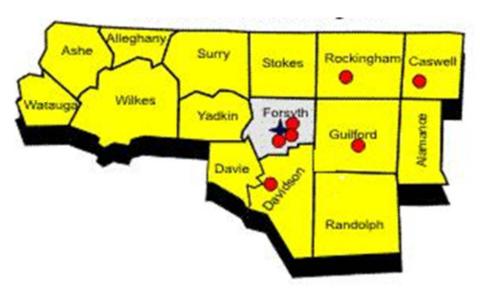


# 2016-2017 Annual Monitoring Network Plan for the North Carolina Division of Air Quality

# Volume 2

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

# **B.** The Winston-Salem Monitoring Region



July 1, 2016

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### The Winston-Salem Monitoring Region

The Winston-Salem monitoring region of North Carolina, shown in Figure B1, consists of five sections: (1) the eastern mountains (Alleghany, Ashe, Surry, Watauga and Wilkes counties), (2) the Winston-Salem metropolitan statistical area (MSA) (Davidson, Davie, Forsyth, Stokes and Yadkin counties), (3) the Greensboro MSA (Guilford, Randolph and Rockingham counties), (4) the Burlington MSA (Alamance County) and (5) Caswell County.

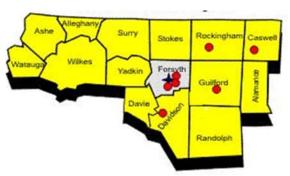


Figure B1. The Winston-Salem monitoring region

The red dots show the approximate locations
of most of the monitoring sites in this
region.

#### (1) The Eastern Mountains

The eastern mountains consist of five counties: Alleghany, Ashe, Surry, Watauga and Wilkes. There are no major metropolitan areas in this section of the North Carolina Mountains. The Boone micropolitan statistical area, MiSA, is located in Watauga County, the Mount Airy MiSA is located in Surry County and the North Wilkesboro MiSA is located in Wilkes County. The North Carolina Division of Air Quality, DAQ, does not operate any monitoring sites in the eastern mountains. The Boone fine particle monitoring site located at Boone in Watauga County was shut down on December 31, 2015.

In 2010 the United States Environmental Protection Agency, EPA, finalized changes to the expanded **lead monitoring** network established in 2008 to support the lower lead national ambient air quality standard, NAAQS, of 0.15 micrograms per cubic meter. EPA focused monitoring efforts on fence line monitoring located at facilities that emit 0.5 ton or more of lead per year, at urban national core, NCore, monitoring sites and at selected airports. The eastern mountains do not have an NCore monitoring site, any permitted facilities emitting 0.5 ton or more per year of lead, or any of the selected airports. Thus, the 2010 changes to the lead monitoring network requirements did not result in any lead monitoring in the eastern mountains.

The 2015 **ozone monitoring** requirements did not result in additional ozone monitoring in the eastern mountains. This area does not have any MSAs requiring a minimum number of monitors by 40 Code of Federal Regulations, CFR, 58 Appendix D for population exposure monitoring in urban areas.

The eastern mountains did not need to add monitors to comply with the 2010 **nitrogen dioxide monitoring** requirements. The area is too small to require area-wide monitors and does not have any roadways with average annual daily traffic above the threshold for near roadway monitoring.

<sup>&</sup>lt;sup>1</sup> DAQ emission inventory database available from the world wide web at <a href="https://xapps.ncdenr.org/aq/ToxicsReportServlet?ibeam=true&year=2014&physical=byCounty&overridetype=All&toxics=153&sortorder=3&viewreport=View+Report">https://xapps.ncdenr.org/aq/ToxicsReportServlet?ibeam=true&year=2014&physical=byCounty&overridetype=All&toxics=153&sortorder=3&viewreport=View+Report</a>.

The eastern mountain area also does not need additional monitors to meet the 2010 **sulfur dioxide monitoring** requirements because there are no large sources of sulfur dioxide emissions located within the area.<sup>2</sup> 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) The Winston-Salem MSA

The Winston-Salem MSA consists of five counties: Davidson, Davie, Forsyth, Stokes and Yadkin. The major metropolitan area is Winston-Salem. The DAQ currently operates one monitoring site in the Winston-Salem MSA and the Forsyth County Office of Environmental Assistance and Protection, FCOEAP, operates three. These sites are located at Lexington (Davidson County) and Clemmons, Union Cross, and Hattie Avenue in Winston-Salem (Forsyth County). The locations of these monitors are shown in Figure B2. The FCOEAP sites and monitors are discussed in Appendix C. Only the DAQ site is further discussed in this subsection.

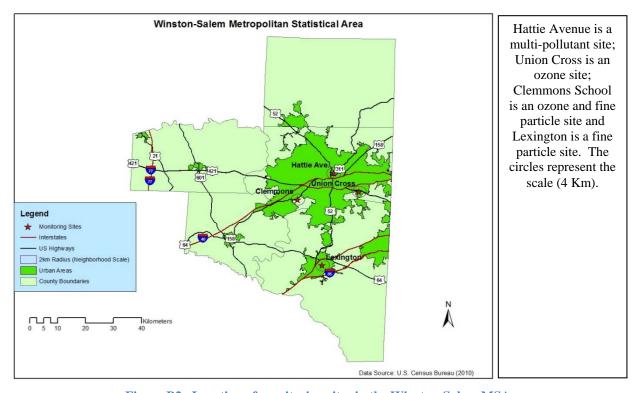


Figure B2. Location of monitoring sites in the Winston-Salem MSA

В5

<sup>&</sup>lt;sup>2</sup> DAQ emission inventory database available from the world wide web at <a href="https://xapps.ncdenr.org/aq/ToxicsReportServlet?ibeam=true&year=2014&physical=byCounty&overridetype=All&toxics=264&sortorder=3">https://xapps.ncdenr.org/aq/ToxicsReportServlet?ibeam=true&year=2014&physical=byCounty&overridetype=All&toxics=264&sortorder=3</a>.



Figure B3. Lexington water tower fine particle monitoring site, 37-057-0002

At the **Lexington** site, 37-057-0002, the DAQ operates a one-in-three-day fine particle FRM monitor and a continuous fine particle monitor. The MetOne Super SASS and URG monitors were shut down in January 2015. The site is pictured in Figure B3. Views looking north, northeast, east, south, southwest and west are provided in Figure B4 through Figure B9. Table B1 summarizes monitoring information for the site.



Figure B4. Looking north from Lexington site



Figure B5. Looking west from Lexington site



Figure B6. Looking northeast from Lexington site



Figure B7. Looking east from Lexington site



Figure B8. Looking southwest from Lexington site



Figure B9. Looking south from Lexington site

# **Table B1. Site Table for Lexington**

Site Name:	Lexington								ntifi	tification Number				57-000	02
<b>Location:</b>	938 South	Salis	bury Stre	et, Le	exington, No	rth (	Caroli	ina							
CBSA:			Winston	-Sale	m, NC				C	BSA #:			4918	30	
Latitude			35.8144	8						WGS84					
Elevation			241 met	ers											
Parameter N	ame		<b>Aethod</b>							thod ference	ID	Samp Dura			npling edule
PM 2.5 Local Conditions, P					5 PM-2.5 Sec C – Gravimetr				RF 145	PS-1006	5-	24-H	our		ry third day, r round
PM 2.5 Local		Me	t One BA	M-10	020 Mass Mo	onito	or		EQ	PM-030	)8-			Hou	ırly, year
Conditions, S	econdary	w/\	VSCC (17	70)					170	)		1-Ho	ur	roui	
Data Manita	n Establisha	d.	PM 2.5	Local	Conditions,	Prin	nary	Monit	tor					Jan. 1	1, 1999
Date Monitor Established: PM 2.5					Conditions,	Sec	onda	ry Coi	ntinu	ious Mo	nitor			July 2	22, 2014
Nearest Road: South Salisbury Street Traffic Count:						nt:	1000	Y	ear of	f Cou	nt:	Estimated			
Parameter Name Distator to Ro					Direction Monitor to Road Type			or		C4 ~ 4 ~	4	¢ D			
			to Roa	u	to Koau	1.	ype		_	Statemo				C	
PM 2.5 Local Primary	Conditions,		30 me	tora	East	CI	LAM	C		Require mainten					A A OS
PM 2.5 Local	Conditions		30 1116	ters	East	SI	LAM	.S	- 1	шашен	ance	Com	pirane	e w/11/	AAQS
Secondary	Conditions,		30 me	ters	East	Sl	LAM	S	]	Real-tin	ne A0	QI repo	orting	& fore	ecasting.
Parameter N	ame			Moi	nitoring Obj	ecti	ve	Scale	e		Cor	table f nparis AQS			Proposal to Move or Change
PM 2.5 Local	Conditions,	Prin	nary	Pop	ulation expos	sure		Neig	hboı	hood		Y	es		None
PM 2.5 Local	Conditions,	Sec	ondary	Pop	ulation expos	sure		Neig				N	0		None
			•		•		Me	ets Pa	ırt 5	8 Requ	irem	ents fo	or:	•	
Parameter Name				App	endix A			endi		•	_	pendi		App	endix E
PM 2.5 Local Conditions, Primary			Yes			7	<i>l</i> es		Î	Yes			Yes		
PM 2.5 Local Conditions, Secondary				Yes			7	<i>l</i> 'es			Yes			Yes	
					be Height (n	-			to Sı	ıpport	Γ	istano	nce to Trees		Obstacles
PM 2.5 Local	PM 2.5 Local Conditions, Primary							2.1				>20	meter	rs	None
PM 2.5 Local	Conditions,	Sec	ondary		2.4			2.1	mete	ers		>20	mete	rs	None

In 2014 the DAQ shut down the seasonal ozone monitor at **Mocksville**, 37-059-0003, because it was not required by 40 CFR 58 Appendix D. In 2015 the FCOEAP shut down the Peters Creek carbon monoxide monitor and the Shiloh Church ozone monitor. The carbon monoxide monitor was no longer required by the state implementation plan to demonstrate compliance with the carbon monoxide standard and the ozone monitor was not required by Appendix D.

The 2010 changes to the **lead monitoring** requirements did not require lead monitoring in the Winston-Salem MSA. The Winston-Salem MSA does not have any NCore monitoring sites and does not have any permitted facilities emitting more than 0.5 ton per year of lead.<sup>3</sup>

The 2015 changes to the **ozone monitoring** requirements will lengthen the monitoring season so that it will begin on March 1 instead of April 1 starting in 2017. The ozone monitoring changes will not result in additional monitors in the Winston-Salem MSA. This MSA already exceeds the minimum number of monitors required by 40 CFR 58 Appendix D for population exposure monitoring in urban areas.

To comply with the 2010 **nitrogen dioxide monitoring** requirements according to the monitoring rules finalized on March 7, 2013, the Winston-Salem MSA will need to add a monitor by Jan. 1, 2017. However, on May 6, 2016, EPA proposed to narrow the scope of near-road monitoring by removing the requirement for near-road NO2 monitoring stations in areas with populations between 500,000 and 1 million. The MSA population exceeds the 500,000 threshold resulting in a need for near roadway monitoring if the EPA does not finalize the proposal to remove near roadway monitoring for MSAs with populations between 0.5 and 1 million. If a near-roadway monitor is required, it most likely would be located somewhere along I-40 in Forsyth County. Currently, the MSA is too small to require area-wide monitors. The existing nitrogen dioxide monitor at Hattie Avenue was designated as one of the monitors required by the administrator to represent vulnerable populations.

The Winston-Salem MSA will not need to add sulfur dioxide monitors to comply with the 2010 **sulfur dioxide monitoring** requirements. In August 2012, the Office of Air Quality Planning and Standards, OAQPS, calculated, based on a revised 2008 emission inventory, that population weighted emission index, PWEI, monitoring was not required in the MSA. Source oriented monitoring will also not be required at the Belews Creek Steam Station in Stokes County because the facility was able to show by modeling that the ambient air in the vicinity of the facility meets the current standard. This area will also not be required to operate near road **carbon monoxide** and **fine particle** monitors because the population is under one million.

**B8** 

<sup>&</sup>lt;sup>3</sup> DAQ emission inventory database available from the world wide web at <a href="https://xapps.ncdenr.org/aq/ToxicsReportServlet?ibeam=true&year=2014&physical=byCounty&overridetype=All&toxics=153&sortorder=3&viewreport=View+Report">https://xapps.ncdenr.org/aq/ToxicsReportServlet?ibeam=true&year=2014&physical=byCounty&overridetype=All&toxics=153&sortorder=3&viewreport=View+Report</a>.

### (3) The Greensboro-High Point MSA

The Greensboro-High Point MSA consists of three counties: Guilford, Randolph and Rockingham. The major metropolitan areas are the cities of Greensboro and High Point. The DAQ currently operates two monitoring sites in the Greensboro-High Point MSA. These sites are located at Mendenhall (Guilford County) and Bethany (Rockingham County). The locations of these monitors are shown in Figure B10. The DAQ shut down the **Colfax**, 37-081-0014, one-in-three-day fine particle monitoring site at the end of 2014 because it was no longer required by Appendix D.

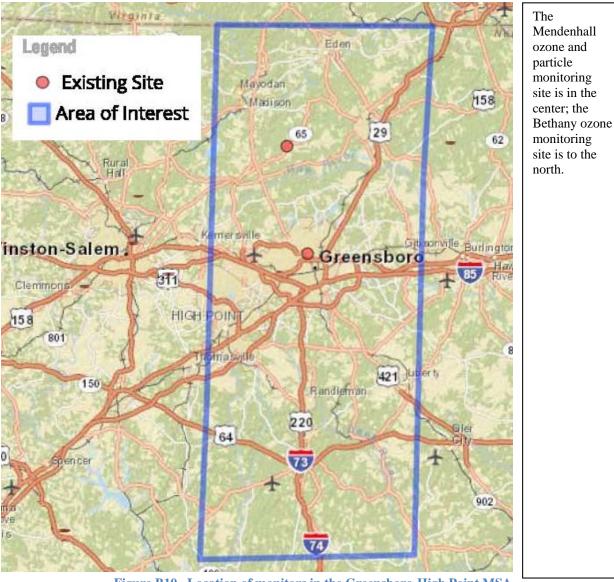


Figure B10. Location of monitors in the Greensboro-High Point MSA

At the Mendenhall site, 37-081-0013, the DAQ operates a seasonal ozone monitor, a one-in-sixday fine particle monitor, a continuous fine particle monitor and a continuous PM<sub>10</sub> monitor. Figure B11 through Figure B19 show the site and views looking north, northeast, east, southeast, south, southwest, west and northwest. The Mendenhall site is the design value ozone monitoring site for the MSA. In 2011, the DAQ reduced the monitoring schedule for the fine particle monitor to one-insix day. Site information is in Table B2.



Figure B11. Mendenhall ozone and particle **monitoring site, 37-081-0013** 





Figure B12. Looking north from the Mendenhall site Figure B14. Looking northeast from the Mendenhall site



Figure B13. Looking northwest from the Mendenhall site



Figure B15. Looking east from the Mendenhall site



Figure B16. Looking west from the Mendenhall site



Figure B18. Looking southeast from the Mendenhall site



Figure B17. Looking southwest from the Mendenhall



Figure B19. Looking south from the Mendenhall site

Table B2. S	Site Ta	able for	Mendenha	11										
Site Name:	Mei	ndenhall	School A	QSS	Site Identif	ication	Nun	nber	r			37-	081-0013	
<b>Location:</b>	205	Willoug	hby Blvd, Gr	eenst	oro, North	Caroli	na							
CBSA:	Green	nsboro-H	igh Point, NO	C		<b>CBSA</b>	#:	24	660					
Latitude	36.10	9167	Longitude	-7	9.801111	Datu	m:	NA	AD83	Elev	vation	24	7 meters	
								Method Samp					Sampling	
Parameter N	Method	d				Re	efere	ence ID		Durat	ion	Schedule		
		Instrum	nental with ul	tra vi	olet photon	netry							April 1 to Oct.	
Ozone		(047)					EQ	QOA	-0880-0	47	1-Hou	r	31	
PM 2.5 Local	l		Model 2025 I										Every Sixth day,	
Conditions, F	Conditions, FRM Sampler w/VSCC – Gravimetric Analysis RFI						RFPS-0498-118 24-Hour				ur	year round		
PM 2.5 Local	l		ne BAM-1022	2 Mas	ss Monitor	w/								
Conditions, B		VSCC					EC	QPM	I-1013-2	09	1-Hou	r	Year round	
PM10 Total 0	)-10													
μm STP			e Beta Atten	uatio	n BAM-102	20	EQPM-0798-122 1-Hour					Year round		
<b>Date Monito</b>	r Esta	blished:											April 15, 2005	
Date Monito	r Esta	blished:	PM 2.5 Lo									Dec. 14, 2001		
Date Monito			PM 2.5 Lo			continu	ous						Dec. 14, 2001	
Date Monito			PM10 Tota	_									Dec. 14, 2001	
Nearest Road	d: S	Saint Reg	is Road	Tra	iffic Count	: 1,0	000		Year of	Cou	nt:		Estimate	
	Distance to Direction to													
Parameter Name Road Road						M	onite	or Type	St	atemen	t of l	Purpose		
									Co	omplian	ce w	/ NAAQS; real-time		
Ozone			130 meter	:S	North nor	thwest	nwest SLAMS			re	reporting; air quality forecasting			
PM 2.5 Local Conditions,										Co	omplian	ance w/NAAQS.		
FRM			130 meter	:S	North nor	thwest	SL	AM	S					

Table B2. Site Table for Mendenhall

PM 2.5 Local Conditions,				SPM; n	on-	Real-time repo	orting;	air quality
BAM	130 meters	North no	orthwest	regulate	ory	forecasting.		
PM10 Total 0-10 µm STP	130 meters	North no	orthwest	SLAM	S	Compliance w	/NAA	.QS
	Monitoring	3			Suital	ble to Compare	Pro	posal to Move
Parameter Name	Objective		Sc	ale	t	o NAAQS	(	or Change
	General bac	ekground					Sea	son will start
Ozone	Population	exposure	Url	ban		Yes	M	ar. 1 in 2017
	Population							
PM 2.5 Local Conditions, FR		_	Neighb	orhood		Yes		None
	Population	-						
PM 2.5 Local Conditions, BA			Neighb	orhood		No		None
	Population							
PM10 Total 0-10 µm STP	General bac	ekground	Url	ban		Yes		None
	Meets Part		Meets l			<b>Ieets Part 58</b>		ets Part 58
	Appendix A		Append			ppendix D		endix E
Parameter Name	Requireme	ents	Requir	ements	R	equirements	Reg	uirements
Ozone	Yes	S		Yes		Yes	Yes	
PM 2.5 Local Conditions, FR	M Ye	S		Yes		Yes		Yes
PM 2.5 Local Conditions, BA	M Ye	S		No		Yes		Yes
PM10 Total 0-10 µm STP	Yes	S		Yes		Yes		Yes
Parameter Name	Probe Heig	ght (m)	Distance	nce to Support		Distance to Tre	ees	Obstacles
Ozone	3		1.	1.1 meters		>20 meters		None
PM 2.5 Local Conditions, FR	M 2.4		2.	2.2 meters		>20 meters		None
PM 2.5 Local Conditions, BA	M > 3.4	1	~2	.2 meters		>20 meters		None
PM10 Total 0-10 µm STP	2.4		2.3	2 meters		>20 meters		None

At the **Bethany** site, 37-157-0099, the DAQ operates a seasonal ozone monitor, the second required ozone monitoring site for the MSA. The DAQ added a background sulfur dioxide monitor for background PSD modeling to this site Jan. 1, 2011. The monitor operates for 12 months every three years. It operated in 2014 and will operate again in 2017. A picture of the site as well as views looking north, east, south and west are provided in Figure B20 through Figure B24. Site information is in Table B3



Figure B20. Bethany ozone and sulfur dioxide monitoring site, 37-157-0099



Figure B21. Looking north from the Bethany site



Figure B23. Looking east from the Bethany site



Figure B22. Looking west from the Bethany site



Figure B24. Looking south from the Bethany site

# Table B3. Site Table for Bethany School

Site Name:	Dot	thany Sch	0.01	AQS Site Ide	ntificat	on Nu	mbor			27 1	57-0099		
				_						37-1	37-0099		
Location:				School, Reids									
CBSA:	Gree	nsboro-H	igh Point, N	C	CBSA	<b>.</b> #:	2	24660					
Latitude	36.3	08889	Longitude	-79.85916	57 <b>D</b> a	atum:	W	GS84	Elevation	277	meters		
Parameter						Me	thod		Sample				
Name	Met	hod				Ref	erenc	ce ID	Duration	Sa	ampling Schedule		
Ozone	Instr	umental v	vith ultra vic	olet photometr	y (047)	EQ	OA-0	880-047	1-Hour	A	pril 1 to Oct. 31		
Sulfur										12	2 months		
dioxide	Instr	umental v	vith pulsed f	luorescence (	060)	EQ:	SA-04	486-060	1-Hour	Ev	very third year		
Date Monito	r Esta	blished:	Ozone								July 7, 1993		
Date Monitor Established:       Sulfur dioxide       Jan. 1, 2011													
Nearest Road	d:	SR2316		Traffic Co	unt:	700		Year of	Count:		2013		
Parameter N	ame	Distanc	e to Road	Direction to	Road	M	Ionito	or Type	Statement	t of P	urpose		
							Complia				ce w/ NAAQS; real-time		
Ozone		20	meters	We	st	S	LAM	S	reporting;	air qı	ality forecasting.		
						Sı	pecial						
Sulfur dioxide	e	20	meters	We	st		urpos		PSD mode	eling.			
Parameter								Suitab	le to Compa	re	Proposal to		
Name	I N	Ionitorin	g Objective			S	cale	to NA	_		Move or Change		
Name	14	10111101111	<b>_,</b>	Population exposure, transport, welfare related									
Name	_		<b>t</b>	ansport, welfa	are relat	ed					Season will start		
Ozone	P		<b>t</b>	ansport, welfa	are relat	l l	rban		Yes		Season will start Mar. 1 in 2017		

Table B3. Site Table for Bethany School

Parameter Name	Meets Part 58 Appendix A Requirements	Meets Part 58 Appendix C Requirements	Meets Part 58 Appendix D Requirements	Ap	eets Part 58 pendix E quirements
Ozone	Yes	Yes	Yes	Yes Yes	
Sulfur dioxide	Yes	Yes	Yes		Yes
Parameter Name	Probe Height (m)	Distance to Support	Distance to Tr	ees	Obstacles
Ozone	3	1.0 meter	>20 meters	>20 meters	
Sulfur dioxide	3	1 meter	>20 meters	S	None

As shown in Figure B25 the site is located near two emission sources: Duke Energy Carolinas, LLC - Rockingham County Combustion Turbine is located about 3 kilometers to the northeast and Transcontinental Gas Pipeline Corporation - Compressor Station 160 is located about 5 kilometers to the north northeast. In 2014 the Duke Energy Carolinas facility emitted 67.1 tons of nitrogen oxides, 2.8 tons of volatile organic compounds, VOC, and 1.6 tons of sulfur dioxide. Transcontinental Gas Pipeline emitted 629.1 tons of nitrogen oxides, 52.1 tons of VOC and 0.2 tons of sulfur dioxide.<sup>4</sup>

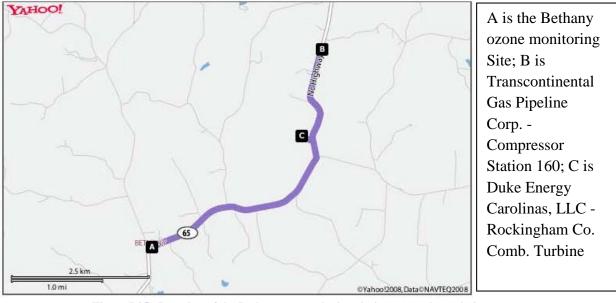


Figure B25. Location of the Bethany ozone site in relation to nearby emission sources

The DAQ received a new PSD application, 7900182.16A, for a power greenfield plant, which is currently being processed. The latitude and longitude coordinates for the facility, NTE Carolinas, are shown in relation to the location of the Bethany monitoring site in Figure B26. The Bethany monitoring site is approximately 3.2 Km southwest from where the new plant will be constructed.

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<sup>&</sup>lt;sup>4</sup> DAQ Emission Inventory available from the World Wide Web at <a href="http://ncair.org/">http://ncair.org/</a>.

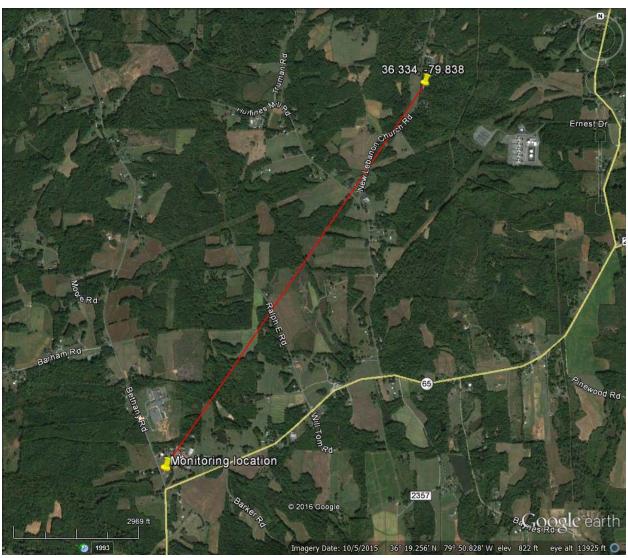


Figure B26. Location of new facility in relative to the existing Bethany ozone and sulfur dioxide monitoring station

In 2008 EPA expanded the **lead monitoring** network to support the lower lead NAAQS of 0.15 micrograms per cubic meter. In 2010 EPA focused monitoring efforts on fence line monitoring located at facilities that emit 0.5 or more tons of lead per year and at NCore monitoring sites in urban areas. The Greensboro-High Point MSA was not required by the revised lead monitoring requirements to do lead monitoring because it does not have an NCore monitoring site and does not have any permitted facilities emitting 0.5 or more tons per year of lead.<sup>5</sup>

The 2015 **ozone monitoring** requirements did not result in additional monitors in the Greensboro-High Point MSA. This MSA meets the minimum monitoring requirements in 40 CFR 58 Appendix D for population exposure monitoring in urban areas. However, the monitoring season will begin one month earlier on March 1 instead of April 1 starting in 2017.

<sup>&</sup>lt;sup>5</sup> ibid.

To comply with the 2010 **nitrogen dioxide monitoring** requirements, the monitoring rules finalized on March 7, 2013, require the Greensboro-High Point MSA to add a monitor by Jan. 1, 2017. However, on May 6, 2016, EPA proposed to narrow the scope of near-road monitoring by removing the requirement for near-road NO<sub>2</sub> monitoring stations in areas with populations between 500,000 and 1 million. The MSA population exceeds the 500,000 threshold resulting in a need for near roadway monitoring if the EPA does not finalize the proposal to remove near roadway monitoring for MSAs with populations between 0.5 and 1 million. If DAQ is required to establish a near roadway monitor, it will follow the United States Environmental Protection Agency recommendation that states choose near road monitoring stations along road segments with the highest average annual daily traffic, AADT, values adjusted for fleet mix. The segments with the highest AADT adjusted for fleet mix are shown in Table B4.

Table B4. Fleet Equivalent Average Annual Daily Traffic for Selected Road Segments in the Greensboro-High Point MSA

				Percent	2014	Fleet Equivalent
Station	Route	Location	Station	Passenger	AADT	AADT
	I-85					
(A) 340	BUS	From Exit 37 to Exit 39	09MC0066	88	133,000	276,640
(B)3400	I-85	From Exit 131 To Exit 132	Extrapolate	85	115,000	270,250
(C)697	I-85	From Exit 132 To Exit 135	Extrapolate	85	115,000	270,250
(D)811	I-85	From Exit 135 To Exit 138	Extrapolate	85	113,000	265,550
(E)813	I-85	From Exit 138 To Exit 140	10MC0001	85	112,000	263,200
	I-85					
(F) 341	BUS	From Exit 36B to Exit 37	09MC0065	90	133,000	252,700
(G)508	I-40	From Exit 211 To Exit 212	09MC0023	89	126,000	250,740
(H)902	I-40	From Exit 206 To Exit 208	09MC0022	88	114,000	237,120

The locations of these segments are shown with lettered black squares in Figure B27. They stretch from the eastern part of Guilford County to the western part with heaviest fleet adjusted AADT being from central Greensboro going east toward Burlington. At this time, if monitoring is required in this area, the monitor might be placed along Knox Road by exit 132 on I-85, Square B. This location is desirable because it is one of the segments with the highest fleet adjusted average annual daily traffic and it is easily accessible from Knox Road. If the monitoring regulations proposed on May 6, 2016, are not finalized, the current regulations require this monitoring station to start on Jan. 1, 2017. The DAQ will wait to see if the EPA finalizes the proposed regulation before moving forward with establishing this near road monitoring station.

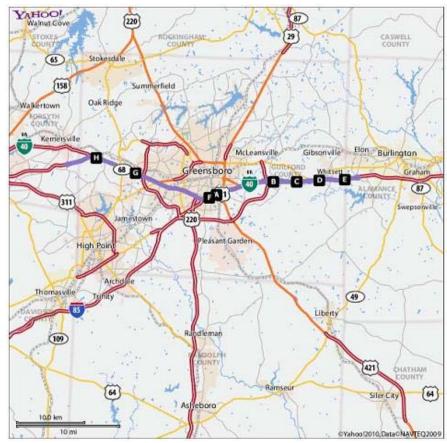


Figure B27. Possible locations of future Greensboro near-roadway nitrogen dioxide monitoring sites

The 2010 **sulfur dioxide monitoring** requirements ended up not requiring additional monitoring in this area because the OAQPS released revised PWEI calculations in August 2012. The August 2012 calculations resulted in a PWEI monitor not being needed in the Greensboro MSA. This MSA will also not be required to operate near road **carbon monoxide** and **fine particle** monitors because the population is less than one million.

#### (4) The Burlington MSA

The Burlington MSA consists of the county of Alamance. The major metropolitan area is the city of Burlington. The DAQ currently does not operate any monitoring sites in the Burlington MSA. The Hopedale fine particle monitoring site was shut down in 2015. This fine particle monitoring site was not required by 40 CFR 58 Appendix D.

The changes made to the **lead monitoring** requirements in December 2010 did not require additional monitoring in the Burlington MSA because the MSA does not have an NCore site and does not have any permitted facilities emitting 0.5 tons or more of lead per year. The 2010 **nitrogen dioxide monitoring** requirements will not require the Burlington MSA to monitor for nitrogen dioxide. The MSA is too small to require area-wide monitors and does not have any roadways with average annual daily traffic above the threshold for near roadway monitoring.

<sup>&</sup>lt;sup>6</sup> Data obtained from the DAQ emission inventory database available from the world wide web at <a href="http://ncair.org/">http://ncair.org/</a>.

The 2010 **sulfur dioxide monitoring** requirements will also not result in additional monitoring in the MSA because there are no large sources emitting sulfur dioxide within its bounds. This area will also not be required to operate near road **carbon monoxide** and **fine particle** monitors because the population is under one million.

The DAQ does not plan to make any changes to the Burlington MSA ozone monitoring network unless the EPA requires additional monitoring for the MSA. Currently, the DAQ does not monitor for ozone in Burlington because there are ozone monitors in the neighboring counties of Caswell, Guilford and Rockingham. Figure B28 shows the locations of these monitors in relation to the Burlington MSA. The monitor at Bushy Fork in Person County (also shown in Figure B28) was established as a downwind monitor for the Burlington MSA.



The Burlington MSA is outlined in heavy blue line. A, to the north, is the Cherry Grove monitor; B to the northwest, is the Bethany monitor; C, to the west, is the Mendenhall monitor; E, to the east, is the Durham monitor; F, to the northeast, is the **Bushy Fork** monitor; G, to the south, is the Blackstone monitor. The scale of representation for these monitors is urban, 4 to 50 Km, for all but the Durham monitor, which is neighborhood scale-0.5 to 4 Km.

Figure B28. Locations of ozone monitors near the Burlington MSA.

### (5) Caswell County

There are no metropolitan or micropolitan statistical areas in Caswell County. The DAQ currently operates one monitoring site in this county, located in Cherry Grove. Figure B29 shows the location of this ozone and rotating particle monitoring site. At the **Cherry Grove** site, 37-033-0001, the DAQ operates a seasonal ozone monitor and a continuous every third year PM10 monitor. Fine particle monitoring at the site ended on Dec. 31, 2015.



Figure B29. Location of the Cherry Grove monitoring site

A is the Cherry Grove ozone and fine particle site. The circle approximates the urban scale of representation (4 to 50 Km) for ozone and fine particles.

Figure B30 shows the site. Table B5 summarizes information for the site. Views looking north, northeast, east, south, southwest and west are shown in Figure B31 through Figure B36. The DAQ is operating a background PM10 monitor at this site. The monitor operates on a one-in-three-year schedule to provide data for prevention of significant deterioration modeling for industrial expansion. Fine particle monitoring ended at the site on Dec. 31, 2016.



Figure B30. Cherry Grove ozone and particle monitoring Site, 37-033-0001

Table B5. Site Table for Cherry Grove

Tubic Det	DICC IC	tore r	or emerry	31010							
Site Name:	Cherr	nerry Grove AQS Site Identification Number									-033-0001
<b>Location:</b>	cation: 7074 Cherry Grove Road, Reidsville, North Carolina										
MSA:	Not in a	an MS	A		MSA #: 00000						
Latitude	36.3070	033	Longitude	-79.467417	Date	um:	WGS84	Elev	241 meters		
M					Met	hod	S	Sample		Sampling	
Parameter N	ame	Metl	hod			Refe	erence ID	Ι	Ouration	ì	Schedule
		Instr	umental With	Ultra Violet							
Ozone		Phot	ometry (047)		EQOA-0880-0				-Hour		April 1 to Oct. 31
<b>V</b> \ /					M-0798-122	2 1	-Hour		For 12 months,		

**Table B5. Site Table for Cherry Grove** 

Table D3. Bitt	I dole	ior cherry	GIOVE								
μm STP										Ever	y third year
Wind speed/	Inst	rumental - Elec	ctronic or Ma	chine		Not a Re	efere	nce			
direction	Avg	. (050)				Method			1-Hour	Year	round
Date Monitor Es	tablished	Ozone								Apri	1 1, 1993
<b>Date Monitor Es</b>	tablished	PM10 Tota	M10 Total 0-10 μm STP Jan. 1, 2013								
<b>Date Monitor Es</b>	tablished	Wind speed	d /direction							Jan.	12, 2006
Nearest Road:	Cherry C	Grove Road	Traffic Cou	nt:	1,	,300	Yea	r of (	Count:		2013
		Distance to	Direction								
Parameter Name	2	Road	to Road	Mo	nito	or Type	S	taten	nent of Purpos	e	
							C	Compl	liance w/ NAA(	QS. A	Air quality
Ozone		100 meters	South	SL.	AM	S	fe	oreca	sting.		
PM10 Total 0-10		100 meters	South			l purpose			rial expansion n		
Wind speed / direct	ction	100 meters	South	No	n-re	gulatory	R	Real-time information			odeling.
	Suitable to Compare				e to Compare	_					
Parameter Name	rameter Name   Monitoring Objective   Scale			e	to	NAA	QS	or	Change		
										Se	eason will start
Ozone		ort, welfare re		J	Jrba	ın			Yes		1ar. 1 in 2017
PM10 Total 0-10		tion exposure,									erating 4/1
μm STP	backgı	ound, transpor	rt	_	Jrba	ın			Yes	201	6 to 3/31/2017
Wind speed /				1 -	Vot						
direction	Not ap	plicable		a		icable			applicable	No	
						eets Part		_	ets Part 58		eets Part 58
			ırt 58 Appen	dix		pendix C			pendix D		pendix E
Parameter Name	)	A Requir			Re	equireme	nts		quirements	Re	quirements
Ozone			Yes			Yes			requirements		Yes
PM10 Total 0-10			Yes			Yes			requirements		Yes
Wind speed / direction Not applicable Not applicable Not applicable						t applicable					
Parameter Name	8 7			Distance to Tre	ees	Obstacles					
Ozone			3		1	1.1 meters			>20 meters		None
PM10 Total 0-10	•		2.4		2	2.2 meters			>20 meters		None
Wind speed / dire	ction		10			~ 1 meter			>20 meters		None



Figure B31. Looking north from Cherry Grove site



Figure B32. Looking northeast from Cherry Grove site



Figure B33. Looking west from Cherry Grove site



Figure B35. Looking east from Cherry Grove site



Figure B34. Looking southwest from Cherry Grove site



Figure B36. Looking south from Cherry Grove site

The **lead monitoring requirements** did not add any lead monitoring in Caswell County because the county does not have an NCore monitoring site and does not have any permitted facilities located within its bounds that emit 0.5 tons or more of lead per year. Caswell County also will not need additional ozone monitors to comply with the 2015 **ozone monitoring requirements**. This county does not have an MSA that must meet the minimum monitoring requirements in 40 CFR 58 Appendix D for population exposure monitoring in urban areas. Ozone monitoring will be required to start on March 1 in 2017.

The 2010 **nitrogen dioxide monitoring requirements** did not result in additional monitoring in Caswell County. The county is too small to require area-wide monitors and does not have any roadways with average annual daily traffic above the threshold for near roadway monitoring. This area will not need additional sulfur dioxide monitors to comply with the 2010 **sulfur dioxide monitoring** requirements because it does not have any large sulfur dioxide sources within its bounds. This area also will not be required to operate near road **carbon monoxide** and **fine particle** monitors because the population is under one million.

<sup>&</sup>lt;sup>7</sup> Data obtained from the DAQ emission inventory database available from the worldwide web at <a href="http://ncair.org/">http://ncair.org/</a>.

# Appendix B.1 Annual Network Site Review Forms for 2015

Lexington

Mendenhall in Greensboro

Bethany

Cherry Grove

#### Site Information

Region_WSRO Site Na	me <u>Lexington</u>	AQS Site # 37- <u>057</u> - <u>0002</u>						
Street Address-938 S Salisbury	St.	City Lexington, NC 27292						
Urban Area LEXINGTON	Core-based S	Statistical Area Winston-Salem, NC						
Enter E	xact							
<b>Longitude</b> <u>-80.2628</u>	ongitude <u>-80.2628</u> Latitude <u>35.8144</u> Method of Measuring							
In Decimal Degrees	In Decimal Degrees	Other (explain) Explanation: Google Earth						
Elevation Above/below Mean Se	ea Level (in meters)	<u>241</u>						
Name of nearest road to inlet pro	bbe S Salisbury Street A	DT Choose an Item <u>1000</u> Year latest available						
Distance of ozone probe to neare	est traffic lane (m) <u>30</u> Direc	tion from inlet to nearest traffic lane $\underline{E}$						
Comments: An estimated ADT	number from previous year	1						
Name of nearest major road So	uth Main St. ADT 13000	Year latest available 2013						
Distance of site to nearest major	road (m) 120.00 Direction	n from site to nearest major road <u>NE</u>						
Comments: <u>"Traffic Volume (A</u>	ADT) Maps 2012 David	son County"						
Site located near electrical substa	ation/high voltage power li	nes? Yes No 🛛						
Distance of site to nearest railroa	nd track (1	m) <u>120</u> Direction to RR <u>NE</u> NA						
Distance of site to nearest power pole w/transformer (m) Direction								
Distance between site and drip line of water tower (m) 3 Direction from site to water tower SSW 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 <a href="http://transition.fcc.gov/mb/audio/bickel/DDDMMSS-decimal.html">http://transition.fcc.gov/mb/audio/bickel/DDDMMSS-decimal.html</a>, 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 <a href="http://www.ncdot.gov/travel/statemapping/trafficvolumemaps/default.html">http://www.ncdot.gov/travel/statemapping/trafficvolumemaps/default.html</a>. 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.

Parameters	Monitoring Objective	Scale	Monitor Type
Air flow < 200 L/min  ☑ PM2.5 FRM ☐ PM10 FRM	☑General/Background ☐Highest Concentration	☐Micro ☐Middle	□SLAMS ⊠SPM_FRM
☐ PM10 Cont. (BAM) ☐ PM10-2.5 FRM	☐ Population Exposure ☐ Source Oriented ☐	Neighborhood  ☐Urban	☑ Nonregulatory <u>BAM</u>
PM10-2.5 BAM PM10 Lead (PB)	Transport	Regional	Supplemental Speciation
☐ PM2.5 Cont. (TEOM) ☐ PM2.5 Cont. (BAM) ☐ PM2.5 Spec. (SASS)	Welfare Related Impacts		
PM2.5 Spec. (URG) PM2.5 Cont. Spec.			
Probe inlet height (from			\[ \] > 15 m
15.11096-0 2007	ce from probe inlet to ground (n	, a	
	of probe inlet from horizontal (w Yes No 🗌	vall) and/or vertical (pl	atform or roof) supporting
	ce from outer edge of probe inle	t to supporting structu	re (meters) <u>2.1</u>
	uter edge of probe inlets of any me monitor at the site = 1 m or g		Yes ⊠ No □ NA □
	uter edge of all low volume mor		Yes 🗌 No 🗌 NA 🔯
	SP inlet = 2 m or greater?		
Are collocated PM2.5 M TEOM, BAM & TEOM	Monitors (Two FRMs, FRM & E D Located at Site?	3AM, FRM & *Yes	(answer * 'd questions)
	f collocated PM 2.5 samplers (X	() within 2 to 4 m	Yes No
of each other?			Give actual (meters): 2.6
*Are collocated PM2.5	sampler inlets within 1 m vertic		Yes $\square$ No $\square$ Give actual (meters): $0.1$
Is an URG 3000 monito	r collocated with a SASS monit		(answer *'d questions) ☐ NA 🏻
	ollocated speciation samplers inlet	s (X) within 2 to 4 m of	each other? Yes \[ \] No \[ \]
Give actual (meters)		4!11C1416	
Give actual (meters)	tion sampler inlets within 1 m ve	eriicany of each other.	Yes No No
and the second s	monitor collocated with a PM2.	5 monitor at *Yes [	(answer *'d questions)
the site to measure PM1		1 C DN (10-2-5-	No NA 🛛
within 2 to 4 m of each	f collocated PM10 and PM2.5sa	mpiers for PM10-2.5	Yes No
	and PM2.5 sampler inlets within	1 m vertically of each	other? Yes \( \subseteq \text{No} \( \subseteq \)
Is probe > 20 m from th			7 - 120
*Is probe > 10 m from t	he nearest tree drip line? Yes	1 <del> </del>	
*Distance from probe to			Height of tree (m)
	to air flow? *Yes [ (answer *		
	Distance from probe inlet (m) probe to obstacle at least twice the		
probe? Yes No	nooc to obstacle at least twice ti	ie neight that the obsta	ere produces above the

1) Maintain current site status? Yes X *No (answer *'d questions)	tions)
*2) Change monitoring objective? Yes [ (enter new objective:	
*3) Change scale of representativeness? Yes [ ] (enter new scale:	) No 🗌
*4) Relocate site? Yes No No	
Comments:	
Date of Last Site Pictures: 7/2014 New Pictures Submitted? Yes	No 🛛
Reviewer Michael Horton	Date: <u>January 25, 2016</u>
Ambient Monitoring Coordinator Chengqing Xiao	Date: 02/05/2016

#### **Instructions (continued):**

DECOMMENDATIONS.

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.

### **Site Information**

Region_WSRO Site Name Mendenhall			AQS Site # 37- <u>081</u> - <u>0013</u>	
Street Address-205 Willoughby Street			City Greensboro, NC 27408	
Urban Area GREENSBORO Core-based Statistical Area Greensboro-High Point, NC				
Enter Exact				
Longitude <u>-79.802</u>				od of Measuring
In Decimal Degrees	In Decimal		Address Matching	Explanation: <u>LatLong.net</u>
Elevation Above/below l				<u>247</u>
Name of nearest road to inl			ear latest available	
Comments: An estimated A	107%			
Distance of site to nearest n	789 N. N. N. N.			<u>S</u>
Name of nearest major road	W Cone Blvd AD	T <u>19000</u> Year <u>20</u>	013	
Comments: 2014 Guilford	County map exists, b	ut has no nearby tr	affic counts. 2013 map r	espresents count on Cone Blvd at
Lawndale Drive				
Site located near electrical	substation/high voltag	ge power lines?		Yes 🔲 No 🛛
Distance of site to neares	t railroad track	(m	)Direction	to RR NA
Distance of site to neares			) Direction	
Distance between site and o			ection from site to water	
				tacks, vents, railroad tracks,
construction activities, fa	st food restaurants,	and swimming p	oools.	
No sources				
ANSWER ALL APPLICA	ARLE OUESTIONS	ş.		
Parameters	Monitoring (		Scale	Monitor Type
□NA	Companyal/Docalesme	а Г	□N Gioma	SLAMS
$\square$ SO <sub>2</sub> (NAAQS)	General/Backgro Highest Concent		Micro	
SO <sub>2</sub> (trace-level)	Max O3 Concen		Middle	SPM
□ NO <sub>x</sub> (NAAQS) □HSNO <sub>y</sub>			Neighborhood	Monitor Network Affiliation
$\square$ $\square$ $\square$ $\square$ $\square$ $\square$	Population Expo		Urban	NCORE
☐ NH <sub>3</sub>				Unofficial PAMS
Hydrocarbon	Transport	L	Regional	
Air Toxics HSCO (Not Micro)	Upwind Backgro			
CO (trace-level)	Welfare Related	Impacts		
Probe inlet height (from ground) 2-15 m? Yes No Give actual measured height from ground (meters) 3.00				
I Probe injet neight (from gro	und) 2-15 m? Yes	No∏ G	ive actual measured heig	ht from ground (meters) 3.00
		<del></del>		
	robe inlet from horizo	ontal (wall) and/or	vertical (roof) supporting	ht from ground (meters) 3.00 structure > 1 m? Yes ⊠ No □
Distance of outer edge of pr	robe inlet from horizo rom outer edge of pro	ontal (wall) and/or be to supporting st	vertical (roof) supporting ructure (meters) 1.10	structure > 1 m? Yes 🛛 No 🗌
Distance of outer edge of production Actual measured distance fi	robe inlet from horizorom outer edge of pro robe inlet from other	ontal (wall) and/or be to supporting st monitoring probe i	vertical (roof) supporting ructure (meters) 1.10	structure > 1 m? Yes No No
Distance of outer edge of pr Actual measured distance fi Distance of outer edge of pr	robe inlet from horizon rom outer edge of pro- robe inlet from other earest tree drip line?	ontal (wall) and/or be to supporting st monitoring probe i	vertical (roof) supporting ructure (meters) 1.10 nlets > 1 m? (answer *'d questions)	structure > 1 m? Yes No No
Distance of outer edge of pr Actual measured distance fi Distance of outer edge of pr Is probe > 20 m from the ne	robe inlet from horizorom outer edge of pro- robe inlet from other earest tree drip line?	ontal (wall) and/or be to supporting st monitoring probe i	vertical (roof) supporting ructure (meters) 1.10 nlets > 1 m? (answer *'d questions)	structure > 1 m? Yes No No
Distance of outer edge of pr Actual measured distance fi Distance of outer edge of pr Is probe > 20 m from the no *Is probe > 10 m from the no	robe inlet from horizorom outer edge of prorobe inlet from other earest tree drip line?  nearest tree drip line?  oe (m) Direct	ontal (wall) and/or the to supporting st monitoring probe i Yes *No Yes *No ion from probe to to	vertical (roof) supporting ructure (meters) 1.10 nlets > 1 m? (answer *'d questions)  ree *Height of tree	structure > 1 m? Yes No No
Distance of outer edge of pr Actual measured distance fr Distance of outer edge of pr Is probe > 20 m from the no *Is probe > 10 m from the r *Distance from probe to tre	robe inlet from horizorom outer edge of propose inlet from other carest tree drip line?  The energy in the energy	ontal (wall) and/or the to supporting st monitoring probe i Yes *No Yes *No ion from probe to t swer *d questions	vertical (roof) supporting ructure (meters) 1.10 nlets > 1 m? (answer *'d questions) (aree *Height of tree)	structure > 1 m? Yes No No Yes No No NA No
Distance of outer edge of production of prod	robe inlet from horizon robe inlet from other robe inlet from other robe inlet from other robe inlet from other robe in tree drip line?  The mean robe in the from policy and the from probe in the from probability and p	ontal (wall) and/or the to supporting st monitoring probe i Yes *No Yes *No ion from probe to t swer *'d questions nlet (m)Di	vertical (roof) supporting ructure (meters) 1.10 nlets > 1 m?  (answer *'d questions)  ree *Height of tree ) No  rection from probe inlet to	structure > 1 m? Yes No No Yes No No NA No

Parameters	Monitoring Objective	Scale	Monitor Type		
NA	General/Background				
□ NO <sub>y</sub> (trace-level)	Highest Concentration	Micro	SLAMS		
	Max O3 Concentration	Middle	SPM		
	Population Exposure	Neighborhood			
	Source Oriented	Urban	Monitor Network Affiliation		
	Transport	Regional			
	Upwind Background		NCORE		
	Welfare Related Impacts				
Probe inlet height (from s	ground) 10-15 m? Yes No				
	from probe inlet to ground (meters)				
D' 1 C 1 1 (	. 1 . 1 . 6 . 1 1 . 17		1 0 X		
	probe inlet from horizontal and/or ver from outer edge of probe inlet to supp				
Distance of outer edge of	probe inlet from other monitoring pro	be inlets > 1 m?	Yes No NA		
Is probe > 20 m from the	nearest tree drip line? Yes ☐ *N	o \(\sigma\) (answer *'d questions	)		
	e nearest tree drip line? Yes 🔲 *N	0 🔲			
*Distance from probe to	tree (m) Direction from probe	to tree *Height of tre	e (m)		
Are there any obstacles to	o air flow? *Yes [ (answer *'d questi	ons) No 🗌			
*Identify obstacle	Distance from probe inlet (m)	Direction from probe inlet	to obstacle		
	obe to obstacle at least twice the heigh				
	est traffic lane (m) Direction				
Parameters Monitoring Objective Scale Monitor Type					
NA	Highest Concentration	Micro	SLAMS		
Air flow > 200 L/min	Population Exposure				
☐ PM10 ☐ TSP	Source Oriented	Middle	SPM		
TSP Pb	Background	Neighborhood	Monitor Network Affiliation		
	Transport	Urban	NCORE		
	Welfare Related Impacts		I NCORE		
	Wenare Related Impacts	Regional			
Probe inlet height (from )	ground)	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 probe to supporting structure (meters) Yes No					
T. (1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1					
Entire inlet opening of collocated PM-10, TSP or TSP Pb Samplers (X) within 2 to 4 m of each other? Yes No NA Actual measured distance (X) including entire inlet openings of both (all) collocated probe inlets (meters)					
Distance (Y) between outer edge of any high volume inlet and any other high or low volume inlet $\geq 2 \text{ m}$ ? Yes No NA					
Is probe > 20 m from the	nearest tree drip line? Yes - *N	o (answer *'d questions	)		
*Is probe > 10 m from th	e nearest tree drip line? Yes 🔲 *N	· o 🗖			
*Distance from probe to	tree (m) Direction from probe		e (m)		
Are there any obstacles to	o air flow? *Yes 🔲 (answer *'d questi	ons) No			
*Identify obstacle _	Distance from probe inlet (m)	Direction from probe inlet to	o obstacle		
*Is distance from inlet probe to obstacle at least twice the height that the obstacle protrudes above the probe? Yes \(\Boxed{\text{No}}\) No \(\Boxed{\text{No}}\)					
Distance of probe to near		from probe to nearest traffi			

Parameters	Monitoring Objective	Scale	Si	te Type		
□NA	MC an areal/Bask array and	□N fiore	⊠SLAMS			
Air flow < 200 L/min  ✓ DM2.5 EDM	General/Background	Micro				
☑ PM2.5 FRM □ PM10 FRM	Highest Concentration	Middle	Monitor Networl	- A CC:1: -4:		
PM10 Cont. (BAM)	Population Exposure	Neighborhood	The state of the s			
☐ PM10-2.5 FRM	Source Oriented		NCORE	-		
☐ PM10-2.5 BAM	Transport	Urban	SUPPLEMEN	TAL SPECIATION		
PM10 Lead (PB)	☐Welfare Related Impacts	Regional				
☐ PM2.5 Cont. (TEOM)  ☑ PM2.5 Cont. (BAM)	•			T-1-:		
PM2.5 Spec. (SASS)		10	Monitor NAAQS			
PM2.5 Spec. (URG)			NONREGUL.	ATORY		
PM2.5 Cont. Spec.						
	ound)		⊔	> 15 m		
	rom probe inlet to ground (meters)					
	robe inlet from horizontal (wall) and					
	rom outer edge of probe inlet to sup edge of probe inlets of any low vol		y other low	Yes ⊠ No 🔝		
volume monitor at the site =		unite monitor and an	Yes	No NA NA		
	edge of all low volume monitor inl	ets and any Hi-Volu	me PM-10			
or TSP inlet = 2 m or greate	er?		Yes	□ No□ NA 🛛		
	itors (Two FRMs, FRM & BAM, F	RM & *Yes	(answer *'d ane	estions) No 🗌 NA 🗍		
TEOM, BAM & TEOM) Lo	ocated at Site?		Z (dibiter dique	,stions) 110 [111 [		
each other?	llocated PM 2.5 samplers (X) within		es M No D Give	e actual (meters) 2.5		
	pler inlets within 1 m vertically of			e actual (meters) <u>2.5</u>		
	ollocated with a SASS monitor at the					
	llocated speciation samplers inlets (					
Give actual (meters)	•					
	sampler inlets within 1 m vertically		es 📙 No 📙 Give	actual (meters)		
Is a low-volume PM10 mor site to measure PM10-2.5?	nitor collocated with a PM2.5 monit	or at the Yes	(answer *'d ques	tions) No 🗌 NA 🛛		
	llocated PM10 and PM2.5samplers	for PM10-2.5 (X) w	ithin 2 to 4 m of			
each other?	nooded 11110 and 1112.55amplets	101 111110 2.0 (11) 11		Yes No		
*Are collocated PM10 and PM2.5 sampler inlets within 1 m vertically of each other? Yes No						
	earest tree drip line? Yes 🛛 🔭	No 🔲 (answer *'d q	uestions)			
*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  (bistance from probe inlet (m)  (bistance from probe inlet to obstacle  (m)  (bistance from probe inlet (m)  (bistance from p						
*Is distance from inlet prob	e to obstacle at least twice the heigh	that the obstacle p	rotrudes above the	probe? Yes $\square$ No $\square$		
	t traffic lane (m) 130 Direction fi					
RECOMMENDATIONS:	<u> </u>					
·	tus? Vas X *Na (onewar *	'd quartiana)				
	tus? Yes X *No (answer *	_	1			
	jective? Yes (enter new object entativeness? Yes (enter new					
*4) Relocate site? Yes		scale	Δ <b>Ι</b>			
_	Monitors operating at site include E	RAM 1022 2 5 BAN	4 1020 Pm10 FRN	A siv day sampler		
ozone (during ozone season		57 HVI 1022-2.5, D7 HV	1 1020-1 11110, 1 100	ri six-day sampici,		
		bmitted? Yes 🛛 1	No 🗖			
	1 New 1 letules Su	iomitted: 1 to 🔼 1	,			
Reviewer Chris Bryant				Data 1/20/2016		
	linator Chengqing Xiao			Date <u>1/20/2016</u> ate 3/1/2016		

### **Site Information**

STATE OF THE STATE	Region_WSRO Site Name Bethany AQS Site # 37-157-0099						
Street Address-6371 NC 65			2207 0	City Reidsville, NC 27320			
Urban Area ROCKINGHAM Core-based Statistical Area Rockingham, NC							
T	Enter E		26.20	.0.6	3.6.41		Carra Ciciosa • Silvania
Longitude <u>-79</u> In Decimal Degrees	9.8593	Latitude In Decimal 1	36.30	86	Other (explain) Ex		asuring
Elevation Above/bel	low Mean Se				Other (explain)   Ex	274.00	
Name of nearest roa				ADT	>700 Year latest avail		
					n from ozone probe to n	_	The state of the s
-			1001 A A		OT) Maps 2013 Rocki		
Name of nearest ma							
					om site to nearest major	road	S
times and the second se					13 - Rockingham Count		_
Site located near ele	ctrical substa	tion/high vol	tage power l	lines?	?		Yes No 🛛
Distance of site to n	earest railroa	d track	3	(m)	Direction to	RR	⊠NA
Distance of site to n	earest power	pole w/transf		(m)_	Direction	_	
Distance between si					Direction from site to w	ater tow	/erNA
Explain any sources	of potential	bias; include	cultivated fi	elds,	loose bulk storage, stac	ks, ven	ts, railroad tracks,
construction activitie	es, fast food	restaurants, ar	nd swimmin	ıg poo	ols.		
ANSWER ALL AP	ALC: 100	AND BUXAN IN	2000		2 •		C*1 PP
Parameters		oring Objec			Scale		Site Type
$\square$ O <sub>3</sub>		l/Backgroun		$\square$ M	icro	⊠S1	LAMS
		t Concentrati		Пм	iddle		22.6
		tion Exposur					PM
	Source		·   [				
		CITCITION			eighborhood		
	Transp	ort		<b>∑</b> Uı			
	Upwine	ort d Backgroun	ıd [				
Proba inlat haight	Upwind Welfar	ort d Backgroun e Related Im	id pacts	□R€	rban		
Probe inlet height	Upwind Welfard	ort d Backgroun e Related Im nd) 2-15 m?	id [ pacts Yes 🔀 ]	□R€ No [	rban		
Give actual measu	Upwind Welfard (from ground the g	ort d Backgroun e Related Im nd) 2-15 m? rom ground	yes \(\sigma\) 1 (meters) 3	□R€ No [	rban egional	of) sun	norting
Give actual measu Distance of outer	Upwind Welfard (from ground Fred height fedge of prob	ort d Backgroun e Related Im nd) 2-15 m? From ground oe inlet from	yes \(\sigma\) 1 (meters) 3	□R€ No [	rban	of) sup	porting
Give actual measured Distance of outer of structure > 1 m? Y	Upwind Welfard (from ground Fired height for the problem of the the problem of th	ort d Backgroun e Related Im nd) 2-15 m? From ground be inlet from	yes 1 (meters) 3	No [8]	rban egional  II) and/or vertical (roo		
Give actual measured Distance of outer of structure > 1 m? Y	Upwind Welfard (from ground Fred height fred ge of prolomer No [ Juite 1	ort d Backgroun e Related Im d) 2-15 m? from ground oe inlet from  m outer edge	Yes I (meters) 3 horizontal	No [8]	rban egional  II) and/or vertical (roopporting structure (me	eters) 1	1.00
Give actual measured of outer of structure > 1 m? Y Actual measured of Is probe > 20 m fr	Upwind Welfar (from ground used height for the dege of problems of the mean of	ort d Backgroun e Related Im nd) 2-15 m? From ground be inlet from mouter edge est tree drip	Yes 1 (meters) 3 horizontal cof probe to line? Ye	No [3]   (wallo supples 🛛	rban egional  II) and/or vertical (roopporting structure (me	eters) 1	1.00
Give actual measured of outer of structure > 1 m? You Actual measured of Is probe > 20 m from 18 probe > 10 m from	Upwind Welfard (from ground Gred height for the ledge of prolomother the learn Upwind the learn Upwind Upwi	ort d Backgroun e Related Im nd) 2-15 m? From ground be inlet from mouter edge est tree drip urest tree drip	Yes 1 (meters) 3 horizontal e of probe to line? Ye	No [3]   (wallo supposes X	rban egional  II) and/or vertical (roc porting structure (me  *No  (answer *	eters) <u>l</u>	1.00 stions)
Give actual measured of outer of structure > 1 m? Y Actual measured of Is probe > 20 m fr	Upwind Welfard (from ground Gred height for the least No [ Sistance from the near from the near looke to tree (	ort d Backgroun e Related Im d) 2-15 m? from ground be inlet from m outer edge est tree drip mrest tree drip	Yes I (meters) 3 horizontal e of probe to line? Ye p line? Y	No No Supes Xes From	rban egional  II) and/or vertical (roopporting structure (mellow) *No (answer *	eters) <u>l</u>	1.00
Give actual measured of outer of structure > 1 m? You Actual measured of Is probe > 20 m fr *Is probe > 10 m fr *Distance from pr Are there any obst	Upwind Welfard (from ground Gred height for the ledge of prology Wes No Indicate the ledge of prology Wes No Indicate the learn of the near state to tree (cacles to air	ort d Backgroun e Related Im nd) 2-15 m? From ground be inlet from mouter edge est tree drip arest tree drip flow? *Yes	Yes 1 (meters) 3 horizontal of probe to line? Ye p line? Ye in (answer)	No [3] (wallo supples [7] (res [7] (res 7]	rban egional  II) and/or vertical (roc porting structure (me  *No  (answer *  *No  probe to tree questions) No	eters) <u>]</u> 'd que *Heigh	stions)  nt of tree (m)
Give actual measured of outer of structure > 1 m? Y Actual measured of Is probe > 20 m fr *Is probe > 10 m fr *Distance from pr Are there any obst *Identify obstacle	Upwind Welfard (from ground Gred height for the ledge of prolomation of the near from the near the ledge to tree (ledge)  Lacles to air  Distant	ort d Backgroun e Related Im nd) 2-15 m? from ground be inlet from mouter edge est tree drip arest tree drip flow? *Yes nce from prob	Yes \( \) 1  (meters) 3  horizontal  of probe to line? Ye p line? Ye Direction f  (answer to inlet (m)	No [3]  (wallo suppes Xes [from r *'d	rban egional  II) and/or vertical (roopporting structure (mellow) *No (answer *	eters) ] 'd que  *Heigh	stions)  nt of tree (m)  o obstacle

1

1) Maintain current site status? Yes	RECOMMENDATIONS.	
*3) Change scale of representativeness? Yes  (enter new scale: ) No   *4) Relocate site? Yes  No   Comments:   Date of Last Site Pictures: August 1, 2011 New Pictures Submitted? Yes  No   Reviewer Michael Horton Date: January 22, 2016	1) Maintain current site status? Yes ⊠ *No □ (answer *'d questions)	
*4) Relocate site? Yes No No Comments:  Date of Last Site Pictures: August 1, 2011 New Pictures Submitted? Yes No Reviewer Michael Horton  Date: January 22, 2016	*2) Change monitoring objective? Yes [ (enter new objective:)	No 🗌
Comments:	*3) Change scale of representativeness? Yes [ (enter new scale: ) N	lo 🗌
Date of Last Site Pictures: August 1, 2011 New Pictures Submitted? Yes No Reviewer Michael Horton Date: January 22, 2016	*4) Relocate site? Yes No No	
Reviewer Michael Horton Date: January 22, 2016	Comments:	
	Date of Last Site Pictures: <u>August 1, 2011</u> New Pictures Submitted? Yes	No 🛛
Ambient Monitoring Coordinator Chengqing Xiao Date: 03/01/2016	Reviewer Michael Horton	Date: <u>January 22, 2016</u>
	Ambient Monitoring Coordinator Chengqing Xiao	Date: <u>03/01/2016</u>

#### Instructions

DECOMMENDATIONS.

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 Information**

In Decimal Degrees  Elevation Above/below Me Name of nearest road to inlet Comments:"Traffic Volume Distance of site to nearest ma Name of nearest major road Comments: Site located near electrical sul Distance of site to nearest major road Comments: Distance of site to nearest major road Distance of site to nearest major road Comments: Site located near electrical sul	ILLE  nter Exact  94 Latitude  In Decimal	36.307047	City Reidsville, NC tatistical Area None	
Longitude -79.46739  In Decimal Degrees  Elevation Above/below Mename of nearest road to inlet Comments: "Traffic Volume Distance of site to nearest maname of site to nearest maname of sit	nter Exact  94 Latitude In Decimal	36.307047	tatistical Area None	9
In Decimal Degrees  Elevation Above/below Mename of nearest road to inlet Comments: "Traffic Volume Distance of site to nearest maname of site to nearest manaments: Site located near electrical sulful Distance of site to nearest manaments of site to nearest manaments of site to nearest manaments. Distance between site and drip Explain any sources of pote construction activities, fast not seem to see the seem of	94 Latitude In Decimal			
In Decimal Degrees  Elevation Above/below Me Name of nearest road to inlet Comments:"Traffic Volume Distance of site to nearest ma Name of nearest major road Comments: Site located near electrical sul Distance of site to nearest n Distance between site and dri Explain any sources of pote construction activities, fast No  ANSWER ALL APPLICAL	In Decimal			
Elevation Above/below Me Name of nearest road to inlet Comments: "Traffic Volume Distance of site to nearest ma Name of nearest major road Comments: Site located near electrical sul Distance of site to nearest major road Comments: Establishment of site to nearest major road Comments: Site located near electrical sul Distance of site to nearest major road Comments: Distance of site to nearest major road Comments: Site located near electrical sul Distance of site to nearest major road Comments: Comments: Distance of site to nearest major road Comments: Comments: Distance of site to nearest major road Comments:		Danner		od of Measuring
Name of nearest road to inlet Comments: "Traffic Volume Distance of site to nearest ma Name of nearest major road Comments: Site located near electrical sul Distance of site to nearest r Distance of site to nearest r Distance of site to nearest r Explain any sources of pote construction activities, fast No ANSWER ALL APPLICATE	lean Sea Level (ir		Address Matching	<b>Explanation:</b> <u>LatLong.net</u>
Comments: "Traffic Volume Distance of site to nearest ma Name of nearest major road Comments: Site located near electrical sub Distance of site to nearest to Distance of site to nearest to Distance between site and drip Explain any sources of pote construction activities, fast No ANSWER ALL APPLICATE				<u>241</u>
Distance of site to nearest many Name of nearest major road Comments:  Site located near electrical sulful Distance of site to nearest and Distance of site to nearest and Distance between site and drip Explain any sources of pote construction activities, fast No  ANSWER ALL APPLICATE				<u>2013</u>
Name of nearest major road Comments: Site located near electrical sul Distance of site to nearest r Distance of site to nearest r Distance between site and dri Explain any sources of pote construction activities, fast No ANSWER ALL APPLICAN				
Comments: Site located near electrical sult Distance of site to nearest to Distance between site and drip Explain any sources of pote construction activities, fast No  ANSWER ALL APPLICATE	250 100 5 10		-	<u>S</u>
Distance of site to nearest postance of site to nearest postance between site and dright Explain any sources of pote construction activities, fast No  ANSWER ALL APPLICATE	ADT	Year estimated_		
Distance of site to nearest redistance of site to nearest project Distance between site and driff Explain any sources of pote construction activities, fast No.  ANSWER ALL APPLICATE				
Distance of site to nearest project Distance between site and drip Explain any sources of pote construction activities, fast No ANSWER ALL APPLICATE	ubstation/high voltag	ge power lines?		Yes 🔲 No 🛛
Distance of site to nearest project Distance between site and drip Explain any sources of pote construction activities, fast No.  ANSWER ALL APPLICATE	railroad track	(m	)Direction	to RR NA
Distance between site and drij Explain any sources of pote construction activities, fast No ANSWER ALL APPLICAL				
construction activities, fast  No  ANSWER ALL APPLICAT	ip line of water tow	er (m)Dire	ection from site to water	
No ANSWER ALL APPLICATE				tacks, vents, railroad tracks,
ANSWER ALL APPLICAT	t food restaurants,	and swimming p	ools.	
	DI E QUESTIONS	·.		
	Monitoring (		Scale	Monitor Type
Air Toxics	General/Backgro Highest Concent Max O3 Concen Population Expo Source Oriented Transport Upwind Backgro Welfare Related	ration [ tration   sure	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) 3.00  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) 1.10  Distance of outer edge of probe inlet from other monitoring probe inlets > 1 m? Yes No No NA 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				

Parameters	Monitoring Objective	Scale	Monitor Type
⊠NA	General/Background	Mioro	SLAMS
□ NO <sub>y</sub> (trace-level)	Highest Concentration	Micro Middle	
	Max O3 Concentration	Neighborhood	SPM
	Population Exposure	Urban	
	Source Oriented	Regional	Monitor Network Affiliation
	Transport		NCORE
	Upwind Background		
Drobe inlet height (from a	Welfare Related Impacts ground) 10-15 m? Yes No		
	e from probe inlet to ground (meters)		
	probe inlet from horizontal and/or ver from outer edge of probe inlet to supp		
Distance of outer edge of	probe inlet from other monitoring pro	be inlets > 1 m?	Yes No NA
	nearest tree drip line? Yes *N		)
		0	
*Distance from probe to t	tree (m) Direction from probe	to tree *Height of tre	e (m)
	o air flow? *Yes ☐ (answer *'d questi		
	Distance from probe inlet (m)		
*Is distance from inlet probe to obstacle at least twice the height that the obstacle protrudes above the probe? Yes \( \square\) No			
Distance of probe to near		from probe to nearest traffi	
Distance of probe to near Parameters	est traffic lane (m) Direction  Monitoring Objective	from probe to nearest traffi	c lane Monitor Type
Parameters  NA			
Parameters  NA Air flow > 200 L/min	Monitoring Objective	Scale  Micro	Monitor Type  SLAMS
Parameters  NA Air flow > 200 L/min □ PM10 □ TSP	Monitoring Objective  Highest Concentration Population Exposure Source Oriented	Scale  Micro Middle	Monitor Type  SLAMS  SPM
Parameters  NA Air flow > 200 L/min  PM10	Monitoring Objective  Highest Concentration  Population Exposure  Source Oriented  Background	Scale  Micro  Middle  Neighborhood	Monitor Type  SLAMS  SPM  Monitor Network Affiliation
Parameters  NA Air flow > 200 L/min □ PM10 □ TSP	Monitoring Objective  Highest Concentration Population Exposure Source Oriented Background Transport	Scale  Micro Middle Neighborhood Urban	Monitor Type  SLAMS  SPM
Parameters  NA Air flow > 200 L/min  PM10  TSP  TSP Pb	Monitoring Objective  Highest Concentration Population Exposure Source Oriented Background Transport Welfare Related Impacts	Scale  Micro Middle Neighborhood Urban Regional	Monitor Type  SLAMS  SPM  Monitor Network Affiliation  NCORE
Parameters  NA Air flow > 200 L/min □ PM10 □ TSP □ TSP Pb  Probe inlet height (from g	Monitoring Objective  Highest Concentration Population Exposure Source Oriented Background Transport	Scale  Micro Middle Neighborhood Urban Regional 7-15 m	Monitor Type  SLAMS  SPM  Monitor Network Affiliation  NCORE
Parameters  NA Air flow > 200 L/min PM10 TSP TSP D TSP Pb  Probe inlet height (from g Actual measured distance	Monitoring Objective  Highest Concentration Population Exposure Source Oriented Background Transport Welfare Related Impacts ground)	Scale    Micro   Middle   Neighborhood   Urban   Regional   7-15 m  /or vertical (platform or roo	Monitor Type  SLAMS  SPM  Monitor Network Affiliation  NCORE  > 15 m
Parameters  NA Air flow > 200 L/min PM10 TSP TSP Pb  Probe inlet height (from g Actual measured distance Distance of outer edge of Actual measured distance Entire inlet opening of co	Monitoring Objective  Highest Concentration Population Exposure Source Oriented Background Transport Welfare Related Impacts from probe inlet to ground (meters) from probe inlet from horizontal (wall) and from probe to supporting structure (meters)	Scale    Micro   Middle   Neighborhood   Urban   Regional   7-15 m  /or vertical (platform or rooteters)   lers (X) within 2 to 4 m of 6	Monitor Type  SLAMS  SPM  Monitor Network Affiliation  NCORE  1) > 15 m  f) supporting structure > 2 m? Yes  No  No NA  each other? Yes No No NA
Parameters  NA Air flow > 200 L/min PM10 TSP TSP TSPPb  Probe inlet height (from g Actual measured distance Distance of outer edge of Actual measured distance Entire inlet opening of co Actual measured distance	Monitoring Objective  Highest Concentration Population Exposure Source Oriented Background Transport Welfare Related Impacts from probe inlet to ground (meters) from probe inlet from horizontal (wall) and a from probe to supporting structure (meters) Collocated PM-10, TSP or TSP Pb Samp (X) including entire inlet openings of	Scale    Micro   Middle   Neighborhood   Urban   Regional   7-15 m  /or vertical (platform or rooteters)  lers (X) within 2 to 4 m of 6 both (all) collocated probe	Monitor Type  SLAMS  SPM  Monitor Network Affiliation  NCORE  1) > 15 m  f) supporting structure > 2 m? Yes No No NA cach other? Yes No NA cach other?
Parameters  NA Air flow > 200 L/min PM10 TSP TSP Pb  Probe inlet height (from g Actual measured distance Distance of outer edge of Actual measured distance Entire inlet opening of co Actual measured distance Distance (Y) between out	Monitoring Objective  Highest Concentration Population Exposure Source Oriented Background Transport Welfare Related Impacts from probe inlet to ground (meters) from probe inlet from horizontal (wall) and from probe to supporting structure (meters)  Collocated PM-10, TSP or TSP Pb Samp (X) including entire inlet openings of the redge of any high volume inlet and a	Scale    Micro   Middle   Neighborhood   Urban   Regional   7-15 m   /or vertical (platform or rooteters)   lers (X) within 2 to 4 m of elboth (all) collocated probeinty other high or low volum	Monitor Type  SLAMS  SPM  Monitor Network Affiliation  NCORE  1) supporting structure > 2 m?  Yes No No NA inlets (meters) e inlet > 2 m? Yes No NA
Parameters  NA Air flow > 200 L/min PM10 TSP TSP Pb  Probe inlet height (from gate and the parameter and parameter	Monitoring Objective  Highest Concentration Population Exposure Source Oriented Background Transport Welfare Related Impacts From probe inlet to ground (meters) From probe inlet from horizontal (wall) and from probe to supporting structure (meters)  Concentration Transport From probe inlet to ground (meters) From probe inlet from horizontal (wall) and from probe to supporting structure (meters)  Concentration Transport Tra	Scale    Micro   Middle   Neighborhood   Urban   Regional   7-15 m   /or vertical (platform or roo leters)   lers (X) within 2 to 4 m of each both (all) collocated probe any other high or low volum of answer *'d questions of	Monitor Type  SLAMS  SPM  Monitor Network Affiliation  NCORE  1 > 15 m  f) supporting structure > 2 m? Yes No No NA inlets (meters) e inlet > 2 m? Yes No NA
Parameters  NA Air flow > 200 L/min PM10 TSP TSP Pb  Probe inlet height (from gactual measured distance of Actual measured distance en actual measured distance en actual measured distance en actual measured distance (Y) between out Is probe > 20 m from the *Is probe > 10 m from the *Distance from probe to the second control of t	Monitoring Objective  Highest Concentration Population Exposure Source Oriented Background Transport Welfare Related Impacts From probe inlet to ground (meters) From probe inlet from horizontal (wall) and from probe to supporting structure (molecular of any high volume inlet and a nearest tree drip line? Yes *N tree (m) Direction from probe	Scale   Micro   Middle   Middle   Neighborhood   Urban   Regional   7-15 m   Middle   10   Middle   Middle_	Monitor Type  SLAMS  SPM  Monitor Network Affiliation  NCORE  1 > 15 m  f) supporting structure > 2 m? Yes No No NA inlets (meters) e inlet > 2 m? Yes No NA
Parameters  NA Air flow > 200 L/min PM10 TSP TSP Pb  Probe inlet height (from gate and the parameter)  Probe inlet height (from gate and the parameter)  Actual measured distance Distance of outer edge of Actual measured distance Entire inlet opening of coactual measured distance Distance (Y) between out Is probe > 20 m from the *Is probe > 10 m from the *Is probe > 10 m from the *Is probe > 10 m from the *To stance from probe to the probability of the probability o	Monitoring Objective  Highest Concentration Population Exposure Source Oriented Background Transport Welfare Related Impacts from probe inlet to ground (meters) probe inlet from horizontal (wall) and from probe to supporting structure (monitoring tructure) Compared to the follocated PM-10, TSP or TSP Pb Samper (X) including entire inlet openings of the redge of any high volume inlet and a mearest tree drip line? Yes *N tree (m) *Direction from probe to air flow? *Yes (answer *'d question of the redge of the	Scale   Micro   Middle   Middle   Neighborhood   Urban   Regional_   7-15 m   Middle_   7-15 m   Middle_   Middle	Monitor Type  SLAMS  SPM  Monitor Network Affiliation  NCORE  1 > 15 m  f) supporting structure > 2 m? Yes No No NA inlets (meters) e inlet > 2 m? Yes No NA ONA  e (m)  e (m)
Parameters  NA Air flow > 200 L/min PM10 TSP TSP Pb  Probe inlet height (from gate and the parameter a	Monitoring Objective  Highest Concentration Population Exposure Source Oriented Background Transport Welfare Related Impacts From probe inlet to ground (meters) From probe inlet from horizontal (wall) and from probe to supporting structure (molecular of any high volume inlet and a nearest tree drip line? Yes *N tree (m) Direction from probe	Scale   Micro   Middle   Neighborhood   Urban   Regional_   7-15 m   Middle_   7-15 m   Middle_   Middle_	Monitor Type  SLAMS  SPM  Monitor Network Affiliation  NCORE  1 > 15 m  f) supporting structure > 2 m? Yes No No NA inlets (meters) e inlet > 2 m? Yes No NA ONA  o obstacle  o obstacle

Parameters	Monitoring Objective	Scale	Site Type			
□NA	M.C1/D11	□\\ f:=	□SLAMS			
Air flow < 200 L/min	General/Background	Micro				
☐ PM2.5 FRM ☐ PM10 FRM	Highest Concentration	Middle	Monitor Network Affiliation			
PM10 Cont. (BAM)	☑Population Exposure	Neighborhood				
☐ PM10-2.5 FRM	Source Oriented		NCORE			
☐ PM10-2.5 BAM	⊠Transport	☑Urban	SUPPLEMENTAL SPECIATION			
PM10 Lead (PB)	☐Welfare Related Impacts	Regional				
☐ PM2.5 Cont. (TEOM) ☐ PM2.5 Cont. (BAM)						
PM2.5 Spec. (SASS)			Monitor NAAQS Exclusion			
☐ PM2.5 Spec. (URG)			NONREGULATORY BAM			
PM2.5 Cont. Spec.						
Probe inlet height (from gr		7-15 m	> 15 m			
100 m	from probe inlet to ground (meters)					
			m or roof) supporting structure > 2 m?			
	rom outer edge of probe inlet to sup					
	r edge of probe inlets of any low vol	ume monitor and an	y other low Yes No NA			
volume monitor at the site	= 1 m or greater? r edge of all low volume monitor inl	ets and any Hi-Volu	me PM-10			
or TSP inlet = 2 m or great	er?	STORE STREET, STORE & STREET,	Yes No NA			
	nitors (Two FRMs, FRM & BAM, F.	RM & *Yes	(answer *'d questions) No 🗌 NA 🛛			
TEOM, BAM & TEOM) L	ocated at 51te? ollocated PM 2.5 samplers (X) within					
each other?	onocated 1 W 2.5 samplers (24) with		es No Give actual (meters) 2.5			
*Are collocated PM2.5 sampler inlets within 1 m vertically of each other?  Yes No Give actual (meters) 2.5						
Is an URG 3000 monitor collocated with a SASS monitor at the site? *Yes \( \text{(answer *'d questions)} \text{ No } \( \text{ No } \text{ No } \text{ No } \text{ No } \( \text{No } \text{ No } \text{ No } \text{ No } \( \text{ No } \text{ No } \text{ No } \text{ No } \( \text{ No } \text{ No } \text{ No } \text{ No } \( \text{ No } \text{ No } \text{ No } \text{ No } \( \text{ No } \text{ No } \text{ No } \text{ No } \( \text{ No } \text{ No } \text{ No } \text{ No } \( \text{ No } \text{ No } \text{ No } \text{ No } \( \text{ No } \text{ No } \text{ No } \text{ No } \( \text{ No } \text{ No } \text{ No } \text{ No } \( \text{ No } \( \text{ No } \( \text{ No } \( \text{ No } \tex						
	ollocated speciation samplers inlets (	X) within 2 to 4 m c	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 \sum (answer *'d questions) No \sum NA \sum \text{NA}						
	ollocated PM10 and PM2.5samplers	for PM10-2.5 (X) w	ithin L. D			
2 to 4 m of each other?						
*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 🔲 *1	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 ☒						
	sistance from probe inlet (m)					
*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) 100 Direction from probe to nearest traffic lane S						
RECOMMENDATIONS:	traine lane (iii) 100 Direction i	Tom probe to hearest	tuarric lanc <u>5</u>			
	atus? Yes X *No ☐ (answer *	'd questions)				
	jective? Yes (enter new objective)	•	1_			
*3) Change scale of repres						
	□ No 🛛					
		lown on 01/05/2016.	The BAM1020 PM10 monitor as the			
	monitor started sampling from Feb.		Frove site.			
Date of Last Site Pictures New Pictures Submitted? Yes No 🗵						
Reviewer Chengqing Xiao	Reviewer Chengqing Xiao Date 03/01/2016					
Ambient Monitoring Coordinator Chengqing Xiao Date 3/1/2016						
S						

### **Appendix B-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 station throughout which actual pollutant concentrations are reasonably similar. Area dimensions or scales of representativeness used in the network description are:

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

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

There are six basic exposures:

- a) Sites located to determine the highest concentrations expected to occur in the area covered by the network.
- b) Sites located to determine representative concentrations in areas of high population density.
- c) Sites located to determine the impact on ambient pollution levels of significant sources or source categories.
- d) Sites located to determine general background concentration levels.
- e) Sites located to determine the extent of regional pollutant transport among populated areas.
- 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 B6. 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