Nunavut Water Board (NWB)
P.O. Box 119
Gjoa Haven, NU
X0B 1J0
Attention: Stephanie Autut, Executive Director

December 21, 2018

Re: Submission of Baffinland Responses to Intervener Information Requests in relation to the Type A Water License Amendment for the Phase 2 Development Proposal

Please find enclosed a copy of Baffinland Iron Mines Corporation's ('Baffinland') Supplementary Information Request Response Package in relation to the *Application to Amend Type A Water License 2AM-MRY1325, August 2018* (the 'Application') for Phase 2 of the Mary River Project. This package is intended to supplement the Information Request Response Package submitted on December 19, 2018 in relation to the *Addendum to the Final Environmental Impact Statement, August 2018* (FEIS Addendum) for Phase 2. Although this previous submission consolidates responses for both amendment processes given the overlap in materials, Baffinland is providing this supplementary submission as a means to maintain the scope of the review for those reviewers not involved in the NIRB process.

Baffinland would also like to take this opportunity to address several issues of concern raised by reviewers in their submissions to the NWB relating to the integrity of the Application and the management of the coordinated review process. The points addressed below are verbatim from the covering letter submitted by the Qikiqtani Inuit Association (QIA), but also reflect similar comments made by Crown-Indigenous Relations and Northern Affairs (CIRNAC) in their cover letter, both submitted November 23, 2018.

- *Absence of updated management, monitoring, and mitigation plans reflecting added activities and undertakings proposed*

As described in TSD-28 of the FEIS Addendum, Baffinland will provide 'in text' edits to its management plans, including the Interim Waste Rock Management Plan and Interim Closure and Reclamation Plan (ICRP) following the Technical Meeting, currently scheduled for March 12-15, 2019. The intention is that reviewers will be able to comment on the implementation of their recommended edits through final written submissions. In the interim, proposed edits will be captured in the Commitment Register, included as Appendix 4 to the enclosed submission, as a means of document control.

- *Lack of details on financial/reclamation security including an updated closure and reclamation plan that is consistent with the activities and/undertakings proposed*

An estimate of the total reclamation security for the highest liability over the life of the project will be included in the revised ICRP. As stated above, this update to the ICRP will be submitted for review following the Technical Meeting, currently planned for March 12-15, 2019. However, it is noted that Baffinland will continue to assess security on an annual basis through the Annual Security Review process outlined in the current Water Licence 2AM-MRY1325 and the Commercial Lease.

- *Lack of complete or fully developed engineering drawings/design for many of the water and waste management infrastructure/facilities proposed*

Baffinland notes the NWB's Guide to Completing and Submitting Water Licence Applications does not require the submission of final plans as part of the water licensing approval process unless there is some technical complexity. Much of the Phase 2 Proposal is not technically complex, including the in-water and waste disposal aspects, and therefore the drawings presented in the application provide a sufficient level of detail for the impacts of the project and the mitigations proposed to be assessed. Regardless, Baffinland has submitted 'Issued for Construction' (IFC) drawings wherever possible and will continue to do so throughout the review process. Of course, Baffinland will submit all IFC drawings for review 60 days prior to construction, consistent with the NWB guidelines and the conditions of the Type A Water Licence 2AM-MRY1325.

Closing

Baffinland acknowledges that many reviewers are operating with constrained resources through the Phase 2 review and that a coordinated process can double the demand for their attention. That being said, this process is also a complex undertaking for the Boards and Baffinland, and has not been proposed without serious consideration of the overall benefits to the integrity of the review, as well as the requirements of the Phase 2 development timeline. Baffinland believes it has provided the necessary information to carry the coordinated review to the Technical Meetings and Pre-Hearing Conference, after which the NIRB and NWB review processes will run in parallel but separate.

Baffinland appreciates the efforts put forward by reviewers in their submissions and the opportunity to provide the enclosed Supplementary Information Request Response Package for the Phase 2 Proposal. We trust the responses provided will satisfy the requirements of the NWB to issue a formal Notice of Application and initiate the technical review period. The Phase 2 Proposal represents a significant opportunity for Baffinland and Nunavut and we are committed to working collaboratively such that the benefits of the Phase 2 Proposal can be fully realized.

Sincerely,

Megan Lord-Hoyle

Megan Lord-Hoyle
Director, Sustainable Development

CC Karen Kharatyan, Nunavut Water Board
Assol Kubeisinova, Nunavut Water Board
Ryan Barry, Nunavut Impact Review Board
Solomon Amuno, Nunavut Impact Review Board
Tara Arko, Nunavut Impact Review Board
Grant Goddard, Baffinland Iron Mine Corporation
Lou Kamermans, Baffinland Iron Mine Corporation

Water License IR Responses
Phase 2 Proposal – Mary River Project

Baffinland Iron Mines Corporation
Mary River Project
NIRB File No. 08MN053

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LIST OF ATTACHMENTS

ENVIRONMENT AND CLIMATE CHANGE CANADA

ID1	Info Request	Response	Attachment
ECCC WL 01	ECCC requests that Baffinland Iron Mines Corporation (the Proponent): 1. Clarify whether monitoring of collection pond water quality will be done prior to use for dust suppression and how this monitoring would be undertaken. 2. Identify whether it is feasible to consolidate collected runoff for management and water quality testing.	1. Prior to use for dust suppression, water quality monitoring of contact water will be completed to ensure that the water meets the appropriate effluent discharge limits detailed in the Project's Type 'A' Water Licence. Monitoring will be undertaken through sampling of water prior to discharge/use. 2. Effluent collected in the additional ponds at Milne Port will be used for water suppression or will be trucked to one of the existing ponds, or the shore, to be discharged to Milne Inlet via the existing approved discharges. Because an existing discharge will be used, new Surveillance Network Program (SNP) stations were not identified for each of the new ponds. It is conceivable, however, that effluent testing would be conducted at these new ponds, and for this reason, it may be appropriate to establish new SNP stations for each of the new ponds.	
ECCC WL 02	ECCC requests that the Proponent clarify where pond water in the ore processing drainage area will be discharged.	Effluent discharged from the proposed Crushing Feed Stockpile surface water management pond will be pumped to the approved Mary River outfall discharge location, currently used to discharge treated effluent from both the Mine Site Sewage Treatment Plant (MS-01) and the surface water management pond that services the Mine Site Crusher Facility (MS-06). The new final discharge point (FDP) and outfall location for the new surface water management pond will be established in accordance with the Metal and Diamond Mining Effluent Regulations. This commitment is reflected in the Commitment Register (Appendix 11). A figure showing water monitoring location is provided in the Attachment to this response (Appendix 4)	Appendix 4 Commitment Register ECCC WL 02: Attachment 1: Mine Site Layout and MDMER/Water Licence Monitoring Locations
ECCC WL 03	ECCC requests that the Proponent identify how additional camp wastewater treatment needs will be met, and if there will be any potential changes to receiving environments due to increased discharges as well as if additional mitigation measures will be required.	Details on additional wastewater treatment infrastructure will be provided through the technical review period. Additional infrastructure is expected to utilize similar technologies as that currently existing on site. No potential changes to receiving environments due to increased discharges are expected as even with this additional infrastructure, Baffinland's operations will remain within the water taking and discharge volume limits prescribed in the existing water licence. All discharges must also meet the appropriate effluent quality parameters in this water licence.	
ECCC 09	ECCC requests that the Proponent develop a management plan to mitigate potential effects to adjacent waterbodies from the application of calcium chloride for dust suppression.	This is identified as a Technical Comment; a response will be provided during the technical review period	
ECCC 10	ECCC requests that the Proponent: 1. Provide information on how mitigation has reduced dustfall deposition and sedimentation in waterbodies since the previously documented dust exceedances, and how these methods will be sufficient to mitigate the expected further increases in dust due to the Phase 2 Project. 2. Provide information on how dust deposition and subsequent impacts to water quality will be monitored and mitigated along the transportation corridor and at Milne Port.	1. Dustfall deposition for the ERP was anticipated to be greatest at the Mine Site. Recent monitoring of sediment deposition rates in aquatic environments (Sheardown Lake NW) at the Mine Site in 2018 indicate that deposition rates are significantly less than thresholds associated with potential effects on incubating fish eggs. Key dust mitigation measures implemented to date at the Project include the use of water, CaCl2 and the installation of coverings on Mine Site ore crushers. As part of Phase 2, dust deposition at the Mine Site is anticipated to be reduced further with the relocation of secondary ore crushing to the enclosed facility at Milne Port. Additionally, dust deposition along the Northern Transportation Corridor will be reduced as ore transportation is transitioned to rail. As noted in the original FEIS, dust is anticipated to play a minor role in the overall sediment deposition rates in aquatic environments. 2. Dust deposition will be monitored as detailed in the Project's current Dustfall Monitoring Program (TSD 28 Management and Monitoring Plans, Appendix X-Attachment 6) and expanded to include additional monitoring locations as required for the Northern Transportation Corridor. This commitment is reflected in the Commitment Register (Appendix 11). Other monitoring programs of note include: • Aquatic Effects Monitoring Plan (TSD-28 Management and Monitoring Plans, Appendix T) – governs monitoring of water and sediment quality around the Mine Site • Tote Road Monitoring Program (planned implementation in 2019 after finalization with the QIA) – focused on measuring total suspended solids (TSS) and would capture dustfall runoff into surface water.	Appendix 4 Commitment Registerr
ECCC 11	ECCC requests that the Proponent identify criteria that would be used to determine whether runoff from the ore transfer area stockpiles is suitable for dust suppression along the North Transportation Corridor.	Runoff retained by surface water management infrastructure and recycled for dust suppression purposes will be compliant with the water quality criteria detailed in the Project's Type 'A' Water Licence.	

ID1	Info Request	Response	Attachment
ECCC 12	ECCC requests that the Proponent provide information on the expected water quality impacts on Phillips Creek due to dust deposition in the Milne Port Area, including predicted metal concentrations.	This is identified as a Technical Comment; a response will be provided during the technical review period	
ECCC 17	ECCC request that the Proponent provide an updated Aquatic Effects Monitoring Plan and that this plan monitors for potential impacts to aquatic ecosystems across the whole project (mine site, Milne Port, and transportation corridor including the Northern Railway).	This is identified as a Technical Comment; a response will be provided during the technical review period	
ECCC 18	ECCC requests that the Proponent identify how additional camp wastewater treatment needs will be met, and if there will be any potential changes to receiving environments due to increased discharges as well as if additional mitigation measures will be required.	The requested information is presented in Section 4.7 of the Water Licence Amendment Application (TSD 2 Project Description, Appendix D) as well as the attachments referenced in that section.	
ECCC 19	ECCC requests that the Proponent provide updates to Section 6 describing the potential maximum volumes of oily water/wastewater, treatment capacity, monitoring and contingency measures associated with Phase 2 expansion.	This is identified as a Technical Comment; a response will be provided during the technical review period	
ECCC 20	ECCC requests that the Proponent include Total Petroleum Hydrocarbons (TPH) as a monitoring parameter for oily water treatment facilities, bulk fuel storage facilities, and landfarm facilities. ECCC recommends that discharge limits be reduced to 5 mg/L for TPH.	This is identified as a Technical Comment; a response will be provided during the technical review period	
ECCC 21	ECCC requests that the Proponent update references of the MMER to MDMER.	References to the Metal Mining Effluent Regulations (MMER) under the Fisheries Act will be updated to refer to the current Metal and Diamond Mining Effluent Regulations (MDMER) in all relevant management plans, including the Metal Mining Effluent Regulations Emergency Response Plan, the Interim Closure and Reclamation Plan, the Marine Environmental Effects Monitoring Plan, the Interim Waste Rock Management Plan, the Phase 1 Waste Rock Management Plan, the Life-of-Mine Waste Rock Management Plan, and the Aquatic Effects Monitoring Plan. This commitment is reflected in the Commitment Register (Appendix 11).	Appendix 4 Commitment Register
ECCC 22	ECCC requests that the Proponent: 1. Revise Table 1 to include the updates that are required for the Landfill Maintenance and Operations Manual. These updates are identified in Table 11. 2. Update the Landfill Maintenance and Operations Manual accordingly.	1. Table 1 indicates that the Landfill Maintenance and Operations Manual does require an update, which is detailed in Table 11. Table 1 will not be edited through the review process. 2. The proposed updates are reflected in the Commitment Register (Appendix 11).	Appendix 4 Commitment Register
ECCC 23	CCC requests that the Proponent update the Environmental Protection Plan (EPP) to include: • Dust management/suppression during construction and operation of North Railway • Details on water quality monitoring during construction of the ore dock • Updates to the EPP related to changes at Milne Port	This is identified as a Technical Comment; a response will be provided during the technical review period	
ECCC 24	ECCC requests that the Proponent provide a description of the changes to the Interim Closure and Reclamation Plan that will be required as part of the changes at Milne Port during the Phase 2 Project.	The infrastructure and earthworks at Milne Port associated with the Phase 2 Project will require minimal updates to the ICRP, and generally be restricted to the Project Description, Site Plans, Post Closure Monitoring and Closure Objectives. Updates to the Closure Objectives and Criteria will be required to include the second Ore Dock, but the closure principals for all other infrastructure and earthworks are already considered directly or indirectly in the existing ICRP.	

THE QIKIQTANI INUIT ASSOCIATION

ID1	Info Request	Response	Attachment
QIA WL 01	1. An estimate of the total financial/reclamation security for the highest liability over the life of the undertaking should be provided in the application, as required in the NWB's SIG. 2. It is requested that details on the expected overall reclamation cost be provided so that parties can consider the information in the context of the current review process rather than outside of or sperate from the current review process.	An estimate of the total reclamation security for the highest liability over the life of the project will be included in the revised Interim Closure and Reclamation Plan. The planned updates to mitigation and monitoring plans will be reflected in the Commitment Register (Appendix 11). All management plans are expected to be updated following the Technical Meeting, currently planned for March 12-15, 2019. However, it is noted that Baffinland will continue to assess security on an annual basis through the Annual Security Review process outlined in the current Water Licence 2AM-MRY1325 and the Commercial Lease.	Appendix 4 Commitment Register
QIA WL 02	1. In accordance with relevant NWB guidelines, new/updated plans must be submitted for applications related to new activities/undertakings. Baffinland states that the current Interim Closure and Reclamation Plan (ICRP) includes all elements of the Phase II Proposal. However, information contained in the document suggests otherwise. 2. The reference to Part J, item 2 in the application is erroneous, and misleading. The amendment in reference in Item 2 is the approved Amendment 1, not future applications for amendments. As per the NWB guidelines a new plan should be submitted with the application, specific for the new activities 3. Baffinland should clarify the current Project scope in the approved ICRP and what components of the Phase II Proposal are in the current ICRP (if any). To ensure that reviewers are able to access and review the components of the ICRP including those relevant to the Phase II Proposal, an updated version of the ICRP should be provided for the current review process.	1. The ICRP will be updated to include the location and scale of the Phase 2 earthworks and infrastructure, as outlined in TSD 28 Management and Monitoring Plans. The scope of earthworks and infrastructure considered in Phase 2 is consistent with, or a variation on the existing scale of the project as approved under Project Certificate No. 005, for which closure strategies, objectives and criteria have been developed in the ICRP. In discussions with QIA, Baffinland has made clear that an update to the ICRP will be required for Phase 2 Proposal and that QIA approval will be required. Consistent with all management plan updates outlined in TSD 28, the ICRP will be updated. The planned updates to mitigation and monitoring plans will be reflected in the Commitment Register (Appendix 11). 2. Part J, Item 2 states the following: *The Licensee shall to submit to the Board for Approval in writing, within sixty (60) days following approval of this Amendment, a revised version of the Plan entitled Interim Closure and Reclamation Plan (BAF-PH1-830-P16-0012, Rev 3), March 19, 2015, that addresses the relevant comments and recommendations provided by intervening parties during the review period. The Plan under this section will supersede the Plan referred to in Part J, Item 1 once approved and must address all mine related components including the following….* We understand that this clause was written for Amendment 1. If that process was suitable during Amendment 1, it would seem to be applicable to the current amendment application; that an update to the current plan can be submitted to the NWB within 60 days of approval of receiving Amendment 2 that incorporates any comments and recommendations provided by intervening parties during the review period, and the revised plan will be subject to review by the parties and approval by the NWB. 3. The scope of the ICRP considers the current mining operations at Deposit 1, stockpiling, crushing and hauling of ore, the operation of the waste rock facility, transportation of ore by truck on the Tote Road, stockpiling and shiploading of ore (including the Ore Dock), and various support infrastructure at the Mine and Milne port including; transportation (roads, airstrip, helipad), accommodations, utilities (power, water and sewage), warehouses/offices/garages, waste storage (landfills, landfarms, hazardous waste berms), polishing and sedimentation ponds, and quarry and borrow areas. In addition, the ICRP considers the closure strategy for the approved railway execution phase of the project under Project Certificate No. 005, and other associated infrastructure associated with this phase but not yet constructed. Phase 2 will include the addition of the railway in the Northern Transportation Corridor, reconfiguration of and new construction of crushing, screening and stockpiling facilities, and an additional Ore Dock and shiploader at Milne Port. Support infrastructure will remain generally consistent with the Approved Project. With respect to changes required for the ICRP, the description of this infrastructure and earthworks, as well as all figures demonstrating their location will need to be updated. Closure strategies, criteria and objectives remain the same, including for railway infrastructure already considered in the ICRP. Consistent with all management plan updates outlined in TSD 28, the ICRP will be updated. The planned updates to mitigation and monitoring plans will be reflected in the Commitment Register (Appendix 11)	Appendix 4 Commitment Register
QIA WL 03	It is requested that copies of IFC drawings/designs for water and waste management facilities be provided in time for the current review process.	The NWB's Guide to Completing and Submitting Water Licence Applications states the following: *Generally, the NWB requires final plans to be submitted for review and approval. Submissions may be approved either as part of the water licence application or prior to construction as a condition of an*	

ID1	Info Request	Response	Attachment
		approved water licence. Depending upon the complexity of the technical issues associated with a proposed undertaking, the NWB may request final plans to be submitted as part of the water licensing approval process. The application contained a mix of drawings labelled, "Issued for Construction," "Approved for Construction," and "Not for Construction". Much of the Phase 2 Proposal is not technically complex, including the in-water and waste disposal aspects of the Phase 2 Proposal, and therefore the drawings presented in the application provide a sufficient level of detail for the impacts of the project and the mitigations proposed to be assessed. Consistent with the NWB guidelines and the conditions of the Type A Water Licence 2AM-MRY1325, Baffinland will submit all IFC drawings for review 60 days prior to construction.	
QIA WL 04	QIA requests that updated versions of these plans (management and/or monitoring plans) or relevant new plans, which addresses Phase II activities and undertakings, be provided to parties for review at the earliest stage under the current review process.	The planned updates to mitigation and monitoring plans will be reflected in the Commitment Register (Appendix 11). All relevant management plans are expected to be updated following the Technical Meeting, currently planned for March 12-15, 2019.	Appendix 4 Commitment Register
QIA WL 05	QIA notes that the current Water Compensation Agreement (WCA) and the Commercial Production Lease (CPL) do not cover the activities and/or undertakings proposed under the Phase II Proposal. Consequently, the CPL and WCA will likely need to be amended/new ones will need to be developed and implemented.	Baffinland recognizes that updates to the WCA and CPL are necessary and has already begun discussions with the QIA and will continue to work with the QIA to develop amended versions prior to the NWB Public Hearing	

FISHERIES AND OCEANS CANADA

ID1	Info Request	Response	Attachment
DFO 3.1.1	Provide an updated table which contains all information related to watercourse crossings, diversions, and encroachments. The table should include: a) A numbered list of proposed crossings, diversions, and encroachments; b) If the crossing is permanent, temporary, new, replacement, extension, or modification; c) The type of crossing structure (e.g. bridge, culvert). In cases where a single or multi barrel culvert crossing is proposed, please indicate if a box culvert or bridge is a feasible alternative; d) Information regarding locations that will have more than one crossing, diversion, or encroachment on the same waterbody; e) Fish-bearing status and species present. For fish-bearing status, please indicate yes/no. In cases where uncertainty exists (e.g. "possible, "probable", "possible", "unlikely"), DFO will consider these habitats to be fish-bearing; f) Description of fish habitat and waterbody characteristics; and, g) Amount (m2) of fish habitat permanently altered or destroyed at each site.	The inconsistencies in several of the peripheral TSDs is acknowledged. TSD 14 (Freshwater Biota and Habitat Assessment) is the definitive document for this information, and Table A1-1 of that document provides a full listing of these sites. Attachment 8.1 of TSD 2 Project Description, Appendix D (Application to Amend the Type A Water Licence) presents the same information as well as the requested details with regard to the type of structure, number of culverts, and fish-bearing status. The information in the table presented as Attachment 8.1 has been confirmed to be correct. The amount of fish habitat estimated to be either altered or lost at each site is presented in Tables 4-3 to 4-7 in Appendix 1 of TSD 14. All this information has been consolidated into a single table presented as an Attachment to this response (Appendix 4). The exception is the identification of which crossings are best suited for bridges or box culverts. The project proposed to use corrugated steel pipe (CSP) culverts at the vast majority of crossings, since culverts offer substantial benefits in terms of cost, ease of installation, scheduling considerations, and physical properties that are preferable for arctic conditions: Cost: CSP culverts offer cost benefits over other crossing structures. Ease of installation/scheduling considerations: More than 400 crossings need to be installed. CSP culverts can be installed quickly and efficiently. Construction is focused on working during the shoulder seasons while the water is frozen and there is no flow in the streams. Physical properties: The tolerance of CSP culverts to compressive and tensile stresses make them very suitable for use in the Arctic conditions since changes in the rail embankment and long-term settlement remain a risk even if the design includes consideration of this. Therefore, these culverts provide flexibility into the future while some of the other culvert solutions pose risks should excessive settlement and creep be experienced. The culverts are galvanized and with the low corrosion level on site due to the area being classified as an Arctic desert there is little to no risk of corrosion being a problem. Further to this there is not any debris and organic matter in the streams since vegetation levels are so low. Ease of repair: These culverts also offer the ability for easy repair should a total culvert failure occur. Despite these advantages, Baffinland is currently reviewing the crossings to identify a short-list of crossings that are better suited to alternatives to CSP culverts and will be prepared to table this for discussion with DFO in the upcoming weeks.	DFO 3.1.1 Attachment 1: List of Stream Crossings (Culverts), Bridges, Cuts/Diversions, and Lake/Pond Encroachments/Infills Along the North Rail Alignment and Tote Road Realignment and Fish Habitat Summary

CROWN-INDIGENOUS RELATIONS AND NORTHERN AFFAIRS CANADA

ID	Info Request	Response	Attachment
CIRNAC WL 01	CIRNAC recommends that the Proponent identify and describe the incremental mining activities that will be required to achieve the proposed increase in ore production rate from the Project.	The Mine Plan remains unchanged, only the rate of mining will differ from a previous maximum rate of 22.2 Mtpa to 30 Mtpa, and an interim period at 12 Mtpa. More explosives will be consumed, and more trucks will deliver ore from the pit to the crusher. Rail loading facilities at the Mine Site and the North Railway will deliver the increased ore to Milne Port. Stockpiles at Milne Port will be larger to accommodate additional ore, and a second ship loader and ore dock will be constructed to transport the ore to market. The updated air quality model accounts for the increased rate of mining, movement of ore and stockpiling. In terms of waste rock production and stockpiling at the Mine Site, no changes are proposed as the result of the Phase 2 Proposal. The method of stockpiling and ultimate waste rock stockpile are subject to the same management processes as proposed and assessed through the original FEIS and Type A Water License Application, and implemented through the existing Project Certificate and Type A Water License. The Key Facts Table, attached as Appendix C to TSD-02 'Project Description' does include annual waste rock production quantities, generated by the simplified method of applying the most recent overall strip ratio of 1.6 to the anticipated ore production level for that year. An Interim Waste Rock Management Plan was issued in March 2018, and will be updated in December 2018. This version of the Plan will include the planned waste rock deposition rate through 2019. The 1 to 5 year plan will be submitted later in 2019 and will cover the next 5 years of operations.	
CIRNAC WL 02	CIRNAC recommends that the revised Waste Rock Management Plan undergo a comprehensive review and approval process prior to approving the licence and initiating any Phase 2 waste rock production.	The revised Phase 1 Waste Rock Management plan will be submitted for review by Interveners, consistent with the existing terms and conditions of the Type "A" Water Licence 2AM-MRY1325, Part B Item 17. An Interim Waste Rock Management Plan was issued in March 2018, and will be updated in December 2018, detailing how ARD issues at the Waste Rock Facility are being addressed and will include further studies to assess waste rock geochemistry and thermal modelling. These updates, studies and revised management practices are required to address ARD issues regardless of the rate of waste rock generation or production. As such, these updates are unrelated to the Phase 2 expansion and will be implemented regardless of the outcome of the review process. Baffinland continues to effectively manage ARD at the Waste Rock Facility with an active water treatment system which has resulted in discharges from the facility meeting the applicable Water Licence and MDMER discharge criteria. Consistent with the Life of Mine Waste Rock Management Plan (BAF-PH1-830-P16-0031), Baffinland will continue to employ adaptive strategies as information is gained over the life of the Project from on-going characterization of waste rock, including depositional strategy, runoff management and final closure.	
CIRNAC WL 03	CIRNAC recommends that the revised ICRP be provided for review during the current water licence amendment process. The revised ICRP should propose a well-supported method of permanently reclaiming the pit and data to back up the decision. If this is not feasible, BIMC should provide a summary of all anticipated changes to the ICRP that will be required to address the incremental infrastructure and activities associated with Phase 2.	A draft Interim Closure and Reclamation Plan (ICRP) will be provided for review by Interveners during the water licence amendment process, with the final approved plan to be filed 60-days following approval of the licence amendment. Regarding reclamation of the pit, the approved ICRP Revision 4 (2016) addresses this in Section 9.2, and the ICRP Revision 5 (2018) addresses this in section 5.2.1. The final site condition of the open pit will be a pit lake that drains to the natural environment through the spillway and natural drainage. The ICRP Revision 5 further details reclamation research associated with the open pit water quality to improve predictions throughout the operation of the mine. Given that mining commenced on a hill crest outcrop and will progress until year 10 to 12 of operation at full production before an open pit is formed, updates to the ICRP with additional detail than what has been provided to date is not necessary to consider the Phase 2 amendment. The principal change to the ICRP will be the inclusion of rail transportation along the northern corridor. All other infrastructure and earthworks associated with the Phase 2 expansion are addressed through existing closure	

ID	Info Request	Response	Attachment
		objectives, criteria and principals. Additionally, reclamation of the southern rail corridor is considered in the ICRP, so the inclusion of the northern rail is a refinement of these principals based on the change in location and scale.	
CIRNAC WL 04	Given the potential environmental risks associated with ARD/ML from quarried rock and cut/fill excavations, CIRNAC recommends that BIMC present an in-depth description justifying their conclusion that additional geochemical characterization is not warranted.	Discussions on geochemical testing and ARD/ML potential are presented in Section 2.7.2 of the Water Licence Amendment Application, Section 2.5.3 of TSD-08 (Landforms, Soils and Permafrost Assessment), and Section 3.5.3 of TSD-13 (Surface Water Assessment). Section 3.5.3 of TSD-13 states, in part: "Based on geochemical testing completed to date, the risk of these activities generating ARD/ML within the sedimentary rocks is negligible, and within the granitic and diabase rocks the risk is low but not negligible. Baffinland's Borrow Pit and Quarry Management Plan (Baffinland, 2014) prescribes site-specific geochemical testing of rocks prior to quarrying. As a precautionary measure, quarries and rock cuts within the granitic and diabase rock materials will be subject to geochemical testing to confirm that the material is geochemically suitable." Though not explicitly stated in the Water Licence Amendment Application, Baffinland intends to complete geochemical testing to confirm ARD/ML potential before use of quarried rock or rock removed from rock cuts. The Protocol for the Assessment of the Potential for Acid Rock Drainage included as Appendix B of Baffinland's Borrow Pit and Quarry Management Plan will be applied to rock cuts and quarries as part of the Phase 2 Project. Individual Quarry Management Plans prepared for each quarry location and the North Railway will provide additional detail on geochemical testing frequency.	
CIRNAC WL 05	Given any relevant technical information to the Phase 2 Proposal that may be contained in the various management plans, BIMC should provide updated versions of all of the affected management plans, or at least provide TSD 28 containing detailed descriptions of the proposed edits to the management plans prescribed by both the Water Licence and by NIRB" (EIS preparation guidelines for Mary River Project).	The planned updates to mitigation and monitoring plans will be reflected in the Commitment Register (Appendix 4). All relevant management plans are expected to be updated following the Technical Meeting, currently planned for March 12-15, 2019.	Appendix 4 Commitment Register
CIRNAC WL 06	We request that BIMC provide additional information on the SNP and other aquatic monitoring programs and proposed changes to these stations including figures/maps describing monitoring stations in relation to new facilities and nearby watercourses.	The monitoring stations proposed in the application are directly associated with new water management infrastructure at Milne Port and the Ore Staging Area, which are clearly identified on drawings submitted with the application. For clarity, the SNP sites have been added to the relevant figures and provided as Appendix 2. Monitoring from these locations will ensure that water quality meets the applicable discharge criteria set out in the Type 'A' Water Licence.	
CIRNAC 8	CIRNAC requests that the Proponent provide: a) Geochemical testing of rock cut areas in the North Railway area; and b) Information available on the risk of encountering ARD/ML material in the North Railway construction materials and how this can be mitigated effectively to avoid unexpected problems in the long term.	a) Appendix B of Baffinland's Borrow Pit and Quarry Management Plan presents a Protocol for the Assessment for the Potential for Acid Rock Drainage. The analytical criteria that are used for classifying material as potentially acid-generating (PAG) are: 1) Neutralization Potential Ratio (NPR) < 2 2) Sulphur concentration > 0.20% b) Documents provided in response to CIRNAC-IR#:10 provide information on ARD/ML testing that has been completed.	
CIRNAC 11	CIRNAC requests that the Proponent provide the following: a) The proposed areas of snow stockpiles at Milne Port and along the Tote Road; b) Details on the physical delineation of 31 m boundary from water body in the Snow Management Plan; and c) Description of methods used in the field to delineate these areas.	a, b) BIM will update the Snow Management Plan with the requested information, as outlined in the Commitment Register (Appendix 11). The current Snow Management Plan includes snow stockpiles for both Milne Port and Tote Road. Note that snow stockpiles contain only non-contaminated snow. c) To ensure the limits of snow stockpiles are at least 31 metres from the ordinary high-water mark of nearby water bodies, Baffinland will delineate the limits of snow stockpile areas using stakes or similar in-field markers.	Appendix 4 Commitment Register
CIRNAC 12	CIRNAC requests that the Proponent provide the following: a) Details on contaminated snow and ice collected volumes from previous and current operations at site; and b) Details on projected volumes and requirements.	a) Volumes of hydrocarbon contaminated snow and ice are presented in the QIA/NWB Annual Report for Operations which can be found on the NWB's ftp site.	

ID	Info Request	Response	Attachment
		b) Projections of additional contaminated quantities of snow requiring storage due to the Phase 2 Project are difficult to quantify objectively as the majority of contaminated snow is sourced from unplanned spills/releases of hazardous substances. If additional contaminated snow storage locations are required, they will be identified and developed in accordance with Baffinland's Type A Water Licence. Baffinland already plans to increase its hazardous material containment capacity in 2019 through the construction of lined containment berms that have been included in the 2019 Work Plan as part of the approved project.	
CIRNAC 13	CIRNAC requests that the Proponent provide the following: a) A summary of the investigation reports mentioned above describing the geological conditions and geotechnical investigations along the Railway alignment; and b) A summary of the feasibility study mentioned above regarding the North Railway embankment designs (Hatch 2017c).	The referenced geotechnical reports are presented as appendices to the Application to Amend the Type A Water Licence (TSD 2 Project Description, Appendix D). Geotechnical reports are presented as Attachments 6.1, 6.2, 6.3, and 12.1 to 12.4. The Project Description (TSD 2) provides a summary level of the feasibility study; the feasibility study is not a public document.	
CIRNAC 14	CIRNAC requests that the Proponent provide the following: a) Thermal modelling or analysis and monitoring plans for the entire service life of the infrastructure and related facilities such as the North Railway, docks, railway embankments, bridges, and other relevant components, as well as for the WRF; b) Incorporate the site-specific meteorological information in its climate change assessment and update the relevant modelling accordingly; c) Clarification as to when the Proponent expects suitable data to become available for updating thermal modelling; and d) Thaw consolidation data or thaw strain predictions for various infrastructures, namely North Railway, docks, railway embankments, bridges, and other relevant components.	a) Thermal modelling for the North Railway is currently being updated and will be made available with the technical response. Thermal modelling for port infrastructure will be provided after that date. The waste rock facility (WRF) is not part of the Phase 2 Proposal. b) This is being done as part of the current updates to the thermal models. c) See response to Part A. d) Settlement was considered in the geotechnical reports for the various project components. See Attachments 5.2, 6.3 and 12.2 of TSD 2 Project Description, Appendix D.	
CIRNAC 15	CIRNAC requests that the Proponent provide the following: a) Relevant updates to the Phase 1 Waste Rock Management Plan on closure strategies based on thermal modelling in light of climate change; b) Additional short and long term contingencies for managing potential ARD/ML concerns; and c) Comparison to other relevant mine sites in similar climatic conditions using the strategy establishing and maintaining permafrost in order to encapsulate PAG material within a waste rock storage facility.	This is identified as a Technical Comment; a response will be provided during the technical review period	
CIRNAC 16	CIRNAC requests that the Proponent provide the following: a) Clear description of expected changes in quantities and types of waste (including sewage) that would be required to be managed under Phase 2; b) Locations and capacities of key management infrastructure such as landfills, incinerators and sewage treatment plants; and c) Details related to expected changes in quantities and type of hazardous materials associated with Phase 2 and their expected management, particularly those associated with fuel and explosive agents.	The Application to Amend the Type A Water Licence (TSD 2 Project Description, Appendix D) contains these specific details. Table 4.3 presents quantities of solid waste, sewage effluent and hazardous waste expected to be generated from the Phase 2 Proposal. Sewage volumes are summarized in Section 4.7 and site water balances presented as Attachments 11.2 and 11.4 (to the water licence application). The locations of landfills, incinerators and sewage treatment plants are shown on Figures B.1 and B.5.	
CIRNAC 17	CIRNAC requests that the Proponent provide the following: a) The 2014 version of Mine Rock ML/ARD Characterization Report Deposit 1, Mary River Project, as appended to the Life-of-Mine Waste Rock Management Plan; b) Detailed results from the blast hole data completed in 2017, referred to in the Interim Waste Rock Management Plan; c) Detailed results from 2018 Geochemical Evaluation, referred to in the Interim Waste Rock Management Plan; and d) Geochemical reports or data sets from mine sites in comparable climatic conditions.	a) The Life-of-Mine Waste Rock Management Plan and attachments can be found on Baffinland's Document Portal, located on Baffinland's website at http://www.baffinland.com/document-portal-new/?cat=9&archive=0&lang=en. It is also included as Appendix J of TSD 28. b) 2017 blasting hole data and summary tables were provided in Appendix E.6 of the 2017 QIA and NWB Annual Report for Operations, provided to regulators on March 31, 2018 and available on the NWB's ftp site c) Results from the 2018 Geochemical Evaluation are not available at this time and will be provided in 2019. d) Baffinland does not have access to geochemical reports or data sets from industry peers in similar climatic conditions.	

APPENDIX 1
ECCC IR ATTACHMENTS

ECCC WL 02: ATTACHMENT 1: MINE SITE LAYOUT AND MDMER/WATER LICENCE MONITORING LOCATIONS

0	17DEC'18	ISSUED WITH TRANSMITTAL	CB	AS	AV
REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED

SAVED: I:\1\02\00181\45\A\Acad\FIGS\B09 R0, 12/17/2018 3:50:47 PM, ASIMPSON PRINTED: 12/17/2018 3:52:44 PM, Layout1, ASIMPSON

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LEGEND:

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INUIT OWNED LAND - SURFACE ONLY EXCLUDING MINERALS
- 🟨 ᐃᓄᐃᑦ ᓄᓇᖁᑎᖓᓂ - ᖃᖓᓂ ᐊᑖᓂᓗ ᐱᖃᓯᐅᑎᓗᒋᑦ ᓴᕕᕐᓴᐅᓂᖏᑦ
INUIT OWNED LAND - SURFACE AND SUBSURFACE INCLUDING MINERALS
- 🟦 ᐃᒥᖅ
WATER
- ▨ (2013 Q10C3001)
BORROW AREAS (2013 UNDER Q10C3001)
- ▨ (Q13C301)
QUARRY AREA (EXISTING UNDER Q13C301)
- RIVER/STREAM/DRAINAGE
- ROAD
- QIA SURFACE COMMERCIAL LEASE BOUNDARY
- LAY FLAT HOSE
- FISH BEARING WATER
- NON-FISH BEARING WATER
- HDPE PIPE
- OVERLAND SURFACE WATER FLOW
- ● WATER QUALITY MONITORING LOCATION
- ● PUMP
- ← DRAINAGE DIRECTION

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 17N.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PLAN BASED ON INFORMATION PROVIDED BY HATCH, DATED (JAN 13, 2015).
4. CONTOUR INTERVAL IS 2.5 METRES.

1. UTM NAD83 ZONE 17N.
2. EAGLE MAPPING (2005).
3. 13, 2015).
4. 2.5

SCALE A 300 150 0 500 1000 1500 m

Baffinland

MARY RIVER PROJECT

MINE SITE LAYOUT AND
MDMER / WATER LICENCE
MONITORING LOCATIONS

Knight Piésold CONSULTING

P/A NO.	REF NO.
NB102-181/45	NB18-00875

FIGURE 1 REV 0

APPENDIX 2
FISHERIES AND OCEANS CANADA

DFO 3.1.1 ATTACHMENT 1: LIST OF STREAM CROSSINGS (CULVERTS), BRIDGES, CUTS/DIVERSIONS, AND LAKE/POND ENCROACHMENTS/INFILLS ALONG THE NORTH RAIL ALIGNMENT AND TOTE ROAD REALIGNMENT AND FISH HABITAT SUMMARY

DFO IR 3.1.1. **List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the north rail alignment and Tote Road realignment and fish habitat summary.**

Number	Site ID	Description	Waterbody Type	Diversion to	Receives Diversion From	Permanent/Temporary	Rail/Road	New/Replacement /Extension /Modification	Other Crossings/Bridges/Encroachments/Cuts on Same Waterbody [1]		Current UTM Coordinates		Arctic Char		Ninespine Stickleback		No. Barrels	Culvert Length (m)	Culvert Diameter (mm)	Stream Order at Crossing/Cut /Bridge	Stream Crossings			Bridges			Lake/Pond Encroachment /Infilling	Cuts		
									Rail Crossing	Road Crossing	Easting	Northing	Fish Bearing	Habitat Quality (MAR/IMP/NFB)	Fish Bearing	Habitat Quality (MAR/IMP/NFB)					Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)	Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)	Lost Habitat (m^2)	Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)
1	CV-0-1	Culvert	S		CV-0-2	PERM	Rail	New	No	Yes; Access road to port infrastructure	504289	7975593	No	NFB	No	NFB	1	6.0	900	n/a										
2	CV-0-2	Cut	S	CV-0-1		PERM	Rail	New	Yes; CV-0-1	Yes; Access road to port infrastructure	504234	7975572	No	NFB	No	NFB	NA	NA	NA	n/a									
3	CV-0-3	Culvert	S			PERM	Rail	New	No	Yes; CV-177	503796	7975281	No	NFB	No	NFB	TBD	TBD	TBD	n/a									
4	CV-1-1	Culvert	S			PERM	Rail	New	No	Yes; CV-176	503802	7975052	No	NFB	No	NFB	TBD	TBD	TBD	n/a									
5	CV-1-2	Culvert	S			PERM	Rail	New	Yes; CV-1-3	No	503830	7974912	No	NFB	No	NFB	TBD	TBD	TBD	n/a									
6	CV-1-3	Culvert	S/P			PERM	Rail	New	No	Yes; CV-175	503820	7974824	No	NFB	No	NFB	TBD	TBD	TBD	n/a									
7	CV-1-4	Culvert	LP			PERM	Rail	New	No	No	503877	7974421	No	NFB	No	NFB	TBD	TBD	TBD	n/a									
8	CV-1-5	Culvert	LP			PERM	Rail	New	No	No	503938	7974333	No	NFB	No	NFB	TBD	TBD	TBD	n/a									
9	CV-1-6	Culvert	S			PERM	Rail	New	No	Yes; CV-174	504292	7974064	No	NFB	No	NFB	1	12.0	900	n/a									
10	CV-1-7	Culvert	S			PERM	Rail	New	No	Yes; CV-173	504662	7973667	No	NFB	No	NFB	1	12.0	900	n/a									
11	CV-1-8	Culvert	S			PERM	Rail	New	No	Yes; CV-173	504895	7973426	No	NFB	No	NFB	1	12.0	900	n/a									
12	CV-1-9	Culvert	S			PERM	Rail	New	No	Yes; CV-173	504924	7973381	No	NFB	No	NFB	1	12.0	900	n/a									
13	CV-2-1	Culvert	S			PERM	Rail	New	No	Yes; CV-170	505154	7973121	No	NFB	No	NFB	1	12.0	900	n/a									
14	CV-2-2	Culvert	S			PERM	Rail	New	No	Yes; CV-170	505217	7973067	No	NFB	No	NFB	1	12.0	900	n/a									
15	CV-3-1	Culvert	S			PERM	Rail	New	No	No	505388	7972906	No	NFB	No	NFB	1	12.0	900	n/a									
16	CV-3-2	Culvert	S			PERM	Rail	New	No	Yes; Unnamed Tote Road	505396	7972893	No	NFB	No	NFB	1	12.0	900	n/a									
17	CV-4-1	Culvert	S			PERM	Rail	New	No	Yes; CV-167, CV-169-1	505666	7972585	No	NFB	No	NFB	1	12.0	900	n/a									
18	CV-4-2	Culvert	S			PERM	Rail	New	No	Yes; CV-167, CV-169-1	505774	7972512	No	NFB	No	NFB	1	12.0	900	n/a									
19	CV-4-3	Culvert	S			PERM	Rail	New	No	Yes; CV-167, CV-169-1	505836	7972435	No	NFB	No	NFB	1	12.0	900	n/a									
20	CV-4-4	Culvert	S			PERM	Rail	New	No	Yes; CV-167, CV-169-1	505862	7972397	No	NFB	No	NFB	1	12.0	900	n/a									
21	CV-4-5	Culvert	S			PERM	Rail	New	No	Yes; CV-166, CV-169-1	506070	7972201	No	NFB	No	NFB	1	12.0	900	n/a									
22	CV-5-1	Culvert	S			PERM	Rail	New	No	Yes; CV-166, CV-169-1	506158	7972031	No	NFB	No	NFB	1	10.0	900	n/a									
23	CV-5-2	Culvert	S			PERM	Rail	New	No	No	506172	7971999	No	NFB	No	NFB	1	10.0	900	n/a									
24	CV-5-3	Culvert	S			PERM	Rail	New	No	Yes; CV-165	506297	7971792	No	NFB	No	NFB	1	10.0	900	n/a									
25	CV-5-4	Culvert	S			PERM	Rail	New	No	Yes; CV-164	506540	7971622	No	NFB	No	NFB	1	10.0	900	n/a									
26	CV-5-5	Culvert	S			PERM	Rail	New	No	Yes; CV-163	506643	7971540	No	NFB	No	NFB	1	10.0	900	n/a									
27	CV-5-6	Culvert	S			PERM	Rail	New	No	Yes; CV-163	506661	7971526	No	NFB	No	NFB	1	10.0	900	n/a									
28	CV-5-7	Culvert	S			PERM	Rail	New	No	No	506781	7971420	No	NFB	No	NFB	1	10.0	900	n/a									
29	CV-6-1	Culvert	S			PERM	Rail	New	No	No	506927	7971257	No	NFB	No	NFB	2	24.0	1200	n/a									
30	CV-6-2	Culvert	S			PERM	Rail	New	No	No	507170	7971061	No	NFB	No	NFB	1	10.0	900	n/a									
31	CV-6-3	Culvert	S			PERM	Rail	New	No	Yes; CV-157	507417	7970910	No	NFB	No	NFB	1	10.0	900	n/a									
32	CV-6-4	Culvert	S			PERM	Rail	New	No	Yes; CV-157	507476	7970841	No	NFB	No	NFB	1	10.0	900	n/a									
33	CV-7-1	Culvert	LP			PERM	Rail	New	No	No	507732	7970526	No	NFB	No	NFB	1	12.0	900	n/a									
34	CV-7-2	Culvert	LP			PERM	Rail	New	No	No	507884	7970336	No	NFB	No	NFB	1	12.0	900	n/a									
35	CV-7-3	Culvert	LP			PERM	Rail	New	No	No	507953	7970255	No	NFB	No	NFB	1	12.0	900	n/a									
36	CV-7-4	Culvert	LP			PERM	Rail	New	No	No	508038	7970146	No	NFB	No	NFB	1	12.0	900	n/a									
37	CV-7-5	Culvert	LP			PERM	Rail	New	No	No	508060	7970116	No	NFB	No	NFB	1	12.0	900	n/a									
38	CV-7-6	Culvert	LP			PERM	Rail	New	No	No	508094	7970073	No	NFB	No	NFB	1	12.0	900	n/a									
39	CV-7-7	Culvert	LP			PERM	Rail	New	No	No	508097	7970069	No	NFB	No	NFB	1	12.0	900	n/a									
40	CV-8-0	Cut	S	CV-8-1 and CV-		PERM	Rail	New	No	Yes; CV-152	508293	7969747	No	NFB	No	NFB	0	NA	NA	n/a									
41	CV-8-1	Culvert	S		CV-8-0	PERM	Rail	New	No	Yes; CV-152	508311	7969712	No	NFB	No	NFB	1	12.0	1200	n/a									
42	CV-8-2	Culvert	S		CV-8-0	PERM	Rail	New	No	Yes; CV-152	508325	7969683	No	NFB	No	NFB	1	18.0	1200	n/a									
43	CV-8-3	Culvert	S			PERM	Rail	New	No	Yes; CV-151	508351	7969601	No	NFB	No	NFB	1	12.0	900	n/a									
44	CV-8-4	Culvert	S			PERM	Rail	New	No	No	508412	7969338	No	NFB	No	NFB	1	12.0	1200	n/a									
45	CV-9-1	Culvert	S			PERM	Rail	New	No	Yes; CV-146, CV-146-1	508805	7968873	No	NFB	No	NFB	6	12.0	900	n/a									
46	CV-10-1	Culvert	LP			PERM	Rail	New	No	No	509365	7968264	No	NFB	No	NFB	1	6.0	900	n/a									
47	CV-10-2	Culvert	LP			PERM	Rail	New	No	No	509637	7968011	No	NFB	No	NFB	1	6.0	900	n/a									
48	CV-10-3	Culvert	LP			PERM	Rail	New	No	No	509653	7967999	No	NFB	No	NFB	1	6.0	900	n/a									
49	CV-10-4	Culvert	LP			PERM	Rail	New	No	No	509829	7967867	No	NFB	No	NFB	1	6.0	900	n/a									
50	CV-10-5	Culvert	S			PERM	Rail	New	No	No	509872	7967824	No	NFB	No	NFB	1	12.0	900	n/a									
51	CV-11-1	Culvert	S			PERM	Rail	New	No	No	509931	7967723	Potential	MAR	Potential	MAR	1	6.0	900	1	17	20	37						
52	CV-11-2	Culvert	LP			PERM	Rail	New	No	No	510076	7967537	No	NFB	No	NFB	1	12.0	1200	n/a									
53	CV-11-3	Culvert	S			PERM	Rail	New	No	No	510214	7967455	No	NFB	No	NFB	1	12.0	900	n/a									
54	CV-11-4	Culvert	LP			PERM	Rail	New	No	No	510472	7967402	No	NFB	No	NFB	1	12.0	900	n/a									
55	CV-11-5	Culvert	LP			PERM	Rail	New	No	No	510589	7967385	No	NFB	No	NFB	1	12.0	900	n/a									
56	CV-12-1	Culvert	S			PERM	Rail	New	No	No	510933	7967256	Unlikely	MAR	Unlikely	MAR	1	18.0	900	1	50	20	71						
57	CV-12-2	Culvert	S			PERM	Rail	New	No	No	511019	7967241	Unlikely	MAR	Unlikely	MAR	1	18.0	900	1	50	20	71						
58	CV-12-3	Culvert	LP			PERM	Rail	New	No	No	511127	7967223	No	NFB	No	NFB	1	12.0	900	n/a									
59	CV-12-4	Culvert	LP			PERM	Rail	New	No	No	511355	7967185	No	NFB	No	NFB	1	6.0	900	n/a									
60	CV-12-4b	Cut	LP	CV-12-5 and CV-		PERM	Rail	New	No	No	511455	7967168	No	NFB	No	NFB	0	NA	NA	n/a									
61	CV-12-5	Culvert	S		CV-12-4b	PERM	Rail	New	No	Yes; CV-131	511552	7967152	No	NFB	No	NFB	1	10.0	900	n/a									
62	CV-13-1	Culvert	LP		CV-12-4b	PERM	Rail	New	No	No	511798	7967111	No	NFB	No	NFB	1	12.0	900	n/a									
63	CV-13-2	Culvert	LP			PERM	Rail	New	No	No	512120	7966981	No	NFB	No	NFB	1	12.0	900	n/a									
64	CV-13-3	Culvert	S			PERM	Rail	New	No	No	512375	7966823	No	NFB	No	NFB	1	7.5	900	n/a									
65	CV-13-4	Culvert	S			PERM	Rail	New	No	Yes; CV-129	512415	7966799	Yes	IMP	Yes	IMP	2	18.0	1400	3	293	183	476						
66	CV-13-5	Culvert	S			PERM	Rail	New	No	No	512556	7966712	No	NFB	No	NFB	1	12.0	900	n/a									
67	CV-14-1	Culvert	S			PERM	Rail	New	No	No	513252	7966428	No	NFB	No	NFB	1	12.5	1200	n/a									
68	CV-14-2	Culvert	P			PERM	Rail	New	No	No	513436	7966375	No	NFB	No	NFB	1	12.0	1200	n/a									
69	CV-14-3	Culvert	P			PERM	Rail	New	No	No	513532	7966333	No	NFB	No	NFB	1	12.0	1200	n/a									
70	CV-15-1	Culvert	LP			PERM	Rail	New	No	No	513624	7966294	No	NFB	No	NFB	1	12.0	1200	n/a									
71	CV-15-2	Culvert/encroachment	S/P			PERM	Rail	New	No	Yes; Unnamed Tote Road	513781	7966188	Yes	MAR	Yes	IMP	1	24.0	1400	3							722		
72	CV-15-3	Culvert/encroachment	S/P			PERM	Rail	New	No	Yes; Unnamed Tote Road	513892	7966034	Yes	MAR	Yes	IMP	2	17.5	900	2							523		
73	CV-15-4	Culvert	P			PERM	Rail	New	No	No	514123	7965711	No	NFB	No	NFB	1	15.0	1200	n/a									
74	CV-15-5	Bridge	S			PERM	Rail	New	No	Yes; CV-128 bridge	514239	7965626	Yes	IMP	Yes	IMP	N/A	N/A	N/A	3+				14.60	769	784			
75	CV-16-1	Culvert	LP			PERM	Rail	New	No	No	514325	7965565	No	NFB	No	NFB	4	15.0	1200	n/a									
76	CV-16-2	Culvert/encroachment	S/P			PERM	Rail	New	Yes; CV-15-5	Yes; CV-128 bridge	514768	7965089	No	NFB	No	NFB	4	12.5	1200	n/a									
77	CV-16-3	Culvert	S			PERM	Rail	New	Yes; CV-16-2, CV-15-5	Yes; CV-128 bridge	514811	7964916	No	NFB	Potential	MAR	1	12.0	900	n/a									
78	CV-17-1	Culvert	P			PERM	Rail	New	No	No	515261	7964025	No	NFB	No	NFB	1	17.5	900	n/a									
79	CV-18-1	Encroachment	P			PERM	Rail	New	No	Yes; CV-125	515331	7963846	No	NFB	Unlikely	MAR	1	30.0	900	1									
80	CV-18-2	Culvert	S			PERM	Rail	New	No	Yes; CV-124	515405	7963693	No	NFB	No	NFB	1	18.0	900	n/a									
81	CV-18-3	Culvert	S			PERM	Rail	New	No	No	515607	7963389	No	NFB	No	NFB	1	18.0	900	n/a									
82	CV-18-4	Culvert	S			PERM	Rail	New	No	No	515682	7963328	No	NFB	No	NFB	1	15.0	900	n/a									
83	CV-19-1	Culvert	S			PERM	Rail	New	No	Yes; CV-123	515927	7963175	No	NFB	No	NFB	1	18.0	900	n/a									
84	CV-19-2	Culvert	P			PERM	Rail	New	No	No	516161	7963031	No	NFB	No	NFB	1	30.0	900	n/a									
85	CV-19-3	Culvert	S			PERM	Rail	New	No	No	516613	7962587	No	NFB	No	NFB	1	18.0	900	n/a									
86	CV-20-1	Culvert	LP		CV-20-2	PERM	Rail	New	No	No	517040	7962255	No	NFB	No	NFB	1	12.0	900	n/a									
87	CV-20-2	Cut	S	CV-20-1		PERM	Rail	New	No	Yes; CV-121	517267	7962029	No	NFB	No	NFB	0	NA	NA	n/a									

DFO IR 3.1.1. **List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the north rail alignment and Tote Road realignment and fish habitat summary.**

Number	Site ID	Description	Waterbody Type	Diversion to	Receives Diversion From	Permanent/Temporary	Rail/Road	New/Replacement /Extension /Modification	Other Crossings/Bridges/Encroachments/Cuts on Same Waterbody [1]		Current UTM Coordinates		Arctic Char		Ninespine Stickleback		No. Barrels	Culvert Length (m)	Culvert Diameter (mm)	Stream Order at Crossing/Cut /Bridge	Stream Crossings			Bridges			Lake/Pond Encroachment /Infilling	Cuts		
									Rail Crossing	Road Crossing	Easting	Northing	Fish Bearing	Habitat Quality (MAR/IMP/NFB)	Fish Bearing	Habitat Quality (MAR/IMP/NFB)					Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)	Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)	Lost Habitat (m^2)	Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)
88	CV-21-1	Culvert	LP			PERM	Rail	New	No	No	517391	7961887	No	NFB	No	NFB	1	12.0	900	n/a										
89	CV-21-2	Culvert	LP			PERM	Rail	New	No	No	517607	7961640	No	NFB	No	NFB	1	12.0	900	n/a										
90	CV-21-3	Culvert	LP			PERM	Rail	New	No	Yes; CV-119	517928	7961308	No	NFB	No	NFB	1	18.0	900	n/a										
91	CV-21-4	Culvert	LP			PERM	Rail	New	No	No	518010	7961196	No	NFB	No	NFB	0	18.0	0	n/a										
92	CV-22-1	Pond Infilling	P			PERM	Rail	New	Yes; CV-21-3	Yes; CV-119	518123	7960950	No	NFB	Unlikely	MAR	1	12.0	900	n/a (LE)										
93	CV-22-2	Encroachment	P			PERM	Rail	New	Yes; CV-21-3, CV-22-1	Yes; CV-119	518232	7960617	No	NFB	Unlikely	MAR	1	12.0	900	n/a (LE)										
94	CV-22-3	Culvert	LP			PERM	Rail	New	No	No	518295	7960427	No	NFB	No	NFB	1	12.0	900	n/a										
95	CV-22-4	Encroachment	P			PERM	Rail	New	Yes; CV-21-3, CV-22-1, CV-22-2	Yes; CV-119	518370	7960198	No	NFB	Unlikely	MAR	does not require modeling			n/a (LE)										
96	CV-23-1	Culvert	S			PERM	Rail	New	No	No	518441	7959981	No	NFB	No	NFB	1	18.0	900	n/a										
97	CV-23-2	Culvert	S			PERM	Rail	New	No	Yes; CV-118	518501	7959798	No	NFB	No	NFB	1	12.0	900	n/a										
98	CV-23-3	Culvert	LP			PERM	Rail	New	No	No	518695	7959425	No	NFB	No	NFB	1	12.0	900	n/a										
99	CV-23-4	Culvert	S			PERM	Rail	New	No	Yes; CV-198	518754	7959335	No	NFB	No	NFB	1	18.0	900	n/a										
100	CV-24-1	Culvert	S			PERM	Rail	New	No	Yes; CV-199	518988	7958946	No	NFB	No	NFB	1	12.0	900	n/a										
101	CV-24-2	Culvert	S			PERM	Rail	New	No	Yes; Unnamed Tote Road	519081	7958667	No	NFB	No	NFB	1	18.0	900	n/a										
102	CV-24-3	Culvert	S			PERM	Rail	New	Yes; CV-24-2	Yes; Unnamed Tote Road	519153	7958481	No	NFB	No	NFB	1	12.0	900	n/a										
103	CV-25-1	Culvert	S			PERM	Rail	New	Yes; CV-24-2, CV-24-3	Yes; Unnamed Tote Road	519225	7958229	No	NFB	No	NFB	2	12.0	900	n/a										
104	CV-25-2	Culvert	S			PERM	Rail	New	No	Yes; CV-115	519507	7958144	Probable	MAR	Probable	MAR - IMP	1	13.6	900	1	38	20	58							
105	CV-25-3	Culvert	S			PERM	Rail	New	Yes; CV-25-2	Yes; CV-115	519661	7958016	Potential	MAR	Potential	MAR	2	20.6	1200	3	336	156	492							
106	CV-26-1	Culvert/Encroachment	S/P			PERM	Rail	New	Yes; CV-25-2, CV-25-3	Yes; CV-115	519989	7957450	Potential	MAR	Potential	MAR				3							3,114			
107	CV-26-3	Culvert	LP			PERM	Rail	New	No	No	520156	7957209	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
108	CV-26-4	Culvert	LP			PERM	Rail	New	No	No	520224	7957110	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
109	CV-26-5	Culvert	S			PERM	Rail	New	No	No	520386	7956847	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
110	CV-27-1	Culvert	S			PERM	Rail	New	No	No	520406	7956775	Potential	MAR	Potential	MAR	1	13.6	900	1	3	0	3							
111	CV-27-2	Culvert	S			PERM	Rail	New	No	Yes; CV-114	520412	7956735	Potential	MAR	Potential	MAR	1	13.6	900	3	222	117	339							
112	CV-27-3	Culvert	LP			PERM	Rail	New	No	No	520516	7956235	No	NFB	No	NFB	1	12.5	900	n/a										
113	CV-27-4	Culvert	LP			PERM	Rail	New	No	No	520564	7956131	No	NFB	No	NFB	1	12.5	900	n/a										
114	CV-27-5	Culvert	S			PERM	Rail	New	No	No	520699	7955833	No	NFB	No	NFB	1	12.0	900	n/a										
115	CV-28-1	Culvert	LP			PERM	Rail	New	No	No	520722	7955784	No	NFB	No	NFB	1	12.0	900	n/a										
116	CV-28-2	Culvert	S			PERM	Rail	New	No	Yes; CV-113	520749	7955722	No	NFB	No	NFB	1	12.0	900	n/a										
117	CV-28-3	Culvert	LP			PERM	Rail	New	No	No	520891	7955261	No	NFB	No	NFB	1	18.0	900	n/a										
118	CV-28-4	Culvert	LP			PERM	Rail	New	No	No	520924	7955182	No	NFB	No	NFB	1	18.0	900	n/a										
119	CV-28-5	Culvert/encroachment	P			PERM	Rail	New	No	No	521005	7955067	No	NFB	No	NFB	1	18.0	900	n/a										
120	CV-28-6	Culvert	S			PERM	Rail	New	No	Yes; CV-112	521092	7954969	Yes	IMP	Yes	IMP	1	17.5	1400	3	285	183	468							
121	CV-28-7	Culvert	S			PERM	Rail	New	No	Yes; Unnamed Tote Road	521305	7954680	No	NFB	No	NFB	1	15.0	900	n/a										
122	CV-29-1	Culvert	S			PERM	Rail	New	No	Yes; Unnamed Tote Road	521341	7954608	No	NFB	No	NFB	1	17.5	900	n/a										
123	CV-29-2	Culvert	S			PERM	Rail	New	No	Yes; CV-111	521379	7954516	Yes	IMP	Yes	IMP	1	25.0	1400	3	408	183	590							
124	CV-29-3	Culvert	S			PERM	Rail	New	No	Yes; CV-110	521464	7954306	No	NFB	No	NFB	1	18.0	900	n/a										
125	CV-29-4	Culvert	S			PERM	Rail	New	No	No	521512	7954187	No	NFB	No	NFB	1	12.0	900	n/a										
126	CV-29-5	Culvert	S			PERM	Rail	New	No	Yes; CV-109	521541	7954115	No	NFB	No	NFB	1	12.0	900	n/a										
127	CV-30-1	Culvert	S			PERM	Rail	New	No	Yes; CV-108	521569	7954040	No	NFB	No	NFB	1	18.0	900	n/a										
128	CV-30-2	Culvert	LP			PERM	Rail	New	No	Yes; CV-202	521609	7953873	No	NFB	No	NFB	1	18.0	1200	n/a										
129	CV-30-3	Culvert	S/LP			PERM	Rail	New	No	No	521635	7953720	No	NFB	No	NFB	1	24.0	900	n/a										
130	CV-30-4	Culvert	S			PERM	Rail	New	No	No	521676	7953461	No	NFB	No	NFB	1	12.0	900	n/a										
131	CV-30-5	Culvert	S			PERM	Rail	New	No	Yes; CV-106	521687	7953363	Yes	IMP	Yes	IMP	1	7.5	900	2	51	49	100							
132	CV-30-6	Culvert	S			PERM	Rail	New	No	No	521700	7953250	No	NFB	Unlikely	MAR	1	12.0	900	1										
133	CV-30-7	Pond Infilling	S/P			PERM	Rail	New	Yes; CV-30-6	Yes; CV-105	521712	7953143	No	NFB	Unlikely	MAR	1	12.5	900	n/a (LE)										
134	CV-31-1	Culvert	S			PERM	Rail	New	No	Yes; CV-104	521748	7952788	Yes	IMP	Yes	IMP	1	20.0	1200	3	326	156	482							
135	CV-31-2	Culvert	S			PERM	Rail	New	No	Yes; CV-104	521749	7952776	Yes	IMP	Yes	IMP	1	20.0	1200	3	326	156	482							
136	CV-31-3	Culvert	LP			PERM	Rail	New	No	No	521763	7952346	No	NFB	No	NFB	1	12.0	900	n/a										
137	CV-31-4	Culvert	LP			PERM	Rail	New	No	No	521772	7952278	No	NFB	No	NFB	1	18.0	900	n/a										
138	CV-32-1	Culvert	LP			PERM	Rail	New	No	No	521827	7952066	No	NFB	No	NFB	1	18.0	900	n/a										
139	CV-32-2	Culvert	LP			PERM	Rail	New	No	No	521882	7951861	No	NFB	No	NFB	1	12.0	900	n/a										
140	CV-32-3	Culvert	LP			PERM	Rail	New	No	No	521946	7951620	No	NFB	No	NFB	1	12.0	900	n/a										
141	CV-32-4	Culvert	S			PERM	Rail	New	No	Yes; CV-204	521983	7951453	No	NFB	No	NFB	1	12.0	900	n/a										
142	CV-33-1	Culvert	LP			PERM	Rail	New	No	No	521990	7951011	No	NFB	No	NFB	1	12.0	900	n/a										
143	CV-33-2	Culvert	LP			PERM	Rail	New	No	Yes; Unnamed Tote Road	521991	7950911	No	NFB	No	NFB	1	12.0	900	n/a										
144	CV-33-3	Culvert	LP			PERM	Rail	New	No	No	521990	7950839	No	NFB	No	NFB	1	12.0	900	n/a										
145	CV-33-4	Culvert	S			PERM	Rail	New	No	Yes; CV-103	521976	7950733	No	NFB	No	NFB	1	18.0	900	n/a										
146	CV-33-5	Culvert	S			PERM	Rail	New	No	No	521964	7950662	No	NFB	No	NFB	1	12.0	900	n/a										
147	CV-33-6	Culvert	S			PERM	Rail	New	No	Yes; CV-102	521947	7950568	Yes	IMP	Yes	IMP	4	18.0	1200	3	293	156	450							
148	CV-33-7	Culvert	P			PERM	Rail	New	No	No	521885	7950215	No	NFB	No	NFB	1	10.0	900	n/a										
149	CV-34-1	Culvert	S			PERM	Rail	New	No	No	521789	7949673	No	NFB	No	NFB	1	24.0	1200	n/a										
150	CV-34-2	Culvert	S			PERM	Rail	New	No	No	521801	7949153	No	NFB	No	NFB	1	12.0	900	n/a										
151	CV-35-2	Culvert	S			PERM	Rail	New	No	Yes; CV-099	521947	7948828	Yes	IMP	Yes	IMP	5	22.5	1400	3+	317	158	475							
152	CV-35-4	Culvert	S		CV-35-5	PERM	Rail	New	No	No	522249	7948287	No	NFB	No	NFB	4	12.0	900	n/a										
153	CV-35-5	Cut	LP	CV-35-4		PERM	Rail	New	No	No	522298	7948170	No	NFB	No	NFB	0	NA	NA	n/a										
154	CV-37-1	Culvert	LP			PERM	Rail	New	No	No	522533	7946398	No	NFB	No	NFB	1	12.0	900	n/a										
155	CV-38-1	Culvert	S			PERM	Rail	New	No	Yes; Unnamed Tote Road	522570	7946000	No	NFB	No	NFB	1	30.0	900	n/a										
156	CV-38-2	Culvert	S			PERM	Rail	New	No	Yes; CV-095	522646	7945802	No	NFB	No	NFB	1	36.0	900	n/a										
157	CV-38-3	Culvert	S			PERM	Rail	New	No	Yes; CV-094	522846	7945387	No	NFB	No	NFB	3	30.0	1400	n/a										
158	CV-39-1	Culvert	S			PERM	Rail	New	No	Yes; CV-093	523125	7944922	No	NFB	No	NFB	1	36.0	900	n/a										
159	CV-40-1	Culvert	LP			PERM	Rail	New	No	No	523148	7944309	No	NFB	No	NFB	1	18.0	900	n/a										
160	CV-40-2	Culvert	S			PERM	Rail	New	No	Yes; CV-092	523147	7944150	No	NFB	No	NFB	2	18.0	1200	n/a										
161	CV-40-3	Culvert	LP			PERM	Rail	New	No	No	523231	7943898	No	NFB	No	NFB	1	18.0	900	n/a										
162	CV-40-4	Culvert	LP			PERM	Rail	New	No	No	523301	7943665	No	NFB	No	NFB	1	18.0	900	n/a										
163	CV-41-1	Culvert	S			PERM	Rail	New	No	No	523332	7943397	No	NFB	No	NFB	1	12.5	900	n/a										
164	CV-41-2	Culvert	S			PERM	Rail	New	No	No	523342	7943311	No	NFB	No	NFB	1	18.0	900	n/a										
165	CV-41-3	Culvert	LP			PERM	Rail	New	No	No	523359	7943152	No	NFB	No	NFB	1	12.0	900	n/a										
166	CV-41-4	Culvert	LP			PERM	Rail	New	No	No	523351	7942963	No	NFB	No	NFB	1	24.0	900	n/a										
167	CV-42-1	Culvert	S			PERM	Rail	New	No	Yes; CV-090	523423	7942323	No	NFB	No	NFB	1	24.0	1200	n/a										
168	CV-42-2	Culvert	S			PERM	Rail	New	No	No	523475	7941603	No	NFB	No	NFB	1	22.5	900	n/a										
169	CV-43-1	Culvert	S			PERM	Rail	New	No	Yes; CV-088	523647	7941268	No	NFB	No	NFB	1	18.0	900	n/a										
170	CV-43-2	Culvert	LP			PERM	Rail	New	No	No	523721	7941127	No	NFB	No	NFB	2	12.0	1200	n/a										
171	CV-43-3	Culvert	S			PERM	Rail	New	No	Yes; CV-087	523738	7941095	No	NFB	No	NFB	1	18.0	900	n/a										

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Number	Site ID	Description	Waterbody Type	Diversion to	Receives Diversion From	Permanent/Temporary	Rail/Road	New/Replacement /Extension /Modification	Other Crossings/Bridges/Encroachments/Cuts on Same Waterbody [1]		Current UTM Coordinates		Arctic Char		Ninespine Stickleback		No. Barrels	Culvert Length (m)	Culvert Diameter (mm)	Stream Order at Crossing/Cut /Bridge	Stream Crossings			Bridges			Lake/Pond Encroachment /Infilling	Cuts		
									Rail Crossing	Road Crossing	Easting	Northing	Fish Bearing	Habitat Quality (MAR/IMP/NFB)	Fish Bearing	Habitat Quality (MAR/IMP/NFB)					Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)	Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)	Lost Habitat (m^2)	Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)
172	CV-43-4	Culvert	S			PERM	Rail	New	No	Yes; CV-087	523749	7941075	No	NFB	No	NFB	1	18.0	900	n/a										
173	CV-43-5	Culvert	S			PERM	Rail	New	No	Yes; CV-085	523846	7940904	No	NFB	No	NFB	1	30.0	900	n/a										
174	CV-44-1	Culvert	S			PERM	Rail	New	No	No	524074	7940563	No	NFB	No	NFB	2	12.0	900	n/a										
175	CV-44-2	Culvert	S			PERM	Rail	New	No	Yes; CV-084	524174	7940415	No	NFB	No	NFB	2	18.0	1200	n/a										
176	CV-44-3	Culvert	S			PERM	Rail	New	No	Yes; CV-083	524535.655	7939827.42	No	NFB	No	NFB	2	12.0	1200	n/a										
177	CV-45-1	Culvert	LP			PERM	Rail	New	No	No	525004.068	7938964.92	No	NFB	No	NFB	1	12.0	900	n/a										
178	CV-46-1	Culvert	LP			PERM	Rail	New	No	No	525118	7938743	No	NFB	No	NFB	1	18.0	900	n/a										
179	CV-46-1a	Cut	P	CV-46-3		PERM	Rail	New	No	Yes; CV-206	525226	7938529	No	NFB	No	NFB	NA	NA	NA	n/a										
180	CV-46-2	Culvert	S			PERM	Rail	New	No	No	525278	7938537	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
181	CV-46-3	Culvert	S		CV-46-1a	PERM	Rail	New	No	Yes; Unnamed Tote Road	525380	7938336	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
182	CV-46-4	Culvert	S			PERM	Rail	New	No	Yes; CV-082	525394	7938239	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
183	CV-46-6	Culvert	S			PERM	Rail	New	No	Yes; CV-080	525404	7938168	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
184	CV-47-1A	Culvert	S			PERM	Rail	New	No	Yes; CV-080	525415	7938089	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
185	CV-47-1B	Culvert	S			PERM	Rail	New	No	Yes; CV-081	525454	7937939	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
186	CV-47-1	Culvert	S			PERM	Rail	New	No	Yes; CV-079	525683	7937366	Yes	IMP	No	NFB	1	13.6	900	3	222	117	339							
187	CV-47-2	Culvert	S			PERM	Rail	New	No	Yes; CV-079	525698	7937327	Yes	IMP	Yes	IMP	4	15.0	1400	3	245	183	427							
188	CV-47-3	Culvert	S			PERM	Rail	New	Yes; CV-47-2	Yes; CV-079	525729	7937268	Yes	IMP	Yes	IMP	2	17.5	1400	3	285	183	468							
189	CV-48-1	Culvert	S/LP			PERM	Rail	New	No	Yes; CV-207	525839	7937127	No	NFB	No	NFB	TBD	TBD	TBD	1										
190	CV-48-2	Culvert	S/LP			PERM	Rail	New	No	Yes; CV-207	525916	7937063	No	NFB	No	NFB	TBD	TBD	TBD	1										
191	CV-48-3	Culvert	S/LP			PERM	Rail	New	No	Yes; CV-078	526356	7936875	No	NFB	No	NFB	TBD	TBD	TBD	3										
192	CV-48-4	Culvert	S			PERM	Rail	New	No	Yes; CV-078	526523	7936808	Yes	IMP	Yes	IMP	2	27.5	1200	3	448	156	605							
193	CV-49-1	Culvert	S			PERM	Rail	New	No	Yes; CV-076	526690	7936443	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
194	CV-49-2	Culvert	S			PERM	Rail	New	No	Yes; CV-076	526737	7936101	Potential	MAR	Potential	MAR	1	16.1	900	2	109	49	158							
195	CV-49-3	Culvert	S/LP			PERM	Rail	New	No	No	526788	7935730	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
196	CV-50-1	Culvert	S			PERM	Rail	New	No	No	526835	7935393	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
197	CV-50-2	Culvert	S			PERM	Rail	New	No	No	526863	7935175	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
198	CV-50-3	Culvert	S			PERM	Rail	New	No	No	526868	7935095	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
199	CV-50-4	Culvert	LP			PERM	Rail	New	No	No	526874	7934905	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
200	CV-50-4a	Culvert	LP			PERM	Rail	New	No	No	526876	7934875	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
201	CV-50-4b	Culvert	LP			PERM	Rail	New	No	No	526888	7934776	No	NFB	No	NFB	TBD	TBD	TBD	n/a										
202	CV-50-5	Culvert	S			PERM	Rail	New	Yes; CV-50-6	Yes; CV-072	526924	7934630	Yes	MAR	Yes	MAR	2	30	1200	3	489	156	645							
203	CV-50-6	Culvert	S			PERM	Rail	New	Yes; CV-50-5	Yes; CV-072	526926	7934620	Yes	IMP	Yes	IMP	2	30	1200	3	489	156	645							
204	CV-51-1	Culvert	LP			PERM	Rail	New	No	No	527006	7934331	No	NFB	No	NFB	1	24	900	n/a										
205	CV-51-2	Culvert	LP			PERM	Rail	New	No	No	527054	7933628	No	NFB	No	NFB	1	30	1200	n/a										
206	CV-52-1	Culvert	S			PERM	Rail	New	No	Yes; CV-063	527080	7932998	No	NFB	No	NFB	1	12	900	n/a										
207	CV-52-2	Culvert	S			PERM	Rail	New	No	Yes; CV-062	527132	7932787	No	NFB	No	NFB	1	18	900	n/a										
208	CV-52-3	Culvert	LP			PERM	Rail	New	No	No	527180	7932698	No	NFB	No	NFB	1	12	900	n/a										
209	CV-53-1	Culvert	LP			PERM	Rail	New	No	No	527366	7932476	No	NFB	No	NFB	1	12	900	n/a										
210	CV-53-2	Culvert	P			PERM	Rail	New	No	No	527274	7932000	No	NFB	No	NFB	1	36	900	n/a										
211	CV-54-1	Culvert	S			PERM	Rail	New	No	Yes; CV-061	527333	7931375	No	NFB	No	NFB	1	24	1200	n/a										
212	CV-54-2	Culvert	S			PERM	Rail	New	No	Yes; Unnamed Tote Road	527529	7930869	No	NFB	No	NFB	2	12.5	900	n/a										
213	CV-55-1	Culvert	LP			PERM	Rail	New	No	No	527583	7930653	No	NFB	No	NFB	1	18	1200	n/a										
214	CV-55-2	Culvert	LP			PERM	Rail	New	No	No	527632	7930421	No	NFB	No	NFB	1	12	900	n/a										
215	CV-55-3	Culvert	S			PERM	Rail	New	No	Yes; CV-060, CV-60-1	527650	7930339	Yes	IMP	Yes	IMP	5	12.5	900	3	204	117	321							
216	CV-56-1	Culvert	S			PERM	Rail	New	No	Yes; CV-59-1	528085	7929337	Yes	MAR	Yes	MAR	2	12.2	1200	3	199	156	355							
217	CV-57-1	Culvert	S			PERM	Rail	New	No	No; Tote Road is US now	528309	7928841	Yes	MAR	Yes	MAR	1	12.2	900	2	83	49	132							
218	CV-57-2	Culvert	S			PERM	Rail	New	No	No; Tote Road is US now	528345	7928683	Yes	MAR	Yes	MAR	1	12.2	900	2	83	49	132							
219	CV-58-1	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528241	7927966	Probable	MAR	Probable	MAR	2	9.76	900	1	27	20	47							
220	CV-58-2	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528168	7927807	Yes	MAR - IMP	Yes	MAR - IMP	1	9.76	900	1	27	20	47							
221	CV-58-3	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528109	7927716	Potential	MAR	Potential	MAR	1	9.76	900	1	27	20	47							
222	CV-58-4	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528062	7927656	Yes	MAR - IMP	Yes	MAR - IMP	1	12.2	900	2	83	49	132							
223	CV-58-4a	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527931	7927527	Yes	MAR - IMP	Yes	MAR - IMP	1	12.2	900	1	34	20	54							
224	CV-58-5	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527751	7927378	Probable	MAR - IMP	Probable	MAR - IMP	1	12.2	900	2	83	49	132							
225	CV-58-6	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527681	7927318	Probable	MAR - IMP	Probable	MAR - IMP	1	12.2	900	1	34	20	54							
226	CV-58-7	Cut	S	CV-59-1		PERM	Rail	New	Yes; CV-70-3 bridge	No	527650	7927282	Unlikely	MAR	Unlikely	MAR	NA	NA	NA	1								959	433	1,392
227	CV-58-8	Cut	S	CV-59-1		PERM	Rail	New	Yes; CV-70-3 bridge	No	527613	7927217	Potential	MAR	Potential	MAR	NA	NA	NA	1								530	-	530
228	CV-59-1	Culvert	S		CV-58-7 and CV-58-6	PERM	Rail	New	Yes; CV-70-3 bridge	No	527590	7927169	Probable	MAR - IMP	Probable	MAR - IMP	1	9.76	900	2	66	49	115							
229	CV-59-2	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527553	7927052	Potential	MAR	Potential	MAR	1	14.64	900	1	41	20	61							
230	CV-59-3	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527529	7926917	Potential	MAR	Potential	MAR	1	9.76	900	1	27	20	47							
231	CV-59-4b	Cut	LP	CV-59-4		PERM	Rail	New	Yes; CV-70-3 bridge	No	527467	7926817	No	NFB	No	NFB	0		0	n/a										
232	CV-59-4	Culvert	S		CV-59-4a and	PERM	Rail	New	Yes; CV-70-3 bridge	No	527395	7926734	Yes	IMP	Yes	IMP	3	21.96	1200	2	149	65	215							
233	CV-59-4a	Cut	S	CV-59-4		PERM	Rail	New	Yes; CV-70-3 bridge	No	527329	7926595	No	NFB	No	NFB	0	NA	NA	n/a								698	-	698
234	CV-59-5	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527272	7926457	No	NFB	No	NFB	1	12.2	900	n/a										
235	CV-60-1	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527202	7926246	No	NFB	No	NFB	1	9.76	900	n/a										
236	CV-60-2	Culvert/encroachment	S/P			PERM	Rail	New	Yes; CV-70-3 bridge	No	527214	7926070	No	NFB	No	NFB	1	17.08	900	n/a										
237	CV-60-3	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527225	7925961	Probable	MAR - IMP	Probable	MAR - IMP	1	24.4	900	2	166	49	215							
238	CV-60-4	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527243	7925782	Unlikely	MAR	Unlikely	MAR	1	9.76	900	2	66	49	115							
239	CV-60-4a	Cut	S	CV-60-5		PERM	Rail	New	Yes; CV-70-3 bridge	No	527252	7925685	No	NFB	No	NFB	0	NA	NA	n/a								277	1,518	1,795
240	CV-60-5	Culvert	S		CV-60-4a	PERM	Rail	New	Yes; CV-70-3 bridge	No	527273	7925480	Potential	MAR - IMP	Potential	MAR - IMP	1	26.84	1200	2	183	65	248							
241	CV-60-6	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527283	7925381	Unlikely	MAR	Unlikely	MAR	1	26.84	900	1	75	20	95							
242	CV-61-1	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527296	7925237	Probable	MAR - IMP	Probable	MAR - IMP	1	31.72	900	1	89	20	109							
243	CV-61-2	Culvert	S		CV-61-3	PERM	Rail	New	Yes; CV-70-3 bridge	No	527181	7925009	Probable	MAR - IMP	Probable	MAR - IMP	1	9.76	900	1	27	20	47							
244	CV-61-3	Cut	S	CV-61-2		PERM	Rail	New	Yes; CV-70-3 bridge	No	527023	7924876	Potential	MAR - IMP	Potential	MAR - IMP	NA	NA	NA	1								2,097	3,965	6,062
245	CV-62-1	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	526868	7924453	Yes	IMP	Yes	IMP	7	51.24	1800	3+	835	235	1070							
246	CV-62-2	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	526897	7924167	Probable	MAR - IMP	Probable	MAR - IMP	1	12.2	900	2	83	49	132							
247	CV-62-3	Cut	S	CV-62-4		PERM	Rail	New	Yes; CV-70-3 bridge	No	526951	7923938	Unlikely	MAR	Unlikely	MAR	NA	NA	NA	1								1,405	-	1,405
248	CV-62-4	Culvert	S		CV-62-3	PERM	Rail	New	Yes; CV-70-3 bridge	No	526975	7923621	No	NFB	No	NFB	1	9.76	900	n/a										
249	CV-62-5	Culvert	LP		CV-62-6 and CV-62-6b	PERM	Rail	New	Yes; CV-70-3 bridge	No	526982	7923557	No	NFB	No	NFB	1	12.2	900	n/a										
250	CV-62-6	Cut	S	CV-62-5		PERM	Rail	New	Yes; CV-70-3 bridge	No	527016	7923383	Unlikely	MAR	Unlikely	MAR	NA	NA	NA	1								6,191	-	6,191
251	CV-62-6b	Cut	S	CV-62-5		PERM	Rail	New	Yes; CV-70-3 bridge	No	527011	7923411	Unlikely	MAR	Unlikely	MAR	NA	NA	NA	1								350	-	350
252	CV-63-1	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527058	7923177	Potential	MAR	Potential	MAR	1	14.64	900	1	41	20	61							
253	CV-63-2	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527100	7923086	Potential	MAR	Potential	MAR	1	12.2	900	2	83	49	132							
254	CV-63-3	Culvert	S		CV-63-3a	PERM	Rail	New	Yes; CV-70-3 bridge	No	527162	7922964	Potential	MAR - IMP	Potential	MAR - IMP	1	14.64	900	1	41	20	61							
255	CV-63-3a	Cut	LP	CV-63-3		PERM	Rail	New	Yes; CV-70-3 bridge	No	527179	7922796	No	NFB	No	NFB	0	NA	NA	n/a										
256	CV-63-4	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527204	7922667	Probable	MAR - IMP	Probable	MAR - IMP	1	12.2	900	2	83	49	132							
257	CV-63-4a	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527229	7922619	Potential	MAR	Potential	MAR	1	12.2	900	1	34	20	54							
258	CV-63-5	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527241	7922603	Potential	MAR	Potential	MAR	1	12.2	900	1	34	20	54							

DFO IR 3.1.1. **List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the north rail alignment and Tote Road realignment and fish habitat summary.**

Number	Site ID	Description	Waterbody Type	Diversion to	Receives Diversion From	Permanent/Temporary	Rail/Road	New/Replacement /Extension /Modification	Other Crossings/Bridges/Encroachments/Cuts on Same Waterbody [1]		Current UTM Coordinates		Arctic Char		Ninespine Stickleback		No. Barrels	Culvert Length (m)	Culvert Diameter (mm)	Stream Order at Crossing/Cut /Bridge	Stream Crossings			Bridges			Lake/Pond Encroachment /Infilling	Cuts		
									Rail Crossing	Road Crossing	Easting	Northing	Fish Bearing	Habitat Quality (MAR/IMP/NFB)	Fish Bearing	Habitat Quality (MAR/IMP/NFB)					Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)	Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)	Lost Habitat (m^2)	Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)
259	CV-64-1	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527295	7922538	Unlikely	MAR	Unlikely	MAR	1	9.76	900	1	27	20	47								
260	CV-64-2	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527414	7922399	Unlikely	MAR	Unlikely	MAR	1	12.2	900	1	34	20	54								
261	CV-64-3	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527482	7922239	No	NFB	No	NFB	1	12.2	900	n/a											
262	CV-64-4	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527625	7921956	Yes	MAR - IMP	Yes	MAR - IMP	1	19.52	900	1	55	20	75								
263	CV-64-5a	Cut	LP	CV-64-5		PERM	Rail	New	Yes; CV-70-3 bridge	No	527688	7921835	No	NFB	No	NFB	0	NA	NA	n/a											
264	CV-64-5	Culvert	S		CV-64-5a	PERM	Rail	New	Yes; CV-70-3 bridge	No	527743	7921726	No	NFB	No	NFB	1	12.2	900	n/a											
265	CV-64-6	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527757	7921691	No	NFB	No	NFB	1	12.2	900	n/a											
266	CV-65-1	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527793	7921396	Probable	MAR - IMP	Probable	MAR - IMP	1	17.08	900	3	278	117	396								
267	CV-65-2a	Cut	LP	CV-65-2		PERM	Rail	New	Yes; CV-70-3 bridge	No	527803	7921140	Unlikely	MAR	No	NFB	0	NA	NA	n/a									537	-	537
268	CV-65-2	Pond Infilling/Culvert	P		CV-65-2a	PERM	Rail	New	Yes; CV-70-3 bridge	No	527828	7920934	Potential	MAR	Potential	MAR	1	21.96	900	1							541				
269	CV-66-1	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	527959	7920627	Unlikely	MAR	Unlikely	MAR	1	12.2	900	2	83	49	132								
270	CV-66-2a	Cut	LP	CV-66-2		PERM	Rail	New	Yes; CV-70-3 bridge	No	528013	7920571	No	NFB	No	NFB	0	NA	NA	n/a											
271	CV-66-2	Culvert	S		CV-66-2a	PERM	Rail	New	Yes; CV-70-3 bridge	No	528063	7920532	No	NFB	No	NFB	1	14.64	900	n/a											
272	CV-66-3	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528328	7920342	Probable	MAR - IMP	Probable	MAR - IMP	1	19.52	900	1	55	20	75								
273	CV-66-4	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528359	7920292	No	NFB	No	NFB	1	12.2	900	n/a											
274	CV-66-5	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528389	7920187	No	NFB	No	NFB	1	14.64	900	n/a											
275	CV-66-6	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528390	7920161	No	NFB	No	NFB	1	9.76	900	n/a											
276	CV-66-7	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528378	7920014	No	NFB	No	NFB	1	9.76	900	n/a											
277	CV-66-8	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528376	7919987	Probable	MAR - IMP	Probable	MAR - IMP	1	9.76	900	1	27	20	47								
278	CV-67-1	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528299	7919743	Probable	MAR - IMP	Probable	MAR - IMP	1	14.64	900	1	41	20	61								
279	CV-67-2	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528226	7918995	No	NFB	No	NFB	1	9.76	900	n/a											
280	CV-68-1a	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528200	7918864	Yes	MAR - IMP	Yes	MAR - IMP	1	33	900	2	224	49	273								
281	CV-68-1	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528199	7918838	Yes	IMP	Yes	IMP	3	31.72	1400	2	216	76	292								
282	CV-68-2	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528194	7918768	No	NFB	No	NFB	1	21.96	900	n/a											
283	CV-68-3	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528059	7918496	Probable	MAR - IMP	Probable	MAR - IMP	1	21.96	1200	2	149	65	215								
284	CV-68-4	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528055	7918461	No	NFB	No	NFB	1	12.2	900	n/a											
285	CV-68-5	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528081	7918334	Potential	MAR - IMP	Potential	MAR - IMP	1	26.84	900	2	183	49	231								
286	CV-69-1	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528322	7917862	No	NFB	No	NFB	1	12.2	900	n/a											
287	CV-69-2	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528438	7917517	Yes	MAR - IMP	Yes	MAR - IMP	1	14.64	900	2	100	49	149								
288	CV-69-3	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528458	7917456	Yes	MAR - IMP	Yes	MAR - IMP	1	14.64	900	1	41	20	61								
289	CV-69-4	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	528474	7917407	Potential	MAR - IMP	Potential	MAR - IMP	1	12.2	900	1	34	20	54								
290	CV-70-1	Encroachment	P			PERM	Rail	New	Yes; CV-70-3 bridge	No	528704	7916939	No	NFB	Unlikely	MAR	1	12.2	900	n/a (LE)											
291	CV-70-2	Culvert	S			PERM	Rail	New	Yes; CV-70-3 bridge	No	529030	7916745	Yes	IMP	Yes	IMP	1	17.08	900	2	116	49	165								
292	CV-70-3	Bridge	S			PERM	Rail	New	No	No	529120	7916693	Yes	IMP	Yes	IMP	0	NA	NA	3+				10.50	677	688					
293	CV-71-1	Pond Infilling	S/P			PERM	Rail	New	Yes; CV-70-3 bridge	No	529451	7916535	Yes	IMP	Yes	IMP	4	17.08	1800	3							1,214				
294	CV-71-2a	Encroachment	S/P			PERM	Rail	New	No	No	529708	7916558	Probable	MAR	Probable	MAR	NA	NA	NA	1							72				
295	CV-71-3	Culvert	S			PERM	Rail	New	No	No	529965	7916706	No	NFB	Unlikely	MAR	1	12.2	900	1											
296	CV-71-4	Culvert	S			PERM	Rail	New	No	No	530214	7916862	No	NFB	Unlikely	MAR	1	9.76	900	1											
297	CV-72-1	Culvert	S			PERM	Rail	New	No	No	530370	7916951	No	NFB	Unlikely	MAR	1	17.08	1200	3											
298	CV-72-1a	Culvert	S			PERM	Rail	New	No	No	530587	7917015	No	NFB	Unlikely	MAR	1	12.2	1200	1											
299	CV-72-2	Culvert	S			PERM	Rail	New	No	No	530784	7917069	No	NFB	Unlikely	MAR	1	12.2	900	1											
300	CV-72-3	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	531048	7917142	Potential	MAR	Potential	MAR	1	12.2	900	1	34	20	54								
301	CV-72-3a	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	531130	7917165	Potential	MAR	Potential	MAR	1	12.2	900	1	34	20	54								
302	CV-72-4	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	531160	7917173	Potential	MAR	Potential	MAR	2	9.76	900	2	66	49	115								
303	CV-73-1	Culvert	S			PERM	Rail	New	No	No	531795	7917555	Unlikely	MAR	Unlikely	MAR	1	9.76	900	1	27	20	47								
304	CV-73-2	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	532007	7918051	Potential	MAR	Potential	MAR	1	16.1	900	2	109	49	158								
305	CV-73-3	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	532156	7918212	Potential	MAR	Potential	MAR	1	16.1	900	2	109	49	158								
306	CV-73-4	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	532303	7918244	Potential	MAR	Potential	MAR	1	13.6	900	1	38	20	58								
307	CV-74-1	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	532376	7918246	Probable	MAR - IMP	Probable	MAR - IMP	2	20.6	1200	3	336	156	492								
308	CV-74-2	Culvert	S			PERM	Rail	New	No	No	532406	7918246	Yes	MAR - IMP	Yes	MAR - IMP	2	20.6	1200	3	336	156	492								
309	CV-74-3	Culvert	S			PERM	Rail	New	No	No	532735	7918374	Potential	MAR	Potential	MAR	1	14.64	1800	1	41	40	81								
310	CV-74-4	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	532888	7918494	Potential	MAR	Potential	MAR	1	14.64	1800	1	41	40	81								
311	CV-74-6	Culvert	S		CV-74-7	PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	532988	7918553	Potential	MAR - IMP	Potential	MAR - IMP	1	9.76	900	1	27	20	47								
312	CV-74-7	Cut	S	CV-74-6		PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	533258	7918549	Potential	MAR - IMP	Potential	MAR - IMP	NA	NA	NA	1									3,718	-	3,718
313	CV-75-1	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	533398	7918521	Potential	MAR	Potential	MAR	1	12.2	1200	1	34	27	61								
314	CV-75-1a	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	533444	7918512	Potential	MAR	Potential	MAR	1	12.2	1200	3	199	156	355								
315	CV-75-2	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	533559	7918501	Potential	MAR	Potential	MAR	1	17.08	900	1	48	20	68								
316	CV-76-1	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	533900	7918535	Probable	MAR	Probable	MAR	1	19.52	1200	2	133	65	198								
317	CV-76-1a	Culvert	S			PERM	Rail	New	No	No	534333	7918581	Potential	MAR	Potential	MAR	1	19.52	1200	1	55	27	82								
318	CV-76-2	Culvert	LP			PERM	Rail	New	No	No	534506	7918563	No	NFB	No	NFB	1	9.76	900	n/a											
319	CV-76-3	Culvert	S			PERM	Rail	New	No	No	534825	7918511	Potential	MAR	Potential	MAR	1	19.52	900	1	55	20	75								
320	CV-77-1	Culvert	S			PERM	Rail	New	No	No	534992	7918491	Potential	MAR	Potential	MAR	1	19.52	900	1	55	20	75								
321	CV-77-2	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	535267	7918560	Yes	MAR - IMP	Yes	MAR - IMP	3	39.04	1400	3	636	183	819								
322	CV-77-3	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	535497	7918521	Probable	MAR	Probable	MAR	1	9.76	900	2	66	49	115								
323	CV-78-1	Culvert	LP			PERM	Rail	New	No	No	535691	7918488	No	NFB	No	NFB	1	14.64	900	n/a											
324	CV-78-2	Culvert	S			PERM	Rail	New	No	No	535890	7918531	Unlikely	MAR	Unlikely	MAR	1	14.64	900	1	41	20	61								
325	CV-78-3	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	536006	7918599	Yes	MAR - IMP	Yes	MAR - IMP	1	29.28	900	3	477	117	595								
326	CV-78-4	Culvert	LP			PERM	Rail	New	No	No	536163	7918706	No	NFB	No	NFB	1	9.76	900	n/a											
327	CV-78-5	Culvert	S			PERM	Rail	New	No	No	536237	7918756	Unlikely	MAR	Unlikely	MAR	1	9.76	900	1	27	20	47								
328	CV-78-6	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	536450	7918866	Probable	MAR - IMP	Probable	MAR - IMP	1	10	900	1	28	20	48								
329	CV-79-0	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	537243	7919138	Probable	MAR - IMP	Probable	MAR - IMP	1	10	900	2	68	49	117								
330	CV-79-1	Culvert	S			PERM	Rail	New	No	No	537418	7919175	Unlikely	MAR	Unlikely	MAR	1	17.08	900	1	48	20	68								
331	CV-80-1	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	537461	7919180	Yes	MAR - IMP	Yes	MAR - IMP	2	24.4	1200	3	398	156	554								
332	CV-80-1a	Culvert	S			PERM	Rail	New	No	No	537487	7919182	Unlikely	MAR	Unlikely	MAR	1	No	**12.2**	1200	1	34	27	61							
333	CV-80-2	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	538320	7919565	Unlikely	MAR	Unlikely	MAR	1	10	900	1	28	20	48								
334	CV-80-2a	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	538307	7919556	Unlikely	MAR	Unlikely	MAR	1	10	900	1	28	20	48								
335	CV-80-2b	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	538334	7919573	Unlikely	MAR	Unlikely	MAR	1	10	900	2	68	49	117								
336	CV-80-3	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	538453	7919642	Unlikely	MAR	Unlikely	MAR	1	10	900	1	28	20	48								
337	CV-80-4	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	538510	7919675	Unlikely	MAR	Unlikely	MAR	1	10	900	1	28	20	48								
338	CV-80-5	Culvert	S			PERM	Rail	New	No	No	538604	7919729	Unlikely	MAR	Unlikely	MAR	1	10	900	2	68	49	117								
339	CV-81-1	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	538691	7919779	No	NFB	No	NFB	2	9.76	900	n/a											
340	CV-81-2	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	538879	7919924	Probable	MAR - IMP	Probable	MAR - IMP	1	12.2	900	1	34	20	54								
341	CV-81-3	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	538942	7920004	Probable	MAR - IMP	Probable	MAR - IMP	1	12.2	900	2	83	49	132								
342	CV-81-4	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	539077	7920175	Unlikely	MAR	Unlikely	MAR	1	12.2	900	1	34	20	54								
343	CV-82-1	Culvert	S		CV-82-1a	PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	539131	7920244	Unlikely	MAR	Unlikely	MAR	2	12.2	900	2	83	49	132								
344	CV-82-1a	Cut	LP	CV-82-1		PERM	Rail	New	No	No	539242	7920376	No	NFB	No	NFB	0	NA	NA	n/a											
345	CV-82-2	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	539376	7920489	Unlikely	MAR	Unlikely	MAR	1	9.76	900	1	27	20	47								
346	CV-82-3	Culvert	S			PERM	Rail	New	No	No	539508	7920599	Unlikely	MAR	Unlikely	MAR	1	12.2	900	1	34	20	54								
347	CV-82-4	Culvert	S			PERM	Rail	New	No	No	539729	7920783	Probable	MAR - IMP	Probable	MAR - IMP	1	13.2	1200	1	37	27	64								
348	CV-83-1	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	539835	7920871	Probable	MAR - IMP	Probable	MAR - IMP	1	12.2	1200	2	83	65	148								
349	CV-83-1a	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	539887	7920915	Potential	MAR - IMP	Potential	MAR - IMP	1	12.2	1200	1	34	27	61								
350	CV-83-2	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	540162	7921134	Yes	MAR	Yes	MAR	4	12.2	1800	3	199	235	434								
351	CV-84-1	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	540842	7921510	Yes	IMP	Yes	IMP	1	17.08	1200	3+	96	54	149								

DFO IR 3.1.1. **List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the north rail alignment and Tote Road realignment and fish habitat summary.**

Number	Site ID	Description	Waterbody Type	Diversion to	Receives Diversion From	Permanent/Temporary	Rail/Road	New/Replacement /Extension /Modification	Other Crossings/Bridges/Encroachments/Cuts on Same Waterbody [1]		Current UTM Coordinates		Arctic Char		Ninespine Stickleback		No. Barrels	Culvert Length (m)	Culvert Diameter (mm)	Stream Order at Crossing/Cut /Bridge	Stream Crossings			Bridges			Lake/Pond Encroachment /Infilling	Cuts		
									Rail Crossing	Road Crossing	Easting	Northing	Fish Bearing	Habitat Quality (MAR/IMP/NFB)	Fish Bearing	Habitat Quality (MAR/IMP/NFB)					Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)	Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)	Lost Habitat (m^2)	Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)
352	CV-84-2	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-217 bridge	541030	7921642	Unlikely	MAR	Unlikely	MAR	1	12.2	900	2	83	49	132								
353	CV-84-3	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-214, CV-217 bridge	541294	7921948	No	NFB	No	NFB	1	14.64	1200	n/a										
354	CV-85-1	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; Unnamed Tote Road, CV-217 bridge	541514	7922054	No	NFB	No	NFB	1	12.2	900	n/a										
355	CV-85-2	Culvert	S			PERM	Rail	New	Yes; CV-85-4 bridge	Yes; CV-215, CV-217 bridge	541921	7922236	No	NFB	No	NFB	2	17.08	1800	n/a										
356	CV-85-3	Bridge	S			PERM	Rail	New	No	Yes; CV-217 bridge	542213	7922215	Yes	IMP	Yes	IMP		NA	NA	3+				10.50	677	688				
357	CV-85-4	Culvert	S			PERM	Rail	New	No	Yes; CV-217 bridge	542288	7922156	Yes	IMP	Yes	IMP	1	17.08	1800	3+	427	360	787								
358	CV-86-1	Encroachment	P			PERM	Rail	New	No	No	542671	7921780	No	NFB	Potential	MAR	6	9.76	900	n/a (LE)										
359	CV-86-2	Culvert	S			PERM	Rail	New	No	Yes; CV-216	542753	7921708	Yes	MAR	Yes	MAR	2	19.52	1800	3	1171	864	2035								
360	CV-87-1	Culvert	LP			PERM	Rail	New	No	No	543078	7921473	No	NFB	No	NFB	1	9.76	900	n/a										
361	CV-87-2	Culvert	LP			PERM	Rail	New	No	No	543392	7921247	No	NFB	No	NFB	1	12.2	900	n/a										
362	CV-87-3	Culvert	LP			PERM	Rail	New	No	No	543532	7921170	No	NFB	No	NFB	1	9.76	900	n/a										
363	CV-87-4	Culvert	S			PERM	Rail	New	No	No	543736	7921141	Yes	MAR	Yes	MAR	1	9.76	900	2	66	49	115								
364	CV-88-1	Culvert	LP			PERM	Rail	New	No	No	543976	7921204	No	NFB	No	NFB	1	9.76	900	n/a										
365	CV-88-2	Culvert	S			PERM	Rail	New	No	No	544209	7921282	Yes	MAR	Yes	MAR	1	14.64	900	2	100	49	149								
366	CV-88-3	Culvert	S			PERM	Rail	New	No	No	544259	7921299	Yes	MAR	Yes	MAR	1	12.2	900	2	83	49	132								
367	CV-88-4	Culvert	LP			PERM	Rail	New	No	No	545151	7921245	No	NFB	No	NFB	1	15	900	n/a										
368	CV-89-1	Culvert	S			PERM	Rail	New	No	Yes; BG-29 US though fish at this crossing may come from DS Muriel Lake instead	545492	7921173	Yes	IMP	Yes	IMP	1	24.4	900	3	398	117	515								
369	CV-89-2	Pond Infilling	P			PERM	Rail	New	No	No	545729	7921121	No	NFB	Unlikely	MAR	1	12.2	1400	n/a (LE)										
370	CV-90-1	Culvert	LP			PERM	Rail	New	No	No	545902	7921048	No	NFB	No	NFB	1	12.2	900	n/a										
371	CV-90-2	Cut	S	CV-90-3		PERM	Rail	New	No	Yes; BG-29	546181	7920409	No	NFB	Unlikely	MAR	NA	NA	NA	1									639	-	639
372	CV-90-3	Culvert	S		CV-90-2 and CV-90-4	PERM	Rail	New	No	Yes; BG-29	546240	7920244	No	NFB	No	NFB	0	12.2	0	n/a										
373	CV-90-4	Cut	S	CV-90-3		PERM	Rail	New	No	Yes; CV-022	546459	7920041	No	NFB	No	NFB	0	NA	NA	n/a										
374	CV-91-0	Culvert	S			PERM	Rail	New	No	Yes; CV-021	546858	7919853	No	NFB	No	NFB	1	12.2	900	n/a										
375	CV-91-1	Culvert	S			PERM	Rail	New	Yes; CV-91-0	Yes; CV-021	546928	7919820	No	NFB	No	NFB	1	12.2	900	n/a										
376	CV-91-2	Culvert	S			PERM	Rail	New	Yes; CV-91-0	Yes; CV-021	547012	7919781	No	NFB	No	NFB	1	9.76	900	n/a										
377	CV-92-1b	Cut	S	CV-92-1		PERM	Rail	New	No	No	547125	7919725	No	NFB	No	NFB	0	NA	NA	n/a										
378	CV-92-1	Culvert/encroachment	S/P		CV-92-1b	PERM	Rail	New	Yes; CV-91-0	Yes; CV-021	547173	7919694	No	NFB	Unlikely	MAR	1	9.76	1200	n/a (LE)										
379	CV-92-2	Culvert	LP			PERM	Rail	New	No	No	547416	7919506	No	NFB	No	NFB	1	9.76	900	n/a										
380	CV-92-3	Culvert	S			PERM	Rail	New	No	Yes; BG-28	547521	7919456	No	NFB	No	NFB	1	9.76	900	n/a										
381	CV-92-4	Culvert	S			PERM	Rail	New	No	No	547721	7919363	No	NFB	No	NFB	1	12.2	900	n/a										
382	CV-92-5	Culvert	S			PERM	Rail	New	No	Yes; BG-27	547879	7919262	Yes	MAR	Yes	MAR	1	14.64	900	2	100	49	149								
383	CV-92-6	Culvert	S			PERM	Rail	New	No	No	547927	7919241	No	NFB	No	NFB	1	9.76	900	n/a										
384	CV-92-7	Culvert	S			PERM	Rail	New	No	Yes; CV-015	548001	7919220	No	NFB	No	NFB	1	14.64	900	n/a										
385	CV-92-8	Culvert	LP			PERM	Rail	New	No	Yes; CV-015	548033	7919215	No	NFB	No	NFB	1	12.2	900	n/a										
386	CV-92-9	Culvert	S			PERM	Rail	New	No	Yes; CV-014	548062	7919211	No	NFB	No	NFB	1	12.2	900	n/a										
387	CV-93-1	Culvert	LP			PERM	Rail	New	No	Yes; BG-26	548228	7919188	No	NFB	No	NFB	1	14.64	900	n/a										
388	CV-93-2	Culvert	LP			PERM	Rail	New	No	No	548355	7919148	No	NFB	No	NFB	1	17.08	900	n/a										
389	CV-93-3	Culvert	LP			PERM	Rail	New	No	No	548601	7918857	No	NFB	No	NFB	1	12.2	900	n/a										
390	CV-93-3a	Culvert	S			PERM	Rail	New	No	Yes; CV-218	548670	7918765	No	NFB	No	NFB	1	24.4	1200	n/a										
391	CV-93-4a	Culvert	S			PERM	Rail	New	No	Yes; BG-24	548749	7918703	Probable	MAR	Probable	MAR	1	12.2	900	1	34	20	54								
392	CV-93-4b	Culvert	S			PERM	Rail	New	No	Yes; BG-24	548701	7918736	Probable	MAR	Probable	MAR	1	24.2	1200	1	68	27	95								
393	CV-93-4	Culvert	S			PERM	Rail	New	No	Yes; BG-24	548770	7918691	Yes	IMP	Yes	IMP	3	24.4	1400	3	398	183	580								
394	CV-94-1	Culvert	LP			PERM	Rail	New	No	No	548899	7918649	No	NFB	No	NFB	1	12.2	900	n/a										
395	CV-94-2	Culvert	S		CV-95-1	PERM	Rail	New	No	No	549840	7918391	No	NFB	No	NFB	1	12	900	n/a										
396	CV-95-1	Cut	LP	CV-94-2		PERM	Rail	New	No	No	550005	7918257	No	NFB	No	NFB		NA	NA	n/a										
397	CV-95-2	Culvert	S			PERM	Rail	New	No	Yes; BG-21	550144	7918111	No	NFB	No	NFB	1	9.76	900	n/a										
398	CV-95-3	Culvert	S			PERM	Rail	New	Yes; CV-96-1	Yes; BG-18, BG-17, BG-13-1, BG-14-1	550483	7917613	Probable	MAR - IMP	Probable	MAR - IMP	1	12.2	900	1	34	20	54								
399	CV-95-4	Culvert	S			PERM	Rail	New	Yes; CV-96-1	Yes; BG-17; BG-13-1, BG 14-1	550630	7917484	Probable	MAR	Probable	MAR	1	12.2	900	1	34	20	54								
400	CV-95-5	Culvert	S			PERM	Rail	New	No	No	550708	7917426	No	NFB	No	NFB	1	12.2	900	n/a										
401	CV-95-5a	Culvert	S			PERM	Rail	New	Yes; CV-96-1	Yes; BG-17; BG-13-1, BG 14-1	550781	7917371	No	NFB	No	NFB	1	12.2	900	n/a										
402	CV-95-6	Culvert	S			PERM	Rail	New	Yes; CV-96-1	Yes; BG-17; BG-13-1, BG 14-1	550832	7917333	No	NFB	No	NFB	1	12.2	900	n/a										
403	CV-95-7	Culvert	S			PERM	Rail	New	No	No	550885	7917294	No	NFB	No	NFB	1	12.2	900	n/a										
404	CV-96-1	Culvert	S			PERM	Rail	New	No	Yes; BG-17; BG-13-1, BG 14-1	550924	7917265	Yes	IMP	Yes	IMP	1	26.84	900	3	142	38	180								
405	CV-96-2	Culvert	S			PERM	Rail	New	Yes; CV-96-1	Yes; BG-17; BG-13-1, BG 14-1	550964	7917235	No	NFB	No	NFB	1	26.84	900	n/a										
406	CV-96-3	Culvert	LP			PERM	Rail	New	No	No	551117	7917101	No	NFB	No	NFB	1	26.84	900	n/a										
407	CV-97-1	Culvert	LP			PERM	Rail	New	Yes; CV-96-1	Yes; BG-17; BG-13-1, BG 14-1	551191	7917013	No	NFB	No	NFB	1	12.2	900	n/a										
408	CV-97-2	Culvert	S			PERM	Rail	New	Yes; CV-96-1	Yes; BG-17; , BG-13, BG-13-1, BG-14-1	551226	7916972	No	NFB	No	NFB	1	21.96	900	n/a										
409	CV-97-3	Culvert	S			PERM	Rail	New	Yes; CV-96-1	Yes; BG-17; , BG-13, BG-13-1, BG-14-1	551254	7916940	No	NFB	No	NFB	1	9.76	900	n/a										
410	CV-97-4	Culvert	S			PERM	Rail	New	No	Yes; CV-006	551292	7916898	No	NFB	No	NFB	1	19.52	900	n/a										
411	CV-97-5	Culvert	S		CV-97-6	PERM	Rail	New	No	Yes; CV-006	551351	7916843	No	NFB	No	NFB	1	12.2	900	n/a										
412	CV-97-5b	Culvert	S			PERM	Rail	New	No	Yes; CV-006	551326	7916865	No	NFB	No	NFB	1	12.2	900	n/a										
413	CV-97-6	Cut	LP	CV-97-5		PERM	Rail	New	No	Yes; BG-12	551457	7916754	No	NFB	No	NFB		NA	NA	n/a										
414	CV-97-7	Culvert	S			PERM	Rail	New	No	Yes; CV-005	551576	7916658	No	NFB	No	NFB	1	12	900	n/a										
415	CV-97-7a	Culvert	S			PERM	Rail	New	No	Yes; CV-005	551560	7916671	No	NFB	No	NFB	1	12.2	900	n/a										
416	CV-97-9	Culvert	S			PERM	Rail	New	No	Yes; BG-11	551629	7916614	No	NFB	No	NFB	1	19.52	900	n/a										
417	CV-97-10	Culvert	S			PERM	Rail	New	No	Yes; BG-09	551781	7916475	No	NFB	No	NFB	1	19.52	900	n/a										
418	CV-97-11	Culvert	LP			PERM	Rail	New	No	No	551823	7916434	No	NFB	No	NFB	1	12.2	900	n/a										
419	CV-97-12	Culvert	LP			PERM	Rail	New	No	No	551891	7916370	No	NFB	No	NFB	1	14.64	900	n/a										
420	CV-98-0	Culvert	LP			PERM	Rail	New	No	No	552001	7916266	No	NFB	No	NFB	1	19.52	900	n/a										
421	CV-98-1	Culvert	LP			PERM	Rail	New	No	No	552043	7916226	No	NFB	No	NFB	1	19.52	900	n/a										
422	CV-99-1	Culvert/Encroachment	S/P			PERM	Rail	New	No	No	552464	7915930	No	NFB	Potential	MAR	1	12.2	900	1										
423	CV-99-2	Culvert	S			PERM	Rail	New	No	No	552958	7915502	No	NFB	Potential	MAR	5	12.2	900	1										
424	CV-99-3	Culvert	S			PERM	Rail	New	No	Yes; BG-04	553253	7915414	Yes	MAR - IMP	Yes	MAR - IMP	5	12.2	900	3	199	117	316								
425	CV-100-1	Culvert	LP			PERM	Rail	New	No	No	553579	7915319	No	NFB	No	NFB	5	7.32	900	n/a										
426	CV-100-2	Culvert	LP			PERM	Rail	New	No	No	553862	7915292	No	NFB	No	NFB	1	9.76	900	n/a										
427	CV-100-3	Culvert	LP			PERM	Rail	New	No	No	554050	7915379	No	NFB	No	NFB	1	9.76	900	1										

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Number	Site ID	Description	Waterbody Type	Diversion to	Receives Diversion From	Permanent/Temporary	Rail/Road	New/Replacement /Extension /Modification	Other Crossings/Bridges/Encroachments/Cuts on Same Waterbody [1]		Current UTM Coordinates		Arctic Char		Ninespine Stickleback		No. Barrels	Culvert Length (m)	Culvert Diameter (mm)	Stream Order at Crossing/Cut /Bridge	Stream Crossings			Bridges			Lake/Pond Encroachment /Infilling	Cuts		
									Rail Crossing	Road Crossing	Easting	Northing	Fish Bearing	Habitat Quality (MAR/IMP/NFB)	Fish Bearing	Habitat Quality (MAR/IMP/NFB)					Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)	Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)	Lost Habitat (m^2)	Lost Habitat (m^2)	Altered Habitat (m^2)	Total (m^2)
428	CV-100-4	Culvert	S			PERM	Rail	New	No	Yes; CV-001	554185	7915443	Probable	MAR	Probable	MAR	2	12.2	1200	3	199	156	355							
429	CV-101-1	Culvert	S		CV-101-1a and CV-101-	PERM	Rail	New	No	Yes; CV-001	554664	7915456	Probable	MAR	Probable	MAR	1	9.76	900	3	159	117	276							
430	CV-101-1a	Cut	S	CV-101-1		PERM	Rail	New	No	Yes; CV-001	554772	7915455	No	NFB	No	NFB		NA	NA	2									
431	CV-101-1b	Cut	S	CV-101-1		PERM	Rail	New	No	Yes; CV-001	554885	7915454	No	NFB	No	NFB		NA	NA	2									
432	CV-101-2	Culvert	S			PERM	Rail	New	No	Yes; BG-03	555200	7915449	No	NFB	Unlikely	MAR	5	9.76	1400	1									
433	CV-102-1	Bridge	S			PERM	Rail	New	No	Yes; CV-223 bridge	555728	7915442	Yes	IMP	Yes	IMP	0	NA	NA	3+				14.00	242	256				
434	CV-102-1a	Cut	S	CV-102-2		PERM	Rail	New	No	No	555891	7915441	No	NFB	No	NFB	0	NA	NA	n/a									
435	CV-102-2	Culvert	S		CV-102-1a	PERM	Rail	New	No	Yes; CV-224	556019	7915438	Yes	IMP	Yes	IMP	1	21.96	1200	3	358	156	514							
436	CV-102-3	Culvert	S			PERM	Rail	New	No	Yes; CV-224	556373	7915485	Probable	MAR - IMP	Probable	MAR - IMP	1	14.64	900	1	41	20	61							
437	CV-102-4	Culvert	S			PERM	Rail	New	No	Yes; CV-224	556461	7915488	Yes	MAR - IMP	Yes	MAR - IMP	3	9.76	900	1	27	20	47							
438	CV-102-5	Cut	S	CV-103-1		PERM	Rail	New	No	Yes; CV-225	557111	7915356	No	NFB	No	NFB	NA	NA	NA	1									
439	CV-103-1	Culvert	S		CV-102-5	PERM	Rail	New	No	Yes; CV-225	557447	7915244	Yes	IMP	Yes	IMP	1	41.48	1800	3	369	128	497							
440	CV-104-1	Culvert	S			PERM	Rail	New	No	Yes; CV-225	557574	7915202	Probable	MAR	Probable	MAR	1	17.08	900	1	48	20	68							
441	CV-104-2	Culvert	S			PERM	Rail	New	No	Yes; BG-01	557882	7915099	Yes	MAR - IMP	Yes	MAR - IMP	1	21.96	1200	2	149	65	215							
442	CV-104-3	Culvert	S			PERM	Rail	New	No	Yes; BG-01	557996	7915052	Yes	IMP	Yes	IMP	3	26.84	1400	1	75	31	107							
443	CV-104-4	Culvert	LP			PERM	Rail	New	No	No	558154	7914976	No	NFB	No	NFB	1	12.2	900	n/a									
444	CV-104-5	Culvert	S			PERM	Rail	New	No	Yes; BG-01	558340	7914885	Yes	IMP	Yes	IMP	1	21.96	1800	3	123	81	204							
445	CV-105-1	Culvert	S			PERM	Rail	New	Yes; CV-104-5	Yes; BG-01	558521	7914785	Probable	MAR	Probable	MAR	1	9.76	900	1	27	20	47							
446	CV-105-2	Culvert	S			PERM	Rail	New	Yes; CV-104-5 (CV-105-1 is a separate tributary)	Yes; BG-01	558750	7914656	Yes	MAR	Yes	MAR	1	9.76	900	3	159	117	276							
447	CV-105-3	Pond Infilling	P			PERM	Rail	New	Yes; CV-105-2, CV-104-5	Yes; BG-01	558875	7914578	Yes	MAR	Yes	IMP	1	9.76	900	n/a (LE)							1,090			
448	CV-105-4	Culvert	S			PERM	Rail	New	Yes; CV-105-3, CV-105-2, CV-104-5	Yes; BG-01	559196	7914375	Yes	MAR	Yes	MAR	1	14.64	900	3	239	117	356							
449	CV-106-1	Pond Infilling	P			PERM	Rail	New	Yes; CV-105-4, CV-105-3, CV-105-2, CV-104-5	Yes; BG-01	559334	7914281	Yes	MAR	Yes	IMP	1	12.2	900	n/a (LE)							375			
450	CV-106-2	Pond Infilling	P			PERM	Rail	New	Yes; CV-106-1, CV-105-4, CV-105-3, CV-105-2, CV-104-5	Yes; BG-01	559615	7914085	Yes	MAR	Yes	IMP	1	12.2	900	n/a (LE)							1,310			
451	CV-106-3	Encroachment	P			PERM	Rail	New	Yes; CV-106-1, CV-105-4, CV-105-3, CV-105-2, CV-104-5	Yes; BG-01	559980	7913834	Yes	MAR	Yes	IMP	1	14.64	900	n/a (LE)							281			
452	CV-107-1	Encroachment	P			PERM	Rail	New	Yes; CV-106-3, CV-106-1, CV-105-4, CV-105-3, CV-105-2, CV-104-5	Yes; BG-01	560409	7913682	Probable	MAR - IMP	Probable	MAR - IMP	1	19.52	900	n/a (LE)							585			
453	CV-107-2	Encroachment	P			PERM	Rail	New	No	No	560529	7913655	Potential	MAR	Potential	MAR	1	19.52	900	n/a (LE)							27			
454	CV-107-3	Encroachment	P			PERM	Rail	New	No	No	560660	7913555	No	NFB	No	NFB	1	24.4	900	n/a									
455	CV-107-4	Culvert	S			PERM	Rail	New	No	Yes; CV-186	560706	7913502	Yes	IMP	Yes	IMP	1	26.84	1400	3	437	183	620							
456	CV-108-1	Culvert	S			PERM	Rail	New	No	No	560926	7913247	No	NFB	No	NFB	1	17.08	900	n/a									
457	CV-108-2	Culvert	S			PERM	Rail	New	No	No	560963	7913204	No	NFB	No	NFB	1	17.08	900	n/a									
458	CV-108-3	Culvert	S			PERM	Rail	New	Yes; CV-110-1	Yes; Landfill Road	561364	7912739	No	NFB	No	NFB	1	9.76	900	n/a									
459	CV-109-1	Cut	S	CV-109-2		PERM	Rail	New	No	No	561856	7912346	Unlikely	MAR	Unlikely	MAR	NA	NA	NA	1								2,395	-	2,395
460	CV-109-2	Culvert	S		CV-109-1	PERM	Rail	New	No	No	561973	7912254	No	NFB	No	NFB	TBD	TBD	TBD	n/a									
461	CV-109-3	Culvert	LP			PERM	Rail	New	No	No	562024	7912215	No	NFB	No	NFB	TBD	TBD	TBD	n/a									
462	CV-110-1	Culvert	S			PERM	Rail	New	No	Yes; Landfill Road	561084	7912910	No	NFB	No	NFB	TBD	TBD	TBD	n/a									
463	CV-110-2	Culvert/Encroachment	P			PERM	Rail	New	No	No	561266	7912241	No	NFB	No	NFB	TBD	TBD	TBD	n/a									
464	CV-110-3	Pond Infilling	P			PERM	Rail	New	Yes; CV-110-2	No	561445	7912240	No	NFB	No	NFB	TBD	TBD	TBD	n/a									
465	CV-110-4	Culvert	S			PERM	Rail	New	No	No	561546	7912425	No	NFB	No	NFB	TBD	TBD	TBD	n/a									
466	CV-169-1	Culvert	S			PERM	Road	New	No	No	505149	7972688	Probable	MAR	Probable	MAR	TBD	TBD	TBD	3	TBD	TBD	TBD							
467	CV-146-1	Culvert	S			PERM	Road	Relocation	Yes; CV-9-1	Yes; CV-146, CV-146-2, CV-146-3	508928	7968816	Unlikely	APR	Unlikely	APR	TBD	TBD	TBD	3	TBD	TBD	TBD							
468	CV-146-2	Culvert	S			PERM	Road	Relocation	No	Yes; CV-146-3	508726	7968858	Unlikely	MAY	Unlikely	MAY	TBD	TBD	TBD	3	TBD	TBD	TBD							
469	CV-146-3	Culvert	S			PERM	Road	Relocation	No	Yes; CV-146-2	508721	7968887	Unlikely	JUN	Unlikely	JUN	TBD	TBD	TBD	3	TBD	TBD	TBD							
470	CV-131-1	Culvert	S			PERM	Road	New	No	No	511333	7967096	Unlikely	JUL	Unlikely	JUL	TBD	TBD	TBD	2	TBD	TBD	TBD							
471	CV-060-1	Culvert	S			PERM	Road	New	No	No	527517	7930366	Yes	IMP	Unlikely	MAR	TBD	TBD	TBD	3	TBD	TBD	TBD							
472	CV-060-2	Culvert	S			PERM	Road	New	Yes; CV-55-3	Yes; CV-060, CV-060-1	527756	7930278	Yes	IMP	Yes	MAR	TBD	TBD	TBD	3	TBD	TBD	TBD							
473	CV-059-1	Culvert	S			PERM	Road	New	No	No	528033	7929251	Yes	MAR	Unlikely	MAR	TBD	TBD	TBD	3	TBD	TBD	TBD							
474	CV-214-1	Culvert	S			PERM	Road	Relocation	Yes; CV-84-3	Yes; CV-214, CV-217	541273	7921956	No	NFB	No	NFB	TBD	TBD	TBD											
475	CV-214-2	Culvert	S			PERM	Road	New	Yes; CV-85-1	Yes; Unnamed Tote Road, CV-217	541507	7922071	No	NFB	No	NFB	TBD	TBD	TBD											
476	CV-215-1	Culvert	S			PERM	Road	Relocation	Yes; CV-85-2	Yes; CV-215, CV-217	541909	7922250	No	NFB	No	NFB	TBD	TBD	TBD											
477	CV-216-1	Culvert	LP			PERM	Road	New	No	No	543381	7921181	No	NFB	No	NFB	TBD	TBD	TBD											
478	CV-216-2	Culvert	LP			PERM	Road	New	No	No	543524	7921151	No	NFB	No	NFB	TBD	TBD	TBD											
479	CV-020-2	Culvert	S			PERM	Road	New	Yes; CV-91-0	Yes; CV-020-2, CV-021	546893	7919846	No	NFB	No	NFB	TBD	TBD	TBD											
480	CV-020-1	Culvert	S			PERM	Road	New	Yes; CV-91-0	Yes; CV-021	547094	7919813	No	NFB	No	NFB	TBD	TBD	TBD											
481	BG-14-1	Culvert	S			PERM	Road	New	Yes; CV-96-1	Yes; BG-17; BG-14-1	550839	7917414	Yes	IMP	Yes	IMP	TBD	TBD	TBD	3+	TBD	TBD	TBD							
482	BG-13-1	Culvert	S			PERM	Road	New	Yes; CV-96-1	Yes; BG-17; BG-13-1	551001	7917116	Probable	IMP	Probable	IMP	TBD	TBD	TBD	2	TBD	TBD	TBD							

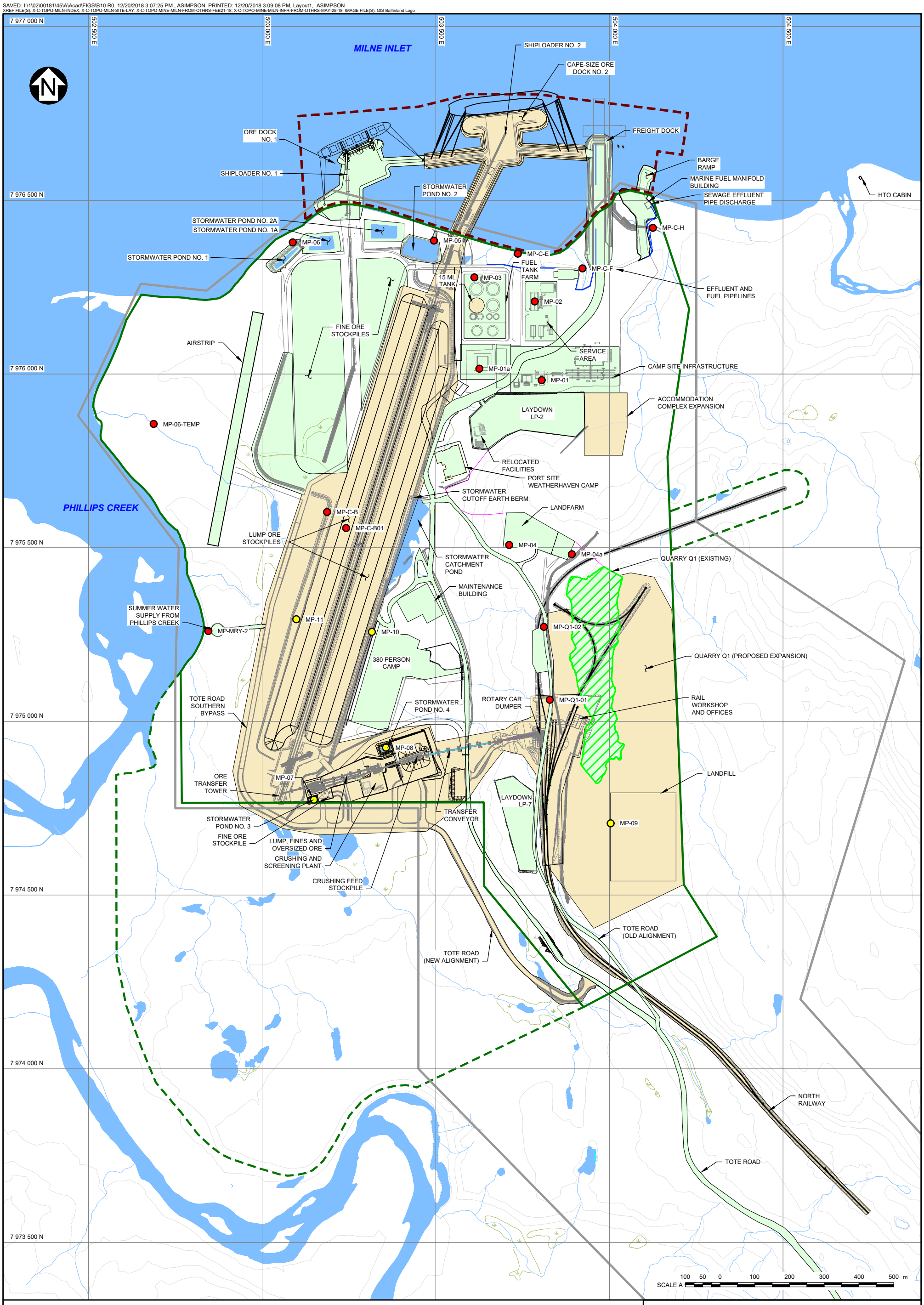
S = stream; P = pond; LP = Low point; L = Lake; PERM = Permanent; TEMP = Temporary; IMP = Important; MAR = Marginal; and NFB = Not fish bearing

1 For each site on a stream, where stream is defined as terminating at either a large watercourse or a lake, all downstream road and rail crossings and cuts are identified.
For lakes, the number of encroachments/infilling sites are identified.
For bridges the number of bridges on the same river are identified.
For cuts, the number of crossings and cutes on the stream are identified (where stream is defined as above).

APPENDIX 3
CIRNAC IR ATTACHMENTS

CIRNAC 06 ATTACHMENT 1: FIGURE 1 – MILNE PORT LAYOUT, DRAWING – RAIL SITE, RAIL TEMPORARY LOADING FACILITY AND TABLE 6.1 - PROPOSED ADDITIONAL MONITORING STATIONS

SAVED: I:\1\02\00181\45\A\Acad\FIGS\B10 R0, 12/20/2018 3:07:25 PM , ASIMPSON PRINTED: 12/20/2018 3:09:08 PM, Layout1, ASIMPSON
XREF FILE(S): X-C-TOPO-MILN-INDEX; X-C-TOPO-MILN-SITE-LAY; X-C-TOPO-MINE-MILN-FROM-OTHRS-FEB21-18; X-C-TOPO-MINE-MILN-INFR-FROM-OTHRS-MAY-25-18 IMAGE FILE(S): GIS Baffinland Logo



LEGEND:

- WATER
- QUARRY
- WASTE MANAGEMENT INFRASTRUCTURE
- ROAD
- NORTH RAILWAY
- COMMERCIAL LEASE BOUNDARY
- APPROVED INFRASTRUCTURE
- ADDITIONAL PHASE 2 PROPOSAL INFRASTRUCTURE
- PROJECT DEVELOPMENT AREA (PDA)
- PDA EXPANSION FOR PHASE 2 PROPOSAL
- FORESHORE LEASE BOUNDARY / MARINE PDA
- EXISTING SNP MONITORING LOCATION
- NEW SNP MONITORING LOCATION

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 17N.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. CONTOUR INTERVAL IS 10 METRES.
4. PROPOSED MILNE PORT INFRASTRUCTURE PROVIDED BY HATCH MAY 25, 2018.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	20DEC'18	ISSUED WITH TRANSMITTAL	RAC	AS	RAC

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

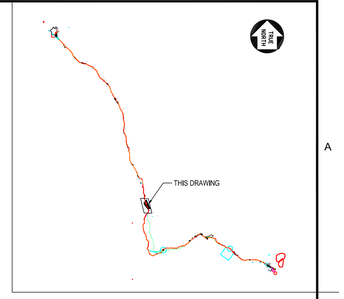
MILNE PORT LAYOUT PHASE 2 PROPOSAL

Baffinland

P/A NO.	REF NO.
NB102-181/45	NB18-00887

FIGURE 1 REV 0

DWG. No. H353004-30000-224-271-0029-0001



KEY PLAN
N.T.S.

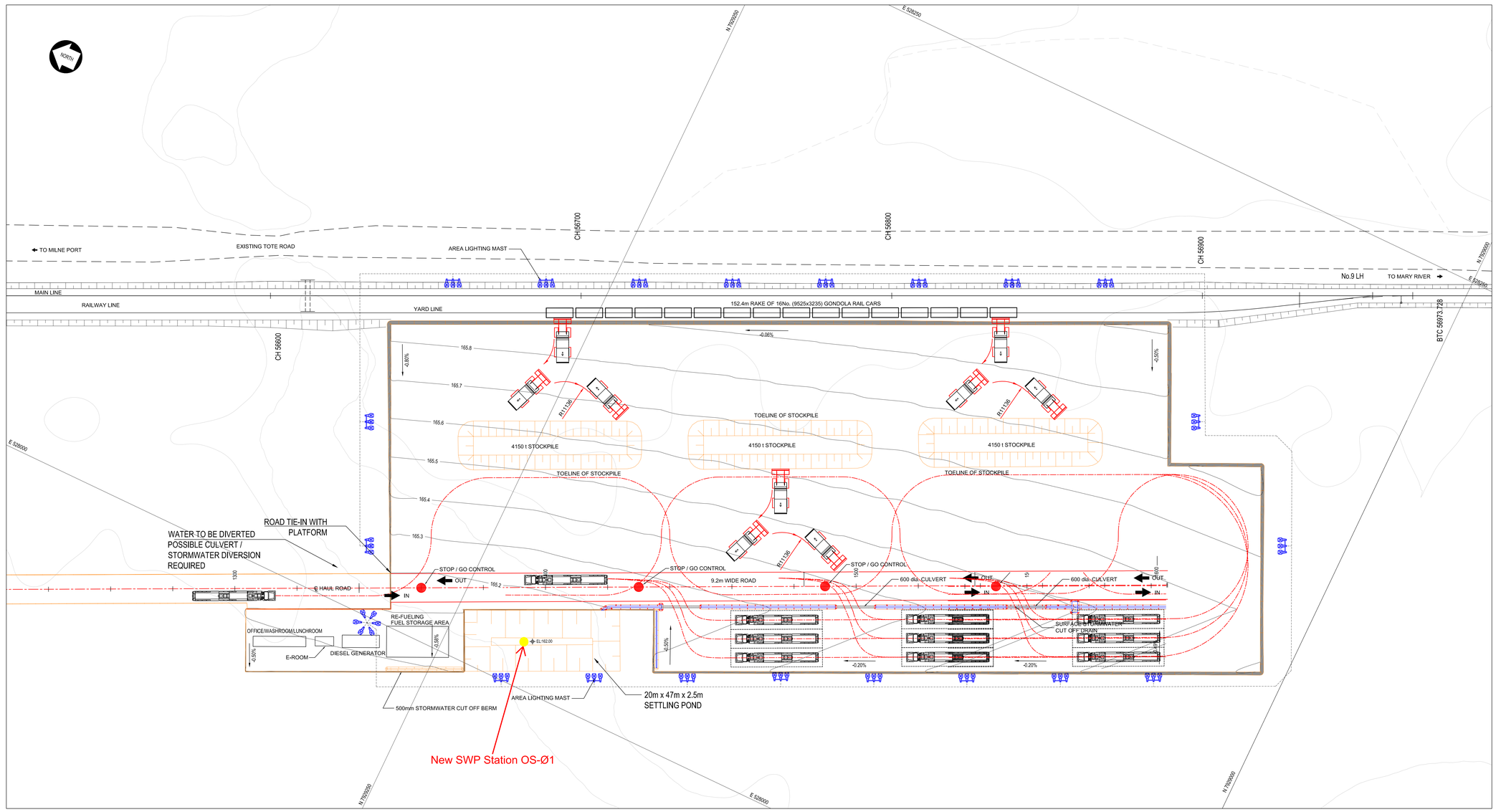
NOTES:

1. LIDAR SURVEY PROVIDED BY PHOTSAT (2016)
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METERS.
3. CONTOURS ARE IN METERS. CONTOUR INTERVAL IS 0.5m.
4. ALL DIMENSIONS SHOWN ARE IN METERS, UNLESS OTHERWISE SPECIFIED.

LEGEND:

198 — CONTOUR

NEW TREATED EFFLUENT



LOADING PLATFORM LAYOUT
SCALE 1:500

DRAWING No.	DRAWING TITLE
H353004-30000-224-273-0032-0001	TEMPORARY LOADOUT CROSS SECTION
H353004-30000-224-271-0029-0003	HAUL ROAD LAYOUT AND PROFILE 800m to 1600m
H353004-30000-224-271-0029-0002	HAUL ROAD LAYOUT AND PROFILE 0.0m to 800m

REFERENCE DRAWINGS

NAME
SIGNATURE
ENG REG NUMBER
REVISION DATE
ORIGINAL DATE
REG. PROFESSIONAL

INTERNAL/CLIENT REVIEW

No.	DESCRIPTION	BY	CHK'D	DATE
A	INTERNAL / CLIENT REVIEW	WR	FVB	2017/02/03

REVISIONS

HATCH

ROLE	NAME	SIGNATURE	DATE
DRAFTSPERSON	S VAN DER WALT	NR	2018/03/21
DESIGNER	S VAN DER WALT	NR	2018/03/21
CHECKER	A AQUIL		.
DESIGN COORD.	A AQUIL		.
RESP. ENG.	F VAN BILJON		.
LEAD DISC. ENG.	F VAN BILJON		.
AREA LEAD	F VAN BILJON		.
ENG. MANAGER			.
AREA MANAGER			.

DRAWING APPROVAL STATUS: INTERNAL / CLIENT REVIEW

Baffinland

BAFFINLAND IRON MINES LP
MARY RIVER EXPANSION PROJECT

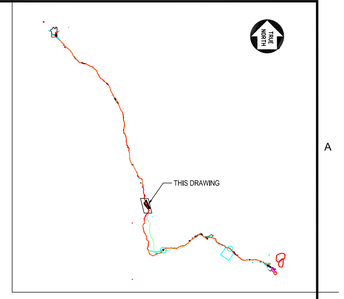
RAIL SITE (56km)
RAIL TEMPORARY LOADING FACILITY

SCALE 1:2000 OR AS NOTED | DWG. No. H353004-30000-224-271-0029-0001 | REV A

SHEET SIZE: A0

$USERNAME$
$TIMES$
$DATE$

DWG. No. H353004-30000-224-271-0029-0001



KEY PLAN
N.T.S.

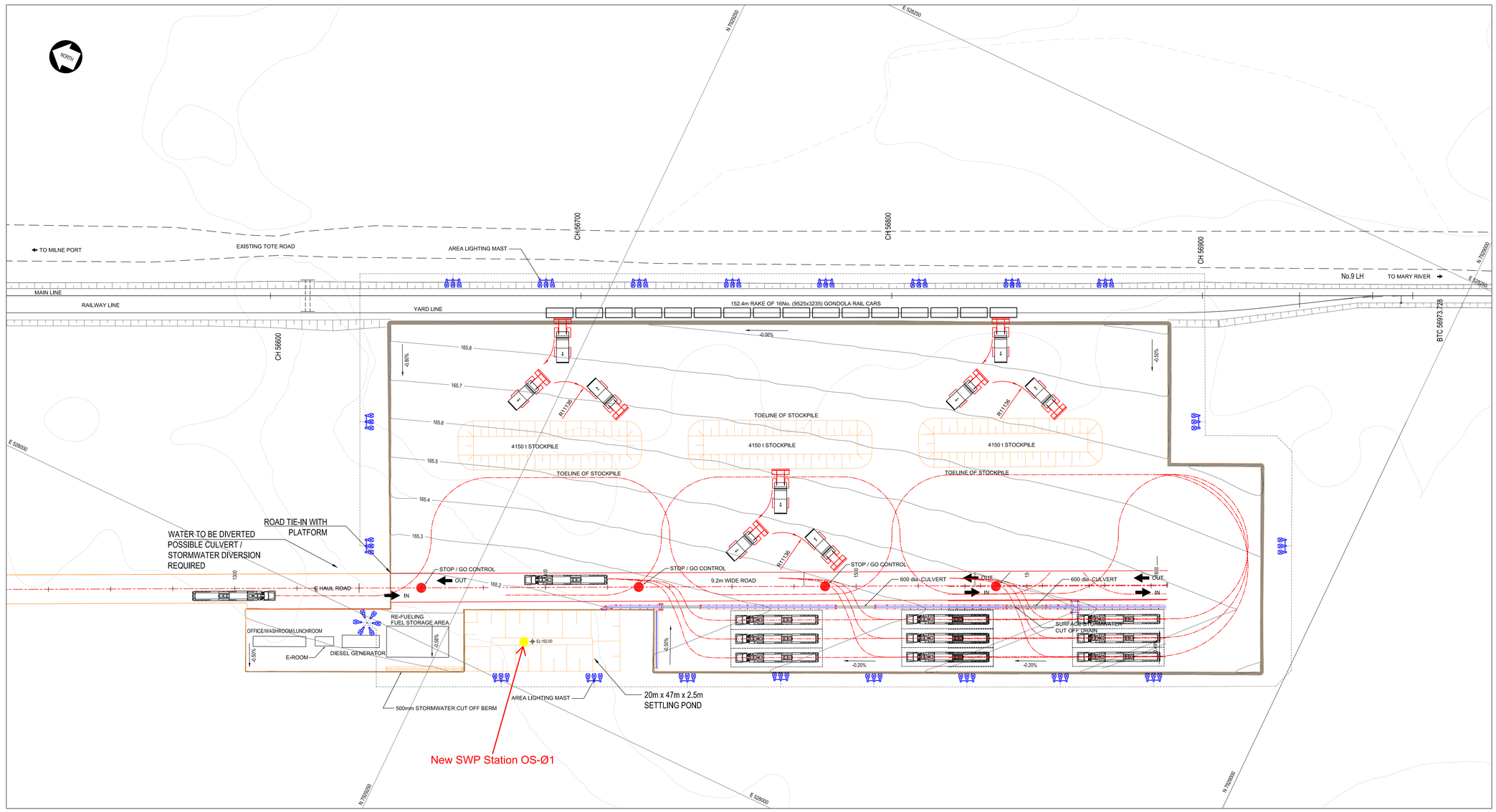
NOTES:

1. LIDAR SURVEY PROVIDED BY PHOTSAT (2016)
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METERS.
3. CONTOURS ARE IN METERS. CONTOUR INTERVAL IS 0.5m.
4. ALL DIMENSIONS SHOWN ARE IN METERS, UNLESS OTHERWISE SPECIFIED.

LEGEND:

198 — CONTOUR

NEW TREATED EFFLUENT



LOADING PLATFORM LAYOUT
SCALE 1:500

DRAWING No.	DRAWING TITLE
H353004-30000-224-273-0032-0001	TEMPORARY LOADOUT CROSS SECTION
H353004-30000-224-271-0029-0003	HAUL ROAD LAYOUT AND PROFILE 800m to 1600m
H353004-30000-224-271-0029-0002	HAUL ROAD LAYOUT AND PROFILE 0.0m to 800m

REFERENCE DRAWINGS

NAME
SIGNATURE
ENG REG NUMBER
REVISION DATE
ORIGINAL DATE
REG. PROFESSIONAL

INTERNAL/CLIENT REVIEW

No.	DESCRIPTION	BY	CHK'D	DATE
A	INTERNAL / CLIENT REVIEW	WR	FVB	2017/02/03

REVISIONS

HATCH

ROLE	NAME	SIGNATURE	DATE
DRAFTSPERSON	S VAN DER WALT	NR	2018/03/21
DESIGNER	S VAN DER WALT	NR	2018/03/21
CHECKER	A AQUIL		.
DESIGN COORD.	A AQUIL		.
RESP. ENG.	F VAN BILJON		.
LEAD DISC. ENG.	F VAN BILJON		.
AREA LEAD	F VAN BILJON		.
ENG. MANAGER			.
AREA MANAGER			.

DRAWING APPROVAL STATUS: INTERNAL / CLIENT REVIEW

Baffinland

BAFFINLAND IRON MINES LP
MARY RIVER EXPANSION PROJECT

RAIL SITE (56km)
RAIL TEMPORARY LOADING FACILITY

SCALE 1:2000 OR AS NOTED | DWG. No. H353004-30000-224-271-0029-0001 | REV A

SHEET SIZE: A0

$USERNAME$
$TIMES$
$DATE$

APPENDIX 4
COMMITMENT REGISTER

Baffinland

Memo

TO:	Nunavut Impact Review Board	From:	Baffinland Iron Mines Corporation
File:	Phase 2 Proposal Updates to Environmental Management and Monitoring Plans and Commitment Registry	Date:	December 17, 2018

REFERENCE: PHASE 2 PROPOSAL – COMMITMENT REGISTRY

Introduction

Baffinland Iron Mines Corporation (Baffinland) developed environmental management, mitigation and monitoring documents to support the Final Environmental Impact Statement (FEIS) and Early Revenue Phase and has continued to create and update its plans throughout operations. As an operational mine, it is important to recognize that all management plans are living documents, where regular updates are tracked through a formal versioning process. It is recognized that the Phase 2 Proposal requires a consolidated update to many of Baffinland's management plans and that some of these management plans will require further update(s) once Phase 2 is approved by the Nunavut Impact Review Board (NIRB) and Nunavut Water Board (NWB), and, revisions to the Project Certificate No. 005 and Type A Water License No. 2AM-MRY1325, respectively, are granted.

As part of the regulatory review and consultation process, including the technical review period, it is anticipated that new mitigation, monitoring and commitments will be identified, and that some existing commitments may change. Therefore, the attached Commitment Register is intended to be a living document that will be updated throughout the review process and provides a tool for all reviewers to easily identify any track changes. After the technical review is complete, based on the final consolidated Commitment Register, the management, mitigation and monitoring plans will then be updated according to the schedule below.

Management, Mitigation and Monitoring Plan Update Schedule

Required changes to plans will be tracked, and the Commitment Register will be updated for circulation at various milestones through the regulatory process, including but not necessarily limited to the following: with submission of information request responses (version submitted with this memo); with submission of technical question responses; immediately following the technical meetings; and in advance of any formalized engagement activities as neccessary. It is anticipated that the final draft plans reflecting all changes identified will be distributed after the technical meetings and before final written submissions are due, with some reasonable exceptions. These exceptions include plans that are specific to a separate approval or permitting process and include the following:

- Ore Dock Construction Management Plan: to be developed during the permitting phase
- Interim Closure and Reclamation Plan: to be developed in accordance with regulatory timelines as established for the ICRP
- Oil Pollution Emergency Plan – Milne Inlet: to be developed in accordance with regulatory timelines associated with the OPEP
- Landfill Maintenance and Operations Manual: to be developed when appropriate detailed engineering information is available (after the closure of Quarry 1)

Baffinland Phase 2 Commitment Register

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
1	EPP	2.2	Operation of North Railway	The construction and operation of the railway will require updates related to local land use
2	EPP	2.3	Operation of North Railway	The construction and operation of the railway will require updates related to land disturbance.
3	EPP	2.12	Operation of North Railway	The construction and operation of the railway will require updates related to caribou protection measures.
4	EPP	2.19	Operation of North Railway	The construction and operation of the railway will require updates related to lo traffic management.
5	EPP	2.20	Operation of North Railway	The construction and operation of the railway will require updates related to local land use, and drilling, blasting, and crushing.
6	EPP	2.3	Land Disturbance Mitigation	Mitigation to be added:Slopes will be flattened as necessary when being constructed in ice-rich or thaw sensitive materials, and will be protected with thermal and erosion protection material, if required.Excavations will be minimized, especially in areas of known ice-rich permafrost. Prior to embankment construction, ground disturbance will be minimized and vegetative or organic cover left in place to provide the maximum protection of the thermal regime. In areas where excavation is required, the foundations will be over excavated and backfilled with 0.8 m of non-freeze/thaw susceptible fill to minimize frost heaving and settlement. Slopes will be flattened as necessary when being constructed in ice-rich or thaw sensitive materials, and will be protected with erosion protection material, if required. This will include a geotextile layer as well as an engineered backfill. For high embankment fills on ice-rich materials, the side slopes may be flattened significantly or stabilization berms constructed to reduce the creep deformation potential. For construction during the summer, woven geotextile may be required over unstable ground.Proper runoff collection and diversions drainage systems will be used to control runoff and erosion from affecting the modified thermal regime. As part of basic design, thermal modeling will be conducted for each typical embankment condition and configuration to identify the actual permafrost protection measures required and to predict the nature of the active layer and the effect that construction will have on the thermal regime over the life of the Project. The thermal modeling will incorporate potential warming trends resulting from climate change based on world-recognized global warming scenarios.Thaw settlements and surface sloughing of cut slopes is expected, particularly during the thaw seasons immediately following construction. The behaviour of both cut slopes and embankment fills will be monitored throughout these thaw seasons and remedial measures will be implemented as necessary. For example, it is expected that many of the cut slopes will need to be monitored as thaw settlements occur. Silt fences and

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
				other erosion protection measures will be installed as necessary to prevent siltation of adjacent drainage courses and water bodies.
7	EPP	2.9	Drainage Patterns	Add measures to minimize changes to the hydrologic drainage patterns.
8	EPP	2.17	Drainage Patterns	Add measures to minimize changes to the hydrologic drainage patterns.
9	EPP	2.25	Drainage Patterns	Add measures to minimize changes to the hydrologic drainage patterns.
10	EPP	2.27	Drainage Patterns	Add measures to minimize changes to the hydrologic drainage patterns.
11	EPP	2.29	Drainage Patterns	Add measures to minimize changes to the hydrologic drainage patterns.
12	EPP	2.18	Culvert Design	Add the following design considerations for culvert installation/replacement: •Install culverts at the same slope as the existing stream, where feasible. •Minimize culvert lengths. •Culverts with lengths that exceed 50 m may be considered barriers to fish passage due to darkness. Examine and consider methods to provide light inside culverts, where applicable. •Compare culvert velocities to the velocity in the existing watercourse to determine fish passage potential. This information can be used to reassess design velocities under proposed conditions with the culvert installed. With the channelization of flows and conveyance in culverts, the velocity of the flows may increase. This may be mitigated by placing rocks and boulders inside the culverts (stream replication) to provide greater friction, thereby reducing velocities and increasing the flow depth and to provide resting locations for fish. Boulders may be bolted into place. In culverts on steep slopes, high velocities may result in the movement of rocks inside the culvert. At these locations, install baffles, baffle inserts or weirs to: •assist in keeping rocks inside the culvert; •maintain and increase roughness in order to reduce velocities; and •provide additional resting locations for fish as they move through the culvert.
13	EPP	2.2	Railway and Road Safety Features	The following safety features will increase the visibility of the crossings and increase safe use of the road: • Early warning signs will warn road users of an approaching railway crossing and stop sign ahead. • A combined stop and railway crossing sign will be located on either side of the crossings. • Crossing timbers will ease vehicle, ATV, and snowmobile crossing. • Instructional bulletins regarding the rail crossings will be posted in English and Inuktitut at each end of the Tote Road.
14	EPP	2.3	Thaw Settlements from Construction	Thaw settlements and surface sloughing of cut slopes is expected, particularly during the thaw seasons immediately following construction. The behaviour of both cut slopes and embankment fills will be monitored throughout these thaw seasons and remedial measures will be implemented as necessary. For example, it is expected that many of the cut slopes will need to be

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
				monitored as thaw settlements occur. Silt fences and other erosion protection measures will be installed as necessary to prevent siltation of adjacent drainage courses and water bodies.
15	EPP	2.3	Permafrost Protection	Excavations will be reduced, especially in areas of known ice-rich permafrost.
16	EPP	2.3	Embankment Construction	In areas where excavation is required, the foundations will be over excavated and backfilled with 1.5 m of non-freeze/thaw susceptible fill to reduce frost heaving and settlement. For high embankment fills on ice-rich materials, the side slopes may be flattened substantially or stabilization berms constructed to reduce the creep deformation potential. To reduce the rate of creep settlement, embankments thicker than three metres should be constructed with side slopes no steeper than 5H:1V or with toe buttresses. For construction during the summer, woven geotextile may be required over unstable ground.
17	EPP	2.3	Thermal Regime	Proper runoff collection and diversion drainage systems will be used to control runoff and erosion from affecting the modified thermal regime.
18	EPP	New Section 'Ore Dock Construction'	Ore Dock Construction	An Ore Dock Construction Environmental Plan will be prepared to meet Fisheries Act Authorization requirements and implemented during construction of marine facilities in Milne Inlet. Silt curtains will be installed around localized construction areas during the ice break-up period and around the full perimeter of construction including removed sediment disposal area during the open-water season.Silt curtains will be installed prior to any in-water work in order to encapsulate the entire construction footprint and to reduce disturbance to the marine environment in the surrounding area.Construction of concrete components of the dock will consist of installation of prefabricated concrete elements whenever possible. If in-situ concrete production is required, works will be conducted in the way to avoid contact of cement and uncured concrete with surrounding water.The majority of construction work, particularly in shallow water (e.g., access causeway), will take place in winter as land-fast ice is formed. It is expected that, as construction gradually moves offshore, ice will thicken and become grounded. Therefore, ice surrounding construction areas will act as a barrier limiting particulate deposition and spills in surrounding water.To reduce disturbance to the marine environment, the ore dock components will be constructed sequentially, moving from onshore to offshore; the causeway will be constructed in small sections, placing protective layers and armoring immediately after core material is placed to minimize erosion.Backfilling of the birth will only occur after a sufficient length of quay is installed so the fill remains within the structure footprint and no material is dispersed. Machine operation in water will be reduced, e.g., piling and filling equipment will operate on the constructed sections of the ore dock and will not enter the water. Use of a suction pump for localized removal of soft sediment layer will reduce dispersal of re-suspended sediment in water. Disposal of removed sediment will be conducted in accordance in a way to minimize effects on water and sediment quality. The material will be removed using a suction pump, which will reduce dispersal of re-suspended sediment in water. Most acoustically sensitive fish will avoid

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
				the immediate impact area once impact pile driving is underway. Operators are encouraged to take advantage of this behaviour by adopting a ramp-up / soft-start procedure when operating the impact hammer, when this is technically feasible. A ramp-up procedure consists of initial activation of the equipment using the lowest energy source / pulse and gradually increasing the intensity of the sound until it reaches the required intensity, thus allowing time and incentive for acoustically sensitive fish to leave the area prior to operating the impact driver at full power.
19	EPP	New Section 'Ore Dock Construction'	Ore Dock Construction	Concurrent impact pile driving activities will be minimized when practicable (e.g., avoiding multiple pile driving activities at the same time). Where multiple underwater noise generating activities are planned, they will be sequenced where possible to minimize acoustic impacts.Underwater noise generated during impact pile driving will not exceed 207 dB re 1µPa2·s (SPLPk) at a distance of 200 m from the source. If the sound level exceeds 30 kPa at a distance of 10 m from the source, measures will be undertaken to reduce either the intensity of the sound generated or the level of sound propagation through the water column. The appropriate measure will be chosen based on practicality and effectiveness and may include: The placement of bubble curtains around the wetted pile during impact driving. Bubble curtains are proven to be an effective mitigation measure for dampening underwater noise generated by pile driving, and are reported to reduce peak pressures by up to 30 dB (Buehler et al. 2015).The use of a vibratory hammer in place of an impact hammer for pile driving.Impact pile driving activities will be temporarily suspended if aggregations of fish are spotted within the immediate work area or if any fish spawn is observed attached to equipment or structures in the water.Impact pile driving will be scheduled when practical to avoid sensitive fish periods such as fish spawning and migratory periods.During in water construction, a silt curtain will be installed in order to isolate the footprint of the proposed ore dock. The curtain will be designed and procured in sections which relate to the water depth in order to remain buoyant and extend to the ocean floor with sufficient slack. Prior to construction work within the silt curtain area, efforts will be made to salvage fish and release them alive outside of the work area. The silt curtain will also serve as a deterrent to fish re-entering the isolated work area.Construction activities will be managed through development of the Environmental Protection and Monitoring Plan, outlining specific procedures to avoid or reduce effects on the marine environment. Proposed mitigation measures during construction will include the installation of silt curtains around in-water works to minimize disturbance to the surrounding marine environment, turbidity monitoring and underwater noise monitoring during pile installation and dredging, and environmental monitoring with regular inspection audits to verify effectiveness of mitigation measures and compliance of Project activities with existing permits and authorizations.Proposed mitigation measures included the use of a bubble curtain to reduce peak sound pressure levels emitted from the pile (during pile driving).

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
20	EPP	New Section 'Ore Dock Construction'	Ore Dock Construction	The proposed ore dock will be constructed in succession to limit disturbance to the natural marine environment, with a focus on in-water activities and producing an effective structure for long term, low maintenance operation.The dock face will be oriented parallel to the existing seabed contours to minimize dredging activities.The proposed ore dock will be constructed during the ice-covered season, when ringed seal would be the only marine mammal species present in Southern Milne Inlet.A ramp-up procedure consists of initial activation of the equipment using the lowest energy source / pulse and gradually increasing the intensity of the sound until it reaches the required intensity, thus allowing time and incentive for marine mammals to leave the immediate zone of potential injury before the pile driver is operating at full power.Installation of a bubble curtain around the wetted pile to dampen sound transmission through water during active pile driving.During all pile driving activities, marine mammal monitoring will be undertaken by a qualified and experienced Marine Mammal Observer (MMO), with all sightings communicated to the piling contractor.Implementation of a 1-km Marine Mammal Exclusion Zone – defined as the zone within which MM may be potentially exposed to sound levels above the injury threshold criteria (180 dB re 1 µPa SPLrms for cetaceans and 190 dB re 1 µPa SPLrms for pinnipeds). The occurrence of a marine mammal within the exclusion zone will trigger specific mitigation actions (e.g., shut-downs) such to avoid potential for physical injury to animals from pile driving noise.Shut-down procedures –pile driving will be temporarily suspended when a marine mammal enters within the exclusion zone until which time it moves outside the safety zone.Implementation of a 30 minute pre-operational (pre-ops) search for marine mammals prior to start-up of pile driving. This would consist of a visual scan of the water by the MMO to determine that no marine mammals are present within the exclusion zone. If an animal is spotted within the exclusion zone during the pre-ops search, the ramp-up procedure will be delayed 20 minutes from the time the marine mammal has left the exclusion zone, or was last sighted in this zone.The MMO will periodically verify underwater sound levels in the field using a hydrophone and a real-time sound monitor to confirm that sound levels at the modeled exclusion zone radius are below the established injury thresholds for marine mammals. If sound levels are shown to exceed the injury thresholds at the exclusion zone radius, the exclusion zone boundary will be adjusted accordingly.Vessels will reduce speeds to a maximum of 9 knots when transiting along the established shipping corridor, and 5 knots when operating in Milne Port, thus reducing the overall noise output generated by ship propulsion and the potential for ship strikes.
21	Borrow Pit and Quarry Management Plan	Appendix E	Identify New Quarry Sites	Update tables and figures with new quarry site information.
22	Interim Closure and	3.2	Project Description	Update to include new Project components and infrastructure.

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	Reclamation Plan			
23	Interim Closure and Reclamation Plan	6	Closure and Objectives	Update to include North Rail, consistent with the Closure Objectives and Criteria for the South Rail already considered.
24	Interim Closure and Reclamation Plan	13.3.2	Post-closure Monitoring	Update to include new Project components and infrastructure.
25	Interim Closure and Reclamation Plan	13.3.7	Post-closure Monitoring	Update to include new Project components and infrastructure.
26	Interim Closure and Reclamation Plan	14	Annual Security Requirements	Baffinland will submit a revised version of the ICRP within 60 days following approval of the requested water licence amendment, in accordance to Part J, Item 2 of the Licence. In accordance to Part C of the Licence, Baffinland will update the security requirements for the Project annually, with necessary adjustments accounted for in the results of the Annual Security Review process.
27	Interim Closure and Reclamation Plan	Appendix A	Mine Closure and Reclamation Plan Drawings	Update to include new Project components and infrastructure.
28	Explosives Management Plan	2.1	Project Timelines	Update to incorporate the project timelines and applicable activities from the Phase 2 Proposal.
29	Explosives Management Plan	2.3	Quantity of Ammonium Nitrate	Update to incorporate the new quantity of ammonium nitrate required for Phase 2.
30	Explosives Management Plan	2.4	Quantity of Ammonium Nitrate	Update to incorporate the new quantity of ammonium nitrate required for Phase 2.

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
31	Explosives Management Plan	2.4	Expansion of Explosives Area	Update to incorporate the expansion of the explosives area to accommodate increases in volume of ammonium nitrate and storage of pre-packaged explosives required for Phase 2
32	Fresh Water Supply, Sewage and Wastewater Management Plan	4.3	Water Supply for Temporary Camps	Describe water supply to temporary camps.
33	Fresh Water Supply, Sewage and Wastewater Management Plan	5.4	Sewage Disposal for Temporary Camps	Describe sewage disposal plans for temporary camps.
34	Fresh Water Supply, Sewage and Wastewater Management Plan	Table 4-2	Additional Water Sources for Dust Suppression	Add the additional dust suppression water sources within the Northern Transportation Corridor.
35	Fresh Water Supply, Sewage and Wastewater Management Plan	4.2	Additional Water Supply Mitigation	Add that monthly cumulative withdrawals from lakes represent less than 10% of the monthly outflow, unless site-specific conditions indicate that a greater water withdrawal will not be significant in the context of fish habitat (i.e., Camp Lake).
36	Fresh Water Supply, Sewage and Wastewater Management Plan	4.2	Additional Water Supply Mitigation	Add that stream water take stations are selected to be sufficiently large such that the instantaneous water withdrawal rate does not exceed 20% of the 10-year monthly low flow condition if a stream is fish-bearing, or 40% of the 10-year monthly low flow condition if the stream is not fish-bearing.

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
37	Fresh Water Supply, Sewage and Wastewater Management Plan	4.2	Additional Water Supply Mitigation	Add mitigation that at select streams where the water take exceeds than the applicable threshold under mean flow conditions but not under the 10-year low flow, water withdrawals are permitted only during the months of June and July.
38	Fresh Water Supply, Sewage and Wastewater Management Plan	7	Address Water Management Changes with New Ore Stockpiles	Update to reflect the changes in water management associated with ore and product stockpiles, including the use of the temporary ore transfer stormwater pond as a water source for dust suppression.
39	Fresh Water Supply, Sewage and Wastewater Management Plan	8	Update to Include New Water Monitoring Locations for Milne Landfill	Update to include the addition of the Milne Port Landfill and associated water quality monitoring locations.
40	Fresh Water Supply, Sewage and Wastewater Management Plan	Appendix B	Updates to Figures and Block Diagrams	Update to reflect new infrastructure and water quality monitoring locations.
41	Fresh Water Supply, Sewage and Wastewater Management Plan	Appendix C	Updates to Figures and Block Diagrams	Update to reflect new infrastructure and water quality monitoring locations.
42	Snow Management Plan	4.3	Snow Stockpile Locations	Revise snow stockpile locations based on site layout changes arising from the Phase 2 Proposal.

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43	Snow Management Plan	Attachment A	Project Camp Sites Snow Management Guidelines	Update to reflect camp infrastructure.
44	Snow Management Plan	Attachment B	Milne Port Ore Stockpile Snow Management Guidelines	Update to reflect revised ore stockpile infrastructure.
45	Snow Management Plan	Attachment D	Tote Road Snow Management Guidelines	Expand scope of section to include North Railway Snow Management Guidelines.
46	Waste Management Plan	3.7	Milne Port Landfill	Update to include new landfill facility at Milne Port
47	Hazardous Materials and Hazardous Waste Management Plan	Appendix B	Hazardous Waste Storage Facilities Locations	Provide updated site layout figures identifying hazardous waste storage facilities.
48	Hazardous Materials and Hazardous Waste Management Plan	3.1.2	Explosives Quantities	Update to reflect new quantities of ammonium nitrate and explosives.
49	Hazardous Materials and Hazardous Waste Management Plan	5	Roles and Responsibilities	Update roles and responsibilities for Project departments and personnel related to Phase 2.
50	Hazardous Materials and Hazardous Waste	Appendix A	Concordance Tables for Relevant Terms and Conditions	Update to reflect terms and conditions in amended Type 'A' Water Licence and Project Certificate.

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
	Management Plan			
51	Hazardous Materials and Hazardous Waste Management Plan	Appendix B	Site Layouts	Update to reflect new Project facilities and infrastructure.
52	Life of Mine Waste Rock Management Plan	3	Waste Rock Production Schedule	Quantities of waste rock generated over the mine life and the phasing of waste rock deposition over time will be updated to reflect the higher production rate associated with the Phase 2 Proposal.
53	Life of Mine Waste Rock Management Plan	4	Waste Rock Production Schedule	Quantities of waste rock generated over the mine life and the phasing of waste rock deposition over time will be updated to reflect the higher production rate associated with the Phase 2 Proposal.
54	Landfill Maintenance and Operations Manual	Throughout	New Non-hazardous Waste Landfill at Milne Port	Update to include reference to the new non-hazardous waste landfill at Milne Port.
55	Health and Safety Management Plan	2.4	Consistency with Emergency Response Plan	Update section to ensure it is consistent with the detailed information provided in the Emergency Response Plan.
56	Health and Safety Management Plan	8	References	Change reference to reporting and documentation requirements so it is not referencing Appendices of the FEIS.
57	Health and Safety Management Plan	9	References	Change reference to reporting and documentation requirements so it is not referencing Appendices of the FEIS.

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
58	Health and Safety Management Plan	11	References	Change reference to reporting and documentation requirements so it is not referencing Appendices of the FEIS.
59	Health and Safety Management Plan	12	References	Provide Canadian reference for indicators (Recordable incident rate, lost time injury rate) rather than OSHA (United States).
60	Health and Safety Management Plan	Annex 1	Update Out-of-date Annex 1 Document	Provide updated Annex or reference other more recent safety plans.
61	Emergency Response Plan	Appendix B	New Risks due to Updated Site Layouts (Part of Water Licence Amendment Application)	New risks to be considered including: collisions along road/rail, stranding due to rail accident.
62	Emergency Response Plan	Foreword	Railway Emergency Plan	Remove 'Future revisions to the Emergency Response Plan will include references to the Railway Emergency Plan' and add reference to the Railway Emergency Plan.
63	Emergency Response Plan	2.2	Reference to Railway Emergency Response Plan	Add Railway Emergency Response Plan to Baffinland Emergency Response figure. Add Section 2.2.6 which will describe Railway Emergency Response Plan.
64	Emergency Response Plan	4.2	Add Probable Emergencies Related to Rail	Add sections on probable emergencies that may occur with the railway (e.g., derailments).
65	Emergency Response Plan	8.1	Emergency Response Equipment for Railway Incidents	Add additional emergency response equipment that will be available for incidents on the railway.
66	Emergency Response Plan	9	Reporting Requirements for Railway Occurrences	Add information on how railway occurrences must be reported as per Transportation Safety Board Regulations Section 5(1).

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67	Emergency Response Plan	Appendix A.1	New Project Certificate Conditions	Add any new Project Certificate conditions applicable to Emergency Response that have been added to the amended Project Certificate.
68	Emergency Response Plan	Appendix A.2	Reference Regulatory Documents Related to railway	Add reference to regulatory documents related to railway.
69	Spill Contingency Plan	7	New Fuel Storage and Handling Facilities	Update to include the location and details of new fuel storage and new spill response equipment.
70	Spill Contingency Plan	Appendix A	Site Layouts	Update to reflect new Project facilities and infrastructure.
71	Spill Contingency Plan	6.4	Rail-based Emergency Response Vehicles	Update to include rail-based emergency response.
72	Spill Contingency Plan	Table 7-1	Fuel Storage Capacity	Update to include updated fuel storage capacities.
73	Spill Contingency Plan	Table 7-2	Explosives Storage Quantities	Update to include current explosives storage quantities.
74	Spill Contingency Plan	7.4.1	Potential Spill Scenario	Add detail on potential scenario: Railway Lubricants/Oil Spill.
75	Spill Contingency Plan	8	Reporting Requirements	Update reporting requirements to include Transportation Safety Board reporting requirements.
76	Spill Contingency Plan	Appendix B	Inventory	Add rail-based emergency response vehicles and spill kit supplies to inventory.

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77	Spill Contingency Plan	Appendix C	Railway Specific Chemicals to MSDS Inventory Appendix	Add any additional chemicals that will be used for railway operations to the MSDS inventory.
78	Oil Pollution Emergency Plan – Milne Inlet	4.1	Bulk Oil Transfer, Ship to Shore	Update section to reflect increased volumes of fuel to be transferred (110ML+) and relocation of fuel transfer manifold.
79	Oil Pollution Emergency Plan – Milne Inlet	Appendix A	Site Layout	Update to reflect new Project facilities and infrastructure.
80	Spill at Sea Response Plan	General Overview	Project Description	Update description of project to change mode of ore transport to railway, increase tonnage from 3.5 to 12 Mtpa.
81	Spill at Sea Response Plan	General Overview	Shipping Route	Change shipping route description/figure to indicate final destination is not necessarily Rotterdam.
82	Spill at Sea Response Plan	Figure 1-1	Shipping Route	Change shipping route description/figure to indicate final destination is not necessarily Rotterdam.
83	Spill at Sea Response Plan	Context for the SSRP	Number of Tugs in Use	Increase number of tugs from 2, to 6-10.
84	Spill at Sea Response Plan	Context for the SSRP	List of Vessel Types	Remove reference to Rotterdam, add capsize vessels to list of vessels.
85	Spill at Sea Response Plan	Context for the SSRP	Number of Fuel Tanker Deliveries	Increase number of fuel tanker deliveries per year.
86	Spill at Sea Response Plan	Section 11	Fuel Volume due to Capesize Vessels	Confirm maximum volume of fuel on capesize vessels and update Table 11-1 Fuel Inventory if greater than 3000 m^3.
87	Spill at Sea Response Plan	Table 15	Update to Fuel Volumes in Risk Register due to Capesize Vessels	Update table with increased spill volume due to increased fuel volume on capesize vessels.
88	MMER Emergency Response Plan	Appendix A	Site Plans	Update to reflect the new water management infrastructure at the primary crusher pad (Mine Site) and secondary crusher pad (Milne Port).

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89	MMER Emergency Response Plan	Appendix B	Drainage Plan	Update to describe the Phase 2 components and activities that interact with surface water.
90	Surface Water and Aquatic Ecosystems Management Plan	1.4	Incorporate Scope of Phase 2 Proposal	Update to describe the Phase 2 Proposal components and activities that interact with surface water quantity and water quality including mitigation measures to address the effects on streams receiving diverted flows, and mitigation measures to address fish passage at select culvert crossings along the railway.
91	Surface Water and Aquatic Ecosystems Management Plan	4	Mitigation Measures for Surface Water	Update mitigation measures for exposed soils, sedimentation, erosion, dust suppression, stream crossings, flow diversions, and fish habitat based on activities and components in the Phase 2 Proposal. Mitigation measures to be updated/added include: •In-stream work will not be conducted during the restricted activity window, September 1 through June 30, where applicable (i.e., where spawning habitat is present or at sites where fall spawning movements are occurring such as at the bridge crossing sites CV-15-5, CV-70-3, and CV-85-3) to avoid effects on Arctic Char spawning and egg incubation. •Work in watercourses will be conducted in isolation of surface waters, if flow is present. •If dewatering is required, salvage fish prior to dewatering and release to adjacent surface waters; if water is pumped from within a cofferdam prior to fish salvage, screens meeting criteria set out by DFO will be used. •Preserve low vegetative cover within 100 metres (m) of the crossing unless effective erosion and sediment control are in place to protect water quality. •Implement measures as soon as possible to stabilize banks disturbed by construction to avoid erosion or sediment releases to the water. Re-vegetation with natural vegetation is the preferred approach. •Implement measures for managing water flowing onto the site, as well as water being pumped/diverted from the site, such that sediment is filtered out prior to the water entering the waterbody (e.g., by discharging water to a vegetated area). •Deposit all dredged material in a manner to prevent its re-entry into the watercourse. •Stabilize slopes with rocks, geotextiles, and/or hydraulic seed and mulch.
92	Surface Water and Aquatic Ecosystems Management Plan	4	Mitigation Measures for Surface Water	Update mitigation measures for exposed soils, sedimentation, erosion, dust suppression, stream crossings, flow diversions, and fish habitat based on activities and components in the Phase 2 Proposal.Mitigation measures to be updated/added include•Fill material placed below the high water level within the waterbody's flood plain will be either erosion resistant or protected from erosion and only clean fill will be used.•No waste material resulting from work activities will be left in a manner such that it can enter the water (e.g., by being left on the ice).•Machinery will be washed, refueled and serviced, and fuel and other materials will be stored in such a way as to

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
				prevent any deleterious substances from entering the water. Such activities typically occur at least 50 m from the high water mark.-machinery will arrive at site in a clean condition and be maintained free of fluid leaks, invasive species and noxious weeds.•Limit fording of the watercourse by machinery to a one-time event (i.e., over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are required, a temporary crossing structure will be constructed.-design mitigation for potential effects of increased flows on fish habitat include channel widening; regrading, construction of habitat features (in fish bearing streams); and channel stabilization.•Install culverts at the same slope as the existing stream, where feasible.•Minimize culvert lengths.•Culverts with lengths that exceed 50 m may be considered barriers to fish passage due to darkness. Examine and consider methods to provide light inside culverts, where applicable.•Compare culvert velocities to the velocity in the existing watercourse to determine fish passage potential. This information can be used to reassess design velocities under proposed conditions with the culvert installed.With the channelization of flows and conveyance in culverts, the velocity of the flows may increase. This may be mitigated by placing rocks and boulders inside the culverts (stream replication) to provide greater friction, thereby reducing velocities and increasing the flow depth and to provide resting locations for fish. Boulders may be bolted into place.
93	Surface Water and Aquatic Ecosystems Management Plan	5.3	Description of Hydrology	Update regional hydrology and peak flow estimates.
94	Surface Water and Aquatic Ecosystems Management Plan	6.1	Water Management Plans for Milne Port, Tote Road, and Mine Site	Update water management plans for site drainage, laydowns, soil stockpiles, rock cuts, quarries, mine effluent, and dust suppression. Key issues include management of contact water from construction and operations.
95	Surface Water and Aquatic Ecosystems Management Plan	6.2	Water Management Plans for Milne Port, Tote Road, and Mine Site	Update water management plans for site drainage, laydowns, soil stockpiles, rock cuts, quarries, mine effluent, and dust suppression. Key issues include management of contact water from construction and operations.
96	Surface Water and Aquatic Ecosystems Management Plan	6.3	Water Management Plans for Milne Port, Tote Road, and Mine Site	Update water management plans for site drainage, laydowns, soil stockpiles, rock cuts, quarries, mine effluent, and dust suppression. Key issues include management of contact water from construction and operations.

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
97	Surface Water and Aquatic Ecosystems Management Plan	7	Water Management Plans for Milne Port, Tote Road, and Mine Site	Update water management plans for site drainage, laydowns, soil stockpiles, rock cuts, quarries, mine effluent, and dust suppression. Key issues include management of contact water from construction and operations.
98	Surface Water and Aquatic Ecosystems Management Plan	New Section	Water Management Plan for North Railway	Add water management plans for laydowns, soil stockpiles, soil disposal areas, rock cuts, quarries, flow diversions, watercourse crossings, and water takes for dust suppression. Key issues include maintaining minimum flows for fish, fish passage at culverts, and management of contact water and dust from construction and operations. Includes mitigation measures to address the effects on streams receiving diverted flows, and mitigation measures to address fish passage at select culvert crossings along the railway.
99	Surface Water and Aquatic Ecosystems Management Plan	9	Monitoring Plan for Fish Passage Along North Railway	Add monitoring during construction and operation of the North Railway, and where applicable, at new or relocated stream crossings along the Tote Road, to assess fish passage at fish-bearing stream crossings.
100	Surface Water and Aquatic Ecosystems Management Plan	New Section	Pre-Construction Survey Request	A survey of the Camp Lake outflow and at water withdrawal site BG32 is recommended in the first year following Project approval in late summer/fall when water withdrawals occur and during a low flow event to ensure there is no stranding of Arctic Char. In the event that stranding is observed, a fish salvage would be undertaken to relocate stranded fish to a local waterbody.
101	Surface Water and Aquatic Ecosystems Management Plan	9	Monitoring Plan for Flow Diversions	Update monitoring plan to include post-construction monitoring for low risk flow diversions.
102	Terrestrial Environment Mitigation and Monitoring Plan	Table 1-1	Commitments relevant to Phase 2 Proposal	Update, post approval, to include commitments made (if any) relevant to monitoring Phase 2 Project impacts.
103	Terrestrial Environment Mitigation and	Table 1-2	Terms and Conditions relevant to Phase 2	Update, post-approval, to include new or revised Project Terms and Conditions relevant to monitoring Phase 2 Project impacts.

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
	Monitoring Plan			
104	Terrestrial Environment Mitigation and Monitoring Plan	1.5	Relationship to Other Management Plans	Update management plan references and describe the relevance of those management plans to the mitigations identified in the TEMMP.
105	Terrestrial Environment Mitigation and Monitoring Plan	2	Key Indicators for Follow-up Monitoring	Post-approval text editing to cross-reference to Phase 2 impact assessment and updated status report.
106	Terrestrial Environment Mitigation and Monitoring Plan	3	Mitigation Measures	Post-approval updates to include any mitigations that may be agreed to during technical review and Project Terms and Conditions requirements. Update all cross-references to any updated or new Terms and Conditions. This will include mitigation measures for-wind turbine operations, should wind turbines be approved as part of the Phase 2 Proposal. Specific mitigation measures to be added include: •seasonal avoidance of construction near nests during the breeding season; and •temporarily making raptor nest sites potentially affected by construction inaccessible during the nesting seasons and hazing nesting pairs to discourage nesting at an affected nest site.
107	Terrestrial Environment Mitigation and Monitoring Plan	4.3	Vegetation Monitoring	Programs identified in Tables 4-3 (Vegetation Monitoring: Vegetation Health) and 4-4 (Vegetation Monitoring: Dust) may be adjusted pending comments and direction received during the technical review and Project Terms and Commitments post project approval.
108	Terrestrial Environment Mitigation and Monitoring Plan	4.5.1	Caribou Monitoring	May be updated to address any MoUs that Baffinland may have in place with the Government of Nunavut or other parties to support broader regional research/monitoring to better understand north Baffin Island population recovery and ecology.

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
109	Terrestrial Environment Mitigation and Monitoring Plan	4.5.2	Caribou Monitoring	May be updated to address any MoUs that Baffinland may have in place with the Government of Nunavut or other parties to support broader regional research/monitoring to better understand north Baffin Island population recovery and ecology.
110	Terrestrial Environment Mitigation and Monitoring Plan	Appendix B	Monitoring Details and Methods	As part of ongoing "living" document, the methods are updated regularly as part of annual report and review/critique by the TEWG and the Nunavut Impact Review Board (NIRB). Portions of these methods may be updated to identify changes in spatial scope of plots, frequency of sampling, or analytical methods pending technical review and final project terms and conditions, post project approval.
111	Shipping and Marine Wildlife Management Plan	All	New Shipping Scenario	Update to reflect new shipping scenario included in the Phase 2 Proposal.
112	Shipping and Marine Wildlife Management Plan	1.3	Commitments Relevant to Phase 2	Update (post-approval) to include commitments made (if any) relevant to monitoring Phase 2 Project impacts.
113	Shipping and Marine Wildlife Management Plan	1.3	Terms and Conditions Relevant to Phase 2	Update (post-approval) to include new or revised Project Terms and Conditions relevant to monitoring Phase 2 Project impacts, including revisions to the Table of Concordance in Appendix G.
114	Shipping and Marine Wildlife Management Plan	Appendix G	Terms and Conditions Relevant to Phase 2	Update (post-approval) to include new or revised Project Terms and Conditions relevant to monitoring Phase 2 Project impacts, including revisions to the Table of Concordance in Appendix G.
115	Shipping and Marine Wildlife	1.5	Relationship to Other Management Plans	Update references in document and describe the relevance of those management plans to the mitigations identified in the SMWMP.

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
	Management Plan			
116	Shipping and Marine Wildlife Management Plan	3	Updated Project Description for Shipping relevant to Phase 2 shipping operations	Update to reflect current Project Description for shipping operations, including vessel specifications, schedule, ship loading and unloading, safety, navigation, insurance and compensation.
117	Shipping and Marine Wildlife Management Plan	5	Environmental Management Practices Relevant to Phase 2 Shipping Operations	Document will be updated to include additional mitigation measures to minimize impacts on marine mammals and fish and fish habitat due to increased frequency of shipping, extended shipping season, and updated berth design relevant to Phase 2 operationsMitigation to be added to Section 5.3 include:•When marine mammals appear to be trapped or disturbed by vessel movements, the vessel will implement appropriate measures to mitigate disturbance, including stoppage of movement until wildlife move away from the immediate area.•Project vessels shall not approach within 300 m of a walrus or polar bear observed on sea ice.•All Project vessels will not be operated in such a way as to separate an individual member(s) of a group of marine mammals from other members of the group.
118	Shipping and Marine Wildlife Management Plan	5.5.1	Detailed Ballast Water Management Plan	A stand-alone ballast water management plan will be developed (to be included as a separate Appendix in the SMWMP) to address the increased risk from invasive species and D-2 requirements of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, to prescribe ballast water monitoring and reporting requirements specific to the Project, and to identify management procedures in the event of any non-compliance events.
119	Shipping and Marine Wildlife Management Plan	6	Environmental Monitoring Relevant to Phase 2 shipping Operations	Update to reflect environmental monitoring and Environmental Effects Monitoring (EEM) commitments relevant to Phase 2 shipping operations.
120	Shipping and Marine Wildlife Management Plan	7	Roles and Responsibilities Relevant to Phase 2 Shipping Operations	Update to identify Project-specific roles and responsibilities related to environmental issues for Phase 2 shipping operations.
121	Shipping and Marine Wildlife	8	Environmental Reporting	Update to reflect environmental reporting requirements relevant to Phase 2 shipping operations.

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
	Management Plan			
122	Marine Environmental Effects Monitoring Plan	1	Commitments Relevant to Phase 2	Update (post-approval) to include commitments made (if any) relevant to monitoring Phase 2 Project effects.
123	Marine Environmental Effects Monitoring Plan	1	Terms and Conditions Relevant to Phase 2	Update (post-approval) to include new or revised Project Terms and Conditions relevant to monitoring Phase 2 Project impacts.
124	Marine Environmental Effects Monitoring Plan	New subsection of Section 1	Relationship to Other Management Plans	Add new sub-section in Section 1.0 identifying relationship of MEEMP to other management plans. Update management plan references and describe the relevance of those management plans to the mitigations identified in the MEEMP.
125	Marine Environmental Effects Monitoring Plan	Table 1.1	Effect Pathway Linkages Relevant to Phase 2	Update to include impact predictions made in the FEIS Addendum for the Phase 2 Proposal.
126	Marine Environmental Effects Monitoring Plan	3	Study Design for EEM Program - Marine Ecosystem Relevant to Phase 2	Update to identify EEM study design changes required to monitor for Project effects on Marine Ecosystem related to Phase 2 construction (new ore dock) and operations (e.g., increased shipping, expansion of ore stockpiles, fugitive dust emissions, increase in wastewater discharge). Revised study design will be based on results from EEM studies conducted to date and Phase 2 modelling.
127	Marine Environmental Effects Monitoring Plan	3.4.7	Update Study Design for Aquatic Invasive Species Monitoring Program Relevant to Phase 2	Update to identify study design changes required to monitor for potential aquatic invasive species introduction related to increases in the overall ballast water discharge volume and new discharge locations. Revised study design will be based on results from aquatic invasive species monitoring study conducted to date and Phase 2 modelling.
128	Marine Environmental Effects	6	Update Study Design for EEM Program -	Update to identify EEM study design changes required to monitor for Project effects on Marine Mammals related to Phase 2 construction (e.g., new ore dock) and operations (e.g., increased

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
	Monitoring Plan		Marine Mammals relevant to Phase 2	shipping, extended shipping season). Revised study design will be based on results from EEM studies conducted to date,
129	Air Quality and Noise Abatement Management Plan	2.3	Wind Power	Update for potential addition of wind power as an offset to diesel power generation.
130	Air Quality and Noise Abatement Management Plan	3.4	Noise Modelling	Add noise modelling results from TSD 07.
131	Air Quality and Noise Abatement Management Plan	3	Dustfall Mitigation	Update mitigation measures to reduce dustfall, including additional water takes and applications, as well as the continued examination of viable alternatives.
132	Air Quality and Noise Abatement Management Plan	3	Dustfall Monitoring	Update dustfall monitoring program to account for new and modified emission sources during construction and operations.
133	Air Quality and Noise Abatement Management Plan	3.4.1	Noise Mitigation	Add mitigation to use acoustical screening from existing on-site buildings to shield dwellings from construction equipment noise.
134	Air Quality and Noise Abatement Management Plan	3.4.1	Noise Mitigation	Add mitigation that local topography will be taken advantage of to screen noise emissions, where possible.
135	Air Quality and Noise Abatement	3.4.1	Noise Mitigation	Add mitigation that discussions with the HTO will determine if it would be preferred to move the existing HTO cabin to an area outside of the area of disturbance for noise.

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
	Management Plan			
136	Air Quality and Noise Abatement Management Plan	5.3	New Mitigation and Monitoring Measures for Underwater Noise	Add mitigation and monitoring measures for marine underwater noise, including bubble curtains and marine mammal monitoring.
137	Air Quality and Noise Abatement Management Plan	4	Roles and Responsibilities	Update roles and responsibilities for Project departments and personnel.
138	Air Quality and Noise Abatement Management Plan	Attachment 2	Concordance Tables for Relevant Terms and Conditions	Update to reflect terms and conditions in amended Project Certificate.
139	Cultural Heritage Resource Protection Plan	1.1.1	Incorporate the scope of the Phase 2 Proposal	Update to remove reference to the FEIS and 2012 Archaeology Mitigation Plan, as that plan has already been implemented.
140	Cultural Heritage Resource Protection Plan	3.2	Annual Reporting Requirements	Section 3.2 incorrectly discusses annual reporting to NIRB on archaeology. Update this section to reflect Baffinland's commitment to provide the Government of Nunavut with an annual archaeology status report by February 28, in addition to the requirement for any licensed archaeologists on the project to provide an archaeology permit report by March 31.
141	Cultural Heritage Resource Protection Plan	4	Annual Reporting Requirements	Commitment #11 in Section 4 incorrectly discusses annual reporting to NIRB on archaeology. Update this section to reflect Baffinland's commitment to providing the Government of Nunavut with an annual archaeology status report by February 28, in addition to the requirement for any licensed archaeologists on the project to provide an archaeology permit report by March 31.
142	Roads Management Plan	4	Operational Mitigation Measures	Update operational measures to mitigate erosion, sedimentation, and fish passage at culvert crossings associated with the Phase 2 Proposal.

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
143	Human Resource Management Plan	5.3	Education and Training Partnerships	Baffinland will include both the GN Department of Family Services and the GN Department of Education in Section 5.3 of a revised future version of the Human Resource Management Plan.
144	Snow Management Plan	4.3	Snow Stockpile Locations	Details on the physical delineation of 31 m boundary from water body.
145	Metal Mining Effluent Regulations Emergency Response Plan	Throughout	References to MMER	References to the Metal Mining Effluent Regulations (MMER) under the *Fisheries Act* will be updated to refer to the current Metal and Diamond Mining Effluent Regulations (MDMER)
146	Aquatic Effects Monitoring Plan.	Throughout	References to MMER	References to the Metal Mining Effluent Regulations (MMER) under the *Fisheries Act* will be updated to refer to the current Metal and Diamond Mining Effluent Regulations (MDMER)
147	Life of Mine Waste Rock Management Plan	Throughout	References to MMER	References to the Metal Mining Effluent Regulations (MMER) under the *Fisheries Act* will be updated to refer to the current Metal and Diamond Mining Effluent Regulations (MDMER)
148	Interim Waste Rock Management Plan	Throughout	References to MMER	References to the Metal Mining Effluent Regulations (MMER) under the *Fisheries Act* will be updated to refer to the current Metal and Diamond Mining Effluent Regulations (MDMER)
149	Interim Closure and Reclamation Plan	Throughout	References to MMER	References to the Metal Mining Effluent Regulations (MMER) under the *Fisheries Act* will be updated to refer to the current Metal and Diamond Mining Effluent Regulations (MDMER)
150	Marine Environmental Effects Monitoring Plan	Throughout	References to MMER	References to the Metal Mining Effluent Regulations (MMER) under the *Fisheries Act* will be updated to refer to the current Metal and Diamond Mining Effluent Regulations (MDMER)

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
151	Phase 1 Waste Rock Management Plan	Throughout	References to MMER	References to the Metal Mining Effluent Regulations (MMER) under the *Fisheries Act* will be updated to refer to the current Metal and Diamond Mining Effluent Regulations (MDMER)
152	Explosives Management Plan	1.2	Explosives Storage Areas	Add information related to four new explosives storage areas for the storage of pre-packaged explosives (for use in rail construction) that are planned along the Northern Transportation Corridor (as shown on Figure B.2 and in Figure B.2 sheets in Appendix B of TSD 02 [Project Description]).
153	Other Commitment	N/A	N/A	Specific design parameters for the Wind Energy Project will be developed at the preliminary engineering phase. Specific locations and lengths of collector lines, number of poles, and placement above and/or below ground will depend on site-specific factors and will also be assessed during preliminary design work, but fully determined at detailed design in consultation with turbine vendor.
154	Other Commitment	N/A	N/A	Dedicated crossing locations of the railway for land users will be determined through consultation with local community members and elders.
155	Other Commitment	N/A	N/A	New mitigation and monitoring that arises during the technical review will be added to the applicable management plans if required.
156	Other Commitment	N/A	N/A	Baffinland will undertake an additional stand-alone assessment of icebreaking effects that addresses icebreaking effects during the shoulder season hich will include underwater noise modelling of icebreaker transits along the Northern Shipping Route. The acoustic modelling will be based on a conservative scenario for icebreaking noise based on thickest seasonal ice conditions in the RSA and maximum acoustic propagation potential. The stand-alone acoustic modelling report and icebreaking assessment will be submitted to the NIRB in 2019 once reporting is completed.
157	Other Commitment	N/A	N/A	Baffinland plans to engage "Operation Lifesaver" (Operation Lifesaver Canada 2017). Baffinland believes that this organization has the experience and knowledge that can help the company ensure Nunavummiut are educated about rail safety through rail safety presentations to schools, and community groups such as Hunter and Trapper Organizations.
158	Other Commitment	N/A	N/A	An update to the water quality predictions for the Waste Rock Facility that incorporates data collected will be provided in 2019.
159	Other Commitment	N/A	N/A	Results from the 2018 Geochemical Evaluation will be provided in 2019.
160	Other Commitment	N/A	N/A	Baffinland is currently reviewing the required water crossings to identify a short-list of crossings that are better suited to alternatives to CSP culverts and will be prepared to discuss this with DFO.

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
161	Other Commitment	N/A	N/A	Upon selection of the specific site(s) for wind turbine(s), Baffinland will conduct a risk assessment including any surveys required for informing site sensitivity, consistent with Environment and Climate Change Canada's Environmental Assessment Guidance Document on Wind Turbines and Birds.
162	Other Commitment	N/A	N/A	Baffinland will conduct the required pre-construction phase surveys for migratory birds and species at risk surveys, consistent with ECCC guidance prior to construction of the wind energy project .
163	Other Commitment	N/A	N/A	Baffinland will identify mitigation and monitoring requirements from the pre-construction phase surveys and incorpoate them into into the wind energy project design, consistent with Environment and Climate Change Canada's Guidance Document on Recommended Protocols for Monitoring Impacts of Wind Turbines and Birds
164	Other Commitment	N/A	N/A	Prior to use for dust suppression, water quality monitoring of contact water will be completed to ensure that the water meets the appropriate effluent discharge limits. Monitoring will be undertaken through sampling of water prior to discharge.
165	Other Commitment	N/A	N/A	Reclamation research plans are expected to be developed in consultation with IQ. Where practical, IQ will be incorporated into research plans for revegetation.
166	Other Commitment	N/A	N/A	Before final siting of the wind turbines is confirmed, Baffinland will carry out specific engagements with local land users to identify optimal and/or preferable locations.
167	Other Commitment	N/A	N/A	Exact coordinates for the Proposed additional SNP stations to address the Phase 2 Proposal will be provided to the NWB for approval prior to the commissioning of the associated Phase 2 infrastructure.
168	Other Commitment	N/A	N/A	Roads used in operation will be constructed to appropriate design criteria, as presented in TSD 02.
169	Air Quality and Noise Abatement Management Plan	Attachment 7	Dust Monitoring Locations	The Dustfall Monitoring Program will be expanded to include additional monitoring locations as required for the Northern Transportation Corridor.
170	Surface Water and Aquatic Ecosystems Management Plan	5.3.1	Surfface Water Runoff Estimation	Provide mean flows for streamflow record (not just 2015 flows)

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
171	Surface Water and Aquatic Ecosystems Management Plan	6	Stormwater Management	Update stormwater management to reflect Phase 2 and the addition of the, North Railway
172	Surface Water and Aquatic Ecosystems Management Plan	9.1	Rpi	Add routine inspections for railway.
173	Surface Water and Aquatic Ecosystems Management Plan	9.2.1	Water Monitoring	Add new water monitoring stations.
174	Surface Water and Aquatic Ecosystems Management Plan	Appendix B	2016 Work Plan	Remove 2016 work plan details.
175	Surface Water and Aquatic Ecosystems Management Plan	Appendix C	Water Balance	Update with water balance PFDs.
176	Surface Water and Aquatic Ecosystems Management Plan	Appendix D	Site Layouts	Update site layouts showing SNP stations.
177	Other Commitment	N/A	N/A	Follow-up and Adaptive Management Plans will be updated to indicate the criteria and thresholds to trigger mitigation measures.
178	Other Commitment	N/A	N/A	Quality Assurance and Quality Control measures to be applied to each monitoring program will be included in relevant plans, where warranted.

Commitment ID#	Management Plan	Section to be Updated	Required Update	Description of Update/ Commitment
179	Other Commitment	N/A	N/A	A detailed fish salvage plan will be developed and included in an Environmental Management Plan (EMP), which will form part of the application for the Fisheries Act Authorization (FAA).