



REPORT

METRO VANCOUVER ANNUAL AIR PERMIT REPORTING

Neptune Bulk Terminal Ltd

Prepared for:

Neptune Bulk Terminal Ltd.

1001 Low Level Road

North Vancouver, BC, V7L 1A7

Envirochem Project No.: 8005-25

Reporting Period: 2024

Envirochem Services Inc.
#206 – 267 Esplanade West
North Vancouver, BC
V7M 1A5

Main: 1-604-986-0233
Fax: 604-986-8583
Email: response@envirochem.com
envirochem.com

TABLE OF CONTENTS

1.0 BACKGROUND	1
2.0 AMBIENT AIR QUALITY MONITORING PROGRAM	2
2.1 WIND MONITORING DATA ANALYSIS	2
2.1.1 METHODOLOGY	2
2.1.2 RESULTS	2
2.2 PARTICULATE MONITORING DATA ANALYSIS	4
2.2.1 METHODOLOGY	4
2.2.2 TREND ANALYSES	4
2.2.3 POLLUTION ROSES AND FREQUENCY DISTRIBUTION ANALYSES	9

FIGURES

Figure 1: Windroses (direction wind blowing from) at on-site and off-site monitoring stations for Jan 1 st – Dec 31 st , 2024	3
Figure 2: 24-hour rolling averages of PM _{2.5} from on-site monitor (Electrical Substation) for Jan 1 st – Dec 31 st , 2024	5
Figure 3: 24-hour rolling averages of PM ₁₀ from on-site monitor (Electrical Substation) for Jan 1 st – Dec 31 st , 2024	6
Figure 4: 24-hour rolling averages of PM _{2.5} from off-site monitor at the Neptune Office Building (340 Brooksbank Ave.) for Jan 1 st – Dec 31 st , 2024	7
Figure 5: 24-hour rolling averages of PM ₁₀ from off-site monitor at the Neptune Office Building (340 Brooksbank Ave.) for Jan 1 st – Dec 31 st , 2024	8
Figure 6: Pollution roses (direction wind blowing from) at on-site and off-site monitoring stations for Jan 1 st – Dec 31 st , 2024	10
Figure 7: Frequency distributions at on-site and off-site monitoring stations for Jan 1 st – Dec 31 st , 2024	11

1.0 BACKGROUND

To meet Metro Vancouver Air Permit GVA0081 (issued September 23rd, 2016) requirements, Neptune Bulk Terminals Ltd. (Neptune) has implemented a procedure for periodic permit reporting requirements to Metro Vancouver including this annual reporting.

Fulfilling these requirements requires processing and checking large amounts of data. The procedures in this report provide an efficient means of processing large amounts of data and ensuring that all calculations and outputs generated are completed accurately. In order to increase the efficiency of this process, Neptune has implemented a data management system which allows for uploading of data to the Neptune database and generation of outputs. Envirochem Services Inc. (Envirochem) has been retained to calculate, tabulate and report these requirements to Metro Vancouver and ensure that:

- Raw data being collected and used for generating outputs is valid,
- Correct methodologies are used to generate these outputs, and
- Any outputs being generated undergo quality assurance/quality control (QA/QC) before being submitted electronically to Metro Vancouver.

All of the procedures contained within this report detail methodologies in conformance with Section 3 Schedules A and B of the current version of the permit (September 23rd, 2016).

This report includes annual ambient air quality monitoring reporting requirements.

2.0 AMBIENT AIR QUALITY MONITORING PROGRAM

2.1 WIND MONITORING DATA ANALYSIS

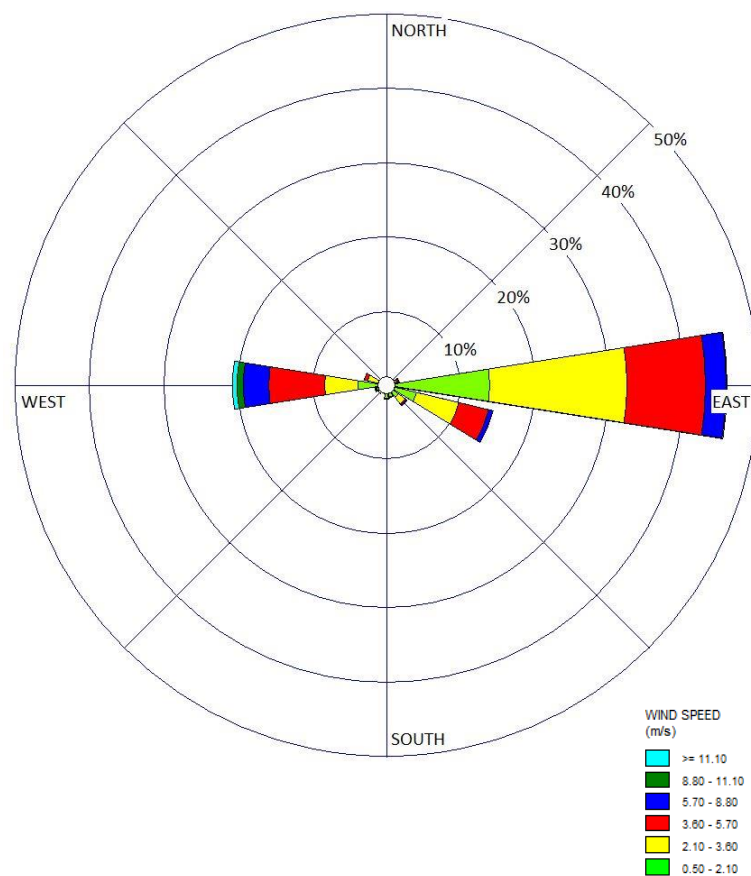
2.1.1 METHODOLOGY

Envirochem retrieves wind data from Neptune's database at the following locations: On-site (Electrical Substation), Neptune Office Building (340 Brooksbank Ave.), and Neighborhood Pole (618 2nd St. East). Note that Neighbourhood Pole (618 E 2nd St) has not been operational since September 22nd, 2023, and was non-operational in 2024, due to demolition and construction of buildings on this street. This was communicated to Metro Vancouver and a relocation plan for this station is pending approval.

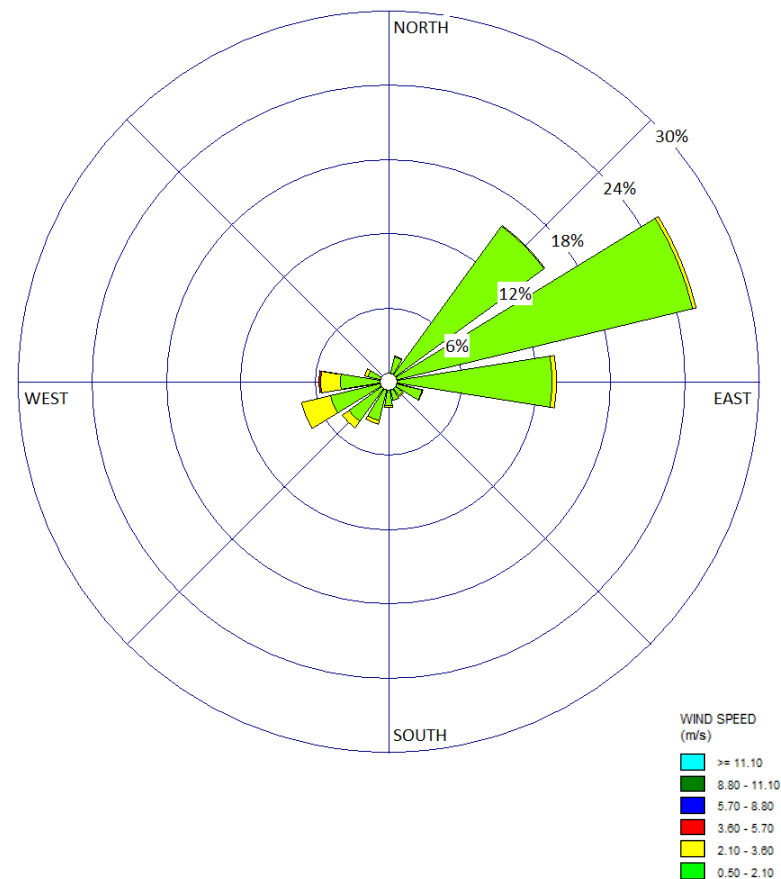
- Using wind data, wind roses for each wind instrument location are prepared for the preceding year. The wind roses are shown in **Figure 1**.
- Envirochem submits these figures to Metro Vancouver for each preceding calendar year as part of the annual air quality monitoring program report.

2.1.2 RESULTS

Wind roses are presented in **Figure 1** below representing the distribution of wind direction and wind speed at Neptune on-site (Neptune Electrical Substation) and off-site monitors (roof of Neptune Office Building) for 2024.



On-Site (Electrical Substation)



Neptune Office Building (340 Brooksbank)

Figure 1: Windroses (direction wind blowing from) at on-site and off-site monitoring stations for Jan 1st – Dec 31st, 2024
Note: Scales are not consistent between wind roses.

2.2 PARTICULATE MONITORING DATA ANALYSIS

2.2.1 METHODOLOGY

Neptune is conducting continuous PM_{2.5} and PM₁₀ monitoring. Ambient Air Monitoring data for PM_{2.5} and PM₁₀ are stored in Neptune's database. These data are retrieved and verified by Envirochem. QA/QC is performed on the raw data and any invalid data are flagged. Neptune's data management system is then updated accordingly.

The vetted monitoring data are used to summarize the results of on-site and off-site monitoring. Envirochem retrieves the preceding calendar year's 24-hr rolling averages for PM_{2.5} and PM₁₀ at each instrument location from Neptune's database.

Using the wind and hourly average concentration data, four pollution roses are prepared (both PM_{2.5} and PM₁₀ at each location) and corresponding frequency distributions are prepared for the preceding year.

2.2.2 TREND ANALYSES

Using Neptune's data management system, Envirochem:

- Converts and tabulates the vetted PM_{2.5} and PM₁₀ data to 24-hour rolling averages and performs QA/QC;
- Submits the graphs (**Figure 2 -Figure 5**) to Metro Vancouver.

The trend analyses represent 24-hour rolling averages of PM_{2.5} and PM₁₀ data measured on-site (Electrical Substation) and at the Neptune Office Building (340 Brooksbank Ave.). Any gaps in the trend analyses are due to missing or invalid data.

Note that Neighbourhood Pole (618 E 2nd St) has not been operational since September 22nd, 2023, and was non-operational in 2024, due to demolition and construction of buildings on this street. This was communicated to Metro Vancouver and a relocation plan for this station is pending approval.

The on-site and off-site PM₁₀ ambient air quality monitors showed a few AAQO exceedances in 2024. All exceedances were discussed in more detail in the quarterly ambient air quality monitoring reports.

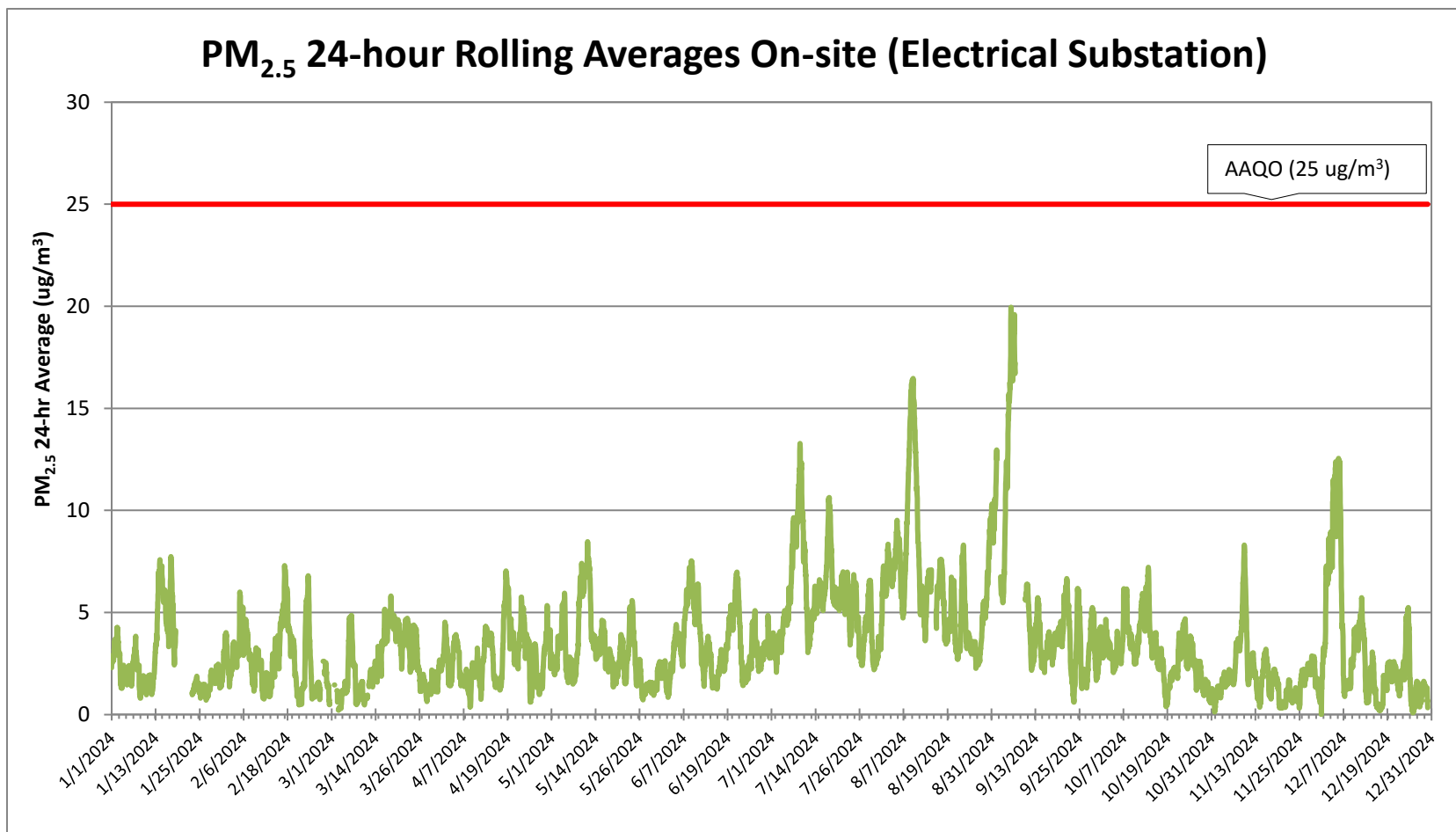


Figure 2: 24-hour rolling averages of PM_{2.5} from on-site monitor (Electrical Substation) for Jan 1st – Dec 31st, 2024

Note: Blank spaces indicate no data available.

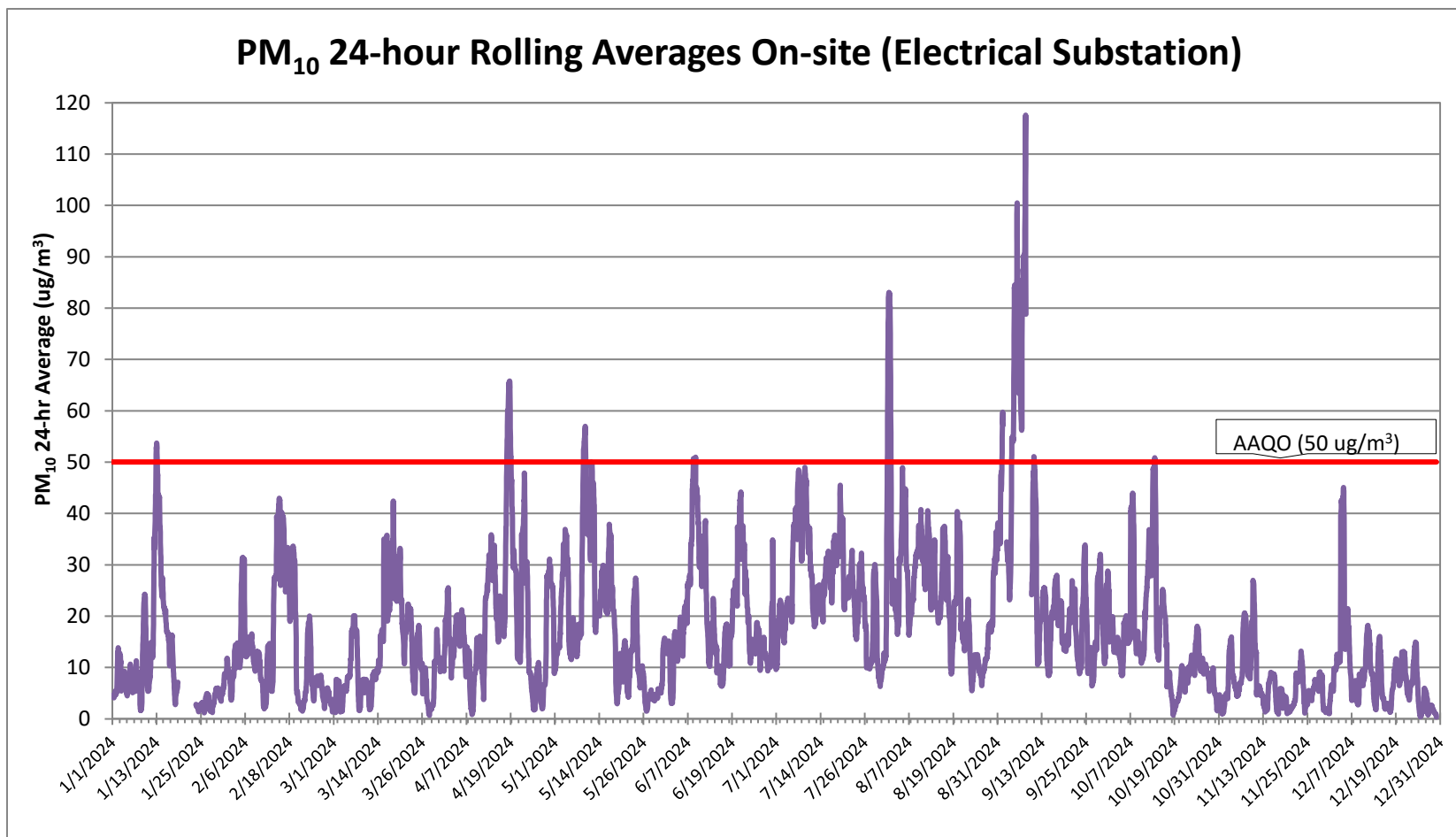


Figure 3: 24-hour rolling averages of PM₁₀ from on-site monitor (Electrical Substation) for Jan 1st – Dec 31st, 2024

Note: Blank spaces indicate no data available.

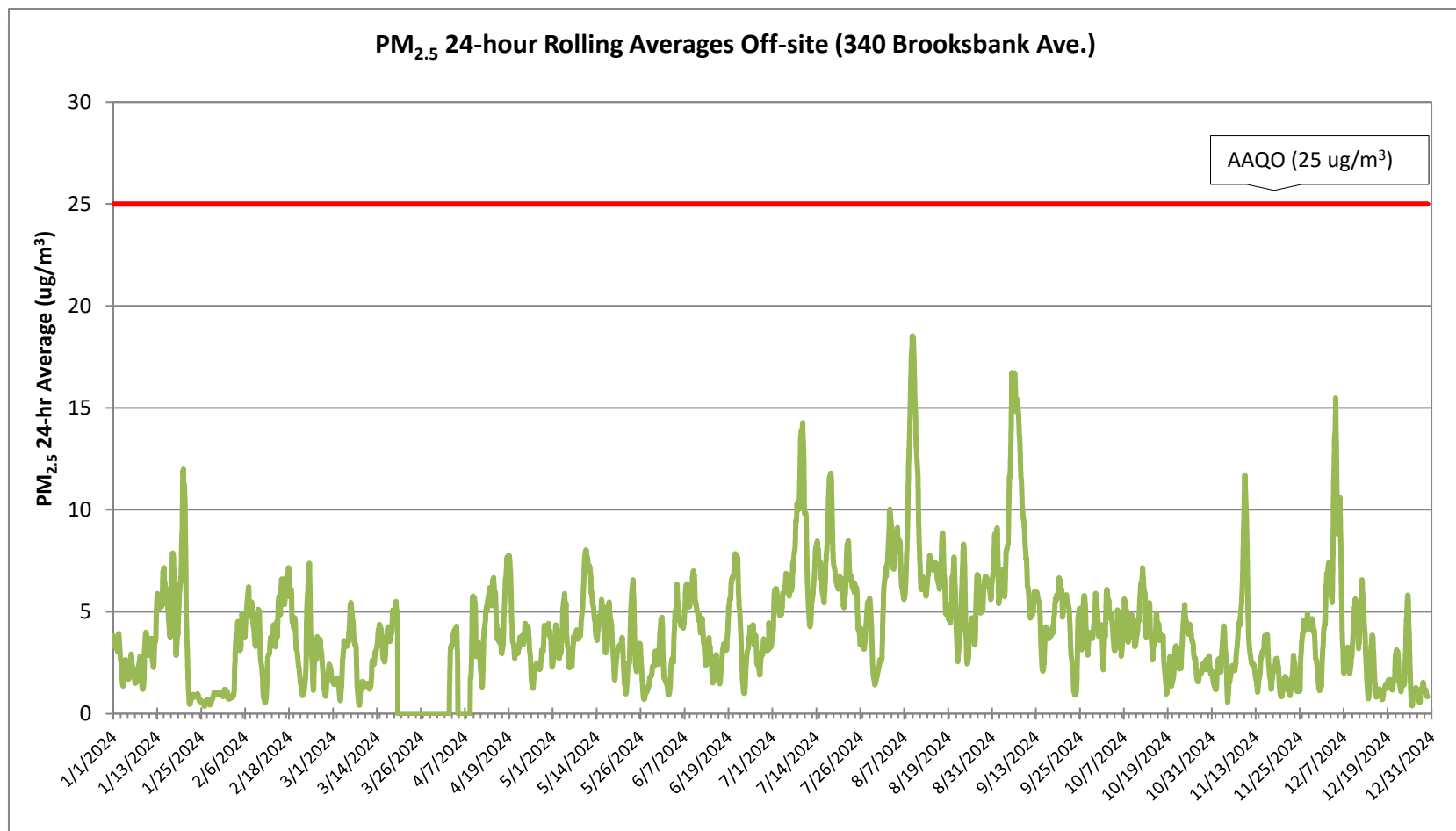


Figure 4: 24-hour rolling averages of PM_{2.5} from off-site monitor at the Neptune Office Building (340 Brooksbank Ave.) for Jan 1st – Dec 31st, 2024

Note: Blank spaces indicate no data available.

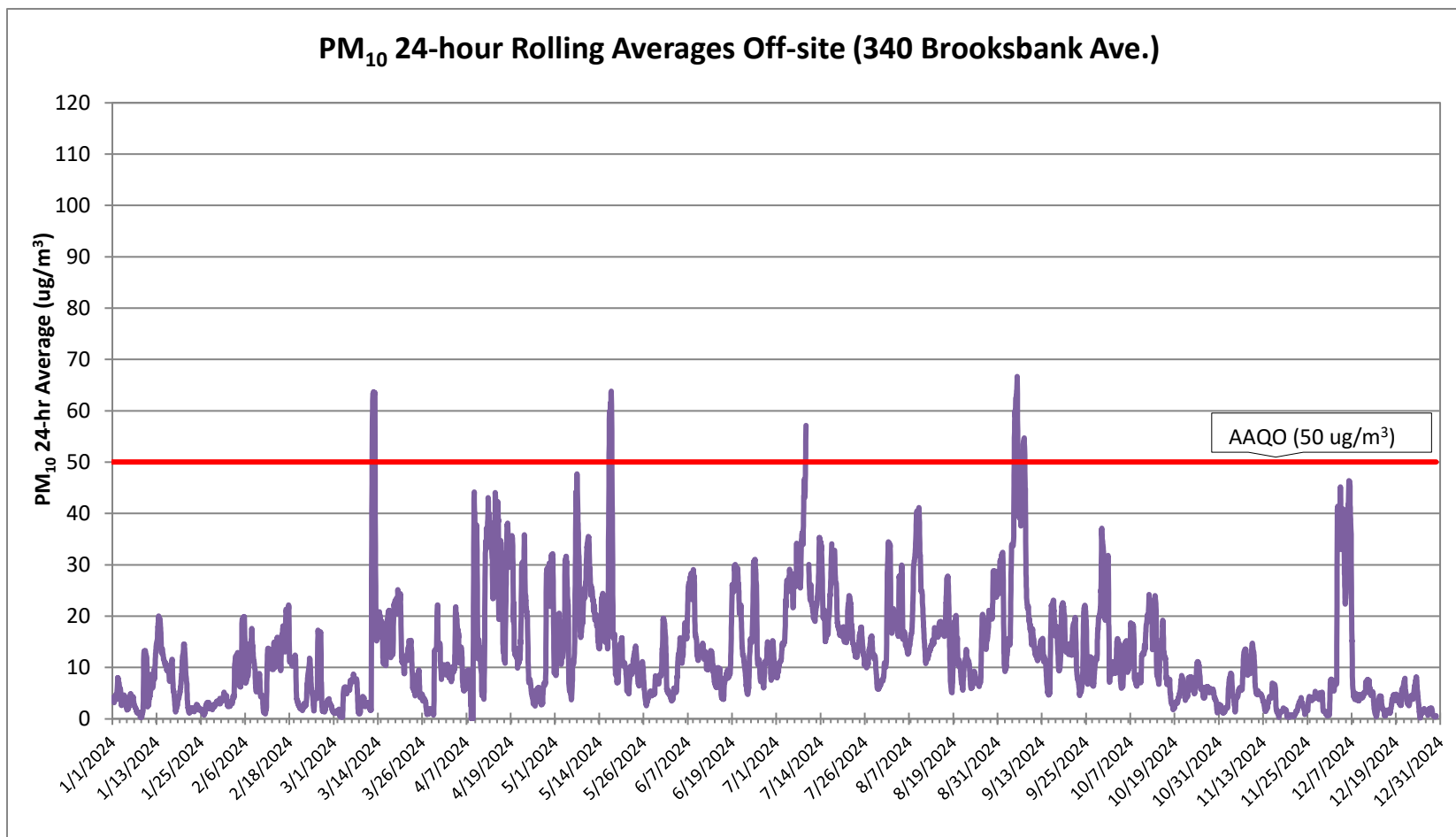


Figure 5: 24-hour rolling averages of PM₁₀ from off-site monitor at the Neptune Office Building (340 Brooksbank Ave.) for Jan 1st – Dec 31st, 2024

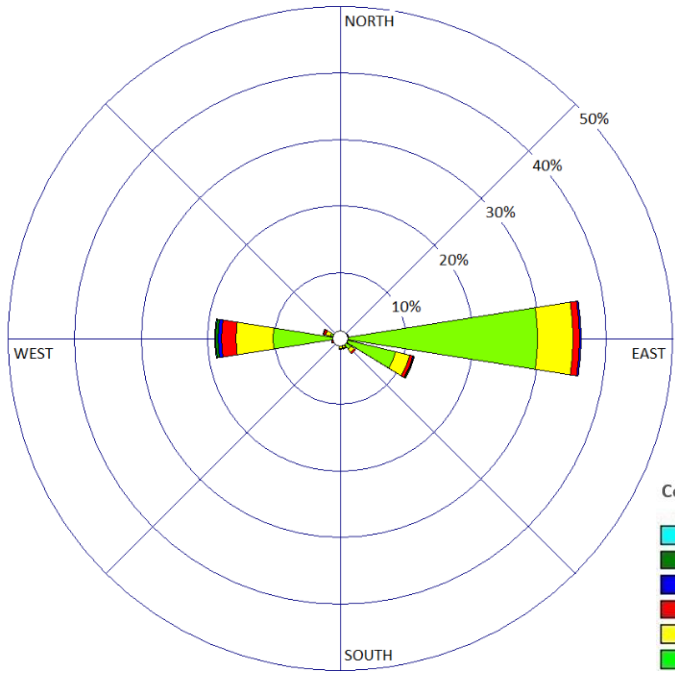
Note: Blank spaces indicate no data available.

2.2.3 POLLUTION ROSES AND FREQUENCY DISTRIBUTION ANALYSES

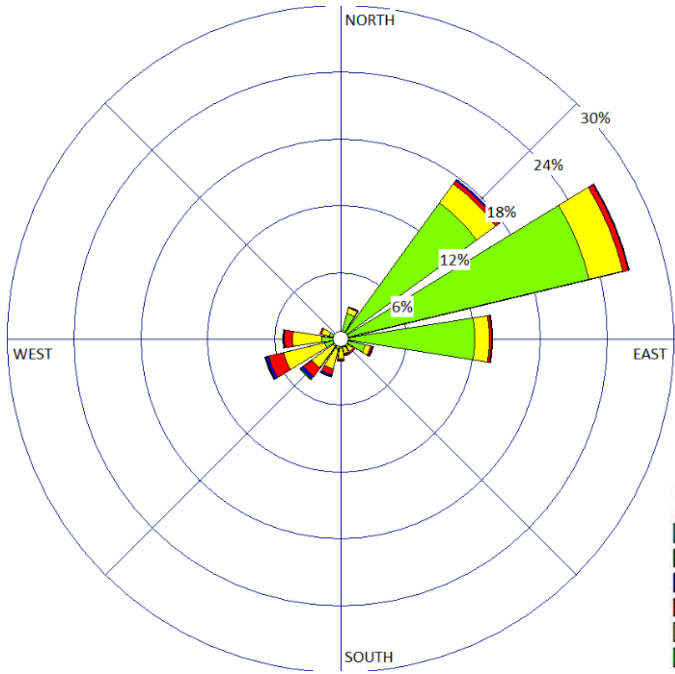
Pollution roses are shown in **Figure 6** and the frequency distributions are shown in **Figure 7**.

The pollution roses and frequency distributions represent the distribution of wind direction temporally correlated with PM_{2.5} and PM₁₀ concentrations at the on-site (Electrical Substation) and off-site monitors (roof of Neptune Office Building (340 Brooksbank Ave) for 2024.

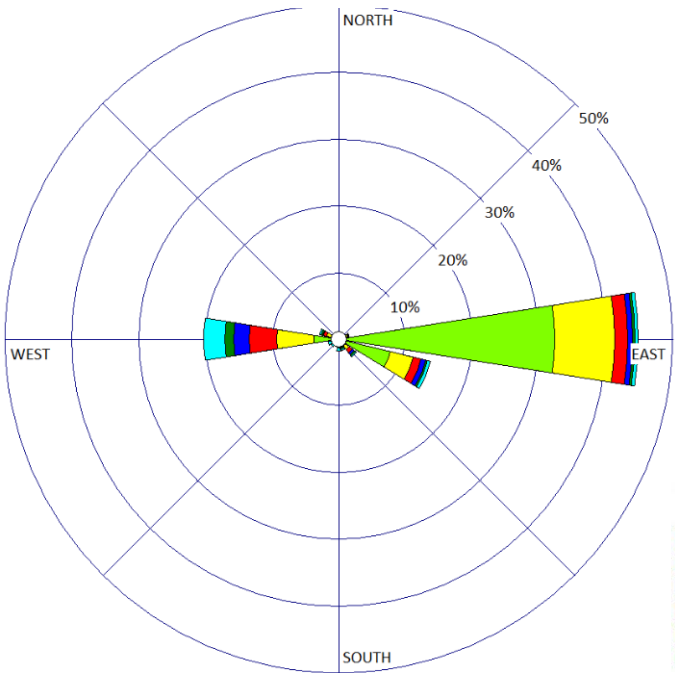
Note that Neighbourhood Pole (618 E 2nd St) has not been operational since September 22nd, 2023, and was non-operational in 2024, due to demolition and construction of buildings on this street. This was communicated to Metro Vancouver and a relocation plan for this station is pending approval.



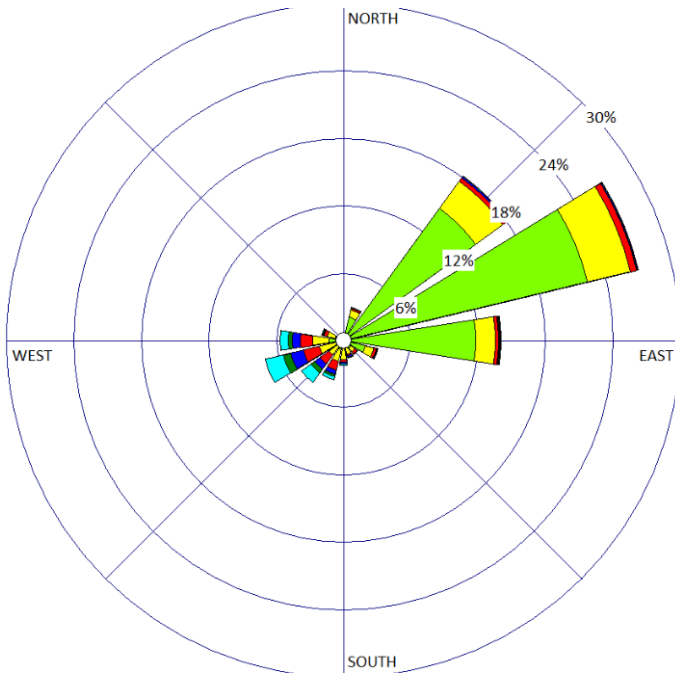
PM_{2.5} Pollution Rose at Neptune Electrical Substation



PM_{2.5} Pollution Rose at Neptune Office Building
(340 Brooksbank Ave.)



PM₁₀ Pollution Rose at Neptune Electrical Substation

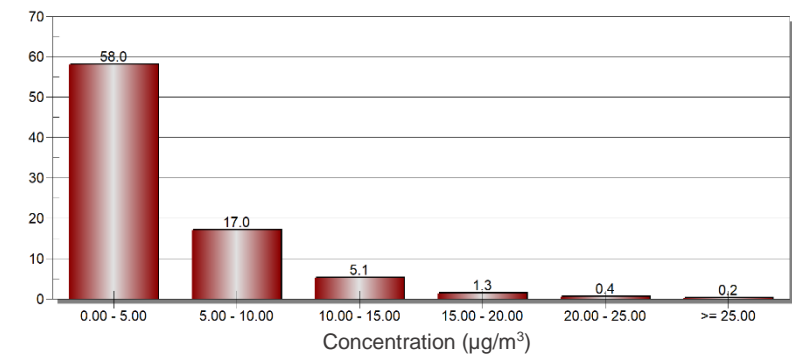


PM₁₀ Pollution Rose at Neptune Office Building
(340 Brooksbank Ave.)

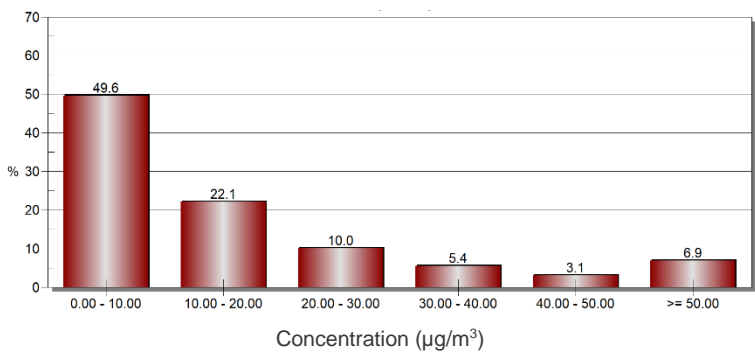
Figure 6: Pollution roses (direction wind blowing from) at on-site and off-site monitoring stations for Jan 1st – Dec 31st, 2024

Note: Scales are not consistent between wind roses.

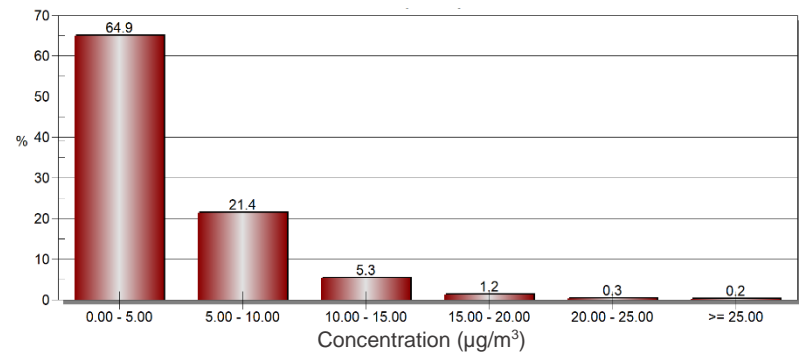
* Note that Neighbourhood Pole (618 E 2nd St) has not been operational since September 22nd, 2023, and was non-operational in 2024, due to demolition and construction of buildings on this street. This was communicated to Metro Vancouver and a relocation plan for this station is pending approval.



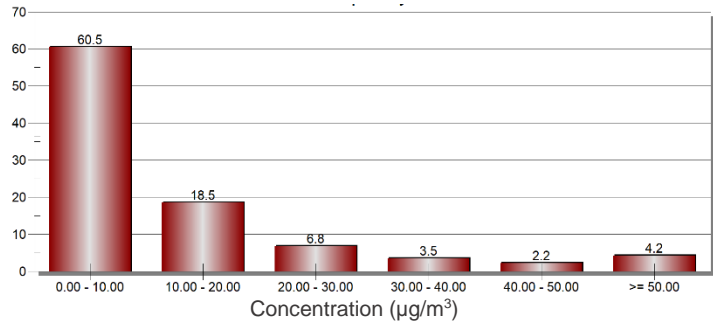
PM_{2.5} Frequency Distribution On-Site (Electrical Substation)



PM₁₀ Frequency Distribution On-Site (Electrical Substation)



PM_{2.5} Frequency Distribution at Neptune Office Building (340 Brooksbank Ave.)



PM₁₀ Frequency Distribution at Neptune Office Building (340 Brooksbank Ave.)

Figure 7: Frequency distributions at on-site and off-site monitoring stations for Jan 1st – Dec 31st, 2024