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NORTH CAROLINA
Environmental Quality

2021-2022 Annual Monitoring Network Plan for the North Carolina Division of Air Quality

Volume 2

Site Descriptions by Metropolitan Statistical Area

G. The Wilmington Monitoring Region

July 1, 2021

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Table of Contents

List of Figures

List of Tables

G. The Wilmington Monitoring Region

The Wilmington monitoring region, shown in Figure G1, has four parts. The Wilmington metropolitan statistical area, or MSA, consists of New Hanover and Pender Counties. The North Carolina part of the Myrtle Beach-Conway-North Myrtle Beach MSA consists of Brunswick County. The Jacksonville MSA consists of Onslow County and the non-MSA portion of this monitoring region consists of Carteret, Columbus and Duplin Counties.

Figure G1. The Wilmington monitoring region
The red dots show the approximate locations of the North Carolina Division of Air Quality monitoring sites in this region.

(1) The Wilmington MSA

The Wilmington MSA consists of two counties: New Hanover and Pender. The City of Wilmington is the major metropolitan area. The North Carolina Division of Air Quality, or DAQ, currently operates one criteria pollutant monitoring site and one urban air toxics monitoring site in this MSA. The criteria-pollutant monitoring site is the Castle Hayne ozone and particle-monitoring site. The urban air toxics site is at Eagles Island, formerly known as the Battleship site.

At the **Castle Hayne** site, 37-129-0002, DAQ operates an ozone monitor and a continuous fine particle monitor. Figure G2 shows the site. Table G1 summarizes monitoring information for the site. Figure G3 through Figure G10 provide views looking north, northeast, east, southeast, south, southwest, west and northwest.

Figure G2. Castle Hayne ozone and particle monitoring site, 37-129-0002

Table G1. Site Table for Castle Hayne

Site Name:	Castle Hayne			**AQS Site Identification Number:**	37-129-0002
Location:	6028 Holly Shelter Road, Castle Hayne, North Carolina				
MSA:	Wilmington, NC			**MSA #:**	9200
Latitude	34.364167	**Longitude**	-77.838611	**Datum:**	WGS84
Elevation	12 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
PM10 Total 0-10 µm STP	Teledyne API T640X at 16.67 LPM, 239	EQPM-0516-239	1-Hour	12 months, every third year
PM 2.5 local conditions, FEM	Met One BAM w/VSCC, 170	EQPM-0308-170	1-Hour	Year-round

Date Monitor Established:	Ozone	Jan. 1, 1979
Date Monitor Established	PM10 Total 0-10 µm STP	Aug. 1, 2016
Date Monitor Established:	PM 2.5 local conditions, federal equivalent method	July 1, 2017

Nearest Road:	Holly Shelter Road	**Traffic Count:**	3500	**Year of Count:**	2018

Parameter Name	**Distance to Road**	**Direction to Road**	**Monitor Type**	**Statement of Purpose**
Ozone	59	North northwest	SLAMS	Real-time AQI reporting. Compliance with the national ambient air quality standards (NAAQS)
PM10 Total 0-10 µm STP	59	North northwest	SPM	Industrial expansion monitoring for PSD modeling
PM 2.5 local conditions, FEM	59	North northwest	SLAMS	Real-time AQI reporting. Compliance w/NAAQS

Parameter Name	**Monitoring Objective**	**Scale**	**Suitable to Compare to NAAQS**	**Proposal to Move or Change**
Ozone	Population exposure	Urban	Yes	None
PM10 Total 0-10 µm STP	General/Background	Neighborhood	Yes	Will end in 2021
PM 2.5 local conditions, FEM	Population exposure	Neighborhood	Yes	None

	Meets Part 58 Requirements:			
Parameter Name	**Appendix A**	**Appendix C**	**Appendix D**	**Appendix E**
Ozone	Yes	Yes	Yes – not required	Yes
PM10 Total 0-10 µm STP	Yes	Yes	Yes – not required	Yes
PM 2.5 local conditions, FEM	Yes	Yes	Yes – not required	Yes

Parameter Name	**Probe Height (m)**	**Distance to Support**	**Distance to Trees**	**Obstacles**
Ozone	4.5	2.0 meters	>20 meters	None
PM10 Total 0-10 µm STP	4.6	2.0 meters	>20 meters	None
PM 2.5 local conditions, FEM	4.6	2.0 meters	>20 meters	None

Figure G3 Looking north from the Castle Hayne site

Figure G5. Looking northeast from the Castle Hayne site

Figure G4. Looking northwest from the Castle Hayne site

Figure G6. Looking east from the Castle Hayne site

Figure G7. Looking west from the Castle Hayne site

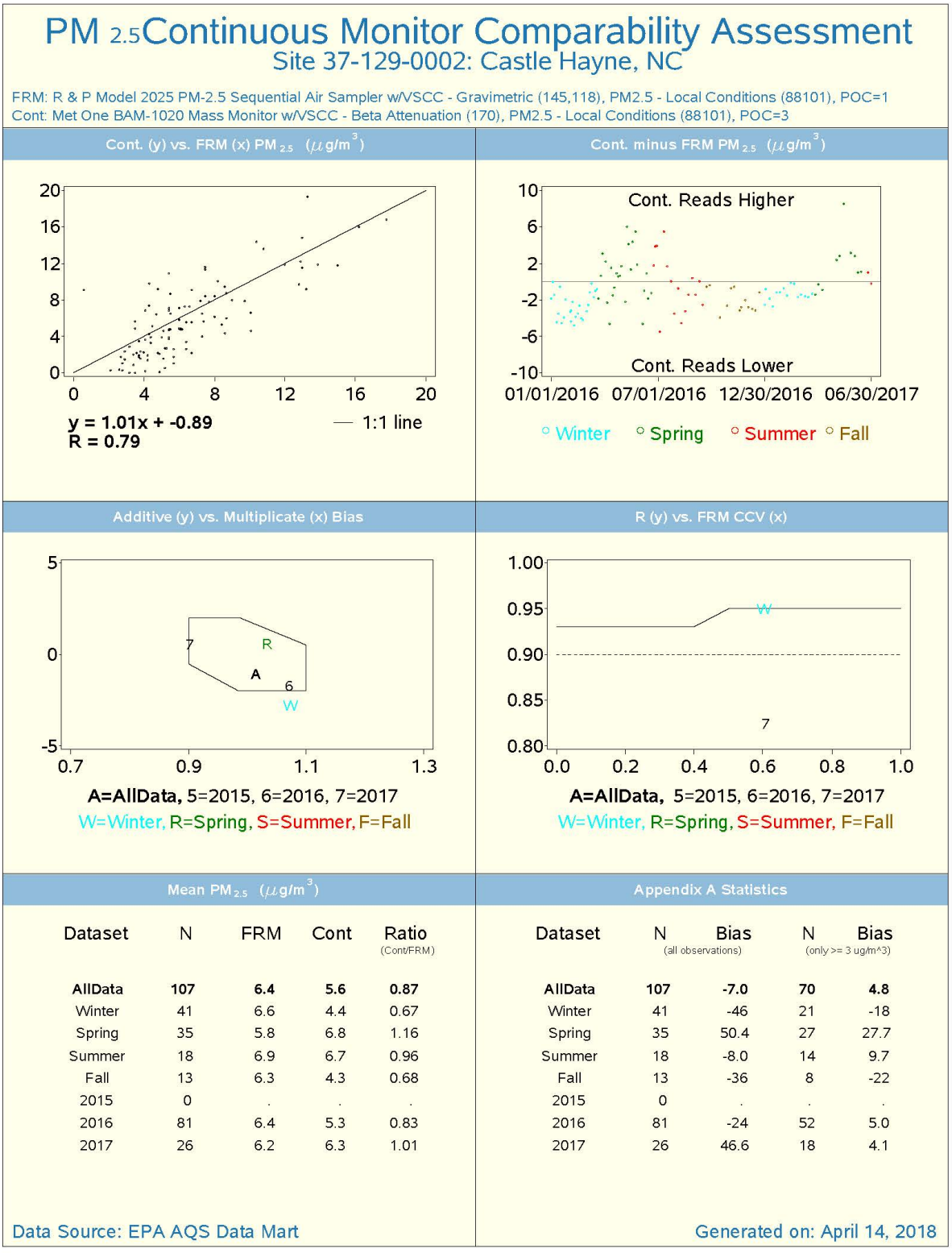
Figure G9. Looking southeast from the Castle Hayne site

Figure G8. Looking southwest from the Castle Hayne site

Figure G10. Looking south from the Castle Hayne site

DAQ completed one beta attenuation monitor, BAM, study in Dec. 2011. At that time, the division shut down the BAM and made the manual fine particle federal reference method, or FRM, monitor a state and local air monitoring station, or SLAMS. In 2012, DAQ installed another special purpose non-regulatory BAM and began a second BAM study at the site on Oct. 23, 2012. Comparisons for the BAM and FRM monitors are available from the United States Environmental Protection Agency, or EPA, at https://www.epa.gov/outdoor-air-quality-data/pm25-continuous-monitor-comparability-assessments. On March 12, 2015, DAQ moved the FRM to the roof of the building and installed the BAM inside the building to help stabilize temperature and relative humidity to see if the two monitors would agree better under these conditions. Figure G11 provides the data comparison for Jan. 1, 2016, through June 30, 2017. Since DAQ moved the BAM into the shelter, the BAM and FRM compare better at this site. Because of this improved agreement, the division made the BAM a SLAMS and the primary monitor at this site on Jan. 1, 2016. On Jan. 1, 2016, DAQ also made the FRM the collocated quality assurance monitor for the DAQ BAM 1020 monitoring network. However, the FRM and BAM data do not agree well enough to meet 40 CFR Part 58, Appendix A requirements, probably because the concentrations are so low, so the division shut down the collocated FRM at this site on June 30, 2017.

DAQ requires PM_{10} data in the coastal area for Prevention of Significant Deterioration, or PSD, modeling for industrial expansion. Because DAQ shut down the PM_{10} monitoring site in Jacksonville on Dec. 31, 2007, DAQ began manual one-in-six-day PM_{10} monitoring at the Castle Hayne site in February 2008 to provide the necessary PM_{10} data for PSD modeling for the coastal area. However, a wildfire next to the site forced the division to shut down the monitor on March 31, 2008. After appropriate firefighting and rains extinguished the wildfire, the division decided not to resume PM_{10} monitoring at Castle Hayne because of the pending construction of the Titan Cement Facility across the street from the Castle Hayne site. Modeling results indicated that Titan would contribute over 10 percent of the national ambient air quality standard (NAAQS) to the PM_{10} concentrations measured at Castle Hayne, making Castle Hayne an unsuitable site for obtaining background data to use for PSD modeling. Thus, DAQ located the PM_{10} monitor at Kenansville in second quarter 2009. At the end of 2010, DAQ began operating the monitor on a one-in-three-year schedule and made the site one of six rotating background PM_{10} sites for the state. The Kenansville site collected PM_{10} data from August 2013 through July 2014. In 2016, Titan announced that they would not be building a cement facility in Castle Hayne. Since the Titan facility is no longer under consideration, DAQ collected PM_{10} data at Castle Hayne from October 2016 to October 2017 and is collecting PM_{10} data there from October 2020 through October 2021.



Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	**107**	**6.4**	**5.6**	**0.87**
Winter	41	6.6	4.4	0.67
Spring	35	5.8	6.8	1.16
Summer	18	6.9	6.7	0.96
Fall	13	6.3	4.3	0.68
2015	0	.	.	.
2016	81	6.4	5.3	0.83
2017	26	6.2	6.3	1.01

Dataset	N (all observations)	Bias	N (only >= 3 ug/m^3)	Bias
AllData	**107**	**-7.0**	**70**	**4.8**
Winter	41	-46	21	-18
Spring	35	50.4	27	27.7
Summer	18	-8.0	14	9.7
Fall	13	-36	8	-22
2015	0	.	.	.
2016	81	-24	52	5.0
2017	26	46.6	18	4.1

Figure G11. Comparison of BAM and FRM results at Castle Hayne after moving the BAM inside the building

When the Office of Management and Budget redefined the Wilmington MSA in February 2013, the estimated population of the Wilmington MSA dropped below 350,000. In July 2019, the United States Census Bureau estimated 297,533 people live in the Wilmington MSA.[1] Thus, only one ozone monitor is required for the MSA if the ozone design value is above 85 percent of the NAAQS. The design value for 2018-2020 for Wilmington is at 83 percent of the standard. So currently, DAQ is not required to add additional ozone monitors in the MSA. As shown in Figure G12, the North Carolina Office of State Budget and Management projects the population in the Wilmington MSA will remain under 350,000 for at least the next decade.

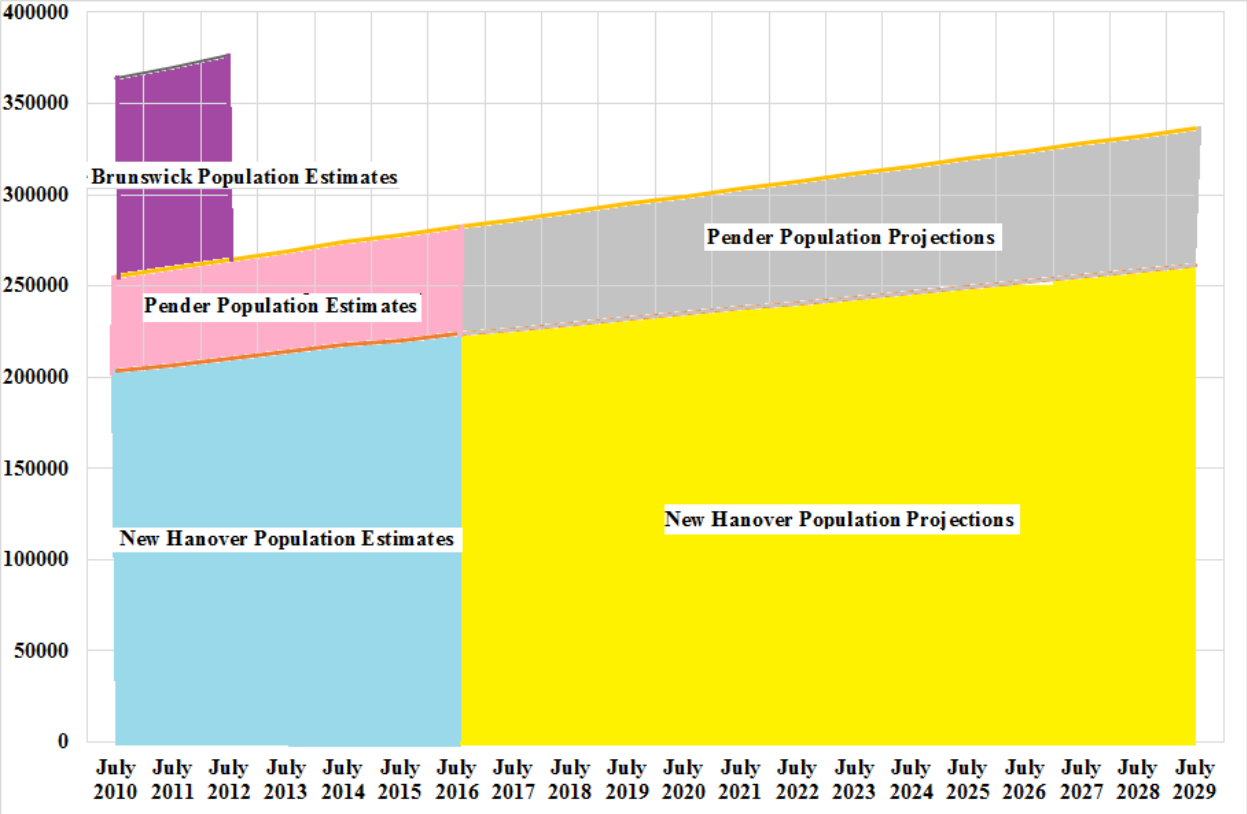


Figure G12. Population Estimates and Projections for the Wilmington MSA from 2010 to 2029
Estimates and projections are from the North Carolina Office of State Budget and Management, updated in September 2016

[1] Source: Cumulative Estimates of Resident Population Change and Rankings for Metropolitan Statistical Areas in the United States and Puerto Rico: April 1, 2010 to July 1, 2019, U.S. Census Bureau, Population Division, Released March 2020, available online at https://www.census.gov/newsroom/press-kits/2020/pop-estimates-county-metro.html.

At the **Eagles Island** site, 37-129-0010, DAQ operates a year-round air toxics volatile organic compound sampler. The WIRO collects samples in stainless steel canisters and sends them to the Laboratory Analysis Branch (LAB) where the LAB analyzes them for 68 compounds using the Compendium Method for Toxic Organics 15. On Jan. 8, 2019, DAQ added a rainwater collection sampler to the site. Figure G13 through Figure G21 show the site and views looking north, northeast, east, southeast, south, southwest, west and northwest.

Figure G13. The Eagles Island urban air toxics monitoring site

Figure G14. Looking north from the Eagles Island site

Figure G15. Looking northeast from the Eagles Island site

Figure G16. Looking northwest from the Eagles Island site

Figure G17. Looking west from the Eagles Island site

Figure G18. Looking east from the Eagles Island site

Figure G19. Looking southeast from the Eagles Island site

Figure G20. Looking southwest from the Eagles Island site

Figure G21. Looking south from the Eagles Island site

In 2008, EPA expanded the **lead monitoring** network to support the lower lead NAAQS of 0.15 micrograms per cubic meter.[2] The 2010 changes to the lead monitoring requirements focused monitoring efforts on fenceline monitoring located at facilities that emit 0.5 ton or more of lead per year and at National Core, NCore, monitoring sites.[3] In 2016, the EPA removed the requirement for monitoring at NCore sites.[4] These changes to the lead monitoring network requirements did not require lead monitoring in the Wilmington MSA. The MSA has no permitted facilities that emit more than 0.5 tons per year of lead.[5]

Changes to **the ozone monitoring** requirements extended the ozone season a month. Beginning in 2017, the ozone season starts on March 1 instead of April 1.

The 2010 **nitrogen dioxide monitoring** rule does not require the Wilmington MSA to monitor for nitrogen dioxide. It is too small to require area-wide monitors or near-roadway monitoring.

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[2] National Ambient Air Quality Standards for Lead, Federal Register, Vol. 73, No. 219, \ Wednesday, Nov. 12, 2008, p. 66964, available on the worldwide web at https://www.gpo.gov/fdsys/pkg/FR-2008-11-12/pdf/E8-25654.pdf.

[3] Revisions to Lead Ambient Air Monitoring Requirements, Federal Register, Vol. 75, No. 247, Monday, Dec. 27, 2010, p. 81126, available on the worldwide web at https://www.gpo.gov/fdsys/pkg/FR-2010-12-27/pdf/2010-32153.pdf#page=1.

[4] Revisions to Ambient Monitoring Quality Assurance and Other Requirements, Federal Register, Vol. 81, No. 59, Monday, March 28, 2016, p. 17248, available on the worldwide web at https://www.gpo.gov/fdsys/pkg/FR-2016-03-28/pdf/2016-06226.pdf.

[5] Data obtained from the 2016 DAQ emission inventory database and the 2016 Toxics Release Inventory.

This MSA was also not required to do carbon monoxide monitoring because of the changes to the **carbon monoxide monitoring** requirements because the population is less than one million.

The 2010 **sulfur dioxide monitoring** rule has not required the Wilmington MSA to add additional sulfur dioxide monitors. The sulfur-dioxide monitor at the New Hanover site met the PWEI monitoring requirements for the MSA from 2011 through 2017. With the release of the 2014 National Emissions Inventory, a PWEI monitor was no longer required in this MSA so DAQ shut down the New Hanover site at the end of 2017.

(2) The Myrtle Beach-Conway-North Myrtle Beach MSA

The Myrtle Beach-Conway-North Myrtle Beach MSA consists of Brunswick County in North Carolina and Horry County in South Carolina. The principal cities are Myrtle Beach, Conway and North Myrtle Beach. The MSA has an estimated population as of July 2019 of 496,901 people, which requires it to have an ozone monitor.[6] As shown in Figure G22, the South Carolina Department of Health and Environmental Control, or DHEC, started operating the Coastal Carolina ozone monitoring station on July 27, 2016.

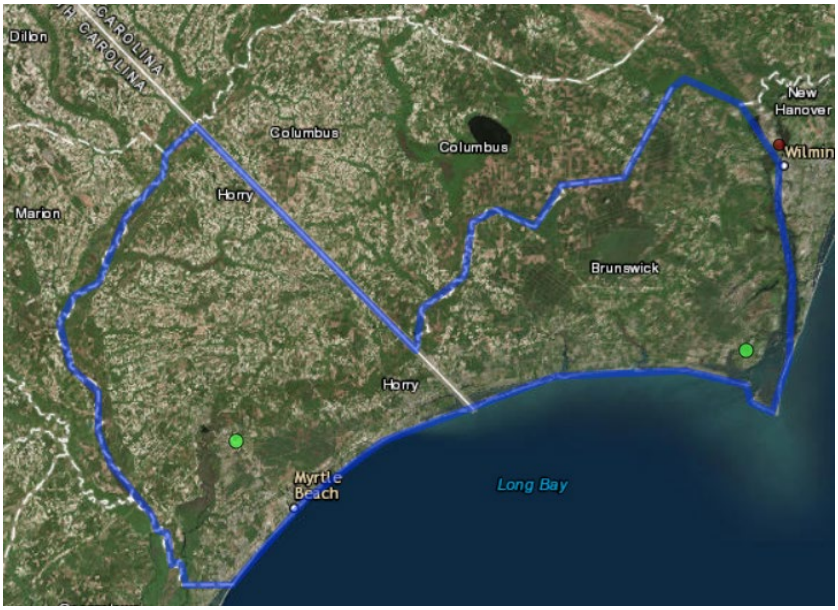

Figure G22. Monitoring sites in the Myrtle Beach-Conway-North Myrtle Beach MSA
The green dots show the locations of the Coastal Carolina ozone and the Southport DRR sulfur dioxide monitoring stations.

The Coastal Carolina ozone monitor in the Myrtle Beach area collected its first complete ozone design value in 2019. Its design value for 2017-2019 is at 86 percent of the NAAQS, requiring the MSA to have a second ozone monitor according to Appendix D of 40 CFR Part 58. Since this

[6] Source: Cumulative Estimates of Resident Population Change and Rankings for Metropolitan Statistical Areas in the United States and Puerto Rico: April 1, 2010 to July 1, 2019, U.S. Census Bureau, Population Division, Released March 2020, available online at https://www.census.gov/newsroom/press-kits/2020/pop-estimates-county-metro.html.

design value is the first complete design value for the monitor and the 2019 design value is so close to the 85% threshold DAQ and DHEC are working with EPA Region 4 to determine the appropriate ozone monitoring for this MSA. The 2018-2020 ozone design value is less than the 85 percent threshold but does not meet the three-year completeness requirement of 90 percent. Since the 2020 census data are not yet available, DAQ has decided to delay the analysis requested by the EPA in the 2021-2022 network plan until next year. Currently, DAQ and DHEC have signed an official agreement regarding the monitoring responsibilities for the MSA.[7] Section 4.1 of Appendix D to 40 CFR Part 58 allows the EPA flexibility in addressing ozone monitoring requirements as stated in paragraph b) below:

"b) Within an O_3 network, at least one O_3 site for each MSA, or CSA if multiple MSAs are involved, must be designed to record the maximum concentration for that particular metropolitan area. More than one maximum concentration site may be necessary in some areas. Table D-2 of this appendix does not account for the full breadth of additional factors that would be considered in designing a complete O_3 monitoring program for an area. Some of these additional factors include geographic size, population density, complexity of terrain and meteorology, adjacent O_3 monitoring programs, air pollution transport from neighboring areas, and measured air quality in comparison to all forms of the O_3 NAAQS (i.e., 8-hour and 1-hour forms). Networks must be designed to account for all of these area characteristics. Network designs must be re-examined in periodic network assessments. Deviations from the above O_3 requirements are allowed if approved by the EPA Regional Administrator."

Besides the ozone monitoring site operated by DHEC, DAQ operates an industrial sulfur dioxide monitoring site, Southport DRR, in this MSA. In 2016, DAQ began working with CPI USA North Carolina Southport to establish a sulfur dioxide monitoring station in Southport, North Carolina, to characterize the ambient sulfur dioxide concentrations near the CPI facility as required by Special Order by Consent 2016-001.[8] The area chosen for placement of the monitor was selected using the results of modeling done as described in the technical assistance document for source-oriented monitoring[9] and was reported in an addendum to the 2016-2017 network plan.[10] Figure G-23 provides an aerial view of the monitoring location.

[7] Memorandum of Agreement (MOA) on Criteria Monitoring Between SCDHEC and NCDENR DAQ, July 1, 2015, Available on the worldwide web at http://xapps.ncdenr.org/aq/documents/DocsSearch.do?dispatch=download&documentId=6786.

[8] Special Order by Consent CPI USA North Carolina, LLC, SOC 2016-001, June 24, 2016, available on the worldwide web at https://files.nc.gov/ncdeq/Air+Quality/compliance/soc/CPI_USA_NC_Southport_SOC_2016-001.pdf.

[9] SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, U.S. EPA, Office of Air and Radiation, Office of Air Quality Planning and Standards, Air Quality Assessment Division, December 2013, Draft.

[10] Appendix L. CPI Southport Siting Analysis and Additional Site Information, North Carolina Division of Air Quality, Sep. 1, 2016. Available on the worldwide web at http://xapps.ncdenr.org/aq/documents/DocsSearch.do?dispatch=download&documentId=9275.

Figure G-23. Aerial view showing the location of the Southport DRR monitoring station

DAQ assigned this monitor the Air Quality System, AQS, identification number 37-019-0005-42401-1. DAQ operates this monitor in collaboration with CPI Southport to ensure the air in the Southport area complies with the national ambient air quality standards for sulfur dioxide. The division operates the monitor following the DAQ Sulfur Dioxide DRR quality-assurance project plan and the monitor is part of the DAQ primary quality assurance organization. Figure G-24 through Figure G-32 show the site and views from the site looking north, northeast, east, southeast, south, southwest, west and northwest.

Figure G-24. Southport DRR sulfur dioxide monitoring site

Figure G-25. Southport DRR site looking north

Figure G-26. Southport DRR site looking northwest

Figure G-27. Southport DRR site looking northeast

Figure G-28. Southport DRR site looking east

Figure G-29. Southport DRR site looking west

Figure G-30. Southport DRR site looking southeast

Figure G-31. Southport DRR site looking southwest

Figure G-32. Southport DRR site looking south

The monitoring site is located 30 meters from the trees to the east. DAQ estimates the tallest trees to be 15 meters in height. The nearest road is Rob Gandy Boulevard located 83 meters to the south-southeast. This road does not have traffic count data; however, as shown in Figure G-33, secondary road number 1526, Jabbertown Road, further south than Rob Gandy Boulevard, had an average annual daily traffic count of 4,600 in 2014. The division expects traffic on Rob Gandy Boulevard to be less than that on Jabbertown Road. The probe height is 4.8 meters.

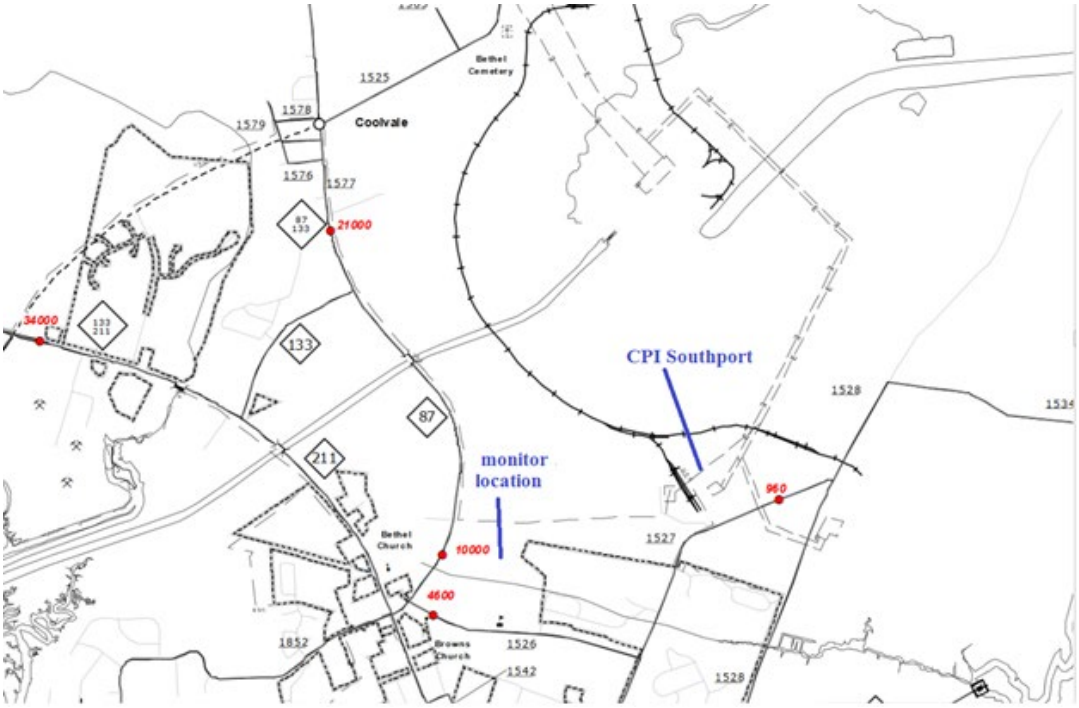

Figure G-33. 2014 Traffic count map (from NC DOT)

The AQS identification number and street address for the site is 37-019-0005 and 5538 Rob Gandy Blvd SE, Southport, NC 28461. The latitude and longitude is 33.942288 and -78.019265. The sampling and analysis method is AQS code 560, Thermo Electron 43i-TLE pulsed fluorescent instrument, EQSA-0486-060, and the operating schedule is hourly. The monitoring objective is source-oriented. Figure G-34 shows the location of the monitoring station relative to the population center of Brunswick County in the Southport area.

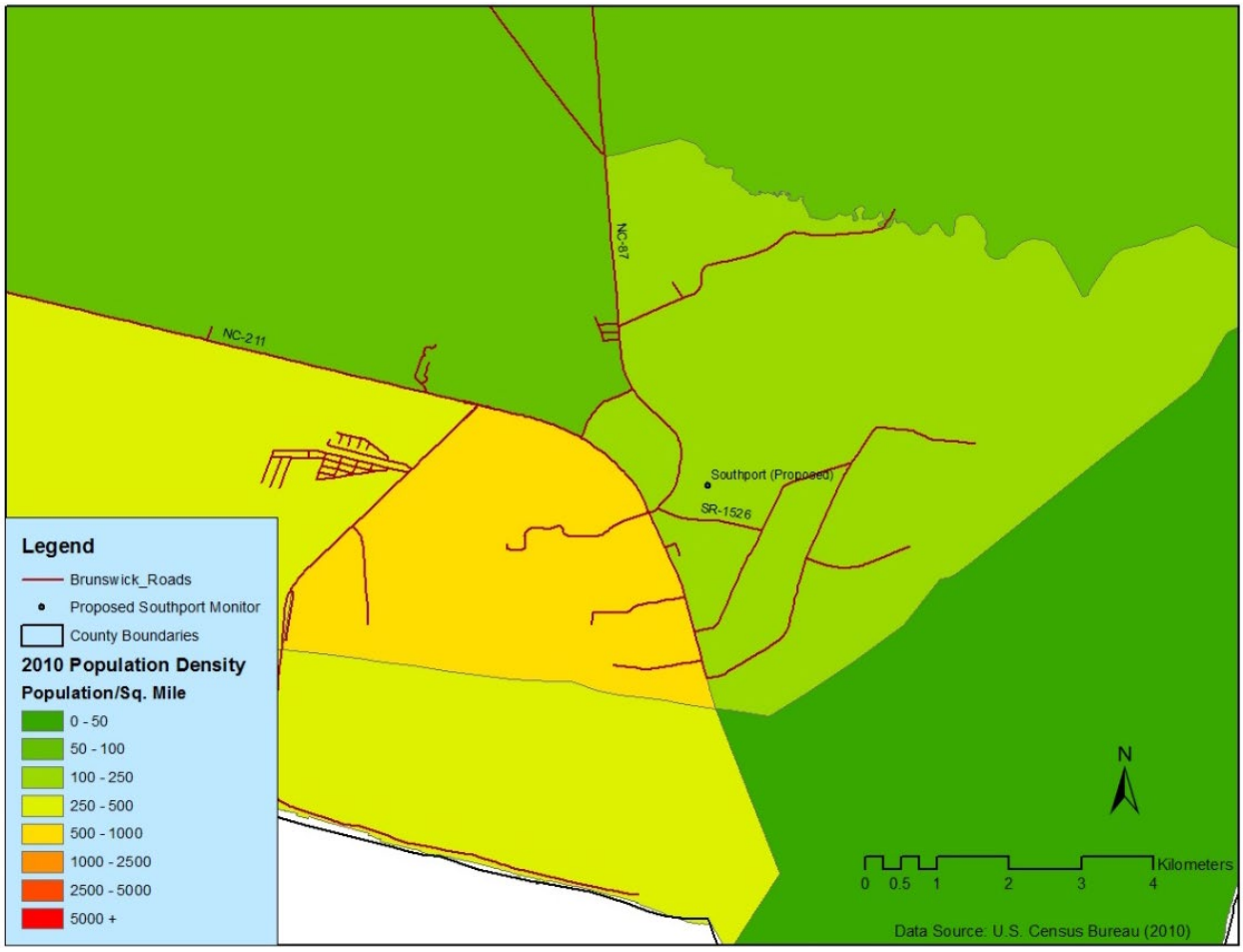

Figure G-34. Location of the Southport DRR monitoring station relative to the population of the Southport area in Brunswick County

Based on the wind rose in Figure G35, the Southport DRR monitoring station is located downwind of the CPI Southport plant. Figure G35 is a wind rose representing the 3-year period (2013 to 2015) for Wilmington, NC, surface meteorological data. As expected, the greatest frequency of occurrence or tendency of wind speed and direction occurred within the northeast quadrant. There is also a high frequency of wind speed and direction from the southwest, which is consistent with the direction of prevailing wind flow patterns for much of North Carolina. The high frequency of winds from the northeast direction likely coincides with colder ridge air masses to the north/northeast and coastal low-pressure systems off the coast during winter and early spring.

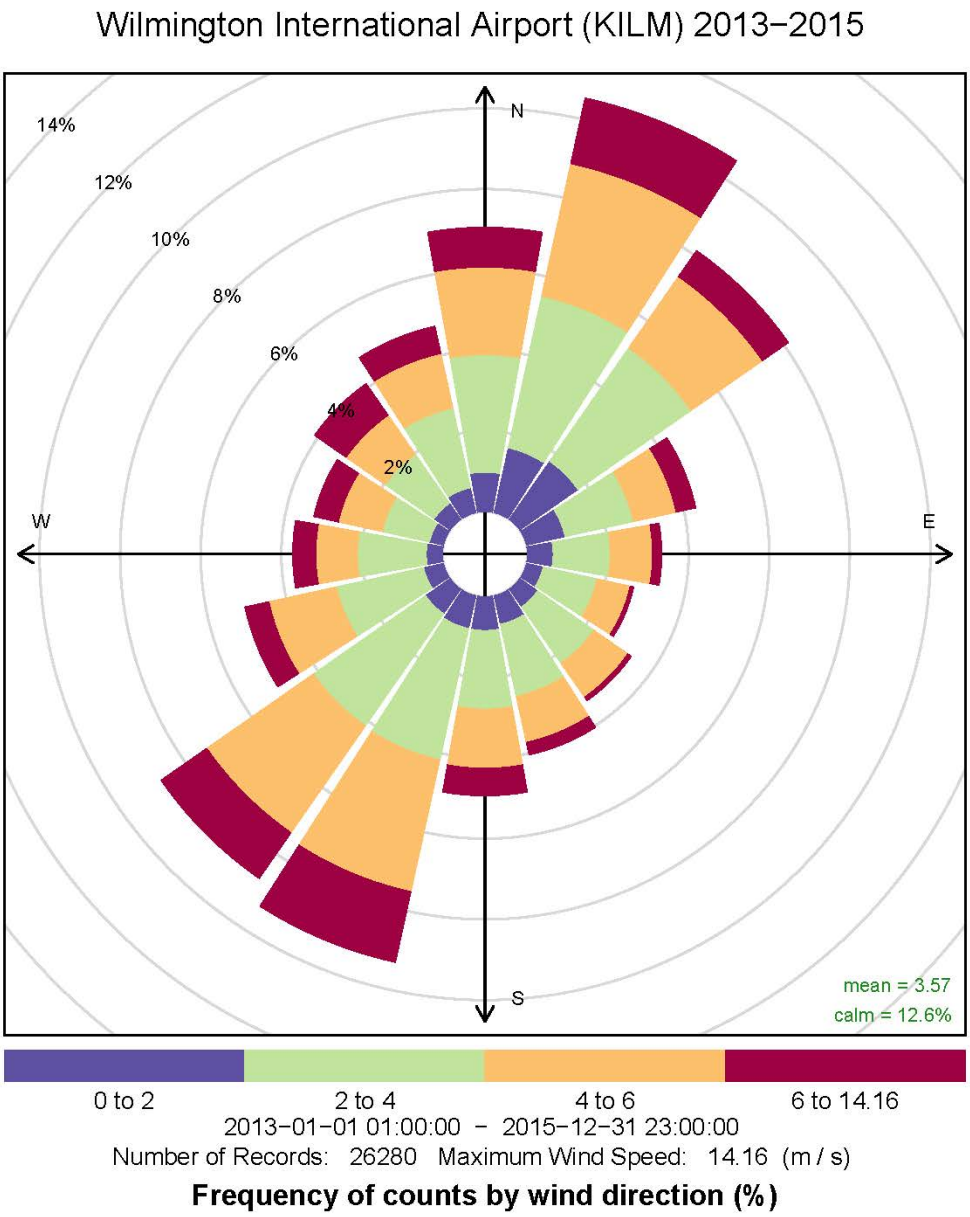

Figure G35. Wind rose from the Wilmington International Airport for 2013 to 2015

The spatial scale of representativeness for the monitor is neighborhood based on the distance of the monitor from the source. The monitor is located approximately 600 meters southwest from the property line of the CPI Southport facility. This monitor is representative of the air quality downwind from the fenceline of the CPI Southport facility. Table G2 summarizes other factors DAQ evaluated when choosing the location for the monitoring station.

Table G2. Other considerations in site selection

Factor	Evaluation
Long-term Site Commitment	The property owner is willing to provide DAQ with a long-term lease agreement and does not plan to develop the current area any time in the next three years
Sufficient Operating Space	10-meter by 10-meter area free of brush and 70-meter by 150-meter area free of trees and buildings
Access and Security	The building will be located by a driveway onto the property off either a lumber road or the nearby Rob Gandy Boulevard so it has easy access.
Safety	DAQ obtained the appropriate electrical permits.
Power	Overhead powerlines are located 130 meters northwest of the site.
Environmental Control	DAQ placed the monitoring shelter with the door to the north so that sunlight will not shine in through the window and warm up the building.
Exposure	The monitoring station will be at least 30 meters from the driplines of trees and will not be near any trees or buildings that could be an obstacle to air flow.
Distance from Nearby Emitters	The only permitted facility within 0.5 miles of the location is CPI Southport. There are two other facilities that are within one mile: **S & W Ready Mix Concrete**, located at 1619 N Howe Street, 960 meters west southwest of the Southport DRR monitoring station, emitted 0.4 tons of PM10 and 0.4 tons of TSP in 2014. **Duke Energy Progress – Brunswick Plant**, located at 8470 River Road, 1500 meters north northeast of the Southport DRR monitoring station, emitted 1.9 tons of SO2, 12.6 tons of NOx, 0.3 tons of VOC, 3.3 tons of CO and 0.4 tons of TSP in 2014.
Proximity to Other Measurements	The Southport DRR monitoring station is located about 4.5 kilometers east of the Brunswick County Airport.

As stated in Appendix D to Volume 1 of this network plan, DAQ is planning on shutting this monitoring station down in third quarter 2021, after the area is redesignated as attainment/unclassifiable, because the CPI Southport facility ceased operations on March 31, 2021. With the facility no longer operating, there is no longer a need to continue operating this monitoring site.

Changes to the **lead monitoring network** requirements in 2010,[11] as revised in 2016,[12] did not result in additional monitoring in this MSA. Changes to the **ozone monitoring requirements** in 2015 did not require additional monitoring in the Myrtle Beach-Conway-North Myrtle Beach MSA other than the ozone monitor that is already required and the extension of the ozone season by one month.

This MSA is also not required to do nitrogen dioxide monitoring by the 2010 **nitrogen dioxide monitoring** requirements. It is too small to require area-wide monitors or near roadway monitoring. The 2010 **sulfur dioxide monitoring** requirements did not require the Myrtle Beach-Conway-North Myrtle Beach MSA to monitor for sulfur dioxide. However, the North Carolina Environmental Management Commission required the CPI USA North Carolina LLC to conduct monitoring downwind of their Southport facility. DAQ performed modeling demonstrating that the facility operating at its allowable emission limits would exceed the standard. The 2016-2017 Network Plan Volume 1, Appendix L. CPI Southport Siting Analysis and Additional Site Information provides more information on this facility and monitor.[13] The **changes to the carbon monoxide monitoring requirements** will not require this MSA to monitor for carbon monoxide because the population is less than one million.

(3) The Jacksonville MSA

The Jacksonville MSA consists of Onslow County. The principal city is Jacksonville. DAQ does not operate any monitoring stations in the Jacksonville MSA. DAQ shut down the Jacksonville particle-monitoring site on Dec. 31, 2007, because the measured concentrations were less than 80 percent of the NAAQS.

Changes to the **lead monitoring network** requirements in 2010,[14] as revised in 2016,[15] did not result in adding lead monitors to the MSA. Jacksonville had a permitted facility that emitted 0.5 tons or more per year of lead in 2009. [16] However, lead emissions at Camp Lejeune in 2010 were

[11] Revisions to Lead Ambient Air Monitoring Requirements, Federal Register, Vol. 75, No. 247, Monday, Dec. 27, 2010, p. 81126, available on the worldwide web at https://www.gpo.gov/fdsys/pkg/FR-2010-12-27/pdf/2010-32153.pdf#page=1.
[12] Revisions to Ambient Monitoring Quality Assurance and Other Requirements, Federal Register, Vol. 81, No. 59, Monday, March 28, 2016, p. 17248, available on the worldwide web at https://www.gpo.gov/fdsys/pkg/FR-2016-03-28/pdf/2016-06226.pdf.
[13] Appendix L. CPI Southport Siting Analysis and Additional Site Information, North Carolina Division of Air Quality, Sep. 1, 2016. Available on the worldwide web at http://xapps.ncdenr.org/aq/documents/DocsSearch.do?dispatch=download&documentId=9275.
[14] Revisions to Lead Ambient Air Monitoring Requirements, Federal Register, Vol. 75, No. 247, Monday, Dec. 27, 2010, p. 81126, available on the worldwide web at https://www.gpo.gov/fdsys/pkg/FR-2010-12-27/pdf/2010-32153.pdf#page=1.
[15] Revisions to Ambient Monitoring Quality Assurance and Other Requirements, Federal Register, Vol. 81, No. 59, Monday, March 28, 2016, p. 17248, available on the worldwide web at https://www.gpo.gov/fdsys/pkg/FR-2016-03-28/pdf/2016-06226.pdf.
[16] United States Environmental Protection Agency. 2009 Toxic Release Inventory, released March 2010, available on the worldwide web at https://iaspub.epa.gov/triexplorer/tri_release.chemical.

below the 0.5-ton threshold. [17] The EPA concurred that actual emissions were less than 0.5 ton and did not require monitoring at the facility fenceline.[18] The lead emissions in 2019 are still below 0.5 ton.[19]

Changes to the **ozone monitoring requirements** did not result in additional monitoring in the Jacksonville MSA. Its population is above the threshold for requiring population exposure monitoring in urban areas but monitoring is not required because it does not have an ozone design value. Currently, DAQ does not monitor for ozone in Jacksonville because the ozone levels measured by the Castle Hayne monitor in New Hanover County indicate that the ozone concentrations on the coast are at 84 percent of the 2015 standard of 70 parts per billion. As shown in Figure G36, models consistently show low ozone levels in the Jacksonville MSA and that the probability of exceeding the standard in Jacksonville is less than 20 percent.

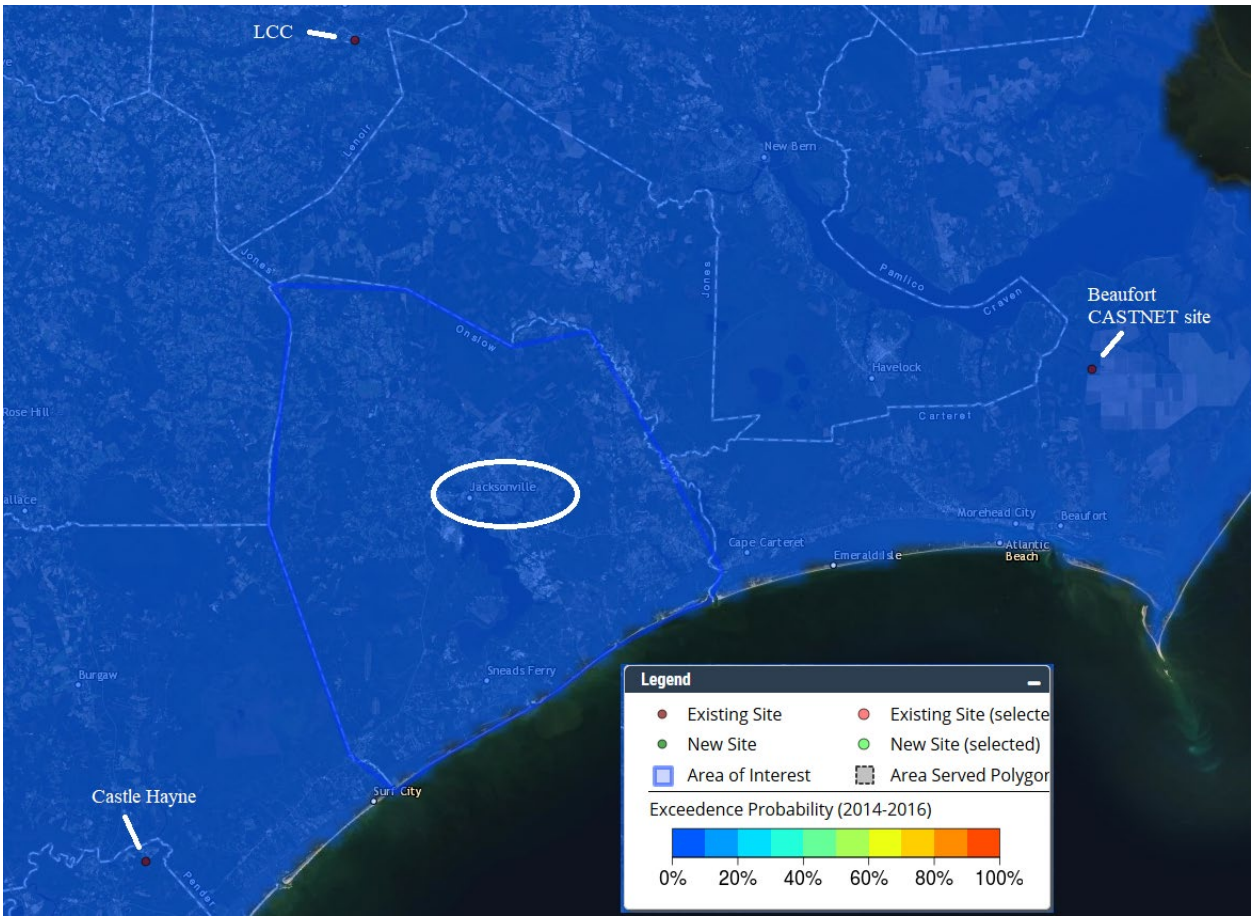

Figure G36. Probability of ozone exceeding the 2015 standard at least once in the Jacksonville MSA

[17] United States Environmental Protection Agency. 2010 Toxic Release Inventory, released March 2011, available on the worldwide web at https://iaspub.epa.gov/triexplorer/tri_release.chemical.
[18] United States Environmental Protection Agency. (2011). *FY 2011 State of North Carolina Ambient Air Monitoring Network Plan, U.S. EPA Region 4 Comments and Recommendations* (Oct. 20, 2011). Available on the worldwide web at http://xapps.ncdenr.org/aq/documents/DocsSearch.do?dispatch=download&documentId=7843
[19] United States Environmental Protection Agency. (2021). *TRI Explorer* (2019 Updated Dataset (released March 2021)) [Internet database]. Retrieved from https://www.epa.gov/triexplorer, (May 1, 2021).

The Jacksonville MSA did not add nitrogen dioxide monitors to comply with the 2010 **nitrogen dioxide monitoring** requirements. It is too small to require area-wide monitors or near-roadway monitoring. The Jacksonville MSA also did not need to add monitors to comply with the 2010 **sulfur dioxide monitoring** requirements because there are no large sources of sulfur dioxide in the MSA and the population is not large enough to require a PWEI monitor. This MSA is also not required to do carbon monoxide monitoring by the changes to the **carbon monoxide monitoring** requirements because the population is less than one million people.

(4) The Non-MSA Portion of the Wilmington Monitoring Region

The non-MSA portion of the Wilmington monitoring region consists of three counties - Carteret, Columbus and Duplin. This area has no MSAs. DAQ currently operates one monitoring site here and the EPA operates a clean air status and trends network, CASTNET, site in Beaufort in Carteret County. The CASTNET network plan discusses the CASTNET sites. The CASTNET network plan is available at http://xapps.ncdenr.org/aq/documents/DocsSearch.do?dispatch=download&documentId=13138. This section further discusses the one DAQ site. The DAQ site is a Mercury Deposition Network, MDN, site at Lake Waccamaw State Park. The division shut down the Kenansville particle monitoring station Dec. 31, 2015.

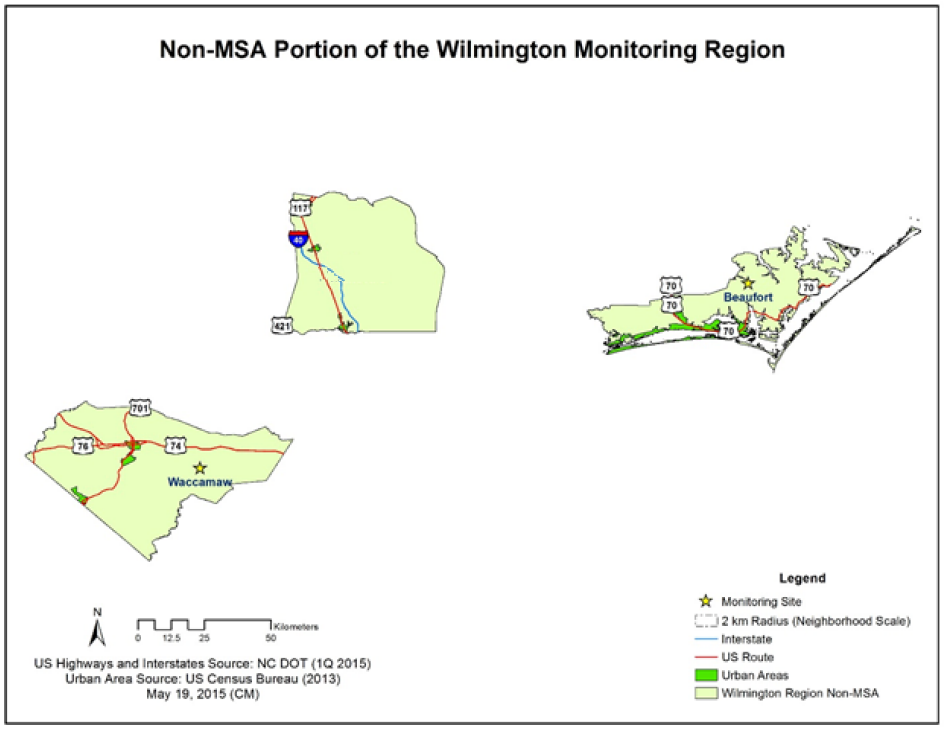

Figure G37. Monitoring site locations

At the **Lake Waccamaw** MDN site in Columbus County, DAQ operates a weekly mercury deposition monitor to measure total mercury, Hg, concentration and deposition in precipitation. The division upgraded the site to more modern equipment in 2014. Currently, DAQ is looking

for an alternate location for the site because of the growth of the nearby trees. Although the division wanted to collocated the MDN site at Castle Hayne, the Castle Hayne site did not meet the MDN siting criteria for a background site because it is too close to industrial sources. Figure G38 through Figure G46 provide a picture of the site as well as views looking north, northeast, east, southeast, south, west and northwest.

Figure G38. The Lake Waccamaw (NC08) MDN site

Figure G39. Looking north from the Lake Waccamaw MDN site

Figure G41. Looking northeast from the Lake Waccamaw MDN site

Figure G40. Looking northwest from the Lake Waccamaw MDN site

Figure G42. Looking east from the Lake Waccamaw MDN site

Figure G43. Looking west from the Lake Waccamaw MDN site

Figure G45. Looking southeast from the Lake Waccamaw MDN site

Figure G44. Looking southwest from the Lake Waccamaw MDN site

Figure G46. Looking south from the Lake Waccamaw MDN site

The 2010 **lead monitoring** requirements did not result in lead monitoring in these counties. No permitted facilities emitting 0.5 ton or more of lead per year are located in this area.[20] The new **ozone monitoring** requirements did not require additional monitoring in these counties. There is no MSA so population exposure monitoring requirements for urban areas do not apply. The 2010 **nitrogen dioxide** monitoring requirements also did not add monitors to these counties. These counties are too small to require area-wide monitors or near road monitoring. These counties did not need to add monitors to meet the 2010 **sulfur dioxide monitoring** requirements because there are no large sources of sulfur dioxide in them and their populations are too small to require a PWEI monitor. The changes to the **carbon monoxide monitoring** requirements did not require monitoring in these counties because their populations are under one million.

[20] *ibid*.

Appendix G.1 Annual Network Site Review Forms for 2020

Castle Hayne

Eagles Island in Wilmington

Southport DRR

Lake Waccamaw MDN

Site Review Form Calendar Year 2020

Site Information

Region WIRO	**Site Name** Castle Hayne	**AQS Site # 37-129-0002**
Street Address 6028 Holly Shelter Road		**City** Castle Hayne
Urban Area Not in an Urban Area	**Core-based Statistical Area** Wilmington, NC	
Enter Exact		
Latitude -77.838611	**Longitude** 34.364167	**Method of Measuring**
In Decimal Degrees	In Decimal Degrees	**Other (explain)** **Explanation: Google Earth**
Elevation Above/below Mean Sea Level (in meters)		8

Name of nearest road to inlet probe Holly Shelter Road ADT 3800 Year latest available 2019

Comments: No ADT Available

Distance of site to nearest major road (m) 4500.00 Direction from site to nearest major road WSW

Name of nearest major road I-40 ADT 38000 Year 2019

Comments: _____

Site located near electrical substation/high voltage power lines? Yes ☐ No ☒

Distance of site to nearest railroad track (m) _____ Direction to RR ___ ☒NA

OPTIONAL Distance of site to nearest power pole w/transformer (m) _____ Direction ___

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
☐ 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) 4.50

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) 2.00

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 ☐ *Number of trees within 10 meters _____

*Distance from probe to closest tree (m) 7.00 Direction from probe to tree W *Height of tree above probe (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) 59 Direction from probe to nearest traffic lane NNW

Site Review Form Calendar Year 2020

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 ☒ PM2.5 Cont. (BAM)	☐ General/Background _____ ☐ Highest Concentration _____ ☒ Population Exposure _____ ☐ Source Oriented _____ ☐ Transport _____ ☐ Welfare Related Impacts _____	☐ Micro _____ ☐ Middle _____ ☒ Neighborhood _____ ☐ Urban _____ ☐ Regional _____	☐ SLAMS _____ ☒ SPM_PM-10 = T640X not BAM **Monitor NAAQS Exclusion** ☐ NONREGULATORY_____

Probe inlet height (from ground) ☐ < 2 m _____ ☒ 2-7m 4.6 ☐ 7-15 m _____ ☐ > 15 m _____
Actual measured distance from probe inlet to ground (meters) _____

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) 2.0 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 ☐

Are collocated PM2.5 Monitors (Two FRMs, FRM & BAM, BAM & BAM) 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 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 ☐ *Number of trees within 10 meters _____
*Distance from probe to closest tree (m) _____ Direction from probe to tree ___ *Height of tree above probe (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) 59 Direction from probe to nearest traffic lane NNW

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: PM-10 is a T640X

Date of Last Site Pictures 11/16/2020 New Pictures Submitted? Yes ☒ No ☐

Reviewer Tony Sabetti Date December 18, 2020

Ambient Monitoring Coordinator Tony Sabetti DateDecember 18, 2020

Site Review Form Calendar Year 2020

Site Information

Region WIRO	**Site Name** Eagle Island	**AQS Site # 37-129-0010**
Street Address 1 Battleship Road		**City** Wilmington
Urban Area WILMINGTON	**Core-based Statistical Area** Wilmington, NC	
Enter Exact		
Latitude -77.95586389	**Longitude** 34.23553611	**Method of Measuring**
In Decimal Degrees	In Decimal Degrees	**Other (explain)** **Explanation: Google Earth**
Elevation Above/below Mean Sea Level (in meters)		5

Name of nearest road to inlet probe Battleship Road ADT _____ Year Choose an item _____

Comments: No ADT Available

Distance of site to nearest major road (m) 262.00 Direction from site to nearest major road W

Name of nearest major road US HWY 421 ADT 38000 Year 2019

Comments: _____

Site located near electrical substation/high voltage power lines?	Yes ☐ No ☒
Distance of site to nearest railroad track	(m) _____ Direction to RR ___ ☒NA
OPTIONAL Distance of site to nearest power pole w/transformer	(m) _____ Direction ___
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
☐ 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 UAT & GenX Dep. **Monitor Network Affiliation** ☐ NCORE_____ ☐ Unofficial PAMS_____

Probe inlet height (from ground) 2-15 m? Yes ☒ No ☐ Give actual measured height from ground (meters) 4.00

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) 0.00

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 ☐ *Number of trees within 10 meters _____

*Distance from probe to closest tree (m) _____ Direction from probe to tree ___ *Height of tree above probe (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) 75 Direction from probe to nearest traffic lane S

Site Review Form Calendar Year 2020

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 ☐ PM2.5 Cont. (BAM)	☐ General/Background _____ ☐ Highest Concentration _____ ☐ Population Exposure _____ ☐ Source Oriented _____ ☐ Transport _____ ☐ Welfare Related Impacts _____	☐ Micro _____ ☐ Middle _____ ☐ Neighborhood _____ ☐ Urban _____ ☐ Regional _____	☐ SLAMS _____ ☐ SPM_____ **Monitor NAAQS Exclusion** ☐ NONREGULATORY_____

Probe inlet height (from ground) ☐ < 2 m _____ ☐ 2-7m 4.6 ☐ 7-15 m _____ ☐ > 15 m _____
Actual measured distance from probe inlet to ground (meters) _____

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) _____ 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 ☐

Are collocated PM2.5 Monitors (Two FRMs, FRM & BAM, BAM & BAM) 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 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 ☐ *Number of trees within 10 meters _____
*Distance from probe to closest tree (m) _____ Direction from probe to tree ___ *Height of tree above probe (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) _____ Direction from probe to nearest traffic lane ___

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:

Date of Last Site Pictures 12/18/2020 New Pictures Submitted? Yes ☒ No ☐

Reviewer Tony Sabetti Date December 18, 2020

Ambient Monitoring Coordinator Tony Sabetti DateDecember 18, 2020

Site Review Form Calendar Year 2020

Site Information

Region WIRO	**Site Name** Southport DRR	**AQS Site # 37-**019**-**0005
Street Address-5538 Rob Gandy Blvd SE	**City** Southport	
Urban Area Choose an item.	**Core-based Statistical Area** Myrtle Beach-Conway-North Myrtle Beach	

Enter Exact		**Method of Measuring**	
Latitude 78.0192638	**Longitude** 33.94229444		
In Decimal Degrees	In Decimal Degrees	Other (explain)	**Explanation:** Google Earth
Elevation Above/below Mean Sea Level (in meters)		9	

Name of nearest road to inlet probe Rob Gandy Blvd ADT n/a Year Choose one _____

Comments: _____

Distance of site to nearest major road (m) 360.00 Direction from site to nearest major road W

Name of nearest major road Hwy 87 ADT 8100 Year Choose one 2019

Comments: _____

Site located near electrical substation/high voltage power lines?		Yes ☐ No ☒
Distance of site to nearest railroad track	(m) 725 Direction to RR NNE	☐NA
OPTIONAL Distance of site to nearest power pole w/transformer	(m) _____ Direction ___	
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
☒ SO_2 (DRR) ☒ 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	☒INDUSTRIAL ☐SLAMS ☐SPM

Probe inlet height (from ground) 2-15 m? Yes ☒ No ☐ Give actual measured height from ground (meters) 4.8

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) 1.8

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 ☐ *Number of trees within 10 meters _____

*Distance from probe to closest tree (m) _____ Direction from probe to tree ___ *Height of tree above probe (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) 85 Direction from probe to nearest traffic lane S

Site Review Form Calendar Year 2020

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 12/4/2020 New Pictures Submitted? Yes ☒ No ☐

Reviewer Tony Sabetti Date December 18, 2020

Ambient Monitoring Coordinator Tony Sabetti Date December 18, 2020

Revised 2021-05-11

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.

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.

Site Review Form Calendar Year 2020

Site Information

Region WIRO	**Site Name** Lake Waccamaw	**AQS Site # 37-____-____**
Street Address 1866 State Park Drive		**City** Lake Waccamaw
Urban Area Not in an Urban Area	**Core-based Statistical Area** None	
Enter Exact		**Method of Measuring**
Latitude -78.4777055	**Longitude** 34.2592336	
In Decimal Degrees	In Decimal Degrees	**Other (explain)** **Explanation: Google Earth**
Elevation Above/below Mean Sea Level (in meters)		15

Name of nearest road to inlet probe State Park Drive ADT _____ Year latest available _____

Comments: No ADT Available

Distance of site to nearest major road (m) 3000.00 Direction from site to nearest major road NE

Name of nearest major road Bella Coola Road ADT 450 Year 2017

Comments: _____

Site located near electrical substation/high voltage power lines?		Yes ☐ No ☒
Distance of site to nearest railroad track	(m) _____ Direction to RR ___	☒NA
OPTIONAL Distance of site to nearest power pole w/transformer	(m) _____	Direction ___
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
☐ 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 Mercury Deposition **Monitor Network Affiliation** ☐NCORE_____ ☐Unofficial PAMS_____

Probe inlet height (from ground) 2-15 m? Yes ☒ No ☐ Give actual measured height from ground (meters) 2.00

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) 2.00

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 ☒ *Number of trees within 10 meters 4.00

*Distance from probe to closest tree (m) 7.00 Direction from probe to tree W *Height of tree above probe (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) 90 Direction from probe to nearest traffic lane NE

Site Review Form Calendar Year 2020

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 ☐ PM2.5 Cont. (BAM)	☐ General/Background _____ ☐ Highest Concentration _____ ☒ Population Exposure _____ ☐ Source Oriented _____ ☐ Transport _____ ☐ Welfare Related Impacts _____	☐ Micro _____ ☐ Middle _____ ☐ Neighborhood _____ ☐ Urban _____ ☐ Regional _____	☐ SLAMS _____ ☐ SPM_____ **Monitor NAAQS Exclusion** ☐ NONREGULATORY_____

Probe inlet height (from ground) ☐ < 2 m _____ ☐ 2-7m 4.6 ☐ 7-15 m _____ ☐ > 15 m _____
Actual measured distance from probe inlet to ground (meters) _____

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) _____ 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 ☐

Are collocated PM2.5 Monitors (Two FRMs, FRM & BAM, BAM & BAM) 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 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 ☐ *Number of trees within 10 meters _____
*Distance from probe to closest tree (m) _____ Direction from probe to tree ___ *Height of tree above probe (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) _____ Direction from probe to nearest traffic lane ___

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:

Date of Last Site Pictures 10/16/2020 New Pictures Submitted? Yes ☒ No ☐

Reviewer Tony Sabetti Date December 18, 2020

Ambient Monitoring Coordinator Tony Sabetti Date December 18, 2020

Appendix G-2. Scale of Representativeness

The agency must describe each station in the monitoring network 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 about 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 match correctly 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 G3. 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