

APPENDIX E

Concordance to NIRB Recommendations

No	Topic	NIRB Comment	NIRB Recommendation	Baffinland Response	Concordance to 2020 Annual Report
1	Dust	<p>Dust production at the both the mine site, Tote Road, and Milne Port have historically received recommendations from the Board over several years. As a result of these recommendations, Baffinland has actively explored and implemented mitigation measures to reduce dust emissions on site. At the crusher facility, Baffinland has been progressively installing hoods, shrouds, and bellows along the conveyor system. Along the Tote Road, Baffinland has been testing and applying a new dust suppression product DustStop and through trials in 2019, Baffinland has found this product to be effective at reducing dust along the road resulting in the product use being expanded to the entire road in 2020. At Milne Port, Baffinland has attempted to reduce dust produced at the stockpile but is still exploring options including the stockpiling techniques and installation of equipment along the conveyors.</p> <p>Although there have been noted improvements, included in NIRB site visits and parties and community feedback, dust produced at the Mine Site and Milne Port stockpile remains an ongoing concern. During the February 2020 winter site visit, the Monitoring Officers observed that several dust control systems including shrouds and hoods were removed from the crusher plant causing large dust plumes to be observed during crushing operations and during the commenting period for the 2019 Annual Report, Crown-Indigenous Relations and Northern Affairs Canada staff noted that during their May 22-23, 2019 site visit, these equipment had been removed from the crusher facility resulting in large dust plumes being produced. Baffinland stated that the shrouds and hoods were removed due to maintenance activities, the Monitoring Officers have noted that removal of this dust control systems has become a consistent observation during site visits and is causing excessive of fugitive dust to be released at the crusher facility to the surrounding environment. Monitoring Officers discussed this with the Baffinland team on site who indicated that this mitigation equipment was removed for maintenance activities and would be immediately re-installed.</p>	<p>The Board requires that within 60 days Baffinland provide information about preventative and control measures in place or under development to minimize the likelihood of high fugitive dust emission from the crusher plant.</p> <p>Details of the preventative and control measures shall include:</p> <p>a) Description of the dust control equipment installed at the crusher plant including details of the frequency of maintenance and length of time dust control systems are removed for maintenance.</p> <p>b) Description of inspection, maintenance procedures, and monitoring initiatives in place at the crusher plant to ensure effective implementation of the preventative and control measures for dust.</p> <p>c) Possible effects of these maintenance activities on overall dust deposition throughout the year.</p> <p>Further, the Board expects any updates to mitigation measures to be reflected in the Air Quality and Noise Abatement Management Plan for the 2020 Annual Report.</p>	<p>In accordance with Section 3.3.1.2 of the Air Quality and Noise Abatement Plan, Baffinland has implemented mitigation measures identified to minimize dust generation at the Crusher Facility, including reducing drop distances to stockpiles, and the use of hoods, shrouds and rubber bellows on Crusher Facility equipment to reduce dust generation and dispersion. The installation of hoods and shrouds on Crusher Facility equipment (stackers and conveyors) is an ongoing initiative shown to minimize dust generation. The dust abatement equipment is removed periodically for maintenance and/or replaced as necessary. The rubber bellows installed on Crusher Facility equipment in 2019 control the fall of the ore and reduce the distance the ore freefalls to the pad, essentially reducing the drop distance, as well as the dispersion of dust at the end of the conveyor system as ore is being discharged to the pad.</p> <p>Inspection, maintenance and monitoring of dust mitigation equipment at the Crusher Facility is integrated into the equipment inspection and maintenance planning process, which is managed through a Computerized Maintenance Management System (CMMS) with support from operating and maintenance staff. Inspections are completed daily when spread conveyors are operating to check for external signs of abnormal operating conditions and worn or damaged enclosures. Equipment is more thoroughly inspected during Planned Maintenance (PM) shutdowns, which are conducted at a minimum of 24 hours per week for each of the three (3) crusher units. During PM shutdowns, dust mitigation enclosures are temporarily removed, if necessary, and all equipment is inspected for internal signs of worn parts or damages while the equipment is down for scheduled service.</p> <p>Deficiencies identified during daily and PM inspections are entered into the CMMS as notifications, and subsequently converted to Work Orders which are scheduled for implementation based on the urgency of the deficiency; critical items are scheduled for immediate repair and less urgent items are scheduled for repair during the planned PM shutdowns. Reinstallation of dust control equipment removed during shutdowns and maintenance work is normally completed, as part of the Work Order, prior to returning Crusher Facility equipment to service. Damaged dust control equipment which cannot be repaired during the scheduled maintenance, due to the extent of the damage, is removed, repaired, and reinstalled during the next scheduled shutdown. Baffinland stocks spare fabricated dust conveyor covers, skirting, and other dust control equipment in the Mine Site Warehouse. Additional dust control enclosures can be fabricated onsite at the Crusher Facility if spare items are not available from the Warehouse. Reliability engineers are currently working with Crushing Facility staff on further improving the design of existing conveyor covers to optimize their efficiency and further reduce dust generation and dispersion.</p> <p>Baffinland monitors overall dust deposition throughout the year using data obtained from existing dustfall monitoring programs including metals content in samples collected from passive dustfall sampling stations located near the Crusher Facility. It is anticipated that the effect of Crusher Facility maintenance activities on overall dust deposition is minimal since dust control measures removed from equipment during shutdowns are normally reinstalled prior to the equipment returning to operation. The mitigation measures installed on Crusher Facility equipment have been shown to minimize dust generation, and integration of their maintenance into the equipment inspection and maintenance planning process has improved the availability of mitigation equipment and is therefore expected to positively impact overall dust deposition throughout the year.</p>	PC Condition No. 10 & 46

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2	Fish Passage	<p>Pursuant to Term and Condition 47 of the Project Certificate, Baffinland is required to ensure that all Project infrastructure in watercourses are designed and constructed in such a manner that they do not unduly prevent and limit the movement of water in fish bearing streams or rivers. The Board has made recommendations between 2016-2019 regarding the maintenance of fish passages as Baffinland has consistently had damaged or hanging culverts. Baffinland’s approach takes to fish passage connectivity is to review the culverts, determine where repairs are needed, in consultation with Fisheries and Oceans Canada, and repair the discussed culverts. This results in a delay between the identification of concern and its correction. During the commenting period on the 2019 Annual Report, Qikiqtani Inuit Association suggested establishing a proactive approach to maintaining fish passage through project infrastructure.</p>	<p>The Board requires Baffinland to continue to maintain connectivity for fish species present in streams and ensure that all existing culverts are functional. Baffinland shall provide a summary of their consultation with Fisheries and Oceans Canada regarding problematic culverts in 2019 along with a detailed plan to proactively address fish passage concerns rather than the current reactionary approach being used within 60 days and also within future annual reports to the Nunavut Impact Review Board.</p>	<p>Baffinland is committed to complying with all Department of Fisheries and Oceans Canada (DFO) fish passage requirements for watercourse crossings in fish bearing streams specified in DFO Authorizations, Letters of Advice (LOAs), standards, and interim codes of practice. Under Baffinland’s Tote Road Fisheries Authorization, annual assessments of watercourse crossing infrastructure are conducted by qualified professionals at all fish bearing crossings with the objective of maintaining connectivity for fish species and verifying the functionality of all existing culverts. Findings and recommendations for mitigations are reported to DFO in annual reports and corrective actions are scheduled to mitigate perched or damaged culvert outlets, damaged culvert inlets, and erosion and sedimentation concerns in a timely manner. The annual DFO Tote Road Monitoring Report is submitted each year as an appendix to the Qikiqtani Inuit Association (QIA) and the Nunavut Water Board (NWB) Annual Report. Baffinland routinely consults with DFO personnel for guidance on site-specific mitigation measures, and installs, maintains, and mitigates crossings in compliance with DFO standards and interim codes of practice to avoid fatal impacts to fish and the harmful alteration, disruption or destruction of fish habitat (DFO, 2020).</p> <p>Baffinland implements a proactive approach to prevent the onset of reduced fish passage in watercourse crossing infrastructure by installing, inspecting, and maintaining crossings in adherence with the approved Hatch (2013) design and the Tote Road Earthworks Execution Plan (TREETP) and Design Report developed in April 2017 (Golder, 2017). Proactive measures that Baffinland follows include the following:</p> <ul style="list-style-type: none">• Install at least one culvert at each fish bearing crossing with an embedment depth in the streambed that is 10% of the culvert diameter (i.e. a 2000 mm diameter culvert requires an embedment depth of 200 mm);• Install rip rap erosion protection at culvert outlets to prevent scour that can result in perched or hanging culverts;• Inspect culverts to verify inlets and outlets are free of debris and sediment and there are no signs of erosion;• Inspect culverts in fish bearing crossings to verify they are embedded in the streambed (i.e. not perched or hanging);• Inspect culverts to verify they are free draining;• Inspect culverts to verify they are in good structural condition (i.e. ends are not damaged, no buckling, etc.); and• Complete mitigations at the first sign of potential for reductions in fish passage, in consultation with DFO personnel and in compliance with the interim code of practice for culvert maintenance (DFO, 2020). <p>A summary of consultations with DFO regarding culvert crossings is included in Attachment 3. Additional details of these works are presented in 2019 QIA-NWB Annual Report, Appendix C.3, 2019 DFO Tote Road Monitoring Report. Table 1 of Appendix C.3 includes details of this work and a photo summary is presented in Appendix B of the report. Additional works completed in 2020 have been reported in the 2020 DFO Tote Road Monitoring Report, and will be included as an appendix in the 2020 QIA-NWB Annual Report for Operations. Future Tote Road improvements/realignments required in support of on-going operations and future expansion projects will continue to follow the historical LOAs, and approved designs prepared by Hatch and Golder. Baffinland will continue to work with DFO to ensure planned modifications to fish bearing crossings are in compliance of the <i>Fisheries Act</i>.</p>	<p>PC Condition No. 47</p> <p>See Appendix G.6 (DFO Tote Road Monitoring Report)</p>

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3	Working Group and Adaptive Management Strategy	<p>Baffinland is required pursuant to Terms and Conditions 49 and 77 of the Mary River Project Certificate to establish a Marine Environment Working Group (MEWG) and Terrestrial Environment Monitoring Group (TEWG) to consult and advise on the monitoring programs of the Project. At the request of group members, the NIRB has participated as an observer in working group meetings since 2018 and has noted the ongoing concerns among group members. As a result of efficacy concerns, the Government of Nunavut has led the process of revising the Terms of Reference for these groups through consultation with all group members, these Terms of Reference are expected to be finalized in 2021.</p> <p>Through the commenting period of the 2019 Annual Report the Qikiqtani Inuit Association, Government of Nunavut, Fisheries and Oceans Canada, Oceans North, and World Wildlife Fund provided comments regarding the working groups and where advice/results of discussion implemented. Group members further expressed concerns regarding the draft monitoring reports not having group member comments incorporated prior to submission to the NIRB as part of the Annual Report.</p>	<p>The Board requires that Baffinland provide a clear list of monitoring suggestions provided by Marine Environment Working Group and Terrestrial Environment Monitoring Group members dating back to 2018, and whether these suggestions were implemented into monitoring and the rational if they were not.</p> <p>Further, the Board recommends that Baffinland facilitate commenting periods on draft monitoring reports to the Marine Environment Working Group and Terrestrial Environment Working Group with sufficient time to incorporate member feedback into the Annual Report provided to the Board on March 31 of each year.</p>	<p>Baffinland strongly disagrees with the general perception that it has not adequately addressed and/or considered input received through the Terrestrial Environment Working Group (TEWG) and Marine Environment Working Group (MEWG) into the design and implementation of its monitoring programs, noting that its operations only began in 2015. Numerous program modifications have been made since 2015, and increasingly so since 2018, and these changes have been summarized as part of individual terrestrial and marine environment program reports. When suggestions have been made by working group members on specific programs, Baffinland has made the effort in considering these requests in the most expedited and feasible manner (e.g., marine mammal aerial surveys completed in both 2019 and 2020, Table 2, rows 24-25). When a change is not implemented, Baffinland has provided rationale as to why the modification cannot immediately be implemented and/or that additional information is required before it can make an informed decision and/or has provided its reasoning for not pursuing specific requests further (e.g., ship hull biofouling dive surveys, Table 2, row 11) and requesting that alternative methods be suggested.</p> <p>A review of recently implemented program modifications clearly demonstrates Baffinland’s willingness to consider and incorporate the numerous suggestions provided through working groups on program design modifications, data analyses and interpretation of results. Baffinland notes that the working groups’ expectations with regards to response timelines may sometimes be unrealistic and unfeasible to plan for and implement over the short-term (i.e., within a few months of a request being made) because of various considerations that may be required prior to implementation (e.g., budgetary and logistical constraints, health and safety planning and oversight, etc.) and must remain in the sole discretion of Baffinland.</p> <p>A summary of key monitoring-related feedback/suggestions provided to Baffinland since 2018 is provided in Table 1 (Terrestrial Environment Working Group) and Table 2 (Marine Environment Working Group) in Attachment 4 along with a statement on the change Baffinland may have made in response, or the rationale if Baffinland has not (or not yet) followed through with specific requests (including if discussions are ongoing). This summary is based on Baffinland’s review of past comments received on monitoring program reports and/or through review of meeting records from working group meetings that took place since 2018. It is noted that when applicable, modifications made to annual programs are typically summarized in program report sections describing changes/modifications to program design from the previous year(s) of study. For example, in the 2019 Marine Environmental Effects Monitoring Program (MEEMP) and Aquatic Invasive Species (AIS) Monitoring Program report (Golder, 2020) sections 2.1.1 and 2.2.1 provide a summary of specific modifications made to the 2019 program design. Baffinland will continue to include a summary of such program modifications in future reports when relevant to do so, including for those programs completed in 2020.</p> <p>Baffinland notes that due to the numerous studies being implemented annually, and the associated volume of data being collected, the inherently complex data analyses required for identifying potential Project-related effects, in addition to the relatively short time period over which data is expected to be collected, analyzed and reported on as part of annual reporting efforts to the NIRB (i.e., less than 1 year between when surveys are initiated and draft reports are made available for review), it is not possible for Baffinland to process the data for annual reporting faster than it already does. To provide context on how rapidly Baffinland is analyzing data, Baffinland was able to provide narwhal abundance estimates for both the Eclipse Sound and Admiralty Inlet stocks based on its 2019 aerial surveys within a year of completing the work (and as part of the 2019 Annual Report to the NIRB. In comparison, DFO published its 2016</p>	PC Conditions Nos. 49 and 77;

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				<p>narwhal abundance estimates for the Eclipse Sound stock only in 2019, three years after surveys were completed.</p> <p>Baffinland will continue appending all draft versions of the various monitoring reports to the upcoming submission of the 2020 Annual Report to the NIRB. Through Annual Report review processes established by the Board, Baffinland also intends to review comments by the working groups and accordingly provide responses within the established timeframes once the reports are made available for review by the NIRB on their public registry (and also distributed directly to working groups via email). Baffinland subsequently intends to produce final drafts of the various marine and terrestrial monitoring program reports following this review period, and will append responses to comments received by reviewers as part of final report versions, which will be submitted to the NIRB so that they can be made available through the NIRB Public Registry.</p>	
4	Groundwater Management	<p>Terms and Conditions 17, 20, and 23 of the Project Certificate states that Baffinland is required to develop and implement a Groundwater Monitoring and Management Plan to monitor, prevent, and/or mitigate the potential effects of the Project on groundwater resources. The Board has made recommendations in 2017, 2018, and 2019 regarding the development of a Groundwater Management Plan and implementation of such a plan across key Project facilities. In the 2019 Recommendations, the Board requested that a Groundwater Monitoring Plan be developed and implemented. In their response, Baffinland indicated that they have been monitoring groundwater for several years; however, there were challenges with operating groundwater monitoring wells in an arctic environment and that an expansion of their plan would be required to further understand the groundwater chemistry.</p> <p>In their 2019 Annual Report, Baffinland indicated that a groundwater monitoring program was implemented and further indicated that sample sizes were low resulting in a limited ability to identify long-term trends and understand groundwater chemistry. Baffinland also indicated that the Groundwater Monitoring Plan was included as part of their Surface Water and Aquatic Ecosystem Management Plan and that they would be looking to continue expansion of this program. In their comments on the 2019 Annual Report, Crown-Indigenous Relations and Northern Affairs Canada noted concerns with the design of the lack of groundwater wells installed near the Waste Rock Facility, quarries, and borrow pits. The Groundwater Management Plan was to be included in the 2019 Annual Report; however, information was not included and with the current inadequacy of the</p>	<p>The Board requires the Baffinland continue to expand their groundwater monitoring program including the installation of groundwater wells near the waste rock facility, quarries, and borrow pits as noted by Crown-Indigenous Relations and Northern Affairs Canada. Further, the Board is requesting that Baffinland provide a standalone Groundwater Management Plan to allow for easy review of the current program, comparisons to Final Environmental Impact Statement Addendum predictions and possible areas of improvement or expansion.</p> <p>The Board requires the information be included in the 2020 Annual Report.</p>	<p>Baffinland has remained committed to further assessing the current program and, in 2020, retained groundwater consultants that are specialized in Arctic environments to further assess the current program and provide recommendations. The consultants completed a desktop review of available groundwater monitoring data, as well as available data regarding lithology and hydrogeology in the area of the Mary River Project, to identify any trends in groundwater quality, groundwater flow, and any discernable information about the condition of subsurface and stratigraphy of the investigated area, and reviewed methodologies used in the execution of the previous monitoring programs including the use of drive-point piezometers and low-flow sampling techniques. Following this review, the consultants made recommendations on the implementation of the groundwater monitoring program for 2020 and subsequently executed the recommendations during the 2020 field season and completed the groundwater monitoring program. The 2020 groundwater monitoring program was expanded to include the installation of three (3) additional temporary shallow monitoring wells around the Landfill Facility to further establish and validate background conditions and further assess down-gradient groundwater quality. The consultant report on the 2020 groundwater monitoring program will make recommendations to further improve and expand the program in 2021 and in subsequent years. Results of the desktop review and the 2020 groundwater monitoring program will be presented in the 2020 Annual Report to the NIRB.</p> <p>Baffinland will continue to retain consultants to execute the groundwater monitoring program in 2021, which will be implemented based on the assessment and recommendations from the 2020 groundwater monitoring report. As part of the assessment, the consultants will provide recommendations regarding the expansion of the program. Baffinland agrees that a formalized standalone Groundwater Monitoring and Management Plan will be a necessary component of the groundwater monitoring program once the study area and monitoring and other program parameters are fully understood, and will develop this plan for submission to the NIRB once the program has been fully established.</p> <p>As Baffinland has previously communicated, implementing a groundwater program in a permafrost-rich environment presents significant methodological challenges including quantifying groundwater direction, flow and interpretation of groundwater quality. Additionally, groundwater flow dynamics are driven primarily by the permafrost table elevations rather than soil stratigraphy, resulting in significant challenges to determine flow direction and gradient. Baffinland agrees with NIRB that an expansion to the groundwater monitoring program is required to gain a better understanding of natural groundwater chemistry at the Project site.</p>	<p>PC Condition Nos. 17, 20, 23</p> <p>2020 Groundwater Monitoring Report (see Appendix G.5).</p>

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		groundwater monitoring on site, the Board has the same concerns as Crown-Indigenous Relations and Northern Affairs Canada including expansion of the program to identified areas.			
5	Updated Ice Information and Assessment of Activities	<p>Under Term and Condition 100 of the Project Certificate, Baffinland is required to supplement baseline information and improve predictions for potential impacts to marine mammals through ensuring that mitigation measures are designed with consideration for the impacts on marine mammals when they might be less mobile (e.g., avoidance of sensitive areas, polynyas, and fuel spills). Term and Condition 78 of the Project Certificate requires the Proponent to incorporate updated ice information into an appropriate management plan.</p> <p>Baffinland reported that it has compiled ice information from the 2011 ice condition study for the approved Project, but the NIRB has been unable to locate this information as incorporated into an appropriate management plan. In 2017, Baffinland provided correspondence to the Board indicating that they would be using an ice-breaker vessel to safely escort ships through the Northern Shipping Route during the shoulder season. Ice-breaking or management activities were discussed as part of the original Mary River Project through Steensby Inlet; however, through the Early Revenue Phase, Production Increase, and Production Increase Extension Request, no formal assessment of the potential effects of these activities has occurred. Through community consultations, Marine Workshops, the Marine Environment Working Group meetings, and Annual Report commenting periods the Board has received comments from several parties regarding the ongoing ice-management activities of the MSV Botnica and its potential effects on marine mammals.</p>	<p>The Board requests Baffinland provide within 60 days, an assessment of the ongoing ice-management activities using the icebreaker (MSV Botnica) including the potential effects of these activities on noise levels and marine mammal activity along the Northern Shipping Route. Also within the 60 days time frame, Baffinland must update a management plan of their choosing to include this additional information on impacts along with historical ice-information in order to inform the use of the ice-breaker vessel. Despite the current reconsideration process occurring for the “Phase 2 Development” proposal by Baffinland, the Board expects that Baffinland commit sufficient time and resources to completing required project monitoring and addressing the recommendations accompanying this report to ensure compliance with Project Certificate No. 005.</p>	<p>In the preamble to its recommendation, the NIRB makes note of the following two conditions. Baffinland wishes to provide clarity on its interpretation of these Terms and Conditions and the interpretations provided by NIRB in its preamble to Board Recommendation No. 5, as set out below.</p> <p><u>Term and Condition 78</u></p> <p>Under Project Certificate (PC) No. 005 Condition No. 78, Baffinland is required to update baseline information for land fast ice. Baffinland is also directed to synthesize and report on this in the most appropriate management plan. As set out in the objective of the term and condition, this is for the purposes of “obtaining accurate and current ice information”.</p> <p>As was noted in the 2019 Annual Report to the NIRB, ice conditions study reports have been commissioned by Baffinland for the Northern Shipping Route on several occasions, including 2011, 2015 and 2016 (Enfotec, 2011, Enfotec, 2015, Enfotec, 2016). Additionally, in support of the Phase 2 Proposal, updated information on the dates for break up and freeze up of landfast ice was provided in Table 1 of a July 2019 memo entitled “Impacts of Icebreaking on Ice (Public Registry ID No. 325731). Ice charts and satellite imagery showing the presence and decay of landfast ice in 2020 were included in Baffinland’s presentation during the NIRB Marine Workshop (Public Registry ID No. 331227). Given the frequent updates that have been undertaken, reported on, and shared in public forums, Baffinland respectfully disagrees with the NIRB’s 2019-2020 status of compliance for PC Condition No. 78, as the objective and requirements of this component of the Term and Condition have objectively been met.</p> <p>Baffinland also notes that accurate and current ice information from the Canadian Ice Service and ice navigators on board the MSV Botnica is obtained by Fednav, on behalf of Baffinland’s Shipping Department, on a daily basis during the start and end of the shipping season for the purposes of managing shipping operations safely and within the parameters of the commitments and mitigations made by the Company (i.e., commitment not to break landfast ice and transit restriction mitigations). This information is produced in real-time during active shipping/icebreaking operations. In other words, it cannot be integrated into a management plan in advance of the season to inform planning of shipping operations. However, historical ice data has been integrated into relevant management plans for this purpose.</p> <p>As was noted in the 2019 Annual Report to the NIRB, accurate and current ice information is used for the purposes of planning the start and end of each shipping season. As outlined in Sections 5.2 and 5.3 of the Shipping and Marine Wildlife Management Plan (SMWMP; Public Registry ID No. 330780) that was submitted to the NIRB in July 2020 in accordance with the NIRB’s May 25 2020 Directive following approval of the PIP Extension Request (Public Registry ID NO. 330106). As outlined in Appendix B (Baffinland Pre-Charter Bulk Carrier Ice Capability Assessment) of the SMWMP, this information is used to inform the procurement of vessels at different times of the shipping season, to ensure vessels have the necessary capacity to sail along the shipping route in varying ice conditions. Lastly, this information is used to provide vessel</p>	PC Condition Nos. 78, 100

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				<p>captains with relevant ice and weather Information for navigational purposes, and is integrated into the Standing Instructions to Masters (SITM), which is referenced in Section 1, 2, 4 and 5 of the SMWMP.</p> <p>In light of the clarity provided above, Baffinland again respectfully disagrees with the NIRB’s status of compliance assigned to Baffinland for PC Condition No. 78 in its 2019-2020 Monitoring Report and would encourage NIRB to revisit this accordingly.</p> <p><u>Term and Condition 100</u></p> <p>Project Certificate Condition No. 100 is as follows:</p> <p>“Update the Project Shipping and Marine Wildlife Management plan to include avoidance of polynyas and mitigation measures designed for potential fuel spills along the shipping lane during the winter months.”</p> <p>The NIRB, as stated in its Annual Report, has interpreted this conditions as follows:</p> <p>“Under Term and Condition 100 of the Project Certificate, Baffinland is required to supplement baseline information and improve predictions for potential impacts to marine mammals through ensuring that mitigation measures are designed with consideration for the impacts on marine mammals when they might be less mobile (e.g., avoidance of sensitive areas, polynyas, and fuel spills).”</p> <p>Under PC Condition No. 100, during the <i>Construction</i> phase of the Project, Baffinland was required to update its SMWMP, to include avoidance of polynyas and mitigation measures designed for potential fuel spills along the shipping lane during the winter months, with consideration for the impact of spilled fuel on marine mammals when they might be less mobile or able to avoid contact with accidental fuel spills. As was noted in 2019 Annual Report to the NIRB, this term and condition, as outlined by the NIRB in Project Certificate No. 005, is not applicable to the <i>Operations</i> phase of the Project, nor is any shipping during the winter months associated with the current phase of the Project. Notwithstanding the aforementioned, additional clarity is provided to the NIRB in the Sections that follow.</p> <p><i>Fuel Spills</i></p> <p>As outlined in Section 1.2 and Section 3 of the SMWMP, the SMWMP should be reviewed in relation to other management plans, including the Spill at Sea Response plan (SSRP). Section 7 of the SSRP addresses spill management during the end and start of the shipping season (i.e., July and October). Additionally, Baffinland notes that all vessels contracted by the Company are required under MARPOL to have a Shipboard Oil Pollution Emergency Plan (SOPEP). For clarity, the spill and emergency responses management measures are the mitigation for efficiently and effectively dealing with unforeseen effects of the Project, such as a fuel spill during the shoulder season.</p> <p><i>Avoidance of the North Water Polynya</i></p> <p>Baffinland understands the North Water Polynya is more or less defined with geographic boundaries at the top of Baffin Bay between Northwest Greenland (Avanersuaq) and Ellesmere Island and Devon Island on the Canadian Coast (Hastrup 2018). At its peak, the general area covered by this polynya is between 76°N and 79°N and 70°W and 80°W.</p>	

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				<p>Vessels generally follow a route below 75 °N through Baffin Bay, and so, ore carriers will not normally enter the area the polynya is known to occur. To provide evidence supporting this conclusion, Baffinland provided Daily Ship Tracks with Ice Imagery in its 2019 Annual Report to the NIRB in Appendix G 19. Additionally, in July of 2019, Baffinland submitted mapping/ice charts to the NIRB that show the condition of the North Water Polynya relative to the shipping route in early July between 2014 and 2018 (Public Registry ID NO. 325730). As shown in Figures 2 through 6 of that document, there are safe navigable routes across Baffin Bay in areas south of the polynya even during the shoulder season. In short, this aspect of Term and Condition No. 100 is not applicable to the current phase of the Project as the Northern Shipping Route does not overlap with the North Water Polynya at any point during shipping operations in Baffin Bay. This is because the sea ice boundaries separating the North Water Polynya from the rest of Baffin Bay are melted away or broken up by June of each year at which point the polynya is indiscernible from adjacent areas during July and because of the designated shipping route.</p> <p><i>Mitigations for Marine Mammals that might be “less mobile”</i></p> <p>Baffinland has developed mitigation measures for the shoulder seasons, as outlined in Section 6.2, Table 2 of the SMWMP, that are specific to circumstances when marine mammals would be “less mobile”, or in heavier ice conditions. These include:</p> <ul style="list-style-type: none">• When marine mammals appear to be trapped or disturbed by Project vessel movements, the vessel will implement appropriate measures to mitigate disturbance, including stoppage of movement until wildlife move away from the immediate area (as safe navigation allows);• All Project vessels are provided with standard instructions to not approach within 300 m of a walrus or polar bear observed on sea ice;• All Project vessels are provided with standard instructions to operate their vessel in a manner that avoids separating an individual member(s) of a group of marine mammals from other members of the group; and• Baffinland will place Marine Wildlife Observers (MWOs) on icebreaking vessels during the shoulder seasons that will be responsible for recording relative abundance, group composition and behaviour of marine mammals relative to icebreaker transits along the Northern Shipping Route. MWOs will also be responsible for recording any incidences of marine mammal strikes or near misses with Project vessels, including icebreaker vessels. <p>Baffinland notes that this above list does not account for all mitigations outlined in Section 6.2 (Table 2) of the SMWMP and would refer the NIRB to that for a complete list of all mitigation measures employed by Baffinland to reduce potential effects on marine mammals associated with shipping while ice is present.</p> <p>In light of the clarity provided above, Baffinland respectfully disagrees with the NIRB’s status of compliance assigned to Baffinland for PC Condition No. 100 in its 2019-2020 Monitoring Report and would encourage NIRB to revisit this accordingly.</p> <p>A memo addressing the Board’s request for additional assessment materials related to icebreaking associated with the Project is provided in Attachment 5.</p>	

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Areas Requiring Further Study Or Changes To The Monitoring Program					
1	Emissions of Dioxins and Furans from Waste Incineration	<p>Baffinland indicated within the 2019 Annual Report that dioxins and furans were released from waste incineration at the Project site. These pollutants of concern including dioxins and furans which are formed, in part, by incomplete combustion (PICs) that reacts in the flue gas to form the dioxins. Based on the reported levels of dioxin and furan emissions from the incinerators, the Proponent should make improvement to the combustion efficiency and air-pollution control operations in order to lessen the formation of dioxins and furans and reduce environmental risks.</p> <p>The NIRB requests that Baffinland submit a memo discussing why waste incineration is causing the release of dioxins and furans from the incinerator plants.</p>	<p>The NIRB requests that the Proponent identify, and describe, the operating parameters of the incinerators and explain how design features that have the greatest influence on emissions have been optimized to prevent the formation and release of dioxins and furans into the environment. It is requested that this be provided within 60 days receipt of the Monitoring Report.</p>	<p>Stack testing completed in August 2019 on the Mine Site Incinerator and Milne Port Incinerator units demonstrated exceedances of dioxin/furan parameter standards compared to Canadian Council of Ministers of the Environment (CCME) guidelines, while commissioning of the units in 2013 demonstrated compliance with the applicable standards. Corrective actions were implemented following receipt of the 2019 stack testing results which included performance of maintenance work on the incinerators, and a review of the incinerator settings which resulted in minor process control changes at the Programmable Logic Controller (PLC) to optimize operation. Additionally, specific guidelines were posted at incinerator chambers as visual reminders of waste load designs and suitable incineration materials and a review of the Incinerator Operation Procedure was completed by all operators. Further confirmatory stack testing was completed in August-September 2020 to demonstrate these corrective actions were effective and confirm emissions standards continue to be met. During the 2020 stack testing program, abnormal operating conditions were identified during two (2) of the six (6) tests, resulting in potential impacts in the validity of these stack test results.</p> <p>Baffinland has retained a third party consultant to further review and assess the results of the 2020 stack testing program, including the system logs for the incinerators from the days the units were being tested. A copy of the consultant report, which will include recommendations for operational improvements, will be submitted to the NIRB upon completion. The third party consultant will also be present onsite during further confirmatory stack testing scheduled to be completed in 2021 to verify emissions standards continue to be met. The third party consultant will be present to oversee the 2021 stack testing and provide on-site support to ensure representative testing conditions are established and maintained throughout the 2021 stack testing program. Baffinland will also continue to monitor the incinerator operational and residual bottom ash data to identify changes in operational effectiveness.</p>	<p>PC Condition No. 12</p> <p>2020 Source Testing Report (Appendix G.21)</p>
2	Adaptive Strategies for Dust Deposition	<p>Baffinland reported pursuant to Term and Condition 21 of the Project Certificate that annual terrestrial dustfall exceeded the predicted threshold levels at select locations of the Project site.</p> <p>These exceedances occurred despite application of dust suppressant along the Tote Road and implementation of dust management protocols across the site suggesting that modeling prediction have underestimated dustfall across the site. The amount of dust entering the aquatic and marine environments, including on sea ice directly, from key sources such as crusher, screen, ore stockpiles is not fully known and there are concerns from the communities that impacts have not been properly monitored and mitigated. In addition, no information was provided in the 2019 Annual Report on how the Proponent intends to address dust fall on sea ice and fresh water including strategies for monitoring and mitigating further dust deposition around the Project sites in response to community concerns related to excessive dust from</p>	<p>(i) In conjunction with the Board’s Recommendation regarding dust regarding the Marine Workshop recommendations (Document ID No.: 332006). The NIRB requests that Baffinland continue to implement dust management protocol across the site and update the adaptive management strategies for dust management for the approved Project.</p> <p>(ii) The NIRB requires the Proponent to update the “Adaptive Management” Section of the Air Quality and Noise Management Plan and the Road Management Plan, to provide information about the specific changes to Mine design and operations that would be implemented for fugitive dust control as well as the means to evaluate effectiveness of the dust management protocols across Project sites to address any unanticipated effects or new predicted impacts on the environment.</p>	<p>Baffinland is aware of the concerns respecting fugitive dust emissions from the Project and has made dustfall mitigation a priority since operations began in 2015. Despite an increase in ore shipment, annual dustfall decreased in 2019 relative to prior years, demonstrating that implemented dust suppression control measures and corrective actions have been successful in incrementally reducing dust generation. Baffinland has strong monitoring programs in place to be able to detect changes in the environment that may occur as a result of dust emissions and to date no significant residual effects in environmental media have occurred as a result of mining activities.</p> <p>Baffinland is committed to continuous improvement in its work activities in the aim of reducing risks to the environment and improving operational effectiveness. The strategy employed at Baffinland is regular monitoring supported by operational change and adoption of other mitigating measures if warranted.</p> <p>As per the requirements of Baffinland’s HSE Management Framework (SD-STD-001), the company will conduct and document management reviews of its Air Quality and Noise Abatement Management Plan on a regular basis. Such reviews will ensure the integration of monitoring results for the Air Quality and Noise Abatement Management Plan are integrated with other aspects of the Project and that necessary adjustments are implemented as required. These reviews also provide a formal mechanism to assess the effectiveness of the management</p>	<p>PC Condition No. 21</p> <p>Air Quality and Noise Abatement Plan. (Appendix G.23)</p> <p>Following review, no additional changes were required for the Roads Management Plan and were captured in the Air Quality and Noise Abatement Plan.</p>

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		<p>the Project site. Without the implementation of adaptive management strategies for dust management, the Monitoring Officers are concerned that dustfall exceedances above predicted threshold levels will continue to be a consistent feature of the Mary River Project and may result in unanticipated effects or new predicted impacts to sea ice, freshwater and terrestrial environment that was not predicted in the FEIS or the subsequent FEIS Addendums. In conjunction with the Board's Recommendation regarding dust regarding the Marine Workshop recommendations. The NIRB requests that Baffinland continue to implement dust management protocol across the site and update the adaptive management strategies for dust management for the approved Project.</p>	<p>The revised Air Quality and Noise Management Plan and the Road Management Plan shall be submitted as part of 2020 annual report.</p>	<p>in achieving the company's objectives and maintaining ongoing compliance with Project permits and authorizations.</p> <p>Table 9 of the Air Quality and Noise Abatement Management Plan (AQNAMP) identifies corrective actions to be taken if the threshold of 4.6 g/m²/yr is exceeded. Baffinland's use of the 4.6 g/m²/yr as an indicator threshold, which is the upper limit defining "low" dustfall deposition in modelling and monitoring programs, shows a conservative approach to dustfall management triggers. That threshold (and even 50 g/m²/yr; the upper limit defining the "moderate" dustfall deposition category) was predicted to be exceeded within the Project Development Area (PDA) and some areas adjacent to the PDA in the original CALPUFF model results presented in the Final Environmental Impact Statement (FEIS) and FEIS Addendum. Exceedance of this action level is within the range of anticipated effects for the Project and are associated with routine mining related activities in the PDA. It is important to note that there are no known dust deposition thresholds specific to effects on vegetation, and that regulatory criteria cited for Alberta and Ontario in Table 6 of the AQNAMP are based on nuisance values and not on a human or ecological health endpoint. Therefore, the magnitude of dustfall must be considered in conjunction with the effects assessment in the terrestrial and freshwater environments to determine if dustfall is contributing to loss of vegetation or sedimentation in surface water. Baffinland will continue to implement conservative thresholds for the implementation of mitigation measures, and will work with the QIA on the implementation of further refined adaptive management strategies for dustfall.</p> <p>Baffinland continues to implement dust management protocols across the site. Key dust mitigation measures implemented at the Crusher Facility and Ore Stockpile include the installation of coverings on Mine Site ore crushers, and the implementation of improved methods of dropping ore in the ore stockpiles at Milne Port. Ongoing initiatives include evaluating the effectiveness of new technologies and equipment retrofits to reduce potential local sources of dust, including:</p> <p>Assessing the methods used to drop iron ore into the stockpiles and evaluating and adjusting conveyor heights to minimize drop distances to ore stockpiles, which serves to minimize dust creation.</p> <p>Installation of shrouding at the discharge end of the ore stackers to reduce the effect of windblown dust during stacking activities.</p> <p>Installation of chutes on the shiploader to prevent windblown dust during loading operations.</p> <p>Ongoing installation of hoods and shrouds on Crusher Facility equipment (stackers and conveyors) to minimize dust generation during crushing operations.</p> <p>Installation of rubber bellows on Crusher Facility equipment to control the fall of ore to the pad, and reduce dispersion of dust as ore is being discharged to the pad.</p> <p>DusTreat, a specialized crusting agent designed to be applied to stockpiles for the mitigation of dust generation and produced by SUEZ Water Technologies & Solutions Canada (SUEZ), and the equipment to apply this product was purchased and arrived on the 2020 sealift. To date, Baffinland has applied the product to eleven (11) zones within the ore stockpile, as per the application techniques and dosage calculations provided by SUEZ, and will continue to apply product on an ongoing basis as sections of stockpiles are built to permanent locations. DusTreat is a non-toxic substance which coats the outside of the stockpiles and acts as a sealant to prevent</p>	

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				<p>lift-off of dust from the stockpiles. This type of application has been shown to be effective at reducing dust from stockpiles at other sites, is known to last for months, and is rain resistant.</p> <p>In addition, Baffinland is exploring the potential use of satellite imagery to better assess the extent of dust dispersion during winter months where snow is present and where dust may be depositing during winter operations. An updated Air Quality and Noise Management Plan, and Roads Management Plan will be submitted as part of the 2020 Annual Report.</p>	
3	Fish Sampling	<p>(i) Baffinland is required pursuant to Condition No. 48a to develop plans to conduct additional surveys for the presence of Arctic char in freshwater bodies and ongoing monitoring of Arctic char health where applicable, within watersheds proximal to the mine, Tote Road and Milne Inlet Port project development areas, including but not limited to, Phillips Creek, Tugaat, and Qurluktuk. It is also expected that the Proponent shall consult with the Mittimatalik Hunters and Trappers Organization (MHTO) regarding the design, timing, and location of proposed surveys and ongoing monitoring. The Monitoring Officers note from Baffinland's 2019 Annual Report, that Arctic char population surveys have been undertaken in Camp Lake, Sheardown Lake, Mary Lake and in Reference Lakes near the Mine Site as part of the Project's Core Receiving Environment Monitoring Program (CREMP), but no information was provided on the status of Arctic char health monitoring in those watersheds listed in the Project Certificate.</p> <p>(ii) Term and Condition 48(a) also requires Baffinland to provide plans to conduct additional surveys for the presence of Arctic char in freshwater bodies and implement ongoing monitoring of Arctic char health in areas affected by the Project in consultation with the MHTO. Baffinland noted a significant effort to capture and assess the health of Arctic char in associated water bodies through its 2019 Annual Report and has methodologies outlined in its Aquatic Effects Monitoring plan. Baffinland has further indicated that funding is available to the MHTO to support community-based monitoring through the Inuit Impact Benefit Agreement and that this funding was dispersed in 2019 with results of the MHTO monitoring program to be forthcoming. Term and Condition 48(a) directs Baffinland to work collaboratively with the MHTO to allow traditional knowledge and community-based monitoring be incorporated into Baffinland's monitoring programs. The NIRB notes the efforts that</p>	<p>(i) The NIRB requests Baffinland to collaborate with the MHTO to identify additional waterbodies that may be impacted by ore dust and other constituents that could be potentially harmful to fish and biota aquatic environment. It is requested that an update on the recommendation be provided and incorporated into Baffinland's next annual report to the NIRB.</p> <p>(ii) The NIRB requests Baffinland clearly identify its 2020 Annual Report which monitoring suggestions have been put forward by the MHTO and how and when those were incorporated. The memo should be provided to the NIRB within 60 days of receiving the recommendation.</p>	<p>Engagement activities with the MHTO, QIA and North Baffin communities are planned for 2021, such that Baffinland can provide an overview of the Aquatic Effects Monitoring Plan (AEMP) and results of monitoring to date, and to collaborate with the MHTO regarding additional concerns related to the aquatic environment. Baffinland will provide an update on the scheduling of the engagement activities in the 2020 Annual Report. Baffinland will also include in the 2020 Annual Report a summary of monitoring suggestions which have been put forward by the MHTO and how and when those suggestions have been incorporated into monitoring programs on the Project Site.</p>	PC Condition No. 48(a)

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		Baffinland has taken to date to provide the Community of Pond Inlet with funding to complete community-based monitoring of Arctic char and other species of interest; however, further consultation with the MHTO is required to develop and incorporate community-based monitoring into Baffinland's ongoing monitoring programs.			
4	Effluent Discharge and Exceedances	<p>Under Project Certificate Terms and Conditions 24 and 46, the Proponent is required to ensure that runoff from its facilities meets discharge requirements. In 2019, Baffinland reported five (5) discharges of effluent in 2019 did not comply with the applicable discharge criteria, two at the Sailiivik Camp Sewage Treatment Plant (STP) (MS-01B), the Mobile Treatment System at the Milne Port Contaminated Snow Containment Berm (MP-04A) and at the Waste Rock Facility Water Treatment Plant. Baffinland outlined that some of these samples were further investigated and further sampling indicated that discharge criteria has returned to normal. With regards to the Mobile treatment system, Baffinland indicated that its use was halted due to temperatures and would be reassessed in the spring.</p>	<p>The NIRB requests Baffinland provide information on the current status of water treatment options in the affected infrastructure (e.g., Sewage Treatment Plant, the Waste Rock Facility, and the Mobile Treatment System at the Milne Port Contaminated Snow Containment Berm) and clarify if effluents were released when they did not meet the discharge requirements and if so, reasoning for why. The Proponent is also expected to describe all measures it has taken to date to improve the effectiveness of treatment systems in the affected systems to avoid similar exceedances in the future. The Board Nunavut Impact Review Board further requests that this be outlined in Baffinland's Quality Assurance and Quality Control Plan.</p> <p>It is requested that this information be provided within 60 days' receipt of the NIRB's monitoring report.</p>	<p>The two (2) exceedances of the effluent discharge criteria for treated sewage effluent at MS-01B on May 1, 2019 and November 12, 2019 resulted from a sampling error and a temporary upset condition, respectively, at the Mine Site Sewage Treatment Plant (STP). STP operators are trained in proper sampling protocols, Quality Assurance and Quality Control (QA/QC) procedures and environment personnel provide ongoing training and mentoring, as necessary. If sample collection issues are identified, proper sampling techniques and protocols are followed during sample collection. The exceedance associated with the temporary upset condition was attributed to a failing membrane on one of the STP treatment trains which was subsequently replaced. To address this issue, Baffinland reviewed the discharge criteria with STP operators, and operational protocols were adjusted. Following the replacement of the failing membrane, STP operation was resumed within design specifications.</p> <p>The September 8, 2019 treated effluent sample collected from the mobile oily water treatment system (OWTS), while it was stationed at the Contaminated Snow Containment Berm, exceeded the applicable discharge criteria for lead. The exceedance is suspected to have been the result of either a sampling error, due to the close proximity of the discharge criterion to the analytical minimum detection limit (MDL), or the metals removal media used by the mobile OWTS being spent. Subsequent sampling was not completed in 2019 because discharge of treated effluent from the mobile OWTS had been halted for the year, prior to the receipt of the elevated total lead result from the analytical lab. Prior to operation of the OWTS in 2020, the metals removal media was replaced, however, pre-discharge sampling conducted to verify that the quality of treated effluent met discharge criterion prior to initiating effluent discharge indicated compliant levels of lead and, therefore, treatment for lead was not necessary. Prior to discharge from the OWTS in 2021, pre-discharge sampling will be conducted to verify the operational performance of the OWTS, if required, and that the quality of treated effluent meets discharge criterion prior to initiating effluent discharge from the OWTS. Although there was one (1) exceedance and one (1) potential exceedance of total lead in samples collected from the mobile OWTS (at storm water discharge station MS-03) in 2020, both were attributed to either sampling error or external laboratory error and are not suspected to have been the result of the metals removal media being spent. During discharges from containment areas, periodic sampling and analyses by an independent accredited laboratory (ALS) were conducted for applicable parameters to ensure compliance. To monitor the performance of the OWTS in the field and ensure the removal of organics constituents from the influent, sampling and analyses were also conducted in the field on a daily basis utilizing a portable total oil and grease (TOG) analyzer. Personnel involved in sampling at the Project site are trained in proper sampling protocols and QA/QC procedures prior to conducting field sampling, and receive additional training prior to implementing specific programs, or as needed, to ensure proper sampling techniques and protocols are followed for all sampling programs.</p> <p>During 2019, operation of the Waste Rock Facility (WRF) Water Treatment Plant (WTP) continued to prove to be effective at addressing the water quality concerns observed at the WRF in 2017.</p>	<p>PC Condition Nos. 24, 26</p> <p>2020 NWB/QIA Annual Report for Operations (Baffinland, 2021)</p>

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				<p>Beginning in June 2019, controlled discharges of treated effluent from the WRF Pond were conducted and resulted in no exceedances of the water licence. Additional effluent discharge sampling was completed to satisfy the requirements of the Metal and Diamond Mining Effluent Regulations (MDMER). Within those sampling events, there was one (1) exceedance of the MDMER maximum authorized monthly mean concentration for Total Suspended Solids (TSS) of 15 mg/L and one (1) non-compliant discharge event of the MDMER grab sample criterion for TSS of 30 mg/L in 2019. Since the commissioning and operation of the Facility's WTP in 2018, Baffinland has increased the frequency and rigor of testing and sampling of WRF Pond effluent to optimize dosing requirements and reduce variances in TSS and pH. During 2020, the water quality of the WRF Pond was found to be compliant with the applicable water quality effluent criteria stipulated by the Type 'A' Water Licence and MDMER in June and July without any treatment. In August, operation of the WRF WTP continued to prove to be effective at addressing any water quality concerns. Controlled discharges of effluent from the WRF Pond resulted in no exceedances of the water licence water quality discharge criteria in 2020 observed in samples collected under Schedule I of the Type 'A' Water Licence. Additional effluent discharge sampling was completed to satisfy the requirements of the MDMER. In 2020, effluent discharge from the WRF Pond was determined to be compliant with all MDMER water quality discharge criteria.</p> <p>To ensure the continued collection of representative, accurate and reliable water quality data at the Project, Baffinland will continue to require all personnel involved with water quality sampling to be experienced and fully trained in the Project's Standard Operating Procedures, QAQC procedures and processes outlined in the Project's QA/QC Plan.</p> <p>Exceedances of water quality effluent criteria stipulated by the Type 'A' Water Licence which occurred in 2020 are reported in the Monthly Water Licence Reports and was summarized in the 2020 Type A NWB/QIA and NIRB annual reports.</p>	
5	Blasting and Explosives Residue Monitoring	Baffinland reported, pursuant to Term and Condition 20 of the Project Certificate that there were elevated levels of ammonia and nitrate in runoff from blasted areas around the Project area when compared to baseline concentrations. Baffinland noted that the majority of their grab samples indicated ammonium and nitrate levels below the CCME water quality guidelines. Despite this explanation, no information was provided regarding treatment of the runoff containing elevated levels of explosives residue or related by-products from the Project site.	<p>The NIRB requests Baffinland clarify whether the selected samples were exceedances to CCME guidelines or only elevated compared to baseline values. In addition, the NIRB requests that Baffinland provide a description of site-specific initiatives in place or under development for proper treatment of runoff containing elevated levels of ammonia nitrates or related by-products.</p> <p>It is requested that this be provided within 60 days' receipt of the monitoring report.</p>	<p>While the majority of grab samples of runoff from blasted areas in 2019 indicated ammonium and nitrate levels below the CCME water quality guidelines for the protection of aquatic life in freshwater, the elevated levels that were reported in select samples in 2019 were exceedances of the CCME guidelines. The elevated levels of ammonia reported in these samples exceeded the Canadian Council of Ministers of the Environment (CCME) guideline for un-ionized ammonia of 0.019 mg/L, and the elevated levels of nitrate reported in these samples exceeded the CCME long-term exposure guideline for Nitrate (as N) of 3.0 mg/L. The nitrate exceedances, which ranged from 3.02 mg/L to 29.3 mg/L, were significantly below the CCME short-term exposure guideline of 124 mg.</p> <p>Baffinland continues to implement source controls, in accordance with the Borrow Pits and Quarry Management Plan (Blasting Management Framework), to optimize blasting activities and proactively control the source of ammonium nitrate explosives and minimize runoff to waterbodies. Source controls practiced at the Project to limit explosives-water contact include:</p> <ul style="list-style-type: none"> Ammonium Nitrate (AN)-based explosives handling procedures require that personnel who handle explosives take the necessary precautions to prevent spillage during blasting operations. To limit explosives-water contact, areas that are subject to shallow groundwater flows are identified, and dewatered prior to blasing. Limiting stand time for explosives in wet holes. Rigorous employee orientation and training procedures for managing, transporting and loading explosives into blast holes. 	PC Condition No. 20

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				<ul style="list-style-type: none"> Selecting, adopting, and manufacturing the optimum explosive mix types and loading procedures for site specific applications. Proper selection of explosives types can prevent dissolution and release to the receiving environment (i.e. emulsion based ammonium nitrate-fuel oil (ANFO) mixture contains emulsifiers that can minimize AN dissolution in water and improve blast performance). Quarry and pit plans incorporate a site specific drainage control plans. A performance monitoring program to ensure that AN release to receiving waters from AN explosives is minimized which includes blast performance monitoring to optimize blasting efficiency and surface water runoff downstream of Project mining areas and quarries, and receiving aquatic environment monitoring downstream of Project activities. <p>Baffinland will continue to monitor and assess ammonium and nitrate levels in runoff from blasted areas to verify and evaluate the effectiveness of source control activities.</p>	
6	Caribou	Baffinland currently conducts a Height of Land Survey program to monitor caribou presence and activity near the Project regional study area. Through the commenting period on the 2019 Annual Report as well as the TEWG meetings, the QIA and GN have noted concerns regarding adequacy of sampling efforts as well as the scale that these surveys are conducted. The current surveys are noting very few caribou sightings annually, suggesting that to further understand the caribou presence and ecology of the regional study area, it may be necessary to expand the scale of these efforts.	The NIRB requests that Baffinland work in consultation with the TEWG to expand its caribou surveying by either increasing the survey efforts and monitoring range using its current techniques or to collaborate with the GN to facilitate larger scale surveys using radio collars or aerial surveys and will review the update in the 2020 Annual Report.	Baffinland will continue to work in consultation with the Terrestrial Environment Working Group (TEWG) to discuss the potential for expanding its existing site-specific caribou monitoring programs when North Baffin caribou numbers increase. During the 24 June 2020 and 10 December 2020 teleconference meetings held with the TEWG, Baffinland, as presented by Environmental Dynamics Inc., described its approach for conducting analyses to determine the statistical power of various monitoring options to measure potential changes in caribou movement across Project infrastructure. The results of this work are intended to inform decisions regarding future caribou impact monitoring effort. Additional information will be provided as part of the 2020 Annual Report to the NIRB. To help define caribou monitoring at the regional level, Baffinland remains committed to mutually sponsoring regional-level information needs with the Government of Nunavut upon approval of a Memorandum of Understanding specific to regional wildlife monitoring programs.	PC Condition Nos. 51, 53, 54, 57, 58
7	Helicopter	Term and Conditions 59 and 71 of the Project Certificate requires all Project related aircraft to maintain minimum altitudes to minimize impacts to wildlife and Inuit harvesters. In their 2019 Annual Report, Baffinland indicated that they contracted pilots to complete flight logs after each flight detailing any deviations from the minimum altitudes or restricted areas. Baffinland stated that compliance with these restrictions was 91% in 2019; however, low altitude helicopter flights and their effects on wildlife remain an outstanding concern as noted by QIA, GN, and ECCC through both their review of the 2019 Annual Report and discussions during TEWG meetings. Further, in the February 2020 TEWG meeting, Baffinland committed to provided further analysis on the flight data provided; however, parties still noted concerns regarding what constitutes reasonable rational for deviations from the minimum flight heights and restricted areas.	The NIRB requests Baffinland include additional detail regarding the rational provided by pilots when deviating from flight altitude restrictions in its 2020 Annual Report; including providing the pilots log and definitions regarding what constitutes acceptable rational for a deviation.	As part of its 2020 annual reporting efforts, both in its 2020 Terrestrial Environment Annual Monitoring Report and in its Annual Report to the NIRB, Baffinland will include additional details regarding the rationale provided by pilots when deviating from flight altitude restrictions. Baffinland does not believe providing individual pilot logs recorded over an entire season is necessary, but may provide specific examples of the type of information recorded daily by pilots in their flight logs, as well as the different types of rationale with associated definitions. An overall summary of the process by which these entries are recorded, and subsequently analyzed and reported on will also be described to provide additional context.	PC Condition Nos. 59, 71 Draft Terrestrial Environmental Annual Monitoring Report (EDI, 2021)

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8	Ship Hull	<p>To satisfy Term and Condition 91 of the Project Certificate, Baffinland is required to conduct ship hull biofouling monitoring. Further, Baffinland reported in Appendix G8 of the 2019 Annual Report that most of the ship surfaces below the water lines were found free of biofouling with the exception of small areas of the sterns of four (4) ships where barnacles were found. This recommendation is intended to work in conjunction with recommendations resulting from the 2020 Marine Workshop.</p>	<p>The NIRB requests that Baffinland provide information on the planned strategies in place or under development for preventing barnacles and algae from coating ship hulls with a detailed discussion of their demonstrated effectiveness.</p> <p>It is requested that this be provided within 60 days’ receipt of the Monitoring Report.</p>	<p>Baffinland utilizes world-class vessel owners and operators who follow International Maritime Organization (IMO) and federal laws in the operation of their vessels. All operating and class certificates must be valid before Baffinland employs the vessels in the carriage of its products. Vessels nominated to perform in an upcoming season are 1) thoroughly vetted through RightShip, the world’s largest third-party due diligence organization; and 2) Baffinland also requires every vessel nominated to complete a Baltic Exchange Questionnaire for internal review/record; and, 3) Baffinland must also nominate these vessels to customers for their separate vetting and acceptance before delivering a cargo. Additionally, Transport Canada Marine Safety Inspectors do visit the Milne Inlet Port Site several times per season to inspect vessels directly, but also can and do review vessel certificates/information remotely.</p> <p>Relevant anti-fouling regulations and guidelines include the International Convention on the Control of Harmful Anti-fouling Systems (AFS) on Ships, 2001 (known as the AFS Convention); MEPC 195(61); 2010 Guidelines for Survey and Certification of Anti-fouling systems on ships; MEPC 207 (62); 2011 Guidelines for the Control and Management of Ships’ Biofouling to Minimize the Transfer of Invasive Aquatic Species. The AFS Convention was adopted by Canada in 2001 and MEPC.195(61) in 2010. Canada does not currently legislate a requirement for bio-fouling management plans per MEPC 207 (62). Files are managed by Transport Canada with input from Environment and Climate Change Canada (ECCC), Fisheries and Oceans Canada (DFO) and Health Canada. Vessels must have a valid International Anti-fouling System Certificate and update certificate whenever the anti-fouling coating is changed to either a different product or if more than 25% of the vessels coated area is replaced in dry-dock. Baffinland notes that reapplications of existing product to the vessel representing less than 25% of the coated area is classified as a repair. This does not change or invalidate the existing certificate. Per MEPC 207(62) vessels are “guided” to have a Bio-fouling Management Plan and to maintain Biofouling Management Record Book, noting that the United States of America has adopted this into law.</p> <p>Regulations and guidelines of relevance to vessel bottom surveys include IMO Resolution A.1053(27)/MSC.1/Circ.1348 as amended, “Survey guidelines for the harmonized system of survey and certification (HSSC)”. This requires that inspections of the outside of the ship’s bottom should normally be carried out with the ship in a dry-dock. However, it also provides that Administrations may give consideration to alternate inspections being carried out with the ship afloat. Also relevant is the Unified Requirements (UR) Z3 issued by the International Association of Classification Societies (IACS) as amended from time to time; UR Z7 Hull classification surveys issued by IACS as amended from time to time. Canada mirrors these requirements through the Canada Shipping Act (2001) including amendments. Dry Bulk Vessels over 400 tonnes gross weight and 15 years old or under (which is representative of the vessels used by Baffinland) must undertake two bottom surveys within 36 months of each other within a 5 year survey cycle. Note that a “bottom survey” also includes all parts of vessel which may be below the surface of the water when vessel is loaded or in ballast.</p> <p>Baffinland refers the NIRB to review sub-section 6.4.2 Anti-Fouling Management in the most recently updated Shipping and Marine Wildlife Management Plan (Baffinland, 2020) which describes Baffinland’s approach for reducing and eliminating the risk of invasive aquatic species (AIS) and pathogens being introduced in Canadian waters as a result of ship hull biofouling.</p>	PC Condition No. 91

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9	Marine Sediment Contamination	<p>Baffinland reported that it observed benzene and toluene in some marine sediments collected under the Marine Environmental Effects Monitoring Program (MEEMP), but no information was provided on their concentration levels and possible source of origin. In addition, Baffinland further reported that polycyclic aromatic hydrocarbons (PAHs) was observed in sediment samples at five (5) stations, with the concentrations of acenaphthylene and dibenz(a,h)anthracene exceeding the Canadian Council of Ministers of the Environment (CCME) and Interim freshwater sediment quality guidelines (ISQGs) at some stations in the north transect. Arsenic and nickel were also observed to be elevated in the marine sediments and this recommendation is intended to work in conjunction with recommendations resulting from the 2020 Marine Workshop.</p>	<p>The NIRB requests that that Baffinland provide a memo regarding the concentrations of benzene, toluene, and polycyclic aromatic hydrocarbons and discuss their possible origin in the marine sediments of the northern transect and describe what strategies are in place and/or under development to prevent any negative effects to benthic macroinvertebrate and sediment communities.</p> <p>It is requested that this be provided within 60 days’ receipt of the Board’s monitoring report.</p>	<p>This response follows on the assumption the NIRB incorrectly referenced the Interim Freshwater Sediment Quality Guidelines (ISQGs) instead of referring to marine ISQGs in its comment. Specifically, as described in Section 3.1.4.1 of the 2019 Marine Environmental Effects Monitoring Program (MEEMP)/Aquatic Invasive Species (AIS) Program report, Golder (2020) provides a description of the comparisons of the marine sediment quality data to screening guideline/benchmarks: “Concentrations of metals and hydrocarbons were compared to CCME Interim Sediment Quality Guidelines (ISQGs) and Probable Effect Level (PELs) for the protection of aquatic life in the marine environment (CCME 2014). In addition, metals and hydrocarbons were compared to the British Columbia Working Quality Guidelines for sediment (BC MOE, 2017), and the National Oceanic and Atmospheric Administration (NOAA) sediment benchmarks (Buchman, 2008), following feedback from MEWG”.</p> <p>Section 4.1.4.4 provides a summary of the sediment quality results stating that “<i>volatile organic compounds, extractable petroleum hydrocarbons and PAHs were, with few exceptions, determined to be less than their respective analytical detection limits in sediment samples collected in 2019</i>”. As indicated by NIRB, a few stations had detectable sediment concentrations (i.e., values reported were above analytical detection limits). The few isolated instances where hydrocarbons and polycyclic aromatic hydrocarbons (PAHs) were detected, concentrations were measured within five times the analytical detection limit, and so were considered close to the analytical detection limit.</p> <p>Upon comparison to marine CCME Interim Sediment Quality Guidelines (ISQGs) and Probable Effect Levels (PELs), a limited number of marginal exceedances were noted, though it was indicated that caution must be used when interpreting results, particularly with regard to the use of CCME ISQGs for individual Polycyclic Aromatic Hydrocarbons (PAHs) as benchmarks since they are considered overly conservative for screening primary contaminants of potential concern. As stated in Sections 4.1.4.4 and 5.1.4, PELs are more relevant for screening primary contaminants of potential concern in comparison to CCME ISQGs for individual PAHs. Importantly, Baffinland notes that both sediment organic and inorganic parameters measured in 2019 were less than CCME Probable Effect Levels. This approach of using PELs for contaminant concern screening is consistent with the Federal Contaminated Sites Action Plan (FCSAP) guidance for working harbours (FCSAP, 2018).</p> <p>Given that no exceedances of the PELs are reported, and that concentrations of hydrocarbons and PAHs were detected, were low in 2019 and close to the detection limit, additional management concerns are not warranted at this time, though monitoring through the MEEMP/AIS Program will continue into 2020 to determine whether there is indication of any potentially emerging increasing trends. Baffinland notes that it operates under various management plans, including the Environmental Protection Plan (Baffinland, 2016), which includes a description of potential pathways of effects through which hydrocarbons may enter water bodies and the types of mitigation measures that have been developed to avoid/reduce this risk. Similarly, the Marine Environmental Effects Monitoring Plan (Baffinland 2016b; e.g., in sections 3.1 and 3.2.2) also describes potential pathways of effects leading to increases in hydrocarbons in the marine environment based on predicted effects to the marine environment as identified through the environmental assessment process.</p> <p>A memorandum summarizing the results as requested is therefore considered unnecessary given that a description of results and context for interpretation is already provided in the 2019 MEEMP/AIS report (Golder, 2020), and that pathways of effects are already referred to in existing</p>	<p>PC Condition No. 76;</p> <p>There is currently no evidence of Project-related increases in either hydrocarbons (e.g., benzene and toluene) or PAHs in Milne Port including along the northern transect. Accordingly, there is no requirement or need at this time to develop mitigation or management measures that aim to prevent or minimize adverse effects on marine benthic communities from these sources.</p>

No	Topic	NIRB Comment	NIRB Recommendation	Baffinland Response	Concordance to 2020 Annual Report
				management plans. However, going forward, Baffinland will include and provide greater clarity on the potential pathways of effects for the suite of variables being monitored as part of contaminant monitoring in both water and sediment, and will incorporate historical results when available and relevant to do so. Baffinland reiterates that most samples analyzed for hydrocarbons and PAHs since 2014 have typically had values less than analytical detection limits but as part of the “Trends” section associated with each relevant Project Certificate No. 005 Term and Condition summary sheet (i.e., no. 76), Baffinland will continue to provide any updates on whether any potentially emerging trends are identified by incorporating comparisons to previous sampling years. Furthermore, should potentially emerging trends be detected, additional context will be provided on whether additional mitigation may or may not need to be considered as part of the “Recommendations” section in the MEEMP/AIS Program report and as part of annual reporting efforts to the NIRB.	
10	Early Warning Indicators	<p>Baffinland is required pursuant to Terms and Conditions 110, 111, and 112 of the Mary River Project Certificate to develop monitoring early warning indicators (EWI), thresholds and monitoring protocols to prevent impacts of ship noise on marine mammals in consultation with the Marine Environment Working Group (MEWG). The goal of this monitoring effort is to ensure the rapid identification of negative impacts due to Project shipping activities. Baffinland has several marine monitoring programs outlined in their Shipping and Marine Wildlife Management Plan as well as their 2019 Annual Report which are provided to the MEWG for comment.</p> <p>In 2019 and 2020, Baffinland increased their efforts to finalize the EWI’s through consultation with the MEWG; however, consensus within the group has not occurred. As a result, Baffinland provided a technical memo to the Board in August of 2020 introducing the selected EWI as the proportion of immature narwhal with an associated threshold. Since Baffinland was unable to achieve consensus among MEWG members prior to submission of this memo, Baffinland committed to host a topic specific teleconference with the MEWG to support continued discussion on potential EWI selection. Through review of the Project Certificate, the NIRB notes that Terms and Conditions No. 110, 111, and 112 are aimed at producing early warning indicators with respect to acoustic disturbance in marine mammals.</p>	<p>The NIRB requests that Baffinland continue to work with the MEWG to review and refine the current EWI including a commenting period for MEWG members and submission of</p> <p>finalized EWI and associated MEWG comments on the costs and benefits of selecting this EWI and submit information within the 2020 Annual Report regarding the discussions that occurred, how discussions were incorporated into the EWI, and the final EWI. If the EWI is not finalized by the next annual report, the NIRB expects that the Proponent would discuss why not and when it anticipates submission of the final EWI to the NIRB.</p> <p>Further, the NIRB requests that Baffinland provide the rational for the selection of the current EWI as submitted in August of 2020 and how they intend to link this behavioral response variable to an acoustic response in marine mammals.</p>	<p>Baffinland will continue to meaningfully engage with the Marine Environment Working Group and obtain feedback on the selection of variable(s) that are suitable for use as early warning indicators. Baffinland’s most recent discussions occurred during a December 9, 2020 MEWG meeting where a dedicated session on Baffinland’s most recent EWI technical memo submission was discussed.</p> <p>As part of the 2020 Annual Report to the NIRB, and specifically with regard to PC no. 005 terms and conditions 110, 111 and 112, Baffinland will provide an overall summary on the progress it has made since 2018 towards the establishment of early warning indicator(s), and particularly on its reasoning for selecting calving rate. Baffinland notes that consensus by all MEWG members is not a requirement of PC conditions 110 to 112, and should not be, particularly when considering that not all members of the working group possess traditional knowledge and/or first-hand experience of overseeing narwhal behaviour, or have the appropriate expertise in marine mammal biology and acoustics.</p>	PC Condition Nos. 110, 111, 112

No	Topic	NIRB Comment	NIRB Recommendation	Baffinland Response	Concordance to 2020 Annual Report
11	Marine Environment Working Group	Pursuant to Term and Condition 184, Baffinland is to discuss compliance status of marine related terms and conditions including ship-based observer programs, noise exposure assessments, and the identification of other mitigation measures that have the potential to further reduce potential impacts to marine mammals at the MEWG meetings. In the 2019 Annual Report the NIRB noted that Baffinland provided information regarding how they met the term and condition; however, it is uncertain how or where MEWG feedback was used to assist in determining the compliance of Terms and Conditions regarding impacts to marine mammals.	The NIRB requests Baffinland provide information within 60 days on how it intends to meet the Term and Condition and report on progress annually to the Nunavut Impact Review Board.	<p>It is Baffinland's understands that the purpose of its collaboration with the Marine Environment Working Group (MEWG) is to <i>review</i> the status of compliance with, and implementation of, all of the Terms and Conditions in Project Certificate (PC) No. 005 related to marine environmental protection. The MEWG provides a valuable forum for ongoing Project communications and reporting between Baffinland and other relevant parties. As <i>advisory</i> groups, the working groups are able to review and provide feedback/recommendations on Baffinland's marine and terrestrial environment monitoring programs, potential consideration of additional mitigation measures to offset any potential Project-related effects on the marine environment should emerging Project-related trends be identified through established monitoring programs, and support the development of adaptive management and monitoring strategies as required. PC Term and Condition 184 does not specify that the MEWG or TEWG is responsible for Baffinland's final self-assessment or whether consensus is needed by MEWG members, on whether it is compliant with PC terms and conditions. Baffinland understands that it is the NIRB that will make final decisions on compliance status based on its comprehensive annual review and understanding of all Project operations, monitoring programs, existing mitigation measures and management plans.</p> <p>Baffinland seeks the input and expertise of MEWG members through various methods. As the NIRB is well aware, Baffinland typically meets (via teleconference or in-person) with both the terrestrial and marine working groups (TEWG and MEWG, respectively) a minimum of 3 times per year. During these meetings, Baffinland consistently provides relevant updates on Baffinland's operations including mitigation measures being implemented (or proposed to be implemented), and also updates on most recent results available and/or descriptions of anticipated monitoring programs for the coming field season. Through these exchanges, Baffinland is able to obtain input on its programs, including program design, data analysis and interpretation, which includes discussing whether results are consistent with Final Environmental Impact Statement (FEIS) predictions (and subsequent addendums). In addition to these meetings, working group members can provide comments on draft versions of Baffinland's various monitoring reports on an annual basis. Baffinland subsequently considers the comments prior to issuing final drafts based on the feedback provided by the working groups. Baffinland's responses to comments are included as appendices to final drafts, and where applicable, Baffinland aims to provide rationale if specific feedback was not incorporated into the same year's report, but may be considered as part of future monitoring and/or reporting efforts. Working groups are also given the opportunity to provide input during the review period following submission of Baffinland's Annual Report to the NIRB, and this may include feedback on whether they are in agreement with Baffinland's compliance status for applicable terms and conditions. As done for individual monitoring program reports, Baffinland also submits to the NIRB formal responses to comments received by all parties.</p> <p>Working group members are thus able to provide meaningful feedback throughout the year and Baffinland has the opportunity to respond to feedback both informally/formally during working group meeting discussions and more formally through NIRB review processes. Baffinland intends to continue engaging with its working groups to obtain meaningful feedback into its programs and in the development of new mitigation measures as deemed necessary through review of most recent monitoring results and other available and relevant data.</p>	PC Condition No. 184

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