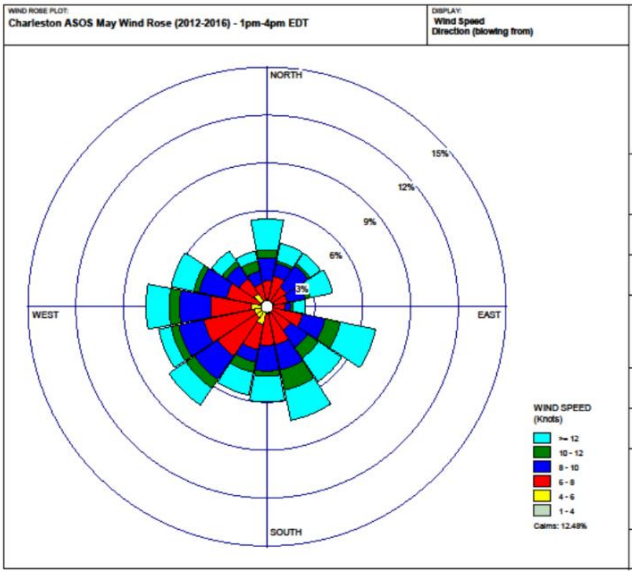
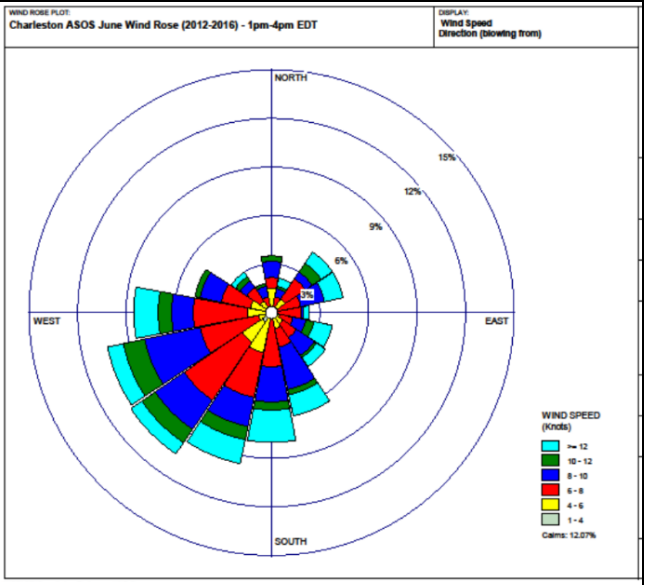
Graph 3: Number of days within 15% of Standard (59.5 ppb)



Wind data was obtained from the Charleston International Airport (CHS) and wind roses were created for the Ozone season and the afternoon hours (1-4 P.M.) of the highest months of April, May and June.

Table 13: Charleston International Airport wind roses for April, May and June 2012-2016 1-4 P.M.

Ozone Season 2012-2016	April 2012-2016 1-4 P.M. wind rose
	

May 2012-2016 1-4 P.M. wind rose	June 2012-2016 1-4 P.M. wind rose
	

As Table 13 indicates, although each wind rose showed variability due to the coastal influences, a southwest to northeast pattern can be seen.

The 'Guidance for Ozone Monitoring Site Selection' document states that maximum Ozone concentrations usually occur approximately 4 to 6 hours after maximum emissions. The wind speed is an average of 6.27 knots or 7.22 miles per hour. Therefore, a distance of approximately 28 miles northeast from the maximum population and emissions areas in Berkeley County should be considered.

Meteorology for the Charleston-North Charleston MSA

The Department's meteorologists did a meteorological analysis to locate the area with maximum Ozone concentration in the MSA. The Department's meteorological conclusions are as follows:

The Bushy Park Pump Station (45-015-0002) Monitoring Site is currently located in a rather rural and swampy area on the outskirts (due north) of downtown Charleston. The Cooper River is located approximately one kilometer east, the Back River is located about one-half kilometer west, and the two rivers merge about two kilometers south of the Bushy Park Pump Station (45-015-0002) Monitoring Site. The water bodies and swampy areas that surround the monitor location (within 5 kilometers or more in any direction) may produce a near-surface airmass that is likely mesoscale in nature, especially during afternoon hours during spring and summer months. This mesoscale airmass is expected to be much cleaner than the surrounding air due to the lack of sources contributing to the airmass over the area. Although there are a couple of large facilities in the Bushy Park area, an airmass that is largely influenced by water bodies and swamps is not expected to produce high concentrations of Ozone due to rather limited mixing with an airmass that contains high contributions of NO_x precursors, such as an airmass affected by more urbanized land use

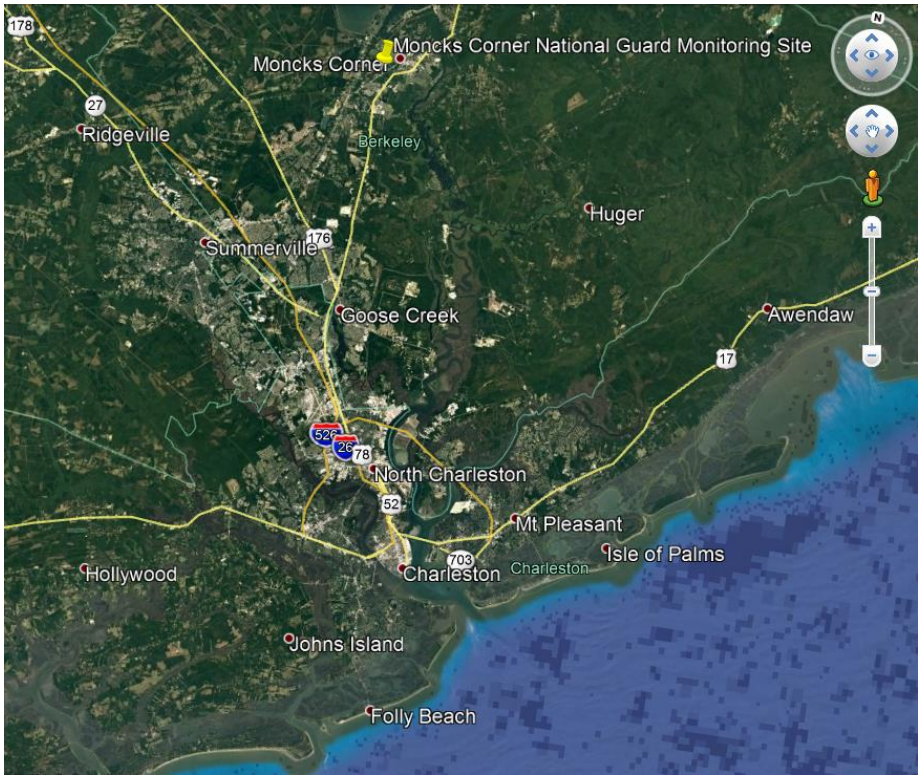
in the Charleston, North Charleston, and Summerville areas. Highest NO_x concentrations would likely pool up along convergent boundaries along land and water interfaces and/or override the boundary that also exists aloft.

It is also important to note that the Ozone monitor at the Bushy Park Pump Station (45-015-0002) Monitoring Site hasn't observed an exceedance of 70ppb (the current standard) since April 1, 2010. For the reasons described here, the Bushy Park Pump Station location is not believed to be the location where the maximum downwind Ozone concentrations would be for the Charleston-North Charleston MSA.

Moncks Corner is a suburb of Charleston that has fewer water bodies in the immediate vicinity of the proposed monitor location. The town of Moncks Corner is located about 30 kilometers north of North Charleston, SC. Moncks Corner is more suburban in nature and, unlike the Bushy Park Pump Station location, may be affected more by precursors released within the Charleston-North Charleston MSA due to mesoscale winds that allow pools of Ozone precursors to transport northward along land/water interface boundaries. Much of the emissions that are generated in the Charleston-North Charleston MSA are anticipated to channel along convergent boundaries that run parallel to water bodies in a day with fairly stagnant conditions, which are also usually the days with the highest Ozone concentrations. Since there is an extended corridor of population that extends from Charleston to Summerville (about 30 kilometers in length), an accumulation of precursors is anticipated along boundaries that do develop and transport these precursors north and northeastward on the more stagnant days with light south-southwest flow. Stronger heating at the surface at Moncks Corner may also allow for higher mixing heights, which would allow for mixdown of transported precursors aloft. This will allow Ozone precursors to mix down from aloft and allow urban plumes to form and be transported downwind from the dominant south-southwest direction from North Charleston, a high population density region. Particularly on days when winds are light, which is usually when concentrations are highest, Moncks Corner is an ideal location for a monitor to be located in the Charleston-North Charleston MSA to monitor maximum downwind Ozone concentrations.

The area around Moncks Corner was canvassed and a Monitoring Site on the property of the Moncks Corner National Guard (Map 14) was obtained.

Map 13: Moncks Corner National Guard location



Map 14: Close-up of Moncks Corner National Guard location

Pictures 11 and 12 show the new Monitoring Site looking north and east.

Picture 11: Looking north

Picture 12: Looking east

Pictures 13 and 14 show the new Monitoring Site looking south and west.

Picture 13: Looking south

Picture 14: Looking west

The purple X's (in front of the transformer) in Pictures 15 and 16 are approximately where the monitoring building is expected to be placed.

Picture 15: Approximate location of monitoring building looking north

Picture 16: Approximate location of monitoring building looking south

Picture 17 shows the tallest trees looking northwest from the proposed monitoring building site. Table 14 indicates that, using an average of all South Carolina Ozone probes from other sites with monitoring buildings for the probe height, these trees should not obstructions.

Picture 17: Tallest trees

Table 14: Possible Obstructions

Parameter	Obstruction Description (include compass direction)	Drip Line	Obstruction Distance (m)	Obstruction Height (m)	Monitor Height (m)	Obstruction Hgt - Monitor Hgt (m) = Height Above Probe	X 2	Pass /Fail
Ozone	Drip line NW tree	20.4	27.3	16.8	4.12*	12.68	25.36	Pass
	Tallest NW tree	N/A	29.5	18.4	4.12*	14.28	28.56	Pass
• Average height of Ozone monitor in South Carolina								
If Obstruction Distance (Column 4) is greater than Obstruction Hgt-Monitor Height x 2 (Column 8), the obstruction passes. If Obstruction Distance (Column 4) is less than Obstruction Hgt-Monitor Height x 2 (Column 8), the obstruction fails.								

Therefore, the Department asks for concurrence from the EPA on the establishment of the Moncks Corner National Guard (45-015-1002) Monitoring Site.

Site Waiver for Drip Line at Congaree Bluff (45-079-0021) Monitoring Site

General site information

The Department requests approval for a waiver to be granted for the drip line criteria specified in 40 CFR Part 58 Appendix E Section 5-Spacing from Trees, and Section 11 Table E-4 for one pine tree at the Congaree Bluff (45-079-0021) Monitoring Site in Richland County.

The Congaree Bluff (45-079-0021) Monitoring Site is located within the boundary of the Congaree National Park (Park), which was established by Congress in 1976. The Site represents general/background concentrations at a neighborhood scale within the Congaree National Park. Most of the Park is designated as Wilderness and also has a Class II Floor Area designation[3]. The National Park Service (NPS) has a Resource Management Plan, which includes an agreement with the Department to operate an air monitoring station within the Park boundaries. As a result of the Wilderness designation, modifications or improvements are highly restrictive and, in some cases, prohibited. The original Site (Congaree Swamp (45-079-1006)) was located in the flood plain and had to be relocated in 2001 after a flood washed the monitors away[4]. Basic information on the Site is listed in Table 15.

Table 15: Congaree Bluff (45-079-0021) Monitoring Site Data

Name	Congaree Bluff
Site ID	45-079-0021
Address	1850 South Cedar Creek Road, Gadsden, South Carolina
County	Richland
Name of MSA	Columbia
Name of CSA	Columbia-Orangeburg-Newberry CSA
Coordinates	+33.81467, -80.78113
Parameter	**Sulfur Dioxide**
Scale	Neighborhood
Objective	General/Background
Designation	SPM
Probe Height	4.15
Analysis Method and code	Pulsed Fluorescent (560)
Sampling Frequency	Continuous, hourly
Distance to road	187.5
Distance to drip line	7.4
Parameter	**Ozone**
Scale	Neighborhood
Objective	General/Background

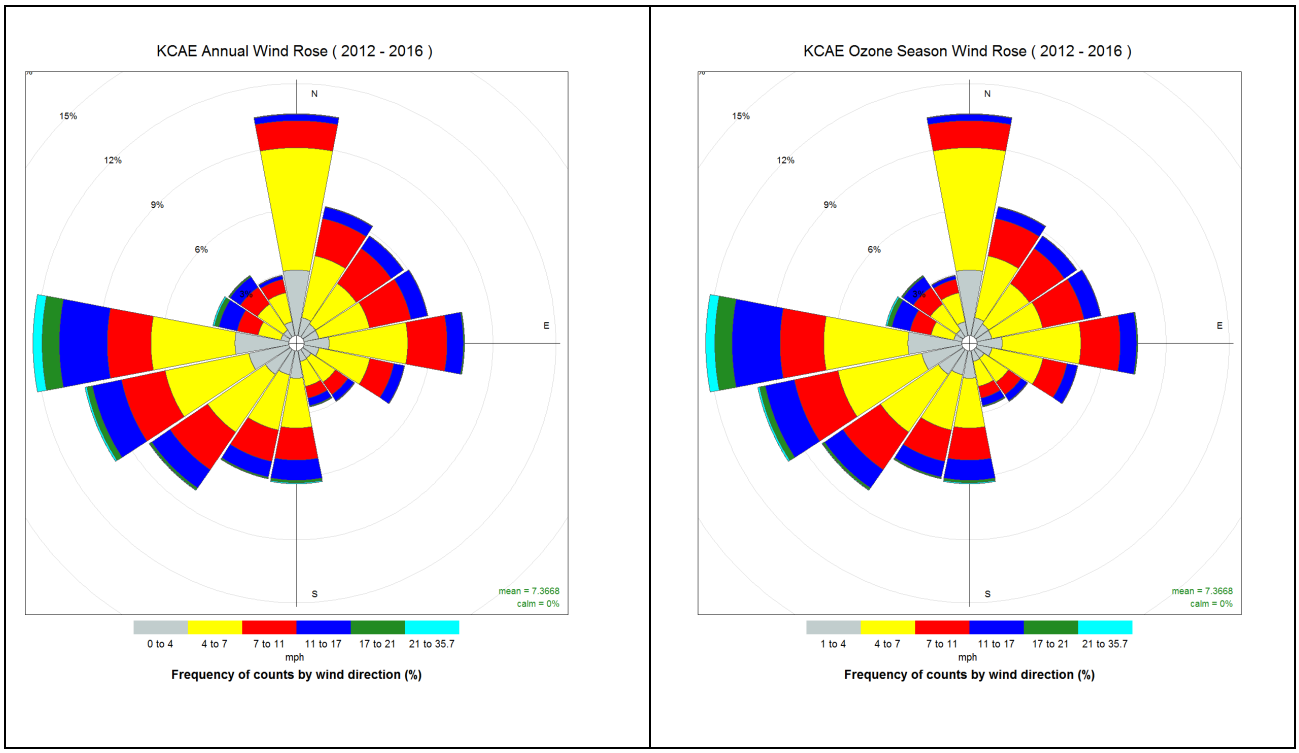
[3]Southeast Support Office, Natural Resources Management, *Relocation of the Ambient Air Quality Monitoring Station at Congaree Swamp National Monument*, by Bobby C. Carson, (Columbia, South Carolina, August, 1998).
[4]South Carolina Department of Health and Environmental Control, *General Management Plan/Wilderness Suitability Study and Environmental Assessment letter*, by Otto Pearson, (Columbia, South Carolina, December 17, *1987*).

Designation	SPM
Probe Height	4.15
Analysis Method and code	Ultraviolet absorption (047)
Sampling Frequency	Continuous, hourly
Distance to road	187.5
Distance to drip line	7.4

Meteorology

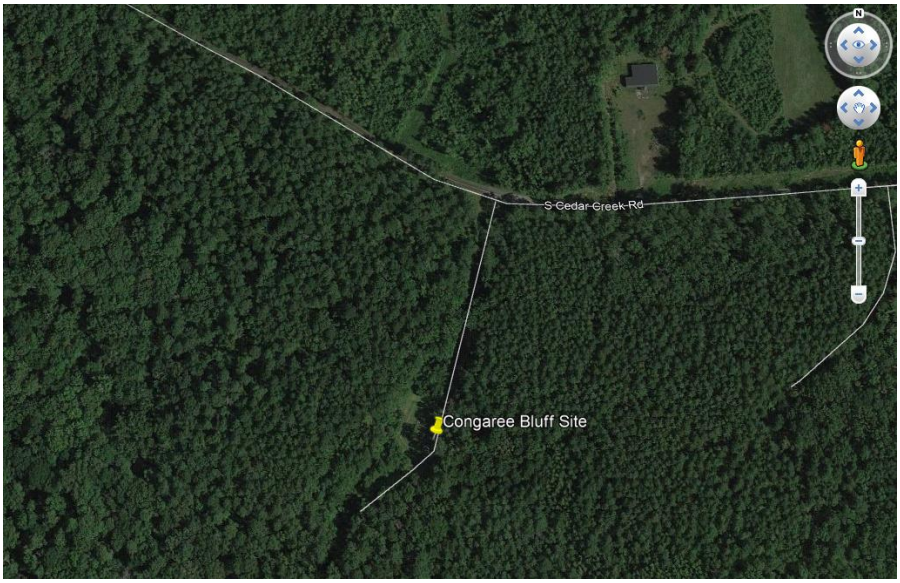
The wind data from the Columbia Metropolitan Airport is representative of the wind pattern for the Congaree Bluff (45-079-0021) Monitoring Site. The wind roses in Table 16 used 2012-2016 data. It indicates that the predominant wind direction for this Site is from the west. Also, secondary dominant winds come from the west-southwest, southwest, and north.

Table 16: Wind Rose for the Congaree Bluff Site (45-079-0021) Monitoring Site



As can be seen in Map 15 and Map 16, the monitoring station is located in the farthest southeast corner of the opening to give the monitors maximum exposure to the western and northern winds.

Map 15: Aerial photograph of the Congaree Bluff (45-079-0021) Monitoring Site in the Congaree Swamp National Park



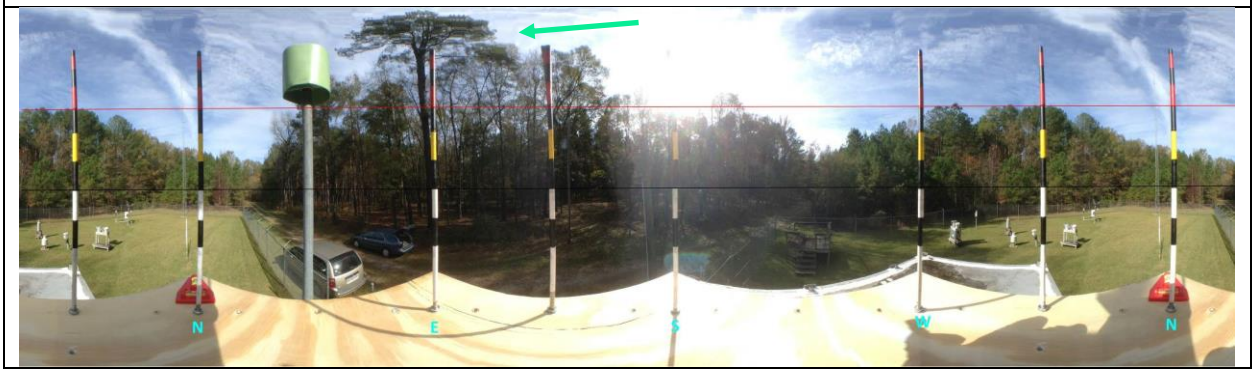
Map 16: Close-up of the Congaree Bluff (45-079-0021) Monitoring Site

Justification for request

The Congaree Bluff (45-079-0021) Monitoring Site is an essential part of the agreement with the NPS to operate air monitoring within the bounds of the Congaree Swamp National Monument. During the Site Evaluations, a pine tree causing the drip line violation east of the Monitoring Site was noted. The 40 CFR Part 58, Appendix E, Section 5-Spacing from Trees, and Section 11 Table E-4, requires that the probe must be at least 10 meters or further from any drip line of trees. The height of the tree is approximately 35 meters tall and the drip line is 7.4 meters from the probe. The tree limb is very high (17.7 meters) and it is not practical to trim the branch. The Park is hesitant to remove the tree as the Forestry Service is trying to reestablish the habitat for the endangered Red-cockaded Woodpecker.

Table 17 shows an aerial picture of the Congaree Bluff (45-079-0021) Monitoring Site with a picture of the drip line tree in relation to the monitors. In addition, a panoramic view of the Site with the drip line tree is shown.

Table 17: Drip Line Issue

Drip line tree branch	Drip line tree
	
Panorama taken from Ozone monitor	
	

The probe at the Congaree Bluff Site cannot be relocated to meet the siting criteria because of physical constraints, nor can the Site be moved, as there are firm restrictions on changes made to the Site. Therefore, since the drip line tree cannot be trimmed or cut, and the Site cannot be moved, the Department requests a drip line waiver for the one pine tree at Congaree Bluff (45-079-0021) Monitoring Site.

Appendix I: E-mail from Clemson University

From: Kyle Campbell <preservationsouth@bellsouth.net>
Sent: Tuesday, February 20, 2018 11:18:53 AM
To: Le, Thanh-Thao T.
Subject: Ozone Station at Clemson

Hi,

Thank you for speaking with me about the Ozone Station at Hopewell. Please let me know who I should speak with.

Kyle Campbell, MHP

From: Le, Thanh-Thao T.
Sent: Tuesday, February 20, 2018 7:09:04 PM
To: Watts, Kevin
Cc: Kyle Campbell
Subject: Fw: Ozone Station at Clemson

Kevin,

I spoke with Mr. Kyle Campbell when I was doing my ozone audit and he has asked if we could relocate our site to somewhere else. I have forwarded his email with all of his contact information and also cc'ed him to this email. Please advise.

Thank you!
Thao

From: Kyle Campbell <preservationsouth@bellsouth.net>
Sent: Wednesday, February 21, 2018 9:18:29 AM
To: Watts, Kevin
Subject: Re: Ozone Station at Clemson

Thank Mr. Watts,

If you need another site in the area I can put you in contact with the person who oversees the Ag. Lands at Clemson and they can likely find you another location.

Kyle Campbell, MHP

From: Watts, Kevin
Sent: Wednesday, February 21, 2018 9:42 AM
To: Kyle Campbell <preservationsouth@bellsouth.net>
Cc: Mattocks, Micheal <MATTOCM@dhec.sc.gov>; Flynn, Thomas <flynntj@dhec.sc.gov>
Subject: Re: Ozone Station at Clemson

Thank you Mr. Campbell.

I will pass along your information to my director and I'm sure he will be in touch.

Thanks again,

Kevin

Appendix J: Public Comments-No comments were received.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

APR 22 2019

Ms. Rhonda Thompson
Chief
Bureau of Air Quality Control
South Carolina Department of Health and
Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Dear Ms. Thompson:

Thank you for submitting the state of South Carolina's 2018 annual ambient air monitoring network plan dated July 10, 2018; an addendum to the 2017 annual ambient air monitoring network plan submitted August 16, 2018; and the addendum to the 2018 plan, submitted November 19, 2018. The U.S. Environmental Protection Agency has evaluated these three documents together as the South Carolina "Network Plan." The Network Plan is required by 40 Code of Federal Regulations (CFR) §58.10.

The EPA understands that the South Carolina Department of Health and Environmental Control (DHEC) provided the public a 30-day review period for each of the three submittals that are part of the Network Plan. The EPA staff submitted one public comment to the July 2018 submittal which was addressed in the November 2018 addendum. It is the EPA's understanding that no other comments on the Network Plan were received.

The Network Plan requests the relocation of two ozone (O_3) monitors, one in the Greenville area and one in the Charleston area; the discontinuation of one additional O_3 monitor in the Greenville area; and changes to the $PM_{2.5}$ network including relocation of the state's collocated monitor and background $PM_{2.5}$ monitor. The EPA supports the redesign of the O_3 networks in the Greenville and Charleston area as well as the reconfiguration of the South Carolina $PM_{2.5}$ monitoring network. The EPA approves the 2018 Network Plan as proposed in the July 2018 submittal and supported with additional information in the August 2018 and November 2018 addendums, with the exception of the PM_{10} monitoring network in the Augusta-Richmond County, GA-SC area. After a recent PM_{10} NAAQS violation at the Augusta, GA monitoring site, the EPA Region 4 has been consulting with the EPA Office of Air Quality Planning and Standards staff on whether additional monitoring is required. Once we have finished those discussions, the EPA will contact both Georgia and South Carolina to discuss the next steps.

Details regarding the EPA's review of the Network Plan are provided in the enclosed comments. Thank you for working with us to monitor air pollution and promote healthy air quality in South Carolina. If you have any questions or concerns, please contact Gregg Worley at (404) 562-9141 or Ryan Brown at (404) 562-9147.

Sincerely,

Carol L. Kemker

Carol L. Kemker
Acting Director
Air, Pesticides and Toxics Management Division

Enclosure

cc: Mr. Robert Brown
Division Director, Air Planning Development
and Outreach, SC DHEC

Ms. Connie Turner, Director
Division of Air Quality Analysis, SC DHEC

Ms. Renee Madden, Manager
Air Data Analysis and Support Section, SC DHEC

The Honorable William Harris
Chief of the Catawba Indian Nation

Mr. Darin Steen
Director, Environmental Services, Catawba Indian Nation

CY 2018 State of South Carolina Ambient Air Monitoring Network Plan
The U.S. EPA Comments and Recommendations

This document contains the U.S. Environmental Protection Agency comments and recommendations regarding the state of South Carolina's 2018 ambient air monitoring network plan (Network Plan). Ambient air monitoring rules, which include regulatory requirements that address network plans, data certification, and minimum monitoring requirements, among other requirements, are found in 40 CFR Part 58. Minimum monitoring requirements for criteria pollutants are listed in 40 CFR Part 58, Appendix D. Minimum monitoring requirements are listed for ozone (O_3), particulate matter less than 2.5 microns ($PM_{2.5}$), particulate matter less than 10 microns (PM_{10}), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), and lead (Pb).

The minimum monitoring requirements are based on core based statistical area (CBSA) boundaries as defined by the U.S. Office of Management and Budget (OMB), July 1, 2017, population estimates from the U.S. Census Bureau, and historical ambient air monitoring data. Minimum monitoring requirements for O_3, $PM_{2.5}$, and PM_{10} only apply to metropolitan statistical areas (MSAs) which are a subset of CBSAs. OMB currently defines 10 MSAs in the state of South Carolina. These MSAs and the respective July 1, 2017, population estimates from the U.S. Census Bureau are shown in Table 1.

Table 1: Metropolitan Statistical Areas and Populations

MSA Name	Population
Charlotte-Gastonia-Concord NC-SC	2,525,305
Greenville-Anderson-Mauldin, SC	895,923
Columbia, SC	825,033
Charleston-North Charleston-Summerville, SC	775,831
Augusta-Richmond County, GA-SC	600,151
Myrtle Beach-Conway-North Myrtle Beach, SC-NC	464,165
Spartanburg, SC	334,391
Hilton Head Island-Bluffton-Beaufort, SC	215,302
Florence, SC	205,831
Sumter, SC	106,847

Proposed Monitoring Network Changes

The South Carolina Department of Health and Environmental Control (SC DHEC) proposed numerous changes to its monitoring network in the Network Plan. Table 2 summarizes the requested discontinuations and relocations of monitors and Table 3 summarizes the requested monitor startups. Specifics of each change and rationale are also contained in the following pollutant sections.

Table 2: Monitors Proposed for Relocation or Discontinuation

AQS ID	Site Name	CBSA	Pollutant	Type	Comments
45-007-0005	Big Creek	Greenville-Anderson-Mauldin, SC	O_3	SLAMS	EPA supports this and will review and make a final decision for the next network plan. Proposed to shut down after 2019 O_3 season.
45-077-0002	Clemson	Greenville-Anderson-Mauldin, SC	O_3	SLAMS	Approved. Monitoring relocation to Garrison Arena (AQS ID 45-007-0006)

45-077-0003	Wolf Creek	Greenville-Anderson-Mauldin, SC	O_3	SLAMS	Approved to discontinue as part of the re-designed Greenville area O_3 monitoring network. Has consistently measured lower concentrations than other monitors in the MSA
45-019-0048	FAA	Charleston-North Charleston-Summerville, SC	$PM_{2.5}$	Collocated SPM	Acknowledged. The primary Sampler will continue to operate at FAA. The collocated sampler was moved to TK Gregg (AQS ID 45-083-0011) site in the Spartanburg MSA. Collocated sampler will be moved back to the Charleston area once a new $PM_{2.5}$ site is established.
45-015-0002	Bushy Park	Charleston-North Charleston-Summerville, SC	O_3	SLAMS	Approved to relocate. Does not meet siting criteria. Moncks Corner site (AQS ID 45-015-1002) established as a replacement in Charleston CBSA.
45-029-0002	Ashton	Walterboro, SC	$PM_{2.5}$	SLAMS	Approved. Monitor changed from SLAMS to SPM. This monitor is not in a minimally required MSA for $PM_{2.5}$. Cape Romain (AQS ID 45-019-0046) will be designated as the required background site.

Table 3: Monitors Proposed for Startup

AQS ID	Site Name	CBSA	Pollutant	Type	Comments
45-007-0006	Garrison Arena	Greenville-Anderson-Mauldin, SC	O_3	SLAMS	Approved. Relocation of Clemson O_3 monitor. Approximately one mile southeast of the Clemson site.
45-015-1002	Moncks Corner National Guard	Charleston-North Charleston-Summerville, SC	O_3	SLAMS	Approved. O_3 monitor for Charleston CBSA instead of Bushy Park. Rationale provided to show that this is in an area of expected maximum concentration.
45-019-0046	Cape Romain	Charleston-North Charleston-Summerville, SC	$PM_{2.5}$	SLAMS	$PM_{2.5}$ monitor will be a SLAMS instead of SPM and designated as the $PM_{2.5}$ regional background site for SC. This monitor must operate on a 1-in-3-day sampling frequency per 40 CFR 50.12(d)(2).
45-091-0008	York	Charlotte-Gastonia-Concord NC-SC	SO_2	SPM	Acknowledged. SO_2 monitor added to existing site.
45-083-0011	T. K. Gregg	Spartanburg, SC	$PM_{2.5}$	SLAMS collocated	Approved. Addition of collocated FRM sampler to existing site.

Waivers of Monitor Siting Criteria
40 CFR Part 58, Appendix E

Under 40 CFR Part 58, Appendix E, Section 10, waivers of siting criteria for existing sites can be granted if either of the following criteria are met:

> 10.1.1 The site can be demonstrated to be as representative of the monitoring area as it would be if the siting criteria were being met.
>
> 10.1.2 The monitor or probe cannot reasonably be located so as to meet the siting criteria because of physical constraints (e.g., inability to locate the required type of site the necessary distance from roadways or obstructions).

The Network Plan requests a waiver of monitoring siting requirements for the Congaree Bluff monitoring site (AQS ID 45-079-0021). The objective of the Congaree Bluff site is to measure O_3 and SO_2 within the Congaree National Park boundaries. Within the national park boundaries this monitor cannot be reasonably located so as to meet the siting criteria because of physical constraints. The EPA staff visited the Congaree Bluff site on January 25, 2016 and agree that this is the best monitoring location within the park boundaries. The EPA previously waived the requirements of 40 CFR Part 58, Appendix E, Section 4 (a) and Table E-4 to 40 CFR Part 58, Appendix E, Section 11 in regard to trees identified by SC DHEC as obstructing airflow. In its most recent Network Plan, the SC DHEC is requesting a further waiver for 40 CFR Part 58, Appendix E, Section 5 "Spacing from Trees" and Table E-4 to 40 CFR Part 58, Appendix E, Section 11 for one branch which is within 10 meters of the monitoring probes.

The Network Plan describes one branch that is 17.7 meters above the ground (about 13.5 meters above the probe) and 7.4 meters horizontally from the closest monitoring probe. The EPA believes this branch should have minimal impact and the site would still meet the objective of monitoring O_3 and SO_2 within the park boundaries. The EPA encourages the SC DHEC to meet siting criteria requirements as much as possible at this site but understands the National Park Service's and SC DHEC's hesitation to remove trees in an old growth forest. Thus, the EPA waives the spacing from trees requirement for the one branch identified by SC DHEC in the Network Plan. This site must still meet all other siting requirements found in Appendix E to 40 CFR Part 58. This waiver, as with all other waivers of regulatory requirements granted by the EPA, should be re-evaluated in the 2020 South Carolina network assessment.

Operating Schedules
40 CFR § 58.12

The monitoring network proposed in the Network Plan meets the required operating schedules for all continuous analyzers and all manual Pb, PM_{10}, $PM_{2.5,}$ and $PM_{2.5}$ Speciation Trends Network (STN) monitors. The SC DHEC did not propose any changes to its operating schedules in the Network Plan.

Air Quality Index (AQI) Reporting
40 CFR §58.50

AQI reporting is required in MSAs with populations over 350,000. There are four MSAs in the state of South Carolina required to report an AQI: Greenville-Anderson-Mauldin, Columbia, Charleston-North Charleston, and Myrtle Beach-Conway-North Myrtle Beach. The Network Plan indicates that the daily AQI for all of these areas is available on the EPA's AirNow web site, as well as areas in and around Aiken, SC (in the Augusta-Richmond County, GA-SC CBSA); Florence-Darlington, SC; and York-Chester-Lancaster, SC (in the Charlotte–Concord–Gastonia, NC-SC CBSA). The SC DHEC monitoring network satisfies the minimum AQI reporting requirements in 40 CFR Part 58.

National Core (NCore) Monitoring Network
40 CFR Part 58, Appendix D, 3

A requirement that each state operate at least one NCore site is found in 40 CFR Part 58, Appendix D, Section 3. The state's approved NCore site is in Columbia at the Parklane site (AQS ID 45-079-0007) and SC DHEC has not proposed any changes for the site in its Network Plan.

O_3 Monitoring Requirements
40 CFR Part 58, Appendix D, Table D-2

The Network Plan proposes to discontinue four O_3 monitors (one after the 2019 O_3 monitoring season) and to relocate O_3 monitors to two new O_3 monitoring sites. These O_3 shutdown and relocations would be in the Greenville-Anderson-Mauldin, SC MSA and the Charleston-North Charleston-Summerville, SC MSA.

In the Greenville area, the Network Plan proposes to:

- Shutdown the Wolf Creek O_3 monitor (AQS ID 45-077-0003) after the 2018 O_3 season;
- Shutdown the Big Creek O_3 monitor (AQS ID 45-007-0005) after the 2019 O_3 season; and
- Relocate the Clemson O_3 monitor (AQS ID 45-077-0002) approximately a mile away to the new Garrison Arena site (AQS ID 45-007-0006).

Relocate the Bushy Park O_3 monitor (AQS ID: 45-015-0002) to the new Moncks Corner National Guard site (AQS ID: 45-015-1002) he Greenville-Anderson-Mauldin, SC MSA is minimally required to have two O_3 monitors based on population and recent design values. Historically the Clemson and the Hillcrest (AQS ID: 45-045-0016) O_3 monitors have measured the highest concentrations in the MSA. The preliminary 2018 O_3 design value is 62 ppb at both Hillcrest and Clemson. The Wolf Creek monitor has typically measured the lowest O_3 concentrations in the MSA. Thus, the EPA supports the discontinuation of the Wolf Creek O_3 monitor. The SC DHEC states in the Network Plan that a final decision on the discontinuation of O_3 monitoring at Big Creek will be made in the next network plan. The EPA will evaluate the Big Creek discontinuation in its response to the next network plan. This Network Plan proposes to replace the Clemson site with a new site at Garrison Arena. The Garrison Arena site is approximately one mile from the Clemson site and the SC DHEC presented information that Garrison Arena is representative of the same airshed as the Clemson site for O_3 measurements. Thus, the EPA approves the proposed changes to O_3 monitoring in the Greenville and Anderson area: discontinuation of Wolf Creek and relocation of O_3 monitoring from Clemson to Garrison Arena.

In the Charleston area, the Network Plan proposes to replace the Bushy Park O_3 monitor (AQS ID 45-015-0002) with a new O_3 site at Moncks Corner National Guard (AQS ID: 45-015-1002). The SC DHEC submitted meteorological information and analysis that the Moncks Corner National Guard site might be in a location of maximum expected O_3 concentration and/or higher expected concentration than O_3 concentrations measured at Bushy Park. Additionally, Bushy Park has significant siting criteria issues which the SC DHEC has not been able to address. Thus, the EPA approves relocating the O_3 monitor from Bushy Park to Moncks Corner National Guard.

It is the EPA's understanding that the Moncks Corner National Guard and Garrison Arena sites were not established in time to start up for the 2019 O_3 season and that SC DHEC is continuing to operate the Clemson and Bushy Park monitoring sites for the 2019 O_3 season. SC DHEC intends to operate O_3 monitors at Moncks Corner National Guard and Garrison Arena for the 2020 O_3 season and the O_3 monitors at Clemson and Bushy Park will be discontinued after the 2019 O_3 season.

The SC DHEC O_3 monitoring network outlined in the Network Plan meets the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-2 for all MSAs in South Carolina.

SO_2 Monitoring Requirements
40 CFR Part 58, Appendix D, 4.4

Ambient air monitoring network design criteria for SO_2 are found in Section 4.4 of 40 CFR Part 58, Appendix D. This section requires that "The population weighted emissions index (PWEI) shall be calculated by states for each core-based statistical area (CBSA)…" As a result, the SO_2 monitoring site(s) required in each CBSA will satisfy minimum monitoring requirements if the monitor(s) is sited within the boundaries of the parent CBSA and is of the following site types: population exposure, maximum concentration, source-oriented, general background, or regional transport. An SO_2 monitor at an NCore station may satisfy minimum monitoring requirements if that monitor is located within a CBSA with minimally required monitors consistent with Appendix D, Section 4.4.

Based upon PWEIs calculated using the latest population estimates and 2014 emission inventory data, the minimum numbers of monitors required for the CBSAs in South Carolina are summarized in Table 4.

Table 4: SO_2 Monitoring System Status – PWEI Requirements

CBSA Name	SLAMS Required	SLAMS Present	SO_2 SLAMS site
Charleston-North Charleston-Summerville, SC	1	1	Jenkins Ave Fire Station (AQS ID 45-019-0003)
Charlotte-Gastonia-Concord, NC-SC	1	1	Garinger High School (AQS ID 37-119-0041)
Columbia, SC	1	1	Parklane (AQS ID 45-079-0007)
Greenville-Anderson-Mauldin, SC	1	1	Greenville ESC (AQS ID 45-045-0015)

Based upon the information summarized in Table 4, the SO_2 monitoring network outlined in the Network Plan meets the SO_2 PWEI requirements specified in 40 CFR Part 58, Appendix D, Section 4.4. The DHEC operates SO_2 monitors in the Charleston-North Charleston-Summerville, SC; Columbia, SC; and Greenville-Anderson-Mauldin, SC CBSAs to meet the PWEI requirements. The SC DHEC has a Memorandum of Agreement with Mecklenburg County Air Quality (MCAQ) to share the monitoring requirements for the Charlotte-Gastonia-Concord NC-SC CBSA. The MCAQ operates an SO_2 monitor

at its Garinger High School site (AQS ID 37-119-0041) to meet the PWEI requirement in the Charlotte area.

The EPA finalized the SO_2 Data Requirements Rule (DRR) (see 80 *Federal Register*, No. 162) on August 21, 2015. This rule requires characterization of the air quality near sources with SO_2 emissions greater than 2,000 tons per year by conducting ambient air monitoring or modeling. On January 15, 2016, the SC DHEC submitted to the EPA a list of eight sources in the state around which SO_2 air quality must be characterized. These eight sources were characterized using modeling and/or took federally enforceable emissions limits. The SC DHEC is not operating any SO_2 monitoring sites to meet the DRR requirements.

The Network Plan proposes another SO_2 monitor at the existing York site (AQS ID 45-091-0008), which is in the Charlotte-Gastonia-Concord, NC-SC CBSA. The SC DHEC will operate this monitor as an SPM. SPMs do not require the EPA approval. The EPA acknowledges the startup of this monitor as part of the SO_2 network operated by the DHEC. The SO_2 monitoring network described in the Network Plan meets all design criteria of 40 CFR Part 58.

NO_2 Monitoring Requirements
40 CFR Part 58, Appendix D, 4.3

Ambient air monitoring network design criteria for NO_2 are found in 40 CFR Part 58, Appendix D, Section 4.3. There are three types of required NO_2 monitoring: near-road, area-wide, and Regional Administrator. These types of NO_2 monitoring are described in Sections 4.3.2, 4.3.3 and 4.3.4, respectively.

Ambient air monitoring design criteria for near-road NO_2 monitoring sites are found in 40 CFR Part 58, Appendix D, Section 4.3.2. The requirement for near-road monitoring in the Charlotte-Gastonia-Concord NC-SC CBSA is met by the Remount site (AQS ID 37-119-0045) operated by the MCAQ in Charlotte, North Carolina. No other CBSA in South Carolina is required to have near-road NO_2 monitoring, at this time.

Ambient air monitoring network design criteria for area-wide NO_2 sites are found in Section 4.3.3 of Appendix D to 40 CFR Part 58. The Garinger High School site (AQS ID 37-119-0041) operated by the MCAQ fulfills the area-wide NO_2 monitoring requirement for the Charlotte-Gastonia-Concord NC-SC CBSA. No other CBSA in South Carolina is required to have area-wide NO_2 monitoring.

Ambient air monitoring network design criteria for Regional Administrator required NO_2 monitoring, often referred to as RA-40 monitoring, are found in 40 CFR Part 58, Appendix D, section 4.3.4. Under these provisions, Regional Administrators must require a minimum of 40 additional NO_2 monitoring stations nationwide, with a primary focus on siting these monitors in locations to protect susceptible and vulnerable populations. Previously, the EPA selected the Greenville ESC site (AQS ID 450-045-0015) as a location for an RA-40 NO_2 monitoring site. The full list of NO_2 monitors identified by EPA's Regional Administrators can be found on EPA's website at http://www.epa.gov/ttnamti1/svpop.html. The NO_2 monitoring network described in the Network Plan meets all design criteria of 40 CFR Part 58.

Pb Monitoring Requirements
40 CFR Part 58, Appendix D, 4.5

40 CFR Part 58, Appendix D, Section 4.5 requires that "At a minimum, there must be one source-oriented SLAMS [State and Local Air Monitoring Station] site located to measure the maximum Pb concentration in ambient air resulting from each non-airport Pb source which emits 0.50 or more tons per year and from each airport which emits 1.0 or more tons per year…"

Although South Carolina has no sources that exceed the thresholds for Pb monitoring, the SC DHEC and Johnson Control Battery Group conduct source-oriented ambient Pb monitoring at three sites around the Florence Recycling Center in Florence, South Carolina. The company and the SC DHEC conduct this monitoring under terms of a settlement agreement reached with several petitioners who commented on the construction permit for the facility. Locations for the monitoring sites were selected based upon an agreement between the company and the stakeholders.

The Pb monitoring network described in the Network Plan meets all design criteria of 40 CFR Part 58.

PM_{10} Monitoring Requirements
40 CFR Part 58, Appendix A, 3.3.1
40 CFR Part 58, Appendix D, Table D-4

The EPA has determined that the PM_{10} monitoring network outlined in the Network Plan meets or exceeds the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-4 for all MSAs except the Augusta-Richmond County, GA-SC MSA. EPA Region 4 is consulting with the EPA Office of Air Quality Planning and Standards (OAQPS) staff on whether additional monitoring is required in the Augusta area. All manual PM_{10} collocation requirements for the state are being met.

At the Augusta, GA PM_{10} site (AQS ID 13-245-0091) in the Augusta-Richmond County, GA-SC MSA, the monitor measured one exceedance of the PM_{10} NAAQS on January 25, 2017. According to information provided by the Georgia Environmental Protection Division, (GA EPD) this exceedance was due to smoke from prescribed burning at Fort Gordon. Because the manual PM_{10} sampler operated on a 1-in-6-day sampling schedule and the PM_{10} NAAQS design value is based on estimated exceedances, this one exceedance resulted in a violating design value at the monitor for 2015-2017. On October 1, 2017, GA EPD replaced the manual PM_{10} sampler at the site with a continuous PM_{10} sampler. So, in the future, the design value at the site will not be as influenced by a single exceedance since the monitor will collect data at a much higher time resolution.

The PM_{10} minimum monitoring requirements found in 40 CFR Part 58 Appendix D, Table D-4 indicate that minimum number of PM_{10} monitors would increase for the Augusta MSA if the area increased from low concentration (areas where ambient PM_{10} data show ambient concentrations less than 80 percent of the PM_{10} NAAQS) to medium concentration (exceeding 80 percent of the PM_{10} NAAQS) or high concentration (exceeding the PM_{10} NAAQS by 20 percent or more). Since the violating design value at this site is due to an exceedance on a single day during the three-year period and the area does not have a history of PM_{10} NAAQS violations, the EPA Region 4 is in consultation with OAQPS on whether additional monitoring is required. Once a determination has been made, the EPA will contact both Georgia and South Carolina to discuss the next steps.

$PM_{2.5}$ Monitoring Requirements
40 CFR Part 58, Appendix A, 3.2.5
40 CFR Part 58, Appendix D, Table D-5

The EPA has determined that the $PM_{2.5}$ monitoring network outlined in the Network Plan meets or exceeds the minimum requirements found in 40 CFR Part 58, Appendix D, Table D-5 for all MSAs.

Also, all $PM_{2.5}$ collocation requirements are met. The collocated sampler that was at the FAA site (AQS ID 45-019-0048), in the Charleston-North Charleston-Summerville, SC MSA, is now operating at the T.K. Gregg site (AQS ID: 45-083-0011), in the Spartanburg, SC MSA, to meet FRM collocation requirements.
The SC DHEC plans to move this collocated sampler back to the Charleston-North Charleston-Summerville, SC MSA once a new $PM_{2.5}$ site is established. It is the EPA's understanding that the SC DHEC has selected a location for a new $PM_{2.5}$ site in the North Charleston area.

$PM_{2.5}$ Continuous Monitoring Requirements
40 CFR Part 58, Appendix D, 4.7.2

Regulatory provisions for continuous $PM_{2.5}$ monitoring require that "The State, or where appropriate, local agencies must operate continuous $PM_{2.5}$ analyzers equal to at least one-half (round up) of the minimum required sites listed in Table D–5 of this Appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM [Federal Reference Method/Federal Equivalent Method/Approved Regional Method] monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies."

The five MSAs listed in Table 5, below, have minimum continuous monitoring requirements. These requirements are met in all MSAs in the state. The SC DHEC also operates continuous $PM_{2.5}$ monitors in the Florence, SC MSA and Spartanburg, SC MSA. Additionally, the continuous $PM_{2.5}$ collocation requirements are met in all MSAs.

Table 5: Continuous $PM_{2.5}$ Monitoring Requirements

SC MSA	Number of Minimally Required Continuous $PM_{2.5}$ Monitors	Number of Operated Continuous $PM_{2.5}$ Monitors
Charlotte-Gastonia-Concord NC-SC	1	4 (operated by MCAQ)
Greenville-Anderson-Mauldin, SC	1	1
Columbia, SC	1	2
Charleston-North Charleston-Summerville, SC	1	2
Augusta-Richmond County, GA-SC	1	1

$PM_{2.5}$ Background and Transport Sites
40 CFR Part 58, Appendix D, 4.7.3

Forty (40) CFR Part 58, Appendix D, Section 4.7.3 requires that "Each State shall install and operate at least one $PM_{2.5}$ site to monitor for regional background levels and at least one $PM_{2.5}$ site to monitor for regional transport." The Network Plan identifies Chesterfield (AQS ID 45-025-0001) in Chesterfield County as a regional transport site.

The Network Plan identifies the existing Cape Romain (AQS ID 45-019-0046) continuous $PM_{2.5}$ monitor as the regional background monitor. The previously selected $PM_{2.5}$ general background monitor at the Ashton site (AQS ID: 45-029-0002) was recently identified as not meeting regulatory siting criteria and the SC DHEC does not expect to be able to trim or remove the nearby trees that obstruct airflow. The SC DHEC analyzed hourly $PM_{2.5}$ data around the entire state and determined that the Cape Romain monitor was the most representative of regional background. The Cape Romain monitor typically measures less of an increase in $PM_{2.5}$ during the afternoon and evening hours than monitors located in urban settings. This is similar to the daily trend measured at the $PM_{2.5}$ monitors identified to represent $PM_{2.5}$ general background in both Florida and North Carolina. The EPA supports the SC DHEC's analysis and agrees that of the existing monitors, the Cape Romain $PM_{2.5}$ monitor is likely the most representative of a rural or general background site. This monitor must minimally operate on a 1-in-3-day sampling frequency per 40 CFR 58.12(d)(2). It is the EPA's understanding that the SC DHEC is working with the U.S. Fish and Wildlife Service, which owns the Cape Romain site, to resolve recently identified regulatory siting criteria issues for the Cape Romain site.

The SC DHEC has satisfied the requirements of 40 CFR Part 58 for $PM_{2.5}$ regional background and transport sites.

$PM_{2.5}$ Chemical Speciation Network (CSN)
40 CFR Part 58, Appendix D, 4.7.4

The EPA conducted an assessment of the CSN in an effort to optimize and create a network that is sustainable going forward. As a result of this assessment, the EPA defunded a number of monitoring sites, eliminated the CSN $PM_{2.5}$ mass measurement, reduced the frequency of carbon blanks, reduced sample frequency at monitoring sites, and reduced the number of icepacks in shipments during the cooler months of the year.

The EPA defunded two CSN monitors at sites in South Carolina: Chesterfield (AQS ID 45-025-0001) and Greenville ESC (AQS ID 45-045-0015). It is the EPA's understanding that the Chesterfield speciation monitor continued to operate until December 2018. The SC DHEC decided to, in consultation with the EPA, to move the Chesterfield speciation monitor to the Parklane NCore site (AQS ID 45-079-0007). Parklane also has a CSN speciation monitor, but the SC DHEC reports that this monitor has been failing. The SC DHEC decided to only operate $PM_{2.5}$ speciation at Parklane, since Parklane was identified in the EPA's assessment as being of higher value than speciation measurements at Chesterfield and only one monitor is still in good condition. The SC DHEC should propose this modification in its next network plan, which will be made available for public comment.

Photochemical Assessment Monitoring Station (PAMS)
40 CFR Part 58, Appendix D, 5.0

With the promulgation of a revised O_3 NAAQS on October 1, 2015, the EPA also finalized changes to the PAMS program. NCore sites in CBSAs with greater than 1,000,000 population will be required to implement PAMS monitoring. Parklane (AQS ID 45-079-0007) is not required to operate PAMS monitoring since the Columbia CBSA's population is less than one million. The PAMS requirement is met by the state.

Monitoring Siting Criteria and Site Assessments
40 CFR Part 58, Appendix A, B, C, D, and E

In reference to the Network Plan, 40 CFR §58.10(a)(1) states "[t]he plan shall include a statement of whether the operation of each monitor meets the requirements of appendices A, B, C, D, and E of this part, where applicable. The Regional Administrator may require additional information in support of this statement." The Network Plan includes assessment information for all monitoring sites. The EPA appreciates the inclusion of this information and the work that the SC DHEC has done to evaluate siting criteria at all of its monitoring sites. The EPA understands that the SC DHEC is still working to resolve siting criteria issues identified by their own assessments and in recent EPA audits and appreciates the SC DHEC's continued progress in resolving these issues.