

AMBIENT AIR MONITORING PLAN

STERIGENICS

Willowbrook, Illinois

October 2019



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1. INTRODUCTION

Ramboll US Corporation (Ramboll) is pleased to provide the Illinois Environmental Protection Agency (IEPA) with this Ambient Air Monitoring Plan (AAMP), per the requirement of Consent Order 2018 CH 001329, Paragraph III.D.3(b) to document the ambient air concentration of ethylene oxide (EtO) over a 30-day period following startup of commercial EtO sterilization activities following installation of upgraded air pollution controls at their Willowbrook, Illinois facility. A site location map is provided as **Figure 1**.

1.1 Site Description

The Sterigenics Willowbrook complex (the Site) consists of two facilities located in Willowbrook, Illinois, in DuPage County. The first facility is located at 7775 South Quincy Street (Willowbrook I) and the second facility is located at 830 Midway Street (Willowbrook II). A map showing the current site layout is provided as **Figure 2**.

1.2 Sampling Objective

This AAMP has been prepared to document the air quality in the area surrounding the Sterigenics Willowbrook 1 facility over a 30-day period following installation of upgraded air pollution controls for its commercial EtO sterilization business.

2. DATA GENERATION AND ACQUISITION

Ambient air samples will be collected and analysed for EtO during the first 30 days of facility operation following installation of upgraded air pollution control equipment and approval of stack testing results by IEPA. Samples will be analysed using a method suitable for achieving a detection limit of at least 0.08 parts per billion (ppb) EtO.

2.1 Sampling Design

The following section outline the basis for sample location selection and the sampling schedule strategy.

2.1.1 Sample Location Selection

Four sampling stations were established based on the following decision factors: 1) covering approximately the four cardinal directions (north, south, east and west) of the facility; 2) reflecting areas likely to be influenced by the facility based on the latest version of US Environmental Protection Agency's (EPA) atmospheric dispersion model (AERMOD) modelling conducted in support of their air permit application; and 3) accessibility. Two additional sampling stations were established based on community request and/or potential for residential impact.

Ranges of modelled impacts in the areas surrounding the facility are shown on **Figure 3** using the receptor grid specified in the model submitted (EPA-454/R-18-003).

The AERMOD modelling predicts that the highest annual average influences will be northeast of Willowbrook 1. All facility influences are projected to be less than local background EtO levels and less than the Agency for Toxic Substances and Disease Registry (ATSDR) Cancer Risk Evaluation Guide (CREG) value for residential exposure assumptions.

Station Monitor-N will be located near the modelled maximum concentration location and in the northern portion of the overall area of predicted highest impacts (**Figure 3**). The sampling equipment will be placed in the public right-of-way around the cul-de-sac at the northern end of Plaza Court.

Station Monitor-E will be located directly east from Willowbrook 1, near the southern end of the overall area of predicted highest impacts (**Figure 3**). The sampling equipment will be setup in the right-of-way island between South Madison Street and South Frontage Road, immediately south of Interstate 55.

Station Monitor-S will be located in the southern end of the area of highest impacts modelled west of Willowbrook 1 (**Figure 3**). The sampling equipment will be setup in the public right-of-way at the western dead end of North Frontage Road.

Station Monitor-W will be located in the back (west) parking lot of the Willowbrook Police Department. This location is readily accessible and near the area of highest impacts modelled west of Willowbrook 1 (**Figure 3**).

Station Monitor-G will be located in the front parking lot at Gower Middle School. This location is further south from Monitor-E (**Figure 3**).

Station Monitor-T will be located at the water tower north of the facility and north, northwest of Monitor-N (**Figure 3**).

2.1.2 Sampling Schedule Strategy

The IEPA will be notified 24 hours in advance of the planned pre-startup sampling rounds.

The ambient air monitoring will begin within 14 days following IEPA approval of the stack test results. The facility will be operating under routine conditions and emissions when rounds of full-day ambient air samples will be collected over a period of 30 days using the 1-day on/2-day off approach routinely used by USEPA ambient monitoring programs (every three days). A maximum of 10 rounds of sample collection will be completed. Sampling will be postponed during periods of significant predicted precipitation or when predicted wind speeds are expected to be higher than 10 mph sustained or gusting over 15 mph.

The Agency will be notified 24 hours in advance of the planned first sampling round during operations and will be provided a schedule for the planned subsequent sampling rounds.

2.2 Sampling Methods

This project will follow EPA Compendium Method TO-15 Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS) for both sampling and analysis methodology.

Ambient air samples will be collected using standard 6-liter stainless steel canisters fitted with 24-hour flow controlling regulators supplied by the testing laboratory. Canisters and regulators will be individually certified clean by the laboratory. The inlet height will be approximately two meters above ground.

For comparability, rounds of sampling will be conducted using similar start times. Vacuum pressure for each canister will be recorded in the field. Target sample collection periods will be 22-24.5 hours and the target final vacuum pressure will be -5 inches of mercury (in-Hg).

Canisters will not be analyzed if they fail to fill adequately (residual vacuum greater than -15 in-Hg after 24.5 hours) or if there is less than -2 in-Hg residual vacuum remaining in the canister. Field pressure measurements will be verified in the laboratory before excluding canisters.

2.3 Sample Handling and Custody

Canisters are shipped to the site accompanied by a triplicate chain-of-custody (COC) form. When a sample is collected, the form is filled out with the date, time, initials of the sampling team, canister vacuum/pressure, and signed. The back copy of the form is kept with the sample team and the other copies are sent with the canister to the laboratory.

Upon receipt at the laboratory, the sample canister is logged into the laboratory information management system (LIMS) and the vacuum/pressure is measured and compared to the field documented values. If the receiving vacuum differs from the field vacuum more than 3 in-Hg, the sample will not be analyzed.

2.4 Analytical Methods

All samples collected during this program will be submitted to an American Industrial Hygiene Association (AIHA) and/or National Environmental Laboratory Accreditation Conference (NELAC) accredited laboratory for analysis. Analytical results will be provided using standard turnaround times (TAT) as determined by laboratory receipt of the samples unless otherwise requested.

Analyses for EtO will be conducted by gas chromatography/mass spectrometry (GC/MS) using EPA Method TO-15 modified to achieve a detection limit of at least 0.08 ppb (USEPA, 1999). The analysis method for EtO will use sample pre-concentration and GC coupled with MS in selected ion monitoring (SIM) mode.

2.5 Field Measurements

Meteorological data (wind speed, wind direction, precipitation, relative humidity, and temperature) will be obtained from a meteorological station located on the roof of the EPA Region V Willowbrook warehouse, located adjacent to one of the Sterigenics facilities. Wind speed and direction data will be collected in 1-hour intervals using a MET One Sonic sensor, which will be mounted on a 3-meter tripod. The MET One sensor was certified for wind speed and direction in November 2018.

If possible, a meteorological station (e.g., Vantage Pro2 Plus [or similar]) will be set up in a secure central location to track wind speed and direction, ambient air temperature and relative humidity, atmospheric pressure, and rainfall. If a secure location cannot be established for the meteorological station, the meteorological conditions will be estimated based on field observation at the beginning of each day and through publicly available media outlets (local news, internet, etc.). At a minimum, wind direction will be evaluated each day to establish upwind and downwind monitoring locations, which will be adjusted to match daily wind.

2.6 Quality Control/Quality Assurance Requirements

Laboratory Quality Control (QC) procedures include the evaluation of trip and laboratory blanks, calibration standards, internal standards, standard reference materials (SRMs), continuing calibration verification (CCV), and sample replicates will be performed throughout the monitoring period. Analytical instrument performance will be assessed daily. Lab batch blanks will be checked for each batch of canisters cleaned to ensure thorough cleaning.

Field QC will be performed by field personnel daily. Prior to sampling leak tests will be performed on each canister/flow regulator setup according to the manufacturer's instructions and will be documented in a field logbook.

For Quality Assurance (QA) precision and bias purposes, one duplicate (field QA) sample and one trip blank (TB) will be collected each week. The QA sample will be co-located with one of the routine field sampling locations and will rotate through the sampling locations throughout the monitoring period. The TB will be used to assess any potential contamination issues during batch preparation, transport and deployment.

2.7 Instrument/Equipment Testing, Inspection, and Maintenance

Six-liter stainless steel passivated canisters will be used for this project. The canisters will be fitted with particulate filters, fixed orifice flow controllers, and suitable inlets. The canisters will be placed on tripod stands for sampling. Initial canister pressure will be checked prior to sample collection by measurement with a calibrated pressure gauge or pressure transducer. The initial pressure will be documented on the sample COC form. Canister must show greater than 28 in-Hg vacuum to conduct sampling.

Once vacuum is verified, the canister is connected to the sampling unit and a leak check is performed. A leak check may be performed by quickly opening and closing the valve of the canister to generate a vacuum in the sampling unit. The vacuum/pressure gauge in the sampling unit will be observed for a

minimum of five minutes to ensure that the vacuum does not change by more than 0.2 pounds per square inch (psi).

3. DATA REVIEW AND USABILITY

Field personnel will be responsible for completion of the field COC forms and submitting the triplicate form (minus the back copy) with the laboratory samples. Once the laboratory has completed their analysis and QC, a sample data package containing the results and the QC backup are generated. The laboratory results will be reviewed for compliance with the project objectives while the sample data packages will be subjected to data review, validation and verification.

3.1 Data Review, Validation, and Verification Requirements

Data review, validation, and verification will be performed on samples results before distribution to the public for review. Sample data is examined for representativeness, completeness, precision and bias. Requirements for the frequency of data review is set for 100%. The information used to verify EtO air concentration data includes:

- Sample COCs, holding times, preservation methods
- Multi-point calibrations
- Standards
- Instrument logs
- Supporting equipment
- Blank, CCVs, replicate and spike results.

3.2 Verification and Validation Methods

Data validation consists of examining the sample data package(s) against pre-determined standardized requirements. The validator may examine, as appropriate, the reported results, QC summaries, case narratives, COC information, raw data, initial and continuing instrument calibration, and other reported information to determine the accuracy and completeness of the data package. During this process, the validator will verify that the analytical methodologies were followed, and the QC requirements were met. The validator may recalculate selected analytical results to verify the accuracy of the reported information. Analytical results will then be qualified as necessary.

Data verification includes checking that results have been transferred correctly from laboratory data printouts to the laboratory report and to the electronic data deliverable (EDD).

4. REPORTING

An Air Monitoring Results Report will be prepared and submitted to IEPA no later than 30 days after the final date of collection of the air samples proposed in this AAMP.

4.1 Description of Test Methods and Sample Locations

The report will include a description of the test methods and sample locations, including global positioning system (GPS) locations for all sample locations.

4.2 Summary of Analytical Results

The analytical results will be summarized in a data table and the data will be compared to the permit limits set by IEPA in Sterigenic's Construction Permit: NESHAP Source ID 043110AAC. These limits are set to comply with the requirements for control of EtO in Section 9.16(b) of the Illinois Environmental Protection Act, "Control of Ethylene Oxide Sterilization Source".

4.3 Wind and Weather Information

Meteorological information will also be tabulated and presented in the report.

5. SCHEDULE FOR IMPLEMENTATION

Table 1 presents the schedule for implementation of this plan.

6. REFERENCES

- USEPA, 1999. EPA Compendium Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS) for both sampling and analysis methodology.
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Tables

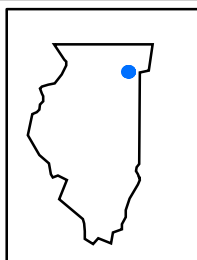
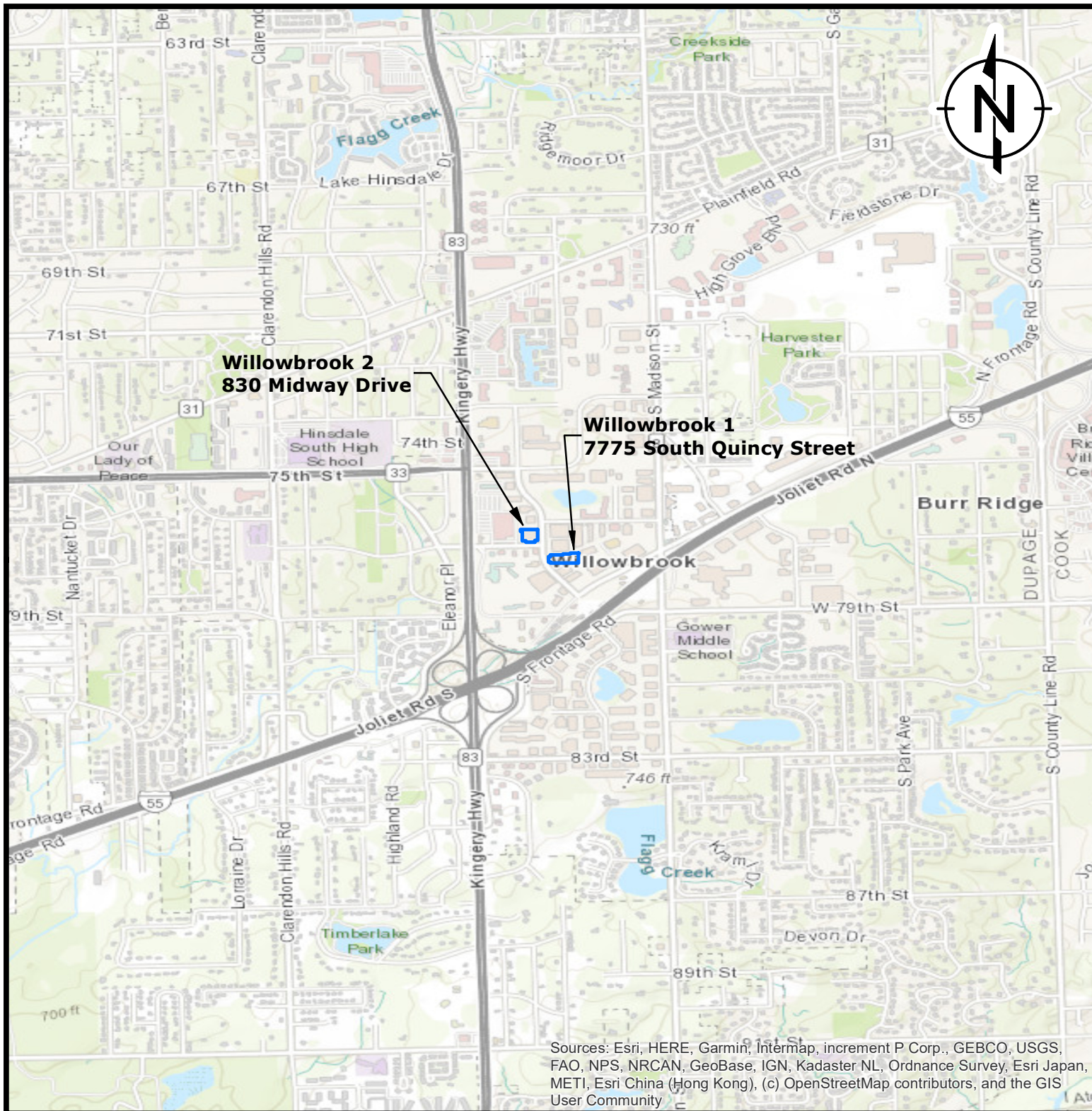
TABLE 1
30-DAY AMBIENT AIR SAMPLING SCHEDULE
Sterigenics Willowbrook 1, Willowbrook, Illinois

Station ID	Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
N		FS,Dup,TB			FS			FS			FS			FS			FS			FS			FS			FS			FS		
S		FS			FS			FS			FS,Dup,TB			FS			FS			FS			FS			FS			FS		
E		FS			FS			FS			FS			FS			FS			FS,Dup,TB			FS			FS			FS		
W		FS			FS			FS			FS			FS			FS			FS			FS			FS			FS,Dup,TB		
G		FS			FS			FS			FS			FS			FS			FS			FS			FS			FS		
T		FS			FS			FS			FS			FS			FS			FS			FS			FS			FS		
Total No. Samples		6			6			6			6			6			6			6			6			6			6		60
Total No. QA Samples		2			0			0			2			0			0			2			0			0			2		8

Footnotes:

FS - Field Sample
Dup - Duplicate (quality control) sample
TB - Trip Blank
QA - Quality Assurance samples include Dups and TBs
N - Station-North
S - Station-South
E - Station-East
W - Station-West
G - Station-Gower
T - Station-Tower

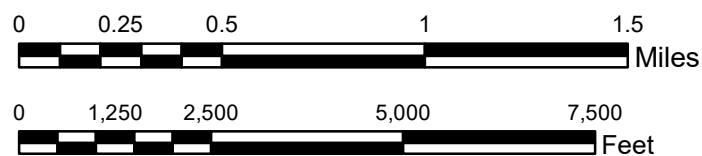
Figures



Legend

— Sterigenics Facility Locations

- 1: 7775 South Quincy Street
- 2: 830 Midway Drive



Map Scale: 1:30,000

RAMBOLL

Site Location Map Sterigenics International, Inc

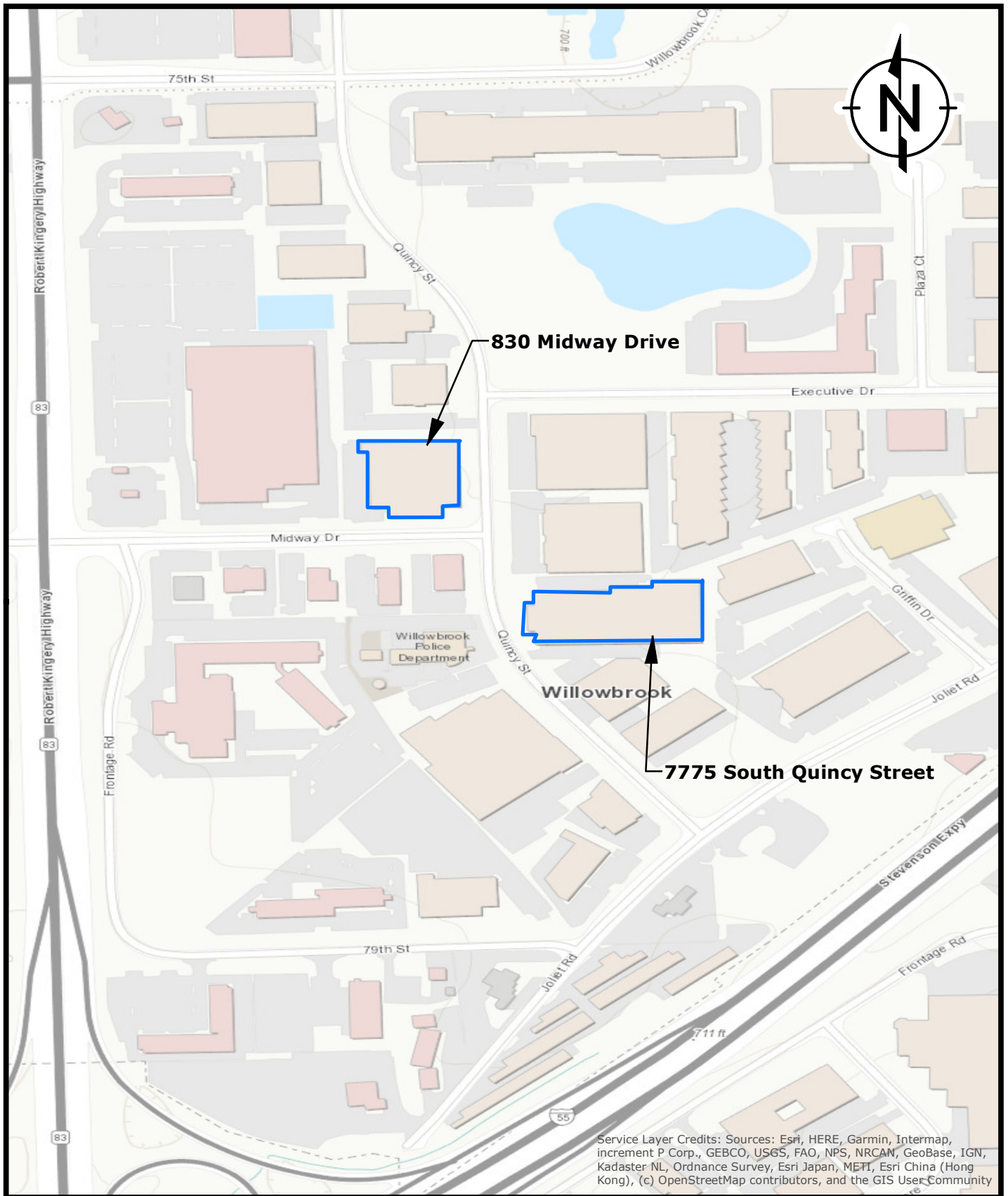
Willowbrook, Illinois

FIGURE
1

DRAFTED BY: AEM

DATE: 10/1/2019

PROJECT: 1690009066



Legend

— Sterigenics Facility Locations

0 165 330 660 990 Feet

RAMBOLL

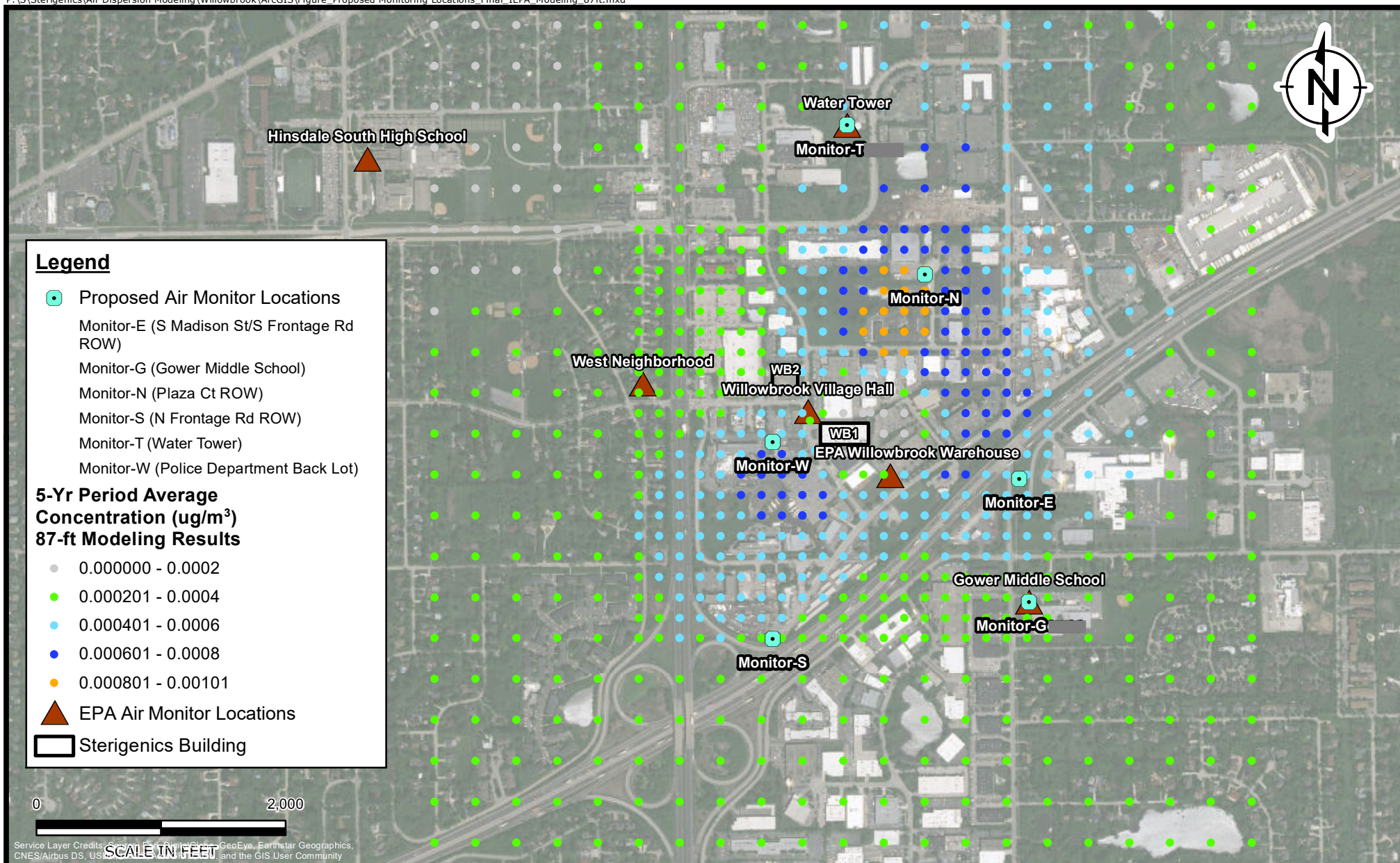
Site Map Sterigenics International, Inc Willowbrook, Illinois

**FIGURE
2**

DRAFTED BY: AEM

DATE: 10/1/2019

PROJECT: 1690009066



Proposed Ambient Air Monitoring Locations 87-ft Stack Modeling Scenario

Sterigenics International, Inc
Willowbrook, Illinois

FIGURE
3

PROJECT: 1690009066

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DRAFTED BY: SLEE

DATE: 9/26/2019