Ambient Air Monitoring Plan

KNOX COUNTY
TENNESSEE
HEALTH DEPARTMENT

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1.0 Introduction

In 2007, the U.S Environmental Protection Agency EPA) finalized amendments to the ambient air monitoring regulations. These amendments revised the technical requirements for certain types of monitoring site, programs and analyzers. Monitoring agencies are required to submit annual monitoring network plans. Knox County Air Quality is a local monitoring agency operating under a certificate of exemption from the State of Tennessee. The regulations from title 40, part 58, Section 10(1) of the Code of Federal Regulations state that: (40 CFR 58.10 (a)(1))

> *The state, or where applicable local, agency shall adopt and submit to the Regional Administrator an annual monitoring network plan which shall provide for the establishment and maintenance of an air quality surveillance system that consists of a network of SLAMS monitoring stations including FRM, FEM, and ARM monitors that are part of SLAMS, NCore stations, STN, State speciation stations, SPM stations, and/or in serious, sever and extreme ozone nonattainment areas, PAMS stations, and SPM monitoring stations. The plan shall include a statement of purposes for each monitor and evidence that siting and operation of each monitor meets the requirements of appendices A, C, D and E of this part, where applicable. The annual monitoring network plan must be made available for public inspection for at least 30 days prior to submission to EPA.*

This document is prepared and submitted to fulfill the requirements of the annual monitoring plan (AMP), as well as provide opportunity for the Knox County Department of Air Quality (Knox County Air Quality) to solicit, evaluate and respond to comments and input from the State of Tennessee Department of Environment and Conservation Division of Air Pollution Control (TDEC-APC) and the general public regarding the network. This comprehensive review serves to evaluate whether the current monitoring strategies are meeting the needs of the County, to determine compliance with all current Federal, State, and Local regulations and to aid in the development of future strategies and decisions. It also serves to identify and report the needs for changes within the network and request approval for those changes from US EPA Regional Office

1.1 Scope and Organization

Knox County Air Quality operates five locations where ambient air quality is routinely measured for air pollutants. The measured data provide the public with information on the status of the air quality. Health researchers, business interests, and others can use the data.

As required by the CFR, this document includes equipment, which have federal reference methods (FRM) or federal equivalent methods (FEM) designations. The terms FRM and FEM denote monitoring instruments that produce measurements of the ambient pollution concentrations that regulations allow to be compared to the national ambient air quality standards (NAAQS) for regulatory purposes. Also included is information regarding non-regulatory and non-criteria pollutant monitoring.

1.2 Description of Monitoring

The criteria pollutants consist of ozone (O_3), nitrogen dioxide (NO_2), Carbon monoxide (CO), Sulfur dioxide (SO_2), lead (Pb) and particulate matter (PM). Knox County operates monitoring stations for Ozone, Particulate Matter, and Lead. Knox County operates an additional EPA monitoring program for the Chemical Speciation Network (CSN).

The ambient air monitoring network is designed by considering several criteria which meet the monitoring objectives. The primary monitoring objective are monitoring compliance with the NAAQS and providing data to the public regarding in a timely manner. Logistics to be considered in design and

continuation of a site include:

- Safety, security, and accessibility
- Cost of site, relocation, maintenance, e.g. fencing, roads, vegetation clearing
- Level footprint for shelter, platforms or concrete pads
- Availability of power and communications
- Meeting pollutant specific location objectives
- Funding
- Staffing
- Proximity to other monitors and statistical relevance of data

1.3 Climate and Topography

Knox County is located within the Great Valley of East Tennessee. It is paralleled with an elevated plateau to the west and the Great Smoky Mountains to the east. The valley, characterized by long, narrow ridges, flanked by broad valleys, contains slops from 700 to 1, 500 feet above sea level. The highest peak is 2,064 ft above sea level located in the northeast quadrant. This topography is relevant in monitoring plants due to the influence on inversion events. Additionally, topography can drive pollutant levels with considerations of contributors and recipients of transport pollutants.

Knox County temperatures fall within the humid subtropical climate zone. Temperature is variable due to elevation between valleys and peaks as well as the surrounding plateau and mountains. In the valley summers are hot and humid, with the average high temperature in July of 88° F. East Tennessee averages cooler than Middle or West Tennessee. The average January low is 28 ° F. The average precipitation for the year is 57 inches with 51 inches of rain and 6 inches of snow. Weather data gathered from the National Oceanic and Atmospheric Administration (NOAA).

The wind rose for the last five years indicates the winds continue to alternate between blowing from the southwest to blowing from the northeast. Figures 1.1 and 1.2 below are windrose run at the Knoxville McGhee Tyson Airport located in Blount County, and the Oak Ridge location in Anderson County. Each of these locations are located within the Knoxville metropolitan statistical area. Wind rose developed using the cli-MATE tools provided by the Midwestern Regional Climate Center.

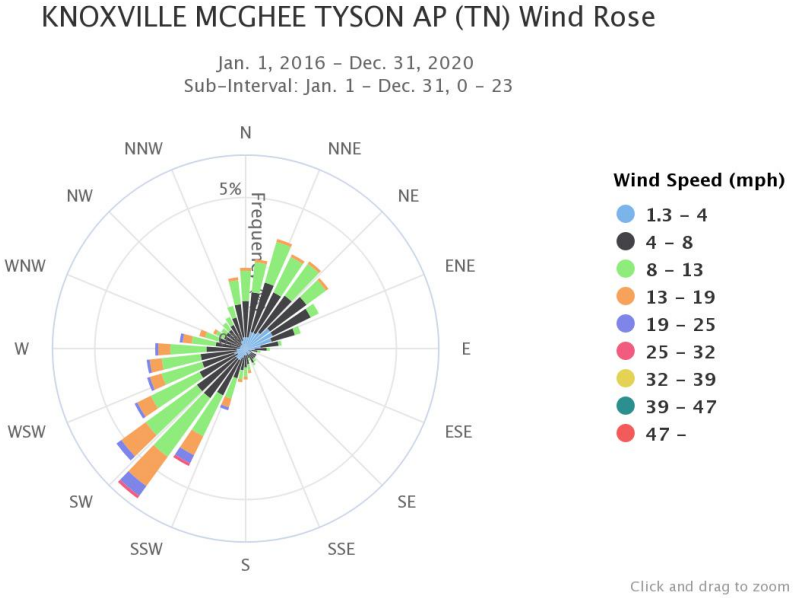


Figure 1.1 Wind Rose Knoxville

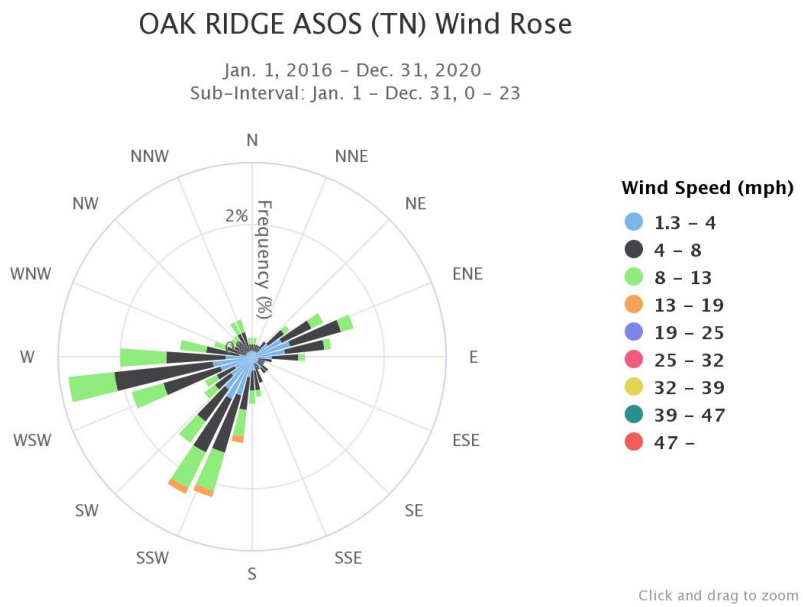


Figure 1.2 Wind Rose Oak Ridge

1.4 Population

The population for Knox County has been increasing, with a variable growth rate around 0.70%. Air monitoring network design considers two different population data metrics. The Core Based Statistical Area (CBSA) and the Metropolitan Statistical Area (MSA). The Knoxville CBSA, defined by the Office of Management and Budget, consists of Anderson, Blount, Campbell, Grainger, Knox, Loudon, Morgan, Roane and Union Counties. The Knoxville MSA was updated in 2013 to include the same 9 counties in the CBSA. Knox County Air Quality works in conjunction with the State of Tennessee for meeting the area monitoring objectives.

Table 1.3 below details the estimated population change over the 2015-2019. The American Community Survey and the Population Estimate Program, both part of the US Census Bureau, perform population estimates. The 2020 full census data will not be released until after the submittal of this document due to delays as a result of COVID-19 pandemic.

Table 1.3 Population Estimates

Geographic Area	April 1, 2010		Population Estimates (July 1)				
	Census	Estimates	2015	2016	2017	2018	2019
Anderson County,	75,129	75,082	75,456	75,528	76,056	76,287	76,978
Blount County	123,010	123,098	126,954	128,264	129,999	131,331	133,088
Campbell County	40,716	40,723	39,772	39,784	39,791	39,795	39,842
Grainger County	22,657	22,656	22,848	23,095	23,106	23,137	23,320
Knox County	432,226	432,260	451,297	456,089	461,565	466,258	470,313
Loudon County	48,556	48,561	50,916	51,373	52,260	53,082	54,068
Morgan County	21,987	21,986	21,494	21,741	21,555	21,534	21,403
Roane County	54,181	54,208	52,770	52,944	53,020	53,258	53,382
Union County	19,109	19,107	19,159	19,219	19,399	19,689	19,972
Knoxville MSA Totals	837,571	837,681	860,666	868,037	876,751	884,371	892,366

2.0 Monitoring Network

The term ‘ambient air’ is defined in 40 CFR 50.1 as “that portion of the atmosphere, external to buildings, to which the general public has access.“ Federal rules implemented by the USEPA require each state to establish a network of monitors to measure concentrations of criteria pollutants in ambient air based upon population, regional air quality, and regulatory concerns. There are 6 monitoring sites operated in Knox County that collect criteria pollutant data. (Table 2.1 and Figure 2.2).

Table 2.1 Station Identification

Station Name	Address	Latitude/Longitude	AQS ID
Air Lab	939 Stewart St	35.980756,-83.925802	47-093-1013
Ameristeel	1526 New York Ave	35.98102,-83.9544	47-093-0023
Burnside	2522 Burnside St	35.98306,-83.9523	47-093-0027
East Knox	9315 Rutledge Pike	36.0855,-83.7649	47-093-0021
Rule	1613 Vermont Ave	35.97773,-83.9504	47-093-1017
Springhill	4711 Mildred Dr.	36.01914,-83.8739	47-093-1020

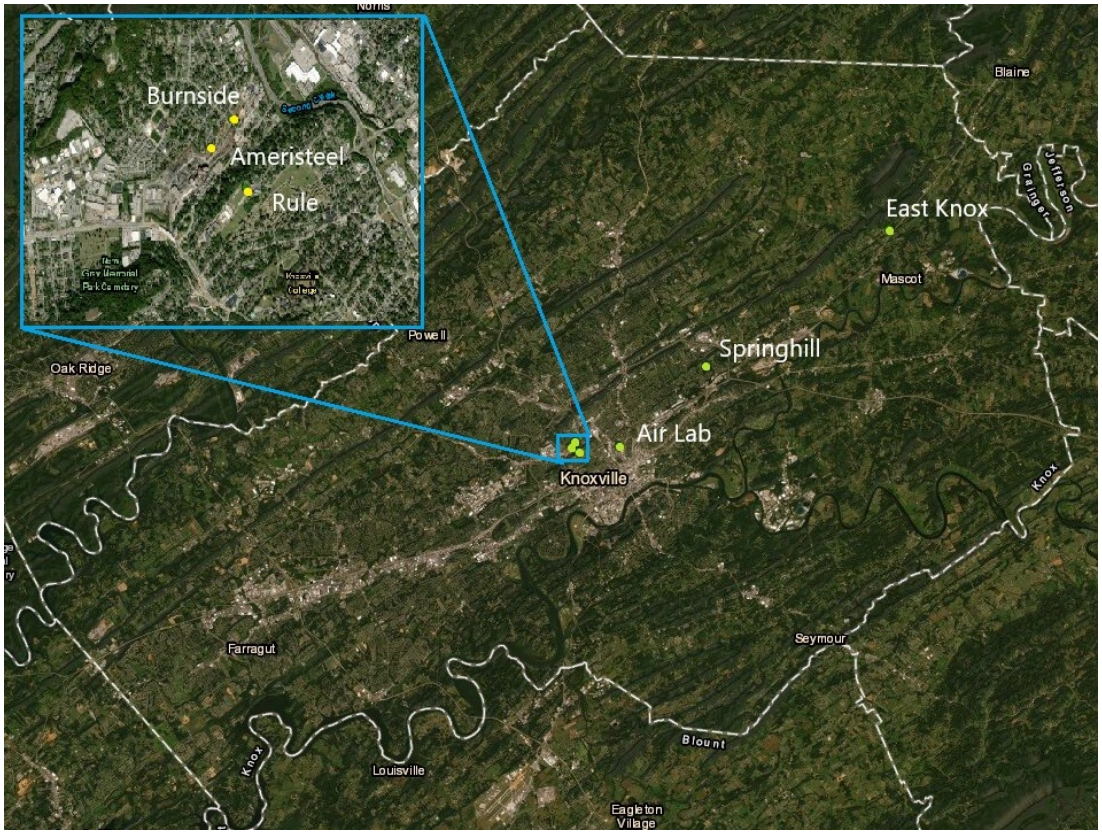


Figure 2.2 Satellite View of Monitoring Stations

2.1 Ozone (O_3) Monitoring

Ambient level ozone is sampled on a continuous basis from March – October at 2 sites in Knox county and referenced to the NAAQS ozone standard. The minimum number of ozone monitors required by 40 CFR Part 58, appendix D is summarized in Table 2.3 below.

Table 2.3 Minimum O_3 Requirements [1]

Metropolitan Statistical Area (MSA) population [2,3]	Number of Monitors per MSA	
	Most recent 3 year design value ≥85% of NAAQS [4]	Most Recent 3 year design value <85% of NAAQS [4,5]
>10 million	4	2
4-10 million	3	1
350,000- < 4 million	2	1
50,000-349,999 [6]	1	0

(1) From table D-2 of Appendix D to 40 CFR Part 58

(2) Minimum monitoring requirements apply to the (MSA)

(3) Population based on latest available census figures.

(4) O3 NAAQS levels are defined in 40 CFR part 50

(5) Minimum monitoring requirements apply in absence of a design value

(6) MSA defined as urbanized area of 50,000 or more population.

According to the 2010 Census and the extrapolated US Census Bureau's Population Estimate Program, the Knoxville MSA falls within the 350,000-<4million population category. Knox County operates ozone monitoring sites at Springhill Elementary (47-093-1020) and East Knox Elementary (47-093-0021). Table 2.4 summarizes the 8-hour O_3 values measured at the monitoring sites during the designated ozone season (March-October) of 2020. 2020 saw continued reduction O_3 values. The Springhill 2020 Design Value has dropped below 85% of the NAAQS.

Table 2.4 Ozone Concentrations 2020

Station	Concentrations			Design Value 2020	NAAQS	Is Design Value ≥ 85%of NAAQS
	Minimum	Maximum	Average			
East Knox	0.015	0.074	0.041	0.061	0.070	Yes
Springhill	0.007	0.066	0.041	0.058	0.070	No

The monitoring directives in 40 CFR Appendix D Section 5 contain specific requirements for the operation of Photochemical Assessment Monitoring Stations (PAMS) in areas classified as serious, severe, or extreme nonattainment for O_3. Knox County does not contain any O_3 nonattainment areas, therefore no PAMS monitoring is required in Knox County.

2.2 Carbon Monoxide (CO) Monitoring

Per 40 CFR 58 Appendix D Section 4.2, the requirements for CO monitoring sites are closely related to the requirements for near-road NO2 monitoring sites (see Section 2.3). Table 2.5 below summarizes the number of required CO monitoring sites. As documented in Section 1.4 of this document, the Knoxville CBSA does not meet the listed criteria, therefore none are required. There are no CO monitors in Knox County Air Quality's monitoring program.

Table 2.5 CO Monitoring Requirements

Criteria	Number of Near-Road CO Monitors Required
CBSA ≥ 1,000,000	One, collocated with an NO2 monitor or in an alternative location approved by the EPA

2.3 Nitrogen Dioxide (NO_2) Monitoring

The minimum number of NO2 monitoring sites required by 40 CFR 58 Appendix D Section 4.3 is summarized in Table 2.6.

Table 2.6 Minimum NO_2 Monitoring Requirements [1]

Requirement Type	Criteria	Minimum Monitors Required
Near road	CBSA Population ≥ 1,000,000	1
	CBSA Population ≥ 2.5 Million	2
	CBSA Population ≥ 1,000,000 and Road Segments with annual average daily traffic counts ≥ 250,000	2
Area- Wide	CBSA Population ≥ 1,000,000	1
Protection of Susceptible and Vulnerable Populations	Any area inside or outside CBSAs	As required by EPA Administrator [2]

[1] From 40 CFR 58 Appendix D Section 4.3
[2] From 40 CFR 58 Appendix D Section 4.3.4 (b)

As documented in Section 1.4 of this document, the Knoxville CBSA does not meet the listed criteria, therefore none are required. There are no NO_2 monitors in Air Quality's monitoring program.

2.4 Sulfur Dioxide (SO2) Monitoring

The EPA criteria used to determine the numbers of required SO_2 monitors is based upon two metrics: The Core Based Statistical Area (CBSA), and the Population Weighted Emissions Index (PWEI). The emissions are based upon the most current emissions inventory calculations. The largest emission sources for SO_2 in the CBSA lays outside the county. The Knoxville CBSA PWEI can be calculated as follows:

Knoxville CBSA 2019 census estimate: 892,366
2017 SO2 Emissions (tones per year): 3,421.23
PWEI= (892,366*3,421.23)/1,000,000 = 3,053

There are no SO_2 monitors required or located in Knox County.

2.5 Lead (Pb) Monitoring

The lead monitoring design rule in 40 CFR 58 Appendix D Section 4.5 requires monitoring agencies to establish monitoring near industrial facilities that emit more than 0.5 tons per year (tpy) of lead into the atmosphere, and at specified airports. None of the listed airports are located in Knox County, but one facility reports annual lead emissions in excess of the 0.5 tpy emissions threshold. The Commercial Metals Company (CMC) plant (formerly Gerdau) reported total lead emissions of 0.64 tons for calendar year 2020. The value exceeds the 0.5 tpy monitoring threshold. Knox County Air Quality operates 2 lead

monitoring sites surrounding the plant which includes one collocated site. The Ameristeel site (47-093-0023) is the source-oriented site required by the rule. This site was established to provide data at the fence line of the plant. The Burnside site (47-093-0027) contains an official and collocated monitor. It was the source specific monitor until 2011 when replaced by the Ameristeel site. Knox County Air Quality has continued to operate the Burnside site (47-093-0027) for additional population exposure data. Knox County Air Quality, as directed in response to the 2020 Annual Monitoring Plan, is requesting the relocation of the Burnside Site to a new site on Tennessee Ave and moving the collocated monitor to the Ameristeel site. Please refer to section 4.1 for all required documentation.

2.6 Particulate Matter (PM_{10}) Monitoring

The minimum number of PM_{10} monitoring sites required by 40 CFR 58 Appendix D Section 4.6 is shown in Table 2.7.

Table 2.7 Minimum PM_{10} Monitoring Requirements [1]

	Number of Monitors per MSA [1]		
Population Category	**High Conc.** [2]	**Medium conc.** [3]	**Low conc.**[4][5]
>1,000,000	6 - 10	4 - 8	2 - 4
500,000 - 1,000,000	4 - 8	2 - 4	1 - 2
250,000- 500,000	3 - 4	1 - 2	0 - 1
100,000 - 250,000	1 - 2	0 - 1	0

[1] From Table D-4 of Appendix D to 40 CFR Part 58. Selection of urban areas and number of stations per MSA within ranges shown are jointly determined by EPA, TDEC, and Air Quality

[2] High concentration areas are those for which data exceeds the NAAQS by 20 % or more

[3] Medium concentration areas are those for which data exceeds 80% of the NAAQS

[4] Low concentration areas are those for which data is less than 80% of the NAAQS

[5] Low concentration requirements apply in the absence of a design value.

The Knoxville MSA is a low concentration 500,000-1,000,000 population category requiring 1-2 monitors. Air Quality operates one continuous monitor at the Air Lab site, the APTI-T640x.

2.7 Fine Particulate Matter ($PM_{2.5}$) Monitoring

The minimum number of $PM_{2.5}$ monitoring sites required by 40 CFR 58 Appendix D Section 4.7 is shown in Table 2.8. In addition to the minimum number of primary monitors required in the network, 40 CFR part 58 appendix A requires

> *"For each distinct monitoring method designation (FRM or FEM) that a PQAO is using for a primary monitor, the PQAO must have 15 percent of the primary monitors of each method designation collocated (values of 0.5 and greater round up); and have at least one collocated quality control monitor (if the total number of monitors is less than three). The first collocated monitor must be a designated FRM monitor"*

Table 2.8 Minimum $PM_{2.5}$ Monitoring Requirements [(1)]

	Number of Monitors per MSA	
MSA Population [(2)]	**Most recent 3 year design value ≥ 85% of any $PM_{2.5}$ NAAQS [(3)]**	**Most recent 3-year design value < 85% of any $PM_{2.5}$ NAAQS [(3)]**
> 1,000,000	3	2
500,000 - 1,000,000	2	1
50,000 -<500,000	1	0

[(1)] From Table D-5 of appendix D to 40 CFR Part 58.

[(2)] Population based on latest available census figures.

[(3)] Minimum monitoring requirements apply in absence of design value

The NAQQS primary standard for the annual mean and the 24-hour average is taken from a 3-year average Based upon the population data and most recent design values, the Knoxville MSA is required to operate 1 primary and 1 collocated $PM_{2.5}$ monitors. Air Quality operates 5 SLAMS monitors which include 3 primary monitors (all continuous method) and 2 collocated FRM monitors. One of the continuous monitors is also used for Air Quality Index (AQI) reporting. Table 2.9 gives the 2020 design values by site.

Table 2.9 $PM_{2.5}$ NAAQS Comparisons

Site	NAAQS Design Values($\mu g/m^3$)	
	24 hour	**Annual**
Air Lab	15	8.0
Rule	18	8.1
Springhill	15	7.2

Additionally, Section 4.7.2 of 40 CFR Part 58 Appendix D requires that agencies operate continuous analyzers in at least one-half of the required $PM_{2.5}$ monitoring sites and at least one analyzer per MSA must be collocated with a sequential Federal Reference Method (FRM) analyzer. All primary monitors in the network are continuous analyzers. The monitors at Rule and Air Lab are both collocated.

2.8 Chemical Speciation

The $PM_{2.5}$ monitoring criteria in 40 CFR 58 Appendix D Section 4.7.4 requires that each state continue to conduct $PM_{2.5}$ Chemical Speciation monitoring at locations designated to be part of the National Speciation Trends Network (STN). Air Quality operates one of these speciation sites at Springhill Elementary (47-093-1020).

2.9 National Core Monitoring

Section 3 of Appendix D to 40 CFR part 58 requires that each state operate at least one NCore multi-pollutant monitoring site. By definition, each NCore site must include monitoring equipment to measure $PM_{2.5}$, $PM_{10-2.5}$, speciated $PM_{2.5}$, O_3, SO_2, CO, NO, NOx, lead, and basic meteorology. Knox County is not a chosen NCore site within the State of Tennessee.

3.0 Monitoring Sites

The following section shall detail in the individual sites within the monitoring network, including location, equipment, pollutants monitored and most recent siting evaluation.

3.1 Air Lab

Figure 3.1 Air Lab Site Photo

The Air Lab site is a particulate site, located in the city limits of Knoxville, in a mixed-use zoning area. It is surrounded by residential and commercial facilities. The Teledyne T640X light scattering monitor is used for reporting the Air Quality Index (AQI).

Address	939 Stewart St, Knoxville 37917	
AQSID	470931013	
Latitude	35.980756N	
Longitude	83.925769W	
Pollutant	PM 2.5	PM 2.5/ PM 10
Parameter Code	88101	88101, 81102
Monitor Type	SLAMS	SLAMS
POC	1	3,4
Interval	24-Hour	24-Hour
Collection Frequency	1:6	Hourly
Method	145	238,239
FRM/FEM Monitoring Instrument	Thermo Partisol Plus 2025	Teledyne T640X
Analysis	Gravimetric	Light Scattering
Ref Method ID	RFPS-0498-118	EQPM-0516-238 EQPM-0516-239
Monitor Objective Type	Collocated	Population Exposure
Dominant Source	Mobile	Mobile
Measurement Scale	Middle Scale	Middle Scale
Land Use Type	Mobile	Mobile
Location Setting	Urban and City Center	Urban and City Center
Date Established	20110101	20171001

Table 3.2 Air Lab Monitoring Details

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Site Name: Air Lab
AQSNo: 47-093-1013
Coordinate 35.980756, -83.925802

Date: 3/9/2021
Site Address: 939 Stewart St
Inspected by: Rebecca Larocque

Pollutant	Scale	Probe Height [1]	Flow (hi or Low)	Separation from samplers [1]	Pass/Fail	Distance to Road [1]	Pass/Fail
$PM_{2.5}$ FRM	Middle	4.6	Low	1.7	Pass	15.3	Pass
$PM_{2.5-10}$ Continous	Middle	4.9	Low			15.8	Pass

				Tree	
Obstruction type [2]	Obst. Height [1]	Obst. Distance [1,2]	Pass/Fail	Dripline [1]	Pass/ Fail
Closest Tree €	15	25	Pass	17.5	Pass

[1] All Measurements in meters
[2] Including vertical and horizontal separation from walls &/or parapets if applicable

Collocated Samplers must be within 4 m of each other and at least 2 m apart for hi vol, at least 1 m for low volume
Obstruction Distance must be ≥ 2* (Obst height - probe height)
Tree Dripline must be >10 m away, prefer >20m
Horizontal and vertical disance on rooftop 1m for O_3 gases - 2m for all others
Unrestricted air flow must be ≥ 270 °

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Site Drawing

Estimated Degree of Unrestricted Air Flow: 360°

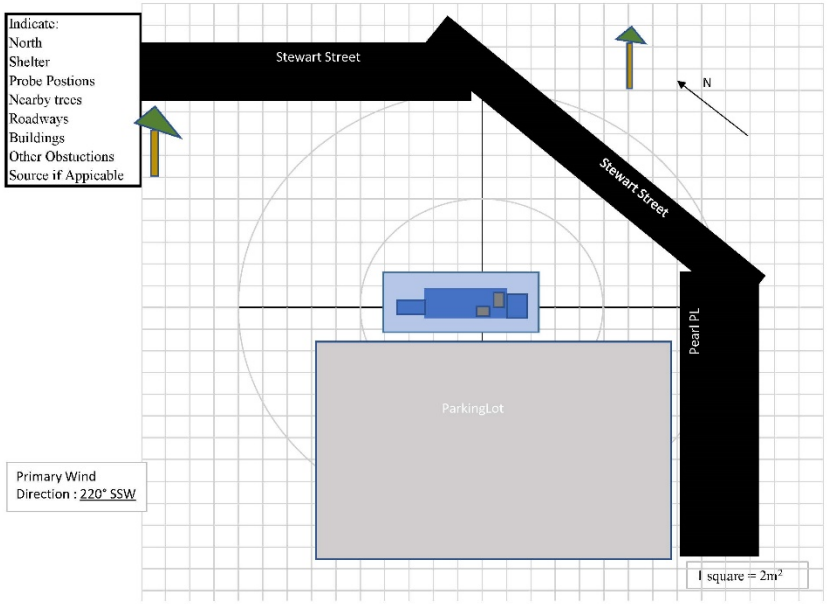


Figure 3.3 Air Lab Site Evaluation pgs 1 & 2

KNOX COUNTY TENNESSEE HEALTH DEPARTMENT

Siting Evaluation Form

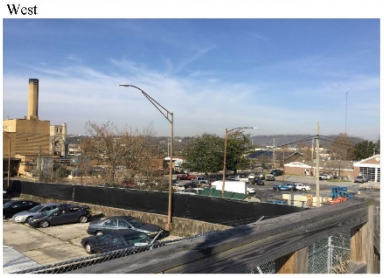
Photos facing out from monitor to cardinal direction

North

South

East

West



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Siting Evaluation Form
Rev 1, 02/10/2020

KNOX COUNTY TENNESSEE HEALTH DEPARTMENT

Siting Evaluation Form

Photos from cardinal direction facing in towards monitor

North

South

East

West

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Figure 3.4 Air Lab Site Evaluation pg 3 & 4

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Figure 3.5 Air Lab Site Eval. pg 5

3.2 Ameristeel

Figure 3.6 Ameristeel Site Photo

This is a lead only site established as a source-oriented site to fulfill the requirements in 40 CFR part 58 App. D 4.5. It is located in the urban core, downwind of the source. This site was lowered in March 2021 and space added for collocation.

Address	1526 New York Ave, 37921
AQSID	470930023
Lat	35.981
Lon	-83.9543
Pollutant	Lead
Parameter Code	14129
Monitor Type	SLAMS
POC	1
Interval	24-hour average
Collection Frequency	1:6
Method	193
FRM/FEM Monitoring Instrument	High Volume PB-TSP
Analysis	ICP - Mass Spectroscopy
Ref Method ID	RFLA-0813-813
Monitor Objective Type	Source Oriented
Dominant Source	Point
Measurement Scale	Microscale
Land Use Type	Residential
Location Setting	Urban Center
Date Established	20110101

Table 3.7 Ameristeel Monitoring Details

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Site Name: Ameristeel
AQSNo: 47-093-0023
Coordinates: 35.98102, -83.9544

Date: 4/6/2021
Site Address: 1526 New York Ave
Inspected by: Rebecca Larocque

Pollutant	Scale	Probe Height [1]	Flow (hi or Low)	Separation from samplers [1]	Pass/Fail	Distance to Road [1]	Pass/Fail
Lead	Microscale	2.69	Hi	N/A		12.8	Pass

				Tree	
Obstruction type [2]	Obst. Height [1]	Obst. Distance [1,2]	Pass/Fail	Dripline [1]	Pass/ Fail
Small trees NNE	4.9	12.4	Pass	10.6	Pass
Large Tree SW	15.8	34.4	Pass	>20	Pass

[1] All Measurements in meters
[2] Including vertical and horizontal separation from walls &/or parapets if applicable

Collocated Samplers must be within 4 m of each other and at least 2 m apart for hi vol, at least 1 m for low volume
Obstruction Distance must be ≥ 2* (Obst height - probe height)
Tree Dripline must be >10 m away, prefer >20m
Horizontal and vertical disance on rooftop 1m for O_3, gases - 2m for all others
Unrestricted air flow must be ≥ 270 °

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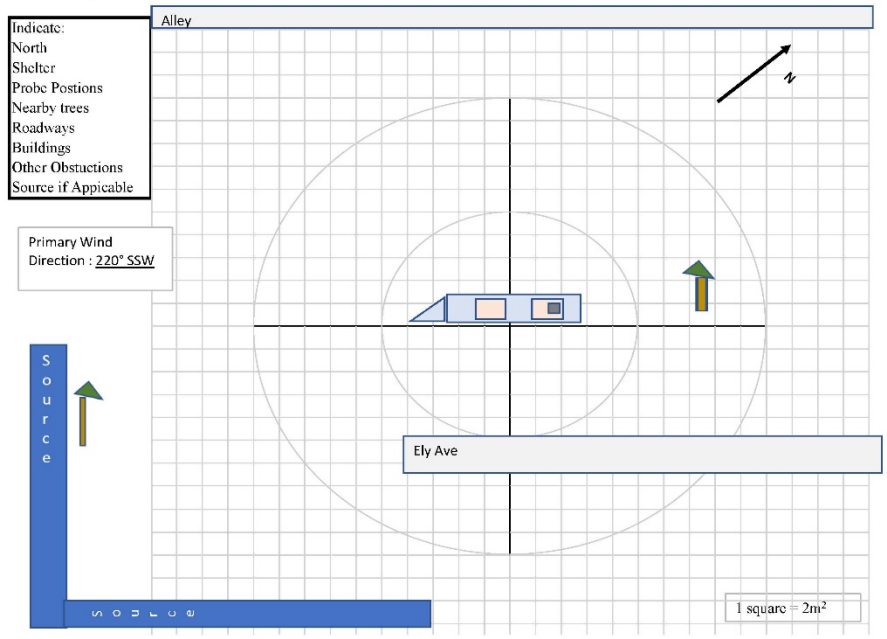
Siting Evaluation Form
Rev 1, 02/10/2020

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Site Drawing

Estimated Degree of Unrestricted Air Flow: 360°



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Siting Evaluation Form
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Figure 3.8 Ameristeel Site Evaluation pgs 1&2

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Photos facing out from monitor to cardinal direction

North

South

East

West

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Siting Evaluation Form
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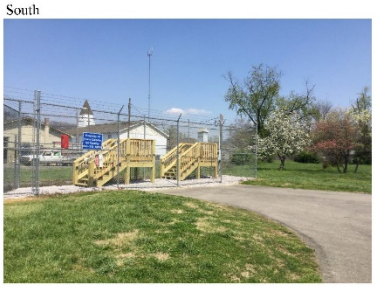
KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Photos from cardinal direction facing in towards monitor

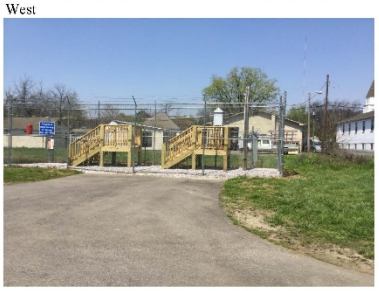
North

South



East

West



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Siting Evaluation Form
Rev 1, 02/10/2020

Figure 3.9 Ameristeel Site Evaluation pgs 3 &4

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Figure 3.10 Ameristeel Site Eval pg 5

3.3 Burnside

Figure 3.11 Burnside Site Photo

The Burnside site is in the Urban Industrial section of the city of Knoxville. The site was established in 1994 and serve as a source-oriented lead monitor and collocated monitoring site. The Ameristeel Site is now the source-oriented monitor and the Burnside site serves as a population exposure site. This site is requested to be relocated to Tennessee Ave and collocation moved to Ameristeel site.

Address	2522 Burnside St, 37921	
AQSID	47090027	
Lat	35.98306	
Lon	-83.95226	
Pollutant	Lead	Lead
Parameter Code	14129	14129
Monitor Type	SLAMS	SLAMS
POC	1	2
Interval	24-hour average	24-hour average
Collection Frequency	1:6	1:6
Method	193	193
FRM/FEM Monitoring Instrument	Hi-Vol Pb-TSP	Hi-Vol Pb-TSP
Analysis	ICP - Mass Spectroscopy	ICP - Mass Spectroscopy
Ref Method ID	RFLA-0813-813	RFLA-0813-813
Monitor Objective Type	Population Exposure	Quality Assurance - Collocated
Dominant Source	Point	Point
Scale	Neighborhood	Neighborhood
Land Use Type	Industrial	Industrial
Location Setting	Urban and City Center	Urban and City Center
Date Established	19941204	19941204

Table 3.12 Burnside Monitoring Details

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Site Name: Burnside
AQSNo: 47-093-0027
Coordinate 35.98306, -83.9523

Date: 3/9/2021
Site Address: 2522 Burnside St, 37921
Inspected by: Rebecca Larocque

Pollutant	Scale	Probe Height [1]	Flow (hi or Low)	Separation from samplers [1]	Pass/Fail	Distance to Road [1]	Pass/Fail
Lead - Official	Neighborhood	2M	Hi	2.56M	Pass	24.0M	Pass
Lead Collocated	Neighborhood	2M	Hi	2.56M	Pass	23.8M	Pass

				Tree	
Obstruction type [2]	Obst. Height [1]	Obst. Distance [1,2]	Pass/Fail	Dripline [1]	Pass/ Fail
Tree SW quadrent	20	18		10.5	Pass
Firehouse	6.2	26.2	Pass		

[1] All Measurements in meters
[2] Including vertical and horizontal separation from walls &/or parapets if applicable

Collocated Samplers must be within 4 m of each other and at least 2 m apart for hi vol, at least 1 m for low volume
Obstruction Distance must be ≥ 2* (Obst height - probe height)
Tree Dripline must be >10 m away, prefer >20m
Horizontal and vertical disance on rooftop 1m for O_3 gases - 2m for all others
Unrestricted air flow must be ≥ 270 °

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Siting Evaluation Form
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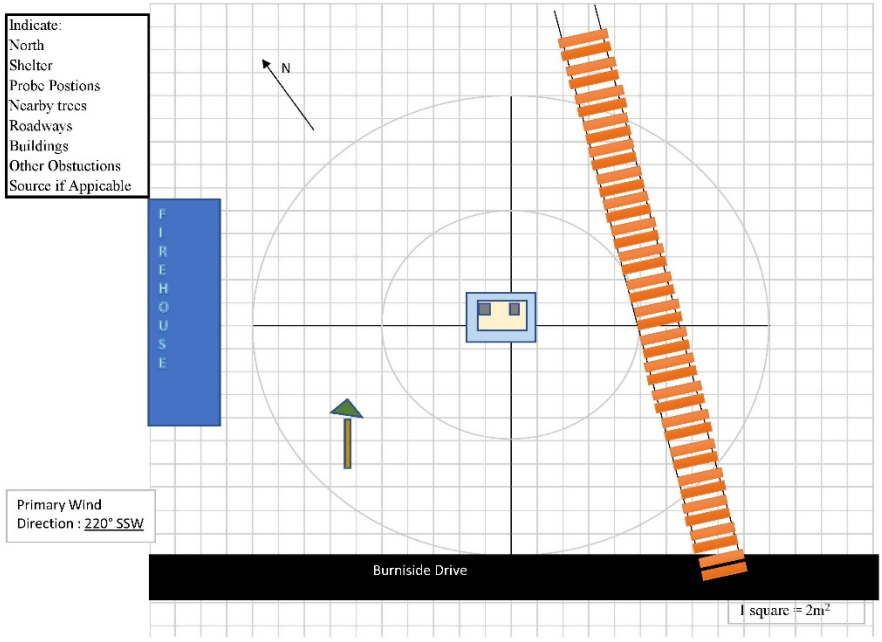
KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Site Drawing

Estimated Degree of Unrestricted Air Flow: 270°



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Siting Evaluation Form
Rev 1, 02/10/2020

Figure 3.13 Burnside Site Evaluation pgs 1&2

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Photos facing out from monitor to cardinal direction

North

South

East

West

13 of 30

Siting Evaluation Form
Rev 1, 02/10/2020

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Photos from cardinal direction facing in towards monitor

North

South

East

West

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Siting Evaluation Form
Rev 1, 02/10/2020

Figure 3.14 Burnside Site Evaluation pgs 3&4

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Figure 3.15 Burnside Site Eval pg 5

3.4 East Knox

Figure 3.16 East Knox Site Photo

This site is located in East Knox County and currently monitors for ozone. The site was initially established in 1981. The site is located downwind from the core Knoxville MSA area.
This site serves in assessing the highest concentration of ozone in the Knoxville area and used in the AQI forecasting program.

Address	9315 Rutledge Pike, Mascot, 37806
AQSID	470930021
Lat	36.08564
Lon	-83.76475
Pollutant	Ozone
Parameter Code	44201
Monitor Type	SLAMS
POC	1
Interval	Hourly
Collection Frequency	Hourly
Method	087
FRM/FEM Monitoring Instrument	Teledyne 400E
Analysis	Ultraviolet
Ref Method ID	EQOA-0992-087
Monitor Objective Type	Highest Concentration
Dominant Source	Null
Measurement Scale	Urban Scale
Land Use Type	Agricultural
Location Setting	Rural
Date Established	19810601

Figure 3.17 East Knox Monitoring Details

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Site Name: East Knox
AQSNo: 47-093-0021
Coordinate 36.0855,-83.7649

Date: 3/9/2021
Site Address: 9315 Rutledge Pike
Inspected by: Rebecca Larocque

Pollutant	Scale	Probe Height [1]	Flow (hi or Low)	Separation from samplers [1]	Pass/Fail	Distance to Road [1]	Pass/Fail
Ozone	Urban	4	Low	n/a		180	Pass

				Tree	
Obstruction type [2]	Obst. Height [1]	Obst. Distance [1,2]	Pass/Fail	Dripline [1]	Pass/ Fail
Pine West	18.2	34.4	Pass	>20	Pass
Tallest Pine WSW	18.6	31	Pass	>20	Pass
Smaller closer brush	6	15	Pass	13	Pass
This site should be monitored for tree growth carefully, keep smaller brush maintained					

[1] All Measurements in meters
[2] Including vertical and horizontal separation from walls &/or parapets if applicable

Collocated Samplers must be within 4 m of each other and at least 2 m apart for hi vol, at least 1 m for low volume
Obstruction Distance must be ≥ 2* (Obst height - probe height)
Tree Dripline must be >10 m away, prefer >20m
Horizontal and vertical disance on rooftop 1m for O_3, gases - 2m for all others
Unrestricted air flow must be ≥ 270 °

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Site Drawing

Estimated Degree of Unrestricted Air Flow: 310

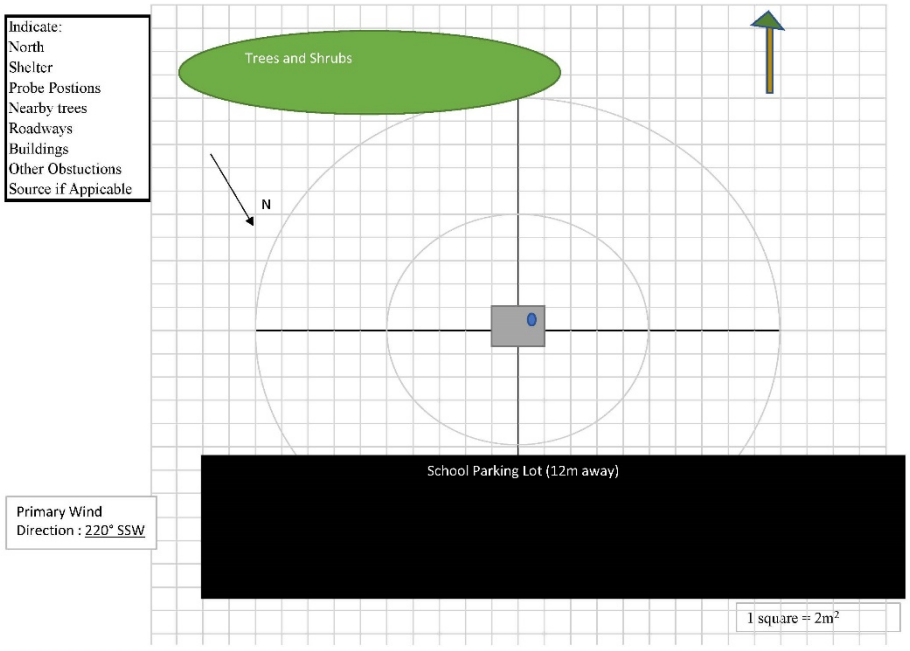

Figure 3.18 East Knox Site Evaluation pgs 1&2

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Photos facing out from monitor to cardinal direction

North

South

East

West

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Siting Evaluation Form
Rev 1, 02/10/2020

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Photos from cardinal direction facing in towards monitor

North

South

East

West

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Siting Evaluation Form
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Figure 3.19 East Knox Site Evaluation pgs 3&4

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Figure 3.20 East Knox Site Eval pg 5

3.5 Rule

Figure 3.21 Rule Site Photo

The Rule site serves as a population exposure site for $PM_{2.5}$ and the collocated site. It is located in a residential area that is less than .5-kilometer SE of several industries.

Address	1613 Vermont Ave, Knoxville, 37921	
AQSID	470931017	
County	Knox	
CBSA	28940	
Lat	35.97802	
Lon	-83.95067	
Pollutant	PM 2.5	PM 2.5
Parameter Code	88101	88101
Monitor Type	SLAMS	SLAMS
POC	1	3
Interval	24-hour average	24-hr
Collection Frequency	1:6	Hourly
Method	145	236
FRM/FEM Monitoring Instrument	Thermo Partisol Plus 2025	Teledyne T640
Analysis	Gravimetric	Light Scattering
Ref Method ID	RFPS-0498-118	EQPM-0516-236
Monitor Objective Type	Quality Assurance - Collocated	Population Exposure
Dominant Source	Mobile	Mobile
Measurement Scale	Neighborhood	Neighborhood
Land Use Type	Residential	Residential
Location Setting	Urban and Center city	Urban and Center City
Date Established	20020101	20201101

Figure 3.22 Rule Monitoring Details

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Site Name: Rule
AQSNo: 47-093-1017
Coordinate 35.97773, -83.9504

Date: 3/9/2021
Site Address: 1613 vermont Ave
Inspected by: Rebecca Larocque

Pollutant	Scale	Probe Height [1]	Flow (hi or Low)	Separation from samplers [1]	Pass/Fail	Distance to Road [1]	Pass/Fail
$PM_{2.5}$	Neighborhood	2.2	Low	n/a		>42M	Pass
$PM_{2.5}$ continuous	Neighborhood	2.36	Low	3.5	Pass	> 42 M	Pass

* height increased on 11/2 to meet 2M high and 1M from top of shelter

				Tree	
Obstruction type [2]	Obst. Height [1]	Obst. Distance [1,2]	Pass/Fail	Dripline [1]	Pass/ Fail
WaterTower	23.4M	65.2M	Pass		
Tallest tree W	9.2M	32M	Pass	>20M	Pass

[1] All Measurements in meters
[2] Including vertical and horizontal separation from walls &/or parapets if applicable

Collocated Samplers must be within 4 m of each other and at least 2 m apart for hi vol, at least 1 m for low volume
Obstruction Distance must be ≥ 2* (Obst height - probe height)
Tree Dripline must be >10 m away, prefer >20m
Horizontal and vertical disance on rooftop 1m for O_3 gases - 2m for all others
Unrestricted air flow must be ≥ 270 °

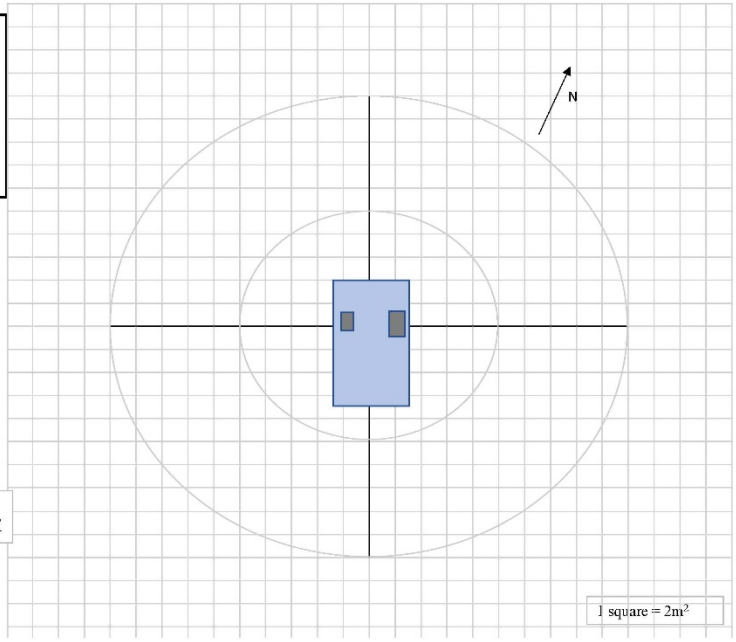
KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Site Drawing

Estimated Degree of Unrestricted Air Flow: 360°

Indicate:
North
Shelter
Probe Postions
Nearby trees
Roadways
Buildings
Other Obstuctions
Source if Appicable



Primary Wind Direction : 220° SSW

Figure 3.23 Rule Site Evaluation pgs 1&2

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Photos facing out from monitor to cardinal direction

North

South

East

West

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Photos from cardinal direction facing in towards monitor

North

South

East

West

Figure 3.24 Rule Site Evaluation pgs 3&4

KNOX COUNTY
TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Figure 3.25 Rule Site Eval pg 5

3.6 Springhill

Figure 3.26 Springhill Site Photo

The Springhill site is a neighborhood scale site located downwind of the urban core of Knoxville where ozone precursors are likely to occur. This site provides PM speciation information as well as Ozone and PM 2.5.

Address	4711 Mildred Drive, Knoxville, 37914			
AQSID	470931020			
County	Knox			
CBSA	28940			
Lat	36.01920			
Lon	-83.87390			
Pollutant	Ozone	PM 2.5	PM 2.5 speciated	
Parameter Code	44201	88101	88502	88502
Monitor Type	SLAMS	SLAMS	Speciation	Speciation
POC	1	3	5	5
Interval	Hourly	24 Hour Average	24 Hour Average	24 Hour Average
Frequency	Hourly	Hourly	1:6	1:6
Method	087	236	810	810
FRM/FEM Monitoring Instrument	Teledyne 400E	Teledyne T640	Met One Super SASS	URG 3000
Analysis	Ultraviolet	Light Scattering	Gravimetric	Gravimetric
Ref Method ID	EQOA-0992-087	EQPM-0516-236	RFPS-0400-136	RFPS-0400-136
Objective	Population Exposure			
Dominant Source	Mobile			
Measurement Scale	Neighborhood			
Land Use Type	Residential			
Location Setting	Suburban			
Date Established	19810101	1990101 (Pm2.5) 20210101 (236 method)		

Figure 3.27 Springhill Monitoring Details

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Site Name: Springhill
AQS No: 47-093-1020
Coordinate 36.0114, -83.8739

Date: 3/9/2021
Site Address: 4711 Mildred Drive
Inspected by: Rebecca Larocque

Pollutant	Scale	Probe Height [1]	Flow (hi or Low)	Separation from samplers [1]	Pass/Fail	Distance to Road [1]	Pass/Fail
Ozone	Neighborhood	4.3	Low	2.1	Pass	36.2	Pass
PM2.5	Neighborhood	5.1	Low	1.2	Pass	37.8	Pass
URG Speciation	Neighborhood	4.6	Low	1.2	Pass	36.2	Pass
SASS speciation	Neighborhood	4.4	Low	1.5	Pass	36.2	Pass

				Tree	
Obstruction type [2]	Obst. Height [1]	Obst. Distance [1,2]	Pass/Fail	Dripline [1]	Pass/ Fail
Tree NE	16.4	24.6	Pass	19	Pass
Tallest Pine E	21.6	28		19.4	Pass
small brush line				16.4	Pass

[1] All Measurements in meters
[2] Including vertical and horizontal separation from walls &/or parapets if applicable

Collocated Samplers must be within 4 m of each other and at least 2 m apart for hi vol, at least 1 m for low volume
Obstruction Distance must be ≥ 2* (Obst height - probe height)
Tree Dripline must be >10 m away, prefer >20m
Horizontal and vertical disance on rooftop 1m for O_3, gases - 2m for all others
Unrestricted air flow must be ≥ 270 °

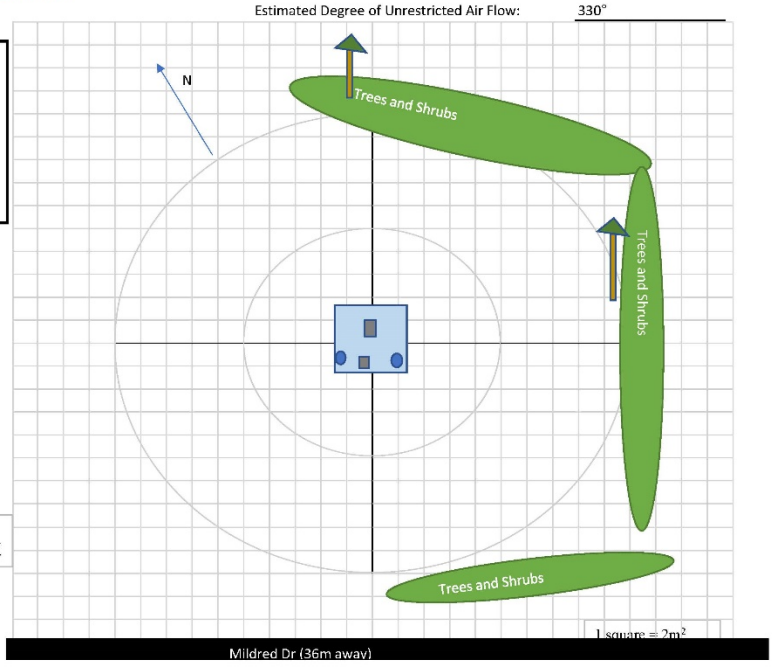
KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Site Drawing

Estimated Degree of Unrestricted Air Flow: 330°

Indicate:
North
Shelter
Probe Postions
Nearby trees
Roadways
Buildings
Other Obstuctions
Source if Appicable



Primary Wind Direction : 220° SSW

Figure 3.28 Springhill Site Evaluation pgs 1&2

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Photos facing out from monitor to cardinal direction

North

South

East

West

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Siting Evaluation Form
Rev 1, 02/10/2020

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Photos from cardinal direction facing in towards monitor

North

South

East

West

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Siting Evaluation Form
Rev 1, 02/10/2020

Figure 3.29 Springhill Site Evaluation pgs 3&4

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Figure 3.30 Springhill Site Eval pg 5

3.7 Proposed New Site – "Parton Place"

Figure 3.31 New location Site Photo

This site is proposed to meet the requirements of the 2020 Air Monitoring Plan response by EPA for a relocation of the Burnside site to a location on Tennessee Ave. It is proposed as a special purpose monitor for a minimum of 1 year. The property is 25 feet wide and 144 feet long. See Section 4.1.2 for additional details.

Address	1904 Tennessee Ave, 37921
AQSID	Pending
Lat	35.977749
Lon	-83.954933
Pollutant	Lead
Parameter Code	14129
Monitor Type	SPM
POC	1
Interval	24-hour average
Collection Frequency	1:6
Method	193
FRM/FEM Monitoring Instrument	High Volume PB-TSP
Analysis	ICP - Mass Spectroscopy
Ref Method ID	RFLA-0813-813
Monitor Objective Type	Source Oriented
Dominant Source	Point
Measurement Scale	Microscale
Land Use Type	Residential
Location Setting	Urban Center
Date Established	Estimated Nov-2021

Table 3.32 Proposed Site Monitoring Details

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Site Name: Parton Place
AQSNo: n/a
Coordinate: 35° 58' 39 N", 83° 57' 14"W

Date: 5/10/2021
Site Address: 1904 Tennessee Ave, 37921
Inspected by: Amber Talgo

Pollutant	Scale	Probe Height [1]	Flow (hi or Low)	Separation from samplers [1]	Pass/Fail	Distance to Road [1]	Pass/Fail
Lead	Micro	2M [3]	Hi	n/a		2M [4]	Pass

				Tree	
Obstruction type [2]	Obst. Height [1]	Obst. Distance [1,2]	Pass/Fail	Dripline [1]	Pass/ Fail
House SSW	3.5M	8M [4]	Pass		
Trees E	Vegetation obstructed ability to measure heights			Unknown	
Trees SE					
Trees NE					

[1] All Measurements in meters

[2] Including vertical and horizontal separation from walls &/or parapets if applicable

[3] Assumed as no site established

[4] Measurements take from Google Earth. Property too overgrown

Collocated Samplers must be within 4 m of each other and at least 2 m apart for hi vol, at least 1 m for low volume
Obstruction Distance must be ≥ 2* (Obst height - probe height)
Tree Dripline must be >10 m away, prefer >20m
Horizontal and vertical disance on rooftop 1m for O_3, gases - 2m for all others
Unrestricted air flow must be ≥ 270 °

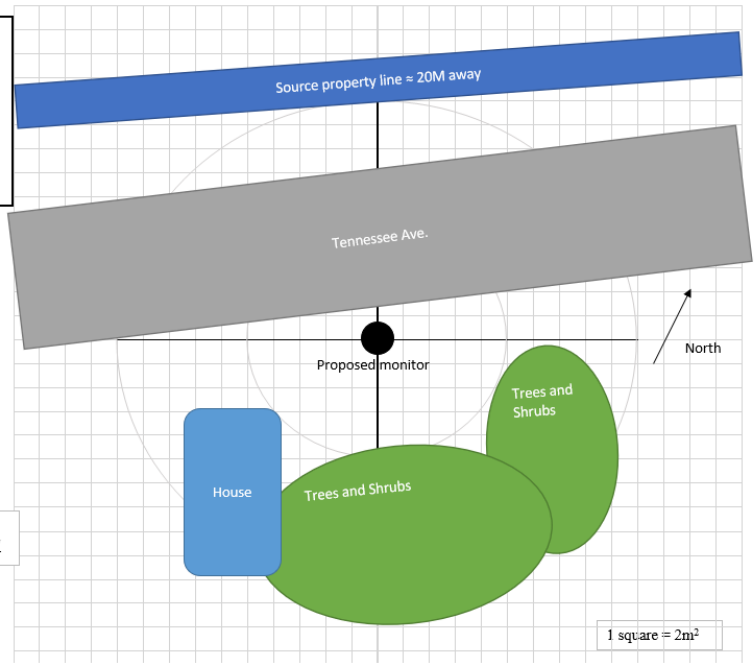
KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Site Drawing

Estimated Degree of Unrestricted Air Flow: 200 [3,4]

Indicate:
North
Shelter
Probe Postions
Nearby trees
Roadways
Buildings
Other Obstuctions
Source if Appicable



Primary Wind Direction : 220° SW

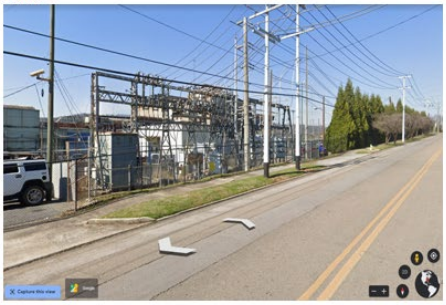
Figure 3.33 Pages 1 & 2 proposed site evaluation

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

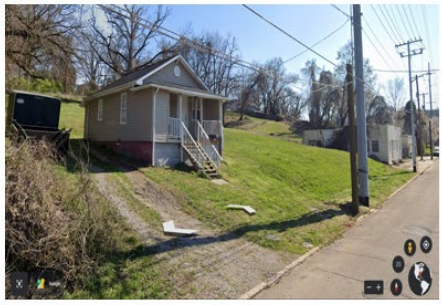
Siting Evaluation Form

Photos facing out from monitor to cardinal direction

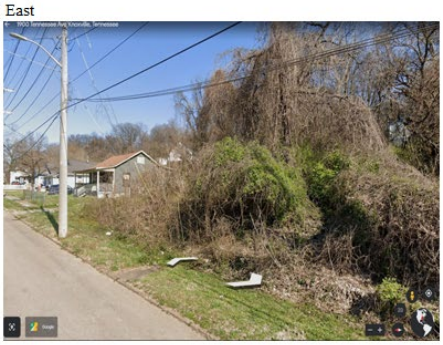
North



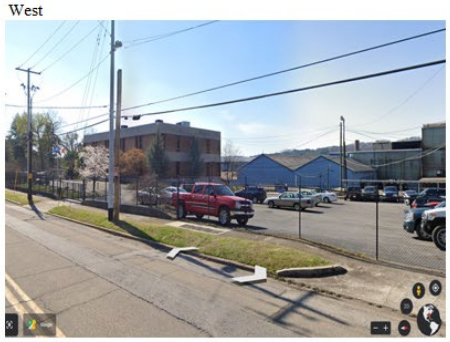
South



East



West



KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Photos from cardinal direction facing in towards monitor - Red arrow indicates approximate location

North

South

East

West

Figure 3.34 Pages 3 & 4 Proposed Site Evaluation

KNOX COUNTY TENNESSEE
HEALTH DEPARTMENT

Siting Evaluation Form

Siting Evaluation Form
Rev 1, 02/10/2020

Figure 3.35 Page 4 Proposed Site Evaluation

4.0 Proposed Changes

The EPA Region 4 governing authority approves Knox County's distribution of monitors and the location of the collocated sites for compliance with Federal regulations. Any changes will be undertaken in partnership and direct advisement with the EPA (and TDEC, when applicable). Before decommissioning any SLAMS monitor, Knox County Air Quality will follow the procedure listed in 40 CFR Part 58.14, "System Modifications". Any proposed changes to the air monitoring network will be documented in the Annual Network Plan.

Changes to the monitoring network may occur outside the Annual Monitoring Plan (AMP) and planning process due to unforeseen circumstances resulting from eviction or other situations that occur after the AMP has been posted for public inspection and approved by the EPA Regional Administrators. Any changes to the network due to circumstances beyond Knox County Air Quality's control will be communicated in writing to the EPA Regional Authority, (and TDEC authorities, when applicable), and identified in the subsequent Annual Monitoring Plan.

4.1 Decommission and Relocations

According to 40 CFR 58.14 (c))(1) a monitor can be removed (after Regional Administrator approval) if it is currently in attainment with the applicable NAAQS standard and if the following four tests can be met:

1. The PM2.5, ozone, carbon monoxide (CO), PM10, sulfate dioxide (SO2), lead, or nitrogen dioxide (NO2) monitor showed attainment during the previous five years.
2. The probability is less than 10% that the monitor will exceed 80% of the applicable NAAQS during the next three years based on the concentrations, trends, and variability observed in the past.
3. The monitor is not specifically required by an attainment plan or maintenance plan.
4. The monitor is not the last monitor in a nonattainment area or maintenance area that contains a contingency measure triggered by an air quality concentration in the latest attainment or maintenance plan adopted by the state and approved by EPA.

To conservatively demonstrate test 2, Air Quality shall use the equation:

$$\mathrm{X} + \frac{t * s}{\sqrt{n}} < 0.8 * NAAQS$$

Where X is the average design value for a minimum of 5 years, t is the t value for n-1 degrees of freedom at the 90% confidence level, s is the standard deviation of the design values, n is the number of design values, and NAAQS is the standard of interest.

4.1.1 Burnside Collocated Sampler Relocation Request

Knox County Air Quality is requesting the relocation of the quality assurance collocated sampler to the Ameristeel site (47-093-0023) located on New York Avenue. The current location only produced 8 out of 55 sample values that were above the 0.02 µg/m^3 minimum for comparability in CY 2020. Knox County requests to immediately, upon approval of this plan, relocate the collocated monitor to the Ameristeel Site.

4.1.2 Burnside Site Decommission and New Site Location Proposal

Knox County Air Quality requested to discontinue the Burnside lead monitor (47-093-0027) in the 2020 Annual Network Plan. That request was denied, and EPA requested that Knox County Air Quality establish a new site prior to removal of the Burnside lead monitor. That new site was directed to be to the southeast side of the Commercial Metals Company Steel US Plant based on the results of air dispersion modeling found in Appendix B Model Report – CMC Steel USA, LLC Fence Line PB Monitoring Modeling.

Using the model outputs, the receptors sites around the facility were ranked using the methodology provided by EPA. This is included in the Model Report in Appendix B. The methodology took into account the number of months that site had the highest predicted Pb concentration, the number of 3-month periods that the site had the highest predicted Pb Concentration, and each site's overall highest 3-month predicted Pb concentration. The current Pb monitoring site at 1526 New York Avenue (47-93-0023 Ameristeel site) was one of two receptors ranked 20th. The 20 highest ranked receptor sites were located along the southern and northeastern fence line of the facility. Figure 3 of Appendix B Model Report – CMC Steel USA, LLC depicts the ranked site locations.

Knox County Air Quality attempted to contact the property owners of all the receptor sites and adjacent properties along the southern fence line of the facility to locate a Pb air monitor. Table 4.1 lists the properties Air Quality contacted along with the closest receptor site ranking, ownership type and reason the monitor was not sited prior to obtaining 1904 Tennessee Ave (see section 4.1.2.1 below).

Receptor Site Rank(s)	Property	Reason Monitor not sited	Type of Ownership
1,6,7,9,11,12,13 and 18	1943 Tennessee Ave (Fence line and locations on source property)	Denied access by property owner	Private Business
2,3,5 and 8	1919 Tennessee Ave	Denied access by property owner	Private Business
4,14,15 and 16	1536 New York Ave (fence line)	Denied access by property owner	Private Business
10	1916 and 1924 Tennessee Ave	Could not obtain permission from property owner	Private Business
17	1900, 1930 and 1934 Tennessee Ave	Could not obtain permission from property owner	Private residence
19	1734,1738,1742 and 1746	Could not obtain permission from property owner	Private Residence

Table 4.1 Disqualified Site Locations

4.1.2.1 New Site Location Approval Request

Through the site selection process described in section 4.1.2 above, the property owner located at 1904 Tennessee Avenue was contacted. It is located across the street from the 3rd ranked receptor site, and between the receptor sites ranked 10th and 17th on the southeast side of Tennessee Ave. As the property is located between receptor sites ranked higher than the current Ameristeel (47-093-0023) monitoring site and on the southeast side of Commercial Metals Company Steel US Plant, Knox County acquired

this property on May 10, 2021. Figure 4.2 below illustrates the air monitoring locations in relation to the Commercial Metals Company Steel US Plant. Marker 1 is the Ameristeel monitoring site (the current source-oriented site). Marker 2 is the Burnside monitoring site (being requested for decommission). Marker 3 is the proposed Parton Place monitoring site for a special purpose monitoring study.

Figure 4.2 Lead Monitoring Existing and Proposed Site Locations

The new monitoring site, Parton Place, will be classified as a special purpose monitor (SPM) to establish if it or the Ameristeel monitoring site is the site of maximum Pb concentration. Knox County Air Quality will then request that only the site of maximum Pb concentration be operated as the required source-oriented monitor. Upon approval of the site location Knox County will begin surveying, clearing, and constructing the proposed monitoring site with a goal to commence monitoring in November of 2021.

Knox County Air Quality will gather a minimum of 12 months of 3-month rolling averages (15 months of data) and then conduct an analysis to compare the data from the new monitoring site with the Ameristeel (47-093-0023) monitoring site (current source-oriented monitor) to determine the maximum concentration site. This data analysis will be presented along with a request to establish the primary SLAMS monitor at the maximum concentration site and decommission the other site in a subsequent Annual Monitoring Plan, expected in July of 2023.

4.1.2.2 Siting Criteria Waiver Request

Lead (Pb) is an elemental heavy metal that can be released directly into the air as suspended particles during manufacturing process. As a heavy metal, it settles quickly out of the air into soil or dust. The aerodynamics of this settling increases the priority in microscale source-oriented monitoring at a site in direct line with the source.

The recently acquired property is 25 feet wide and 144 feet long, with a sloping terrain. The expected probe height will be between 2 and 5 meters from site ground level, which

is elevated some from street level. The final establishment of probe height will be determined after the property is properly surveyed and vegetation cleared. The final height will provide the greatest amount of unrestricted airflow and clear line of site to the source property. See Section 3.7 of this document for the initial site assessment of the proposed site.

Knox County Air Quality requests a waiver from EPA for the siting requirement in 40 CFR Part 58 Appendix E stating, “Must have unrestricted airflow 270 degrees around the probe for sampler; 180 degrees if probe is on the side of a building or wall.” The property has several large trees on the south and the eastern side that Knox County Air Quality feels confident can be trimmed to meet the 10 meter drip line requirement, but still create an obstruction as the monitor cannot be located a distance 2 times the difference in height.

40 CFR Part 58 Appendix E section 10 states, in pertinent part, “*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.”* Section 4.1.2.1 above describes the property selection process; This is the property Knox County could obtain for siting a monitor located between receptor sites ranked higher than the current Ameristeel (47-093-0023) monitoring site (see Section 4.1.2.1 for the property selection process). The following discussion details the waiver criteria contained in 40 CFR Part 58 Appendix E Section 10.1 and response and evidence from Knox County Air Quality.

40 CFR Part 58 Appendix E Section 10.1 Criteria	**Response**
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.	The obstructions are not located between the source and the proposed monitor.

The modeling results found in Appendix B of this document support the demonstration that the unobstructed area between the proposed monitoring site and the facility is the area of concern for the highest concentration and, as such, this site would be as representative of the monitoring area as it would be if siting criteria were met. Figure 4.3 below are photos from the proposed site facing the source illustrating the direct line of site.

Figure 4.3 Proposed Site Facing West

Facing North

40 CFR Part 58 Appendix E Section 10.1 Criteria	Response
10.1.2 The monitor or probe cannot reasonably be located so as to meet the siting criteria because of physical constraints (e.g., inability to locate the required type of site the necessary distance from roadways or obstructions).	The obstructions (i.e., building, trees, and shrubs) are located on adjourning properties and, therefore, Knox County Air Quality cannot remove them.

Knox County did an extensive search for locations for monitoring lead based upon the modeling results. This is the only property located between receptor sites ranked higher than the current Ameristeel (47-093-0023) monitoring site that Knox County Air Quality could acquire to monitor Pb on the southeast site of the source. Knox County Air Quality is unable to establish the exact siting of the new monitor placement at this time. However, Air Quality anticipates there will be at minimum 210 degrees of unrestricted airflow and 180 degrees of that is facing the source. Additionally, Knox County will provide the maximum amount of unrestricted air flow that can be safely accomplished by clearing vegetation on the property. Figure 4.4 below shows the current vegetative overgrowth of the property and the arrow represents the approximate location of the monitor.

Figure 4.4 Proposed Site - Parton Place

4.1.2.3 Burnside Site Decommission Request

Following the directives of the 2020 AMP response, and approval of this plan, Knox County Air Quality shall decommission the Burnside site upon the commencement of monitoring at Parton Place, the new site established in section 4.1.2. The Burnside site is not required by any attainment or maintenance plan, nor is it the last monitor in a non-attainment or maintenance area. The Burnside site measured levels of lead are less than 50% of the NAAQS. Table 4.5 below demonstrates attainment of standard for the past 5 years and demonstrates a less than 10% probability that the site will come within 80% of the NAAQS. This request follows the EPA provided guidance in the response to the 2020 AMP and 5-year Network Assessment.

Monitor	2016	2017	2018	2019	2020	Avg	Std Dev	n	t	NAAQS	80% of NAAQS	90% upper CI	Test Pass
Burnside	0.02	0.02	0.02	0.02	0.02	0.02	0	5	2.13	0.15	0.12	0.02	YES

Table 4.5 Burnside Probability of Exceedance

According to 40 CFR Part 58, Appendix D " Network Design Criteria for Ambient Air Quality Monitoring" Section 4.5, Knox County Air Quality is only required to operate one source specific Lead Monitor. The Burnside site was the original lead site in the monitoring network. In 2011 the Ameristeel source-oriented site was established at the fence line of the source. The Burnside site was maintained to view trends and continue to monitor population exposure. The trends data in figure 4.6 below, shows 19 years of design values under 50% of the NAAQS standard for this site.

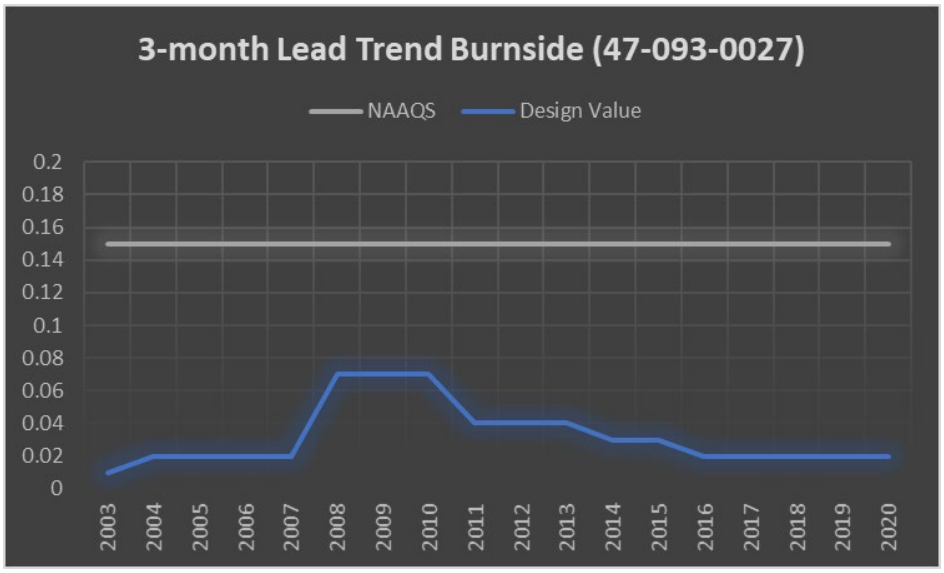


Figure 4.6 Burnside Trends

The Ameristeel site has 10 years of data illustrating a reduction to below the NAAQS, and continued decline. Figure 4.7 charts the 3 month rolling average design value of each site plotted together. This illustrates the large difference between the source oriented Ameristeel (47-093-0023) site and Burnside (47-093-0027) site. The Burnside site is no longer useful for source monitoring or trends data.

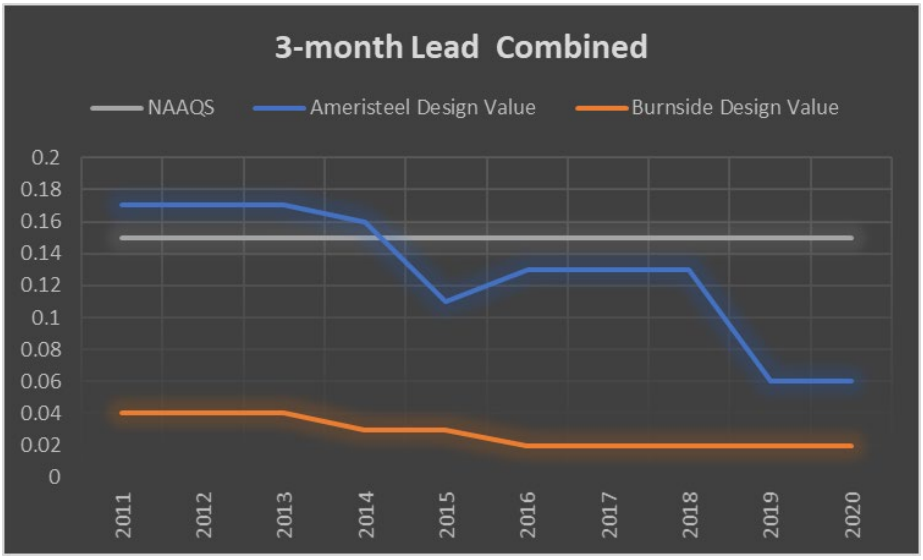


Figure 4.7 Combined Trends Lead Sites

4.2 Replacements and Reassignments

Knox County Air Quality has completed the transition to continuous monitoring in the $PM_{2.5}$ network as approved in the 2020 AMP. There are no changes in methods requested in 2021.

Knox County Air Quality removed the elevated platform at the Ameristeel Site (47-093-0023). This platform was removed due to serious safety issues. Two new platforms have been built in the same location. The new platforms meet the siting criteria in 40 CFR Part 58 Appendix E but the elevation is a lower profile (See Section 3.2). These lower platforms will allow for additional room at the site for the collocated monitor, as well as room for PEP audit equipment for additional quality assurance checks.

Appendix A -Equipment List

Knox County Air Quality Equipment Inventory 2021

Completed 2/19/2021

	Description	Serial Number	Conditionut in servi	Comments:
Air Lab Site: 47-093-1013				
PM 2.5 Sequential	Thermo Partisol Plus 2025	SN B225760909	Fair	2010
Data Logger	ESC 8832	SN A3760K	Fair	2010
PM10/ PM2.5 continous	Teledyne T640X	SN192	Good	2018	2020 official method
T640X Pump	86R145-101-N270X	217909449	Good	2019
Rule Site: 47-093-1017				
Pm2.5 Continuous	Teledyne T640	SN675	New	2020
PM 2.5 Sequential	Thermo Partisol Plus 2025i	SN 20251W209521601	Good	2018	installed 2020
Data Logger	ESC 8832	SN A4154 K	Fair	2020	Not new - from Nashville
Burnside Site: 47-093-0027				
TSP Hi-Vol	General Metal Works	SN P2875	Good	Unknown
TSP Hi-Vol	Anderson/GMW	SN P04302	Good	Unknown
Ameristeel Site: 47-093-0023				
TSP Hi-Vol	General Metal Works	SN P04304	Good	Unknown
Spring Hill Site: 47-093-1020				
Pm2.5 Continuous	Teledyne T640	SN675	New	2020
Carbon Sampler	URG 3000N	SN 3N-B0224	Fair	2007	Repair 2020
Carbon Sampler	Controller module	3N-B0409	Fair	2007
PM 2.5 Speciation	Met One Super SASS	SN G9188	Fair	2008
Ozone Analyzer	Teledyne / API 400E	4005	Good	2018
Ozone Calibrator	Teledyne / API 703E	190	Good	2009
Data Logger	ESC 8832	A 3758 K	Good	2010
East Knox Site: 47-093-0021				
Ozone Analyzer	Teledyne / API 400E	4006	Good	2018
Ozone Calibrator	Teledyne / API 703E	189	Good	2009
Data Logger	ESC 8832	A 3757 K	Good	2010
Back-up equipment located at the Air Lab				
Ozone Analyzer	Teledyne / API 400E	2014	Poor	2009
Ozone Analyzer	Teledyne / API 400E	2013	Fair	2009	Back up analyzer
Ozone Analyzer	Teledyne / API 400E	2697	Poor	2011	used for parts
Ozone Calibrator	Teledyne / API 703E	188	Fair	2009	back up calibrator
Ozone Calibrator	Teledyne / API 703E	187	Good	2009	bench standard
Ozone Calibrator	teledyne/ API 703U	179	Good	2017	audit standard
Data Logger	ESC 8832	A 3759 K	Good	2010	Bench Logger
Gast Pump	DOA-P704-AA	0611013627	Good	2011	Bench use
Gast Pump	DOA-P704-AA	611014883	Good	2011	For XZAS at sites
Gast Pump	DOA-P704-AA	611014884	Good	2011	Audit use
Gast Pump	75R647-V45-H306X	813944551	Fair	2015	back up
T640X Pump	86R145-101-N270X	718906665	Good	2018	rebuilt 2020
T640X Pump	86R145-101-N270X	620309752	Good	2020
TEOM Pump	87R647-V46-N470X	1115910619	Good	2018
TEOM Pump	87R647-V46-N470X	1215908192	Fair	2016
PM 10 Continuous	Thermo BAM 5014i	CM14521015	Poor	2015	not working
PM 2.5 Sequential	Thermo Partisol Plus 2025	SN B26451005	Poor	2012
PM 2.5 Sequential	Thermo Partisol Plus 2025	SN B218950606	Fair	2007	Remote Connection issues
Hi-Vol Orifice	Anderson/GMW	P3619	Good	Unknown
Hi-Vol Orifice	Anderson/GMW	P2861	Good	Unknown
Hi-Vol Orifice	Anderson/GMW	P4306	Good	Unknown
PM 2.5 Continuous	TEOM 1405	SN 1405A209531006	Good	2011	back up for AQI
Hi Vol Orifice	Andersen/GMW	SN P3084	Good	Unknown
Hi Vol Orifice	Andersen/GMW	SN P999	Good	Unknown
Hi Vol Orifice	General Metal Works	SN P1938	Good	Unknown
PM 2.5 Sequential	Thermo Partisol Plus 2025	SN B218930606	Fair	2007
PM 2.5 Sequential	Thermo Partisol Plus 2025	SN B218940606	Poor	2007
Ozone Calibrator	Teledyne 703	SN316	New	2021	unpacked 2020
Ozone Calibrator	Teledyne 703	SN317	New	2021	unpacked 2020

	Description	Serial Number	Condition	Put in service
Unknown status aqcuired from TDEC				
Carbon Sampler	URG module	3N-B0359	unknown	unknown
Carbon Sampler	URG module	3N-B0767	unknown	Unknown
Carbon Sampler	URG Controller	3N-B0700	unknown	Unknown
Carbon Sampler	URG Controller	3N-B0704	unknown	Unknown
Carbon Sampler	URG controller	3N-B0773	unknown	Unknown
PM 2.5 Continuous	BAM 1020	K1258	unknown	Unknown
PM 2.5 Continuous	BAM 1020	K1744	unknown	Unknown
PM 2.5 Continuous	BAM 1020	K1808	unknown	Unknown
PM 2.5 Continuous	BAM 1020	K1284	unknown	Unknown
PM 2.5 Continuous	BAM 1020	K1254	unknown	Unknown
PM 2.5 Sequential	Thermo Partisol 2025	2025B225160903	unknown	Unknown
PM 2.5 Sequential	Thermo Partisol 2025	2025A207869809	unknown	Unknown
PM 2.5 Sequential	Thermo Partisol 2025	2025B221650904	unknown	Unknown
PM 2.5 Sequential	Thermo Partisol 2025	2025B225230903	unknown	Unknown
BAM Pump	P0935A-V0128-D2-05	I1201501	unknown	Unknown

Appendix B - Model Report-CMC Steel USA, LLC Fence Line Pb Monitor Modeling

Model Report – CMC Steel USA, LLC Fence Line Pb Monitor Modeling
1919 Tennessee Avenue, Knoxville, TN 37921
May 6, 2019

1.0 Summary

As required by 40 CFR Part 58 Appendix D, the Knox County Department of Air Quality Management (KCDAQM) is required to site a lead (Pb) monitor, 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. The KCDAQM performed an air dispersion modeling analysis to determine the locations of maximum Pb concentrations. The air dispersion modeling analysis was conducted following the guidance obtained from the Environmental Protection Agency (EPA) and contained in the EPA Guideline on Air Quality Models.

2.0 Model Inputs

2.1 Model of Choice/Version

The AERMOD model, version 18081, was used for the air dispersion modeling analysis.

2.2 Description of the Site

The base elevation of the plant is 960 feet (292.6 meters) and was used throughout the modeling. During the modeling review for the Prevention of Significant Deterioration (PSD) Air Permit Application submitted on November 22, 2004, the applicant had used the land use methodology known as the Auer Technique to determine the area was Urban. Therefore, the Urban dispersion coefficient was selected in AERMOD. See Figure 1 below for a scaled facility drawing showing the proximity of the fence line and buildings.

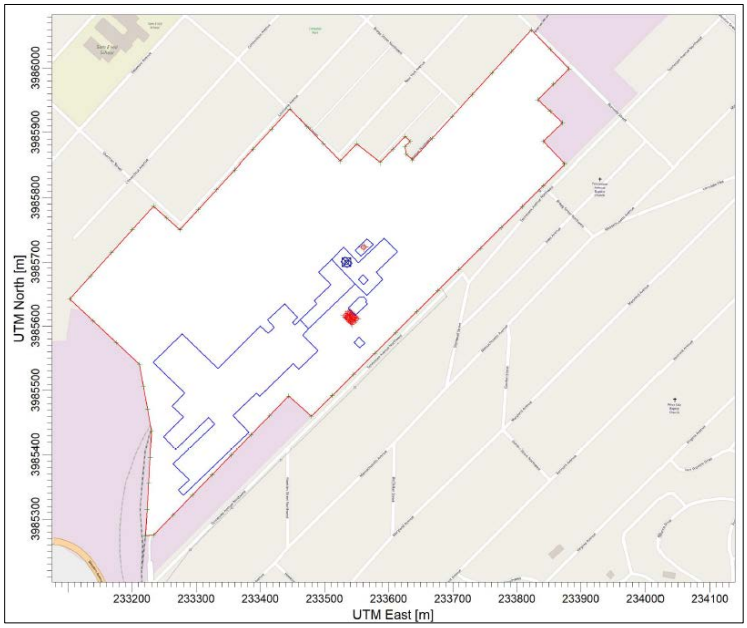


Figure 1: Scaled Facility Drawing

2.3 Emission Sources

The emission of Pb was modeled for three emission sources at the facility. They are baghouse 2, baghouse 4, and the meltshop building louver. All other sources of Pb emissions were considered negligible.

The stacks of baghouses 2 and 4 were inputted into AERMOD as point sources (1 stack for baghouse 4 and 14 stacks for baghouse 2). During the modeling review for the Prevention of Significant Deterioration (PSD) Air Permit

Application submitted on November 22, 2004, the applicant listed the baghouses stack heights and stack diameters. Baghouses 2 and 4 average Pb emissions, temperature, and volumetric flow rate data from stack tests conducted in 2012 and 2015 were used for the emission rate, gas exit temperature, and gas exit flow rate. Since baghouse 2 has 14 stacks and one is always in cleaning mode (i.e., not in operation), one of baghouse 2's stacks (stack 14) emission rate or gas exit flow rate was set to zero with the average Pb emissions and volumetric flow rate, from the stack tests, allocated evenly to the remaining 13 stacks. Lastly, the coordinates of the emissions sources were updated.

The meltshop building louver was inputted into AERMOD as a volume source. The center and half the height of the penthouse were used for the coordinates and release height of the volume source, respectively. The average Pb emission data from the Meltshop Building Louver Study (industrial hygiene/ambient methodology) conducted in 2013 was used for the emission rate.

See Attachment 1 for the AERMOD parameters for baghouse 2, baghouse 4, and the meltshop building louver.

2.4 Downwash Effects

The EPA downwash program called BPIPPRM, dated 04-27-04, was used to calculate the downwash parameters for input to AERMOD. During the modeling review for the Prevention of Significant Deterioration (PSD) Air Permit Application submitted on November 22, 2004, the applicant had determined the building heights. KCDAQM staff updated the building coordinates due to additions to the buildings. See Attachment 2 for the updated building coordinates and heights that were used for input to BPIPPRM.

2.5 Receptors and Complex Terrain

A dense receptor grid was used with 50 meter spacing at the fence line and a Cartesian grid with 50 meter spacing beyond the fence line out to 500 meters. Terrain elevations for all the receptors were imported from AERMAP, version 18081, input data processor using the United States Geological Survey (USGS) 1-degree Digital Elevation Model (DEM) files.

Some of the receptors are located at terrain heights that are greater than the top of the stacks. This terrain is called complex terrain. However, these receptors are not located in areas where the concentrations are highest (i.e., not around the facility boundary). Therefore, no further analysis is required.

2.6 Meteorological Data

The meteorological data input to the AERMOD model consists of the five years of National Weather Service (NWS) data, for years 2014, 2015, 2016, 2017, and 2018. The surface station data is from the Knoxville/McGhee Tyson Airport station (Station No. 13891) and the upper air data is from the Nashville/Metro Airport station (Station No. 13897). The surface station data were processed with the upper air sounding data using AERMET, version 18081, to create the meteorological files for input to AERMOD. Meteorological data for the five years were used for the air dispersion modeling analysis.

3.0 Model Results

The predicted highest 3-month Pb concentrations in Figure 2 show maximum impact areas along the southern and northeastern fence lines of the facility. An analysis of the predicted highest 3-month Pb concentration as well as a ranking system for the monthly and 3-month maximum receptor concentration were utilized according to EPA guidance (see Attachment 3 for e-mail dated 10/9/2018).

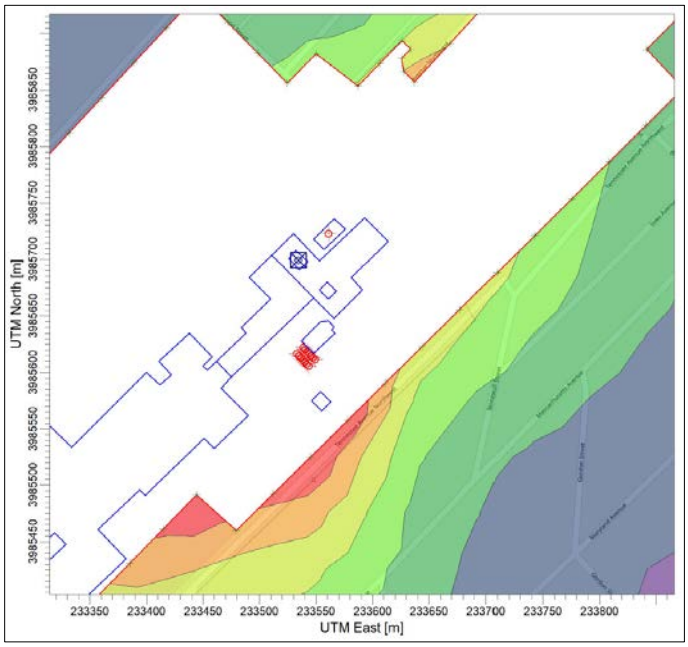


Figure 2: Highest 3-Month Concentrations

The ranking system combined the ranks of each receptor according to the number of months that the receptor had the highest predicted Pb concentration, the number of 3-month periods that receptor had the highest predicted Pb concentration, and each receptor's overall highest 3-month predicted concentration was used to rank proposed sites to locate the Pb monitor. The resulting receptor ranking confirmed that the areas along the southern and northeastern fence lines are the most probable locations for capturing the maximum Pb concentrations at a monitor. Figure 3 shows the location of the top 20 ranked receptors.

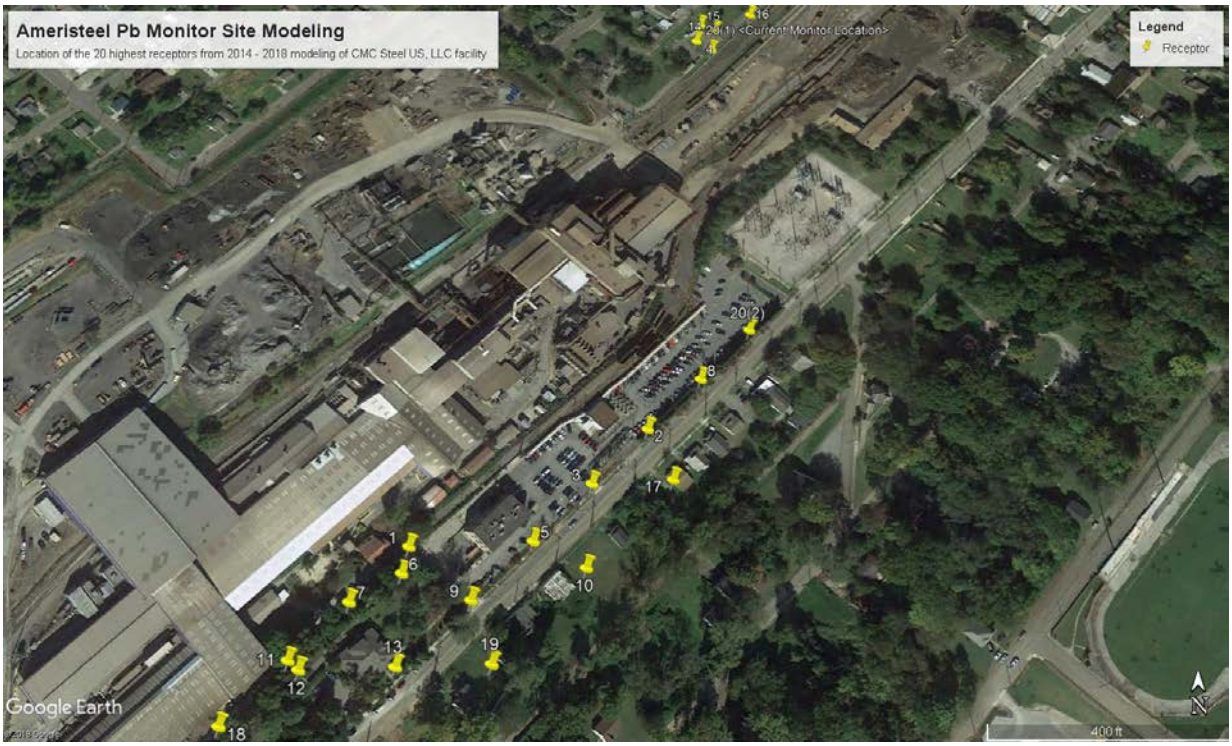


Figure 3: 20 Highest 3-Month Pb Concentration Receptor Sites

Attachment 1

AERMOD parameters for baghouse 2, baghouse 4, and the meltshop building louver

Table 1: AERMOD parameters for baghouse 2, baghouse 4, and the meltshop building louver

	Parameters	Units	Description
	Type		POINT, AREA, AREA_CIRC, AREA_POLY, VOLUME, OPEN_PIT, LINE, LINE_VOLUME, LINE_AREA, BUOYLINE
	ID		Source ID up to 12 characters
	Desc		Optional description
	SourceID_Prefix		Text prefix up to 4 characters long for generated LINE_VOLUME and LINE_AREA sources
	Base_Elev	[m]	Source base elevation above mean sea level
	Height	[m]	Release height above ground
	Diam	[m]	Inner stack diameter (POINT) or circular area radius (AREA_CIRC)
	Exit_Vel	[m/s]	Exit velocity (POINT only)
	Exit_Temp	[K]	Exit temperature (POINT only)
	Release Type		VERTICAL, HORIZONTAL, CAPPED (POINT only) - HORIZONTAL and CAPPED are non-default beta options
	SigmaY	[m]	Initial sigma Y (VOLUME only)
	SigmaZ	[m]	Initial sigma Z (AREA, AREA_CIRC, AREA_POLY, VOLUME, LINE, and LINE_AREA only; optional for AREA, AREA_CIRC, AREA_POLY, and LINE)
	Length_X	[m]	X side length (AREA, VOLUME, OPEN PIT, and LINE_AREA only; optional for VOLUME, will be used to calculate SigmaY)
	Emission_Rate	[g/s or g/s/m2]	Emission rate (g/s for POINT, VOLUME, and LINE_VOLUME; g/s/m2 for AREA, AREA_CIRC, AREA_POLY, OPENPIT, LINE, and LINE_AREA)
	X1	[m]	X coordinate of source location [m]
	Y1	[m]	Y coordinate of source location [m]

Type	ID	Desc	Base_Elev	Height	Diam	Exit_Vel	Exit_Temp	Release_Type	SigmaY	SigmaZ	Length_X	Emission_Rate	X1	Y1
			[m]	[m]	[m]	[m/s]	[K]		[m]	[m]	[m]		[m]	[m]
POINT	BH4	Baghouse 4 Monovent	292.6	27.13	7.17	3.81107515	378.7055556	CAPPED				0.004535924	233561.00	3985723.00
POINT	BH2_1	Baghouse 2 Stack 1	292.6	11.58	0.97	8.742206798	326.4833333	HORIZONTAL				0.000340194	233543.60	3985605.60
POINT	BH2_2	Baghouse 2 Stack 2	292.6	11.58	0.97	8.742206798	326.4833333	HORIZONTAL				0.000340194	233541.80	3985607.40
POINT	BH2_3	Baghouse 2 Stack 3	292.6	11.58	0.97	8.742206798	326.4833333	HORIZONTAL				0.000340194	233540.00	3985609.40
POINT	BH2_4	Baghouse 2 Stack 4	292.6	11.58	0.97	8.742206798	326.4833333	HORIZONTAL				0.000340194	233538.30	3985611.20
POINT	BH2_5	Baghouse 2 Stack 5	292.6	11.58	0.97	8.742206798	326.4833333	HORIZONTAL				0.000340194	233536.80	3985612.90
POINT	BH2_6	Baghouse 2 Stack 6	292.6	11.58	0.97	8.742206798	326.4833333	HORIZONTAL				0.000340194	233535.00	3985614.70
POINT	BH2_7	Baghouse 2 Stack 7	292.6	11.58	0.97	8.742206798	326.4833333	HORIZONTAL				0.000340194	233533.20	3985616.70
POINT	BH2_8	Baghouse 2 Stack 8	292.6	11.58	0.97	8.742206798	326.4833333	HORIZONTAL				0.000340194	233538.80	3985622.30
POINT	BH2_9	Baghouse 2 Stack 9	292.6	11.58	0.97	8.742206798	326.4833333	HORIZONTAL				0.000340194	233540.30	3985620.50
POINT	BH2_10	Baghouse 2 Stack 10	292.6	11.58	0.97	8.742206798	326.4833333	HORIZONTAL				0.000340194	233542.30	3985618.70
POINT	BH2_11	Baghouse 2 Stack 11	292.6	11.58	0.97	8.742206798	326.4833333	HORIZONTAL				0.000340194	233543.80	3985617.00
POINT	BH2_12	Baghouse 2 Stack 12	292.6	11.58	0.97	8.742206798	326.4833333	HORIZONTAL				0.000340194	233545.60	3985614.90
POINT	BH2_13	Baghouse 2 Stack 13	292.6	11.58	0.97	8.742206798	326.4833333	HORIZONTAL				0.000340194	233547.40	3985613.20
POINT	BH2_14	Baghouse 2 Stack 14	292.6	11.58	0.97	0	326.4833333	HORIZONTAL				0	233549.10	3985611.40
VOLUM	MSLOUV	Meltshop Louvers	292.6	32.13					3.18977	16.0906	13.716	0.013859767	233534.40	3985699.50

Attachment 2

Building coordinates and heights

Table 2: Baghouse 4 and Rolling Mill/Fab Shop Building Data

Parameters	Units	Description
ID_Building =	-	Name up to 8 characters with no spaces or "-"
Description =	-	Optional (up to 250 characters)
Base_Elevation =	[m]	Building base elevation above mean sea level
Tier_Height =	[m]	Tier height above ground / height of tank
Num_Coords =	integer	Number of coordinate pairs (X,Y) for the building corners to follow
X =	[m]	X coordinate for corner
Y =	[m]	Y coordinate for corner

ID_Building	Description	Base_Elevation	Tier_Height	Num_Coords	X1	Y1
		[m]	[m]		[m]	[m]
BH4_BLD	Baghouse 4	292.61	27.13	4	233566	3985736
					233576	3985727
					233557	3985709
					233548	3985718
RM/FS_BLD	Rolling Mill/Fab Shop	292.61	14.48	32	233280	3985337
					233272	3985345
					233289	3985361
					233264	3985386
					233329	3985448
					233319	3985458
					233268	3985408
					233249	3985428
					233280	3985459
					233262	3985476
					233282	3985496
					233233	3985544
					233278	3985588
					233334	3985534
					233400	3985600
					233412	3985589
					233422	3985598
					233411	3985610
					233438	3985635
					233458	3985614
					233450	3985606
					233454	3985602
					233462	3985610
					233475	3985596
					233466	3985586
					233490	3985562
					233460	3985533
					233451	3985542
					233399	3985491
					233394	3985496
					233357	3985461
					233382	3985435

Table 3: Caster, Meltshop (including penthouses), Baghouse 2 Control, and Parking Lot Buildings Data

Parameters	Units	Description
ID_Building =	-	Name up to 8 characters with no spaces or "-"
Description =	-	Optional (up to 250 characters)
Base_Elevation =	[m]	Building base elevation above mean sea level
Tier_Height =	[m]	Tier height above ground / height of tank
Num_Coords =	integer	Number of coordinate pairs (X,Y) for the building corners to follow
X =	[m]	X coordinate for corner
Y =	[m]	Y coordinate for corner

ID_Building	Description	Base_Elevation	Tier_Height	Num_Coords	X1	Y1
		[m]	[m]		[m]	[m]
CSTR_BLD	Caster	292.61	17.53	8	233462	3985610
					233488	3985635
					233484	3985640
					233510	3985665
					233491	3985684
					233511	3985704
					233548	3985666
					233475	3985596
MS_BLD	Melt Shop	292.61	29.66	9	233511	3985704
					233530	3985723
					233553	3985699
					233593	3985737
					233614	3985716
					233581	3985684
					233591	3985673
					233566	3985648
					233548	3985666
MSPNT1_BLD	Penthouse 1	292.61	34.59	4	233535	3985691
					233526	3985701
					233532	3985708
					233543	3985698
MSPNT2_BLD	Penthouse 2	292.61	34.59	4	233561	3985665
					233553	3985673
					233560	3985680
					233568	3985672
BH2_BLD	Baghouse 2 Control Building	292.61	11.58	7	233548	3985617
					233537	3985628
					233554	3985645
					233561	3985646
					233566	3985640
					233564	3985638
					233567	3985635
BUILDING	Parking Lot Building	304.66	8.86	4	233546	3985575
					233554	3985583
					233563	3985574
					233555	3985566

Attachment 3

Ranking of receptor guidance provided by EPA

From: Walther, Katherine
To: Brian Rivera
Cc: Howard, Chris
Subject: Knox County Pb Modeling
Date: Tuesday, October 09, 2018 3:50:35 PM
Attachments: GerdauExample_KW_Oct2018.xlsx

Hi Brian,

I hope you are doing well! I wanted to let you know that we talked with James Thurman from OAQPS to get his thoughts on how to do the ranking analysis for potential placement of a lead monitor. Would you be available sometime this week to have a call to discuss James' proposed methodology? Additionally, Chris wanted to discuss the model inputs for the volume source (MSLOUV), specifically, the initial vertical dimension (sz) of 0.83 meters.

Below is an outline of James' suggestions for the ranking analysis.

Run AERMOD with monthly output and run LEADPOST to get the rolling 3-month averages at each receptor as well as the maximum rolling 3-month average at each receptor. Then do the following:

1. Using the maximum rolling 3-month output from LEADPOST, rank the receptors from highest to lowest design value. Give each receptor a score based on its rank. The highest receptor would have rank of 1. This is analogous to the design value ranking in the SO2 guidance.
2. For the monthly output from AERMOD, determine the highest receptor for each month in the modeled period. Total up the number of times each receptor is the highest across the modeled months. For example, a receptor may be the highest for 6 monthly averages across the modeled period, another receptor could be highest 4 times in the modeled period, etc. After getting how many times each receptor is the highest for each month, rank the receptors by the number times each is the highest, ranking from the highest number of months to the lowest number of months. Give each receptor a score, with rank 1 being the receptor having the most number of months where it's the highest across all the receptors. This is analogous to the MAXDAILY analysis in the SO2 guidance.
3. Since the design value is a rolling 3-month average, perform a similar analysis as step 2, except do it on the rolling 3-month averages output from LEADPOST. Get a ranking similar to step 2.
4. For each receptor, add up the scores from the 3 steps. The lowest score a receptor could have is 3. That would be a receptor that has the highest design value (DV), has the most occurrences of monthly max, and most occurrences of rolling 3-month average max.

I used the initial Pb modeling that you submitted to run through these steps. I have attached that spreadsheet for your reference as an example.

The first sheet, "monthlysorted" lists the AERMOD monthly concentrations sorted by descending concentration for each month with the rank (MONTHRANK). The sheet "monthly_stats" lists the number of times a receptor has an occurrence of a particular monthrank. For example, the first receptor listed has 21 months where it is the highest

receptor for the month. The second receptor listed has the highest monthly concentration 16 times. The highlighted receptors are the ones which are the highest receptor at least one time.

The third sheet, "3monthconc" is similar to "monthlysorted" except it is the rankings for the 3-month rolling averages output by LEADPOST. The "3monthconc" sheet has all of the source groups and the "3monthconcALLOnlySrcGrp" has just the "All" source group. The sheet "rolling3monthstats" is similar to "monthlystats" except it is for the rolling 3-month averages. Here there are 4 receptors that were highest for at least one 3-month period.

The sheet "maxconcreceptor" contains the maximum 3-month rolling averages output by LEADPOST, basically the design value. These are sorted by descending concentrations.

The last sheet ("scores") is the score for the receptors where all three datasets: monthlystats, rolling3monthstats, and the sorted design values are merged and scores calculated. I've highlighted six receptors with the lowest scores that had monthcount and count values > 0.

Please let me know if you have any questions regarding the steps outlined in this email. Additionally, at your earliest convenience, please let me know your upcoming availability so we can schedule a call to discuss this. I wanted to provide the steps ahead of time so that you had time to look through the example and see what questions you might have.

Thanks!

Sincerely,
Katie

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Appendix C Response to Comments

Air Quality received the following comments during the public comment period from May 24, 2021 – June 24 ,2021. Comments are indicated by italic print, and standard type the response.

Comment 1 USEPA Region 4 - Knox County discussed a new monitoring site at Parton Place on Tennessee Ave in "Section 4.0 Proposed Changes." Additional information related to the site selection of Parton Place will need to be provided in the final Annual Network Plan submittal for EPA to be able to approve the site.

- *Knox County provided modeling information in "Section 6.0 Model Report-CMC Steel USA, LLC Fence Line Pb Monitor Modeling;" however, an analysis of the rankings and site selection process based on modeling results was not included in the report. This report should explain how the Parton Place location was selected, and why a site with a higher rank could not be established along Tennessee Ave.*
- *The Proposed Changes section should include the following information:*
  - *Discussion on what the model outputs show and mean.*
  - *A narrative description and relevant documentation of your agency's site selection process. This should include any documentation demonstrating how your agency followed the appropriate EPA guidance for selecting a site and your process for looking into several properties by rank. Please discuss why higher ranked sites were not chosen (e.g. access issues). Document the steps Knox County completed to find a suitable monitoring location.*
  - *Provide a good public record on the thought process for site selection.*

: In addition to the above information, please provide:

- *A proposed timeframe for installation of the monitor*
- *A proposed timeframe for data collection*
- *A discussion on how you will determine which monitor is the maximum concentration monitor, including the minimum timeframe for data collection at both sites*
- *The expected process of maintaining the maximum concentration monitor as a SLAMS monitor and the request to shut down the lower reading to be included in future annual network plans*
- *Expected probe height*
- *It would be useful to include 3.7 Proposed New Site – "Parton Place" within the Proposed Changes section rather than splitting the information*

As part of the waiver request, please provide a thorough discussion on:

- *Explanation of Pb source-oriented monitoring and the importance of collecting data at the highest possible receptor with a clear line of sight of the facility.*
  - *The expected amount of unrestricted airflow*
  - *Refer back to the process for securing a suitable property, and provide discussion on if another, more suitable site was not available*
  - *The narrative text should clearly state if there will be a clear line of sight between the monitor and the facility*
    - *40 CFR Part 58 Appendix E 5 (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" and how this applies to your waiver request*

For the discontinuation of the Burnside monitor, please provide an updated version (e.g. 2020 data) of Section "4.2.2 Lead" included in the 2020 Annual Network Plan/Assessment. The discussion provided in 2020 Annual Network Plan/Assessment was thorough in explaining the difference between the Ameristeel and Burnside sites, including why Knox Co is requesting to shut down Burnside over the Ameristeel site.

Response to Comment 1: Section 4 of this document has been revised to include the requested information.