



CEMS Rozelle Interchange - Release Points 8, 9 & 10 – Validated Data Report for January 2025

Project ID: 16032

17/02/2025

Release: RO

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Project Reference ID: 16032

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EXECUTIVE SUMMARY

Assured Environmental Pty Ltd was commissioned by Fulton Hogan Egis O&M Pty Ltd to undertake the operation and maintenance of the continuous emission monitoring system established to monitor emissions from the following release points of the Rozelle Interchange Road tunnels:

- Release Point 8 - Rozelle Ventilation Facility (Mid)
- Release Point 9 - Iron Cove Ventilation Facility; and
- Release Point 10 - Rozelle Ventilation Facility (West).

The specific locations of each release point are identified in Section 2.1.

Assured Environmental Pty Ltd commenced monitoring on 27 November 2023 upon following opening of the roadway on 26 November 2023.

This report represents the results of air quality monitoring from the above-mentioned release points for the monitoring period 1 January 2025 to 31 January 2025.

Monitoring was conducted at all release points for all parameters, with data availability ranging from 90.5% to 100% across all parameters, except for velocity and VOC at Release Points 8 and 10. The velocity parameter at Release Point 8 had a low data capture rate of 19.6% due to a technical issue with the velocity sensor. VOC instruments at Release Points 8 and 10 experienced issues with data freezing.

The measured hourly levels of CO, VOC, solid particles, NO₂, and NO_x at all release points were below the maximum air quality goals provided in the EPL No. 21372 (Table 6).



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GLOSSARY

°C	Degrees centigrade
Conversion of ppm to mg/m ³	<p>Where R is the ideal gas constant; T, the temperature in kelvin (273.16 + T°C); and P, the pressure in mm Hg, the conversion is as follows:</p> $\text{mg m}^3 = (P/RT) \times \text{Molecular weight} \times (\text{concentration in ppm})$ $= \frac{P \times \text{Molecular weight} \times (\text{concentration in ppm})}{62.4 \times (273.2 + T^\circ\text{C})}$
	<p>For the purposes of the air quality assessment all conversions were made at 0°C unless stated otherwise.</p>
m	Metre.
m/s	Metres per second
mg/m ³	Milligrams (10 ⁻³) per cubic metre. Conversions from mg/m ³ to parts per volume concentrations (i.e., ppm) are calculated at 0 °C.
µg/m ³	Micrograms (10 ⁻⁶) per cubic metre. Conversions from µg/m ³ to parts per volume concentrations (i.e., ppb) are calculated at 0 °C.
ppb	Parts per billion.
ppm	Parts per million.
75 th percentile	The value exceeded for 25 % of the time. 75 % of values are below this figure.
90 th percentile	The value exceeded for 10 % of the time. 90 % of values are below this figure.



1 INTRODUCTION

Fulton Hogan Egis O&M Pty Ltd (FHEOM) operates and maintains the WestConnex Roadway Tunnels, including the Rozelle Interchange Road tunnels, under Environment Protection License (EPL) 21372 issued by the NSW EPA. In compliance with Condition M2.3 of the EPL, FHEOM is required to install a Continuous Emission Monitoring System (CEMS) to monitor the air pollutants specified in Condition M2.2 at the following release points:

- Release Point 8 - Rozelle Ventilation Facility (Mid)
- Release Point 9 - Iron Cove Ventilation Facility; and
- Release Point 10 - Rozelle Ventilation Facility (West).

Assured Environmental Pty Ltd was commissioned by FHEOM to undertake the operation and maintenance of the CEMS established at these release points. This report includes the following:

- A detailed presentation of all continuous monitoring data as required by condition M2.2 of the EPL, including a comparison with the concentration limits specified in condition L2.2.
- Information on the measurement principles and equipment specifications used for the continuous monitoring.
- A report on any exceedances, including the operating conditions of the tunnel at the time of the exceedances.
- Verification that the CEMS Quality Assurance and Control Procedures were followed throughout the reporting period.

2 VSO EMISSIONS MONITORING

2.1 VSO Locations

The Rozelle Interchange tunnels comprise part of the WestConnex project consists of multiple road tunnel projects including the M4E, M8, M5E and M4-M8 link. Table 2 presents a summary of each of the Ventilation Stack Outlets (VSOs) associated with the Rozelle Interchange and their locations respectively.

Table 2: Tunnel description – EPL 21372

EPA Release Point	Description	Operating	Operational year	Coordinates (WGS84)
8	Rozelle Ventilation Facility (Mid), RRY2	Rozelle Interchange	November 2023	-33.870934, 151.172089
9	Iron Cove Ventilation Facility	Rozelle Interchange	November 2023	-33.861933°, 151.166629°
10	Rozelle Ventilation Facility (West), RRY1	Rozelle Interchange	November 2023	-33.871148°, 151.171713°

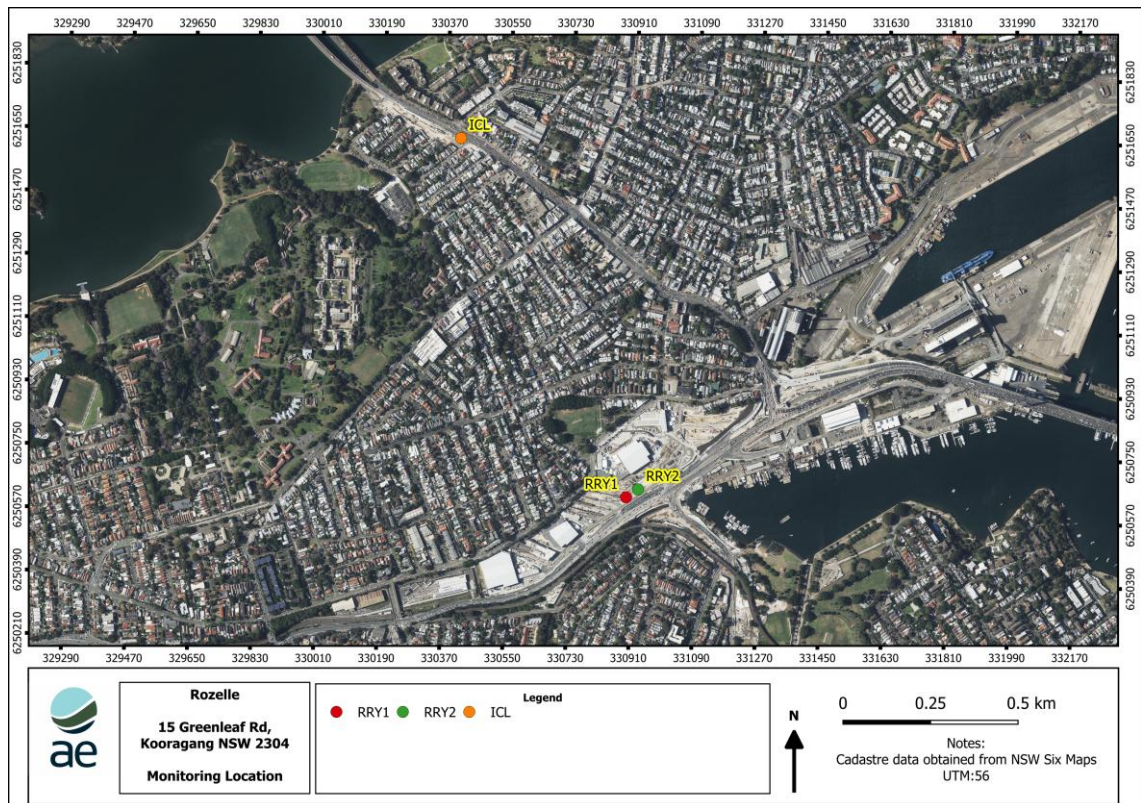


Figure 1: Ventilation Stack Locations



2.2 Monitoring Methodology

The WestConnex Rozelle Interchange project comprises three VSOs. Each of these ventilation outlets is fitted with a CEMS, with all parameters measured directly on each of the exhausts. All gas and particulate matter CEMS use a direct extractive measurement technique to transfer the sample gas from the relevant exhaust ducts to the analysers. This system continuously measures total particulate matter (PM), CO, NO_x, Methane and Nonmethane VOCs, velocity, temperature, and moisture. Table 3 below presents a summary of the instrumentation installed in each of the Rozelle Interchange CEMS to monitor air emissions.

Table 3: Summary of CEMS Instrumentation

Parameter	Analyser Make and Model	Serial Number Release Point 8	Serial Number Release Point 9	Serial Number Release Point 10
Particulate Matter (PM)	Teledyne/T640	1678	1679	1677
NO/NO ₂ /NO _x	Teledyne/N200	73	74	72
CO	Teledyne/N300	57	58	56
VOCs (Methane and Nonmethane)	Teledyne/N901	73	72	74
Velocity	Durag/D-FL 220	VMF4VO3021A /B	VMF4VO4001 A/B	VMF4VO3001A/B
Moisture	Vaisala/HMT330	VMR4VO3021	VMR4VO4001	VMR4VO3001
Temperature	Vaisala/HMT330	VMR4VO3021	VMR4VO4001	VMR4VO3001
Zero Air Generator	Teledyne/N701	VMG4VO3S24	VMG4VO4S04	VMG4VO3S04
Hydrogen Generator	Hydroxichrome	VMG4VO3S26	VMG4VO4S06	VMG4VO3S06
Multi Gas Calibrator	Teledyne/T700	5457	5458	5456
Logger	Trelia Data - Converge	VMD4VO3S22	VMD4VO4S01	VMD4VO502

Table 4 details the parameters monitored and the specific monitoring methodology utilised for the Rozelle Interchange CEMS.

Table 4: Parameters and Instruments

Parameter	Equivalent NSW EPA Test Method	Equivalent Reference Method	Description
NO, NO ₂ , NO _x	CEM-2	AS 3580.5.1:2023 US EPA: RFNA-1194-099	The chemiluminescence light detection is employed for two distinct samples, one dedicated for NO and the other for NO _x . The NO _x sample involves a chemical reaction to transform NO ₂ into NO using Molybdenum converter. The concentration of NO ₂ is then calculated by subtracting NO from NO _x .
PM	TM-15	US EPA: EQPM-0516-236	Measurement of particulate matter by measuring the dispersion of light caused by the solid particles in the air.



CO	CEM-4	AS 3580.7.1:2023 US EPA: RFCA-1093-093	The analyser passes the Infrared light beam through a correlation wheel made up of two separate chambers: one containing a high concentration of CO known as the reference, and the other containing a neutral gas known as the measure. The concentration of CO in the sample chamber is computed by taking the ratio of the instantaneous measure and reference values and then compensating the ratio for sample temperature and pressure.
Methane and nonmethane VOCs	CEM-8	NA	Measurement of Methane (CH ₄) and Volatile Organic Compounds (VOCs) in air using a Flame Ionization Detector (FID), in combination with gas chromatography (GC). The concentration of non-Methane (NMHC) is calculated by the subtraction of CH ₄ from VOC.
Velocity & volumetric flow rate	CEM-6	NA	Two identical measuring heads alternately transmit and receive ultrasonic pulses and measure their transit time. There is a directionally dependent difference in the transit time of the ultrasonic pulses, from which the system precisely calculates the gas velocity and the temperature of the gas that is measured. By reference to the cross-section, the temperature of the gas that is measured and the absolute pressure, the system calculates the volumetric flow rate.
Moisture	Special Method 2	NA	Continuous measurements of temperature and relative humidity using specific transmitters. Moisture is calculated.
Temperature	TM-2	USEPA Method 2	

2.3 Conformity with Standards

Unless stated below, parameters are monitored at the Rozelle Interchange according to the methods detailed in Table 4. In undertaking the monitoring, the following is noted:

- Measurement of solid particles, methane and nonmethane VOCs, temperature, moisture and stack pressure are not covered by Assured Environmental's NATA scope of accreditation.



2.4 Data Acquisition

Data acquisition is performed using a PC based logger situated at each of the monitoring sites. Each logger is equipped with a modem for remote data collection. The recorded data is remotely collected from the CEMS loggers on an hourly basis (using Airodis™) and stored at Assured Environmental's facility in Brisbane. Data samples are logged in 5-minute intervals.

2.5 Data Capture

Data capture refers to the amount of valid data for the reporting period, excluding overnight calibrations, routine maintenance, and power interruptions. It is based on 5-minute data, for all continuously monitored parameters. For the purposes of this report, data capture is calculated using the following formula:

$$DC (\%) = \frac{NVDP}{TNVDP - REDP} \times 100$$

Where:

- *DC = Data capture*
- *NVDP = number of valid data points obtained; Number of samples (instrument readings) which have been validated through a quality assured process and excludes all data errors, zero data collection due to calibration, equipment failures, power interruptions, data transmission errors, planned and unplanned maintenance.*
- *TNVDP = Total number of data points for the period; Total number of samples (instrument readings) expected for the sampling period. Total data is calculated based on the same averaging period as "reported air quality data" and the duration of the corresponding report period. e.g., for 5-minute data collected over a month of 31 days, the total data would be equal to 12 (5-minute samples in an hour) x 24 (hours in a day) x 31 (days in a month) = 8928 samples.*
- *REDP = Reasonable exclusions data points; Reasonable exclusions data points = Number of samples which have been invalidated due to overnight calibrations and routine maintenances.*
- *Tables 11, 12 & 13 below display data capture statistics for the reporting period. Bold values in the table indicate data capture below 90%.*
- *Details of all invalid or missing data affecting data capture are included in the Valid Data Exception Tables, see Section 7.0 and attached Excel files.*

2.6 Uncertainty of Measurement

The measurement uncertainty is dependent on the quality control systems and accredited procedures of the CEMS Operator. The uncertainties for each parameter have been determined by the manufacturer's tolerance limits of the equipment's parameters, and by the data collection standard method. Table 5 presents a summary of the uncertainty of measurement for each VSO.

The reported uncertainties are expanded uncertainties, calculated using a coverage factor K=2, which give a level of confidence of approximately 95%.



Table 5: Units and Uncertainties

Parameter	Units	Resolution	Uncertainty	Measurement Range
NO, NO ₂ & NO _x	ppb	0.1	7.8% of reading	Min: 0-50 Max: 0-20000
CO	ppm	0.1	7.0% of reading	Min: 0-1 Max: 0-1000
PM	µg/m ³	0.1	Not specified yet	0.1 to 10000
VOC	ppm	1	7.5% of reading	Min: 0-5 Max: 0-1000

2.7 Data Validation and Reporting

2.7.1 Validation

The Assured Environmental data validation team performs daily data checks on continuously monitored parameters to ensure maximum data capture rates are maintained. Any equipment failures are communicated to the responsible field technicians for rectification or resolved remotely (where possible). As part of the validation process, two distinct databases (unvalidated and validated) are maintained to enable tracing of any data changes made through the validation process.

The validated database is created by duplicating the non-validated database and then flagging data affected by instrument faults, calibrations and other maintenance activities. The data validation software requires the analyst to supply a valid reason in the database for flagging any data as invalid.

Details of all invalid or missing data are recorded in the Valid Data Exception Tables.

Validation is performed by the analyst, and the validation is reviewed. Graphs and tables are generated based on the validated 5-minute data.

2.7.2 Corrections to Data

Validated Data for gaseous and particulate parameters are reported corrected to dry conditions at standard temperature (0 °C) and standard pressure (101.325 kPa).

In circumstances where data required for correction is not available, the following substitutions are made in the correction formulae applied:

- If moisture (H₂O) data is invalid or null, a value of 2% (based on typical measurements) is substituted for the measured H₂O percentage. This value may be adjusted seasonally.
- Where Temperature and pressure readings are unavailable, substituted values of 20°C and 101 kPa respectively (based on typical values).
- Oxides of Nitrogen are calculated from the sum of NO and NO₂ data and reported as NO_x (NO₂ equivalents).
- VOC results are expressed as propane equivalents in mg/m³.



-
- Volumetric flow rate is calculated at dry conditions using gas properties (temperature, pressure, moisture and velocity) and stack's cross-sectional area.

2.7.3 Reporting

The reported data is in a Microsoft Excel format file named "16032_RO – Validated January 2025.xlsx".

The Excel file consists of 6 Excel worksheets:

1. RRY1 - 5 Minute
2. RRY1 - 1 Hour Data
3. RRY2 - 5 Minute
4. RRY2 - 1 Hour Data
5. ICL - 5 Minute
6. ICL - 1 Hour Data

The data contained in this report is based on Australian Eastern Standard Time.

All averages are calculated from the 5-minute data. Averages are based on a minimum of 75 % valid readings within the averaging period.

AE reports decimal places for concentration values according to relevant Australian Standards and the resolution of each instrument.

Missing data (excluding automatic spans/zeros and background checks) for all stations are explained in Section 7 of this report.



3 AIR QUALITY GOALS

The air quality goals and criteria for pollutants monitored at the Rozelle Interchange CEMS are based on the project EPL No. 21372 Condition L2.2. The air quality goals and criteria shown in Table 6 are specified at reference conditions of 273 K and 101.3 kPa.

Table 6: Current Air Quality Objectives

Parameter	Time Period	Goal	Maximum Allowable Exceedances
Solid particles	1-hour block	1.1 mg/m ³	None
Nitrogen oxides	1-hour block	20 mg/m ³	None
Nitrogen dioxide	1-hour block	2.0 mg/m ³	None
Carbon monoxide	1-hour rolling	40 mg/m ³	None
VOC (as propane)	1-hour rolling	4.0 mg/m ³	None



4 CALIBRATIONS AND MAINTENANCE

4.1 Automatic Calibration Checks

Automatic span and zero checks occur each night for continuously monitored gaseous parameters. Data associated with these checks is invalidated automatically and is excluded from the valid data exception reports. Table 7 displays the times for when these checks occur.

Table 7: Automatic Span/Zero Check Times

Station	Parameter	Span/Zero and Stabilisation Times
Rozelle Ventilation Facility (West), RRY1	CO, NOx, VOC	00:55 – 01:55
Iron Cove Ventilation Facility	CO, NOx, VOC	00:55 – 01:55
Rozelle Ventilation Facility (Mid), RRY2	CO, NOx, VOC	00:55 – 01:55

4.2 Last Calibration and Maintenance Performed/Scheduled

The last calibration for the following parameters were performed on the indicated dates. Data supplied after this time is subject to further validation, to be performed at the next calibration cycle. Table 8, Table 8 and Table 9 indicate when the equipment was last maintained and calibrated.

Table 8: Maintenance and Calibration – Release Point 8 - Rozelle Ventilation Facility (Mid)

Parameter	Date of last Maintenance	Maintenance Type	Date of last Calibration	Calibration Cycle
NO, NO ₂ , NO _x	07/02/2025	Monthly	07/02/2025	Monthly
	Scheduled	Quarterly		
	Scheduled	Semi-annual	Scheduled	Quarterly
Solid particles	08/01/2025	Annual	07/02/2025	Monthly ^a
	07/02/2025	Monthly		
	Scheduled	Semi-annual		
CO	08/01/2025	Annual	07/02/2025	Monthly
	07/02/2025	Monthly		
	08/01/2025	Annual		
VOC	07/02/2025	Monthly	07/02/2025	Monthly

^a Zero calibration



Table 9: Maintenance and Calibration – Release Point 9 - Iron Cove Ventilation Facility

Parameter	Date of last Maintenance	Maintenance Type	Date of last Calibration	Calibration Cycle
NO, NO ₂ , NO _x	05/02/2025	Monthly	05/02/2025	Monthly
	Scheduled	Quarterly		
	Scheduled	Semi-annual	Scheduled	Quarterly
	14/01/2025	Annual		
Solid particles	05/02/2025	Monthly	05/02/2025	Monthly ^b
	Scheduled	Semi-annual		
	14/01/2025	Annual		
CO	05/02/2025	Monthly	05/02/2025	Monthly
	14/01/2025	Annual		
VOC	05/02/2025	Monthly	05/02/2025	Monthly

Table 10: Maintenance and Calibration – Release Point 10 - Rozelle Ventilation Facility (West)

Parameter	Date of last Maintenance	Maintenance Type	Date of last Calibration	Calibration Cycle
NO, NO ₂ , NO _x	07/02/2025	Monthly	07/02/2025	Monthly
	Scheduled	Quarterly		
	Scheduled	Semi-annual	Scheduled	Quarterly
	16/01/2025	Annual		
Solid particles	07/02/2025	Monthly	07/02/2025	Monthly ^b
	Scheduled	Semi-annual		
	16/01/2025	Annual		
CO	07/02/2025	Monthly	07/02/2025	Monthly
	16/01/2025	Annual		
VOC	07/02/2025	Monthly	07/02/2025	Monthly

^b Zero calibration



5 RESULTS

5.1 Data Capture

The data presented in the tables below reflect the data availability for the reporting period.

Table 11: Data capture (%) - Release Point 8 - Rozelle Ventilation Facility (Mid)

Month	CO	Solid particles	VOC	NO ₂	NO _x	Temp	Moisture	Velocity	Flow rate
January 2025	90.9	94.0	73.4	90.9	90.9	100	100	19.6	19.6

Table 12: Data capture - Release Point 9 - Iron Cove Ventilation Facility

Month	CO	Solid particles	VOC	NO ₂	NO _x	Temp	Moisture	Velocity	Flow rate
January 2025	94.9	97.8	94.4	94.6	94.6	97.8	97.8	97.8	97.8

Table 13: Data capture - Release Point 10 - Rozelle Ventilation Facility (West)

Month	CO	Solid particles	VOC	NO ₂	NO _x	Temp	Moisture	Velocity	Flow rate
January 2025	90.6	99.7	55.8	90.5	90.5	99.7	99.7	99.7	99.7

5.2 Exceedances

The following tables represent the number of exceedances at each monitoring station. Exceedances are only reported when the hourly concentrations are above the Air Quality Objectives (Table 6). The measurement uncertainty (Table 5) is not considered when assessing the exceedances.

Table 14: Exceedances Record – Release Point 8 - Rozelle Ventilation Facility (Mid)

Month	CO	Solid particles	VOC	NO ₂	NO _x
January 2025	0	0	0	0	0

Table 15: Exceedances Record – Release Point 9 - Iron Cove Ventilation Facility

Month	CO	Solid particles	VOC	NO ₂	NO _x
January 2025	0	0	0	0	0

Table 16: Exceedances Record – Release Point 10 - Rozelle Ventilation Facility (West)

Month	CO	Solid particles	VOC	NO ₂	NO _x
January 2025	0	0	0	0	0



5.3 1-hour Average Concentrations

This section presents a summary of 1-hour average measured contaminant concentrations across the reporting period.

Table 17: Maximum 1-hour values – Release Point 8 - Rozelle Ventilation Facility (Mid)

Parameter	Goal	Month	Maximum	75 th Percentile	90 th Percentile	Average
CO (mg/m ³)	40	January 2025	9.9	3.2	3.9	2.4
VOC (mg/m ³)	4.0	January 2025	1.2	0.80	0.88	0.75
Solid particles (mg/m ³)	1.1	January 2025	0.17	0.03	0.03	0.02
NO ₂ (mg/m ³)	2.0	January 2025	0.50	0.18	0.28	0.11
NO _x (mg/m ³)	20	January 2025	5.6	1.5	2.4	1.0

Table 18: Maximum 1-hour values – Release Point 9 - Iron Cove Ventilation Facility

Parameter	Goal	Month	Maximum	75 th Percentile	90 th Percentile	Average
CO (mg/m ³)	40	January 2025	4.2	2.4	2.8	1.7
VOC (mg/m ³)	4.0	January 2025	0.99	0.67	0.71	0.61
Solid particles (mg/m ³)	1.1	January 2025	0.08	0.02	0.02	0.01
NO ₂ (mg/m ³)	2.0	January 2025	0.30	0.13	0.20	0.09
NO _x (mg/m ³)	20	January 2025	2.8	1.4	1.9	0.91

Table 19: Maximum 1-hour values – Release Point 10 - Rozelle Ventilation Facility (West)

Parameter	Goal	Month	Maximum	75 th Percentile	90 th Percentile	Average
CO (mg/m ³)	40	January 2025	5.0	2.5	3.2	1.6
VOC (mg/m ³)	4.0	January 2025	1.2	0.64	0.74	0.61
Solid particles (mg/m ³)	1.1	January 2025	0.19	0.02	0.03	0.03
NO ₂ (mg/m ³)	2.0	January 2025	0.51	0.12	0.22	0.09
NO _x (mg/m ³)	20	January 2025	4.3	1.3	2.2	0.95



6 GRAPHIC REPRESENTATIONS

6.1.1 Overview

This section displays data trends of the pollutants and gas properties monitored for the reporting period. The trends are based on validated 1 hour average and 5-minute data as appropriate.

For each monitoring station, graphical representations of the monitoring data are presented as follows:

CO data trends: Figure 2, Figure 11 and Figure 20 provide data trends of 1-hour rolling average CO concentrations observed across the monitoring period.

VOC data trends: Figure 3, Figure 12 and Figure 21 provide data trends of 1-hour rolling average VOC concentrations observed across the monitoring period.

Solid particles data trends: Figure 4, Figure 13 and Figure 22 provide data trends of 1-hour average solid particles concentrations observed across the monitoring period.

Nitrogen dioxide data trends: Figure 5, Figure 14 and Figure 23 provide data trends of 1-hour average nitrogen dioxide concentrations observed across the monitoring period.

Nitrogen oxides data trends: Figure 6, Figure 15 and Figure 24 provide data trends of 1-hour average nitrogen oxides concentrations observed across the monitoring period.

Temperature data trends: Figure 7, Figure 16 and Figure 25 provide data trends of 1-hour average gas temperatures observed across the monitoring period.

Moisture data trends: Figure 8, Figure 17 and Figure 26 provide data trends of 1-hour average gas moisture observed across the monitoring period.

Velocity data trends: Figure 9, Figure 18 and Figure 27 provide data trends of 1-hour average gas velocity observed across the monitoring period.

Flow rate data trends: Figure 10, Figure 19 and Figure 28 provide data trends of 1-hour average gas flow rate observed across the monitoring period.



6.1.2 Release Point 8 - Rozelle Ventilation Facility (Mid)

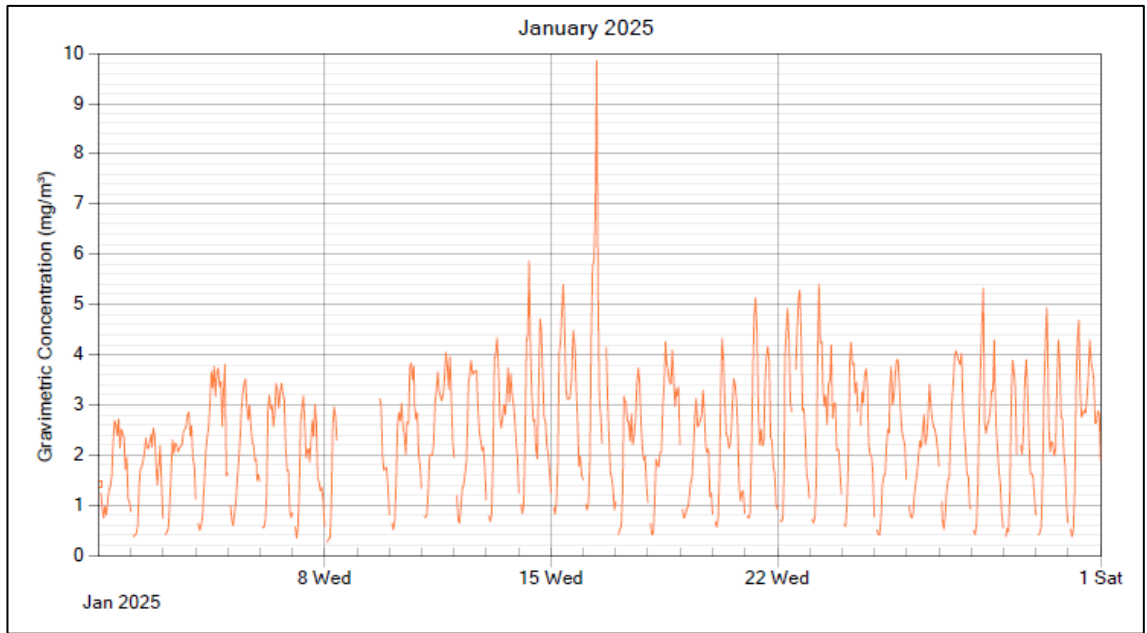


Figure 2: 1- Hour Rolling Average CO Concentrations at Rozelle Ventilation Facility (Mid), January 2025^c

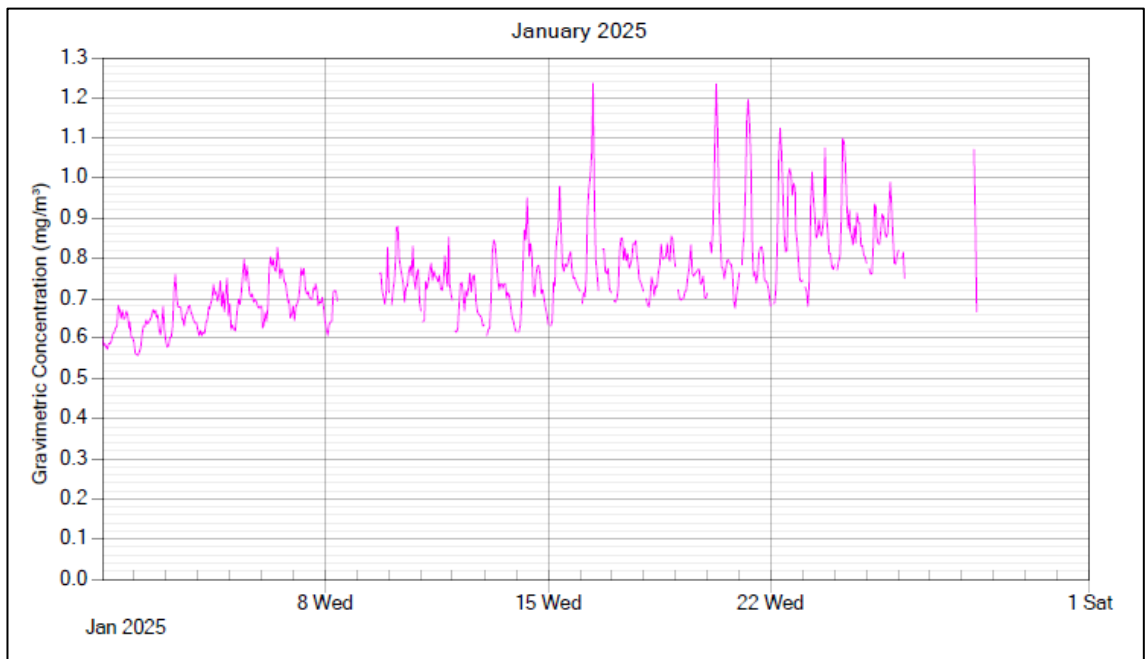


Figure 3: 1- Hour Rolling Average VOC (as Propane) Concentrations at Rozelle Ventilation Facility (Mid), January 2025

^c A spike in CO concentration was observed on 16th January between 10:05 AM and 11:00 AM. The spike could be attributed to emissions from vehicle exhaust.

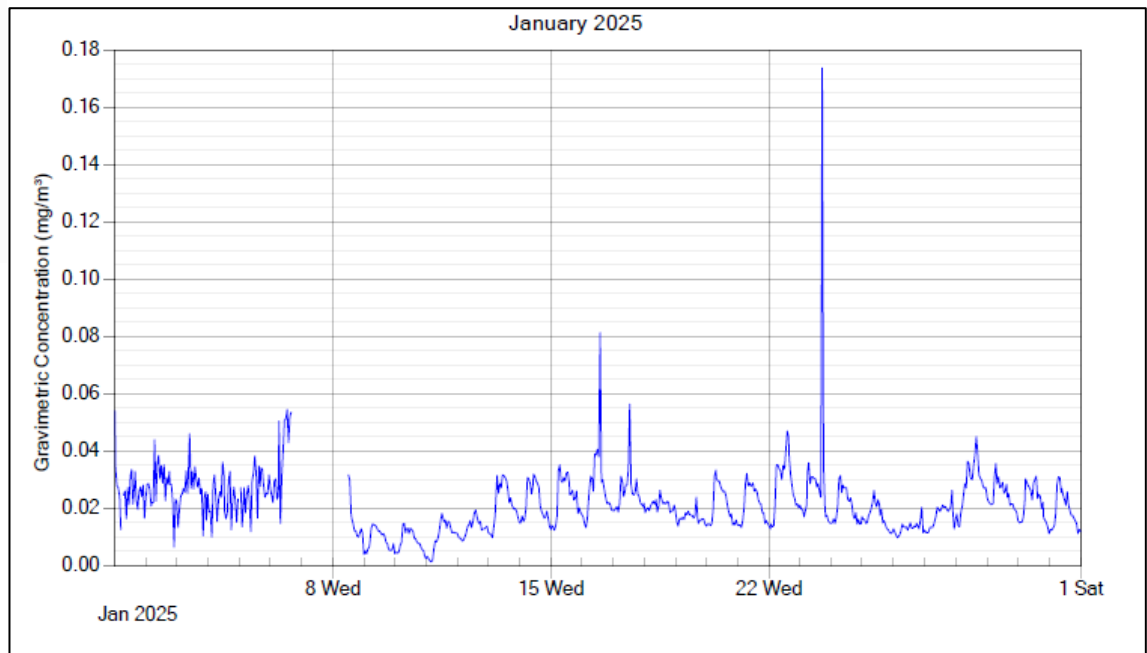


Figure 4: 1- Hour Average Solid Particles Concentrations at Rozelle Ventilation Facility (Mid), January 2025^d

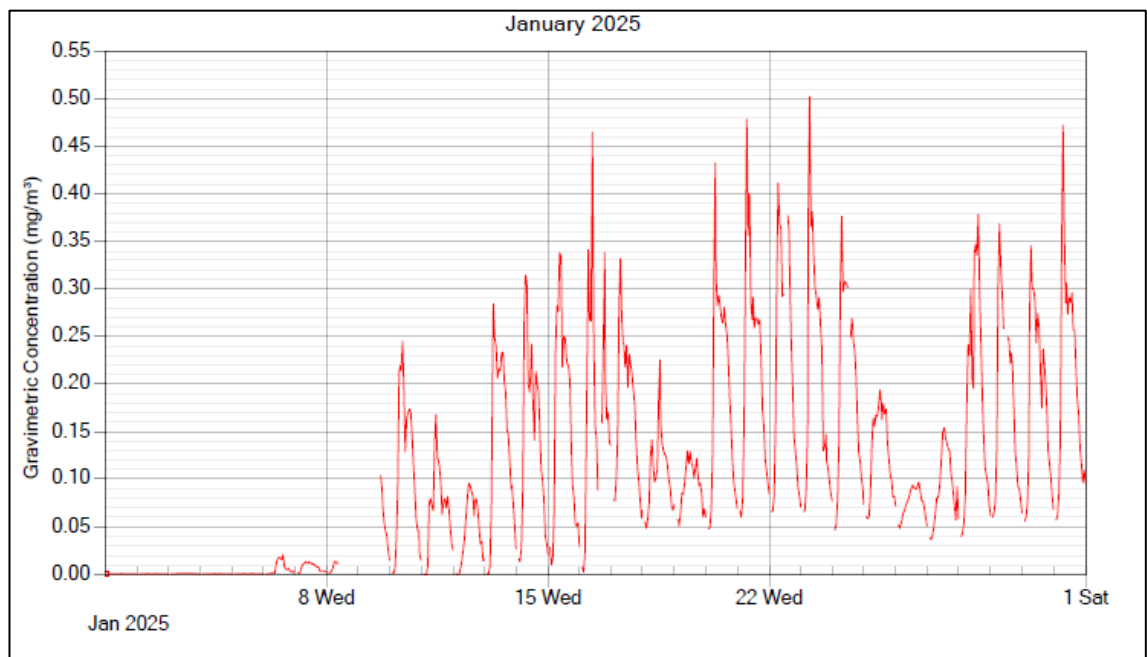


Figure 5: 1- Hour Average Nitrogen Dioxide Concentrations at Rozelle Ventilation Facility (Mid), January 2025

^d A spike in solid particle concentration was observed on 23rd January between 5:05 PM and 5:25 PM. The spike could be attributed to emissions from vehicle exhaust or to an increase in stack velocity, which may have caused the resuspension of solid particles within the tunnel. Note that stack velocity was not measured during this time due to a technical issue with the sensor.

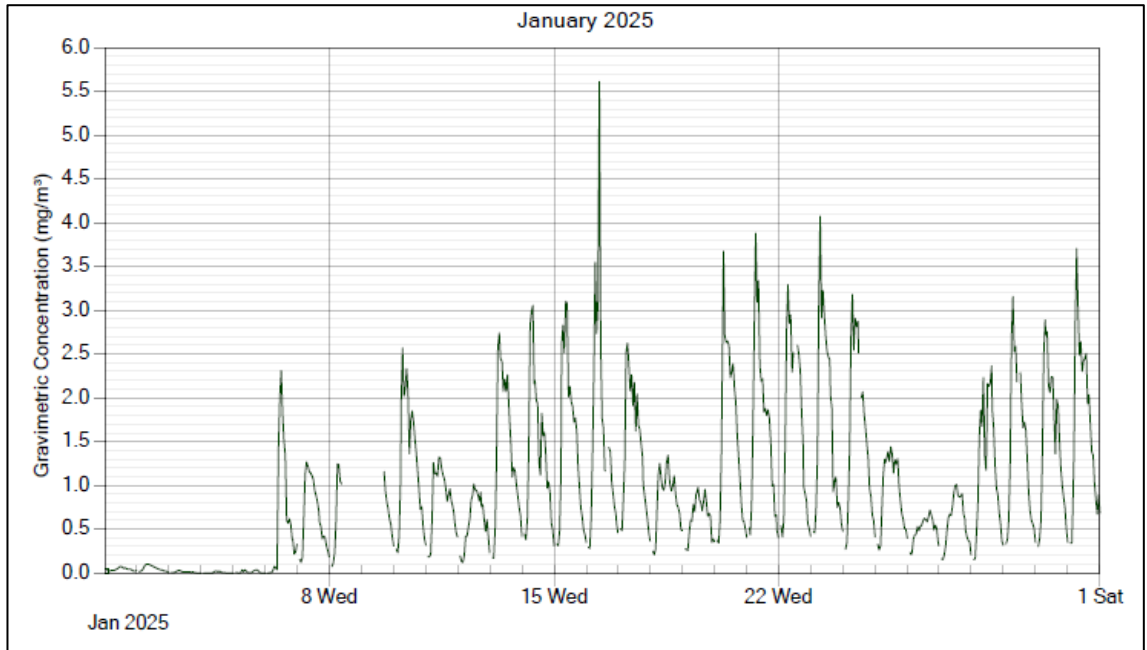


Figure 6: 1- Hour Average Nitrogen Oxides Concentrations at Rozelle Ventilation Facility (Mid), January 2025

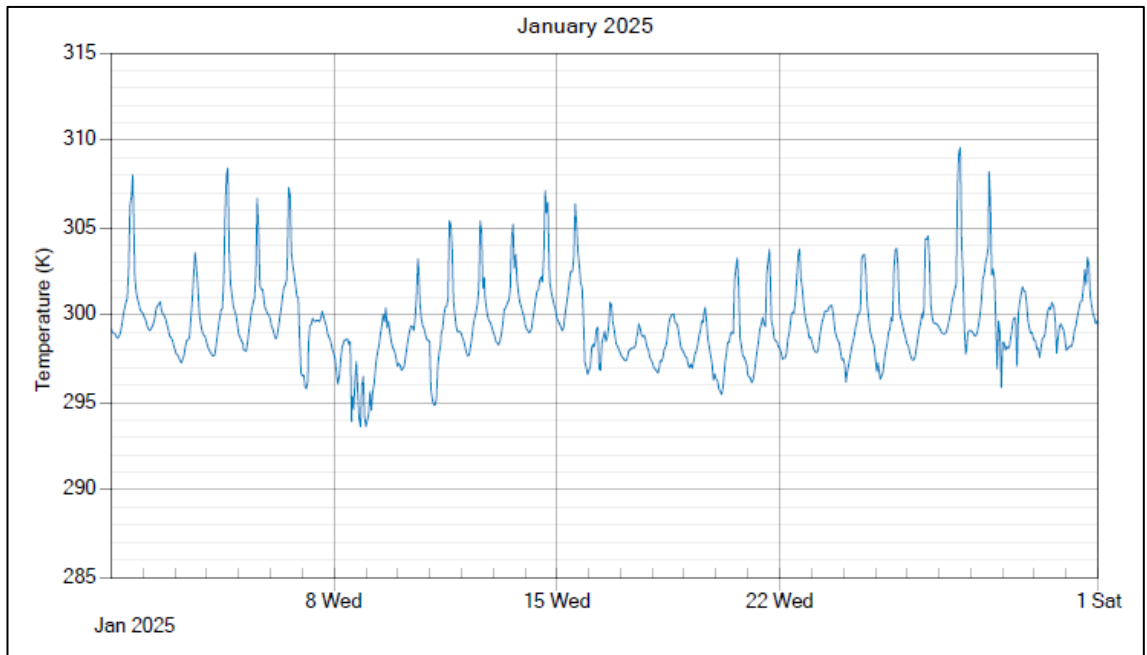


Figure 7: 1- Hour Average Temperature at Rozelle Ventilation Facility (Mid), January 2025

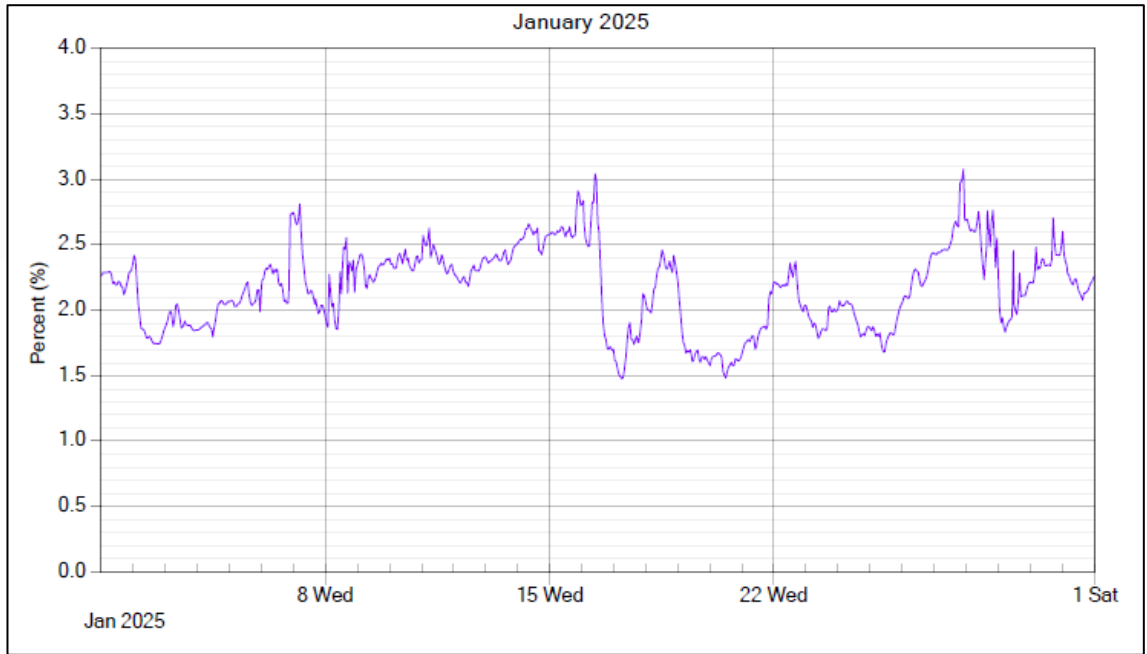


Figure 8: 1- Hour Average Moisture at Rozelle Ventilation Facility (Mid), January 2025

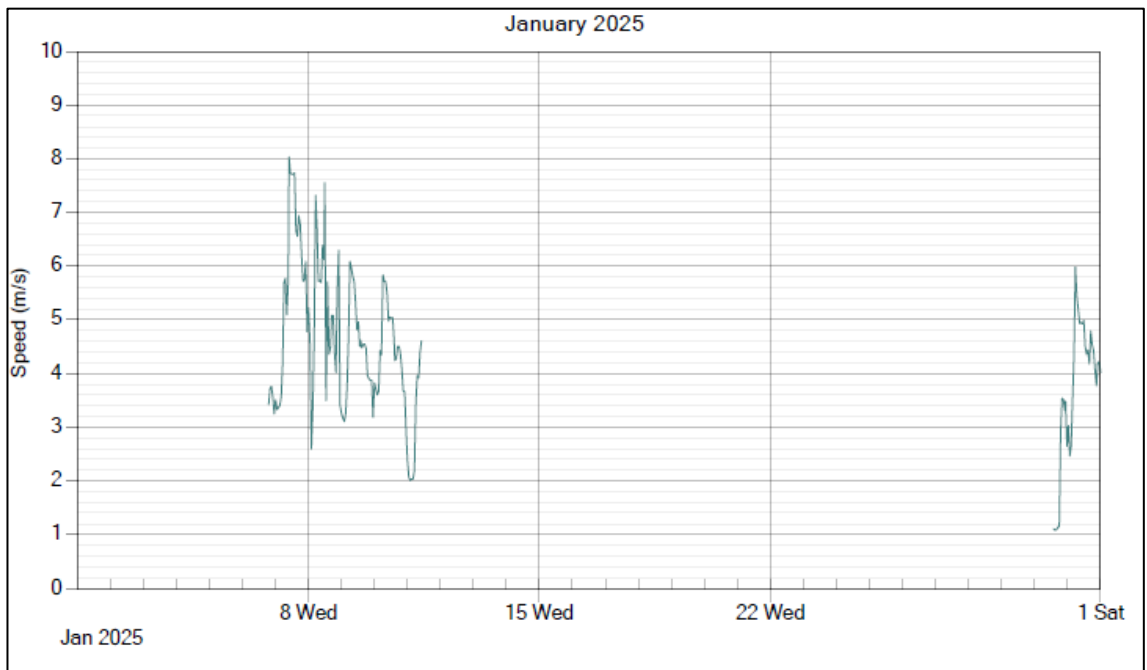


Figure 9: 1- Hour Average Velocity at Rozelle Ventilation Facility (Mid), January 2025

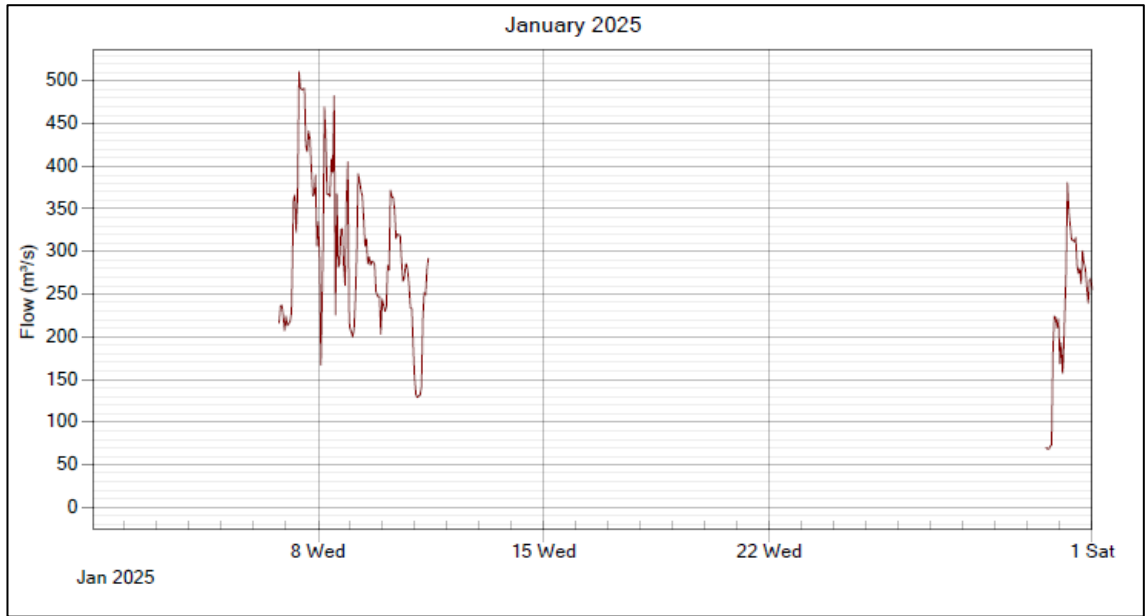


Figure 10: 1- Hour Average Flow Rate at Rozelle Ventilation Facility (Mid), January 2025

6.1.3 Release Point 9 - Iron Cove Ventilation Facility

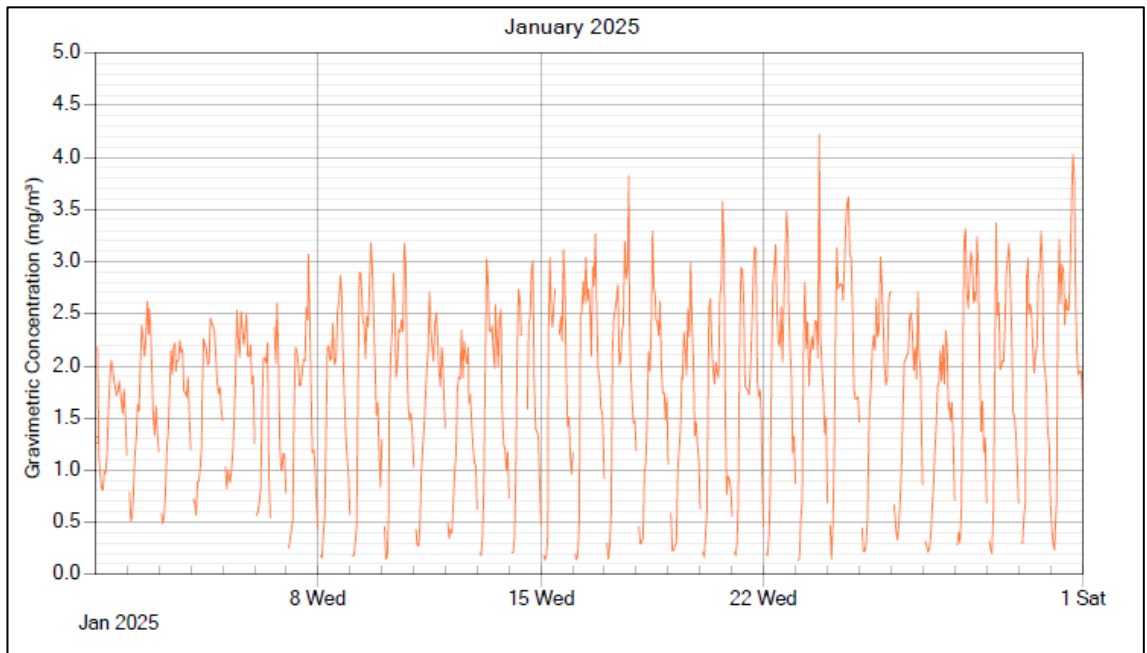


Figure 11: 1- Hour Rolling Average CO Concentrations at Iron Cove Ventilation Facility, January 2025

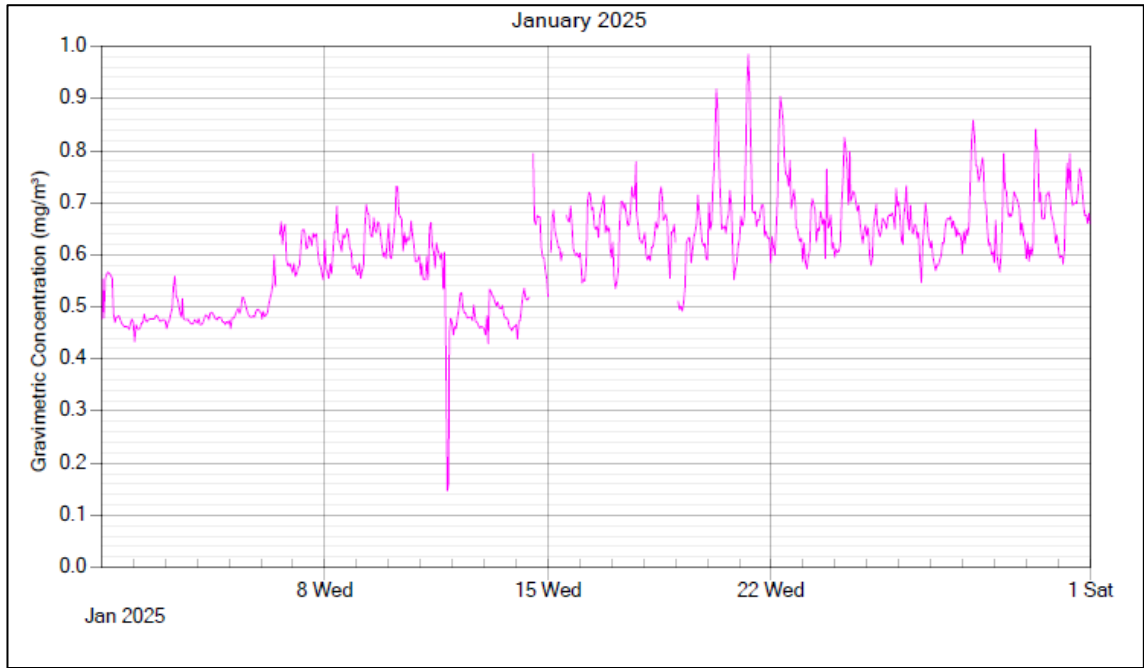


Figure 12: 1- Hour Rolling Average VOC (as Propane) Concentrations at Iron Cove Ventilation Facility, January 2025

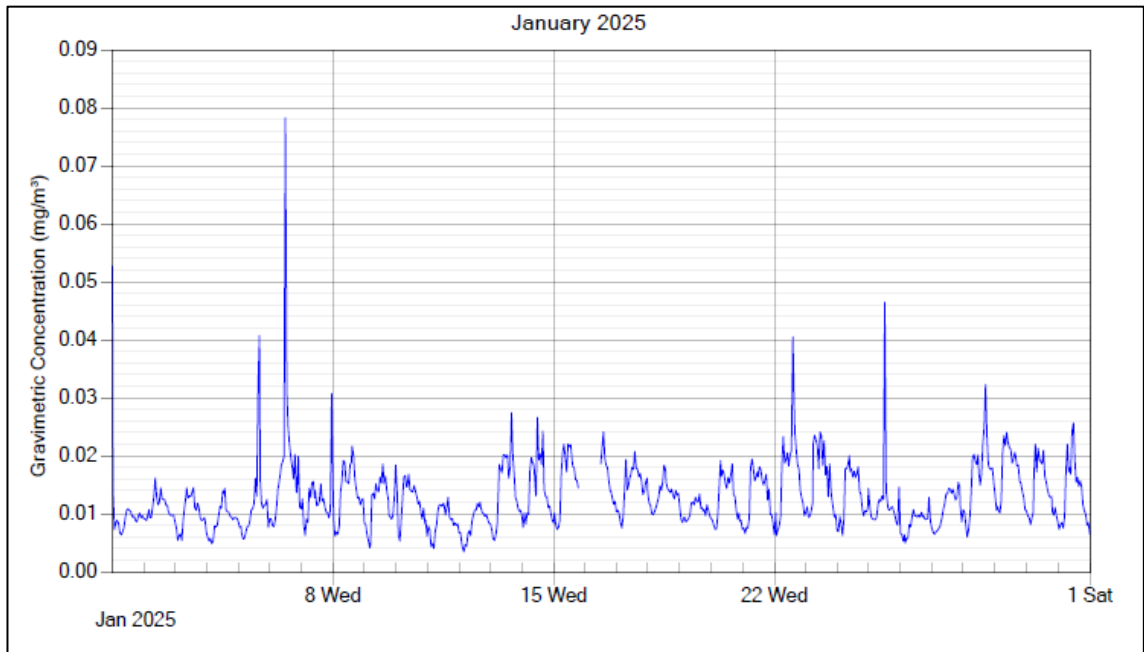


Figure 13: 1- Hour Average Solid Particles Concentrations at Iron Cove Ventilation Facility, January 2025

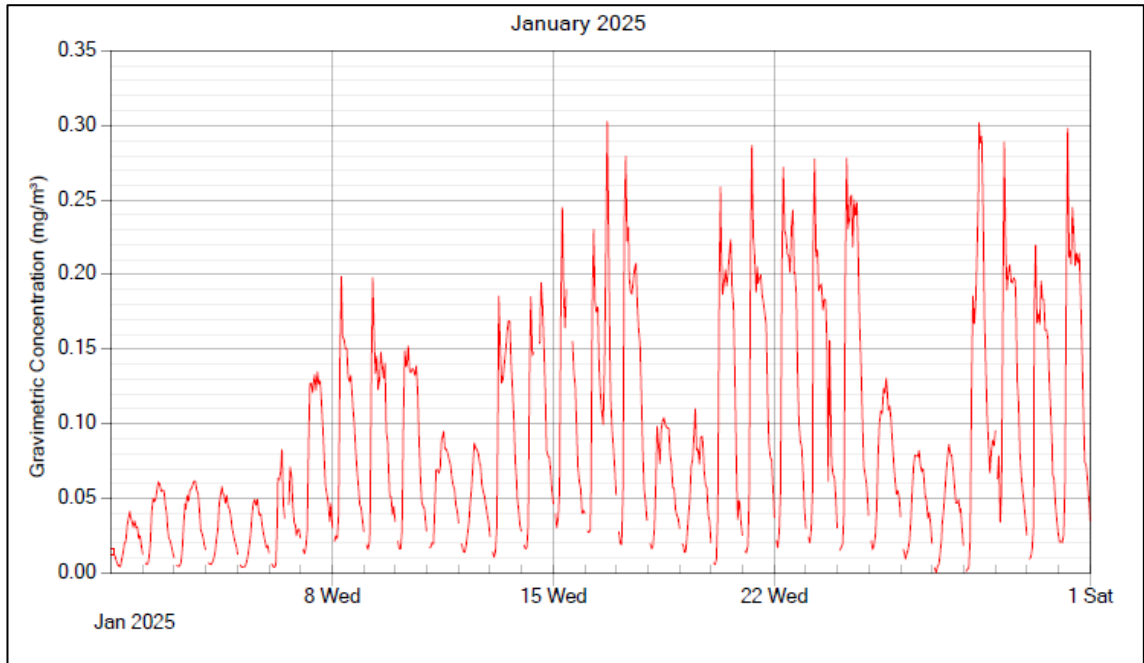


Figure 14: 1- Hour Average Nitrogen Dioxide Concentrations at Iron Cove Ventilation Facility, January 2025

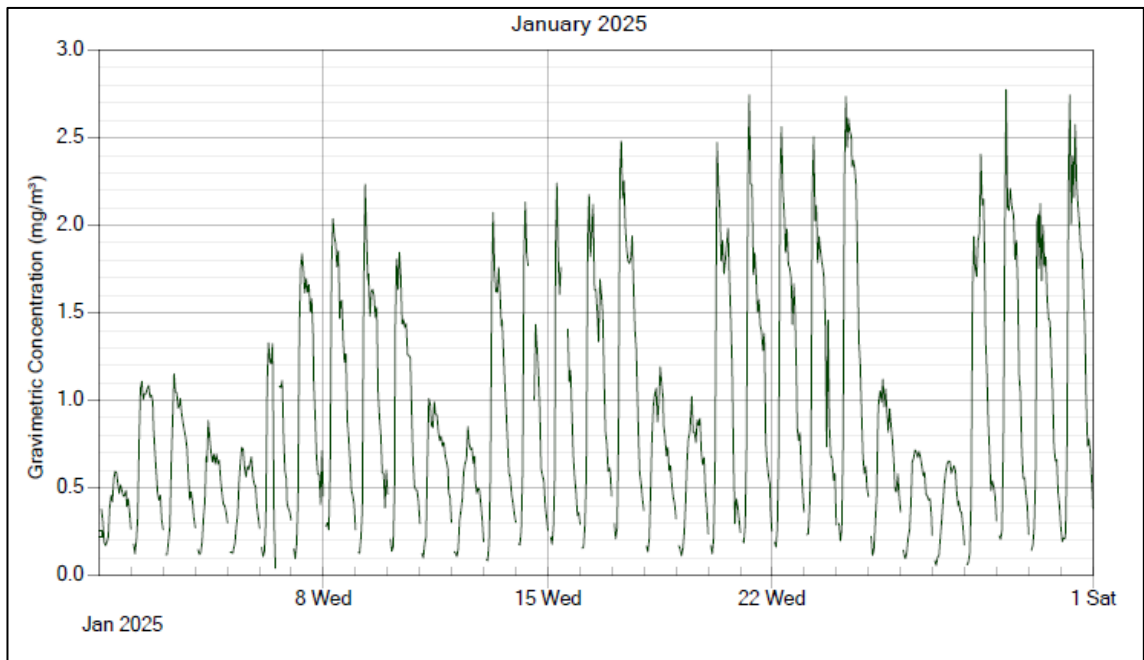


Figure 15: 1- Hour Average Nitrogen Oxides Concentrations at Iron Cove Ventilation Facility, January 2025

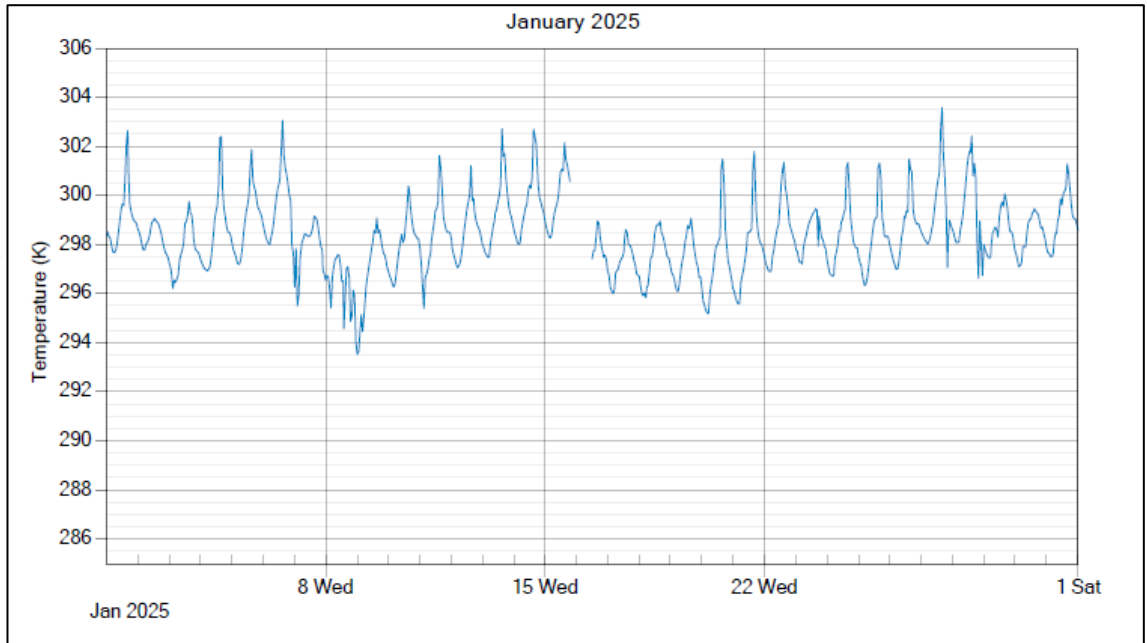


Figure 16: 1- Hour Average Temperature at Iron Cove Ventilation Facility, January 2025

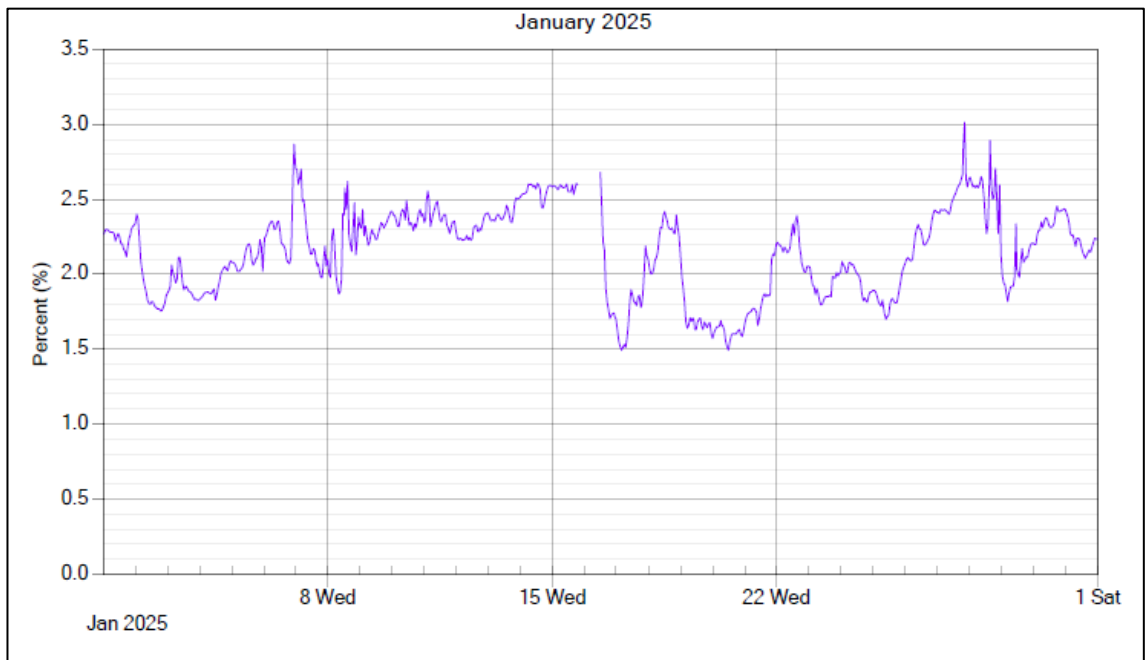


Figure 17: 1- Hour Average Moisture at Iron Cove Ventilation Facility, January 2025

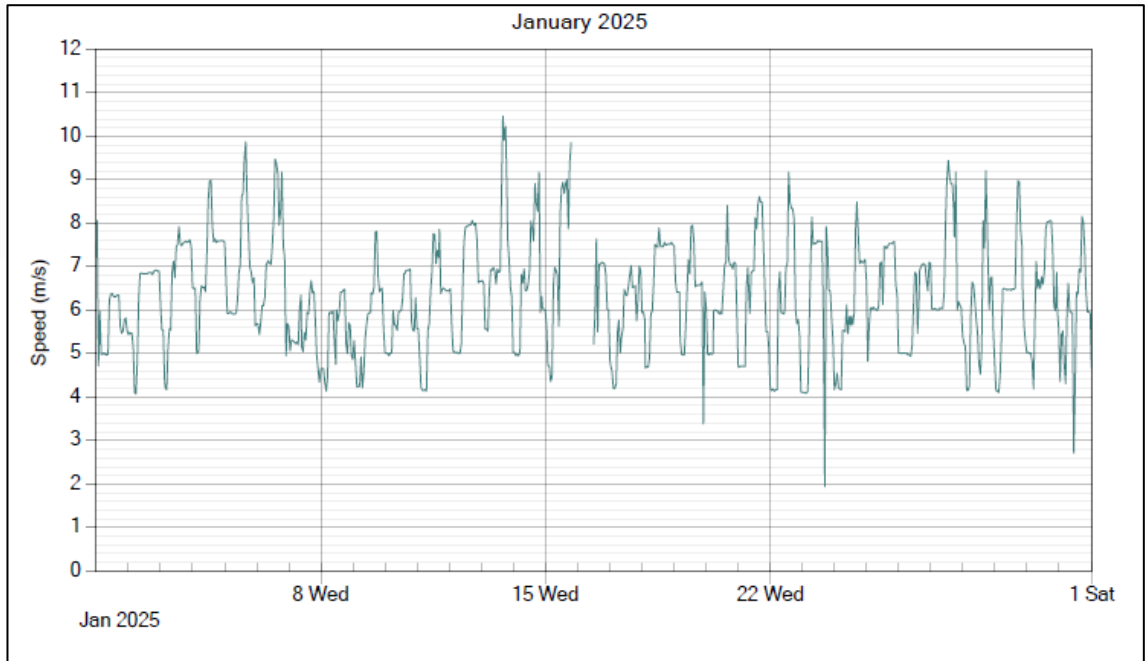


Figure 18: 1- Hour Average Velocity at Iron Cove Ventilation Facility, January 2025

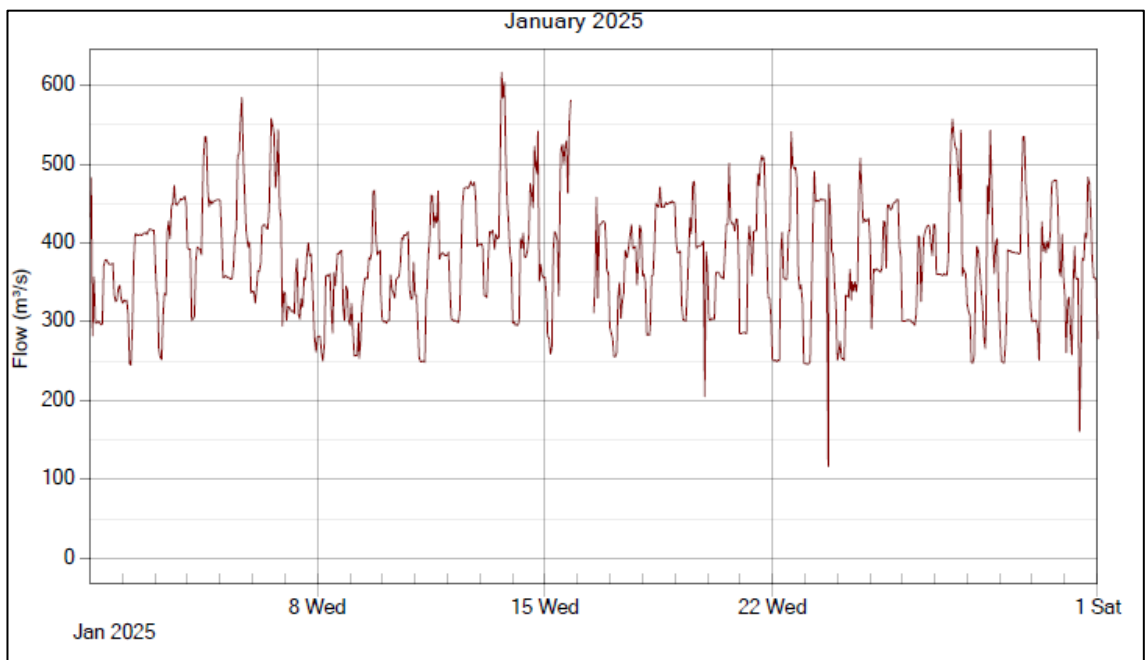


Figure 19: 1- Hour Average Flow Rate at Iron Cove Ventilation Facility, January 2025



6.1.4 Release Point 10 - Rozelle Ventilation Facility (West)

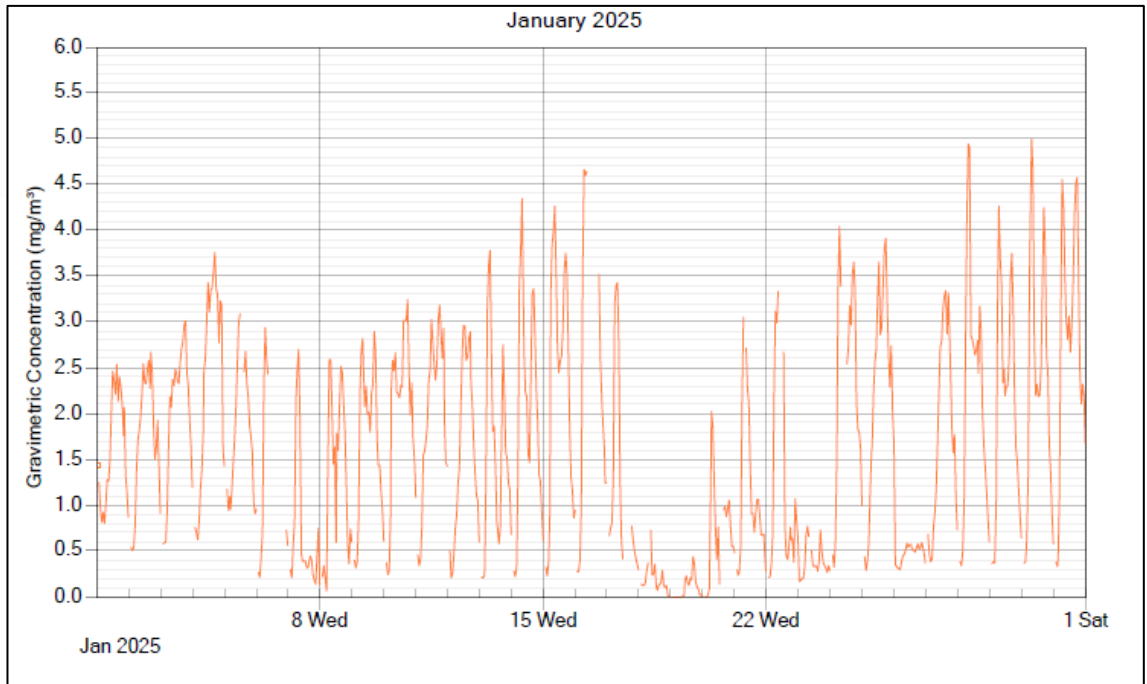


Figure 20: 1- Hour Rolling Average CO Concentrations at Rozelle Ventilation Facility (West), January 2025

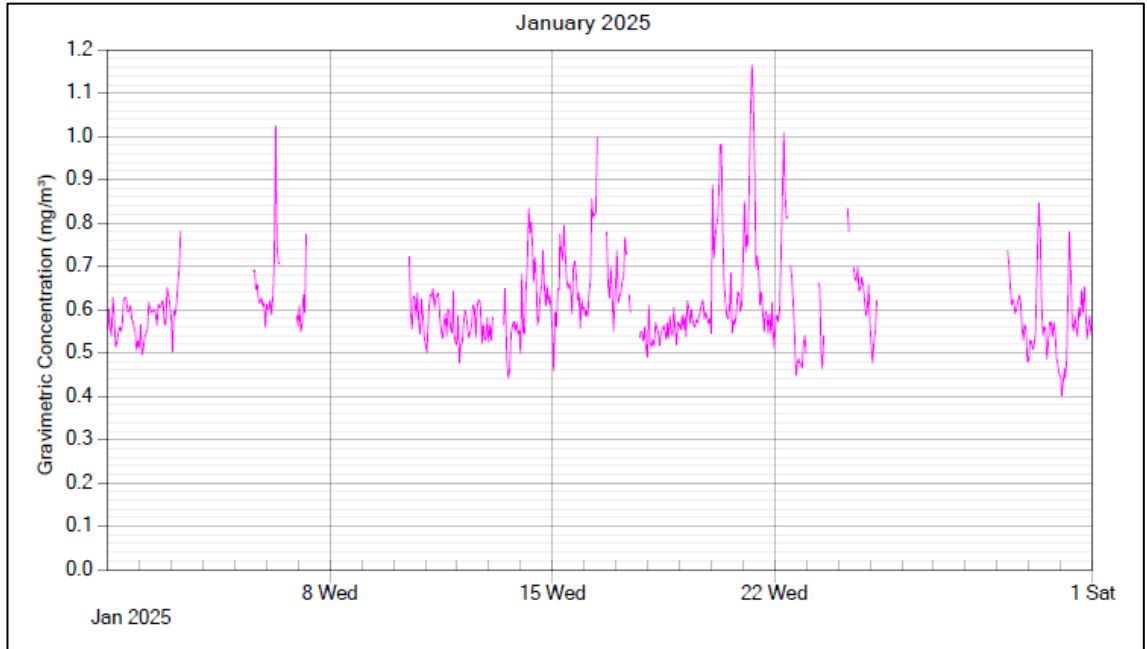


Figure 21: 1- Hour Average VOC (as Propane) Concentrations at Rozelle Ventilation Facility (West), January 2025

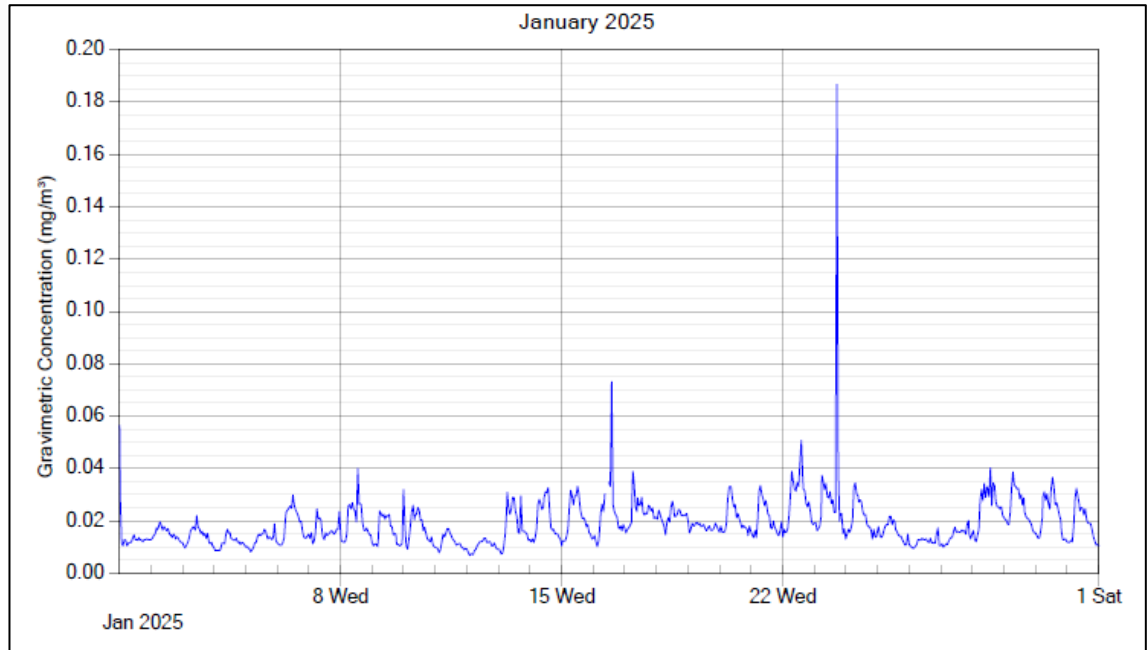


Figure 22: 1- Hour Average Solid Particles Concentrations at Rozelle Ventilation Facility (West), January 2025^e

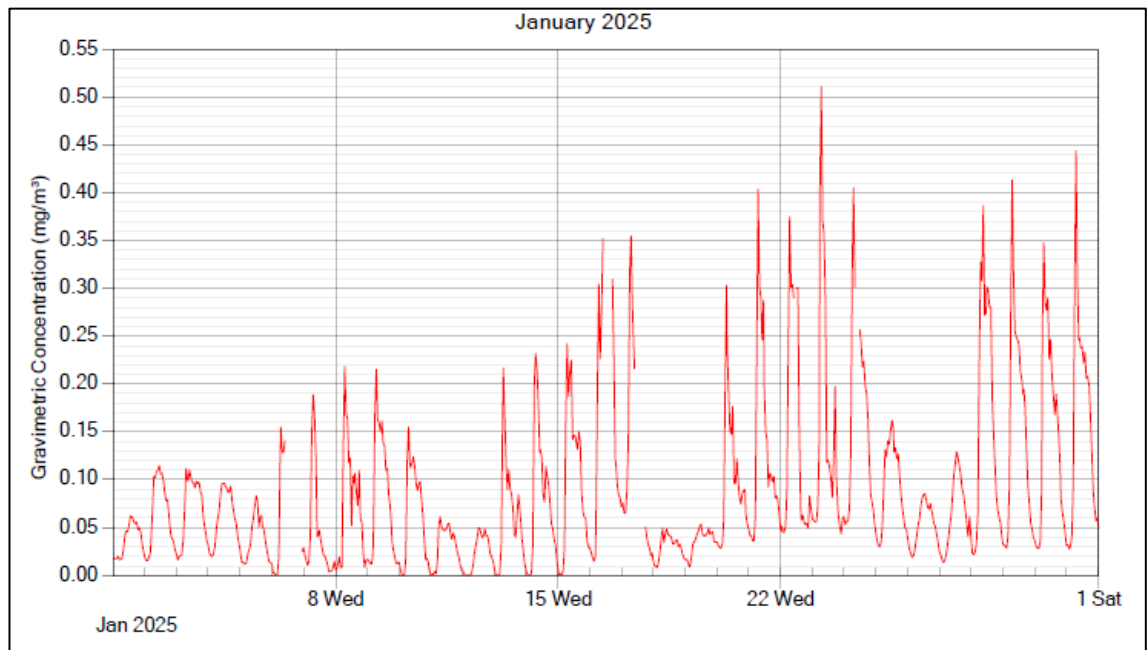


Figure 23: 1- Hour Average Nitrogen Dioxide Concentrations at Rozelle Ventilation Facility (West), January 2025

^e A spike in solid particles concentration was observed on 23rd January between 5:05 PM and 5:25 PM. The spike could be attributed to emissions from vehicle exhaust, as the results align with the spike recorded at Rozelle Ventilation Facility (Mid).

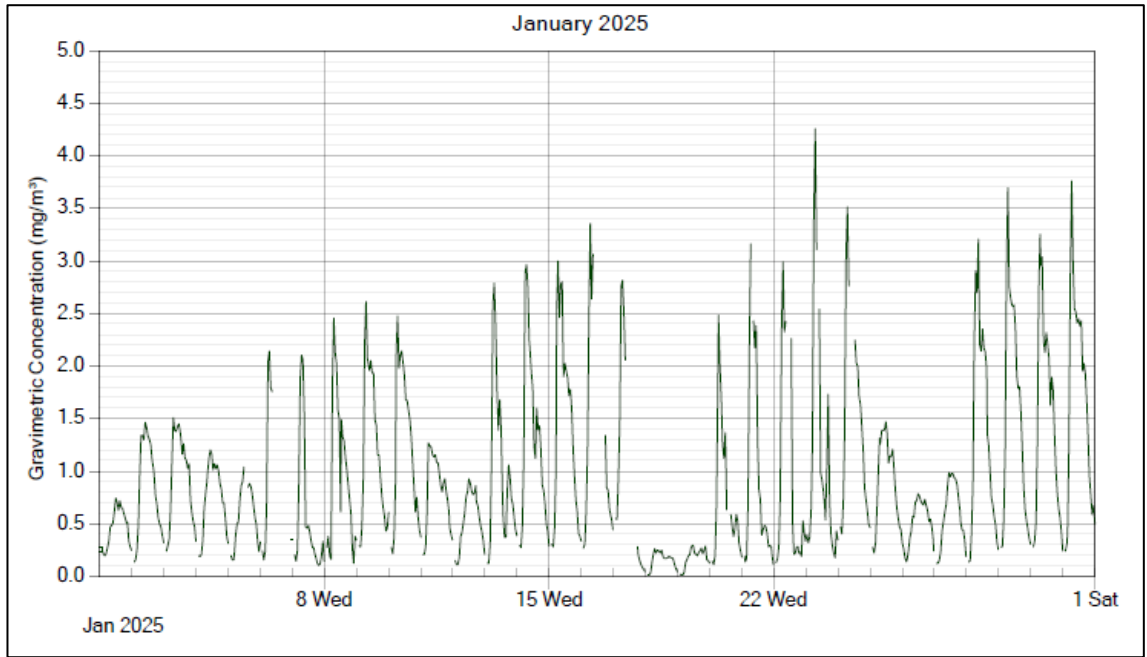


Figure 24: 1- Hour Average Nitrogen Oxides Concentrations at Rozelle Ventilation Facility (West), January 2025

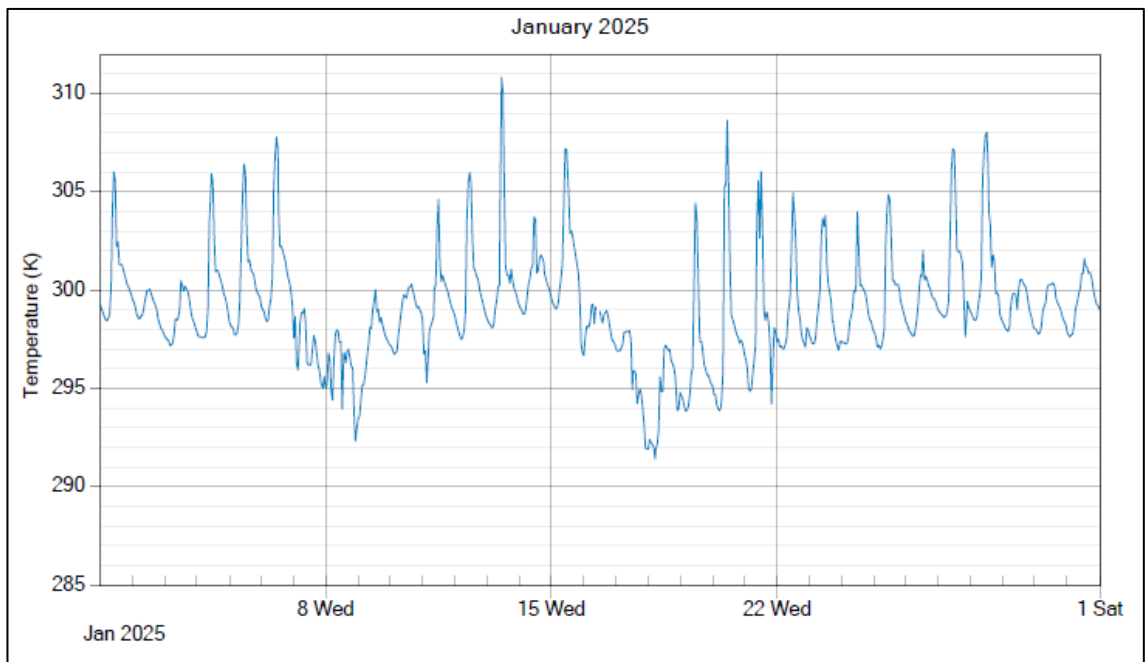


Figure 25: 1- Hour Average Temperature at Rozelle Ventilation Facility (West), January 2025

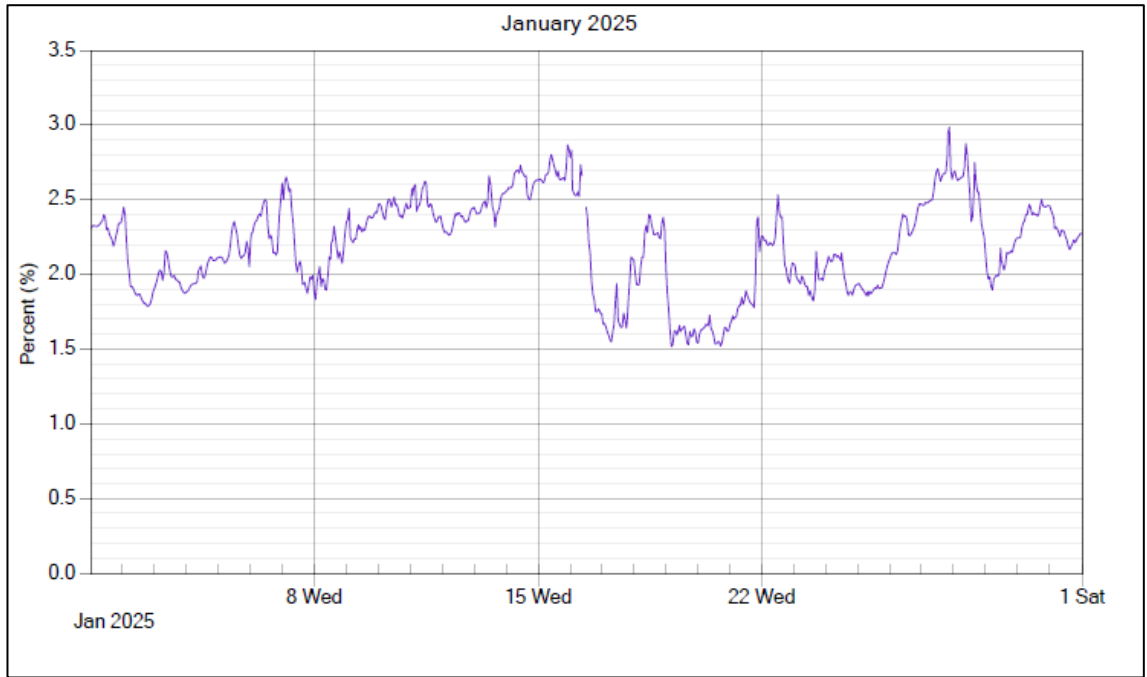


Figure 26: 1- Hour Average Moisture at Rozelle Ventilation Facility (West), January 2025

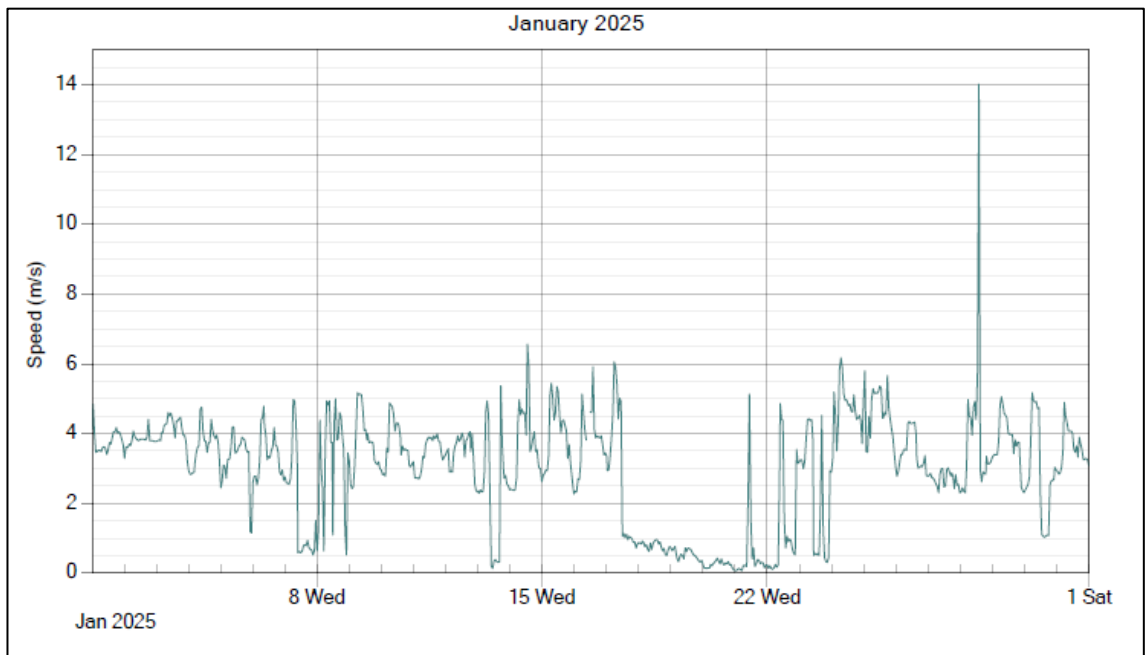


Figure 27: 1- Hour Average Velocity at Rozelle Ventilation Facility (West), January 2025

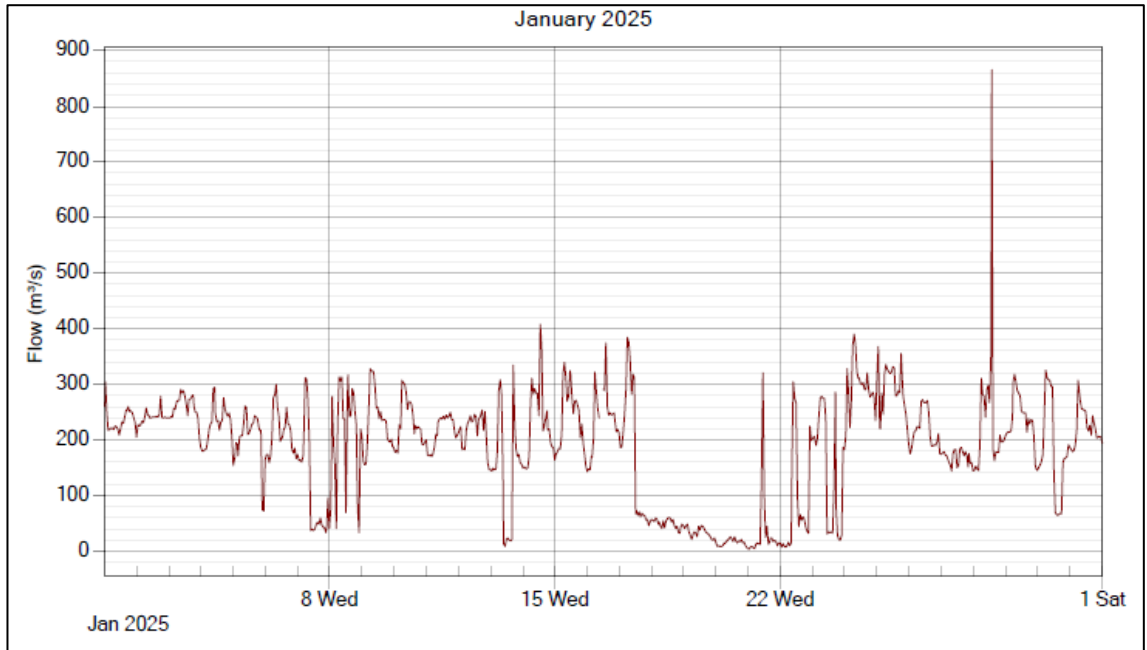


Figure 28: 1- Hour Average Flow Rate at Rozelle Ventilation Facility (West), January 2025



7 VALID DATA EXCEPTION TABLES

The tables below detail all changes made to the raw data set during the validation process. Data may be invalidated due to a number of reasons, including, but not limited to:

- Daily zero or span checks outside tolerances; and
- Internal instrument error.

Table 20: Valid Data Exception Table – Release Point 8 - Rozelle Ventilation Facility (Mid)

Date	Time	Reason	Change Details	Affected Parameters
01 - 06/01/2025	00:00 - 18:15	Technical issue	Invalidated data	Velocity
11 - 30/01/2025	11:25 - 13:35	Technical issue	Invalidated data	Velocity
08 - 09/01/2025	09:55 - 16:55	Maintenance	Invalidated data	VOC, CO, NO ₂ & NO _x
16/01/2025	14:55 - 17:05	Maintenance/zero and span checks	Invalidated data	VOC, CO, NO ₂ & NO _x
22/01/2025	12:40 - 13:25	Data flatline	Invalidated data	VOC, CO, NO ₂ & NO _x
24/01/2025	13:15 - 13:45	Maintenance/zero and span checks	Invalidated data	VOC, CO, NO ₂ & NO _x
26 - 28/01/2025	05:20 - 09:25	Data flatline	Invalidated data	VOC
28/01/2025	12:05 - 12:10	Maintenance	Invalidated data	CO, NO ₂ & NO _x
29/01/2025	11:25 - 12:25	Maintenance	Invalidated data	CO, NO ₂ & NO _x
28 - 31/01/2025	11:50 - 23:55	Data flatline/Maintenance/zero and span checks	Invalidated data	VOC
31/01/2025	08:10	Maintenance	Invalidated data	Solid particles, VOC, CO, NO ₂ , NO _x , Temperature, Moisture and Velocity

Table 21: Valid Data Exception Table – Release Point 9 - Iron Cove Ventilation Facility

Date	Time	Reason	Change Details	Affected Parameters
06/01/2025	13:05 - 14:20	Maintenance	Invalidated data	CO, NO ₂ & NO _x
06/01/2025	11:25 - 14:20	Data flatline	Invalidated data	VOC
09/01/2025	15:30	Maintenance	Invalidated data	VOC, NO ₂ & NO _x
09/01/2025	15:30 - 15:35	Maintenance	Invalidated data	CO
14/01/2025	10:15 - 13:40	Maintenance/zero and span checks	Invalidated data	VOC, CO, NO ₂ & NO _x
09/01/2025	16:30 - 16:35	Maintenance	Invalidated data	CO
15/01/2025	11:45 - 14:10	Maintenance	Invalidated data	CO



15/01/2025	11:10 – 14:20	Maintenance	Invalidated data	NO ₂ & NO _x
15/01/2025	11:30 – 13:20	Data flatline	Invalidated data	VOC
15/01/2025	13:25 – 14:15	Maintenance	Invalidated data	VOC
15/01/2025	16:35	Maintenance	Invalidated data	Solid particles, VOC, CO, NO ₂ , NO _x , Temperature, Moisture and Velocity
15/01/2025	16:45	Maintenance	Invalidated data	CO
15/01/2025	17:20	Maintenance	Invalidated data	CO
15 - 16/01/2025	20:35 – 11:00	Maintenance	Invalidated data	Solid particles, Temperature, Moisture and Velocity
16/01/2025	11:35 – 11:50	Maintenance	Invalidated data	Solid particles, Temperature, Moisture and Velocity
19/01/2025	19:55	Outliers	Invalidated data	Temperature and Moisture
23/01/2025	10:25	Maintenance	Invalidated data	CO, NO ₂ & NO _x
23/01/2025	10:25 – 10:30	Maintenance	Invalidated data	VOC
30/01/2025	22:20 – 22:25	Maintenance	Invalidated data	Solid particles, Temperature, Moisture and Velocity

Table 22: Valid Data Exception Table – Release Point 10 - Rozelle Ventilation Facility (West)

Date	Time	Reason	Change Details	Affected Parameters
01/01/2025	06:25 – 06:40	Outliers	Invalidated data	Solid particles
04/01/2025	07:55 – 08:05	Outliers	Invalidated data	Solid particles
05/01/2025	00:25 – 00:45	Outliers	Invalidated data	Solid particles
05/01/2025	05:10 – 05:20	Outliers	Invalidated data	Solid particles
06 - 08/01/2025	16:45 – 11:55	Maintenance	Invalidated data	Solid particles
15/01/2025	17:35	Maintenance	Invalidated data	Solid particles, Temperature, Moisture and Velocity
16/01/2025	10:40 – 11:40	Maintenance	Invalidated data	Solid particles, Temperature, Moisture and Velocity
03 - 05/01/2025	07:40 – 13:30	Data flatline	Invalidated data	VOC
05/01/2025	13:35 – 14:25	Maintenance/zero and span checks	Invalidated data	VOC, CO, NO ₂ & NO _x



06/01/2025	10:35 - 22:55	Maintenance	Invalidated data	VOC, CO, NO ₂ & NO _x
07 - 10/01/2025	06:20 - 12:40	Maintenance	Invalidated data	VOC
13/01/2025	03:40 - 11:45	Data flatline	Invalidated data	VOC
16/01/2025	10:05 - 17:45	Maintenance/zero and span checks	Invalidated data	VOC, CO, NO ₂ & NO _x
17/01/2025	09:00 - 09:55	Data flatline	Invalidated data	VOC
17/01/2025	11:55 - 18:05	Data flatline	Invalidated data	VOC
17/01/2025	10:10 - 18:10	Maintenance/zero and span checks	Invalidated data	NO ₂ & NO _x
17/01/2025	13:20 - 18:30	Maintenance/zero and span checks	Invalidated data	CO
17/01/2025	18:30	Maintenance	Invalidated data	CO
18/01/2025	08:35 - 08:50	Maintenance	Invalidated data	CO
18/01/2025	09:25 - 09:30	Maintenance	Invalidated data	CO
20/01/2025	09:10	Maintenance	Invalidated data	Solid particles, VOC, CO, NO ₂ , NO _x , Temperature, Moisture and Velocity
20/01/2025	14:15 - 15:50	Maintenance	Invalidated data	VOC, CO, NO ₂ & NO _x
21/01/2025	08:15 - 08:40	Maintenance	Invalidated data	CO, NO ₂ & NO _x
21/01/2025	08:15 - 08:45	zero and span checks	Invalidated data	VOC
22/01/2025	10:40 - 12:20	Maintenance	Invalidated data	CO, NO ₂ & NO _x
22/01/2025	10:30 - 12:20	Data flatline	Invalidated data	VOC
23/01/2025	09:00 - 09:50	Maintenance	Invalidated data	CO, NO ₂ & NO _x
23/01/2025	01:55 - 09:50	Overnight calibration stuck on	Invalidated data	VOC
23 - 24/01/2025	13:50 - 07:40	Data flatline	Invalidated data	VOC
24/01/2025	08:45 - 12:45	Maintenance/zero and span checks	Invalidated data	VOC, CO, NO ₂ & NO _x
25 - 29/01/2025	05:05 - 08:05	Data flatline	Invalidated data	VOC
29/01/2025	10:50 - 11:15	Zero check	Invalidated data	VOC
29/01/2025	10:50 - 11:10	Zero check	Invalidated data	CO, NO ₂ & NO _x



8 REPORT SUMMARY

Monitoring was conducted at all release points for all parameters, with data availability ranging from 90.5% to 100% across all parameters, except for velocity and VOC at Release Points 8 and 10. The velocity parameter at Release Point 8 had a low data capture rate of 19.6% due to a technical issue with the velocity sensor. VOC instruments at Release Points 8 and 10 experienced issues with data freezing.

The measured hourly levels of CO, VOC, solid particles, NO₂, and NO_x at all release points were below the maximum air quality goals provided in the EPL No. 21372 (Table 6).



9 REFERENCES

Standards Australia. (2023). Methods for sampling and analysis of ambient air Method 5.1: Determination of oxides of nitrogen – Direct-reading instrumental method (AS 3580.5.1).

Standards Australia. (2023). Methods for sampling and analysis of ambient air, Method 7.1: Determination of carbon monoxide – Direct-reading instrumental method (AS 3580.7.1).

Standards Australia. (2020). Methods for sampling and analysis of ambient air, Method 19: Ambient air quality data validation and reporting (AS 3580.19).