Ambient Air Monitoring Plan

Tennessee Dept. of Environment and Conservation
Air Pollution Control Division

Final Plan
June 30, 2016

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Introduction to the 2016 Ambient Air Monitoring Plan for Tennessee

The draft plan that is presented in the following pages will address each of the requirements specified in the CFR. An overview of the geography, general climate, wind patterns and population trends are included to provide background information that will assist the reader in understanding the current air monitoring network and reasons for placement of the existing monitoring sites. The actual regulatory requirements that specify the number and placement of air monitoring sites are found in 40 CFR 58. The sections that provide this guidance are also included in the report as a reference to help better understand the actual monitoring needs in a given area.

In many instances, the "areas" for which monitoring is required are based on population criteria in which population must be considered to allow for monitoring in the areas where populations may be affected or exposed to the various criteria pollutants of concern. Additional monitoring sites are needed to address areas where source related emission density might be elevated and impact communities in the same area. Other considerations must also be addressed when selecting and operating air monitoring sites. The local influences of some types of sources (roadway dust or emissions) may be factors that require monitoring sites to be spaced certain distances from those sources or in the case or near-road or roadway monitoring activities, the monitors must be located very close to the potential sources of mobile emissions.

The principal areas in Tennessee with air monitoring sites are depicted with a graphic showing the locations for each of the monitoring sites. The sites are further identified with a site number, an Air Quality Site Identification (AQSID) and the types of pollutants being monitored for at each location. Tables containing the relevant information for each site are also included. The tables are provided in two sections following the location graphic and have been condensed and combined from the previous year's format so that all relevant information can be found within each area's section of the report and relieves the reader from searching tables at the end of the report for information about a given site.

Each of the four local programs operating an air monitoring network in Tennessee have also provided a separate annual review, that are included with this report. Where revisions were noted in the local networks, similar revisions were added to the State's overall plan.

The recent changes in the National Ambient Air Quality Standards (NAAQS) have resulted in a need to evaluate additional air monitoring in order to comply with the new standards. In some cases (SO_2 and NO_2), the revisions to the standard were augmented with revisions to the monitoring requirements. Some of the necessary changes to the monitoring networks have been completed while others are being planned for implementation.

The state of Tennessee is required to evaluate the ambient air monitoring network each year in accordance with the requirements specified in 40 CFR Subpart B 58.10. The requirements that must be met in the annual evaluation are included.

Proposed Revisions to Tennessee's Ambient Air Monitoring Network

$PM_{2.5}$ Monitoring:

The state of Tennessee does not propose to shut down any of the current $PM_{2.5}$ monitoring sites currently in operation but will propose adding to the sites an FEM continuous monitor so that eventually all pf the $PM_{2.5}$ sites are equipped with an FEM/FRM continuous monitor. The following table details the proposed modifications to this network, Once the FEM/FRM monitors are received and properly installed, a period of correlation testing will be performed with the FRM and FEM/FRM samplers both operating at the same time. After suitable amounts of data are generated, the selected FRM samplers will be evaluated for possible shutdown. Adequate colocation for the new FEM/FRM samplers will be implemented and the need for meeting colocation requirements for the remaining filter based FRM's will be addressed based on the remaining network and minimum requirements for colocation. Tennessee is proposing to move the Clarksville $PM_{2.5}$ monitoring site due to safety concerns of the elevated platforms that are a part of the sampling network. The siting package is attached. There are no Source Oriented $PM_{2.5}$ network monitoring requirements.

County	$PM_{2.5}$ FRM Site ID	Street Address	Existing TEOM Site	Proposed BAM FEM/FRM 1020/1022	$PM_{2.5}$ FRM Filter Based Sampler to Remain	Change out Schedule
Blount	470090011	2007 Sequoyah Ave, Maryville TN 37803	Yes	Yes	No	7/1/2015 to 12/31/2016
Dyer	470450004	175-B Greenwood St, Dyersburg TN 38024	Yes	Yes	No	7/1/2015 to 12/31/2016
Lawrence	470990002	355 Busby Rd, Loretto, TN 38469	Yes	Yes	No	7/1/2015 to 12/31/2016
Loudon	471050108	1703 Roberts Rd, Loudon, TN	No	Yes	No	7/1/2015 to 12/31/2016
McMinn	470071002	707 N Jackson St, Athens, TN 37303	Yes	Yes	No	7/1/2015 to 12/31/2016
Madison	471130006	1371-A North Pky, Jackson, TN 38301	Yes	Yes	No	7/1/2015 to 12/31/2016
Maury	471192007	1600 Nashville Hwy, Columbia, TN	No	Yes	No	7/1/2015 to 12/31/2016
Montgomery	471251009	1514-C Golf Club Ln, Clarksville, TN 37040	Yes	Yes	TBD	TBD
Putnam	471410005	630 East 20th St, Cookeville, TN 38501	No	Yes	No	7/1/2015 to 12/31/2016
Roane	471450004	1002 N. Roan St, Harriman, TN 37748	Yes	Yes	No	7/1/2015 to 12/31/2016
Sullivan	471631007	1649 D St, Kingsport TN 37664	Yes	Yes	No	7/1/2015 to 12/31/2016
Sumner	471650007	Rockland Recreation Area Old Hickory Dam Army Corp of Engineer Property	Yes	Yes	TBD	TBD

PM_{10} Monitoring:

The state of Tennessee does not operate any PM_{10} monitors as a part of the state network.

Ozone Monitoring:

The state of Tennessee is proposing to shut down the Blountville (471-163-2002) ozone monitoring site in Kingsport, Sullivan County, Tennessee. This site is a historical site, (Jan 1, 1980, operating for 36 years) with another ozone monitoring site (471-163-2003) located in Sullivan County that will remain in operation after the Blountville site is approved to be shut down. In the last 8 years, the Blountville site had an 8-hr daily maximum average difference of only +0.5 ppb from the Kingsport site. Last year, the Blountville site had an 8-hr daily maximum average difference of -1.2 ppb from the Kingsport site. The Blountville site's 3-year design value is 6 ppb below the new NAAQS standard of 70 ppb.

The Loudon Pope ozone site was approved by EPA to be relocated back to the Loudon Elementary School and restarted there. This is proposed to be completed during the 2016 monitoring season. The EPA approval letter is attached.

Carbon Monoxide Monitoring:

The state of Tennessee does not operate any CO monitors as a part of the state network.

Nitrogen Dioxide Monitoring:

The state of Tennessee does not operate any NO_2 monitors as a part of the state network.

Community Wide Monitors

An NO_2 monitoring site that meets the community wide monitoring requirement is already in operation in Nashville (AQS 47-037-0011). The NO_2 monitor AQS ID 47-037-0011, located on Trinity Lane in Nashville, Tennessee is identified in AQS as a SLAMS monitor. In the Memphis CBSA the State of Arkansas currently operates an NO_2 monitor at its Marion site, (AQS 05-035-0005). Memphis-Shelby County Air Pollution Control has requested EPA approve this site to meet minimum community-wide NO_2 monitoring requirements in the Memphis CBSA.

Near-Road Monitors

There are currently two Near Road sites in Tennessee, both located and operated in local program counties (Davidson and Shelby).

Lead Monitoring:

The state operates a single lead monitoring site in Sullivan County, Tennessee in the vicinity of the Exide facility. This site is located within the boundary of the current Bristol lead nonattainment area. A redesignation request was submitted to EPA to classify the area as attainment based on clean data previously submitted for the state site. There are three lead monitoring sites operating in Knox County.

Sulfur Dioxide Monitoring:

The state of Tennessee will be installing two SO_2 monitoring sites in the Kingsport, TN area named as nonattainment by EPA in Sullivan County, Tennessee. The EPA approved siting documentation is attached.

The Purpose of Tennessee's Ambient Air Monitoring Network

There are several criteria used to determine the need for ambient air quality monitoring. Some of the criteria are as follows:

- EPA National Ambient Air Quality Standards (NAAQS) Criteria pollutant monitoring network requirements for the NCore (National Core), formally NAMS (National Air Monitoring Site); SLAMS (State and Local Air Monitoring Site); and SPM (Special Purpose Monitoring) monitoring networks
- The Code of Federal Regulations (CFR) sets forth as regulations the requirements for air quality monitoring to be implemented by the states and EPA. These requirements are primarily organized around population and emission density in a given area with the number of required monitors and the distribution of the monitors within the networks specified by these regulations. Additionally 40CFR, Part 58, Appendix D specifies criteria that must be followed in designing the NCore and SLAMS networks. The EPA must approve design and/or modifications to these networks.
- Additional federal regulations also specify requirements for Prevention of Significant Deterioration (PSD) monitoring networks. This monitoring is addressed at new facilities to be constructed in a given area or around certain types of existing industry such as large coal fired power plants or facilities that release toxic heavy metals such as lead to the environment.
- Air quality monitoring is required to be conducted to alert citizens in given areas to elevated levels of air pollutants in cities or communities of designated population levels that are required to provide Air Quality Index (AQI) reports to the general public.
- Air quality monitoring is conducted to address the need for background air quality data and to provide needed air quality data that is used in industrial recruitment efforts with the monitoring areas periodically rotated to new locations throughout the state on a routine basis.
- Special air quality monitoring studies are conducted based on identified needs for monitoring data in a given area.
- Citizen complaints and enforcement investigations related to air quality are other reasons for air quality monitoring usually in or around a specific area related to the complaint or investigation.
- Requests from citizens for special air monitoring studies are also a reason for air monitoring activities.
- The federal regulations also specify the frequency, method, location requirements, equipment, quality assurance procedures and reporting of data collected from the ambient air monitoring networks.

MSA Monitoring Configuration for 2016

MSA Monitor Requirements

Monitoring Program	Census Area Identification and Population			14129 Lead		42101 CO		42401 SO_2		42602 NO_2		44201 Ozone			81102 PM_{10}		88101 $PM_{2.5}$				88502 $PM_{2.5}$ Speciation		88101 or 88501 $PM_{2.5}$ Cont.	
State / PQAO	CBSA Code	Census 2010 / 2014	CBSA Title (MS Areas)	Operating	Required	Operating	Required	Operating	Required	Operating	Required	Operating	2013 2015 8 Hr DV*	Required	Operating	Required	Operating	2013 2015 Annual DV ug/m3	2013 2015* 24 Hr DV ug/m3	Required	Operating	Required	Operating	Required
GA 0437	16860	528143 / 547776	Chattanooga, TN-GA	0	0	0	0	0	0	0	1(b)	2	0.066	2	0	0	1	9.9	21	2	0	1(a)	1	1
TN 0170																	3							
TN 1025																								
KY 0584	17300	260625 / 281021	Clarksville, TN-KY	0	0	0	0	2	0	0	0	1	0.063	1	1	0	1	8.9	20	1	0	0	1	1
TN 0953																								
TN 1025																	1						1	
TN 0112	17420	115788 / 120864	Cleveland, TN	0	0	0	0	1	0	0	0	0		0	0	0	0			0	0	0	0	0
TN 1025																								
TN 1025	27180	130011 / 129864	Jackson, TN	0	0	0	0	0	0	0	0	0		0	0	0	1	8.3	17	0	0	0	1	1
TN 1025	27740	198716 / 200648	Johnson City, TN	0	0	0	0	0	0	0	0	0		0	0	0	0			0	0	0	0	0
TN 0375	28700	309544 / 307120	Kingsport-Bristol-Bristol, TN-VA	3	1	1	0	2	1	1	0	1	0.064	1	0	0	1	8.4	15	0	0	0	1	0
TN 1025				1																				
TN 1026						1		1		1														
VA 1127																								
TN 0581	28940	837571 / 861424	Knoxville, TN	3	1	1	0	1	1	0	1(b)	2	.067	2	1	1	4	10	20	2	0	0	1	1
TN 0921															2									
NPS 0745						1		1				2											1	
TN 1025								1				2			0		3						1	
TN 1027															1									
AR 0055	32820	1324829 / 1344127	Memphis, TN-MS-AR	1	1	3	1	1	1	1	2	1	0.067	2	2	2	2	9.1	19	2	1	1	1	1
MS 073										1		1												
TN 0673										1		3												
TN 1025																								
TN 1025	34100	113951 / 116642	Morristown, TN	0	0	0	0	0	0	0	0	1	0.067	1	0	0	0			0	0	0	0	0
TN 0682	34980	1670890 / 1830345	Nashville-Davidson--Murfreesboro, TN			1	1	1	1	2	2	2	0.067	2	2	2	2	10.1	21	3	0	1(a)	1	1
TN 1025												3					1						1	

* Ozone DV is based on the NAAQS standard of .075 ppb

Micropolitan Monitor Requirements

Monitoring Program	Census Area Identification and Population			14129 Lead		42101 CO		42401 SO_2		42602 NO_2		44201 Ozone			81102 PM_{10}		88101 $PM_{2.5}$				88502 $PM_{2.5}$ Speciation		88101 or 88501 $PM_{2.5}$ Cont.	
State / PQAO	CBSA Code	Census 2010 / 2014	CBSA Title (MicroS Areas)	Operating	Required	Operating	Required	Operating	Required	Operating	Required	Operating	2013 2015 8 Hr DV*	Required	Operating	Required	Operating	2013 2015 Annual DV ug/m3	2013 2015 24 Hr DV ug/m3	Required	Operating	Required	Operating	Required
TN 0112	11940	52266 / 52639	Athens. TN					1												0				
TN 1025																	1	8.6	17				1	0

(a) EPA has defunded the required speciation sampling in these areas. The CFR requirement has not been revised.

(b) This monitor is the rear road site that may not be funded. The CFR requirement has not been revised.

Monitoring Sites and Discussion

Freels Bend – Anderson County

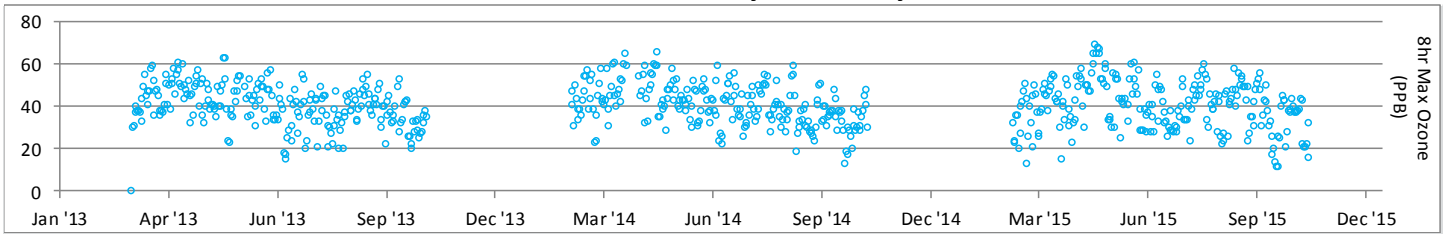
Address	Freels Bend Study Area Melton Lake Oak R	
AQSID	470010101	
CBSA	28940	
Lat, Lon	35.96522, -84.223159	
Parameter Code	42401	44201
Parameter Name	SO2	O3
Monitor Type	SLAMS	SLAMS
POC	1	1
Int	1	W
Collection Frequency	Hourly	Hourly
Method	100	87
FRM/FEM Instrument	Api Model 100 A SO2 Analyzer	Model 400 Ozone Analyzer
Analysis	Ultraviolet Fluorescence	Ultra Violet Absorption
Ref Mtd ID	EQSA-0495-100	EQOA-0992-087
Monitor Objective	Population Exposure	Population Exposure
Dominant Source	Area	Area
Measurement Scale	Urban Scale	Urban Scale
Land Use Type	Forest	Forest
Location Setting	Rural	Rural

The Freels Bend site is located in Anderson County, Tennessee and currently supports monitoring for ozone and sulfur dioxide. The site was initially established in 1992 and is expected to operate during CY's 2015 and 2016. This site is located west of Knoxville and southeast of Oak Ridge, Tennessee. This site is an upwind site from the core Knoxville MSA area.

Sulfur dioxide monitoring began 03/01/2013 to assess emission impacts from the Bull Run FP.

Because of the importance this site serves in assessing both the upwind ozone levels entering the Knoxville area and the ongoing need to continue to collect SO_2 data to assess area impacts near the TVA facility, this site will be recommended to remain in operation over the next 5 years (2015 thru 2020). The Knoxville MSA has 6 operating ozone sites and is required to have only 2. This MSA is also required to have 1 SO_2 site which this site provides for. This site is also employed in the AQI forecasting program and currently is attaining the standards for both ozone and SO_2.

Freels Bend Daily Air Quality



Maryville – Blount County

Address	2007 Sequoyah Avenue Maryville TN 37803	
AQSID	470090011	
CBSA	28940	
Lat, Lon	35.768847, -83.942152	
Parameter Code	88101	88501
Parameter Name	$PM_{2.5}$	$PM_{2.5}$ Cont
Monitor Type	SPM	SPM
POC	1	3
Int	7	1
Collection Frequency	1 in 3	Hourly
Method	118	716
FRM/FEM Instrument	R & P Co Plus Model 2025	None
Analysis	Gravimetric	Teom Gravimetric 50 Deg C
Ref Mtd ID	Rfps-0498-118	None
Monitor Objective	Population Exposure	
Dominant Source	Area	
Measurement Scale	Neighborhood	
Land Use Type	Residential	
Location Setting	Suburban	

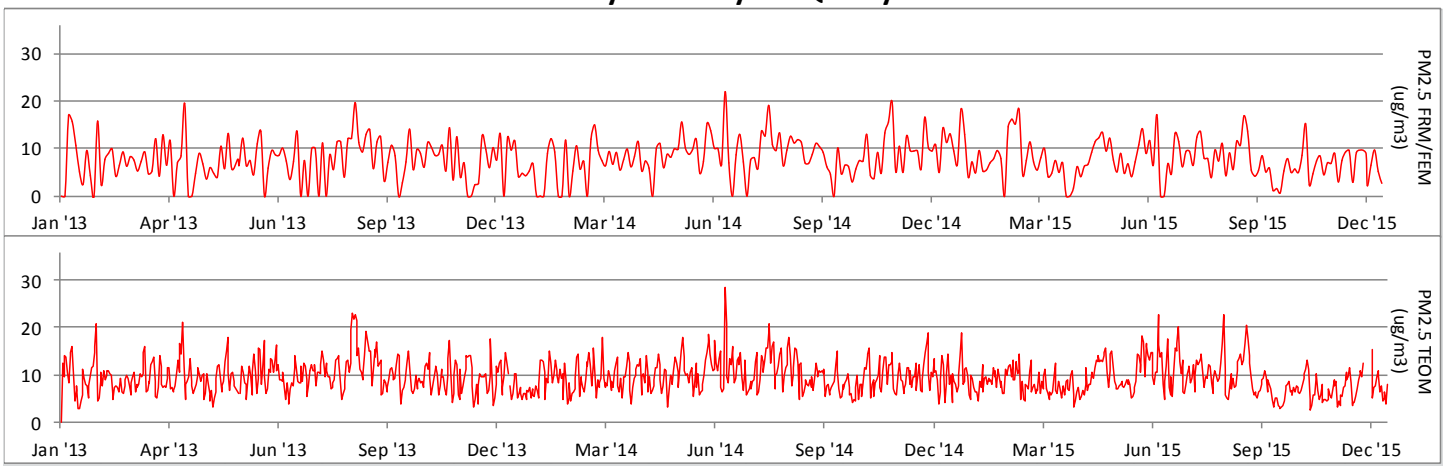
The Maryville site is located in Blount County, Tennessee and currently supports monitoring for fine particulate matter. The site was initially established in 2000 and is expected to operate during CY's 2015 and 2016. This site is located south of Knoxville and northwest of the GSMNP. Tennessee. This site is an upwind site from the core Knoxville MSA area.

$PM_{2.5}$ monitoring began 05/01/2000 as a part of the original $PM_{2.5}$ state network. Continuous $PM_{2.5}$ monitoring using a non FRM/FEM method was added later to assist with the PM Fine AQI forecasting program.

Because of the importance this site serves in assessing the upwind $PM_{2.5}$ levels entering the Knoxville area, this site will be recommended to remain in operation over the next 5 years (2015 thru 2020). The Knoxville MSA has 6 PM2.5 FRM sites and is only required to have 2 to meet the minimum requirements. This site is a candidate site to receive an FEM continuous $PM_{2.5}$ sampler (2016/2017) and at such time the FRM sampler will be retired.

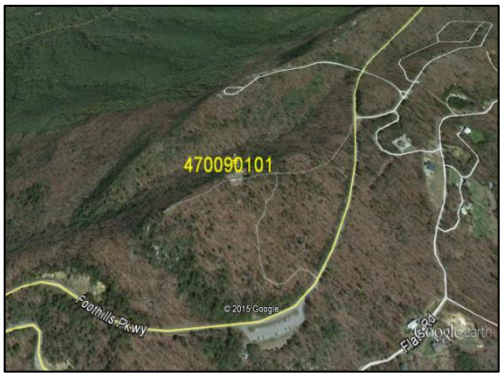
This site is also employed in the AQI forecasting program and is used to help assess impacts from precursor transport into Tennessee from Georgia and North Carolina.

Maryville Daily Air Quality



Look Rock – Blount County (GSM NP)

Address	Great Smoky Mountains NP Look Rock	
AQSID	470090101	
CBSA	28940	
Lat, Lon	35.6334799, -83.941605999999993	
Parameter Code	44201	
Parameter Name	O_3	
Monitor Type	SLAMS	
POC	1	
Int	W	
Collection Frequency	Hourly	Hourly
Method	053	716
FRM/FEM Instrument	Monitor Labs 8810	None
Analysis	Ultra Violet	TEOM Gravimetric 50 deg C
Ref Mtd ID	EQOA-0881-053	None
Monitor Objective	General Background	
Dominant Source	0	
Measurement Scale	0	
Land Use Type	Forest	
Location Setting	Rural	

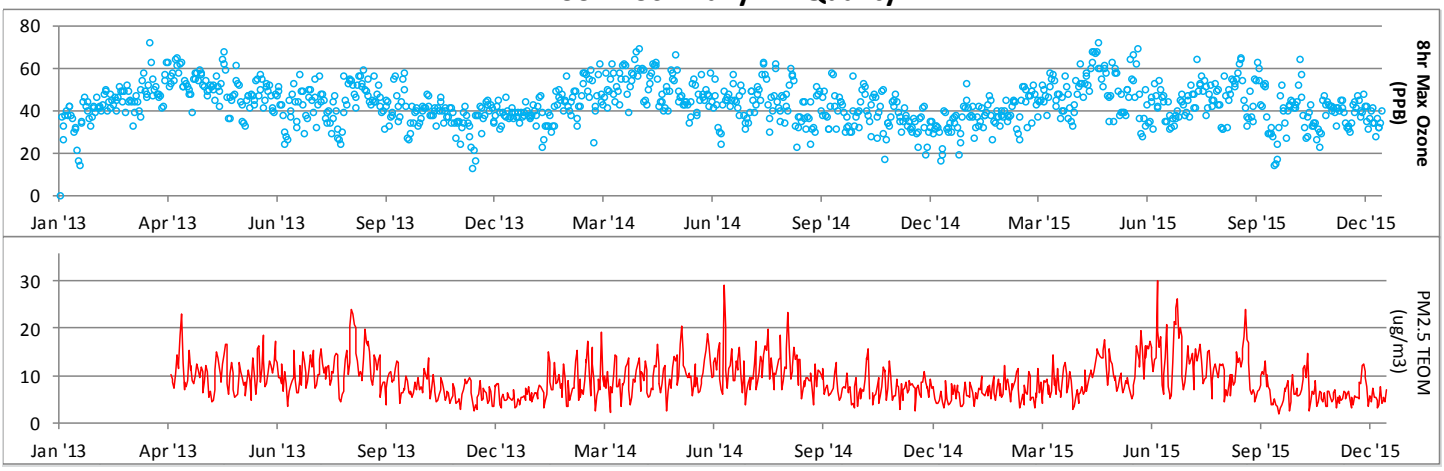


The Look Rock site is located in Blount County, Tennessee and currently supports monitoring for ozone and other pollutants. The site was initially established in 1980 and is expected to operate during CY's 2015 and 2016. This site is located within the Tennessee portion of the Great Smoky Mtns. National Park. This site is within and southeast of the Knoxville MSA area.

Ozone monitoring began 07/23/1998 and this site is used with the ozone AQI forecasting program for verification and to help address ozone levels found in the GSMNP area. $PM_{2.5}$ monitoring began 05/01/2002 and this site is used with the PM Fine AQI forecasting program for verification and to help address fine particulate levels found in the GSMNP area. TDEC DAPC reports the TEOM PM2.5 data for this site to AQS.

This site is operated and maintained by the NPS and will likely remain in operation over the next 5 years (2015 thru 2020), subject to funding support from the NPS.

Look Rock Daily Air Quality



Cades Cove – Blount County (GSM NP)

Address	Great Smoky Mountains NP - Cades Cove
AQSID	470090102
CBSA	28940
Lat, Lon	35.603056, -83.7836109999999
Parameter Code	44201
Parameter Name	O_3
Monitor Type	Non-Epa Federal
POC	1
Int	W
Collection Frequency	Hourly
Method	53
FRM/FEM Instrument	Monitor Labs 8810
Analysis	Ultra Violet
Ref Mtd ID	EQOA-0881-053
Monitor Objective	Highest Concentration
Dominant Source	0
Measurement Scale	Regional Scale
Land Use Type	Forest
Location Setting	Rural

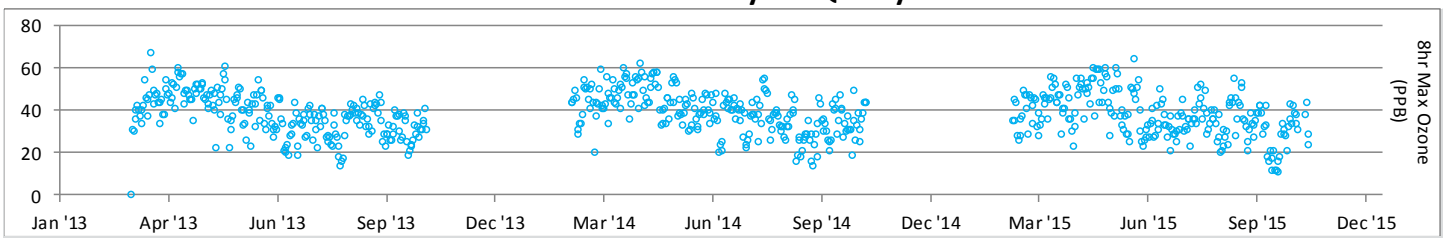
The Cades Cove site is located in Blount County, Tennessee and currently supports monitoring for ozone and meteorological parameters. The site was initially established in 05/01/1994 and is expected to operate during CY's 2015 and 2016. This site is located within the Tennessee portion of the Great Smoky Mtns. National Park. This site is within and southeast of the Knoxville MSA area.

Ozone monitoring began 05/01/1994 and this site is used with the ozone AQI forecasting program for verification and to help address ozone levels found in the GSMNP area and

TDEC APCD reports the ozone data for this site to AQS.

This site is operated and maintained by the NPS and will likely remain in operation over the next 5 years (2015 thru 2020), subject to funding support from the NPS.

Cades Cove Daily Air Quality



Dyersburg – Dyer County

Address	175-B Greenwood Street, Dyersburg TN 38024	
AQSID	470450004	
CBSA	20540	
Lat, Lon	36.038924, -89.382126	
Parameter Code	88101	88501
Parameter Name	$PM_{2.5}$	$PM_{2.5}$ Cont
Monitor Type	SLAMS	SPM
POC	1	3
Int	7	1
Collection Frequency	1 In 3	Hourly
Method	118	716
FRM/FEM Instrument	R & P Co Plus Model 2025	None
Analysis	Gravimetric	Teom Gravimetric 50 Deg C
Ref Mtd ID	RFPS-0498-118	None
Monitor Objective	Population Exposure	
Dominant Source	Area	
Measurement Scale	Neighborhood	
Land Use Type	Residential	
Location Setting	Suburban	

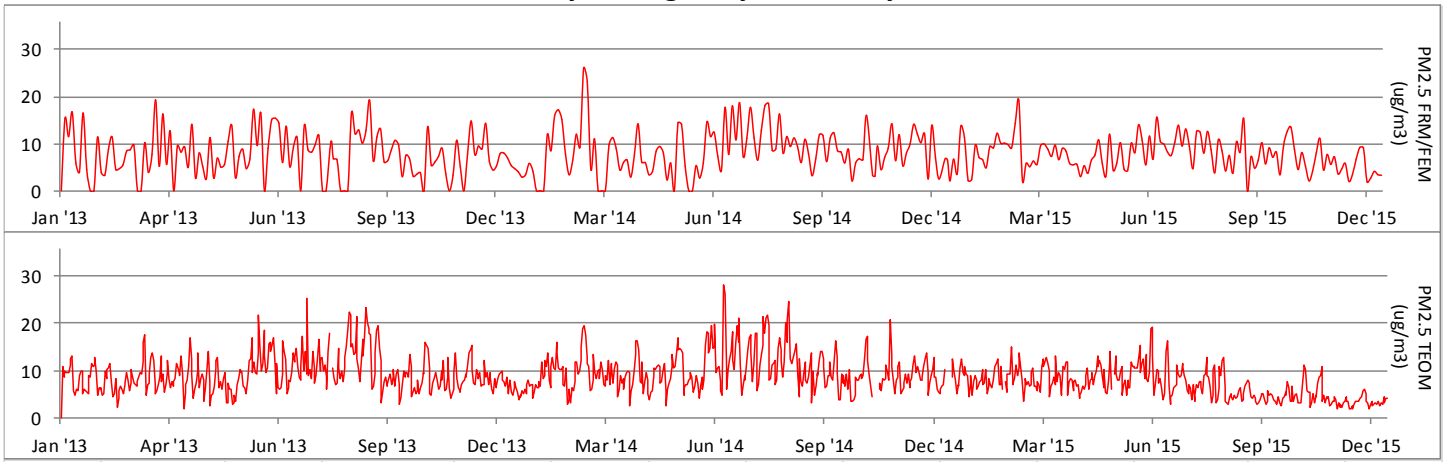
The Dyersburg site is located in Dyer County, Tennessee and currently supports monitoring for fine particulate matter. The site was initially established in 1999 and is expected to operate during CY's 2015 and 2016. This site is located northwest of Jackson and north-northeast of Memphis, Tennessee. This site is downwind from the core Memphis MSA area.

$PM_{2.5}$ monitoring began 08/22/1998 as a part of the original $PM_{2.5}$ state network. Continuous $PM_{2.5}$ monitoring using a non FRM/FEM method was added later to assist with the PM Fine AQI forecasting program.

Because of the importance this site serves in assessing the area $PM_{2.5}$ levels outside of the Memphis area, this site will be recommended to remain in operation over the next 5 years (2015 thru 2020).

This site is a candidate site to receive an FEM continuous $PM_{2.5}$ sampler (2016/2017) and at such time, the FRM sampler will be retired. This site is also employed in the AQI forecasting program and is used to help assess impacts from precursor transport into Tennessee from adjacent states.

Dyersburg Daily Air Quality



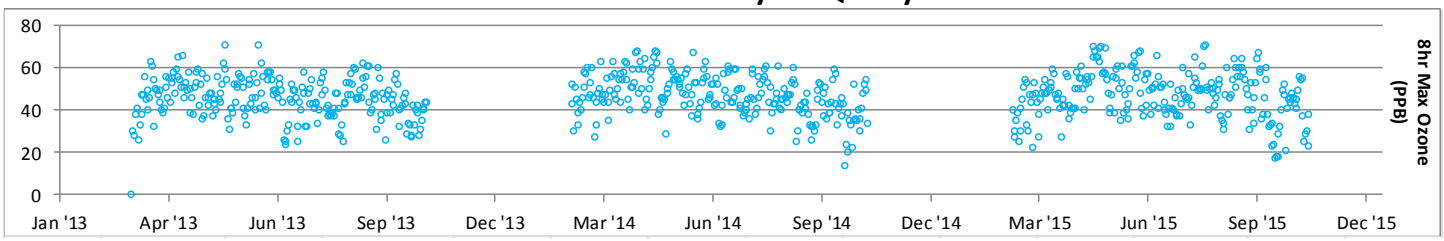
New Market – Jefferson County

Address	2393 Forrester Rd, New Market, TN 37820
AQSID	470890002
CBSA	34100
Lat, Lon	36.105629, -83.6020769999999
Parameter Code	44201
Parameter Name	O_3
Monitor Type	SLAMS
POC	1
Int	W
Collection Frequency	Hourly
Method	87
FRM/FEM Instrument	Model 400 Ozone Analyzer
Analysis	Ultra Violet Absorption
Ref Mtd ID	EQOA-0992-087
Monitor Objective	Max Ozone Concentration
Dominant Source	0
Measurement Scale	0
Land Use Type	Agricultural
Location Setting	Rural

The New Market site is located in Jefferson County, Tennessee and currently supports monitoring for ozone. The site was initially established in 1999 and is expected to operate during CY's 2015 and 2016. This site is located east northeast of Knoxville and west northwest of Morristown, Tennessee. This site is downwind from the core Knoxville MSA area.

Ozone monitoring began 03/01/1999 and this site is used with the ozone AQI forecasting program for verification and to help address transport wind patterns opposite of the predominate area directions. This MSA is required to have 1 ozone site and this site meets that requirement. Because of the importance, this site serves in assessing the area ozone levels outside and downwind of the Knoxville area, this site will be recommended to remain in operation over the next 5 years (2015 thru 2020).

New Market Daily Air Quality

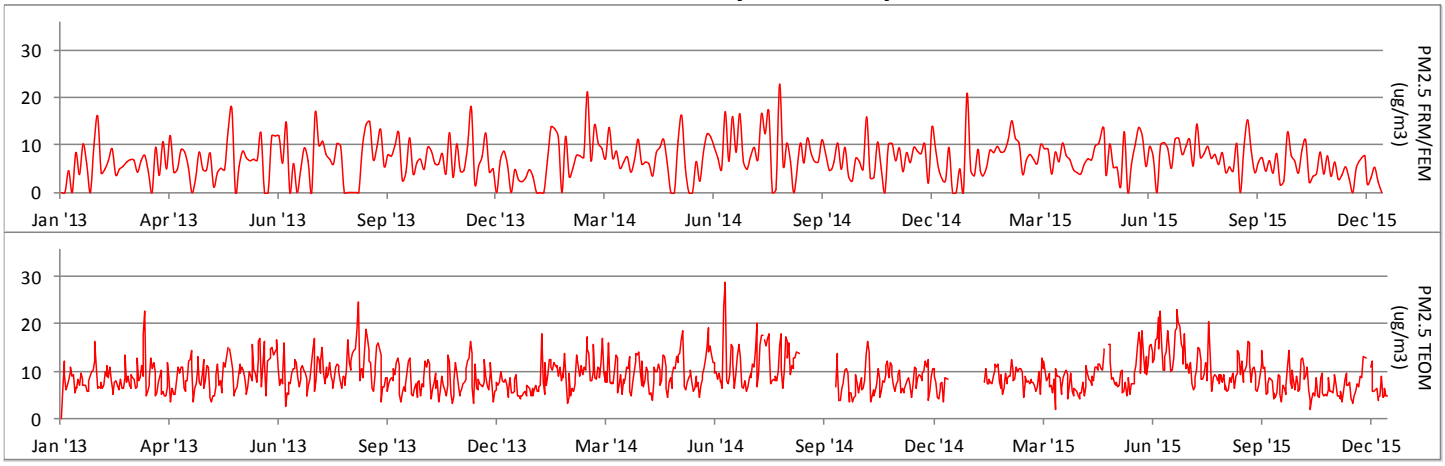


Lawrence – Lawrence County

Address	355 Busby Rd, Loretto, TN 38469	
AQSID	470990002	
CBSA	29980	
Lat, Lon	35.115968, -87.469954	
Parameter Code	88101	88501
Parameter Name	$PM_{2.5}$	$PM_{2.5}$ Cont
Monitor Type	SLAMS	SPM
POC	1	3
Int	7	1
Collection Frequency	1 In 3	Hourly
Method	118	716
FRM/FEM Instrument	R & P Co Plus Model 2025	None
Analysis	Gravimetric	Teom Gravimetric 50 Deg C
Ref Mtd ID	RFPS-0498-118	None
Monitor Objective	Upwind background, population exposure	
Dominant Source	0	
Measurement Scale	Regional Scale	
Land Use Type	Agricultural	
Location Setting	Rural	

The Lawrence Co. site is located in Lawrence County, Tennessee and currently supports monitoring for PM2.5. This site is located on the southern border of Tennessee north of Alabama. The site is south west of Nashville and south east of Jackson, Tennessee. This site is not located near any MSA area in Tennessee.
$PM_{2.5}$ monitoring began 12/24/1998 as a part of the original $PM_{2.5}$ state network. Continuous $PM_{2.5}$ monitoring using a non FRM/FEM method was added 01/01/2003 to assist with the PM Fine AQI forecasting program. This site also supported a $PM_{2.5}$ Speciation and URG sampler from 12/03/2001 to 09/26/2014. This site has also supported ozone monitoring in the past. This site is a candidate site to receive an FEM continuous $PM_{2.5}$ sampler (2016/2017) and at such time the FRM sampler will be retired.
Because this site serves as a background $PM_{2.5}$ site it is proposed to remain in operation over the next 5 years (2015 thru 2020).

Lawrence Daily Air Quality

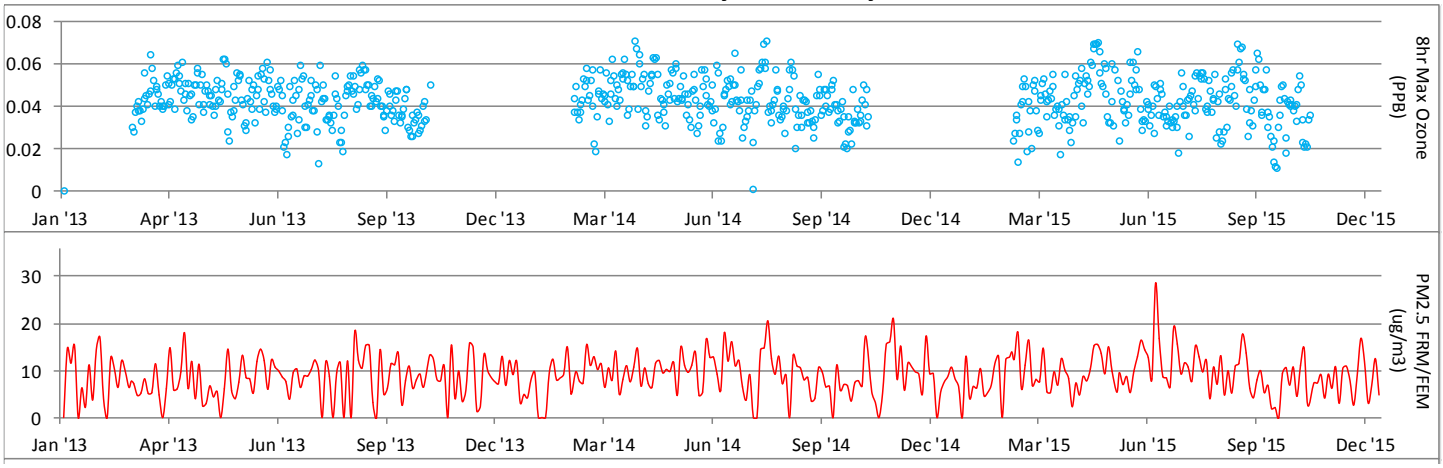


Loudon – Loudon County

Address	130 Webb Drive, Loudon, TN 37774	
AQSID	471050108	
CBSA	28940	
Lat, Lon	35.744539, -84.317057	
Parameter Code	44201	88101
Parameter Name	O_3	$PM_{2.5}$
Monitor Type	SLAMS	SPM
POC	1	1
Int	W	7
Year	2014	2014
Collection Frequency	Hourly	1 In 3
Method	87	118
FRM/FEM Instrument	Model 400 Ozone Analyzer	R & P Co Plus Model
Analysis	Ultra Violet Absorption	Gravimetric
Ref Mtd ID	EQOA-0992-087	RFPS-0498-118
Monitor Objective	Max Ozone Concentration	Population Exposure
Dominant Source	Area	
Measurement Scale	Neighborhood	
Land Use Type	Residential	
Location Setting	Suburban	

The Loudon Pope site is located in Loudon County, Tennessee and currently supports monitoring for $PM_{2.5}$ and ozone. This site is located southwest of Knoxville and northeast of Chattanooga, Tennessee. This site is upwind of the Knoxville Core MSA area and downwind from the Chattanooga MSA area. Ozone monitoring began 03/01/2014 and this site is used with the ozone AQI forecasting program for verification and to help address Knoxville MSA area. The ozone monitor is scheduled to be relocated to the Loudon Elementary School site during 2016. $PM_{2.5}$ monitoring began 08/01/2003 as a part of the Loudon air quality study and complaint investigation. This site is a candidate site to receive an FEM continuous $PM_{2.5}$ sampler (2016/2017) and at such time the FRM sampler will be retired. This sampler will also be relocated at the time of the ozone move. This site serves in assessing the area ozone levels upwind of the Knoxville area. This site will be recommended to remain in operation over the next 5 years (2015 thru 2020). The Knoxville MSA has 6 operating ozone sites and is required to have only 2. The Knoxville MSA has 6 operating $PM_{2.5}$ FRM sites and is required to have only 2.

Loudon Daily Air Quality

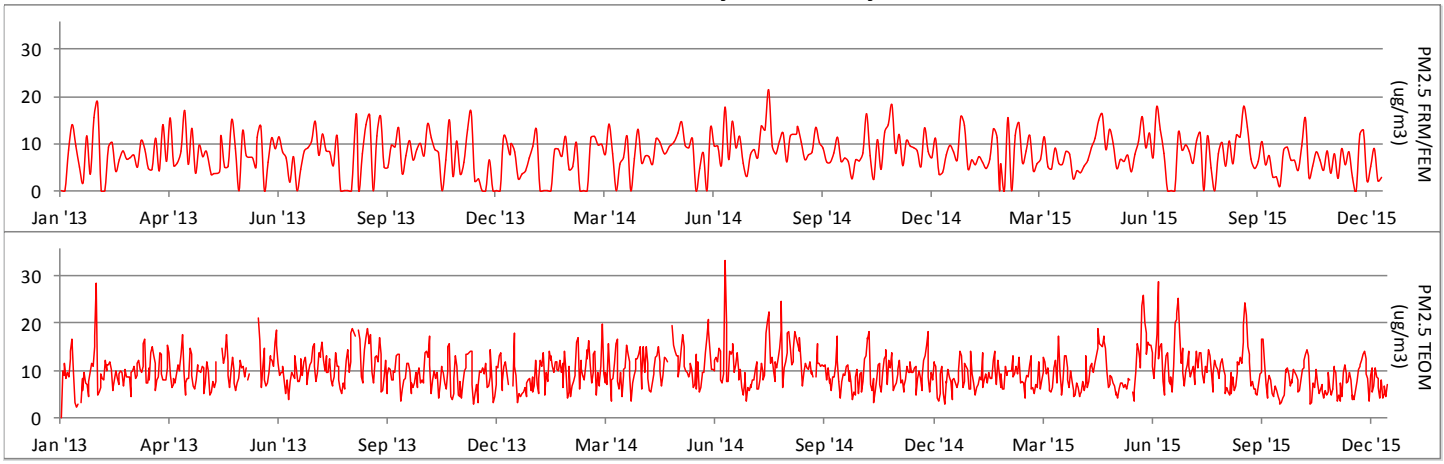


Athens – McMinn County

Address	Saint Mark Ame Zion Church: 707 North Jackson St, Athens, TN 37303	
AQSID	471071002	
CBSA	11940	
Lat, Lon	35.45011499, -84.5961949999999	
Parameter Code	88101	88501
Parameter Name	$PM_{2.5}$	$PM_{2.5}$ Cont
Monitor Type	SPM	SPM
POC	1	3
Int	7	1
Collection Frequency	1 In 3	Hourly
Method	118	716
FRM/FEM Instrument	R & P Co Plus Model 2025	None
Analysis	Gravimetric	Teom Gravimetric 50 Deg C
Ref Mtd ID	RFPS-0498-118	None
Monitor Objective	Population Exposure	
Dominant Source	Area	
Measurement Scale	Neighborhood	
Land Use Type	Commercial	
Location Setting	Urban And Center City	

The Athens site is located in McMinn County, Tennessee and currently supports monitoring for $PM_{2.5}$. This site is located northeast of Chattanooga and southwest of Knoxville, Tennessee. This site is downwind from the Chattanooga MSA area and located in the Athens, Micropolitan area.
$PM_{2.5}$ monitoring began 02/03/2000 as a part of the original $PM_{2.5}$ state network. Continuous $PM_{2.5}$ monitoring using a non FRM/FEM method was added 01/01/2005 to assist with the PM Fine AQI forecasting program.
This site is a candidate site to receive an FEM continuous $PM_{2.5}$ sampler (2016/2017) and at such time, the FRM sampler will be retired.
This site will be recommended to remain in operation over the next 5 years (2015 thru 2020). This site serves to help quantify air quality in this developing area of the state.

Athens Daily Air Quality



Jackson – Madison County

Address	1371-A North Parkway, Jackson, TN 38301		
AQSID	471130006		
CBSA	27180		
Lat, Lon	35.6513489999999, -88.809578		
Parameter Code	88101	88101	88501
Parameter Name	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$ Cont
Monitor Type	SLAMS	SLAMS	SPM
POC	1	2	3
Int	7	7	1
Collection Frequency	1 In 3	1 In 3	Hourly
Method	118	118	716
FRM/FEM Instrument	R & P Co Plus Model 2025		None
Analysis	Gravimetric		TEOM Gravimetric 50 Deg C
Ref Mtd ID	RFPS-0498-118		None
Monitor Objective	Population Exposure		
Dominant Source	Area		
Measurement Scale	Neighborhood		
Land Use Type	Residential		
Location Setting	Suburban		

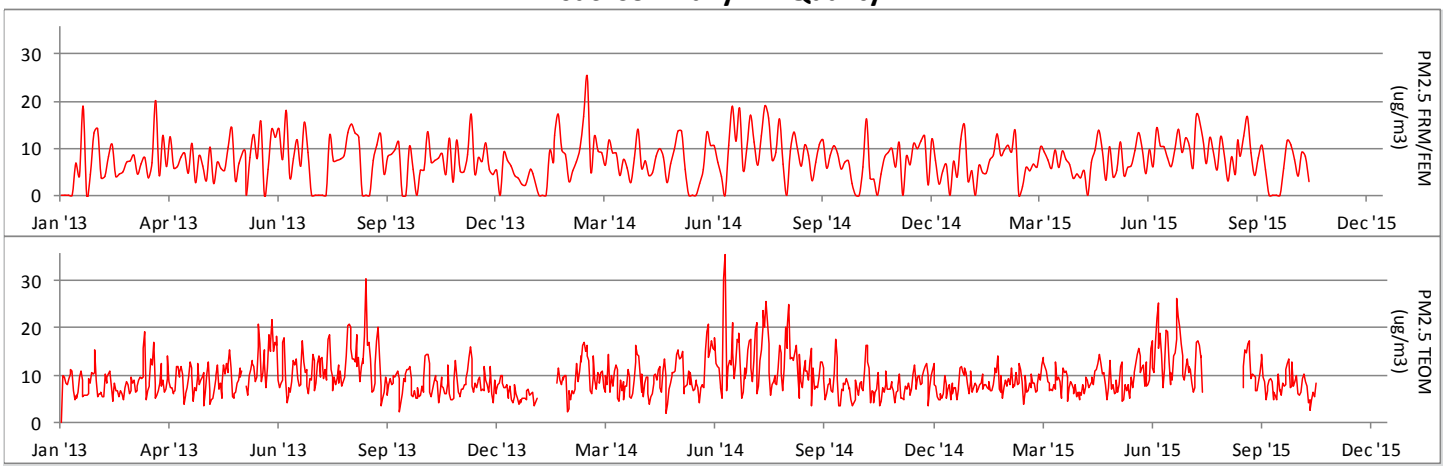
The Jackson site is located in Madison County, Tennessee and currently supports monitoring for $PM_{2.5}$. This site is located northeast of Memphis, Tennessee and southeast of Dyersburg, Tennessee. This site is located in the Jackson, TN MSA area.

$PM_{2.5}$ monitoring began 11/17/2004 as a part of the original $PM_{2.5}$ state network. Continuous $PM_{2.5}$ monitoring using a non FRM/FEM method was added 01/01/2005 to assist with the PM Fine AQI forecasting program.

This site is a candidate site to receive an FEM continuous $PM_{2.5}$ sampler (2016/2017) and at such time, the FRM sampler will be retired. The Jackson MSA area has a single FRM $PM_{2.5}$ sampler and is not required to operate any $PM_{2.5}$ sites.

This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is the only $PM_{2.5}$ site in this region.

Jackson Daily Air Quality



Columbia – Maury County

Address	1600 Nashville Hwy, Columbia, TN
AQSID	471192007
CBSA	17940
Lat, Lon	35.65187999, -87.0096
Parameter Code	88101
Parameter Name	$PM_{2.5}$
Monitor Type	SPM
POC	1
Int	7
Collection Frequency	1 In 3
Method	118
FRM/FEM Instrument	R & P Co Plus Model 2025
Analysis	Gravimetric
Ref Mtd ID	RFPS-0498-118
Monitor Objective	Population Exposure
Dominant Source	Area
Measurement Scale	Middle Scale
Land Use Type	Commercial
Location Setting	Urban And Center City

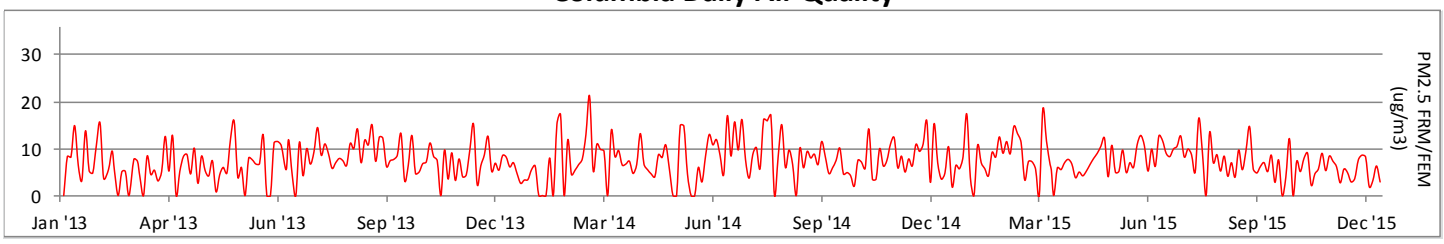
The Columbia site is located in Maury County, Tennessee and currently supports monitoring for $PM_{2.5}$. This site is located south-southwest of Nashville and northwest of Lewisburg, Tennessee. This site is up wind from the Nashville MSA area.

$PM_{2.5}$ monitoring began 12/25/1998 as a part of the original $PM_{2.5}$ state network

This site is a candidate site to receive an FEM continuous $PM_{2.5}$ sampler (2016/2017) and at such time, the FRM sampler will be retired.

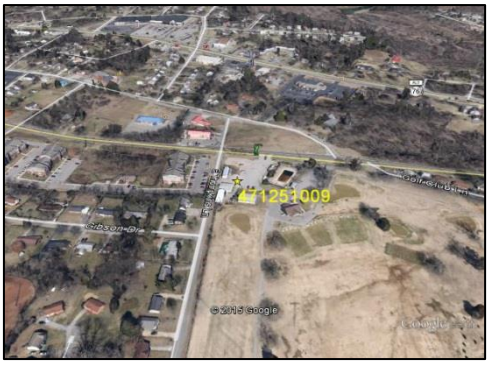
This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is the only $PM_{2.5}$ site in this region.

Columbia Daily Air Quality



Clarksville – Montgomery County

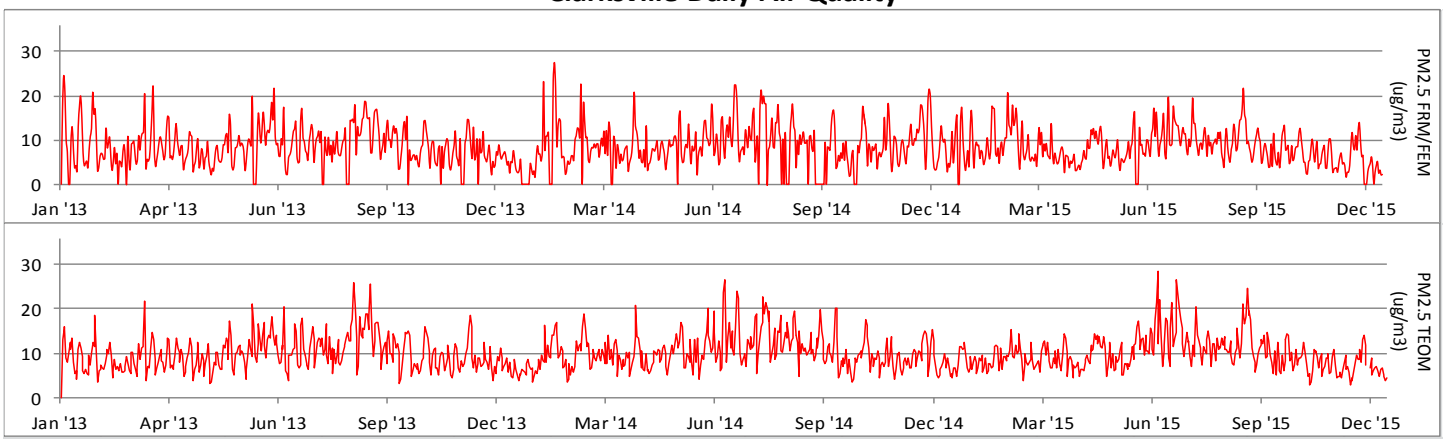
Address	1514-C Golf Club Ln, Clarksville, TN	
AQSID	471251009	
CBSA	11940	
Lat, Lon	36.514712, -87.3280469999999	
Parameter Code	88101	88501
Parameter Name	$PM_{2.5}$	$PM_{2.5}$ Cont
Monitor Type	SLAMS	SPM
POC	1	3
Int	7	1
Collection Frequency	Daily	Hourly
Method	118	716
FRM/FEM Instrument	R & P Co Plus Model 2025	None
Analysis	Gravimetric	TEOM Gravimetric 50 Deg C
Ref Mtd ID	RFPS-0498-118	None
Monitor Objective	Population Exposure	
Dominant Source	0	
Measurement Scale	Neighborhood	
Land Use Type	Residential	
Location Setting	Suburban	



The Clarksville site is located in Montgomery County, Tennessee and currently supports monitoring for $PM_{2.5}$. This site is located northwest of Nashville, Tennessee and is located near the Tennessee/Kentucky border. This site is upwind from the Clarksville, TN-KY MSA area. This site is suitable for use in meeting the MSA monitoring requirement for $PM_{2.5}$ for both Tennessee and Kentucky.

$PM_{2.5}$ monitoring began 01/01/1998 as a part of the original $PM_{2.5}$ state network. Continuous PM2.5 monitoring using a non FRM/FEM method was added 03/10/2008 to assist with the PM fine AQI forecasting program. The Clarksville MSA area has a single FRM $PM_{2.5}$ sampler and is not required to operate a PM2.5 site for the MSA. This site is a candidate site to receive an FEM continuous $PM_{2.5}$ sampler. This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is the only $PM_{2.5}$ site in this region. Tennessee is considering removal of the elevated platforms that are a part of the sampling network for safety related concerns and is proposing to place the Clarksville $PM_{2.5}$ monitoring site on the ground near the existing location the elevated platform now occupies. If a suitable location is not available in the immediate area, Tennessee proposes to relocate the site as close as possible to the previous location. This proposed change is anticipated over the next calendar year and will be preceded by a formal written request to EPA with the relocation details.

Clarksville Daily Air Quality



Cookeville – Putnam County

Address	630 East 20Th Street, Cookeville TN
AQSID	471410005
CBSA	18260
Lat, Lon	36.1857019999999, -85.492107
Parameter Code	88101
Parameter Name	$PM_{2.5}$
Monitor Type	SPM
POC	1
Int	7
Collection Frequency	1 In 3
Method	118
FRM/FEM Instrument	R & P Co Plus Model 2025
Analysis	Gravimetric
Ref Mtd ID	RFPS-0498-118
Monitor Objective	Population Exposure
Dominant Source	Area
Measurement Scale	Neighborhood
Land Use Type	Residential
Location Setting	Suburban

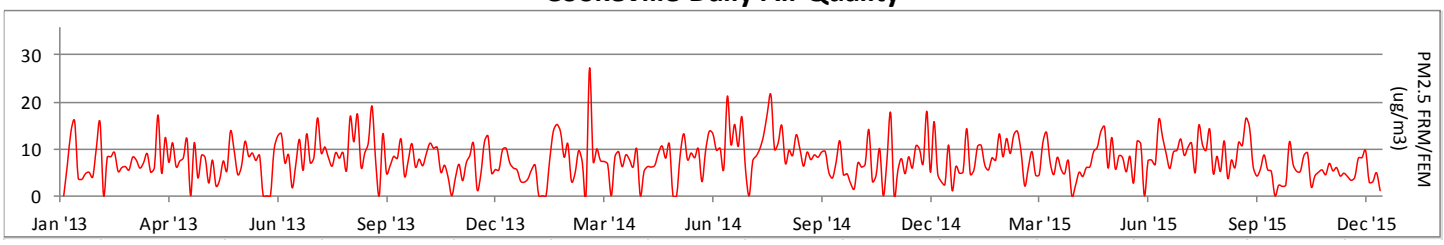
The Cookeville site is located in Putnam County, Tennessee and currently supports monitoring for $PM_{2.5}$. This site is located east of Nashville and northeast of Chattanooga, Tennessee. This site is not located in or near an MSA area.

$PM_{2.5}$ monitoring began 08/15/2006 after the site was relocated.

This site is a candidate site to receive an FEM continuous $PM_{2.5}$ sampler (2016/2017) and at such time, the FRM sampler will be retired.

This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is the only $PM_{2.5}$ site in this region.

Cookeville Daily Air Quality



Harriman – Roane County

Address	Harriman High: 1002 N. Roan St Harriman, TN	
AQSID	471450004	
CBSA	11940	
Lat, Lon	35.939078, -84.5428019999999	
Parameter Code	88101	88501
Parameter Name	$PM_{2.5}$	$PM_{2.5}$ Cont
Monitor Type	SPM	SPM
POC	1	3
Int	7	1
Collection Frequency	1 In 3	Hourly
Method	118	716
FRM/FEM Instrument	R & P Co Plus Model 2025	None
Analysis	Gravimetric	TEOM Gravimetric 50 Deg C
Ref Mtd ID	RFPS-0498-118	None
Monitor Objective	Population Exposure	
Dominant Source	Area	
Measurement Scale	0	
Land Use Type	Industrial	
Location Setting	Suburban	

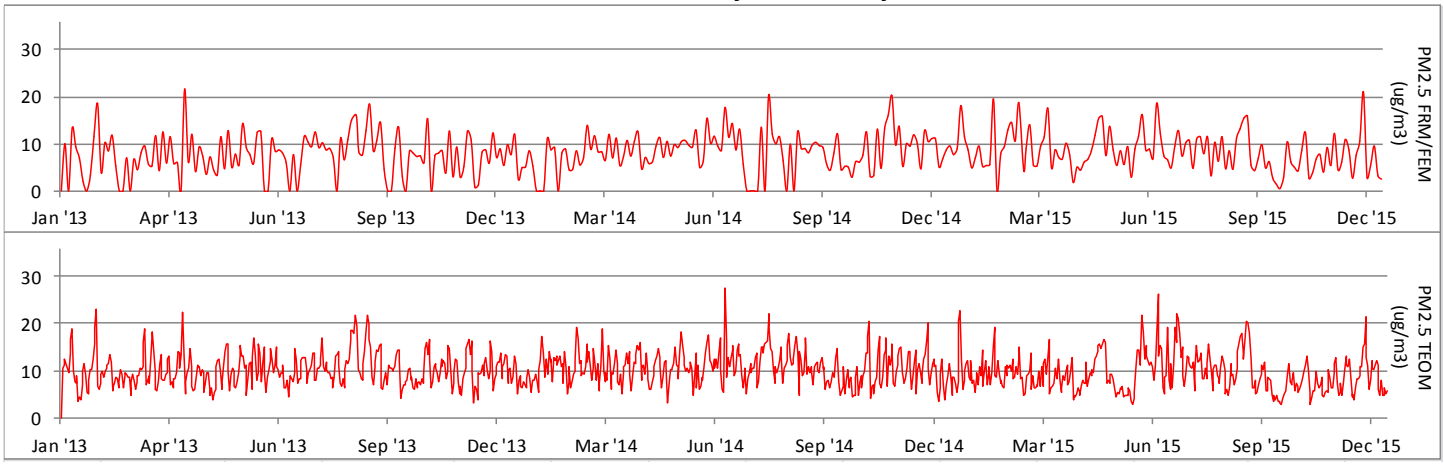
The Harriman site is located in Roane County, Tennessee and currently supports monitoring for $PM_{2.5}$. This site is located west of Knoxville and west-southwest of Oak Ridge, Tennessee. This site is upwind from the Knoxville MSA area.

$PM_{2.5}$ monitoring began 01/01/1998 as a part of the original $PM_{2.5}$ state network. Continuous PM2.5 monitoring using a non FRM/FEM method was added 01/01/2005 to assist with the PM fine AQI forecasting program.

This site is a candidate site to receive an FEM continuous $PM_{2.5}$ sampler (2016/2017) and at such time, the FRM sampler will be retired.

This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is in a county containing a partial $PM_{2.5}$ nonattainment area. The Knoxville MSA has six operating $PM_{2.5}$ FRM sites and is required to have only two.

Harriman Daily Air Quality

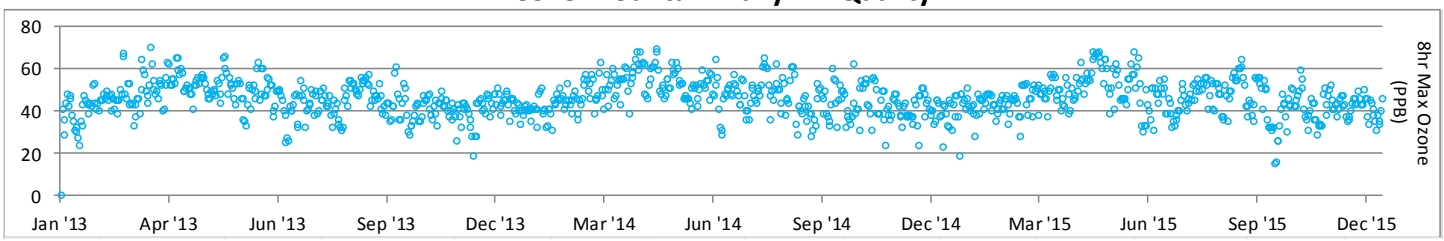


Cove Mountain – Sevier Country (GSM NP)

Address	Great Smoky Mountain NP- Cove Mountain
AQSID	471550101
CBSA	42940
Lat, Lon	35.6966669999999, -83.609722
Parameter Code	44201
Parameter Name	O_3
Monitor Type	NON-EPA FEDERAL
POC	1
Int	W
Collection Frequency	Hourly
Method	47
FRM/FEM Instrument	Thermo Electron 49
Analysis	Ultra Violet
Ref Mtd ID	EQOA-0880-047
Monitor Objective	General/Background
Dominant Source	Area
Measurement Scale	Neighborhood
Land Use Type	Forest
Location Setting	Rural

The Cove Mt. site is located in Sevier County, Tennessee and currently supports monitoring for ozone and meteorological parameters. This site is located within the Tennessee portion of the Great Smoky Mtns. National Park. This site is outside and southeast of the Knoxville MSA area.
Ozone monitoring began 07/01/1988 and this site is used with the ozone AQI forecasting program for verification and to help address ozone levels found in the GSMNP area.
This site is operated and maintained by the NPS and will likely remain in operation over the next 5 years (2015 thru 2020), subject to funding support from the NPS.

Cove Mountain Daily Air Quality



Clingman's Dome – Sevier County (GSM NP)

Address	Great Smoky Mountain Np Clingman's Dome
AQSID	471550102
CBSA	42940
Lat, Lon	35.562778, -83.4981
Parameter Code	44201
Parameter Name	O_3
Monitor Type	NON-EPA FEDERAL
POC	1
Int	W
Year	2014
Collection Frequency	Hourly
Method	47
FRM/FEM Instrument	Thermo Electron 49
Analysis	Ultra Violet
Ref Mtd ID	EQOA-0880-47
Monitor Objective	Highest Concentration
Dominant Source	Area
Measurement Scale	Regional Scale
Land Use Type	Forest
Location Setting	Rural

The Clingman's Dome site is located in Sevier County, Tennessee and currently supports monitoring for ozone and meteorological parameters. This site is located within the Tennessee portion of the Great Smoky Mtns. National Park. This site is outside and southeast of the Knoxville MSA area.

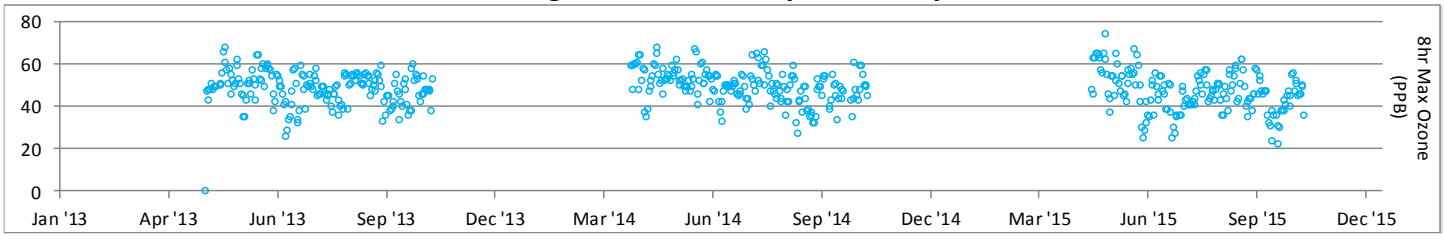
Ozone monitoring began 04/01/1993 and this site is used with the ozone AQI forecasting program for verification and to help address ozone levels found in the GSMNP area.

This site is operated and maintained by the NPS and will likely remain in operation over the next 5 years (2015 thru 2020), subject to funding support from the NPS.

The location for the site is the highest point inside of Tennessee and the site is actually located on the border of Tennessee and North Carolina. The elevation of the site poses challenges in maintenance and access as the site is often impacted in the late fall and through-out the winter and spring by excessive snow fall and icing events that prevent access to the site.

The ozone data collected at this site is truncated due to the site access issues in March and April and in some years in October due to early snowfall events.

Clingman's Dome Daily Air Quality



Kingsport ($PM_{2.5}$) – Sullivan County

Address	1649 D Street Kingsport Tn 37664	
AQSID	471631007	
CBSA	11940	
Lat, Lon	36.5387619999999, -82.5215649999999	
Parameter Code	88101	88501
Parameter Name	$PM_{2.5}$	$PM_{2.5}$ Cont
Monitor Type	SLAMS	SPM
POC	1	3
Int	7	1
Collection Frequency	1 In 3	Hourly
Method	118	716
FRM/FEM Instrument	R & P Co Plus Model 2025	None
Analysis	Gravimetric	TEOM Gravimetric 50 Deg C
Ref Mtd ID	RFPS-0498-118	None
Monitor Objective	Population Exposure Upwind Background	Population Exposure
Dominant Source	0	
Measurement Scale	Urban Scale	
Land Use Type	Residential	
Location Setting	Suburban	

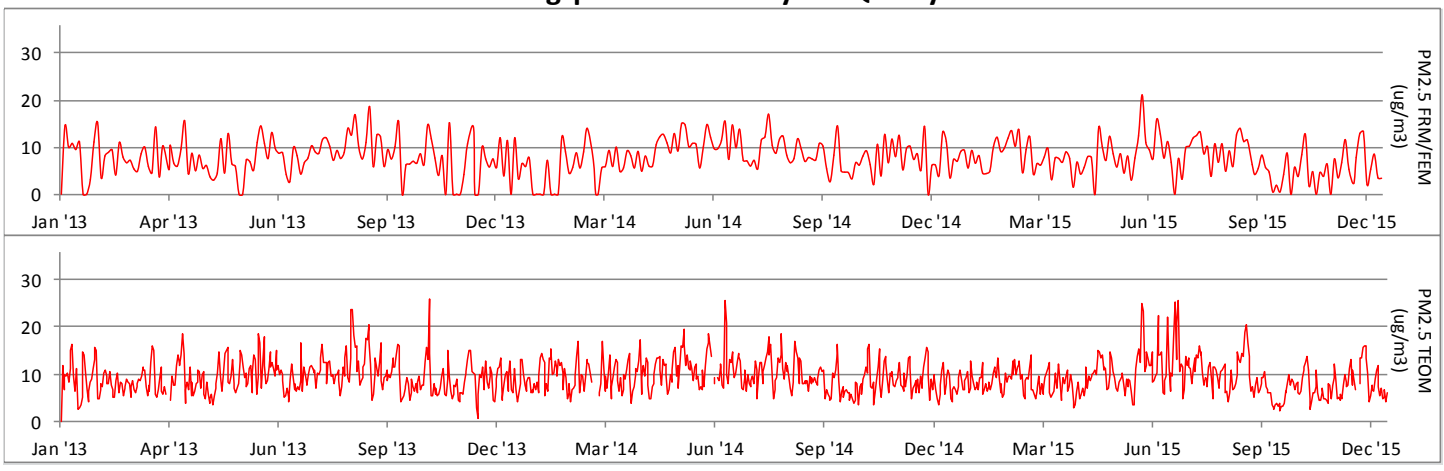
The Kingsport site is located in Sullivan County, Tennessee and currently supports monitoring for $PM_{2.5}$. This site is located in the far northeast corner of the state and is south of the state of Virginia on the Tennessee Virginia line. This site is upwind of Gate City, VA and downwind from the Johnson City MSA area. Kingsport is also a part of the Kingsport Bristol MSA.

$PM_{2.5}$ monitoring began 10/01/1998 as a part of the original $PM_{2.5}$ state network. Continuous PM2.5 monitoring using a non FRM/FEM method was added 01/01/2005 to assist with the PM Fine AQI forecasting program. The Kingsport MSA area has a single FRM $PM_{2.5}$ sampler and is not required to operate a $PM_{2.5}$ site for the MSA.

This site is a candidate site to receive an FEM continuous $PM_{2.5}$ sampler (2016/2017) and at such time the FRM sampler will be retired.

This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is the only $PM_{2.5}$ site in this region.

Kingsport PM2.5 Daily Air Quality

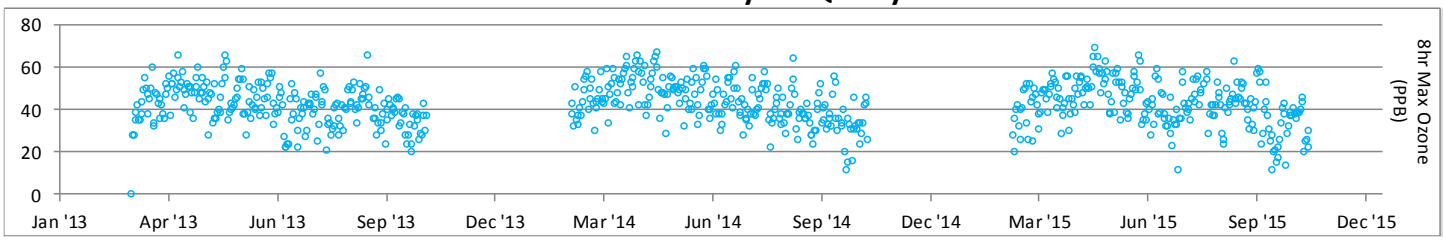


Blountville – Sullivan County

Address	Indian Springs School Shawnee Ave Blountville, TN
AQSID	471632002
CBSA	28700
Lat, Lon	36.5414389999999, -82.424824
Parameter Code	44201
Parameter Name	O_3
Monitor Type	SLAMS
POC	1
Int	W
Collection Frequency	Hourly
Method	87
FRM/FEM Instrument	Model 400 Ozone Analyzer
Analysis	Ultra Violet Absorption
Ref Mtd ID	EQOA-0992-087
Monitor Objective	Population Exposure
Dominant Source	Area
Measurement Scale	Neighborhood
Land Use Type	Residential
Location Setting	Rural

The Blountville site is located in Sullivan County, Tennessee and currently supports monitoring for ozone. This site is located east of Kingsport and near the Virginia state line. This site is downwind from the Johnson City MSA area. Ozone monitoring began 01/01/1980 and this site is used with the ozone AQI forecasting program for verification and to help address the ozone impacts in the Kingsport - Bristol and Johnson City MSA area. The Kingsport MSA has 2 ozone sites operating and is required to have only 1 ozone site.
TDEC will propose the shut this site down in the next year. There is another ozone monitoring site in Sullivan County that will remain operational.

Blountville Daily Air Quality



Kingsport O_3 – Sullivan County

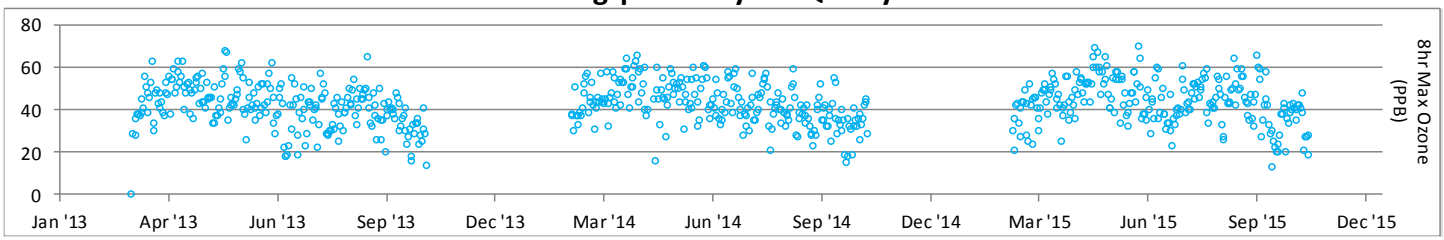
Address	3301 Bloomingdale Rd. Kingsport Tn 3762
AQSID	471632003
County Name	Sullivan
CBSA	28700
Lat, Lon	36.58211, -82.485742
Parameter Code	44201
Parameter Name	O_3
Monitor Type	SLAMS
POC	1
Int	W
Collection Frequency	Hourly
Method	87
FRM/FEM Instrument	Model 400 Ozone Analyzer
Analysis	Ultra Violet Absorption
Ref Mtd ID	EQOA-0992-087
Monitor Objective	Population Exposure
Dominant Source	0
Measurement Scale	Neighborhood
Land Use Type	Residential
Location Setting	Suburban

The Kingsport site is located in Sullivan County, Tennessee and currently supports monitoring for ozone. This site is located in the far northeast corner of the state and is south of the state of Virginia on the Tennessee Virginia line. This site is upwind of Gate City, VA and downwind from the Johnson City MSA area. Kingsport is also a part of the Kingsport Bristol MSA

Ozone monitoring began 04/01/1995 and this site is used with the ozone AQI forecasting program for verification and to help address the Kingsport-Bristol-MSA area. The Kingsport MSA has two ozone sites operating and is required to have only one ozone site.

This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is located in the Kingsport area.

Kingsport Daily Air Quality



Exide – Sullivan County

Address	364 Exide Dr, Bristol TN 37620	
AQSID	471633004	
County Name	Sullivan	
CBSA	11940	
Lat, Lon	36.524433, -82.27261	
Parameter Code	14129	14129
Parameter Name	Pb	Pb
Monitor Type	SLAMS	SLAMS
POC	1	2
Int	7	7
Collection Frequency	1 In 6	1 In 6
Method	192	192
FRM/FEM Instrument	Pb-TSP/ICP Spectra (ICP-MS)	Pb-TSP/ICP Spectra (ICP-MS)
Analysis	Inductively Coupled Plasma-Mass Spectrometry Acid Filter Extract With Hot Nitric Acid	Inductively Coupled Plasma-Mass Spectrometry Acid Filter Extract With Hot Nitric Acid
Ref Mtd ID	EQL-0710-192	EQL-0710-192
Monitor Objective	Source Oriented	
Dominant Source	Point	
Measurement Scale	Urban Scale	
Land Use Type	Industrial	
Location Setting	Urban And Center City	

The Exide site is located in Sullivan County, Tennessee and currently supports monitoring for lead. This site is located east of Kingsport and northeast of Blountville on the Tennessee Virginia state lines. This site is downwind from Johnson City and Blountville and is located in the Kingsport Bristol MSA area.
Lead monitoring began 01/01/2010 and this site is used to verify lead NAAQS compliance at a now shutdown lead battery plant. This site is an industrial oriented site helping to define the lead air quality in the Kingsport Sullivan county lead nonattainment area.
This site will be recommended to remain in operation over the next 2 years (2015 thru 2017) primarily to demonstrate lead NAAQS compliance.

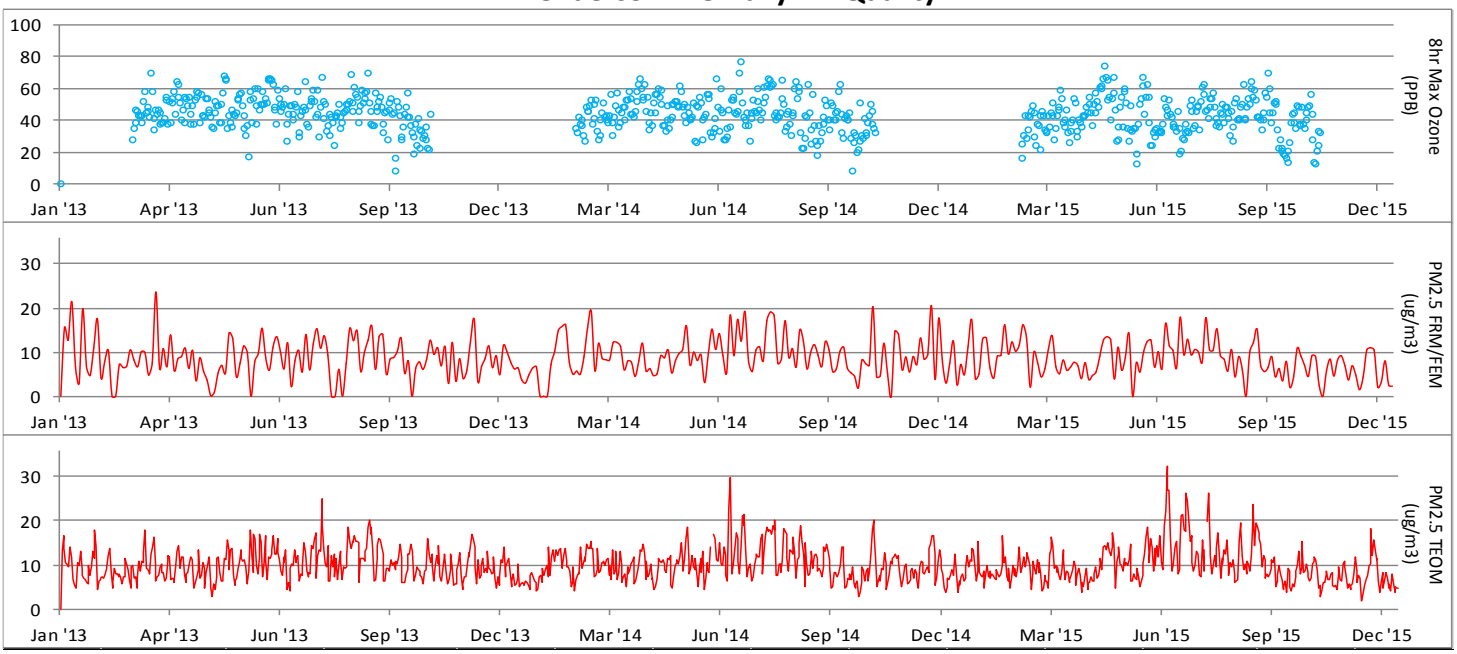
Hendersonville - Sumner County

Address	Rockland Recreational Area, Old Hickory Dam			
AQSID	471650007			
CBSA	34980			
Lat	36.297559999999997, -86.653137000000001			
Parameter Code	44201	88101	88101	88501
Parameter Name	O_3	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$ Cont
Monitor Type	SLAMS	SLAMS	SLAMS	SPM
POC	1	1	2	3
Int	W	7		1
Collection Frequency	Hourly	1 in 3		Hourly
Method	047	118		716
FRM/FEM Instrument	Thermo Electron 49	R&P Co Plus Model 2025		None
Analysis	Ultra violet	Gravemetric		TEOM Gravimetric 50C
Ref Mtd ID	EQOA-0880-047	RFPS-0498-118		None
Monitor Objective	Highest Conc	Population Exposure		
Dominant Source	Area	Area		
Measurement Scale	Neighborhood	Neighborhood		
Land Use Type	Industrial	Industrial		
Location Setting	Rural	Rural		

The Hendersonville site is located in Sumner County, Tennessee and currently supports monitoring for ozone and PM2.5. This site is located northeast of Nashville and west southwest of Gallatin, Tennessee. This site is downwind from the core Nashville MSA area. Sumner County is part of the Nashville MSA.

Ozone monitoring began 01/01/1973 and this site is used with the ozone AQI forecasting program for verification and to help address NAAQS compliance in the Nashville MSA area. $PM_{2.5}$ monitoring began 10/01/1998 as a part of the original $PM_{2.5}$ state network. Continuous $PM_{2.5}$ monitoring using a non FRM/FEM method was added 01/01/2003 to assist with the PM fine AQI forecasting program. This site is a candidate site to receive an FEM continuous $PM_{2.5}$ sampler. This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is the ozone DV site for the Nashville MSA area and is downwind from the Nashville fine particulate precursor sources. The Nashville MSA has 5 ozone monitors operating and is only required to have 2.

Hendersonville Daily Air Quality



Fairview – Williamson County

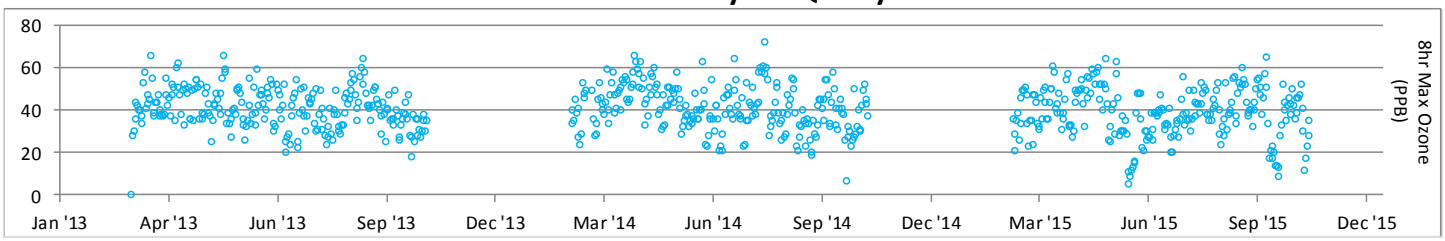
Address	Fairview Middle School Crow Cut Road F
AQSID	471870106
CBSA	34980
Lat, Lon	35.951534, -87.137005
Parameter Code	44201
Parameter Name	O_3
Monitor Type	SLAMS
POC	1
Int	W
Collection Frequency	Hourly
Method	47
FRM/FEM Instrument	Thermo Electron 49
Analysis	Ultra Violet
Ref Mtd ID	EQOA-0880-047
Monitor Objective	Population Exposure
Dominant Source	Area
Measurement Scale	Urban Scale
Land Use Type	Agricultural
Location Setting	Rural

The Fairview site is located in Williamson County, Tennessee and currently supports monitoring for ozone. This site is located southwest of Nashville and northwest of Franklin, Tennessee. This site is upwind from the core Nashville MSA area.

Ozone monitoring began 10/30/2001 and this site is used by the ozone AQI forecasting program for verification and to help address upwind ozone concentrations entering the Nashville MSA area. The Nashville MSA has 5 ozone sites operating and is only required to have 2.

Because of the importance this site serves in assessing the area ozone levels outside and upwind of the Nashville area, this site will be recommended to remain in operation over the next 5 years (2015 thru 2020).

Fairview Daily Air Quality



Cedars of Lebanon – Wilson County

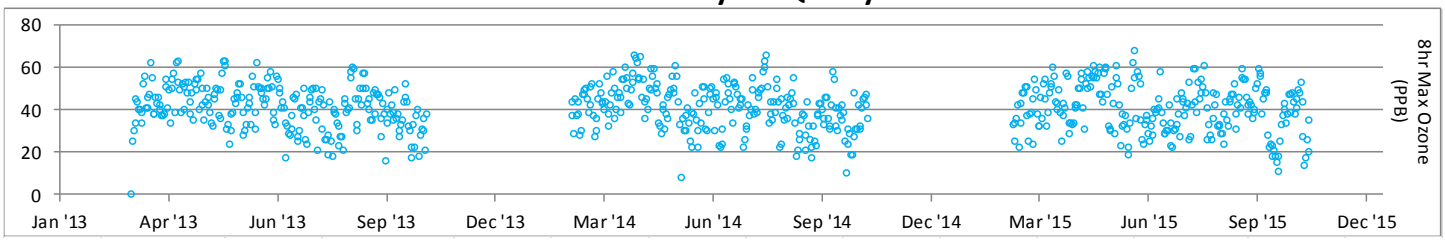
Address	Cedars Of Lebanon State Park
AQSID	471890103
CBSA	34980
Lat, Lon	36.060833, -86.2862609999999
Parameter Code	44201
Parameter Name	O_3
Monitor Type	SLAMS
POC	1
Int	W
Collection Frequency	Hourly
Method	47
FRM/FEM Instrument	Thermo Electron 49
Analysis	Ultra Violet
Ref Mtd ID	EQOA-0880-047
Monitor Objective	Unknown
Dominant Source	Area
Measurement Scale	Urban Scale
Land Use Type	Forest
Location Setting	Rural

The Cedars site is located in Wilson County, Tennessee and currently supports monitoring for ozone. This site is located east of Nashville and north of Murfreesboro, Tennessee. This site is downwind from Franklin and is located within the Nashville MSA area.

Ozone monitoring began 05/01/1988 and this site is used with the ozone AQI forecasting program for verification and to help address downwind ozone levels in the Nashville MSA area. The Nashville MSA has 5 ozone sites operating and is only required to have 2.

Because of the importance this site serves in assessing the area ozone levels outside and downwind of the Nashville area, this site will be recommended to remain in operation over the next 5 years (2015 thru 2020).

Cedars Daily Air Quality



Tennessee Geographic Regions, Descriptions and Climate

Climate of Tennessee

Topographic Features - The topography of Tennessee is quite varied, stretching from the lowlands of the Mississippi Valley to the mountain peaks in the east. The westernmost part of the State, between the bluffs overlooking the Mississippi River and western valley of the Tennessee River, is a region of gently rolling plains sloping gradually from 200 to 250 feet in the west to about 600 feet above sea level in the hills overlooking the Tennessee River. The hilly Highland Rim, in a wide circle touching the Tennessee River Valley in the west and the Cumberland Plateau in the east, together with the enclosed Central Basin make up the whole of Middle Tennessee. The Highland Rim ranges from about 600 feet in elevation along the Tennessee River to 1,000 feet in the east and rises 300 to 400 feet above the Central Basin which is a rolling plain of about 600 feet average elevation, but with a crescent of hills reaching to over 1,000 feet south of Nashville. The Cumberland Plateau, with an average elevation of 2,000 feet extends roughly northeast-southwest across the State in a belt 30 to 50 miles wide, being bounded on the west by the Highland Rim and overlooking the Great Valley of East Tennessee on the east. The Great Valley, paralleling the Plateau to the west and the Great Smoky Mountains to the east, is a funnel shaped valley varying in width from about 30 miles in the south to about 90 miles in the north. Within the valley, which slopes from 1,500 feet in the north to 700 feet in the south, is a series of northeast-southwest ridges. Along the Tennessee-North Carolina border lie the Great Smoky Mountains, the most rugged and elevated portion of Tennessee, with numerous peaks from 4,000 to 6,000 feet.

Tennessee, except for a small area east of Chattanooga, lies entirely within the drainage of the Mississippi River system. The extreme western section of the State is drained through several relatively small rivers directly into the Mississippi River. Otherwise, drainage is into either the Cumberland or Tennessee Rivers, both of which flow northward near the end of their courses to join the Ohio River along the Kentucky-Illinois border. The Cumberland River, which drains north-central portions of Tennessee rises in the Cumberland Mountains in Kentucky, flows southwestward, then south into Tennessee reaching the Nashville area before tuning northward to re-enter Kentucky. The Tennessee River is formed by the juncture of the Holston and French Broad rivers at Knoxville. It flows southwesterly along the Alabama-Mississippi line, and then flows northward across the State into Kentucky. Besides the headwater streams, other important tributaries include the: Clinch, Little Tennessee, Hiawassee, Elk and Duck Rivers.

Temperature - Most aspects of the State's climate are related to the widely varying topography within its borders. The decrease of temperature with elevation is quite apparent, amounting to, on the average, three degrees Fahrenheit (°F) per 1,000 feet increase in elevation. Thus higher portions of the State, such as the Cumberland Plateau and the mountains of the east, have lower average temperature than the Great Valley of East Tennessee, which they flank, and other lower parts of the State. In the Great Valley temperature increases from north to south, reaching a value at the south end comparable to that of Middle and West Tennessee where elevation variations are a generally minor consideration. Across the State, the average annual temperature varies from over 62° F in the extreme southwest to near 45 degrees atop the highest peaks of the east. It is of interest to note that average January temperature atop a 6,000 foot peak in the Great Smokies is equivalent to that in Central Ohio, while average July temperature is duplicated along the southern edge of the Hudson Bay in Canada. While most of the State can be described as having warm, humid summers and mild winters, this must be qualified to include variations with elevation. Thus with increasing elevation, summers become cooler and more pleasant while winters become colder and more blustery.

This dependence of temperature on elevation is of considerable importance to a variety of interests. Temperature, together with precipitation, plays an important role in determination what plant and animal life are adaptable to the area. In the Great Smoky Mountains, for example, the variations in elevation from 1,000 to 6,000 feet with attendant variations in temperature contribute to a remarkable variety of plant life. The relative coolness of the mountains also contributes to the popularity of that area during the warmer part of the year.

Length of growing season is linked to topography in a way similar to temperature, varying from an average of 237 days at low-lying Memphis to a near 130 days on the highest mountains in the east. Most of the State is included in the range of 180 to 220 days. Shorter growing seasons than this are confined to the mountains forming the State's eastern border and to the northern part of the Cumberland Plateau. Longer growing seasons are found in counties bordering the Mississippi River, parts of the Central Basin of the Middle Tennessee, and the southern end of the Great Valley of East Tennessee.

Precipitation - Since the principal source of moist air for this area is the Gulf of Mexico, there exists a gradual decrease of average precipitation from south to north. This effect is largely obscured however, by the overruling influence of topography. Air forced to ascend, cools and condenses out a portion of its moisture. Thus, average precipitation ranges from 46 to 54 inches, increasing from Mississippi bottomlands to the slight hills farther east. In Middle Tennessee the variation is from a minimum of 45 inches in the Central Basin to 50 to 55 inches in the surrounding hilly Highland Rim. Over the elevated Cumberland Plateau average annual precipitation is generally from 50 to 55 inches. In contrast, average annual precipitation in the Great Valley of East Tennessee increases from near 40 inches in northern portions to over 50 inches in the south. The northern minimum, lowest for the entire State, results from the shielding influence of the Great Smoky Mountains to the southeast and the Cumberland Plateau to the northwest. The mountainous eastern border of the State is the wettest, having average annual precipitation ranging up to 80 inches on the higher, and well-exposed peaks of the Smokies.

Over most of the State, the greatest precipitation occurs during the winter and early spring due to the more frequent passage of large-scale storms over and near the State during those months. A secondary maximum of precipitation occurs in midsummer in response to thunderstorm activity. This is especially pronounced in the mountains of the east where July rainfall exceeds the precipitation of any other month. Lightest precipitation, observed in the fall, is brought about by the maximum occurrence of slow moving, rain suppressing high pressure areas. Although all parts of Tennessee are generally well supplied with precipitation, there occurs on the average one or more prolonged dry spells each year during summer and fall. Studies illustrate the beneficial effects of supplemental irrigation of crops, despite usually bountiful annual precipitation.

Average annual snowfall varies from four to six inches in the southern and western parts of the State and in most of the Great Valley of East Tennessee to more than 10 inches over the northern Cumberland Plateau and the mountains of the east. Over most of the State, due to relatively mild winter temperatures, snow cover rarely persists for more than a few days.

The most important flood season is during the winter and early spring when the frequent migratory storms bring general rains of high intensity. During this period both widespread flooding and local flash floods can occur. During the summer, heavy thunderstorm rains frequently result in local flash flooding. In the fall, while flood producing rains are rare, a decadent tropical system on occasion causes serious floods. The numerous dams constructed along the Tennessee and Cumberland rivers are major features in the control of flood waters in the State.

The dams of the Tennessee and Cumberland River systems and the lakes so formed, in addition to vastly reducing flood damage have: facilitated water transportation, provided abundant low cost hydroelectric power and created extensive recreation areas. Fishing, boating, swimming and camping along the many lakes, together with the several state and national parks, have made tourism one of the major industries in the State.

Climate and the Economy - Water resources of Tennessee have been a major factor in the State's industrial growth. The bountiful and good quality water supply has influenced the location of industry, especially chemical processing plants. Three major waterways, the Mississippi, Cumberland and Tennessee Rivers, are suitable for commercial traffic. Finally, the availability of low cost hydroelectric power from the multipurpose dams of the Cumberland and Tennessee rivers and tributaries has been stimulus to industry of all types. The principal types of manufacturing products are: textile mill products, primary metals, fabricated metals and lumber products.

Although surpassed in monetary value by industrial activity, agriculture remains a vital feature of Tennessee's economic life. The wide range of climates in Tennessee, from river bottom to mountaintop, coupled with a wide range of soils, has resulted in a large number of crops which thrive in the State.

Forests represent an additional important segment of Tennessee's natural resources related to the climate of the State. Timberland, containing principally hardwood types, covers approximately one-half of the total area of Tennessee. This has led to a highly diversified woodworking industry and made the area around Memphis the center of production for wood flooring. The temperate climate of the State is very favorable for logging operations, allowing full-scale activity during nine months of the year and to a lesser extent during the winter months.

Climate descriptions of Tennessee

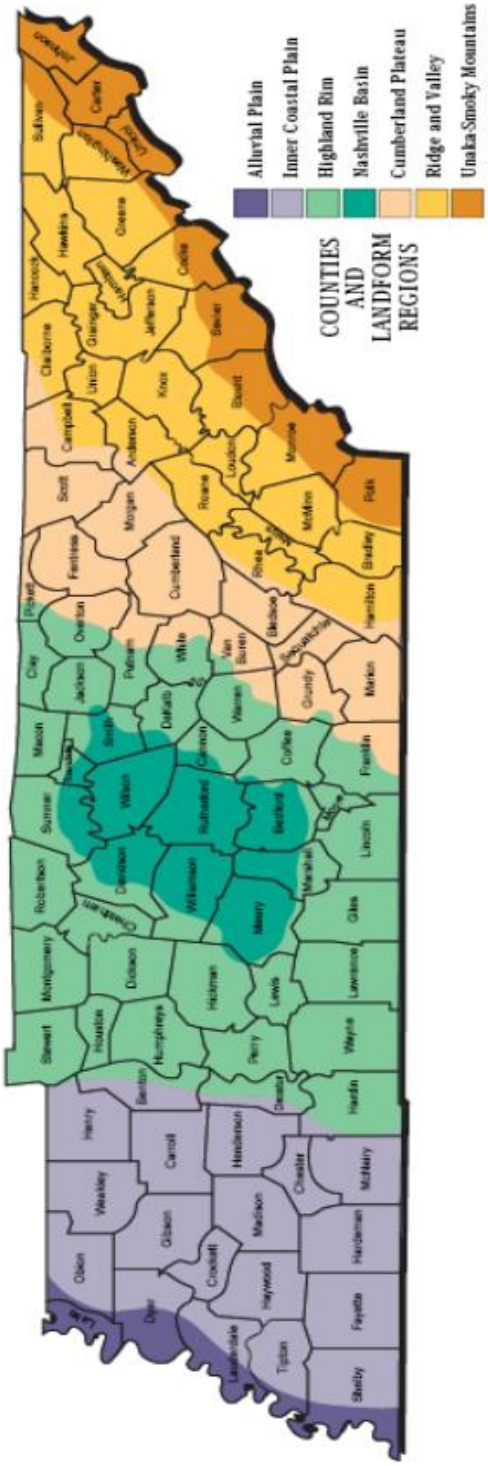
Generally, Tennessee has a temperate climate, with warm summers and mild winters. However, the state's varied topography leads to a wide range of climatic conditions.

The warmest parts of the state, with the longest growing season, are the Gulf Coastal Plain, the Central Basin, and the Sequatchie Valley. In the Memphis area in the southwest, the average date of the last killing frost is 20 March, and the growing season is about 235 days. Memphis has an annual mean temperature of 62°F (17°C), 40°F (4°C) in January, and 83°F (28°C) in July. In the Nashville area, the growing season lasts about 225 days. Nashville has an annual mean of 59°F (15°C), ranging from 36°F (2°C) in January to 79°F (26°C) in July. The Knoxville area has a growing season of 220 days. The city's annual mean temperature is 60°F (16°C), with averages of 41°F (5°C) in January and 78°F (26°C) in July. In some parts of the mountainous east, where the temperatures are considerably lower, the growing season is as short as 130 days. The record high temperature for the state is 113°F (45°C), set at Perryville on 9 August 1930; the record low, –32°F (–36°C), was registered at Mountain City on 30 December 1917.

Severe storms occur infrequently. The greatest rainfall occurs in the winter and early spring, especially March; the early fall months, particularly September and October, are the driest. Average annual precipitation (1971–2000) was 54.7 in (138.9 cm) in Memphis and 48 in (122 cm) in Nashville. Snowfall varies and is more prevalent in East Tennessee than in the western section; Nashville gets about 10 in (25.4 cm) a year, Memphis only 5 in (12.7 cm).

UT Institute of Agriculture > Tennessee Climatological Service > Climate Data for Tennessee

Map of Tennessee Geographic Regions



Climate Synopsis for Tennessee

The highly varied topography of Tennessee has a significant impact on the state's climate. The landscape varies generally from west to east, starting with the gently rolling lowlands (200-600' above sea level) in the west, rising to the Highland Rim (600-1000') enclosing the Central Basin, and on up to the Cumberland Plateau (~2000') which trends northeast-southwest across the state in a belt 30-50 miles wide. East of the Plateau is the Great Valley of East Tennessee (elevations ranging from 1500' in the north down to 700' in the south) containing a series of northeast-southwest ridges. The eastern border of the state is dominated by the Great Smoky Mountains, with numerous peaks rising 4000' to 6000' above sea level.

Average annual temperatures across the state range from around 57°F to 60°F (1981-2010). Winter mean temperatures are near 39°F (1981-2010) over most of the state, while summer temperatures average between 74°F and 78°F (1981-2010). Of course, these general patterns are affected by topography: the higher mountain areas tend to have milder summers as well as colder, more blustery winters. The length of the growing season is also linked to topography: most of the state has a growing season between 180 and 220 days, but this stretches to over 235 days in the lowlands around Memphis and drops to near 130 days in the highest mountains to the east.

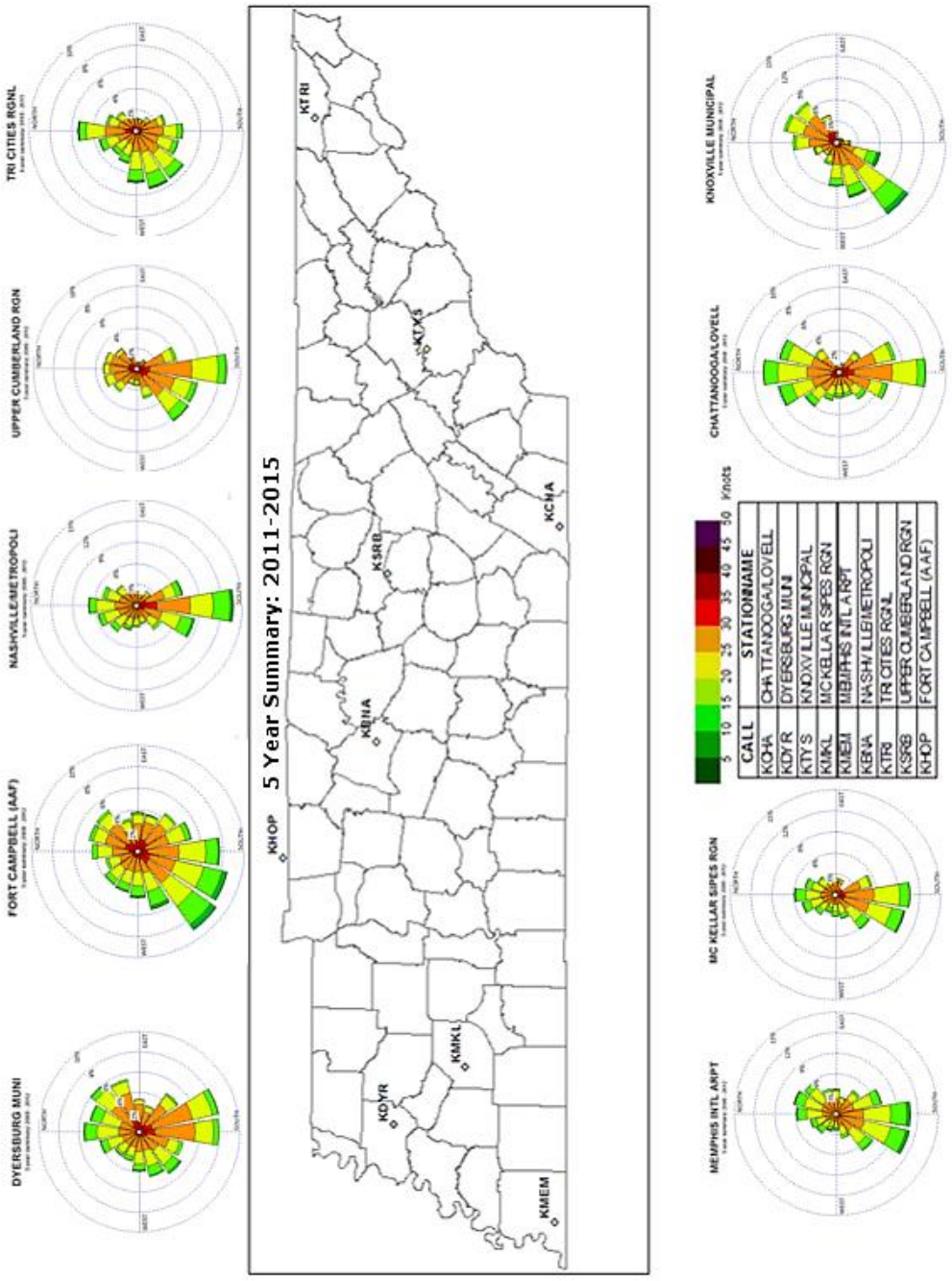
The principal source of moisture for the state is the Gulf of Mexico to the south, which results in a gradual decrease of precipitation from south to north. This gradient is largely obscured, however, by orographic effects. In West Tennessee, annual precipitation amounts range from 46 inches to 54 inches, increasing from the Mississippi bottomlands to the slight hills farther east. In Middle Tennessee, the variation is from around 45 inches in the Central Basin to 50-55 inches in the surrounding Highland Rim. The Cumberland Plateau also averages 50-55 inches per year. In the Great Valley of Eastern Tennessee, annual precipitation rises from a minimum of 40 inches in the north (the driest part of the state due to the rain shadow effect of the Great Smoky Mountains and the Cumberland Plateau) to over 50 inches in the south. The mountainous eastern border of the state is the wettest part, with annual totals of up to 80 inches in the higher, well-exposed peaks.

Over most of the state, the greatest precipitation occurs in winter and early spring owing to the more frequent passage of large-scale (frontal) storms over the region. A secondary maximum of precipitation occurs in midsummer in response to shower and thunderstorm activity, especially in July in the mountains of the east. Fall tends to be the dry season for the state, due to the higher frequency of slow-moving high pressure areas during this season. Average annual snowfall ranges from 4-6 inches in the south and west to over 10 inches in the east. Due to the relatively mild winter conditions over most of the state, snow cover rarely persists for more than a few days.

Severe storms are relatively infrequent in the state, being east of the center of tornado activity, south of most blizzard conditions, and too far inland to be often affected by hurricanes. An average of 26 (1991-2011) tornadoes are observed in the state each year, mostly confined to areas west of the Cumberland Plateau. Hailstorms (>1”) at a given location are observed 3 to 6 (2003-2012) times a year, and damaging glaze storms occur in the state every 3 or 4 years (1996-2013). Thunderstorms are frequent in the warm season, and severe thunderstorms with damaging winds are experienced at scattered locations throughout the state each year.

Adapted from: Climatography of the United States, No. 60, National Climatic Data Center
Updated 2/26/2014 by TDAPC using data from NCDC

Windrose Data for Tennessee



Tennessee Metropolitan Statistical Areas and Population Estimates

CBSA	ST COU	NAME	LSAD	CENSUS 2010 POP	POP EST 2015
16860		**Chattanooga, TN-GA**	**Metropolitan Statistical Area**	**528143**	**547776**
16860	13047	Catoosa County, GA	County or equivalent	63942	66050
16860	13083	Dade County, GA	County or equivalent	16633	16264
16860	13295	Walker County, GA	County or equivalent	68756	68066
16860	47065	Hamilton County, TN	County or equivalent	336463	354098
16860	47115	Marion County, TN	County or equivalent	28237	28487
16860	47153	Sequatchie County, TN	County or equivalent	14112	14811
17300		**Clarksville, TN-KY**	**Metropolitan Statistical Area**	**260625**	**281021**
17300	21047	Christian County, KY	County or equivalent	73955	73309
17300	21221	Trigg County, KY	County or equivalent	14339	14233
17300	47125	Montgomery County, TN	County or equivalent	172331	193479
17420		**Cleveland, TN**	**Metropolitan Statistical Area**	**115788**	**120864**
17420	47011	Bradley County, TN	County or equivalent	98963	104091
27180		**Jackson, TN**	**Metropolitan Statistical Area**	**130011**	**129682**
27180	47023	Chester County, TN	County or equivalent	17131	17471
27180	47033	Crockett County, TN	County or equivalent	14586	14601
27180	47113	Madison County, TN	County or equivalent	98294	97610
27740		**Johnson City, TN**	**Metropolitan Statistical Area**	**198716**	**200648**
27740	47019	Carter County, TN	County or equivalent	57424	56486
27740	47171	Unicoi County, TN	County or equivalent	18313	17860
27740	47179	Washington County, TN	County or equivalent	122979	126302
28700		**Kingsport-Bristol-Bristol, TN-VA**	**Metropolitan Statistical Area**	**309544**	**307120**
28700	47073	Hawkins County, TN	County or equivalent	56833	56471
28700	47163	Sullivan County, TN	County or equivalent	156823	156791
28700	51169	Scott County, VA	County or equivalent	23177	22126
28700	51191	Washington County, VA	County or equivalent	54876	54591
28700	51520	Bristol city, VA	County or equivalent	17835	17141
28940		**Knoxville, TN**	**Metropolitan Statistical Area**	**837571**	**861424**
28940	47001	Anderson County, TN	County or equivalent	75129	75749
28940	47009	Blount County, TN	County or equivalent	123010	127253
28940	47013	Campbell County, TN	County or equivalent	40716	39752
28940	47057	Grainger County, TN	County or equivalent	22657	22846
28940	47093	Knox County, TN	County or equivalent	432226	451324
28940	47105	Loudon County, TN	County or equivalent	48556	51130
28940	47129	Morgan County, TN	County or equivalent	21987	21498
28940	47145	Roane County, TN	County or equivalent	54181	52753
28940	47173	Union County, TN	County or equivalent	19109	19119
32820		**Memphis, TN-MS-AR**	**Metropolitan Statistical Area**	**1324829**	**1344127**
32820	5035	Crittenden County, AR	County or equivalent	50902	48963
32820	28009	Benton County, MS	County or equivalent	8729	8182
32820	28033	DeSoto County, MS	County or equivalent	161252	173323
32820	28093	Marshall County, MS	County or equivalent	37144	35916
32820	28137	Tate County, MS	County or equivalent	28886	28296
32820	28143	Tunica County, MS	County or equivalent	10778	10343
32820	47047	Fayette County, TN	County or equivalent	38413	39165
32820	47157	Shelby County, TN	County or equivalent	927644	938069
32820	47167	Tipton County, TN	County or equivalent	61081	61870
34100		**Morristown, TN**	**Metropolitan Statistical Area**	**113951**	**116642**
34100	47063	Hamblen County, TN	County or equivalent	62544	63402
34100	47089	Jefferson County, TN	County or equivalent	51407	53240
34980		**Nashville-Davidson--Murfreesboro--Franklin, TN**	**Metropolitan Statistical Area**	**1670890**	**1830345**
34980	47015	Cannon County, TN	County or equivalent	13801	13840
34980	47021	Cheatham County, TN	County or equivalent	39105	39741
34980	47037	Davidson County, TN	County or equivalent	626681	678889
34980	47043	Dickson County, TN	County or equivalent	49666	51487
34980	47081	Hickman County, TN	County or equivalent	24690	24363
34980	47111	Macon County, TN	County or equivalent	22248	23177
34980	47119	Maury County, TN	County or equivalent	80956	87757
34980	47147	Robertson County, TN	County or equivalent	66283	68570
34980	47149	Rutherford County, TN	County or equivalent	262604	298612
34980	47159	Smith County, TN	County or equivalent	19166	19295
34980	47165	Sumner County, TN	County or equivalent	160645	175989
34980	47169	Trousdale County, TN	County or equivalent	7870	8042
34980	47187	Williamson County, TN	County or equivalent	183182	211672
34980	47189	Wilson County, TN	County or equivalent	113993	128911

Tennessee Micropolitan Statistical Areas and Population Estimates

CBSA	ST COU	NAME	LSAD	CENSUS 2010 POP	POP ESTIMATE 2015
11940		**Athens, TN**	**Micropolitan Statistical Area**	**52266**	**52639**
11940	47107	McMinn County, TN	County or equivalent	52266	52639
18260		**Cookeville, TN**	**Micropolitan Statistical Area**	**106042**	**108191**
18260	47087	Jackson County, TN	County or equivalent	11638	11509
18260	47133	Overton County, TN	County or equivalent	22083	22129
18260	47141	Putnam County, TN	County or equivalent	72321	74553
18900		**Crossville, TN**	**Micropolitan Statistical Area**	**56053**	**58229**
18900	47035	Cumberland County, TN	County or equivalent	56053	58229
19420		**Dayton, TN**	**Micropolitan Statistical Area**	**31809**	**32526**
19420	47143	Rhea County, TN	County or equivalent	31809	32526
20540		**Dyersburg, TN**	**Micropolitan Statistical Area**	**38335**	**37893**
20540	47045	Dyer County, TN	County or equivalent	38335	37893
24620		**Greeneville, TN**	**Micropolitan Statistical Area**	**68831**	**68580**
24620	47059	Greene County, TN	County or equivalent	68831	68580
29980		**Lawrenceburg, TN**	**Micropolitan Statistical Area**	**41869**	**42564**
29980	47099	Lawrence County, TN	County or equivalent	41869	42564
30280		**Lewisburg, TN**	**Micropolitan Statistical Area**	**30617**	**31552**
30280	47117	Marshall County, TN	County or equivalent	30617	31552
32280		**Martin, TN**	**Micropolitan Statistical Area**	**35021**	**33960**
32280	47183	Weakley County, TN	County or equivalent	35021	33960
32660		**McMinnville, TN**	**Micropolitan Statistical Area**	**39839**	**40435**
32660	47177	Warren County, TN	County or equivalent	39839	40435
35460		**Newport, TN**	**Micropolitan Statistical Area**	**35662**	**35162**
35460	47029	Cocke County, TN	County or equivalent	35662	35162
37540		**Paris, TN**	**Micropolitan Statistical Area**	**32330**	**32147**
37540	47079	Henry County, TN	County or equivalent	32330	32147
42940		**Sevierville, TN**	**Micropolitan Statistical Area**	**89889**	**95946**
42940	47155	Sevier County, TN	County or equivalent	89889	95946
43180		**Shelbyville, TN**	**Micropolitan Statistical Area**	**45058**	**47183**
43180	47003	Bedford County, TN	County or equivalent	45058	47183
46100		**Tullahoma-Manchester, TN**	**Micropolitan Statistical Area**	**100210**	**102048**
46100	47031	Coffee County, TN	County or equivalent	52796	54277
46100	47051	Franklin County, TN	County or equivalent	41052	41449
46100	47127	Moore County, TN	County or equivalent	6362	6322
46460		**Union City, TN-KY**	**Micropolitan Statistical Area**	**38620**	**36877**
46460	21075	Fulton County, KY	County or equivalent	6813	6238
46460	47131	Obion County, TN	County or equivalent	31807	30639

Tennessee County Population Data Trends

(2010 Census and Estimates to 2015 by US Census Bureau)

Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2015

2015 Population Estimates

Geography	April 1, 2010		Population Estimate (as of July 1)					
	Census	Estimate	2010	2011	2012	2013	2014	2015
Anderson	75,129	75,126	75,154	75,222	75,354	75,443	75,382	75,749
Bedford	45,058	45,058	45,103	45,279	45,327	45,712	46,428	47,183
Benton	16,489	16,489	16,492	16,421	16,359	16,281	16,115	16,129
Bledsoe	12,876	12,869	12,870	12,837	12,786	13,778	14,526	14,502
Blount	123,010	123,016	123,156	123,623	123,998	124,943	126,124	127,253
Bradley	98,963	98,963	99,155	100,009	101,222	101,929	103,058	104,091
Campbell	40,716	40,716	40,716	40,570	40,439	40,211	39,910	39,752
Cannon	13,801	13,801	13,800	13,746	13,848	13,783	13,718	13,840
Carroll	28,522	28,505	28,466	28,569	28,608	28,472	28,207	27,910
Carter	57,424	57,424	57,360	57,483	57,352	57,025	56,358	56,486
Cheatham	39,105	39,108	39,120	39,000	39,257	39,396	39,714	39,741
Chester	17,131	17,131	17,173	17,212	17,210	17,349	17,379	17,471
Claiborne	32,213	32,213	32,234	32,084	31,723	31,598	31,624	31,709
Clay	7,861	7,860	7,843	7,819	7,796	7,775	7,740	7,771
Cock	35,662	35,662	35,660	35,385	35,463	35,309	35,285	35,162
Coffee	52,796	52,795	52,778	52,880	53,125	53,321	53,638	54,277
Crockett	14,586	14,584	14,584	14,556	14,611	14,597	14,635	14,601
Cumberland	56,053	56,050	56,198	56,604	57,048	57,478	57,915	58,229
Davidson	626,681	626,662	628,131	635,799	649,318	659,428	669,094	678,889
Decatur	11,757	11,750	11,729	11,683	11,658	11,701	11,730	11,660
DeKalb	18,723	18,721	18,717	18,795	18,903	19,098	19,211	19,182
Dickson	49,666	49,654	49,697	49,934	50,153	50,195	50,592	51,487
Dyer	38,335	38,337	38,321	38,142	38,237	38,132	37,868	37,893
Fayette	38,413	38,413	38,408	38,526	38,615	38,765	38,999	39,165
Fentress	17,959	17,959	17,928	18,021	17,919	17,936	17,862	17,917
Franklin	41,052	41,052	40,957	40,844	40,759	41,258	41,378	41,449
Gibson	49,683	49,683	49,723	49,855	49,663	49,441	49,501	49,399
Giles	29,485	29,485	29,398	29,325	28,926	28,737	28,811	28,946
Grainger	22,657	22,652	22,709	22,722	22,633	22,663	22,815	22,846
Greene	68,831	68,831	68,834	68,981	68,643	68,265	68,413	68,580
Grundy	13,703	13,708	13,720	13,628	13,628	13,478	13,444	13,441
Hamblen	62,544	62,541	62,558	62,826	62,718	63,054	62,994	63,402
Hamilton	336,463	336,465	337,313	340,918	345,752	349,036	350,800	354,098
Hancock	6,819	6,819	6,812	6,711	6,676	6,634	6,619	6,572
Hardeman	27,253	27,253	27,158	26,842	26,523	26,251	25,941	25,707
Hardin	26,026	26,025	26,052	25,886	26,014	26,002	25,843	25,756
Hawkins	56,833	56,836	56,872	56,637	56,569	56,740	56,558	56,471
Haywood	18,787	18,787	18,769	18,541	18,255	18,227	18,196	18,023
Henderson	27,769	27,793	27,797	28,032	28,025	27,976	28,017	28,015
Henry	32,330	32,330	32,381	32,359	32,353	32,224	32,261	32,147
Hickman	24,690	24,699	24,659	24,350	24,142	24,170	24,388	24,363
Houston	8,426	8,426	8,444	8,340	8,420	8,284	8,258	8,149
Humphreys	18,538	18,538	18,573	18,400	18,299	18,240	18,128	18,135
Jackson	11,638	11,614	11,577	11,490	11,501	11,504	11,478	11,509
Jefferson	51,407	51,570	51,608	51,927	52,289	52,312	52,680	53,240
Johnson	18,244	18,244	18,285	18,212	18,123	18,001	17,917	17,830
Knox	432,226	432,234	433,035	436,530	441,097	444,170	448,617	451,324

Geography	April 1, 2010		Population Estimate (as of July 1)					
	Census	Estimate	2010	2011	2012	2013	2014	2015
Lake	7,832	7,832	7,820	7,773	7,708	7,714	7,664	7,576
Lauderdale	27,815	27,815	27,731	27,680	27,659	27,526	27,335	26,936
Lawrence	41,869	41,869	42,005	42,073	42,154	42,017	42,323	42,564
Lewis	12,161	12,161	12,151	12,137	11,905	11,953	11,872	11,854
Lincoln	33,361	33,361	33,420	33,414	33,438	33,568	33,589	33,743
Loudon	48,556	48,559	48,752	49,088	49,773	50,431	50,722	51,130
McMinn	52,266	52,266	52,185	52,358	52,447	52,401	52,684	52,639
McNairy	26,075	26,076	26,054	26,040	26,166	26,092	26,149	26,066
Macon	22,248	22,242	22,258	22,466	22,509	22,643	23,012	23,177
Madison	98,294	98,294	98,252	98,010	98,505	98,707	98,089	97,610
Marion	28,237	28,232	28,234	28,084	28,233	28,328	28,396	28,487
Marshall	30,617	30,617	30,686	30,904	30,940	31,100	31,301	31,552
Maury	80,956	80,959	81,218	81,448	82,002	83,640	85,598	87,757
Meigs	11,753	11,753	11,781	11,667	11,684	11,677	11,724	11,830
Monroe	44,519	44,517	44,631	44,932	45,153	45,225	45,386	45,771
Montgomery	172,331	172,337	173,189	176,681	185,311	184,635	189,795	193,479
Moore	6,362	6,362	6,356	6,418	6,355	6,325	6,336	6,322
Morgan	21,987	21,987	22,001	22,062	21,946	21,709	21,757	21,498
Obion	31,807	31,807	31,818	31,685	31,356	31,081	30,884	30,639
Overton	22,083	22,078	22,091	22,177	22,208	22,004	21,981	22,129
Perry	7,915	7,915	7,930	7,844	7,840	7,862	7,843	7,929
Pickett	5,077	5,077	5,072	5,135	5,073	5,046	5,084	5,146
Polk	16,825	16,825	16,808	16,729	16,595	16,628	16,711	16,773
Putnam	72,321	72,367	72,601	72,905	73,339	73,788	74,467	74,553
Rhea	31,809	31,809	31,865	32,005	32,290	32,498	32,652	32,526
Roane	54,181	54,180	54,144	53,820	53,472	53,011	52,756	52,753
Robertson	66,283	66,288	66,330	66,644	66,700	67,235	67,983	68,570
Rutherford	262,604	262,604	263,781	269,097	274,339	281,596	289,147	298,612
Scott	22,228	22,228	22,235	22,110	22,157	22,004	21,994	21,950
Sequatchie	14,112	14,119	14,135	14,280	14,425	14,666	14,778	14,811
Sevier	89,889	89,876	90,131	91,282	92,436	93,532	94,889	95,946
Shelby	927,644	927,640	928,618	933,529	939,672	939,074	938,405	938,069
Smith	19,166	19,162	19,135	19,156	19,126	19,064	19,040	19,295
Stewart	13,324	13,324	13,347	13,239	13,333	13,329	13,268	13,259
Sullivan	156,823	156,823	156,833	156,952	156,636	156,578	156,803	156,791
Sumner	160,645	160,657	161,288	163,943	166,183	169,128	172,870	175,989
Tipton	61,081	61,081	61,147	61,318	61,659	61,712	61,812	61,870
Trousdale	7,870	7,869	7,867	7,809	7,780	7,785	8,002	8,042
Unicoi	18,313	18,313	18,275	18,272	18,233	18,052	17,928	17,860
Union	19,109	19,109	19,100	19,216	19,112	19,051	18,984	19,119
Van Buren	5,548	5,548	5,548	5,523	5,616	5,553	5,611	5,677
Warren	39,839	39,840	39,864	39,899	39,775	39,930	40,038	40,435
Washington	122,979	122,979	123,338	124,012	124,919	125,488	125,862	126,302
Wayne	17,021	17,021	16,978	16,997	16,988	16,908	16,842	16,748
Weakley	35,021	35,021	35,031	34,912	34,780	34,283	34,142	33,960
White	25,841	25,834	25,836	26,045	26,086	26,260	26,350	26,521
Williamson	183,182	183,180	184,068	188,296	193,010	198,969	205,334	211,672
Wilson	113,993	114,011	114,620	116,787	119,106	122,002	125,418	128,911

http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

Suggested Citation:

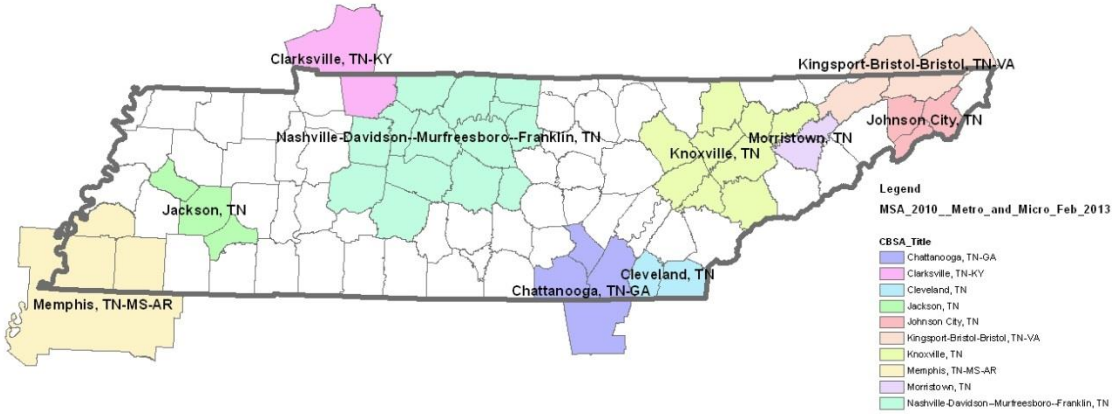
Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2015

Source: U.S. Census Bureau, Population Division

Release Dates: For the United States, regions, divisions, states, and Puerto Rico Commonwealth, December 2015. For counties, municipios, metropolitan statistical areas, micropolitan statistical areas, metropolitan divisions, and combined statistical areas, March 2016. For Cities and Towns (Incorporated Places and Minor Civil Divisions), May 2016.

2010 Metropolitan/Micropolitan Areas of Tennessee

No proposed changes



TAPC Monitoring Equipment Evaluation 2016 AMP Field Sites

Site	Monitor		Chart Recorder		Data Logger		Calibrator		Shelter	
	Model	Condition	Model	Condition	Model	Condition	Model	Condition	Model	Condition
Blountville	Teledyne 400A	Good	L&N	Good	ESC8832	Good	Teledyne T703	Good	T&R 8X20	Good
Blountville	API 400A	Good			ESC8832	Good	Teledyne T703	New		
Kingsport	Teledyne 400e	Good	L&N	Good	ESC8832	Good	Teledyne T703	New	x	Good
Kingsport					ESC8832	Good	Dasibi (spare)			
Cookeville	R&P 2025	Good					Streamline Pro	Good		
Freel's Bend	API 400A	Good	L&N	Poor	ESC8832	Good	Teledyne T703	New	820	Good
Freel's Bend					ESC8832	Good(spare)				
Freel's Bend	Teledyne M100E	New	E&A	Poor			Teledyne T700	New		
New Market	API 400E	Good	L&N	Good	ESC8832	Good	Teledyne T703	New	820	Good
New Market					ESC8832	Good(spare)				
Loudon Pope	R&P 2025	Good					Streamline Pro			
Loudon Pope	ATEC2200	Poor								Good
Loudon MS at	Teledyne 400e	Good	EA	Good	ESC8832	Good	Teledyne T703	New	818	Good
Pope (O3)					ESC 8832	Good(spare)				
Kingsport	R&P 2025	Good					Streamline Pro	Good		
Kingsport	TEOM1400a	Good			ESC8832	Good	ESC 8832(spare)			
Bristol	Hivol	Good								
Bristol	Hivol	Good					Kit #9	Good		
Clarksville	TEOM1400a	Good			ESC 8816	Good			432SP	Good
Clarksville	Thermo 2025	Good								
Clarksville	MetOne BAM1022	New								
Centerhill	MIC AUC	Good			ESC 8816	Good				
Centerhill	Climatronics 101156-GO	Good								
Cedars of Leb	TEI49C	Good	E&A	Poor	ESC8832	Good	Teledyne 703E	Good	Trailer	Good
Cedars of Leb					ESC8832	Good				
Dyersburg	R&P 2025	Good								
Dyersburg	TEOM 1400a	Good			ESC 8816				TEOM 432SP	
Hendersonville	TEI49C	Good	Westron ics 4000	Good	ESC8832	Good	Teledyne 703E	Good	Trailer	Good
Hendersonville					ESC8832	Good(spare)				
Hendersonville	R&P 2025	Good								
Hendersonville	R&P 2025	Good								
Hendersonville	TEOM1400a	Good								
Hendersonville	MetOne BAM1022	New								
Jackson	R&P 2025	Good								
Jackson	R&P 2025	Good								
Jackson	TEOM1400a	Good			ESC 8816	Good			432SP	Good
Maryville	R&P 2025	Good								
Maryville	TEOM1400a	Good			ESC 8816	Good	Streamline Pro	Good	TEOM 432SP	Good
Fairview	TEI49C	Good	L&N	Good	ESC8832	Good	Teledyne T703	New	T&R Custom	Good
Fairview					ESC8832	Good (spare)				
Columbia	R&P 2025	Good					Streamline Pro			
Lawrence	R&P 2025	Good								
Lawrence	TEOM1400a	Good			ESC 8816	Good			432SP	Good
Athens	R&P 2025	Good					Streamline Pro	Good		
Athens	TEOM1400a	Good			ESC8832	Good			4325P	Good
Harriman	R&P 2025	Good								
Harriman	TEOM1400a	Good			ESC 8816	Good			x	Good
Hatchie Refuge									x	Poor

TAPC Monitoring Equipment Evaluation 2016 AMP In Storage

Site	Monitor		Chart Recorder		Data Logger		Calibrator		Shelter	
	Model	Condition	Model	Condition	Model	Condition	Model	Condition	Model	Condition
NFO Storage and QA	Climatronics Sonic	Good			CS CR200	Good	Dasisbi 1008PC	Poor		
NFO Storage and QA	TEOM 1400a	Poor			ESC8816	Poor	Dasisbi 1008PC	Poor		
NFO Storage and QA	TEOM 1400a	Good			ESC8816	Poor	Dasisbi 1008PC	Poor		
NFO Storage and QA	TEOM 1400a	Good			ESC8816	Poor	Dasisbi 1008PC	Poor		
NFO Storage and QA	TEOM 1400a	Good			ESC8816	Poor	Dasisbi 1008PC	Poor		
NFO Storage and QA	TEOM 1400a	Good			ESC8816	Poor	Dasisbi 1008PC	Poor		
NFO Storage and QA	TEOM 1400a	Good			ESC8816	Good	Dasisbi 1008PC	Poor		
NFO Storage and QA	MetOne SASS	New			ESC8832	Good	Dasisbi 1008PC	Poor		
NFO Storage and QA	MetOne SASS	Poor			ESC8832	Good	Dasisbi 1008PC	Poor		
NFO Storage and QA	MetOne SASS	Good			ESC8832	Good	Dasisbi 1008PC	Poor		
NFO Storage and QA	MetOne SASS	Good			ESC8832	Good	Dasisbi 1008PC	Poor		
NFO Storage and QA	MetOne SASS	Good			ESC8816	Poor	Dasisbi 1008PC	Poor		
NFO Storage and QA	URG3000N	Good			ESC8816	Good	Dasisbi 1008PC	Poor		
NFO Storage and QA	URG3000N	Good			ESC8816	Good				
NFO Storage and QA	R&P 2025	Poor			ESC8816	Good	Teledyne 703E	Good		
NFO Storage and QA	R&P 2025	Poor			ESC8816	Good	Teledyne 703E	Good		
NFO Storage and QA	R&P 2025	Poor			ESC8816	Good	Teledyne T703	New		
NFO Storage and QA	R&P 2025	Poor			ESC8816	Good	Teledyne T700	Good		
NFO Storage and QA	R&P 2025	Good			ESC8816	Good	Teledyne T700	Good		
NFO Storage and QA	R&P 2025	Good			ESC8832	Good	Teledyne T700	Good		
NFO Storage and QA	R&P 2025	Poor					Environics 100	Poor		
NFO Storage and QA	R&P 2025	Poor			Agilaire 8872	New	TEI 146	Poor		
NFO Storage and QA	R&P 2025	Poor			Agilaire 8872	New	GMW 76-100	Good		
NFO Storage and QA	R&P 2025	Poor			Agilaire 8872	New	GMW 76-100	Good		
NFO Storage and QA					Agilaire 8872	New	GMW 76-100	Good		
NFO Storage and QA					Agilaire 8872	New	GMW 76-100	Good		
NFO Storage and QA	MetOne BAM 1020	Good			Agilaire 8872	New	GMW 76-100	Good		
NFO Storage and QA	MetOne BAM 1020	Good			Agilaire 8872	New	GMW 76-100	Good		
NFO Storage and QA	MetOne BAM 1020	Good			Agilaire 8872	New	GMW 76-100	Good		
NFO Storage and QA	MetOne BAM 1020	Good			Agilaire 8872	New	GMW 2000	Good		
NFO Storage and QA	MetOne BAM 1020	Good			Agilaire 8872	New	Streamline Pro	Good		
NFO Storage and QA	MetOne BAM 1020	Good					Streamline Pro	Good		
NFO Storage and QA	MetOne BAM 1020	Good					Streamline Pro	Good		
NFO Storage and QA	MetOne BAM 1022	New					Streamline Pro	Good		
NFO Storage and QA	MetOne BAM 1022	New					Streamline Pro	Good		
NFO Storage and QA	MetOne BAM 1022	New					Streamline Pro	Good		
NFO Storage and QA	MetOne BAM 1022	New					Streamline Pro	Good		
NFO Storage and QA	MetOne BAM 1022	New					Tetracal	Good		
NFO Storage and QA	MetOne BAM 1022	New					Tetracal	Good		
NFO Storage and QA	MetOne BAM 1022	New					Streamline Pro	New		

Site	Monitor		Chart Recorder		Data Logger		Calibrator		Shelter	
	Model	Condition	Model	Condition	Model	Condition	Model	Condition	Model	Condition
NFO Storage and QA	MetOne BAM 1022	New					Streamline Pro	New		
NFO Storage and QA	MetOne BAM 1022	New					Streamline Pro	New		
NFO Storage and QA	MetOne BAM 1022	New					Roots meter 5M125TC	Good		
NFO Storage and QA	TEI49C	Good					BGI Orifice	Good		
NFO Storage and QA	TEI 49C	Good					BGI Orifice	Good		
NFO Storage and QA	TEI 49C	Good					BGI Orifice	Good		
NFO Storage and QA	TEI49C	Good					Orifice	Good		
NFO Storage and QA	TEI 49i	Good					Buck M-5	Good		
NFO Storage and QA	API 400E	Good					BIOS DryCal DC-1B Rev 2.06F	Poor		
NFO Storage and QA	API 400A	Poor								
NFO Storage and QA	API 400A	Good					Environics Calibrator	Poor		
NFO Storage and QA	API 400A	Poor					Environics Calibrator	Poor		
NFO Storage and QA	API 400A	Poor					Environics Calibrator	Poor		
NFO Storage and QA	Teledyne API T400	Good					Dasibi Calibrator	Poor		
NFO Storage and QA	Teledyne API T400	Good					Bios Drycal flow meter	Poor		
NFO Storage and QA	Teledyne API T400	Good					Dasibi Calibrator	Poor		
NFO Storage and QA	Teledyne API T400	Good					Dasibi Calibrator	Poor		
NFO Storage and QA	Teledyne API T400	Good					Dasibi Calibrator	Poor		
NFO Storage and QA	Teledyne API T400	Good					Roots Meter	Good		
NFO Storage and QA	Teledyne API T400	Good					Sierra Cal Bench	Good		
NFO Storage and QA	Teledyne M100E	Good					Teledyne 703E	Good		
NFO Storage and QA	Teledyne M100E	Good								
NFO Storage and QA	Teledyne M100E	Good					Environics Calibrator 6103S	Good		
NFO Storage and QA	Tisch Housing	Good					TEI 49i (ref phometer	Good		
NFO Storage and QA	Tisch Housing	Good					TEI 49i (ref phometer	Good		
NFO Storage and QA	Tisch Housing	Good					Teledyne T750U	New		
NFO Storage and QA	GMW Housing	Good					Teledyne T750U	New		
NFO Storage and QA	GMW Housing	Good					Streamline Pro	Good		
NFO Storage and QA	GMW Housing	Good					Streamline Pro	Good		
NFO Storage and QA	GMW Housing	Good					Streamline Pro	Good	shelter (from EV)	Good
NFO Storage and QA	Anderson 2000	Good					BGI TetraCal	Good	Shelter (from Copper HIll)	
NFO Storage and QA	Graseby	Good					BGI TetraCal	Good	shelter (from CT)	Good
NFO Storage and QA	Graseby	Good					BGI Challenger	Good		
NFO Storage and QA	Aircheck 224-PCXR7	Poor								
NFO Storage and QA	Aircheck 224-PCXR7	Poor								
NFO Storage and QA	Aircheck 224-PCXR7	Poor								

Tennessee Monitoring Site Agreement Letters

Kentucky

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Air Pollution Control
William R. Snodgrass TN Tower
312 Rosa L. Parks Ave., 15th Floor
Nashville, Tennessee 37243

July 2, 2014

Sean Alteri, Director
Kentucky Division for Air Quality
Kentucky Department for Environmental Protection
200 Fair Oaks Lane
Frankfort, KY 40601

Dear Mr. Alteri:

The United States Environmental Protection Agency (EPA) revised monitoring regulations found in 40 CFR Part 58, Appendix D states in part: "The EPA recognizes that there may be situations where the EPA Regional Administrator and the affected State or local agencies may need to augment or to divide the overall MSA/CSA monitoring responsibilities and requirements among these various agencies to achieve an effective network design. Full monitoring requirements apply separately to each affected State or local agency in the absence of an agreement between the affected agencies and the EPA Regional Administrator." This revision of the CFR also describes the minimum monitoring requirements for the NAAQS pollutants, including continuous PM 2.5 as it applies to MSA areas where the population is sufficient to warrant monitoring for that pollutant. Tennessee and Kentucky share the Clarksville, TN-KY MSA, which is comprised of Trigg and Christian counties in Kentucky and Montgomery county in Tennessee. The US Census Bureau lists this area as containing a population in excess of 260,000.

CBSA Code	Geographic area	Legal/statistical Area description	July 1, 2013 Estimate	2010 Census
17300	Clarksville, TN-KY	Metropolitan Statistical Area	272,579	260,625

The Tennessee Division of Air Pollution Control (TDAPC) currently operates one (1) PM 2.5 FRM monitor and one (1) continuous PM 2.5 monitor in this area. The TDAPC believes the operation of the existing PM 2.5 monitors; (FRM and continuous), are sufficient to properly characterize the particulate air quality in the entire Clarksville, TN-KY MSA and comply with the requirements for both population and concentration based monitoring identified in the revised monitoring regulations as found at 40 CFR58,AppD. The TDAPC would like to invite the

Kentucky Division for Air Quality to participate in Tennessee's annual ambient air monitoring network review. Tennessee commits to sharing with Kentucky any and all quality assured ambient air monitoring data collected in the Tennessee portion of the Clarksville, TN-KY MSA. Tennessee also will notify Kentucky in advance of the intent to relocate or shutdown any of the PM 2.5 monitors referenced above so that adequate monitoring arrangements can be made to meet the entire MSA monitoring requirements for PM 2.5.

Sincerely,

Barry R. Stephens, PE
Director, Air Pollution Control Division

BRS/lb
Cc: Heather McTeer-Toney, US EPA Region IV

Steven L. Beshear
Governor

Leonard K. Peters
Secretary

Energy and Environment Cabinet
Department for Environmental Protection
Division for Air Quality
200 Fair Oaks Lane, 1st Floor
Frankfort, Kentucky 40601-1403
Web site: air.ky.gov

May 15, 2015

Mr. Barry R. Stephens, PE
Director
Tennessee Division of Air Pollution Control
312 Rosa L. Parks Avenue, 15th Floor
Nashville, TN 37243

Dear Mr. Stephens:

In a letter from your office dated July 1, 2014, the Tennessee Division of Air Pollution Control (TDAPC) agreed to operate a continuous $PM_{2.5}$ monitor and an intermittent FRM $PM_{2.5}$ sampler, to meet the minimum network design requirements stated in 40 CFR 58, Appendix D for the Clarksville, TN-KY metropolitan statistical area (MSA). The Kentucky Division for Air Quality (Division) appreciates TDAPC's cooperation and looks forward to participating in TDAPC's annual air monitoring network review.

The Division currently operates one (1) intermittent FRM $PM_{2.5}$ sampler and one (1) continuous ozone monitor at the Hopkinsville site (21-047-0006) in Christian County. In accordance with Table D-2 of 40 CFR 58, Appendix D, one (1) ozone monitor is required to be operated in the Clarksville, TN-KY MSA, based upon the most current population estimates from the US Census Bureau, as well as 2012-2014 ozone design values.

Geographic Area	Area Description	2014 USCB Population Estimate	2014 Three-Year Ozone DV (ppm)
Christian County, KY	County	74,250	0.067
Trigg County, KY	County	14,142	0.069 (CASTNET)
Montgomery County, TN	County	189,961	N/A
Clarksville, TN-KY	**MSA**	**278,353**	**0.069**

To satisfy the regulatory requirement, the Division agrees to operate one ozone monitor at the Hopkinsville site. Also, the Division agrees to notify TDAPC in the event that shutdown or relocation of the ozone monitor is necessary.

Despite the fact that 2012-2014 design values show that no FRM $PM_{2.5}$ samplers are required in the Clarksville MSA, the Division will continue to operate the $PM_{2.5}$ sampler at

Hopkinsville. The Division also agrees to notify TDAPC in the event that the Hopkinsville FRM $PM_{2.5}$ sampler must be shutdown or relocated, as it is the design value monitor for the MSA.

The Division commits to sharing with TDAPC any and all quality-assured ambient monitoring data collected in the Kentucky portion of the Clarksville, TN-KY MSA. The Division also welcomes TDAPC participation in Kentucky's annual network review process. If you have any questions or concerns, please contact me at 502-564-3999.

Sincerely,

Sean Alteri,
Director

SA/jfm
c: -Heather McTeer Toney, USEPA Region IV
-Daniel Garver, USEPA Region IV

Virginia

Department of Environment & Conservation

May 13, 2016

Michael Dowd
Director of Air Division
Virginia Department of Environmental Quality
P.O. Box 1105
Richmond, VA 23218

Dear Mr. Dowd,

This letter is in regard to ambient air monitoring in the MSA/CSA that our two states share.

The United States Environmental Protection Agency's (EPA) revised monitoring regulations found in 40 CFR Part 58, Appendix D state in part: "The EPA recognizes that there may situations where the EPA Regional Administrator and the affected State or local agencies may need to augment or divide the overall MSA/CSA monitoring responsibilities and requirements among these various agencies to achieve an effective network design. Full monitoring requirements apply separately to each affected State or local agency in the absence of an agreement between the affected agencies and the EPA Regional Administrator." This revision of the CFR also describes the minimum monitoring requirements for the NAAQS pollutants.

Tennessee and Virginia share the Kingsport-Bristol-Bristol, TN-VA MSA, which is comprised of Scott and Washington counties in Virginia, and Hawkins and Sullivan counties in Tennessee. The US Census Bureau estimates the 2015 population under 309,000; however in 2010 the census population was 309,544.

CBSA Code	Geographic Area	Legal/Statistical Area Description	2015 Estimate	2010 Census
28700	Kingsport-Bristol-Bristol, TN-VA MSA	Metropolitan Statistical Area	307,120	309,544

The Tennessee Division of Air Pollution Control (DAPC) currently operates a $PM_{2.5}$, TEOM continuous monitor at site 47-163-1007, two ozone monitors at sites 47-163-2002 and 47-163-2003, and a lead monitor at site 47-163-3004, all in Sullivan County. In addition, we are establishing two SO_2 monitoring sites in the Kingsport, Sullivan County nonattainment area.

Upon a 3 year data review, the records show the ozone concentrations recorded by the two ozone monitors are similar. DAPC will propose that the ozone monitor site 47-163-2002 be shut down in 2017 or at the conclusion of the 2016 ozone monitoring season. The other sites with

Division of Air Pollution Control
William R. Snodgrass Tennessee Tower 15th Floor
312 Rosa L. Parks Avenue Nashville, TN 37243
Tel: 615-532-0554 Fax: 615-532-0614
Air.Pollution.Control@tn.gov
We value your opinion. Please take a few minutes to complete our customer service survey.

existing monitors in operation: (ozone, $PM_{2.5}$ FRM, and $PM_{2.5}$ continuous TEOM), are sufficient to properly characterize the air quality in the entire Kingsport-Bristol-Bristol, TN-VA MSA and comply with the requirements for both population and concentration-based monitoring, identified in the revised monitoring regulations found in 40 CFR Part 58, Appendix D. The TEOM monitor is used for air quality forecasting.

TDAPC would like to invite the Virginia Department of Environmental Quality Air Division to participate in Tennessee's annual ambient air monitoring network review. Tennessee commits to notifying the Virginia Department of Environmental Quality Air Division in advance of any proposed relocation or shut down of ozone or $PM_{2.5}$ monitors referenced above so that adequate monitoring arrangements can be made to meet the entire MSA monitoring requirements.

If you have technical questions contact Jason Stephens at 615-532-0584/ jason.stephens@tn.gov. I may be contacted at 615-532-9668/michelle.b.walker@tn.gov.

Sincerely,

Michelle W. Owenby

Michelle Walker Owenby
Director
Department of Environment and Conservation
Division of Air Pollution Control

Cc: Heather McTeer-Toney, US EPA Region IV

Sections of the CFR Referred to in the 2016 NMP

§ 58.10 Annual monitoring network plan and periodic network assessment.

(a)(1) Beginning July 1, 2007, the state, or where applicable local, agency shall submit to the Regional Administrator an annual monitoring network plan which shall provide for the documentation of the establishment and maintenance of an air quality surveillance system that consists of a network of SLAMS monitoring stations that can include FRM, FEM, and ARM monitors that are part of SLAMS, NCore, CSN, PAMS, and SPM stations. The plan shall include a statement of whether the operation of each monitor meets the requirements of appendices A, B, C, D, and E of this part, where applicable. The Regional Administrator may require additional information in support of this statement. The annual monitoring network plan must be made available for public inspection and comment for at least 30 days prior to submission to the EPA and the submitted plan shall include and address, as appropriate, any received comments.

(2) Any annual monitoring network plan that proposes network modifications (including new or discontinued monitoring sites, new determinations that data are not of sufficient quality to be compared to the NAAQS, and changes in identification of monitors as suitable or not suitable for comparison against the annual $PM_{2.5}$ NAAQS) to SLAMS networks is subject to the approval of the EPA Regional Administrator, who shall approve or disapprove the plan within 120 days of submission of a complete plan to the EPA.

(3) The plan for establishing required NCore multipollutant stations shall be submitted to the Administrator not later than July 1, 2009. The plan shall provide for all required stations to be operational by January 1, 2011.

(4) A plan for establishing source-oriented Pb monitoring sites in accordance with the requirements of appendix D to this part for Pb sources emitting 1.0 tpy or greater shall be submitted to the EPA Regional Administrator no later than July 1, 2009, as part of the annual network plan required in paragraph (a)(1) of this section. The plan shall provide for the required source-oriented Pb monitoring sites for Pb sources emitting 1.0 tpy or greater to be operational by January 1, 2010. A plan for establishing source-oriented Pb monitoring sites in accordance with the requirements of appendix D to this part for Pb sources emitting equal to or greater than 0.50 tpy but less than 1.0 tpy shall be submitted to the EPA Regional Administrator no later than July 1, 2011. The plan shall provide for the required source-oriented Pb monitoring sites for Pb sources emitting equal to or greater than 0.50 tpy but less than 1.0 tpy to be operational by December 27, 2011.

(5)(i) A plan for establishing or identifying an area-wide NO_2 monitor, in accordance with the requirements of Appendix D, section 4.3.3 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2012. The plan shall provide for these required monitors to be operational by January 1, 2013.

(ii) A plan for establishing or identifying any NO_2 monitor intended to characterize vulnerable and susceptible populations, as required in Appendix D, section 4.3.4 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2012. The plan shall provide for these required monitors to be operational by January 1, 2013.

(iii) A plan for establishing a single near-road NO_2 monitor in CBSAs having 1,000,000 or more persons, in accordance with the requirements of Appendix D, section 4.3.2 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2013. The plan shall provide for these required monitors to be operational by January 1, 2014.

(iv) A plan for establishing a second near-road NO_2 monitor in any CBSA with a population of 2,500,000 or more persons, or a second monitor in any CBSA with a population of 500,000 or more persons that has one or more

roadway segments with 250,000 or greater AADT counts, in accordance with the requirements of Appendix D, section 4.3.2 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2014. The plan shall provide for these required monitors to be operational by January 1, 2015.

(v) A plan for establishing a single near-road NO_2 monitor in all CBSAs having 500,000 or more persons, but less than 1,000,000, not already required by paragraph (a)(5)(iv) of this section, in accordance with the requirements of Appendix D, section 4.3.2 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2016. The plan shall provide for these monitors to be operational by January 1, 2017.

(6) A plan for establishing SO_2 monitoring sites in accordance with the requirements of appendix D to this part shall be submitted to the EPA Regional Administrator by July 1, 2011 as part of the annual network plan required in paragraph (a) (1). The plan shall provide for all required SO_2 monitoring sites to be operational by January 1, 2013.

(7) A plan for establishing CO monitoring sites in accordance with the requirements of appendix D to this part shall be submitted to the EPA Regional Administrator. Plans for required CO monitors shall be submitted at least six months prior to the date such monitors must be established as required by section 58.13.

(8)(i) A plan for establishing near-road $PM_{2.5}$ monitoring sites in CBSAs having 2.5 million or more persons, in accordance with the requirements of appendix D to this part, shall be submitted as part of the annual monitoring network plan to the EPA Regional Administrator by July 1, 2014. The plan shall provide for these required monitoring stations to be operational by January 1, 2015.

(ii) A plan for establishing near-road $PM_{2.5}$ monitoring sites in CBSAs having 1 million or more persons, but less than 2.5 million persons, in accordance with the requirements of appendix D to this part, shall be submitted as part of the annual monitoring network plan to the EPA Regional Administrator by July 1, 2016. The plan shall provide for these required monitoring stations to be operational by January 1, 2017.

(9) The annual monitoring network plan shall provide for the required O_3 sites to be operating on the first day of the applicable required O_3 monitoring season in effect on January 1, 2017 as listed in Table D-3 of appendix D of this part.

(10) A plan for making Photochemical Assessment Monitoring Stations (PAMS) measurements, if applicable, in accordance with the requirements of appendix D paragraph 5(a) of this part shall be submitted to the EPA Regional Administrator no later than July 1, 2018. The plan shall provide for the required PAMS measurements to begin by June 1, 2019.

(11) An Enhanced Monitoring Plan for O_3, if applicable, in accordance with the requirements of appendix D paragraph 5(h) of this part shall be submitted to the EPA Regional Administrator no later than October 1, 2019 or two years following the effective date of a designation to a classification of Moderate or above O_3 nonattainment, whichever is later.

(12) A detailed description of the PAMS network being operated in accordance with the requirements of appendix D to this part shall be submitted as part of the annual monitoring network plan for review by the EPA Administrator. The PAMS Network Description described in section 5 of appendix D may be used to meet this requirement.

(b) The annual monitoring network plan must contain the following information for each existing and proposed site:

(1) The AQS site identification number.

(2) The location, including street address and geographical coordinates.

(3) The sampling and analysis method(s) for each measured parameter.

(4) The operating schedules for each monitor.

(5) Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal.

(6) The monitoring objective and spatial scale of representativeness for each monitor as defined in appendix D to this part.

(7) The identification of any sites that are suitable and sites that are not suitable for comparison against the annual $PM_{2.5}$ NAAQS as described in §58.30.

(8) The MSA, CBSA, CSA or other area represented by the monitor.

(9) The designation of any Pb monitors as either source-oriented or non-source-oriented according to Appendix D to 40 CFR part 58.

(10) Any source-oriented monitors for which a waiver has been requested or granted by the EPA Regional Administrator as allowed for under paragraph 4.5(a)(ii) of Appendix D to 40 CFR part 58.

(11) Any source-oriented or non-source-oriented site for which a waiver has been requested or granted by the EPA Regional Administrator for the use of Pb-PM_{10} monitoring in lieu of Pb-TSP monitoring as allowed for under paragraph 2.10 of Appendix C to 40 CFR part 58.

(12) The identification of required NO_2 monitors as near-road, area-wide, or vulnerable and susceptible population monitors in accordance with Appendix D, section 4.3 of this part.

(13) The identification of any $PM_{2.5}$ FEMs and/or ARMs used in the monitoring agency's network where the data are not of sufficient quality such that data are not to be compared to the NAAQS. For required SLAMS where the agency identifies that the $PM_{2.5}$ Class III FEM or ARM does not produce data of sufficient quality for comparison to the NAAQS, the monitoring agency must ensure that an operating FRM or filter-based FEM meeting the sample frequency requirements described in §58.12 or other Class III $PM_{2.5}$ FEM or ARM with data of sufficient quality is operating and reporting data to meet the network design criteria described in appendix D to this part.

(c) The annual monitoring network plan must document how state and local agencies provide for the review of changes to a $PM_{2.5}$ monitoring network that impact the location of a violating $PM_{2.5}$ monitor. The affected state or local agency must document the process for obtaining public comment and include any comments received through the public notification process within their submitted plan.

(d) The state, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to determine, at a minimum, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation

into the ambient air monitoring network. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby states and tribes or health effects studies. The state, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The assessments are due every five years beginning July 1, 2010.

(e) All proposed additions and discontinuations of SLAMS monitors in annual monitoring network plans and periodic network assessments are subject to approval according to §58.14.

[71 FR 61298, Oct. 17, 2006, as amended at 72 FR 32210, June 12, 2007; 73 FR 67059, Nov. 12, 2008; 73 FR 77517, Dec. 19, 2008; 75 FR 6534, Feb. 9, 2010; 75 FR 35601, June 22, 2010; 75 FR 81137, Dec. 27, 2010; 76 FR 54341, Aug. 31, 2011; 78 FR 16188, Mar. 14, 2013; 78 FR 3282, Jan. 15, 2013; 80 FR 65466, Oct. 26, 2015; 81 FR 17279, Mar. 28, 2016]

Ozone Monitoring Network Requirements

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

TABLE D–2 OF APPENDIX D TO PART 58 SLAMS MINIMUM O_3 MONITORING REQUIREMENTS

MSA population[1, 2]	Most recent 3-year design value concentrations ≥85% of any O_3 NAAQS[3]	Most recent 3-year design value concentrations <85% of any O_3 NAAQS[3,4]
>10 million	4	2
4–10 million	3	1
350,000–<4 million	2	1
50,000–<350,000 [5]	1	0

1. Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).
2. Population based on latest available census figures.
3. The ozone (O_3) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
4. These minimum monitoring requirements apply in the absence of a design value.
5. Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

CO Monitoring Network Requirements

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

4.2 Carbon Monoxide (CO) Design Criteria.

4.2.1 General Requirements. (a) Except as provided in subsection (b), one CO monitor is required to operate collocated with one required near-road NO_2 monitor, as required in Section 4.3.2 of this part, in CBSAs having a population of 1,000,000 or more persons. If a CBSA has more than one required near-road NO_2 monitor, only one CO monitor is required to be collocated with a near-road NO_2 monitor within that CBSA.

(b) If a state provides quantitative evidence demonstrating that peak ambient CO concentrations would occur in a near-road location which meets microscale siting criteria in Appendix E of this part but is not a near-road NO_2 monitoring site, then the EPA Regional Administrator may approve a request by a state to use such an alternate near-road location for a CO monitor in place of collocating a monitor at near-road NO_2 monitoring site.

4.2.2 Regional Administrator Required Monitoring. (a) The Regional Administrators, in collaboration with states, may require additional CO monitors above the minimum number of monitors required in 4.2.1 of this part, where the minimum monitoring requirements are not sufficient to meet monitoring objectives. The Regional Administrator may require, at his/her discretion, additional monitors in situations where data or other information suggest that CO concentrations may be approaching or exceeding the NAAQS. Such situations include, but are not limited to, (1) characterizing impacts on ground-level concentrations due to stationary CO sources, (2) characterizing CO concentrations in downtown areas or urban street canyons, and (3) characterizing CO concentrations in areas that are subject to high ground level CO concentrations particularly due to or enhanced by topographical and meteorological impacts. The Regional Administrator and the responsible State or local air monitoring agency shall work together to design and maintain the most appropriate CO network to address the data needs for an area, and include all monitors under this provision in the annual monitoring network plan.

NO_2 Monitoring Network Requirements

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

4.3.2 Requirement for Near-road NO_2 Monitors

(a) Within the NO_2 network, there must be one microscale near-road NO_2 monitoring station in each CBSA with a population of 500,000 or more persons to monitor a location of expected maximum hourly concentrations sited near a major road with high AADT counts as specified in paragraph 4.3.2(a)(1) of this appendix. An additional near-road NO_2monitoring station is required for any CBSA with a population of 2,500,000 persons or more, or in any CBSA with a population of 500,000 or more persons that has one or more roadway segments with 250,000 or greater AADT counts to monitor a second location of expected maximum hourly concentrations. CBSA populations shall be based on the latest available census figures.

(1) The near-road NO_2 monitoring stations shall be selected by ranking all road segments within a CBSA by AADT and then identifying a location or locations adjacent to those highest ranked road segments, considering fleet mix, roadway design, congestion patterns, terrain, and meteorology, where maximum hourly NO_2 concentrations are expected to occur and siting criteria can be met in accordance with appendix E of this part. Where a State or local air monitoring agency identifies multiple acceptable candidate sites where maximum hourly NO_2 concentrations are expected to occur, the monitoring agency shall consider the potential for population exposure in the criteria utilized to select the final site location. Where one CBSA is required to have two near-road NO_2 monitoring stations, the sites shall be differentiated from each other by one or more of the following factors: fleet mix; congestion patterns; terrain; geographic area within the CBSA; or different route, interstate, or freeway designation.

(b) Measurements at required near-road NO_2 monitor sites utilizing chemiluminescence FRMs must include at a minimum: NO, NO_2, and NO_X.

Originally, near –road monitoring sites were to be established and in operation by January 1, 2013. However, the lack of funding has delayed the implementation of near-road monitoring requirements. The Memphis and Nashville CBSA's are now established and operational. The Knoxville and Chattanooga near-road sites may not be funded by EPA until sometime in the future.

4.3.3 Requirement for Area-wide NO_2 Monitoring

(a) Within the NO_2 network, there must be one monitoring station in each CBSA with a population of 1,000,000 or more persons to monitor a location of expected highest NO_2 concentrations representing the neighborhood or larger spatial scales. PAMS sites collecting NO_2 data that are situated in an area of expected high NO_2 concentrations at the neighborhood or larger spatial scale may be used to satisfy this minimum monitoring requirement when the NO_2 monitor is operated year round. Emission inventories and meteorological analysis should be used to identify the appropriate locations within a CBSA for locating required area-wide NO_2 monitoring stations. CBSA populations shall be based on the latest available census figures.

An area-wide NO_2 monitoring site is required in each of the Memphis and Nashville CBSA's. An area-wide NO_2 monitoring site is currently in operation in the Nashville CBSA (Site 47-037-0011). Currently the State of Arkansas operates an NO_2 monitor at its Marion site (AQS 05-035-0005) which is in the Memphis CBSA.

SO_2 Monitoring Network Requirements

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

4.4 Sulfur Dioxide (SO_2) Design Criteria.

4.4.1 *General Requirements.* (a) State and, where appropriate, local agencies must operate a minimum number of required SO_2 monitoring sites as described below.

4.4.2 *Requirement for Monitoring by the Population Weighted Emissions Index.* (a) The population weighted emissions index (PWEI) shall be calculated by States for each core based statistical area (CBSA) they contain or share with another State or States for use in the implementation of or adjustment to the SO_2 monitoring network. The PWEI shall be calculated by multiplying the population of each CBSA, using the most current census data or estimates, and the total amount of SO_2 in tons per year emitted within the CBSA area, using an aggregate of the most recent county level emissions data available in the National Emissions Inventory for each county in each CBSA. The resulting product shall be divided by one million, providing a PWEI value, the units of which are million persons-tons per year. For any CBSA with a calculated PWEI value equal to or greater than 1,000,000, a minimum of three SO_2 monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 100,000, but less than 1,000,000, a minimum of two SO_2 monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 5,000, but less than 100,000, a minimum of one SO_2 monitor is required within that CBSA.

(1) The SO_2 monitoring site(s) required as a result of the calculated PWEI in each CBSA shall satisfy minimum monitoring requirements if the monitor is sited within the boundaries of the parent CBSA and is one of the following site types (as defined in section 1.1.1 of this appendix): population exposure, highest concentration, source impacts, general background, or regional transport. SO_2 monitors at NCore stations may satisfy minimum monitoring requirements if that monitor is located within a CBSA with minimally required monitors under this part. Any monitor that is sited outside of a CBSA with minimum monitoring requirements to assess the highest concentration resulting from the impact of significant sources or source categories existing within that CBSA shall be allowed to count towards minimum monitoring requirements for that CBSA.

PWEI calculations were performed for CBSA's in Tennessee based on emissions and populations listed in the following table. Based on these calculations ambient sulfur dioxide monitors are required as listed in the table.

CBSA AREA NAME	POP ESTIMATE 2015	2011 NEI SO_2 Total CBSA 03232016	Using 2011 NEI Data 03/23/2016						
			PWEI 2010	PWEI 2011	PWEI 2012	PWEI 2013	PWEI 2014	PWEI 2015	SO_2 Monitors Required
Chattanooga, TN-GA	547776	953	503	508	512	516	519	522	FALSE
Clarksville, TN-KY	281021	431	112	114	119	118	120	121	FALSE
Cleveland, TN	120864	5	1	1	1	1	1	1	FALSE
Jackson, TN	129682	154	20	20	20	20	20	20	FALSE
Johnson City, TN	200648	4	1	1	1	1	1	1	FALSE
Kingsport-Bristol-Bristol, TN-VA	307120	39082	12098	12080	12071	12051	12040	12003	1
Knoxville, TN	861424	28722	24057	24207	24351	24470	24632	24742	1
Memphis, TN-MS-AR	1344127	15025	19905	20025	20144	20159	20182	20195	1
Morristown, TN	116642	21	2	2	2	2	2	2	FALSE
Nashville-Davidson--Murfreesboro--Franklin, TN	1830345	24560	41038	41710	42419	43191	44028	44954	1

4.4.3 *Regional Administrator Required Monitoring.* (a) The Regional Administrator may require additional SO_2monitoring stations above the minimum number of monitors required in 4.4.2 of this part, where the minimum monitoring requirements are not sufficient to meet monitoring objectives. The Regional Administrator may require, at his/her discretion, additional monitors in situations where an area has the potential to have concentrations that may violate or contribute to the violation of the NAAQS, in areas impacted by sources which are not conducive to modeling, or in locations with susceptible and vulnerable populations, which are not monitored under the minimum monitoring provisions described above. The Regional Administrator and the

responsible State or local air monitoring agency shall work together to design and/or maintain the most appropriate SO_2 network to provide sufficient data to meet monitoring objectives.

4.4.5 *NCore Monitoring.* (a) SO_2 measurements are included within the NCore multipollutant site requirements as described in paragraph (3)(b) of this appendix. NCore-based SO_2 measurements are primarily used to characterize SO_2trends and assist in understanding SO_2 transport across representative areas in urban or rural locations and are also used for comparison with the SO_2 NAAQS. SO_2 monitors at NCore sites that exist in CBSAs with minimum monitoring requirements per section 4.4.2 above shall be allowed to count towards those minimum monitoring requirements.

Lead Monitoring Network Requirements

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

4.5 Lead (Pb) Design Criteria.

a) State and, where appropriate, local agencies are required to conduct ambient air Pb monitoring near Pb sources which are expected to or have been shown to contribute to a maximum Pb concentration in ambient air in excess of the NAAQS, taking into account the logistics and potential for population exposure. At a minimum, there must be one source-oriented SLAMS site located to measure the maximum Pb concentration in ambient air resulting from each non-airport Pb source which emits 0.50 or more tons per year and from each airport which emits 1.0 or more tons per year based on either the most recent National Emission Inventory (*http://www.epa.gov/ttn/chief/eiinformation.html*) or other scientifically justifiable methods and data (such as improved emissions factors or site-specific data) taking into account logistics and the potential for population exposure.

(i) One monitor may be used to meet the requirement in paragraph 4.5(a) for all sources involved when the location of the maximum Pb concentration due to one Pb source is expected to also be impacted by Pb emissions from a nearby source (or multiple sources). This monitor must be sited, taking into account logistics and the potential for population exposure, where the Pb concentration from all sources combined is expected to be at its maximum.

$PM_{2.5}$ Monitoring Network Requirements

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

TABLE D–5 OF APPENDIX D TO PART 58 $PM_{2.5}$ MINIMUM MONITORING REQUIREMENTS

MSA population[1, 2]	Most recent 3-year design value concentrations ≥85% of any $PM_{2.5}$ NAAQS[3]	Most recent 3-year design value concentrations <85% of any $PM_{2.5}$ NAAQS[3,4]	Continuous $PM_{2.5}$ Monitoring	$PM_{2.5}$ Background and Transport Sites	$PM_{2.5}$ Chemical Speciation Sites
>1,000,000	3	2	1 - 2	One site each per state for background and transport.	Existing STN Required Site(s)
500,000–1,000,000	2	1	1		
50,000–<500,000 [5]	1	0	0 - 1		

1 Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).
2 Population based on latest available census figures.

3 The $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
4 These minimum monitoring requirements apply in the absence of a design value.
5 Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

4.7.2 Requirement for Continuous $PM_{2.5}$ Monitoring. The State, or where appropriate, local agencies must operate continuous $PM_{2.5}$ analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies. State and local air monitoring agencies must use methodologies and quality assurance/quality control (QA/QC) procedures approved by the EPA Regional Administrator for these required continuous analyzers.

4.7.3 Requirement for $PM_{2.5}$ Background and Transport Sites. Each State shall install and operate at least one $PM_{2.5}$ site to monitor for regional background and at least one $PM_{2.5}$ site to monitor regional transport. These monitoring sites may be at community-oriented sites and this requirement may be satisfied by a corresponding monitor in an area having similar air quality in another State. State and local air monitoring agencies must use methodologies and QA/QC procedures approved by the EPA Regional Administrator for these sites. Methods used at these sites may include non-federal reference method samplers such as IMPROVE or continuous $PM_{2.5}$ monitors.

4.7.4 $PM_{2.5}$ Chemical Speciation Site Requirements. Each State shall continue to conduct chemical speciation monitoring and analyses at sites designated to be part of the $PM_{2.5}$ Speciation Trends Network (STN). The selection and modification of these STN sites must be approved by the Administrator. The $PM_{2.5}$ chemical speciation urban trends sites shall include analysis for elements, selected anions and cations, and carbon. Samples must be collected using the monitoring methods and the sampling schedules approved by the Administrator. Chemical speciation is encouraged at additional sites where the chemically resolved data would be useful in developing State implementation plans and supporting atmospheric or health effects related studies.

Index reporting requirements

40 CFR 58 Subpart F, 58.50 Revised as of July 1, 2014

58.50 Index reporting.
(a) The State or where applicable, local agency shall report to the general public on a daily basis through prominent notice an air quality index that complies with the requirements of appendix G to this part.
(b) Reporting is required for all individual MSA with a population exceeding 350,000.
(c) The population of a MSA for purposes of index reporting is the most recent decennial U.S. census population.

Geographic area	2010 Census	2015 Census Est.	Required to Have AQI Reporting	Daily AQI/Air Quality Forecasts Provided
Chattanooga, TN-GA	528143	547776	Yes	Yes
Clarksville, TN-KY	260625	281021	No	Yes
Cleveland, TN	115788	120864	No	No
Jackson, TN	130011	129682	No	No
Johnson City, TN	198716	200648	No	Yes Based on the combined population of both areas.
Kingsport-Bristol-Bristol, TN-VA	309544	307120	No	
Knoxville, TN	837571	861424	Yes	Yes In addition, the GSMNP has a separate AQI/Forecast provided.
Memphis, TN-MS-AR	1324829	1344127	Yes	Yes
Morristown, TN	113951	116642	No	No
Nashville-Davidson--Murfreesboro, TN	1670890	1830345	Yes	Yes

NCore Monitoring Network Requirements and PM $_{10-2.5}$

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

(a) Each State (i.e. the fifty States, District of Columbia, Puerto Rico, and the Virgin Islands) is required to operate at least one NCore site. States may delegate this requirement to a local agency. States with many MSAs often also have multiple air sheds with unique characteristics and, often, elevated air pollution. These States include, at a minimum, California, Florida, Illinois, Michigan, New York, North Carolina, Ohio, Pennsylvania, and Texas. These States are required to identify one to two additional NCore sites in order to account for their unique situations. These additional sites shall be located to avoid proximity to large emission sources. Any State or local agency can propose additional candidate NCore sites or modifications to these requirements for approval by the Administrator. The NCore locations should be leveraged with other multipollutant air monitoring sites including PAMS sites, National Air Toxics Trends Stations (NATTS) sites, CASTNET sites, and STN sites. Site leveraging includes using the same monitoring platform and equipment to meet the objectives of the variety of programs where possible and advantageous.

(b) The NCore sites must measure, at a minimum, $PM_{2.5}$ particle mass using continuous and integrated/filter-based samplers, speciated $PM_{2.5}$, $PM_{10-2.5}$ particle mass, O_3, SO_2, CO, NO/NO_Y, wind speed, wind direction, relative humidity, and ambient temperature.

(1) Although the measurement of NO_y is required in support of a number of monitoring objectives, available commercial instruments may indicate little difference in their measurement of NO_y compared to the conventional measurement of NO_X, particularly in areas with relatively fresh sources of nitrogen emissions. Therefore, in areas with negligible expected difference between NO_y and NO_X measured concentrations, the Administrator may allow for waivers that permit NO_X monitoring to be substituted for the required NO_y monitoring at applicable NCore sites.

(2) The EPA recognizes that, in some cases, the physical location of the NCore site may not be suitable for representative meteorological measurements due to the site's physical surroundings. It is also possible that nearby meteorological measurements may be able to fulfill this data need. In these cases, the requirement for meteorological monitoring can be waived by the Administrator.

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

Coarse Particulate Matter (PM10-2.5) Design Criteria.

4.8.1 General Monitoring Requirements.
The only required monitors for $PM_{10-2.5}$ are those required at NCore Stations.

NCore Look Rock Monitoring Site

Air quality monitoring at the Look Rock monitoring site has a long history dating at least back to about 1980. Monitoring at this site has been a joint effort of the National Park Service (NPS), EPA and the State of Tennessee.

Siting

The coordinates are:
Latitude + 35.6334N
Longitude -83.9416W
Elevation 801 Meters.

Site is approved by the EPA as a rural NCore site.

Monitoring Objective

Determine compliance with NAAQS; observe pollution trends for national data analysis, provide pollution levels for daily index reporting; and provide date for scientific studies.

Quality Assurance

All Quality Assurance procedures shall be implemented in accordance with 40 CFR 58, Appendix A.

Area of Representativeness

40 CFR Part 58 Appendix D provides design criteria for ambient air monitoring. In the case of urban NCore the spatial scales to be used are neighborhood and urban. Because the Look Rock site is located in a pristine high elevation area, it is understood that the site is ideally suited for both background and transport related measurements..

Spatial Scales for Each Pollutant

Generally regional scale.

Need For Additional Resources

All parties agree that the collaboration between the National Park Service, EPA and the State of Tennessee at the Look Rock sampling site has produced an extraordinarily diverse and in-depth air quality record and that the bulk of this data set has been validated and reported to the U.S. EPA AQS repository. However, under the present piecemeal funding by the various agencies, there is no assurance that this will continue at the site for the longer term needed for monitoring compliance with the PM NAAQS and with the regional haze rule (RHR). What is needed is a long-term commitment by EPA to coordinate the operation of this and other sites to maintain quality and relevance in the NCore network over the long term. This commitment should commence by the 2011 time frame when NCore sites are expected to become fully operational.

EPA has agreed to provide support and funding to continue the operation of the NCore site. This is the final equipment list currently in place at the site.

Air Monitoring Equipment at Look Rock

POLLUTANT INSTRUMENT	ANALYSIS METHOD	SAMPLING REPORTING FREQ	AQS CODE	PARA METER CODE	POC	REP ORD CODE	DATE SAMPLING BEGAN	MONITOR		SAMPLING INSTRUMENT NAME AND DESIGNATION	FED AGENCY
								Type	Comment		
Sulfur Dioxide (SO_2) trace-level	Pulsed fluorescence	Continuous/1hr	47-029-101	42401	2	745	20070401	Special Purpose	Ncore	Thermo SO_2 47i TLE EQSA-0436-060	NPS
Carbon Monoxide (CO)	Trace-level NDIR-GFC	Continuous/1hr	47-029-101	42102	2	745	20070401	Special Purpose	Ncore	Thermo CO 48i TLE RFNA-0981-054	NPS
Nitrogen oxide (NO) trace-level	Chemilumenescence with molybdenum convertor	Continuous/1hr	47-029-101	42601	2	745	20070401	Special Purpose	Ncore	Thermo NO_2/NOy 42c TLE RFNA1289-074	NPS
Total reactive nitrogen (NOy) trace-level	Chemilumenescence with molybdenum convertor	Continuous/1hr	47-029-101	42603	2	745	20070401	Special Purpose	Ncore	Thermo NO_2/NOy 42c TLE RFNA1289-074	NPS
Nitrogen dioxide (NO_2) trace-level	Chemilumenescence with molybdenum convertor	Continuous/1hr	47-029-101	42412	1	745	20070401	Special Purpose	Ncore	Thermo NO_2/NOy 42c TLE RFNA1289-074	NPS
Nitrogen dioxide (NO_2) trace-level	Cavity attenuated phase shift	Continuous/1hr	47-029-101	42202	1	745	20141102	Special Purpose	Ncore	Teledyne NO_2 T500U CAS	NPS
Calibrator	NA	Daily	NA	NA	NA	NA	20070401	NA	NA	Thermo Model 146c	TVA
Zero Air Supply	NA	NA	NA	NA	NA	NA	20070401	NA	NA	Thermo 111	TVA
Telemetry-Data Logger	NA	1 minute/ 1 hour	NA	NA	NA	NA	20070401	NA	NA	ESC 8832	TVA

Proposed Clarksville $PM_{2.5}$ Site Information

Site Information
Existing Site 47-125-1009
The following proposed siting information supplements the supporting documentation section immediately following this table. Where applicable, the section from 40CFR58 is included.

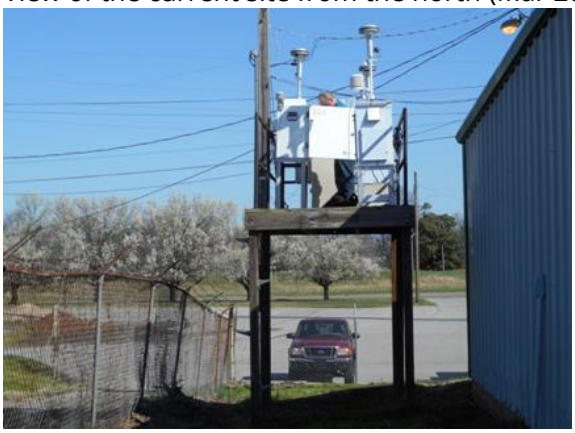
§58.10 (a)(1)	A statement of purposes for each monitor	The existing Clarksville site (Golf Club Lane) is located upwind from the Clarksville, TN-KY MSA area. The site is suitable for use to meet the MSA monitoring requirements for PM2.5 for both Tennessee and Kentucky. The site is part of the state PM2.5 network and began monitoring in January 1998. The monitors at the existing site are located on an elevated platform. The removal of the elevated platform for safety related concerns will leave the existing site not meeting EPA air monitoring siting criteria. The monitors will be placed at ground level at the proposed new site (Paradise Hill Road). PM2.5 monitoring will be discontinued at the existing site when monitoring begins at the proposed relocated site.
	Site photos facing from the site in each direction (N, S, E, W)	See photographs for general site information in the next sections. Photographs for the current Clarksville site and proposed relocated site are included.
	Applicable measurements to any obstructions or trees	See measurement graphic provided in the next sections. The nearest obstruction is over 13 meters away (building north of proposed site) and the obstruction height is 3 meters est. height. The next closest obstruction (trees on other side of Paradise Hill Road) is over 30 meters away and the obstruction height is 12 meters est. height. The nearest roadway is 18 meters away (Paradise Hill Road).
	Estimated PM2.5 inlets height for the site.	The PM2.5 inlet heights will be > 2 meters.
§58.10 (b)	(1) The AQS site identification number.	The AQS ID for this site is: 47-125-1009. The existing site is located at 1514-C Golf Club Lane. The proposed relocation site (Paradise Hill Road) is about 325 meters SW of the existing site.
	(2) The location, including street address and geographical coordinates.	The current Clarksville site, 1514-C Golf Club Lane, Clarksville, TN 37040, Lat. 36.514627, Long.-87.328041, Elev. 535 to 540 ft. Proposed new Clarksville site, Paradise Hill Road, Clarksville, TN 37040, Lat. 36.512856, Long. -87.331045, Elev. 535 to 540 ft.
	(3) The sampling and analysis method(s) for each measured parameter.	PM2.5 - Thermo Scientific Partisol®-Plus 2025 Sequential PM2.5 Air Sampler, Manual Reference Method: RFPS-0498-118 Continuous Ambient Particulate TEOM, Series 1400a.

		Met one BAM 1022 (FEM)
	(4) The operating schedules for each monitor.	The TEOM monitor will operate continuously collecting 1 minute and hourly PM2.5 data. The single PM2.5 monitor will operate on the standard every day and will convert to operating on the 1 in 3 day national schedule when approved by EPA. The BAM will operate continuously collecting minute and hourly data.
	(5) Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal.	This is an existing site and is planned to operate for at least 3 years when approved.
	(6) The monitoring objective and spatial scale of representativeness for each monitor as defined in appendix D to this part.	Monitoring objective: NAAQS Compliance Spatial Scale: Neighborhood scale—Defines concentrations within some extended area of the city that has relatively uniform land use with dimensions in the 0.5 to 4.0 kilometers range. Site type: population exposure. The non-reference continuous PM2.5 TEOM monitor is used for PM2.5 AQI forecasting.
	(7) The identification of any sites that are suitable and sites that is not suitable for comparison against the "Ozone and PM2.5 NAAQS".	The proposed site will be suitable for comparison to the PM2.5 NAAQS. This site will be a SLAMs or SLAMs equivalent site.
	(8) The MSA, CBSA, CSA or other area represented by the monitor.	The site is located in the Clarksville TN-KY CBSA #17300.

§58.10 (a)(1) Site photos facing from the site in each direction (N, S, E, W)
Existing site location at 1514-C Golf Club Lane, Clarksville, TN.

View of the current site from the north (Mar 2016)

Looking north from site (Mar 2016)



View of the current site from the south (Mar 2016)

Looking south from site (Mar 2016)

View of the current site from the east (Mar 2016)

Looking east from site (Mar 2016)

View of the current site from the west (Mar 2016)

Looking west from site (Mar 2016)

Proposed new site located at Paradise Hill Road, Clarksville, TN

Looking north from site (Mar 2016)

Looking south from site (Mar 2016)

Looking south from site (Mar 2016)

Looking west from site (Mar 2016)

Looking west from the site (Mar 2016)

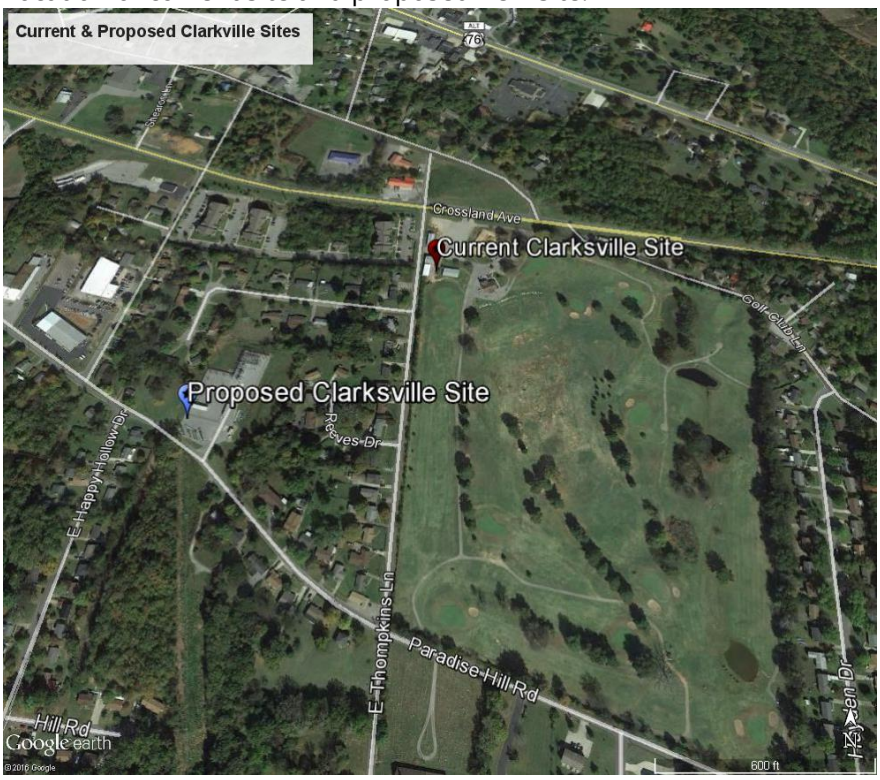
Looking east from the site (Mar 2016)

Looking east from site

§58.10 (a)(1) Applicable measurements to any obstructions or trees

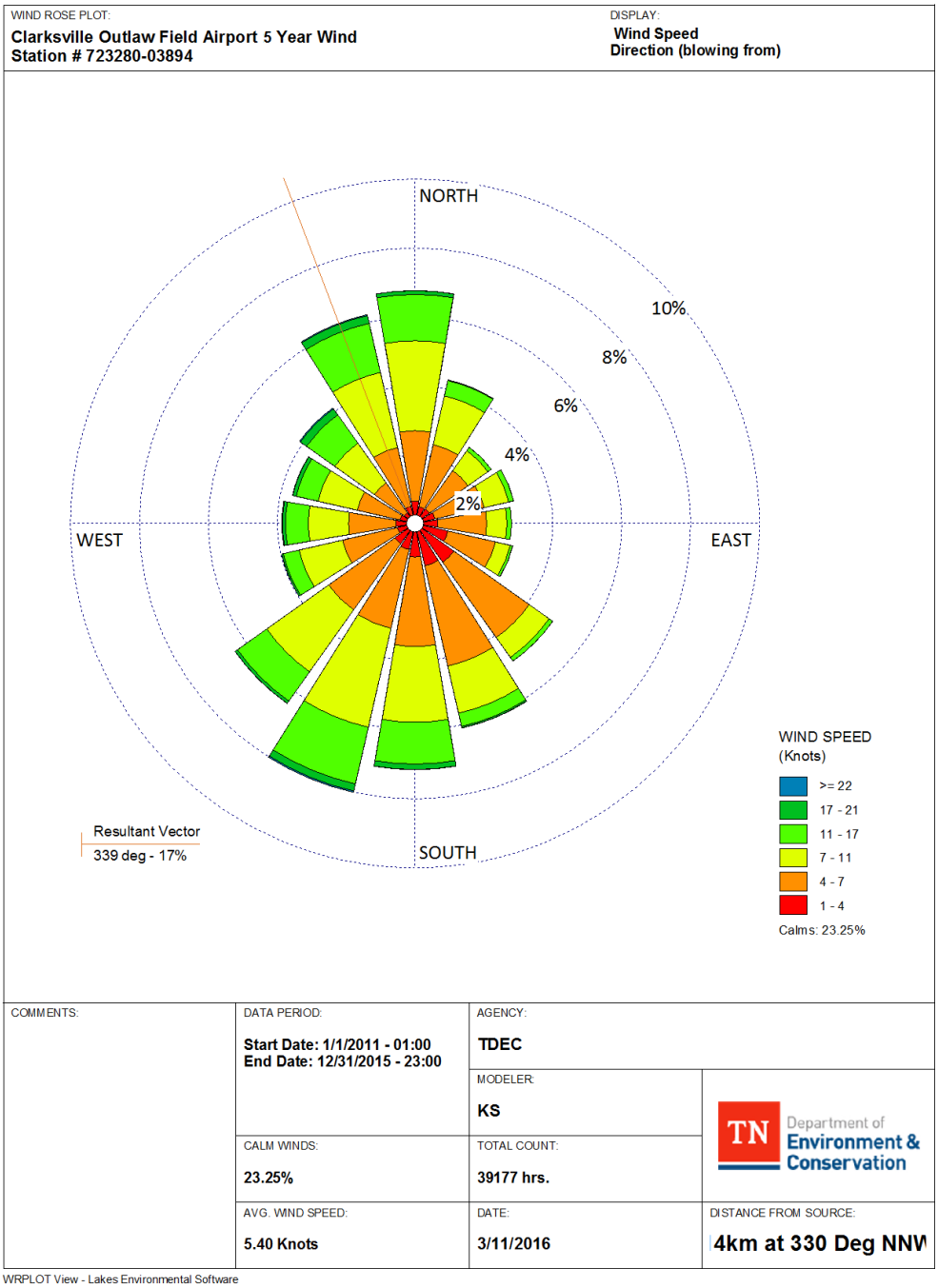
PM2.5 Monitoring Site in Clarksville, TN

Location of current site and proposed new site.



The following wind rose is presented to establish the representative wind directions based upon the Clarksville station located at Clarksville Outlaw Field Airport.

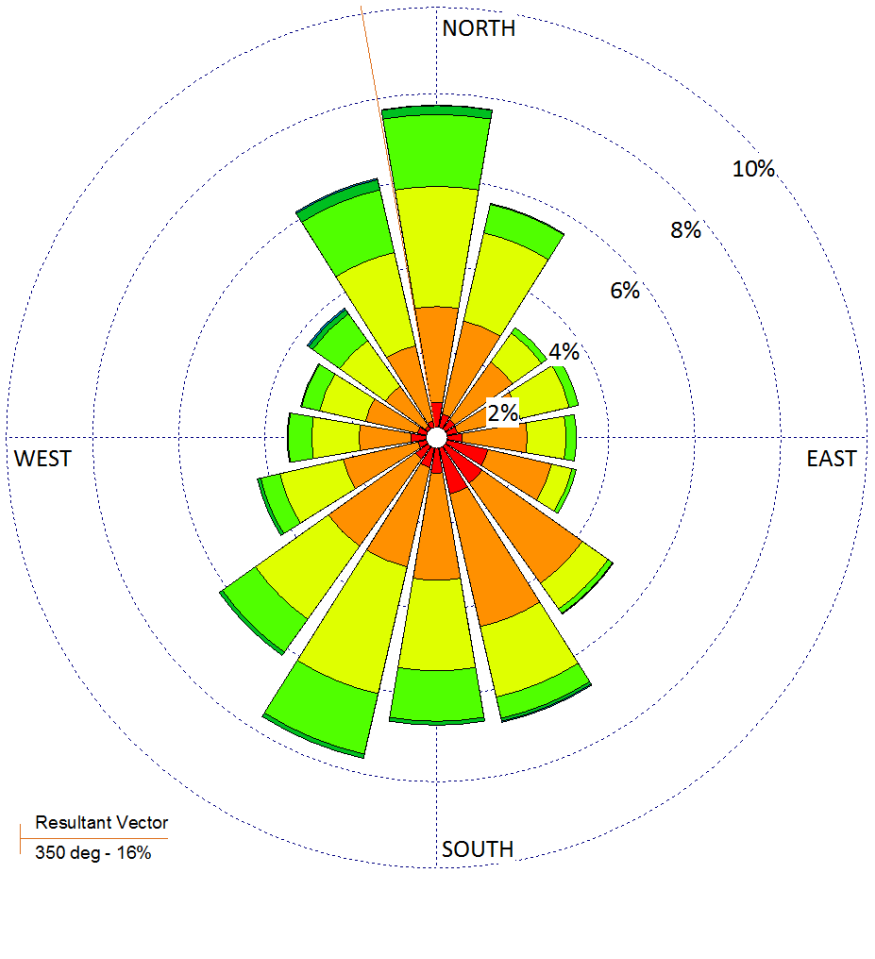
5-Year Winds



1-Year Winds (Most recent)

WIND ROSE PLOT:
Clarksville Outlaw Field Airport 1 Year Wind
Station # 723280-03894

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	AGENCY:	
	Start Date: 1/1/2015 - 01:00 **End Date: 12/31/2015 - 23:00**	**TDEC**	
		MODELER: **KS**	TN Department of Environment & Conservation
	CALM WINDS: **20.29%**	TOTAL COUNT: **8716 hrs.**	
	AVG. WIND SPEED: **5.55 Knots**	DATE: **3/11/2016**	DISTANCE FROM SOURCE: **4km at 330 Deg NNW**

WRPLOT View - Lakes Environmental Software

EPA Approval Letter for the Loudon Pope Monitoring Site

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

MAR 21 2016 PM12:37

MAR 16 2016

Ms. Michelle Walker Owenby
Director
Division of Air Pollution Control
Tennessee Department of Environment and Conservation
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor
Nashville, Tennessee 37243

Dear Ms. Owenby:

Thank you for submitting a request to relocate the Loudon Pope monitoring site (AQS # 47-105-0108) to Loudon Elementary School (AQS # 47-105-0109), dated March 4, 2016. The U.S. Environmental Protection Agency Region 4 understands that the Tennessee Department of Environment and Conservation (TDEC) provided the public a 30-day review period for its draft relocation request, and no comments were received. According to 40 CFR §58.10(a)(2), since public inspection and comment have already been solicited, the EPA is not required to offer another comment period.

The TDEC requested relocation of the Loudon Pope Fine Particulate Matter ($PM_{2.5}$) and ozone monitoring site to the Loudon Elementary School (formerly the Loudon Middle School) monitoring site. The EPA approves the relocation of the $PM_{2.5}$ and ozone monitors from the Loudon Pope monitoring site to the Loudon Elementary School monitoring site. In future requests to establish, discontinue, or relocate a State and Local Air Monitoring Station site, the EPA requests TDEC follow Region 4's Draft *Region 4 Policy on Establishing, Discontinuing, or Relocating a State and Local Air Monitoring Station.* In particular, for site relocation requests it would be helpful to document that the site selection process in the appropriate EPA guidance was followed, analyze the design value trend of the site and any nearby site(s) over the most recent 5 years or more, and provide documentation of special circumstances (if applicable).

Thank you for working with us to monitor air pollution and promote healthy air quality in Tennessee and the nation. If you have any questions or concerns, please contact Gregg Worley at (404) 562-9141 or Sara Waterson at (404) 562-9061.

Sincerely,

Beverly H. Banister
Director
Air, Pesticides and Toxics Management Division

cc: Mr. Jason Stephens
Environmental Manager 3, TDEC

Internet Address (URL) • http://www.epa.gov
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Final Kingsport SO2 Site Proposal and letter to EPA

Ross N Robinson

Site Information

Existing Site 47-163-0007 (To Be Operated by TDEC APCD)

The following proposed siting information supplements the supporting documentation section immediately following this table. Where applicable, the section from 40CFR58 is included.

§58.10 (a)(1)	A statement of purposes for each monitor	This monitoring site is designed to measure the maximum projected SO2 ambient impacts in the vicinity of the Kingsport SO2 nonattainment area and determine future attainment of the 1 hour SO2 standard. This monitor is required to operate to demonstrate monitored attainment of the standard.
	Site photos facing from the site in each direction (N, S, E, W)	See photographs for general site information in the next sections. These are photos of the actual site. Photographed 08 18 2015.
	Applicable measurements to any obstructions or trees	See measurement graphic provided in the next sections. The nearest obstruction is 20 meters away and the obstruction height is 5 meters. The nearest roadway is 25 meters away. Physical onsite measurements made at site 08 18 2015.
	Estimated probe height for the site	The probe height will be 2 to 5 meters.
§58.10 (b)	(1) The AQS site identification number.	The AQS ID for the site is: 47-163-0007 POC 2
	(2) The location, including street address and geographical coordinates.	Off Wilburn Dr. and East Center St., 36.5348, -82.5171 next to the existing Eastman monitoring site building shown in the photographs.
	(3) The sampling and analysis method(s) for each measured parameter.	Sulfur Dioxide (Fluorescence Analyzer) Teledyne API M100 E SO2 analyzer, Automated Equivalent Method EQSA-0495-100 and Teledyne T700 dilution calibrator.
	(4) The operating schedules for each monitor.	The monitor will be a continuous SO2 monitor operating continuously collecting 1 minute, 5 minute and hourly SO2 data 365 days per year.
	(5) Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal.	This is a new site and is planned to operate for at least 3 years when approved.
	(6) The monitoring objective and spatial scale of representativeness for each monitor as defined in appendix D to this part.	Monitoring objective: NAAQS Compliance Spatial Scale: Neighborhood scale—Defines concentrations within some extended area of the city that has relatively uniform land use with dimensions in the 0.5 to 4.0 kilometers range. Site type: population exposure, highest concentration, source impacts.

	(7) The identification of any sites that are suitable and sites that are not suitable for comparison against the "SO_2 NAAQS".	The proposed site will be suitable for comparison to the SO2 NAAQS. This site will be a SLAMs or SLAMs equivalent site.
	(8) The MSA, CBSA, CSA or other area represented by the monitor.	The site is located in the Kingsport-Bristol-Bristol, TN-VA MSA CBSA # 28700. See PWEI table in the following sections that identifies the requirement for operation of a monitor in this area.
SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document	To adequately characterize the area going forward, and given the planned emissions controls/changes already in progress, your analysis should be based on modeling using future projected actual emissions.	The TDEC APCD modeling analysis includes the future case evaluation and results. The potential site locations and method for identification of potential max concentration sites are included in the modeling analysis provided that was done following the guidance provided in the TAD. The modeling employed to identify the locations of potential highest concentration receptors that might be suitable for monitoring site placement, will be re-evaluated based on the approved attainment case modeling demonstration to be submitted later. Relocation or addition of additional monitoring sites will be considered subject to significant changes in the maximum receptor locations identified in the approved attainment case modeling demonstration.

The criteria used to evaluate and select the proposed Ross N Robinson monitoring site were based in part on the following siting criteria found in 40 CFR Part 58 Appdx E and included for reference below.

TABLE E–4 OF APPENDIX E TO PART 58—SUMMARY OF PROBE AND MONITORING PATH SITING CRITERIA

Pollutant	Scale (maximum monitoring path length, meters)	Height from ground to probe, inlet or 80% of monitoring path [1] (meters)	Horizontal and vertical distance from supporting structures [2] to probe, inlet or 90% of monitoring path [1] (meters)	Distance from trees to probe, inlet or 90% of monitoring path [1] (meters)	Distance from roadways to probe, inlet or monitoring path [1] (meters)
SO_2 [3][4][5][6]	Middle (300 m) Neighborhood Urban, and Regional (1 km).	2–15	>1	>10	N/A

N/A—Not applicable.

1 Monitoring path for open path analyzers is applicable only to middle or neighborhood scale CO monitoring, middle, neighbor- hood, urban, and regional scale NO2 monitoring, and all applicable scales for monitoring SO2, O3, and O3 precursors.

2 When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

3 Should be greater than 20 meters from the dripline of tree(s) and must be 10 meters from the dripline when the tree(s) act as an obstruction.

4 Distance from sampler, probe, or 90 percent of monitoring path to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler, probe, or monitoring path. Sites not meeting this criterion may be classified as middle scale (*see* text).

5 Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

6 The probe, sampler, or monitoring path should be away from minor sources, such as furnace or incineration flues. The separation distance is dependent on the height of the minor source's emission point (such as a flue), the type of fuel or waste burned, and the quality of the fuel (sulfur, ash, or lead content). This criterion is designed to avoid undue influences from minor sources.

40 CFR Part 58 Appdx E (7–1–15 Edition)

5. SPACING FROM TREES

(a) Trees can provide surfaces for SO2, O3, or NO2 adsorption or reactions, and surfaces for particle deposition. Trees can also act as obstructions in cases where they are located between the air pollutant sources or source areas and the monitoring site, and where the trees are of a sufficient height and leaf canopy density to

interfere with the normal air- flow around the probe, inlet, or monitoring path. To reduce this possible interference/obstruction, the probe, inlet, or at least 90 per- cent of the monitoring path must be at least 10 meters or further from the drip line of trees.

(b) The scavenging effect of trees is greater for O3 than for other criteria pollutants. Monitoring agencies must take steps to consider the impact of trees on ozone monitoring sites and take steps to avoid this problem.

(c) For microscale sites of any air pollutant, no trees or shrubs should be located between the probe and the source under investigation, such as a roadway or a stationary source.

9. PROBE MATERIAL AND POLLUTANT SAMPLE RESIDENCE TIME

(a) For the reactive gases, SO2, NO2, and O3, special probe material must be used for point analyzers. Studies have been conducted to determine the suitability of materials such as polypropylene, poly- ethylene, polyvinyl chloride, Tygon, aluminum, brass, stainless steel, copper, Pyrex glass and Teflon for use as intake sampling lines. Of the above materials, only Pyrex glass and Teflon have been found to be acceptable for use as intake sampling lines for all the reactive gaseous pollutants. Further- more, the EPA 25 has specified borosilicate glass or FEP Teflon as the only acceptable probe materials for delivering test atmospheres in the determination of reference or equivalent methods. Therefore, borosilicate glass, FEP Teflon or their equivalent must be the only material in the sampling train (from inlet probe to the back of the analyzer) that can be in contact with the ambient air sample for existing and new SLAMs.

(c) No matter how nonreactive the sampling probe material is initially, after a period of use reactive particulate matter is de- posited on the probe walls. Therefore, the time it takes the gas to transfer from the probe inlet to the sampling device is also critical. Ozone in the presence of nitrogen oxide (NO) will show significant losses even in the most inert probe material when the residence time exceeds 20 seconds. Other studies indicate that a 10 second or less residence time is easily achievable. Therefore, sampling probes for reactive gas monitors at NCore and at NO2 sites must have a sample residence time less than 20 seconds.

10. WAIVER PROVISIONS

Most sampling probes or monitors can be located so that they meet the requirements of this appendix. New sites with rare exceptions, can be located within the limits of this appendix. However, some existing sites may not meet these requirements and still produce useful data for some purposes. The EPA will consider a written request from the State agency to waive one or more siting criteria for some monitoring sites providing that the State can adequately demonstrate the need (purpose) for monitoring or establishing a monitoring site at that location.

10.1 For establishing a new site, a waiver may be granted only if both of the following criteria are met:

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

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

10.2 However, for an existing site, a waiver may be granted if either of the criteria in sections 10.1.1 and 10.1.2 of this appendix are met.

10.3 Cost benefits, historical trends, and other factors may be used to add support to the criteria in sections 10.1.1 and 10.1.2 of this appendix, however, they in themselves, will not be acceptable reasons for granting a waiver. Written requests for waivers must be submitted to the Regional Administrator.

§58.10 (a)(1) Site photos facing from the site in each direction (N, S, E, W)

47-163-0007
Ross N. Robinson
Looking North
08 18 2015

47-163-0007
Ross N. Robinson
Looking South
08 18 2015

47-163-0007
Ross N. Robinson
Looking East
08 18 2015

47-163-0007
Ross N. Robinson
Looking West
08 18 2015

Ross N Robinson Area Looking North from site.
08 18 2015

Ross N Robinson Area Looking East from site.
08 18 2015

Ross N Robinson Area Looking South from site.
08 18 2015

Ross N Robinson Area Looking West from site.
08 18 2015

Discussion of General and Specific Site Characteristics

The previous photographs provide details of the surrounding local terrain, urban development, location of residences and roadways. The photographs also identify the presence of trees and other obstacles that may be considered to be possible obstructions in the vicinity of the proposed sampling site for SO_2. The following analysis will identify the actual site conditions based on field measurements and field observations augmented by the accompanying imagery to identify and address any possible obstructions. Please reference the sections from 40 CFR Part 58 Appdx E in the preceding section that actually presents the criteria that must be met in order to meet the SLAMs siting criteria.

§58.10 (a)(1) Applicable measurements to any obstructions or trees

Inlet Probe Estimated Height:

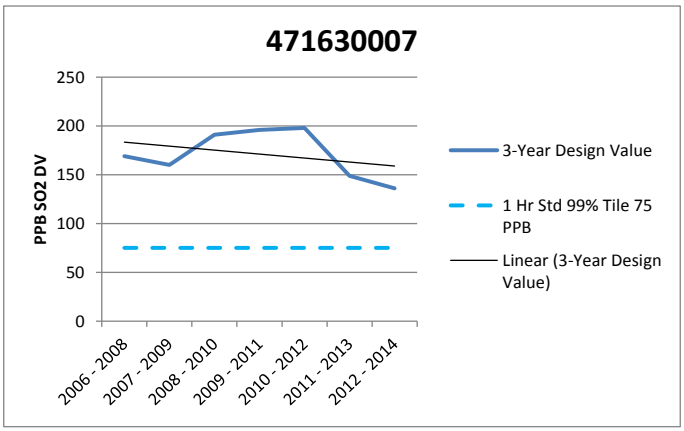
Location of existing inlet probe (4 to 5 meters).

New shelter inlet probe will be 2 to 5 meters.

The new shelter is proposed to be setup immediately

Supporting Documentation for the Site Establishment Letter to EPA

An air quality history for the Ross N. Robinson monitoring site is provided below to describe the air quality data resulting in the area being named nonattainment for SO_2 by EPA. It must be noted that the air quality is improving over the 2009 to 2011 dataset used to designate the area.



AQS ID	Design Value Year	3-Year Design Value	3-Year DV Validity Indicator
471630007	2006 - 2008	169	Y
471630007	2007 - 2009	160	Y
471630007	2008 - 2010	191	Y
471630007	2009 - 2011	196	Y
471630007	2010 - 2012	198	Y
471630007	2011 - 2013	149	Y
471630007	2012 - 2014	136	Y

Discussion taken from EPA's Draft TSD
http://www.epa.gov/so2designations/eparesp/04_TN_tsd.pdf

Geography/Topography (mountain ranges or other air basin boundaries)

Most of Sullivan County is located in the Ridge and Valley Geographic Region, which covers 7,703 square miles and is situated between the Cumberland Plateau and the Unaka Mountains. Sullivan County is a rural area with urban centers. The topography of this region consists of long linear ridges with elevations of 1100 to 1500 feet, and parallel lowland valleys, where the elevations vary from 700 to 1000 feet. The ridges and valleys are typically oriented from northeast to southwest. Generally, the ridges and valleys have a higher elevation in the northern part of the region and slightly less elevated in the south.

Meteorology (weather/transport patterns)

Evidence of source-receptor relationships between specific emissions sources and high SO2 values at violating monitors is another important factor in determining the appropriate contributing areas and the appropriate extent of the nonattainment area boundary. For this factor, EPA considered recent hourly meteorological data from the NWS site nearest to the violating monitor to determine which wind vectors were associated with 1-hour SO2 exceedances. For the Sullivan Area, 2009-2011 meteorological data was evaluated from two NWS sites in the area. The two sites are the Bristol/Tri City Airport (ID # 723183-13877) and the Virginia Highlands site (ID# 724058-53818). The Bristol/Tri City Airport is approximately 12 km southeast of the violating monitor and the Virginia Highlands site is approximately 50 kilometers northeast of the violating monitor. Data from the Virginia Highlands site was evaluated because data was not available after July 2010 from the Bristol/Tri City Airport site. The primary SO2 emissions source nearby is the Eastman Chemical Company facility, located approximately 2.5 kilometers southwest from the violating monitor. Figures 4 and 5 show that the majority of the exceeding hours have winds blowing from the southwest and west with generally moderate wind speeds. No other major sources are located near the violating monitor in the southwest to west direction. Therefore, the Eastman Chemical facility is likely the major contributor to the violations at the monitor.

(Figure 4 and 5. taken from EPA's Draft TSD)

Figure 4. Wind Rose of 2009-2011 hours exceeding the 1-hr SO_2 NAAQS at the violating monitor with wind data from the Bristol/Tri-City Airport.

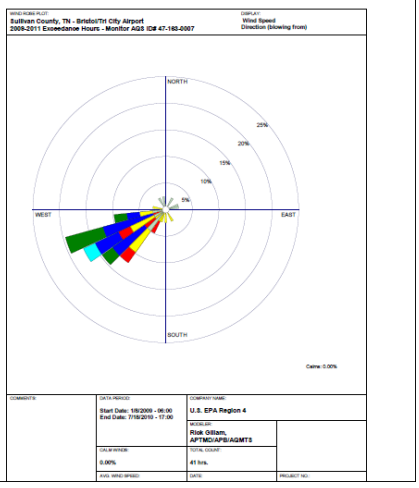
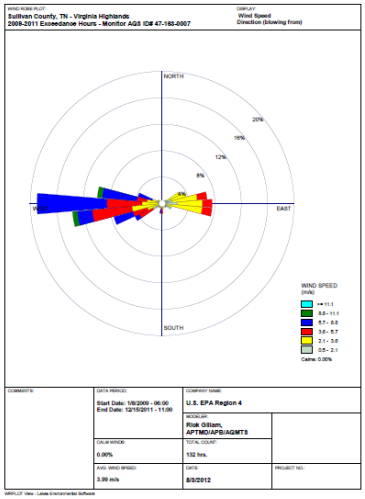


Figure 5. Wind Rose of 2009-2011 hours exceeding the 1-hr SO_2 NAAQS at the violating monitor with wind data from the Virginia Highlands site.



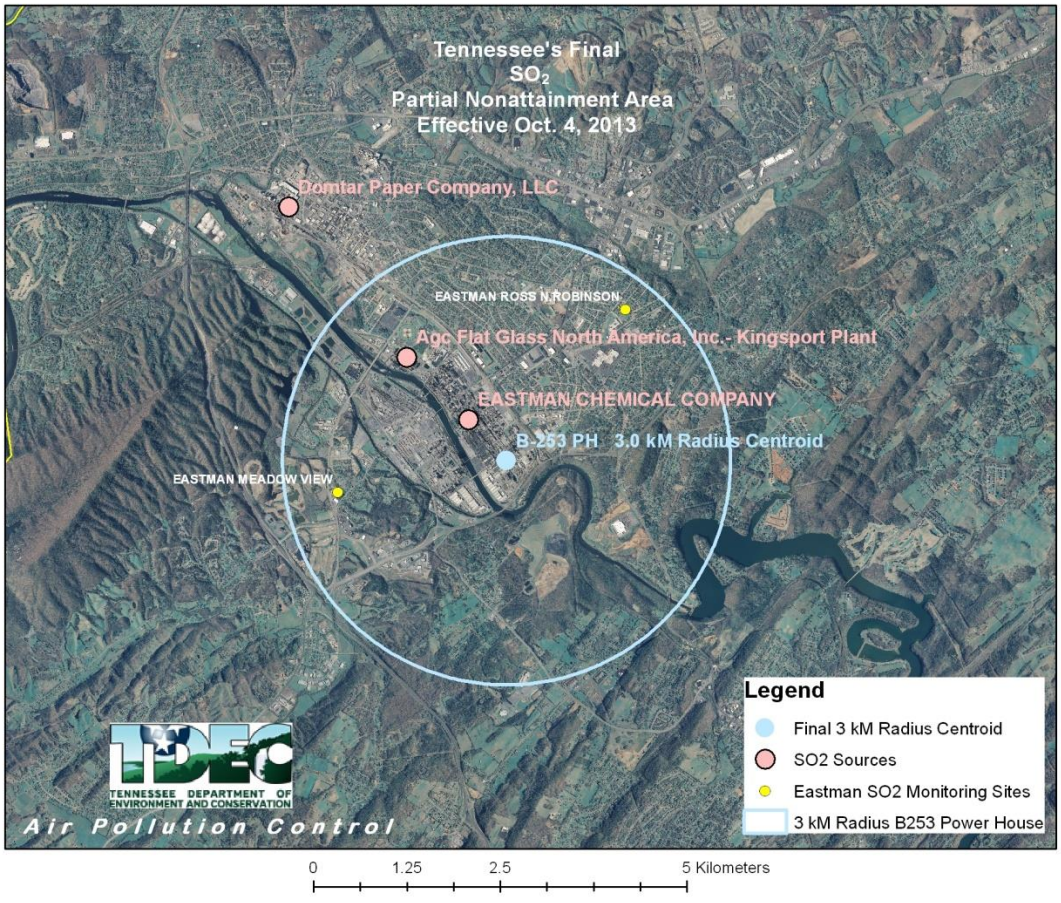
Proposed SO_2 Monitoring Site in Sullivan County, TN

The Ross N. Robinson School monitoring site has operated continuously since before 1981 by the Eastman Company.

- Site location: Located about 2.5 km ENE of the Eastman facility (downwind).

The Ross N. Robinson School site is also the site used to name the area nonattainment for the 1 hour SO_2 standard. Figure 1 below shows the relationship between the boundary of the nonattainment area and the location of the proposed SO_2 monitoring site in the north east quadrant of the circular area boundary. Given the site location is the design value site and is also located within the nonattainment area boundary, it is believed that this site should be considered a representative site for the area.

Figure 1



The following wind rose is presented to establish the representative wind directions based upon actual onsite meteorological data collected by the Eastman Company. (Figure 2).

Figure 2

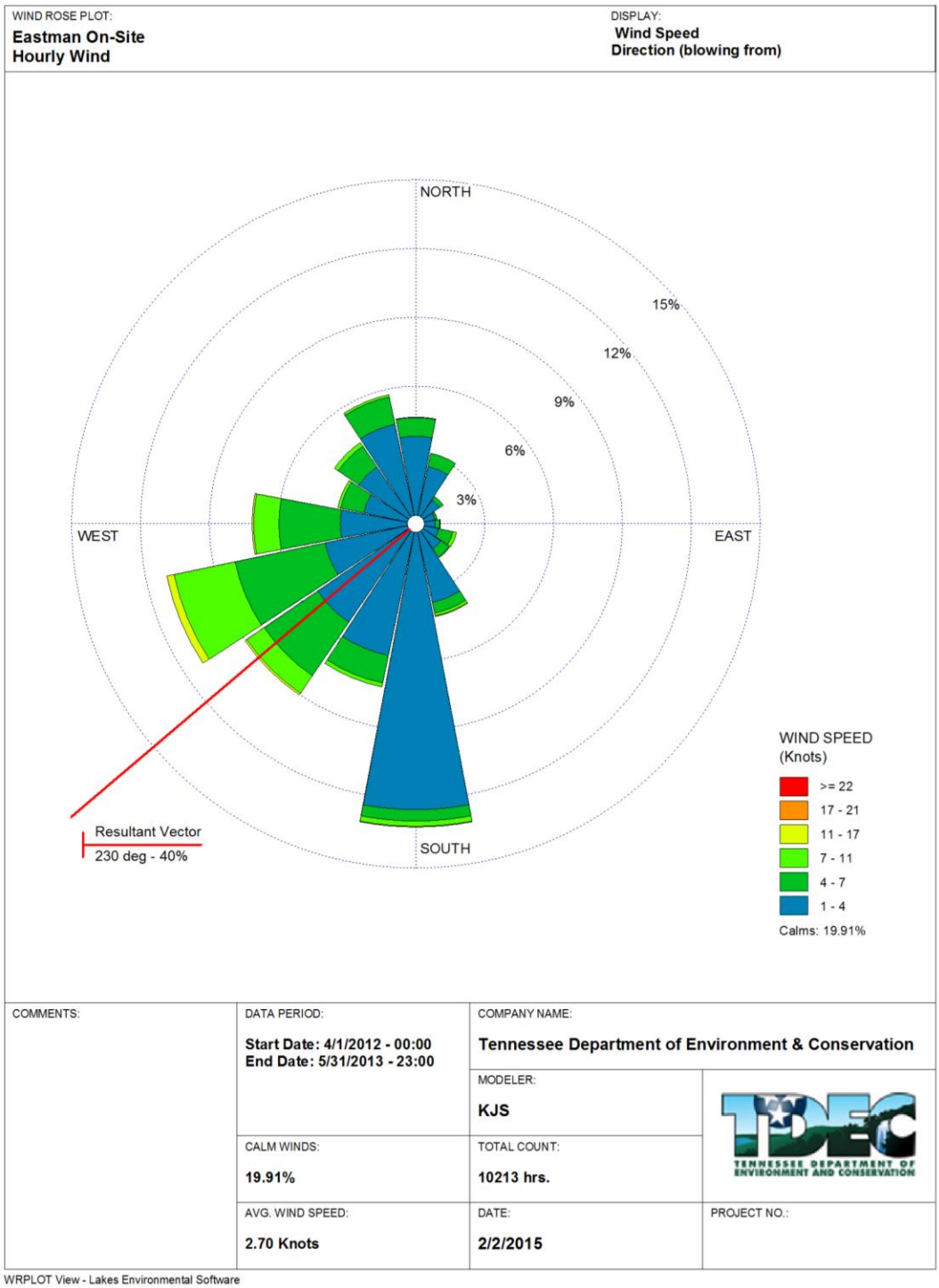
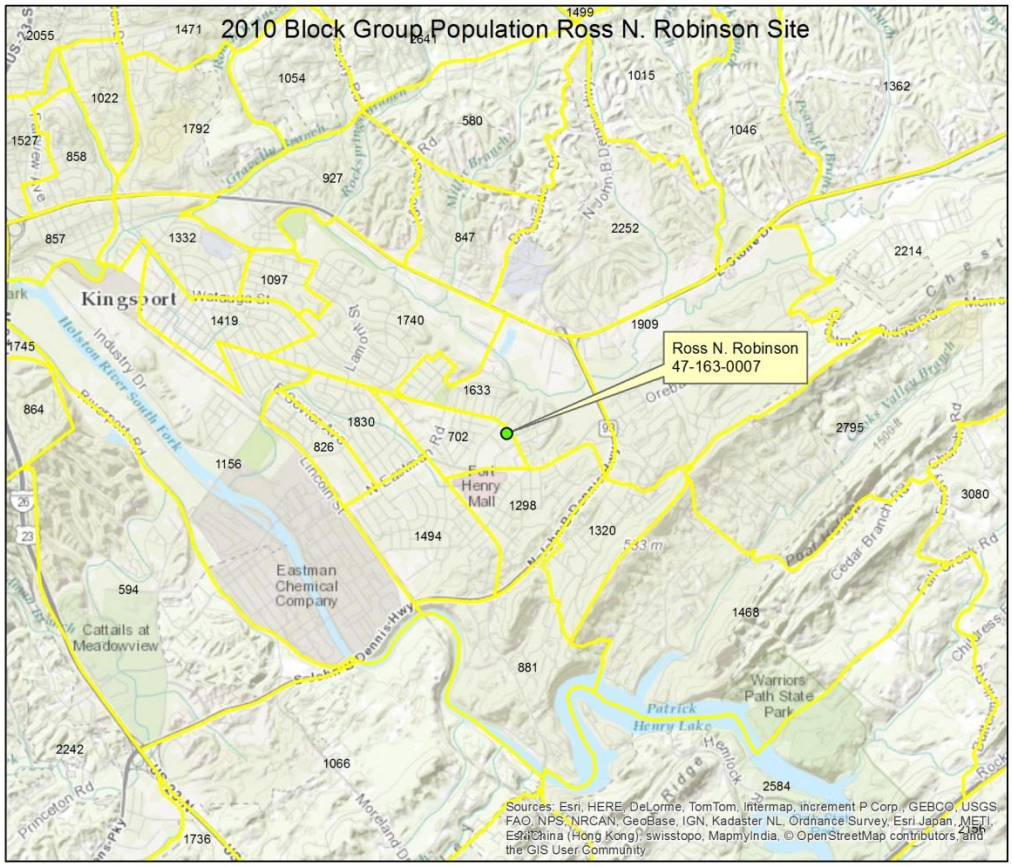


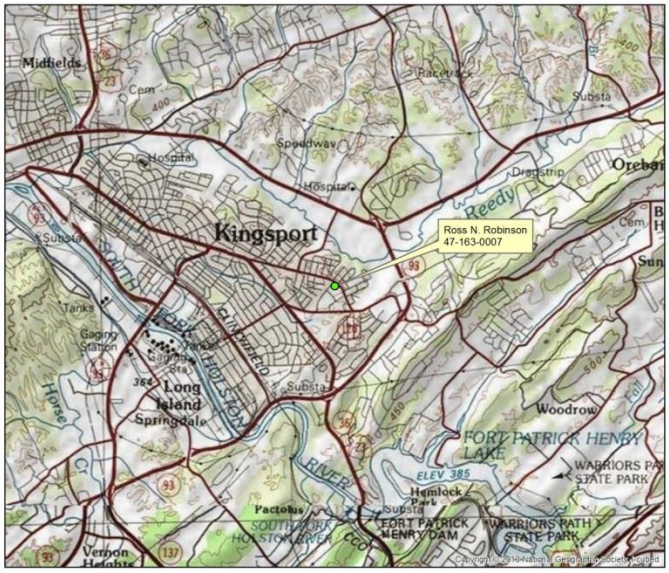
Figure 3 shows the general area around the Ross N. Robinson site and the population defined for the area by the 2010 Census. The block group population counts (total population), are identified by the yellow boundary lines with the population reported for each in black text.

Figure 3



The Ross N. Robinson site is located at approximately 1300 feet elevation as shown in the following topo map, Figure 4. In addition, the map also depicts the locations of the roads that surround the area.

Figure 4



The graphic shown in Figure 5 identifies the 2014 ADT counts for the area in and around the Ross N. Robinson site.

Figure 5

PWEI Table for Tennessee MSA's Including the Kingsport MSA

CBSA ID	CBSA Name		2008 NEI v1.5 so2 (tpy)	Population (2010)	PWEI in Million persons-tpy	Required Monitors	Population (2009) Est.	PWEI in Million persons-tpy	Required Monitors
34980	Nashville-Davidson--Murfreesboro--Franklin	TN	41,476	1,589,934	65,944	1	1,582,264	65,626	1
28940	Knoxville	TN	39,833	698,030	27,805	1	699,247	27,853	1
32820	Memphis	TN-MS-AR	17,651	1,316,100	23,231	1	1,304,926	23,034	1
28700	Kingsport-Bristol-Bristol	TN-VA	56,754	309,544	17,568	1	305,629	17,346	1
17300	Clarksville	TN-KY	16,820	273,949	4,608	0	268,546	4,517	0
25340	Harriman	TN	50,674	54,181	2,746	0	53,508	2,711	0
16860	Chattanooga	TN-GA	2,178	528,143	1,150	0	524,303	1,142	0
27740	Johnson City	TN	2,976	198,716	591	0	197,381	587	0
34100	Morristow n	TN	4,004	136,608	547	0	137,612	551	0
27180	Jackson	TN	2,894	115,425	334	0	113,629	329	0
17420	Cleveland	TN	2,692	115,788	312	0	113,358	305	0

Population Weighted Emissions Index (PWEI) Calcuations - April 2012 - Using 2010 Census Data & 2008 NEI v1.5 (no fires included)

Skyland Drive

Site Information

Existing Site 47-163-0018 (20) (To Be Operated by TDEC APCD)

The following proposed siting information supplements the supporting documentation section immediately following this table. Where applicable, the section from 40CFR58 is included.

§58.10 (a)(1)	A statement of purposes for each monitor	This monitoring site is designed to measure the maximum projected SO2 ambient impacts in the vicinity of the Kingsport SO2 nonattainment area and determine future attainment of the 1 hour SO2 standard. This monitor is required to operate to demonstrate monitored attainment of the standard.
	Site photos facing from the site in each direction (N, S, E, W)	See photographs for general site information in the next sections. These are photos of the actual site. Photographed 01 07 2016.
	Applicable measurements to any obstructions or trees	See measurement table and graphics provided in the next sections. Physical onsite measurements made at site 01 07 2016.
	Estimated probe height for the site	The probe height will be between 10 to 13 meters when installed (per siting criteria). Existing manifold is glass. New manifold will be Teflon.
§58.10 (b)	(1) The AQS site identification number.	The proposed AQS ID for the site is: 47-163-0020.
	(2) The location, including street address and geographical coordinates.	Off Skyland Drive, 36.5209, -82.5025 at the existing Eastman monitoring site.
	(3) The sampling and analysis method(s) for each measured parameter.	Sulfur Dioxide (Fluorescence Analyzer) Teledyne API M100 E SO2 analyzer, Automated Equivalent Method EQSA-0495-100 and Teledyne T700 dilution calibrator.
	(4) The operating schedules for each monitor.	The monitor will be a continuous SO2 monitor operating continuously collecting 1 minute, 5 minute and hourly SO2 data 365 days per year.
	(5) Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal.	This is a new site and is planned to operate for at least 3 years when approved.
	(6) The monitoring objective and spatial scale of representativeness for each monitor as defined in appendix D to this part.	Monitoring objective: NAAQS Compliance Spatial Scale: Neighborhood scale—Defines concentrations within some extended area of the city that has relatively uniform land use with dimensions in the 0.5 to 4.0 kilometers range. Site type: population exposure, highest concentration, source impacts.
	(7) The identification of any sites that are suitable and sites that are not suitable for comparison against the "SO_2 NAAQS".	The site will be suitable for comparison to the SO2 NAAQS. The site is proposed to be a SLAMs or SLAMs equivalent site.
	(8) The MSA, CBSA, CSA or other area represented by the monitor.	The site will be located in the Kingsport-Bristol-Bristol, TN-VA MSA CBSA # 28700. See PWEI table in the following sections that identifies the requirement for operation of a monitor in this area.

SO2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document	To adequately characterize the area going forward, and given the planned emissions controls/changes already in progress, your analysis should be based on modeling using future projected actual emissions	The TDEC APCD modeling analysis includes the future case evaluation and results. The potential site locations and method for identification of potential max concentration sites are included in the modeling analysis provided that was done following the guidance provided in the TAD. The modeling employed to identify the locations of potential highest concentration receptors that might be suitable for monitoring site placement, will be re-evaluated based on the approved attainment case modeling demonstration to be submitted later. Relocation or addition of additional monitoring sites will be considered subject to significant changes in the maximum receptor locations identified in the approved attainment case modeling demonstration.

The criteria used to evaluate and select the proposed Skyland Drive monitoring site were based in part on the following siting criteria found in 40 CFR Part 58 Appdx E and included for reference below.

TABLE E–4 OF APPENDIX E TO PART 58—SUMMARY OF PROBE AND MONITORING PATH SITING CRITERIA

Pollutant	Scale (maximum monitoring path length, meters)	Height from ground to probe, inlet or 80% of monitoring path [1] (meters)	Horizontal and vertical distance from supporting structures [2] to probe, inlet or 90% of monitoring path [1] (meters)	Distance from trees to probe, inlet or 90% of monitoring path [1] (meters)	Distance from roadways to probe, inlet or monitoring path [1] (meters)
SO_2 [3456]	Middle (300 m) Neighborhood Urban, and Regional (1 km).	2–15	>1	>10	N/A

N/A—Not applicable.

1 Monitoring path for open path analyzers is applicable only to middle or neighborhood scale CO monitoring, middle, neighbor- hood, urban, and regional scale NO_2 monitoring, and all applicable scales for monitoring SO_2, O_3, and O_3 precursors.

2 When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

3 Should be greater than 20 meters from the dripline of tree(s) and must be 10 meters from the dripline when the tree(s) act as an obstruction.

4 Distance from sampler, probe, or 90 percent of monitoring path to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler, probe, or monitoring path. Sites not meeting this criterion may be classified as middle scale (*see* text).

5 Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

6 The probe, sampler, or monitoring path should be away from minor sources, such as furnace or incineration flues. The separation distance is dependent on the height of the minor source's emission point (such as a flue), the type of fuel or waste burned, and the quality of the fuel (sulfur, ash, or lead content). This criterion is designed to avoid undue influences from minor sources.

5. SPACING FROM TREES

(a) Trees can provide surfaces for SO2, O3, or NO2 adsorption or reactions, and surfaces for particle deposition. Trees can also act as obstructions in cases where they are located between the air pollutant sources or source areas and the monitoring site, and where the trees are of a sufficient height and leaf canopy density to interfere with the normal air- flow around the probe, inlet, or monitoring path. To reduce this possible interference/obstruction, the probe, inlet, or at least 90 per- cent of the monitoring path must be at least 10 meters or further from the drip line of trees.
(b) The scavenging effect of trees is greater for O3 than for other criteria pollutants. Monitoring agencies must take steps to con- sider the impact of trees on ozone monitoring sites and take steps to avoid this problem.
(c) For microscale sites of any air pollutant, no trees or shrubs should be located between the probe and the source under investigation, such as a roadway or a stationary source.

9. PROBE MATERIAL AND POLLUTANT SAMPLE RESIDENCE TIME

(a) For the reactive gases, SO2, NO2, and O3, special probe material must be used for point analyzers. Studies have been conducted to determine the suitability of materials such as polypropylene, poly- ethylene, polyvinyl chloride, Tygon, aluminum, brass, stainless steel, copper, Pyrex glass and Teflon for use as intake sampling lines. Of the above materials, only Pyrex glass and Teflon have been found to be acceptable for use as intake sampling lines for all the reactive gaseous pollutants. Further- more, the EPA 25 has specified borosilicate glass or FEP Teflon as the only acceptable probe materials for delivering test atmospheres in the determination of reference or equivalent methods. Therefore, borosilicate glass, FEP Teflon or their equivalent must be the only material in the sampling train (from inlet probe to the back of the analyzer) that can be in contact with the ambient air sample for existing and new SLAMs.

(c) No matter how nonreactive the sampling probe material is initially, after a period of use reactive particulate matter is de- posited on the probe walls. Therefore, the time it takes the gas to transfer from the probe inlet to the sampling device is also critical. Ozone in the presence of nitrogen oxide (NO) will show significant losses even in the most inert probe material when the residence time exceeds 20 seconds. Other studies indicate that a 10 second or less residence time is easily achievable. Therefore, sampling probes for reactive gas monitors at NCore and at NO2 sites must have a sample residence time less than 20 seconds.

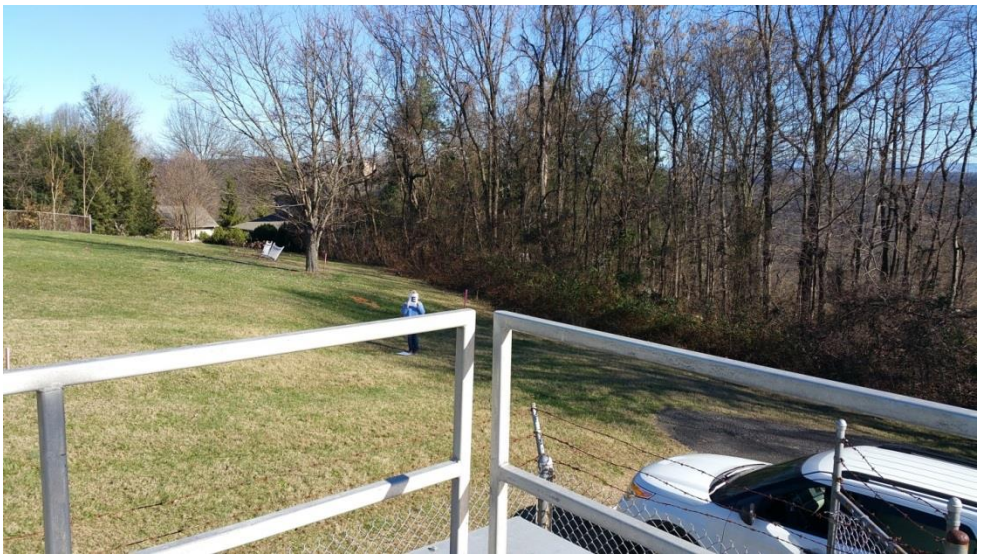
10. WAIVER PROVISIONS

Most sampling probes or monitors can be located so that they meet the requirements of this appendix. New sites with rare exceptions, can be located within the limits of this appendix. However, some existing sites may not meet these requirements and still produce useful data for some purposes. The EPA will consider a written request from the State agency to waive one or more siting criteria for some monitoring sites providing that the State can adequately demonstrate the need (purpose) for monitoring or establishing a monitoring site at that location.
10.1 For establishing a new site, a waiver may be granted only if both of the following criteria are met:
10.1.1 The site can be demonstrated to be as representative of the monitoring area as it would be if the siting criteria were being met.

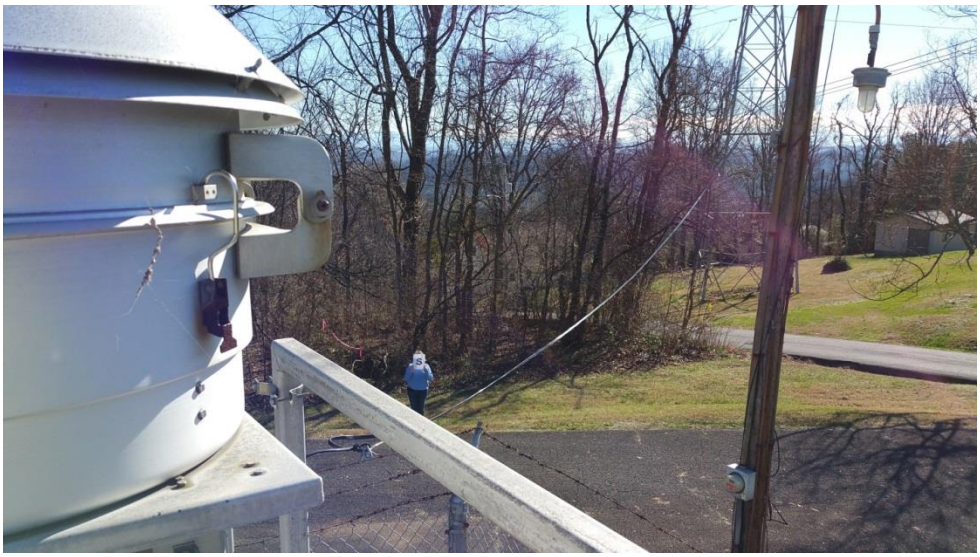
10.1.2 The monitor or probe cannot reasonably be located so as to meet the siting criteria because of physical constraints (e.g., inability to locate the required type of site the necessary distance from roadways or obstructions).
10.2 However, for an existing site, a waiver may be granted if either of the criteria in sections 10.1.1 and 10.1.2 of this appendix are met.
10.3 Cost benefits, historical trends, and other factors may be used to add support to the criteria in sections 10.1.1 and 10.1.2 of this appendix, however, they in themselves, will not be acceptable reasons for granting a waiver. Written requests for waivers must be submitted to the Regional Administrator.

58.10 (a)(1) Proposed SO2 **s**ite location and area. (Photos facing in the direction noted.

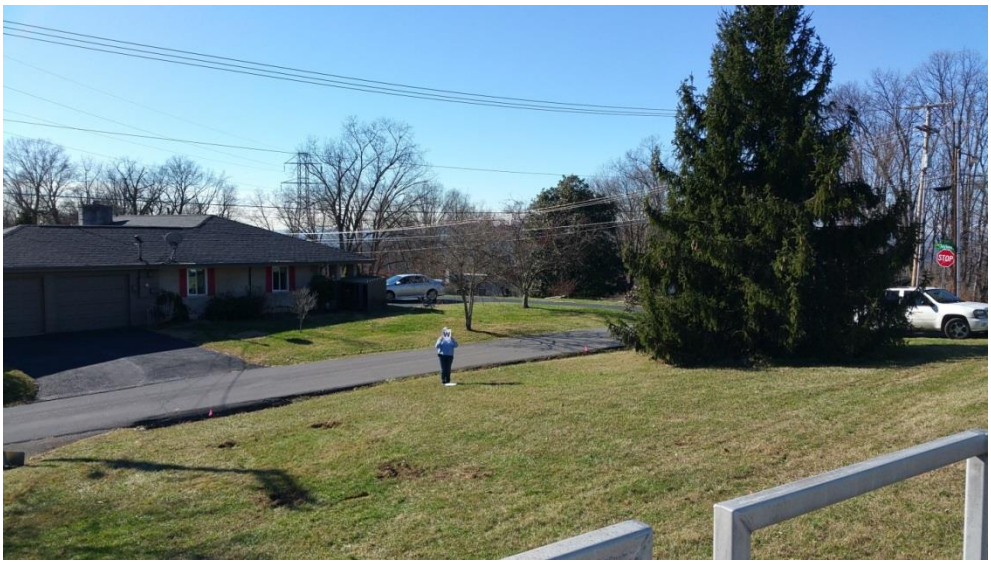
Proposed new Skyland Dr. site location looking North from area selected. 01 07 2016



Proposed new Skyland Dr. site location looking East from area selected. 01 07 2016



Proposed new Skyland Dr. site location looking South from area selected. 01 07 2016



Proposed new Skyland Dr. site location looking West from area selected. 01 07 2016

§58.10 (a)(1) Discussion of Applicable measurements to any obstructions or trees

Discussion of General and Specific Site Characteristics

The previous photographs provide details of the surrounding local terrain, urban development, location of residences and roadways. The photographs also identify the presence of trees and other obstacles that may be considered to be possible obstructions in the vicinity of the proposed sampling site for SO_2. The following analysis will identify the actual site conditions based on field measurements and field observations augmented by the accompanying imagery to identify and address any possible obstructions. Please reference the sections from 40 CFR Part 58 Appdx E in the preceding section that actually presents the criteria that must be met in order to meet the SLAMs siting criteria.

The imagery provided in the following graphic "**General Site Quadrants and Site Layout"** present the overall proposed monitoring site area and show general landscape features that need to be addressed according to the referenced siting criteria. It should be noted in the graphic that the major industrial source of SO_2 is located on the western side of the proposed monitoring site and is relatively open to air movement in that direction.

General Site Quadrants and Site Layout

The following graphic **"Site Layout with 30 Degree Sectors Identified"** is presented to help identify any potential obstruction and compare that obstruction with the required footnote 5 "**Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.**" found in Table E 4 of 40 CFR Part 58 Appdx E. It is clear that of the 360 degree area around the proposed sampling site, an existing water storage tank (tower) is present and creates a 30 degree obstruction in the NNW quadrant (360 – 30 results in 330 degrees unobstructed). It is also clear that a nearby tree line located on the SSE and SE presents an obstruction which collectively create another 60 degrees of obstruction (330 – 60 results in 270 degrees unobstructed). The exact language in Table E4 states that the site must have "**unrestricted airflow 270 degrees around the probe or sampler**". The calculations and imagery presented demonstrate this as the language in table E 4 does not state that the 270 degrees must be a **contiguous or co-joined** open area without breaks or interruptions.

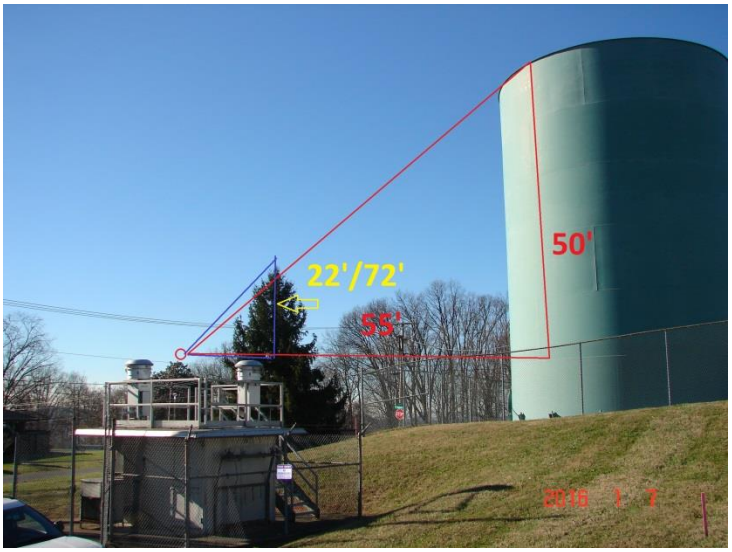
Site Layout with 30 Degree Sectors Identified

The following photographs and direct site measurements were made to establish conformance with the siting criteria found in 40 CFR Part 58 Appdx E. The view depicted in the following photograph shows the proposed sampling site in the foreground and an evergreen conifer tree in the background. This tree is also depicted in the west view photograph taken from the roof of the proposed sampling site building. The tree dripline is 20 meters from the proposed sample inlet and meets both (a) and almost meets the (b) criteria in the table below. The height measurements were made using a sample inlet height of about **1 meter above the surface of the existing building (current height of existing manifold assembly which will be replaced)** which is also approximately 3.8 meters above ground level. The tree is currently far enough away to satisfy the "**must be >10 meters**" and almost meets the "**should be >20 meters**" from the sample inlet without any other modifications to the existing manifold. In order to address the potential for future growth of the tree and to ensure the (b) criteria are currently met and no growth related encroachment on the distance requirements occurs, the property owners have agreed to allow the tree **to be pruned by an arborist to ensure these requirements are met now and in the future**.

View looking toward the plant. Main sampling direction would be considered clear with no obstructions.
Photographed 01 07 2016

Feature to Evaluate	Height Meters	Tree Dripline Meters (Radius)	Distance from Dripline or Object to Sample Inlet Meters	(a) Tree Dripline Must Be >10 Meters	(b) Tree Dripline Should Be >20 Meters	Twice Height Above Inlet Meters	Obstruction (Yes or No)
Conifer Tree	6.7	4.0	20.0	Yes	No	13.4	Yes

The view depicted in the following photograph shows the proposed sampling site in the foreground and an "evergreen tree" in the background along with a utility water tank. The "evergreen tree conifer tree" was previously discussed. The photograph is facing west north-west taken from the ground. The height measurements were made using a sample inlet height of about 1 meter above the surface of the existing building (current height of existing manifold assembly which will be replaced) which is also approximately 3.8 meters above ground level. The water tank is an obstruction and is approximately 17.1 meters from the existing sample probe inlet and is 15 meters above the existing sample probe inlet.



Photographed 01 07 2016

Feature to Evaluate	Height Meters	Distance from Dripline or Object to Sample Inlet Meters	Twice Height Above Inlet Meters	Obstruction (Yes or No)
Water Tower	15.2	17.1	30.5	Yes

The view depicted in the following photograph shows the proposed sampling site in the foreground and a "tree line" in the background. The "tree line" consists of a principal tree that is closest to the proposed site with all of the trees actually growing on property not controlled by the site owner and overhanging the property line. The trees are located south and south east of the proposed site. The photograph was taken from the ground looking across the roof of the proposed site building. The height measurements were made using a sample inlet height of about 1 meter above the surface of the existing building (current height of existing manifold assembly which will be replaced) which is also approximately 3.8 meters above ground level. The tree dripline is 12 meters from the proposed sample inlet and meets (a) but does not meet the (b) criteria in the table below. The property owner will be contacted for permission **to allow the tree to be pruned by an arborist to ensure these requirements are met now and in the future.**

Photographed 01 07 2016

Feature to Evaluate	Height Meters	Tree Dripline Meters (Radius)	Distance from Dripline or Object to Sample Inlet Meters	(a) Tree Dripline Must Be >10 Meters	(b) Tree Dripline Should Be >20 Meters	Twice Height Above Inlet Meters	Obstruction (Yes or No)
Closest Tree	21.0	8.0	12.0	Yes	No	42.1	Yes

Another tree is located on the south south-west of the proposed site which is located on property owned by the site owner in a utility easement at the entrance driveway on Bagwell Street. This tree will be removed by the property owner. In the following imagery, the tree is 13 meters from the proposed site and is currently far enough away to satisfy the (a) but does not meet the (b) criteria from the sample inlet without any other modifications to the existing manifold. **Because this tree will be removed, it will not be an obstruction for sampling**.

	Height Meters	**Tree Dripline Meters (Radius)**	**Distance from Dripline or Object to Sample Inlet Meters**	**(a) Tree Dripline Must Be >10 Meters**	**(b) Tree Dripline Should Be >20 Meters**	**Twice Height Above Inlet Meters**	**Obstruction (Yes or No)**
Tree at Drive	5.3	4.0	13.0	Yes	No	10.7	Yes

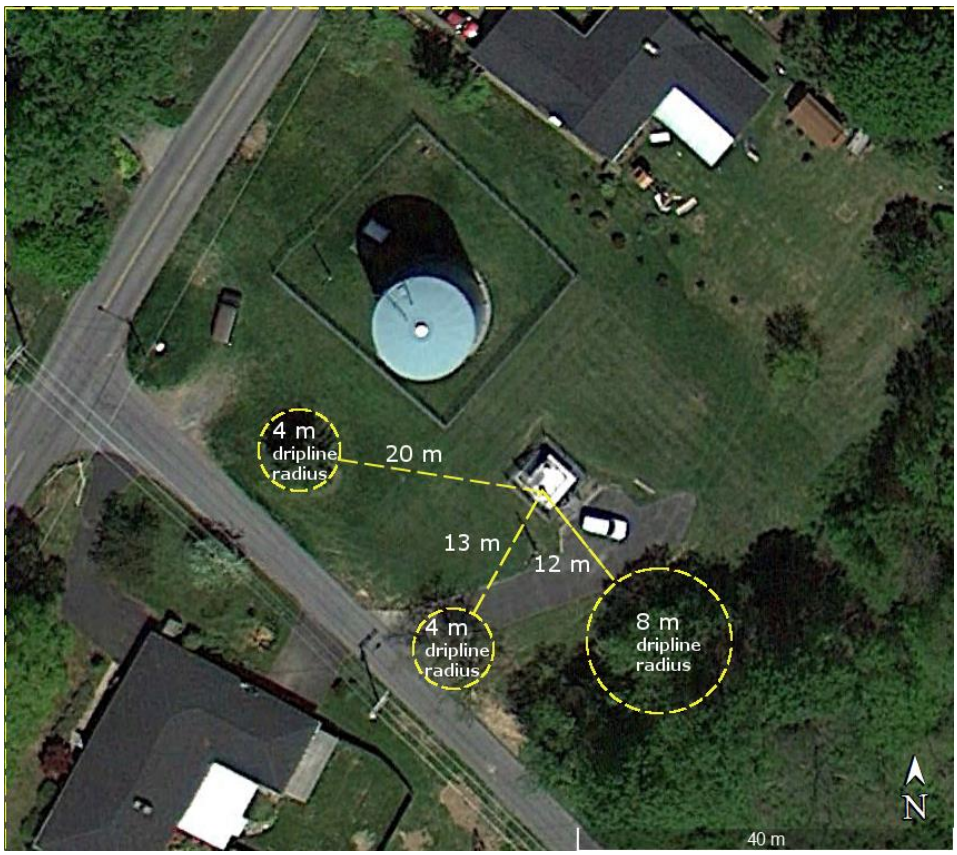


TABLE E–4 OF APPENDIX E TO PART 58—SUMMARY OF PROBE AND MONITORING PATH SITING CRITERIA

Pollutant	Scale (maximum monitoring path length, meters)	Height from ground to probe, inlet or 80% of monitoring path [1] (meters)	Horizontal and vertical distance from supporting structures [2] to probe, inlet or 90% of monitoring path[1] (meters)	Distance from trees to probe, inlet or 90% of monitoring path [1] (meters)	Distance from roadways to probe, inlet or monitoring path [1] (meters)
SO_2 [3 4 5 6]	Middle (300 m) Neighborhood Urban, and Regional (1 km).	2–15	>1	>10	N/A

N/A—Not applicable.

[1] Monitoring path for open path analyzers is applicable only to middle or neighborhood scale CO monitoring, middle, neighbor- hood, urban, and regional scale NO_2 monitoring, and all applicable scales for monitoring SO_2, O_3, and O_3 precursors.

[2] When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

[3] Should be greater than 20 meters from the dripline of tree(s) and must be 10 meters from the dripline when the tree(s) act as an obstruction.

[4] Distance from sampler, probe, or 90 percent of monitoring path to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler, probe, or monitoring path. Sites not meeting this criterion may be classified as middle scale (*see* text).

[5] Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

[6] The probe, sampler, or monitoring path should be away from minor sources, such as furnace or incineration flues. The separation distance is dependent on the height of the minor source's emission point (such as a flue), the type of fuel or waste burned, and the quality of the fuel (sulfur, ash, or lead content). This criterion is designed to avoid undue influences from minor sources.

In order to address the concerns associated with the potential obstructions identified in the above discussions, a 10 meter met tower is proposed to be installed on site immediately behind the existing monitoring building between the building and the existing water tank superstructure at ground level. Depending on spacing issues associated with lowering the tower to the ground for NPAP audit purposes, the tower may be required to be located on the north east side of the existing monitoring building. The met tower will also be equipped with an extension support pole 3 to 5 meters in length, as shown in the following photograph to further enhance the height of the met tower and to better satisfy the need for optimum vertical distance where the (a) or (b) distance criteria are not being met.

10 Meter met tower mockup at Skyland Dr. monitoring site. Location of tower will be immediately next to the monitoring shelter building.

Supporting Documentation for the Site Establishment Letter to EPA

Discussion taken from EPA's Draft TSD
http://www.epa.gov/so2designations/eparesp/04_TN_tsd.pdf

Geography/Topography (mountain ranges or other air basin boundaries)

Most of Sullivan County is located in the Ridge and Valley Geographic Region, which covers 7,703 square miles and is situated between the Cumberland Plateau and the Unaka Mountains. Sullivan County is a rural area with urban centers. The topography of this region consists of long linear ridges with elevations of 1100 to 1500 feet, and parallel lowland valleys, where the elevations vary from 700 to 1000 feet. The ridges and valleys are typically oriented from northeast to southwest. Generally, the ridges and valleys have a higher elevation in the northern part of the region and slightly less elevated in the south.

Meteorology (weather/transport patterns)

Evidence of source-receptor relationships between specific emissions sources and high SO2 values at violating monitors is another important factor in determining the appropriate contributing areas and the appropriate extent of the nonattainment area boundary. For this factor, EPA considered recent hourly meteorological data from the NWS site nearest to the violating monitor to determine which wind vectors were associated with 1-hour SO2 exceedances. For the Sullivan Area, 2009-2011 meteorological data was evaluated from two NWS sites in the area. The two sites are the Bristol/Tri City Airport (ID # 723183-13877) and the Virginia Highlands site (ID# 724058-53818). The Bristol/Tri City Airport is approximately 12 km southeast of the violating monitor and the Virginia Highlands site is approximately 50 kilometers northeast of the violating monitor. Data from the Virginia Highlands site was evaluated because data was not available after July 2010 from the Bristol/Tri City Airport site. The primary SO2 emissions source nearby is the Eastman Chemical Company facility, located approximately 2.5 kilometers southwest from the violating monitor. Figures 4 and 5 show that the majority of the exceeding hours have winds blowing from the southwest and west with generally moderate wind speeds. No other major sources are located near the violating monitor in the southwest to west direction. Therefore, the Eastman Chemical facility is likely the major contributor to the violations at the monitor.

(Figure 4 and 5. taken from EPA's Draft TSD)

Figure 4. Wind Rose of 2009-2011 hours exceeding the 1-hr SO_2 NAAQS at the violating monitor with wind data from the Bristol/Tri-City Airport.

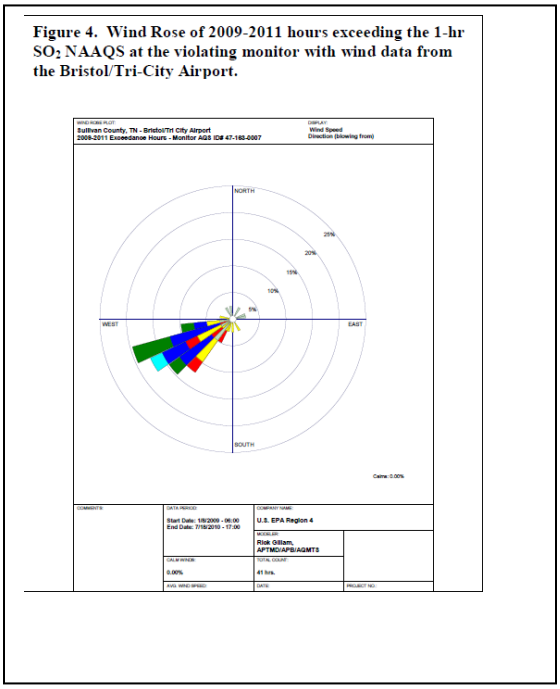
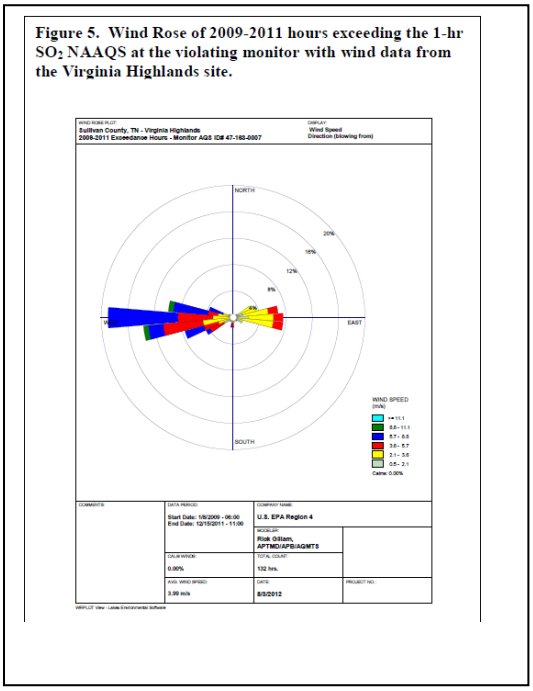


Figure 5. Wind Rose of 2009-2011 hours exceeding the 1-hr SO_2 NAAQS at the violating monitor with wind data from the Virginia Highlands site.



TDEC APCD Proposed SO_2 Monitoring Site in Sullivan County, TN

The Skyland Drive monitoring site was operated previously by Tennessee Eastman during the recent modeling study by the Eastman Company. TDEC APCD proposes to operate a new SO_2 monitor at the existing monitoring site.

- Site location: Located about 2.9 E of the Eastman facility (downwind).

Figure 1 and 1(a) below shows the relationship between the boundary of the nonattainment area and the location of the proposed SO2 monitoring site in the east quadrant of the circular area boundary. Given the site location is located within the nonattainment area boundary; it is believed that this site should be considered a representative site for the area.

Figure 1

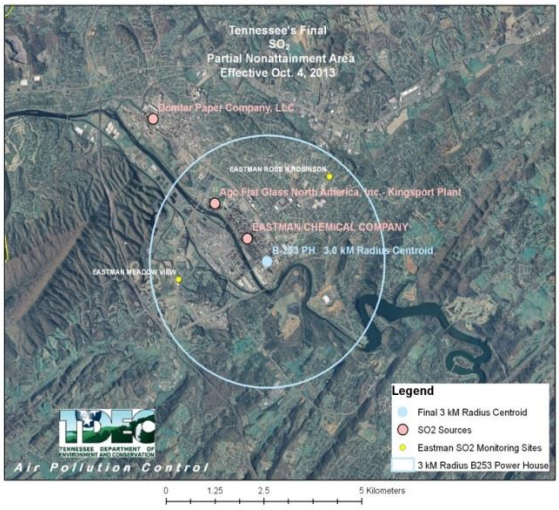
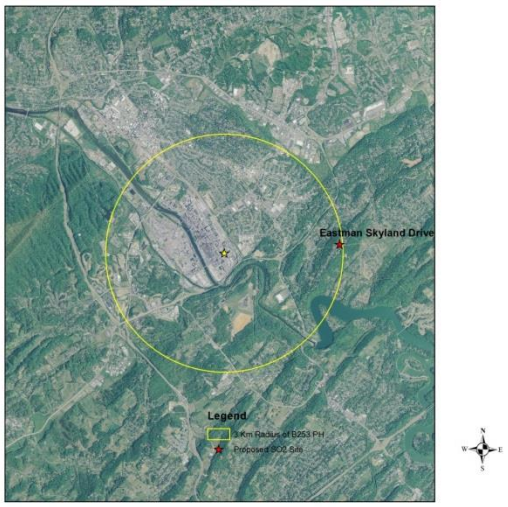


Figure 1 (a)



The following wind rose is presented to establish the representative wind directions based upon actual onsite meteorological data collected by the Eastman Company. (Figure 2).

Figure 2

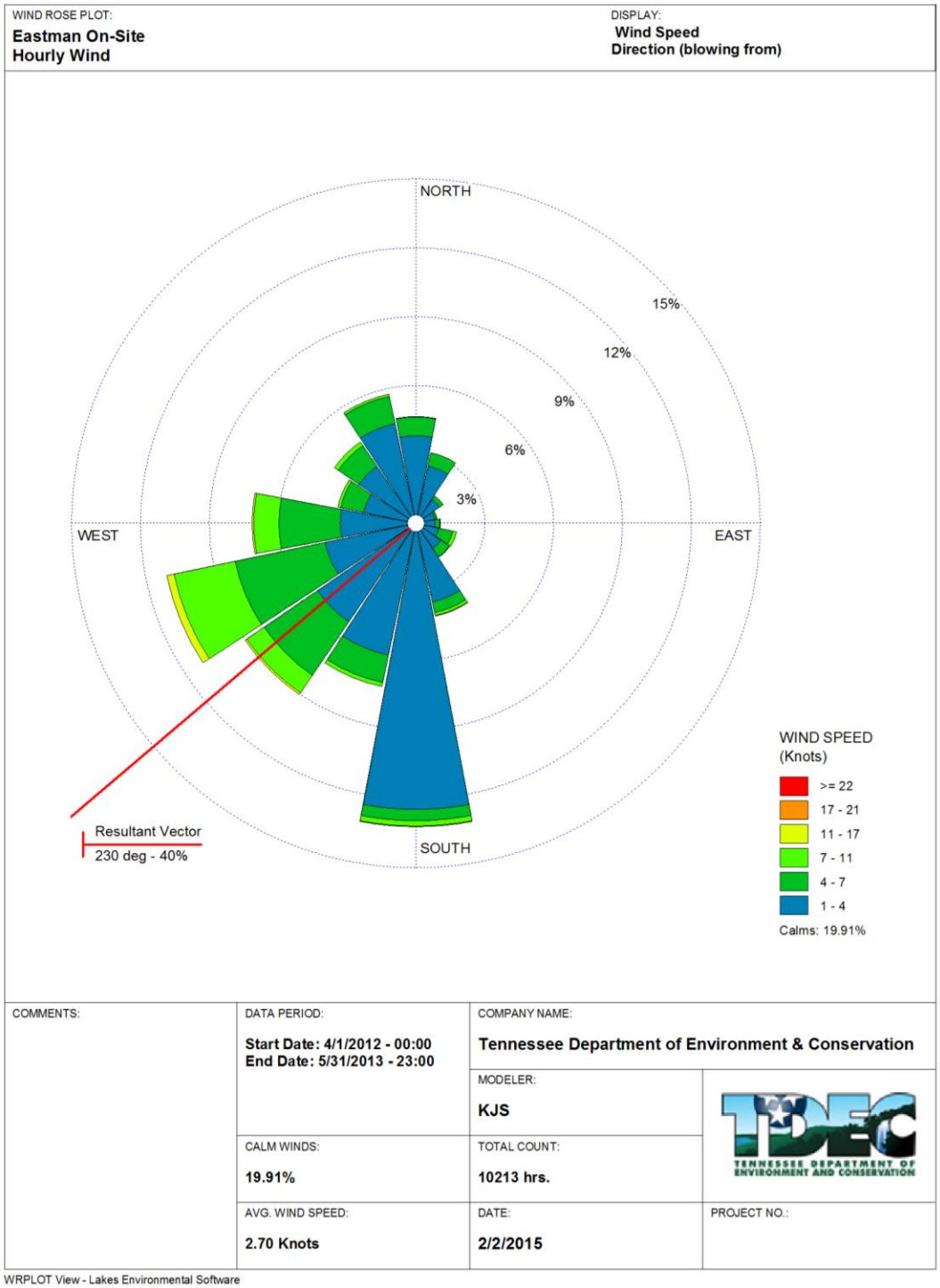
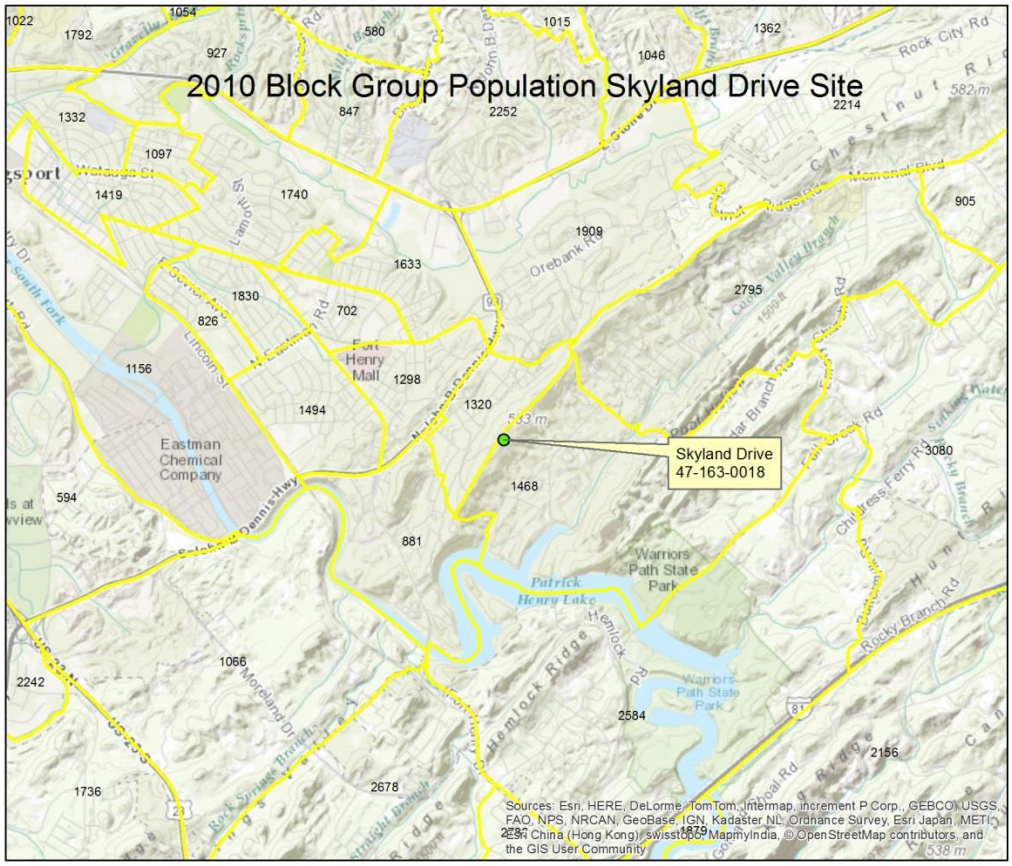


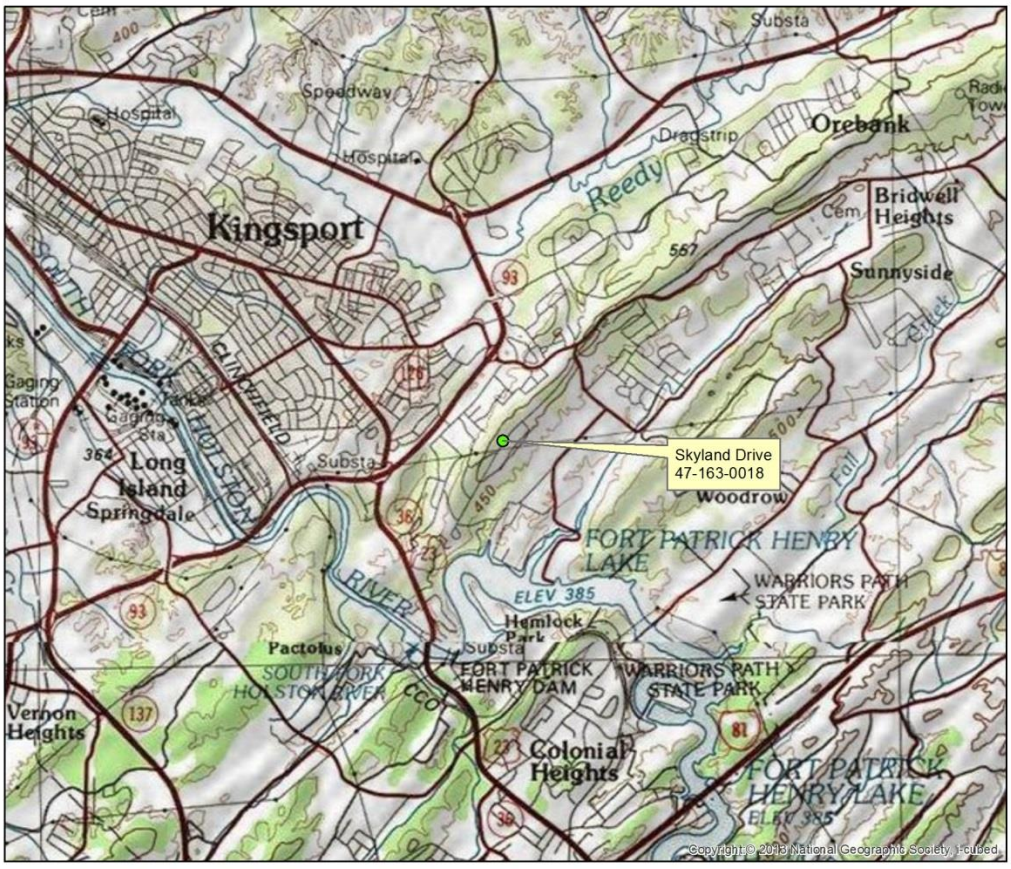
Figure 3 shows the general area around the Skyland Drive site and the population defined for the area by the 2010 Census. The block group population counts (total population), are identified by the yellow boundary lines with the population reported for each in black text.

Figure 3



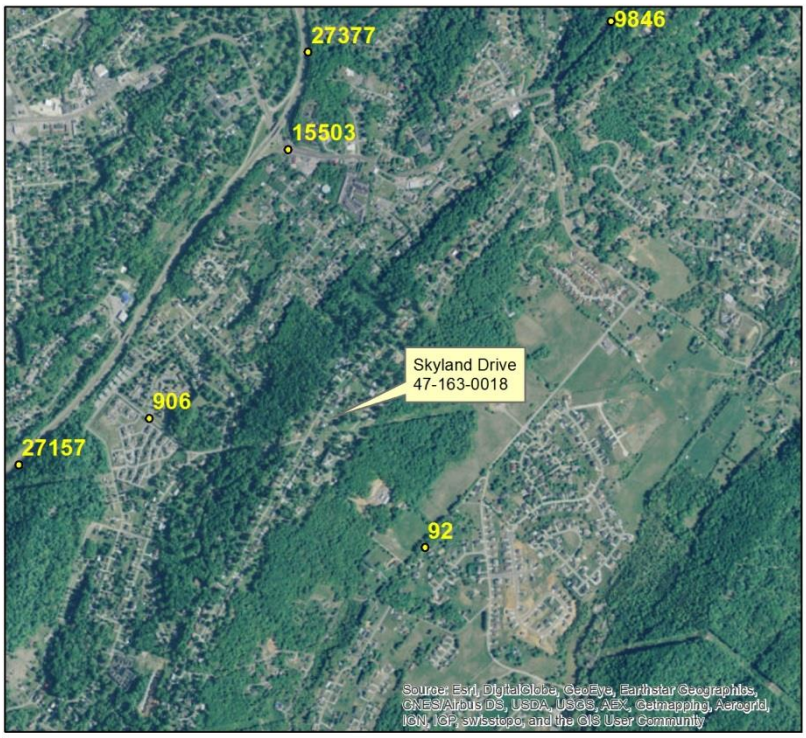
The Skyland Drive site is located at approximately 1738 feet elevation as shown in the following topo map, Figure 4. In addition, the map also depicts the locations of the roads that surround the area.

Figure 4



The graphic shown in Figure 5 identifies the 2014 ADT counts for the area in and around the Skyland Drive site.

Figure 5



PWEI Table for Tennessee MSA's Including the Kingsport MSA

CBSA ID	CBSA Name		2008 NEI v1.5 so2 (tpy)	Population (2010)	PWEI in Million persons-tpy	Required Monitors	Population (2009) Est.	PWEI in Million persons-tpy	Required Monitors
34980	Nashville-Davidson--Murfreesboro--Franklin	TN	41,476	1,589,934	65,944	1	1,582,264	65,626	1
28940	Knoxville	TN	39,833	698,030	27,805	1	699,247	27,853	1
32820	Memphis	TN-MS-AR	17,651	1,316,100	23,231	1	1,304,926	23,034	1
28700	Kingsport-Bristol-Bristol	TN-VA	56,754	309,544	17,568	1	305,629	17,346	1
17300	Clarksville	TN-KY	16,820	273,949	4,608	0	268,546	4,517	0
25340	Harriman	TN	50,674	54,181	2,746	0	53,508	2,711	0
16860	Chattanooga	TN-GA	2,178	528,143	1,150	0	524,303	1,142	0
27740	Johnson City	TN	2,976	198,716	591	0	197,381	587	0
34100	Morristow n	TN	4,004	136,608	547	0	137,612	551	0
27180	Jackson	TN	2,894	115,425	334	0	113,629	329	0
17420	Cleveland	TN	2,692	115,788	312	0	113,358	305	0

Population Weighted Emissions Index (PWEI) Calcuations - April 2012 - Using 2010 Census Data & 2008 NEI v1.5 (no fires included)

Final Proposal Letter to EPA

TN Department of Environment & Conservation

April 15, 2016

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

Re: Final Kingsport SO_2 Site Proposal

Dear Ms. Banister:

Previously; the Tennessee Department of Environment and Conservation (TDEC), Division of Air Pollution Control (DAPC), provided an opportunity for public review and comment on site proposals for the Kingsport area SO_2 air monitoring network during the 2015 Annual Network Monitoring Plan public review and inspection process that ran from May 22, 2015 through June 25, 2015. This plan was provided to EPA during that process.

An addendum to the 2015 Annual Network Monitoring Plan was prepared for a second public review and inspection process that ran from November 27, 2015 through December 29, 2015. This addendum to the plan was also provided to EPA during that process.

During recent meetings on April 5, 2016 with Daniel Garver; (Atlanta, EPA) and Stephanie McCarthy; (Athens, SESD EPA), here in Nashville, Tennessee, we informed your staff of our plan to provide our final Kingsport SO_2 monitoring site plan to EPA at this time for approval. We will also include the final site documents in the 2016 Annual Network Monitoring Plan soon to be released for public review and comment to be finalized as required before July 1, 2016. This proposal was acceptable to Daniel and Stephanie, therefore we are attaching the final site documents.

Thank you for your assistance in this endeavor.

Please feel free to contact me with questions at 615-532-0573.

Robert Brawner
Environmental Fellow
Robert.Brawner@tn.gov

Attachment