NTH Consultants, Ltd.

Infrastructure Engineering
and Environmental Services

2990 W. Grand Blvd., Suite M-10
Detroit, MI 48202
Phone: 313-237-3900
Fax: 313-237-3909

Mr. Hosam Hassanien, PG, CPG
City of Detroit
Environmental Affairs
2 Woodward Avenue – CAYMC, Suite 401
Detroit, MI 48226

May 14, 2021
NTH Project No. 74-200457-01

RE: Ambient Air Quality Monitoring – 1st Baseline Monitoring Report
Proposed Amazon Distribution Center
Detroit, Michigan

Dear Mr. Hassanien:

The City of Detroit (City) contracted NTH Consultants, Ltd. (NTH) to conduct ambient air quality monitoring at the proposed Amazon Distribution Center site to be located at the former State Fairgrounds property in Detroit, Michigan.

The monitoring program consists of siting localized monitors at an upwind and downwind location to measure concentrations of particulate matter (PM_{10} and $PM_{2.5}$), nitrogen dioxide (NO_x) and volatile organic compounds (VOC), and evaluate air quality from the property during three (3) distinct phases:

- Pre-development baseline period prior to construction activities
- Construction phase
- Post-construction facility operation

This letter and enclosed report present the results of the pre-development baseline monitoring that was completed between November 13, 2020 and March 5, 2021. The goal of the baseline monitoring is to characterize pre-development concentration levels of target air pollutants including NO_x (as NO_2), fugitive dust and fine particulate matter (PM_{10} and $PM_{2.5}$), and VOCs, with respect to prevailing wind directions and speeds (vectors).

Pre-Development Baseline Period

The enclosed "Baseline Ambient Monitoring Report 2021 Former Michigan State Fairgrounds", from Montrose Air Quality Services, LLC (MAQS), dated May 7, 2021, describes the baseline monitoring program, objectives, site overview, monitor locations and equipment, monitoring results, and an overview of data quality assurance. MAQS served as a subconsultant to NTH for on-site air monitoring services.

The report includes baseline monitoring data from three (3) available sources, including:

- Two (2) Fairground site monitors operated by MAQS for NTH during the baseline monitoring period (January 22 through March 5, 2021) and identified as Unit 1479 and Unit 1480.

- Nearby off-site monitors operated by Michigan Department of Environment, Great Lakes, and Energy (EGLE) during the baseline monitoring period (January 22 through March 5, 2021).

- Monitoring data provided by Hillwood Development Company (HDC), the project developers, for the period November 13, 2020 through December 2, 2020 from five (5) monitoring locations at the project site and identified as ML1, ML2, ML3, ML4 and ML5. Langan conducted ambient air monitoring for HDC.

As part of the baseline monitoring program, NTH's team collected one (1) month of air monitoring data for NO_x (as NO_2), PM_{10} and $PM_{2.5}$, and VOCs at two (2) monitors, when construction-related activity were light. The monitors, designated as Unit 1479 and Unit 1480, were located on opposite sides of the site and both stations also collected meteorological data. The upwind monitor (Unit 1479) measures pollutant concentrations that have not blown across the site and should be free from potential impacts of on-site development activity. Therefore, we were able to use the monitor upwind of the project site during the baseline period to determine baseline, or local area background, concentrations.

NTH has also reviewed recent data from EGLE's monitoring network during the years prior to Amazon obtaining the site (2017-2019) and has included the information in this letter to provide context regarding variability in the local area background concentrations over other seasons.

On-Site Activities During Baseline Period

In November 2020, the City completed a property transaction for a new Amazon Fulfillment Center to be constructed on a 137-acre parcel at the former State Fairgrounds property located at 1120 W. State Fair Avenue in Detroit, Michigan. Prior to this time, the property was owned by the City.

Based upon the site construction schedule, Amazon's developer (HDC) began mobilizing equipment to the site as early as November 24, 2020. Early on-site earthwork efforts consisted of pre-construction activities including digging initial detention basins and grading for a portion of the site.

The City anticipates that development of the proposed Amazon Distribution Center may result in direct and fugitive air emissions from site construction activities, as well as future site operations. Sources of NO_x and VOC emissions related to construction may include vehicular traffic and diesel engines (over-the-road and non-road heavy duty construction). Potential emissions of PM_{10} and $PM_{2.5}$ related to construction may include fugitive dust associated with vehicular traffic, soil handling, material storage piles, concrete batching, and abrasives blasting.

Results of Pre-Development Baseline Monitoring

Site-specific baseline concentrations were derived as the highest monitored concentration from the monitoring program and are presented in Table 1 below, and are compared with the applicable National Ambient Air Quality Standards (NAAQS). These concentrations were determined to be baseline and representative of pollutant concentrations prior to start of site construction activities.

Table 1 – Site-Specific Baseline Concentrations

Pollutant	Operator	Monitor	Baseline Concentration	Date of Baseline Concentration	NAAQS	Units
PM_{10}	Langan	ML2	47	11/25/2020	150	$\mu g/m^3$
$PM_{2.5}$	Langan	ML2	22	11/25/2020	35	$\mu g/m^3$
NO_2	Montrose	Unit 1480	52	1/30/2021	100	ppb
VOC	Langan	ML1	0.11	11/14/2020	NA [1]	ppm

[1] NAAQS have not been established for VOC. VOCs are considered precursors to the formation of ozone. Ozone is formed downwind by photochemical reaction of NO_x and VOCs in certain ambient conditions (typically hot, sunny weather)

During baseline monitoring, concentrations varied by pollutant, date, and monitor location. The results of on-site baseline monitoring demonstrated that some natural variation in concentrations occurs irrespective of development but is limited in scope based upon the monitoring program duration and season; approximately one (1) month during the winter season. Natural variability in monitoring concentrations may occur due to factors including changing emissions from upwind sources, seasonal variation in weather, changing traffic patterns as COVID-19 restrictions ease, or other factors. The data collected during this baseline period is a limited subset of conditions that may be expected at the site but also provides a snapshot of ambient air quality trends local to the site.

Local Area Background Concentrations

Maximum pollutant concentrations from both HDC/Langan and NTH/Montrose operated monitors are compared to data from the State of Michigan's monitoring network to provide comparison and context to local area background conditions. Data from EGLE air quality monitors operated over many years in the Detroit area indicate a large variation in pollutant concentrations primarily due to location, as presented in Table 2 below. This data shows that site-specific monitoring data is consistent with background concentrations recorded as part of the State of Michigan's monitoring network.

Table 2 – Local Ambient Concentrations

Pollutant	Operator	Monitor	Maximum	Date of Maximum	Units
PM_{10}	Montrose	Unit 1480 [1]	8	2/21/2021	µg/m³
	Langan	ML2	47	11/25/2020	
	EGLE	Dearborn	33	2/3/2021 [2]	
		Dearborn	66	2018 [3]	
$PM_{2.5}$	Montrose	Unit 1480 [1]	8	2/21/2021	µg/m³
	Langan	ML2	22	11/25/2020	
	EGLE	Dearborn	15	2/20/2021 [2]	
		Oak Park	34	2018 [3]	
NO_2	Montrose	Unit 1480 [1]	52	1/30/2021	ppb
	Langan	ML2	28	11/25/2020	
	EGLE	Fort Street	56	2/17/2021 [2]	
		E. 7-Mile	62	2018 [3,4]	
VOC	Montrose	Unit 1479 [5]	0.02	1/30/2021	ppm
	Langan	ML1	0.11	11/14/2020	

[1] Maximum concentration at downwind monitor during baseline monitoring period.
[2] Maximum concentration at EGLE monitor during baseline monitoring period (January 22 to March 5, 2021).
[3] Maximum concentration at EGLE monitor during calendar year.
[4] EGLE East 7-mile monitor is no longer operated; historic baseline evaluated from 2016-2018.
[5] Maximum concentration at upwind monitor during baseline monitoring period.

Establishment of Baseline Values and Recommendations

Based upon data collected during the baseline monitoring program, NTH recommends that the City further evaluate periods of activity during development and post-construction phases that meet either of the following conditions:

1. Monitored average concentrations (hourly or 24-hour) at the downwind monitor (Unit 1480) that are both:

    a. Greater than the site-specific baseline concentrations established during the pre-development baseline period as summarized in Table 1; and
    b. Greater than 150 percent of the concentration at the upwind monitor.

2. Monitored average concentrations (hourly or 24-hour) at the downwind monitor (Unit 1480) that are greater than 90 percent of the applicable hourly or 24-hour NAAQS values of 150 µg/m³ for PM_{10}, 35 µg/m³ for $PM_{2.5}$, and 100 ppb for NO_2.

In conclusion, the air quality monitoring data gathered for this baseline assessment do not indicate a threat to public health or unusual/elevated concentrations of the analyzed parameters.

We appreciate this opportunity to be of service to you. If you have questions or need additional information, please contact us at 248-662-2740.

Sincerely,

NTH Consultants, Ltd.

Christopher O. Occhipinti
Project Professional

Bhushan C. Modi
Project Manager

COO/BCM/mam

Attachments

BASELINE AMBIENT MONITORING REPORT 2021
FORMER MICHIGAN STATE FAIRGROUNDS
CITY OF DETROIT
DETROIT, MICHIGAN

Prepared For:
NTH Consultants, Ltd.
2990 W. Grand Blvd., Suite M-10
Detroit, MI 48202

Prepared By:
Montrose Air Quality Services, LLC
4949 Fernlee Avenue
Royal Oak, MI 48073

Document Number:	**928ET-5509-RT-78**
NTH Project Number:	**74-200457-03**
Monitoring Period:	**January 22 through March 5, 2021**
Submittal Date:	**May 7, 2021**

ACCREDITED TO ASTM D7036 ONLY CERT #3925.01

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Project Overview

Background

NTH Consultants, Ltd. (NTH) contracted Montrose Air Quality Services, LLC (Montrose) to conduct an ambient air monitoring program on behalf of the City of Detroit at the proposed Amazon distribution center located at the former Michigan State Fairgrounds located in Detroit, Michigan. The program is conducted to monitor for a mixture of pollutants that may originate from construction activities as well as future site operations including vehicular traffic, surface attrition, and dust emissions. This report includes data from monitors operated by Montrose and Michigan Department of Environment, Great Lakes, and Energy (EGLE) during the baseline monitoring period (January 22 through March 5, 2021), and includes additional raw monitoring data provided by the land developer for the period November 13, 2020 through December 2, 2020.

Objectives

The specific objectives are to measure ambient concentrations of the following parameters at two (2) monitoring locations:

- Particulate Matter (PM_{10}) of diameter less than 10 microns
- Particulate Matter ($PM_{2.5}$) of diameter less than 2.5 microns
- Nitrogen Dioxide (NO_2)
- Volatile Organic Compounds (VOC)
- Meteorological parameters (wind speed, wind direction, temperature, relative humidity, and barometric pressure) at two (2) monitoring locations

Potential Sources

Sources of NO_x and VOC emissions related to construction include vehicular traffic and diesel engines (over-the-road and non-road heavy duty construction). Potential emissions of PM_{10} and $PM_{2.5}$ related to construction may include fugitive dust associated with vehicular traffic, soil handling, material storage piles, concrete batching, and abrasives blasting.

Operational Staff and Contacts

Facility Information

Monitoring Location: Proposed Amazon Distribution Facility
Former Michigan State Fairgrounds
1120 W. State Fair Avenue
Detroit, MI 48203

Monitoring Program Coordinator

NTH Consultants, Ltd.
2990 W. Grand Blvd., Suite M-10
Detroit, MI 48202

Project Contacts:	Mr. Bhushan Modi
Role:	Project Manager
Company:	NTH Consultants, Ltd.
Telephone:	248-662-2740
Email:	bmodi@nthconsultants.com

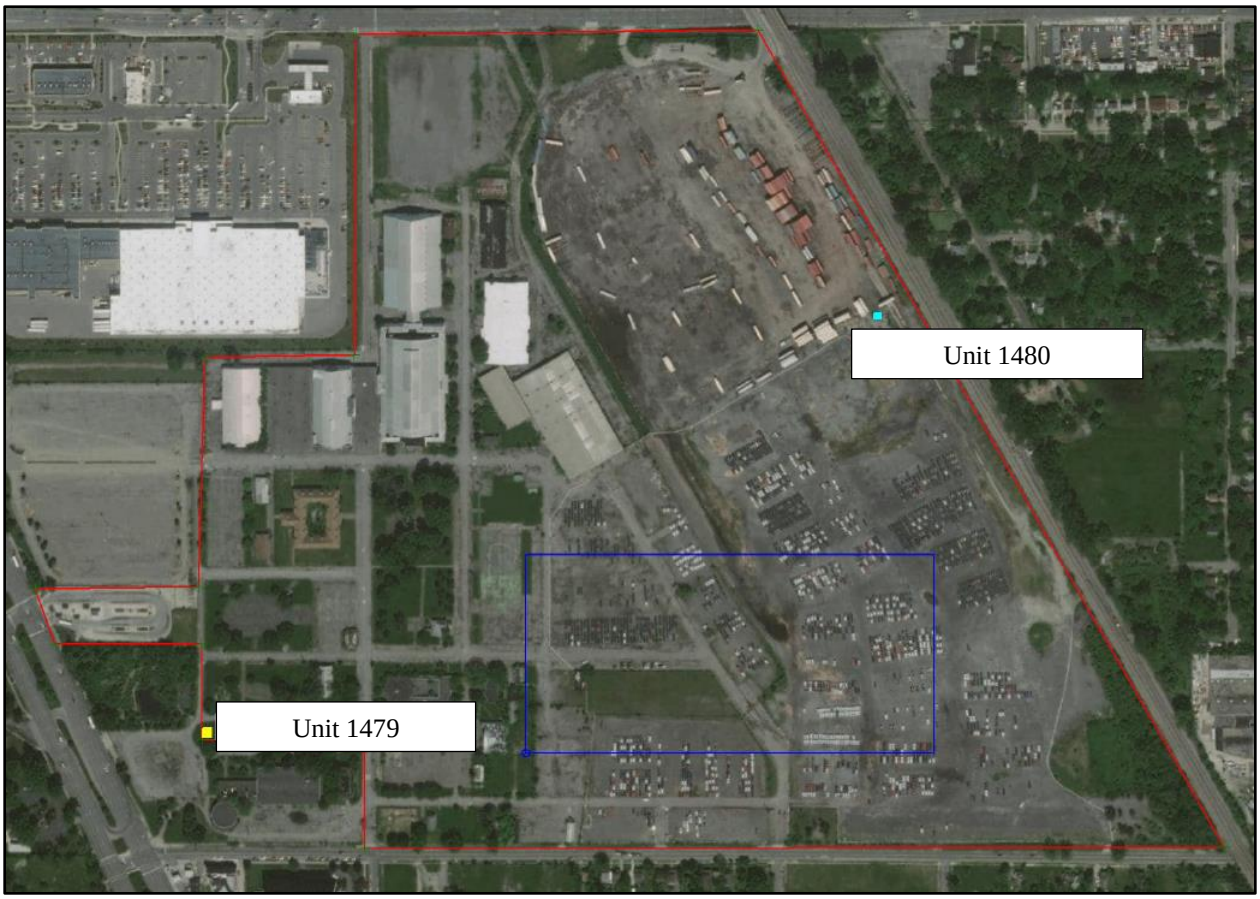
Monitoring Team Contact Information

Testing Firm:	Montrose Air Quality Services, LLC (Montrose)	
Contact:	Austin Heitmann	Jeffrey Peitzsch
Title:	Client Project Manager	Shop Coordinator
Telephone:	720-253-5496	313-213-4816
Email:	aheitmann@montrose-env.com	jbpeitzsch@montrose-env.com

Site Overview

The site air quality monitoring was performed at the former Michigan State Fairgrounds property located at 1120 W State Fair Avenue in Detroit, MI. This area was purchased by Hillwood Development Company, LLC (Hillwood) who will be demolishing the existing structures onsite and building a large warehouse that will be occupied by an Amazon distribution center. The two (2) monitor locations are identified in Figure 1 below.

Figure 1 – Monitor Locations



Monitoring Equipment

The monitoring at the former State Fairgrounds was performed using an AQS1 Urban Air Quality Monitor manufactured by Aeroqual. In the device, sampling occurs actively by pulling in ambient air via pump and the air sample passing over the surface of each sensor. Each device used in this project is solar powered and transmits data via cellular signal. Monitoring was conducted for the constituents listed in Table 1.

Table 1. Pollutants Monitored

Air Pollutant/Parameter Category	Principle of Operation
PM_{10} and $PM_{2.5}$	Laser Scattering
NO_2	Electrochemical
VOC	Photoionization
Wind Speed, Wind Direction, Temperature, Relative Humidity, Barometric Pressure	Sonic Anemometer and Various

A Photoionization Detector (PID) sensor contains a lamp that produces photons that carry enough energy to break molecules into ions. The PID will only respond to molecules that have an ionization energy at or below the energy of the lamp; the PID used on this project employs a 10.6 electron-volt lamp. The produced ions then generate an electrical current that is measured as the output of the detector.

The sampled particles are measured by the physical principle of light scattering. Each single particle is illuminated by a defined laser light and each scattering signal is detected at an angle of 90° by a photo diode. In accordance with the Mie theory, each measured pulse height is directly proportional to the particle size whereas each pulse is classified in an electronic register of 32 different size channels.

Electrochemical sensors measure the concentration of a specific gas within an external circuit via oxidation or reduction reactions. These reactions generate the positive or negative current flow through the external circuit. An electrochemical sensor is made up of a working, counter, and reference electrode. All of these components sit inside of a sensor housing along with a liquid electrolyte that is specific to the compound of interest.

All operation and maintenance procedures contained in the monitoring plan, dated January 10, 2021, were followed for the continuous monitoring equipment.

Discussion of Results

The results of PM_{10}, $PM_{2.5}$, NO_2, and VOC and monitoring data can be found in Figures 1 through 4. These figures also include data from air monitoring stations maintained by the Michigan Department of Environment, Great Lakes, and Energy (EGLE); however, none of the data provided by EGLE has been processed through their final quality assurance procedures as of the date of this report. The EGLE data in this report are from monitors that are routinely subjected to calibration and maintenance. The monitor locations for EGLE sites can be found on the map provided in Appendix C *State Monitor Map*.

Hillwood conducted their own baseline ambient air monitoring data in November and December of 2020, this data is also included in this report. The data provided by Hillwood was provided without quality assurance data or any description of the procedures. The monitor locations for the Hillwood monitoring sites can be found on the map provided in Appendix D *Hillwood Monitor Map*.

The Clean Air Act requires EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The graphs shown indicate that readings for the monitoring period relative to the NAAQS Standard (if applicable). Electronic records of all data and calibrations have been uploaded to the Montrose's Data Server and will be stored indefinitely.

NO_2, $PM_{2.5}$, and PM_{10} NAAQS were not exceeded during these monitoring periods. NAAQS have not been established for VOCs. VOCs are considered precursors to the formation of ozone. Ozone is formed downwind by photochemical reaction of NO_x and VOCs in certain ambient conditions.

Pollutant Data Collected

Figure 2a – Baseline PM_{10} Data

The graph below is shown for the monitoring period of 1/22/21 to 3/5/21 and is a plot of the twenty-four (24) hour averages. The dashed yellow line represents the 24-hour PM_{10} NAAQS of 150 micrograms per cubic meter ($\mu g/m^3$). The EGLE Dearborn site is the nearest PM_{10} monitor to the area monitored in this report.

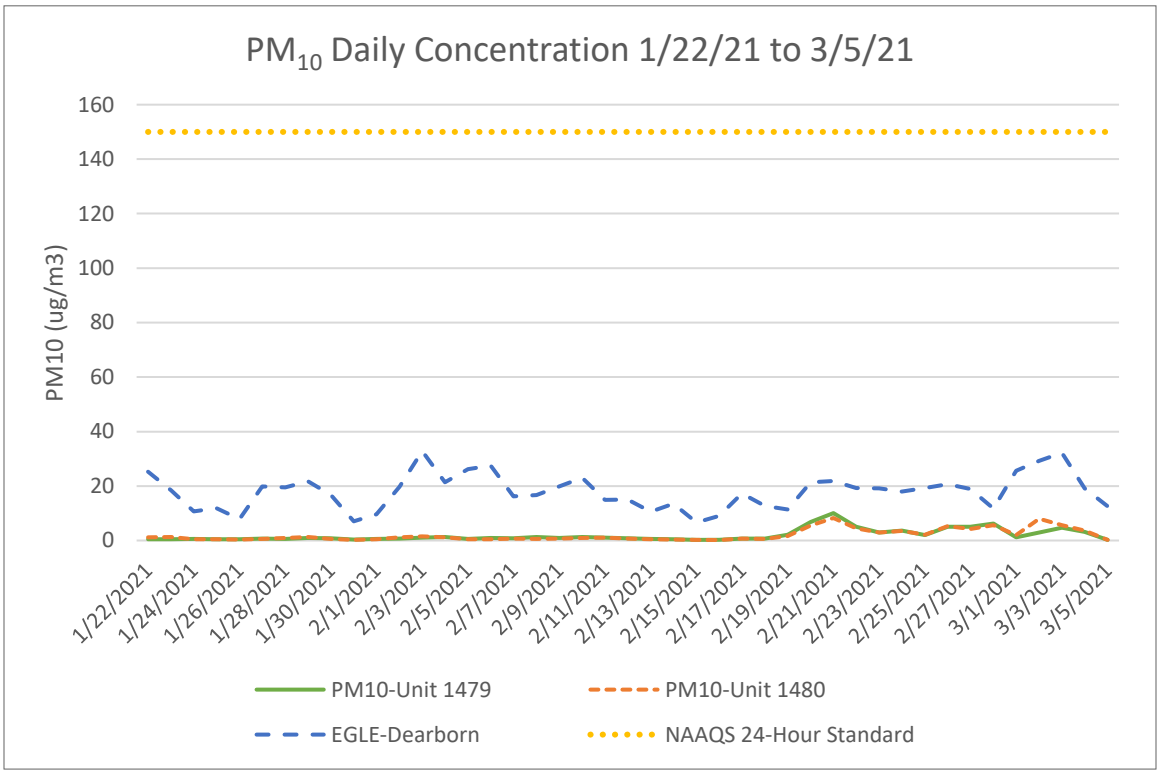


Figure 2b – Hillwood Baseline PM_{10} Data

The graph below is shown for the monitoring period of 11/23/20 to 12/1/20 by Hillwood and is a plot of the twenty-four (24) hour averages. The solid green line represents the 24-hour PM_{10} NAAQS of 150 ug/m^3.

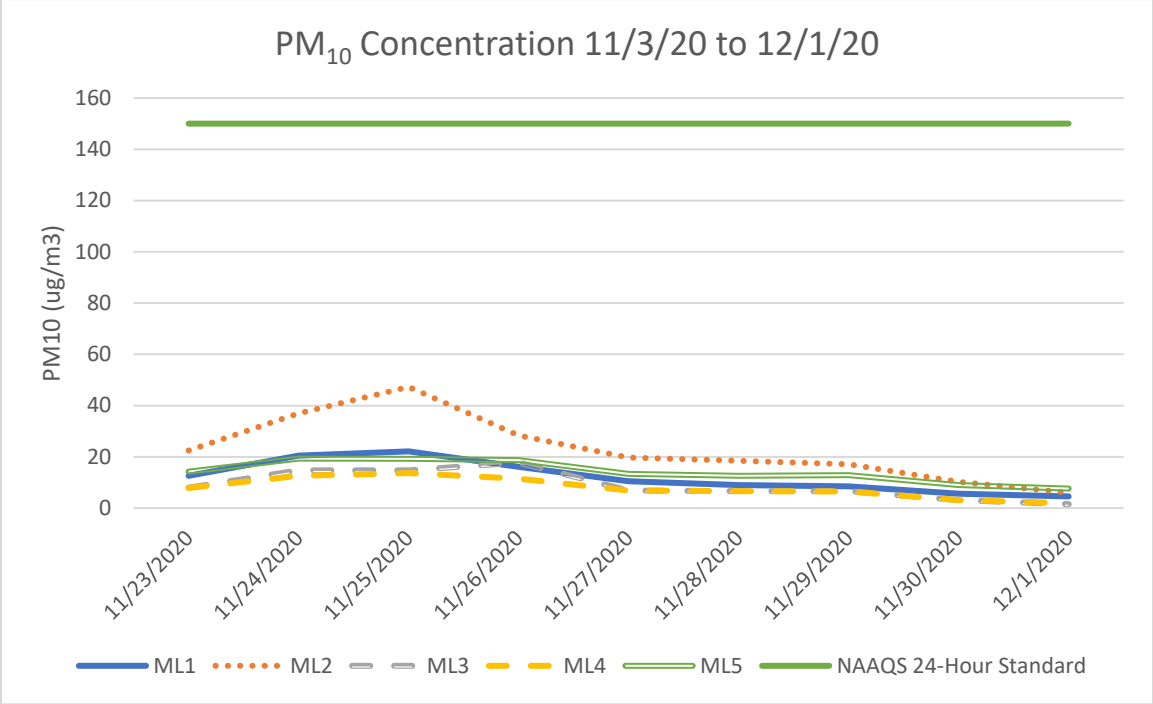


Figure 3a – Baseline $PM_{2.5}$ Data

The graph below is shown for the monitoring conducted from 1/22/21 to 3/5/21 and is a plot of the twenty-four (24) hour averages. The solid yellow line represents the 24-hour $PM_{2.5}$ NAAQS of 35 ug/m^3. The EGLE Oak Park site is the nearest $PM_{2.5}$ monitor to the area monitored in this report. The Oak Park data is based on 24-hour filter based sampling that occurs approximately every 3 days.

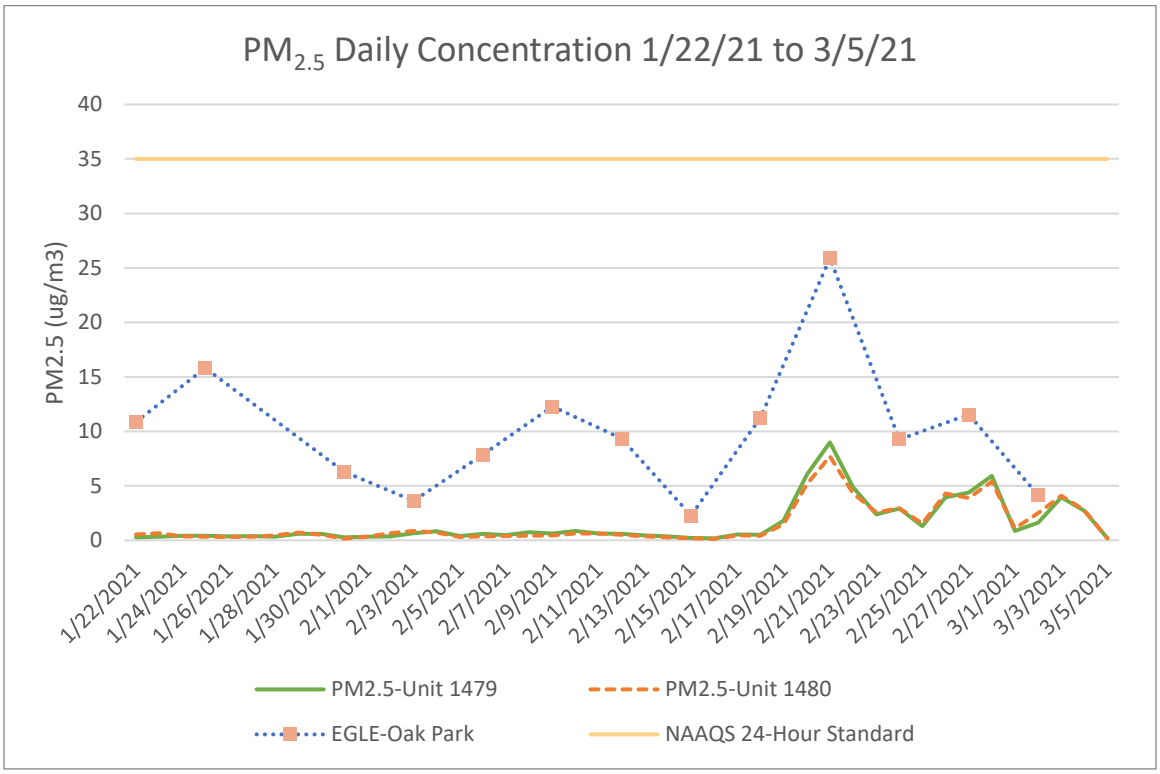


Figure 3b – Hillwood Baseline $PM_{2.5}$ Data

The graph below is shown for the monitoring conducted from 11/23/20 to 12/1/20 by Hillwood and is a plot of the twenty-four (24) hour averages. The solid green line represents the 24-hour $PM_{2.5}$ NAAQS of 35 ug/m^3.

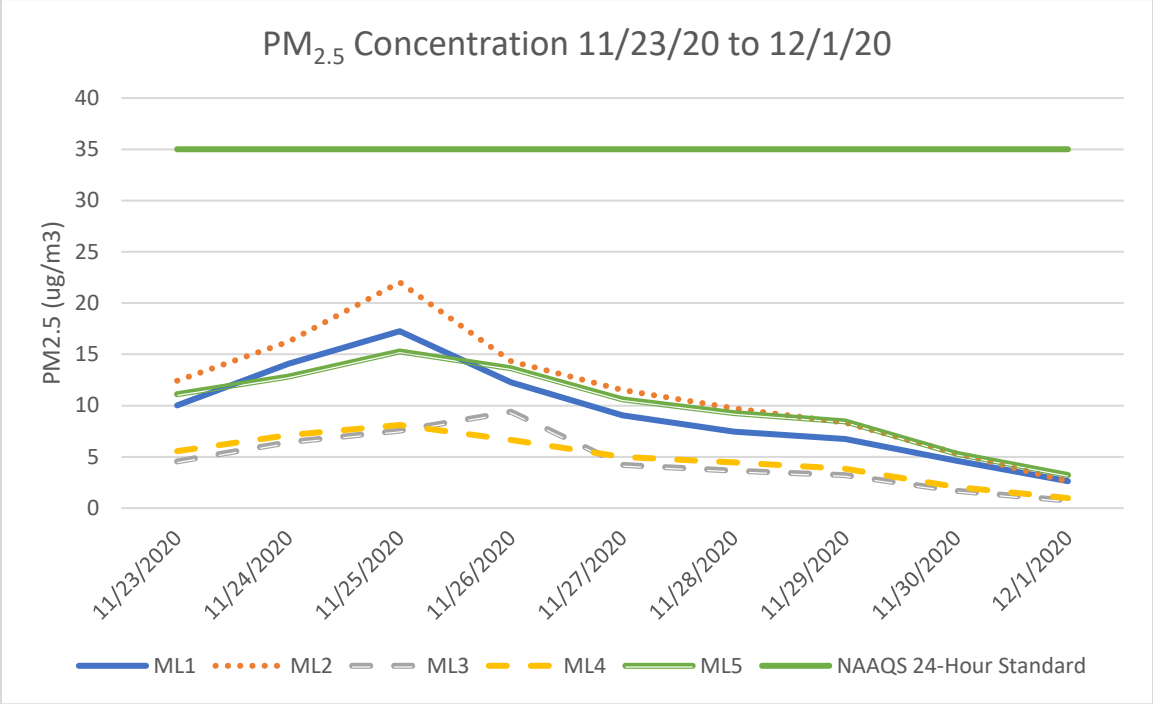


Figure 4a – Baseline NO_2 Data

The graph below is shown for the monitoring period of 1/22/20 to 3/5/21 and is a plot of the one (1) hour averages. The solid yellow line represents the 1-hour NO_2 NAAQS of 100 ppb. The EGLE Fort Street site is the nearest NO_2 monitor to the area monitored in this report.

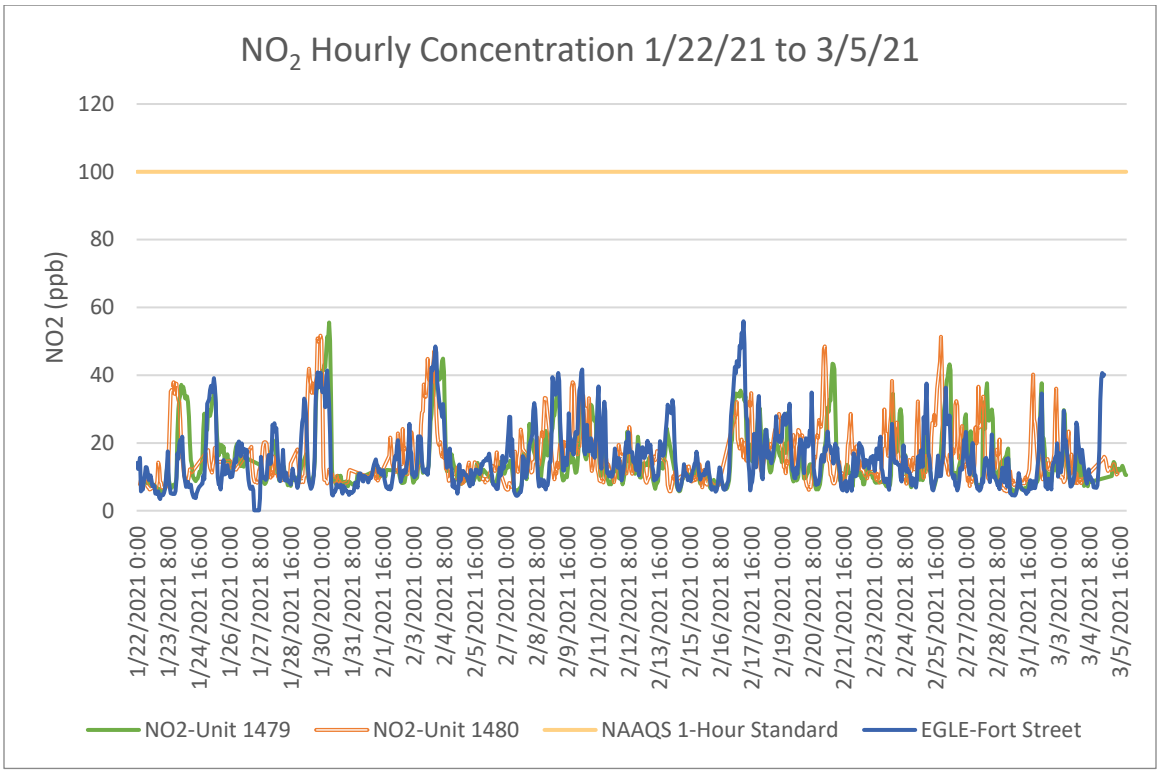


Figure 4b – Hillwood Baseline NO_2 Data

The graph below is shown for the monitoring period of 11/22/20 to 12/2/20 by Hillwood and is a plot of the one (1) hour averages. The dashed yellow line represents the 1-hour NO_2 NAAQS of 100 ppb.

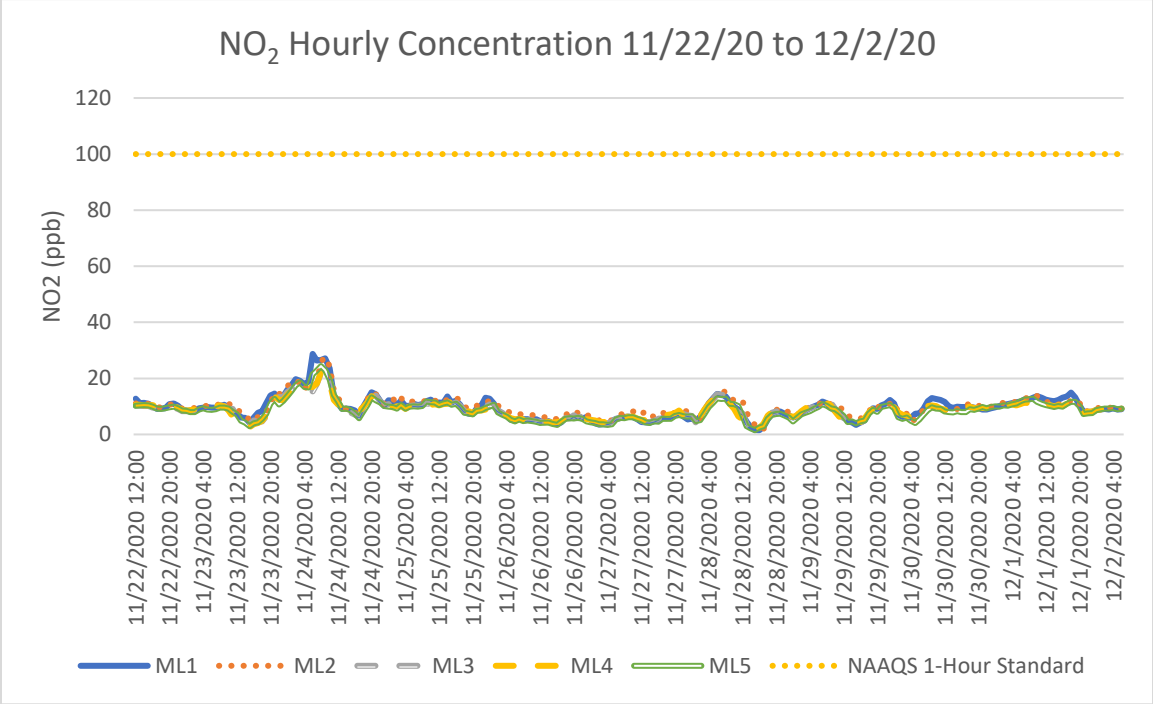


Figure 5a – Baseline VOC Data

The graph below is shown for the monitoring conducted from 1/22/21 to 3/5/21 and is a plot of the one (1) hour averages. VOC does not have a NAAQS.

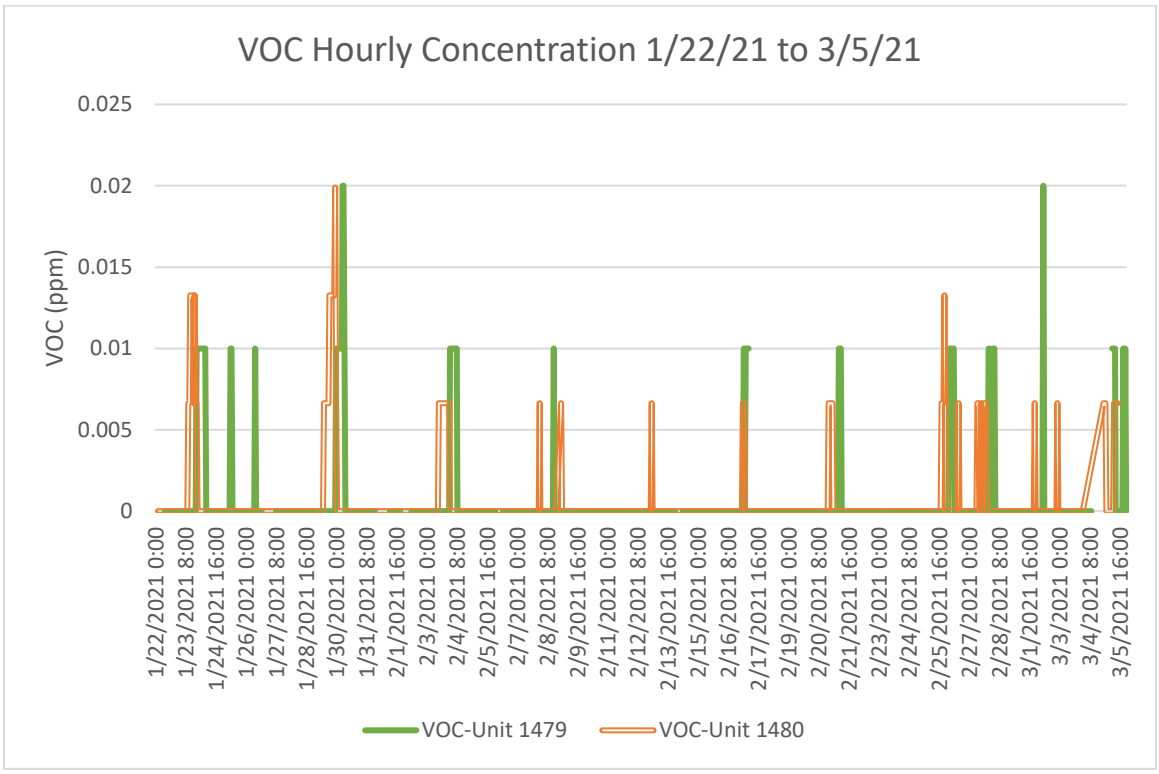
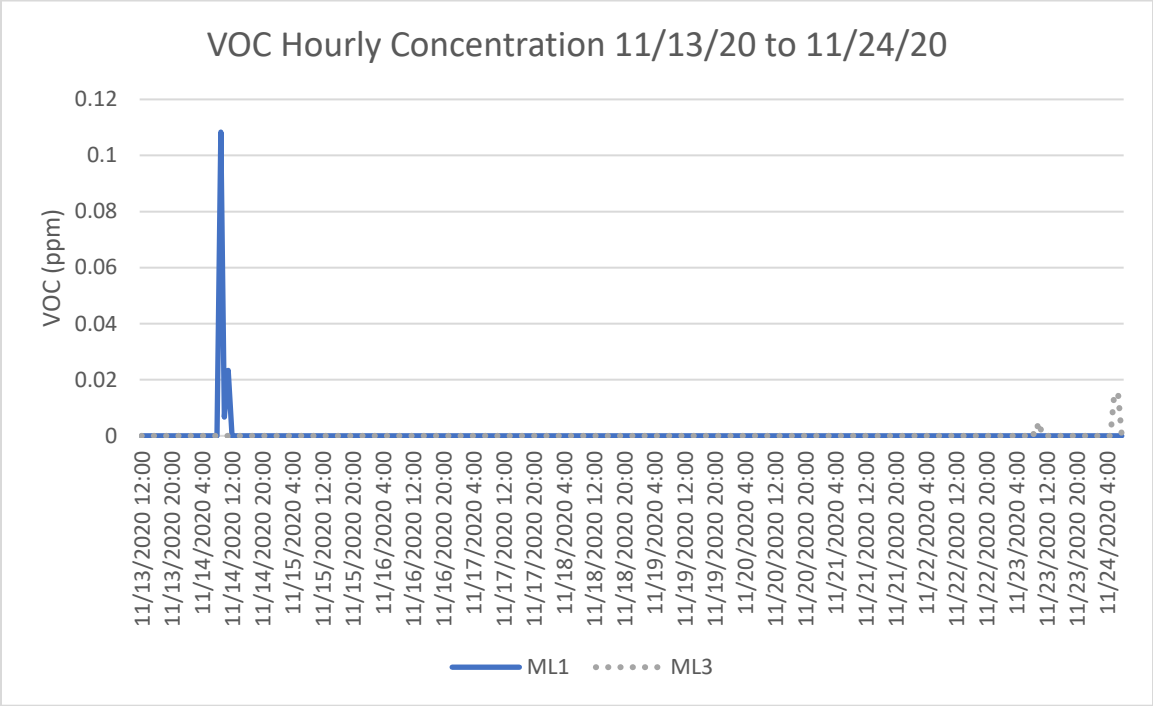


Figure 5b – Hillwood Baseline VOC Data

The graph below is shown for the monitoring conducted from 11/13/20 to 11/24/20 by Hillwood and is a plot of the one (1) hour averages. VOC does not have a NAAQS.



Data Quality Assurance/Quality Control

Quality Assurance/Quality Control

Quality assurance is a general term for the procedures used to ensure that a particular measurement meets the quality requirements for its intended use. Quality control of continuous analyzers consists of precision and span checks or flow verifications. Quality objectives were assessed via site system audits.

All work being done on this project follows the operating procedures described in the "Former Michigan State Fairgrounds Work Plan" dated 1/10/21.

All quality control monitor data can be found in Appendix Titled *Quality Assurance Logs*.

Signature Page

Prepared and reviewed by:

Austin Heitmann
Montrose Air Quality Services, LLC

Patrick Clark, PE
Montrose Air Quality Services, LLC

Appendix

A: Quality Assurance Logs

AEROQUAL AQS-1 NO2 MODULE MULTI-POINT CALIBRATION FORM

Calibration Data on This Form Are For:			**Unadjusted Cal.**	X	**Adjusted Cal.**	
Network:	City of Detroit Amazon Proj	Site:	Upwind Monitor		Date:	3/11/21
Time Off-Line:	09:03 EST	Time On-Line:	11:25 EST		Technician:	Rob Bienenstein

Calibration Equipment Info.						
	Analyzer Model:	Aeroqual AQS-1	S/N:	1479	Last Cal:	12/17/20
	Calibrator Model No.:	Teledyne API	S/N:	69	Cal. Date:	12/29/20
	Zero Air Model No.:	Teledyne API	S/N:	3465	Cert Date:	n/a
	Gas Supplier:	Airgas	Cyl. Cert. Date:	1/26/21	Cyl. Pressure (PSIG)	2,000
	Gas Cylinder ID #:	D068357	Cyl. Conc. (PPM):	30.95	NO2 Module Flow Rate (mL)	60.0

Analyzer Calibration Settings	**"As Found" (Before Any Adjustment)**	**"As Left" (After Adjustment)**
OFFSET	0.000	.
GAIN	1.036	.

Calibrator Flow and Test Gas Data					**NO_2 Response**		**ERROR**	
Calibrator Gas Channel		**Calibrator Air Channel**			***Observed from AQS-1***			
Display Setting (SLPM)	**Actual Flow Rate** (SLPM)	Display Setting (SLPM)	**Actual Flow Rate** (SLPM)	**Known NO_2 Gas Conc. (PPB)**	Response (PPB)	Std. Dev. (PPB)	**(PPB)** Observed - Known Conc.	**(Δ%)** (Observed Vs. Known Conc.)
0.0500	0.0501	3.8497	3.8652	396.0	365.4	0.8	-30.6	-7.7%
0.0145	0.0146	4.4855	4.5102	99.9	87.7	0.5	-12.2	-12.2%
0.0081	0.0082	4.9919	5.0123	50.6	39.8	0.4	-10.8	-21.3%
0.0048	0.0050	4.9952	5.0164	30.8	24.0	0.7	-6.8	-22.1%
OFF	OFF	5.0000	5.0150	0.0	0.1	0.2	0.1	n/a
Linear Regression Analysis:								
Slope:	0.931210	Intercept:	-4.117527	Corr. Coefficient (r):			0.999831	

NOTES:

1. The NO2 sensor zero response should be 0.0 ppb ± 0.2 ppb with a Std. Dev. < 0.2 ppb. If the sensor response error is greater than ± 0.2 ppb then an offset adjustment is required. If the Std. Dev. is greater than 0.2 ppb then the sensor is outside acceptable range and may need relacement.
2. The adjusted zero response NEW offset should be -1 < OFFSET < 1 and the sensor response 0.0 ppb ± 0.2 ppb.
3. The NO2 sensor SPAN response should be 400 ppb ± 20 ppb (5% span of 400 ppb) with a Std. Dev. < 8 ppb (2% span of 400 ppb). If the sensor response error is greater than ±20 ppb then a GAIN adjustment is required. If the Std. Dev. is greater than 8.0 ppb then the sensor is outside acceptable range and may need relacement.
4. The adjusted span response NEW gain should be 0.2 < GAIN < 5.0 and the sensor response 400 ppb ± 20 ppb.

Comments:

Data collected from startup on 01/22/21 to end of initial monitoring period on 03/05/21 should be corrected by applying the following correction factor based upon the linear regression analysis derived from the above calibration resuts:

CORR = (DATA - (-4.117527))/0.931210

Technician: Rob Bienenstein

QA Review: 

MONTROSE AIR QUALITY SERVICES LLC

AEROQUAL AQS-1 VOC HIGH RANGE MODULE VERIFICATION/CALIBRATION FORM

Network:	City of Detroit Amazon Proj	Site:	Upwind Monitor	Date:	3/12/21
Time Off-Line:	9:45 EST	Time On-Line:	10:24 EST	Technician:	Dennis Weyburne

Calibration Equipment Info.	Analyzer Model:	Aeroqual AQS-1	S/N:	1479	Last Cal:	1/22/21
	Calibrator Model No:	Teledyne API	S/N:	69	Cal. Date:	12/29/20
	Zero Air Model No:	Teledyne API	S/N:	3465	Cert Date:	n/a
	Gas Supplier:	GASCO #1-1	Cyl. Conc. (PPM):	0.99	Cyl. Pressure (PSIG)	400
	Gas Supplier:	GASCO #3-2	Cyl. Conc. (PPM):	3.10	Cyl. Pressure (PSIG)	450

VOC Sensor Module Calibration Settings	"As Found" (Before Any Adjustment)	"As Left" (After Adjustment)
OFFSET	0.000	
GAIN	1.774	

"AS FOUND" (UNADJUSTED) TEST DATA

Calibrator Flow and Test Gas Data					Observed VOC Response from AQS-1		Error (Δ%)
Calibrator Gas Channel		Calibrator Air Channel		Known VOC Input Gas Conc. (PPM)			
Display Setting (SLPM)	Actual Flow Rate (SLPM)	Display Setting (SLPM)	Actual Flow Rate (SLPM)		Response (PPM)	Std. Dev. (PPM)	
OFF	OFF	5.0000	5.0130	0.00	0.00	0.00	-
n/a	n/a	1.0000	n/a	0.99	1.47	0.00	48.5%
n/a	n/a	1.0000	n/a	3.10	4.28	0.00	38.1%

"AS LEFT" (ADJUSTED) TEST DATA

Calibrator Flow and Test Gas Data					Observed VOC Response from AQS-1		Error (Δ%)
Calibrator Gas Channel		Calibrator Air Channel		Known VOC Input Gas Conc. (PPM)			
Display Setting (SLPM)	Actual Flow Rate (SLPM)	Display Setting (SLPM)	Actual Flow Rate (SLPM)		Response (PPM)	Std. Dev. (PPM)	
OFF	OFF						-

NOTES:

1. The VOC sensor zero response should be 0.0 ppm ± 0.2 ppm with a Std. Dev. < 0.2 ppm. If the sensor response error is greater than ± 0.2 ppm then an offset adjustment is required. If the Std. Dev. is greater than 0.2 ppm then the sensor is outside acceptable range and may need relacement.

2. The adjusted zero response NEW offset should be -1 < OFFSET < 1 and the sensor response 0.0 ppm ± 0.2 ppm.

3. The VOC sensor SPAN response should be 1 ppm ±0.15 ppm (5% span of 3 ppm) with a Std. Dev. < 0.06 ppm (2% span of 3 ppm). If the sensor response error is greater than ±0.15 ppm then a GAIN adjustment is required. If the Std. Dev. is greater than 0.06 ppm then the sensor is outside acceptable range and may need relacement.

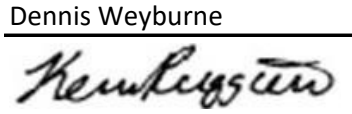
4. The adjusted span response NEW gain should be 0.2 < GAIN < 5.0 and the sensor response 1.0 ppm ± 0.15 ppm.

Comments:

Data collected from startup on 01/22/21 to end of initial monitoring period on 03/05/21 should be corrected by applying the following correction factor based upon the linear regression analysis derived from the above calibration resuts:

CORR = (DATA - (-0.18571))/1.423571

Technician: Dennis Weyburne

QA Review: 

MONTROSE AIR QUALITY SERVICES LLC

AEROQUAL AQS-1 FLOW and LEAK CHECK FORM

QC Checks are: X Scheduled _____ Unscheduled (If unscheduled, explain reason why in "Comments" Section)

Network:	City of Detroit (Amazon)	**Site:**	Upwind	**Date of Checks:**	3/12/2021
Operator:	Rob Bienenstein			**Time Off-Line:**	11:23 EST
AEROQUAL QS-1 S/N	1479			**Time On-Line:**	11:59 EST

Reference Standards:

Flow Standard:	Mesa 530+	**S/N#**	M153584	**Cert Date:**	5/8/2020

AS FOUND CHECK DATA

Checks are "as found" checks. Adjust profiler flow or resolve leak and complete "as left" section below if any acceptability limits are exceeded or if any adjustments to the monitor are to be made.

FLOW CHECK DATA:

AQS-1 Expected Flow Rate (A)	Reference Flow Rate (B)	Profiler Flow Rate Error LPM (A-B)	Profiler Flow Rate Error Δ% (A-B) ÷ A x 100
1.0 LPM	1.0 LPM	0.00	0.0%

Flow Check Procedure Link

Acceptability Limits: The expected AQS-1 Particle Profiler Flow Rate is 1.0 LPM ± 0.05 LPM (between 0.95 LPM and 1.05 LPM) or ≤±5%.

LEAK CHECK DATA:

PROFILER LEAKAGE RATE:	>30 seconds	(Must be >10 sec for 10 kPa pressure change)

Leak Check Procedure Link

AS LEFT CHECK DATA

FLOW CHECK DATA:

AQS-1 Expected Flow Rate (A)	Reference Flow Rate (B)	Profiler Flow Rate Error LPM	Profiler Flow Rate Error Δ%
1.0 LPM	LPM		

LEAK CHECK DATA:

PROFILER LEAKAGE RATE:	seconds	(Must be > 10 sec for 10 kPa pressure change)

Comments:

Technician: *Rob Bienenstein*

QA Review: Ken Kuyper

MONTROSE AIR QUALITY SERVICES LLC

AEROQUAL AQS-1 NO2 MODULE MULTI-POINT CALIBRATION FORM

Calibration Data on This Form Are For:			**Unadjusted Cal.**	X	**Adjusted Cal.**	
Network:	City of Detroit Amazon Proj	Site:	Downwind Monitor		Date:	3/11/21
Time Off-Line:	09:03 EST	Time On-Line:	11:25 EST		Technician:	Rob Bienenstein

Calibration Equipment Info.	Analyzer Model:	Aeroqual AQS-1	S/N:	1480	Last Cal:	12/17/20
	Calibrator Model No.:	Teledyne API	S/N:	69	Cal. Date:	12/29/20
	Zero Air Model No.:	Teledyne API	S/N:	3465	Cert Date:	n/a
	Gas Supplier:	Airgas	Cyl. Cert. Date:	1/26/21	Cyl. Pressure (PSIG)	2,000
	Gas Cylinder ID #:	D068357	Cyl. Conc. (PPM):	30.95	NO2 Module Flow Rate (mL)	60.0

Analyzer Calibration Settings	**"As Found" (Before Any Adjustment)**	**"As Left" (After Adjustment)**
OFFSET	0.000	.
GAIN	1.052	.

Calibrator Flow and Test Gas Data					**NO_2 Response** *Observed from AQS-1*		**ERROR**	
Calibrator Gas Channel		**Calibrator Air Channel**		**Known NO_2 Gas Conc. (PPB)**			**(PPB)** Observed - Known Conc.	**(Δ%)** (Observed Vs. Known Conc.)
Display Setting (SLPM)	**Actual Flow Rate** (SLPM)	Display Setting (SLPM)	**Actual Flow Rate** (SLPM)		Response (PPB)	Std. Dev. (PPB)		
0.0500	0.0501	3.8497	3.8698	395.6	355.9	0.4	-39.7	-10.0%
0.0145	0.0146	4.4855	4.5102	99.9	85.7	0.2	-14.2	-14.2%
0.0081	0.0082	4.9919	5.0123	50.6	39.2	0.4	-11.4	-22.5%
0.0048	0.0050	4.9952	5.0164	30.8	22.8	0.3	-8.0	-26.0%
OFF	OFF	5.0000	5.0150	0.0	-0.1	0.2	-0.1	n/a
Linear Regression Analysis:								
Slope:	0.908357	Intercept:	-4.106218		Corr. Coefficient (r):		0.999850	

NOTES:

1. The NO2 sensor zero response should be 0.0 ppb ± 0.2 ppb with a Std. Dev. < 0.2 ppb. If the sensor response error is greater than ± 0.2 ppb then an offset adjustment is required. If the Std. Dev. is greater than 0.2 ppb then the sensor is outside acceptable range and may need relacement.
2. The adjusted zero response NEW offset should be -1 < OFFSET < 1 and the sensor response 0.0 ppb ± 0.2 ppb.
3. The NO2 sensor SPAN response should be 400 ppb ± 20 ppb (5% span of 400 ppb) with a Std. Dev. < 8 ppb (2% span of 400 ppb). If the sensor response error is greater than ±20 ppb then a GAIN adjustment is required. If the Std. Dev. is greater than 8.0 ppb then the sensor is outside acceptable range and may need relacement.
4. The adjusted span response NEW gain should be 0.2 < GAIN < 5.0 and the sensor response 400 ppb ± 20 ppb.

Comments:

Data collected from startup on 01/22/21 to end of initial monitoring period on 03/04/21 should be corrected by applying the following correction factor based upon the linear regression analysis derived from the above calibration resuts:

CORR = (DATA - (-4.106218))/0.908357

Technician: Rob Beinenstein

QA Review: Ken Kuggsen

MONTROSE AIR QUALITY SERVICES LLC

AEROQUAL AQS-1 VOC HIGH RANGE MODULE VERIFICATION/CALIBRATION FORM

Network:	City of Detroit Amazon Proj	Site:	Downwind Monitor	Date:	3/12/21
Time Off-Line:	9:45 EST	Time On-Line:	10:24 EST	Technician:	Dennis Weyburne

Calibration Equipment Info.	Analyzer Model:	Aeroqual AQS-1	S/N:	1480	Last Cal:	1/22/21
	Calibrator Model No:	Teledyne API	S/N:	69	Cal. Date:	12/29/20
	Zero Air Model No:	Teledyne API	S/N:	3465	Cert Date:	n/a
	Gas Supplier:	GASCO #1-1	Cyl. Conc. (PPM):	0.99	Cyl. Pressure (PSIG)	400
	Gas Supplier:	GASCO #3-2	Cyl. Conc. (PPM):	3.10	Cyl. Pressure (PSIG)	450

VOC Sensor Module Calibration Settings	"As Found" (Before Any Adjustment)	"As Left" (After Adjustment)
OFFSET	0.000	
GAIN	2.210	

"AS FOUND" (UNADJUSTED) TEST DATA

Calibrator Flow and Test Gas Data					Observed VOC Response from AQS-1		Error (Δ%)
Calibrator Gas Channel		Calibrator Air Channel		Known VOC Input Gas Conc. (PPM)			
Display Setting (SLPM)	Actual Flow Rate (SLPM)	Display Setting (SLPM)	Actual Flow Rate (SLPM)		Response (PPM)	Std. Dev. (PPM)	
OFF	OFF	5.0000	5.0130	0.00	0.00	0.00	-
n/a	n/a	1.0000	n/a	0.99	1.48	0.00	49.5%
n/a	n/a	1.0000	n/a	3.10	4.52	0.00	45.8%

"AS LEFT" (ADJUSTED) TEST DATA

Calibrator Flow and Test Gas Data					Observed VOC Response from AQS-1		Error (Δ%)
Calibrator Gas Channel		Calibrator Air Channel		Known VOC Input Gas Conc. (PPM)			
Display Setting (SLPM)	Actual Flow Rate (SLPM)	Display Setting (SLPM)	Actual Flow Rate (SLPM)		Response (PPM)	Std. Dev. (PPM)	
OFF	OFF						-

NOTES:

1. The VOC sensor zero response should be 0.0 ppm ± 0.2 ppm with a Std. Dev. < 0.2 ppm. If the sensor response error is greater than ± 0.2 ppm then an offset adjustment is required. If the Std. Dev. is greater than 0.2 ppm then the sensor is outside acceptable range and may need relacement.

2. The adjusted zero response NEW offset should be -1 < OFFSET < 1 and the sensor response 0.0 ppm ± 0.2 ppm.

3. The VOC sensor SPAN response should be 1 ppm ±0.15 ppm (5% span of 3 ppm) with a Std. Dev. < 0.06 ppm (2% span of 3 ppm). If the sensor response error is greater than ±0.15 ppm then a GAIN adjustment is required. If the Std. Dev. is greater than 0.06 ppm then the sensor is outside acceptable range and may need relacement.

4. The adjusted span response NEW gain should be 0.2 < GAIN < 5.0 and the sensor response 1.0 ppm ± 0.15 ppm.

Comments:

Data collected from startup on 01/22/21 to end of initial monitoring period on 03/04/21 should be corrected by applying the following correction factor based upon the linear regression analysis derived from the above calibration resuts:

CORR = (DATA - (-0.011429))/1.508571

Technician: Dennis Weyburne

QA Review: Kenneth Leggett

MONTROSE AIR QUALITY SERVICES LLC

AEROQUAL AQS-1 FLOW and LEAK CHECK FORM

QC Checks are: X Scheduled _____ Unscheduled (If unscheduled, explain reason why in "Comments" Section)

Network:	City of Detroit (Amazon)	**Site:**	Downwind	**Date of Checks:**	3/12/2021
Operator:	Rob Bienenstein			**Time Off-Line:**	11:23 EST
AEROQUAL QS-1 S/N	1480			**Time On-Line:**	11:59 EST

Reference Standards:

Flow Standard:	Mesa 530+	**S/N#**	M153584	**Cert Date:**	5/8/2020

AS FOUND CHECK DATA

Checks are "as found" checks. Adjust profiler flow or resolve leak and complete "as left" section below if any acceptability limits are exceeded or if any adjustments to the monitor are to be made.

FLOW CHECK DATA:

AQS-1 Expected Flow Rate (A)	Reference Flow Rate (B)	Profiler Flow Rate Error LPM (A-B)	Profiler Flow Rate Error Δ% (A-B) ÷ A x 100
1.0 LPM	1.0 LPM	0.00	0.0%

Flow Check Procedure Link

Acceptability Limits: The expected AQS-1 Particle Profiler Flow Rate is 1.0 LPM ± 0.05 LPM (between 0.95 LPM and 1.05 LPM) or ≤±5%.

LEAK CHECK DATA:

PROFILER LEAKAGE RATE:	>30 seconds	(Must be >10 sec for 10 kPa pressure change)

Leak Check Procedure Link

AS LEFT CHECK DATA

FLOW CHECK DATA:

AQS-1 Expected Flow Rate (A)	Reference Flow Rate (B)	Profiler Flow Rate Error LPM	Profiler Flow Rate Error Δ%
1.0 LPM	LPM		

LEAK CHECK DATA:

PROFILER LEAKAGE RATE:	seconds	(Must be > 10 sec for 10 kPa pressure change)

Comments:

Technician: *Rob Bienenstein*

QA Review: Ken Kagen

MONTROSE AIR QUALITY SERVICES LLC

B: Calibration Certification Sheets

MesaLabs

NVLAP Lab Code 200661-0
Calibration

Calibration Certificate

CertificateNo.	388679	**Sold To:**	Montrose Air Quality Services, LLC
Product	200-530+ Medium Defender 530+ Medium Flow		45 US Hwy 46 East, Suite 601
Serial No.	153584		Pine Brook, NJ 07058
Cal. Date	08-May-2020		US

All calibrations are performed at Mesa Laboratories, Inc., 10 Park Place, Butler, NJ, 07405, an ISO 17025:2005 accredited laboratory through NVLAP of NIST. This report shall not be reproduced except in full without the written approval of the laboratory. Results only relate to the items calibrated. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

As Received Calibration Data

Technician	Lilianna Malinowska	**Lab. Pressure**	747 mmHg
		Lab. Temperature	22.1 °C

Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Received
4807.28 sccm	4794.46 sccm	0.27%	1.00%	In Tolerance
1088.33 sccm	1089.94 sccm	-0.15%	1.00%	In Tolerance
289.44 sccm	290.04 sccm	-0.21%	1.00%	In tolerance
21.5 °C	21.9 °C	-	± 0.8°C	In Tolerance
747 mmHg	746 mmHg	-	± 3.5 mmHg	In Tolerance

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML-800-24	100439	30-Mar-2020	30-Mar-2021
Percision Thermometer	305460	08-Oct-2019	07-Oct-2020
Precision Barometer	2981392	19-Jul-2019	18-Jul-2020

MesaLabs

NVLAP Lab Code 200661-0
Calibration

As Shipped Calibration Data

Certificate No	388679	**Lab. Pressure**	747 mmHg
Technician	Lilianna Malinowska	**Lab. Temperature**	22.1 °C

Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Shipped
4790.5 sccm	4802.74 sccm	-0.25%	1.00%	In Tolerance
1089.45 sccm	1091.86 sccm	-0.22%	1.00%	In Tolerance
290.28 sccm	290.92 sccm	-0.22%	1.00%	In Tolerance
22.8 °C	22.8 °C	-	± 0.8°C	In Tolerance
747 mmHg	747 mmHg	-	± 3.5 mmHg	In Tolerance

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML-800-24	117991	11-Feb-2020	10-Feb-2021
Percision Thermometer	305460	08-Oct-2019	07-Oct-2020
Precision Barometer	2981392	19-Jul-2019	18-Jul-2020

Calibration Notes

The expanded uncertainty of flow, temperature, and pressure measurements all have a coverage factor of k = 2 for a confidence interval of approximately 95%.

Flow testing is in accordance with our test number PR18-13 with an expanded uncertainty of 0.18% using high-purity nitrogen or filtered laboratory air. Flow readings in sccm are performed at STP of 21.1°C and 760 mmHg.

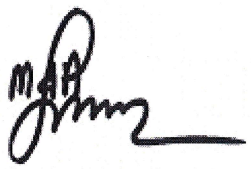
Pressure testing is in accordance with our test number PR18-11 with an expanded uncertainty of 0.16 mmHg.

Temperature testing is in accordance with our test number PR18-12 with an expanded uncertainty of 0.04 °C.

Traceability to the International System of Units (SI) is verified by accreditation to ISO/IEC 17025 by NVLAP under NVLAP Code 200661-0.

Technician Notes:

By:



Mohammed Aziz
Director of Engineering
Mesa Laboratories, Inc., Butler, NJ

TAPI T700 MFC CALIBRATION

PPLICATION INFORMATION:

Calibrator Model/S/N:	TAPI T700; SN 69	NETWORK:	Marathon Detroit PAMS	SITE:	MTMS
Calibration Site:	MTMS Site	Test Date:	12/29/2020		
Barometric Pressure (Pa, in mmHg):	740.0	Calibrated by:	Dennis Weyburne		
Flow Standard Model:	Mesa Labs Defender 530+	Air Temp. (Ta, in deg. C):	27.4	(=deg. K):	300.6
Flow Standard Base S/N:	Not Applicable	Flow Cell Model No:	530+ High Flow		
Certification Date:	Not Applicable	Flow Cell S/N:	153452		
		Flow Cell Certification Date:	5/8/2020		

Check One: **X** Air Channel _____ Gas Channel

(X) MFC Drive Voltage (mVDC)	Flow Meter Readings (5 sets of 10 averaged flows) F_1 (SLPM)	F_2 (SLPM)	F_3 (SLPM)	F_4 (SLPM)	F_5 (SLPM)	Average Flow (F1...F5) (SLPM)	STD DEV F1...F5 (in *sccm*)	Flow Rate ***From Previous Cal*** (SLPM)	Δ% ("New Cal Flow" Vs "Prev. Cal Flow")
5000	10.6340	10.6400	10.6380	10.6400	10.6350	10.637	2.8	10.657	0.2%
4750	10.1050	10.1020	10.0960	10.0950	10.0870	10.097	7.0	10.101	0.0%
4500	9.5920	9.5815	9.5763	9.5981	9.5759	9.585	9.9	9.573	-0.1%
4250	8.9901	8.9977	8.9954	8.9918	8.9909	8.993	3.2	9.030	0.4%
4000	8.4595	8.4595	8.4599	8.4604	8.4516	8.458	3.7	8.478	0.2%
3750	7.9298	7.9289	7.9244	7.9223	7.9254	7.926	3.1	7.955	0.4%
3500	7.3934	7.3891	7.3861	7.3909	7.3974	7.391	4.3	7.406	0.2%
3250	6.8480	6.8463	6.8474	6.8470	6.8487	6.847	0.9	6.872	0.4%
3000	6.3225	6.3215	6.3208	6.3174	6.3198	6.320	1.9	6.332	0.2%
2750	5.7859	5.7866	5.7889	5.7868	5.7835	5.786	1.9	5.800	0.2%
2500	5.2548	5.2542	5.2557	5.2541	5.2538	5.255	0.8	5.264	0.2%
2250	4.7312	4.7316	4.7310	4.7321	4.7311	4.731	0.5	4.738	0.1%
2000	4.2061	4.2039	4.2018	4.1994	4.1999	4.202	2.8	4.203	0.0%
1750	3.6657	3.6700	3.6710	3.6695	3.6697	3.669	2.0	3.673	0.1%
1500	3.1310	3.1318	3.1317	3.1316	3.1320	3.132	0.4	3.140	0.3%
1250	2.6006	2.6011	2.6014	2.6026	2.6023	2.602	0.8	2.609	0.3%
1000	2.0700	2.0706	2.0695	2.0687	2.0696	2.070	0.7	2.075	0.2%
750	1.5436	1.5450	1.5450	1.5466	1.5465	1.545	1.2	1.548	0.2%
500	1.0150	1.0150	1.0150	1.0150	1.0150	1.015	0.0	1.015	0.0%
250	0.48082	0.48108	0.48340	0.48327	0.48351	0.482	1.3	0.483	0.0%
SLOPE:	**0.002135607**		**INTERCEPT:**	**-0.068705011**	**CORRELATION COEFF (r):**			**0.999983645**	

Comments:

echnician: Dennis Weyburne 12/29/2020

(signature) Date

TAPI T700 MFC CALIBRATION

CALIBRATOR APPLICATION INFORMATION:

Calibrator Model/S/N:	TAPI T700; SN 69	NETWORK:	Marathon Detroit PAMS	SITE:	MTMS
Calibration Site:	MTMS Site	Test Date:	12/29/2020		
Barometric Pressure (Pa, in mmHg):	731.0	Calibrated by:	Dennis Weyburne		
Flow Standard Model:	Mesa Labs Defender 530+	Air Temp. (Ta, in deg. C):24.4	25.0	(=deg. K):	298.2
Flow Standard Base S/N:	Not Applicable	Flow Cell Model No:	530+ Low Flow		
Base Certification Date:	Not Applicable	Flow Cell S/N:	153435		
		Flow Cell Certification Date:	5/8/2020		

Check One: _____ Air Channel **X** Gas Channel

(X) MFC Drive Voltage (mVDC)	Flow Meter Readings (5 sets of 10 averaged flows)					Average Flow (F1...F5) (SLPM)	STD DEV F1...F5 (in *sccm*)	Flow Rate ***From Previous Cal*** (SLPM)	Δ% ("New Cal Flow" Vs "Prev. Cal Flow")
	F_1 (SLPM)	F_2 (SLPM)	F_3 (SLPM)	F_4 (SLPM)	F_5 (SLPM)				
5000	0.05390	0.05399	0.05399	0.05399	0.05399	0.0540	0.04	0.0540	0.0%
4750	0.05139	0.05138	0.05136	0.05140	0.05141	0.0514	0.02	0.0514	0.0%
4500	0.04866	0.04868	0.04867	0.04870	0.04866	0.0487	0.02	0.0487	0.1%
4250	0.04596	0.04597	0.04598	0.04599	0.04599	0.0460	0.01	0.0459	-0.1%
4000	0.04325	0.04327	0.04327	0.04329	0.04330	0.0433	0.02	0.0432	-0.1%
3750	0.04059	0.04056	0.04058	0.04057	0.04051	0.0406	0.03	0.0406	0.1%
3500	0.03791	0.03789	0.03790	0.03790	0.03791	0.0379	0.01	0.0380	0.3%
3250	0.03522	0.03524	0.03524	0.03524	0.03524	0.0352	0.01	0.0353	0.3%
3000	0.03259	0.03258	0.03258	0.03259	0.03259	0.0326	0.01	0.0327	0.2%
2750	0.02990	0.02991	0.02992	0.02991	0.02993	0.0299	0.01	0.0300	0.3%
2500	0.02724	0.02724	0.02725	0.02724	0.02724	0.0272	0.00	0.0274	0.5%
2250	0.02462	0.02462	0.02463	0.02454	0.02460	0.0246	0.04	0.0247	0.3%
2000	0.02190	0.02188	0.02189	0.02190	0.02191	0.0219	0.01	0.0220	0.3%
1750	0.01917	0.01918	0.01918	0.01918	0.01918	0.0192	0.00	0.0193	0.4%
1500	0.01644	0.01644	0.01643	0.01641	0.01643	0.0164	0.01	0.0165	0.6%
1250	0.01370	0.01369	0.01369	0.01369	0.01369	0.0137	0.00	0.0138	0.6%
1000	0.01098	0.01096	0.01097	0.01091	0.01092	0.0109	0.03	0.0110	0.5%
750	0.00819	0.00818	0.00819	0.00818	0.00819	0.0082	0.01	0.0082	0.5%
500	0.00536	0.00533	0.00535	0.00535	0.00538	0.0054	0.02	0.0054	1.0%
250	0.00250	0.00250	0.00250	0.00250	0.00250	0.0025	0.00	0.0025	0.0%
SLOPE: 0.000011			**INTERCEPT: 0.0002130**			**CORRELATION COEFF (r): 0.999980**			

Comments:

Technician: Dennis Weyburne 12/29/20

(signature) Date

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
12722 S. Wentworth Ave.
Chicago, IL 60628
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: TRACEABILITY STANDARD

Part Number:	X02NI99T33W0004	Reference Number:	54-402006473-1
Cylinder Number:	D068357	Cylinder Volume:	32.0 CF
Laboratory:	124 - Chicago (SAP) - IL	Cylinder Pressure:	2218 PSIG
		Valve Outlet:	660
		Certification Date:	Jan 26, 2021

Expiration Date: Jan 26, 2024

This cylinder has been analytically certified as directly traceable to NIST with a total analytical uncertainty as stated below with a confidence level of 95%, in accordance with Airgas ISO procedures. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

Do Not Use This Cylinder Below 100 psig.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Total Relative Uncertainty
NITROGEN DIOXIDE	30.00 PPM	30.95 PPM	+/- 1% NIST Traceable
NITROGEN	Balance		

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	401438584104	EB0120492	48.18 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.8%	Nov 01, 2022

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
MKS FTIR NO2 017707558	FTIR	Jan 07, 2021

Triad Data Available Upon Request

PERMANENT NOTES: OXYGEN ADDED TO MAINTAIN STABILITY

Approved for Release

GASCO AFFILIATES, LLC.

320 Scarlet Blvd.
Oldsmar, FL 34677
(800) 910-0051
fax: (866) 755-8920
www.gascogas.com

CERTIFICATE OF ANALYSIS

Date: January 13, 2021
Order Number: 1199610
Lot Number: 304-402007938-1

Customer: Cal Gas Direct Inc.

Use Before: 01/13/2025

Component	Requested Concentration	Analytical Result (+/- 2%)
Isobutylene	1 PPM	0.99 PPM
Air	Balance	Balance

Cylinder Size: 1.2 Cu. Ft.
Contents: 34 Liter

Valve: CGA 600
Pressure: 500 psig

Product composition verified by direct comparison to calibration standards traceable to N.I.S.T. weights and/ or N.I.S.T. Gas Mixture reference materials.

Analyst:

Afton Eakins

Afton Eakins

GASCO

GASCO AFFILIATES, LLC.

320 Scarlet Blvd.
Oldsmar, FL 34677
(800) 910-0051
fax: (866) 755-8920
www.gascogas.com

CERTIFICATE OF ANALYSIS

Date: January 13, 2021
Order Number: 1199610
Lot Number: 304-402007939-1

Customer: Cal Gas Direct Inc.

Use Before: 01/13/2025

Component	Requested Concentration	Analytical Result (+/- 2%)
Isobutylene	3 PPM	3.1 PPM
Air	Balance	Balance

Cylinder Size: 1.2 Cu. Ft.
Contents: 34 Liter

Valve: CGA 600
Pressure: 500 psig

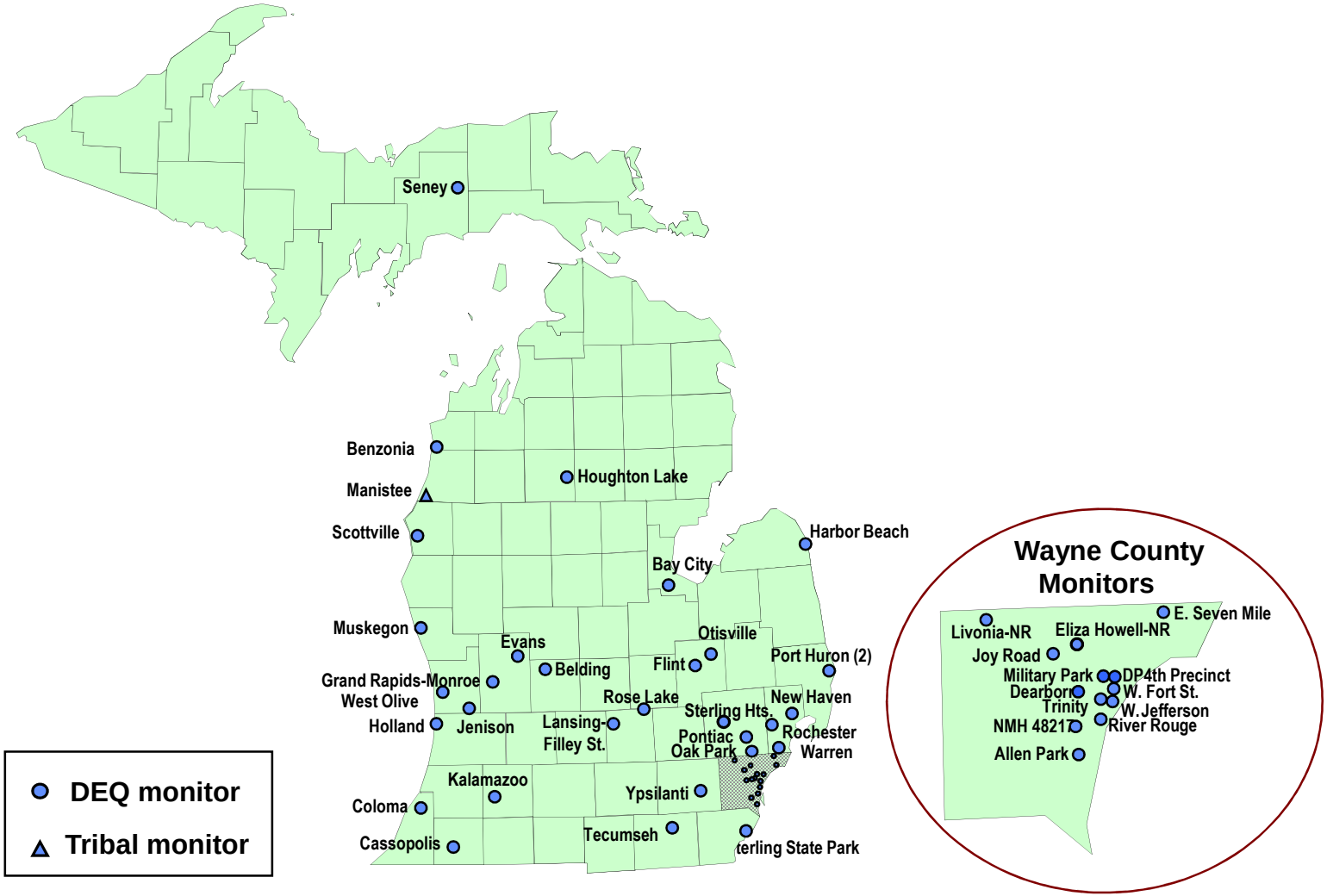
Product composition verified by direct comparison to calibration standards traceable to N.I.S.T. weights and/ or N.I.S.T. Gas Mixture reference materials.

Analyst:

Ofton Eakins
Ofton Eakins

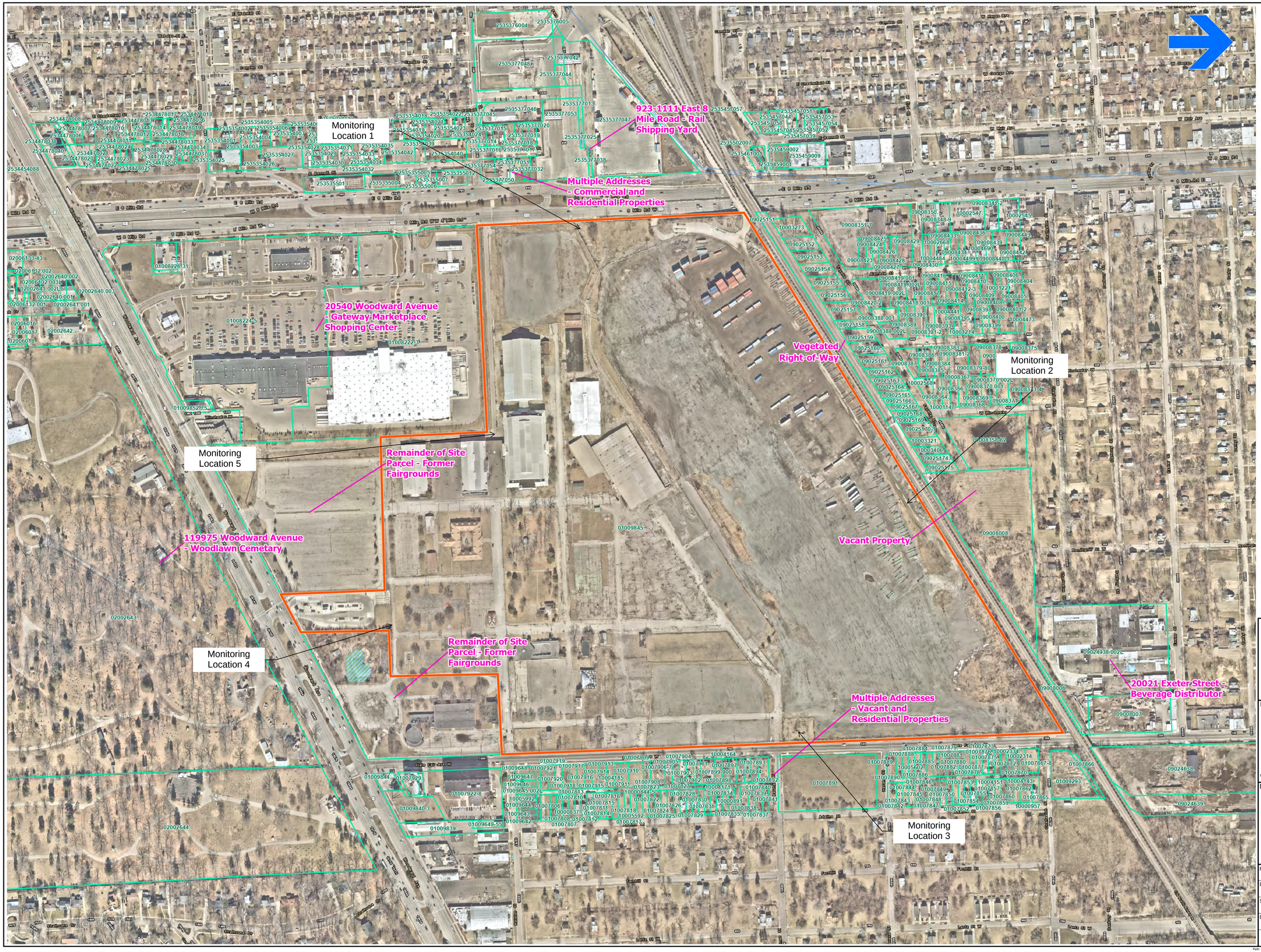
C: State Monitor Map

Michigan Air Monitor Network



Updated June 2019

D: Hillwood Monitor Map



N

W E

S

Legend

- Inferred Groundwater Flow Direction
- Site Boundary
- Parcel Boundary
- Rail Lines
- Electricity Transmission Lines
- NWI Wetland

Notes:
1. Imagery provided through Langan's subscription to Nearmap.com. Flown on 03/07/20.
2. All locations of Site reconnaissance observations are approximate.
3. Streams provided by the National Hydrologic Dataset.
4. Wetlands provided by the National Wetlands Inventory.
5. Floodplains provided by the Federal Emergency Management Agency.
6. Parcel data provided by Wayne and Oakland counties.
7. Utility data provided through Langan's subscription to Rextag.
8. Historical Site features are taken from various Sanborn Maps, provided by Environmental Data Resources, Inc.

0 200 400

SCALE IN FEET

LANGAN

Langan, MI Inc.

6000 Lombardo Center, Suite 210
Cleveland, OH 44131

T: 216.328.3300 F: 216.328.3301
www.langan.com

Project

PROJECT PANDA

DETROIT

WAYNE COUNTY MI

Drawing Title

NEARBY PROPERTIES MAP

Project No. 250095201	Figure 3
Date 6/9/2020	
Scale 1" = 200 feet	
Drawn By BLA	

Path: C:\Users\bbaich\Desktop\GIS_Projects\PIT\250095201\250095201.aprx Date: 6/9/2020 User: baich Time: 4:24 PM