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

January 25, 2024
NTH Project No. 74-200457-07

RE: Ambient Air Quality Monitoring – 3rd Post-Construction Phase Monitoring Report
November 3, 2023 – November 12, 2023
Amazon Distribution Center
Detroit, Michigan

Dear Mr. Hassanien:

The City of Detroit (City) completed a property transaction for a new Amazon Distribution Center constructed on a 137-acre parcel at the former State Fairgrounds property located at 1120 W. State Fair Avenue in Detroit, Michigan. The City contracted NTH Consultants, Ltd. (NTH) to conduct ambient air quality monitoring at the proposed Amazon Distribution Center site (Site).

The monitoring program consists of siting localized monitors at upwind and downwind locations to measure concentrations of particulate matter (PM_{10} and $PM_{2.5}$), nitrogen oxide (NO_x, as NO_2), and volatile organic compounds (VOCs), and to evaluate air quality from the Site during three (3) distinct phases:

- Pre-development baseline period
- Construction phase
- Post-construction facility operation

PRE-DEVELOPMENT BASELINE PERIOD (COMPLETED)

NTH's Baseline Monitoring Report, dated May 7, 2021, presented ambient concentrations prior to significant construction activities at the Site. The baseline period included monitoring data collected by Montrose Air Quality Services, LLC (MAQS), from January 22, 2021 through March 5, 2021, and was supplemented with monitoring data collected by the Site developer's consultant (Langan) from November 13, 2020 through December 2, 2020. The purpose of the Baseline Monitoring Report was to establish an ambient background concentration for each pollutant and use that concentration as a baseline whereas concentrations measured above these levels during construction would trigger the contractor to employ additional mitigation efforts in order to reduce pollutant concentrations.

The concentrations in Table 1 were published in the Baseline Monitoring Report and represent pollutant concentrations prior to the start of significant construction activities. Each concentration is also compared to the applicable National Ambient Air Quality Standards (NAAQS) protective of public health and the environment.

Table 1 – Site-Specific Baseline Concentrations from Pre-Development Baseline Period

Pollutant	Operator	Monitor [1]	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	MAQS	Unit 1480	52	1/30/2021	100	ppb
VOC	Langan	ML1	0.11	11/14/2020	NA[2]	ppm

[1] Baseline Monitoring included two (2) Site monitors operated by MAQS for NTH from January 22 through March 5, 2021, and identified as Unit 1479 ("upwind", located to the southwest of the Site) and Unit 1480 ("downwind", located to the northeast of the Site), as well as 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. For the post-construction phase, Unit 1479 was replaced by Unit 1838, and Unit 1480 was replaced by Unit 1839, as discussed in the 1st Post-Construction Phase Monitoring Report dated August 10, 2023.

[2] 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)

CONSTRUCTION PHASE MONITORING (COMPLETED)

NTH's six (6) Construction Phase Monitoring Reports represented ambient concentrations during construction. The reports included monitoring data collected by MAQS and supplemented with monitoring data collected from Michigan Department of Environment, Great Lakes, and Energy (EGLE) monitoring sites. The goal of construction phase monitoring was to collect concentration data of target air pollutants during construction activities consisting of paving, concrete work, steel construction, roofing, interior buildout, electrical work, and plumbing. Construction was completed and the facility was turned over to Amazon in April 2023.

None of the six (6) Construction Phase Monitoring Reports indicated a threat to public health or the environment. PM_{10}, $PM_{2.5}$, NO_2, and VOCs results were analyzed and compared to baseline concentrations and NAAQS. None of the analyzed parameters exceeded NAAQS during any of the Construction Phase Monitoring events. Particulate matter did exceed baseline concentrations during two (2) of the Construction Phase Monitoring events but was determined to be due to wildfires in the western United States and Canada and sustained local elevated wind speeds.

POST-CONSTRUCTION PHASE MONITORING

The City anticipates that the operation of Amazon Distribution Center may result in direct and fugitive air emissions. Sources of NO_x, VOC, PM_{10} and $PM_{2.5}$ emissions related to operation may include vehicular traffic (employee vehicles or delivery trucks) or the associated fugitive dust.

The data collected during the post-construction phase air monitoring events completed to date were not indicative of a threat to public health or unusual concentrations of the analyzed parameters.

The enclosed report presents the results of the 3rd post-construction phase monitoring event that was conducted for the period of November 3 through November 12, 2023 using two Site monitors identified as Unit 1838 and Unit 1839, which operated simultaneously for ten (10) days. This report describes the monitoring program, objectives, Site overview, monitor locations and equipment, monitoring results, and an overview of data quality assurance. The goal of post-construction phase monitoring is to collect concentration data of target air pollutants during regular operation of the

facility to assess whether additional mitigation efforts are warranted to reduce pollutant concentrations to below baseline levels.

The monitors were located on opposite sides of the Site and both stations are configured to collect pollutant and meteorological data. An upwind monitor measures pollutant concentrations that have not blown across the Site and should be free from potential impacts of on-site development activity and is representative of local area background concentrations.

The report includes monitoring data from two (2) available sources, including:

- Two (2) Site monitors identified as Unit 1838 ("upwind", located to the southwest) and Unit 1839 ("downwind", located to the northeast) and operated by MAQS for NTH during the monitoring period of November 3 through November 12, 2023.

- Nearby off-site monitors operated by Michigan Department of Environment, Great Lakes, and Energy (EGLE) during the MAQS monitoring period.

As part of this air monitoring program, MAQS collected air monitoring data over this period for NO_x (as NO_2), PM_{10} and $PM_{2.5}$, and VOCs at two (2) monitors, along with wind directions and speeds (vectors).

RESULTS OF POST-CONSTRUCTION PHASE MONITORING

As presented below and in the enclosed report, for monitoring conducted November 3 through November 12, 2023, concentrations of PM_{10}, $PM_{2.5}$, NO_x (as NO_2), and VOC from the on-site monitors are less than their baseline concentrations and NAAQS, as summarized in Table 2. Monitored concentrations of PM_{10}, $PM_{2.5}$ are also less than the 24-hour NAAQS of 150 µg/m^3 for PM_{10}, 35 µg/m^3 for $PM_{2.5}$[1].

For this post-construction phase monitoring event, NTH's objective was to obtain at least seven (7) days of air quality data at the site. Unit 1838 and 1839 both recorded valid PM_{10} and $PM_{2.5}$ daily averages for ten (10) days.

Table 2 – Summary of Air Monitoring from November 3 through November 12, 2023

Pollutant	Maximum Concentration	Monitor	Date of Maximum Concentration	Baseline Concentration	NAAQS	Units
PM_{10}	9.3	Unit 1839	11/6/2023	47	150	µg/m^3
$PM_{2.5}$	7.6	Unit 1839	11/5/2023	22	35	µg/m^3
NO_2	33.1	Unit 1839	11/4/23	52	100	ppb
VOC	0.03	Unit 1838 Unit 1839	11/12/2023 11/10/2023	0.11	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)

In summary, the data collected during this air monitoring event are not indicative of a threat to public

health or unusual 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.

DocuSigned by:
Christopher O. Occhipinti
F72D85E12731430...

Christopher O. Occhipinti
Senior Project Professional

DocuSigned by:
Bhushan C. Modi
2B348C09314C474...

Bhushan C. Modi
Project Manager

COO/BCM/mam

Attachments

3rd POST-CONSTRUCTION PHASE MONITORING REPORT
NOVEMBER 3, 2023 – NOVEMBER 12, 2023
AMAZON FULFILLMENT CENTER (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
45 U.S. 46, Suite 601
Pine Brook, NJ 07058

Document Number:	**027AA-020300-RT-86**
NTH Project Number:	**74-200457-03**
Monitoring Period:	**November 3, 2023 through November 12, 2023**
Submittal Date:	**December 1, 2023**

Table of Contents

Project Overview

Background

NTH Consultants, Ltd. (NTH) has retained Montrose Air Quality Services, LLC (Montrose) to conduct an ambient air quality monitoring program in support of an Amazon Fulfillment Center construction project located on a portion of the former Michigan State Fairgrounds in Detroit, Michigan. The monitoring program collects, validates and reports continuously-measured, hourly-averaged data for a mixture of pollutants that may originate from construction activities at the Site, as well as emissions from vehicular traffic, diesel engines, surface attrition, other sources of dust emissions, and future Site operations.

The monitoring program is conducted in accordance with the schedule, monitoring protocols and procedures contained in approved Monitoring Test Plans. The monitoring program consists of several phases, starting with a pre-construction monitoring period conducted to characterize and establish baseline background concentrations at the Site. Following completion of the Pre-construction monitoring, six (6) one-week monitoring periods were conducted during the construction phase of the project. Construction Phase monitoring commenced in April 2021 and concluded in October, 2021.

The monitoring program will conclude by conducting a total of four (4) one-week Post-Construction monitoring periods. Post-Construction monitoring will be conducted at approximately 3-month intervals.

A summary of the monitoring program and associated deliverables completed to date follows:

- A Pre-Construction "Baseline" Report, dated May 7, 2021 presents data collected from two on-site monitors operated by Montrose supplemented with data collected from selected off-site monitors operated by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) for the period commencing January 22, 2021 and concluding March 5, 2021. The pre-construction monitoring report also incorporated monitoring data collected by the land developer for the period November 13, 2020 through December 2, 2020.
- The first Construction Phase Report, dated June 8, 2021 presents monitoring data collected from two on-site monitors operated by Montrose for the period commencing April 14 and concluding April 21, 2021.
- The second Construction Phase Monitoring Report presents data collected from two on-site monitors operated by Montrose supplemented with data collected from selected off-site monitors operated by the EGLE for the monitoring period commencing on June 20 and concluding on June 27, 2021.
- The third Construction Phase Monitoring Report presents data collected from two on-site monitors operated by Montrose supplemented with data collected from selected off-site monitors operated by EGLE for the monitoring period commencing on July 18 and concluding on July 24, 2021.
- The fourth Construction Phase Monitoring Report presents data collected from two on-site monitors operated by Montrose supplemented with data collected from selected off-site monitors operated by EGLE for the monitoring period commencing on August 15 and concluding on August 21, 2021.
- The fifth Construction Phase Monitoring Report presents data collected from two on-site monitors operated by Montrose supplemented with data collected from selected off-site monitors operated by EGLE for the monitoring period commencing on September 19 and concluding on September 28, 2021.
- The sixth Construction Phase Monitoring Report presents data collected from two on-site monitors operated by Montrose supplemented with data collected from selected off-site monitors operated by EGLE for the monitoring period commencing on October 13 and concluding on October 24, 2021.

- The first Post-Construction Phase Monitoring Report presents data collected from two on-site monitors operated by Montrose supplemented with data collected from selected off-site monitors operated by the EGLE for the monitoring period commencing on May 13 and concluding on May 29, 2023.
- The second Post-Construction Phase Monitoring Report presents data collected from two on-site monitors operated by Montrose supplemented with data collected from selected off-site monitors operated by the EGLE for the monitoring period commencing on August 22 and concluding on August 28, 2023.
- This third Post-Construction Phase Monitoring Report presents data collected from two on-site monitors operated by Montrose supplemented with data collected from selected off-site monitors operated by the EGLE for the monitoring period commencing on November 3 and concluding on November 12, 2023.

Objectives

The specific objectives of the Post-Construction monitoring effort are defined in Section 1.1 of the approved Post-Construction Ambient Air Test Plan for the Amazon Fulfillment Center at the Former Michigan State Fairgrounds dated January 31, 2023. These objectives are to measure ambient concentrations of the following parameters at two (2) monitoring locations at the Site:

- Particulate Matter (PM_{10}) of diameter equal to or less than 10 microns
- Particulate Matter ($PM_{2.5}$) of diameter equal to or less than 2.5 microns
- Nitrogen Dioxide (NO_2)
- Volatile Organic Compounds (VOC)
- Meteorological parameters (i.e., wind speed, wind direction, temperature, relative humidity, and barometric pressure)

To accomplish these objectives, two air quality and meteorological monitors were deployed at the Site to concurrently collect continuous measurements for the parameters listed above. The Unit 1838 monitor was situated "upwind", located to the southwest (latitude 42.440184º, longitude -83.119514º) and Unit 1839 was situated "downwind", located to the northeast (latitude 42.443536º, longitude -83.111440º), as presented in Figure 1-A. Continuous measurement data collected from each monitor were reduced and reported as hourly block-averaged values.

Potential Sources

Sources of NO_2, VOC, PM_{10} and $PM_{2.5}$ emissions related to operation may include vehicular traffic and associated fugitive dust.

Operational Staff and Contacts

Facility Information

Monitoring Location: Amazon Fulfillment Center
Former Michigan State Fairgrounds
20110 Woodward Avenue
Detroit, MI 48203

Monitoring Program Coordinator

NTH Consultants, Ltd.
3300 Eagle Run Drive NE, Suite 202
Grand Rapids, MI 49525

Project Contacts: Mr. Chris Occhipinti
Role: Project Professional
Company: NTH Consultants, Ltd.
Telephone: 616-951-4774
Email: cocchipinti@nthconsultants.com

Monitoring Team Contact Information

Testing Firm: Montrose Air Quality Services, LLC (Montrose)

Contact: David Cummings
Title: District Manager
Telephone: 201-213-2913
Email: dcummings@montrose-env.com

Contact: Kevin Ruggiero
Title: Sr. Project Manager
Telephone: 973-417-6487
Email: kruggiero@montrose-env.com

Contact: Jeffrey Peitzsch
Title: Shop Coordinator
Telephone: 313-213-4816
Email: jbpeitzsch@montrose-env.com

Contact: Linda Quigley
Title: Senior Reporting QC Specialist
Telephone: 973-575-2555 (Ext. 12707)
Email: lquigley@montrose-env.com

Site Overview

The Site air quality monitoring was performed at the newly constructed Amazon Fulfillment Center situated on a portion of the former Michigan State Fairgrounds property located at 20110 Woodward Avenue in Detroit, MI. This area was purchased by Hillwood Development Company, LLC (Hillwood) who demolished the existing structures onsite and constructed a large warehouse occupied by the Amazon Fulfillment Center. The locations of the two (2) on-site monitors are identified in Figure 1-A below.

Figure 1-A – Monitor Locations at the Amazon Fulfillment Center (Former Michigan State Fairgrounds) Property

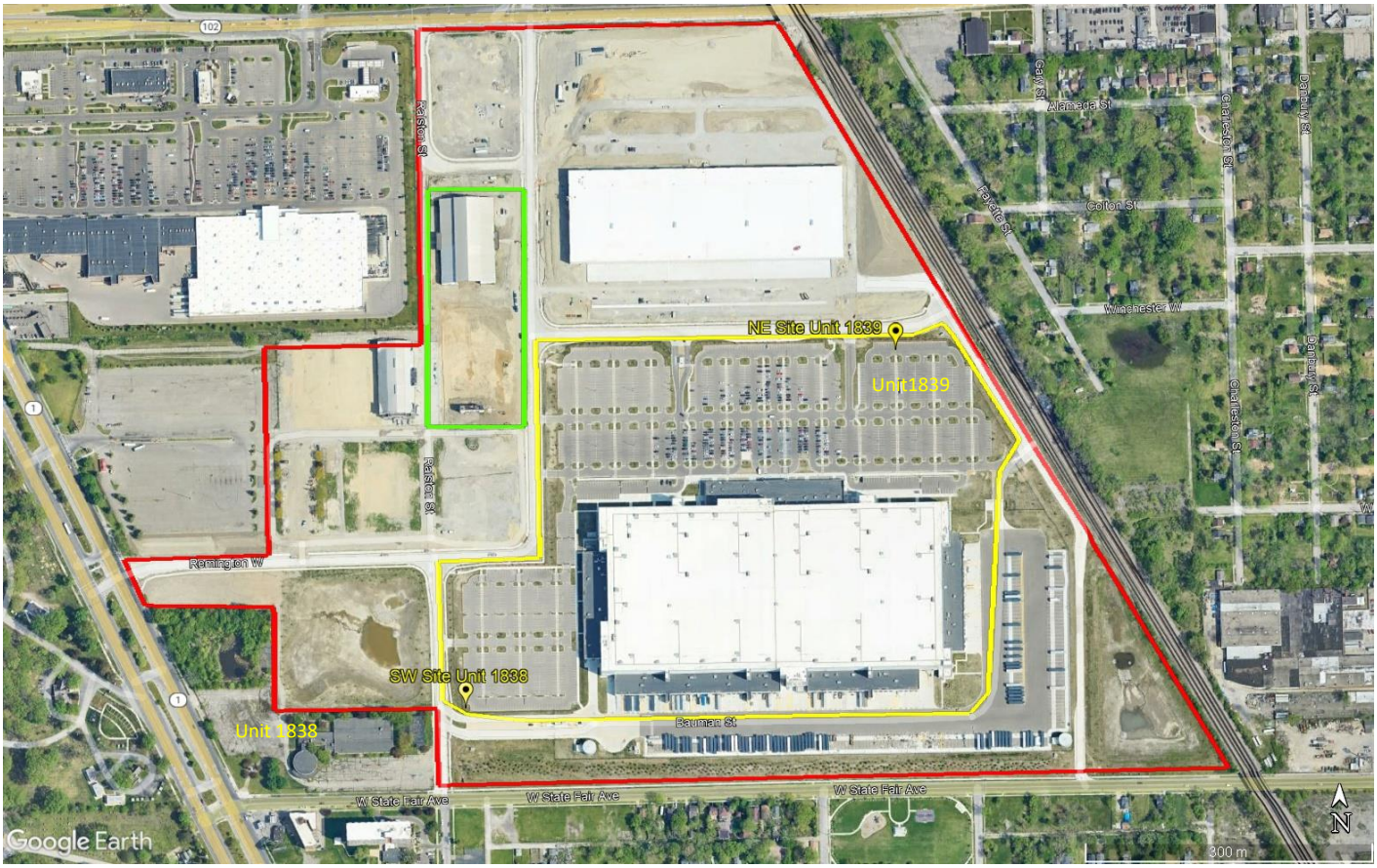
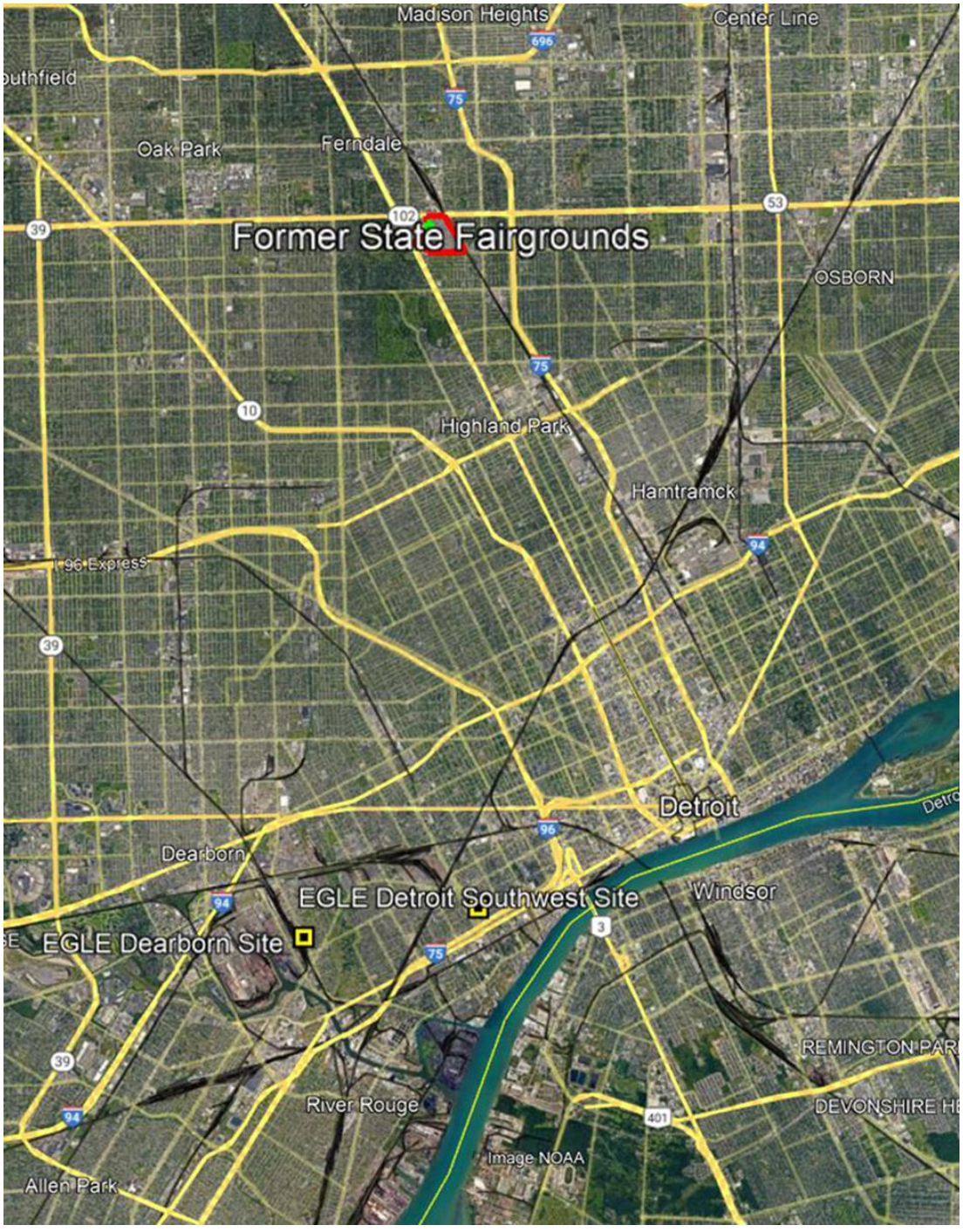


Figure 1-B is an aerial view of the two monitoring site locations at the Amazon Fulfillment Center (Former Michigan State Fairgrounds) property and two nearby air monitoring stations maintained by the Michigan Department of Environment, Great Lakes, and Energy (EGLE). Monitoring data available from the two nearby EGLE monitoring stations are intercompared in this report with corresponding monitoring data reported from the two monitors operated by Montrose at the former Michigan State Fairgrounds property.

Figure 1-B – Monitor Locations at the Amazon Fulfillment Center (Former Michigan State Fairgrounds) Property and Nearby MI EGLE Monitoring Stations



Monitoring Equipment

Air monitoring at the Amazon Fulfillment Center (former Michigan State Fairgrounds) was performed using two Aeroqual Model AQS-1 Urban Air Quality Monitors. The AQS-1 monitors continuously sample for pollutant parameters by actively pulling in ambient air via a pump and passing the sample air stream over the surface of each sensor. Each AQS-1 monitor used in this project is powered by deep-cycle batteries charged by solar photovoltaic panels. The measurement data are acquired and processed by an inboard, microprocessor-based computer and values are stored in non-volatile, electronic memory. An inboard integrated wireless data modem transmits the data via cellular service to a secure, cloud-based data platform. 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

Measurement of particulate matter (PM_{10} and $PM_{2.5}$) is accomplished using the physical principle of light scattering. As the sample air stream is drawn through a detector module, each single particle in the air stream 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, where each pulse is classified in an electronic register of 32 different size channels.

A separate electrochemical sensor measures concentrations of NO_2 via oxidation or reduction reactions in an electrochemical sensor. These reactions generate a positive or negative current flow through an electronic detector circuit. The electrochemical sensor is made up of a working counter and reference electrode. All of these components are situated inside of a sensor housing along with a liquid electrolyte that is specific to the compound of interest, i.e., NO_2.

A Photoionization Detector (PID) sensor is used for detection and measurement of VOC. The PID 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 ions produced by the PID generate an electrical current that is measured as the output of the detector.

The continuous monitoring equipment utilized in this project were operated and maintained in accordance with the procedures and quality control elements contained in the Post-Construction Ambient Air Test Plan for the Amazon Fulfillment Center at the Former Michigan State Fairgrounds dated January 31, 2023.

Discussion of Results

The results of PM_{10}, $PM_{2.5}$, NO_2, and VOC monitoring data are presented in Figures 3 through 6 in this report. These figures also include data for the same time period reported from nearby air monitoring stations maintained by the Michigan Department of Environment, Great Lakes, and Energy (EGLE). The EGLE data contained in this report are from monitors that are routinely subjected to calibration and maintenance. It should be noted that, as of the date of this report, the EGLE data have not yet been processed through

EGLE final quality assurance procedures. The monitor locations for EGLE Sites are depicted in Figure 1-B and can also be found on the map provided in Appendix C (*State Monitor Map*).

The Clean Air Act requires EPA to establish National Ambient Air Quality Standards (NAAQS) for certain air pollutants considered harmful to public health and the environment. Air pollutants for which NAAQS are established include NO_2, $PM_{2.5}$ and PM_{10}. 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.

The graphed data shown in Figures 3 through 5 present measured concentrations for these pollutants collected during the monitoring period relative to the Baseline concentration and NAAQS Standard.

The NAAQS for NO_2, $PM_{2.5}$, and PM_{10} were not exceeded during the monitoring period addressed in this report.

Electronic records of all data and calibrations have been uploaded to the Montrose Data Server, where they will be archived for a period of at least three (3) years.

Meteorological Data Collected

Figures 2-A and 2-B present wind roses derived from the meteorological data collected from each of the two monitors operated at the former State Fairgrounds over the course of the monitoring period of 11/3/23 to 11/12/23.

Figure 2-A – Wind Rose From 1838 Monitor

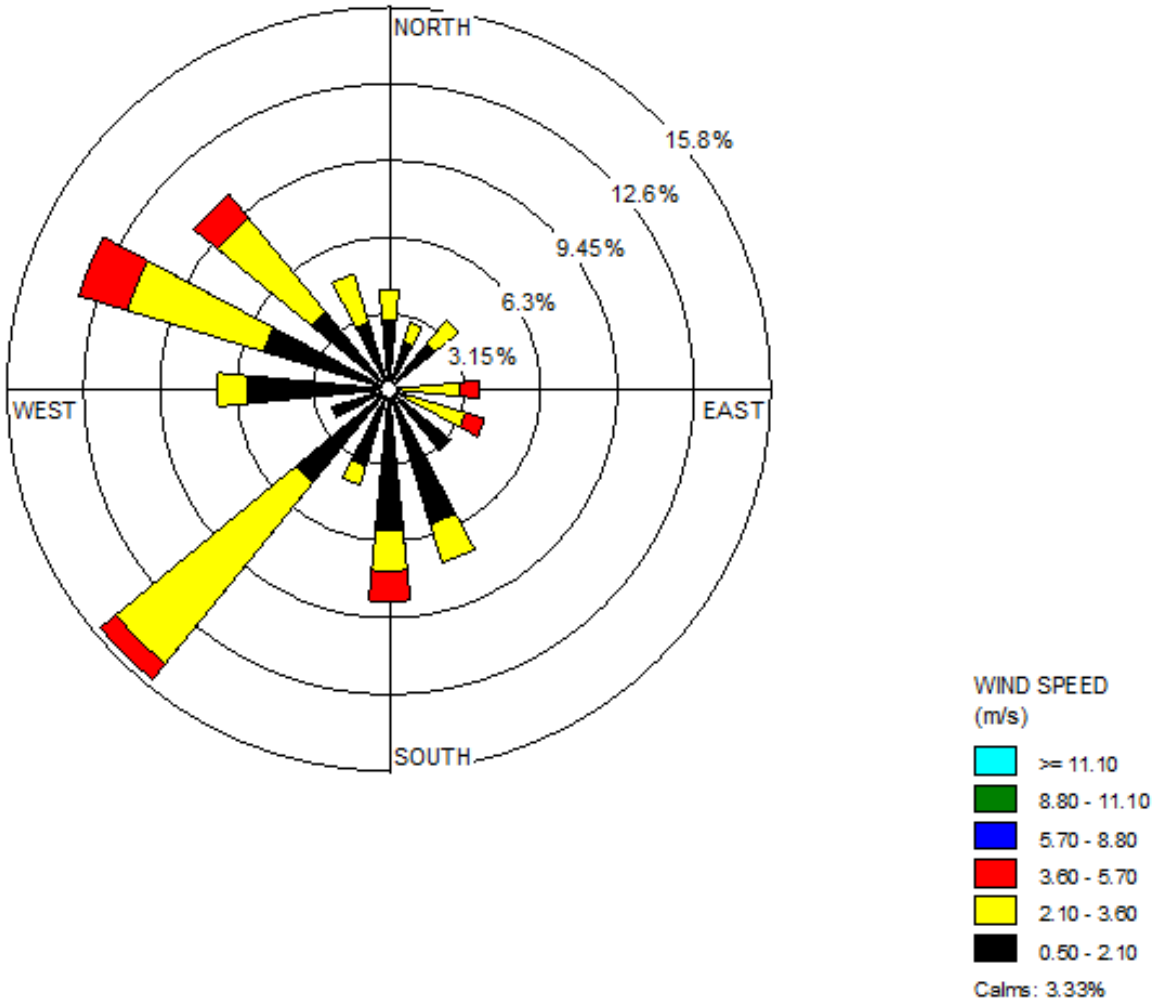
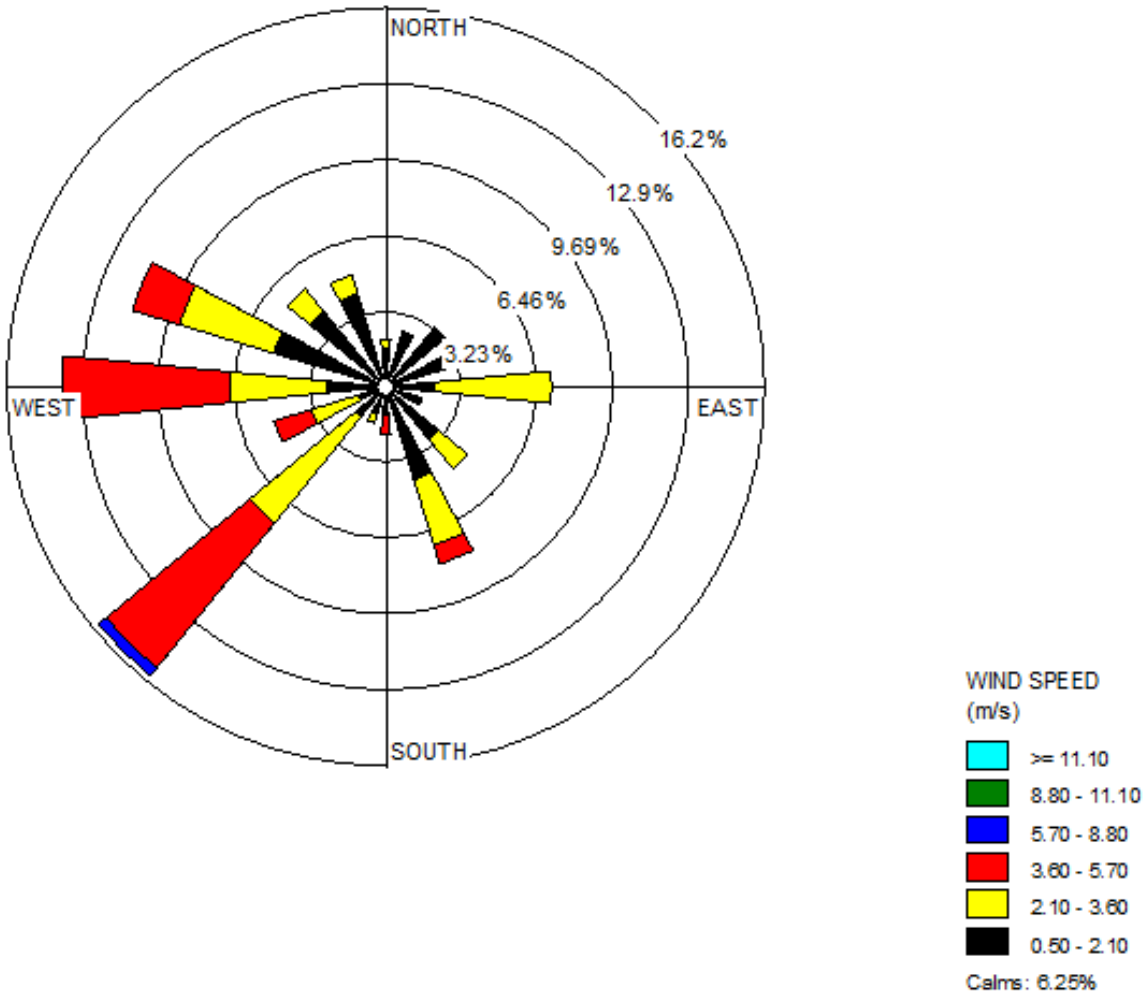


Figure 2-B – Wind Rose From 1839 Monitor



As is evident from the wind rose data, predominant winds were from the west during the monitoring period. Wind speeds recorded at monitors 1838 and 1839 were generally very light to medium.

Pollutant Data Collected

Figure 3 – PM_{10} Data

Monitoring at the Upwind site location (AQS-1 S/N 1838) commenced on 11/3/23. Monitoring at the Downwind site location (AQS-1 S/N 1839) also commenced on 11/3/23. Concurrent monitoring at both locations satisfied the (minimum) one-week Post-Construction monitoring period requirement.

The graph below represents the ambient PM10 measurement data collected at the former Michigan State Fairgrounds property during the monitoring period of 11/3/23 to 11/12/23. This graph is a plot of the PM_{10} measurement data as averaged over each daily monitoring period. The daily averaging interval for PM_{10} data is consistent with the associated EPA primary and secondary PM_{10} NAAQS; a 24-hour (daily) averaged value of 150 micrograms per cubic meter ($\mu g/m^3$) not to be exceeded more than once per year on average over 3 years.

The solid yellow line represents the 24-hour PM_{10} NAAQS of 150 $\mu g/m^3$. The solid red line represents the baseline concentration established in the 1st Baseline Report. The PM_{10} monitor at the EGLE Dearborn Site is the closest state-operated PM_{10} monitor relative to the former Michigan State Fairgrounds property. Therefore, the graph below presents the 24-hour averaged data from the EGLE Dearborn continuous PM_{10} monitor for comparison to corresponding PM_{10} measurement data reported from the on-site monitors.

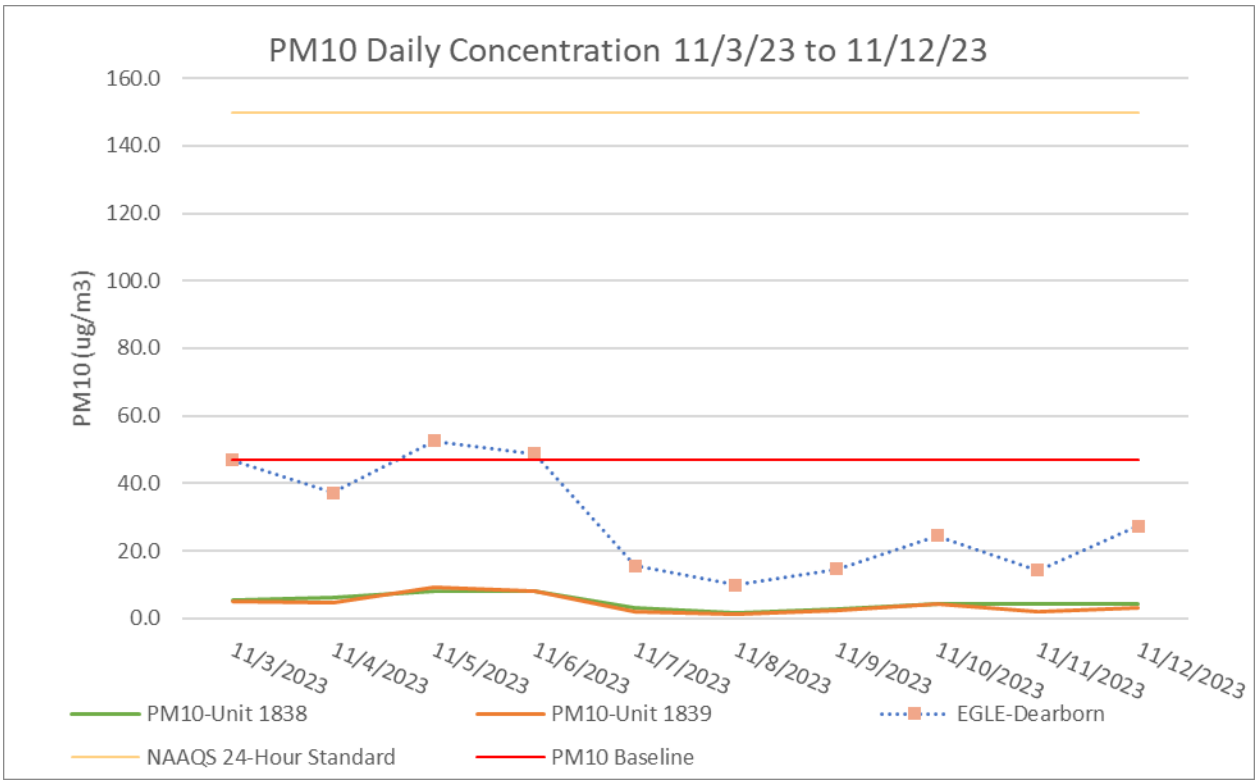


Figure 4 – $PM_{2.5}$ Data

Monitoring at the Upwind site location (AQS-1 S/N 1838) commenced on 11/3/23. Monitoring at the Downwind site location (AQS-1 S/N 1839) also commenced on 11/3/23. Concurrent monitoring at both locations satisfied the (minimum) one-week Post-Construction monitoring period requirement.

The graph below represents the ambient $PM_{2.5}$ measurement data collected at the former Michigan State Fairgrounds property during the monitoring period of 11/3/23 to 11/12/23. This graph is a plot of the $PM_{2.5}$ measurement data as averaged over each daily monitoring period. The daily averaging interval for $PM_{2.5}$ data is consistent with the associated EPA primary and secondary $PM_{2.5}$ NAAQS: A 24-hour (daily) averaged value of 35 micrograms per cubic meter ($\mu g/m^3$) not to be exceeded more than once per year on average over 3 years.

The solid yellow line represents the 24-hour $PM_{2.5}$ NAAQS of 35 $\mu g/m^3$. The solid red line represents the baseline concentration established in the 1st Baseline Report. The EGLE Oak Park monitoring Site is the nearest state-operated $PM_{2.5}$ monitor relative to the former Michigan State Fairgrounds property. The EGLE Oak Park $PM_{2.5}$ monitor is a 24-hour, filter-based sampler that collects a sample at 3-day intervals. Filter-based PM samples require gravimetric analysis at a laboratory; EGLE estimates that analytical results for the Oak Park $PM_{2.5}$ filters are delayed on average by approximately three months. Therefore, the graph below presents the 24-hour averaged data from the EGLE Dearborn and EGLE DET-SW continuous $PM_{2.5}$ monitors for comparison to corresponding $PM_{2.5}$ measurement data reported from the on-site monitors.

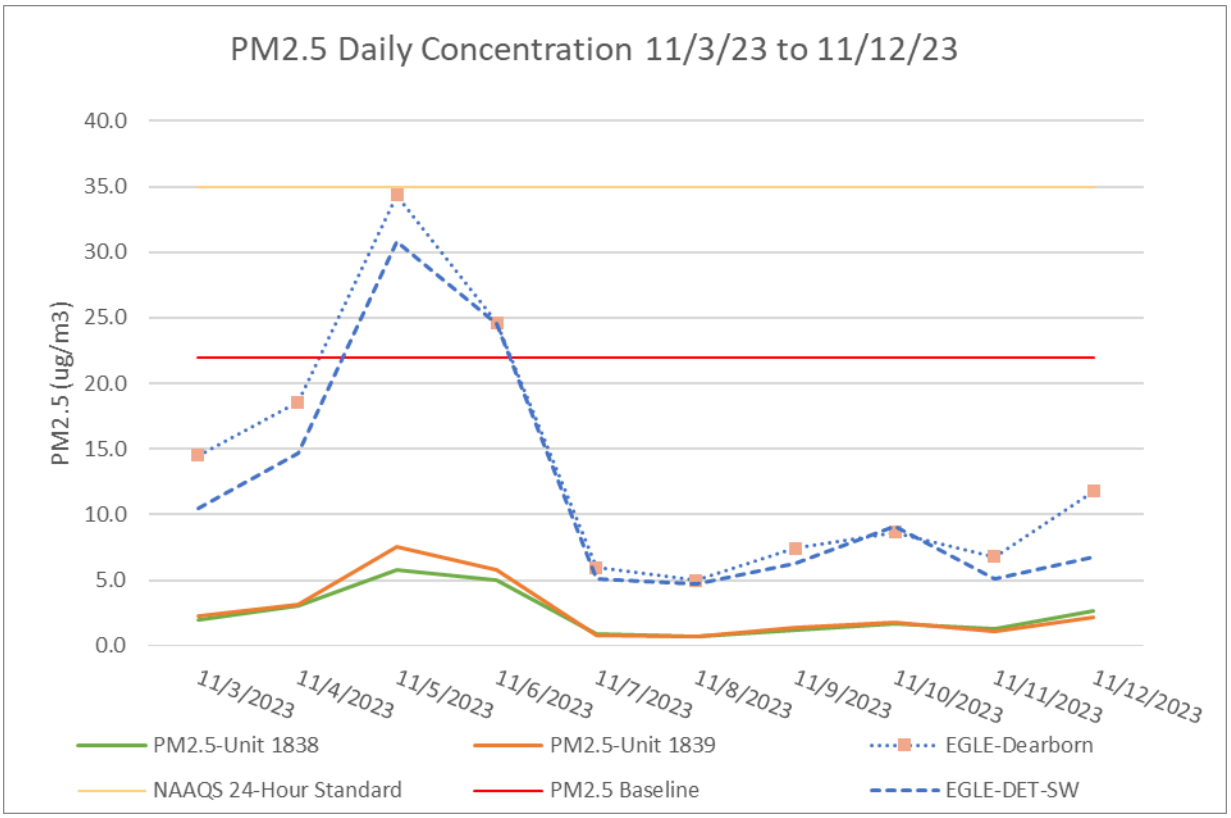


Figure 5 – NO_2 Data

Monitoring at the Upwind site location (AQS-1 S/N 1838) commenced on 11/3/23. Monitoring at the Downwind site location (AQS-1 S/N 1839) also commenced on 11/3/23. Concurrent monitoring at both locations satisfied the (minimum) one-week Post-Construction monitoring period requirement.

The graph below represents the ambient NO_2 measurement data collected at the former Michigan State Fairgrounds property during the monitoring period of 11/3/23 to 11/12/23. This graph is a plot of the NO_2 measurement data as averaged over a period of one (1) hour. This is consistent with the associated EPA primary NO_2 NAAQS: A 1-hour averaged value of 100 parts-per-billion (ppb) not to be exceeded more than once per year on average over 3 years.

The solid yellow line represents the 1-hour NO_2 NAAQS of 100 ppb. The solid red line represents the baseline concentration established in the 1st Baseline Report. The NO_2 monitor at the EGLE DET-SW site is the closest state-operated NO_2 monitor relative to the former Michigan State Fairgrounds property. The graph below presents the 1-hour averaged data from the EGLE DET-SW continuous NO_2 monitor for comparison to corresponding NO_2 measurement data reported from the on-site monitors.

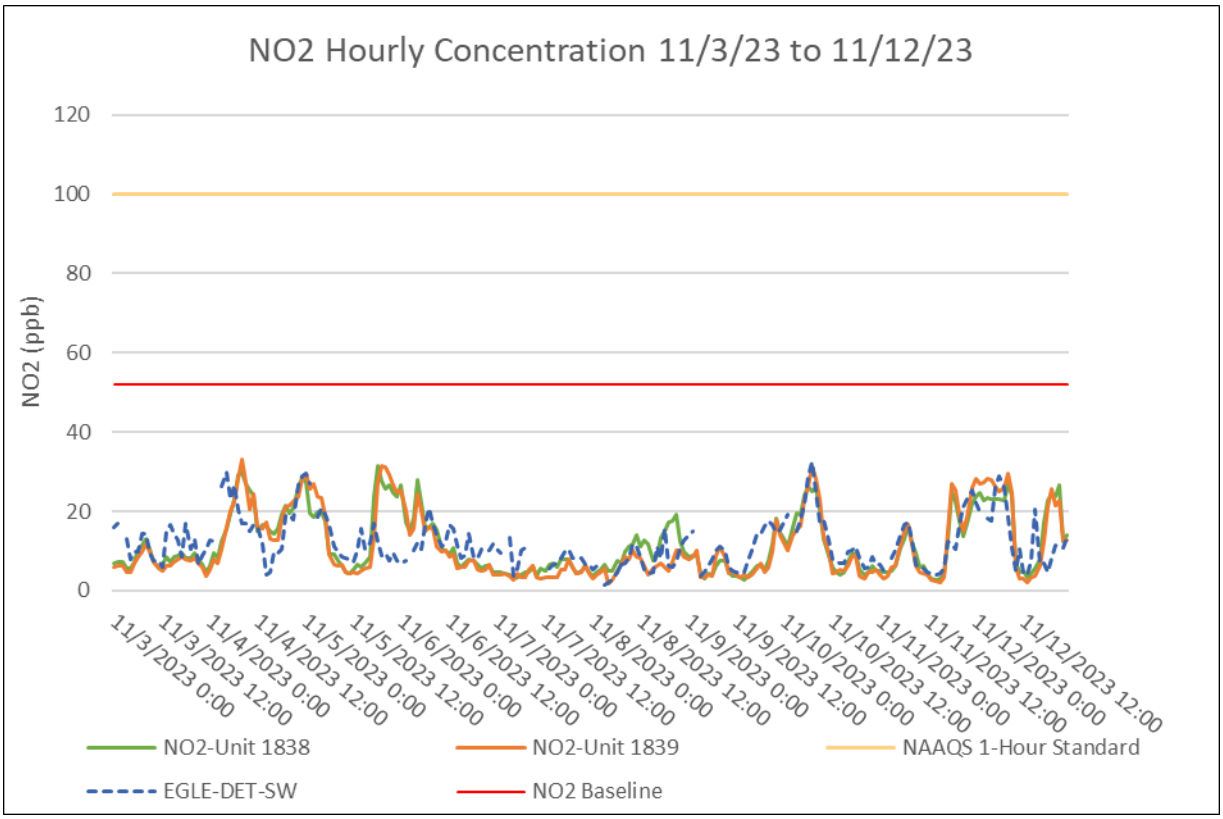
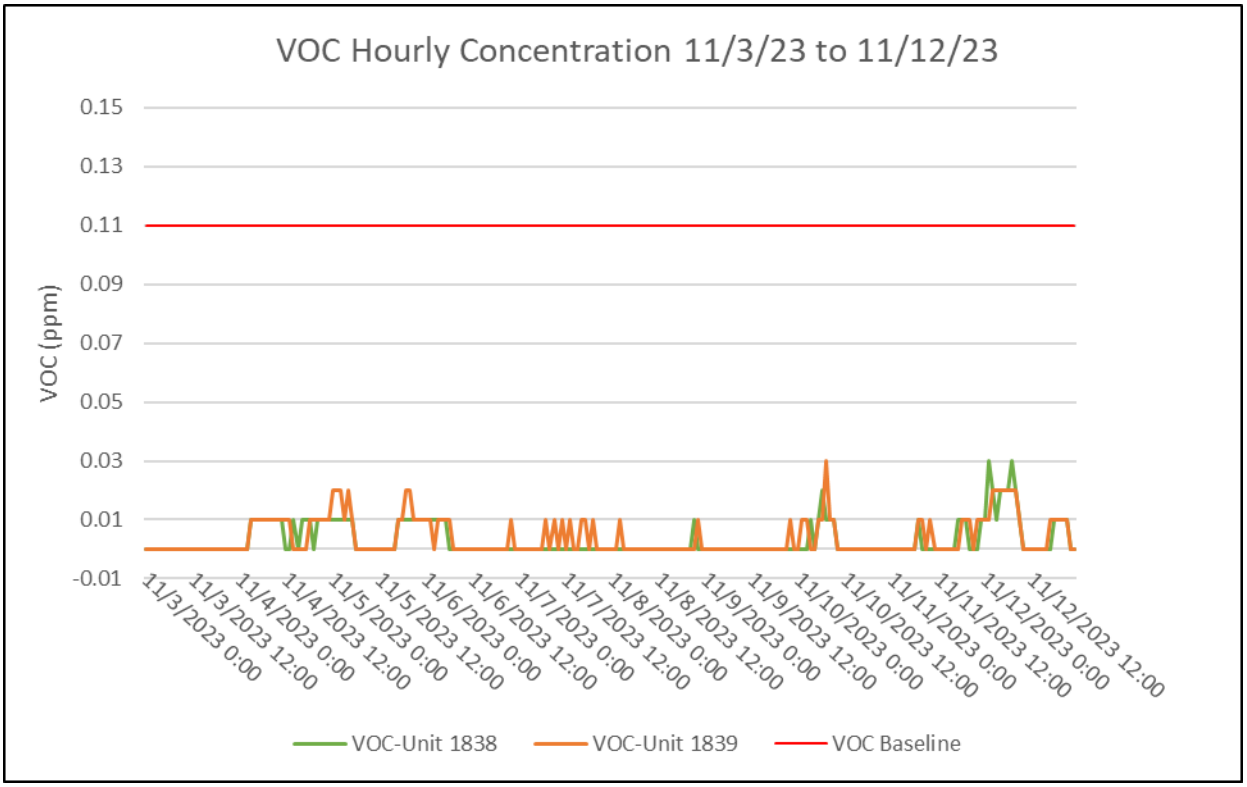


Figure 6 – VOC Data

Monitoring at the Upwind site location (AQS-1 S/N 1838) commenced on 11/3/23. Monitoring at the Downwind site location (AQS-1 S/N 1839) also commenced on 11/3/23. Concurrent monitoring at both locations satisfied the (minimum) one-week Post-Construction monitoring period requirement.

The graph below presents the ambient VOC measurement data collected at the former Michigan State Fairgrounds property during the monitoring period of 11/3/23 to 11/12/23. This graph is a plot of the VOC measurement data as averaged over a period of one (1) hour. The solid red line represents the baseline concentration established in the 1st Baseline Report. The EPA has not established a NAAQS for VOC. VOC data are not available from nearby EGLE monitoring Sites.



Data Quality Assurance/Quality Control

Quality Assurance/Quality Control

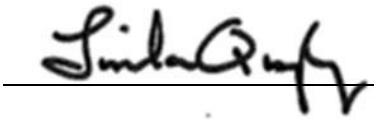
Quality assurance is a general term for the procedures used to ensure that a particular measurement meets the quality requirements for its intended use. Quality control of continuous analyzers consists of precision and span checks or flow verifications. Quality objectives were assessed via Site system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

All work performed by Montrose in support of this project follows the operating and quality control procedures contained in the Post-Construction Ambient Air Test Plan for the Amazon Fulfillment Center at the Former Michigan State Fairgrounds dated 1/31/23.

All quality control test data for the on-site monitors operated at the former Michigan State Fairgrounds property can be found in Appendix A to this report entitled *"Quality Assurance Logs"*. Certificates of traceability for the calibration standards and equipment used in support of quality assurance checks are presented in Appendix B to this report entitled *"Calibration Certification Sheets"*.

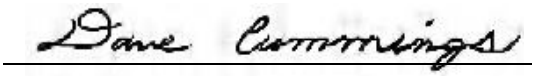
Signature Page

Prepared by:



Linda Quigley
Senior Reporting QC Specialist
Montrose Air Quality Services LLC

Reviewed by:



David Cummings
District Manager
Montrose Air Quality Services LLC

Appendix

A: Quality Assurance Logs

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

Network:	City of Detroit (Amazon)	Site:	MTMS Lab	Date:	10/31/23
Time Off-Line:	11:49 EST	Time On-Line:	14:11 EST	Technician:	Jeremy Levine

Calibration Equipment Info.	Analyzer Model:	Aeroqual AQS-1	S/N:	1838	Last Cal:	9/27/23
	Calibrator Model No:	Teledyne API	S/N:	69	Cal. Date:	3/2/23
	Zero Air Model No:	Teledyne API	S/N:	n/a	Cert Date:	n/a
	Gas Supplier:	AirGas	Cyl. Conc. (PPM):	49.33	Cyl. Pressure (PSIG)	2,060

VOC Sensor Module Calibration Settings	"As Found" (Before Any Adjustment)	"As Left" (After Adjustment)
OFFSET	0.00	
GAIN	1.389	

"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	5.0153	0.00	0.00	0.00	-
0.0500	0.0502	4.9493	4.9741	0.49	0.50	0.00	2.0%
0.0500	0.0501	4.4493	2.4688	0.98	0.94	0.00	-4.1%

"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	5.0000		0.00			-

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 (5% span of 20 ppm) with a Std. Dev. < 0.4 ppm (2% span of 20 ppm). If the sensor response error is greater than ± 1 ppm then a GAIN adjustment is required. If the Std. Dev. is greater than 0.4 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 0.0 ppm ± 1 ppm.

Comments:

Values good, no adjustment needed.

Technician: *Jeremy Levine*

QA Review:

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)	Site:	MTMS Lab		Date:	10/31/23
Time Off-Line:	14:13 EST	Time On-Line:	19:57 EST		Technician:	Jeremy Levine

Calibration Equipment Info.	Analyzer Model:	Aeroqual AQS-1	S/N:	1838	Last Cal:	9/27/23
	Calibrator Model No.:	Teledyne API	S/N:	69	Cal. Date:	3/2/23
	Zero Air Model No.:	Teledyne API	S/N:	n/a	Cert Date:	n/a
	Gas Supplier:	Airgas	Cyl. Cert. Date:	1/26/21	Cyl. Pressure (PSIG)	1,300
	Gas Cylinder ID #:	D068357	Cyl. Conc. (PPM):	30.95	Gas Module Total Flow Rate	130 mL

Analyzer Calibration Settings	**"As Found" (Before Any Adjustment)**	**"As Left" (After Adjustment)**
OFFSET	-0.6	-0.6
GAIN	1.213	1.310

Calibrator Flow and Test Gas Data					**NO_2 Response** ***Observed from AQS-1***			
Calibrator Gas Channel		**Calibrator Air Channel**		**Known NO_2 Gas Conc. (PPB)**			Δ% (Observed Response Vs. Known Conc.) 3	PASS/FAIL
Display Setting (SLPM)	**Actual Flow Rate** (SLPM)	Display Setting (SLPM)	**Actual Flow Rate** (SLPM)		Response (PPB)	Std. Dev. (PPB)		
0.0452	0.0453	3.4548	3.4780	397.9	368.4	0.2	-7.4%	
0.0484	0.0485	4.9516	4.9776	298.7	277.5	0.6	-7.1%	
0.0323	0.0324	4.9677	4.9928	199.6	186.7	0.9	-6.5%	
0.0161	0.0163	4.9839	5.0093	100.4	92.5	0.4	-7.9%	
OFF	OFF	5.0000	5.0179	0.0	0.6	0.2	-	
Linear Regression Analysis:								
Slope:	0.926064	Intercept:	0.557010	Corr. Coefficient (r):		0.999981		

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:

Technician: *Jeremy Levine*

QA Review:

MONTROSE AIR QUALITY SERVICES LLC

AEROQUAL AQS-1 NO2 MODULE MULTI-POINT CALIBRATION FORM

Calibration Data on This Form Are For:			Unadjusted Cal.			Adjusted Cal.	X
Network:	City of Detroit (Amazon)		Site:	MTMS Lab		Date:	10/31/23
Time Off-Line:	14:13 EST		Time On-Line:	19:57 EST		Technician:	Jeremy Levine

Calibration Equipment Info.	Analyzer Model:	Aeroqual AQS-1	S/N:	1838	Last Cal:	9/27/23
	Calibrator Model No.:	Teledyne API	S/N:	69	Cal. Date:	3/2/23
	Zero Air Model No.:	Teledyne API	S/N:	n/a	Cert Date:	n/a
	Gas Supplier:	Airgas	Cyl. Cert. Date:	1/26/21	Cyl. Pressure (PSIG)	1,380
	Gas Cylinder ID #:	D068357	Cyl. Conc. (PPM):	30.95	Gas Module Total Flow Rate	130 mL

Analyzer Calibration Settings	"As Found" (Before Any Adjustment)	"As Left" (After Adjustment)
OFFSET	-0.6	-0.6
GAIN	1.213	1.310

Calibrator Flow and Test Gas Data					NO_2 Response *Observed from AQS-1*		Δ% (Observed Response Vs. Known Conc.) 3	PASS/FAIL
Calibrator Gas Channel		Calibrator Air Channel		Known NO_2 Gas Conc. (PPB)				
Display Setting (SLPM)	**Actual Flow Rate** (SLPM)	Display Setting (SLPM)	**Actual Flow Rate** (SLPM)		Response (PPB)	Std. Dev. (PPB)		
0.0452	0.0453	3.4548	3.4788	397.8	394.1	0.4	-0.9%	
0.0484	0.0486	4.9516	4.9779	299.2	298.2	0.7	-0.3%	
0.0323	0.0324	4.9677	4.9921	199.6	196.8	0.5	-1.4%	
0.0161	0.0163	4.9839	5.0104	100.4	99.3	0.6	-1.1%	
OFF	OFF	5.0000	5.0147	0.0	0.9	0.8	-	
Linear Regression Analysis:								
Slope:	0.990848		Intercept:	0.284936	Corr. Coefficient (r):		0.999977	

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:

Technician: *Jeremy Levine*

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 (Transit)	**Site:**	Fairgrounds	**Date of Checks:**	7/14/2023
Operator:	Jeremy Levine, Jeff Peitzsch			**Time Off-Line:**	EST
AEROQUAL QS-1 S/N	1838			**Time On-Line:**	EST

Reference Standards:

Flow Standard:	Aeroqual Rotometer	**S/N#**	n/a	**Cert Date:**	n/a

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	1.00 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%
LPM	LPM		

LEAK CHECK DATA:

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

Comments:

Technician: *Jeremy Levine*

QA Review: Ken Leggieri

MONTROSE AIR QUALITY SERVICES LLC

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

Network:	City of Detroit (Amazon)	Site:	MTMS Lab	Date:	11/14/23
Time Off-Line:	12:48 EST	Time On-Line:	15:08 EST	Technician:	Jeremy Levine

Calibration Equipment Info.	Analyzer Model:	Aeroqual AQS-1	S/N:	1838	Last Cal:	10/31/23
	Calibrator Model No:	Teledyne API	S/N:	69	Cal. Date:	3/2/23
	Zero Air Model No:	Teledyne API	S/N:	n/a	Cert Date:	n/a
	Gas Supplier:	AirGas	Cyl. Conc. (PPM):	49.33	Cyl. Pressure (PSIG)	2,050

VOC Sensor Module Calibration Settings	"As Found" (Before Any Adjustment)	"As Left" (After Adjustment)
OFFSET	0.00	
GAIN	1.389	

"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	5.0174	0.00	0.00	0.00	-
0.0500	0.0502	4.9439	4.9742	0.49	0.51	0.00	4.1%
0.0500	0.0501	2.4493	2.4672	0.98	0.95	0.00	-3.1%

"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	5.0000		0.00			-

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 (5% span of 20 ppm) with a Std. Dev. < 0.4 ppm (2% span of 20 ppm). If the sensor response error is greater than ± 1 ppm then a GAIN adjustment is required. If the Std. Dev. is greater than 0.4 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 0.0 ppm ± 1 ppm.

Comments:

Values good, no adjustment needed.

Technician: *Jeremy Levine*

QA Review:

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)	Site:	MTMS Lab		Date:	11/14/23
Time Off-Line:	15:09 EST	Time On-Line:	18:09 EST		Technician:	Jeremy Levine

Calibration Equipment Info.						
	Analyzer Model:	Aeroqual AQS-1	S/N:	1838	Last Cal:	10/31/23
	Calibrator Model No.:	Teledyne API	S/N:	69	Cal. Date:	3/2/23
	Zero Air Model No.:	Teledyne API	S/N:	n/a	Cert Date:	n/a
	Gas Supplier:	Airgas	Cyl. Cert. Date:	1/26/21	Cyl. Pressure (PSIG)	1,290
	Gas Cylinder ID #:	D068357	Cyl. Conc. (PPM):	30.95	Gas Module Total Flow Rate	130 mL

Analyzer Calibration Settings	**"As Found" (Before Any Adjustment)**	**"As Left" (After Adjustment)**
OFFSET	-0.6	
GAIN	1.310	

Calibrator Flow and Test Gas Data					**NO_2 Response** ***Observed from AQS-1***			
Calibrator Gas Channel		**Calibrator Air Channel**		**Known NO_2 Gas Conc. (PPB)**			Δ% (Observed Response Vs. Known Conc.) 3	PASS/FAIL
Display Setting (SLPM)	**Actual Flow Rate** (SLPM)	Display Setting (SLPM)	**Actual Flow Rate** (SLPM)		Response (PPB)	Std. Dev. (PPB)		
0.0452	0.0453	3.4548	3.4775	398.0	395.4	1.0	-0.7%	
0.0484	0.0485	4.9516	4.9791	298.6	300.0	0.4	0.5%	
0.0323	0.0324	4.9677	4.9918	199.6	197.1	0.3	-1.3%	
0.0161	0.0162	4.9839	5.0078	99.8	100.1	0.8	0.3%	
OFF	OFF	5.0000	5.0164	0.0	-0.3	0.2	-	
Linear Regression Analysis:								
Slope:	0.996476	Intercept:	-0.037950	Corr. Coefficient (r):	0.999943			

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:

Values goode, no adjustment needed.

Technician: *Jeremy Levine*

QA Review: Ken 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 (Transit)	**Site:**	Fairgrounds	**Date of Checks:**	7/14/2023
Operator:	Jeremy Levine, Jeff Peitzsch			**Time Off-Line:**	EST
AEROQUAL QS-1 S/N	1838			**Time On-Line:**	EST

Reference Standards:

Flow Standard:	Aeroqual Rotometer	**S/N#**	n/a	**Cert Date:**	n/a

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	1.00 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%
LPM	LPM		

LEAK CHECK DATA:

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

Comments:

Technician: *Jeremy Levine*

QA Review: Ken Leggieri

MONTROSE AIR QUALITY SERVICES LLC

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

Network:	City of Detroit (Amazon)	Site:	MTMS Lab	Date:	10/31/23
Time Off-Line:	11:49 EST	Time On-Line:	14:11 EST	Technician:	Jeremy Levine

Calibration Equipment Info.	Analyzer Model:	Aeroqual AQS-1	S/N:	1839	Last Cal:	9/27/23
	Calibrator Model No:	Teledyne API	S/N:	69	Cal. Date:	3/2/23
	Zero Air Model No:	Teledyne API	S/N:	n/a	Cert Date:	n/a
	Gas Supplier:	AirGas	Cyl. Conc. (PPM):	49.33	Cyl. Pressure (PSIG)	2,060

VOC Sensor Module Calibration Settings	"As Found" (Before Any Adjustment)	"As Left" (After Adjustment)
OFFSET	0.00	0.00
GAIN	1.573	1.643

"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	5.0153	0.00	0.00	0.00	-
0.0500	0.0502	4.9493	4.9741	0.49	0.49	0.00	0.0%
0.0500	0.0501	4.4493	2.4688	0.98	0.90	0.00	-8.2%

"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	5.0000	5.0137	0.00	0.00	0.0	-
0.0500	0.0502	4.9493	4.9760	0.49	0.52	0.0	6.1%
0.0500	0.0501	2.4493	2.4690	0.98	0.95	0.0	-3.1%

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 (5% span of 20 ppm) with a Std. Dev. < 0.4 ppm (2% span of 20 ppm). If the sensor response error is greater than ± 1 ppm then a GAIN adjustment is required. If the Std. Dev. is greater than 0.4 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 0.0 ppm ± 1 ppm.

Comments:

Technician: *Jeremy Levine*

QA Review:

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)		Site:	MTMS Lab		Date:	10/31/23
Time Off-Line:	14:13 EST		Time On-Line:	19:57 EST		Technician:	Jeremy Levine

Calibration Equipment Info.	Analyzer Model:	Aeroqual AQS-1	S/N:	1839	Last Cal:	9/27/23
	Calibrator Model No.:	Teledyne API	S/N:	69	Cal. Date:	3/2/23
	Zero Air Model No.:	Teledyne API	S/N:	n/a	Cert Date:	n/a
	Gas Supplier:	Airgas	Cyl. Cert. Date:	1/26/21	Cyl. Pressure (PSIG)	1,300
	Gas Cylinder ID #:	D068357	Cyl. Conc. (PPM):	30.95	Gas Module Total Flow Rate	130 mL

Analyzer Calibration Settings	**"As Found" (Before Any Adjustment)**	**"As Left" (After Adjustment)**
OFFSET	0.0	0.0
GAIN	1.144	1.255

Calibrator Flow and Test Gas Data					**NO_2 Response** ***Observed from AQS-1***			
Calibrator Gas Channel		**Calibrator Air Channel**						
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)	Δ% (Observed Response Vs. Known Conc.) 3	PASS/FAIL
0.0452	0.0453	3.4548	3.4780	397.9	362.6	0.6	-8.9%	
0.0484	0.0485	4.9516	4.9776	298.7	272.0	0.5	-8.9%	
0.0323	0.0324	4.9677	4.9928	199.6	182.5	0.2	-8.6%	
0.0161	0.0163	4.9839	5.0093	100.4	89.1	0.6	-11.3%	
OFF	OFF	5.0000	5.0179	0.0	-0.4	0.4	-	
Linear Regression Analysis:								
Slope:	0.914286		Intercept:	-1.075537	Corr. Coefficient (r):		0.999974	

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:

Technician: *Jeremy Levine*

QA Review: Ken Leggiero

MONTROSE AIR QUALITY SERVICES LLC

AEROQUAL AQS-1 NO2 MODULE MULTI-POINT CALIBRATION FORM

Calibration Data on This Form Are For:			Unadjusted Cal.		Adjusted Cal.	X
Network:	City of Detroit (Amazon)	Site:	MTMS Lab	Date:	10/31/23	
Time Off-Line:	14:13 EST	Time On-Line:	19:57 EST	Technician:	Jeremy Levine	

Calibration Equipment Info.						
	Analyzer Model:	Aeroqual AQS-1	S/N:	1839	Last Cal:	9/27/23
	Calibrator Model No.:	Teledyne API	S/N:	69	Cal. Date:	3/2/23
	Zero Air Model No.:	Teledyne API	S/N:	n/a	Cert Date:	n/a
	Gas Supplier:	Airgas	Cyl. Cert. Date:	1/26/21	Cyl. Pressure (PSIG)	1,380
	Gas Cylinder ID #:	D068357	Cyl. Conc. (PPM):	30.95	Gas Module Total Flow Rate	130 mL

Analyzer Calibration Settings	"As Found" (Before Any Adjustment)	"As Left" (After Adjustment)
OFFSET	0.0	0.0
GAIN	1.144	1.255

Calibrator Flow and Test Gas Data					NO_2 Response *Observed from AQS-1*		Δ% (Observed Response Vs. Known Conc.) 3	PASS/FAIL
Calibrator Gas Channel		Calibrator Air Channel		Known NO_2 Gas Conc. (PPB)				
Display Setting (SLPM)	**Actual Flow Rate** (SLPM)	Display Setting (SLPM)	**Actual Flow Rate** (SLPM)		Response (PPB)	Std. Dev. (PPB)		
0.0452	0.0453	3.4548	3.4788	397.8	395.7	0.4	-0.5%	
0.0484	0.0486	4.9516	4.9779	299.2	299.5	0.6	0.1%	
0.0323	0.0324	4.9677	4.9921	199.6	197.1	0.3	-1.3%	
0.0161	0.0163	4.9839	5.0104	100.4	98.1	0.9	-2.3%	
OFF	OFF	5.0000	5.0147	0.0	0.2	0.4	-	
Linear Regression Analysis:								
Slope:	0.997984		Intercept:	-0.877949	Corr. Coefficient (r):		0.999962	

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:

Technician: *Jeremy Levine*

QA Review: Ken Leggiero

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 (Transit)	**Site:**	Fairgrounds	**Date of Checks:**	10/31/2023
Operator:	Rob Bienenstein			**Time Off-Line:**	n/a EST
AEROQUAL QS-1 S/N	1839			**Time On-Line:**	n/a EST

Reference Standards:

Flow Standard:	Aeroqual Rotometer	**S/N#**	n/a	**Cert Date:**	n/a

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	1.00 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%
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 Kegerreis

MONTROSE AIR QUALITY SERVICES LLC

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

Network:	City of Detroit (Amazon)	Site:	MTMS Lab	Date:	11/14/23
Time Off-Line:	12:48 EST	Time On-Line:	15:08 EST	Technician:	Jeremy Levine

Calibration Equipment Info.	Analyzer Model:	Aeroqual AQS-1	S/N:	1839	Last Cal:	10/31/23
	Calibrator Model No:	Teledyne API	S/N:	69	Cal. Date:	3/2/23
	Zero Air Model No:	Teledyne API	S/N:	n/a	Cert Date:	n/a
	Gas Supplier:	AirGas	Cyl. Conc. (PPM):	49.33	Cyl. Pressure (PSIG)	2,050

VOC Sensor Module Calibration Settings	"As Found" (Before Any Adjustment)	"As Left" (After Adjustment)
OFFSET	0.00	0.00
GAIN	1.643	1.457

"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	5.0174	0.00	0.00	0.00	-
0.0500	0.0502	4.9439	4.9742	0.49	0.57	0.00	16.3%
0.0500	0.0501	2.4493	2.4672	0.98	1.04	0.00	6.1%

"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	5.0000	5.0175	0.00	0.00	0.0	-
0.0500	0.0502	4.9493	4.9761	0.49	0.51	0.0	4.1%
0.0500	0.0502	2.4493	2.4694	0.98	0.93	0.0	-5.1%

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 (5% span of 20 ppm) with a Std. Dev. < 0.4 ppm (2% span of 20 ppm). If the sensor response error is greater than ± 1 ppm then a GAIN adjustment is required. If the Std. Dev. is greater than 0.4 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 0.0 ppm ± 1 ppm.

Comments:

Technician: *Jeremy Levine*

QA Review:

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)	Site:	MTMS Lab		Date:	11/14/23
Time Off-Line:	15:09 EST	Time On-Line:	18:09 EST		Technician:	Jeremy Levine

Calibration Equipment Info.	Analyzer Model:	Aeroqual AQS-1	S/N:	1839	Last Cal:	10/31/23
	Calibrator Model No.:	Teledyne API	S/N:	69	Cal. Date:	3/2/23
	Zero Air Model No.:	Teledyne API	S/N:	n/a	Cert Date:	n/a
	Gas Supplier:	Airgas	Cyl. Cert. Date:	1/26/21	Cyl. Pressure (PSIG)	1,290
	Gas Cylinder ID #:	D068357	Cyl. Conc. (PPM):	30.95	Gas Module Total Flow Rate	130 mL

Analyzer Calibration Settings	**"As Found" (Before Any Adjustment)**	**"As Left" (After Adjustment)**
OFFSET	0.0	
GAIN	1.255	

Calibrator Flow and Test Gas Data					**NO_2 Response** *Observed from AQS-1*		Δ% (Observed Response Vs. Known Conc.) 3	PASS/FAIL
Calibrator Gas Channel		**Calibrator Air Channel**		**Known NO_2 Gas Conc. (PPB)**				
Display Setting (SLPM)	**Actual Flow Rate** (SLPM)	Display Setting (SLPM)	**Actual Flow Rate** (SLPM)		Response (PPB)	Std. Dev. (PPB)		
0.0452	0.0453	3.4548	3.4775	398.0	412.2	0.7	3.6%	
0.0484	0.0485	4.9516	4.9791	298.6	313.3	0.5	4.9%	
0.0323	0.0324	4.9677	4.9918	199.6	207.9	0.3	4.2%	
0.0161	0.0162	4.9839	5.0078	99.8	103.6	0.5	3.8%	
OFF	OFF	5.0000	5.0164	0.0	0.1	1.0	-	
Linear Regression Analysis:								
Slope:	1.039306	Intercept:	0.390281	Corr. Coefficient (r):	0.999952			

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:

Results acceptable, no adjustment needed.

Technician: *Jeremy Levine*

QA Review: Ken Leggiero

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 (Transit)	**Site:**	Fairgrounds	**Date of Checks:**	11/14/2023
Operator:	Rob Bienenstein			**Time Off-Line:**	n/a EST
AEROQUAL QS-1 S/N	1839			**Time On-Line:**	n/a EST

Reference Standards:

Flow Standard:	Aeroqual Rotometer	**S/N#**	n/a	**Cert Date:**	n/a

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	1.00 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%
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 Rogstein

MONTROSE AIR QUALITY SERVICES LLC

B: Calibration Certification Sheets

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
24075 US Hwy 6
Stryker, OH 43557
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: CERTIFIED STANDARD-SPEC

Part Number:	X02NI99C15A0104	Reference Number:	141-402072346-1
Cylinder Number:	EB0112566	Cylinder Volume:	144.4 CF
Laboratory:	124 - Stryker (SAP) - OH	Cylinder Pressure:	2015 PSIG
Analysis Date:	Mar 31, 2021	Valve Outlet:	350
Lot Number:	141-402072346-1		

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.

ANALYTICAL RESULTS

Component	Req Conc	Actual Concentration (Mole %)	Analytical Uncertainty
ISOBUTYLENE	50.00 PPM	49.33 PPM	+/- 2%
NITROGEN	Balance		

Approved for Release

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

Using Bios Dry-Cal Flow Standard(s)

PPLICATION INFORMATION:

Calibrator Model/S/N:	TAPI T700; SN 69	NETWORK: Marathon Detroit PAMS	SITE: MTMS
Calibration Site:	MTMS Site	Test Date: 3/2/2023	
Barometric Pressure (Pa, in mmHg):	743.0	Calibrated by: Jeremy Levine	
Flow Standard Model:	Mesa Labs Defender 530+ M, 530+ H	Air Temp. (Ta, in deg. C): 23.1	(=deg. K): 296.3
Flow Standard Base S/N:	Not Applicable	Flow Cell Model No: Defender 530+ M	Defender 530+ H
Certification Date:	Not Applicable	Flow Cell S/N: 205428	205361
		Flow Cell Certification Date: 7/22/2022	7/21/2022

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	10.8520	10.8580	10.8420	10.8600	10.8530	10.853	7.0	10.832	-0.2%
4750	10.3170	10.3160	10.3150	10.3110	10.3160	10.315	2.3	10.266	-0.5%
4500	9.6906	9.6895	9.6869	9.6877	9.6923	9.689	2.2	9.708	0.2%
4250	9.1475	9.1495	9.1520	9.1448	9.1438	9.148	3.4	9.157	0.1%
4000	8.5987	8.6045	8.6008	8.6002	8.5984	8.601	2.4	8.603	0.0%
3750	8.0527	8.0573	8.0563	8.0529	8.0549	8.055	2.0	8.053	0.0%
3500	7.5167	7.5172	7.5134	7.5132	7.5105	7.514	2.8	7.507	-0.1%
3250	6.9823	6.9845	6.9790	6.9783	6.9767	6.980	3.2	6.967	-0.2%
3000	6.4503	6.4485	6.4492	6.4473	6.4441	6.448	2.4	6.430	-0.3%
2750	5.9049	5.8928	5.8966	5.9052	5.9054	5.901	5.9	5.879	-0.4%
2500	5.3137	5.3172	5.3185	5.3195	5.3172	5.317	2.2	5.334	0.3%
2250	4.7718	4.7757	4.7813	4.7790	4.7793	4.777	3.7	4.801	0.5%
2000	4.2360	4.2314	4.2315	4.2332	4.2360	4.234	2.3	4.265	0.7%
1750	3.6825	3.6817	3.6854	3.6793	3.6879	3.683	3.3	3.724	1.1%
1500	3.1393	3.1393	3.1519	3.1439	3.1461	3.144	5.3	3.189	1.4%
1250	2.6238	2.6284	2.6290	2.6273	2.6287	2.627	2.1	2.650	0.9%
1000	2.0926	2.0917	2.0912	2.0918	2.0917	2.092	0.5	2.115	1.1%
750	1.5499	1.5498	1.5498	1.5505	1.5516	1.550	0.8	1.579	1.8%
500	1.0163	1.0157	1.0146	1.0148	1.0145	1.015	0.8	1.037	2.1%
250	0.48024	0.48137	0.48059	0.48179	0.48179	0.481	0.7	0.493	2.4%
SLOPE:	**0.002180501**		**INTERCEPT:**	**-0.102560589**		**CORRELATION COEFF (r):**		**0.999962608**	

Comments:

echnician: *Jeremy Levine* 3/2/2023

(signature) Date

TAPI T700 MFC Calibration Using Bios Dry-Cal Flow Standard(s)

CALIBRATOR APPLICATION INFORMATION:

Calibrator Model/S/N:	TAPI T700; SN 69	NETWORK:	Marathon Detroit PAMS	SITE:	MTMS
Calibration Site:	MTMS Site	Test Date:	3/1/2023		
Barometric Pressure (Pa, in mmHg):	740.0	Calibrated by:	J Levine		
Flow Standard Model:	Mesa Labs Defender 530+ L	Air Temp. (Ta, in deg. C):	22.9	(=deg. K):	296.1
Flow Standard Base S/N:	Not Applicable	Flow Cell Model No:	530+ Low Flow		
Base Certification Date:	Not Applicable	Flow Cell S/N:	205663		
		Flow Cell Certification Date:	8/4/2022		

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

(X) MFC Drive Voltage (mVDC)	0.0538 (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	0.05511	0.05513	0.05514	0.05507	0.05504	0.0551	0.04	0.0549	-0.3%
4750	0.05239	0.05240	0.05240	0.05241	0.05240	0.0524	0.01	0.0523	-0.2%
4500	0.04958	0.04960	0.04961	0.04963	0.04964	0.0496	0.02	0.0496	-0.1%
4250	0.04669	0.04674	0.04676	0.04680	0.04683	0.0468	0.05	0.0468	0.1%
4000	0.04415	0.04416	0.04412	0.04406	0.04405	0.0441	0.05	0.0441	0.1%
3750	0.04147	0.04148	0.04146	0.04150	0.04145	0.0415	0.02	0.0414	-0.2%
3500	0.03870	0.03873	0.03874	0.03873	0.03875	0.0387	0.02	0.0387	-0.2%
3250	0.03587	0.03589	0.03591	0.03593	0.03597	0.0359	0.04	0.0359	-0.1%
3000	0.03329	0.03327	0.03324	0.03320	0.03318	0.0332	0.05	0.0331	-0.5%
2750	0.03054	0.03055	0.03056	0.03057	0.03056	0.0306	0.01	0.0304	-0.5%
2500	0.02775	0.02777	0.02778	0.02779	0.02781	0.0278	0.02	0.0277	-0.5%
2250	0.02502	0.02498	0.02500	0.02498	0.02499	0.0250	0.02	0.0249	-0.3%
2000	0.02231	0.02232	0.02232	0.02232	0.02230	0.0223	0.01	0.0222	-0.7%
1750	0.01950	0.01951	0.01952	0.01952	0.01953	0.0195	0.01	0.0193	-0.9%
1500	0.01668	0.01667	0.01667	0.01668	0.01669	0.0167	0.01	0.0166	-0.6%
1250	0.01392	0.01393	0.01394	0.01394	0.01392	0.0139	0.01	0.0138	-0.9%
1000	0.01110	0.01106	0.01107	0.01110	0.01111	0.0111	0.02	0.0110	-1.0%
750	0.00831	0.00831	0.00832	0.00832	0.00831	0.0083	0.01	0.0082	-1.3%
500	0.00548	0.00545	0.00547	0.00546	0.00546	0.0055	0.01	0.0054	-1.9%
250	0.00261	0.00264	0.00262	0.00262	0.00262	0.0026	0.01	0.0025	-6.0%
SLOPE: 0.000011			**INTERCEPT: 0.000167747**			**CORRELATION COEFF (r): 0.999979775**			

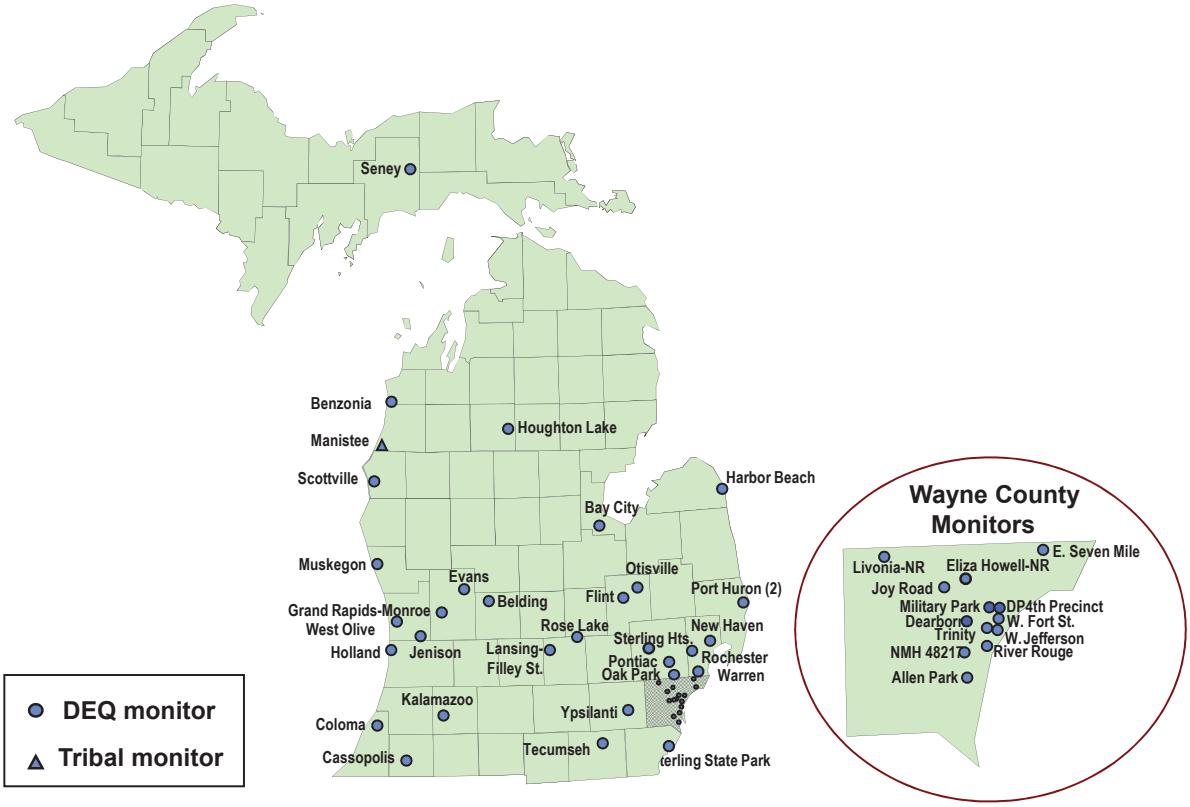
Comments:

Technician: *Jeremy Levine* 3/1/23

(signature) Date

C: State Monitor Map

Michigan Air Monitor Network



Updated June 2019