ADDENDUM TO CHATTANOOGA-HAMILTON COUNTY NETWORK REVIEW 2021

Request for Discontinuation of the East Ridge Site (470650031)

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I. Introduction

The Chattanooga-Hamilton County Air Pollution Control Bureau (the Bureau) is submitting an addendum to the 2021 Network Review, part of the State of Tennessee's 2021 Annual Monitoring Network Plan, to petition EPA to discontinue the 1517 Tombras Avenue, East Ridge City Hall, $PM_{2.5}$ site (470650031). The City of East Ridge built a dog park around the site in January 2022 and requested that the site be moved. Patrons of the dog park feel that the air monitoring site requires too much space inside the dog park.

Figure 1: East Ridge City Hall Dog Park with Enclosed Air Monitoring Site

Several sites at City Hall were investigated but either could not meet the obstacle specifications or were rejected by the City of East Ridge because the City has tentative plans for future development on the City Hall property. An off-site location at a school was selected but was found to flood in heavy rains. A site was offered by the City of East Ridge at Camp Jordan, but it was in a different air shed and required substantial costs for site set-up.

Therefore, the Bureau proposes to discontinue the site. The site was set up originally to support the Core Siskin Drive site downtown and to provide information about transport from Georgia. 40 CFR §58, Appendix D, Table D-5. states that only one $PM_{2.5}$ site is required for a MSA from 500,000-1 million population as long as the data is less than 85% of the standard. The Chattanooga Hamilton County/North Georgia estimated MSA for 2019 from the US Census Bureau is 565,194 (most recent available).

EPA provided funds to the Bureau for sites beyond the one-site requirement. The East Ridge site and a site at Soddy Daisy were originally set up as Special Purpose Monitors (SPMs) with those funds. Soddy Daisy was discontinued at the end of calendar year 2015 because it was historically the lowest data site in Hamilton County. The discontinuation of the East Ridge site will leave two remaining in the attainment area: 911 Siskin Drive (470654002) operated by Chattanooga-Hamilton County and Rossville-Williams Street in Walker County operated by the

State of Georgia (132950004). The Williams Street site in Walker County is three (3.14) miles from the East Ridge site proposed to be discontinued.

If the East Ridge site is discontinued, then the POC2 FRM at 911 Siskin Drive can be discontinued because there will be no collocated FRM with FRM requirement. If the POC2 is discontinued, this will leave a continuous T640 and one filter-based FRM at the Core Siskin site (470654002).

II. Evaluation for Discontinuation

EPA's Network Assessment Guidance and 40 CFR §58.14c (1 and 3) detail applicable criteria that must be met to request discontinuation of a SLAMS instrument. The East Ridge City Hall site was an SPM that became a SLAMS.

These criteria for discontinuation include:

- The monitor showed attainment during the last five years
- The probability is less than 10% that this monitor will exceed 80% of the applicable NAAQS during the next three years based on the concentrations, trends, and variability observed in the past
- The monitor is not specifically required by an attainment plan or maintenance plan, as it is an attainment area which is expected to remain in attainment
- The monitor to be discontinued cannot be the only SLAMS in a nonattainment or maintenance area
- Has not measured violations of applicable NAAQS in five years

III. Attainment

The primary annual $PM_{2.5}$ standard is met when the annual $PM_{2.5}$ NAAQS Design Value (DV) is less than or equal to 12.0 µg/m^3 at each eligible monitoring site. Three years of valid annual means are required to produce a valid annual $PM_{2.5}$ NAAQS DV. A year meets data completeness requirements when quarterly data capture rates for all four quarters are at least 75 percent.

Figure 2 is a Design Value Chart for East Ridge and Siskin Drive to demonstrate that the East Ridge and Siskin Drive sites have been in attainment for over five years. The Chattanooga/Hamilton County/North Georgia area was given a $PM_{2.5}$ attainment designation for the 12 µg/m^3 standard in 2015.

The data are less than 85% of the standard (85%= 10.2 µg/m^3) which means that only one site, the Core Siskin site, is required. The design value for East Ridge (470650031) is less than or equal to that of the Siskin Drive site (470654002) since 2013-2015. Thus, the East Ridge site is not producing the maximum data in the area. The source of the design data is AMP480, the AQS Design Value Report. Data for 2021 are not yet loaded into AQS and are not certified.

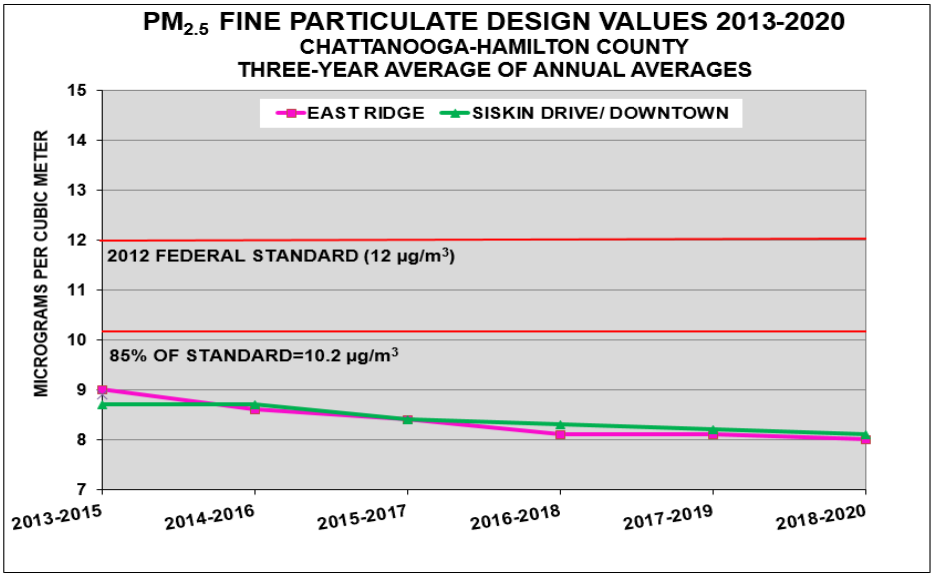

Figure 2: Design Value Chart for East Ridge and Siskin Drive

The DV from 2019-2021 is expected to be very similar to the previous years' design values.

IV. Probability Less than 10% that this Monitor Will Exceed 80%

The probability is less than 10% that this monitor will exceed 80% of the $PM_{2.5}$ standard during the next three years based on the concentrations, trends, and variability observed in the past. The probability is easily assumed from the history on the graph in Figure 2. The following equation is used for mathematical substantiation.

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

$\ddot{X}$ is the average design value for the last 5 years
t is 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 records
NAAQS is the standard of interest

Site Site Name	Pollutant	Averaging Period	Design Value					$\ddot{X}$	s	t	n	NAAQS µg/m³	80 % µg/m³	Pass
			14-16	15-17	16-18	17-19	18-20							
470650031 East Ridge City Hall	$PM_{2.5}$	24-Hour	8.6	8.4	8.1	8.1	8.0	8.24	.251	2.13	5	12	9.6	Yes

Figure 3: Probability Chart

Calculations

$$8.24 + \frac{.5346}{2.2361} < 9.6\ \mu g/m^3 \text{ (80\% of NAAQS)}$$

$8.479\ \mu g/m^3 < 9.6\ \mu g/m^3$ (80% of NAAQS)

V. Analysis Relates to Current Standard

Since the proposed new $PM_{2.5}$ NAAQS has not been announced, no statement or assessment can be made relating the East Ridge design values to the new standard.

VI. No Attainment or Maintenance Plan Requirement

The East Ridge Site (470650031) is not specifically required by an attainment plan or a maintenance plan. The most recent attainment or maintenance plan adopted by the State and approved by EPA contains no contingency measure to be triggered by an air quality concentration. The area is expected to remain in attainment even after the standard is lowered as long as the standard is 8.5 $\mu g/m^3$ or above.

VII. Not the Only SLAMS in the Attainment Area

There will remain two SLAMS $PM_{2.5}$ sites in the attainment area after discontinuation of the East Ridge site: 911 Siskin Drive operated by the Bureau and Rossville-Williams Street operated by the State of Georgia.

VIII. Has Not Measured Violation of Applicable NAAQS in Five Years

It is evident in Figure 2, the Design Value Chart, that the yearly DV NAAQS of 12 $\mu g/m^3$ has not been exceeded in more five years. In fact, the three-year design values have been well under the standard. Figure 3 indicates that the daily standard has not been exceeded at this site as well. 40 CFR §50.18 states that the daily standard for $PM_{2.5}$ is 35 $\mu g/m^3$ 24-hour average concentration measured in the ambient air as $PM_{2.5}$ (particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers). The primary 24-hour $PM_{2.5}$ standard is met when the 98th percentile 24-hour concentration, is less than or equal to 35 $\mu g/m^3$.

The 55.9 $\mu g/m^3$ in 2020 is above the 98th percentile, and is not used to compare against the standard. The extreme data was due to July 5, 2020, fireworks. No exceptional event was requested because the data did not affect the daily design value.

Top 5 Data Days Per Year: East Ridge					
	1st	2nd	3rd	4th	5th
2016	18.0	17.0	16.3	16.0	15.6
2017	27.0	21.1	20.3	20.0	19.1
2018	20.6	16.4	16.4	15.9	15.5
2019	21.0	20.3	15.5	15.4	15.4
2020	55.9	22.3	20.4	17.1	16.2
2021	28.1	26.4	25.9	18.7	18.4

Figure 4: Comparison Against the Daily Standard

IX. Transport

Since the purpose of placing a site close to the Georgia border was to determine transport, the topic is addressed in this discussion. This site was not a required transport site. The rationale in discontinuing the East Ridge site is that the Siskin Drive site historically produces data similar to that of East Ridge. The Bureau believes that the Siskin Drive site can indicate transport: therefore, eliminating the need for a border site.

To demonstrate that the Siskin Drive and East Ridge sites are providing very similar data, a linear regression analysis is provided for 2020. The July 5, 2020, data has been removed from the graph because the 55.9 µg/m^3 was localized at the East Ridge site which made that data point an outlier. Two other outliers were removed (9.8,4.2) and (14.1, 6.4). With the three outlier removals, the correlation is a strong positive correlation with an R^2 value of .9062.

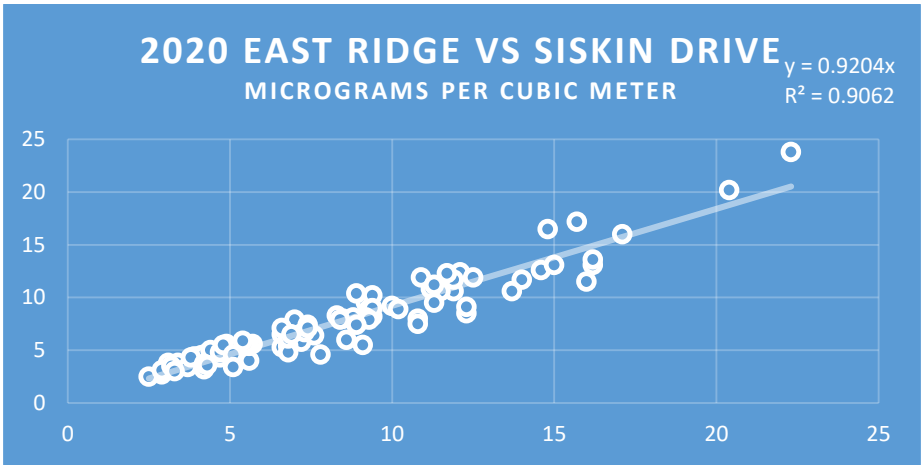

Figure 5: Scatterplot Comparing East Ridge and Siskin Drive

The Rossville-Williams Street site is just below the state line. The Siskin site is north of the Rossville-Williams Street site. Since the primary wind direction is south to north, the Siskin site should indicate transport. The East Ridge site is northeast of the Rossville-Williams Street site.

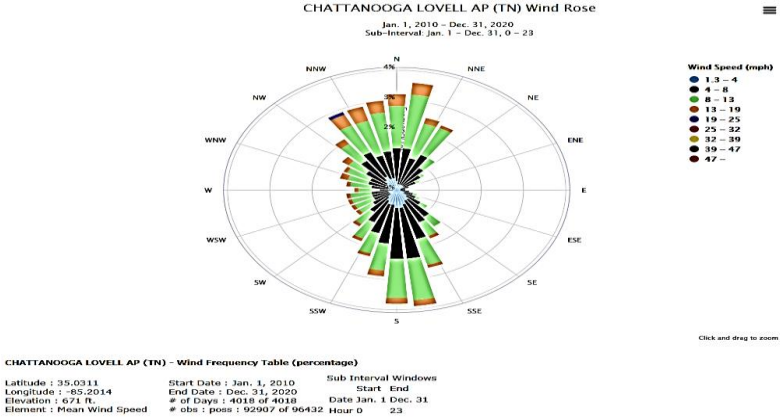

Figure 6: Wind Rose 2010-2020

Wind speed and direction are of interest in evaluating pollution, emissions, and transport. This ten-year wind rose was produced from data collected at the Chattanooga Metropolitan Airport at Lovell Field (Station 13882) using the Midwestern Regional Climate Center's Application Tools Environment.

Figures 7 and 8 are provided to illustrate the relationship of the East Ridge site to the Siskin and Rossville-Williams Street sites.

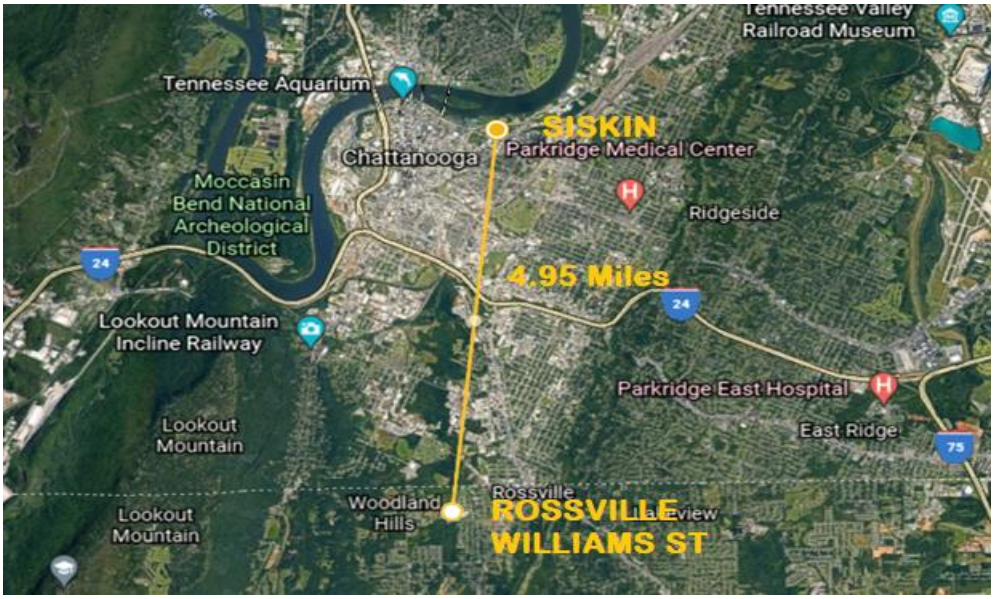

Figure 7: Map of Siskin Drive and Rossville-Williams Street

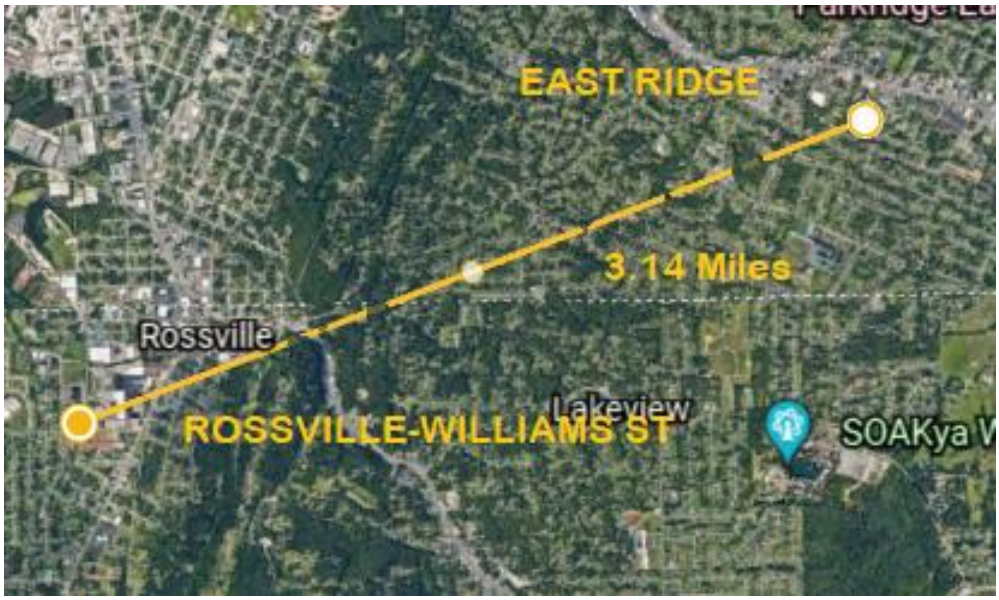

Figure 8: Map of East Ridge and Rossville-Williams Street

X. Sensor Project

In the past few months the City of Chattanooga, the Enterprise Center (a nonprofit associated with the City and County), and the University of Tennessee at Chattanooga partnered with the Electric Power Board, the Hamilton County School System, Air Pollution Control, and green|spaces, to set up a sensor network in the City of Chattanooga. This cooperative project was funded through a US Ignite/NSF grant. The sensors are Tetrad Sensor Network Solutions brand (known as AirU) which are from a company associated with researchers at the University of Utah. There are four Purple Air sensors that are part of a separate project included in this visualization (on MLK Boulevard). The network is currently reporting in two minute averages but the data is available for additional manipulation. The Bureau has requested hourly reporting in order to better compare against the Bureau's Siskin Site and the Georgia Rossville- Williams Street site.

Transport will be visible on the sensor network. Sensors do not have the same accuracy as an EPA approved NAAQS instrument. But a network of sensors can provide meaningful indications of an increase or decrease in particulate pollution. The real-time reporting can be particularly valuable for studying transport and exceptional pollution events, especially those events caused by prescribed burning or wildfires.

If the primary annual National Ambient Air Quality Standard is lowered significantly, the sensor network may prove to be useful in determining a plan for pollution reduction. This network was established with a three-year life span but the project may be extended if the data proves to be useful and funding is available.

The sensor network is most concentrated in downtown Chattanooga. There are plans, if additional funding is secured, to expand the network.

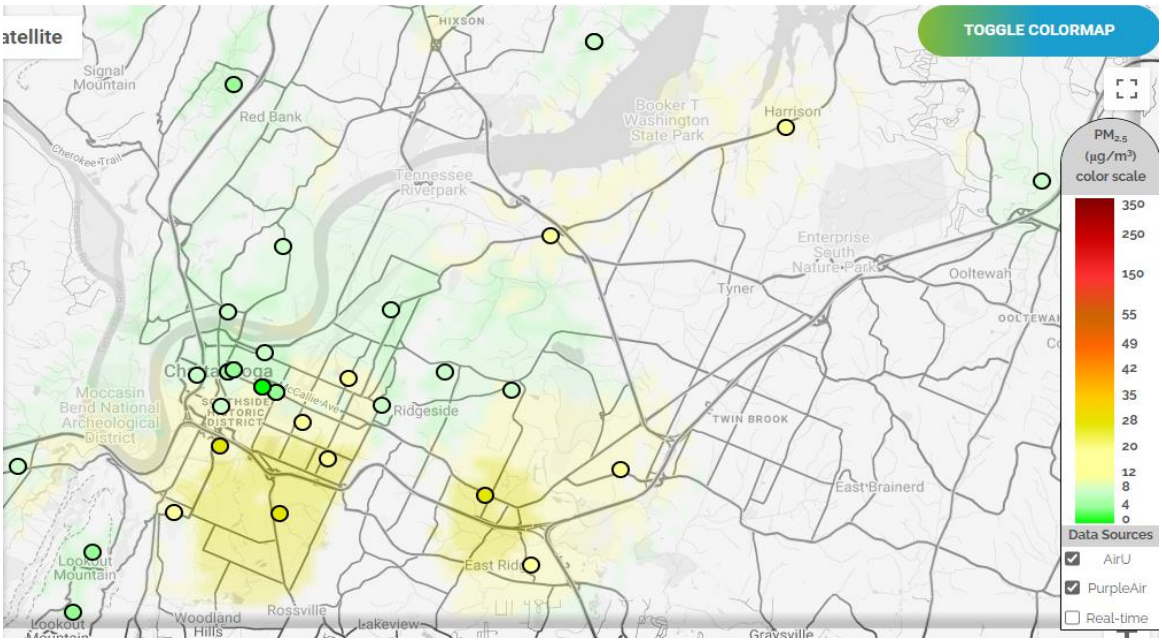

Figure 9: Chattanooga Sensor Network

Figure 10: AirU Description from Website