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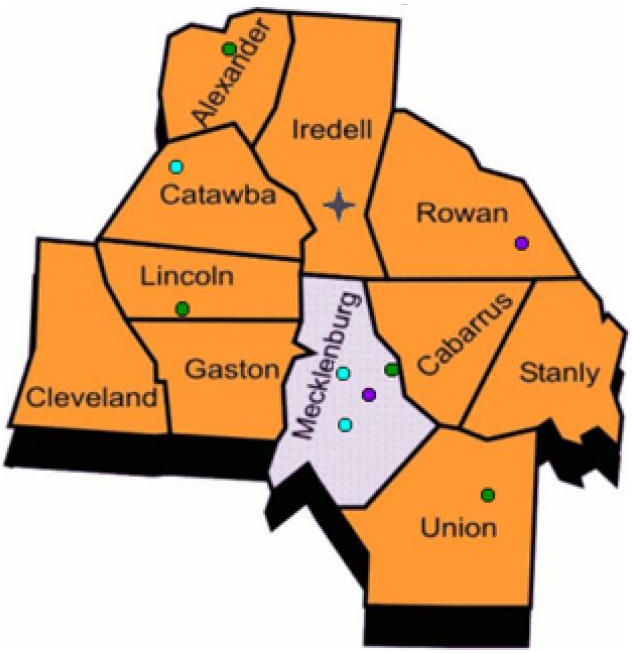
2017-2018 Annual Monitoring Network Plan for the North Carolina Division of Air Quality

Volume 2

Site Descriptions by Division of Air Quality Regional Office and Metropolitan Statistical Area

C. The Mooresville Monitoring Region



June 30, 2017

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C. The Mooresville Monitoring Region

The Mooresville monitoring region, shown in Figure C1, consists of four areas: (1) the eastern portion of the Hickory-Lenoir-Morganton metropolitan statistical area, MSA, (Alexander and Catawba counties), (2) Cleveland County, (3) the Charlotte MSA - Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, Rowan and Union counties and (4) Stanly County.

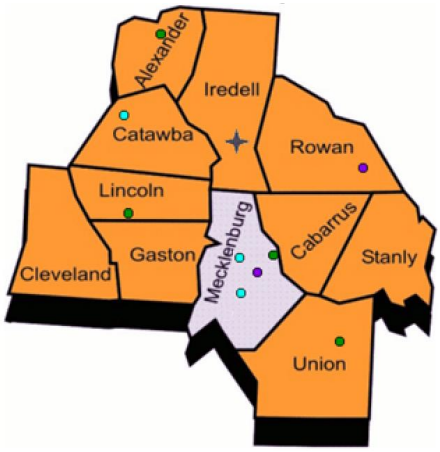
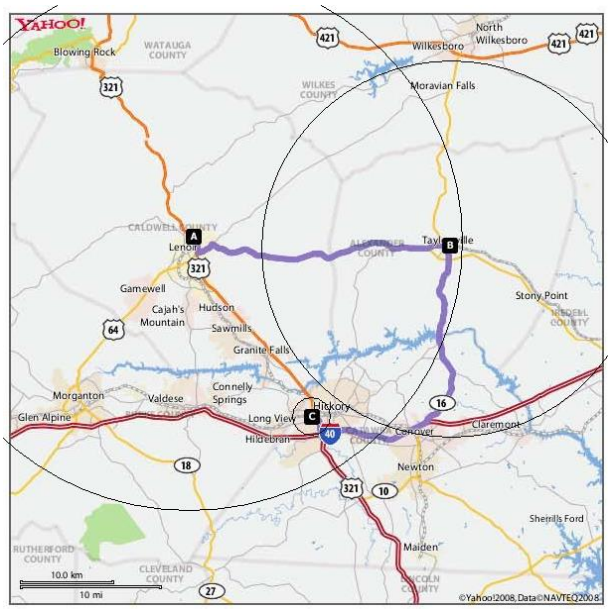


Figure C1. The Mooresville monitoring region
The dots show the approximate locations of most monitoring sites in this region

(1) Hickory-Lenoir-Morganton MSA

The Hickory-Lenoir-Morganton MSA consists of four counties: Alexander, Burke, Caldwell and Catawba County. The major urban areas are the Cities of Hickory, Lenoir and Morganton. The North Carolina Division of Air Quality, DAQ, currently operates three monitoring sites in the Hickory-Lenoir-Morganton MSA. These sites are located at Taylorsville-Liledoun in Alexander County, Lenoir in Caldwell County and the Hickory Water Tower in Catawba County. The locations of these monitors are shown in Figure C2.



A is the Lenoir ozone monitoring site; B is the Taylorsville-Liledoun ozone monitoring site; C is the Hickory particle monitoring site. Circles around the monitors show the scale of representation: Lenoir is regional - 50 Km plus; Taylorsville Liledoun is urban - 4 to 50 Km; Hickory is neighborhood – 0.5 to 4 Km.

Figure C2. Locations of monitors in the Hickory-Lenoir-Morganton MSA

At the Taylorsville-Liledoun site, DAQ operates a seasonal ozone monitor. Figure C3 shows the site. Table C1 summarizes monitoring information for the site. Figure C4 through Figure C7 show views looking north, east, south and west. This site was established as the downwind site for the Hickory-Lenoir-Morganton MSA in 2013 to replace the Taylorsville-Waggin Trail site. The DAQ requested and received permission to combine the 2014 and 2015 data from the Liledoun site with the 2013 data from the Taylorsville site to provide a valid design value for recommended designations due in 2016. This site is the design value monitor for the MSA. 40 CFR 58 Appendix D requires the Hickory-Lenoir-Morganton MSA to have two ozone monitoring sites.

Figure C3. Taylorsville Liledoun ozone monitoring site, 37-003-0005

Table C1. Site Table for Taylorsville-Liledoun

Site Name:	Taylorsville Liledoun			**AQS Site Identification Number:**			37-003-0005		
Location:	700 Liledoun Road, Taylorsville, North Carolina								
CBSA:	Hickory-Lenoir-Morganton, NC			**CBSA #:**			25860		
Latitude	35.9139	**Longitude**	-81.19	**Datum:**	WGS84	**Elevation**	365 meters		
Parameter Name	**Method**			**Method Reference ID**		**Sample Duration**	**Sampling Schedule**		
Ozone	Instrumental with ultra violet photometry, 047			EQOA-0880-047		1-Hour	March 1 to Oct. 31		
Date Monitor Established:	Ozone						Aug. 2, 2013		
Nearest Road:	Liledoun Road	**Traffic Count:**	7400	**Year of Count:**	2014				
Parameter Name	**Distance to Road**	**Direction to Road**	**Monitor Type**	**Statement of Purpose**					
Ozone	219 meters	Southeast	SLAMS	Real-time AQI reporting and forecasting. Compliance w/NAAQS.					
Parameter Name	**Monitoring Objective**	**Scale**	**Suitable for Comparison to NAAQS**	**Proposal to Move or Change**					
Ozone	General Background	Urban	Yes	None					
Parameter Name	**Meets Part 58 Requirements for:**								
	Appendix A	**Appendix C**	**Appendix D**	**Appendix E**					
Ozone	Yes	Yes	Yes	Yes					
Parameter Name	**Probe Height**	**Distance to Support**	**Distance to Trees**	**Obstacles**					
Ozone	3.65 meters	1.06 meters	> 20 meters	None					

Figure C4. Looking north from the Taylorsville-Liledoun site

Figure C6. Looking east from the Taylorsville-Liledoun site

Figure C5. Looking west from the Taylorsville-Liledoun site

Figure C7. Looking south from the Taylorsville-Liledoun site

The Taylorsville-Liledoun site was established on Aug. 2, 2013, after DAQ discovered in January 2013 that Alexander County planned to establish a vehicle maintenance facility at the Waggin Trail site. Because these construction plans, once implemented, made the Waggin Trail site unacceptable for ozone monitoring, DAQ identified the Taylorsville-Liledoun site for the ozone monitor. As shown in Figure C8, the Taylorsville-Liledoun site is located almost exactly one mile south of the former Waggin Trail site, behind the Alexander County Board of Education building, 700 Liledoun Road, Taylorsville. A meteorological tower is operated by the State Climate Office in the same area where the ozone monitor is located. The Waggin Trail and Taylorsville-Liledoun site operated simultaneously from Aug. 2 through Oct. 31, 2013.

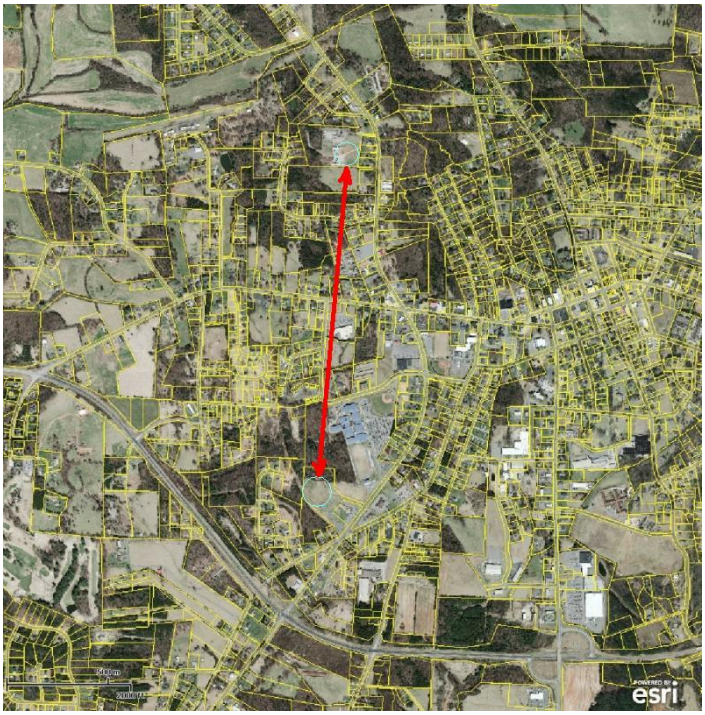


Figure C8. Relationship between old Waggin Trail site (to the north) and Taylorsville Liledoun site (to the south)

At **Lenoir,** 37-027-0003, the DAQ operates a seasonal ozone monitor, the second required ozone-monitor for the MSA. In 2013, DAQ added a special purpose sulfur dioxide monitor at Lenoir that operates every third year to provide data for prevention of significant deterioration, PSD, modeling for industrial expansion. The site is shown in Figure C9. Table C2 summarizes monitoring information for the site. Views looking north, northeast, east, southeast, south, southwest, west and northwest from the site are shown in Figure C10 to Figure C17.

Figure C9. Lenoir ozone and sulfur dioxide monitoring site

Table C2. Site Table for Lenoir

Site Name:	Lenoir			**AQS Site Identification Number:**		37-027-0003	
Location:	291 Nuway Circle, Lenoir, North Carolina						
MSA:	Hickory-Lenoir-Morganton, NC			**CBSA #:**		25860	
Latitude	35.935833	**Longitude**	-81.530278	**Datum:**	WGS84	**Elevation**	366 meters

Parameter Name	**Method**	**Method Reference ID**	**Sample Duration**	**Sampling Schedule**
Ozone	Instrumental with ultra violet photometry, 047	EQOA-0880-047	1-Hour	March 1 to Oct. 31
Sulfur dioxide	Instrumental with pulsed fluorescence, 060	EQSA-0486-060	1-Hour	Year-round; every third year

Date Monitor Established:		
	Ozone	Jan. 1, 1981
	Sulfur dioxide	Jan. 1, 2013

Nearest Road:	Nuway Circle	**Traffic Count:**	500	**Year of Count:**	2015

Parameter Name	**Distance to Road**	**Direction to Road**	**Monitor Type**	**Statement of Purpose**
Ozone	146 meters	East	SLAMS	Real-time AQI reporting & fore-casting. Compliance w/NAAQS.
Sulfur dioxide	146 meters	East	Special purpose	Prevention of significant deterioration, PSD, Modeling

Parameter Name	**Monitoring Objective**	**Scale**	**Suitable for Comparison to NAAQS**	**Proposal to Move or Change**
Ozone	General background	Regional	Yes	None
Sulfur dioxide	General background	Regional	Yes	None

	Meets Part 58 Requirements:			
Parameter Name	**Appendix A**	**Appendix C**	**Appendix D**	**Appendix E**
Ozone	Yes	Yes	Yes	Yes
Sulfur dioxide	Yes	Yes	Yes	Yes

Parameter Name	**Probe Height**	**Distance to Support**	**Distance to Trees**	**Obstacles**
Ozone	4.42 meters	1.5748 meters	>20 meters	None
Sulfur dioxide	4.485 meters	1.5748 meter	>20 meters	None

Figure C10. Looking north from the Lenoir site

Figure C11. Looking northeast from the Lenoir site

Figure C12. Looking northwest from the Lenoir site

Figure C13. Looking west from the Lenoir site

Figure C14. Looking southwest from the Lenoir site

Figure C15. Looking east from the Lenoir site

Figure C16. Looking southeast from the Lenoir site

Figure C17. Looking south from the Lenoir site

Figure C18. Hickory fine particle monitoring site

Figure C19. Looking north from the Hickory site

At the Hickory site, the DAQ operates an one-in-six-day fine particle collocated federal reference method, FRM, monitor and a continuous fine particle monitor. The one-in-six-day speciation fine particle SASS and University Research Glass, URG, monitors and the two one-in-six-day high volume PM10 monitors were shut down in 2014. In 2015 a second continuous fine particle monitor that recently received equivalency status was added to the site so DAQ could evaluate its performance. On Jan. 1, 2017, the DAQ made the second continuous monitor the primary monitor and shut down the primary FRM monitor at the site. Figure C18 through Figure C26 show the site as well as views looking north, northeast, east, southeast, south, southwest, west and northwest. Table C3 summarizes monitoring information for the site.

Figure C20. Looking northeast from the Hickory site

Figure C21. Looking northwest from the Hickory site

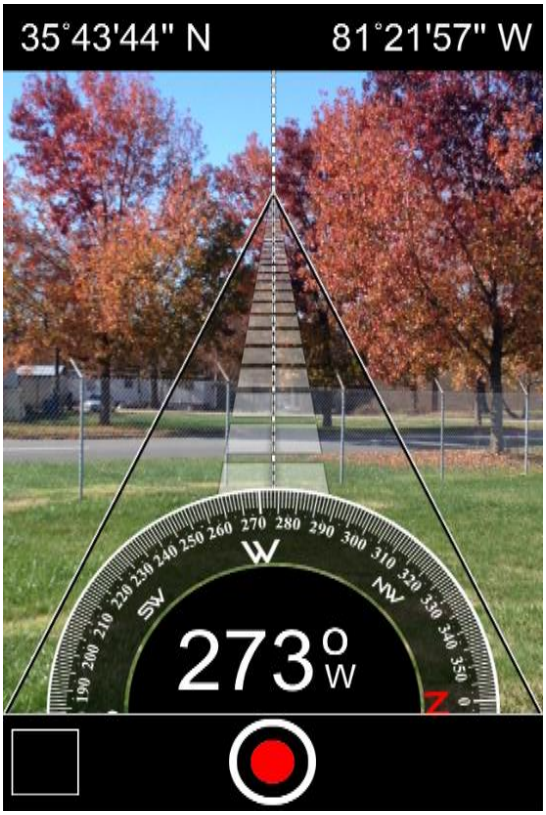


Figure C22. Looking west from the Hickory site

Figure C23. Looking southwest from the Hickory site

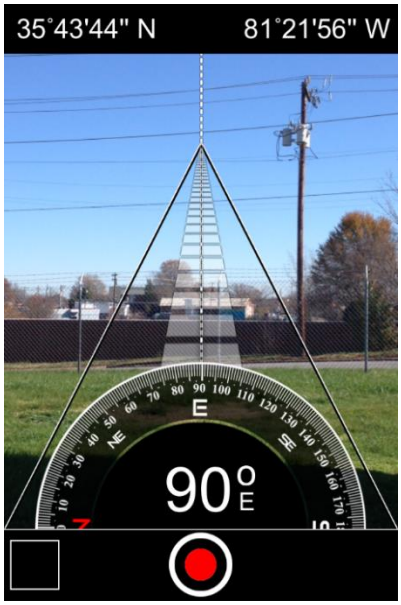


Figure C24. Looking east from the Hickory site

Figure C25. Looking southeast from the Hickory site

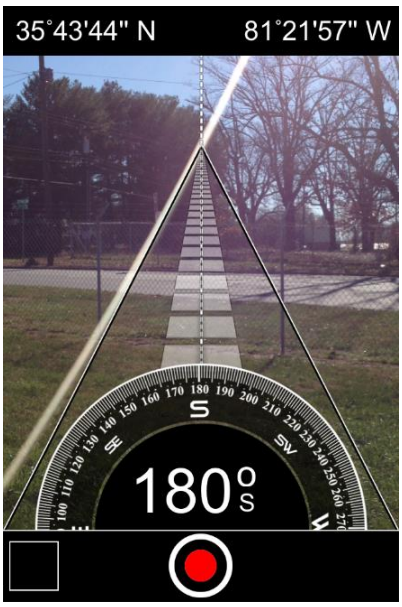


Figure C26. Looking south from the Hickory site

Table C3. Site Table for Hickory

Site Name:	Hickory			**AQS Site Identification Number**	37-035-0004
Location:	1650 1st Street, Hickory, North Carolina				
MSA:	Hickory-Lenoir-Morganton, NC			**CBSA #:**	25860
Latitude	35.728889	**Longitude**	-81.365556	**Datum:**	WGS84
Elevation	333 meters				

Parameter Name	**Method**	**Method Reference ID**	**Sample Duration**	**Sampling Schedule**
PM 2.5 local conditions, FRM	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC – Gravimetric Analysis	RFPS-1006-145	24-Hour	Every Sixth Day, Year Round
PM 2.5 local conditions, BAM 1022	Met One BAM-1022 Mass Monitor w/ VSCC	EQPM-1013-209	1-Hour	Year Round

Date Monitor Established:	PM 2.5 Local Conditions	Jan. 1, 1999
	PM 2.5 local conditions, BAM 1022	Sept. 14, 2015

Nearest Road:	2nd Avenue SW	**Traffic Count:**	3400	**Year of Count:**	2013

Parameter Name	**Distance to Road**	**Direction to Road**	**Monitor Type**	**Statement of Purpose**
PM 2.5 local conditions, FRM	22.25 meters	South southeast	SLAMS, QA Collocated	Compliance w/NAAQS. AQI reporting. SIP required monitor.
PM 2.5 local conditions, BAM 1022	21.34 meters	South southeast	SLAMS	Compliance w/NAAQS. AQI reporting. SIP required monitor.

Parameter Name	**Monitoring Objective**	**Scale**	**Suitable for Comparison to NAAQS**	**Proposal to Move or Change**
PM 2.5 local conditions, FRM	Population Exposure	Neighborhood	Yes	None
PM 2.5 local conditions, BAM 1022	Population Exposure	Neighborhood	No	None

Parameter Name	**Meets Part 58 Appendix A Requirements**	**Meets Part 58 Appendix C Requirements**	**Meets Part 58 Appendix D Requirements**	**Meets Part 58 Appendix E Requirements**
PM 2.5 local conditions, FRM	Yes	Yes	Yes	Yes
PM 2.5 local conditions, BAM 1022	Yes	Yes	Yes	Yes

Parameter Name	**Probe Height**	**Distance to Support**	**Distance to Trees**	**Obstacles**
PM 2.5 local conditions, FRM	2.3368 meters	2.0574 meters	>20 meters	None
PM 2.5 local conditions, BAM 1022	2.4892 meters	2.1082 meters	>20 meters	None

Both one-in-six day PM10 monitors were shut down on Dec. 31, 2014. The PM10 monitor was not required by 40 CFR 58 Appendix D, the DAQ did not use the PM10 data from this site for permit modeling and the monitor was no longer needed to ensure an adequate PM10 network. The United States Environmental Protection Agency, EPA, ended the funding for the analysis of the SASS and URG samples in January 2015. Thus, the DAQ also shut down these monitors in 2014. At the end of December 2015, the well impactor ninety-six, WINS, on the FRM was replaced with a very sharp cut cyclone, VSCC. This change was made because the VSCC is easier and less expensive to maintain.

The Hickory-Lenoir-Morganton MSA did not need to do lead monitoring to meet the 2010 **lead monitoring** requirements. It has no facilities within the MSA reporting over one half tons of lead emissions to the air. [1]

The 2015 **ozone monitoring** requirements do not require additional monitors in the Hickory-Lenoir-Morganton MSA. The MSA has the minimum number of monitors required by 40 CFR 58 Appendix D for population exposure monitoring in urban areas. Seasonal ozone monitoring started on March 1 instead of April 1 beginning in 2017.

The Hickory-Lenoir-Morganton MSA did not need additional monitors to comply with the 2010 **nitrogen dioxide monitoring** requirements. It is too small to require area-wide monitors or near roadway monitoring.

The DAQ will not need to add source-oriented monitors in the Hickory-Lenoir-Morganton MSA to comply with the 2010 **sulfur dioxide monitoring** requirements for source-oriented monitoring. No additional monitors were required to comply with the population weighted emission index, PWEI, monitoring requirements because the total sulfur dioxide emissions in this MSA multiplied by the total MSA population does not result in a high enough index to require monitoring. This area will also not be required to operate near road **carbon monoxide** and **fine particle** monitors because the population is under one million.

(2) Cleveland County – Shelby Micropolitan Statistical Area

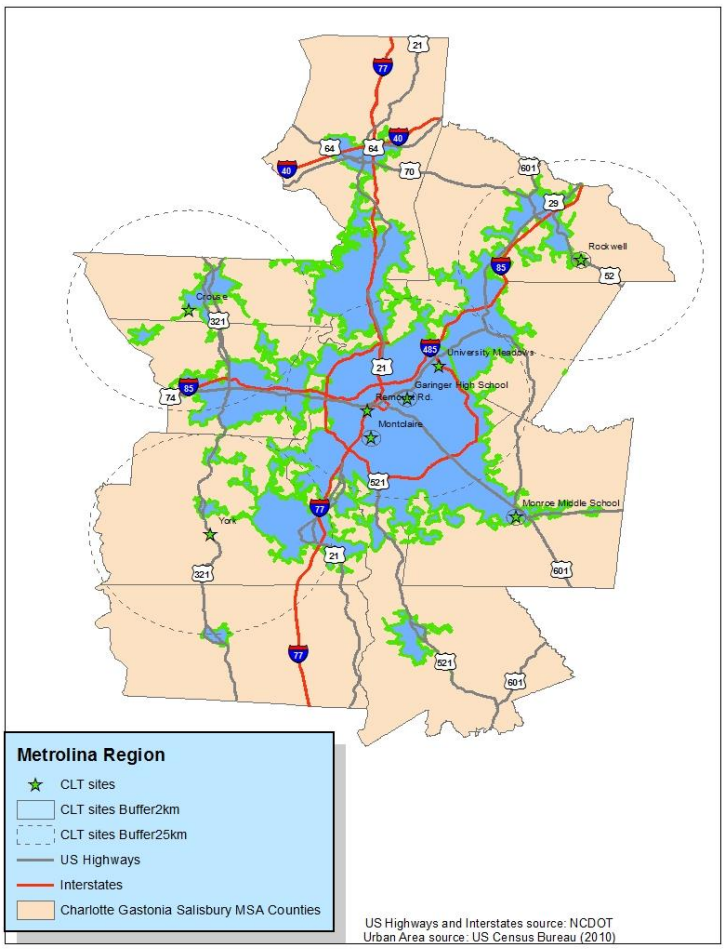
Cleveland County is part of the Charlotte-Concord combined statistical area. The micropolitan statistical area of Shelby is in the county. The DAQ currently does not operate any monitors in Cleveland County. The December 2010 revisions to the **lead monitoring** network regulations did not result in additional monitoring in Cleveland County. This county is not required to add ozone monitors because the area does not have any MSAs that must meet the minimum number of monitors required by 40 CFR 58 Appendix D for population exposure monitoring in urban areas. Cleveland County is too small to require area-wide nitrogen dioxide monitors or near roadway monitoring for nitrogen dioxide, carbon monoxide and fine particles. The 2010 **sulfur dioxide** monitoring requirements also did not result in additional monitoring in this area because there are no large sources of sulfur dioxide in this county. This county is also not required to monitor for **carbon monoxide** because the population is too small to require near road carbon monoxide monitoring.

(3) Charlotte-Gastonia-Concord MSA

The Charlotte-Gastonia-Concord MSA consists of 10 counties: Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, Rowan and Union in North Carolina and Chester, Lancaster and York in South Carolina. The major urban areas are Charlotte, Gastonia and Concord in North Carolina and Rock Hill in South Carolina. This MSA is one of the fastest growing areas in North

[1] United States Environmental Protection Agency. 2015 Toxic Release Inventory, released March 2017, available on the worldwide web at https://iaspub.epa.gov/triexplorer/tri_release.chemical..

Carolina. Currently DAQ operates three monitoring sites in the Charlotte-Gastonia-Concord MSA, Mecklenburg County Air Quality, MCAQ, operates four and the South Carolina Department of Health and Environmental Conservation, DHEC, operates one. These sites are located at Crouse in Lincoln County, Remount Road, Garinger High School, University Meadows and Montclaire in Charlotte in Mecklenburg County, Rockwell in Rowan County, Monroe in Union County and York in York County, South Carolina. The locations of these monitors are shown in Figure C27.



University Meadows, Crouse Monroe, Rockwell and York are ozone sites; Montclaire is a particle site; Remount Road is a multipollutant near-road site; Garinger High School is a multi-pollutant site. The circles approximate the scale of representation: urban – 4 to 50 Km for Crouse, Rockwell, York and University Meadows; microscale - ~10 to 100 meters for Remount Road and neighborhood – 0.5 to 4 Km for the other sites.

Figure C27. Monitoring sites in the Charlotte-Concord-Gastonia MSA

The DAQ shut down the **Enochville** seasonal ozone monitor in Rowan County at the end of the 2013 ozone season and the Grier Middle School fine particle monitoring site in Gaston County in February 2015. At the end of the 2014 ozone season MCAQ was evicted from the Arrowood site in Mecklenburg County and at the end of the 2015 ozone season MCAQ was evicted from the County Line site also in Mecklenburg County. Mecklenburg County Air Quality established the University Meadows site on April 1, 2016, to replace the County Line site. MCAQ also shut down the Fire Station #11 PM10 site on June 29, 2016, due to issues at the site and the Oakdale fine particle monitoring site at the end of 2016 so the monitor could be moved to the Remount Road near-road site. The DAQ shut down the **Grier Middle School** site on Feb. 25, 2015. The

NAAQS and AQI monitors were not required by 40 CFR 58 Appendix D, the DAQ no longer needed the continuous monitor at the site for air quality forecasting and because of the lower fine particle concentrations throughout the state, the monitors were no longer needed to ensure an adequate fine particle network. The MCAQ sites and monitors are discussed in Appendix B to Volume 1. Only the three DAQ sites (Crouse in Lincoln County, Rockwell in Rowan County and Monroe in Union County) are further discussed in this subsection.

At the **Crouse** site in Lincoln County, the DAQ operates a seasonal ozone monitor. The site is shown in Figure C28. Monitoring information for the site is summarized in Table C4. Views looking north, northeast, east, southeast, south, southwest, west and northwest are provided in Figure C29 through Figure C36. The site was originally established in 1993 as the secondary downwind site for the Charlotte-Concord-Gastonia MSA. Today it provides valuable information on ozone concentrations in Lincoln County and could be useful for keeping parts of the county from being designated as in nonattainment with the ozone standard.

Figure C28. Crouse ozone monitoring site

Table C4. Site Table for Crouse

Site Name:	Crouse		**AQS Site Identification Number**		37-109-0004
Location:	1487 Riverview Road, Lincolnton, North Carolina				
CBSA:	Charlotte-Gastonia-Concord, NC-SC		**CBSA #:**		16740
Latitude	35.438556	**Longitude** -81.276750	**Datum:**		WGS84
Elevation	270 meters				
Parameter Name	**Method**	**Method Reference ID**	**Sample Duration**		**Sampling Schedule**
Ozone	Instrumental with ultra violet photometry, 047	EQOA-0880-047	1-Hour		April 1 to Oct. 31
Date Monitor Established:	Ozone				July 1, 1993
Nearest Road:	Riverview Road	**Traffic Count:** 1400	**Year of Count:**		2013
Parameter Name	**Distance to Road**	**Direction to Road**	**Monitor Type**		**Statement of Purpose**
Ozone	62 meters	Southwest	SLAMS		Compliance w/NAAQS. Real-time AQI reporting & forecasting.
Parameter Name	**Monitoring Objective**	**Scale**	**Suitable for Comparison to NAAQS**		**Proposal to Move or Change**
Ozone	General background	Urban	Yes		Season will start March 1 in 2017
Parameter Name	**Meets Requirements of 40 CFR Part 58**				
	Appendix A	**Appendix C**	**Appendix D**		**Appendix E**
Ozone	Yes	Yes	Yes		Yes

Table C4. Site Table for Crouse

Parameter Name	Probe Height (m)	Distance to Support	Distance to Trees	Obstacles
Ozone	3.5	1.3 meter	>20 meters	None

Figure C29. Looking north from the Crouse site

Figure C30. Looking northwest from the Crouse site

Figure C31. Looking northeast from the Crouse site

Figure C32. Looking east from the Crouse site

Figure C33. Looking west from the Crouse site

Figure C34. Looking southwest from the Crouse site

Figure C35. Looking southeast from the Crouse site

Figure C36. Looking south from the Crouse site

At **Rockwell** DAQ operates a year-round ozone monitor. The continuous fine particle nitrate monitor and aethalometer as well as a reactive-oxides-of-nitrogen monitor that operated year-round at this site were shut down in 2016. The DAQ operated these monitors to provide information for planning purposes and to evaluate state regulations. These monitors were not required by 40 CFR 58 Appendix D or any other EPA regulations. Due to staffing considerations, the age of the equipment and the decision that additional data provided by these monitors were not needed for planning purposes, the DAQ shut down the aethalometer on Aug. 8, 2016, because the monitor was broken and removed from service, the reactive oxides of nitrogen monitor on Nov. 3, 2016, and the nitrate monitor on Nov. 4, 2016.

The one-in-three-day fine particle FRM monitor, one-in-six day collocated fine particle monitor and continuous fine particle monitor were shut down at the end of 2015. The one-in-six-day speciation fine particle monitors were shut down in January 2015 because the EPA stopped funding the sample analysis for them. Pictures of the site as well as views looking north, northeast, east, southeast, south, southwest, west and northwest are provided in Figure C37 through Figure C45. Monitoring information for the site is summarized in Table C5.

Figure C37. The Rockwell ozone site, 37-159-0021

Figure C38. Looking north from the Rockwell site

Figure C39. Looking northwest from the Rockwell site

Figure C40. Looking northeast from the Rockwell site

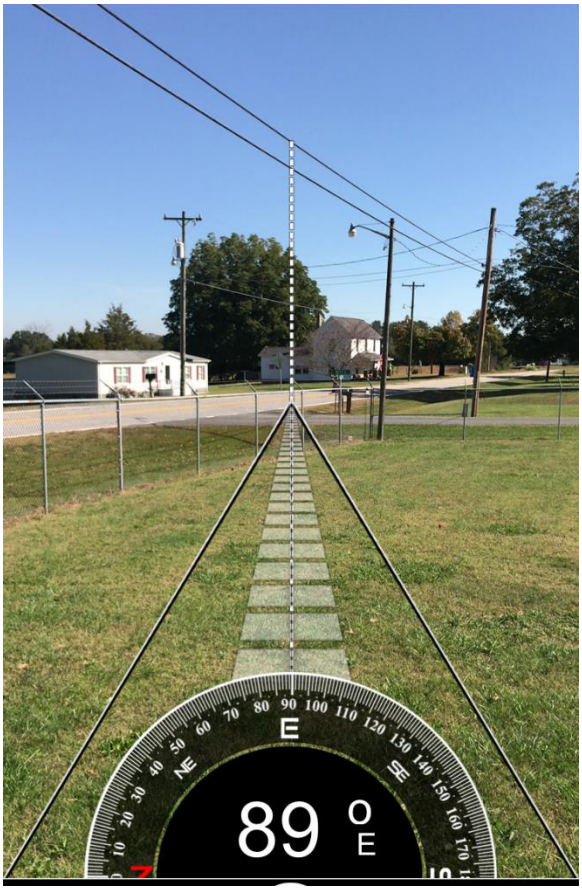


Figure C41. Looking east from the Rockwell site

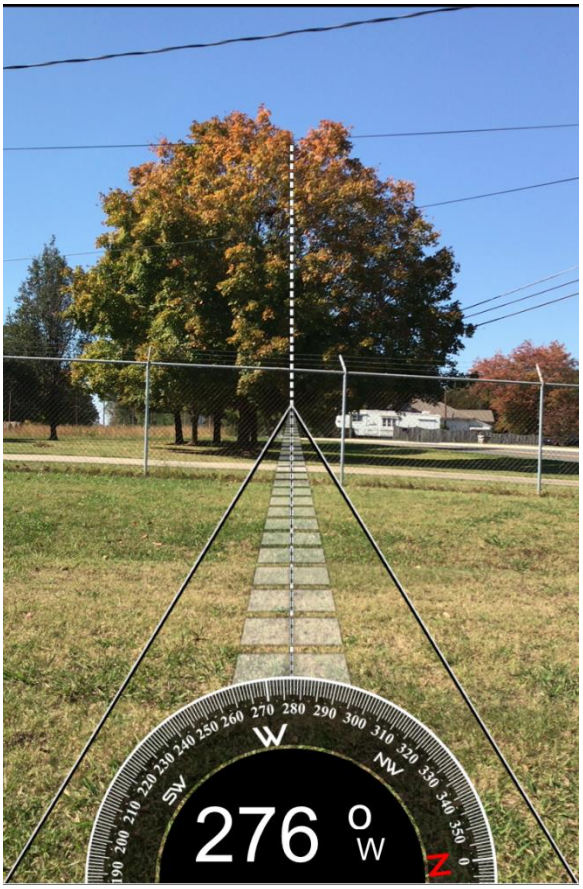


Figure C42. Looking west from the Rockwell site

Figure C43. Looking southwest from the Rockwell site

Figure C44. Looking southeast from the Rockwell site

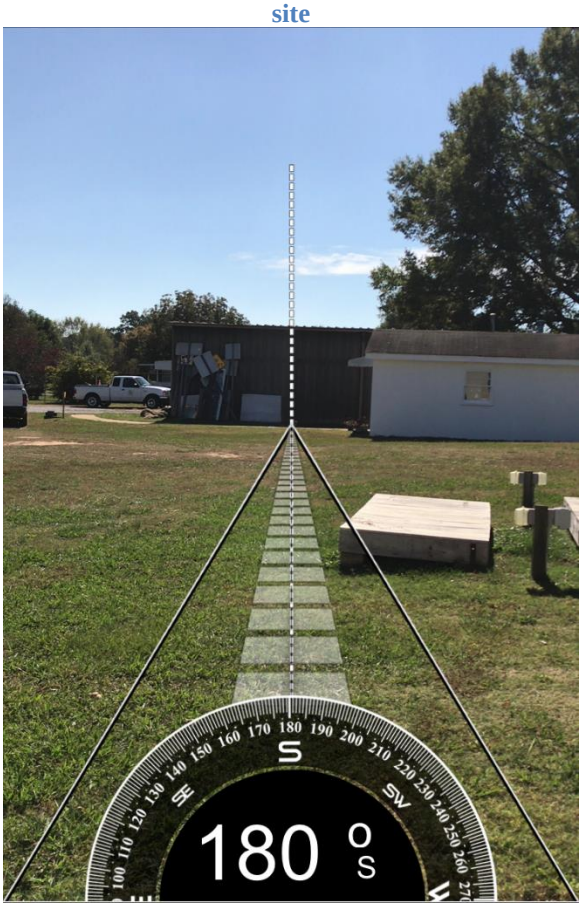


Figure C45. Looking south from the Rockwell site

Table C5. Site Table for Rockwell

Site Name:	Rockwell	**AQS Site Identification Number**	37-159-0021		
Location:	316 West Street, Rockwell, North Carolina				
CBSA:	Charlotte-Gastonia-Concord, NC-SC		**CBSA #:**	16740	
Latitude	35.551868	**Longitude**	-80.395039	**Datum:**	WGS84
Elevation	240 meters				

Parameter Name	**Method**	**Method Reference ID**	**Sample Duration**	**Sampling Schedule**
Ozone	Instrumental with ultra violet photometry, 047	EQOA-0880-047	1-Hour	Year-round

Date Monitor Established:	Ozone	April 1, 1993
Nearest Road:	Gold Hill Road	
Traffic Count:	630	**Year of Count:** 2014

Parameter Name	**Distance to Road**	**Direction to Road**	**Monitor Type**	**Statement of Purpose**
Ozone	17 meters	North	Special purpose	Ozone precursor monitoring. Compliance w/NAAQS. Modeling.

Parameter Name	**Monitoring Objective**	**Scale**	**Suitable to Compare to NAAQS**	**Proposal to Move or Change**
Ozone	Highest concentration	Urban	Yes	None

	Meets Part 58 Requirements for:			
Parameter Name	**Appendix A**	**Appendix C**	**Appendix D**	**Appendix E**
Ozone	Yes	Yes	No requirements	Yes

Parameter Name	**Probe Height (m)**	**Distance to Support**	**Distance to Trees**	**Obstacles**
Ozone	3.5	1.1 meters	> 20 meters	None

At the **Monroe Middle School** site, the DAQ operates a seasonal ozone monitor. Figure C46 shows the site. Table C6 summarizes monitoring information for the site. Figure C47 through Figure C50 provide views looking north, east, south and west. This ozone-monitoring site is one of six for the MSA. 40 CFR 58 Appendix D requires the Charlotte-Gastonia-Concord MSA to have two ozone monitoring sites. The site is located at the goal end of a soccer field so soccer balls sometimes damage the probe. The DAQ has investigated moving the site to another part of Monroe; however, this site meets the siting criteria in 40 CFR 58 Appendix E better than any nearby alternative location. The DAQ has also added a fence on the roof of the building between the probe and soccer field to protect the probe.

Figure C46. Monroe ozone monitoring site, 37-179-0003

Table C6. Site Table for Monroe Middle School

Site Name:	Monroe Middle School			**AQS Site Identification Number**	37-179-0003
Location:	701 Charles Street, Monroe, North Carolina				
CBSA:	Charlotte-Gastonia-Concord, NC-SC			**CBSA #:**	16740
Latitude	34.973889	**Longitude**	-80.540833	**Datum:**	WGS84
Elevation	184 meters				

Parameter Name	**Method**	**Method Reference ID**	**Sample Duration**	**Sampling Schedule**
Ozone	Instrumental with ultra violet photometry, 047	EQOA-0880-047	1-Hour	March 1 to Oct. 31

Date Monitor Established:	Ozone				April 7, 1999
Nearest Road:	Charles Street	**Traffic Count:**	5100	**Year of Count:**	2014

Parameter Name	**Distance to Road**	**Direction to Road**	**Monitor Type**	**Statement of Purpose**
Ozone	71.3 meters	West	Special Purpose	Compliance w/NAAQS. Real-time AQI reporting & forecasting.

Parameter Name	**Monitoring Objective**	**Scale**	**Suitable for Comparison to NAAQS**	**Proposal to Move or Change**
Ozone	Population Exposure	Neighborhood	Yes	None

Table C6. Site Table for Monroe Middle School

Parameter Name	Meets Part 58 Appendix A Requirements	Meets Part 58 Appendix C Requirements	Meets Part 58 Appendix D Requirements		Meets Part 58 Appendix E Requirements
Ozone	Yes	Yes	Yes		Yes
Parameter Name	**Probe Height (m)**	**Distance to Support**		**Distance to Trees**	**Obstacles**
Ozone	3.9	1 meter		>20 meters	None

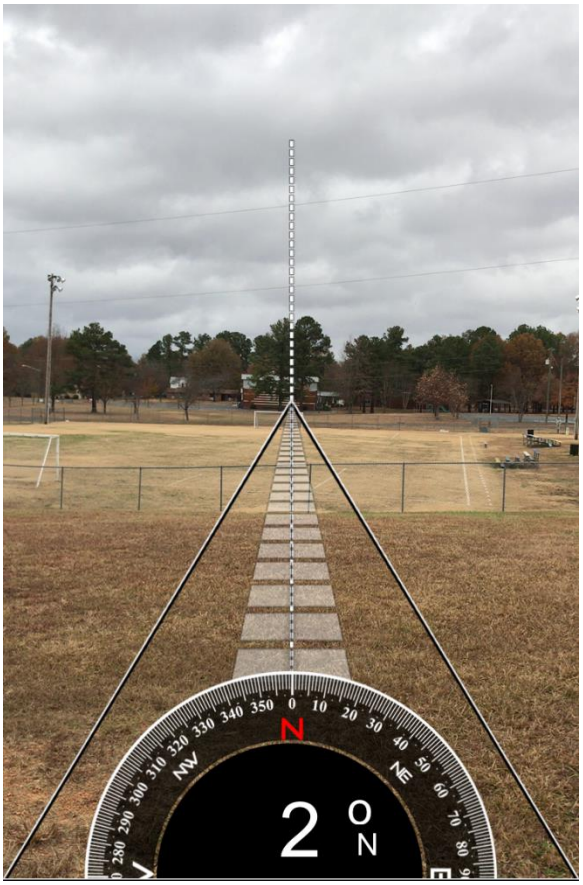


Figure C47. Looking north from the Monroe site

Figure C48. Looking east from the Monroe site

Figure C49. Looking west from the Monroe site

Figure C50. Looking south from the Monroe site

The DAQ continues to operate the Monroe site because it provides valuable information for developing nonattainment boundaries and has been used in the past to keep parts of Union County from being designated as in nonattainment with the ozone standard.

Changes to the **lead monitoring** requirements in 2010 resulted in additional monitoring in the Charlotte-Gastonia-Concord MSA. This MSA has an NCore monitoring site and began monitoring at that site for lead in the ambient air Dec. 27, 2011. This lead monitoring ended on April 30, 2016, when new monitoring regulations became effective.[2]

The 2015 **ozone monitoring** requirements did not result in additional monitoring in the Charlotte-Gastonia-Concord MSA. The MSA currently exceeds the minimum number of monitors required by 40 CFR 58 Appendix D for population exposure monitoring in urban areas. Seasonal ozone monitoring will start on March 1 instead of April 1 beginning in 2017.

The 2010 **nitrogen dioxide** monitoring requirements required additional monitoring in the Charlotte-Gastonia-Concord MSA. The MSA is required to have an area-wide monitor starting in 2013 and a near-roadway monitor starting in 2014. The 2010 **sulfur dioxide** monitoring

[2] Revisions to Ambient Monitoring Quality Assurance and Other Requirements, Federal Register, Vol. 81, No. 59, Monday, March 28, 2016, available on the worldwide web at https://www.gpo.gov/fdsys/pkg/FR-2016-03-28/pdf/2016-06226.pdf.

requirements also required additional monitoring in the Charlotte-Gastonia-Concord MSA. This MSA was required to have two population-weighted emission index, PWEI, monitors within the MSA because there were large sources of sulfur dioxide as well as large numbers of people in the MSA. These PWEI monitors were located at the Garinger High School monitoring site in Charlotte and at the York monitoring site in York, South Carolina. However, a decline in sulfur dioxide emissions result in only one PWEI monitor being required. Thus, the York sulfur dioxide monitor was shut down in June 2014. The changes in the **carbon monoxide monitoring** requirements also resulted in more monitoring in this MSA. Because the population in the MSA is over one million people, a near road carbon monoxide monitor started operating at Remount Road in 2017.

(4) Stanly County – Albemarle Micropolitan Statistical Area

Stanly County is part of the Charlotte- Concord combined statistical area. The Albemarle micropolitan statistical area is in Stanly County. The DAQ does not operate any monitoring sites in this county.

The expansion of the **lead monitoring** network to support the lower lead NAAQS did not result in monitoring in Stanly County. The 2015 **ozone monitoring** requirements also did not result in more monitoring in this area. This area does not have any MSAs requiring a minimum number of monitors by 40 CFR 58 Appendix D for population exposure monitoring in urban areas.

The 2010 **nitrogen dioxide** monitoring requirements did not result in additional monitoring in Stanly County. The area is too small to require area-wide monitors or near roadway monitoring. The 2010 **sulfur dioxide** monitoring requirements did not require any additional monitoring in this area because the population and sulfur dioxide emissions do not exceed the required threshold for monitoring. The 2011 changes to the **carbon monoxide monitoring** requirements also did not require additional monitors in this area because the population is too small.

Appendix C.1 Annual Network Site Review Forms for 2016

Taylorsville-Liledoun

Lenoir

Hickory

Crouse

Rockwell

Monroe Middle School in Monroe

Site Review Form Calendar Year 2016

Site Information

Region MRO	**Site Name** Taylorsville Liledoun	**AQS Site # 37-003-0005**
Street Address 700 Liledoun Road		**City** Taylorsville
Urban Area Not in an Urban Area	**Core-based Statistical Area** Hickory-Lenoir-Morganton, NC	
Enter Exact		**Method of Measuring**
Longitude -81.1910	**Latitude** 35.9138	
In Decimal Degrees	In Decimal Degrees	**Other (explain)** **Explanation: Google Maps**
Elevation Above/below Mean Sea Level (in meters)		**362**

Name of nearest road to inlet probe Liledoun Road ADT 7400 Year Choose an item 2014

Comments: Used http://www.ncdot.gov/travel/statemapping/trafficvolumemaps

Distance of site to nearest major road (m) 526.00 Direction from site to nearest major road SW

Name of nearest major road HWY 64 ADT 9500 Year 2015

Comments: Used http://www.ncdot.gov/travel/statemapping/trafficvolumemaps

Site located near electrical substation/high voltage power lines?	Yes ☐ No ☒
Distance of site to nearest railroad track	(m) 2152 Direction to RR NE ☒NA
OPTIONAL Distance of site to nearest power pole w/transformer	(m) 221 Direction SE
Distance between site and drip line of water tower (m) _____ Direction from site to water tower _____	☒NA

Explain any sources of potential bias; include cultivated fields, loose bulk storage, stacks, vents, railroad tracks, construction activities, fast food restaurants, and swimming pools.

None Noted

ANSWER ALL APPLICABLE QUESTIONS:

Parameters	Monitoring Objective	Scale	Monitor Type
☐ NA ☐ SO_2 (NAAQS) ☐ SO_2 (trace-level) ☐ NO_2 (NAAQS) ☐ $HSNO_y$ ☒ O_3 ☐ NH_3 ☐ Hydrocarbon ☐ Air Toxics ☐ CO (trace-level)	☒General/Background_____ ☐Highest Concentration_____ ☐Max O3 Concentration_____ ☐Population Exposure_____ ☐Source Oriented_____ ☐Transport_____ ☐Upwind Background_____ ☐Welfare Related Impacts _____	☐Micro_____ ☐Middle_____ ☐ Neighborhood_____ ☒Urban_____ ☐Regional_____	☒SLAMS _____ ☐SPM_____ **Monitor Network Affiliation** ☐NCORE_____ ☐Unofficial PAMS_____

Probe inlet height (from ground) 2-15 m? Yes ☒ No ☐ Give actual measured height from ground (meters) 3.65

Distance of outer edge of probe inlet from horizontal (wall) and/or vertical (roof) supporting structure > 1 m? Yes ☒ No ☐

Actual measured distance from outer edge of probe to supporting structure (meters) 1.06

Distance of outer edge of probe inlet from other monitoring probe inlets > 1 m? Yes ☒ No ☐ NA ☐

Is probe > 20 m from the nearest tree drip line? Yes ☒ *No ☐ (answer *'d questions)

*Is probe > 10 m from the nearest tree drip line? Yes ☐ *No ☐

*Distance from probe to tree (m) _____ Direction from probe to tree ___ *Height of tree (m) _____

Are there any obstacles to air flow? *Yes ☐ (answer *'d questions) No ☒

*Identify obstacle _____ Distance from probe inlet (m) _____ Direction from probe inlet to obstacle ___

*Is distance from inlet probe to obstacle at least twice the height that the obstacle protrudes above the probe? Yes ☐ No ☐

Distance of probe to nearest traffic lane (m) 219 Direction from probe to nearest traffic lane SE

Site Review Form Calendar Year 2016

Parameters	Monitoring Objective	Scale	Site Type
☐ NA Air flow < 200 L/min ☐ PM2.5 FRM ☐ PM10 FRM ☒ PM10 Cont. (BAM) ☐ PM10-2.5 FRM ☐ PM10-2.5 BAM ☐ PM10 Lead (PB) ☐ PM2.5 Cont. (BAM) ☐ PM2.5 Spec. (SASS) ☐ PM2.5 Spec. (URG) ☐ PM2.5 Cont. Spec.	☒ General/Background _____ ☐ Highest Concentration _____ ☐ Population Exposure _____ ☐ Source Oriented _____ ☐ Transport _____ ☐ Welfare Related Impacts _____	☐ Micro _____ ☐ Middle _____ ☐ Neighborhood _____ ☒ Urban _____ ☐ Regional _____	☐ SLAMS _____ ☒ SPM_____ **Monitor Network Affiliation** ☐ NCORE _____ ☐ SUPPLEMENTAL SPECIATION_____ **Monitor NAAQS Exclusion** ☐ NONREGULATORY_____

Probe inlet height (from ground) ☐ < 2 m _____ ☒ 2-7m _____ ☐ 7-15 m _____ ☐ > 15 m _____
Actual measured distance from probe inlet to ground (meters) 2.3876

Distance of outer edge of probe inlet from horizontal (wall) and/or vertical (platform or roof) supporting structure > 2 m?
Actual measured distance from outer edge of probe inlet to supporting structure (meters) 2.032 Yes ☒ No ☐

Distance (Y) between outer edge of probe inlets of any low volume monitor and any other low volume monitor at the site = 1 m or greater?	Yes ☐ No ☐ NA ☒
Distance (Y) between outer edge of all low volume monitor inlets and any Hi-Volume PM-10 or TSP inlet = 2 m or greater?	Yes ☐ No ☐ NA ☒

Are collocated PM2.5 Monitors (Two FRMs, FRM & BAM, FRM & TEOM, BAM & TEOM) Located at Site? *Yes ☐ (answer *'d questions) No ☒ NA ☐

* Entire inlet opening of collocated PM 2.5 samplers (X) within 2 to 4 m of each other?	Yes ☐ No ☐ Give actual (meters) _____
*Are collocated PM2.5 sampler inlets within 1 m vertically of each other?	Yes ☐ No ☐ Give actual (meters) _____

Is an URG 3000 monitor collocated with a SASS monitor at the site? *Yes ☐ (answer *'d questions) No ☐ NA ☒
* Entire inlet opening of collocated speciation samplers inlets (X) within 2 to 4 m of each other? Yes ☐ No ☐
Give actual (meters) _____
* Are collocated speciation sampler inlets within 1 m vertically of each other? Yes ☐ No ☐ Give actual (meters)_____

Is a low-volume PM10 monitor collocated with a PM2.5 monitor at the site to measure PM10-2.5? *Yes ☐ (answer *'d questions) No ☒ NA ☐

* Entire inlet opening of collocated PM10 and PM2.5samplers for PM10-2.5 (X) within 2 to 4 m of each other?	Yes ☐ No ☐
*Are collocated PM10 and PM2.5 sampler inlets within 1 m vertically of each other?	Yes ☐ No ☐

Is probe > 20 m from the nearest tree drip line? Yes ☒ *No ☐ (answer *'d questions)
*Is probe > 10 m from the nearest tree drip line? Yes ☐ *No ☐
*Distance from probe to tree (m) _____ Direction from probe to tree ___ *Height of tree (m) _____

Are there any obstacles to air flow? *Yes ☐ (answer *'d questions) No ☒
*Identify obstacle ____ Distance from probe inlet (m) _____Direction from probe inlet to obstacle ___
*Is distance from inlet probe to obstacle at least twice the height that the obstacle protrudes above the probe? Yes ☐No ☐
Distance of probe to nearest traffic lane (m) 219 Direction from probe to nearest traffic lane SE

RECOMMENDATIONS:

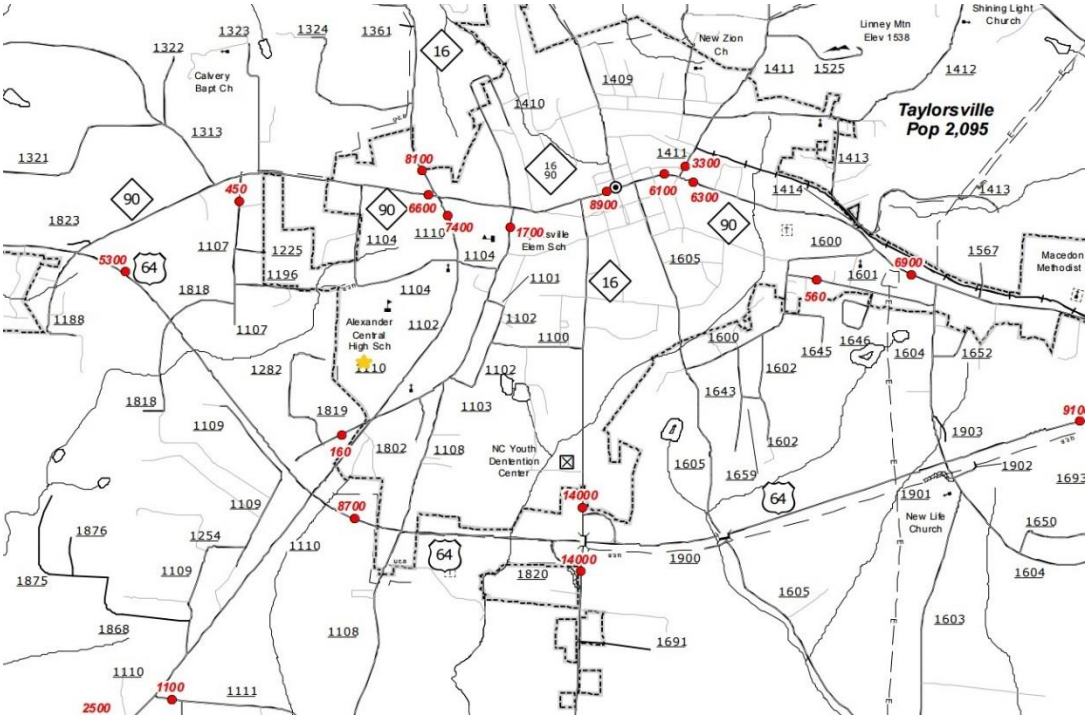
1) Maintain current site status? Yes ☒ *No ☐ (answer *'d questions)
*2) Change monitoring objective? Yes ☐ (enter new objective _____) No ☐-
*3) Change scale of representativeness? Yes ☐ (enter new scale _) No ☐
*4) Relocate site? Yes ☐ No ☐

Comments: PM10 BAM start-up was 3/23/2016. This monitor will operate through 4/1/2017

Date of Last Site Pictures 10/28/2016 New Pictures Submitted? Yes ☒ No ☐

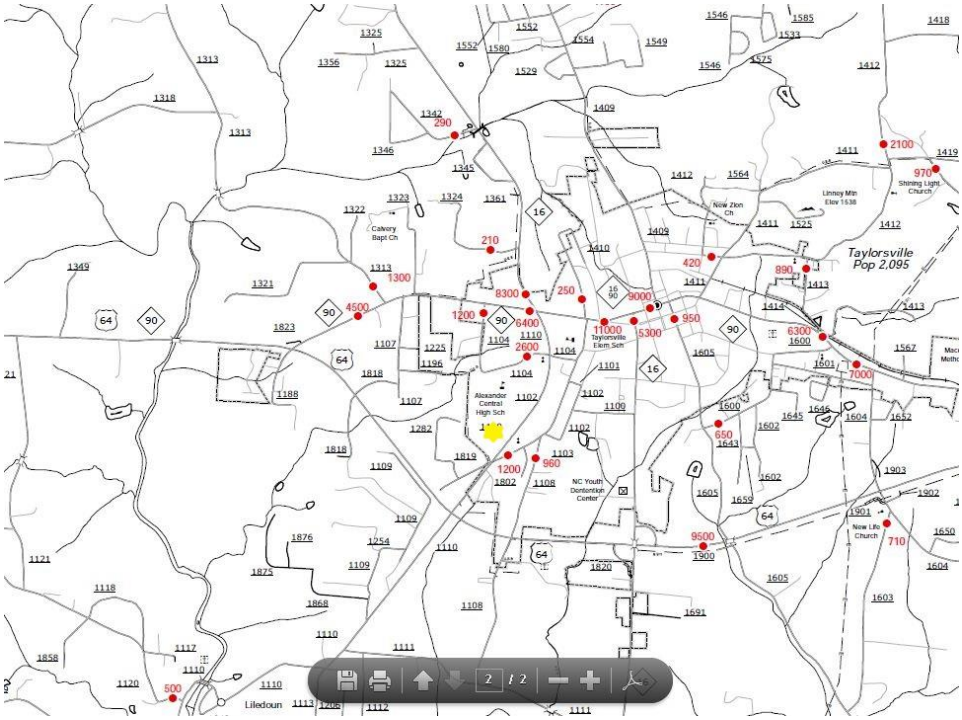
Reviewer Sandra Sherer Date October 28, 2016

Ambient Monitoring Coordinator D. Manning Date11/26/2016



2014 Annual Average Daily Traffic, AADT, star represents location of the Taylorsville-Liledoun monitoring station

AADT obtained from the North Carolina Department of Transportation Traffic Survey Unit



2015 Annual Average Daily Traffic, AADT, star represents location of the Taylorsville-Liledoun monitoring station

AADT obtained from the North Carolina Department of Transportation Traffic Survey Unit

Site Review Form Calendar Year 2016

Site Information

Region ARO	**Site Name** LENOIR	**AQS Site # 37-027-0003**
Street Address-291 Nuway Circle		**City Lenoir**
Urban Area Not in an Urban Area	**Core-based Statistical Area** None	
Enter Exact		
Longitude -81.530614	**Latitude** 35.935934	**Method of Measuring**
In Decimal Degrees	In Decimal Degrees	___ **Explanation: Google Earth**
Elevation Above/below Mean Sea Level (in meters)		**372**

Name of nearest road to inlet probe Nuway Circle ADT 500 Year Choose an item2015
Comments: NCDOT Traffic Volume map
Distance of site to nearest major road (m) 146.00 Direction from site to nearest major road E
Name of nearest major road Hwy 321 ADT 23000 Year Choose an item2015
Comments: NCDOT Traffic Volume map

Site located near electrical substation/high voltage power lines?	Yes ☒ No ☐	
Distance of site to nearest railroad track	(m) 1016 Direction to RR WSW	☐ NA
OPTIONAL Distance of site to nearest power pole w/transformer	(m) 73 Direction ENE	
Distance between site and drip line of water tower (m) _____	Direction from site to water tower _____	☒ NA

Explain any sources of potential bias; include cultivated fields, loose bulk storage, stacks, vents, railroad tracks, construction activities, fast food restaurants, and swimming pools.

_____

ANSWER ALL APPLICABLE QUESTIONS:

Parameters	Monitoring Objective	Scale	Monitor Type
☒ Ozone (O_3)	☒ General/Background ☐ Highest Concentration ☐ Max O3 Concentration ☐ Population Exposure ☐ Source Oriented ☐ Transport ☐ Upwind Background ☐ Welfare Related Impacts	☐ Micro ☐ Middle ☐ Neighborhood ☐ Urban ☒ Regional	☒ SLAMS ☐ SPM

Probe inlet height (from ground) 2-15 m? Yes ☒ No ☐ Give actual measured height from ground (meters) 4.42
Distance of outer edge of probe inlet from horizontal (wall) and/or vertical (roof) supporting structure > 1 m? Yes ☒ No ☐
Actual measured distance from outer edge of probe to supporting structure (meters) 1.5748
Distance of outer edge of probe inlet from other gas monitoring probe inlets > 0.25 m? Yes ☒ No ☐ NA ☐
Is probe > 20 m from the nearest tree drip line? Yes ☒ *No ☐ (answer *'d questions)
*Is probe > 10 m from the nearest tree drip line? Yes ☐ *No ☐
*Distance from probe to tree (m) _____ Direction from probe to tree ___ *Height of tree (m) _____
Are there any obstacles to air flow? *Yes ☐ (answer *'d questions) No ☒
*Identify obstacle _____ Distance from probe inlet (m) _____ Direction from probe inlet to obstacle ___
*Is distance from inlet probe to obstacle at least twice the height that the obstacle protrudes above the probe? Yes ☐ No ☐
Distance of probe to nearest traffic lane (m) 146 Direction from probe to nearest traffic lane E

Site Review Form Calendar Year 2016

OZONE MONITOR RECOMMENDATIONS:

1) Maintain current monitor status? Yes ☒ *No ☐ (answer *'d questions)

*2) Change monitoring objective? Yes ☐ (enter new objective _____) No ☐-

*3) Change scale of representativeness? Yes ☐ (enter new scale _) No ☐

*4) Relocate monitor? Yes ☐ No ☐

Comments: _____

ANSWER ALL APPLICABLE QUESTIONS:

Parameters	Monitoring Objective	Scale	Monitor Type
☒ SO_2 (NAAQS) ☐ SO_2 (trace-level)	☐ General/Background ☐ Highest Concentration ☒ Population Exposure ☐ Source Oriented ☐ Transport ☐ Upwind Background ☐ Welfare Related Impacts	☐ Micro ☐ Middle ☐ Neighborhood ☒ Urban ☐ Regional	☒ SLAMS ☐ SPM

Probe inlet height (from ground) 2-15 m? Yes ☒ No ☐ Give actual measured height from ground (meters) 4.485

Distance of outer edge of probe inlet from horizontal (wall) and/or vertical (roof) supporting structure > 1 m? Yes ☒ No ☐
Actual measured distance from outer edge of probe to supporting structure (meters) 1.5748

Distance of outer edge of probe inlet from other monitoring probe inlets > 1 m? Yes ☒ No ☐ NA ☐

Is probe > 20 m from the nearest tree drip line? Yes ☒ *No ☐ (answer *'d questions)

*Is probe > 10 m from the nearest tree drip line? Yes ☐ *No ☐

*Distance from probe to tree (m) _____ Direction from probe to tree ___ *Height of tree (m) _____

Are there any obstacles to air flow? *Yes ☐ (answer *'d questions) No ☒

*Identify obstacle _____ Distance from probe inlet (m) _____Direction from probe inlet to obstacle ___

*Is distance from inlet probe to obstacle at least twice the height that the obstacle protrudes above the probe? Yes ☐ No ☐

Distance of probe to nearest traffic lane (m) 146 Direction from probe to nearest traffic lane E

SULFUR DIOXIDE MONITOR RECOMMENDATIONS:

1) Maintain current monitor status? Yes ☒ *No ☐ (answer *'d questions)

*2) Change monitoring objective? Yes ☐ (enter new objective _____) No ☐-

*3) Change scale of representativeness? Yes ☐ (enter new scale _) No ☐

*4) Relocate monitor? Yes ☐ No ☐

Comments: _____

Date of Last Site Pictures 10/10/16 New Pictures Submitted? Yes ☒ No ☐

Reviewer Terri Davis Date December 13, 2016

Ambient Monitoring Coordinator Steve Ensley Date 1/19/17

Revised 2017-01-19

Site Review Form Calendar Year 2016

Site Information

Region MRO	**Site Name** Hickory		**AQS Site # 37-035-0004**
Street Address-1st Ave. SW at 15th St. SW			**City Hickory**
Urban Area HICKORY		**Core-based Statistical Area**	Hickory-Lenoir-Morganton, NC
Enter Exact			
Longitude 81.3657	**Latitude 35.7289**	**Method of Measuring**	
In Decimal Degrees	In Decimal Degrees	**Other (explain)**	**Explanation: Google maps**
Elevation Above/below Mean Sea Level (in meters)		342.90	

Name of nearest road to inlet probe 2nd Ave. SW ADT Choose an Item 3400 Year 2013

Distance of ozone probe to nearest traffic lane (m) 22 Direction from inlet to nearest traffic lane SSE

Comments: Used http://www.ncdot.gov/travel/statemapping/trafficvolumemaps/.

Name of nearest major road HWY 321 ADT 37000 Year Choose an item 2013

Distance of site to nearest major road (m) 162.45 Direction from site to nearest major road ENE

Comments: Used http://www.ncdot.gov/travel/statemapping/trafficvolumemaps/.

Site located near electrical substation/high voltage power lines?		Yes ☒ No ☐
Distance of site to nearest railroad track	(m) 227 Direction to RR N	☐NA
OPTIONAL Distance of site to nearest power pole w/transformer	(m) 32 Direction E	
Distance between site and drip line of water tower (m) 15 Direction from site to water tower NW		☐NA

Explain any sources of potential bias; include cultivated fields, loose bulk storage, stacks, vents, railroad tracks, construction activities, fast food restaurants, and swimming pools.

Instructions:

Address: Sometimes local addresses change. Confirm the local address of the site using a 911 locator or the address used by the local utility company, community or county to identify the site location.

Urban Area: If the monitor is located within the bounds of an urban area (an incorporated area with a population of 10,000 or more people), select the appropriate urban area from the list. Otherwise select "Not in an Urban Area".

Core-Based Statistical Area (CBSA): If the monitor is located within a county that is part of a metropolitan statistical area (MSA) or a micropolitan statistical area (MiSA), then it is located within a core-based statistical area. If the monitoring station is located in a county included in a MSA or MiSA, select the appropriate CBSA from the list. Otherwise select "None".

Longitude and Latitude: The longitude and latitude should be entered in decimal degrees. Use a conversion program, such as http://transition.fcc.gov/mb/audio/bickel/DDDMMSS-decimal.html, to convert to decimal degrees.

Road Information: For the nearest road to the inlet probe, list whatever roadway that carries vehicles that is closest to the probe, whether or not it is a named or public road and even if the road has very little traffic. Use the comments space if necessary to describe the road or the source of the annual average daily traffic (AADT) counts. If the monitor is located near an unnamed, little used, private road, use the nearest major road space to list the closest named public road to the site. Include the distance and direction of the nearest major road from the site as well as the AADT if it is available. If the closest road is a small public road but there is a large major roadway such as an interstate highway, divided highway, major thoroughfare, etc., near the monitoring station use the nearest major road space to list the information about this major roadway. Include the distance and direction of the major road from the site as well as the AADT. The AADT for state roads can be obtained from the North Carolina Division of Transportation at http://www.ncdot.gov/travel/statemapping/trafficvolumemaps/default.html. For AADT values for local roadways contact the appropriate local governments.

Any Sources of Potential Bias: Use this space to record any information about the site that is not requested elsewhere. Especially note any changes to the site that occurred near the site in the past year, such as road construction, building construction, new businesses, businesses closing, or changes in traffic patterns, crops or other agricultural activities.

Site Review Form Calendar Year 2016

Parameters	Monitoring Objective	Scale	Monitor Type
Air flow < 200 L/min ☒ PM2.5 FRM ☐ PM10 FRM ☐ PM10 Cont. (BAM) ☐ PM10-2.5 FRM ☐ PM10-2.5 BAM ☐ PM10 Lead (PB) ☒ PM2.5 Cont. (BAM) ☐ PM2.5 Spec. (SASS) ☐ PM2.5 Spec. (URG) ☐ PM2.5 Cont. Spec.	☐ General/Background_____ ☐ Highest Concentration_____ ☒ Population Exposure_____ ☐ Source Oriented_____ ☐ Transport_____ ☐ Welfare Related Impacts _____	☐ Micro_____ ☐ Middle_____ ☒ Neighborhood_____ ☐ Urban_____ ☐ Regional_____	☒ SLAMS PM2.5 FRMs ☒ SPM_BAM 1020 & 1022 ☐ Nonregulatory_____ ☐ Supplemental Speciation _____

Probe inlet height (from ground) ☐ < 2 m _____ ☒ 2-7m _____ ☐ 7-15 m _____ ☐ > 15 m_____

Actual measured distance from probe inlet to ground (meters) HC 2.3368, HCA 2.3622, HK BAM 2.5146, HK 1022 BAM 2.4892.

Distance of outer edge of probe inlet from horizontal (wall) and/or vertical (platform or roof) supporting structure > 2 m? Yes ☒ No ☐

Actual measured distance from outer edge of probe inlet to supporting structure (meters) HC 2.0574, HCA 2.0574 , HK BAM 2.159, HK 1022 BAM 2.1082 _____

Distance (Y) between outer edge of probe inlets of any low volume monitor and any other low volume monitor at the site = 1 m or greater?	Yes ☒ No ☐ NA ☐
Distance (Y) between outer edge of all low volume monitor inlets and any Hi-Volume PM-10 or TSP inlet = 2 m or greater?	Yes ☐ No ☐ NA ☒

Are collocated PM2.5 Monitors (Two FRMs, FRM & BAM, FRM & TEOM, BAM & TEOM) Located at Site? *Yes ☒ (answer *'d questions) No ☐ NA ☐

* Entire inlet opening of collocated PM 2.5 samplers (X) within 2 to 4 m of each other? Yes ☒ No ☐ Give actual (meters): HC and HCA=3.1242, HK and HK 1022=3.1242

*Are collocated PM2.5 sampler inlets within 1 m vertically of each other? Yes ☒ No ☐ Give actual (meters): HC and HCA=0.2286, HK and HK 1022=0.3048

Is an URG 3000 monitor collocated with a SASS monitor at the site? *Yes ☐ (answer *'d questions) No ☐ NA ☒

* Entire inlet opening of collocated speciation samplers inlets (X) within 2 to 4 m of each other? Yes ☐ No ☐ Give actual (meters) _____

* Are collocated speciation sampler inlets within 1 m vertically of each other? Yes ☐ No ☐ Give actual (meters) _____

Is a low-volume PM10 monitor collocated with a PM2.5 monitor at the site to measure PM10-2.5? *Yes ☐ (answer *'d questions) No ☐ NA ☒

* Entire inlet opening of collocated PM10 and PM2.5samplers for PM10-2.5 (X) within 2 to 4 m of each other?	Yes ☐ No ☐
*Are collocated PM10 and PM2.5 sampler inlets within 1 m vertically of each other?	Yes ☐ No ☐

Is probe > 20 m from the nearest tree drip line? Yes ☒ *No ☐ (answer *'d questions)

*Is probe > 10 m from the nearest tree drip line? Yes ☐ *No ☐

*Distance from probe to tree (m) _____ Direction from probe to tree ____ *Height of tree (m) _____

Are there any obstacles to air flow? *Yes ☐ (answer *'d questions) No ☒

*Identify obstacle _____ Distance from probe inlet (m) _____ Direction from probe inlet to obstacle ___

*Is distance from inlet probe to obstacle at least twice the height that the obstacle protrudes above the probe? Yes ☐ No ☐

Site Review Form Calendar Year 2016

RECOMMENDATIONS:

1) Maintain current site status? Yes ☒ *No ☐ (answer *'d questions)

*2) Change monitoring objective? Yes ☐ (enter new objective: _____) No ☐

*3) Change scale of representativeness? Yes ☐ (enter new scale:) No ☐

*4) Relocate site? Yes ☐ No ☐

Comments: PM2.5 BAM 1020 shut down on 7/7/2016 _____

Date of Last Site Pictures: December 4, 2015 New Pictures Submitted? Yes ☐ No ☒

Reviewer Sandra Sherer Date: October 28, 2016

Ambient Monitoring Coordinator D. Manning Date: November 26, 2016

Instructions (continued):

Trees: The probe or inlet must be at least 10 meters or further from the drip line of trees. A distance of at least 20 meters between the probe and any tree or trees is preferred.

Obstacles: An obstacle is anything that restricts air flow. A tree can be an obstacle because it has branches and leaves that restrict the flow of air but a pole is not considered to be an obstacle. To avoid interference from obstacles, the probe or inlet must have unrestricted airflow and be located away from obstacles. The distance from the obstacle to the probe or inlet must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path.

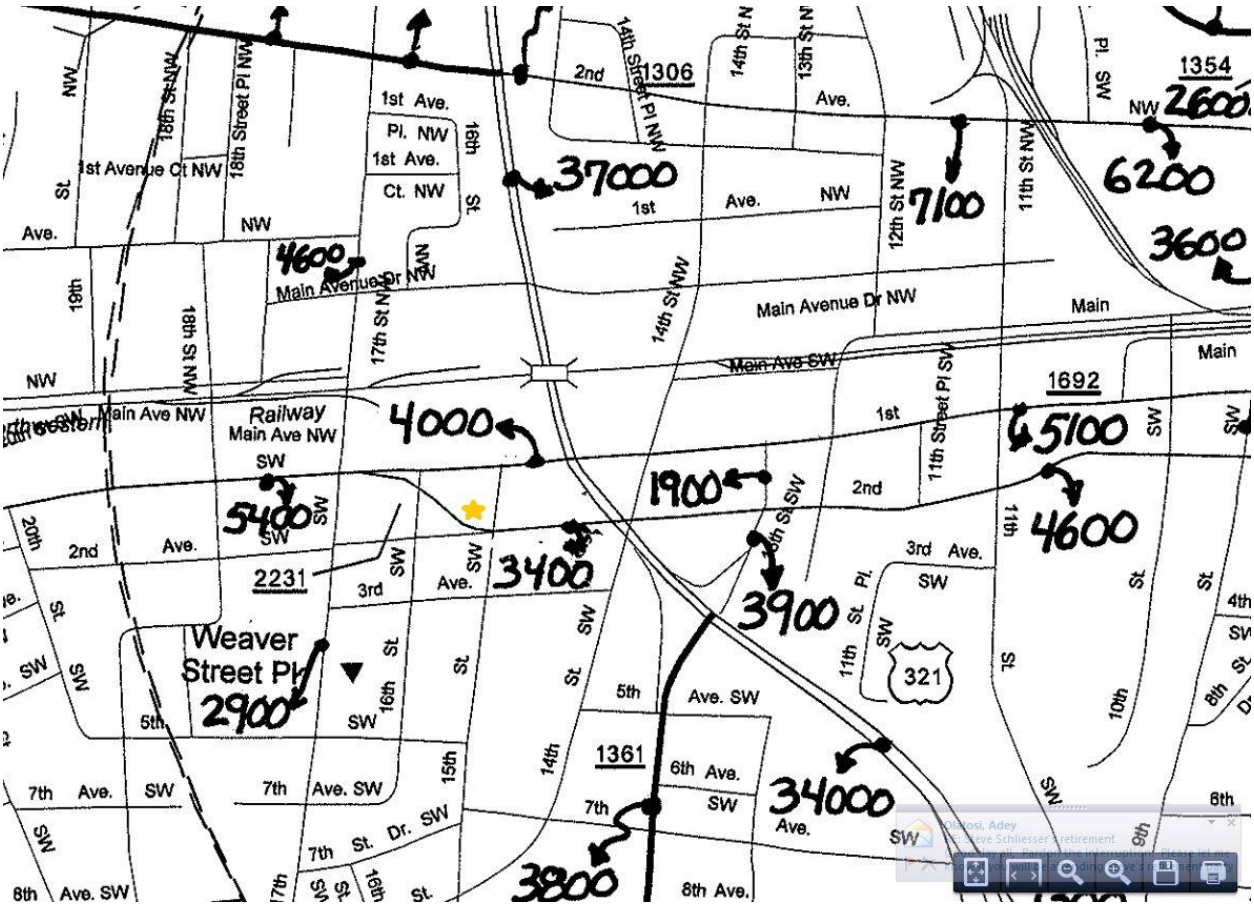
If the annual network review has indicated that the monitoring objectives and scale of representativeness for the site have not changed and the siting criteria still meets those monitoring objectives and that scale of representativeness and there are no other reasons to modify the site in any way, check "Yes" to the question "Maintain current site status?" and skip the rest of the recommendations section.

If the annual network review has indicated that the monitoring objectives, scale of representativeness, or siting criteria have changed for some reason or there is another reason to modify the site in some way, check "No" to the question "Maintain current site status?" and complete the rest of the recommendations section. If the monitoring objective or scale of representativeness needs to be changed, check the "Yes" box and write in the new monitoring objective or scale of representativeness on the line. Otherwise check the "No" box. If the site needs to be relocated, check the "Yes" box. If the site needs to be shut down, write "Shut down" in the comments line. Also use the comments line to explain any change requested.

Check the site picture archive to find out when the last set of site pictures were taken and write the date down on the line. If the pictures are more than five years old or if something at the site has changed in the past year, take new site pictures. Changes that require new site pictures include additions, removals, or movement of monitors at the site, growth or removal of trees and other shrubs at the site, and construction of roads or buildings at or in the vicinity of the site.

Pictures of the site should at a minimum include at least one picture showing the site itself and pictures standing at the probe or inlet or as close as possible to the probe or inlet looking in the four compass directions (north, east, south, and west). If meteorological data are collected at the site, pictures standing at the meteorological tower looking southwest and northeast should also be included. Sometimes pictures looking at the site from the four compass directions are also helpful.

Be sure to correctly identify the pictures as to which compass direction they show. This documentation may be achieved by using good notes when taking the pictures, holding a compass in front of the camera, or placing a sign with the appropriate direction indicated somewhere in the picture. Label the pictures with the name of the site using the two digit logger ID (HC, JW, *etc.*), the direction (N, NE, E, SE, S, SW, W, NW), and the date taken (YYYYMMDD) and transfer the pictures to the group drive in the appropriate Incoming/Regional Office directory.



2013 Annual Average Daily Traffic, AADT, star represents location of the Hickory monitoring station
AADT obtained from the North Carolina Department of Transportation Traffic Survey Unit

Site Review Form Calendar Year 2016

Site Information

Region MRO	**Site Name** Crouse		**AQS Site # 37-109-0004**
Street Address-1487 Riverview Road			**City Lincolnton**
Urban Area Not in an Urban Area		**Core-based Statistical Area** Lincolnton, NC	
Enter Exact			
Longitude 81.2767	**Latitude 35.4385**		**Method of Measuring**
In Decimal Degrees	In Decimal Degrees	___	**Explanation: Google Maps**
Elevation Above/below Mean Sea Level (in meters)			267.00

Name of nearest road to inlet probe Riverview Road ADT 2200 Year latest available 2015

Distance of ozone probe to nearest traffic lane (m) 62 Direction from ozone probe to nearest traffic lane SW

Comments: Used www.ncdot.gov/travel/statemapping/trafficvolume maps/

Name of nearest major road W. Hwy 150 ADT 8200 Year latest available 2015

Distance of site to nearest major road (m) 78.00 Direction from site to nearest major road N

Comments: Used www.ncdot.gov/travel/statemapping/traffic volume maps/

Site located near electrical substation/high voltage power lines?	Yes ☐	No ☒
Distance of site to nearest railroad track	(m) 302 Direction to RR W	☐NA
OPTIONAL Distance of site to nearest power pole w/transformer	(m) 52 Direction SW	
Distance between site and drip line of water tower (m) **28** Direction from site to water tower **NE**		☐NA

Explain any sources of potential bias; include cultivated fields, loose bulk storage, stacks, vents, railroad tracks, construction activities, fast food restaurants, and swimming pools.

none noted

ANSWER ALL APPLICABLE QUESTIONS:

Parameters	Monitoring Objective	Scale	Site Type
☒ O_3	☒General/Background ☐Highest Concentration ☐Max O3 Concentration ☐Population Exposure ☐Source Oriented ☐Transport ☐Upwind Background ☐Welfare Related Impacts	☐Micro ☐Middle ☐Neighborhood ☒Urban ☐Regional	☒SLAMS ☐SPM

Probe inlet height (from ground) 2-15 m? Yes ☒ No ☐

Give actual measured height from ground (meters) 3.50

Distance of outer edge of probe inlet from horizontal (wall) and/or vertical (roof) supporting structure > 1 m? Yes ☒ No ☐

Actual measured distance from outer edge of probe to supporting structure (meters) 1.30

Is probe > 20 m from the nearest tree drip line? Yes ☒ *No ☐ (answer *'d questions)

*Is probe > 10 m from the nearest tree drip line? Yes ☐ *No ☐

*Distance from probe to tree (m) _____ Direction from probe to tree ___ *Height of tree (m) _____

Are there any obstacles to air flow? *Yes ☐ (answer *'d questions) No ☒

*Identify obstacle _____ Distance from probe inlet (m) _____Direction from probe inlet to obstacle ___

*Is distance from inlet probe to obstacle at least twice the height that the obstacle protrudes above the probe? Yes ☐ No ☐

Site Review Form Calendar Year 2016

RECOMMENDATIONS:

1) Maintain current site status? Yes ☒ *No ☐ (answer *'d questions)

*2) Change monitoring objective? Yes ☐ (enter new objective: _____) No ☐

*3) Change scale of representativeness? Yes ☐ (enter new scale:) No ☐

*4) Relocate site? Yes ☐ No ☐

Comments: None

Date of Last Site Pictures: December 8, 2015 New Pictures Submitted? Yes ☐ No ☒

Reviewer Robert Jay Papuga Date: 12/20/2016

Ambient Monitoring Coordinator D. Manning Date: 12/29/2016

Instructions:

If the annual network review has indicated that the monitoring objectives and scale of representativeness for the site have not changed and the siting criteria still meets those monitoring objectives and that scale of representativeness and there are no other reasons to modify the site in any way, check "Yes" to the question "Maintain current site status?" and skip the rest of the recommendations section.

If the annual network review has indicated that the monitoring objectives, scale of representativeness, or siting criteria have changed for some reason or there is another reason to modify the site in some way, check "No" to the question "Maintain current site status?" and complete the rest of the recommendations section. If the monitoring objective or scale of representativeness needs to be changed, check the "Yes" box and write in the new monitoring objective or scale of representativeness on the line. Otherwise check the "No" box. If the site needs to be relocated, check the "Yes" box. If the site needs to be shut down, write "Shut down" in the comments line. Also use the comments line to explain any change requested.

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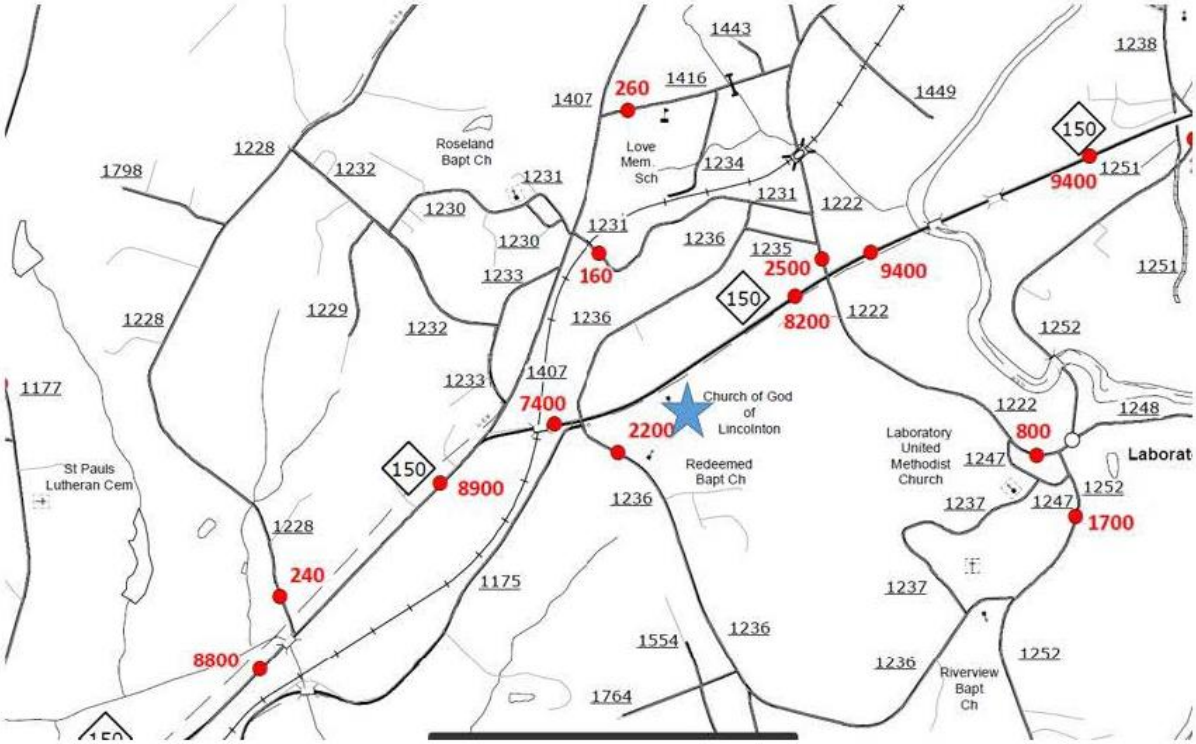

2015 Annual Average Daily Traffic, AADT, star represents location of the Crouse monitoring station
AADT obtained from the North Carolina Department of Transportation Traffic Survey Unit

Site Review Form Calendar Year 2016

Site Information

Region MRO	**Site Name** Monroe Middle School	**AQS Site # 37-179-0003**
Street Address-701 Charles Street		**City Monroe**
Urban Area MONROE	**Core-based Statistical Area** Charlotte-Gastonia-Concord, NC-SC	

Enter Exact		
Longitude -80.5410	**Latitude 34.9739**	**Method of Measuring**
In Decimal Degrees	In Decimal Degrees	___ **Explanation: Google Maps**
Elevation Above/below Mean Sea Level (in meters)		184.00

Name of nearest road to inlet probe Charles Street ADT 5100 Year latest available 2014

Distance of ozone probe to nearest traffic lane (m) 71 Direction from ozone probe to nearest traffic lane W

Comments: Used www.ncdot.gov/travel/statemapping/trafficvolumemaps

Name of nearest major road Highway 74/601 ADT 57000 Year latest available 2015

Distance of site to nearest major road (m) 1548.00 Direction from site to nearest major road ENE

Comments: Used www.ncdot.gov/travel/statemapping/trafficvolumemaps

Site located near electrical substation/high voltage power lines?		Yes ☐ No ☒
Distance of site to nearest railroad track	(m) 967 Direction to RR NE	☐NA
OPTIONAL Distance of site to nearest power pole w/transformer	(m) 30 Direction NE	
Distance between site and drip line of water tower (m) _____ Direction from site to water tower _____		☒NA

Explain any sources of potential bias; include cultivated fields, loose bulk storage, stacks, vents, railroad tracks, construction activities, fast food restaurants, and swimming pools.

none noted

ANSWER ALL APPLICABLE QUESTIONS:

Parameters	Monitoring Objective	Scale	Site Type
☒ O_3	☐General/Background ☐Highest Concentration ☐Max O3 Concentration ☒Population Exposure ☐Source Oriented ☐Transport ☐Upwind Background ☐Welfare Related Impacts	☐Micro ☐Middle ☒Neighborhood ☐Urban ☐Regional	☒SLAMS ☐SPM

Probe inlet height (from ground) 2-15 m? Yes ☒ No ☐

Give actual measured height from ground (meters) 3.90

Distance of outer edge of probe inlet from horizontal (wall) and/or vertical (roof) supporting structure > 1 m? Yes ☒ No ☐

Actual measured distance from outer edge of probe to supporting structure (meters) 1.00

Is probe > 20 m from the nearest tree drip line? Yes ☒ *No ☐ (answer *'d questions)

*Is probe > 10 m from the nearest tree drip line? Yes ☐ *No ☐

*Distance from probe to tree (m) _____ Direction from probe to tree ___ *Height of tree (m) _____

Are there any obstacles to air flow? *Yes ☐ (answer *'d questions) No ☒

*Identify obstacle _____ Distance from probe inlet (m) _____ Direction from probe inlet to obstacle ___

*Is distance from inlet probe to obstacle at least twice the height that the obstacle protrudes above the probe? Yes ☐ No ☐

Site Review Form Calendar Year 2016

RECOMMENDATIONS:

1) Maintain current site status? Yes ☒ *No ☐ (answer *'d questions)

*2) Change monitoring objective? Yes ☐ (enter new objective: _____) No ☐

*3) Change scale of representativeness? Yes ☐ (enter new scale:) No ☐

*4) Relocate site? Yes ☐ No ☐

Comments: Please update "site type" in AQS from SPM to SLAMS

Date of Last Site Pictures: November 29, 2016 New Pictures Submitted? Yes ☒ No ☐

Reviewer Robert Jay Papuga Date: 11/29/2016

Ambient Monitoring Coordinator D. Manning Date: January 3, 2017

Instructions:

If the annual network review has indicated that the monitoring objectives and scale of representativeness for the site have not changed and the siting criteria still meets those monitoring objectives and that scale of representativeness and there are no other reasons to modify the site in any way, check "Yes" to the question "Maintain current site status?" and skip the rest of the recommendations section.

If the annual network review has indicated that the monitoring objectives, scale of representativeness, or siting criteria have changed for some reason or there is another reason to modify the site in some way, check "No" to the question "Maintain current site status?" and complete the rest of the recommendations section. If the monitoring objective or scale of representativeness needs to be changed, check the "Yes" box and write in the new monitoring objective or scale of representativeness on the line. Otherwise check the "No" box. If the site needs to be relocated, check the "Yes" box. If the site needs to be shut down, write "Shut down" in the comments line. Also use the comments line to explain any change requested.

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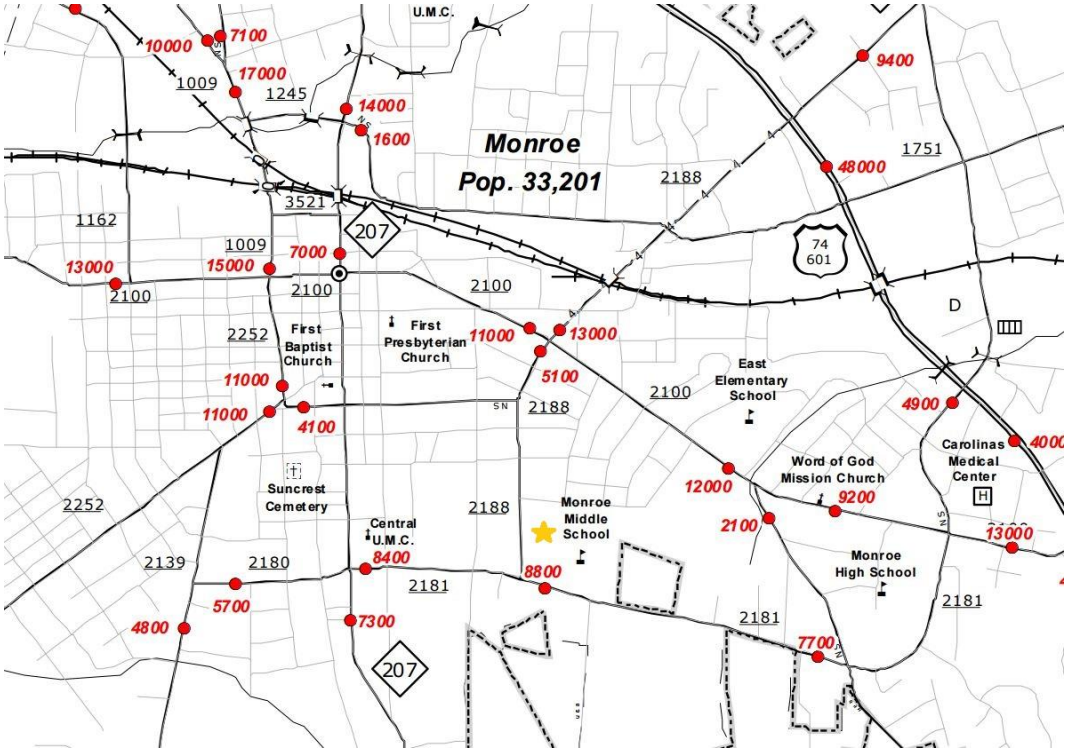
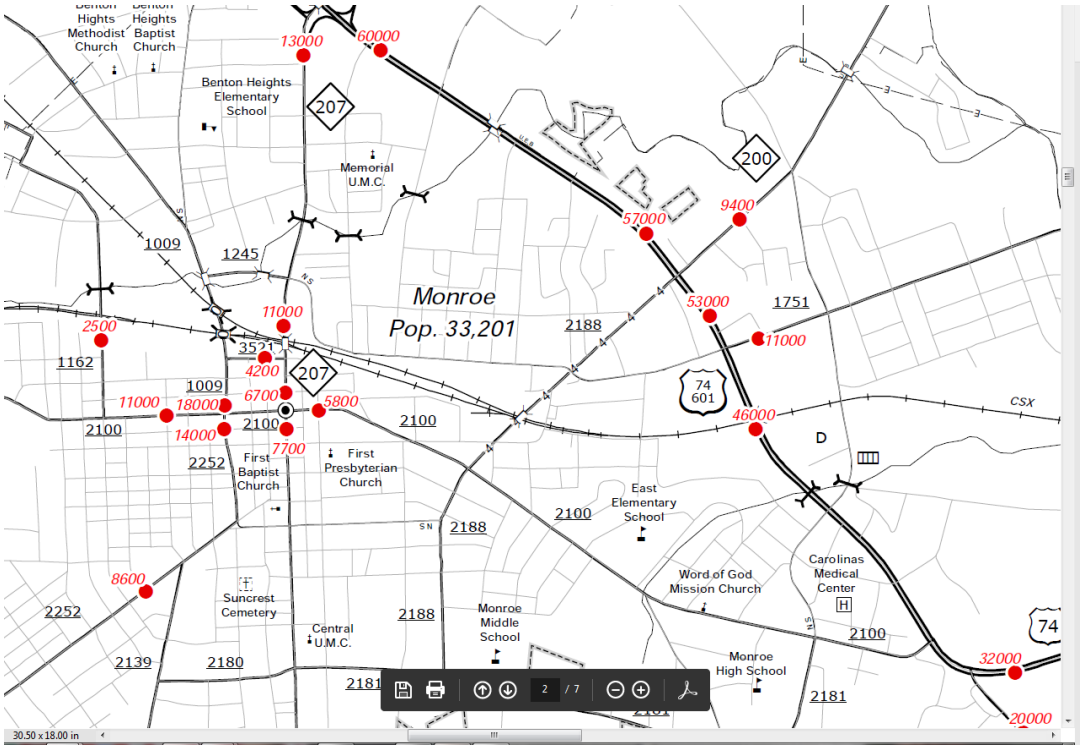


2014 Annual Average Daily Traffic, AADT, star represents location of the Monroe monitoring station
AADT obtained from the North Carolina Department of Transportation Traffic Survey Unit



2015 Annual Average Daily Traffic, AADT, star represents location of the Monroe monitoring station
AADT obtained from the North Carolina Department of Transportation Traffic Survey Unit

Site Review Form Calendar Year 2016

Site Information

Region MRO	**Site Name** Rockwell	**AQS Site # 37-159-0021**
Street Address 316 West Street		**City** Rockwell
Urban Area Not in an Urban Area	**Core-based Statistical Area** Salisbury, NC	
Enter Exact		
Longitude W.80.3953	**Latitude** N.35.5519	**Method of Measuring**
In Decimal Degrees	In Decimal Degrees	___ **Explanation: Google Maps**
Elevation Above/below Mean Sea Level (in meters)		234

Name of nearest road to inlet probe Gold Hill Road ADT 630 Year Choose an item 2014

Comments: Used www.ncdot.gov/travel/statemapping/trafficvolumemaps

Distance of site to nearest major road (m) 370.00 Direction from site to nearest major road S

Name of nearest major road Highway 52 ADT 7800 Year 2014

Comments: Used www.ncdot.gov/travel/statemapping/trafficvolumemaps

Site located near electrical substation/high voltage power lines?	Yes ☐ No ☒
Distance of site to nearest railroad track	(m) 737 Direction to RR SW ☐ NA
OPTIONAL Distance of site to nearest power pole w/transformer	(m) 39 Direction NW
Distance between site and drip line of water tower (m) _____ Direction from site to water tower _____	☒ NA

Explain any sources of potential bias; include cultivated fields, loose bulk storage, stacks, vents, railroad tracks, construction activities, fast food restaurants, and swimming pools.

None Noted

ANSWER ALL APPLICABLE QUESTIONS:

Parameters	Monitoring Objective	Scale	Monitor Type
☐ NA ☐ SO_2 (NAAQS) ☐ SO_2 (trace-level) ☐ NO_2 (NAAQS) ☒ $HSNO_y$ ☒ O_3 ☐ NH_3 ☐ Hydrocarbon ☐ Air Toxics ☐ CO (trace-level)	☐ General/Background_____ ☒ Highest Concentration O3 ☒ Max O3 Concentration HSNOy ☐ Population Exposure_____ ☐ Source Oriented_____ ☐ Transport_____ ☐ Upwind Background_____ ☐ Welfare Related Impacts _____	☐ Micro_____ ☐ Middle_____ ☐ Neighborhood_____ ☒ Urban_____ ☐ Regional_____	☒ SLAMS O3 ☒ SPM HSNOy **Monitor Network Affiliation** ☐ NCORE_____ ☐ Unofficial PAMS_____

Probe inlet height (from ground) 2-15 m? Yes ☒ No ☐ Give actual measured height from ground (meters) 3.50

Distance of outer edge of probe inlet from horizontal (wall) and/or vertical (roof) supporting structure > 1 m? Yes ☒ No ☐
Actual measured distance from outer edge of probe to supporting structure (meters) 1.10

Distance of outer edge of probe inlet from other monitoring probe inlets > 1 m? Yes ☒ No ☐ NA ☐

Is probe > 20 m from the nearest tree drip line? Yes ☒ *No ☐ (answer *'d questions)

*Is probe > 10 m from the nearest tree drip line? Yes ☐ *No ☐

*Distance from probe to tree (m) _____ Direction from probe to tree ___ *Height of tree (m) _____

Are there any obstacles to air flow? *Yes ☐ (answer *'d questions) No ☒

*Identify obstacle _____ Distance from probe inlet (m) _____ Direction from probe inlet to obstacle ___

*Is distance from inlet probe to obstacle at least twice the height that the obstacle protrudes above the probe? Yes ☐ No ☐

Distance of probe to nearest traffic lane (m) 17 Direction from probe to nearest traffic lane N

Site Review Form Calendar Year 2016

Parameters	Monitoring Objective	Scale	Site Type
☐ NA Air flow < 200 L/min ☐ PM2.5 FRM ☐ PM10 FRM ☐ PM10 Cont. (BAM) ☐ PM10-2.5 FRM ☐ PM10-2.5 BAM ☐ PM10 Lead (PB) ☐ PM2.5 Cont. (BAM) ☐ PM2.5 Spec. (SASS) ☐ PM2.5 Spec. (URG) ☒ PM2.5 Cont. Spec.	☐ General/Background _____ ☐ Highest Concentration _____ ☒ Population Exposure _____ ☐ Source Oriented _____ ☐ Transport _____ ☐ Welfare Related Impacts _____	☐ Micro _____ ☐ Middle _____ ☒ Neighborhood _____ ☐ Urban _____ ☐ Regional _____	☐ SLAMS _____ ☒ SPM PM2.5 Cont. Spec. (aethalometer), PM2.5 Cont. Spec. (8400N) _____ **Monitor Network Affiliation** ☐ NCORE _____ ☐ SUPPLEMENTAL SPECIATION _____ **Monitor NAAQS Exclusion** ☐ NONREGULATORY _____

Probe inlet height (from ground) ☐ < 2 m _____ ☒ 2-7m _____ ☐ 7-15 m _____ ☐ > 15 m _____
Actual measured distance from probe inlet to ground (meters) Both monitors are located inside the building with the ambient probe on the roof. Both are within the 2-7 meter range.

Distance of outer edge of probe inlet from horizontal (wall) and/or vertical (platform or roof) supporting structure > 2 m?
Actual measured distance from outer edge of probe inlet to supporting structure (meters) 2.1 Yes ☒ No ☐

Distance (Y) between outer edge of probe inlets of any low volume monitor and any other low volume monitor at the site = 1 m or greater? Yes ☒ No ☐ NA ☐
Distance (Y) between outer edge of all low volume monitor inlets and any Hi-Volume PM-10 or TSP inlet = 2 m or greater? Yes ☐ No ☐ NA ☒

Are collocated PM2.5 Monitors (Two FRMs, FRM & BAM, FRM & TEOM, BAM & TEOM) Located at Site? *Yes ☐ (answer *'d questions) No ☒ NA ☐
* Entire inlet opening of collocated PM 2.5 samplers (X) within 2 to 4 m of each other? Yes ☐ No ☐ Give actual (meters) _____
*Are collocated PM2.5 sampler inlets within 1 m vertically of each other? Yes ☐ No ☐ Give actual (meters) _____

Is an URG 3000 monitor collocated with a SASS monitor at the site? *Yes ☐ (answer *'d questions) No ☐ NA ☒
* Entire inlet opening of collocated speciation samplers inlets (X) within 2 to 4 m of each other? Yes ☐ No ☐
Give actual (meters) _____
* Are collocated speciation sampler inlets within 1 m vertically of each other? Yes ☐ No ☐ Give actual (meters) _____

Is a low-volume PM10 monitor collocated with a PM2.5 monitor at the site to measure PM10-2.5? *Yes ☐ (answer *'d questions) No ☐ NA ☒
* Entire inlet opening of collocated PM10 and PM2.5samplers for PM10-2.5 (X) within 2 to 4 m of each other? Yes ☐ No ☐
*Are collocated PM10 and PM2.5 sampler inlets within 1 m vertically of each other? Yes ☐ No ☐

Is probe > 20 m from the nearest tree drip line? Yes ☒ *No ☐ (answer *'d questions)
*Is probe > 10 m from the nearest tree drip line? Yes ☐ *No ☐
*Distance from probe to tree (m) _____ Direction from probe to tree ___ *Height of tree (m) _____

Are there any obstacles to air flow? *Yes ☐ (answer *'d questions) No ☒
*Identify obstacle ____ Distance from probe inlet (m) _____Direction from probe inlet to obstacle ___
*Is distance from inlet probe to obstacle at least twice the height that the obstacle protrudes above the probe? Yes ☐ No ☐
Distance of probe to nearest traffic lane (m) 17 Direction from probe to nearest traffic lane N

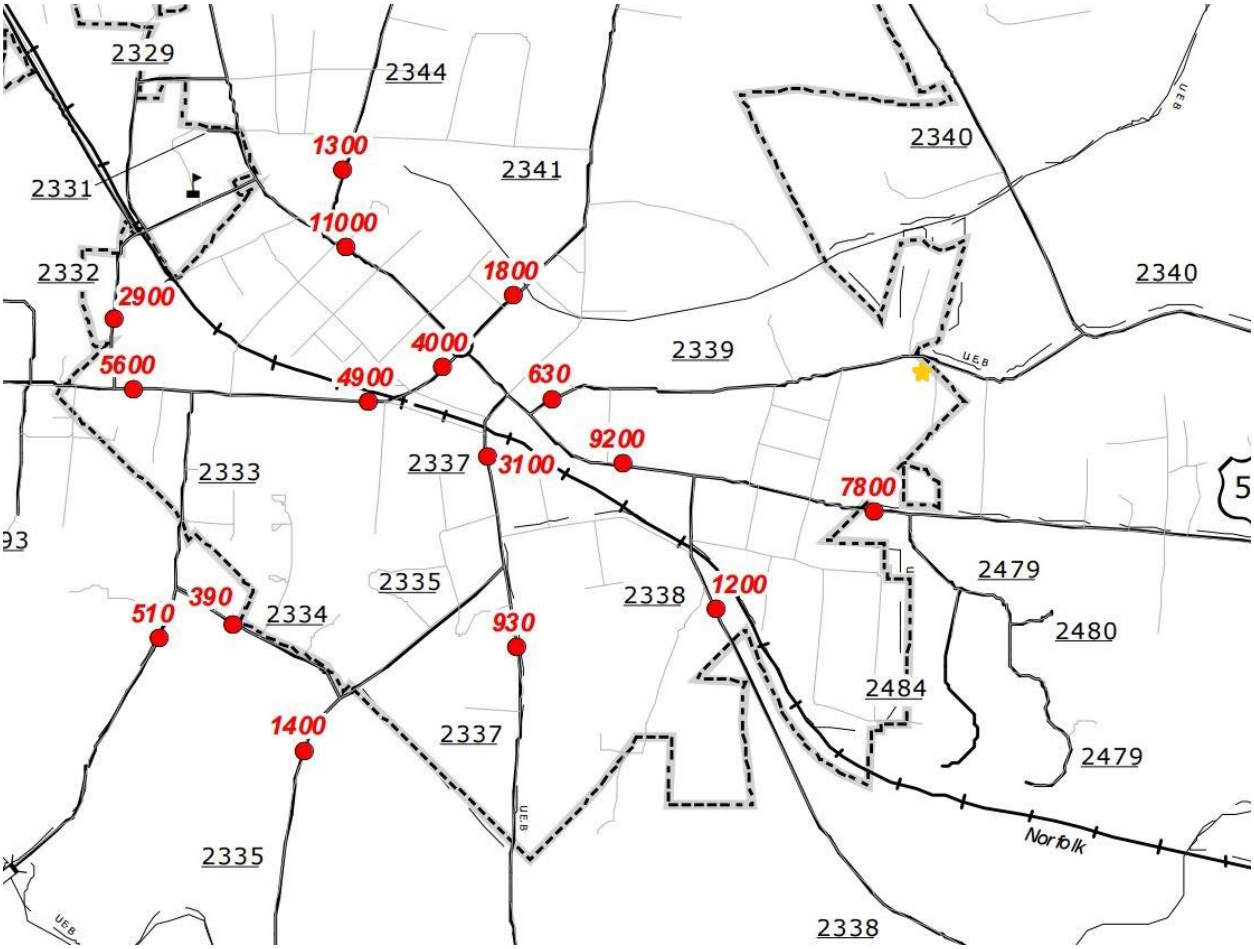
RECOMMENDATIONS:

1) Maintain current site status? Yes ☒ *No ☐ (answer *'d questions)
*2) Change monitoring objective? Yes ☐ (enter new objective _____) No ☐-
*3) Change scale of representativeness? Yes ☐ (enter new scale _) No ☐
*4) Relocate site? Yes ☐ No ☐

Comments: Wind Speed/Wind Diection sensors were shut down on June 28, 2016. Aethalometer was shut down on August 8, 2016. HSNOy monitor was shutdown on November 3, 2016. 8400N was shutdown on November 4, 2016.

Date of Last Site Pictures 10/28/2016 New Pictures Submitted? Yes ☒ No ☐

Reviewer Robert Jay Papuga Date 11/17/2016
Ambient Monitoring Coordinator D. Manning Date 12/28/2016



2014 Annual Average Daily Traffic, AADT, star represents location of the Rockwell monitoring station
AADT obtained from the North Carolina Department of Transportation Traffic Survey Unit

Appendix C-2. Scale of Representativeness

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

a) Micro-scale - defines the concentration in air volumes associated with area dimensions ranging from several meters up to about 100 meters.
b) Middle scale - defines the concentration typical of areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometers.
c) Neighborhood scale – defines concentrations within an extended area of a city that has relatively uniform land use with dimensions ranging from about 0.5 to 4.0 kilometers.
d) Urban scale - defines an overall citywide condition with dimensions on the order of 4 to 50 kilometers.
e) Regional Scale - defines air quality levels over areas having dimensions of 50 to hundreds of kilometers.

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

There are six basic exposures:

a) Sites located to determine the highest concentrations expected to occur in the area covered by the network.
b) Sites located to determine representative concentrations in areas of high population density.
c) Sites located to determine the impact on ambient pollution levels of significant sources or source categories.
d) Sites located to determine general background concentration levels.
e) Sites located to determine the extent of regional pollutant transport among populated areas.
f) Sites located to measure air pollution impacts on visibility, vegetation damage or other welfare-based impacts and in support of secondary standards.

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

Table C7. Site Type Appropriate Siting Scales

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