Appendix 50

Meadowbank and Whale Tail 2022 Air Quality and Dust Monitoring Report

AGNICO EAGLE

MEADOWBANK COMPLEX

2022 Air Quality and Dustfall Monitoring Report

In Accordance with NIRB Project Certificates No.004 and No.008

Prepared by:
Agnico Eagle Mines Limited – Meadowbank Complex

March, 2023

EXECUTIVE SUMMARY

The 2022 air quality and dustfall monitoring program at the Meadowbank Complex was conducted according to the Air Quality and Dustfall Monitoring Plan, Version 6 (March, 2022). The objective of this program is to measure dustfall, NO_2, and suspended particulates (TSP, PM_{10}, $PM_{2.5}$) at various monitoring locations around the Meadowbank and Whale Tail sites, Meadowbank All-Weather Access Road (AWAR), and Whale Tail Haul Road (WTHR).

For the measured parameters, results are primarily compared to Government of Nunavut (GN) Environmental Guidelines for Ambient Air Quality and/or Canadian Ambient Air Quality Standards (CAAQS) for TSP, $PM_{2.5}$ and NO_2; BC Ambient Air Quality Objectives for PM_{10}; and Alberta Ambient Air Quality Guidelines for passive dustfall. Results are also compared to model predictions from the Project's Final Environmental Impact Statement, where available.

For all monitoring stations and parameters, the majority of results were less than regulatory standards and/or FEIS predictions. Some exceedances of short-term standards for suspended particulates occurred, and generally an increase in suspended particulates at some stations was observed in 2022, as described below. No exceedances of annual average standards occurred for any parameter (GN guidelines, CAAQS for particulate matter and NO_2). Occasional exceedances of FEIS predictions also occurred among suspended particulate samples (short-term and annual averaging times), initiating management actions.

In total, 417 of 446 results for suspended particulates met applicable regulatory standards for the 24-h average. Exceedances included 14 TSP samples, 11 PM_{10} samples, and four $PM_{2.5}$ samples. Eighteen of these cases occurred at DF-6b where exceedances were predicted in the FEIS Addendum. All suspended particulate results (TSP, $PM_{2.5}$) met regulatory standards for the annual average. Since the annual average TSP at DF-6b exceeded the management threshold (equivalent to the FEIS prediction), a review of current mitigation practices was initiated, and actions identified to help reduce generation of suspended particulates moving forward.

Of 61 dustfall samples collected at onsite locations DF-1 – DF-6, one exceeded the Alberta guideline for industrial/commercial areas, which is expected to occur occasionally. This sample was collected at station DF-1. All other results at this monitoring station were below the guideline. This sample is therefore considered an isolated event, and no change in mitigation is planned based on this result. For dustfall along the five AWAR and WTHR transects, no relevant exceedances of the established dust management threshold occurred (0.53 mg/cm^2/30d at 500 m). Total dustfall in two samples exceeded the threshold, but in both cases the associated results for fixed dustfall (non-organic fraction; more representative of road dust) were below the guideline, so these results are not considered to be mine-related.

Annual average NO_2 as measured using passive samplers met the GN guideline of 32 ppb and the CAAQS of 17 ppb for all stations (DF-1, DF-2, DF-6b, DF-8, DF-9). All available results for continuous NO_2 monitoring at DF-7 were also below the relevant 1-h, 24-h, and annual standards (GN and/or CAAQS).

Estimated greenhouse gas emissions for the Meadowbank Complex as calculated for reporting to Environment Canada's Greenhouse Gas Emissions Reporting Program in 2022 were 248,921 tonnes CO_2 equivalent (preliminary value at the time of reporting), which is less than the FEIS prediction.

Meadowbank incinerator stack testing was performed in September, 2022. The complete report is provided in Appendix 52 of the 2022 Meadowbank Complex Annual Report. The test result for mercury in 2022 was less than the GN limit, but the result for total dioxins and furans exceeded the regulatory

limit. Operation of the incinerator ceased in November, 2022 until the issue is resolved. No incinerator was in operation at the Whale Tail Mine in 2022.

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

SECTION 1 • INTRODUCTION

1.1 BACKGROUND AND OBJECTIVES

In accordance with conditions of NIRB Project Certificates No.004 and No.008, air quality and dustfall monitoring was conducted at the Meadowbank Complex in 2022, as described in the Air Quality and Dustfall Monitoring Plan - Version 6 (March, 2022). The objective of this program is to measure ambient outdoor air quality (suspended particulates, NO_2, dustfall) around the Meadowbank and Whale Tail sites. Dustfall is also monitored along the Meadowbank All-Weather Access Road (AWAR) and Whale Tail Haul Road (WTHR) as a component of this plan.

This report provides results of current year air quality monitoring (Section 4), historical trends (Section 5), onsite weather data (Section 6), greenhouse gas emissions data as required by Environment Canada's Greenhouse Gas Emissions Reporting Program (GHGRP) (Section 7), and a summary of incinerator stack testing as conducted under Meadowbank's Incinerator Waste Management Plan (Version 10, June 2022) (Section 8).

1.2 DUST MITIGATION

In 2022, road dust management was carried out in accordance with the Air Quality and Dustfall Monitoring Plan (Version 6, March 2022), and the Whale Tail Haul Road Management Plan (Version 3, April 2020). Road dust mitigation options consist primarily of:

- Enforcing or temporarily lowering speed limits
- Grading road surfaces
- Placement of new coarser material on the road surface
- Road watering or application of dust suppressants

Dust management actions are planned according to pre-determined monitoring thresholds (Table 1). Both visual indicators and numeric thresholds are used to determine when specified mitigation measures need to be initiated.

Table 1. Thresholds and mitigation measures (Air Quality and Dustfall Monitoring Plan, Version 6 – March 2022).

Location	Frequency	Indicator	Threshold	Mitigation Measure
Haul road and site access roads	Regular weekly or more frequency inspection by road supervisor during the late spring and summer periods	Measured dustfall Visibility	Deterioration of visibility Safety concern High dust levels evident near significant waterbodies Dustfall exceeding 0.53 mg/cm^2/30-day at	Use of water and/or dust suppressant in areas requiring attention. Grade the road surface. Add new granular material to the road surface.

Location	Frequency	Indicator	Threshold	Mitigation Measure
			500 m from the AWAR or WTHR	Temporarily lower the speed limit on the road.
Mine site, including travel areas	Regular weekly or more frequent inspection by the site supervisor during the late spring and summer periods.	Measured dustfall Measured PM	Deterioration of visibility Safety concern Dust reaching Whale Tail Lake or Mammoth Lake Dustfall exceeding 1.58 mg/cm^2/30-day at stations DF-1 to DF-6 Active PM results exceeding FEIS predictions at DF-6	Use of water and/or dust suppressant on exposed surfaces such as parking areas, pads, haul, access and service roads. Review mitigation measures in place. Add new granular material to surface. If applicable, grade the surface. Temporarily lower the speed limit on site.
Ramps in the open pits	Regular inspection by pit supervisor during summer period	Visibility	Deterioration of visibility Safety concern	Use water as a dust suppressant.

The following sections discuss the application of dust suppressant or watering for each location identified in Table 1 in 2022. Other than dust suppressant application or road watering, records are not specifically maintained on the implementation of other mitigation actions (e.g. grading, new material additions) in response to dustfall thresholds. Rather, the effectiveness of the mitigation overall is determined based on results of dustfall and suspended particulate monitoring for the current year (Section 4.5).

1.2.1 AWAR and Whale Tail Haul Road Dust Suppression

1.2.1.1 AWAR

According to the Air Quality and Dustfall Monitoring Plan (Version 6, March 2022), a calcium chloride dust suppressant is planned to be applied twice during the summer season on five sections of the AWAR, two locations in Baker Lake, and one onsite location. Between May 30 – August 14, 2022, dust suppressant in the form of calcium chloride (dry flake product) was applied once or twice to various sections of the AWAR. Locations are described in Table 2, and have been generally consistent since

this program began in 2017. Changes to dust suppression locations in 2022 compared to the Air Quality and Dustfall Monitoring Plan are indicated in Table 2. Section 4.5 provides a discussion on the effectiveness of the mitigation using quantitative dustfall monitoring thresholds.

Table 2. Dust suppressant locations along the Meadowbank AWAR in 2022. Strikethrough indicates location where dust suppressant application was identified in the Air Quality Monitoring Plan (Version 6), but no application was completed in 2022. Italics indicate supplemental dust suppression locations in 2022.

Location Type	Dust Suppression Location	Rationale
Hamlet	Agnico Eagle spud barge area	High traffic area near hamlet
~~Hamlet~~	~~Agnico Eagle tank farm to Arctic Fuel site~~	~~High traffic area near hamlet~~ (not applied in 2022 due to COVID restrictions)
AWAR	*km 6 – Baker Lake*	*High traffic area near hamlet*
AWAR	km 10 - 12	High traffic area near hamlet & area of concern to HTO – proximity to lake
AWAR	km 24 - 26	Area of concern to HTO – proximity to lake
AWAR	*km 39 - 40*	*New since 2021 (road design and surface stability; safety)*
AWAR	km 48 - 50	Area of concern to HTO – water crossing
AWAR	km 68 - 70	Location identified by Agnico Eagle – water crossing
AWAR	*km 72.5 – 73.5*	*New since 2020 (safety considerations)*
AWAR	km 80 - 84	Location identified by Agnico Eagle – proximity to water & crossing
AWAR	*km 85 - 86*	*New since 2020 (safety considerations)*
AWAR	*km 91 - 94*	*New since 2020 (safety considerations)*
AWAR	*km 97 - 98*	High traffic area near site
Onsite	Emulsion plant turn off to Meadowbank site (km 103 – 104)	High traffic area onsite

1.2.1.2 Whale Tail Haul Road

For the Whale Tail Haul Road, management actions primarily consist of enforcing speed limits, grading, placement of new material, and if necessary, road watering or application of dust suppressants. The implementation of dust mitigation measures is determined by the Road Supervisor and Environment Department based on visibility concerns, or where dust deposition is potentially impacting traditional land uses, fish habitat, and/or water quality.

In 2022, dust suppressant in the form of calcium chloride (dry flake product) was again applied to the entire length of the WTHR between May 27 and September 3. Generally, two to three applications were completed for all sections (one application along the entire length, and follow-up applications in certain areas). In addition, road watering was conducted along the entire WTHR throughout the summer season, as needed.

1.2.2 Mine Site

Road watering was conducted regularly for roads and pits on the Whale Tail and Meadowbank sites in the summer season. In addition, calcium chloride dust suppressant was applied at various Whale Tail

site and Meadowbank site locations in June and July. As in previous years, watering was also conducted regularly throughout the summer months for the Meadowbank airstrip, as needed.

1.3 COMMUNITY CONCERNS

As described in the Air Quality and Dustfall Monitoring Plan (Version 6, March 2022), Agnico records community concerns that are raised with regards to dust generated by traffic on the AWAR and Whale Tail Haul Road.

In 2022, the Community Relations team held 16 days of engagement activities in Baker Lake on various topics, including environmental concerns of community members. No specific comments or complaints were received on this topic by the Meadowbank Environment Department.

The NIRB requested Agnico Eagle to provide an action plan for the development of a community-based monitoring program for dust. In response to the NIRB's recommendations, Agnico Eagle met with Hamlet Council on February 16, 2022 and the Baker Lake HTO on February 17, 2022 to discuss the development of the Baker Lake Dust Advisory Group (BLDAG). This meeting was scheduled earlier in 2021 but postponed due to COVID restrictions. The role of this Dust Advisory Group will mainly be to articulate concerns and identify areas that need special attention and involve the community of Baker Lake in a dust sampling information session with the Environmental Department in 2022.

The first meeting in February 2022 was to identify the groups impacted by dust generated by Agnico Eagle operations. The Baker Lake HTO were asked to identify the berry pickers. Agnico Eagle also requested names of berry pickers from the Kivalliq Elders Advisory Committee. We are pleased to report Agnico Eagle is now engaging with a select group of berry pickers in the community of Baker Lake..

On August 24, 2022, two berry pickers from the community of Baker Lake were consulted and participated into a berry harvesting session along the AWAR up to km 46. This activity was to collect IQ and TK information and listen to the experience from these berries harvesters that will serve Agnico Eagle to better mitigate the potential effect of the dust along the AWAR. One of the participants was selected to investigate berry harvesters interested in participating in a group to identify preferred locations for berry harvesting along the AWAR. A meeting was also planned on October 25, 2022 but extended road closures due to the caribou migration prevented the Environmental team from attending and they were unable to carry out a dust sampling information session. Thus, in 2023, Agnico will continue to collaborate with the community of Baker Lake to identify some areas of concern along the road. These areas will be further discussed during the first BLDAG meeting planned in July 2023.

In the past, consultation with the Hamlet was conducted to identify major areas of concern along the AWAR. Five areas were identified, and Tetraflake ($CaCl_2$) is applied during the summer to mitigate dust in those areas. Additional dust suppression methods could be implemented along the AWAR and WTHR depending on community concerns and traditional knowledge information given during regular consultations.

1.4 MONITORING LOCATIONS

Air quality and dustfall monitoring is conducted at eight locations around the Meadowbank and Whale Tail sites. Dustfall is monitored at five transects along the AWAR and Whale Tail Haul Road. NO_2 is monitored at two locations along the WTHR (two passive monitors and one co-located continuous gas analyzer). For all locations, UTM coordinates are provided in Table 3, and locations are shown in

relation to minesite features in Figures 1 and 2. Stations DF-8 and DF-9 were added in 2021 in response to suggestions by Environment and Climate Change Canada (ECCC).

Table 3. UTM coordinates for the Meadowbank air quality and dustfall monitoring locations (all zone 14W). ^DF-6 replaced DF-5 in May 2019.

Monitoring Location	Measured Parameters	Easting	Northing
DF-1	TSP, PM_{10}, $PM_{2.5}$, passive NO_2, dustfall	636850	7217663
DF-2	TSP, PM_{10}, $PM_{2.5}$, passive NO_2, dustfall	637895	7213049
DF-3	Dustfall	639599	7213198
DF-4	Dustfall	639233	7217074
DF-6a^	Passive NO_2 and dustfall	608842	7254348
DF-6b^	TSP, PM_{10}, $PM_{2.5,}$	608361	7254974
DF-7	Continuous NO_2	632414	7233318
DF-8	Passive NO_2	632407	7233254
DF-9	Passive NO_2	618033	7238670
AWAR km 18	Dustfall	640208	7152082
AWAR km 78	Dustfall	626155	7199739
WTHR km 134	Dustfall	630941	7234375
WTHR km 151	Dustfall	618132	7238621
WTHR km 169	Dustfall	613782	7249508

PROJECT: DA11-062-08

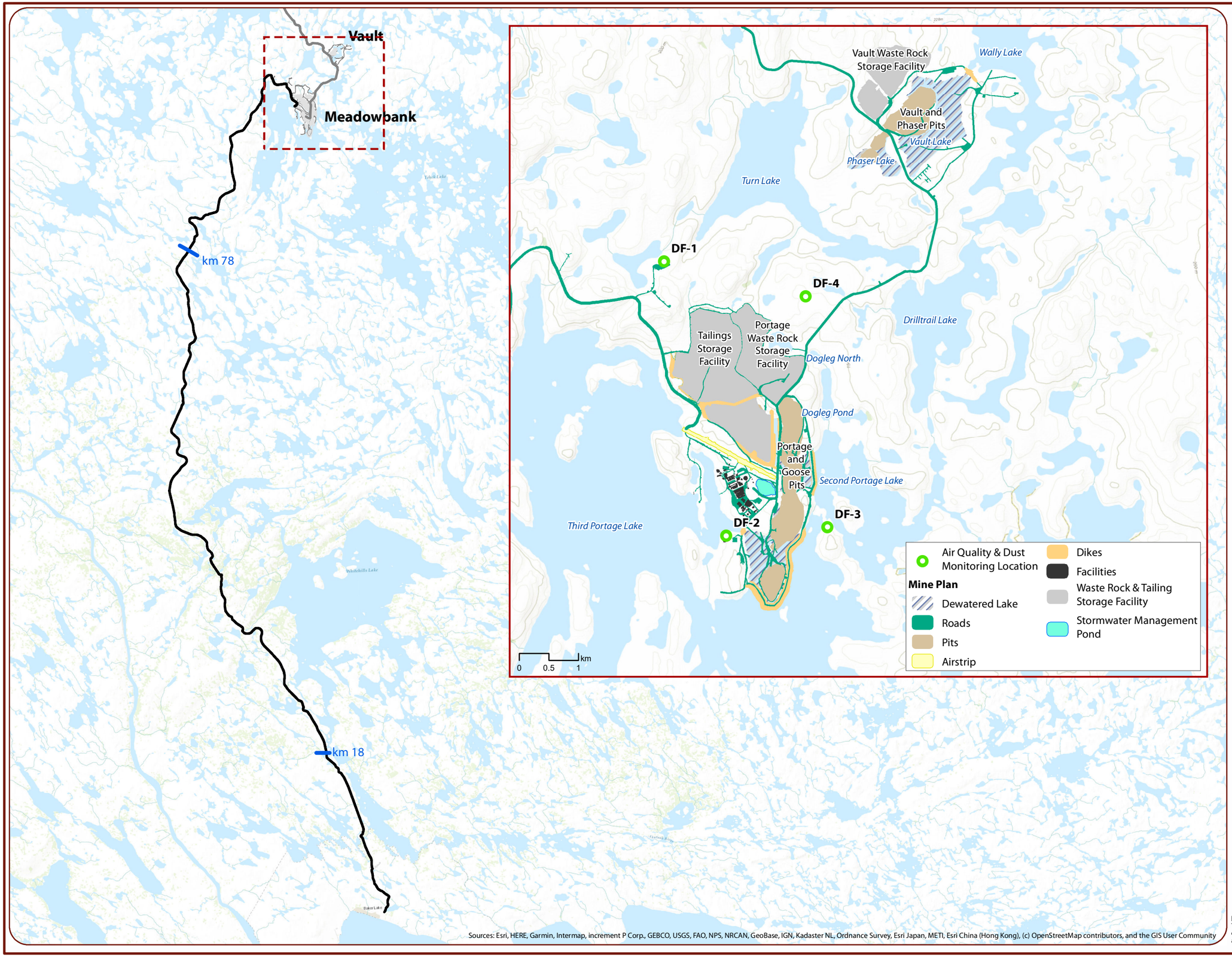
CLIENT: Agnico-Eagle Mines Ltd. Meadowbank Division

DATE: 12, March 2020

DRAWN BY: Janel Sauder

Figure 1: Air Quality and Dustfall Monitoring Locations

Meadowbank Site and All Weather Access Road



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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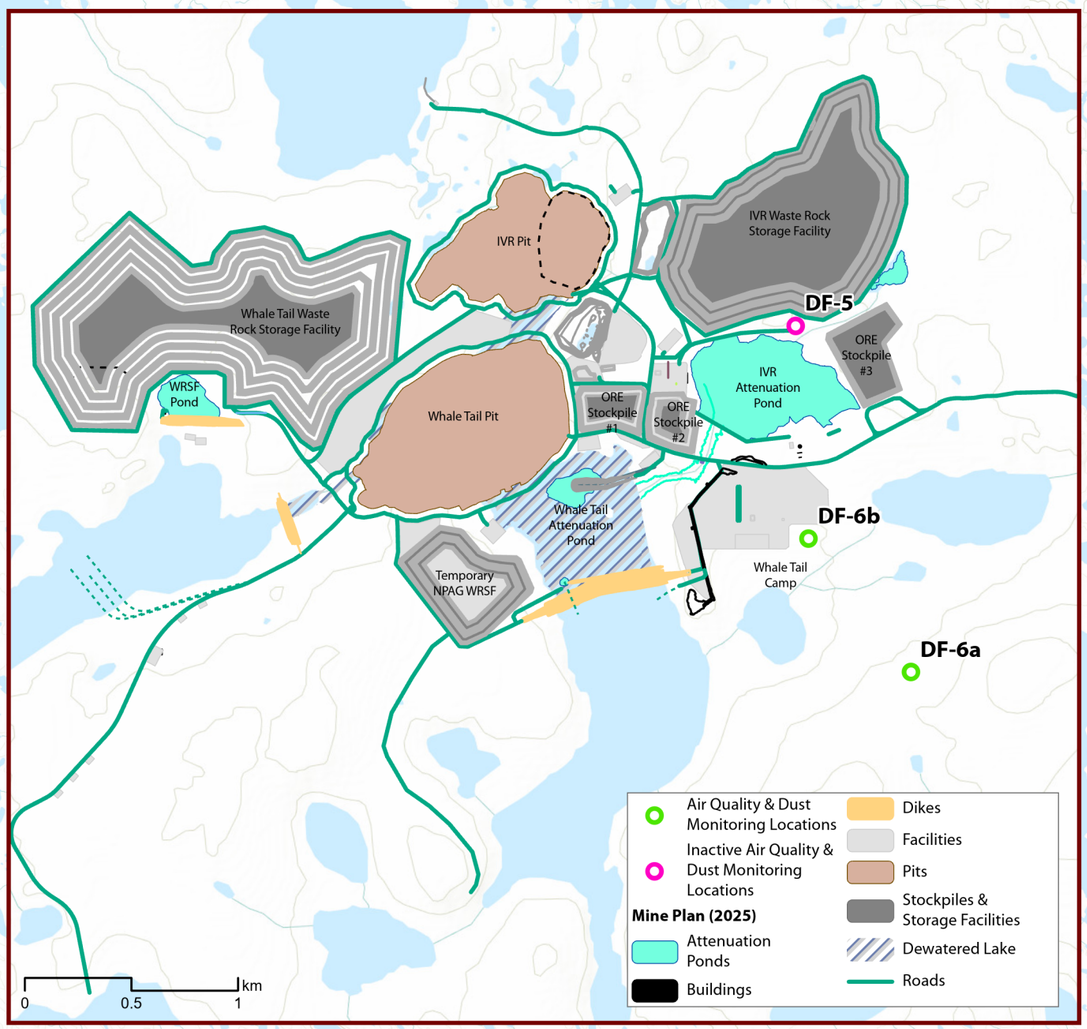
Figure 2: Air Quality and Dustfall Monitoring Locations

Whale Tail Site and Whale Tail Haul Road



Legend

- Air Quality & Dust Monitoring Locations
- Inactive Air Quality & Dust Monitoring Locations
- Dustfall Monitoring Transects

Mine Plan (2025)

- Whale Tail Haul Road
- Road
- Mine Site

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1.4.1 Meadowbank Onsite Locations DF-1 – DF-4

Monitoring locations for the Meadowbank site were determined in consultation with Environment Canada in 2011. One station was moved in 2012 due to changes in the location of the Vault haul road (see 2012 Annual Report – Air Quality and Dust Monitoring Report).

Station DF-1 is located next to the explosive storage area (emulsion plant), and approximately 500 m north of the all-weather access road. PM_{10} and $PM_{2.5}$, NO_2 and dustfall are monitored at this location year-round.

Station DF-2 is located at the northern corner of South Camp Island, near the TCG contractor area. All parameters (TSP, PM_{10} and $PM_{2.5}$, NO_2 and dustfall) are monitored at this location year-round.

Station DF-3 is approximately 1,800 m east of the East Dike. According to the Plan, dustfall only is monitored at this location year-round.

Station DF-4 is approximately 1,500 m southwest of Vault Pit. The original location of this monitoring station was chosen before the beginning of the construction of the Vault Road. Realignment of the road during construction placed the station within 10 feet of the road. Therefore, Agnico re-positioned Station DF-4 approximately 480 m to the north-west on February 29, 2012 to be representative of the originally intended location relative to the road. According to the Plan, dustfall only is monitored at this location year-round.

1.4.2 Whale Tail Onsite Location DF-6 a & b

Station DF-6 replaced DF-5 in May 2019 to accommodate the Whale Tail Expansion Project after only 4 months of monitoring for dustfall and NO_2 at that station.

Station DF-6a (Figure 2) is sited approximately 800 to 1,000 m southeast of the Whale Tail Camp in a representative area for dustfall and NO_2. Station DF-6b (Figure 2) is located on the southern edge of the main camp in an area identified as significant for determination of particulate matter (TSP, PM_{10} and $PM_{2.5}$) relative to concentrations predicted further from the project footprint. Monitoring at DF-6a started in May 2019 for dustfall and NO_2. Suspended particulate monitoring (TSP, PM_{10}, $PM_{2.5}$) began at station DF-6b in April 2020[1].

1.4.3 Whale Tail Haul Road Locations DF-7, DF-8, and DF-9

In 2021, a continuous NO_2 analyzer was installed at station DF-7 (Figure 2), along with a co-located passive monitoring station (DF-8). This station is sited near the communications tower at kilometer 132 along the Whale Tail Haul Road. This location was chosen in consultation with ECCC, and primarily because there is readily available AC power from a diesel generator used to provide power to the communications tower. Stations DF-7 and DF-8 are located approximately 200 m upwind of the generator to minimize the impacts of NO_2 emissions from the generator. This monitoring location was also chosen to provide an assessment of regional NO_2 concentrations that are not unduly influenced by a single facility but are still able to account for the impacts of developments at Whale Tail and Meadowbank. The station is downwind of the Whale Tail site based on the predominant wind directions in the area, which is also a requirement of Project Certificate No.008 Condition 1.c.

Station DF-9 was added in 2021 at WTHR km 151, within approximately 110 m of the road (west side).

[1] Although the Partisol instruments were installed at this station in November 2019, a permanent power supply was not available until April 2020.

1.4.4 Meadowbank AWAR Dustfall Transects

Dustfall transects were established beginning in 2012 at kilometers 18 and 78 along the AWAR from Baker Lake to Meadowbank (Figure 1). Dustfall samples are collected annually during the summer season over 1-month averaging periods. Transects include monitoring stations at 25 m, 100 m, and 300 m from the road on both sides (east/downwind and west/upwind). Stations are also located at 1,000 m for the km 78 transect only (presence of waterbodies has precluded sampling at this distance for km 18). These distances were chosen to bracket the smallest FEIS-predicted zone of influence (ZOI) for wildlife of 100 m. The zone of maximum dustfall has previously been reported to be within 300 m of roads under heavier use than the Meadowbank AWAR (Auerbach et al. 1997).

Previously (from 2017-2019), transects have also been monitored in five locations where dust suppressant was applied (km 11, 25, 50, 69, 80). The purpose of these temporary monitoring stations was to evaluate the effectiveness of dust mitigation measures in comparison to the reference sites at km 18 and 78. This assessment was complete in 2019, and indicated that the application of dust suppressant effectively reduced roadside dustfall levels. Agnico will continue to apply dust suppressant in these locations (Section 1.2.1), but monitoring is conducted only in areas without suppressant (km 18 and 78).

1.4.5 Whale Tail Haul Road Dustfall Transects

In 2019, dustfall transects were established between kilometers 18 & 19, 36 & 37, and 54 & 55 along the Whale Tail Haul Road. In 2019, the WTHR km markers were re-named as a continuation of the AWAR. The WTHR thus begins at km 115, and the sampling locations were renamed as km 134, 151, and 169, respectively (Figure 2).

Dustfall samples are collected during the summer season over two one-month averaging periods. Each transect includes stations at 25 m, 100 m, 300 m and 1,000 m upwind, (east/north) and downwind (west/south) of the haul road. The 1,000 m sample at location km 151 east was historically (2018 – 2020) collected at approximately 800 m, due to the presence of a waterbody, but in 2021 it was moved along the shoreline to 1,000 m.

SECTION 2 • MONITORING METHODS

2.1 TSP, PM_{10}, $PM_{2.5}$ (DF-1, DF-2, DF-6B)

Suspended particulate matter is generated by wind erosion of local landscapes, movement of vehicles/equipment, airstrip activities, construction activities, the combustion of diesel fuel, and solid waste incineration.

The monitoring program for suspended particulates utilizes Partisol Model 2025 sequential air samplers (single and dichotomous units) installed at three locations to measure:

- Total suspended particulates (TSP) – particulate matter less than 100 µm;
- PM_{10} – particulate matter less than 10 µm; and
- $PM_{2.5}$ – particulate matter less than 2.5 µm.

In 2022, suspended particulate monitoring (TSP, PM_{10}, $PM_{2.5}$) was scheduled for 24-h periods every six days using Partisol Plus Model 2025 Sequential Air Samplers (TSP) and Partisol Plus Model 2025-D Dichotomous Sequential Air Samplers ($PM_{2.5}$ and PM_{coarse}). Partisol samplers draw in a stream of ambient air at a controlled flow rate, and particulates are collected on a pre-weighed filter supplied by an accredited laboratory. The exposed filter is then shipped back to the laboratory and re-weighed to measure the total accumulated particulates. Calculations for TSP, PM_{10} and $PM_{2.5}$ were performed according to the Partisol operating manual, as follows.

TSP is calculated as:

$$TSP = M_{TSP}/V$$

Where: TSP = mass concentration of particulates (µg/m^3)

M_{TSP} = final mass of TSP filter – initial mass of filter (µg/filter)

V = volume of air drawn in during the sampling period (~24 m^3)

Since the dichotomous unit splits the intake air stream to determine $PM_{2.5}$ and PM_{coarse} ($PM_{10\text{-}2.5}$), the volume of air is different for each filter. Calculations are performed as follows:

$PM_{2.5}$ is calculated as:

$$PM_{2.5} = M_{2.5}/V_{2.5}$$

Where: $PM_{2.5}$ = mass concentration of particulates (µg/m^3)

$M_{2.5}$ = final mass of $PM_{2.5}$ filter – initial mass of filter (µg/filter)

$V_{2.5}$ = volume of air drawn through the $PM_{2.5}$ filter during the sampling period (~21.7 m^3)

And PM_{coarse} is calculated as:

$$PM_{coarse} = M_{coarse}/V_{total} – PM_{2.5}(V_{coarse}/V_{total})$$

Where: PM_{coarse} = mass concentration of particulates (µg/m^3)

M_{coarse} = final mass of PM_{coarse} filter – initial mass of filter (µg/filter)

V_{total} = total volume of air drawn into unit during sampling (~24m^3)

V_{coarse} = volume of air drawn through the PM_{coarse} filter during the sampling period (~2.4 m^3)

Concentration of PM_{10} is then calculated as PM_{coarse} + $PM_{2.5}$.

For comparison to regulatory guidelines, concentrations of particulates need to be calculated using air volumes normalized to 25°C and 101.3kPA (standard temperature and pressure; STP). Depending on system settings, standardized volumes were either recorded by the Partisol unit, or were calculated from average temperature and pressure values recorded by the Partisol unit during the sampling period.

2.2 DUSTFALL (DF-1 – DF-6; AWAR AND WTHR TRANSECTS)

Dustfall collection provides a measure of particulate deposition in the vicinity of the mine site. The main dust generation processes at Meadowbank and Whale Tail are wind erosion of site structures (e.g. the Waste Rock Storage Facilities), and fugitive sources from open pit mining, rock crushing and movement of vehicles/equipment/air traffic on site.

In accordance with ASTM methods for dustfall measurement (ASTM, 2004), dustfall samples were collected in open vessels containing a purified liquid matrix provided by an accredited laboratory. Particles are deposited and retained in the liquid, which is then filtered to remove large particles (e.g. leaves, twigs) and analyzed by the accredited laboratory for total and fixed (non-combustible) dustfall. Sampling containers are deployed in the field over one-month periods, and calculated dustfall rates are normalized to 30 days (mg/cm^2/30 days per ASTM 1739-98). This sampling method is widely used in air quality studies in Nunavut and elsewhere for dustfall monitoring.

ASTM methods suggest collection of the dustfall sample at 2-3 m height on a utility pole to prevent re-entrainment of particulates from the ground, and to reduce vandalism and potential for wildlife interaction. For locations DF-1 – DF-6, samples have always been collected in this manner. However, due to the difficulty of constructing and deploying stands to hold the large number of sample containers used for roadside dustfall transects, all road-side sampling canisters were deployed at ground level from 2013 - 2019. Although comparative studies conducted in 2012, 2019, and 2020 indicated that samples collected at ground level provide a conservative (high) estimate of dustfall, all sample collection canisters were moved to stands beginning in 2020 based on comments received from regulators.

2.3 NO_2

NO_2 is produced primarily through the combustion of hydrocarbons in powerplants, vehicles and other mining equipment, and during blasting.

2.3.1 Passive NO_2 (DF-1, DF-2, DF-6a, DF-8, DF-9)

Ambient concentrations of NO_2 by volume (ppb) are analyzed over one-month periods (approximately 30 days) using a passive sampling device provided by the accredited laboratory. The annual average NO_2 concentration by volume was calculated from the monthly data for comparison against the relevant GN guideline.

2.3.2 Continuous NO_2 (DF-7)

In July, 2021, a continuous NOx analyser (ThermoScientific 42iQ NO-NO_2-NOx Analyzer) was installed at one location (DF-7), and ambient concentrations of NO_2 by volume (ppb; 1-min averaging time) have

been measured since that time (other than instrument downtime – see Section 4.3) for comparison with CAAQS and GN guidelines for 1-h, 24-h, and annual averaging times.

The recorded dataset was screened according to ECCC (2019) to identify valid data for reporting purposes. Briefly, data was reviewed and corrected as feasible for flags, outliers, and instrument drift. Full details for data manipulations in the current monitoring year are provided in Section 4.3.2.

2.4 WEATHER DATA

Weather data for the dustfall and air quality monitoring plan is collected using the Meadowbank and Whale Tail permanent climate station. Daily averages for wind speed, wind direction and temperature are provided from this station (Appendix A).

In addition, a wind sensor was installed along with the NOx analyser at DF-7, with hourly average wind speed and wind direction recorded. Wind monitoring can be used to help identify sources of pollutants as needed, based on wind direction.

2.5 GREENHOUSE GAS EMISSIONS

Agnico Eagle is required by the Greenhouse Gas Emissions Reporting Program (GHGRP) to track greenhouse gas emissions based on annual fuel consumption, composition and the US EPA's AP-42 emission factors. Full details of the program are provided in the Meadowbank and Whale Tail Greenhouse Gas Reduction Plan.

SECTION 3 • DATA ANALYSIS

3.1 REGULATORY STANDARDS

Regulatory standards for the air quality parameters of concern are provided in Table 4.

Data collected from the onsite air quality monitoring stations are compared primarily to the applicable Government of Nunavut Environmental Guidelines for Ambient Air Quality (October, 2011). These standards are available for TSP, $PM_{2.5}$, and NO_2.

No PM_{10} standard is available in Nunavut, so results are compared to the BC Ambient Air Quality Objective.

Likewise, no standards for dustfall are available for Nunavut. Results of the dustfall analysis for transects along the AWAR and the WTHR are compared to the Alberta Ambient Air Quality Guideline (January, 2019) for residential and recreational areas according to thresholds for dust management described in the Air Quality and Dustfall Monitoring Plan (March, 2022). Results of dustfall analysis at onsite stations DF-1 to DF-6 are compared to the Alberta Ambient Air Quality Guideline for commercial and industrial areas. As stated in the guideline, these dustfall guidelines may be used for airshed planning and management, as a general performance indicator, and to assess local concerns.

Continuous NO_2 monitoring results and $PM_{2.5}$ data are also compared to Canadian Ambient Air Quality Standards (CAAQS). CAAQS represent voluntary objectives for an individual site, and are typically used at a regional scale for airshed planning purposes.

Table 4. Applicable standards for ambient air quality for the Meadowbank Complex.

Parameter	Averaging Period	GN Guideline		CAAQS (2020)		Other Standard
		µg/m³	ppb	µg/m³	ppb	
TSP	24-h average	120	-	-	-	-
	Annual geometric mean	60	-	-	-	-
PM_{10}	24-h average	-	-	-	-	50 µg/m³*
$PM_{2.5}$	24-h average	30	-	27**	-	-
	Annual arithmetic mean	-	-	8.8***	-	-
NO_2	1-h average	400	213	32‡	60‡	-
	24-h average	200	106	-	-	-
	Annual arithmetic mean	60	32	9.1‡‡	17.0‡‡	-
Total Dustfall	30-d average	-	-	-	-	0.53 mg/cm²^ 1.58 mg/cm²^^

* BC Ambient Air Quality Objective (November, 2021)
** The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations
***The 3-year average of the annual average of all 1-hour concentrations
‡The 3-year average of the annual 98th percentile of the daily maximum 1-hour average concentrations
‡‡The average over a single calendar year of all 1-hour average concentrations
^ Alberta Ambient Air Quality Guideline for recreational/residential areas (January, 2019) – applied to AWAR & WTHR transects (500+ m).
^^ Alberta Ambient Air Quality Guideline for commercial/industrial areas (January, 2019) – applied to DF-1 – DF-6 onsite locations.

3.2 FEIS PREDICTIONS

Air quality modelling is a statistical exercise that captures the maximum and average emissions expected from certain sources, and seeks to determine ground-level concentrations at various locations under specific meteorological conditions and terrain factors. Additionally, air quality modelling often does not include transboundary transport or other background sources of contaminants, and it typically assesses specific size fractions of particulates that may not align with field monitoring methods. Therefore, accuracy of quantitative predictions made in the FEIS cannot specifically be assessed through field monitoring.

Tor the purposes of this report, comparisons to FEIS predictions are therefore considered at a screening level only (if measured concentrations are less than predictions, predictions can be verified as conservatively high), and in some cases as management thresholds established in the Air Quality and Dustfall Management Plan. Specific reasons for differences between predictions and field monitoring results are discussed further in results sections, where applicable.

In some cases, as described below, measured or estimated background concentrations were able to be added to predicted values to improve the comparison.

3.2.1 Meadowbank Site

In order to estimate potential impacts of the Project on air quality, modeling exercises were conducted as a component of the original project FEIS to determine emission rates and dispersion of various

criteria air contaminants from different sources (Air Quality Impact Assessment, Cumberland, 2005)[2]. Maximum predicted values of NO_2 (annual average), $PM_{2.5}$ (24-h and annual average), and PM_{10} (24-h) are available for comparison to measured values. It is noted however that these model predictions only include emissions from mobile and power plant sources. FEIS predictions for TSP and dust deposition were considered unsuitable for comparison to field measurements (i.e. monitoring results) since only emissions from three specific point sources were required to be modeled (TSF, WRSF, ore stockpile).

The following specific methods were used to identify FEIS predictions for comparison to monitoring results, and add background concentrations:

- Modeled values for suspended particulates ($PM_{2.5}$ and PM_{10}) were obtained for the two monitoring locations (DF-1 and DF-2) from the FEIS Air Quality Impact Assessment Figures 6.2 – 6.24. PM_{10} values were derived from Figures 6.7 and 6.8, based on references in the text (Table 6.1), although these figures are labelled as SP. Model values for a TSF size of 960x560m were used in the comparison.

- The 2016 impact assessment for the Whale Tail Mine calculated background values for $PM_{2.5}$ of 6.7 and 3.6 µg/m^3 for 24-h and annual averaging times, respectively (Agnico Eagle, 2016 - Whale Tail Pit FEIS, Appendix 4-A). No background data was available for other size classes of suspended particulates, but these $PM_{2.5}$ values were added to predicted concentrations of $PM_{2.5}$ and PM_{10} for the comparison, since $PM_{2.5}$ forms a subset of PM_{10}.

- For NO_2, modeling results were only provided in the FEIS for the maximum predicted ground-level concentration, which occurred adjacent to the power plant. The closest NO_2 monitoring station (DF-2) is at a distance of approximately 1 km southwest (cross-wind) from this location.

Table 5 summarizes the FEIS model predictions for these parameters.

No quantitative predictions were made in the Meadowbank FEIS for the AWAR.

Table 5. Model-predicted maximum concentrations of measured criteria air contaminants for location DF-1 and DF-2 at the Meadowbank site (from Cumberland, 2005).

Parameter	Location	Averaging Time	Concentration
Coarse Particulate Matter (PM_{10})	DF-1	24-h	26.7 µg/m^3
	DF-2	24-h	46.7 µg/m^3
Fine Particulate Matter ($PM_{2.5}$)	DF-1	24-h	26.7 µg/m^3
		Annual	4.6 µg/m^3
	DF-2	24-h	16.7 µg/m^3
		Annual	4.1 µg/m^3
Nitrogen Dioxide (NO_2)	DF-2	Annual	4.97 ppb

[2] As part of the FEIS for the Whale Tail Project (Agnico Eagle, 2016), qualitative assessments were performed for ongoing use of the Meadowbank mill and AWAR, but no quantitative changes to original FEIS predictions were included.

3.2.2 Whale Tail Site

For the Whale Tail site, measured values at DF-6 are also compared to FEIS-modeled maximum concentrations for this location. Maximum predicted values for the DF-6 locations on the Whale Tail site are shown in Table 6. However it is noted that for TSP in particular, the size fraction of particles assessed through air quality modeling is limited (typically <30 µm aerodynamic diameter), whereas Partisol instruments may intake larger suspended particles if they occur in the vicinity of the instrument. Therefore as noted above, this is considered a screening level comparison only.

Dust deposition rates were predicted for the haul road (see Section 3.2) but not for the Whale Tail site.

Table 6. Model-predicted maximum concentrations of measured criteria air contaminants for location DF-6a or b (as applicable) the Whale Tail site (FEIS Addendum, Appendix 4C – Agnico Eagle, 2018b).

Parameter	Location	Averaging Time	Concentration
Total Suspended Particulate (TSP)	DF-6b	24-h	>120 µg/m^3
		Annual	30 - 45 µg/m^3
Coarse Particulate Matter (PM_{10})	DF-6b	24-h	>50 µg/m^3
Fine Particulate Matter ($PM_{2.5}$)	DF-6b	24-h	21 - 28 µg/m^3
		Annual	5 – 7.5 µg/m^3
Nitrogen Dioxide (NO_2)	DF-6a	Annual	8 - 16 ppb

3.2.3 Whale Tail Haul Road

3.2.3.1 NO_2

FEIS Addendum modelling (Agnico Eagle, 2018) indicated that low level emissions of NO_2 will be produced by vehicles using the haul road. The model predicted ground level concentrations of NO_2 due to haul road vehicle emissions represent a very small increase compared to background concentrations and are well below their relevant ambient air quality standards. No quantitative predictions are available for comparison to measured values at DF-7.

3.2.3.2 Dustfall

The primary goal of Whale Tail Haul Road dustfall monitoring is to track trends in dustfall generated by haul road traffic, and verify predictions made during the FEIS process. However, due to differences in particle sizes collected by static dustfall monitors (typically <850 µm) and those assessed through air quality emissions and dispersion modelling (typically <30 µm), these are considered conservative, screening-level comparisons only. Since dustfall canisters collect particles across a much wider range of sizes than included in standard modeling, they are very likely to measure higher rates of total dustfall than those specified in the FEIS. However, if measured dustfall is lower than predicted dustfall, model results can be verified as conservative.

Table 7 shows FEIS Addendum-predicted maximum monthly dust deposition from haul-road generated dust as a function of distance from the road. Results of the Whale Tail Haul Road monitoring program (total dustfall) are compared to these values plus background concentrations of total dustfall. A

background dustfall value of 0.27 mg/cm^2/30d is assumed, based on the maximum dustfall rate measured in this area (km 37, now km 152) during baseline studies for this area in 2015.

In general, FEIS Addendum predictions indicated that maximum monthly dust deposition rates will be below the Alberta guideline for residential and recreational areas within 500 m of the haul road (0.53 mg/cm^2/30d). This value was also set as the threshold for supplemental dust mitigation measures (Section 1.2).

Table 7. Predicted maximum monthly dust deposition rate as a function of distance from the Whale Tail Haul Road (FEIS Addendum, Appendix 4C, Table 4-C-24 – Agnico Eagle, 2018b).

Distance (m)	Predicted Dust Deposition (mg/cm^2/30d)	Measured Maximum Background Dust Deposition (mg/cm^2/30d)	Predicted + Background Dust Deposition (mg/cm^2/30d)
25	3.4	0.27	3.67
100	1.9	0.27	2.17
300	0.59	0.27	0.86
1000	0.11	0.27	0.38

SECTION 4 • 2022 MONITORING RESULTS

4.1 TSP, PM_{10}, $PM_{2.5}$

4.1.1 24-h Average

Sampling dates and 24-h average concentrations of TSP, PM_{10} and $PM_{2.5}$ are shown in Figures 3 - 5. For five of the six Partisol units, minimal data loss occurred in 2022 (i.e. results are available for most targeted sampling dates). For the TSP unit at DF-1, results are only available beginning November 1. Prior to this, the instrument had been removed from the field for repairs since April, 2021. Data loss and operational difficulties for the Partisol samplers are discussed further in Section 4.4.

As in previous years, TSP concentrations for the Meadowbank site were generally well below regulatory standards, with two of 63 samples at DF-1 and DF-2 (combined) exceeding the GN's 24-h standard of 120 µg/m^3. For the Whale Tail site location (DF-6b), FEIS Addendum predictions (Section 3.2.1) indicated that maximum 24-h TSP concentrations would exceed the GN 24-h standard of 120 µg/m^3, which occurred in twelve of 61 samples in 2022 (up from two in 2021). A maximum measured value of 266 µg/m^3 was recorded at DF-6b, which continues to be within the historically recorded high value of 459 µg/m^3 (Section 5.1).

For PM_{10}, five of 107 samples across Meadowbank site stations DF-1 and DF-2 exceeded the BC Air Quality Objective of 50 µg/m^3 for the 24-h average, with a maximum of 134 µg/m^3 on December 7. At DF-1, three of 58 samples exceeded the FEIS prediction of 26.7 µg/m^3 and at DF-2, five of 49 samples exceeded the FEIS prediction of 46.7 µg/m^3. However as noted in Section 3.2.1, these predictions only account for power plant and mobile sources, so it is expected they may be exceeded in some portion of field samples. FEIS Addendum predictions for the Whale Tail site indicated that maximum PM_{10} concentrations at DF-6b would exceed the BC 24-h standard of 50 µg/m^3, which occurred in six of 55 samples in 2022.

For $PM_{2.5}$, four of 160 samples across all three stations exceeded the GN guideline of 30 µg/m^3 for the 24-h average and the 2020 Canadian Ambient Air Quality Standard of 27 µg/m^3 for the 24-h average.

These all occurred at DF-2. These same samples also exceeded the 24-h FEIS maximum model prediction of 26.7 µg/m^3 for this station. The 24-h FEIS maximum model prediction of 16.7 µg/m^3 was exceeded in one sample at DF-1, and all samples at DF-6b were less than the prediction of 21 - 28 µg/m^3 for this location. As indicated above, the DF-1 and DF-2 predictions only account for power plant and mobile sources, so it is expected they may be exceeded in some portion of field samples.

For DF-6b, the increase in measured concentrations of suspended particulates began in March and generally tapered off in August, which is similar to previous years and coincides with the increased levels of activity and the dry season. For DF-2, elevated concentrations were observed in particular in April-May, and are expected to be linked to a structure fire which occurred in March at a nearby building, resulting in a significant new source of particulate matter in this area.

Inter-annual trends are discussed in Section 5.1.

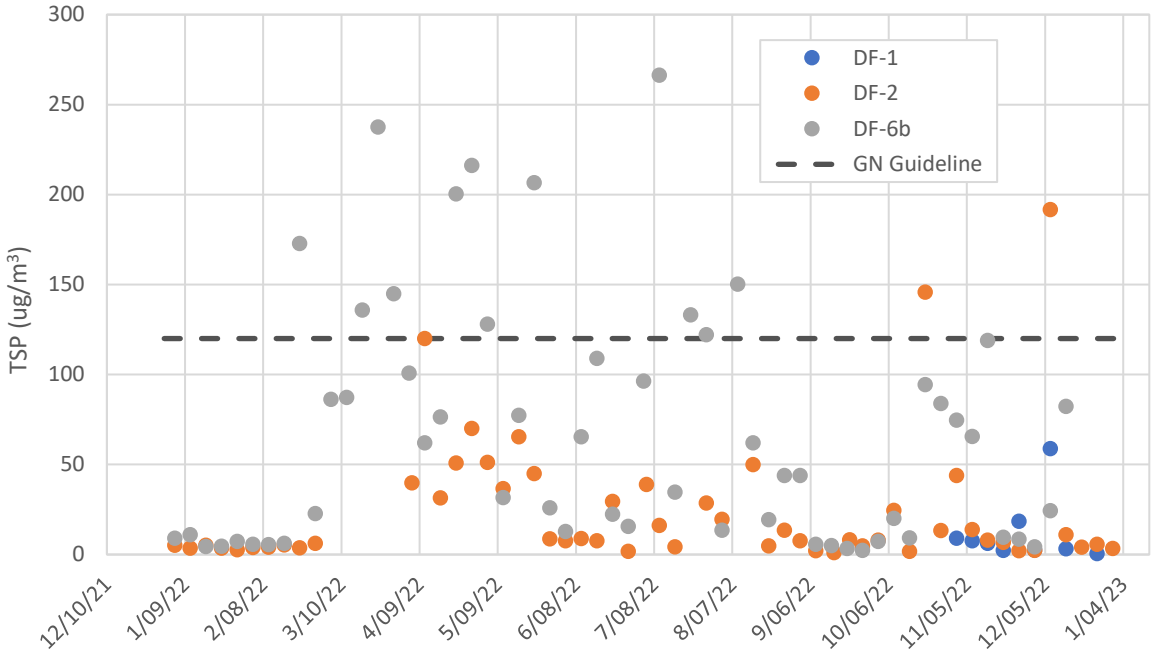

Figure 3. 24-h average concentrations of total suspended particulates (TSP) at Meadowbank Complex stations DF-1, DF-2, and DF-6b. Dashed line indicates the 24-hr average GN guideline for ambient air quality.

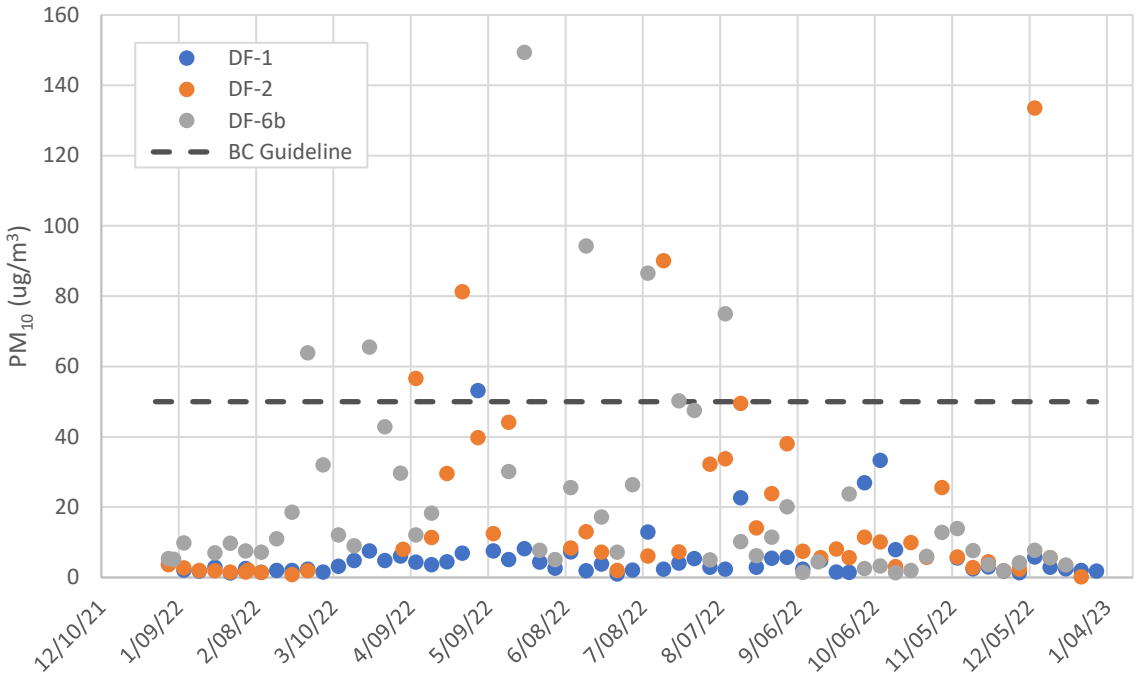

Figure 4. 24-h average concentration of airborne particulate matter less than 10 microns (PM_{10}) at Meadowbank Complex stations DF-1, DF-2, DF-6b. Dashed line indicates the BC Air Quality Objective for this parameter.

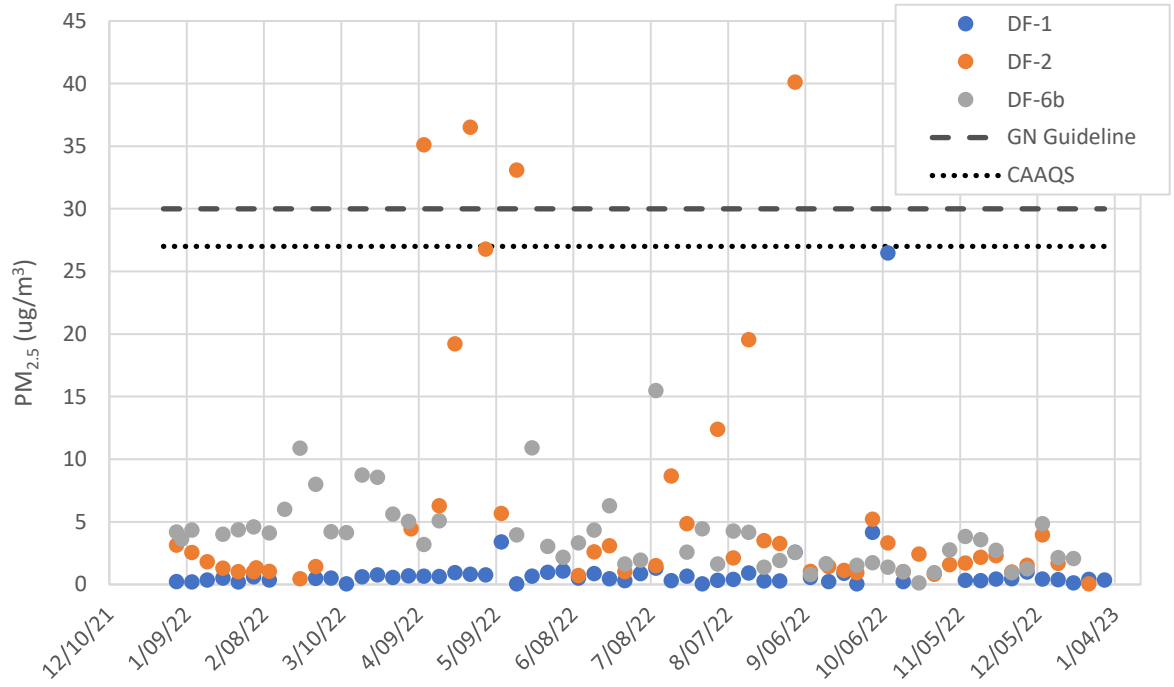

Figure 5. 24-h average concentration of airborne particulate matter less than 2.5 microns ($PM_{2.5}$) at Meadowbank Complex stations DF-1, DF-2, and DF-6b. Dashed line indicates the GN guideline for ambient air quality, and the dotted line represents the Canadian Ambient Air Quality Standard (2020).

4.1.2 Annual Average

Annual geometric mean concentrations of TSP at DF-1, DF-2, and DF-6b were 5.3, 10.7, and 32.6 µg/m^3, respectively. These estimates are below the GN guideline for the annual average of 60 µg/m^3. Values for DF-1 and DF-2 are similar to those observed in previous years, while results for DF-6b are trending higher (Table 8).

Annual arithmetic mean concentrations of $PM_{2.5}$ were 1.1, 6.5 and 3.9 µg/m^3 at DF-1, DF-2, and DF-6b respectively, which are all less than the 2020 Canadian Ambient Air Quality Standard for annual average $PM_{2.5}$ of 8.8 µg/m^3 (Table 8). It is noted that the CAAQS for $PM_{2.5}$ is based on the 3-year average of 1-hr concentrations. Comparisons to annual averages are considered conservative, and 3-year results will be reviewed if any exceedances occur in annual data.

The annual arithmetic mean TSP concentration was also calculated from measured 24-h samples and compared along with the $PM_{2.5}$ annual arithmetic mean to the Meadowbank FEIS and Whale Tail FEIS Addendum model-predicted maximum annual concentrations. These values are shown in Table 9. Both the TSP annual average at DF-6b and the $PM_{2.5}$ annual average at DF-2 exceeded model predictions. As noted previously, comparisons to FEIS predictions for suspended particulates are considered conservative for a variety of reasons (Section 3.2), and these results are used in the context of management thresholds only (Section 4.5). However, the observed increases in particulate matter at DF-2 and DF-6b in 2022 compared to previous years are discussed further in Section 5.1.

Table 8. Annual geometric mean concentrations of TSP and arithmetic mean concentrations of $PM_{2.5}$ at DF-1, DF-2, and DF-6b for comparison with the GN guideline and CAAQS. "-" indicates not available or not required to be calculated.

Year	TSP (µg/m^3)				$PM_{2.5}$ (µg/m^3)			
	DF-1	DF-2	DF-6b	GN Guideline	DF-1	DF-2	DF-6b	CAAQS
2012	8	12	-	60	-	-	-	-
2013	4.6	14.0	-	60	-	-	-	-
2014	6.5	12.8	-	60	-	-	-	-
2015	5.1	9.8	-	60	-	-	-	10
2016	3.8	6.4	-	60	-	-	-	10
2017	2.1	10.5	-	60	-	-	-	10
2018	4.9	9.8	-	60	0.2	1.4	-	10
2019	7.0	6.6	-	60	0.5	1.5	-	10
2020	3.8	7.1	14.1	60	0.6	1.9	1.5	8.8
2021	1.6	6.2	9.4	60	0.5	1.9	1.8	8.8
2022	5.3	10.7	32.6	60	1.1	6.5	3.9	8.8

Table 9. Arithmetic mean of the measured 24-h concentrations and FEIS-modeled maximum annual average concentrations of TSP and $PM_{2.5}$ for monitoring stations DF-1, DF-2, and DF-6b at the Meadowbank Complex (Cumberland, 2005; Agnico Eagle, 2018b - Appendix 4C).

Year	DF-1		DF-2		DF-6b			
	$PM_{2.5}$ (µg/m^3)		$PM_{2.5}$ (µg/m^3)		TSP (µg/m^3)		$PM_{2.5}$ (µg/m^3)	
	Measured	FEIS	Measured	FEIS	Measured	FEIS	Measured	FEIS
2020	0.6	4.6	1.5	4.1	35.0	30 - 45	1.44	5 – 7.5
2021	0.5		1.9		24.3		1.82	
2022	1.1		**6.5**		**64.9**		3.9	

4.2 DUSTFALL

4.2.1 Onsite Locations DF-1 – DF-6

Results of the 2022 onsite dustfall sampling program (30 day-normalized rates of total and fixed dustfall) are provided in Figures 6 - 10. Samples are plotted by the collection start date. For samples below detection limits (0.001 mg/cm^2/30-d), half the limit is used in calculations and figures. To provide context, the Alberta Ambient Air Quality Guideline for industrial/commercial areas for total dustfall (AB-Ind) is indicated (1.58 mg/cm^2/30-d). This guideline is based on aesthetic or nuisance concerns and is to be used for airshed planning and management, as a general performance indicator, and to assess local concerns. The established threshold for dust mitigation actions for these onsite stations is equivalent to this guideline.

Of the 61 onsite dustfall samples collected in 2022, one exceedance of the AB-Ind guideline occurred for total dustfall, in the April 10 sample at DF-1. Since all other results for this location were well below guidelines, this is considered an isolated incident, potentially due to a localized event. While the use of these guidelines is not well defined, there are no recreational or residential users within vicinity of the minesite and exceedance of occasional samples is not expected to result in significant aesthetic or nuisance concerns. Mitigation actions are planned to be implemented if regular exceedances or trends towards regular exceedances occur.

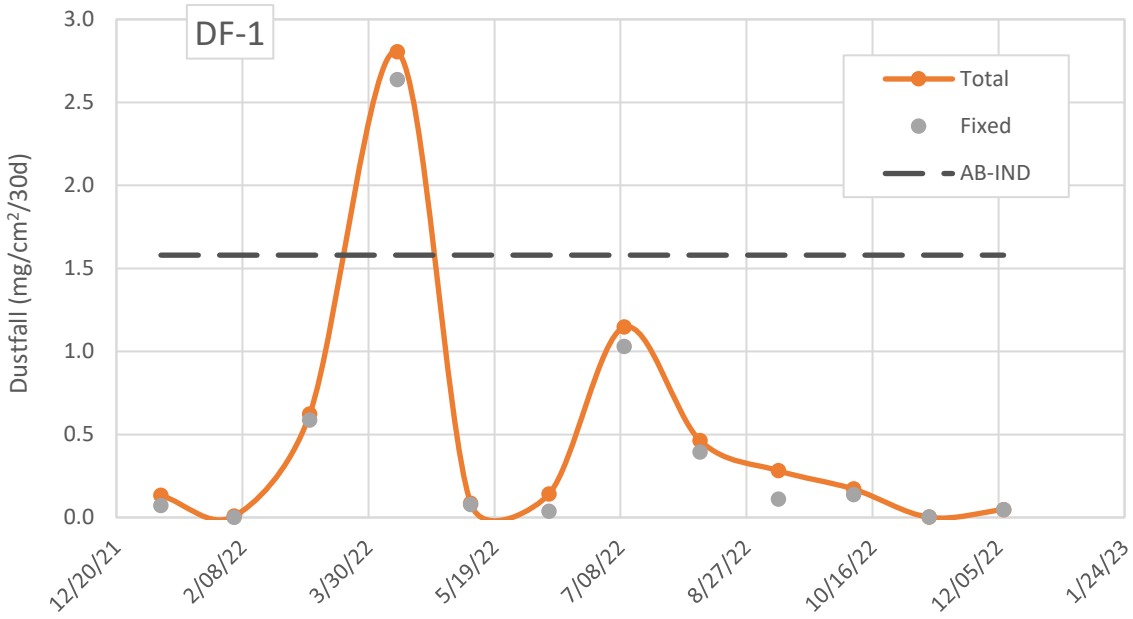

Figure 6. 30-day-normalized rates of total and fixed dustfall at DF-1 at the Meadowbank site. Points represent start date of sample collection. AB-IND indicates the Alberta guideline for industrial/commercial areas, which is equivalent to the management threshold for this station.

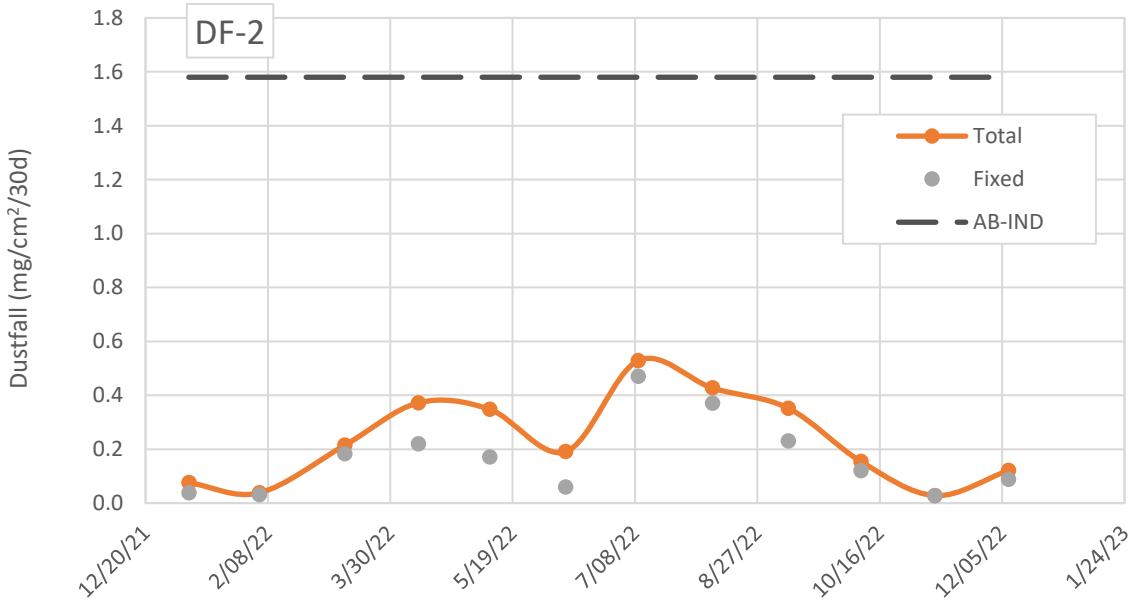

Figure 7. 30-day-normalized rates of total and fixed dustfall at DF-2 at the Meadowbank site. Points represent start date of sample collection. AB-IND indicates the Alberta guideline for industrial/commercial areas, which is equivalent to the management threshold for this station.

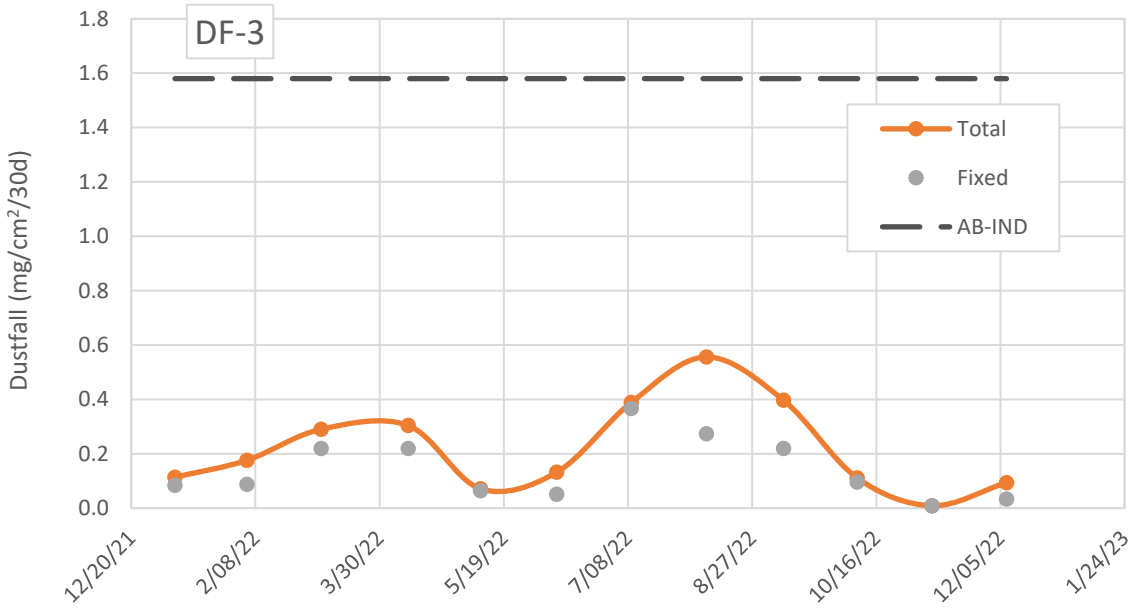

Figure 8. 30-day-normalized rates of total and fixed dustfall at DF-3 at the Meadowbank site. Points represent start date of sample collection. AB-IND indicates the Alberta guideline for industrial/commercial areas, which is equivalent to the management threshold for this station.

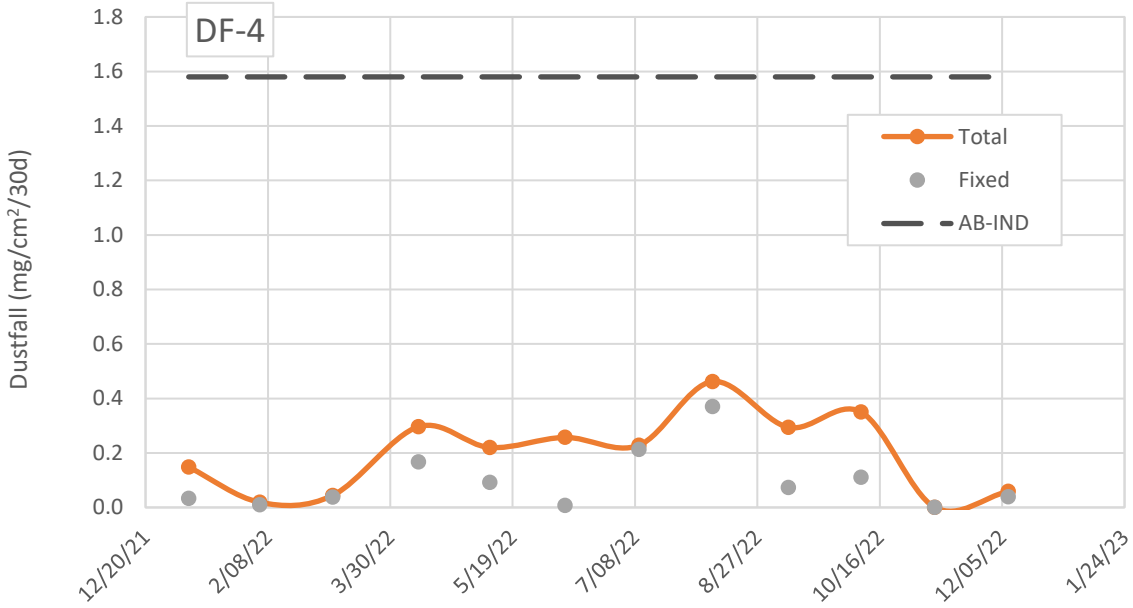

Figure 9. 30-day-normalized rates of total and fixed dustfall at DF-4 at the Meadowbank site. Points represent start date of sample collection. AB-IND indicates the Alberta guideline for industrial/commercial areas, which is equivalent to the management threshold for this station.

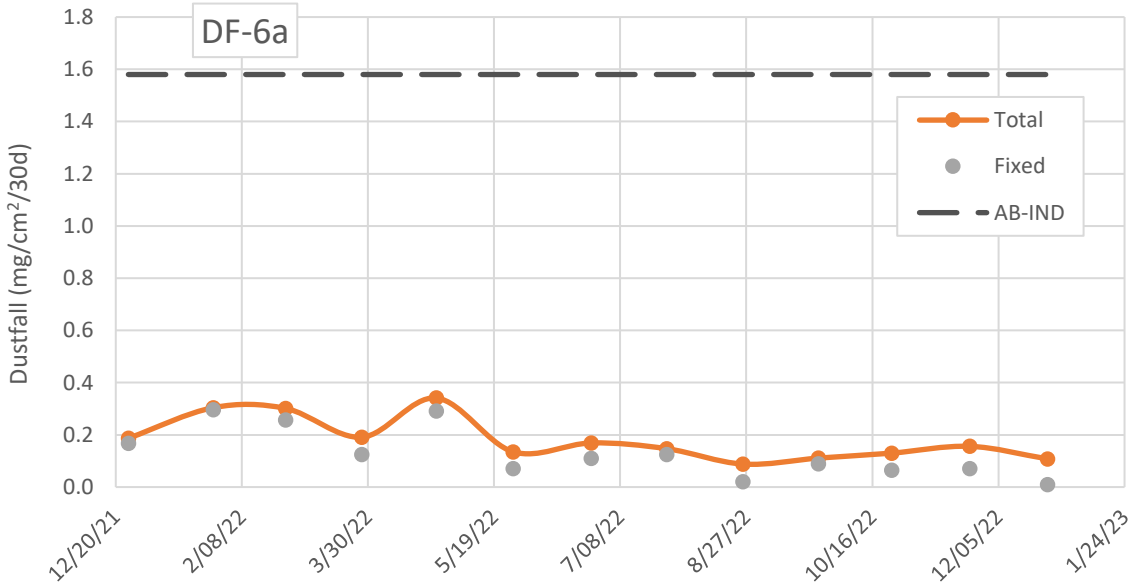

Figure 10. 30-day-normalized rates of total and fixed dustfall at DF-6a at the Whale Tail site. Points represent start date of sample collection. AB-IND indicates the Alberta guideline for industrial/commercial areas, which is equivalent to the management threshold for this station.

4.2.2 Meadowbank AWAR Dustfall Transects

As described in Section 1.4.4, dustfall sampling was conducted for two transects along the AWAR in 2022, in areas where dust suppressant was not applied. Results are presented in Figures 11 and 12, and are compared to the Alberta Ambient Air Quality Guideline for recreational/residential areas (AB-Rec). This guideline is applied to samples collected at and beyond 500 m, according to the management threshold established in the current Air Quality and Dustfall Monitoring Plan (March, 2022). It should be noted that this guideline is based on nuisance and aesthetic concerns, and not necessarily impacts to vegetation or wildlife. It is also generally considered to apply to a specific dust source, over and above background values. Therefore, this is considered a conservative, screening-level comparison, and any significant, ongoing exceedances will be further investigated.

For all four transects, trends indicated the AB-Rec threshold was met or would be met for total dustfall at 500 m. For AWAR transect km 18, samples are not collected at the 1,000 m location, due to presence of a waterbody at approximately 800 m from the road, so 300 m is the furthest sample collection point., and esults at 500 m are inferred to be less than the management threshold based on results at 300 m (Figure 11). At km 18, one sample marginally exceeded the AB-Rec threshold at 300 m, but the result for fixed dustfall (non-organic; more representative of road material) was well below the guideline for this sample, so the result is not considered to be mine-related. Further, a duplicate sample was collected for this location (see Section 4.4.3) and the total dustfall result (0.132 mg/cm^2/30 d) was less than the AB-Rec threshold (0.53 mg/cm^2/30 d). Similarly, one sample at km 78 for total dustfall exceeded the guideline at 1,000 m, but the result for fixed dustfall (non-organic) which is more representative of road material was also well below the guideline for this sample, and in addition the result at 300 m was less than the guideline, so results at 1,000 m are not considered to be mine-related.

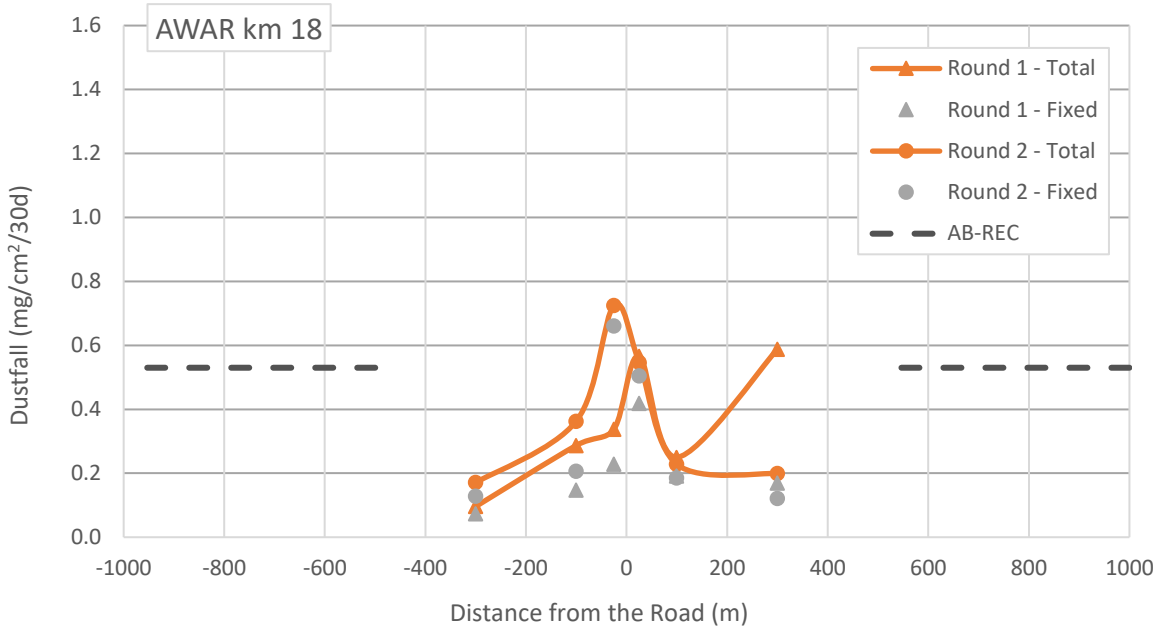

Figure 11. 30-day-normalized rates of total and fixed dustfall at km 18 along the Meadowbank AWAR in 2022. Points represent start date of sample collection. Monitoring Round 1 began June 26, and Round 2 began July 26. Positive distances represent the upwind/west side of the road, and negative distances represent the downwind/east side.

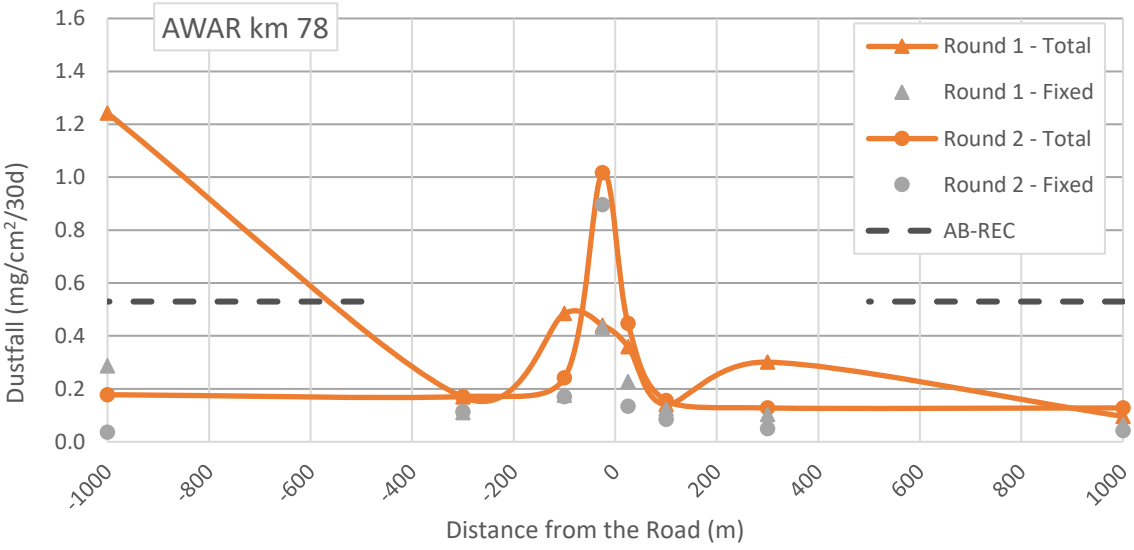

Figure 12. 30-day-normalized rates of total and fixed dustfall at km 78 along the Meadowbank AWAR in 2021. Points represent start date of sample collection. Monitoring Round 1 began June 26, and Round 2 began July 26. Positive distances represent the upwind/west side of the road, and negative distances represent the downwind/east side.

4.2.3 Whale Tail Haul Road Dustfall Transects

Results for all samples collected in 2022 for monitoring rounds 1 (started June 26) and 2 (started July 26) are provided in Figures 13 - 15.

As in previous years, some specific FEIS Addendum model predictions were exceeded, but only for the 25 m downwind location at km 151. One total dustfall result at 300 m downwind for this location also exceeded the prediction, but the fixed dustfall result which is more representative of road material was less than the prediction. The overarching FEIS prediction that maximum deposition rates along the AWAR would decline below the AB-Rec guideline within 500 m of the road was met in all cases. This prediction is equivalent to the management threshold.

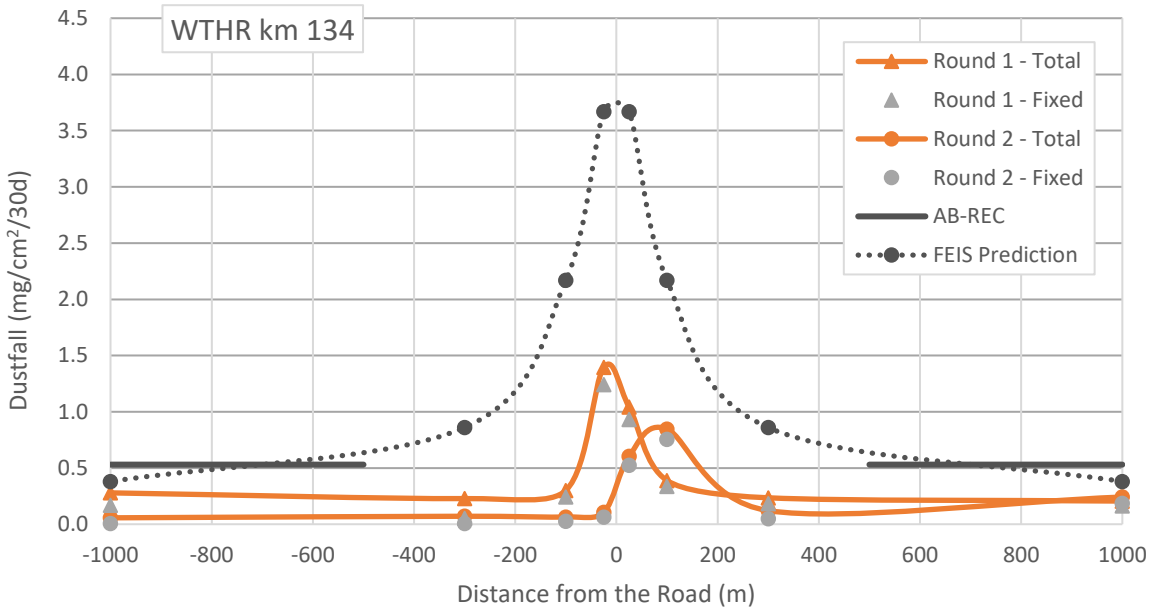

Figure 13. 30-day-normalized rates of total and fixed dustfall at km 134 along the Meadowbank WTHR in 2021. Points represent start date of sample collection. Monitoring Round 1 began June 26, and Round 2 began July 26. Positive distances represent the upwind/west side of the road, and negative distances represent the downwind/east side.

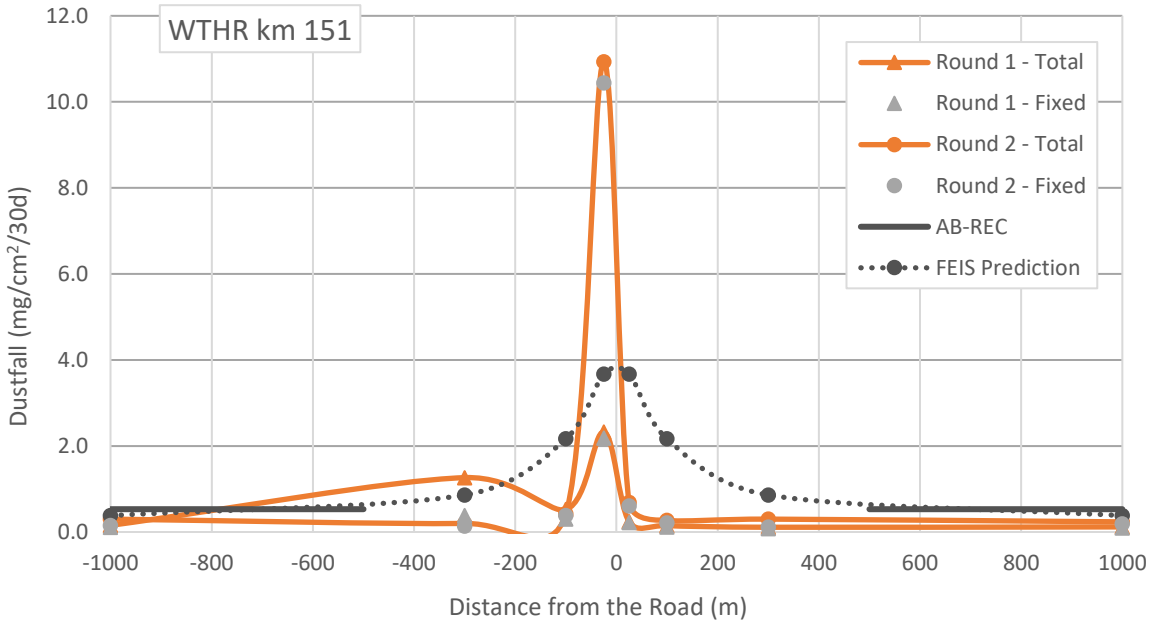

Figure 14. 30-day-normalized rates of total and fixed dustfall at km 151 along the Meadowbank WTHR in 2021. Points represent start date of sample collection. Monitoring Round 1 began June 26, and Round 2 began July 26. Positive distances represent the upwind/west side of the road, and negative distances represent the downwind/east side.

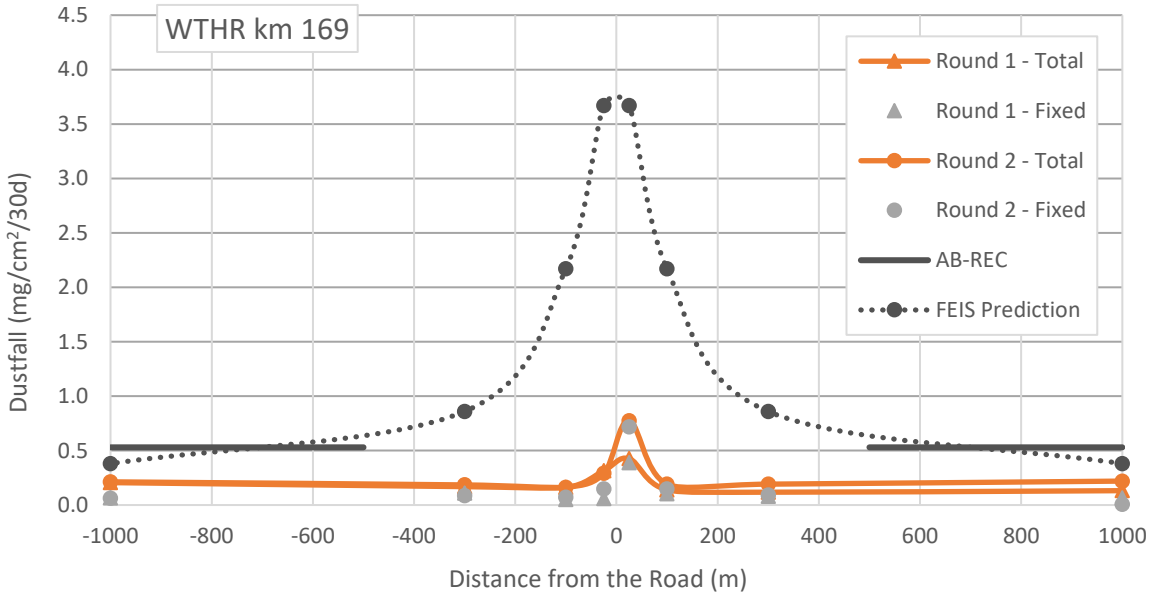

Figure 15. 30-day-normalized rates of total and fixed dustfall at km 169 along the Meadowbank WTHR in 2021. Points represent start date of sample collection. Monitoring Round 1 began June 26, and Round 2 began July 26. Positive distances represent the upwind/west side of the road, and negative distances represent the downwind/east side.

4.3 NO_2

4.3.1 Passive NO_2

Monthly-average NO_2 trends in 2022 as measured by passive sampling devices are provided in Figure 17. Samples are plotted by the collection start date. For samples below detection limits (0.1 ppb), half the limit is used in calculations and figures. In 2022, concentrations of NO_2 varied between non-detect (<0.1 ppb) and 5.8 ppb. This maximum value is similar to those observed previously for the Meadowbank Complex (Section 5.3).

Annual arithmetic mean concentrations were calculated for each station from the monthly-average values (Table 10). These are all less than the Government of Nunavut Ambient Air Quality Standard of 32 ppb for the annual average and the current (2020) CAAQS for the annual average concentration of NO_2 (17.0 ppb). Results for DF-2 and DF-6a were also less than the maximum FEIS model-predicted annual averages.

Table 10. Arithmetic mean of the measured 1-month passive sampler NO_2 concentrations, along with the GN guideline, Canadian Ambient Air Quality Standard, and FEIS maximum model prediction (Cumberland, 2005; Agnico Eagle, 2018b - Appendix 4C).

Year	*Guidelines*		*FEIS Predictions*		Measured Values				
	GN	***CAAQS***	***DF-2***	***DF-6b***	**DF-1**	**DF-2**	**DF-6b**	**DF-8**	**DF-9**
	ppb	*ppb*	*ppb*	*ppb*	ppb	ppb	ppb	ppb	ppb
2021	*32*	*17*	*4.97*	*8 – 16*	0.30	1.27	1.66	0.25	0.27
2022					0.44	0.94	2.17	0.27	0.31

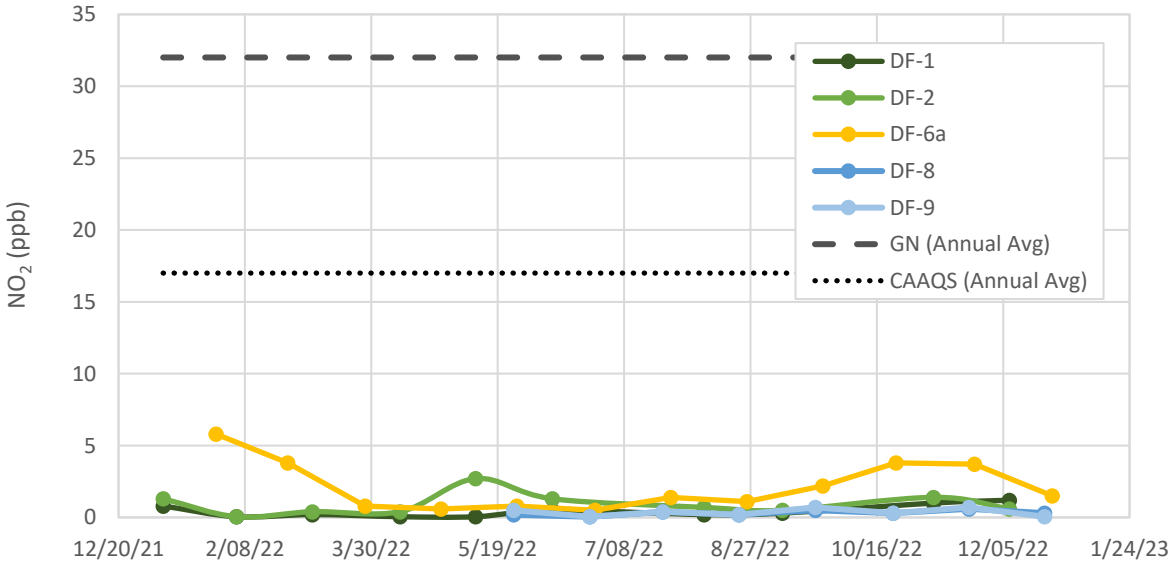

Figure 16. Monthly average concentration of NO_2 at Meadowbank Complex monitoring stations DF-1, DF-2, DF-6a, DF-8, and DF-9. Points represent start date of sample collection. Dashed line indicates GN standard for the annual average and dotted lines represents the Canadian Ambient Air Quality Standard for the annual average.

4.3.2 Continuous NO_2

As described in Section 2.3, a continuous NO_2 analyzer was installed at location DF-7 in July, 2021. At the time of a pre-scheduled quarterly calibration and servicing on July 26, 2022, a problem with the instrument's ozonator was identified, which was preventing proper function. The instrument was not functional for the remainder of 2022 while servicing was ongoing via the supplier and calibration service provider. A summary of this issue is documented in Section 4.4.

To identify valid data for reporting purposes, the recorded dataset for January 1 – July 26, 2022 was screened according to ECCC (2019) as described below.

1 – Review of daily calibration checks (zero and span check) to identify data recorded outside of acceptable targets (+/- 2ppb for zero check, +/- 10% for span check).

Between January 1 and February 5, span checks were outside the 10% target but within or very close to 15%. According to a pre-determined schedule, as-found multi-point verification and calibration was performed by a contracted consultant brought onsite on February 6, 2022. During this assessment, as-found multi-point verification results were 13 – 16% of targets. Since these results bracket the National Air Pollution Surveillance Program data acceptance criteria of 15% (ECCC, 2019) and since overall results are well below compliance criteria for the site, NO_2 data collected from January 1 through February 6 are presented here without a data correction, but identified separately in figures and annual average calculations.

From February 6 through April 14, calibration checks were within targets.

From April 15 through May 5, calibration checks were not being performed due to an error in instrument settings, so data from that time period was excluded from further analyses.

From May 6 through June 27, zero checks were within targets and span checks were largely within targets (occasionally just above acceptance criteria), so these data were retained and treated as valid.

Beginning June 28, calibration checks again were not functional, potentially as a result of the instrument malfunction later identified on July 27, so all data after June 27 was excluded from further analyses.

2 – Screening for outliers (elevated concentrations, generally >100 ppb, likely caused by an idling vehicle in close proximity).

Three events were identified in the January 1 – June 27 dataset, likely associated with instrument calibration. On February 5, elevated concentrations were recorded from 13:57 – 14:31. On February 6, elevated values were recorded from 12:00 – 12:27 and 12:42 – 13:10. In all cases the values for these time periods (all >100 ppb) were excluded from further analyses.

The valid one-minute data was then processed to calculate hourly and 24-h averages for NO_2, for comparison to regulatory guidelines. No quantitative FEIS predictions are available for the DF-7 location.

All hourly and 24-h averages were well below the GN guideline and CAAQS (Figures 17 and 18).

The annual average based on all valid data collected from January 1 – June 27 was 0.74 ppb. The annual average excluding data collected prior to instrument calibration on February 6 was 0.75 ppb. These are both well below the GN standard (32 ppb) and CAAQS (17 ppb).

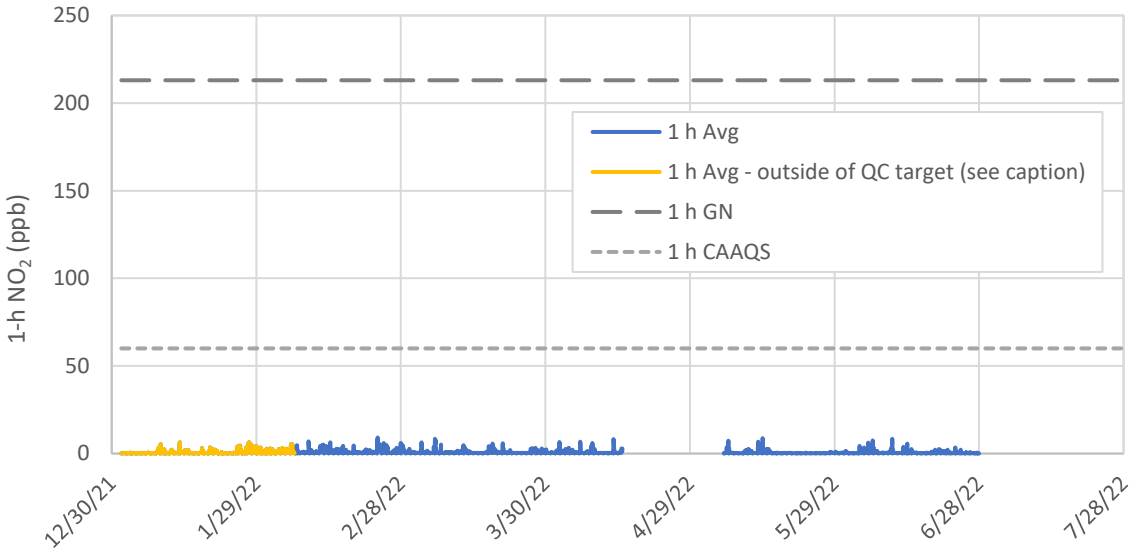

Figure 17. Calculated 1-h average concentrations of NO_2 at station DF-7 in 2022, along with the Government of Nunavut (GN) guideline and Canadian Ambient Air Quality Standard (CAAQS). Data collected from January 1 – February 5 was regularly just outside of National Air Pollution Surveillance Program (NAPS) acceptance criteria. See text for details.

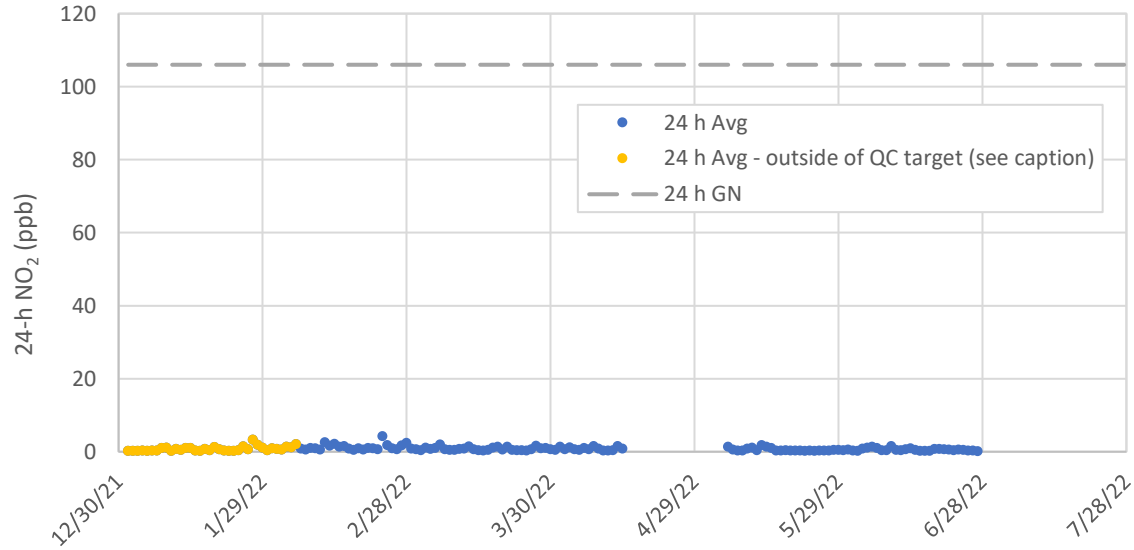

Figure 18. Calculated 24-h average concentrations of NO_2 at station DF-7 in 2022, along with the Government of Nunavut (GN) guideline. Data collected from January 1 – February 5 was regularly just outside of National Air Pollution Surveillance Program (NAPS) acceptance criteria. See text for details.

4.4 QA/QC

QA/QC procedures in 2022 included the use of an accredited lab for sample preparation and analysis, sample collection by appropriate personnel (trained by a professional air quality specialist), use of travel blanks for suspended particulate and NO_2 samples, and use of field duplicates for road-side dustfall samples.

Maintenance and replacement schedules for the Partisol and continuous NO_2 instruments are also discussed here, along with any data loss due to operational downtime or sampling errors.

4.4.1 Partisol Operations and Maintenance

Due to ongoing difficulties in maintaining the Partisol instruments, repairs continue to be performed or parts replaced as necessary on all units. Agnico brought the Partisol supplier onsite most recently in March 2022 to complete a full audit of the six instruments in use, and provide supplemental training to Environment Department personnel. During these visits, the supplier provided maintenance, along with recommendations for improved performance and reduction of downtime, a list of parts needed for some units repairs/maintenance, and a list of spares parts.

In March 2021 the TSP unit at DF-1 began failing, and after troubleshooting by both Environment Department Technicians and a consultant brought onsite in July 2021, it was removed from the field for maintenance. The part requiring replacement was on backorder, and after it was received onsite the instrument was re-installed and functioning beginning November 1, 2022. Additional spare parts were ordered to mitigate similar operational delays in the future, but it is not considered feasible to maintain a complete set of replacement parts onsite.

For the other five of the six Partisol units, limited data loss occurred in 2022. For each sampler, Table 11 shows the monitoring period for 2022 reporting along with available and actual number of 24-h samples collected. For these five units, sporadic data loss occurred throughout the year due to various reasons (e.g. broken part, intake error due to cold weather limitations, technician error (improper settings), or operational concerns such as an onsite fire).

Table 11. Available and actual number of 24-h samples collected in 2022 for suspended particulates.

Location	Monitoring Period	# Available Sampling Dates	# Sampled Dates		
			$PM_{2.5}$	PM_{10}	TSP
DF-1	January 5 – December 31	61	56	58	9
DF-2	January 1 – December 30	61	49	49	54
DF-6b	January 2 – December 30	61	55	55	61

As part of QA procedures and data processing, Partisol operational data files are downloaded from each instrument and reviewed to ensure sampling occurred without error, and confirm intake volumes for use in volumetric calculations. As discussed in Section 2.1, concentrations of particulates need to be calculated using air volumes normalized to 25°C and 101.3kPA (standard temperature and pressure; STP). In 2022, depending on system settings, standardized volumes were either recorded by the Partisol unit (DF-1 TSP, DF-2 $PM_{2.5}$/PM_{10}, DF-6b), or were calculated from average temperature and pressure values recorded by the Partisol unit during the sampling period (DF-1 $PM_{2.5}$/PM_{10}, DF-2 TSP). Moving forward, all Partisol instruments will be set to record standardized volumes.

4.4.2 Continuous NO_2 Operations and Maintenance

As described in Section 2.3, the continuous NO_2 analyzer was installed at location DF-7 in July, 2021. Routine maintenance is performed weekly by onsite technicians trained by the supplying consultant, with quarterly or bi-annual calibration and servicing by professionals brought onsite.

At the time of a pre-scheduled onsite quarterly calibration and servicing on July 26, 2022 by the supplier, a problem with the instrument's ozonator board was identified, which was preventing proper function. The instrument was not functional for the remainder of 2022 while servicing was ongoing via the supplier and calibration service provider.

Specifically, the replacement of the ozonator board SD card was initially proposed by the supplier. It was shipped to site and installed but found to be defective. A new card was shipped and installed in mid-September, but did not fix the problem. The instrument was shipped south to the supplier for repairs (November 8). Multiple problems were found including: a faulty pressure board, a minor system leak caused by a cracked convertor cartridge fitting, and a manufacturer recall on the ozone destroyer and pump. This extensive list of broken parts so early in the instrument's life is considered unusual by the supplier, and they are working with Agnico to identify potential causes and mitigation measures to limit similar issues in the future.

Instrument repairs were completed by December 15. The instrument arrived back onsite December 23, and was re-installed December 28. However, the instrument failed again shortly after installation, and Agnico is again working with the supplier to resolve this issue.

4.4.3 Travel Blanks and Field Duplicates

Travel blanks were used in one suspended particulate sample submission (November 19, 2022), with a result of 8 µg/filter (MDL = 3 µg/filter), which is similar to previous years. Detections in travel blanks have been relatively common, with up to 8 contaminated blanks occurring yearly from 2014 - 2020, with concentrations up to 14 µg/filter. In the majority of cases, blanks marginally exceeded the detection limit (e.g. 4 or 5 µg/filter) and never exceeded 5x the MDL. Since there were few exceedances of regulatory guidelines, interpretation of field results was not modified based on this analysis.

Travel blanks were also analyzed for seven NO_2 sampling events at the Meadowbank site and nine sampling events at the Whale Tail site. Unopened canisters were shipped to the Meadowbank Complex by the laboratory, stored in the Meadowbank and Whale Tail field offices, and shipped back to the laboratory with each monthly NO_2 analysis. Detections occurred in all but one sample, from 0.2 to 0.8 ppb, which is similar to previous years. Since NO_2 concentrations are well below regulatory guidelines, interpretation of field results was not modified based on this analysis. Since historically NO_2 results are well below any regulatory guidelines, the frequency of travel blanks may be reduced to a minimum of 10% of regular samples moving forward.

Field duplicate dustfall canisters are collected in the immediate vicinity of regular transect samples. The relative percent difference (RPD) values calculated for total dustfall for duplicate canisters are shown in Table 12. Relative to other media, RPDs in dustfall samples have tended to be very high, which is understandable given the potential for debris to be entrained by passing vehicles and land in adjacent dustfall canisters. This variability is taken into consideration when interpreting the results of the dustfall studies.

Table 12. RPD values for total dustfall in duplicate dustfall canisters on the east (E) or west (W) side of the Whale Tail Haul Road (WTHR) and All Weather Access Road (AWAR) in 2022.

Location	Sample	Duplicate	RPD
	(mg/cm^2/30d)	(mg/cm^2/30d)	(%)
AWAR km 18; 100 m E	0.287	0.382	33
AWAR km 18; 300 m W	0.588	0.132	78
AWAR km 78; 25 m E	0.441	0.411	7
AWAR km 78; 300 m W	0.301	0.118	61
WTHR km 134; 25 m E	1.396	0.801	43
WTHR km 151; 100 m E	0.522	0.970	86
WTHR km 169; 25 m E	0.316	0.213	33

4.5 EFFECTIVENESS OF MITIGATION

The effectiveness of mitigation measures discussed in Section 1.2 to reduce the generation of road dust is determined here through comparison of monitoring results with numeric thresholds identified in the Air Quality and Dustfall Monitoring Plan (Version 6; March, 2022). These thresholds and results for 2022 are summarized below with a commentary on effectiveness of the mitigation.

Threshold 1: *Dustfall exceeding 0.53 mg/cm^2/30-day at 500 m from the AWAR or WTHR.*

- A single total dustfall sample exceeded this threshold (1,000 m downwind, km 78), but since the fixed dustfall result was well below the threshold, the exceedance is considered unrelated to road activity, and the threshold is met.
- Mitigation activities related to road dust along the AWAR and WTHR are therefore considered to have been effective in 2022.

Threshold 2: *Dustfall exceeding 1.58 mg/cm^2/30-day at stations DF-1 to DF-6.*

- The threshold was exceeded in one of 61 samples from these stations (DF-1). All other samples at the monitoring station (DF-1) were well below the threshold. This sample is therefore considered an isolated event and no change in mitigation is planned based on this result.
- Mitigation activities related to dust deposition for onsite locations are therefore considered to have been effective in 2022.

Threshold 3: *Active PM results exceeding FEIS predictions at DF-6b.*

- For the 24-h averaging time, FEIS predictions with an upper bound are only available for $PM_{2.5}$, and all results at DF-6b in 2022 were less than this prediction.

- The FEIS prediction for the maximum annual average concentration of TSP (45 µg/m^3) was exceeded at DF-6b in 2022 (64 µg/m^3), while the prediction for $PM_{2.5}$ (7.5 µg/m^3) was not exceeded (3.9 µg/m^3).

- Since the management threshold was exceeded for TSP, this is further discussed below.

4.5.1 Threshold Exceedances

In 2022 the management threshold (equivalent to the FEIS prediction) for annual average TSP was exceeded at Whale Tail Mine location DF-6b. It is noted that the regulatory (GN) guideline was met for the annual average, and comparison to FEIS predictions is considered a screening tool only, due to various differences between modeling methods and field measurements (Section 3.2). This threshold was set to assist in informing adaptive management and limiting onsite emissions as much as feasible. Potential causes for the observations in 2022 and suggested mitigation measures are reviewed here.

- In 2022 elevated measurements of TSP (occurrences above the 24-h GN guideline) were recorded from late March through August, which coincides with the dry season and increased rates of activity in summer. This is a trend that is similar to previous years, and regular exceedances of the 24-h guideline at this location were predicted in the FEIS.

- Another cluster of somewhat increased TSP values (less than the GN 24-h guideline but above the FEIS-predicted annual average) occurred in late October-early November.

- Based on review of onsite activities, no specific construction events were occurring in the vicinity of the instrument during these times that may have contributed to these observations. However, according to the FEIS Addendum (Table 1.2-1B), 2022 was planned to be the highest-production year. General mine activities such as pit development, material handling, and road dust generation are therefore expected to be combining to produce these effects.

- Dust suppression records for 2022 were reviewed, and calcium chloride dust suppressant was applied on Whale Tail Mine site roads (other than the WTHR) in June and July (fuel farm, transit pad, WTP Road, E& I office, front desk). Road watering was also conducted regularly.

- FEIS-planned mitigation measures for air quality were reviewed and confirmed to be in practice in 2022 (Appendix B)

- Mitigation measures described in the Air Quality and Dustfall Monitoring Plan (Version 6, March 2022) in response to mine site threshold exceedances include:

    - Use of water and/or dust suppressant on exposed surfaces such as parking areas, pads, haul, access, and service roads;

    - Add new granular material to surfaces;

    - If applicable, grade the surface;

        - Temporarily lower the speed limit on site.

- Based on this review, the above mitigation options will be discussed with the applicable departments ahead of the 2023 dry season to determine the best options for further controlling onsite emissions of TSP moving forward.

- Since this was the first year the management threshold was exceeded, a thorough mid-year review will be conducted for internal adaptive management purposes (for results through approximately July, 2023), to assist in reviewing effectiveness of any supplemental mitigation.

- Mid-year and final monitoring results for 2023 will be carefully reviewed to understand if any trend towards increasing air quality concerns is beginning.

SECTION 5 • HISTORICAL COMPARISON

5.1 TSP, PM_{10}, $PM_{2.5}$

In order to understand trends of suspended particulate concentrations at the Meadowbank Complex over time, measured values of TSP, PM_{10}, and $PM_{2.5}$ at DF-1, DF-2, and DF-6b were plotted since monitoring began in 2012 (DF-1, DF-2) and 2020 (DF-6b) (Figures 19 - 21).

For Meadowbank site DF-1, these results indicate that concentrations of suspended particulates are relatively stable and have not been increasing over time.

For Meadowbank site DF-2, values for $PM_{2.5}$ and PM_{10} were generally greater than observed recently, but were similar to those recorded historically (particularly in 2014). Elevated concentrations at DF-2 in 2022 were most pronounced in April-May, and may have been a result of wind blown particles following a large fire, which engulphed the Sana Garage in proximity of DF-2 in March, and associated reconstruction works following this event.

For DF-6b, a greater number of samples approached or exceeded regulatory guideline values in 2022 than observed previously. As noted in Section 4.1, elevated concentrations (occurrence of results above the GN 24-h guideline) generally began in early March, 2022, and ended in August. Since the management threshold based on the annual average TSP was exceeded, a review of potential causes and mitigation was initiated, as described further in Section 4.5.

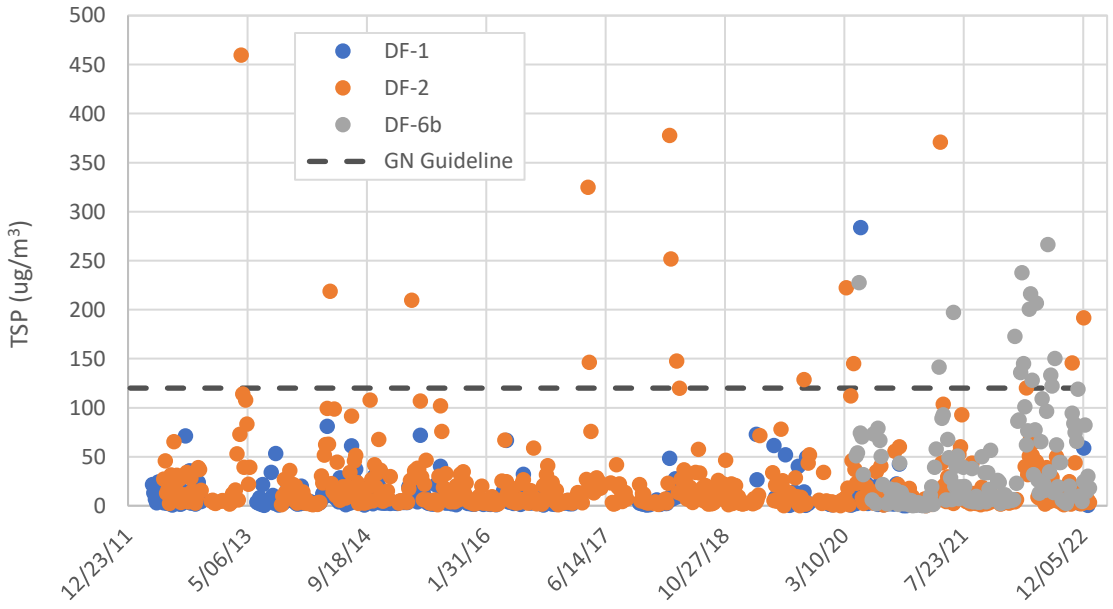

Figure 19. 24-h average concentrations of total suspended particulates (TSP) at Meadowbank Complex stations DF-1, DF-2, and DF-6b. Dashed line indicates the 24-hr average GN guideline for ambient air quality.

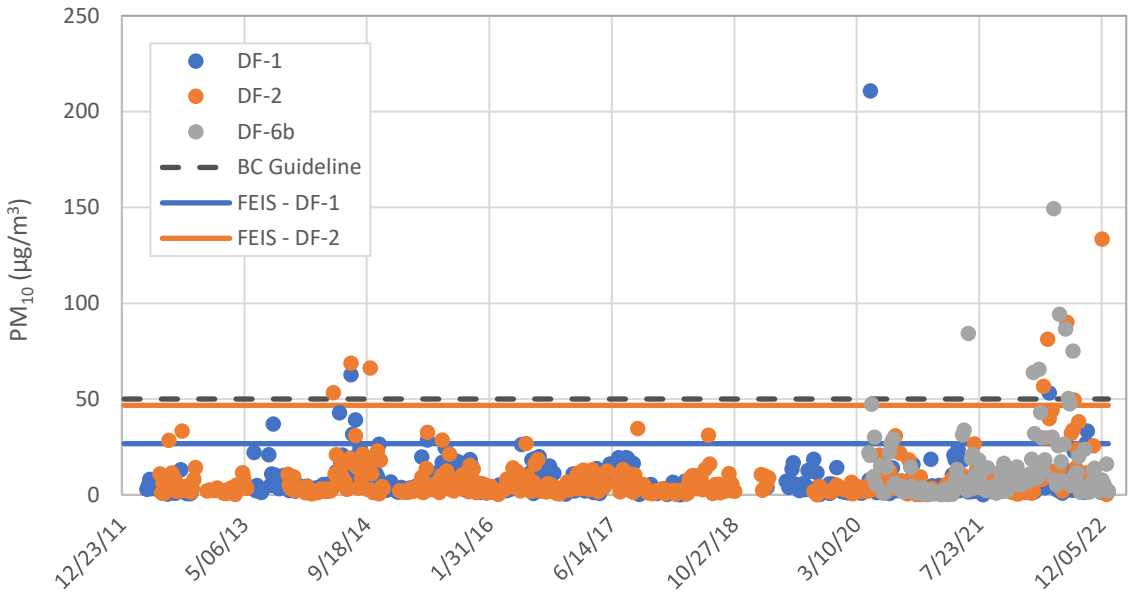

Figure 20. 24-h average concentration of airborne particulate matter less than 10 microns (PM_{10}) at Meadowbank stations DF-1, DF-2, and DF-6b. Dashed line indicates the BC Air Quality Objective for this parameter.

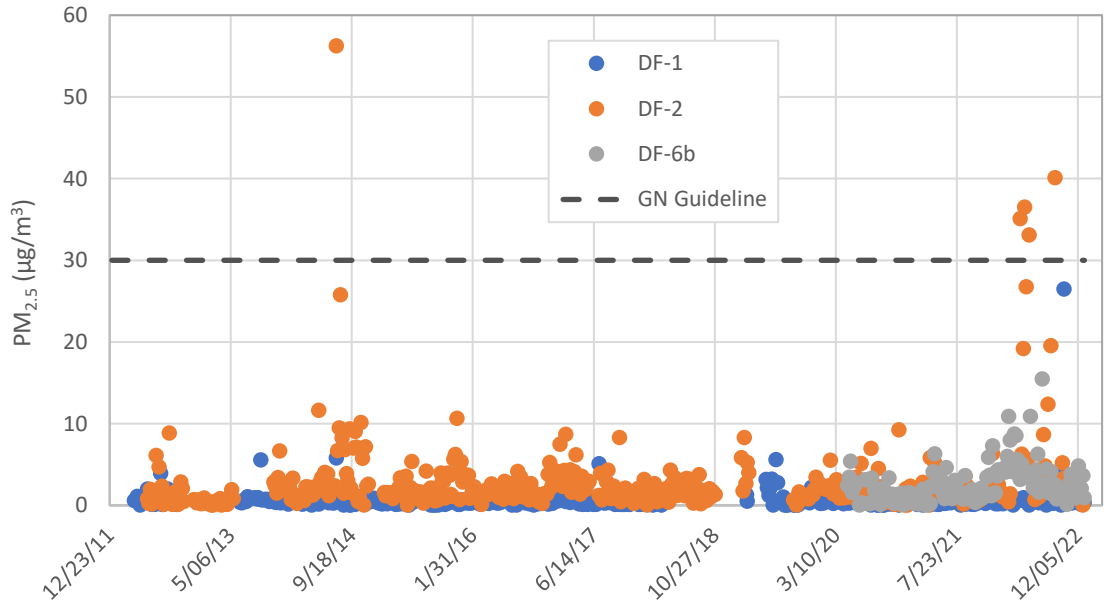

Figure 21. 24-h average concentration of airborne particulate matter less than 2.5 microns ($PM_{2.5}$) at Meadowbank stations DF-1, DF-2, and DF-6b. Dashed line indicates the 24-hr average GN guideline for ambient air quality.

5.2 DUSTFALL

5.2.1 Onsite Locations DF-1 – DF-6

In order to understand trends in generation of deposited particulate matter at the Meadowbank Complex over time, measured values of dustfall at DF-1, DF-2, DF-3, DF-4, and DF-6a were plotted since monitoring began in 2012 and 2020 (Figure 22). Isolated exceedances of the regulatory guideline have occurred, but rates of dustfall do not appear to have been increasing over time.

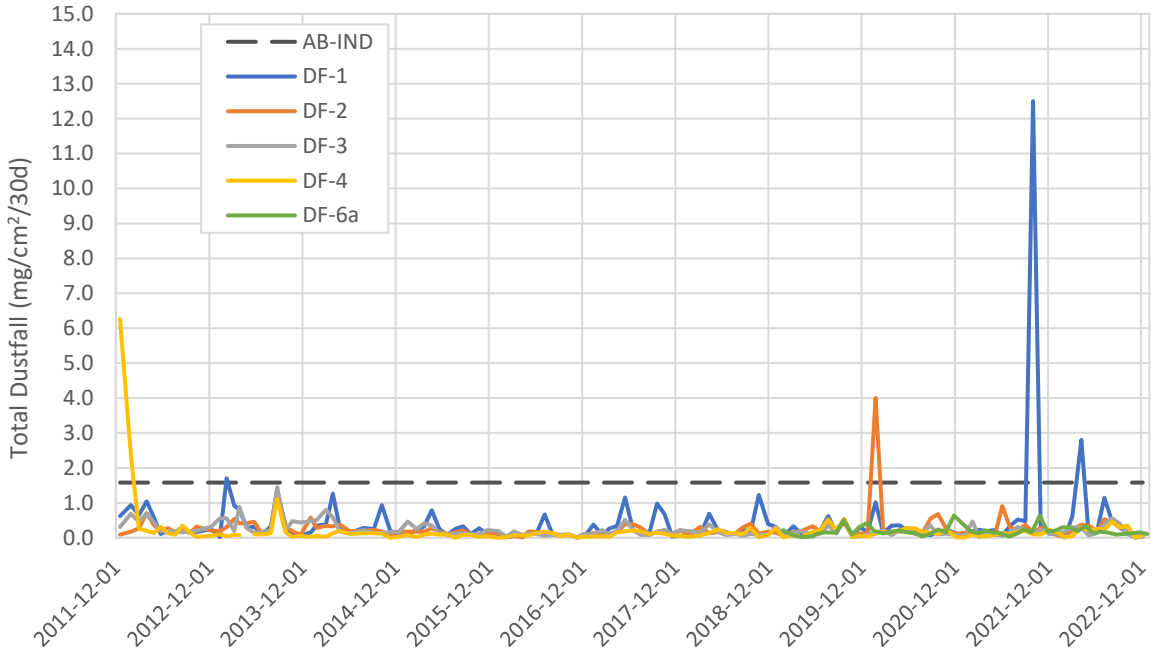

Figure 22. 30-day-normalized rates of total dustfall at DF-1 – DF-6 at the Meadowbank Complex.

5.2.2 Meadowbank AWAR Dustfall Transects

All results collected along the Meadowbank AWAR to date (since 2012) in locations without dust suppression are presented in Figure 23 in relation to AB-Rec. Results are compared here only for samples collected mainly in August, since historically sampling was only performed during this month, when the highest traffic rates and driest weather occurs. In 2020, sampling on stands at approximately 1.8 m height began, while previously sampling was conducted at ground level.

The range of background concentrations was determined from a total of 34 samples collected from four reference locations in 2014 – 2019, including: an established external reference site near Inuggugayualik Lake, baseline samples for the proposed Whale Tail Haul Road, and samples collected 1,000 m upwind of the AWAR at km 18 and 78.

Overall, results demonstrate that measured concentrations of dustfall are not increasing over time. In 2022, similar to 2020 and 2021, results tended to be lower than those observed historically, especially in close proximity to the road. This is likely a result of the switch to sampling on stands, which reduces the influence of re-entrainment on dustfall results. Historically and regardless of sampling method, the

current threshold for supplemental mitigation of dustfall (0.53 mg/cm^2/30d at 500 m) has never been exceeded among these August samples, with all but one sample at 300 m and beyond falling below this threshold.

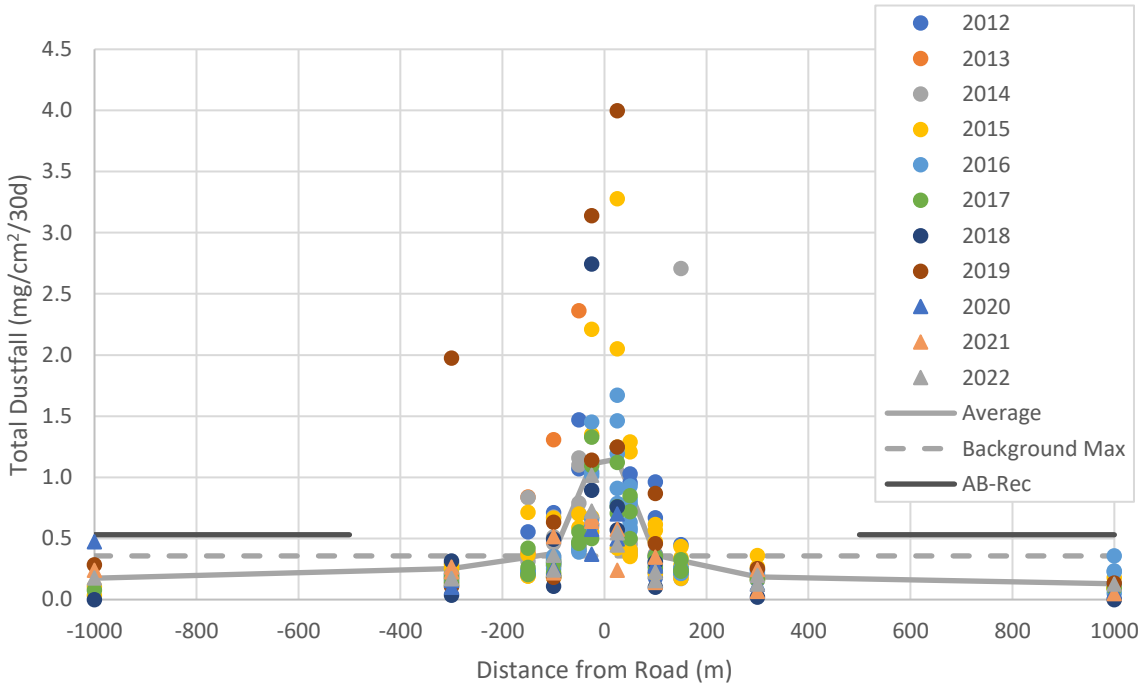

Figure 23. Total dustfall rates (mg/cm^2/30d) for all samples collected since 2012 (August sampling events) along the Meadowbank AWAR in areas without dust suppression. Negative distances represent the downwind (east) side of the road, and positive distances represent the upwind (west) side.

5.2.3 Whale Tail Haul Road Dustfall Transects

All results collected to date in August along the Whale Tail Haul Road (2018 - 2022) are shown in Figure 24. This month was chosen for comparative purposes to align with AWAR methods (see above) and because it generally represents the worst-case dustfall scenario (driest conditions and highest rates of traffic). In 2020, sampling on stands began, while sampling in 2018 and 2019 was at ground level.

Generally, rates of dustfall in 2022 were similar to those observed in 2020 and lower than those observed previously, which may be a result of both increased dust suppression efforts and the switch to samplers at the 1.8 m height, which reduces the potential for introduction of dust re-entrained from the ground. In most years a single sample at 25 m from the road has exceeded specific impact predictions for this distance, but the transect and side of the road are not consistent. Overall rates of dustfall do not appear to be increasing year over year.

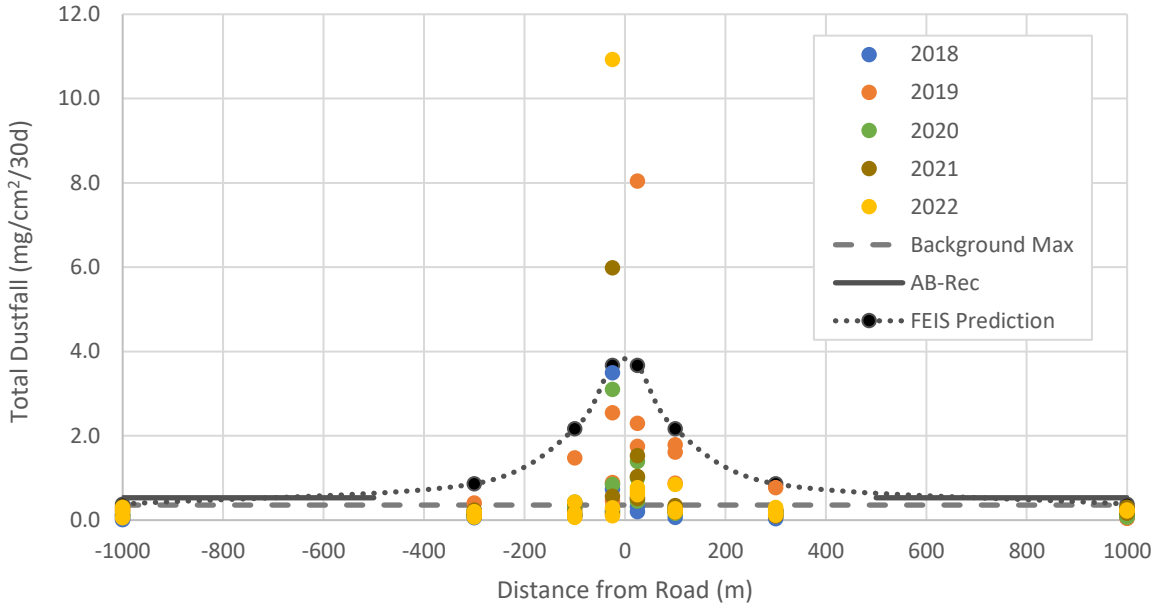

Figure 24. Total dustfall rates (mg/cm²/30d) for all samples collected in August along the Whale Tail Haul Road to date. 2018 and 2019 data was collected at ground level, while 2020+ samples were collected on stands. Negative distances represent the east (downwind) side of the road, and positive distances represent the west (upwind) side. FEIS Prediction values are from the FEIS Addendum Appendix 4C, Table 4-C-24 (Agnico Eagle, 2018b).

5.3 NO_2

In order to understand trends in concentrations of gaseous pollutants at the Meadowbank Complex over time, measured values of NO_2 collected using passive samplers at DF-1, DF-2, DF-6a, DF-8, and DF-9 were plotted since monitoring began in 2012 (DF-1, DF-2) and 2018 (DF-6a) and 2021 (DF-8, DF-9) (Figure 25). These results indicate that concentrations of NO_2 in the area have remained very low relative to guidelines for the annual average, and are not increasing over time.

Historical results are not yet analyzed for DF-7 (continuous NO_2), since only eight months of data are available at this time.

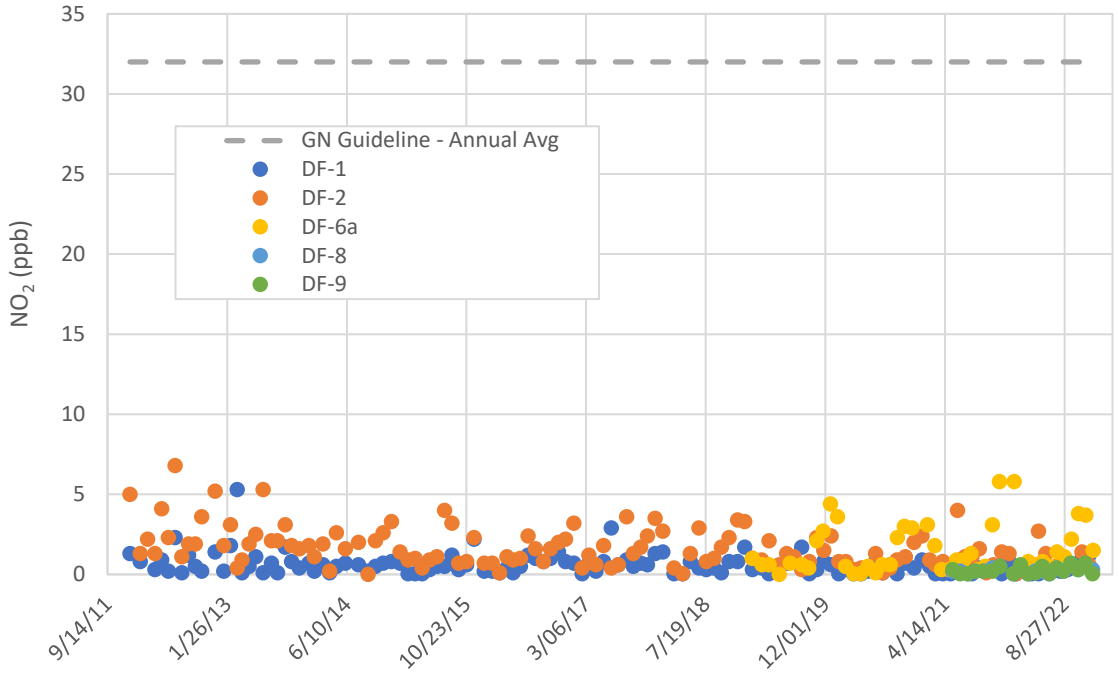

Figure 25. Monthly average concentration of NO_2 at DF-1, DF-2, DF-6a, DF-8, and DF-9. Points represent start date of sample collection. Dashed line indicates the GN standard for the annual average for reference, though it does not apply to the individual monthly averages.

SECTION 6 • WEATHER DATA

Weather data is collected using the mine site's permanent weather stations at the Meadowbank and Whale Tail sites, and the wind monitoring station installed at DF-7. Daily averages for wind speed, wind direction and temperature are provided from the Meadowbank permanent station in Appendix A. Wind data from the DF-7 location is not specifically reported but is reviewed and reported as necessary in interpretation of NO_2 analyzer results.

SECTION 7 • GREENHOUSE GAS EMISSIONS

Agnico is required by Environment Canada's Greenhouse Gas Emissions Reporting Program (GHGRP) to track greenhouse gas emissions based on annual fuel consumption, composition and the US EPA's AP-42 emission factors.

Estimated greenhouse gas emissions for the Meadowbank Complex are reported to Environment Canada's Greenhouse Gas Emissions Reporting Program by June 1, annually, for the preceding calendar year. Results calculated to date are shown in Table 13.

Results to date are below the FEIS Addendum (Agnico Eagle, 2018) prediction for the Meadowbank Complex of 344,200 tonnes CO_2e.

Table 13. Estimated greenhouse gas emissions for the Meadowbank site as reported to Environment Canada's Greenhouse Gas Emissions Reporting Program. 2018+ includes Meadowbank and Whale Tail sites. *[1]Re-calculated in 2020, *[2] in 2021, *[3] in 2022. **Preliminary at the time of reporting.

Reporting Year	Calculated CO_2 Emissions (tonnes CO_2 equivalent)
2012	202,201
2013	195,686
2014	179,889
2015	187,280
2016	184,223
2017	194,440
2018	186,122
2019	195,564*[1]
2020	225,385*[2]
2021	243,893*[3]
2022	248,921**

SECTION 8 • INCINERATOR STACK TESTING

Incinerator stack testing is conducted under Agnico Eagle's Incinerator Waste Management Plan (Version 10, June 2022), and results are summarized here.

Stack testing has been ongoing since 2012, and results for mercury and total dioxins and furans are compared to the Government of Nunavut (GN) Environmental Guideline for the Burning and Incineration of Solid Waste (2012). Results through 2022 are provided in Table 14.

Stack testing performed in 2021 (full details provided in the 2021 Meadowbank Complex Annual Report) indicated no exceedance of the mercury limit. However, two of the three tests for total dioxins and furans and the overall average for this analysis exceeded the regulatory limit of 80 pg/m3 @ 11% O_2.

Following the 2021 exceedance, Agnico initiated investigative actions to determine causation, notified the NIRB, ECCC andCIRNAC, and commissioned a follow-up stack test. The investigation included discussions with the stack test contractor to confirm test results, review of incinerator logs, discussion with the operator to confirm normal operating conditions, and literature review to identify specific potential causal factors for further assessment.

The follow-up stack test was conducted from September 2 – 4, 2022, and again indicated compliance with the GN standard for mercury, but an exceedance of the GN standard for total dioxins and furans (PCDD/F), this time in all three tests (Table 14). Agnico notified the NIRB, ECCC and CIRNAC in December 2022.

Based on the investigation described above, low stack gas temperature was identified as the most likely cause of elevated PCDD/F emission during stack testing in 2021 and 2022. Pending resolution of this issue, operation of the incinerator ceased at the end of November, 2022.

No incinerator was used at the Whale Tail Site in 2022.

Table 14. Historical stack testing results for mercury and dioxins and furans at the Meadowbank site. *The GN standard is for the average of three tests, as reported here.

Year	Mercury (µg/Rm^3 @ 11% v/v O_2)		Dioxins and Furans (pg/Rm^3 @ 11% v/v O_2)	
	GN Standard	Stack Testing Results (Average*)	GN Standard	Stack Testing Results (Average*)
2014	20	64.09	80	53.6
2015		<0.22		21.0
2016		<0.46		33
2017		3.8		22
2018		<0.19		10
2019		0.453		27
2021		1.33		286
2022		0.25		570

SECTION 9 • SUMMARY

9.1 SUSPENDED PARTICULATES (TSP, PM_{10}, $PM_{2.5}$)

For TSP, 14 of 124 samples across all three stations exceeded the GN 24-h guideline of 120 µg/m^3 in 2022. However, this includes 12 samples at the Whale Tail site location (DF-6b), where exceedances were predicted in the FEIS Addendum (Section 3.2). The GN guideline for the annual average was met for all stations, but the FEIS Addendum prediction/management threshold for the maximum annual average TSP at DF-6b (45 µg/m^3) was exceeded (65 µg/m^3). According to the FEIS Addendum (Table 1.2-1B), 2022 was planned to be the year of greatest production, and the increased concentrations of suspended particulates were likely a result of general mine activity. Actions to minimize emissions in 2023 in response to the management threshold exceedance are discussed below.

For PM_{10}, 11 of 162 samples across all three stations exceeded the BC guideline for the 24-h average, including six samples at station DF-6b, where exceedances were predicted in the FEIS Addendum (Section 3.2). There are no annual average guidelines for PM_{10}.

For $PM_{2.5,}$ four of 160 samples across all three stations exceeded the GN guideline of 30 µg/m^3 for the 24-h average and the 2020 Canadian Ambient Air Quality Standard of 27 µg/m^3 for the 24-h average. These all occurred at DF-2. For all three stations annual averages for $PM_{2.5}$ were less than the CAAQS. For one station (DF-2), the annual average $PM_{2.5}$ exceeded the relevant FEIS prediction, but this prediction is considered to be very conservative (low) for the purposes of comparison to field monitoring results. In addition, elevated concentrations of suspended particulates at DF-2 in 2022 are expected to have been a result of an isolated event (fire) at the adjacent structure, and associated re-building activities.

9.2 DUSTFALL

One dustfall sample of 61 collected at onsite locations DF-1 – DF-6 exceeded the relevant Alberta Ambient Air Quality Guideline for industrial/commercial areas. All other samples at the monitoring station (DF-1) were well below the threshold. This sample is therefore considered an isolated event and no change in mitigation is planned based on this result.

For samples collected along the AWAR and WTHR transects, no relevant exceedances of the established dust management threshold (0.53 mg/cm^2/30d at 500 m) occurred. Total dustfall in one sample exceeded the threshold at 300 m upwind (km 18) and at 1000 m downwind (km 78) but in both cases the result for fixed dustfall was less than the guideline, so results are considered unrelated to road activity.

9.3 NO_2

Measured using passive samplers, annual average NO_2 were less than the GN guideline of 32 ppb, the CAAQS of 17 ppb, and FEIS predictions for all stations at the Meadowbank Complex.

Results for continuous NO_2 monitoring indicated all measured concentrations were less than the relevant 1-h, 24-h, and annual average standards (GN and/or CAAQS).

9.4 GHG EMISSIONS

Estimated greenhouse gas emissions for the Meadowbank Complex in 2022 for reporting to Environment Canada's Greenhouse Gas Emissions Reporting Program were 248,921 tonnes CO_2 equivalent (preliminary at the time of reporting).

9.5 INCINERATOR EMISSIONS

Incinerator stack testing results in 2022 indicated an exceedance of the GN limit for total dioxins and furans. The most likely cause was identified as sub-optimal stack gas temperatures. Operation of the incinerator ceased in November, 2022, pending resolution of this issue.

9.6 CONCLUSION

Despite an overall increase in measured concentrations of suspended particulates in 2022, relatively few unpredicted exceedances of short-term ambient air quality standards occurred and no exceedances of standards for annual averages occurred across all relevant parameters (TSP, PM_{10}, $PM_{2.5}$, NO_2).

Management thresholds for dustfall were met along the AWAR and WTHR, and were only exceeded in a single dustfall sample for onsite locations. Based on these results, road dust mitigation is considered to have been effective at maintaining levels of deposited particulates below the established thresholds in 2022.

Based on management thresholds in place and results for suspended particulates at the Whale Tail site, a review of potential causes was conducted, mitigation measures currently in practice were reviewed, and adaptive management actions were identified to reduce the generation of suspended particulates moving forward. In addition, adaptive management actions to address exceedances of source emission limits for the Meadowbank incinerator were initiated, and incinerator operation has ceased pending resolution.

SECTION 10 • ACTIONS

The following actions related to air quality monitoring were planned for 2022:

- Incinerator stack test and investigation
    - Test complete, investigation initiated and ongoing.
- Reduce the frequency of dustfall field duplicates to one per transect.
    - Complete.
- Set the remaining Partisol units to record STP-standardized intake volume.
    - Outstanding.

The following actions are identified for 2023 along with ongoing investigations into incinerator emissions:

- Set the remaining Partisol units to record STP-standardized intake volume.
- To reduce downtime in continuous NO_2 monitoring and suspended particulate monitoring:
    - For both the Partisol and continuous NO_2 units, supplemental spare parts were already ordered.
- Implementation of actions to help reduce generation of suspended particulate matter at the Whale Tail site:
    - Review of mitigation options presented in the Air Quality and Dustfall Monitoring Plan (e.g. supplemental dust suppression, grading, material addition) with relevant onsite departments to assist in determining the optimal solution ahead of the 2023 dry season.
    - Thorough mid-year review of monitoring data to assist in confirming effectiveness of any supplemental mitigation.

SECTION 11 • REFERENCES

Cumberland Resources Ltd. (Cumberland) 2005. Meadowbank Gold Project Air Quality Impact Assessment Report.

Agnico Eagle Mines Ltd. (Agnico Eagle) 2018b. FEIS Addendum for the Whale Tail Pit – Expansion Project – Volume 4: Atmospheric Environment. December, 2018.

ECCC, 2019. CCME NAPS Ambient Air Monitoring and Quality Assurance/Quality Control Guidelines. PN 1599 ISBN 978-1-77202-056-4 PDF. Available online: https://ccme.ca/en/res/ambientairmonitoringandqa-qcguidelines_ensecure.pdf

APPENDIX A

Weather Data

Table A- 1. Daily temperature, wind speed and wind direction in 2022 at the Meadowbank site.

Date	Average Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Wind Speed (m/s)	Average Wind Direction (deg.)
1/01/22	-23.3	-20.3	-26.1	6.9	344
1/02/22	-20.7	-19.1	-23.9	8.8	340
1/03/22	-22.6	-21.2	-23.8	8.3	317
1/04/22	-26.6	-22.9	-28.9	11.1	326
1/05/22	-29.2	-23.7	-32.0	9.2	319
1/06/22	-34.6	-31.8	-36.0	4.2	279
1/07/22	-29.1	-25.1	-34.3	3.6	190
1/08/22	-29.9	-27.0	-33.5	1.9	229
1/09/22	-35.3	-32.8	-37.9	0.9	161
1/10/22	-35.8	-33.6	-37.8	4.2	307
1/11/22	-32.6	-30.4	-34.0	5.1	274
1/12/22	-32.6	-29.5	-35.1	7.6	293
1/13/22	-32.8	-29.8	-36.6	5.7	322
1/14/22	-34.0	-28.0	-37.0	2.1	175
1/15/22	-27.1	-25.4	-29.1	4.4	239
1/16/22	-33.7	-32.4	-34.3	10.6	325
1/17/22	-31.97	-30.62	-34.88	12.05	332.9
1/18/22	-32.98	-29.53	-34.94	7.529	315
1/19/22	-30.76	-28.99	-32.1	8.12	320.7
1/20/22	-28.48	-26.82	-31.16	7.391	299.3
1/21/22	-28.64	-24.79	-32.31	2.923	204.4
1/22/22	-31.48	-24.72	-33.66	12.02	315.3
1/23/22	-32.7	-30.9	-34.5	12.5	320
1/24/22	-33.8	-32.3	-34.9	10.2	332
1/25/22	-32.9	-30.9	-34.0	8.1	318
1/26/22	-30.3	-28.9	-33.5	3.3	115
1/27/22	-31.0	-29.3	-32.8	7.2	346
1/28/22	-34.1	-32.4	-35.4	4.7	305
1/29/22	-31.9	-29.7	-34.5	5.5	303
1/30/22	-30.0	-26.3	-33.9	5.4	288
1/31/22	-30.1	-27.5	-34.4	3.1	215
2/01/22	-32.4	-29.8	-37.3	3.1	268
2/02/22	-37.5	-34.5	-40.6	6.4	316
2/03/22	-36.6	-33.5	-37.7	7.8	311
2/04/22	-36.3	-33.2	-38.6	7.1	297
2/05/22	-37.2	-35.2	-38.7	5.9	298
2/06/22	-37.0	-35.6	-38.5	3.9	291

Date	Average Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Wind Speed (m/s)	Average Wind Direction (deg.)
2/07/22	-32.8	-29.2	-37.8	4.5	169
2/08/22	-27.3	-25.4	-31.2	2.3	167
2/09/22	-34.9	-25.7	-39.5	5.9	329
2/10/22	-38.8	-36.4	-41.2	5.4	299
2/11/22	-40.3	-38.7	-42.1	6.8	319
2/12/22	-36.3	-33.5	-39.3	4.3	299
2/13/22	-34.5	-31.6	-36.8	5.8	307
2/14/22	-35.9	-34.0	-37.0	8.1	304
2/15/22	-33.5	-31.4	-34.8	8.2	297
2/16/22	-33.3	-32.0	-36.0	5.9	306
2/17/22	-34.1	-31.3	-36.8	5.6	287
2/18/22	-31.2	-29.9	-33.5	5.2	255
2/19/22	-35.7	-30.6	-40.3	6.8	299
2/20/22	-40.0	-37.7	-41.5	7.3	322
2/21/22	-36.8	-33.2	-39.3	6.3	303
2/22/22	-34.9	-33.5	-36.7	8.7	299
2/23/22	-35.4	-32.6	-37.5	5.2	314
2/24/22	-34.7	-33.2	-35.9	2.6	297
2/25/22	-30.6	-25.4	-35.9	3.0	153
2/26/22	-27.5	-24.6	-30.4	4.7	323
2/27/22	-31.5	-29.5	-33.9	7.0	315
2/28/22	-29.6	-26.6	-34.9	6.2	292
3/01/22	-34.7	-32.0	-37.5	3.7	324
3/02/22	-33.6	-29.3	-38.3	5.9	312
3/03/22	-28.9	-26.1	-31.6	5.8	317
3/04/22	-22.4	-20.2	-27.6	9.5	325
3/05/22	-19.4	-16.7	-23.3	4.6	282
3/06/22	-17.2	-14.5	-22.4	5.1	303
3/07/22	-24.6	-22.2	-28.7	5.9	316
3/08/22	-26.3	-23.0	-30.0	4.2	334
3/09/22	-24.3	-21.6	-26.6	9.6	323
3/10/22	-27.6	-25.9	-30.1	6.6	310
3/11/22	-28.4	-23.3	-33.5	6.2	297
3/12/22	-26.1	-22.8	-29.5	7.6	308
3/13/22	-30.7	-28.7	-33.2	7.0	296
3/14/22					
	-29.9	-25.7	-35.1	6.4	282
3/16/22	-27.4	-23.9	-30.9	5.5	267

Date	Average Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Wind Speed (m/s)	Average Wind Direction (deg.)
3/17/22	-22.8	-18.9	-28.2	9.8	273
3/18/22	-20.3	-18.9	-23.7	7.1	287
3/19/22	-19.6	-17.2	-24.9	3.5	300
3/20/22	-23.2	-17.4	-27.1	1.7	279
3/21/22	-18.6	-14.3	-23.7	2.6	324
3/22/22	-17.6	-12.8	-23.7	5.5	112
3/23/22	-25.9	-10.3	-50.0	8.4	149
3/24/22	-26.0	-16.4	-50.0	7.2	335
3/25/22	-23.5	-21.7	-27.2	7.6	353
3/26/22	-31.2	-27.1	-33.8	11.6	331
3/27/22	-33.9	-31.7	-36.2	8.1	317
3/28/22	-35.9	-7.8	-39.4	2.6	308
3/29/22	-48.3	-7.2	-50.0	2.1	329
3/30/22	-49.6	-21.8	-50.0	1.6	309
3/31/22	-49.5	-49.3	-49.5	4.5	330
4/01/22	-49.5	-49.3	-49.5	4.2	330
4/02/22	-49.5	-49.3	-49.5	1.6	316
4/03/22	-49.5	-49.2	-49.5	4.8	310
4/04/22	-24.7	-22.2	-27.3	2.3	304
4/05/22	-24.7	-20.1	-29.4	2.9	145
4/06/22	-17.4	-12.2	-24.8	7.1	121
4/07/22	-10.1	-4.9	-15.4	7.1	165
4/08/22	-7.8	-5.6	-11.0	2.7	160
4/09/22	-8.0	-6.3	-11.4	2.9	176
4/10/22	-7.8	-6.2	-9.1	3.6	73
4/11/22	-12.2	-8.1	-19.8	7.2	20
4/12/22	-20.2	-17.6	-23.0	9.1	1
4/13/22	-23.1	-20.9	-26.3	6.7	343
4/14/22	-22.5	-17.5	-27.4	3.9	262
4/15/22	-18.9	-14.1	-22.8	2.7	217
4/16/22	-19.6	-15.9	-25.7	2.8	340
4/17/22	-25.6	-23.5	-28.1	5.2	287
4/18/22	-23.0	-18.6	-26.9	4.0	249
4/19/22	-21.9	-17.8	-26.4	1.8	197
4/20/22	-21.4	-18.7	-25.5	2.6	229
4/21/22	-20.1	-17.5	-25.1	5.1	79
4/22/22	-22.3	-17.4	-28.3	4.1	229
4/23/22	-20.4	-17.6	-25.5	4.7	314

Date	Average Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Wind Speed (m/s)	Average Wind Direction (deg.)
4/24/22	-23.7	-18.7	-28.2	5.7	308
4/25/22	-21.3	-15.7	-27.2	3.4	281
4/26/22	-17.2	-11.4	-22.6	3.5	191
4/27/22	-16.3	-8.7	-24.5	0.2	78
4/28/22	-13.8	-6.4	-21.3	0.0	0
4/29/22	-8.8	-4.1	-14.7	0.0	0
4/30/22	-15.9	-12.8	-18.2	0.0	0
5/01/22	-16.3	-12.9	-20.1	0.0	0
5/02/22	-14.5	-9.0	-19.5	0.0	0
5/03/22	-13.7	-8.5	-18.7	0.0	0
5/04/22	-14.3	-10.0	-19.3	0.0	0
5/05/22	-12.7	-9.1	-15.2	0.0	0
5/06/22	-10.6	-5.7	-17.1	5.3	146
5/07/22	-4.6	-2.1	-6.8	5.5	155
5/08/22	-2.7	0.2	-6.6	0.0	0
5/09/22	-2.8	-0.9	-7.8	5.4	36
5/10/22	-7.2	-5.1	-9.0	8.7	58
5/11/22	-5.7	-3.3	-7.8	6.7	82
5/12/22	-5.3	-3.2	-7.6	4.1	83
5/13/22	-4.1	-1.3	-8.9	4.5	10
5/14/22	-6.0	-1.5	-11.8	2.3	111
5/15/22	-5.6	-1.0	-11.3	3.8	103
5/16/22	-2.8	1.1	-7.8	2.7	344
5/17/22	-1.5	0.2	-2.9	7.7	358
5/18/22	-4.1	-2.1	-6.6	7.2	4
5/19/22	-2.9	0.6	-6.4	6.9	6
5/20/22	-3.2	1.5	-7.4	9.2	2
5/21/22	-4.5	-2.3	-7.8	10.5	353
5/22/22	-6.2	-2.0	-10.5	6.9	338
5/23/22	-10.1	-7.8	-12.5	7.5	334
5/24/22	-7.7	-5.3	-10.3	4.7	281
5/25/22	-4.0	-1.5	-7.1	6.1	276
5/26/22	-5.4	-3.7	-7.9	6.2	291
5/27/22	-1.6	1.3	-6.1	5.3	211
5/28/22	1.3	5.7	-2.8	3.3	189
5/29/22	2.5	5.0	0.2	3.9	59
5/30/22	1.6	3.6	0.0	7.1	100
5/31/22	2.8	4.6	1.4	7.1	128

Date	Average Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Wind Speed (m/s)	Average Wind Direction (deg.)
6/01/22	2.4	4.3	1.0	5.2	76
6/02/22	2.5	4.2	1.0	7.8	13
6/03/22	0.8	1.9	-0.3	10.7	10
6/04/22	3.2	7.4	0.3	3.2	109
6/05/22	7.3	12.7	0.3	2.1	75
6/06/22	9.8	14.4	3.8	2.6	108
6/07/22	14.3	16.6	8.9	2.7	114
6/08/22	12.2	17.0	7.1	2.5	172
6/09/22	9.5	13.3	5.9	4.1	38
6/10/22	9.8	17.8	4.2	4.7	114
6/11/22	12.5	12.8	12.1	2.2	201
6/12/22	13.8	20.6	7.6	5.1	186
6/13/22	11.8	18.0	5.9	4.4	158
6/14/22	11.7	17.7	7.0	5.5	126
6/15/22	15.7	22.7	6.9	3.0	231
6/16/22	8.0	17.3	3.0	8.5	4
6/17/22	5.4	10.7	1.0	7.3	349
6/18/22	8.5	14.6	2.6	6.2	317
6/19/22	14.7	17.0	10.1	4.4	104
6/20/22	10.0	13.5	7.0	4.0	109
6/21/22	79.9	94.7	51.2	3.8	89
6/22/22	63.4	85.3	35.8	3.2	99
6/23/22	38.5	68.9	16.9	4.5	75
6/24/22	45.5	73.7	22.4	3.7	318
6/25/22	71.0	94.3	38.2	4.4	328
6/26/22	66.9	83.4	45.5	3.5	328
6/27/22	65.9	83.6	45.0	3.8	335
6/28/22	73.6	94.4	53.3	4.4	332
6/29/22	81.5	96.5	52.9	5.2	296
6/30/22	84.2	98.7	47.6	4.5	65
7/01/22	63.6	89.5	39.1	4.7	45
7/02/22	62.4	80.8	39.7	2.5	331
7/03/22	12.1	15.1	8.0	2.7	352
7/04/22	15.3	17.4	13.1	4.1	308
7/05/22	11.8	16.6	7.0	6.1	321
7/06/22	13.2	18.1	8.0	6.4	330
7/07/22	14.8	20.3	7.6	3.8	346
7/08/22	17.0	22.4	10.1	1.3	240

Date	Average Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Wind Speed (m/s)	Average Wind Direction (deg.)
7/09/22	20.4	26.9	12.7	0.9	175
7/10/22	21.7	27.2	15.6	3.4	130
7/11/22	19.8	26.4	13.9	5.2	202
7/12/22	20.5	25.3	14.0	3.0	16
7/13/22	24.9	27.8	19.1	1.5	286
7/14/22	23.0	28.3	17.5	4.5	150
7/15/22	19.8	24.9	16.0	7.3	138
7/16/22	14.6	17.0	12.9	6.9	159
7/17/22	10.4	13.3	8.4	9.2	326
7/18/22	9.1	13.1	5.4	7.1	356
7/19/22	10.2	15.8	4.6	3.2	347
7/20/22	15.7	21.8	10.1	3.5	11
7/21/22	16.2	19.7	11.9	3.0	106
7/22/22	16.8	20.3	12.9	4.1	352
7/23/22	19.2	20.9	15.5	2.3	314
7/24/22	18.7	23.6	12.1	1.6	309
7/25/22	22.2	25.0	16.8	2.7	136
7/26/22	18.4	22.2	15.0	3.4	158
7/27/22	18.7	22.9	13.3	2.3	126
7/28/22	19.7	24.9	14.4	3.7	280
7/29/22	15.9	19.6	12.5	5.6	303
7/30/22	11.5	14.4	8.2	7.9	300
7/31/22	8.6	10.2	7.0	10.3	317
8/01/22	7.3	9.0	6.1	9.6	309
8/02/22	7.7	8.6	6.6	11.0	310
8/03/22	9.4	13.1	7.3	8.0	354
8/04/22	10.4	13.6	8.0	6.3	17
8/05/22	10.2	12.0	8.2	6.0	316
8/06/22	11.9	15.2	9.2	2.9	348
8/07/22	16.2	19.0	12.6	2.2	291
8/08/22	18.4	20.2	15.1	2.6	64
8/09/22	16.9	21.5	11.6	4.2	15
8/10/22	17.3	22.3	13.1	4.5	349
8/11/22	17.1	22.0	11.2	4.9	245
8/12/22	13.1	16.3	9.8	10.9	251
8/13/22	10.8	13.6	8.3	10.7	277
8/14/22	11.1	15.6	7.3	6.8	287
8/15/22	15.7	20.9	10.8	2.6	152

Date	Average Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Wind Speed (m/s)	Average Wind Direction (deg.)
8/16/22	23.1	26.6	18.5	2.5	192
8/17/22	21.3	27.9	14.2	2.3	213
8/18/22	12.6	19.0	9.4	7.3	323
8/19/22	10.6	17.1	6.1	5.0	343
8/20/22	16.1	22.3	9.6	7.1	223
8/21/22	8.7	10.9	6.9	3.4	339
8/22/22	7.1	9.0	5.3	9.5	300
8/23/22	6.0	8.0	4.2	8.5	300
8/24/22	5.2	7.4	3.6	11.2	319
8/25/22	7.7	12.8	3.8	9.1	311
8/26/22	5.1	7.4	3.2	5.3	344
8/27/22	4.5	9.2	1.1	2.7	77
8/28/22	7.5	8.9	6.5	6.7	111
8/29/22	7.5	10.0	5.5	6.1	97
8/30/22	7.5	9.5	6.0	4.6	85
8/31/22	7.1	8.6	5.3	2.5	79
9/01/22	7.0	10.0	3.8	2.7	26
9/02/22	6.4	10.8	2.7	4.0	12
9/03/22	10.5	12.4	7.8	6.0	274
9/04/22	11.4	14.3	5.6	3.0	106
9/05/22	11.7	15.6	8.6	3.4	116
9/06/22	9.4	11.4	7.8	8.5	127
9/07/22	8.6	9.2	8.1	3.5	112
9/08/22	5.4	5.9	5.0	12.2	297
9/09/22	6.5	8.1	4.9	7.9	320
9/10/22	6.9	9.1	5.5	8.4	348
9/11/22	6.1	7.0	5.3	11.0	307
9/12/22	7.1	8.3	6.1	5.9	343
9/13/22	4.0	6.3	2.8	9.4	321
9/14/22	4.9	7.6	2.7	4.4	260
9/15/22	5.6	8.2	3.0	5.0	250
9/16/22	2.9	7.6	0.8	9.1	301
9/17/22	3.5	7.8	0.1	3.3	43
9/18/22	7.3	11.7	4.2	6.2	145
9/19/22	7.0	10.8	4.3	5.1	292
9/20/22	3.3	6.2	1.1	4.6	358
9/21/22	1.7	3.5	-0.3	3.4	349
9/22/22	1.9	5.6	-1.5	4.3	258

Date	Average Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Wind Speed (m/s)	Average Wind Direction (deg.)
9/23/22	4.7	6.9	-0.1	6.1	300
9/24/22	2.2	6.1	-1.2	8.3	120
9/25/22	5.4	9.2	0.9	7.6	227
9/26/22	-0.9	1.1	-3.3	10.0	313
9/27/22	-1.6	-0.2	-3.7	5.6	300
9/28/22	2.4	3.6	0.3	7.6	141
9/29/22	3.9	5.9	0.0	9.7	274
9/30/22	-0.8	0.5	-2.5	15.3	313
10/01/22	-1.6	-0.4	-2.8	2.4	198
10/02/22	1.8	5.7	-2.9	7.2	196
10/03/22	6.6	8.7	4.6	7.4	209
10/04/22	0.4	4.9	-1.5	15.8	299
10/05/22	-2.0	-0.5	-3.8	12.3	323
10/06/22	-3.8	-2.9	-4.7	8.8	314
10/07/22	-0.8	2.4	-4.4	8.7	226
10/08/22	-2.3	1.1	-4.2	10.3	343
10/09/22	-1.4	2.2	-4.6	4.6	209
10/10/22	-0.4	0.4	-1.5	7.0	303
10/11/22	-2.4	-1.2	-3.3	6.3	109
10/12/22	-1.7	-0.2	-3.5	9.8	113
10/13/22	0.4	0.8	0.0	5.1	107
10/14/22	-1.4	0.3	-5.2	1.3	20
10/15/22	-1.9	0.7	-7.0	2.2	100
10/16/22	-4.1	-0.5	-6.8	14.7	328
10/17/22	-6.5	-4.8	-8.5	7.5	321
10/18/22	-7.7	-5.4	-10.0	5.4	161
10/19/22	-2.9	0.5	-5.6	11.5	154
10/20/22	-0.7	1.0	-1.9	7.6	258
10/21/22	-1.6	-0.8	-2.8	9.9	97
10/22/22	-3.4	-2.1	-5.4	5.5	4
10/23/22	-5.7	-4.0	-8.2	7.3	332
10/24/22	-11.3	-6.3	-15.5	8.5	271
10/25/22	-8.3	-4.8	-14.2	7.3	187
10/26/22	-7.5	-6.7	-8.3	3.4	158
10/27/22	-11.6	-7.4	-14.1	4.0	311
10/28/22	-5.9	-1.7	-12.6	7.7	128
10/29/22	-0.8	0.0	-3.9	6.0	70
10/30/22	-11.9	-3.8	-14.8	12.2	331

Date	Average Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Wind Speed (m/s)	Average Wind Direction (deg.)
10/31/22	-15.6	-13.5	-16.6	3.7	331
11/01/22	-19.9	-18.3	-20.7	8.9	352
11/02/22	-18.2	-15.8	-20.5	9.3	314
11/03/22	-18.7	-16.3	-20.7	7.0	270
11/04/22	-18.1	-14.3	-21.8	6.0	279
11/05/22	-17.1	-16.3	-17.9	4.3	226
11/06/22	-14.3	-8.0	-17.2	7.0	96
11/07/22	-17.2	-9.8	-23.0	9.4	325
11/08/22	-23.1	-21.0	-24.9	6.5	297
11/09/22	-19.7	-16.6	-23.1	4.9	264
11/10/22	-24.7	-22.3	-27.0	2.8	313
11/11/22	-25.5	-23.6	-27.1	2.6	303
11/12/22	-22.4	-19.7	-24.7	3.3	215
11/13/22	-15.0	-9.0	-19.9	7.0	209
11/14/22	-10.1	-8.9	-12.5	3.9	195
11/15/22	-12.5	-8.7	-19.3	2.7	31
11/16/22	-18.5	-16.5	-20.5	0.8	91
11/17/22	-19.0	-14.9	-21.7	6.4	326
11/18/22	-17.6	-14.8	-23.6	4.5	292
11/19/22	-23.2	-19.3	-25.1	6.9	329
11/20/22	-24.7	-22.2	-27.1	1.7	150
11/21/22	-28.0	-22.2	-30.9	6.5	334
11/22/22	-29.9	-29.1	-31.0	7.5	320
11/23/22	-25.6	-19.9	-30.4	1.9	359
11/24/22	-16.8	-13.3	-20.1	3.1	99
11/25/22	-14.4	-13.1	-17.0	1.3	100
11/26/22	-18.0	-15.3	-21.8	2.8	73
11/27/22	-15.5	-12.6	-19.8	2.2	122
11/28/22	-20.1	-17.7	-26.4	0.7	29
11/29/22	-27.3	-19.7	-31.5	7.4	347
11/30/22	-31.7	-30.9	-32.7	3.3	285
12/01/22	-31.5	-29.7	-33.2	2.3	167
12/02/22	-33.1	-31.8	-34.5	0.7	138
12/03/22	-33.3	-31.0	-35.2	0.9	336
12/04/22	-34.9	-31.7	-36.6	2.4	350
12/05/22	-29.7	-26.7	-32.8	9.1	355
12/06/22	-28.4	-19.3	-32.5	11.6	340
12/07/22	-19.3	-17.9	-23.9	6.3	50

Date	Average Temperature (°C)	Maximum Temperature (°C)	Minimum Temperature (°C)	Average Wind Speed (m/s)	Average Wind Direction (deg.)
12/08/22	-29.3	-23.2	-32.4	3.9	105
12/09/22	-32.1	-30.2	-33.9	2.8	296
12/10/22	-27.1	-18.7	-33.2	6.5	102
12/11/22	-16.1	-12.8	-18.9	6.2	62
12/12/22	-16.3	-10.74	-24.6	4.955	197.4
12/13/22	-19.54	-13.72	-24.66	5.547	120.6
12/14/22	-15.54	-9.4	-21.42	4.293	152
12/15/22	-18.2	-11.02	-23.99	7.213	214.8
12/16/22	-23.13	-21.28	-25.68	1.557	321
12/17/22	-23.76	-19.59	-28.38	7.856	320.7
12/18/22	-30.06	-26.28	-33.72	2.789	288.2
12/19/22	-31.59	-29.53	-32.78	5.762	227.5
12/20/22	-35.2	-34.1	-36.2	4.0	190
12/21/22	-35.2	-33.9	-36.0	2.4	301
12/22/22	-35.8	-33.9	-37.0	2.3	309
12/23/22	-33.4	-27.8	-36.2	4.2	321
12/24/22	-28.4	-26.0	-31.2	6.9	336
12/25/22	-30.2	-28.6	-31.6	6.5	323
12/26/22	-27.0	-24.3	-29.1	11.0	337
12/27/22	-27.7	-24.7	-29.5	10.8	340
12/28/22	-32.2	-26.7	-33.8	7.2	324
12/29/22	-29.2	-25.1	-33.5	2.9	334
12/30/22	-25.8	-24.0	-29.7	4.0	111
12/31/22	-21.0	-18.1	-24.9	4.7	140

APPENDIX B

Review of FEIS-Designed Air Quality Mitigation Measures

Table B-1: Mitigation measures described in the Project FEIS Addendum (Table 3-C-1) to reduce impacts of the project on area air quality and climate, and commentary on current implementation.

Project Activity	**Planned Mitigation Measure** (FEIS Addendum Volume 3, Table 3-C-1)	**Implementation (2022)**
General construction, operations, and decommissioning activities associated with the Whale Tail Pit and the haul road; and Mining of the Whale Tail Pit	All vehicles will adhere to the 50 km/h speed limit.	**Yes**
	Regular maintenance will be implemented for equipment and vehicles.	**Yes** – Maintenance logs
Upgrading of the haul road from the Whale Tail Pit to the Meadowbank Mine	Implement dust control measures, if needed on mine roads.	**Yes –** Air Quality and Dustfall Monitoring Plan
	Equipment and vehicles will comply with relevant non-road emission criteria at the time of purchase.	**Yes –** Air Quality and Dustfall Monitoring Plan
	Regular maintenance will be implemented for equipment and vehicles.	**Yes** – Maintenance logs
Traffic on the haul road from the Whale Tail Pit to the Meadowbank Mine	Watering of roads and enforcing speed limits to suppress dust production.	**Yes –** Air Quality and Dustfall Monitoring Plan
	Equipment and vehicles will comply with relevant non-road emission criteria at the time of purchase	**Yes –** Air Quality and Dustfall Monitoring Plan
	Regular maintenance will be implemented for equipment and vehicles	**Yes** – Maintenance logs
Construction of the Whale Tail Pit	Best Management practices for controlling fugitive dust from construction activities	**Yes** – Air Quality and Dustfall Monitoring Plan
	Equipment and vehicles will comply with relevant non-road emission criteria at the time of purchase	**Yes** – Air Quality and Dustfall Monitoring Plan
	Regular maintenance will be implemented for equipment and vehicles	**Yes** – Maintenance Logs
Mining of the Whale Tail Pit	Watering of pit roads and enforcing speed limits to suppress dust production.	**Yes** – Air Quality and Dustfall Monitoring Plan
	Equipment and vehicles will comply with relevant non-road emission criteria at the time of purchase.	**Yes** – Air Quality and Dustfall Monitoring Plan
	Regular maintenance will be implemented for equipment and vehicles.	**Yes** – Maintenance logs
	Enclosures are used to reduce fugitive emissions at the processing facility	**Yes** – Air Quality and Dustfall Monitoring Plan
	Adherence to the Incinerator Waste Management Plan	**Yes** - Incinerator Waste Management Plan