Sanders Lead Company, Inc. Lead (Pb) Modeling Results

June 25, 2025

1.0 INTRODUCTION

The purpose of this document is to present to the Alabama Department of Environmental Management (ADEM) modeling results following the air quality dispersion modeling analysis for lead (Pb) at Sanders Lead Company. This modeling analysis follows the procedures detailed in the Modeling Protocol (March 25, 2025) which was approved by ADEM; a copy of the modeling protocol is located in **Attachment C** for reference. The air dispersion modeling analysis was used to validate whether on-site improvements and control strategies continue to comply with the lead NAAQS.

1.2 Purpose

On January 6, 2025, Environmental Protection Agency [EPA], Region 4 provided the Alabama Department of Environmental Management [ADEM] with comments following their review of the Lead (Pb) Contingency Measure Implementation Plan for Troy, AL [November 2024]. In response to the EPA comments, ADEM and Sanders Lead agreed that an updated modeling analysis was necessary to demonstrate that recent on-site improvements continue to comply with the lead NAAQS.

The modeling analysis incorporated the following on-site improvements:

- Raised Stack Height for Stack 4a to 145 ft
- Raised Stack Height for Stack 14 to 145 ft
- Raised Stack Height for Stack 10 to 90 ft
- Installed Stack 17 New Torit Venting System (General Ventilation)
- Merged Stack 4 to Stack 4a
- Fugitive Emissions revisions

2.0 FACILITY DESCRIPTION

2.1 Facility Description

Sanders Lead Company (Sanders Lead) operate a Secondary Lead Smelting facility in Troy, Pike County; Troy is located 70 kilometers southeast of Montgomery, Alabama. The primary activities at Sanders Lead are Secondary Lead Smelting and Refining (Standard Industrial Classification [SIC] code 3341). Primary operations at Sanders Lead include three (3) major operations: scrap preparation, smelting, and refining.

2.2 Location

Sanders Lead is located at 1 Sanders Road, in Troy, Alabama. As shown in **Figure 1**, Troy is located in southeastern Alabama, in Pike County. Troy is located 70 kilometers southeast of Montgomery, Alabama. Figure 1 displays the plant site on a 7.5-minute USGS map. The city population of Troy is approximately 18,000. According to the United States Census Bureau, the city has a total area of 26.3 square miles (68.2 km²), of which, 26.2 square miles of it is land and 0.1 square miles of it (0.36%) is water.

The approximate coordinates of Sanders Lead is Latitude 31.787814 and Longitude -85.978913 [NAD83], at an elevation of approximately 160 meters above mean sea level.

2.3 Facility Boundary

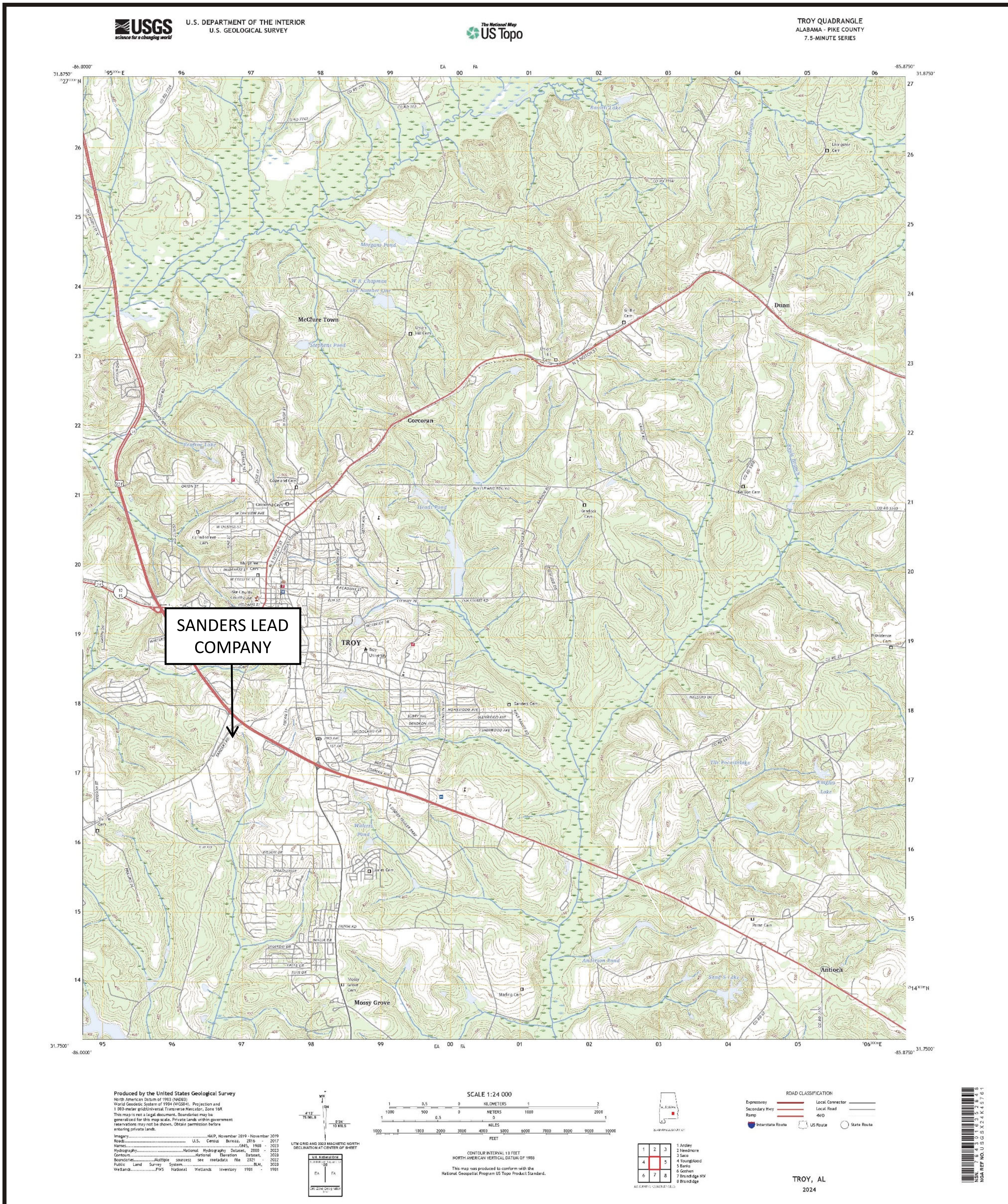
Access to Sanders Lead is restricted in order to prevent the likelihood of unauthorized persons accessing the facility for malicious purposes, such as theft. By securing and monitoring the perimeter of the facility, personnel can more easily and effectively control who enters and leaves the facility, both on foot and in vehicles, and facility personnel are better able to detect, delay, defend against, and respond to individuals or groups who seek to gain access to the facility. Restricting the area perimeter involves two fundamental aspects – 'securing' the restricted area and 'monitoring' the restricted area. These two concepts act in unison to allow the facility to deter, detect, and defend against breaches of the facility perimeter.

2.3.1 Secure Area Perimeter - The facility secures its area perimeter by physically limiting the accessibility, such that there is a low likelihood of an adversary to successfully breach the perimeter. The facility utilizes a number of barriers to secure its perimeter in its entirety as shown **Figure 2 (Attachment A)**. These barriers include:

- Perimeter Fence
- Perimeter Walls
- Perimeter Doors
- Perimeter Gates
- Topographical Barriers
- Landscaping Barriers

These barriers are described in greater detail in the following sections.

2.3.2 Perimeter Fence - The perimeter fence at the facility is the primary security measure used to secure the area. The perimeter fence encircles approximately 95 percent of the facility, with the only exceptions being where walls, doors, and gates are present. The



SANDERS LEAD COMPANY **1 SANDERS ROAD,** **TROY AL**	JB AIR CONSULTING AIR PERMITTING & COMPLIANCE SCALE: NA — DRAWN BY: JBS CHKD. BY: JBS	**SITE LOCATION MAP**	FIG. NO. 1

perimeter fence consists of an eight-foot high chain link fence that is topped with three-strand barbed wire.

2.3.3 Perimeter Walls - In conjunction with the perimeter fence, several areas of the facility perimeter are secured by the presence of walls. These areas are provided in Figure 2 and include the following: The Supply Building/Chemical Storage Warehouse and the guard building. These perimeter walls are abutted in all cases by the perimeter fence in such a way as to not allow access through the perimeter via gaps, holes, or cracks.

2.3.4 Perimeter Doors - An industrial steel perimeter door is located on the wall of the Supply Building/Chemical Storage Warehouse. This door contains a cylinder lockset. The perimeter door will always remain locked and only authorized personnel will be allowed entry via this door. Regular entry into the supply building will occur from inside the facility perimeter and is controlled by Radio Frequency Identification (RFID).

2.3.5 Perimeter Gates -There are nine perimeter gates located at the facility, as provided on Figure 2. Seven of these gates are large enough to allow vehicular passage and two are only large enough for personnel passage. The perimeter gates consist of chain link and are locked with casehardened chains and padlocks. The only gate that allows regular access to the facility is the main gate, which does not have a chain link gate, but instead has a drop arm and is manned by trained security personnel 24 hours per day, 7 days per week. This main entrance gate is located along the northwest perimeter and is accessed from Sanders Road and Henderson Highway via a serpentine traffic pattern. Other than the main entrance gate, all other gates will remain locked except as needed for special use by authorized personnel.

2.3.6 Topographical Barriers - In addition to the primary perimeter barriers discussed in the previous sections, topographical barriers at the facility provide secondary barriers and deterrence for unauthorized persons seeking access to Sanders Lead. Topographical barriers at the facility include a swamp and forested areas along certain portions of the perimeter.

Included in Attachment A is a detailed plot plan with labels for the buildings (refer to **Plant Buildings** drawing),

2.4 Site Characteristics

As shown in **Figure 1**, Troy is located in a gently rolling area of Alabama with no local topographic features which appreciably influence weather and climate. During the months of June through September, inclusive, temperature and humidity conditions generally show little change from day to day. During the coldest months, December, January, and February, there are frequent shifts between mild and moist air from the Gulf of America and dry, cool continental air. From late June through the first half of August, nearly all precipitation is from local, mostly afternoon, thunderstorms, and there are apt to be considerable differences in day-to-day amounts of rainfall in different parts of the Troy area. In late August and in September, summer conditions of temperature and humidity persist as air continues to drift in from the Gulf, but local thunderstorms become less frequent because of the shortening of the days and the decrease in heat received from the sun. As this late summer season progresses, the local climate gives way to thunderstorms which occur with cold fronts and occasional general rains associated with storms on the Gulf. All types and intensities of rain, except the local thunderstorms of summer, may occur at any time from December through March or early April.

Floods in the rivers are correspondingly most frequent during this period. Most rain from late April through early June is in the form of showers or thunderstorms occurring in advance of approaching cool fronts, which become weaker and less frequent as summer approaches. It is during this spring season, and during the late summer and early autumn, that droughts sometimes occur. Snow in Troy is important only as a curiosity. Near the facility, terrain has gentle undulations.

3.0 MODELING SELECTION & SUPPORTING DATA

3.1 Dispersion Model

The modeling analysis was performed using the most current version of the modeling programs:

AERMOD - Version No. 24142
AERMAP - Version No. 24142
BPIPPRM - Version No. 04274
AERMET - Version No. 24142
AERSURFACE - Version No. 24142
AERMINUTE - Version No. 15272
LEADPOST - Version No. 13262

Currently, AERMOD is the EPA guideline model for short-range transport and has the ability to account for the source types and dispersion environment located at, and surrounding the Sanders Lead facility. AERMOD is appropriate for use for many different types of dispersion environments including: sources subject to building downwash and sources located in flat or elevated terrain.

The stacks were modeled with the actual physical stack height. In addition, the USEPA's Building Profile Input Program (BPIPPRM - Version No. 04274) version that is appropriate for use with PRIME algorithms in AERMOD was used to incorporate downwash effects in the model for all modeled point sources. The building dimensions of each structure were input in BPIPPRM program to determine direction specific building data. PRIME addresses the entire structure of the wake, from the cavity immediately downwind of the building to the far wake.

AERMOD was used to model the individual point and volume sources in order to predict maximum ambient lead concentrations from the facility. The modeling options that were used include the following:

• Calculation of average concentrations for each applicable averaging period;
• Non-Urban dispersion conditions;
• Regulatory default options;
• Final plume rise;
• Stack-tip downwash;
• Buoyancy-induced dispersion;
• Calms processing routine;
• Default wind profile exponents;
• Default vertical potential temperature gradients;
• "Upper Bound" values for supersquat buildings;
• No exponential decay; and
• Terrain included.

3.2 Meteorological Data

As provided by ADEM, modeling was performed using the 2019-2023 meteorological Surface data from Troy Municipal Airport, AL and Upper Air data from Alabaster, AL. The MET data was processed using AERMET and AERSURFACE Version 24142;

Since Bowen Ratio varies depending on the soil moisture content, ADEM used the EPA recommended method to determine the applicable Bowen Ratio moisture tables to use for each year. For Troy, ADEM determined 2020, 2021 and 2023 were in the "Average" category; 2019 and 2022 were in the "Dry" category.

AERSURFACE also allows one to assign months to specific seasons to account for climatology differences. Using this option, AERSURFACE yields surface characteristics for each month. For this NWS station, ADEM made the following assignments:

a) Late autumn after frost and harvest, or winter with no snow – Dec, Jan, Feb.
b) Transitional spring – Mar, Apr, May
c) Midsummer with lush vegetation – Jun, Jul, Aug, Sep
d) Autumn with unharvested cropland – Oct, Nov

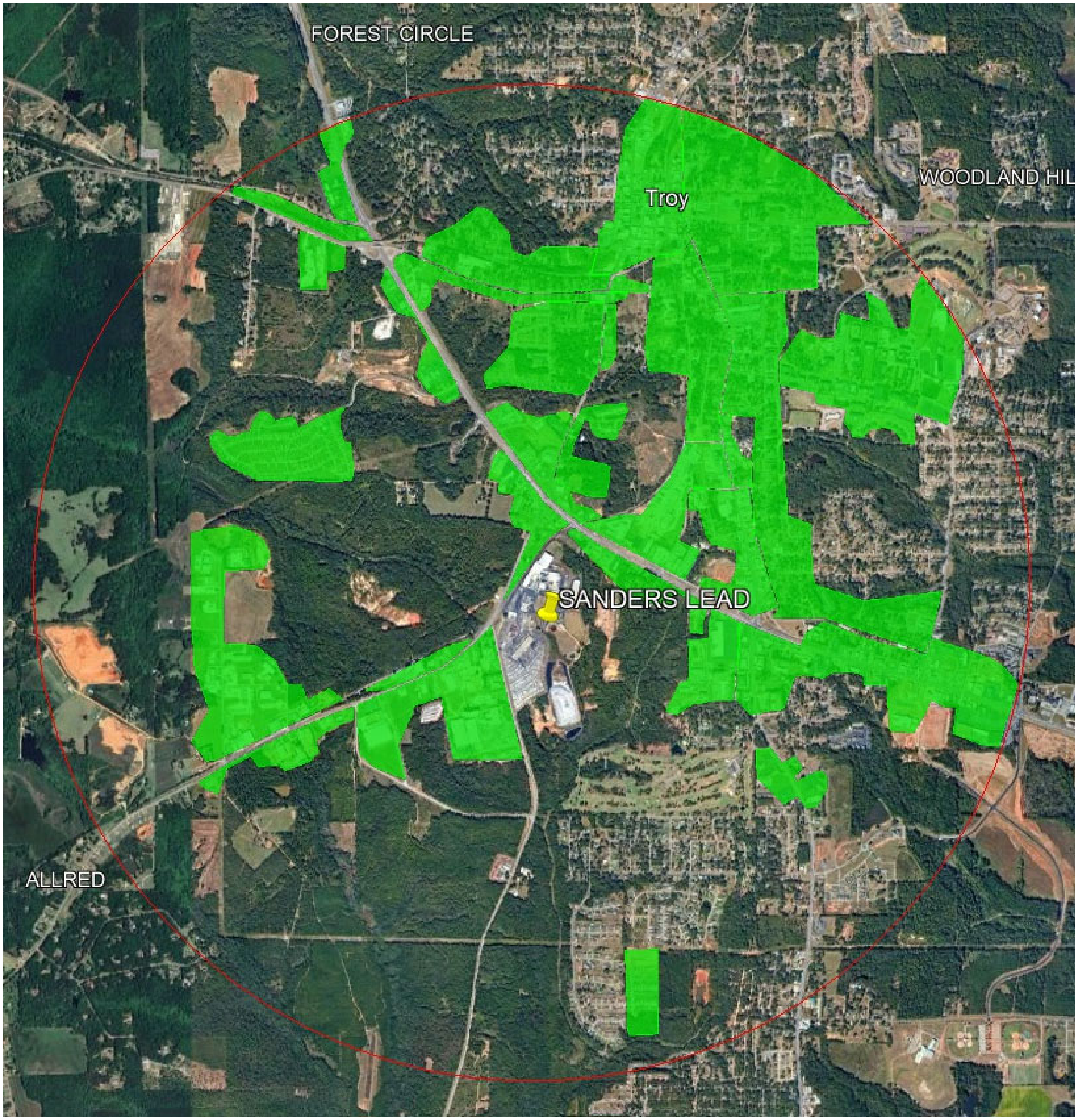
AERMINUTE (Version 15272) was used to process 1-minute (5-minute used when 1-minute is missing) ASOS wind data available from the National Climatic Data Center (NCDC). AERMINUTE was used to generate hourly averaged wind speeds and wind directions to supplement the standard hourly ASOS observations. The hourly averaged wind speed and direction generated by the AERMINUTE program was merged with data from standard surface archives, along with upper air in Stage 2 of AERMET processing.

THRESH_1MIN keyword was used in Stage 2 to specify a threshold wind speed for the 1-minute data. This threshold value only applies to the hourly averaged winds derived from 1-minute data and does not apply to the standard hourly NWS weather observations. A threshold speed of 0.5 m/s was utilized; [note: ADJ_U* KEYWORD was used in Stage 2.]

3.3 Urban vs. Rural Determination

In accordance with the EPA "Guideline on Air Quality Models", Appendix W of CFR Part 51, two methods are identified to determine the character of the modeling area. The land use procedure is the recommended approach according to the ADEM, which classifies land use within an area circumscribed by a circle, centered on the source, with a radius of 3 kilometers. Utilizing the Troy, AL zoning maps as guidance for land use delineation, land use types I1, I2, C1, R2 and R3 comprised of approximately 26% of the 3 km source area. The majority of the land use to the South and West of facility is predominately undeveloped and/or common residential area, while the land use to the North and East is characterized by Commercial and Compact Residential areas.

Following the land use review, it was apparent that the area within a 3-km radius of the facility is rural using Auer techniques. According to Table A-1 of Appendix A – Urban/Rural Classification), land use types I1, I2, C1, R2, and R3 accounted for less than 50 percent of the land use within 3 kilometers of the source, therefore, the modeling regime is considered rural. Although the City of Troy categorizes Troy University and surrounding campus as "R1" Common Residential; to be conservative, the area was included in the land use evaluation since the vegetation is less than 70% in the area. However, other residential areas zoned as R1 which had greater than 70% vegetation was excluded from the evaluation. Please refer to **Figure 2** which delineates the areas (in green) that were identified as land use types I1, I2, C1, R2, and R3.



Land use types I1, I2, C1, R2, and R3

SANDERS LEAD COMPANY 1 SANDERS ROAD, TROY AL	JB AIR CONSULTING AIR PERMITTING & COMPLIANCE SCALE: NA · DRAWN BY: JBS CHKD. BY: JBS	LAND USE EVALUATION	FIG. NO. 2

3.3 Receptors

The proposed modeling analysis was conducted using the following receptor grid design. A Cartesian receptor grid system was created to adequately assess air quality impacts in all directions from the Sanders Lead fenceline to a distance of up to 10 kilometers from the site. The grid system utilized the Universal Transverse Mercator (UTM) coordinate system. Discrete receptors were placed along the property grid fenceline at 100 meter spacing. In addition, receptors extended outward from the fenceline at 100 meter grid spacing at 5,000 meter distance; 250 meter grid spacing at 7,000 meter distance and 500 meter grid spacing at 10,000 meter distance. All receptors included terrain heights generated from the AERMAP terrain processor, utilizing NED terrain data.

AERMAP (EPA Version No. 24142), the AERMOD terrain preprocessor program, was used to calculate terrain elevations and critical hill heights for the modeled receptors using National Elevation Data (NED). The dataset was downloaded from the USGS website (http://viewer.nationalmap.gov/viewer/) and consisted of 1/3 arc second resolution. The NED data used for this modeling exercise included the following quadrangles: Troy, Ansley, Banks, Brundidge, Brundidge NW, Goshen, Needmore, Saco and Youngblood.

Figures 3 and 4 show a graphical depiction of the near-field receptors and entire receptor grid proposed for modeling.

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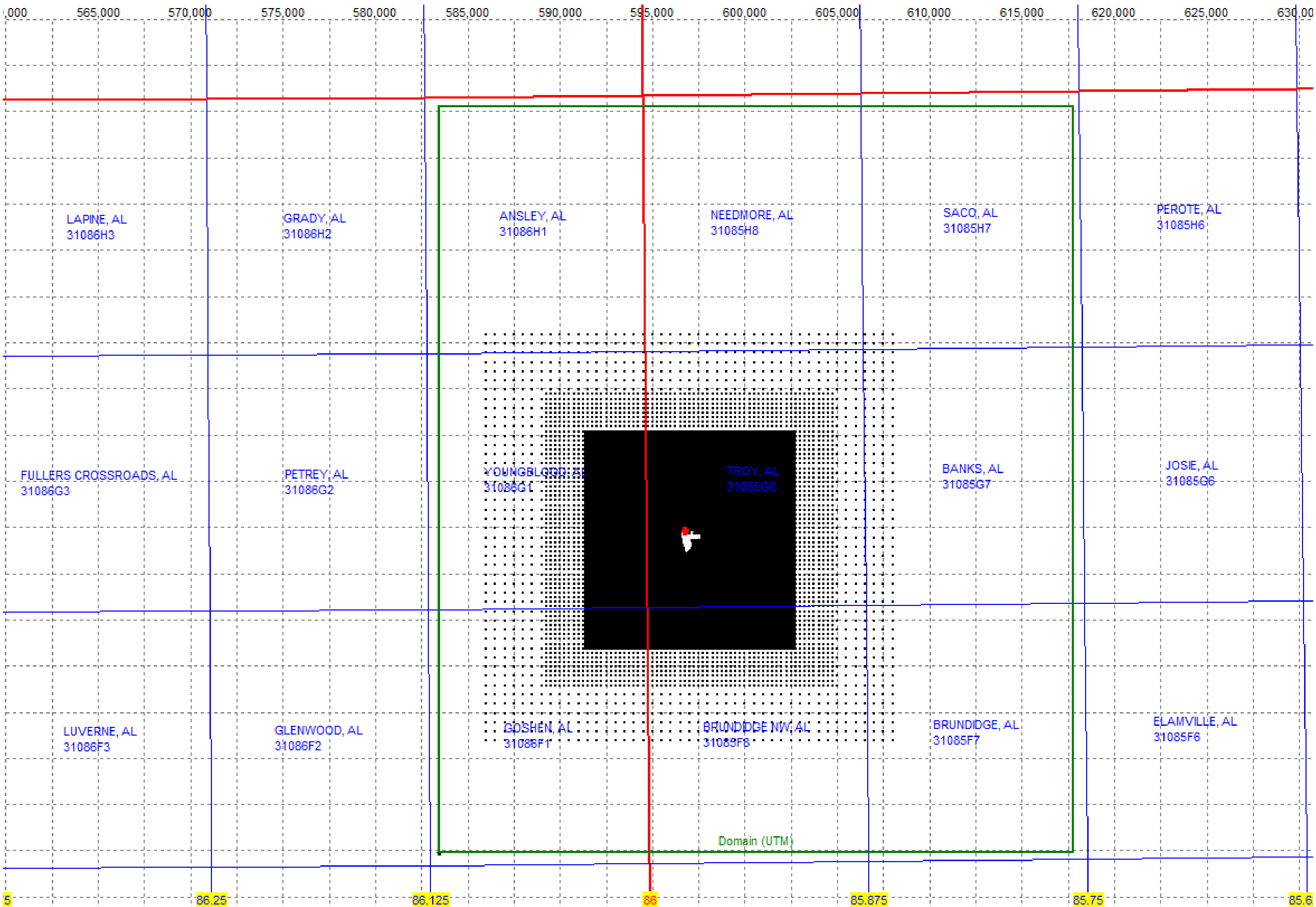
RECEPTOR GRID – NEAR FIELD

FIG. NO.
3



SANDERS LEAD COMPANY 1 SANDERS ROAD, TROY AL	JB AIR CONSULTING AIR PERMITTING & COMPLIANCE SCALE: NA — DRAWN BY: JBS CHKD. BY: JBS	RECEPTOR GRID – DOMAIN	FIG. NO. 4

4.0 SOURCES AND LEAD EMISSIONS

Summarized in **Table 1** and **Figures 5 & 6** is a list of point and volume sources located at the facility. Included in **Tables 2a & 2b** are the stack parameters and emission rates for the source list. Please refer to **Attachment B** for a description of how each volume source was calculated.

TABLE 1 – Source of Emissions at Sanders Lead Company

Source ID	Type	Description
Stack 4a	Point	Sanitary Baghouses for Furnaces 1, 2, 3 & 4
Stack 10	Point	Slag Treatment Building
Stack 11	Point	Canopy Hoods / Vent
Stack 12	Point	Battery Breaker
Stack 13	Point	Raw Material Storage
Stack 14	Point	Alloying Kettles
Stack 15	Point	Blast Furnaces 1-4 and Alloying Kettles [SO_2 Scrubber]
Stack 17	Point	General Ventilation
Haul Road 2	Volume	Material to Slag Treatment building
Haul Road 4	Volume	Delivery of raw coke, limestone and scrap iron
Haul Road 5	Volume	Delivery of batteries to Breaker

4.1 Off-Site Emissions Inventory

Since lead emissions from Sanders Lead are expected to produce the largest concentration gradients for lead in the area, the value of modeling very small contributions from other, more distant lead sources is very limited. Therefore, other “off-site” lead sources were not included in the modeling analysis.

4.2 Background Air Quality Data

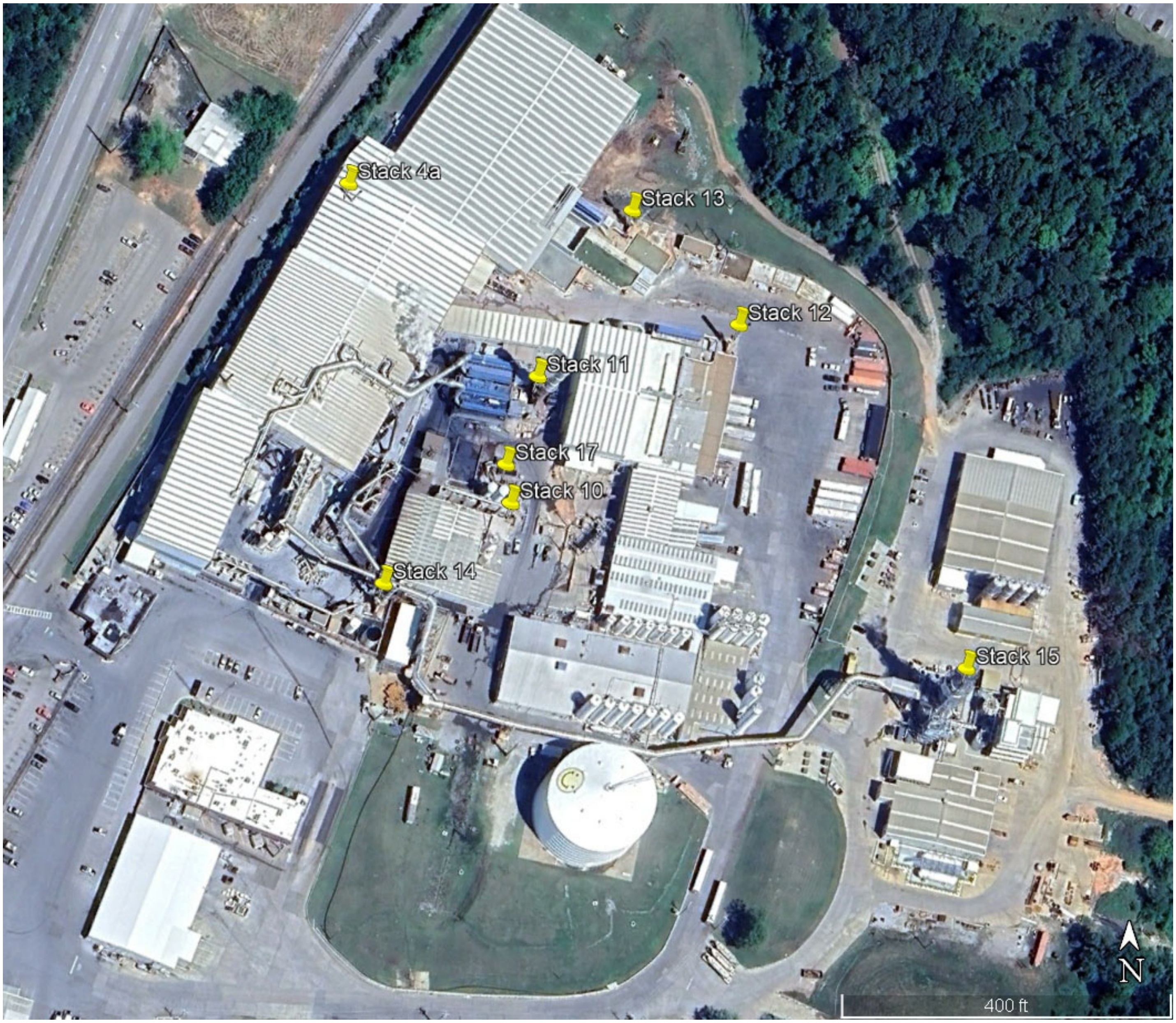
An ambient background concentration for lead was added to the maximum predicted concentrations from all modeled sources to determine a final maximum ambient concentration. ADEM has determined that 0.006 ug/m^3 provides a representative background concentration of lead for the area.

4.3 Lead Concentration Calculation Procedure

Since the dispersion model AERMOD does not provide the ability to directly compute the 3-month rolling averages, results must go through a post-processing procedure. EPA’s “LEADPOST” program [Version 13262] which is a FORTRAN program designed to read monthly concentrations output from AERMOD and calculate the maximum rolling 3-month average concentration for each receptor and overall maximum concentration (across all receptors and source groups).

4.4 Good Engineering Practice

In April 2022, Sanders Lead provided ADEM with results of a preliminary analysis of emissions sources and their associated modeling parameters. The preliminary analysis evaluated the facility’s air dispersion model and associated impacts of nearby buildings; the analysis also evaluated the stack heights and whether the existing stacks on-site are appropriately sized. As noted in EPA regulatory air dispersion modeling guidance, Good



Stack ID	Description	Easting	Northing	Base Elev	Stack Height	Temp	Flow	Exit Velocity	Stack Dia
		m	m	ft	ft	F	ACFM	fps	ft
STACK4A	Blast / Sanitary Hoods	596729.00	3517498.00	530.5	145	111	60,000	141.5	3.0
STACK10	Slag Treatment	596792.00	3517380.00	518.2	90	99	45,000	59.7	4.0
STACK11	Canopy Hoods / Vent	596802.00	3517431.00	530.5	150	107	318,000	55.8	11.0
STACK12	Battery Breaker	596873.00	3517449.00	526.8	90	63	60,000	62.9	4.5
STACK13	Raw Material Storage	596837.00	3517493.00	520.5	90	75	60,000	62.9	4.5
STACK14	Alloying Kettles	596744.00	3517352.00	515.0	145	157	52,000	54.5	4.5
STACK15	SO2 Scrubber	596964.00	3517328.00	499.7	188	115	220,000	58.9	8.9
STACK17	Torit Venting System	586787.08	3517388.97	521.4	90	107	260,000	68.1	9.0

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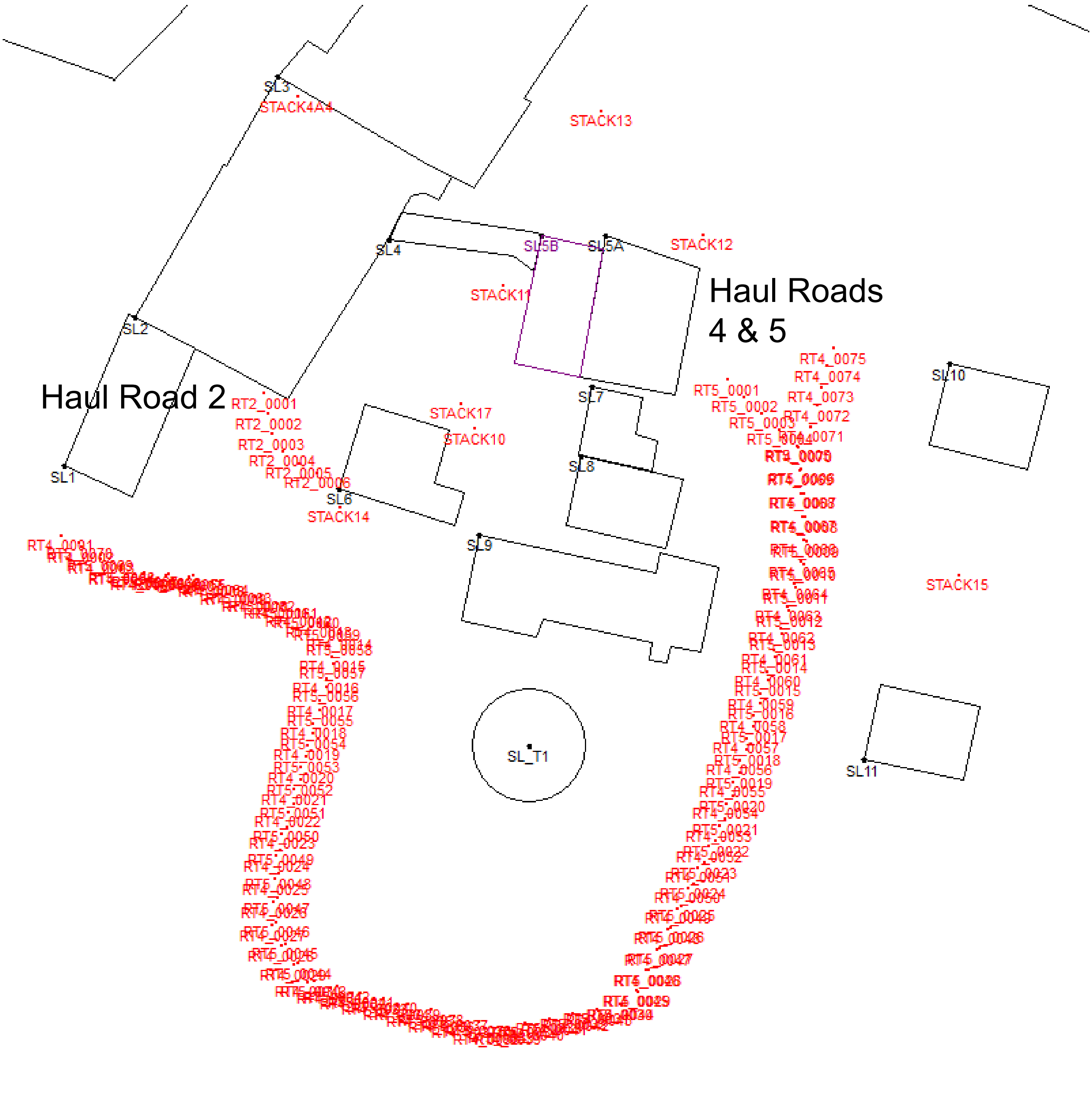
POINT SOURCES

FIG. NO. 5



Source	EU Description	Vehicle Height (x2) m	Release Height m	Vehicle Width m	Adjusted Width (+6m) m	Road Length m	Initial Horiz. Sigma	Initial Vertical Sigma	# of Volume Sources	Emission/ Receptor tpy
Haul Road 2	Material to Slag Treatment building	4.6	2.3	1.4	7.4	47.8	3.44	2.14	6	2.08E-04
Haul Road 4	Delivery of raw coke, limestone and scrap iron	5.4	2.7	2.2	8.2	615.0	3.81	2.51	75	3.74E-05
Haul Road 5	Delivery of batteries to Breaker	8.2	4.1	2.6	8.6	605.0	4.00	3.81	70	7.15E-05

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VOLUME SOURCES

FIG. NO.
6

Engineering Practice (GEP) Stack Height is based on the concept that a sufficient stack height is necessary to ensure the upward dispersion of the exhaust is not adversely affected by the wind blowing over its own building that can entrap the exhaust in eddies and the downwind building cavity and wake areas. A plume caught in the path of this flow is drawn into the wake, temporarily trapping it in a recirculating cavity. This downwash effect leads to higher ground-level pollutant concentrations near ground levels.

Good air pollution control engineering practice (GEP) for stack heights is conservatively calculated with the following formula, which may be simplified in most cases to 2.5 times the building height. At this height the aerodynamic effects of the adjacent buildings are no longer considered to adversely affect the exhaust plume and downwash is not expected to occur. It is desired air pollution control practice to minimize this pollution concentrating effect of downwash. It is important to note that while GEP is the optimum stack height at which building influences on dispersion are eliminated, this can result in a taller stack than practical in many cases.

According to EPA regulations, GEP stack height is defined to be the tallest of the following:

- 213 feet, as measured from the ground-level elevation at the base of the stack;
- 2.5H (for stacks in existence in January 12, 1979); or
- H + 1.5L (for all other stacks), where H is the height of the building itself or any significant nearby structure or structures and L is the lesser of the projected height or width of the building in question.

TABLE 2 - Good Engineering Practice (GEP) Stack Height

Building	Building Height [ft]	Projected Width [ft]		GEP Stack Height [ft]
	H	L-1 (width)	L-2 (length)	GEP = H + 1.5L
SL2	58.00	200	335	145

* GEP used Building Height for "L" since it was the lesser dimension compared to Projected Width

As demonstrated in Table 2, Building SL2 is identified as the tallest building/structure within the facility; more importantly, SL2 houses Stack 4a on top of it. It should be noted that all sources were evaluated, however, only Stacks 4 and 4a were impacted due to the height of building SL2. Based on applying the GEP Stack Height equation with the SL2 parameters, the suggested GEP stack height would be approximately 145 feet. At the time of the evaluation, Stack 4a (from ground surface) to top of stack was 90 ft. Following the GEP evaluation, Sanders Lead has increased the stack height of Stack 4a and two other stacks in order diminish the aerodynamic effects of the adjacent buildings; the following stacks have been raised since the previous air dispersion modeling analysis:

- Stack Height for Stack 4a raised to 145 ft
- Stack Height for Stack 14 raised to 145 ft
- Stack Height for Stack 10 raised to 90 ft

Based on USEPA guidance, the on-site stacks were modeled with the actual physical stack height. In addition, the USEPA's Building Profile Input Program (BPIP-Version 04274) version that is appropriate for use with PRIME algorithms in AERMOD was used to incorporate downwash effects in the model for all modeled point sources. The building dimensions of each structure was input in BPIPPRM program to determine direction specific building data. PRIME addresses the entire structure of the wake, from the cavity immediately downwind of the building to the far wake.

TABLE 2a – Point Source: Stack Parameters and Emission Rates

Model Name	Description	Easting m	Northing m	Base Elev	Stack Height	Temp	Flow	Exit Velocity	Stack Dia	Emission Rate
SLCModel25				Ft	Ft	F	ACFM	fps	Ft	LEAD lb/hr
STACK4A	Blast / Sanitary Hoods	596729.00	3517498.00	530.5	145	111	60,000	141.5	3.0	**0.0590**
STACK10	Slag Treatment	596792.00	3517380.00	518.2	90	99	45,000	59.7	4.0	0.0080
STACK11	Canopy Hoods / Vent	596802.00	3517431.00	530.5	150	107	318,000	55.8	11.0	0.0670
STACK12	Battery Breaker	596873.00	3517449.00	526.8	90	63	60,000	62.9	4.5	0.0330
STACK13	Raw Material Storage	596837.00	3517493.00	520.5	90	75	60,000	62.9	4.5	0.0220
STACK14	Alloying Kettles	596744.00	3517352.00	515.0	145	157	52,000	54.5	4.5	**0.0220**
STACK15	SO2 Scrubber	596964.00	3517328.00	499.7	188	115	**220,000**	**58.9**	8.9	**0.1940**
STACK17	Torit Venting System	596787.08	3517388.97	521.7	90	107	**260,000**	**68.1**	9.0	**0.0550**

TABLE 2b – Volume Source: Parameters and Emission Rates

Source	EU Description	Source Type		Elevation	Vehicle Height (x2)	Release Height	Vehicle Width	Adjusted Width (+6m)	Road Length	Initial Horiz. Sigma	Initial Vertical Sigma	# of Volume Sources	Emission/ Receptor
				m	m	m	m	m	m				tpy
Haul Road 2	Material to Slag Treatment building	Fugitive	Volume	160.93	4.6	2.3	1.4	7.4	47.8	3.44	2.14	6	2.08E-04
Haul Road 4	Delivery of raw coke, limestone and scrap iron	Fugitive	Volume	159.72	5.4	2.7	2.2	8.2	615.0	3.81	2.51	75	3.74E-05
Haul Road 5	Delivery of batteries to Breaker	Fugitive	Volume	160.02	8.2	4.1	2.6	8.6	605.0	4.00	3.81	70	7.15E-05

Adjusted Width - is the actual width of the trucks (plus 6 meters), the additional width represents turbulence caused by the vehicle as it moves along the road; width represents a side of the base of the volume
Number of Volume Sources - divide the length of the road by the adjusted width, the result is the maximum number of volume sources that could be used to represent the road.
Height of Volume - the height will be equal to twice the height of the vehicle generating the emissions.
Initial Horizontal Sigma - calculated by dividing the adjusted width by 2.15.
Initial Vertical Sigma - calculated by dividing the height of the volume determined by 2.15.
Release Height - calculated by dividing the height of volume in half; this point is in the center of the volume.

5.0 MODEL RESULTS

Presently, since AERMOD model does not perform rolling average calculations, the application of the U.S. EPA developed LEADPOST post-processing utility was applied. Below is a summary of the results (**Tables 3 and 4**) from the facility-wide air dispersion modeling analysis at Sanders Lead Company. Included in **Figure 7** is the location of the maxima concentration of lead from the air dispersion modeling analysis. The values depicted in **Figure 7** do not represent LEADPOST post-processor results; values represent maxima 1st high month values; the figure is used solely to demonstrate location of maxima concentration.

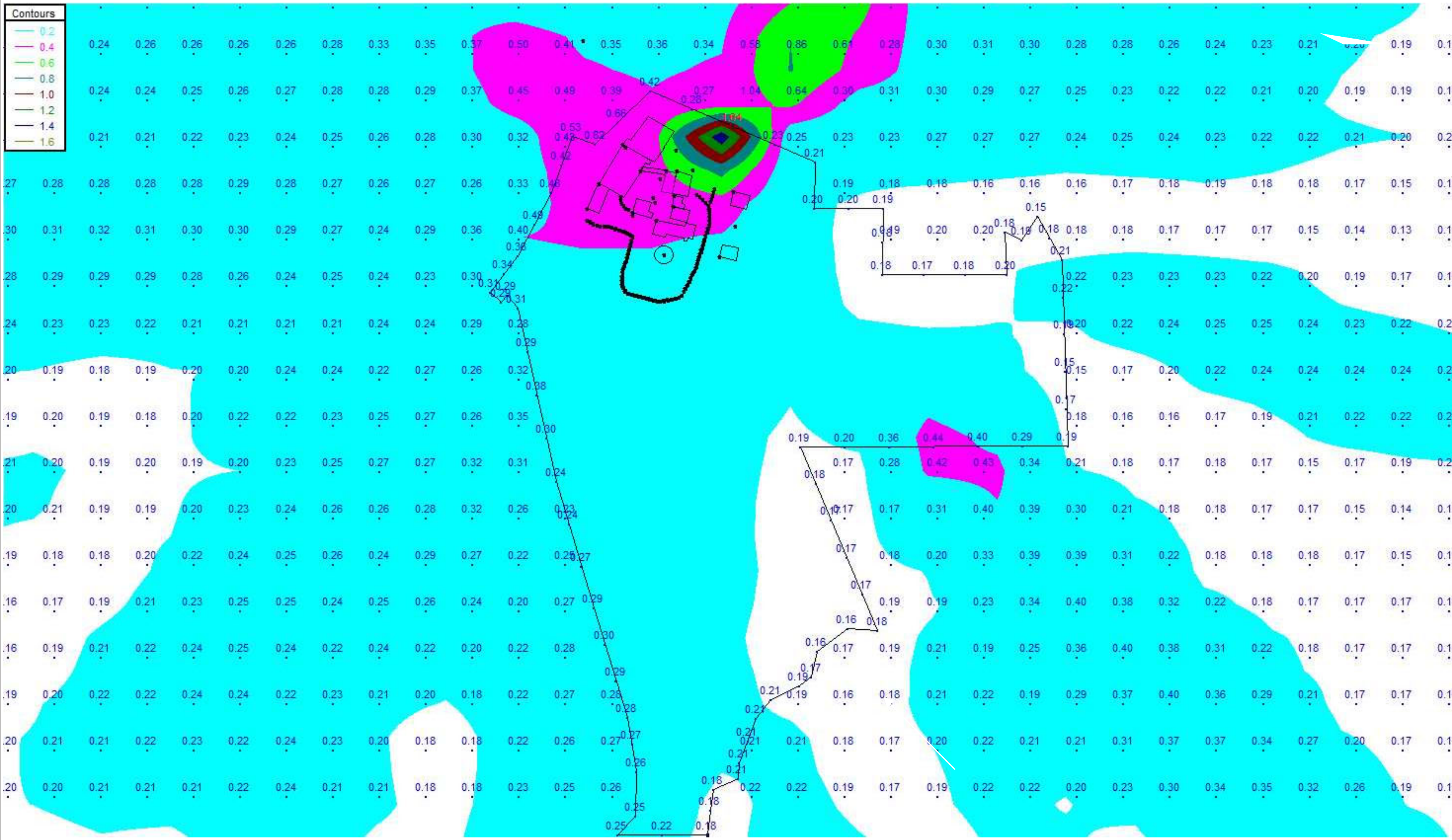
TABLE 3: Maximum 3-month average concentration (2019-2023)

Year	Maximum µg/m^3	Background µg/m^3	Total µg/m^3	Standard µg/m^3
2019-2023	0.0525	0.006	**0.0585**	0.15

TABLE 4: Maximum 3-month average concentration per year

Year	Maximum µg/m^3	Background µg/m^3	Total µg/m^3	Standard µg/m^3
2019	0.0517	0.006	**0.0577**	0.15
2020	0.0482	0.006	**0.0542**	0.15
2021	0.0525	0.006	**0.0585**	0.15
2022	0.0445	0.006	**0.0505**	0.15
2023	0.0373	0.006	**0.0433**	0.15

The air dispersion modeling results validate that on-site improvements and control strategies at Sanders Lead continue to comply with the lead NAAQS.

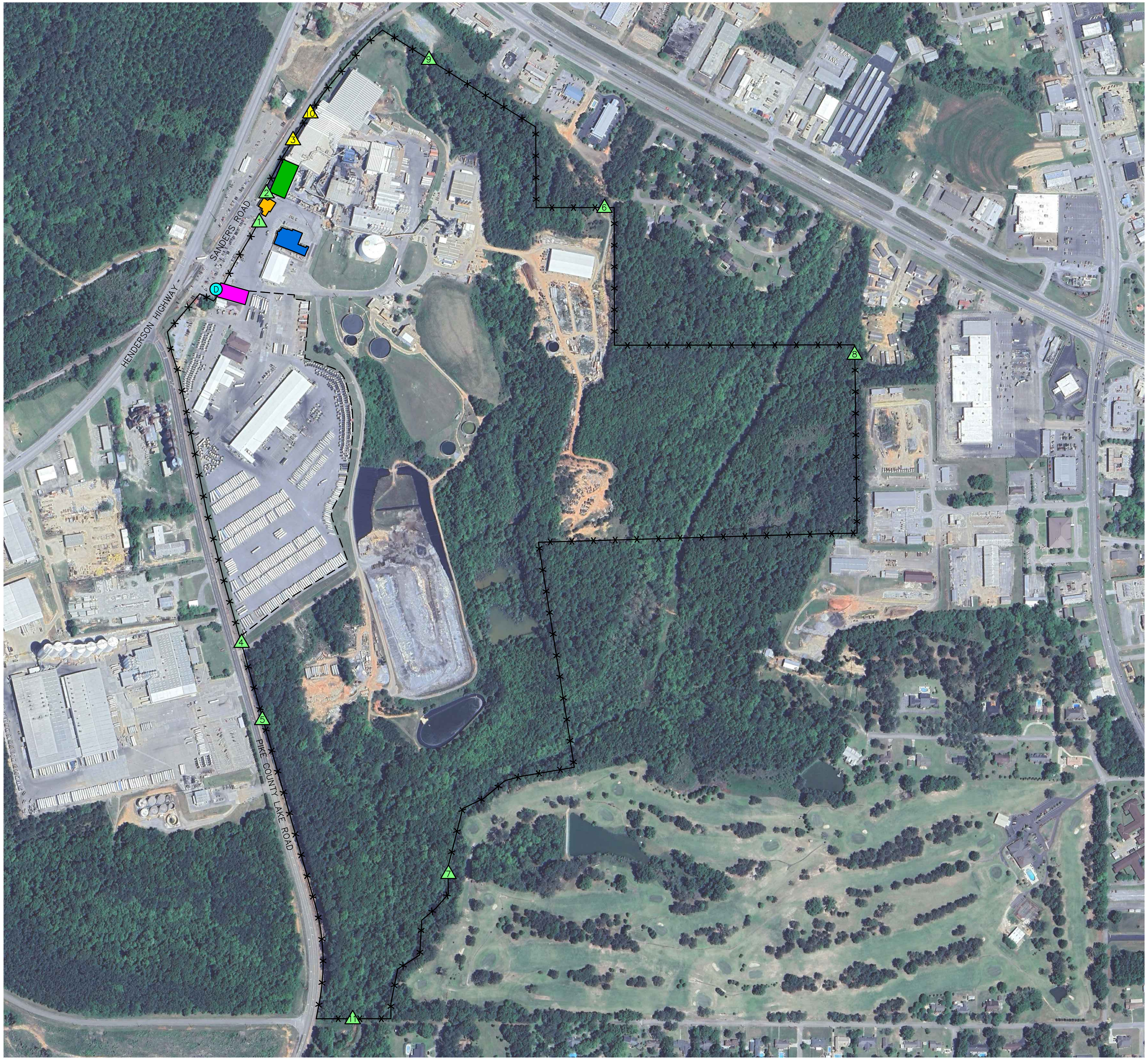


Year	Maximum µg/m³	Background µg/m³	Total µg/m³	Standard µg/m³
2019	0.0517	0.006	**0.0577**	0.15
2020	0.0482	0.006	**0.0542**	0.15
2021	0.0525	0.006	**0.0585**	0.15
2022	0.0445	0.006	**0.0505**	0.15
2023	0.0373	0.006	**0.0433**	0.15

Note: Values depicted in figure do not represent LEADPOST post-processor results; values represent maxima 1st high month values. Figure is used solely to demonstrate location of maxima concentration.

SANDERS LEAD COMPANY **1 SANDERS ROAD,** **TROY AL**	JB AIR CONSULTING AIR PERMITTING & COMPLIANCE SCALE: NA DRAWN BY: JBS CHKD. BY: JBS	**Lead Maxima Concentration**	FIG. NO. 7

ATTACHMENT A
Facility Site Maps



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LEGEND

- PERIMETER FENCE
- PERIMETER GATE (MAN GATE)
- PERIMETER GATE (DOUBLE GATE)
- PERIMETER DOOR
- WILEY SANDERS TRUCK LINES OPERATIONS

BUILDINGS:

- GUARD BUILDING
- REFINING AREA
- SUPPLY AND CHEMICAL WAREHOUSE
- ADMINISTRATION

NOTE

AERIAL IMAGE OBTAINED VIA GOOGLE EARTH, DATED APRIL 14, 2023.

TriAD ENVIRONMENTAL CONSULTANTS, INC.
Suite 200, 207 Donelson Pike, Nashville, TN 37214
615-889-6888, fax: 615-889-4004

SANDERS LEAD COMPANY, INC.
TROY, ALABAMA

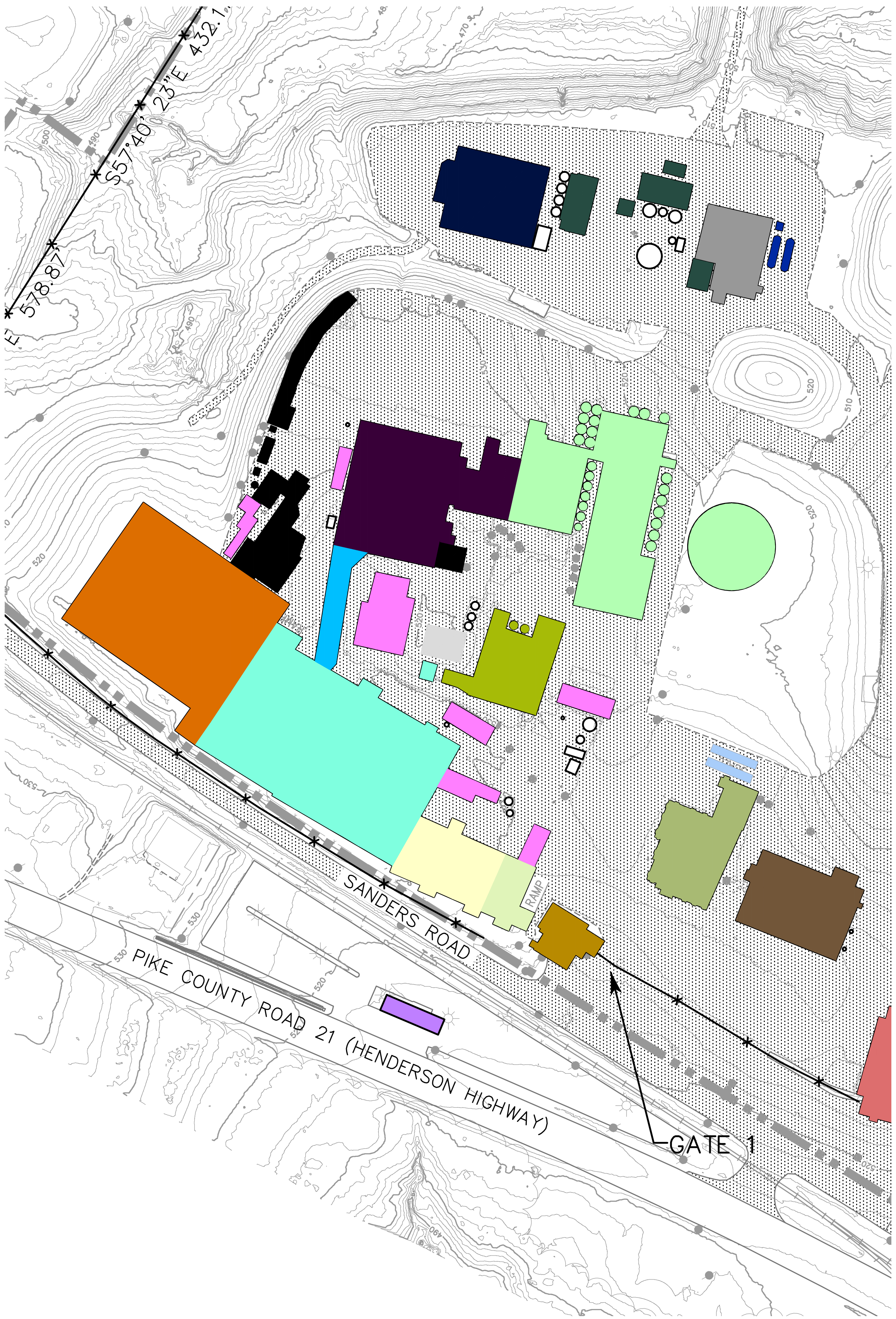
NO.	REVISION	BY	DATE

SITE SECURITY PLAN

DWN BY: ALW DATE: 03/07/25
CHK BY: MAH SCALE: AS SHOWN

SANDERS LEAD COMPANY

DRAWING NO.
0101-1 SITE PLAN.DWG



0 200' 400'
SCALE: 1" = 200'

LEGEND

- PROPERTY LINE
- COUNTY ROADS
- FACILITY ROADS
- RAILROAD
- FENCE LINE
- STREAM LOCATION
- 100–YEAR FLOODPLAIN BOUNDARY

NOTES

1. PLAN ADAPTED FROM MARCH 3, 2022 AERIAL SURVEY BY PLS GROUP INC.
2. PROPERTY BOUNDARY, BOUNDARY LABLERS, AND STREAM LOCATIONS SUPPLEMENTED FROM AERIAL SURVEY BY SOUTHERN MAPPING RESOURCES CORPORATION, DATED JANUARY 31, 2013.

COLOR KEY

- AMMONIUM SULFATE FGD SYSTEM
- ANHYDROUS AMMONIA TANKS
- BAGHOUSE AND STACK
- BATTERY BREAKING BUILDING
- CASTING AND ALLOYING
- CHEMICAL STORAGE AND SUPPLY
- CONNECTOR BUILDING
- CONTAINMENT BUILDING (S01)
- FURNACE BUILDING (T87)
- GUARD STATION AND LOCKER ROOM
- KW PLASTICS
- MAINTENANCE BUILDING
- OFFICE AND LAB
- RAW MATERIAL DESULPHURIZATION SYSTEM
- SCALES
- SLAG TREATMENT BUILDING
- STORM WATER SUMP
- TRAINING
- WAREHOUSE
- WAREHOUSE AND SHIPPING
- WELDING SHOP

PLANT BUILDINGS

Sanders

SANDERS LEAD COMPANY, INC.
TROY, ALABAMA

SCALE: 1" = 200' | DR LMC | CHK MAH | REV MAH

PREPARED BY:

TriAD ENVIRONMENTAL CONSULTANTS, INC.
Suite 200, 207 Donelson Pike, Nashville, TN 37214
615–889–6888 fax 615–889–4004

PROJ: 96–SAN01–01 | DATE: 04/19/23 | SHEET 1 OF 1

REVISION HISTORY

REV.	DESCRIPTION	DATE	APPROVAL
1	UPDATED RAW MATERIAL DESULPHURIZATION	08/27/24	MAH

ATTACHMENT B

Emission Sources and Rates

FUGITIVE EMISSIONS FOR SANDERS LEAD - PROPOSED METHODOLOGY

Trip ID:	Route 2	Route 4	Route 5
Particle Size Multiplier **(k):**	0.011	0.011	0.011
Average Vehicle Weight **(W)** (tons):	6	15	15
Road Surface Silt Loading **(sL)** (g/m^2):	0.60	0.60	0.60
Days/Year with at least 0.01 inches of Precipitation **(P)**:	120	120	120
Number of days in averaging period **(N)**:	365	365	365
Lead Content of PM on Roadways (%):	26%	26%	26%
Control Factor (efficiency %):	80%	80%	80%

SOURCE OF EMISSION FACTOR:	EQUATION	PARAMETERS
The emission factor is taken from Equation 2 in AP-42, 13.2.1, Paved Roads.	$E_{ext} = [k(sL)^{0.91} \times (W)^{1.02}](1 - P/4N)$	k = from AP-42 Table 13.2.1-1 sL = from AP-42 Table 13.2.1-2 W = average vehicle weight (tons)

EMISSIONS CALCULATIONS

ROUTES	Pollutant	Emission Factor (lb/VMT)	VMT/yr	Actual Emissions (lbs/hr)	Actual Emissions (Tons/Yr)
Route 2	Pb	0.039	1,314	0.00031	0.0013
Route 4	Pb	0.100	1,073	0.00064	0.0028
Route 5	Pb	0.100	1,927	0.00115	0.0050
				TOTAL (tons/yr)	**0.0092**

Building Dimensions

Building Name	Number of Tiers	Base elevation	Tier Height	Number of Corners	Corner 1 East (X)	Corner 1 North (Y)	Corner 2 East (X)	Corner 2 North (Y)	Corner 3 East (X)	Corner 3 North (Y)	Corner 4 East (X)	Corner 4 North (Y)	Corner 5 East (X)	Corner 5 North (Y)	Corner 6 East (X)	Corner 6 North (Y)	Corner 7 East (X)	Corner 7 North (Y)
		m	ft		m	m	m	m	m	m	m	m	m	m	m	m	m	m
SL1	1	161.4	29.8	5.0	596645.7	3517366	596668.3	3517420	596670.8	3517419	596692.2	3517408	596670.2	3517356				
SL2	1	161.7	58.0	15.0	596671.2	3517419	596702.3	3517473	596703.5	3517473	596721.6	3517505	596773.6	3517474	596783.8	3517469	596778.9	3517461
SL3	1	161.6	50.0	9.0	596721.6	3517505	596732.5	3517518	596739.4	3517513	596776.9	3517565	596832.8	3517532	596809.2	3517497	596811.8	3517496
SL4	1	162.1	21.8	6.0	596761.3	3517447	596765.8	3517457	596811.2	3517450	596815.5	3517449	596812.8	3517436	596805.7	3517441		
SL5A	1	161.8	28.0	4.0	596838.5	3517448	596871.9	3517437	596863	3517392	596829.3	3517398						
SL5B	1	162.0	40.0	4.0	596815.6	3517448	596837.6	3517444	596829.3	3517398	596806	3517403						
SL6	1	157.6	21.0	6.0	596743.6	3517358	596752.7	3517388	596782.8	3517379	596777.5	3517360	596788.2	3517357	596784.7	3517345		
SL7	1	159.9	22.0	6.0	596833.5	3517395	596851.3	3517391	596848.9	3517377	596856.9	3517375	596854.7	3517364	596828.6	3517371		
SL8	1	157.9	18.5	4.0	596829.9	3517370	596865.8	3517362	596859.7	3517337	596824.5	3517345						
SL9	1	154.8	20.0	12.0	596793.4	3517342	596856.3	3517329	596857.9	3517335	596878.6	3517330	596872	3517300	596861.7	3517302	596860	3517296
SL10	1	154.1	24.0	4.0	596960.6	3517403	596996.2	3517394	596988.2	3517365	596953.5	3517374						
SL11	1	155.9	24.0	4.0	596930.3	3517262	596965.5	3517255	596971.5	3517281	596936.3	3517289						

Building Name	Corner 8 East (X)	Corner 8 North (Y)	Corner 9 East (X)	Corner 9 North (Y)	Corner 10 East (X)	Corner 10 North (Y)	Corner 11 East (X)	Corner 11 North (Y)	Corner 12 East (X)	Corner 12 North (Y)	Corner 13 East (X)	Corner 13 North (Y)	Corner 14 East (X)	Corner 14 North (Y)	Corner 15 East (X)	Corner 15 North (Y)		
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m		
SL1																		
SL2	596773.9	3517464	596773.7	3517463	596772.3	3517464	596769	3517462	596765.9	3517457	596761.6	3517448	596725.3	3517390	596692.2	3517408		
SL3	596791.2	3517465	596773.7	3517474														
SL4																		
SL5A																		
SL5B																		
SL6																		
SL7																		
SL8																		
SL9	596853.7	3517297	596854.8	3517303	596816.2	3517312	596813.6	3517306	596786.9	3517311								
SL10																		
SL11																		

SANDERS LEAD COMPANY

Fenceline Parameters

East (X)	North (Y)
m	m
596904.846	3516017.533
596711.196	3516017.533
596749.926	3516059.243
596752.905	3516154.578
596732.051	3516270.767
596660.549	3516506.126
596580.110	3516777.235
596496.692	3517152.617
596472.858	3517179.430
596460.942	3517164.534
596437.108	3517185.388
596496.692	3517265.827
596568.194	3517399.892
596612.882	3517522.040
596663.529	3517504.165
596711.196	3517551.833
596782.698	3517620.355
597137.225	3517465.435
597134.246	3517367.121
597283.207	3517367.121
597280.228	3517224.118
597548.358	3517224.118
597545.378	3517316.474
597581.129	3517298.599
597613.901	3517349.246
597667.526	3517256.890
597679.443	3516854.695
597104.453	3516851.716
597271.290	3516458.458
597205.747	3516461.437
597140.204	3516413.770
597128.287	3516357.165
597101.474	3516339.289
597041.890	3516309.497
597009.118	3516267.788
596973.368	3516172.453
596970.389	3516139.681
596916.763	3516115.848
596910.804	3516071.159

ATTACHMENT C

Modeling Protocol [March 25, 2025]

Sanders Lead Company, Inc. Lead (Pb) Modeling Protocol

March 25, 2025

1.0 INTRODUCTION

The purpose of this document is to present to the Alabama Department of Environmental Management (ADEM) a detailed protocol of the modeling procedures that will be used to conduct the air quality dispersion modeling analyses. The modeling procedures used to conduct analysis were based on recommendations given in the ADEM PSD Air Quality Analysis Modeling Guidelines (May 2024). Also, modeling guidance contained in the U.S. EPA Guideline on Air Quality Models and the U.S. EPA New Source Review Workshop Manual will be followed when applicable.

1.2 Purpose

On January 6, 2025, Environmental Protection Agency [EPA], Region 4 provided the Alabama Department of Environmental Management [ADEM] with comments following their review of the Lead (Pb) Contingency Measure Implementation Plan for Troy, AL [November 2024]. In response to the EPA comments, ADEM and Sanders Lead Company agreed that an updated modeling analysis was necessary in order to demonstrate that recent on-site improvements continue to comply with the existing lead NAAQS.

The modeling analysis will incorporate the following on-site improvements:

- Raised Stack Height for Stack 4a to 145 ft
- Raised Stack Height for Stack 14 to 145 ft
- Raised Stack Height for Stack 10 to 90 ft
- Installed Stack 17 New Torit Venting System (General Ventilation)
- Merged Stack 4 to Stack 4a
- Fugitive Emissions revisions

2.0 FACILITY DESCRIPTION

2.1 Facility Description

Sanders Lead Company (Sanders Lead) operate a Secondary Lead Smelting facility in Troy, Pike County; Troy is located 70 kilometers southeast of Montgomery, Alabama. The primary activities at Sanders Lead are Secondary Lead Smelting and Refining (Standard Industrial Classification [SIC] code 3341). Primary operations at Sanders Lead include three (3) major operations: scrap preparation, smelting, and refining.

2.2 Location

Sanders Lead is located at 1 Sanders Road, in Troy, Alabama. As shown in **Figure 1**, Troy is located in southeastern Alabama, in Pike County. Troy is located 70 kilometers southeast of Montgomery, Alabama. Figure 1 displays the plant site on a 7.5-minute USGS map. The city population of Troy is approximately 18,000. According to the United States Census Bureau, the city has a total area of 26.3 square miles (68.2 km²), of which, 26.2 square miles of it is land and 0.1 square miles of it (0.36%) is water.

The approximate coordinates of Sanders Lead is Latitude 31.787814 and Longitude -85.978913 [NAD83], at an elevation of approximately 160 meters above mean sea level.

2.3 Facility Boundary

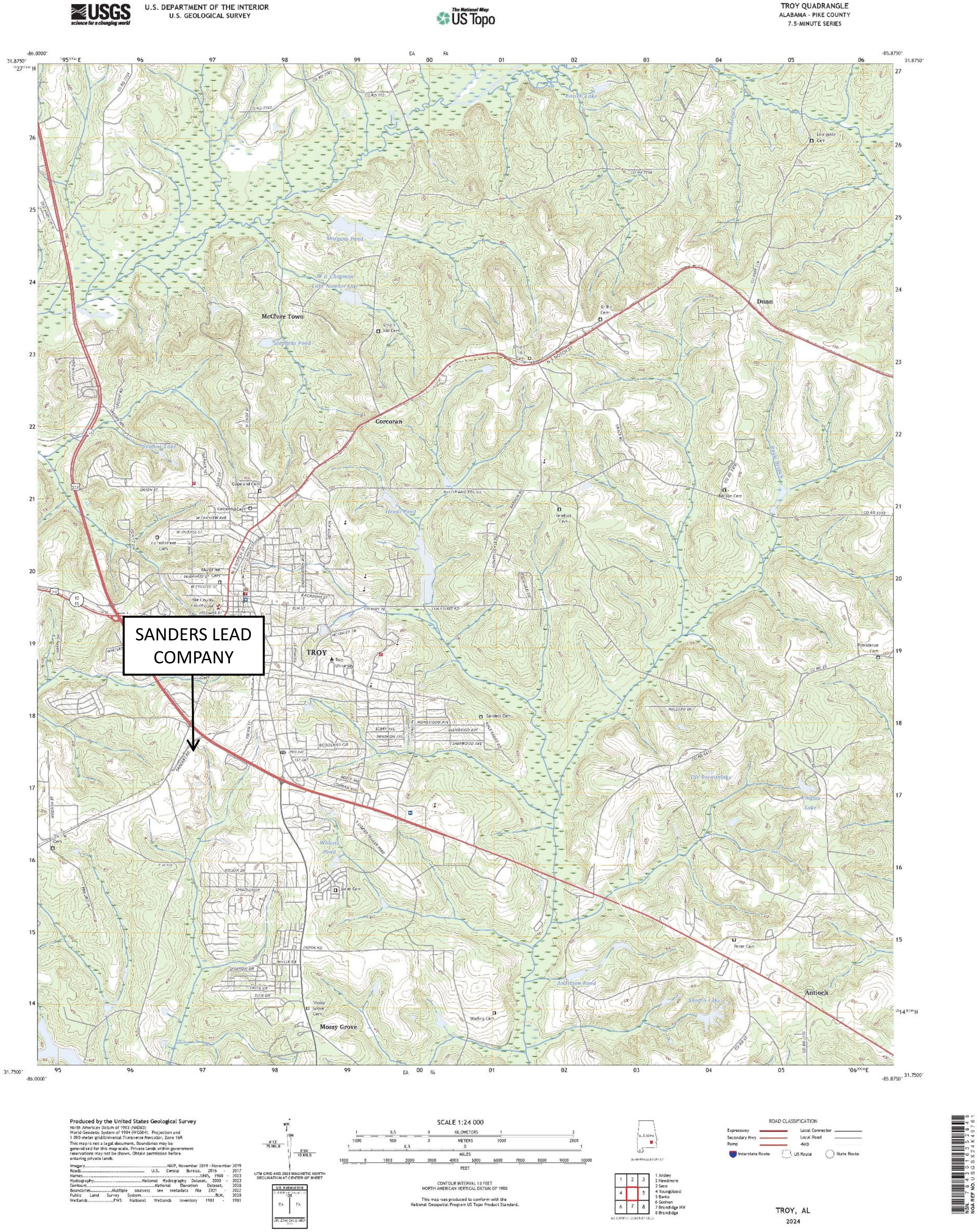
Access to the Sanders Lead is restricted in order to prevent the likelihood of unauthorized persons accessing the facility for malicious purposes, such as theft. By securing and monitoring the perimeter of the facility, personnel can more easily and effectively control who enters and leaves the facility, both on foot and in vehicles, and facility personnel are better able to detect, delay, defend against, and respond to individuals or groups who seek to gain access to the facility. Restricting the area perimeter involves two fundamental aspects – 'securing' the restricted area and 'monitoring' the restricted area. These two concepts act in unison to allow the facility to deter, detect, and defend against breaches of the facility perimeter.

2.3.1 Secure Area Perimeter - The facility secures its area perimeter by physically limiting the accessibility, such that there is a low likelihood of an adversary to successfully breach the perimeter. The facility utilizes a number of barriers to secure its perimeter in its entirety as shown **Figure 2 (Attachment A)**. These barriers include:

- Perimeter Fence
- Perimeter Walls
- Perimeter Doors
- Perimeter Gates
- Topographical Barriers
- Landscaping Barriers

These barriers are described in greater detail in the following sections.

2.3.2 Perimeter Fence - The perimeter fence at the facility is the primary security measure used to secure the area. The perimeter fence encircles approximately 95 percent of the facility, with the only exceptions being where walls, doors, and gates are present. The



SANDERS LEAD COMPANY
1 SANDERS ROAD,
TROY AL

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AIR PERMITTING & COMPLIANCE

SCALE: NA | DRAWN BY: JBS
CHKD. BY: JBS

SITE LOCATION MAP

FIG. NO.
1

perimeter fence consists of an eight-foot high chain link fence that is topped with three-strand barbed wire.

2.3.3 Perimeter Walls - In conjunction with the perimeter fence, several areas of the facility perimeter are secured by the presence of walls. These areas are provided in Figure 2 and include the following: The Supply Building/Chemical Storage Warehouse and the guard building. These perimeter walls are abutted in all cases by the perimeter fence in such a way as to not allow access through the perimeter via gaps, holes, or cracks.

2.3.4 Perimeter Doors - An industrial steel perimeter door is located on the wall of the Supply Building/Chemical Storage Warehouse. This door contains a cylinder lockset. The perimeter door will always remain locked and only authorized personnel will be allowed entry via this door. Regular entry into the supply building will occur from inside the facility perimeter and is controlled by Radio Frequency Identification (RFID).

2.3.5 Perimeter Gates -There are nine perimeter gates located at the facility, as provided on Figure 2. Seven of these gates are large enough to allow vehicular passage and two are only large enough for personnel passage. The perimeter gates consist of chain link and are locked with casehardened chains and padlocks. The only gate that allows regular access to the facility is the main gate, which does not have a chain link gate, but instead has a drop arm and is manned by trained security personnel 24 hours per day, 7 days per week. This main entrance gate is located along the northwest perimeter and is accessed from Sanders Road and Henderson Highway via a serpentine traffic pattern. Other than the main entrance gate, all other gates will remain locked except as needed for special use by authorized personnel.

2.3.6 Topographical Barriers - In addition to the primary perimeter barriers discussed in the previous sections, topographical barriers at the facility provide secondary barriers and deterrence for unauthorized persons seeking access to Sanders Lead. Topographical barriers at the facility include a swamp and forested areas along certain portions of the perimeter.

Included in Attachment A is a detailed plot plan with labels for the buildings (refer to **Plant Buildings** drawing).

2.4 Site Characteristics

As shown in **Figure 1**, Troy is located in a gently rolling area of Alabama with no local topographic features which appreciably influence weather and climate. During the months of June through September, inclusive, temperature and humidity conditions generally show little change from day to day. During the coldest months, December, January, and February, there are frequent shifts between mild and moist air from the Gulf of America and dry, cool continental air. From late June through the first half of August, nearly all precipitation is from local, mostly afternoon, thunderstorms, and there are apt to be considerable differences in day-to-day amounts of rainfall in different parts of the Troy area. In late August and in September, summer conditions of temperature and humidity persist as air continues to drift in from the Gulf, but local thunderstorms become less frequent because of the shortening of the days and the decrease in heat received from the sun. As this late summer season progresses, the local climate gives way to thunderstorms which occur with cold fronts and occasional general rains associated with storms on the Gulf. All types and intensities of rain, except the local thunderstorms of summer, may occur at any time from December through March or early April.

Floods in the rivers are correspondingly most frequent during this period. Most rain from late April through early June is in the form of showers or thunderstorms occurring in advance of approaching cool fronts, which become weaker and less frequent as summer approaches. It is during this spring season, and during the late summer and early autumn, that droughts sometimes occur. Snow in Troy is important only as a curiosity. Near the facility, terrain has gentle undulations.

3.0 MODELING SELECTION & SUPPORTING DATA

3.1 Dispersion Model

The modeling analysis will be performed using the most current version of the EPA AERMOD and AERMAP (Version Number 24142). Currently, AERMOD is the EPA guideline model for short-range transport and has the ability to account for the source types and dispersion environment located at, and surrounding the Sanders Lead facility. AERMOD is appropriate for use for many different types of dispersion environments including: sources subject to building downwash and sources located in flat or elevated terrain.

The stacks will be modeled with the actual physical stack height. In addition, the USEPA's Building Profile Input Program (BPIPPRM - Version No. 04274) version that is appropriate for use with PRIME algorithms in AERMOD will be used to incorporate downwash effects in the model for all modeled point sources. The building dimensions of each structure will be input in BPIPPRM program to determine direction specific building data. PRIME addresses the entire structure of the wake, from the cavity immediately downwind of the building to the far wake.

AERMOD will be used to model the individual point and volume sources in order to predict maximum ambient lead concentrations from the facility. The modeling options that will be used include the following:

• Calculation of average concentrations for each applicable averaging period;
• Non-Urban dispersion conditions;
• Regulatory default options;
• Final plume rise;
• Stack-tip downwash;
• Buoyancy-induced dispersion;
• Calms processing routine;
• Default wind profile exponents;
• Default vertical potential temperature gradients;
• "Upper Bound" values for supersquat buildings;
• No exponential decay; and
• Terrain included.

3.2 Meteorological Data

As provided by ADEM, modeling will be performed using the 2019-2023 meteorological Surface data from Troy Municipal Airport, AL and Upper Air data from Alabaster, AL. The MET data was processed using AERMET and AERSURFACE Version 24142;

Since Bowen Ratio varies depending on the soil moisture content, ADEM used the EPA recommended method to determine the applicable Bowen Ratio moisture tables to use for each year. For Troy, ADEM determined 2020, 2021 and 2023 were in the "Average" category; 2019 and 2022 were in the "Dry" category.

AERSURFACE also allows one to assign months to specific seasons to account for climatology differences. Using this option, AERSURFACE yields surface characteristics for each month. For this NWS station, ADEM made the following assignments:

a) Late autumn after frost and harvest, or winter with no snow – Dec, Jan, Feb.

b) Transitional spring – Mar, Apr, May
c) Midsummer with lush vegetation – Jun, Jul, Aug, Sep
d) Autumn with unharvested cropland – Oct, Nov

AERMINUTE (Version 15272) was used to process 1-minute (5-minute used when 1-minute is missing) ASOS wind data available from the National Climatic Data Center (NCDC). AERMINUTE was used to generate hourly averaged wind speeds and wind directions to supplement the standard hourly ASOS observations. The hourly averaged wind speed and direction generated by the AERMINUTE program was merged with data from standard surface archives, along with upper air in Stage 2 of AERMET processing.

THRESH_1MIN keyword was used in Stage 2 to specify a threshold wind speed for the 1-minute data. This threshold value only applies to the hourly averaged winds derived from 1-minute data and does not apply to the standard hourly NWS weather observations. A threshold speed of 0.5 m/s was utilized; [note: ADJ_U* KEYWORD was used in Stage 2.]

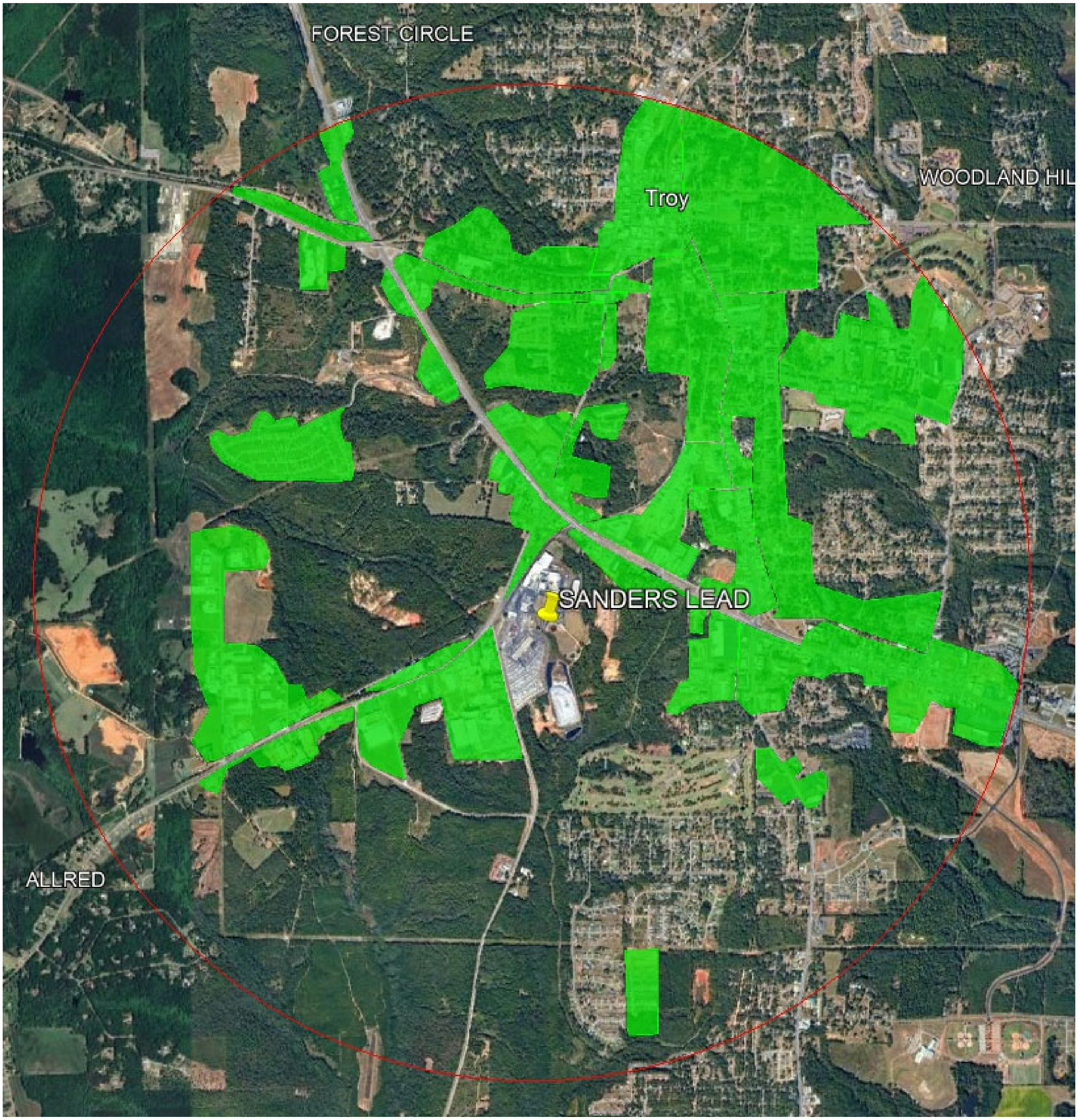
3.3 Urban vs. Rural Determination

In accordance with the EPA "Guideline on Air Quality Models", Appendix W of CFR Part 51, two methods are identified to determine the character of the modeling area. The land use procedure is the recommended approach according to the ADEM, which classifies land use within an area circumscribed by a circle, centered on the source, with a radius of 3 kilometers. Utilizing the Troy, AL zoning maps as guidance for land use delineation, land use types I1, I2, C1, R2 and R3 comprised of approximately 26% of the 3 km source area. The majority of the land use to the South and West of facility is predominately undeveloped and/or common residential area, while the land use to the North and East is characterized by Commercial and Compact Residential areas.

From this review it was apparent that the area within a 3-km radius of the facility is rural using Auer techniques. According to Table A-1 of Appendix A – Urban/Rural Classification), land use types I1, I2, C1, R2, and R3 accounted for less than 50 percent of the land use within 3 kilometers of the source, therefore, the modeling regime is considered rural. Although the City of Troy categorize Troy University and surrounding campus as "R1" Common Residential; to be conservative, the area was included in the land use evaluation since the vegetation is less than 70% in the area. However, other residential area zoned as R1 which had greater than 70% vegetation was excluded from the evaluation. Please refer to **Figure 2** which delineates the areas (in green) that were identified as land use types I1, I2, C1, R2, and R3.

3.3 Receptors

The proposed modeling analysis will be conducted using the following receptor grid design. A Cartesian receptor grid system will be created to adequately assess air quality impacts in all directions from the Sanders Lead fenceline to a distance of up to 10 kilometers from the site. The grid system will utilize the Universal Transverse Mercator (UTM) coordinate system. Discrete receptors will be placed along the property grid fenceline at 100 meter spacing. In addition, receptors extended outward from the fenceline at 100 meter grid spacing at 5,000 meter distance; 250 meter grid spacing at 7,000 meter distance and 500 meter grid spacing at 10,000 meter distance. It should be noted that if the predicted concentrations are not decreasing on the edge of the 10,000 m



Land use types I1, I2, C1, R2, and R3

SANDERS LEAD COMPANY **1 SANDERS ROAD,** **TROY AL**	JB AIR CONSULTING AIR PERMITTING & COMPLIANCE SCALE: NA / DRAWN BY: JBS CHKD. BY: JBS	**LAND USE EVALUATION**	FIG. NO. 2

grid, then the grid distance will be extended further out. All receptors will include terrain heights generated from the AERMAP terrain processor, utilizing NED terrain data.

AERMAP (EPA Version No. 24142), the AERMOD terrain preprocessor program, will be used to calculate terrain elevations and critical hill heights for the modeled receptors using National Elevation Data (NED). The dataset will be downloaded from the USGS website (http://viewer.nationalmap.gov/viewer/) and will consist of 1/3 arc second resolution. The NED data used for this modeling exercise included the following quadrangles: Troy, Ansley, Banks, Brundidge, Brundidge NW, Goshen, Needmore, Saco and Youngblood.

Figures 3 and 4 show a graphical depiction of the near-field receptors and entire receptor grid proposed for modeling.

In the event a maximum predicted NAAQS or increment impact occurs outside of the 100-meter resolution grid, an additional refined 100-meter grid will be developed around the maximum impact receptor.

SANDERS LEAD COMPANY
1 SANDERS ROAD,
TROY AL

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SCALE: NA
DRAWN BY: JBS
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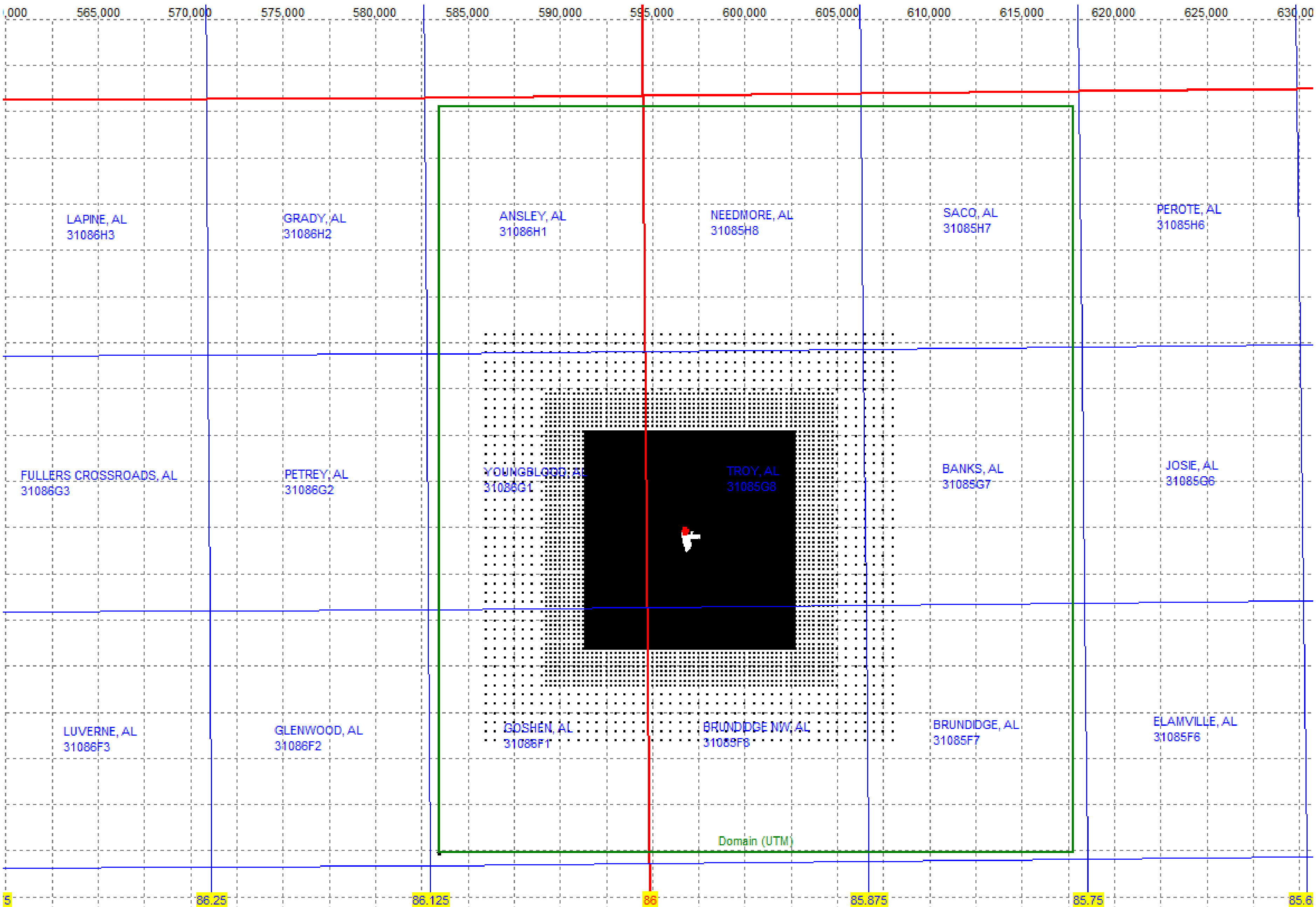
RECEPTOR GRID – NEAR FIELD

FIG. NO.
3



SANDERS LEAD COMPANY **1 SANDERS ROAD,** **TROY AL**	JB AIR CONSULTING AIR PERMITTING & COMPLIANCE SCALE: NA — DRAWN BY: JBS CHKD. BY: JBS	**RECEPTOR GRID – DOMAIN**	FIG. NO. 4

4.0 SOURCES AND LEAD EMISSIONS

Summarized in **Table 1** and **Figures 5 & 6** is a list of point and volume sources located at the facility. Included in **Tables 2a & 2b** are the stack parameters and emission rates for the source list. Please refer to **Attachment B** for a description of how each volume source was calculated.

TABLE 1 – Source of Emissions at Sanders Lead Company

Source ID	Type	Description
Stack 4a	Point	Sanitary Baghouses for Furnaces 1, 2, 3 & 4
Stack 10	Point	Slag Treatment Building
Stack 11	Point	Canopy Hoods / Vent
Stack 12	Point	Battery Breaker
Stack 13	Point	Raw Material Storage
Stack 14	Point	Alloying Kettles
Stack 15	Point	Blast Furnaces 1-4 and Alloying Kettles [SO_2 Scrubber]
Stack 17	Point	General Ventilation
Route 2	Volume	Material to Slag Treatment building
Route 4	Volume	Delivery of raw coke, limestone and scrap iron
Route 5	Volume	Delivery of batteries to Breaker

4.1 Off-Site Emissions Inventory

Since lead emissions from Sanders Lead are expected to produce the largest concentration gradients for lead in the area, the value of modeling very small contributions from other, more distant lead sources it very limited. Therefore, other "off-site" lead sources will not be modeled unless the ADEM specifically identifies an off-site source in response to this modeling protocol.

4.2 Background Air Quality Data

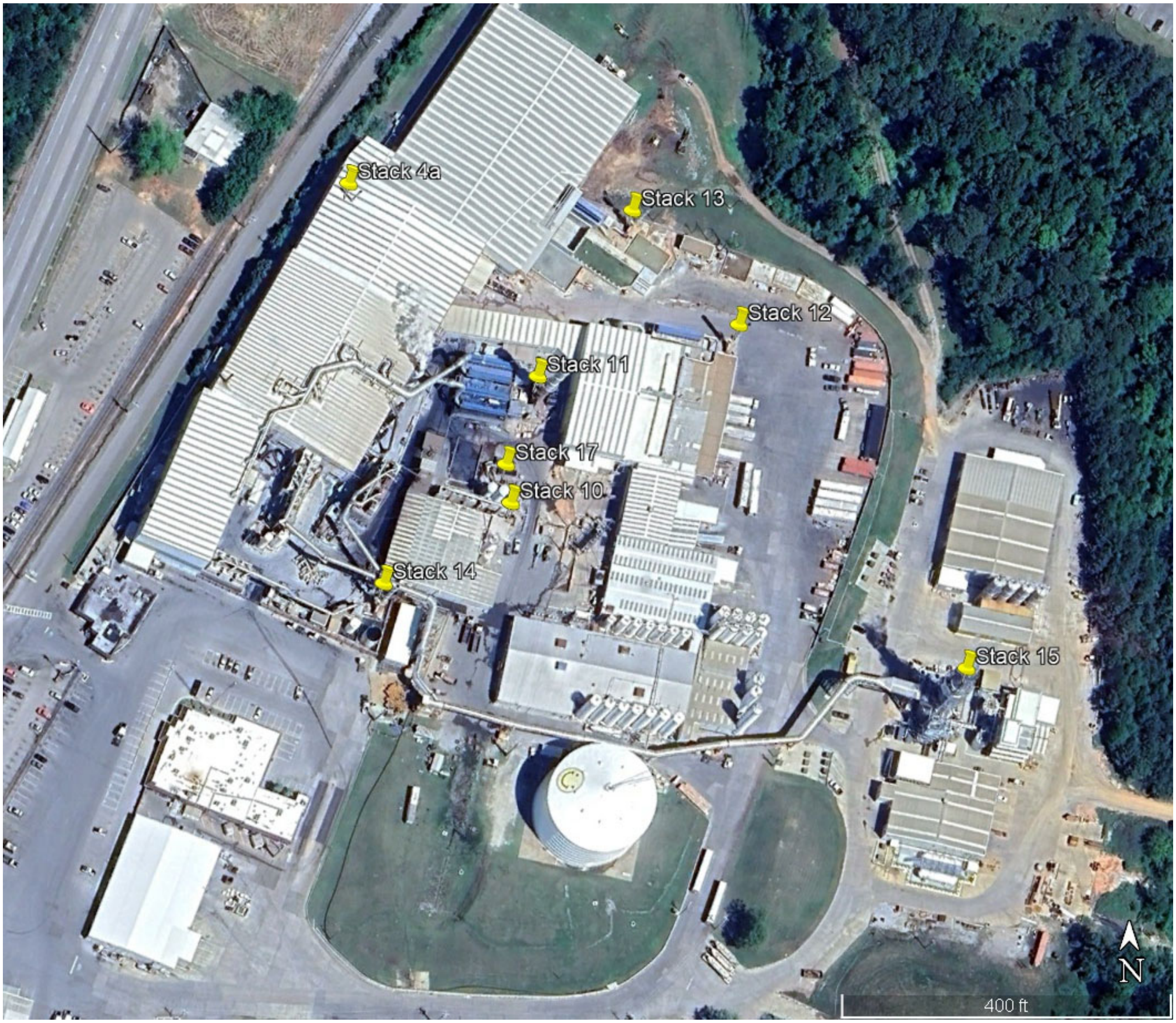
An ambient background concentration for lead will be added to the maximum predicted concentrations from all modeled sources to determine a final maximum ambient concentration. ADEM has determined that 0.006 ug/m^3 provides a representative background concentration of lead for the area.

4.3 Lead Concentration Calculation Procedure

Since the dispersion model AERMOD does not provide the ability to directly compute the 3-month rolling averages, results must go through a post-processing procedure. EPA's "LEADPOST" program [Version 13262] which is a FORTRAN program designed to read monthly concentrations output from AERMOD and calculate the maximum rolling 3-month average concentration for each receptor and overall maximum concentration (across all receptors and source groups).

4.4 Good Engineering Practice

In April 2022, Sanders Lead provided ADEM with results of a preliminary analysis of emissions sources and their associated modeling parameters. The preliminary analysis evaluated the facility's air dispersion model and associated impacts of nearby buildings; the analysis also evaluated the stack heights and whether the existing stacks on-site are



Stack ID	Description	Easting	Northing	Base Elev	Stack Height	Temp	Flow	Exit Velocity	Stack Dia
		m	m	ft	ft	F	ACFM	fps	ft
STACK4A	Blast / Sanitary Hoods	596729.00	3517498.00	530.5	145	111	60,000	141.5	3.0
STACK10	Slag Treatment	596792.00	3517380.00	518.2	90	99	45,000	59.7	4.0
STACK11	Canopy Hoods / Vent	596802.00	3517431.00	530.5	150	107	318,000	61.6	11.0
STACK12	Battery Breaker	596873.00	3517449.00	526.8	90	63	60,000	70.2	4.5
STACK13	Raw Material Storage	596837.00	3517493.00	520.5	90	75	60,000	67.8	4.5
STACK14	Alloying Kettles	596744.00	3517352.00	515.0	145	157	52,000	58.9	4.5
STACK15	SO2 Scrubber	596964.00	3517328.00	499.7	188	115	180,000	48.0	8.9
STACK17	Torit Venting System	596787.08	3517388.97	521.7	90	107	240,000	62.9	9.0

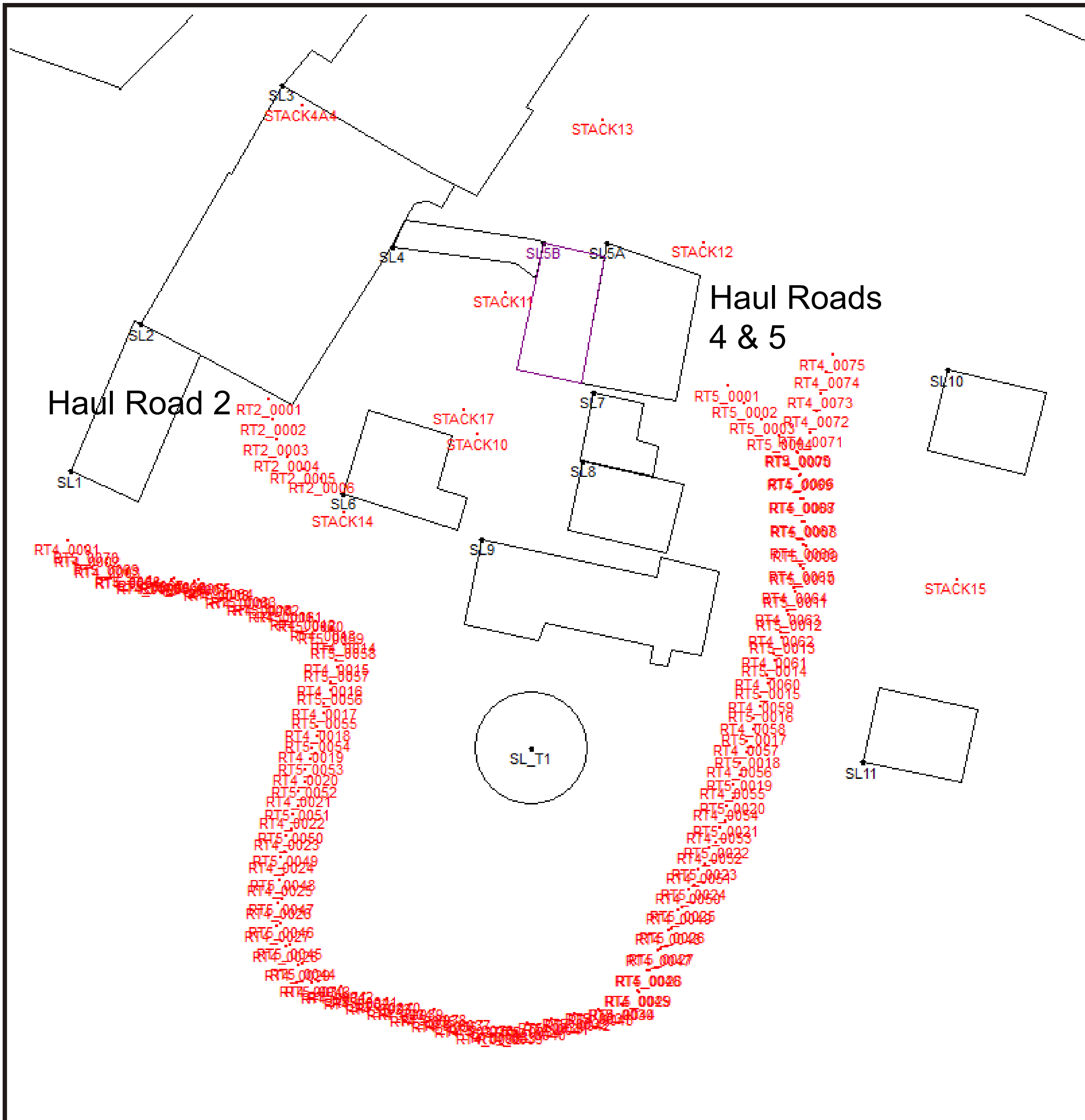
SANDERS LEAD COMPANY
1 SANDERS ROAD,
TROY AL

JB AIR CONSULTING
AIR PERMITTING & COMPLIANCE

SCALE: NA | DRAWN BY: JBS
CHKD. BY: JBS

POINT SOURCES

FIG. NO.
5



Source	EU Description	Vehicle Height (x2) m	Release Height m	Vehicle Width m	Adjusted Width (+6m) m	Road Length m	Initial Horiz. Sigma	Initial Vertical Sigma	# of Volume Sources	Emission/ Receptor tpy
Haul Road 2	Material to Slag Treatment building	4.6	2.3	1.4	7.4	47.8	3.44	2.14	6	2.08E-04
Haul Road 4	Delivery of raw coke, limestone and scrap iron	5.4	2.7	2.2	8.2	615.0	3.81	2.51	75	3.74E-05
Haul Road 5	Delivery of batteries to Breaker	8.2	4.1	2.6	8.6	605.0	4.00	3.81	70	7.15E-05

SANDERS LEAD COMPANY
1 SANDERS ROAD,
TROY AL

JB AIR CONSULTING
AIR PERMITTING & COMPLIANCE

SCALE: NA | DRAWN BY: JBS
CHKD. BY: JBS

VOLUME SOURCES

FIG. NO.
6

appropriately sized. As noted in EPA regulatory air dispersion modeling guidance, Good Engineering Practice (GEP) Stack Height is based on the concept that a sufficient stack height is necessary to ensure the upward dispersion of the exhaust is not adversely affected by the wind blowing over its own building that can entrap the exhaust in eddies and the downwind building cavity and wake areas. A plume caught in the path of this flow is drawn into the wake, temporarily trapping it in a recirculating cavity. This downwash effect leads to higher ground-level pollutant concentrations near ground levels.

Good air pollution control engineering practice (GEP) for stack heights is conservatively calculated with the following formula, which may be simplified in most cases to 2.5 times the building height. At this height the aerodynamic effects of the adjacent buildings are no longer considered to adversely affect the exhaust plume and downwash is not expected to occur. It is desired air pollution control practice to minimize this pollution concentrating effect of downwash. It is important to note that while GEP is the optimum stack height at which building influences on dispersion are eliminated, this can result in a taller stack than practical in many cases.

According to EPA regulations, GEP stack height is defined to be the tallest of the following:

- 213 feet, as measured from the ground-level elevation at the base of the stack;
- 2.5H (for stacks in existence in January 12, 1979); or
- H + 1.5L (for all other stacks), where H is the height of the building itself or any significant nearby structure or structures and L is the lesser of the projected height or width of the building in question.

TABLE 2 - Good Engineering Practice (GEP) Stack Height

Building	Building Height [ft]	Projected Width [ft]		GEP Stack Height [ft]
	H	L-1 (width)	L-2 (length)	GEP = H + 1.5L
SL2	58.00	200	335	145

* GEP used Building Height for "L" since it was the lesser dimension compared to Projected Width

As demonstrated in Table 2, Building SL2 is identified as the tallest building/ structure within the facility; more importantly, SL2 houses Stack 4a on top of it. It should be noted that all sources were evaluated; however, only Stacks 4 and 4a were impacted due to the height of building SL2. Based on applying the GEP Stack Height equation with the SL2 parameters, the suggested GEP stack height would be approximately 145 feet. At the time of the evaluation, Stack 4a (from ground surface) to top of stack was 90 ft. Following the GEP evaluation, Sanders Lead has increased the stack height of Stack 4a and two other stacks in order diminish the aerodynamic effects of the adjacent buildings; the following stacks have been raised since the previous air dispersion modeling analysis:

- Stack Height for Stack 4a raised to 145 ft
- Stack Height for Stack 14 raised to 145 ft
- Stack Height for Stack 10 raised to 90 ft

Based on USEPA guidance, the on-site stacks will be modeled with the actual physical stack height. In addition, the USEPA's Building Profile Input Program (BPIP-Version 04274) version that is appropriate for use with PRIME algorithms in AERMOD will be used to incorporate downwash effects in the model for all modeled point sources. The building dimensions of each structure will be input in BPIPPRM program to determine direction specific building data. PRIME addresses the entire structure of the wake, from the cavity immediately downwind of the building to the far wake.

TABLE 2a – Point Source: Stack Parameters and Emission Rates

Source	EU Description	Source Type		East UTM	North UTM	Elevation	Lead Emission Rate	Operating Schedule	Stack Height	Stack Temp	Stack Diameter	Flow	Exit Velocity
				m	m	ft	lbs/hr	hrs/yr	ft	°F	ft	acfm	fps
Stack 4a	Sanitary for 1 - 4	Stack	Point	596729.00	3517498.00	530.5	0.0440	8,760	145.0	111.0	3.0	60,000	141.5
Stack 10	Slag Treatment with Baghouse	Stack	Point	596792.00	3517380.00	518.2	0.0080	8,760	90.0	99.0	4.0	45,000	59.7
Stack 11	Canopy Hoods	Stack	Point	596802.00	3517431.00	530.5	0.0382	8,760	150.0	107.0	11.0	318,000	61.6
Stack 12	Battery Breaker Building	Stack	Point	596873.00	3517449.00	526.8	0.0330	8,760	90.0	63.0	4.5	60,000	70.2
Stack 13	Raw Material Storage	Stack	Point	596837.00	3517493.00	520.5	0.0220	8,760	90.0	75.0	4.5	60,000	67.8
Stack 14	Alloying Kettles	Stack	Point	596744.00	3517352.00	515.0	0.0270	8,760	145.0	157.0	4.5	52,000	58.9
Stack 15	Blast Furnace #1 - #4	Stack	Point	596964.00	3517328.00	499.7	0.2580	8,760	188.0	115.0	8.9	180,000	48.0
Stack 17	General Ventiliation	Stack	Point	596787.08	3517388.97	521.7	0.0288	8,760	90.0	107.0	9.0	240,000	62.9

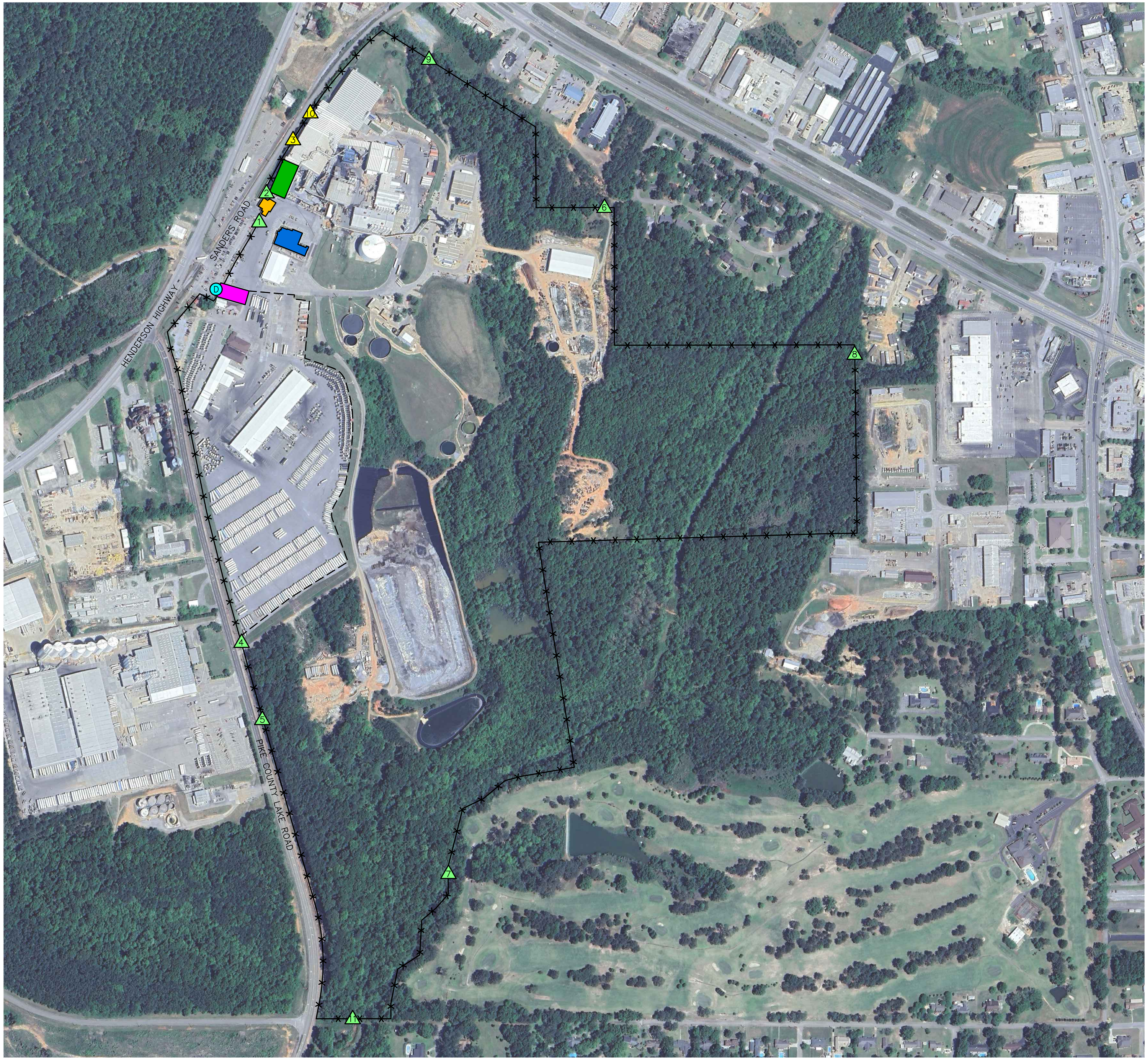
TABLE 2b – Volume Source: Parameters and Emission Rates

Source	EU Description	Source Type		Lead Emission Rate		Hours/Yr	Elevation	Vehicle Height (x2)	Release Height	Vehicle Width	Adjusted Width (+6m)	Road Length	Initial Horiz. Sigma	Initial Vertical Sigma	# of Volume Sources	Emission/ Receptor
				lbs/hr	tons/yr		m	m	m	m	m	m				tpy
Haul Road 2	Material to Slag Treatment building	Fugitive	Volume	0.00031	0.0013	8,760	160.93	4.6	2.3	1.4	7.4	47.8	3.44	2.14	6	2.08E-04
Haul Road 4	Delivery of raw coke, limestone and scrap iron	Fugitive	Volume	0.00064	0.0028	8,760	159.72	5.4	2.7	2.2	8.2	615.0	3.81	2.51	75	3.74E-05
Haul Road 5	Delivery of batteries to Breaker	Fugitive	Volume	0.00115	0.0050	8,760	160.02	8.2	4.1	2.6	8.6	605.0	4.00	3.81	70	7.15E-05

Adjusted Width - is the actual width of the trucks (plus 6 meters), the additional width represents turbulence caused by the vehicle as it moves along the road; width represents a side of the base of the volume
Number of Volume Sources - divide the length of the road by the adjusted width, the result is the maximum number of volume sources that could be used to represent the road.
Height of Volume - the height will be equal to twice the height of the vehicle generating the emissions.
Initial Horizontal Sigma - calculated by dividing the adjusted width by 2.15.
Initial Vertical Sigma - calculated by dividing the height of the volume determined by 2.15.
Release Height - calculated by dividing the height of volume in half; this point is in the center of the volume.

ATTACHMENT A

Facility Site Maps



0 130 260 520

LEGEND

PERIMETER FENCE
PERIMETER GATE (MAN GATE)
PERIMETER GATE (DOUBLE GATE)
PERIMETER DOOR
WILEY SANDERS TRUCK LINES OPERATIONS

BUILDINGS:

GUARD BUILDING
REFINING AREA
SUPPLY AND CHEMICAL WAREHOUSE
ADMINISTRATION

NOTE

AERIAL IMAGE OBTAINED VIA GOOGLE EARTH, DATED APRIL 14, 2023.

TriAD ENVIRONMENTAL CONSULTANTS, INC.
Suite 200, 207 Donelson Pike, Nashville, TN 37214
615-889-6888, fax: 615-889-4004

Sanders

SANDERS LEAD COMPANY, INC.
TROY, ALABAMA

NO.	REVISION	BY	DATE

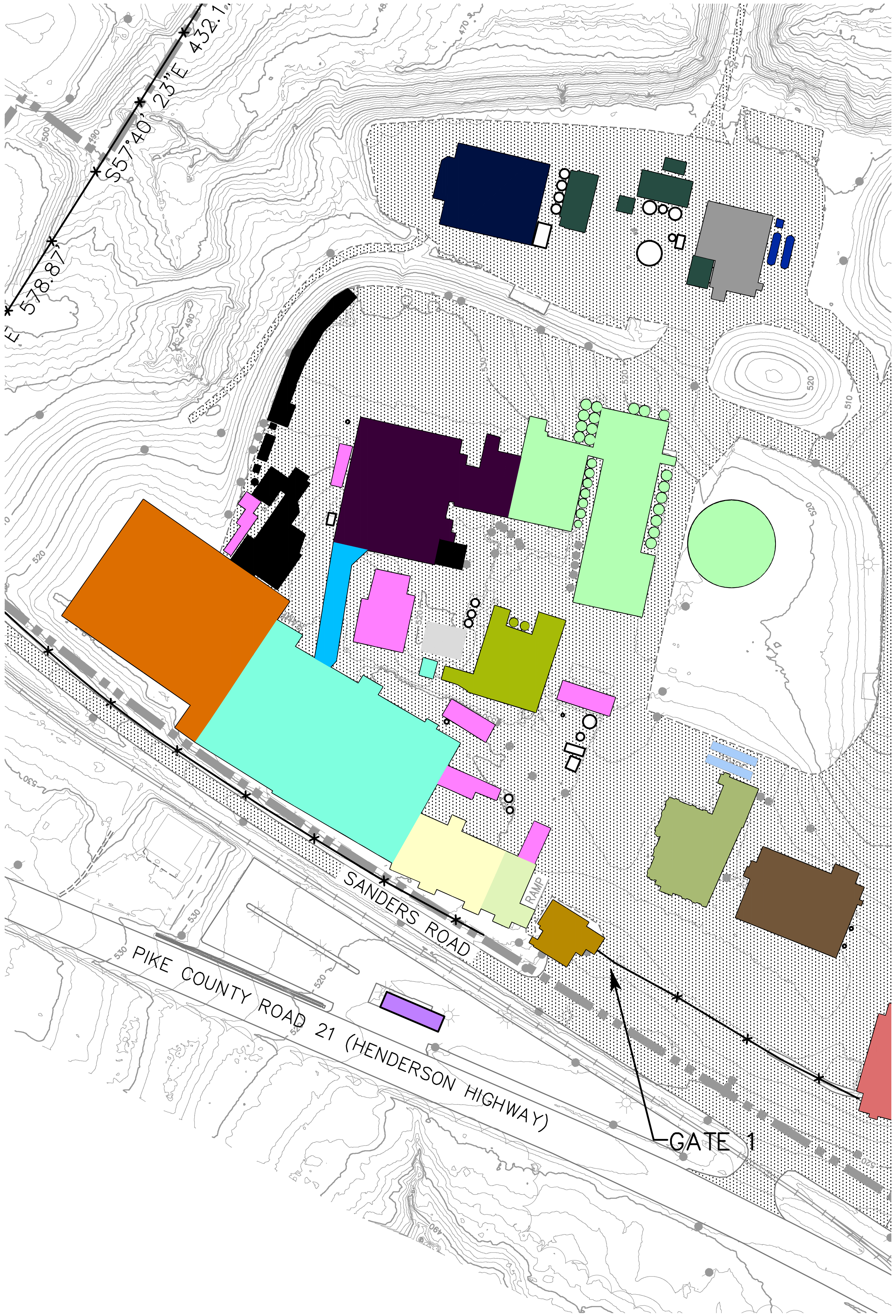
SITE SECURITY PLAN

DWN BY: ALW DATE: 03/07/25
CHK BY: MAH SCALE: AS SHOWN

SANDERS LEAD COMPANY

DRAWING NO.
0101-1 SITE PLAN.DWG

N:\Jobs\SAN\01-01\DRAWINGS\SITE SECURITY PLAN\0101-1 SITE PLAN-03-07-25.dwg SAVED: 3/7/2025 9:58 AM PLOTTED: 3/7/2025 BY: ANWATTS



0 200' 400'

SCALE: 1" = 200'

LEGEND

- PROPERTY LINE
- COUNTY ROADS
- FACILITY ROADS
- RAILROAD
- FENCE LINE
- STREAM LOCATION
- 100-YEAR FLOODPLAIN BOUNDARY

COLOR KEY

- AMMONIUM SULFATE FGD SYSTEM
- ANHYDROUS AMMONIA TANKS
- BAGHOUSE AND STACK
- BATTERY BREAKING BUILDING
- CASTING AND ALLOYING
- CHEMICAL STORAGE AND SUPPLY
- CONNECTOR BUILDING
- CONTAINMENT BUILDING (S01)
- FURNACE BUILDING (T87)
- GUARD STATION AND LOCKER ROOM
- KW PLASTICS
- MAINTENANCE BUILDING
- OFFICE AND LAB
- RAW MATERIAL DESULPHURIZATION SYSTEM
- SCALES
- SLAG TREATMENT BUILDING
- STORM WATER SUMP
- TRAINING
- WAREHOUSE
- WAREHOUSE AND SHIPPING
- WELDING SHOP

NOTES

1. PLAN ADAPTED FROM MARCH 3, 2022 AERIAL SURVEY BY PLS GROUP INC.
2. PROPERTY BOUNDARY, BOUNDARY LABLERS, AND STREAM LOCATIONS SUPPLEMENTED FROM AERIAL SURVEY BY SOUTHERN MAPPING RESOURCES CORPORATION, DATED JANUARY 31, 2013.

PLANT BUILDINGS

SANDERS LEAD COMPANY, INC.
TROY, ALABAMA

SCALE: 1" = 200' | DR LMC | CHK MAH | REV MAH

PREPARED BY:

TriAD ENVIRONMENTAL CONSULTANTS, INC.
Suite 200, 207 Donelson Pike, Nashville, TN 37214
615-889-6888 fax 615-889-4004

PROJ: 96-SAN01-01 | DATE: 04/19/23 | SHEET 1 OF 1

REVISION HISTORY

REV.	DESCRIPTION	DATE	APPROVAL
1	UPDATED RAW MATERIAL DESULPHURIZATION	08/27/24	MAH

N:\Jobs\SAN\01-01\Pressure Monitors\Drawings\Updated 08.27.24\0101-PLANT BUILDINGS.dwg SAVED: 8/28/2024 10:25 AM BY: LACOTTON

ATTACHMENT B

Emission Sources and Rates

FUGITIVE EMISSIONS FOR SANDERS LEAD - PROPOSED METHODOLOGY

Trip ID:	Route 2	Route 4	Route 5
Particle Size Multiplier **(k):**	0.011	0.011	0.011
Average Vehicle Weight **(W)** (tons):	6	15	15
Road Surface Silt Loading **(sL)** (g/m^2):	0.60	0.60	0.60
Days/Year with at least 0.01 inches of Precipitation **(P)**:	120	120	120
Number of days in averaging period **(N)**:	365	365	365
Lead Content of PM on Roadways (%):	26%	26%	26%
Control Factor (efficiency %):	80%	80%	80%

SOURCE OF EMISSION FACTOR:	EQUATION	PARAMETERS
The emission factor is taken from Equation 2 in AP-42, 13.2.1, Paved Roads.	$E_{ext} = [k(sL)^{0.91} \times (W)^{1.02}](1 - P/4N)$	k = from AP-42 Table 13.2.1-1 sL = from AP-42 Table 13.2.1-2 W = average vehicle weight (tons)

EMISSIONS CALCULATIONS

ROUTES	Pollutant	Emission Factor (lb/VMT)	VMT/yr	Actual Emissions (lbs/hr)	Actual Emissions (Tons/Yr)
Route 2	Pb	0.039	1,314	0.00031	0.0013
Route 4	Pb	0.100	1,073	0.00064	0.0028
Route 5	Pb	0.100	1,927	0.00115	0.0050
				TOTAL (tons/yr)	**0.0092**

SANDERS LEAD COMPANY

Building Dimensions

Building Name	Number of Tiers	Base elevation	Tier Height	Number of Corners	Corner 1 East (X)	Corner 1 North (Y)	Corner 2 East (X)	Corner 2 North (Y)	Corner 3 East (X)	Corner 3 North (Y)	Corner 4 East (X)	Corner 4 North (Y)	Corner 5 East (X)	Corner 5 North (Y)	Corner 6 East (X)	Corner 6 North (Y)	Corner 7 East (X)	Corner 7 North (Y)
		m	ft		m	m	m	m	m	m	m	m	m	m	m	m	m	m
SL1	1	161.4	29.8	5.0	596645.7	3517366	596668.3	3517420	596670.8	3517419	596692.2	3517408	596670.2	3517356				
SL2	1	161.7	58.0	15.0	596671.2	3517419	596702.3	3517473	596703.5	3517473	596721.6	3517505	596773.6	3517474	596783.8	3517469	596778.9	3517461
SL3	1	161.6	50.0	9.0	596721.6	3517505	596732.5	3517518	596739.4	3517513	596776.9	3517565	596832.8	3517532	596809.2	3517497	596811.8	3517496
SL4	1	162.1	21.8	6.0	596761.3	3517447	596765.8	3517457	596811.2	3517450	596815.5	3517449	596812.8	3517436	596805.7	3517441		
SL5A	1	161.8	28.0	4.0	596838.5	3517448	596871.9	3517437	596863	3517392	596829.3	3517398						
SL5B	1	162.0	40.0	4.0	596815.6	3517448	596837.6	3517444	596829.3	3517398	596806	3517403						
SL6	1	157.6	21.0	6.0	596743.6	3517358	596752.7	3517388	596782.8	3517379	596777.5	3517360	596788.2	3517357	596784.7	3517345		
SL7	1	159.9	22.0	6.0	596833.5	3517395	596851.3	3517391	596848.9	3517377	596856.9	3517375	596854.7	3517364	596828.6	3517371		
SL8	1	157.9	18.5	4.0	596829.9	3517370	596865.8	3517362	596859.7	3517337	596824.5	3517345						
SL9	1	154.8	20.0	12.0	596793.4	3517342	596856.3	3517329	596857.9	3517335	596878.6	3517330	596872	3517300	596861.7	3517302	596860	3517296
SL10	1	154.1	24.0	4.0	596960.6	3517403	596996.2	3517394	596988.2	3517365	596953.5	3517374						
SL11	1	155.9	24.0	4.0	596930.3	3517262	596965.5	3517255	596971.5	3517281	596936.3	3517289						

Building Name	Corner 8 East (X)	Corner 8 North (Y)	Corner 9 East (X)	Corner 9 North (Y)	Corner 10 East (X)	Corner 10 North (Y)	Corner 11 East (X)	Corner 11 North (Y)	Corner 12 East (X)	Corner 12 North (Y)	Corner 13 East (X)	Corner 13 North (Y)	Corner 14 East (X)	Corner 14 North (Y)	Corner 15 East (X)	Corner 15 North (Y)		
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m		
SL1																		
SL2	596773.9	3517464	596773.7	3517463	596772.3	3517464	596769	3517462	596765.9	3517457	596761.6	3517448	596725.3	3517390	596692.2	3517408		
SL3	596791.2	3517465	596773.7	3517474														
SL4																		
SL5A																		
SL5B																		
SL6																		
SL7																		
SL8																		
SL9	596853.7	3517297	596854.8	3517303	596816.2	3517312	596813.6	3517306	596786.9	3517311								
SL10																		
SL11																		

SANDERS LEAD COMPANY

Fenceline Parameters

East (X)	North (Y)
m	m
596904.846	3516017.533
596711.196	3516017.533
596749.926	3516059.243
596752.905	3516154.578
596732.051	3516270.767
596660.549	3516506.126
596580.110	3516777.235
596496.692	3517152.617
596472.858	3517179.430
596460.942	3517164.534
596437.108	3517185.388
596496.692	3517265.827
596568.194	3517399.892
596612.882	3517522.040
596663.529	3517504.165
596711.196	3517551.833
596782.698	3517620.355
597137.225	3517465.435
597134.246	3517367.121
597283.207	3517367.121
597280.228	3517224.118
597548.358	3517224.118
597545.378	3517316.474
597581.129	3517298.599
597613.901	3517349.246
597667.526	3517256.890
597679.443	3516854.695
597104.453	3516851.716
597271.290	3516458.458
597205.747	3516461.437
597140.204	3516413.770
597128.287	3516357.165
597101.474	3516339.289
597041.890	3516309.497
597009.118	3516267.788
596973.368	3516172.453
596970.389	3516139.681
596916.763	3516115.848
596910.804	3516071.159