



Baffinland Dust Audit

Final Recommendations Report

February 8, 2023

Prepared for:
Baffinland Iron Mines Corporation

Prepared by:
Nunami Stantec Limited
Independent Dust Audit Committee
Members



Baffinland Dust Audit

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Executive Summary

Baffinland Iron Mines Corporation (Baffinland) produces direct shipping iron ore at the Mary River Mine located on Baffin Island, Nunavut. The iron ore is loaded onto bulk carrier ships at Milne Port during the shipping season (typically July to October) and primarily shipped to European ports for use by steel makers in continental Europe. Baffinland's Mary River Mine is one of the most northern mines in the world.

In June 2021, Baffinland submitted a Notice and Request to five (5) North Baffin communities of Pond Inlet, Clyde River, Arctic Bay, Sanirajak, and Igloolik regarding a commitment to the Nunavut Impact Review Board (NIRB) to resolve outstanding issues with the Phase 2 Proposal identified by a Pond Inlet Hamlet Council, including dust-related issues. The Dust Audit Committee was formed in response to a commitment outlined in Appendix C – Final Table of Post Phase 2 Approval/Regulatory Phase Commitments for the Mary River Project Phase 2 Proposal issued on January 24, 2022. This commitment was later integrated into Amendment No 4 to Project Certificate 005 as term and condition 187, which allowed for the operation to continue at a transportation rate of 6 million tonnes per annum (mtpa) for 2022.

Baffinland contracted Nunami Stantec to conduct a third-party audit involving the five (5) Inuit communities on North Baffin to identify the greatest sources of fugitive dust at the Mary River Mine and any modifications or controls that could effectively reduce the generation or spread of dust.

The Dust Audit Committee is comprised of nominated representatives from the hamlets and their Hunter and Trappers' associations including Pond Inlet, Igloolik, Clyde River, Sanirajak and Arctic Bay, as well as representatives from the Qikiqtani Inuit Association (QIA), and facilitators and engineering subject matter experts from Nunami Stantec and CWA Engineers Inc.

This Report presents recommendations from the Dust Committee (Section 5) for Baffinland's consideration and reflects concerns related to the effects of project-generated dust on the health of the environment, wildlife, marine life, and community members. These recommendations are the culmination of discussions that have taken place with the Dust Committee between September 2021 and January 2023 with a focus on continuing conversations with Baffinland and additional studies as outlined throughout this report. Table E.1 includes a high-level summary of Dust Audit Committee Recommendations (full recommendations in Section 5).

The Dust Audit Committee requests that Baffinland provide a written response and timelines to the recommendations in this report.

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Table E.1 Summary of Dust Audit Committee Recommendations (High Level)

Topic	Summary of Dust Audit Committee Recommendations
Blasting	Work with explosives supplier and subject matter experts (SME) to identify dust control measures during the blasting process and to refine blasting protocols to reduce dust and nitrogen oxide (NOx) fumes for implementation.
Blasting	Continue conversations with the Dust Audit Committee regarding ground surface winds during the new moon to integrate IQ into the program under development regarding conditions of high-risk dust dispersion and to determine conditions where additional mitigations to reduce dust can be implemented or, where outlined by the wind thresholds report, blasting may be delayed or rescheduled until wind speeds are within identified thresholds.
Blasting	Conduct a blast fragmentation size study with explosive supplier and blasting specialists that can be incorporated into the program under develop regarding conditions of high-risk dust dispersion.
Blasting	Update draft explosives management plan once the explosive suppliers and SME's have determined the blasting protocols to develop a Standard Operating Procedure (SOP) for blasting.
Material Handling	Conduct a run-of-mine (ROM) optimization study to assess the viability of implementing the following processes to be considered for current and future expansion, including Steensby: <ul style="list-style-type: none"> • Using a ROM dump pocket • Minimizing the use of front-end loaders (FEL) at the ore pad and the port • Use of enclosures to collect and minimize dust. • Increasing the use of conveyors and transfer chutes • Using luffing stackers to reduce drop height when forming stockpiles • Cover hoppers when loading conveyors, crushers, or screens • Load or unload B-Trains within an enclosed area
Dust Suppression Technology	Conduct a study to assess the amount of watering and road maintenance equipment will required for current and future operations.
Dust Suppression Technology	Research the viability of applying sea water on the haul roads and Tote Road, due to the lower freezing point, if Baffinland considers applying water exclusively as dust suppression.
Dust Suppression Technology	Develop a SOP on dust suppression products that includes procedures for the application on and the ongoing maintenance of the active mine haul roads.
Dust Suppression Technology	Conduct a study on dust suppressants for utilization on ore that is loaded onto the B-train trucks, instead of covers due to challenges of Arctic winter conditions. The study should also examine which is the most effective dust suppressant for the Arctic weather conditions (liquid or dry).
Dust Suppression Technology	Analyze aircraft approved dust suppression products for use on the runway. Approved products for runway use should be incorporated into the SOP on dust suppression.
Dust Suppression Technology	Examine the use of wind fences around dust generating infrastructure and complete a feasibility study to determine how to use wind fencing most effectively at both the mine site and the port site, taking into consideration Arctic weather conditions.
Dust Suppression Technology	Explore options to implement a continuous sitewide dust monitoring system, for Artic conditions, to track the effectiveness of implemented dust mitigations.
Dust fall Monitoring	Install additional passive monitors at a greater distance from the mine to capture the broader regional impacts of dust, including up and down wind of prevailing winds.

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Topic	Summary of Dust Audit Committee Recommendations
Dust Audit Committee	<p>Request:</p> <ul style="list-style-type: none">• Ongoing funding of the Dust Audit Committee.• Provision of documents in both English and Inuktitut through accessible means.• A transparent process of providing data obtained through ongoing studies conducted by Baffinland, the Terrestrial Environment Working Group and the Marine Environment Working Group.• Establish a virtual monitoring website that is accessible to the five Northern communities.

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Abbreviations

Baffinland	Baffinland Iron Mines Corporation
BCLO.....	Baffinland Community Liaison Officers
CWA	CWA Engineers Inc.
FEIS	Final Environmental Impact Statement
FEL.....	Front End Loader
IQ.....	Inuit Qaujimajatuqangit
MTPA	Million tonnes per annum
NIRB.....	Nunavut Impact Review Board
Nunami Stantec.....	Nunami Stantec Limited
QIA	Qikiqtani Inuit Association
ROM.....	Run of Mine
SME.....	Subject Matter Expert
SOP	Standard Operating Procedures

1 Introduction

Baffinland's Mary River Mine is located on Baffin Island, Nunavut and is one of the most northern mines in the world. It has one of the richest deposits of iron ore discovered to date which can be mined, crushed and shipped direct to market. This site is unique in that it can be crushed on site with no processing, therefore, no tailings are produced.

Dust has frequently been identified as a potential concern for land users and impacted communities, including dust contamination and its effects on harvesting, wildlife, and water (Baffinland, Aglu and Stratos 2020). As a result of the review of the Final Environmental Impact Statement (FEIS) and FEIS Addendum, communities and regulators expressed concerns related to dust, including dust fall on soil, vegetation and forage and the potential impacts to caribou.

The Baffinland Dust Audit Committee (the Committee) was established in September 2022 to observe and understand the present and potential future dust sources at Baffinland's Mary River Mine Site, Milne Inlet Tote Road Corridor, and Milne Port site, and to recommend dust mitigation measures for Baffinland's consideration.

The formation of a Dust Audit Committee was a commitment outlined in Appendix C – Final Table of Post Phase 2 Approval/Regulatory Phase Commitments for the Mary River Project Phase 2 Proposal (Baffinland 2022a):

Baffinland will fund an independent audit of all present and future (Phase 2) dust sources across the Project to ensure the proper dust controls are in place. This will include an evaluation of existing and proposed dust controls for the purpose of identifying where improvements or additional measures are required. To ensure the audit fully considers the knowledge and concerns of Inuit, and that Baffinland is accountable for implementing the recommendations that follow from the audit, Baffinland will seek to establish a joint Project Charter with the QIA and designated representatives from the impacted communities. The project charter will outline the audit goals, roles and responsibilities, approach to the use of Inuit Qaujimajatuqangit (IQ), major milestones, timelines, risks, etc. Any onsite inspections by the auditors will be attended by designated community representatives to provide their insights at each audit location.

Additionally, the new Term and Condition 187 for the Project Certificate states that:

The Proponent is required to resource an annual audit of dust impacts and mitigations associated with project activities to be completed by a third party acceptable to the responsible parties. The dust audit shall evaluate effectiveness of current measures and if necessary, contain recommendations and options to reduce the spread and impacts of dust from project activities.

The Dust Audit Committee also acknowledges that as per the new Condition (188) in the Mary River Mine Project Certificate, Baffinland will work with the Terrestrial Environmental Working Group (TEWG) to establish site-specific thresholds for conditions that may increase dust dispersion (i.e., wind speed), and corresponding mitigations to implement when thresholds are met. Additionally, the Dust Audit Committee is aware of Baffinland's dust-related commitments to the Qikiqtani Inuit Association (QIA). The Dust Audit

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Committee understands that there are recommendations identified in this final report that overlap with Baffinland's dust-related commitments to the TEWG and QIA. Appendix A presents a concordance table for these commitments.

The Dust Audit Committee was formed to review all present and future dust sources across the Project. The Dust Committee's recommendations in this report were developed in consideration of the current phase and for the Phase 2 proposal, which was officially rejected by the Minister in November 2022; however, they can be applied to present operations and future Project expansion/phases, as appropriate, including the previously approved Mary River Mine with the port at Steensby Inlet.

1.1 Impacts of Dust

Throughout the regulatory process, the five (5) North Baffin communities have raised their concerns regarding the impacts of dust. The Dust Audit Committee, made of representatives of the Hunters and Trappers Associations from each of these communities, brought forward the same concerns including (but not limited to) the impacts to terrestrial and marine resources, human health, wildlife movement, changes to the landscape, pollution of water and snow¹, and the visibility of the iron ore dust in the environment. Concerns related to dust also include the introduction of dust into water sources, metals contamination, impacts to caribou habitat (including habitat loss), and visual changes to wildlife and wildlife habitat (foxes turning red due to dust, dust around seal holes, quality and health of resources). Figure 1, Figure 2, Figure 3, and Figure 4 demonstrate the dust-related concerns, including visual and perceived effects, that the members of the Dust Audit Committee have experienced within their communities and while at site.

These concerns have been emphasized throughout the Committee's discussions and relate to the societal value of Avatittinnik Kamatsiarniq, the respect and care for the land, animals and the environment. Implementation of the recommendations in this report, and a commitment from Baffinland to limit dust is important to the Dust Audit Committee and they hope that these actions will avoid or reduce future impacts to the land, animals and the environment.

Some observations from the members of the Dust Audit Committee during their site visits concerning dust include:

- They thought there was going to be more dust on the ice, but it was nice to see that there was not as much as they anticipated there would be
- During the helicopter flyover, they identified dust travelling, such as within the cracks of some of the ice
- Along Milne Port, Tote Road, there was lots of ice covered in red and that ptarmigan and foxes were also covered in red.

During the Dust Audit Committee meetings and site visits, conversations were had with the community members that provide context to the recommendations that have been put forward in this report.

¹ Refer to the Field Reports for more detailed descriptions of the impacts of dust.

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Figure 1 **Iron ore dust/particulates settled in puddle on mine road within the PDA**
(October 2021)



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Figure 2 **Dust on snow along haul road within the PDA (that reports to water containment structure) (October 2021)**



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Figure 3 **Arctic fox covered in red dust at Deposit 1 (observed October 2021)**



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Figure 4 Image of Narrow Lake at Tote Road KM 32 with dust on shoreline and surrounding snow (top: October 2021; bottom: June 2022)



2 Methodology

This final report provides a summative analysis and final recommendations based on information collected through the various tasks completed by the Dust Audit Committee (Section 4) and includes a review of existing reports and documents provided by Baffinland to identify current processes as related to recommendations, mitigations, and observations (Section 5). The Dust Audit Committee focuses specifically on dust, dust sources, and dust mitigations as defined through Baffinland's NIRB commitments.

The objectives and deliverables of the Dust Audit were established in alignment with the commitment from Baffinland and through collaborative discussions with the Dust Audit Committee. The study was facilitated by Nunami Stantec, involving engagement specialists and engineers and supported by CWA Engineers Inc. (CWA). The methodology used to develop recommendations included discussions on key components of dust and dust sources, such as:

- Known current sources of dust
- Known and current mitigations for dust suppression at Mary River Mine, Milne Inlet Port, and the Tote Road on which ore is hauled from the mine to the port.
- Potential future sources of dust
- Harvested species or resources impacted by dust
- Timing or seasons for harvesting that are impacted by dust (if applicable)
- Changes to land access due to perceived impacts of dust

The methodology considers Baffinland's commitment to identify present and future sources of dust and mitigations, to ensure proper dust controls are in place, and the approach to include Inuit Qaujimajatuqangit (IQ) in understanding and recording recommendations of the Dust Audit Committee.

Questions or recommendations that were raised and out of scope of the Dust Audit Committee have been documented and provided to Baffinland for their follow up and are tracked in Appendix D.

Data was collected through the field trips, bi-weekly meetings of the Dust Committee, and technical research conducted by Nunami Stantec and CWA. During community interviews and workshops, an overview of the Project and the purpose and goals of the study was presented to the Committee members by Nunami Stantec facilitators at the start of the interviews and workshops in order to obtain informed consent. Study participants were asked to sign consent forms or to provide oral consent prior to participating in the sessions (see Appendix B).

All interviews were recorded, and notes were taken with names associated with each statement to allow for redaction of information from the produced reports, however no names or identifying language are used in the quotes and information outlined below. Photographs were taken while at site by the Dust Audit Committee as well as additional photographs provided by several members of the committee members taken outside of the site visits.

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Recommendations put forward in this report were reviewed and endorsed by the Dust Audit Committee with the understanding that further dialogue will continue in the future.

2.1 Definitions

Dust: fine particulate matter generated by drilling, blasting, materials handling, and the transporting of materials. The Dust Audit Committee defines dust as any particles dispersed as a result of Project activities.

Dust Source: sources evaluated by the Dust Audit Committee include drilling, blasting crushing, screening, mine haul roads, Tote Road, material handling, stockpiling, shiploading, and other workspace areas at the Mary River Mine.

Mary River Mine Site: “Baffinland’s Mary River Mine site on Baffin Island, Nunavut, Canada, is one of the most northern mines in the world. It has among the richest iron ore deposits ever discovered, consisting of nine-plus high-grade iron ore deposits that can be mined, crushed, and screened into marketable products” (Baffinland 2022b). Currently, activities are occurring at the Mine Pit (Deposit 1).

Milne Port: is in Milne Inlet, an arm of Eclipse Sound which, along with Navy Board Inlet, separates Bylot Island from Baffin Island in Nunavut's Qikiqtaaluk Region. The port which transports iron ore from the Mary River Mine to Europe is located within this inlet (Baffinland 2022b).

Blasting: Mining activity that involves chemical and physical processes to break iron ore and waste rock into smaller pieces for loading and hauling. Involves the use of explosives, boosters, and detonators based on a blast design.

Tote Road: An approximately 100 km road on which ore is transported from the crushing facility at Mary River Mine site to Milne Inlet for stockpiling and subsequent shipping.

Mine Haul Roads: Roads which connect the Mine Pit (Deposit 1) to the Ore Pad (including the crushing area), waste rock storage area, and mine operation areas.

Ore Pad Stock Piles: The stockpiles at the mine include two crushed and screened ore piles, one for fines and one for lumps. Mined iron ore material is hauled from the pit to the Ore Pad and then material is processed with crushers and screens and placed into these stockpiles.

Ore Stock Piles at Port: Fine and lump ore are also separately stockpiled at the Milne Port.

Run of Mine: Ore that has been processed only by blasting, loading, and hauling to the ore pad.

Fines: Ore that will pass through a screen with approximately 6 mm square mesh.

Lumps: Ore that will pass through a screen with approximately 50 mm square mesh. Typically has higher iron content than fines and is therefore more valuable.

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2.1.1 Dust Sources

The sources of dust to be assessed include (but are not limited to) those listed in Table 1 below:

Table 1 Dust Sources

Type	Description
Airstrip/airplanes	Transportation of workers on aircraft during each shift.
Blasting	A chemical and physical process that occurs through the firing of explosives.
Crushing and screening	Breaking down and sorting different size particles of iron ore.
Drilling	Drilling holes to set explosive charges needed to release ore
Hauling	Transporting ore and waste rock with trucks.
Material handling	To move iron ore or waste rock from one location or process to another with conveyors or mobile equipment
Mining	Extracting materials/substances from the earth.
Shiploading	Moving material from stockpiles onto ships using mobile equipment, conveyors, and the shiploader.
Road traffic	Traffic due to the movement of workers, supplies, and auxiliary activities.
Stockpiling	Placing material in piles in which it is stored between different stages of extraction, processing, handling, and shipping.

2.1.2 Battery Limits

2.1.2.1 *Spatial Boundary*

The assessment of dust sources within the Project footprint includes the Mine Pit (Deposit No. 1) and Haul Road, Crusher, Tote Road and Milne Port site (see Figure 5 Project Overview Map).

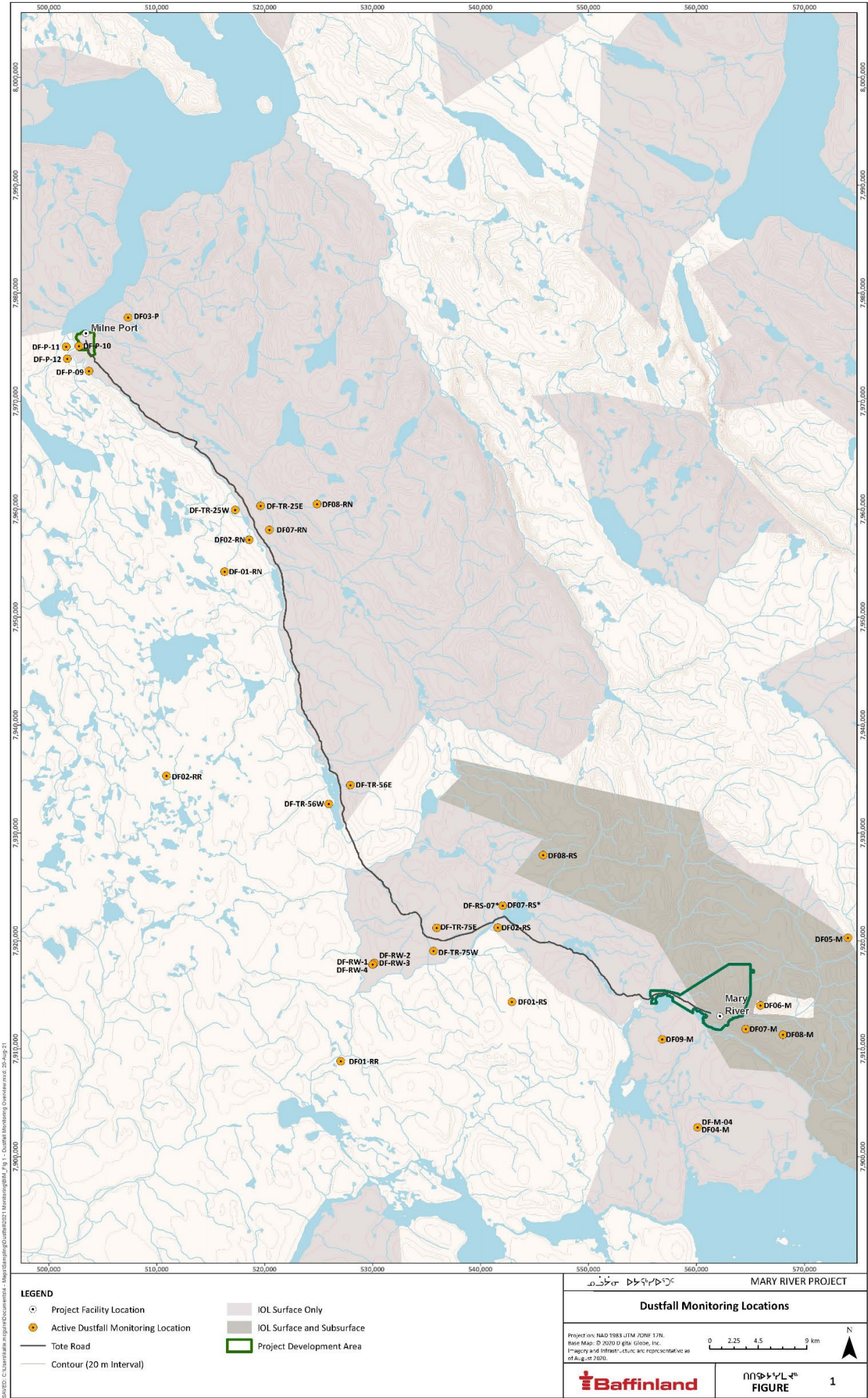
2.1.2.2 *Temporal Boundary*

The phases of the mining life cycle to be included in the recommendations include drilling, blasting, mining, crushing, screening, material handling, hauling, stockpiling and ship loading of current operations and future expansions/extension. The current anticipated life of mine extends to 2038 according to environmental assessment application materials.

2.1.2.3 *Administrative boundaries*

The administrative boundary of the Project is the permitted Project Development Area, within the Qikiqtaaluk Region of North Baffin.

Figure 5 Project Overview Map (including current dust fall monitoring locations)



3 Project Charter

A Project Charter was developed by the members of the Dust Audit Committee to outline the goals and objectives of the Dust Audit Committee, roles and responsibilities of committee members, the approach to the use of IQ, major milestones, and timelines as per the commitment. This was completed prior to the second site visit and has been reviewed and endorsed by the Dust Audit Committee. Inuktitut translations were provided to the Dust Audit Committee via their respective hamlets and Hunters and Trappers Associations.

4 Data Collection

Data used to inform the Recommendations Report came from Dust Audit Committee members over the course of 14 months (beginning September 2021), including two site visits, committee interviews and workshops, and regular bi-weekly ZOOM meetings. Nunami Stantec and CWA conducted technical interviews with Baffinland staff and relayed this information to the Dust Audit Committee. A summary of these data collection methods is provided in the subsections below.

4.1 Information provided by Baffinland

Nunami Stantec and CWA technical engineering subject matter experts requested a number of documents and information from Baffinland in order to review and provide guidance and technical recommendations to the Dust Audit Committee. Baffinland provided the following information to support the work of the Dust Committee:

1. Current 5-year mine plan (slide deck with annual plans incl main haulage routes + production quantities – waste, fines, lump)
2. Current 10-year mine plan (slide deck with annual plans incl main haulage routes + production quantities – waste, fines, lump)
3. Current blast pattern design details including explosives type
4. Are blast holes lined or pumped free of water prior to loading? If so, % of holes typically
5. Dyno Nobel blasting report, or any blasting simulations done in the past
6. Fragmentation size – targeted vs. actual
7. Blasting statistics and/or KPI's (ideally for the last 2 year at least)
8. Current mining equipment fleet list and Ph2 equipment fleet list (Drills/loaders/haul trucks/dozers/graders/water trucks)
9. Current and Phase 2 ROM ore crushing schematic with details on sizes of crushers/conveyers/stockpiles
10. Mine site (incl offices + shops) water management plan – drawing that shows drainage/ditching to catchment ponds
11. Memorandum of Sources of Dustfall – Proportion (%) of Iron March 2, 2021)
12. Mary River Project Dust Mitigation Action Plan Rev. 1
13. Pilot Snow Melt Water Assessment – Preliminary Approach and Findings
14. Qikiqtani Inuit Association's Tusaqtavut Study Specific to Baffinland's Proposed Phase 2 of the Mary River Project for the Communities of Arctic Bay and Clyde River
15. Qikiqtani Inuit Association's Tusaqtavut Study Specific to the Baffinland Mary River Project Phase 2 for the Communities of Igloolik and Hall Beach

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16. Qikiqtani Inuit Association Tusaqtavut Study Specific to Baffinland Mary River Project Phase 2 for the Community of Pond Inlet
17. Tusaqtavut for Phase 2 Application of the Mary River Project
18. Inuit Qaujimanituqangit Management Framework Phase 2 Proposal – Mary River Project
19. Baffinland Technical Supporting Document Phase 2 Workshop Report
20. Baffinland Inuit Qaujimajatuqangit (IQ) of the Mary River Project Phase 2 Proposal
21. Baffinland Mary River Phase 2 Proposal Community Risk Assessment Workshops: Final Report
22. Baffinland Response to NIRM February 2020 Site Visit – 2020 Dustfall Summer Update letter
23. Baffinland Response to MHTO Comments on the 2019 NIRB Annual Report Mary River Project, Project Certificate No. 005Baffinland Freshwater Monitoring Program Summary
24. Predicted Maximum 30-day Dustfall Milne Port Maps
25. Baffinland Phase 2 Community Roundtable presentation
26. Baffinland Human Health and Exposure Potential Assessment presentation
27. Baffinland Atmospheric Environment Phase 2 Proposal presentation
28. MHTO Intervention: Public Hearing for Mary River Phase 2 Proposal
29. Phase 2 Passive Dustfall Monitoring Memorandum 2019
30. Human Health Based Dustfall Thresholds for Mine and Port Site V.3 2019
31. Response to Information Request ECCC-12 – Predictive Metal Loading in Phillips Creek from Dust Deposition at Milne Port Memorandum 2018
32. Extracted Ferric Iron Dustfall Extend from Red/Green Band Ration, 2014-2020 with Baseline and Active Dustfall Collection Sites at Milne Inlet Camp and Port maps
33. Baffinland Dustfall Imagery Analysis, Preliminary Results May 25, 2020
34. Dust Summary Report, Mary River Project

4.2 Site Visits

4.2.1 2021 Field Trip

The first field trip with the Dust Audit Committee took place from September 30th to October 5th, 2021, with members of the five North Baffin communities participating in the Dust Audit including: Arctic Bay, Clyde River, Sanirajak, Igloolik, and Pond Inlet, QIA, members of Nunami Stantec and CWA Engineers Inc.

Engineering investigations included interviews with operational staff regarding dust generation at the mine operations before iron ore is transported to the ship terminal as well as observations of mine-based excavation and material handling. Site work included observing dust generation, crushing, conveying, surge stockpiling and loading into transport trucks as well as transport along the ore haul road to the port. For the investigation at the port, the team focused on dust generation from terminal operations where iron ore is offloaded from the transport trucks, stockpiled, reclaimed, and loaded onto ships.

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The 2021 field trip itinerary is included as Appendix C.

4.2.2 2022 Field Trip

The timing of the second field trip was based on recommendations and requests from the Dust Audit Committee in order to observe snow melt and drier conditions as compared to the snowy October 2021 field trip. The 2022 field trip took place from June 8 to 14th. This site visit included members of the five North Baffin communities participating in the Dust Audit including Arctic Bay, Clyde River, Sanirajak, Igloodik, Pond Inlet, QIA, and members of Nunami Stantec and CWA Engineers Inc.

Continued engineering investigations while at the Mary River Mine included follow-up technical interviews, observation of B-train trucks transporting ore along the Tote Road, blasting, crushing, stockpiling, and traffic along the mine haul roads. In addition to these areas, the Dust Audit Committee had the opportunity to see some of the current water catchments and sedimentation ponds, which were implemented by Baffinland to reduce mine-affected water runoff and keep water clean. The Dust Audit Committee participated in a helicopter tour to observe portions of Milne Inlet and the area around the Tote Road from the port to the Mine site.

The 2022 Field Trip itinerary is included as Appendix D.

4.3 Technical Interviews

Interviews were conducted by technical members of the Dust Audit Committee (Nunami Stantec and CWA) with Baffinland staff to gain an understanding of the various operational areas of the project.

Technical interviews were held with several Baffinland staff working in the following areas:

- A. Mine Operations
- B. Tote Road Maintenance
- C. Run of Mine (ROM) Crushing and Ore Haul Loading
- D. Ship Loading
- E. Port Stockpile Handling
- F. Environment
- G. Ore Haul Truck Maintenance
- H. Proposed Phase 2 Infrastructure

Technical investigations were carried out prior to establishing recommendations. These investigations looked into best practices and reasonable mitigation measures that could be implemented to reduce or minimize dust emissions. Technical investigations were done at a high level and did not include detailed analysis, calculations, or design work as this is outside of the scope of the Dust Audit Committee.

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4.4 Committee Interviews and Workshops

Information from the technical interviews held by the engineers during the field visit was shared with the Dust Audit Committee through virtual and in-person meetings to allow for detailed understandings of current practices, and responses regarding future operations. Workshops with the Dust Audit Committee were held in person and virtually to facilitate discussions and record feedback, concerns, and comments regarding dust, dust sources, and pathways.

5 Dust Mitigations Observed by Dust Audit Committee

During both the 2021 and 2022 field trips, the Dust Audit Committee was able to observe some of the existing mitigations used by Baffinland to reduce dust and dust dispersion. The Dust Audit Committee was able to discuss the effectiveness and success Baffinland has had with these dust mitigations to date.

The current dust mitigation measures observed include:

- Spraying of ore stockpiles at Milne Port (Figure 6)
- Applying dust suppression on the Tote Road from the mine site to Milne Port
- Applying water on all of the mine haul roads
- Use of dust collector systems on drills
- Coverings on the conveyors and chutes at the port used for shiploading
- Use of luffing stackers to limit material drop height when building stockpiles at the port (Figure 7)
- Use of a telescopic spout on the shiploader.

Concerns raised by the Dust Audit Committee include the introduction of dust into water sources at the mine site, along the haul roads and at Milne port and to more distant water sources through aeolian dispersion. The Tote Road extends through three watersheds, the Phillips Creek Watershed (from Milne Inlet to just south of Katiktok Lake), the Raven River Watershed (south of the boundary of Phillips Creek Watershed and continuing south towards Steensby Inlet), and the Mary River Watershed (east of the Raven River Watershed boundary in the north, and south just beyond Mary Lake) (Baffinland 2020).

Comments from the community members of the Dust Audit Committee during the site visit include:

- Inquiring if there had “been any mitigations to reduce all of the dust in the surrounding areas of the mine site that could be immediately seen...and if there are any plans to remediate [the Project] area.”
 - Baffinland provided an overview of mitigations in place at the Mary River Mine site, such as the water treatment pond (Figure 8)
- Noted that the dust collector observed during the site visit is a bit high, and perhaps if it was a bit lower along the road it would collect more.
- Commented that when they first started coming to this area, they built the hunters cabin, at which time they were able to do some tours of the Project footprint. The member was pleased to see the capture/sediment pond. This will be a good news story, as they noted that they and members of the communities were unaware of this process. They wanted to confirm that Baffinland will communicate to the communities about this, and what they saw.
- Noted that they were pleased to see the process for water management, they were grateful that this exists as that reduces the dust and negative environmental impacts. This is something similar to what another member has mentioned related to the crusher/ contact water pond which they originally thought all of the dust would be accumulating on the ground, and were unaware they were being listened to and that this was happening on site.

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Dust Mitigations Observed by Dust Audit Committee
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Figure 6 **View of lump iron ore stockpile (dust suppressant had been applied) (June 2022)**



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Dust Mitigations Observed by Dust Audit Committee
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Figure 7 Ore being deposited at stockpiles with luffing stacker (June 2022)



Figure 8 Water treatment pond (June 2022)



Inuit Qaujimajatuqangit / ᐃᓄᐃᑦ ᖃᐅᐱᐱᐅᐅᖃᖅᐱᑦ (IQ), which translates to “that which Inuit have always known to be true” is recognized as a unified system of beliefs and knowledge characteristic of the Inuit culture (National Collaborating Centre for Aboriginal Health, n.d.).

The principles and Inuit societal values that guide the IQ for the Dust Audit Committee include (Government of Nunavut, n.d.):

(Respecting others, relationships and caring for people / འཇིགས་པ་དང་། རྒྱུན་རྒྱུ་བྲལ་བ་དང་། མི་ལ་སྐྱོལ་བ་)

(Serving and providing for family and/or community / ለረብራቢ፣ ለጋራና ለድርጅት አገልግሎት)

(Development of skills through observation, mentoring, practice, and effort / ᐱᕈᓃᔭᑦᑐᒃᑲ
ᓇᕙᕆᕐᑐᓂ ᕖᓄᓇᓂᓅᑦ, ᑲᕋᕉᕎᑦᑲᕛᓂᓅᑦ, ᐱᕙᓇᓂᓅᑦ, ᓴᓵᓴᓂᓅᑦ)

(working together for a common cause / Δ_၁၂'ဃ်းဝဲၽၢ် ၵာလုလံးဝဲၽၢ် ၵာလုလံးဝဲၽၢ်)

(Fostering good spirits by being open, welcoming and inclusive / $\text{L}\Delta^{\text{a}}\text{L}\sigma^{\text{b}}$, $\Delta\text{c}\triangleright\text{N}\text{c}\text{r}\sigma^{\text{b}}$, $\Delta\text{c}\text{L}\text{a}^{\text{a}}\text{r}^{\text{a}}\sigma^{\text{b}}$.)

(Decision making through discussion and consensus / ΔΓΛΔΨβΓΓΨσ, ΨββΓΓΨσδΨ ΔΨΛΔ
ΔΨΓβΓΓΨσδΨ)

(Being innovative and resourceful / ለጥናታዊና ለሥራ ለመፍፀም ለሥራ ለመፍፀም)

[illegible]

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Inuit Qaujimajatuqangit Integration
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The Project Inuit Impact and Benefit Agreement (IIBA) has a definition of IQ relevant to this discussion. Use of the Inuktitut term “Inuit Qaujimajatuqangit” or the acronym “IQ” is broadly intended to mean Inuit Societal Values (ISV) that include traditional, current and evolving bodies of Inuit values, beliefs, experience, perceptions and knowledge regarding the environment, including, land, water, wildlife and people, to the extent that people are part of the environment.

The points below outline how the Dust Audit Committee has incorporated IQ values during all stages of committee work and reporting:

- Inuuqatigiitsiarniq-- the Dust Audit Committee strives for consensus in our meetings, and we take the time to listen to the opinions and feedback from each member of the group
- Pijitsirniq – the Dust Audit Committee is comprised of community representatives serving their community
- Pilimmaksarniq/Pijariuqsarniq – through collaborative discussions, members of the Dust Audit Committee share observations and knowledge which helps develop skills and understanding for all
- Piliriqatigiinni/ikajuqtigiinni – All member of the Dust Audit Committee are working together for the common cause, to identify and provide recommendations to improve dust generation and management
- Tunnganarniq – All five (5) North Baffin communities working together as part of the Dust Audit Committee, with open discussions and are inclusive of the Hunters and Trappers associations (HTAs) and hamlets
- Aajiiqatigiinni – this drives the Dust Audit Committee in how decisions are made, for example a consensus is reached prior to putting recommendations forward
- Qanuqtuurniq - the Dust Audit Committee looks for ways to mitigate dust while being innovative and resourceful
- Avatittinnik Kamatsiarniq – a driving force of the Dust Audit Committee is to find ways to reduce dust to respect and care for the land, animals, and environment.

Consideration of the IQ values identified above were integrated into the below assessment and are reflected in the information provided by Dust Audit Committee.

7 Recommendations

The Dust Audit Committee has expressed their gratitude for the formation of the committee, as for many community members, when they see dust, it is “very upsetting.”

“When the Europeans first started coming over to our land, that’s when we started losing our rights, and it started back then that other people have control over our animals and not us, and the federal government and green peace have controlled us a lot. Ever since then, we haven’t been able to properly hunt our animals for food. That is why it is so upsetting for us for all of the red dust to be around our animals, animals were always our food and even today we eat a lot of the local animals up here, so it is upsetting to see all of the dust around our animals -- from an Inuk point of view. That is why I am so grateful for being here and I hope our voices are being heard.” (Participant 1; October 4th, 2021).

Throughout the meetings, the Dust Audit Committee has reiterated the importance of collaborative and ongoing discussions with Baffinland to have the Inuit voices and the concerns heard. The Dust Audit Committee, since the formation of the committee in September 2022, have come together to identify dust and dust sources and put forward recommendations for implementation by Baffinland. With the ongoing commitment by Baffinland to continue the Dust Audit Committee, this allows for ongoing conversations regarding mitigations, their implementation and effectiveness.

The Dust Audit Committee have expressed their concerns for dust impacts to water and water sources (specifically, water transporting dust, and snow and ice they have observed melting faster due to dust, and lack of clean water), wildlife and wildlife habitat (including wildlife health), human health, the cumulative effects of mining and dust, and stressed the impact that all industrial activity has on the environment and subsequently on communities on Baffin Island.

“The terrestrial environment has different colours, like silver that comes from glaciers. In these areas where the water is coming from the glaciers, the water is muddy. Some dust that is red in colour is very unpleasant to see. Dust should be silver, not red from iron ore. Carvers experience similar dust coming out of the stone. A lot of this has impacts of wildlife and humans, and all of the balances that come with this”

The following recommendations and proposed mitigations have been endorsed by the Dust Audit Committee for implementation by Baffinland during present or future phases, including Steensby. These recommendations are meant to improve protocols and procedures to avoid and/or mitigate dust generation and dispersion.

In addition to the recommendations identified below, a number were presented by the Dust Audit Committee that fall outside of the current scope of work but are important to communicate to Baffinland. The recommendations have been provided to Baffinland for consideration and follow-up.

7.1 Blasting

Current operations of the Mary River Mine are focused on Deposit No. 1². Blasts, on average, occur one to two times a week in order to loosen the ore to be extracted, loaded and shipped. Baffinland uses standard large surface mining industry practices and equipment for their blasting activities. Currently there are no weather thresholds (i.e., wind) that limit or prohibit blasting activities.

Blasting is a dust source of concern for the five North Baffin Island communities. Community members on the Dust Audit Committee note concern regarding “tall blasts and the blast going all over the place,” “yellow dust coming from the blast,” and “the blast cloud appearing red.” The Dust Audit Committee was able to observe a blast on June 12, 2022 (Figure 9). This blast was 150,000 tonnes at 172 holes. The blast was viewed by the Dust Committee from a distance of approximately 1 km and at an elevation approximately 300 m lower than the blast elevation. Visibility was good with a sunny day however the Committee’s view of the blast was partially obstructed by the topography. Minimal red dust was observed, and no yellow dust was seen post blast. Due to the vantage point and prevailing winds being from the SE to NW, the Dust Audit Committee could not fully observe the dispersion area of the blast.

During the October 2021 visit and in meetings, community members on the Dust Audit Committee noted that the first few days (anywhere from 3-4 days) following a new moon, atmospheric pressure and winds are the strongest and that blasting should be avoided during this time. The Dust Audit Committee technical members reviewed the new moon schedule in 2021 and compared daily average wind speed (meters/second) to the monthly average wind speed (meters/second). Through this review, the data concluded there are 7 months with at least one (1) day of four (4) days following a new moon with the daily average wind speed (m/s) greater than the monthly average wind speed (m/s) (Table 2). There were 14 new moon days during 2021 where the average wind speed was higher than the monthly average wind speed, which represent 29% of the new moon days in 2021 that have higher than monthly average wind speed. The data demonstrated, for 2021, that the months of July, August and October had three new moon days with higher daily wind speeds greater than the monthly average wind speed.

² There are “nine-plus high-grade iron ore deposits that can be mined, crushed, and screened into marketable products” (Baffinland 2022b)

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Table 2 New Moon Cycle correlation to wind speeds

Month	New Moon schedule	Dates of the 4 days following the new moon and daily wind speed (m/s)				Monthly average wind speed (m/s)	Days with daily average > monthly average
January	January 12	13	14	15	16	3.6	1
		0.2	1.0	1.1	7.9		
February	February 11	12	13	14	15	4.0	1
		6.1	3.0	0.9	3.0		
March	March 13	14	15	16	17	3.3	0
		2.1	1.0	3.0	1.7		
April	April 11	12	13	14	15	5.6	0
		2.8	5.2	2.0	0.6		
May.	May 11,	12	13	14	15	3.9	2
		3.8	3.2	5.3	7.6		
June	June 10	11	12	13	14	4.5	0
		3.6	3.0	2.3	2.2		
July	July 9	10	11	12	13	4.5	3
		4.0	7.3	4.7	4.6		
August	August 8	9	10	11	12	5.3	3
		10.1	3.3	5.8	9.9		
September	September 6	7	8	9	10	3.8	0
		3.5	2.1	2.4	3.3		
October	October 6	7	8	9	10	5.9	3
		3.8	8.6	6.4	8.1		
November	November 4	5	6	7	8	2.3	0
		0.3	0.2	0.2	0.0		
December	December 4	5	6	7	8	3.4	1
		6.6	1.2	2.6	0.6		

Additional observations and comments from community members of the Dust Audit Committee include:

- During blasting, the effects seem to be similar in all areas such as the dust going upwards during the blasting. In terms of the dust that comes from the blasting, they said we [all] should be mindful of the different colours that come out of it to see what type of dust it is and should be aware of different sources of dust in our communities, not just from mining and blasting. There are two different types of dust (one is yellow, and one is red), and they would like to know what type of impacts both of these dusts have on the environment. This red dust reaches their community, and goes as far as Igloolik point, and has gone to the Sanirajak area and has been observed to date.
- They noted you can see images of past blasts and that the red powder that travels quite far in the air on the internet.

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Figure 9 **Blast on June 12, 2022, observed by the Dust Audit Committee**



7.1.1 Blasting Recommendation

The Dust Audit Committee understands Baffinland is developing a program to identify conditions for high risks of dust as part of an ongoing evaluation of blasting optimization. The Dust Audit Committee requests the opportunity to review and provide input to Baffinland in relation to defining the conditions that present a high risk of generation of fugitive dust and the criteria/triggers for implementation of mitigations and management measures, and Baffinland include consideration of IQ.

The Dust Audit Committee has identified blasting as an activity that creates substantial dust. Table 3 below outlines recommendations for consideration.

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Table 3 Blasting Recommendations

#	Recommendation
1	Work with explosives supplier and subject matter experts (SME) to identify dust control measures during the blasting process and to refine blasting protocols to reduce dust and nitrogen oxide (NOx) fumes (seen as yellow dust during the blast) for implementation. This includes studying the viability of using dust suppression cannons or fog prior to and during blasting, including looking at truck mounted as well as pit edge mounted machines.
2	Continue conversations with the Dust Audit Committee regarding atmospheric winds during the new moon to integrate IQ into the program under development regarding conditions of high-risk dust dispersion and to determine conditions where additional mitigations to reduce dust can be implemented or, where outlined by the wind thresholds report, blasting may be paused until wind speeds are within identified thresholds.
3	Practice heightened monitoring and vigilance for the 4 days following a new moon and be prepared to delay or re-schedule blasting activities based on forecast or observed pressure/wind relative to established thresholds.
4	Conduct a blast fragmentation size study with explosive supplier and blasting specialists that can be incorporated into the program under develop regarding conditions of high-risk dust dispersion.
5	Update draft explosives management plan ³ once the explosive suppliers and SME's have determined the blasting protocols to develop a Standard Operating Procedure (SOP) for blasting, including thresholds for conditions when/where blasting can occur, blast pattern designs parameters to help reduce dust, explosive type and usage to help reduce dust, stemming material specifications to help reduce dust, and any other blasting related recommendations that the SME determines would help reduce dust generation.

7.2 Materials Handling

7.2.1 Mine Operations

The materials handling process begins once the ore is fragmented during the blasting process. The ore is then loaded onto haul trucks using shovels and front-end loaders. Haul trucks bring ore material to the crushing facility (Ore Pad), and discard waste rock material at the waste rock storage facility site.

Haul trucks, mobile equipment, and pick-up trucks travel along the mine haul road (generally described as the area between Deposit No. 1 and the crushing facilities). Dust is produced when material is loaded onto the haul trucks as well as when the haul trucks, other equipment, and vehicles travel along mine haul roads.

The Dust Audit Committee was able to observe the material handling of the ore during both site visits in October 2021 and June 2022. Poor visibility during October 2021 limited what the Dust Audit Committee was able to observe, and in addition, mine operations other than drilling were suspended at this time (Figure 10). During the June 2022 visit, haul trucks and equipment were observed the mine haul road (Figure 11). At times, the dust created conditions where visibility was limited and the bus the Dust Audit

³ The draft explosives management plan (Baffinland 2019) provides limited detail, which the Dust Audit Committee understands was a draft created for review purposes only in May 2019, and the results from the above studies can be integrated to further refine the explosives management plan.

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Committee was traveling in had to slow down or stop to allow enough time for the dust to disperse. This was observed both on the main haul road up to the pit and within the active pit area.

Some observations recorded by community members of the Dust Audit Committee include:

- Two sources of dust were seen, the first with the materials handling of the iron ore, and dust from haul road as equipment was travelling. Both forms of dust were identified as a concern, and the Dust Audit Committee noted that the dust from gravel was lighter than iron ore dust and could travel easier with high winds (June 2022).

Figure 10 Haul trucks stored during first mine visit due to weather conditions (October 2021)



Figure 11 **Materials handling by haul truck and FEL (June 2022)**



7.2.2 Crushing

Ore hauled from the pit gets dumped onto the Ore Pad and creates a Run of Mine (ROM) stockpile. This material then gets loaded into the crushers using front-end loaders. Material is crushed to reduce the maximum particle size and to reduce ore into the appropriate fraction size (lumps and fines). Crushed and screened ore exiting each crushing stage is re-handled by loaders in order to reach each subsequent stage. Finished ore products are accumulated in separate stockpiles for lumps and fines. The material from the stockpiles gets rehandled again using front-end loaders when it is loaded into the ore haul transport trucks for transportation to the port. The Dust Audit Committee was able to observe the crushing area (Figure 12) and activities (Figure 13) during both site visits. There was some dust observed when material was loaded into the crushers by front-end loaders (Figure 14). There was minimal dust observed through the crushing process but there was some dust observed during the stockpiling and B-Train truck loading processes.

Some observations from the community members of the Dust Audit Committee include:

- A community member stated that the dust comes from the fine ore during crushing, if Baffinland gets rid of the fine ore, the dust would be eliminated.
- Iron ore is not stored in an enclosure [during the ROM loadout], this should be inside of a building rather than uncovered. It is disturbing to see what is proposed because all the dust will be blown and causes snow to melt more. Trucks can get into buildings so it would be better to have the iron ore enclosed

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Figure 12 **Crushing Facility at Mary River Mine Site (October 2021)**



Figure 13 **Crushing Facility at Mary River Mine Site (June 2022)**



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Figure 14 Loading of B-Trains by a FEL (June 2022)



7.2.3 Tote Road

The Tote Road extends approximately 100 km from the ROM stockpile area to Milne Inlet, where iron ore is stockpiled prior to being shipped. The Tote Road sees numerous B-Trains hauling to and from, completing on average 2.5 trips per truck per day. In 2021, Baffinland reported the average number of ore haul one-way transits per day was 255.8, and 28.6 non-haul vehicle transit per day (Baffinland 2022c). Figure 15 show the B-Train travelling on the Tote Road. It is the Dust Audit Committee's understanding that the primary dust suppression product used by Baffinland is water, and secondary chemical dust suppressants on mine haul roads and the airstrip.

Some observations from the Dust Audit Committee include:

- On the Tote Road, at the end of KM 83, there appeared to be less dust, which they were happy to see.
- They noted that the road needs to be regraded, and a lot of sediment is entering the waters

Figure 15 Tote Road - B-Train (June 2022)



7.2.4 Stockpiling

In June 2022, the Dust Audit Committee observed the process of stockpiling fines and were able to observe the spraying of the ore stockpiles (Figure 16). The Dust Audit Committee were able to touch the “crust” formed on the fines stockpiles and feel the effects of the spray.

The Dust Audit Committee have expressed concern for the volume of fines that is produced at the mine, and subsequently the risk of aeolian dispersion, the processes of erosion, transport, and deposition of sediments that are caused by wind at or near the surface of the earth, being introduced into water runoff.

Some observations from the Dust Audit Committee community members include:

- Pleased to see the stockpile and the treatment of the pile, and that the spray was being added to help reduce dust emissions
- Why the quantity of fines is much larger than lumps, as the stockpiles of fines would easily spread dust to the surrounding areas?
 - Baffinland replied to the Dust Audit Committee member during the site visit that the material mined recently produced more fines than lumps

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Figure 16 Stockpiles (lumps on the right, fines on the left) (June 2022)



7.2.5 Material Handling Recommendations

The Dust Audit Committee acknowledges that the current Project certificate may limit which of the following recommendations can be implemented following receipt of this report, and which would be considered through Project expansion. The recommendations for material handling are outlined in Table 4 below.

Table 4 Material Handling Recommendations

#	Recommendation
1	<p>Conduct a run-of-mine (ROM) optimization study to assess the viability of implementing the following processes to be considered for current and future expansion, including Steensby:</p> <ul style="list-style-type: none">• Using a ROM dump pocket• Minimizing the use of front-end loaders (FEL) at the ore pad and the port• Use of enclosures to collect and minimize dust.• Increasing the use of conveyors and transfer chutes• Using luffing stackers to reduce drop height when forming stockpiles• Cover hoppers when loading conveyors, crushers, or screens• Load or unload B-Trains within an enclosed area

7.3 Shiploading

Shipping season occurs from break up (usually mid to end July) until freeze up. In 2021, a total of 73 ships (for iron ore, refuel, and resources) travelled in and out of Milne Inlet. The Dust Audit Committee was able to observe ship loading in October 2021 (Figure 17, Figure 18, Figure 19) and noted that they were content to see that there was a cover on the conveyor, and that the loading of ships seems to produce limited dust.

Some observations from the Dust Audit Committee include:

- Portions of the conveyor were not covered and noted that there should be improvements along the conveyor to prevent dust, including the loading belt. (October 2021)
- While observing the ship loading, the Dust Audit Committee members did not see any dust but when it's warmer in the summer, there might be dust emitted from the ships or the loading of the ships. (October 2021)
- During loading, the ore itself is on the belt, and once it reached the top it goes through the chutes (all contained) so that when it lands on the next conveyor, there is minimal dust coming off that area, then everything is contained and goes through the telescopic chute into the ship. (October 2021)

At the time of writing, the Dust Audit Committee did not express any concerns for dust creation as a result of shiploading.

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Figure 17 **Milne Port Cargo Ship (October 2021)**



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Figure 18 **Second ship loader's second observation deck looking back to conveyor.**
(October 2021)



Figure 19 **Telescopic chute in cargo hold of ship (height of active loading) (October 2021)**



7.4 Dust Fall Monitoring and Suppression

The community members observed seasonal differences in dust generation and dispersion associated with each dust source during site visits. During the winter months, when snow is accumulating and precipitation is higher, there was less dust evident in the air at the Mary River Mine, along the Tote Road, and at the port. The Dust Audit Committee noted that this was likely due to the moisture content of the materials. In the fall months, however, high arctic winds can cause dust particulates to disperse over greater distances.

During the spring/summer site visit, the Dust Audit Committee identified a greater amount of dust along the tote and haul roads, and increased level of dust and particulates in the run-off. As has been previously noted, the Dust Audit Committee noted that the dust which settles on the snow and ice causes snow and ice melt to occur faster.

Some observations from the Dust Audit Committee include:

- Changes to the winds between seasons, winds coming from the south in the fall and the direction changes in the spring. The changing winds are bringing the dust to different areas during different times of the year
- There appears to be less dust at this time of the year, but they wanted to note that when the snow has melted, the dust has seeped down and it is hidden. It makes it look like there is improvement. They indicated that they know that there is more coloration around the cracks
- Observed there appeared to be less dust around this time of the year when snow has melted compared to winter when you see more of it. The Dust Audit Committee member reported that during the winter the dust is more noticeable. This time of the year [June], they have noticed some dust on the ice as it probably went to the bottom (has already sunk down)

The following sections outline the recommendations by the Dust Audit Committee for Dust Fall Monitoring and Suppression.

7.4.1 Dust Fall Monitoring Recommendations

Recent dust fall reports noted that during the months of April through September 2020, there was increased dust fall deposition which did not “respond consistently to the changing seasonal wind speed and rain precipitation conditions” (Nunami Stantec 2021: 3-2). “The elevated dust fall rates for the monitoring stations at the Mine Site and Tote Road North Crossing during September 2020 coincided with dry conditions, and a relatively low level of dust fall during June 2020 coincided with an appreciable amount of rain (46.8 mm [for the month of June] at the Mary River meteorological station). The elevated dust fall rates for the monitoring stations at the Milne Port and Tote Road South Crossing locations during September 2020 coincided with dry conditions, and a relatively low level of dust fall during June and July coincided with an appreciable amount of rain (31.0 mm and 20.9 mm, totals for each month respectively) recorded at the Milne Port meteorology station” (Nunami Stantec 2021: ii).

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As noted in Condition 21 of the Project Certificate No. 005 – Amend. No. 1 (Baffinland 2020): “the Proponent shall ensure that the scope of the Aquatic Effects Monitoring Plan (AEMP) includes, at a minimum...measures for dust fall monitoring designed ...to assess the seasonal deposition (rates, quantities) and chemical composition of dust entering aquatic systems along representative distance transects at right angles to the Tote Road and radiating outward from Milne Port and the Mine Site”.

In consideration of the above, and Baffinland’s existing commitment to increase the number of dust monitors, the following recommendations have been endorsed by the Dust Audit Committee (Table 5).

Table 5 Dust Fall Monitoring Recommendations

#	Recommendation
1	Explore options to implement a continuous sitewide dust monitoring system for Arctic conditions to track the effectiveness of implemented dust mitigations. This system should include active dust monitors in order to: <ul style="list-style-type: none">• measure changes to dust generation associated with changes to blast designs and execution.• determine if there are any exceedances of the ambient air quality standards (at the Project Disturbance Area Boundary) due to dust emissions from blasting and/or mining activities.• Understand the contribution of blasting activities to dust emissions.
2	Install additional passive monitors at a greater distance from the mine to capture the broader regional impacts of dust, including up and down wind of prevailing winds ⁴ .

The Dust Audit Committee understands that Baffinland is exploring the implementation of continuous monitoring for dust around the Project Area, including at Deposit No. 1. and looks forward to continuing discussion with Baffinland on the feasibility of continuous monitoring and results once available.

7.4.2 Dust Suppression Recommendations

Community members of the Dust Audit Committee have expressed their support and desire for Baffinland to use an effective dust suppression spray on the haul and Tote Roads, as they have noted the success of dust suppression products in their other communities (Figure 20, Figure 21). Other areas, such as within the active pit, dump area, and the runway, should also be sprayed with water and/or dust suppression sprays/products. They also noted that due to the rotation of shifts for workers, both iron ore dust and dust from the runway are dispersed often as a result of the planes landing and taking off.

The Dust Audit Committee sees watering roads or the application of dust suppressants (liquid or dry) as key to reducing dust along the haulage routes, in addition to the products being applied consistently and routinely.

⁴ This recommendation would be in addition to the Commitment ID 234 (Baffinland. 2022a), wherein Baffinland committed to developing and funding a “Community Based Monitoring (CBM) program out of Pond Inlet that is Inuit led to monitor the extent of visual dust in the Project Area as well as a snow sampling program”.

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The Dust Audit Committee understands that Baffinland has initiated a feasibility study related to the effectiveness and potential design of wind fencing as they have also seen the effectiveness in their communities (Figure 22). The Dust Audit Committee requests that Baffinland report back to the committee to understand the results of the feasibility study.

The recommendations for dust suppression are listed in Table 6.

Table 6 Dust Suppression Recommendations

#	Recommendation
1	Conduct a study to assess the amount of watering and road maintenance equipment required for present and future operations
2	Research the viability of applying sea water on the haul roads and Tote Road, due to the lower freezing point, if Baffinland considers applying water exclusively as dust suppression
3	Develop a SOP on dust suppression products that includes procedures on application and the ongoing maintenance for active mine haul roads
4	Conduct a study on dust suppressants for utilization on ore that is loaded onto the B-train trucks, instead of covers due to challenges of Arctic winter conditions. The study should also examine which is the most effective dust suppressant for the Arctic weather conditions (liquid or dry).
5	Analyze aircraft approved dust suppression products for use on the runway. Approved products for runway use should be incorporated into the SOP on dust suppression
6	Examine the use of wind fences around dust generating infrastructure and complete a feasibility study to determine how to use wind fencing most effectively at both the mine site and the port site taking into consideration of Arctic weather conditions. This study should include use of computer modelling to determine the optimal height and location of fencing both at the mine site and at the port site.
7	Examine areas where water treatment areas can be increased to reduce the amount of dust and particles that enters the drainage basin to reduce the potential effect of dust on the environment, and the reduction of dust that enters the drainage outside of the Project boundaries.

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Figure 20 Pond Inlet following dust suppression application (provided by Dust Audit Committee Member)



Figure 21 Pond Inlet following dust suppression application (provided by Dust Audit Committee Member)



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Figure 22 Wind fencing in Clyde River (provided by Dust Audit Committee Member)



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7.5 Dust Audit Committee

The Dust Audit Committee is pleased that this scope of work will continue and looks forward to future discussions with Baffinland. As part of continued discussions, and in consideration of the recommendations included in this report, the Dust Audit Committee would like Baffinland to report back to the Committee on implementation and results.

Baffinland met with the Dust Audit Committee in January 2023 and noted that they initiated an exploration of developing a virtual website that could include live video feeds. The Committee understands there are various technical, logistical and legal restrictions to have live feeds for public viewing. Baffinland proposed that their existing website could enhance communications with respect to environmental monitoring and mitigations on a more frequent basis than is currently available and other procedures of interest to the communities. The Dust Audit Committee requests additional discussions on what information can be included on the website.

Table 7 Commitments to the Dust Audit Committee

#	Recommendation
1	<p>Request:</p> <ul style="list-style-type: none">• Ongoing funding of the Dust Audit Committee.• Provision of documents in both English and Inuktitut through accessible means.• A transparent process of providing data obtained through ongoing studies conducted by Baffinland• Establish a virtual monitoring website that is accessible to the five Northern communities.

8 Next Steps

Baffinland has committed to continue funding for the Dust Audit Committee and some immediate next steps are recommended to continue the momentum achieved to date, including:

- Baffinland to provide a written response to all recommendations, timelines for implementation of the recommendations and appoint a Baffinland representative for each area of recommendations for communication purposes.
- Determine a Third Party that is acceptable to the Proponent and the Dust Audit Committee responsible for facilitating the Committee to evaluate the effectiveness of current measures, and if necessary, contain recommendations and options to reduce the spread of impacts of dust from project activities that will be reporting and shared with the NIRB each year no later than January 31st.
- Schedule ongoing regular two-hour virtual meetings with simultaneous translation, with the support of the Baffinland Community Liaison Officers (BCLOs).
- Develop a scope for the Dust Audit Committee to consistently assess and monitor impacts of dust from project activities for the purpose of assessing the efficacy of project mitigation measures and to examine alternative mitigation and management options.
- Establish timelines, deliverables, and site visits to view implemented mitigations for 2023.
- Recommended areas for discussion:
 - Baffinland present the draft program for high-risk dust dispersion and a plan for additional measures to be taken at the times the conditions are present, which may include the use of additional dust suppression and operation staged decreases in dust generating site activities, for the inclusion of the Dust Audit Committee advise and their IQ integration.
 - Baffinland to present draft proposal or current studies underway for dust suppression technologies for input by the Dust Audit Committee.
 - Baffinland to present details on watering and road maintenance equipment required for current and future operations.
 - Baffinland to discuss the virtual monitoring website for input by the Dust Audit Committee on areas such as accessibility and supports to access, documentation to be included, , Dust Audit Committee meeting recordings.

9 Conclusion

The Dust Audit Committee has researched, reviewed, and endorsed the recommendations outlined in this report for Baffinland's implementation. The observations and recommendations take into consideration based on the concerns and issues raised by the community members of the Dust Audit Committee and their communities. The Dust Audit Committee also understands this committee will continue to provide ongoing evaluations of the effectiveness of current dust mitigation measures as well as provide further options to reduce the spread and impacts of dust from project activities.

As indicated in the above report, through the Dust Audit Committee meetings, site visits, and discussions with Baffinland, the committee has reiterated the importance of Baffinland listening to Inuit voices and the concerns identified. Concerns recorded to date note that dust is a primary source of concern for the health of the environment, wildlife, marine life, and human health. Inuit Qaujimajatuqangit / ᐃᓄᐃᑦ ᖃᐅᐱᐭᐅᖃᓐᓴᓐ (IQ), is an important part of the principles that the Dust Audit Committee considers the societal values of Pilimmaksarniq/Pijariuqsarniq / ᐱᑦᐱᐭᐱᓐᓴᓐᓴᓐ / ᐱᓐᐱᐭᐱᓐᓴᓐᓴᓐ; Piliriqatigiinniq/Ikajuqtiigiinniq / ᐱᑦᐱᐭᐱᓐᓴᓐᓴᓐ / ᐃᑦᐱᐭᐱᓐᓴᓐᓴᓐ, Aajiiqatigiinniq / ᐱᑦᐱᐭᐱᓐᓴᓐᓴᓐ, Qanuqtuurniq / ᖃᓄᖃᓐᓴᓐᓴᓐ, and Avatittinnik Kamatsiarniq / ᐱᑦᐱᐭᐱᓐᓴᓐᓴᓐ ᑲᐱᑦᐱᐭᐱᓐᓴᓐᓴᓐ which inform and guide the mitigations identified above. The concerns associated with dust and impacts of dust have been noted throughout the mine's lifetime through various engagement activities, and the Dust Audit Committee has sought to present this information in this report and is eager to continue working with Baffinland.

The Dust Audit Committee requests that Baffinland provide a written response and timelines on the recommendations found in this report. Baffinland has committed to funding the Dust Audit Committee where ongoing discussions regarding these recommendations will continue.

9.1 Acknowledgements

The authors of this report would like to recognize and thank all members of the Dust Audit Committee and QIA for their contribution and knowledge which informed this report.

The Dust Audit Committee would like to thank Baffinland for their support of the committee, coordination and on-site meetings and tours, and receptiveness to answering questions both within and out of scope. The Dust Audit Committee would also like to thank subject matter experts who were consulted during the production of this report, including mining sector leads and air quality specialists at Nunami Stantec, CWA Engineering Inc. and dust suppression specialists.

10 References

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Appendix A Recommendations – Concordance

Baffinland Dust Audit

Appendix A Recommendations – Concordance
February 8, 2023

Table of Recommendations – Concordance

Note: all recommendations are supported by QIA's recommendation ID 22F

Recommendation to Baffinland		Location	Notes / Limitations	QIA IDs
BLASTING				
1	Work with explosives supplier and subject matter experts (SME) to identify dust control measures during the blasting process and to refine blasting protocols to reduce dust and nitrogen oxide (NOx) fumes (seen as yellow dust during the blast) for implementation. This includes studying the viability of using dust suppression cannons or fog prior to and during blasting, including looking at truck mounted as well as pit edge mounted machines.	Mine Site	This is also in consideration of the committee members concerns surrounding 'yellow dust' (NOx fumes). The Dust Audit Committee understands Baffinland is developing a program to identify conditions for high risks of dust as part of an ongoing evaluation of blasting optimization. The Dust Audit Committee requests the opportunity to review and provide input into the high risks of dust prior to finalization, including any consideration of IQ and the establishment of wind speed and/or direction controls to limit or prohibit when a blast can occur to reduce dust dispersion in the atmosphere/surrounding environment.	Blasting conditions overlaps with QIA ID 18A Similarly, QIA ID 21A and 21K relates to general conditions where activities should be paused.
2	Continue conversations with the Dust Audit Committee regarding atmospheric winds during the new moon to integrate IQ into the program under development regarding conditions of high-risk dust dispersion and to determine conditions where additional mitigations to reduce dust can be implemented or, where outlined by the wind thresholds report, blasting may be paused until wind speeds are within identified thresholds.	Mine Site	N/A	Blasting conditions overlaps with QIA ID 18A
3	Practice heightened monitoring and vigilance for the 4 days following a new moon and be prepared to delay or re-schedule blasting activities based on forecast or observed pressure/wind relative to established thresholds.	Mine Site	N/A	N/A

Baffinland Dust Audit

Appendix A Recommendations – Concordance
February 8, 2023

Recommendation to Baffinland		Location	Notes / Limitations	QIA IDs
4	Conduct a blast fragmentation size study with explosive supplier and blasting specialists that can be incorporated into the program under develop regarding conditions of high-risk dust dispersion.	Mine Site	There are several explosives available to mining companies, so collaboration between Baffinland, a drill and blasting engineer, and the supplier to conduct a study that looks at the drill and blast operation from a dust reduction perspective.	Blasting conditions overlaps with QIA ID 18A
5	Update draft explosives management plan once the explosive suppliers and SME's have determined the blasting protocols to develop a Standard Operating Procedure (SOP) for blasting, including thresholds for conditions when/where blasting can occur, blast pattern designs parameters to help reduce dust, explosive type and usage to help reduce dust, stemming material specifications to help reduce dust, and any other blasting related recommendations that the SME determines would help reduce dust generation.	Mine Site	N/A	N/A
MATERIAL HANDLING				
1	<p>Conduct a run-of-mine (ROM) optimization study to assess the viability of implementing the following processes to be considered for current and future expansion, including Steensby:</p> <ul style="list-style-type: none"> • Using a ROM dump pocket • Minimizing the use of front-end loaders (FEL) at the ore pad and the port • Use of enclosures to collect and minimize dust. • Increasing the use of conveyors and transfer chutes • Using luffing stackers to reduce drop height when forming stockpiles • Cover hoppers when loading conveyors, crushers, or screens • Load or unload B-Trains within an enclosed area 	Mine Site, ROM Crushing pad and Milne Port	Capital cost. May not be economically feasible for current operations.	<p>Overlaps with QIA 20A, 20B</p> <p>Aligns with QIA 22H</p>

Baffinland Dust Audit

Appendix A Recommendations – Concordance
February 8, 2023

Recommendation to Baffinland		Location	Notes / Limitations	QIA IDs
DUST FALL MONITORING				
1	<p>Explore options to implement a continuous sitewide dust monitoring system for Arctic conditions to track the effectiveness of implemented dust mitigations. This system should include active dust monitors in order to:</p> <ul style="list-style-type: none"> • measure changes to dust generation associated with changes to blast designs and execution. • determine if there are any exceedances of the ambient air quality standards (at the Project Disturbance Area Boundary) due to dust emissions from blasting and/or mining activities. <p>Understand the contribution of blasting activities to dust emissions.</p>	Active and Passive monitoring stations to be positioned along the Project Disturbance Area Boundary downwind (and upwind) from the major sources (Mine Site/Open Pit, Primary Crushing, Stockpiles, Tote Road, and Milne Port)	<p>Upwind active dust monitors would be included to determine the “baseline” measurement prior to the contributions from the major dust sources (as a control measure/station). The downwind monitors would measure the dust contribution from the major dust sources. Both upwind and downwind monitoring locations should be on or near the Project Disturbance Area Boundary.</p> <p>The active dust monitoring equipment positioned on or near the Project Disturbance Area Boundary (upwind and downwind) will have to operate from battery power because there are not continuous sources of power in those areas. The active dust monitoring equipment will only be able to operate during the summer months (May – October) when there is enough solar energy to re-charge the batteries via solar panels.</p>	Aligns with QIA 21D, 21E, 22C, and 22D
2	Install additional passive monitors at a greater distance from the mine to capture the broader regional impacts of dust, including up and down wind of prevailing winds ⁵ .	Along the Project Disturbance Area Boundary downwind (and upwind) from the major sources (Mine Site/Open Pit, Primary Crushing, Stockpiles, Tote Road, and Milne Port)	See above recommendation in Dust Fall Monitoring	Aligns with QIA 21D, 21E, 22C, and 22D

⁵ This recommendation would be in addition to the Commitment ID 234 (Baffinland. 2022a), wherein Baffinland committed to developing and funding a “Community Based Monitoring (CBM) program out of Pond Inlet that is Inuit led to monitor the extent of visual dust in the Project Area as well as a snow sampling program”.

Baffinland Dust Audit

Appendix A Recommendations – Concordance
February 8, 2023

Recommendation to Baffinland		Location	Notes / Limitations	QIA IDs
DUST SUPPRESSION TECHNOLOGY				
1	Conduct a study to assess the amount of watering and road maintenance equipment required for present and future operations	Mine Site and Tote Road	N/A	Aligns with QIA 19A, 19C
2	Research the viability of applying sea water on the haul roads and Tote Road, due to the lower freezing point, if Baffinland considers applying water exclusively as dust suppression	Mine Site Haul Roads	The Committee acknowledges that there are weather conditions that will impact how application will vary throughout the year.	N/A
3	Develop a SOP on dust suppression products that includes procedures on application and the ongoing maintenance for active mine haul roads	Mine Site Haul Roads	The Committee acknowledges that there are weather conditions that will impact how application will vary throughout the year.	N/A
4	Conduct a study on dust suppressants for utilization on ore that is loaded onto the B-train trucks, instead of covers due to challenges of Arctic winter conditions. The study should also examine which is the most effective dust suppressant for the Arctic weather conditions (liquid or dry).	Crushing pad, Milne Port	Capital cost. Increased operational cost.	N/A
5	Analyze aircraft approved dust suppression products for use on the runway. Approved products for runway use should be incorporated into the SOP on dust suppression	Airstrip	The committee knows that Baffinland has been considering various dust suppression products and are currently utilizing water along the airstrip. Increased operational cost.	N/A
6	Examine the use of wind fences around dust generating infrastructure and complete a feasibility study to determine how to use wind fencing most effectively at both the mine site and the port site taking into consideration of Arctic weather conditions. This study should include use of computer modelling to determine the optimal height and location of fencing both at the mine site and at the port site.	Crushing Pad, Milne Port	Capital cost. May not be practical due to retention of blowing snow in Arctic conditions.	Aligns with QIA ID 20C and 20D
7	Examine areas where water treatment areas can be increased to reduce the amount of dust and particles that enters the drainage basin to reduce the potential effect of dust on the environment, and the reduction of dust that enters the drainage outside of the Project boundaries.	N/A	N/A	N/A

Baffinland Dust Audit

Appendix A Recommendations – Concordance
February 8, 2023

Recommendation to Baffinland		Location	Notes / Limitations	QIA IDs
DUST AUDIT COMMITTEE				
1	<p>Request:</p> <ul style="list-style-type: none">• Ongoing funding of the Dust Audit Committee.• Provision of documents in both English and Inuktitut through accessible means.• A transparent process of providing data obtained through ongoing studies conducted by Baffinland, the Terrestrial Environment Working Group and the Marine Environment Working Group.• Establish a virtual monitoring website that is accessible to the five Northern communities.	N/A	N/A	Potential for overlap with QIA 22E

Appendix B Consent Forms

Baffinland Dust Audit

Appendix B Consent Forms
February 8, 2023

Dust Audit Committee Interview/Fieldwork Consent Form

Baffinland Iron Mine Corporation Mine Mary River Project

Interviewee: _____

Interviewer: _____

Date: _____

Nunami Stantec Limited has been contracted by Baffinland Iron Mine Corporation (Baffinland) to participate in an audit of present and potential future dust sources at the Mine Site, Milne Inlet Tote Road Corridor, and Milne Port to identify sources of dust and recommend actions and mitigation that can be used to reduce dust production and dispersion.

Your name has been put forward by your community or Hunter Trapper Organization to participate in this work.

You will be asked questions about community concerns with fugitive dust emissions, sources of dust emissions, and mitigation options to reduce dust emissions.

Information compiled in the final report, and figures created for the report, will be submitted to the Dust Audit Committee for verification and approval prior to release. The intent is that information you share, and the maps created will be shared with Baffinland.

Your participation in this study is voluntary and your identity will not be disclosed in the final report. Nunami Stantec recognizes that the information you share belongs to you and is provided only for the purposes set out above. You have the right to withdraw from the committee at any time before the report is submitted to Baffinland, without penalty and have all your information deleted.

Informed Consent signatures:

I agree to be interviewed by a representative of Nunami Stantec Limited so that information about present and potential future dust sources and recommendations for mitigation at the Mine Site, Milne Inlet, Tote Corridor and Milne Port can be recorded.

I understand that the interview will be recorded by audio recorder or video camera, and that photos may be taken.

Signature of Interviewee _____

Date _____

Signature of Interviewer _____

Date _____

Appendix B Consent Forms
February 8, 2023[illegible]

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Appendix C 2021 Itinerary

Baffinland Dust Audit

Appendix C 2021 Itinerary
February 8, 2023

Summary of activities and sites visited

Conducted on: September 30th, 2021 – October 5th, 2021 (including travel)

Day 1 Summary: October 2nd, 2021

- Safety Meeting and Kick-Off
- Tour of Deposit 1 and Haul Road (Images in Appendix B)
- Workshops and Interviews reviewing blasting practices, Baffinland showing videos of blasting and hauling on road

Day 2 Summary: October 3rd, 2021

- Tour of Tote Road, Ore Stockpile, Ship loading, and Port Site (Images in Appendix B)

Day 3 Summary: October 4th, 2021

- Workshop discussing site visits
- Tour of Crushing Facility and Shops (Images in Appendix B)
- Workshops and Interviews
 - Simon Fleury, Baffinland Mine Manager
 - Sangjin Yun, Baffinland Ore Handling and Ship loading Manager

Day 4 Summary: October 5th, 2021

- Workshop to review areas visited in previous days
- Visit to Mine (second attempt) (Images in Appendix B)
- Post-Tour Technical Interviews
 - Dave Besler and Sat Pandher with Baffinland:
 - o Phase 2 Interview – Patrick Boucher
 - o Road Maintenance Interview – Remi Pelletier
 - o Crusher Interview – Matt Mayo
 - o Reliability and Operations Ex. Interview – Paula Kratz
 - o Mine Operations Interview - Simon Fleury
 - o Stockpiling and Ship loading – Sangjin Yun

Baffinland Dust Audit

Appendix D 2022 Itinerary
February 8, 2023

Appendix D 2022 Itinerary

Baffinland Dust Audit

Appendix D 2022 Itinerary
February 8, 2023

Summary of activities and sites visited

Conducted on: Wednesday, June 8 – Tuesday June 14, 2022 (including Travel).

Day 1 Summary: June 9, 2022

- Safety Meeting and Kick-Off
- Review of Previous site visit and paperwork
- Group discussions with Baffinland and with Committee

Day 2 Summary: June 10, 2022

- Tour of Haul Road, Crushing Facility, Shops, and Mine Operations
- Group discussions with Baffinland and with Committee

Day 3 Summary: June 11, 2022

- Tour of Tote Road, Ore Stockpile, and Port Site
- Observed B-Trains hauling along the Tote Road, saw one of the dust monitor locations, and observed active stockpiling of fines
- Community Committee members had the opportunity to return from port to Saalivik camp via helicopter and observed ice within Milne Sound.

Day 4 Summary: June 12, 2022

- Visit Mine
- Observing Blasting in the morning, observing loading and hauling from pit in the afternoon
- Visit to the new water catchment near the mine.
- Post-Tour Technical Interviews
- Review of Recommendations

Day 5 Summary: June 13, 2022

- Morning: review of recommendations
- Early Departure for all community committee members except Arctic Bay

Day 6 Summary: June 14, 2022

- Arctic Bay Departure - AM
- Stantec and CWA Departure - PM