FINAL REPORT

TRANS MOUNTAIN PIPELINE WESTRIDGE MARINE TERMINAL

BURNABY, BRITISH COLUMBIA

2025 ANNUAL AIR QUALITY AND METEOROLOGICAL MONITORING REPORT

RWDI #2602729

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1 SUMMARY

This report summarizes ambient air quality measurements made at the Trans Mountain Westridge Marine Terminal (WMT) Air Quality Monitoring (AQM) station during the period from January 1, 2025, to December 31, 2025. This monitoring program addresses the requirements of the Canada Energy Regulator (CER) Condition 52 for the Trans Mountain Expansion Project (TMEP or Project).

The objective of the WMT AQM program during this period was to monitor the ambient air quality in the vicinity of the WMT and other emission sources in the area and assess these measurements relative to the applicable Ambient Air Quality Objectives (AAQOs). The monitoring methods follow the Air Emissions Management Plan for Westridge Marine Terminal (Trans Mountain 2017, CER Condition 52 Filing ID A84415; CER Approval A85416) and the Ambient Air Quality Monitoring Plan for the Westridge Marine Terminal, Burnaby Terminal and Sumas Terminal (AQMP) (Trans Mountain 2020).

The WMT AQM station continuously monitors the following air quality parameters: particulate matter less than 2.5 microns ($PM_{2.5}$), nitrogen oxides (NO_X, NO, NO_2), sulphur dioxide (SO_2), ozone (O_3), total reduced sulphurs (TRS), and benzene, toluene, ethylbenzene, xylene (BTEX), visibility, and diesel particulate matter (DPM) based on black carbon. Additionally, the station has a sequential sampler for fine particulate $PM_{2.5}$ speciation and two passive samplers for NO_2 and SO_2. This AQM station also continuously monitors the following meteorological parameters: wind speed, wind direction, ambient temperature, relative humidity, barometric pressure, and precipitation. Data recovery rates over the course of the year were above 90.9%, except for visibility. Visibility had availability of 57.4%.

From January 1, 2025, to December 31, 2025, there were two (2) exceedances of the Metro Vancouver Regional District (MVRD) 24-hour $PM_{2.5}$ AAQO. These $PM_{2.5}$ exceedances occurred in September 2025 and were likely the result of wildfire smoke.

There were no exceedances of the annual AAQOs for $PM_{2.5}$, NO_2, SO_2, or benzene.

Overall, ambient air quality monitoring indicates WMT operations are likely not having an adverse impact on local or regional ambient air quality.

Air Quality Monitoring Station Location
Westridge Marine Terminal

Map Projection: NAD 1983 UTM Zone 10N
Trans Mountain Pipeline - Burnaby, B.C.

True North

Project #: 2105728

Drawn by: PIP	Figure: 1
Approx. Scale:	1:5,000
Date Revised: Feb 26, 2025	

Map Document: C:\Working Folder\Jobs_America\P2105728\P2105728_TMEP.aprx

2 BACKGROUND

2.1 Geographical Area

The location of the WMT AQM station is shown in **Figure 1**. The WMT AQM station is located to the west of the jet fuel tank bay. The marine terminal sits on the south side of Burrard inlet, at the base of Burnaby Mountain, across from the entrance to Indian Arm. The surrounding land use is a mixture of forest parklands, residential, and industrial. Highway 7A passes the southern edge of WMT shielded behind a vegetation buffer of mixed forest and shrubs.

2.2 Air Emission Sources

Westridge Marine Terminal is the end point of the Trans Mountain Pipeline system in Canada. The emission sources at the terminal consists of two vapour recovery units (VRU) and two vapour combustion units (VCU). There are three berths for tanker traffic along with a utility berth for tugs and other marine support craft.

The WMT is one of several industrial emission sources along the shores of the Burrard inlet. These sources include the Port of Vancouver, Chemtrade, Erco Worldwide, Parkland refinery, other tanker loading facilities and the Pacific Coast Terminal in Port Moody. Many of these facilities emit VOCs that may contain benzene, xylenes and hydrogen sulphide, and combustion products like NO_x and $PM_{2.5}$.

3 MONITORING INSTRUMENTS

The WMT AQM station is equipped with air quality and meteorological monitoring instruments shown in Table 1. The ambient air quality and meteorological parameters being monitored are recorded at 1-minute and 60-minute intervals, as per BC Field Sampling Manual requirements (2020), on a Campbell Scientific CR1000x datalogger. The raw data is stored on the datalogger and is also pushed to a central database for processing and backup. Data is automatically checked using an automated diagnostic observation tool called HORNET and by a technician daily to ensure maximum uptime and data quality of the monitoring parameters. As required by Condition 52, the hourly raw data is also publicly available on the Envision data platform and accessible through the Trans Mountain website.

Table 1. Air Quality and Meteorological Monitoring Instrumentation

Instrument	Parameters measured	Units
Thermo Sharp 5030i	Respirable Particulate Matter ($PM_{2.5}$)	$\mu g/m^3$
Thermo 42iQ	Nitric Oxide/Nitrogen Dioxide/Total Oxides of Nitrogen ($NO/NO_2/NO_x$)	ppb
Thermo 43iQ	Sulphur Dioxide (SO_2)	ppb
Thermo 49iQ	Ozone (O_3)	ppb
Thermo 43iQTL with CDN101 Thermal Oxidizer	Total Reduced Sulphur (TRS)	ppb
AMA GC 5000	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	ppb
Nikira OEA	Visibility	km
CSCC Field Camera	Visibility	N/A
Met One Super SASS	Speciated $PM_{2.5}$	$\mu g/m^3$
Magee AE-33 Aethalometer	Black Carbon (BC)	ng/m^3
Passive Samplers	NO_2 and SO_2	ppb
R.M. Young 5305-10-L	Wind speed and wind direction	m/s and degrees
Ott Pluvio	Precipitation	mm
Vaisala HC2-S3-L	Relative humidity and air temperature	% and ^oC
CSCC CS 106	Barometric pressure	mb

The gas analyzers (Thermo 42iQ, 43iQ, 49iQ, and 43iQTL with CDN101) are zero and span checked daily using the internal zero (charcoal and/or purafil cartridge) and span (permeation wafer in an internal permeation oven) system, referred to as the IZS system. The AMA GC 5000 is zero and span checked daily, but with certified standard span gas and a dilution system. Automatic IZS checks are performed daily, and the checks consist of a zero and span check followed by a purge over a 30-minute period for the Thermo analyzers and 75-minute time-period for the AMA GC 5000. These checks provide a way to monitor daily performance of the analyzer. The IZS checks are not for calibration purposes but are merely a diagnostic tool to identify instrument drift. Monthly calibration visits are undertaken to perform full range linear calibrations and maintenance for all the analyzers.

3.1 $PM_{2.5}$

The SHARP 5030i is a hybrid nephelometric/radiometric particulate mass monitor capable of providing precise, real-time measurements with a superior detection limit. The SHARP monitor incorporates a high sensitivity light scattering photometer whose output signal is continuously referenced to the time-averaged measurement of an integral beta attenuating mass sensor. The SHARP unit also incorporates a dynamic inlet heating system designed to maintain the relative humidity of the air passing through the filter tape.

The SHARP 5030i monitor is calibrated once a month to ensure accuracy and validity of its data. The $PM_{2.5}$ inlet head and sharp cut cyclone are located on the roof of the AQM building. The inlet and cyclone are cleaned routinely to ensure performance. The monthly calibration process consists of the following: zeroing the nephelometer if necessary, calibration of ambient temperature, calibration of barometric pressure, and flow calibration. Instrument mass foil checks are performed quarterly or if diagnostics indicate a requirement to do so in accordance with the BC FSM (Section 10 of SOP-05b).

3.2 NITROGEN OXIDES

The Thermo 42iQ Nitrogen Oxide (NO_X) analyzer uses chemiluminescence detection, coupled with microprocessor technology to provide sensitivity and stability for ambient air quality applications. The instrument determines real-time concentration of nitric oxide (NO), total nitrogen oxides (NO_X) (the sum of NO and NO_2), and nitrogen dioxide (NO_2). The amount of NO is measured by detecting the chemiluminescence reaction that occurs in the reaction cell when NO molecules are exposed to ozone (O_3). The NO and O_3 molecules collide in the reaction cell and enter a higher energy state.

When these excited molecules return to a stable energy state, they emit a photon of light which is proportional to the amount of NO in the sample stream of gas entering the analyzer.

To determine the total NO_X ($NO+NO_2$) measurement, sample gas is periodically bypassed through a heated molybdenum converter cartridge that converts any NO_2 molecules in the sample stream into NO (any existing NO molecules in the stream remain as is). The instrument will switch the sample stream through the converter periodically and then through the reaction cell where the same chemiluminescence reaction occurs with ozone.

The resultant response produced is now the sum of NO and converted NO_2, producing a NO_X measurement. The resultant NO_2 determination is the NO_X measurement subtracted from the NO measurement.

3.3 SULPHUR DIOXIDE

The Thermo 43iQ Sulphur Dioxide (SO_2) analyzer is a microprocessor-controlled analyzer that determines the concentration of SO_2 in a sample gas drawn through the instrument. In the sample chamber, sample gas is excited by ultraviolet light causing the SO_2 to absorb energy from the light and move to an active state (SO_2*). These active SO_2* molecules must decay into a stable state back to SO_2, and when this happens a photon of light is released which is recognized by the instrument as fluorescence. The instrument measures the amount of florescence to determine the amount of SO_2 present in the sample gas.

3.4 OZONE

Monitoring for Ozone (O_3) employs a Thermo 49iQ analyzer which provides sensitivity and stability. The instrument determines real-time concentration of O_3 in a sample gas drawn through the instrument. The sample is split into two gas streams using solenoids, one stream is stripped of O_3 by a scrubber to become a reference gas. Each stream is then intermittently stored in two different cells within which the UV light intensities are measured, and the instrument calculates the O_3 concentrations.

3.5 TOTAL REDUCED SULPHUR

TRS monitoring uses a Thermo 43iQTL Trace Level continuous SO_2 analyzer in conjunction with an CDN-101 thermal oxidizer convertor (oxidizer). This instrument is a two-fold device. First, sample air passes through SO_2 scrubber beads to eliminate any SO_2 molecules that might be in the sample air stream. Secondly, sample air is then passed through a glass tube surrounded by an oven inside of the oxidizer which is continuously heated to 800°C and any reduced sulfur compounds are converted into SO_2 molecules which is then directed to the SO_2 analyzer.

The 43iQTL is a microprocessor-controlled analyzer that determines the concentration of SO_2 in a sample gas drawn through the instrument. In the sample chamber, sample gas is exposed to pulsating ultraviolet light which causes the SO_2 molecules to become excited and enter into a higher energy state. When the light is shut off during one of the pulse cycles, these excited SO_2 molecules decay into a lower energy state where fluoresced light is emitted proportionally to the SO_2 concentration in the gas stream. This fluorescence is read by a photo-multiplier tube, and the instrument reports the concentration of SO_2 in a ratio of 1:1 for TRS.

3.6 BTEX

Monitoring of benzene, toluene, ethylbenzene, m, p-xylenes and o-xylene (BTEX) is conducted using an AMA Gas Chromatograph (GC) Model 5000 BTX fitted with a flame ionization detector (FID). An ambient air sample is drawn into the instrument every 15 min and the gaseous eluent is ignited to produce gas-phase ions of the analytes of interest. These ions are detected by an electrode and the integration of the electrical signal produced is calibrated and used to quantify the concentration of each analyte in the sample. An AMA HG 500 ultra-high purity generator uses deionized water and a compressor to generate ultra-high purity Hydrogen (H_2) as a supply gas for the FID flame and act as a carrier gas for the GC.

3.7 VISIBILITY

Visibility monitoring is conducted using a Nikira Optical Extinction Analyzer (Model NIK-OEA-52001-C01OP). The instrument combines open-path cavity ringdown measurements with a patented self-referencing system to rapidly measure and calculate the optical extinction coefficient of ambient aerosols. Ambient air is drawn into the cavity at ~1m/s where direct optical extinction coefficient measurement is made. The cavity is closed off to ambient air and purged with filtered air to provide a background measurement to use in a comparison

calculation for aerosol optical extinction. A Campbell Scientific CFCC field camera takes photographs of the horizon each hour of the day so the OEA visibility readings can be confirmed by visual records.

3.8 SPECIATED PARTICULATE MATTER

Sampling for speciated particulate matter uses a Met One Super SASS (Speciation Air Sampling System). The SASS collects samples for chemical and gravimetric analysis of ambient $PM_{2.5}$ particles. The Super SASS accommodates eight sampling canisters used in groups of four. Each of the canisters has its own $PM_{2.5}$ cutoff cyclone; denuder ring and tandem filter holders. The collection media used in each of the canisters can be varied as needed to the types of analysis to be performed. In the case of the Westridge Super SASS canisters 1 and 2 are Teflon, canister 3 is nylon, canister 4 has two quartz filters. The Super SASS samples every 6 days for 24 hours, following the National Air Pollutions Surveillance Program sampling schedule. The canisters are collected weekly and sent to an outside laboratory for analysis. The canisters are analyzed for total PM_{25}, inorganic ions, nitrates, organic and elemental carbon with carbon black calculated from the other analytes. Periodically throughout the year, heavy metals are included in the analysis when the filters are visibly stained with particulates.

3.9 BLACK CARBON & DIESEL PARTICULATE MATTER

Black carbon (BC) is measured using a Magee Model AE33 Aethalometer. This unit collects aerosol particles continuously by drawing the aerosol laden air stream through a spot on a filter tape. The aerosols are analyzed by the transmission of light through one portion of the filter tape containing the sample compared to an unloaded portion of the filter tape. This analysis relies on 7 wavelengths spanning near infra-red to near ultraviolet. The Aethalometer calculates the concentrations of optically absorbing aerosols from the rate of attenuation of light transmitted through the filter. The results of the two sample spots are combined to determine the BC mass concentration. DPM is then calculated as a function of the BC based on a previous ambient sampling survey conducted by MVRD. Each month, the validity of the readings are checked via verification of flow rates through the unit and the use of neutral density optical filters measuring the attenuation of each of the wavelengths.

3.10 PASSIVE SAMPLING

In addition to the continuous monitors,NO_2 and SO_2 samples were collected using passive samplers. Samplers were deployed at two locations at the terminal for roughly 30 days of exposure before being replaced with fresh media. The unexposed sampling media are opened and placed in a sampler holder. The open samplers include a trapping agent that collects the target pollutant. After the exposure period, the samplers are sealed, collected then sent to an outside laboratory for analysis.

3.11 METEOROLOGY

The AQM station continuously monitors the wind speed (WS) and wind direction (WD) using a 10 m tower mounted R.M. Young Model 5305-10-L wind sensor. The wind mast is located over the water halfway between Berths 1/2 and 3 as shown in Figure 1. Relative humidity and temperature were measured using a Vaisala HC2-S3-L probe at the AQM station. Barometric pressure was measured using CSCC Model CS 106. Precipitation was measured using an Ott Pluvio, a highly sensitive weight-based measurement system that maximizes capture and quantification of snow and rain, with the attachment of a wind shield and antifreeze inside the collection bucket. Meteorological equipment is physically inspected ranging from 3-months to annually, or more frequently, if data QA/QC indicates the need. Calibrations for these sensors are recertified following manufacturer recommendations (typically every 1 to 2 years).

3.12 Performance Audits

The Westridge AQM station was inspected internally by TM on August 12, 2025.

A third-party performance audit, conducted by WSP Engineering Consultants, took place on August 13 to 15, 2025. This audit involved comparing instrument operations against the BC Ministry of Environment and Parks specifications as outlined in the BC Field Sampling Manual (Table 6.4.1 Gas Analyzer Tolerance Levels and Acceptance Criteria, Page 20 of Part B1). RWDI has addressed the corrective actions identified in the performance audit and has applied the learnings to the other stations in the TM air monitoring network. There was no major impact to data coverage as a result of the audit.

4 SUMMARY OF AMBIENT MEASUREMENTS

Data validity is the percentage of hourly values available over the given period of time that remain after final data quality assurance and control checks (QA/QC). For measured values to be compared to hourly, 8-hour, 24-hour and annual average values there needs to be >75% of the data available for each relevant time period in accordance with the Alberta (AB), Metro Vancouver (MVRD) and BC AAQO as informed by the Canadian Council of Ministers of the Environment (CCME 2019). Similar requirements exist in Alberta and BC in their respective ambient air monitoring guideline documents.

4.1 $PM_{2.5}$

During the period from January 1, 2025, to December 31, 2025, the hourly $PM_{2.5}$ data validity was 99.1%. Summary statistics are presented in Appendix Tables A1, A2 and A6. There were two (2) events that were over the MVRD 24-hour AAQO in 2025. The 2 exceedances occurred during hazy conditions between September 3 to September 6, 2025 and were likely the result of wildfire smoke, with Air Quality Warnings active for the region. The maximum 24-hour mean was 32.6 µg/m^3. The annual mean was 4.9 µg/m^3, less than the annual AAQO (8 µg/m^3).

4.2 NITROGEN OXIDES

During the period from January 1, 2025, to December 31, 2025, the hourly NO_x data validity was 95.%. Summary statistics are presented in Appendix Tables A1, A2 and A6.

The highest maximum 1-hour mean NO_x concentration was in January 2025 with a value of 104.8 ppb. The highest maximum 1-hour mean NO_2 concentration occurred in May 2025 with a value of 44.0 ppb.

Achievement of the MVRD AAQO for NO_2 is not based on direct comparison to the 1-hour concentration to the AAQO level; rather, achievement is based on the annual 98th percentile of the daily maximum 1-hour concentration averaged over three consecutive years. The 98th percentile of the daily maximum 1-hour concentration was calculated to be 36.7 ppb in 2024 and 36.2 ppb in 2025, respectively, both less than the 1-hour AAQO of 42 ppb. The annual mean was 10.6 ppb, less than the annual AAQO of 12 ppb.

Individual instances of the 1-hour NO_2 measurement above 42 ppb are classified as excursions, rather than exceedances. There was one (1) instance where the measured 1-hour NO_2 concentration was above 42 ppb during 2025. Air quality in MVRD was rated as “medium risk” at the time of the excursion, suggesting a regional effect is the cause of the elevated NO_2 levels. A summary of wind conditions and other related factors during the NO_2 excursion are described in Table A11.

Throughout the year, fresh media for the two passive samplers were deployed each month. Summary statistics are presented in Appendix Table A10. The annual maximum 30-day NO_2 concentration was 8.8 ppb. The east December passive samples were delayed in collection due to damaged trees on the approach to the sampler. The samplers were left in place for 38 days, which is 4 days over the method limit of 34 days. Generally, the mean concentrations from the passive samplers were equal to or less than the monthly mean concentrations measured by the continuous analyzers in the AQM station and trended in similar directions.

4.3 SULPHUR DIOXIDE

During the period from January 1, 2025, to December 31, 2025, the hourly SO_2 data validity was 99.2%. Summary statistics are presented in Appendix Tables A1, A2 and A6. There were no events that were over the 1-hour SO_2 AAQO during 2025. During 2025 the highest 1-hour mean was 2.4 ppb. The annual mean was 0.2 ppb, less than the annual AAQO of 4 ppb.

Throughout the year, fresh media for the two passive samplers were deployed each month. Summary statistics are presented in Appendix Table A10. The maximum 30-day SO_2 value was 0.6 ppb. Generally, the mean concentrations from the passive samplers were equal to or greater than the monthly mean concentrations measured by the continuous analyzers in the AQM station. There were no events over the 30-day SO_2 AAQO of 11 ppb during the monitoring period.

4.4 OZONE

During the period from January 1, 2025, to December 31, 2025, the hourly O_3 data validity was 98.4%. Summary statistics are presented in Appendix Tables A1, A2 and A6. The annual highest 1-hour mean value was 50.0 ppb, less than the 1-hour AAQO of 82 ppb. The annual mean value was 16.0 ppb, less than the annual AAQO of 60 ppb

4.5 TOTAL REDUCED SULPHUR

During the period from January 1, 2025, to December 31, 2025, the hourly TRS data validity was 95.0%. Summary statistics are presented in Appendix Tables A1, A2 and A6. There were no TRS reading events over the 1-hour average AAQO of 5 ppb. The annual highest 1-hour mean was 1.5 ppb, less than the 1-hour AAQO of 10 ppb.

4.6 BTEX

During the period from January 1, 2025, to December 31, 2025, the hourly BTEX data validity was 79.0%. Summary statistics are presented in Appendix Tables A3, A4 and A6. The largest loss of data validity was due to the unit being infected with malware in March and a new SSD card needing to be installed and GC reconfigured.

Trans Mountain compares measured benzene, toluene, ethylbenzene and xylenes values to the Alberta AAQOs, as BC does not have objectives for these pollutants.

There were no events exceeding the benzene, toluene, ethylbenzene, or xylenes 1-hour, 24-hour or annual Alberta AAQOs. The maximum 1-hour mean values of benzene, toluene, ethylbenzene and xylenes were 8.7 ppb, 16.6 ppb, 23.1 ppb and 31.9 ppb, respectively, all below their respective 1-hour AAQOs. The annual mean for benzene was 0.2 ppb, below the annual AAQO of 0.9 ppb.

4.7 VISIBILITY

During the period from January 1, 2025, to December 31, 2025, the hourly visibility data validity was 57.4%. Summary statistics are presented in Appendix Table A5. Lower data validity is due to OEA units being sent for repairs. The minimum 1-hour monthly mean values were measured in December 2025 (54.7 km). The mean distance during operations was 383.8 km.

Images are captured by a camera every hour onsite and can be made available for future reference. There are no AAQO or criteria in BC for visibility. Based on a theoretical distance provided by the manufacturer, RWDI invalidates data over 15 000 km to eliminate extreme values.

4.8 SPECIATED PARTICULATE MATTER

During the period from January 1, 2025, to December 31, 2025, there were 61 National Air Pollution Surveillance (NAPS) sampling dates for the Super SASS sampler. Of those 61 dates, 61 successful 24-hour samples were collected, yielding 100.0% availability. Data is presented in Table A9.

Between January 1, 2025, to December 27, 2025, the highest recorded sample was particulate at 11.8 µg/m^3.

4.9 BLACK CARBON & DIESEL PARTICULATE MATTER

During the period from January 1, 2025, to December 31, 2025, the hourly BC and DPM data validity was 99.2%. Summary statistics are presented in Appendix Table A5. There are no current AAQO for BC and DPM. The highest 1-hour mean of BC and DPM were 8903.8 ng/m^3 and 9607.0 ng/m^3, respectively, recorded in December 2025. The annual mean values for BC and DPM were 557.1 ng/m^3 and 601.0 ng/m^3, respectively.

4.10 METEOROLOGY

During the period from January 1, 2025, to December 31, 2025, the hourly meteorological data validity ranged from 99.7 to 100.0%. Summary statistics are presented in Appendix Tables A7 and A8. The anemometer is powered by solar panel with battery backup. The short downtimes were related to issues with the datalogger in the AQM station and annual maintenance. A wind rose, which visually plots the joint frequencies of wind speed and wind direction, is shown in **Figure 2** for the year.

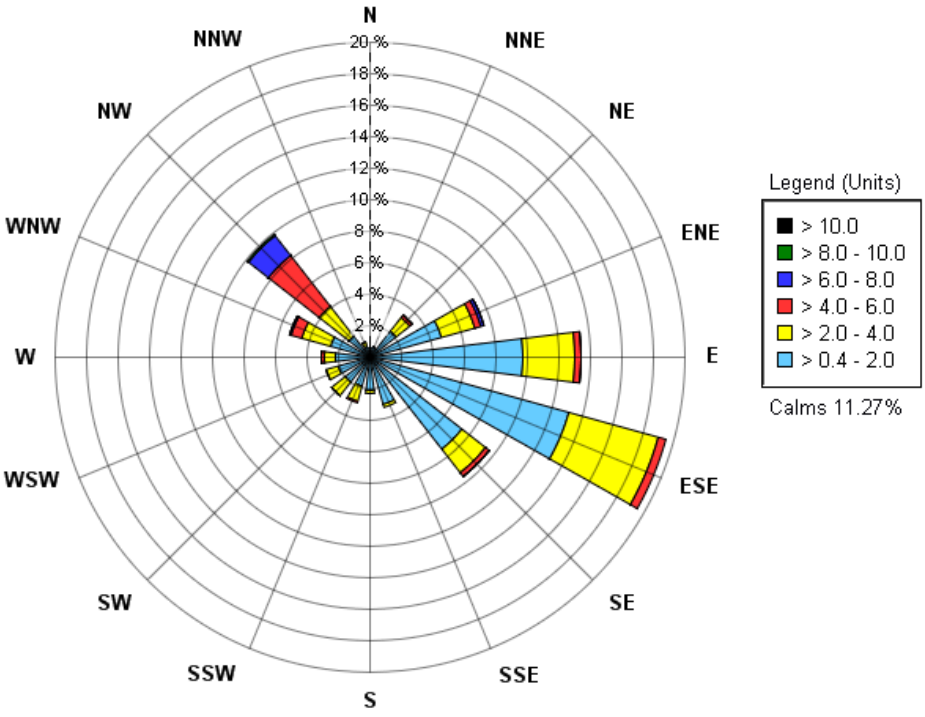

Figure 2 Westridge Marine Terminal Wind Rose – January 1, 2025, to December 31, 2025

5 DISCUSSION

Data validity for most parameters meets the minimum data completeness criteria acceptable range of >75% over the year, except visibility. The visibility availability was 57.3% due to a series of maintenance issues with units needing to be sent for repair multiple times. When possible, the WMT AQM station measurements were compared with the nearby Burnaby Kensington Park, Burnaby Mountain, Burnaby Terminal AQM, and Sumas AQM stations. All the comparable data over this year showed close agreement in measurements, suggesting that a reliable data set was achieved.

From January 1, 2025, to December 31, 2025, there were two (2) exceedances of the relevant 24-hour $PM_{2.5}$ MVRD AAQO. The 24-hour $PM_{2.5}$ exceedances occurred in September 2025 and were likely the result of wildfire smoke events recorded in regional wildfire smoke alerts at that time.

There was one excursion, where measured NO_2 concentration exceeded the 1-hour AAQO. The NO_2 excursion occurred on May 1, 2025, likely due to a regional effect causing the rise in the NO_2 levels. There were no exceedances of the annual AAQOs for $PM_{2.5}$, NO_2 SO_2, or benzene.

6 REFERENCES

Canadian Council of Ministers of the Environment, 2019. Ambient Air Monitoring And Quality Assurance/Quality Control Guidelines. Downloaded from: https://ccme.ca/en/res/ambientairmonitoringandqa-qcguidelines_ensecure.pdf

Trans Mountain Pipeline, 2017. Air Emissions Management Plan for Sumas and Burnaby Terminals. Trans Mountain Expansion Project. CER Condition 79.

Trans Mountain Pipeline, 2020. Ambient Air Quality Monitoring Plan for the Westridge Marine Terminal, Burnaby Terminal and Sumas Terminal. Trans Mountain Expansion Project.

7 GENERAL STATEMENT OF LIMITATIONS

This report entitled Westridge Marine Terminal 2025 Annual Air Quality and Meteorological Monitoring Report was prepared by RWDI AIR Inc. (“RWDI”) for Trans Mountain (“Client”). The findings and conclusions presented in this report have been prepared for Trans Mountain and are specific to the project described herein (“Project”). This report was prepared using scientific principles, published methodologies and professional judgment in assessing available information and data. The findings presented within this document are based on available data within the limits of the existing information, budgeted scope of work, and schedule. The conclusions contained in this report are based on the information available to RWDI when this report was prepared; subsequent changes made by the Client after the date of this report have not been reflected in the conclusions.

This report was prepared for the exclusive use of Trans Mountain. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. RWDI accepts no responsibility for damages, if any, suffered by any third party as result of decisions made or actions based on this report.

APPENDIX A

Table A1. Trans Mountain Westridge Maximum 1-hour and 24-hour Summary Statistics

Westridge Marine Terminal 2025 Statistics	Maximum 1-hour Mean							Maximum 24-hour Mean						
Compound	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	TRS	O_3	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	TRS	O_3
Units	µg/m³	ppb						µg/m³	ppb					
AAQO	—	—	—	**42**[1,2]	**70**[1]	**10**[1]	**82**[1]	**25**[3]	—	—	—	—	—	—
January	20.4	104.8	72.4	32.4	2.2	1.5	31.1	10.0	48.5	34.3	23.2	1.0	0.9	20.6
February	20.6	89.2	55.8	38.8	0.4	1.2	38.4	9.5	37.2	8.6	28.6	0.2	0.8	30.3
March	12.5	77.4	63.0	27.7	0.6	0.7	40.9	5.9	26.6	16.0	18.6	0.0	0.6	30.2
April	19.7	57.0	39.7	34.9	2.4	1.3	48.3	8.5	23.7	6.9	16.9	0.5	0.6	33.7
May	17.9	96.7	75.0	44.0	0.7	1.0	50.0	6.7	26.7	8.6	18.2	0.2	0.7	33.6
June	18.1	65.6	49.1	28.9	2.0	N/A	39.2	10.2	22.4	7.7	19.4	0.6	N/A	26.5
July	15.5	73.0	46.7	36.2	1.9	0.9	47.5	9.1	24.3	8.6	16.5	0.8	0.6	28.5
August	24.5	91.6	75.4	35.8	1.9	1.5	45.3	15.6	40.1	19.5	22.3	1.1	0.7	25.2
September	127.9	N/A	N/A	N/A	1.6	1.2	45.7	**32.6**	N/A	N/A	N/A	0.9	0.8	21.5
October	17.0	90.1	73.4	29.1	0.6	0.9	34.2	7.4	33.3	15.7	17.7	0.2	0.5	30.4
November	13.6	78.1	60.8	25.8	0.5	0.9	37.8	5.7	34.8	23.1	14.3	0.2	0.4	24.1
December	36.7	78.8	70.3	29.1	1.2	1.3	35.7	7.1	48.8	35.9	14.8	0.7	0.5	27.4
Annual	127.9	104.8	75.4	44.0	2.4	1.5	50.0	**32.6**	48.8	35.9	28.6	1.1	0.9	33.7

Notes:

— No AAQO available

[1] Metro Vancouver 1-hour acceptable AAQO.

[2] Metro Vancouver 98th percentile of daily maximumm1-hour concentration averaged over 3 years AAQO.

[3] Metro Vancouver 24-hour rolling average AAQO.

N/A- Not available: Data validity is below 75%.

Bold text indicates the maximum mean exceeds the AAQO.

$PM_{2.5}$ (particulate matter less than 2.5 microns); NO_x, NO, NO_2 (nitrogen oxides); SO_2 (sulphur dioxide); TRS (total reduced sulphurs); O_3 (ozone)

Table A2. Trans Mountain Westridge Monthly Mean and Valid Data Summary Statistics

Westridge Marine Terminal 2025 Statistics	Monthly Mean							Valid Data						
Compound	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	TRS	O_3	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	TRS	O_3
Units	$\mu g/m^3$	ppb						Percentage of Time (hourly)						
AAQO	**8**[1,3]	—	—	**12**[1]	**4**[1]	—	**60**[2]							
January	4.3	24.2	9.5	14.7	0.3	0.6	7.0	99.6	99.6	99.6	99.6	99.5	98.5	98.7
February	3.8	16.8	2.1	14.6	0.1	0.6	16.7	99.3	99.3	99.3	99.3	99.3	98.8	98.5
March	2.6	11.0	2.5	8.5	0.0	0.5	19.8	99.2	99.2	99.2	99.2	99.2	99.2	98.7
April	4.5	12.2	1.9	10.3	0.1	0.4	20.7	99.6	99.4	99.4	99.4	99.4	99.6	98.9
May	4.3	10.2	1.5	8.7	0.1	0.6	23.4	97.2	97.0	97.0	97.0	97.3	96.9	96.5
June	5.5	13.0	2.2	10.8	0.2	N/A	14.6	99.7	99.3	99.3	99.3	99.6	58.1	98.5
July	5.9	13.3	3.7	9.6	0.4	0.4	19.9	99.3	99.2	99.2	99.2	99.3	93.4	98.3
August	8.0	15.3	4.9	10.4	0.5	0.5	16.3	99.7	99.3	99.3	99.3	98.9	98.5	98.7
September	8.6	N/A	N/A	N/A	0.1	0.6	12.8	97.9	58.5	58.5	58.5	99.3	99.6	98.3
October	4.1	12.5	3.5	9.1	0.0	0.3	13.0	99.1	98.9	98.9	98.9	99.3	98.9	98.7
November	3.4	14.5	4.6	9.9	0.0	0.3	13.0	99.7	99.4	99.4	99.4	99.3	99.4	98.9
December	3.4	13.6	4.4	9.4	0.1	0.3	15.3	99.5	99.5	99.5	99.5	99.3	99.2	98.8
Annual	4.9	14.5	3.9	10.7	0.2	0.5	16.0	99.1	95.7	95.7	95.7	99.2	95.0	98.4

Notes:

— No AAQO available

N/A- Not available: Data validity is below 75%.

[1] Metro Vancouver AAQO based on annual average

[2] Metro Vancouver AAQO based on 8-hour average

[3] Metro Vancouver's annual $PM_{2.5}$ planning goal of 6 $\mu g/m^3$ is a longer term aspirational target to support continuous improvement.

$PM_{2.5}$ (particulate matter less than 2.5 microns); NO_x, NO, NO_2 (nitrogen oxides); SO_2 (sulphur dioxide); TRS (total reduced sulphurs); O_3 (ozone)

Table A3. Trans Mountain Westridge Maximum 1-hour and 24-hour BTEX Summary Statistics

Westridge Marine Terminal 2025 Statistics	Maximum 1-hour Mean				Maximum 24-hour Mean			
Compound	Benzene	Toluene	Ethylbenzene	Xylenes	Benzene	Toluene	Ethylbenzene	Xylenes
Units	ppb				ppb			
AAQO	**9**[1]	**499**[1]	**460**[1]	**530**[1]	**—**	**106**[2]	**—**	**161**[2]
January	8.7	16.6	23.1	31.9	1.4	7.5	4.4	10.3
February	1.2	7.3	5.1	6.6	0.3	1.6	0.8	1.5
March	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
April	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
May	0.6	6.1	3.0	4.8	0.2	1.3	0.5	1.0
June	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
July	0.9	8.3	5.2	9.4	0.2	1.7	0.6	1.6
August	1.6	7.1	12.6	13.0	0.3	2.2	1.5	2.4
September	2.6	12.7	10.4	11.8	0.5	2.4	1.4	2.3
October	1.1	14.2	10.4	16.1	0.3	4.1	1.6	3.5
November	3.7	9.3	4.3	12.3	0.7	4.1	1.8	4.6
December	0.5	5.1	2.8	5.4	0.3	2.1	1.1	1.9
Annual	8.7	16.6	23.1	31.9	1.4	7.5	4.4	10.3

Notes:
— No AAQO available
[1] Alberta AAQO 1-hour average
[2] Alberta AAQO 24-hour average
N/A – Not Available: data validity is below 75%

Table A4. Trans Mountain Westridge Monthly Mean and Valid Data BTEX Summary Statistics

Westridge Marine Terminal 2025 Statistics	Monthly Mean				Valid Data			
Compound	Benzene	Toluene	Ethylbenzene	Xylene	Benzene	Toluene	Ethylbenzene	Xylene
Units	ppb				Percentage of Time (hourly)			
AAQO	**0.9**[1]	—	—	—				
January	0.3	2.8	1.5	2.9	92.7	92.7	92.7	92.7
February	0.2	0.9	0.4	0.9	94.6	94.6	94.6	94.6
March	N/A	N/A	N/A	N/A	22.4	22.4	22.4	22.4
April	N/A	N/A	N/A	N/A	19.2	19.2	19.2	19.2
May	0.1	0.6	0.2	0.6	91.0	91.0	91.0	91.0
June	N/A	N/A	N/A	N/A	65.7	65.7	65.7	65.7
July	0.1	0.7	0.3	0.8	94.9	94.9	94.9	94.9
August	0.1	0.9	0.5	1.0	94.1	94.1	94.1	94.1
September	0.2	1.1	0.6	1.1	95.1	95.1	95.1	95.1
October	0.2	1.6	0.7	1.5	92.1	92.1	92.1	92.1
November	0.2	1.3	0.4	1.1	91.9	91.9	91.9	91.9
December	0.1	0.8	0.4	0.7	94.2	94.2	94.2	94.2
Annual	0.2	1.2	0.6	1.2	79.0	79.0	79.0	79.0

Notes:
— No AAQO available
N/A- Not available: Data validity is below 75%.
[1] Alberta AAQO based on annual average

Table A5. Trans Mountain Westridge Maximum 1-hour and 24-hour, Monthly Mean and Valid Data for Visibility and Diesel Particulate Matter Summary Statistics

Westridge Marine Terminal 2025 Statistics	Maximum 1-hour Mean			Maximum 24-hour Mean			Minimum 1-hour Mean	Monthly Mean			Valid Data	
Compound	DPM	BC	Visibility[1]	DPM	BC	Visibility	Visibility	DPM	BC	Visibility	DPM and BC	Visibility
Units	ng/m^3		km	ng/m^3		km	km	ng/m^3		km	Percentage of Time (hourly)	
AAQO	—	—	—	—	—	—	—	—	—	—		
January	4314.0	3997.9	1946.1	2056.2	1905.8	666.4	73.4	1047.9	971.2	345.4	99.2	100.0
February	3539.0	3280.1	1244.5	1339.5	1241.5	672.3	54.7	759.4	703.8	393.5	99.6	100.0
March	4823.0	4469.9	1265.0	1558.2	1444.0	674.4	112.1	743.7	689.3	470.8	99.2	100.0
April	2621.0	2429.2	1079.2	1158.5	1073.6	584.6	78.7	606.2	561.9	345.6	99.7	100.0
May	5239.0	4855.0	912.8	2113.1	1958.4	580.1	87.6	580.0	537.6	363.8	97.2	85.9
June	4455.0	4129.0	N/A	1457.9	1351.1	N/A	N/A	573.9	531.9	N/A	99.6	0.0
July	2290.0	2122.2	N/A	1084.5	1005.1	N/A	N/A	544.9	505.7	N/A	99.5	50.3
August	3381.0	3133.3	N/A	1370.0	1269.7	N/A	N/A	524.1	485.7	N/A	99.2	36.2
September	2035.0	1885.7	N/A	1069.2	991.0	N/A	N/A	488.5	452.7	N/A	99.7	8.5
October	2521.0	2336.6	N/A	898.7	833.0	N/A	N/A	440.2	408.0	N/A	99.5	0.0
November	3388.0	3139.6	N/A	1434.0	1328.9	N/A	N/A	482.7	447.3	N/A	99.6	53.9
December	9607.0	8903.8	N/A	1477.7	1369.5	N/A	N/A	420.7	389.9	N/A	98.9	54.6
Annual	9607.0	8903.8	1946.1	2113.1	1958.4	674.4	54.7	601.0	557.1	383.8	99.2	57.4

Notes:

— No AAQO available

N/A- Not available: Data validity is below 75%

[1] RWDI uses 15,000 km as a maximum cutoff for visibility.

Table A6. Trans Mountain Westridge 1-hour and 24-hour Average AAQO Exceedances

Westridge Terminal 2025 Event Statistics	1-Hour average > AAQO								24-Hour average > AAQO		
Compound	NO_2 [1]	SO_2	TRS	O_3[2]	B[3]	T[3]	E[3]	X[3]	$PM_{2.5}$	T[3]	X[3]
AAQO	**42**	**70**	**10**	**82**	**9**	**499**	**460**	**530**	**25**[4]	**106**	**161**
Units	ppb								µg/m^3	ppb	
	Number > AAQO								Number > AAQO		
January	0	0	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0	0	0	0
May	1	0	0	0	0	0	0	0	0	0	0
June	0	0	0	0	0	0	0	0	0	0	0
July	0	0	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0	0	**2**	0	0
October	0	0	0	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0	0	0	0	0
December	0	0	0	0	0	0	0	0	0	0	0
Annual	1	0	0	0	0	0	0	0	**2**	0	0

Notes:

[1] 1-hour NO_2 AAQO achievement is based on the annual 98th percentile of the daily maximum 1-hour concentration averaged over three consecutive years. Table depicts excursions, not AAQO exceedances.

[2] Determination based on the 4th highest daily maximum 8-hr average averaged over 3 consecutive years

[3]B-Benzene, T-Toluene, E-Ethylbenzene, X-Xylenes, AAQO adopted from Alberta

[3] 24-hour rolling average.

Bold text indicates events that exceed the AAQO.

N/A- Not available: Data validity is below 75%.

Operational period data collected between January 1 and December 31, 2025.

$PM_{2.5}$ (particulate matter less than 2.5 microns); NO_2 (nitrogen oxides); SO_2 (sulphur dioxide); TRS (total reduced sulphurs); O_3 (ozone)

Table A7. Trans Mountain Westridge Maximum and Minimum Meteorological Summary Statistics

2025 Meteorological Statistics	Maximum 1-hour Mean					Minimum 1-hour Mean				
Parameter	WS	Temp	RH	Pres	Rain	WS	Temp	RH	Pres	Rain
Units	m/s	°C	%	mb	mm	m/s	°C	%	mb	mm
January	6.2	8.9	100.0	1043.0	4.3	0.1	-1.1	39.7	1000.0	0.0
February	6.6	15.8	100.0	1035.0	9.2	0.1	-6.5	26.0	997.0	0.0
March	8.4	16.2	100.0	1028.3	7.4	0.2	1.1	38.2	995.0	0.0
April	8.3	21.3	100.0	1032.0	5.1	0.1	3.7	20.0	1006.5	0.0
May	8.3	30.4	100.0	1028.0	17.1	0.1	5.8	20.1	1007.0	0.0
June	7.9	28.7	100.0	1028.0	2.9	0.1	8.9	22.1	1010.0	0.0
July	7.8	30.8	100.0	1025.0	2.9	0.0	12.5	26.0	1008.9	0.0
August	7.8	29.1	100.0	1026.0	8.0	0.0	12.9	29.8	1008.0	0.0
September	6.9	27.3	100.0	1024.0	11.0	0.0	10.7	39.8	1005.0	0.0
October	7.4	19.6	100.0	1033.0	7.0	0.1	4.0	27.6	995.0	0.0
November	6.4	15.0	100.0	1030.0	6.5	0.2	1.1	58.1	998.0	0.0
December	10.7	15.0	100.0	1039.0	7.4	0.2	0.2	48.2	988.8	0.0
Annual	10.7	30.8	100.0	1043.0	17.1	0.0	-6.5	20.0	988.8	0.0

Table A8. Trans Mountain Westridge Monthly Mean and Valid Data Meteorological Summary Statistics

2025 Meteorological Statistics	Monthly Mean					Total	Valid Data					
Parameter	WS	Temp	RH	Pres	Rain	Rain	WS	WD	Temp	RH	Pres	Rain
Units	m/s	°C	%	mb	mm	mm	Percentage of Time (hourly)					
January	1.2	3.6	95.6	1028.0	0.1	87.5	100.0	100.0	100.0	100.0	100.0	100.0
February	2.0	3.7	90.8	1017.6	0.2	164.1	100.0	100.0	100.0	100.0	100.0	100.0
March	2.1	7.3	94.7	1012.3	0.5	338.3	99.7	99.7	100.0	100.0	100.0	100.0
April	2.1	11.1	76.1	1020.1	0.1	105.1	99.7	99.7	100.0	100.0	100.0	100.0
May	2.1	13.7	74.4	1018.4	0.1	102.7	100.0	100.0	97.7	97.8	97.7	97.7
June	2.2	16.8	77.2	1018.2	0.0	20.0	100.0	100.0	100.0	100.0	100.0	100.0
July	1.9	20.3	69.7	1017.2	0.0	22.3	100.0	100.0	100.0	100.0	100.0	100.0
August	1.7	20.2	77.3	1017.7	0.1	94.7	100.0	100.0	100.0	100.0	100.0	99.9
September	1.6	17.5	89.5	1015.6	0.1	67.6	100.0	100.0	100.0	100.0	100.0	100.0
October	1.8	10.6	90.6	1016.8	0.2	180.0	100.0	100.0	100.0	100.0	100.0	100.0
November	1.5	8.0	90.2	1017.3	0.3	196.7	100.0	100.0	100.0	100.0	100.0	100.0
December	1.7	6.1	91.7	1015.0	0.4	332.4	100.0	100.0	100.0	100.0	100.0	100.0
Annual	1.8	11.6	84.8	1017.8	0.2	1711.4	100.0	100.0	100.0	100.0	100.0	100.0

Table A9. Trans Mountain Westridge Summary of Super SASS Sampling Result Statistics

Parameter	Particulate	Ammonium	Calcium	Fluoride	Magnesium	Nitrate	Nitrite	Phosphate	Potassium	Sodium	Sulfate	Nitrate	Elemental Carbon	Organic Carbon	Carbon Black
Units	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)
Time Period	Minimum														
Jan 1, 2025, to Dec 27, 2025	<0.413	<0.0005	<0.001	<0.0002	<0.0004	<0.003	<0.006	<0.002	<0.0005	<0.0003	<0.003	<0.004	<0.019	<0.054	<0.041
Time Period	Maximum														
Jan 1, 2025, to Dec 27, 2025	11.765	0.002	0.01	6E-04	0.017	0.01	0.02	0.002	0.015	0.002	0.012	0.02	0.35	1.103	7.669
Time Period	Mean														
Jan 1, 2025, to Dec 27, 2025	3.15	0.001	0.003	4E-04	0.003	0.01	0.01	0.002	0.003	0.004	0.004	0.01	0.087	0.494	4.117

Notes:
Minimum values include the mean reportable detection limit (RDL) for the period
< = samples below RDL were not included in mean calculations, biasing the mean to higher values

Table A10. Trans Mountain Westridge 30-day Passive Sampler Summary Statistics, Comparison with Continuous Ambient Results

Parameter	NO_2 East	NO_2 West	AQM NO_2	SO_2 East	SO_2 West	AQM SO_2
AAQO	-	-	-	11	11	11
Units	ppb	ppb	ppb	ppb	ppb	ppb
Time Period	Minimum					
Dec 31, 2024, to Jan 5, 2026	3.3	4.2	8.2	0.1	0.2	0
Time Period	Maximum					
Dec 31, 2024, to Jan 5, 2026	8.1	8.8	14.7	0.6	0.5	0.5
Time Period	Mean					
Dec 31, 2024, to Jan 5, 2026	5.2	6.1	10.5	0.4	0.3	0.2

Notes:
AQM station values are based on monthly average 1-hour values for the respective time periods.
The AAQO for 30-day SO_2 is taken from Alberta.
- No AAQO available

Passive samplers had an average deployment of 30.8-days. Minimum duration 28 days, Maximum duration 34 days

Due to damaged trees around east sample location blocking access, the Dec 2025 east samples were left in place for 38 days and not included in the statistics.

Table A11. Trans Mountain Westridge 1-Hour NO_2 Excursion Summary

Date	1-hour Average (ppb)	Wind Speed (m/s)	Wind Direction (deg)	Discussion
May 1, 2025, 20:00-21:00	45.2	0.7	234.6	NO_2 levels steadily rose throughout the day from 7.3 ppb at 03:00 until the excursion event at 20:00 when values rose to 45.2 ppb. The wind throughout the day was predominantly from the northwest. At 21:00 the outflow wind started to take over, shifting the direction to easterly winds dropping the NO_2 level below the AAQO. The Air Quality Health Index (AQHI) for the MV Northwest air zone went from 3 to 4 at 21:00. A NO_2 excursion was also seen at North Vancouver 2nd Narrows (44.9 ppb at 21:00). Elevated values were also seen around the same time at Burnaby-Kensington Park (32.2 ppb), at Port Moody (37.5 ppb) and several other stations in the Northwest air zone. The northwest wind direction suggests that the NO_2 excursion is not related to TM Westridge activities. The multiple stations seeing elevated values suggests more of a regional effect responsible for the rise in the NO_2 levels.

Table A12. Trans Mountain Westridge 24-Hour $PM_{2.5}$ Exceedance Summary

Date	24-hour Average (µg/m³)	Wind Speed (m/s)	Wind Direction (deg)	Discussion
September 3, 2025, 13:00-12:00	32.1	1.5	243	There was one 24-hr $PM_{2.5}$ running average non-conformance that occurred on September 3 at 13:00., with a concentration of 27.4 µg/m³. During the non-conformance period, daily running averages ranged from a minimum of 27.4 µg/m³ to a maximum of 33.3 µg/m³. At 10:00 September 3, 2025, Metro Vancouver issued an air quality update stating that Metro Vancouver and the Fraser Valley were experiencing hazy conditions due to wildfire smoke and humid conditions. Wildfires contributing to the region include those just east of Hope, near Whistler, and a large complex of fires in Cariboo area, in addition to fires in the US. It is likely these exceedances are a result of regional wildfire smoke and not the result of activities at the Westridge Terminal.
September 6, 2025, 06:00-05:00	20.1	1.6	173.7	There was one 24-hr $PM_{2.5}$ running average non-conformance that occurred on September 6 at 06:00., with a concentration of 25,.2 µg/m³. During the non-conformance period, daily running averages ranged from a minimum of 15.2 µg/m³ to a maximum 25.3 µg/m³. At 10:00 September 3, 2025, Metro Vancouver issued an air quality update stating that Metro Vancouver and the Fraser Valley were experiencing hazy conditions due to wildfire smoke and humid conditions. Wildfires contributing to the region include those just east of Hope, near Whistler, and a large complex of fires in Cariboo area, in addition to fires in the US. It is likely these exceedances are a result of regional wildfire smoke and not the result of activities at the Westridge Terminal