Baffinland

July 11, 2025

Karén Kharatyan
Director, Technical Services
Nunavut Water Board
Gjoa Haven, Nunavut, X0B 1J0

Re: 2AM-MRY2540 Mary River Project – Interim Closure and Reclamation Plan Revision 6 and Waste Rock Facility Thermal Model – Responses to Review Comments

Dear Mr. Kharatyan,

On January 28, 2025, The Nunavut Water Board invited parties to review Revision 6 of the Interim Reclamation Plan and Waste Rock Facility Thermal Model for the Mary River Project. Please find enclosed Baffinland's responses to review comments submitted by the Qikiqtani Inuit Association, Crown-Indigenous Relations and Northern Affairs Canada, and Environment and Climate Change Canada.

Sincerely,

Steve Borcsok
Approvals Manager

Cc: Lou Kamermans, Elisabeth Luther (Baffinland)
Enclosed:

- *Responses to Review Comments on the Interim Closure and Reclamation Plan Rev 6 and Waste Rock Facility Thermal Model*

250227 2AM-MRY1325 Baffinland Mary River ICRPVer6 Thermal Model - ECCC Comments-ILAE

11-Jul-25

Comment #	Reference	Section #2	Section Title	Topic	ECCC Comments (Feb. 27th, 2025)	Baffinland Responses / Comments (July 11, 2025)	ICRP Reference
1	241101 2AM-MRY1325 WRF Thermal Model Att 2. CA0020274.4798-005-ILAE(005) Assessment of Active Zone Depth Considering SSP1-2.6 Climate Change Projections at the Mary River Mine Site	3.1	Objectives and Model Set Up	Dimension of Thermal Model	"A one-dimensional (1D) transient thermal model was prepared using the finite element software TEMP/W developed by Geo-Slope International Ltd. (Version 2023.1.0) to predict the potential variation in active zone depths in the long term over 100 years." It is not clear why 1D was used and not two-dimensional (2D) given that in reality the dissipation of heat -temperature on the ground surface or within the Waste Rock Facility (WRF) is both vertical and lateral. **ECCC Recommendation(s)** ECCC recommends that the proponent clarify why the model is only one-dimensional.	The one-dimensional (1D) model was an initial scoping model intended to develop boundary conditions and assess gaps in input data. The model will be developed from the simplest regime (1 D) and complexity will be added in fugure years (2 D). The next planned iteration of the model will be two dimensional as is described in Appendix D4.	Appendix D4, Task 4.2
2	241101 2AM-MRY1325 WRF Thermal Model Att 2. CA0020274.4798-005-ILAE(005) Assessment of Active Zone Depth Considering SSP1-2.6 Climate Change Projections at the Mary River Mine Site	3.2	Model Geometry	Type of Waste Rock Used for Model Geometry	In section 3.2 Model Geometry of the Thermal Model, the Proponent stated: "A 30-m tall column of waste rock was used to simulate a waste rock pile assumed to be homogeneous in depth with uniform material properties." In a model, it may be possible to select a homogenous rock column that measures 30 m tall. However, realistically, any 30 m tall section (column) of the waste rock facility that is isolated in the facility is not expected to be homogeneous. Therefore, it is not clear why the model is limited to homogeneous rock when different rocks in the WRF have different material properties. **Recommendation ECCC** recommends that the model use heterogeneous rock to represent the column of waste rock.	While at this time data does not indicate rock heterogeneity is a significant driver in the thermal model, the following text has been added to Appendix D4 to ensure it is assessed in the next iteration of model development. "Model parameters such as non-linear ground flow temperature and rock heterogeneity will be assessed and integrated into the model if deemed technically required by monitoring data."	Appendix D4
3	241101 2AM-MRY1325 WRF Thermal Model Att 2. CA0020274.4798-005-ILAE(005) Assessment of Active Zone Depth Considering SSP1-2.6 Climate Change Projections at the Mary River Mine Site	3.6	Model Assumptions and Limitations	Model Assumptions	Regarding the list of assumptions in 3.6 Model Assumptions and Limitations, the Proponent states: "The model considers a homogeneous waste rock mass, and the one-dimensional nature of the column can only capture heat transfer in the vertical direction and does not consider lateral heat transfer from adjacent areas." ECCC notes that the assumption of homogeneous waste rock may be limiting because it is likely that the makeup of the waste rock facility will be heterogeneous. In the same section, the Proponent states: "Uncoupled thermal models do not incorporate the impact of heat transfer associated with air and water flow through the pile, and only consider heat flow due to conduction. The thermal properties of waste rock materials change with variations in water content, and air and water convection can affect the depth of the active zone." ECCC notes that there is no mention of other possible heat sources such as heat from hot spots within the WRF that may occur due to sulphide oxidation. ECCC agrees with the comment that the ground surface temperature increases do not occur linearly, however, there is no indication how this will be accommodated in the improved model. Given the assumptions listed in section 3.6, the model is limited to using the material properties of homogenous rock. It is not clear whether the proponent considered using different sets of material properties and/or parameters that represent the different individual rock types, to then compare the results of the different rock types. The material properties of heterogenous waste rock will be an important component of the waste rock facility to consider because there will be a mix of rock types from the mining operation or sourced from borrow. **Recommendation ECCC** recommends the Proponent: 1. Consider other possible heat sources within the waste rock storage facility; 2. Please clarify how non-linear ground surface temperature can be incorporated in the model; 3. Clarify how the heterogenous properties of heterogenous waste rock can be included or accommodated in the Thermal Model.	During the next iteration of the thermal model, parameters such as waste rock moisture content, material thermal conductivity and the effects of snow insulation will be defined as part of the 2-D model development. There has been limited indication from thermistors of "hot spots" within the WRF, with a single location showing a heat increase, and while investigation is ongoing, initial results indicate this was a result of rock movement on site introducing oxygen as a result of pond development. As such, at this point in model development a detailed investigation of this is not planned at this time, although that does not limit future investigation or assessment if additional data identifies a need. In addition, while at this time data does not indicate rock heterogeneity is a significant driver in the thermal model, the following text has been added to Appendix D4 to ensure it is assessed in the next iteration of model development. "Model parameters such as non-linear ground flow temperature and rock heterogeneity will be assessed and integrated into the model if deemed technically required by monitoring data."	Appendix D4
4	Interim Closure and Reclamation Plan Version 6	9.11	Air quality monitoring and reporting	Air quality monitoring activities for the post-closure phase	In section 9.11 of the Interim Closure and Reclamation Plan, the Proponent outlines the planned monitoring activities for the post-closure phase. However, the following section lacks clarity: "As all the major impacts are removed, 2 years of post-closure monitoring is planned to confirm ambient levels of TSP, PM2.5, SO2 and NO2 are within the closure criteria (NU standards). Baffinland expects to continue this monitoring during the first year of post-closure activities (Year 4). TSP and PM2.5 were selected as particulate matter poses health concerns due to their ability to be inhaled and accumulate in the respiratory system.'' It is unclear if post-closure monitoring is planned during one or two years, and whether only TSP and PM2.5 or SO2 and NO2 in addition will be monitored during this period. **Recommendation ECCC** recommends clarifying the planned air quality monitoring during closure and post closure.	Baffinland has revised the noted text in section 9.11 of the ICRP to clarify that monitoring for TSP, PM2.5, SO2 and NO2 will be conducted during the first two years of post-closure activities. This section of the ICRP now states: "As all the major impacts are removed, two years of post-closure monitoring is planned to confirm ambient levels of TSP, PM2.5, SO2 and NO2 are within the closure criteria (NU standards). As such, Baffinland expects to continue this TSP, PM2.5, SO2 and NO2 monitoring during the first two years of post-closure activities (Year 4 and 5)."	Section 9.11
5	Interim Closure and Reclamation Plan Version 6	3.11	Climate	Reference to Environment and Climate Change Canada Climate Station	Comment In section 3.11 of the Interim Closure and Reclamation Plan, the Proponent makes references to the Environment and Climate Change Canada climate station at Pond Port. It appears that the reference was intended to be Pond Inlet. However, clarity is needed, as meteorological parameters are also measured at Milne Port. **Recommendation ECCC** requests confirmation that references to Pond Port are in fact intended to be for Pond Inlet.	Baffinland can confirm references to "Pond Port" are intended to be "Pond Inlet". This is a legacy of naming that dates back prior to the project. For clarity, it has been modified as suggested in the recommendation.	Section 3.1.1
6	241101 2AM-MRY1325 WRF Thermal Model Att 2. CA0020274.4798-005-ILAE(005) Assessment of Active Zone Depth Considering SSP1-2.6 Climate Change Projections at the Mary River Mine Site	2	Climate Change Projects	Sensitivity of Thermal Model	Section 2.0 of the WRF Thermal Model states that climate change projection scenario SSP1-2.6 was used at the request of BIM. This represents a near-ideal sustainability scenario (SSP1-1.9 being the most ideal). While consistent with Canadian government environmental policies, this scenario may be too optimistic given uncertainty regarding degree of environmental commitment among some of the higher-emitting foreign nations. Scenarios such as SSP3-7.0 and SSP5-8.5 are more likely to be overly conservative, however it would be useful to evaluate to the first order the sensitivity of the analysis by considering the SSP2-4.5 scenario. **Recommendation ECCC** recommends a first order evaluation of the Thermal Model's sensitivity by consideration of the SSP2-4.5 scenario.	Baffinland agreed to use multiple scenarios during the Water Licence renewal process, details are available in Appendix D4 of the ICRP. The model will consider three climate change scenarios as part of the analysis, specifically three scenarios as defined by the IPCC Sixth Assessment Report on climate change (IPCC, 2021). These scenarios are as follows: 1.SSP1-2.6 (Global CO_2 emissions cut to net zero ~2075) 2.SSP2-4.5 (Global CO_2 emissions around current levels until ~2050, then falling but not reaching net zero until 2100) 3.SSP5-8.5 (Global CO_2 emissions continue to rise throughout the 21st century, with no net zero achieved by 2100)	Appendix D4

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Comment #	Reference	Section #	Topic	CIRNAC Comments and Recommendations (March 7th, 2025)	BIM Responses / Comments (July 11, 2025)	ICRP Reference
1	Waste Rock Facility Thermal Model	D4.5.1 Task 4.1, Appendix D4	Thermal monitoring of Waste Rock Facility (WRF)	In previous reviews it was clearly stated that the current state of BIM's thermal monitoring network for the WRF needs to be expanded. In D4.5.1 Task 4.1 it is now stated that: "A total of three (3) additional thermistors were installed within the WRF in 2024, bringing the facility total to six (6) installations, and the data collection/thermal data collection is being evaluated in conjunction with model development to ascertain the requirement for more instrumentation. If required, the installation of additional thermistor strings is anticipated to occur in 2026." In 2022 to total number of thermistors had already been 6 and the labels are the same as mentioned in Appendix D4, thus, it seems, despite Baffinland's statement, no new thermistors were installed. Additionally, Baffinland states that: "All instruments are functional except for the oxygen sensors at BH2 (damaged in August 2019) and 8 of the 26 thermistor nodes at BH2 (damaged September 2019). Baffinland will continue to maintain the installed instrumentation to the extent practical. At this time the installed instrumentation is considered sufficient for the current need. The instrumentation requirements will be reviewed regularly based on the results of site observations and measurements." While in 2023 several of the sensors had nonfunctional beads. It was mentioned that new oxygen sensors need to be installed as the ones previously installed were reported uncertain in their functionality. The report also mentions the installation of new oxygen sensors, but that one of the two is damaged. No update has been provided on the status of current instrumentation, if those functional are still functional. It is reported that some additional thermistors have been installed but no mention of oxygen probes, vibrating wire piezometers or barometers whether these have been added. **Recommendation:** (R-01) CIRNAC recommends installing thermistors in the winter 2024/2025 to get a better coverage of thermal heterogeneity in the WRF and aid in understanding of why increasing temperatures are observed in some locations. Furthermore, install additional oxygen sensors and present all data past 2020/2019.	Baffinland installed five thermistors in the WRF in 2024 (one (1) which was previously down, three (3) vertical thermistors and one (1) horizontal thermistor), in excess of what was initially planned. Information on the newly installed thermistors is provided in the 2024 QIA-NWB Annual Report for Operations as per previous commitments to CIRNAC. Regarding the specific request for additional monitoring of oxygen, Baffinland has not planned for installation of additional oxygen probes in the WRF for 2025, as outlined in the 2024 QIA-NWB Annual Report for Operations. Through discussion with BIM's consultant and subject matter expert on waste rock management, new oxygen sensors are not currently being considered for installation at the WRF given their poor success for continued operation. Thermistors installed in target locations at the WRF will provide the necessary monitoring to confirm the deposition strategy is promoting freezing as per the design intent. Updated information on the status of thermistor installations at the WRF are provided in the 2024 QIA-NWB Annual Report for Operations (March 31, 2025), section 9.6.4 and Appendix E.15.1. Baffinland is conducting an assessment of thermistor data sets and assessing the need for additional monitoring and recommendations for future instrumentation.	Appendix D4
2	Interim Closure and Reclamation Plan Version 6	2.3.1.3., Table 2.3	Closure and Reclamation Activities	More frequent updates on the ICRP have been recommended in previous reviews of the annual reports and license renewals. The progressive change deviating from the previous ICRP hindered the review of the interim closure and reclamation activities. The new ICRP states several times "The ICRP will be updated as required throughout the life of the Project." However, no minimum frequency for the updates is mentioned. Section 2.3.1.3. and Table 2.3 in the updated ICRP gives details on the timing of delivery for updates on permits, licences, authorizations, and agreements, but no information on a minimum frequency of updates for the ICRP or trigger on when update is required. The ICRP references the Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories (MVLWB/AANDC) as guidelines to assist in the development of the ICRP. It is noted that Figure 5 (Mine Development Regulatory Process General Steps) in these guidelines suggests a 3-year cycle for ICRP updates. **Recommendation:** (R-02) CIRNAC recommends updating the License to include a description of the minimum frequency for renewals of the ICRP as recommended in the Mackenzie Valley Land and Water Board's Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mines Site in the Northwest Territories, dated November 2013.	As outlined in Section 2.3 of the ICRP, Baffinland will continue to update the ICRP on a regular basis considering lessons learned, the results of research and monitoring data, input from stakeholders, and changes to how the site is operated. This is aligned with the Type A Water Licence, Part J, Item 1, which states that the ICRP "shall be updated as necessary from time to time" (2AM-MRY-2540).	N/A
3	Interim Closure and Reclamation Plan Version 6		PAG Materials Volume	Previous annual reports reported a Potentially Acid Generating (PAG) percentage of waste rock substantially higher than the 11% that Baffinland projected for the project. In the updated ICRP this discrepancy is not discussed and the original 11% is stated. **Recommendation:** (R-03) CIRNAC recommends Baffinland explain the source of the discrepancy in the PAG percentage and update the projection if required.	An analysis of cumulative waste rock mined between 2014 and 2023 indicates the percent of PAG rock mined to date is in-line with current predictions presented in the Life of Mine Waste Rock Management Plan (July 10, 2024 Memo, "Baffinland Waste Rock Reconciliation").	N/A

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4	Interim Closure and Reclamation Plan Version 6	3.3.3, Appendix D3	PAG Materials Classification	The waste rock classification proposed by Baffinland poses several risks as laid out in previous report reviews. The proposed classification only takes sulfur content and paste pH into account. The recent WRF management plan and waste classification has not been formerly approved. Neutralization potential and the neutralizing mineral is not considered to define PAG material. But without a neutralization potential capable of reacting at a similar time scale as the acidification happening, rocks can develop Acid Rock Drainage (ARD) even at a low sulfur content. Additionally, appendix D3 (Table 1) provides a different classification from the one presented in the ICRP (Table 5.3). Section 3.3.3 of the ICRP states that "the waste rock is dominated by noncarbonate sources of Neutralization Potential (NP) (e.g., silicates) with lesser NP derived from carbonate sources." Silicate neutralization is generally slower than carbonate neutralization, thus acidic conditions might develop despite the NP exceeding the Acid Potential (AP), if the acidification commences at a rate that the neutralization can not keep up with. The ICRP cites the MEND 1.20.1 prediction manual for the Neutralization Potential Ration (NPR) that defines PAG vs uncertain vs non-Acid Generating (AG). It fails to cite section 13.1.2.3 of MEND 1.20.1, though, which clearly states that NP from silicates might not be effective in neutralizing acidic conditions from sulfide weathering. Considering this fact, it is important to identify the identity of the neutralizing minerals and the neutralizing kinetics they have. Section 3.3.3 also discusses the humidity cell results: "three cells exhibited slowly declining pH throughout testing reaching a minimum measured weakly acidic pH of between 4.5 and 5" and metal "release rates are the highest in the lower pH humidity cells with notable release rates for cadmium, cobalt, copper, nickel, lead and zinc". No information was given if the samples turning acidic had been identified as PAG or non-AG. Data on neutralization potential depleted samples, which would help evaluate the long-term acid potential, is also not yet available to evaluate the proposed classification. Smith et al. (2013) The Diavik Waste rock project: Initial geochemical response from a low sulfide waste rock pile. Applied Geochemistry 36:210-221. Here demonstrates that in a waste rock pile containing 0.053% sulfur acidic conditions and metal leaching can occur in a waste rock pile in a permafrost region. CIRNAC suggest BIMC review the results of Smith et al. (2013) and compared to the Mary River project to evaluate what impact it has on the conclusions for the PAG classification. **Recommendation:** (R-04) CIRNAC recommends that BIMC determines the minerals responsible for the neutralizing potential and performs a kinetic evaluation on the effectiveness to work towards approval for the proposed classification. In the meantime, standard laboratory analysis should be performed and presented in the relevant documents (i.e., ICRP, WRMP).	While Baffinland acknowledges that the current WRF Management Plan and waste classification scheme are not approved, Baffinland does note the the current approved WRF management plan (Phase 1 Waste Rock Management Plan - Revision 3 June 16, 2020) contains only sulphur content as the classification mechanism, while the revised WRF Management Plan has a more robust classification scheme that includes sulphur percentage and paste pH. As such, CIRNAC's assertion this methodology is not approved is incorrect, as the previous approved classification scheme is being implemented with additional testing. Sulphur content has been part of the approved classification process since project initiation. Baffinland looks forward to working with CIRNAC on future revisions of the Waste Rock Management Plan.	N/A
5	Interim Closure and Reclamation Plan Version 6	4.4.1	Waste Rock Handling	Section 4.4.1 gives an overview of approved project operations. Waste rock handling and deposition in WRF as well as water removal, treatment, and discharge are not listed. Closure objectives for the WRF are provided in Section 5.3.2.1. and water treatment is referenced in Section 5.3.2.2 with the Waste Rock Management Plan – 2023 to 2026 (WSP 2024b). It is inferred that this is an oversight and the text in the ICRP predates the requirement for water treatment. **Recommendation:** (R-05) CIRNAC recommends that all the approved operations are included in the overview list in Section 4.4.1 of the ICRP.	Baffinland has updated section 4.4.1 to include and overview of approved waste rock handling and deposition, water removal, treatment and discharge operations.	Section 4.4.1
6	Interim Closure and Reclamation Plan Version 6		Waste Rock Facility Evolution	Term and Condition #17 states that "The Proponent shall develop and implement effective measures to ensure Figures 5.3 and 5.4 show different configurations of the waste rock facility at closure. **Recommendation:** (R-06) CIRNAC recommends that BIMC include the most recent final configuration of the WRF in the ICRP.	The current configuration of the WRF is in line with the proposed configurations displayed within Figures 5.3 and 5.4. Currently, the WRF is at the stage of development between the 11.4MT realization and the 102.5 MT realization displayed within Figure 5.4	Figure 5.3 and Figure 5.4
7		Table 6.1	Progressive Rehabilitation Schedule	Table 6.1 and 6.2 show the life of mine (LOM) and past reclamation activities. The past activities are not included in the LOM overview. **Recommendation:** (R-07) CIRNAC recommends that BIMC update Table 6.1 and change years to actual years were possible.	Table 6.1 has been updated to include all past reclamation activities and actual years. As Steensby planning and permitting is still ongoing, the exact date of progressive reclamation of certain construction infrastructure is still unknown. For future progressive reclamation activies that are planned in Year 1 of the Steensby component operation (e.g. borrow pits, rail access roads, laydown areas), the actual year will be indicated when it is known.	Section 6.2.2, Table 6.1

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8			Water Quality Predictions	The freshwater quality predictions exceed the water quality objectives for several cases. Additionally, the predictions do not seem to be backed up by available monitoring data despite the report being written long after the first monitoring data was available. Such an update was recommended in previous annual report reviews. **Recommendation:** (R-08) CIRNAC recommends that BIMC discuss the impact and mitigation measures for cases where water quality objectives are not met. In addition, BIMC verify the model predictions using monitoring data and present a comparison of the two.	Baffinland notes this comment, while Appendix H does not represent the most up to date available monitoring data, it is the most up to date collated version. This issue was raised in the March 2025 Type A Water License Renewal Public Hearing by the QIA, and as a result of committments made during the Public Hearing, Baffinland is producing an updating collated version of monitoring and prediction data with the following commitment: "Baffinland commits to the development of a one-time memorandum including the following aquatic monitoring information: • Temporal plots of water quality results from lake and stream CREMP monitoring areas that include results from the baseline (2006 to 2013), construction (2014), and operations (2015 to 2024) periods for specific parameters associated with the mine site ore bodies or with blasting (i.e., aluminum, arsenic, cadmium, chromium, copper, iron, lead, nickel, zinc, nitrate, nitrite, total Kjeldahl nitrogen, and ammonia). Area specific predictions from the Final Environmental Impact Statement (FEIS; Baffinland 2012) will be included on the plots for comparison. • Tabular summaries of seasonal averages • A statement comparing the concentrations to area specific predictions from the FEIS • Weather data will be corelated with sampling to the extent possible to assess the impact of wet versus dry events on observed monitoring values. This memorandum will be submitted within 6 months of the approval of this Licence by the Minister. The memorandum will be submitted to the NWB to allow a review of the study outcomes. Baffinland will provide the memorandum to QIA 30 days before the NWB submission to allow QIA to evaluate the conclusions and provide recommendations of updates into suggested management plans. As required, the outcomes of the memorandum will be integrated into relevant management plans. Any plan updates would be completed within 6 months of publication of the memo, or an alternative date as agreed to between QIA and Baffinland." The Type A Water Licence was issued on June 9, 2025 and as such, this commitment will be completed by January 9, 2026. This information will be included in the next version of the ICRP once developed.	N/A
9	Interim Closure and Reclamation Plan Version 6		Site Wide Drainage Pathways	Review of "Table 5.1 Closure Objectives, Criteria and Actions by Major Project Components of the ICRP" noted that the actions/measurements required for drainage pathways during closure refer to only geotechnical assessment, analysis and/or monitoring of the drainage pathways will occur as part of the Geotechnical/Engineering Monitoring Program. It also mentioned closure surface water quality monitoring. **Recommendation:** (R-09) CIRNAC recommends that BIMC include hydrotechnical assessment, analysis and/or monitoring of the drainage pathways as part of the Engineering assessment for closure.	Baffinland confirms hydrotechnical assessment, analysis and/or monitoring of the drainage pathways will occur as part of the Geotechnical/Engineering Monitoring Program. Table 5.1 (row 1) has been updated accordingly.	Section 5.2, Table 5.1
10	Interim Closure and Reclamation Plan Version 6	5.3.3	Quarries/Rock Cuts and Ore/Aggregate Stockpiles	Section 5.3.3 of ICRP noted that all borrow areas and quarries will be progressively reclaimed maintaining stable side slopes. Active quarry walls will be terraced during operation to closely manage issues related to drainage and will not be altered for closure. The ICRP also noted that the quarry development will reduce the creation of pits and depressions to the degree practicable to reduce the potential for standing water and the quarry pit floors will be left as free draining, but did not provide the decommissioning of the pits when it is not practicable to freely drain the borrow pits. **Recommendation:** (R-10) CIRNAC recommends the creation of a management plan for decommissioning when borrow pits are left with standing water.	The Borrow Pit and Quarry Management Plan states "Site development must ensure positive drainage to prevent water pooling or flooding of the pit." This is an inherent part of development of borrow pits and quarries on site, and as such at decommissioning by design there will be no borrow pits with standing water. If standing water is observed as per the plan the quarry/borrow area will be modified and contoured to ensure there is not standing water in accordance with the Borrow Pit and Quarry Management Plan.	N/A
11	Interim Closure and Reclamation Plan Version 6	5.3.b	Transportation Routes	Section 5.3.b of ICRP noted transportation routes on site to include the Mine Haul Road, Tote Road, and the ore/freight docks and barge landing area at Milne Port. Future approved but not constructed transportation route include the southern rail route to Steensby Port. The report mentioned that bridges, culverts, and other water crossings along the Milne Inlet Tote Road will remain in place until all the closure activities requiring Milne Port access at the Mine site are completed. It is noted that roads will be left in good physical condition for public use to communities with water crossings removed. The report noted that bridge abutments will be left in place where needed to maintain long-term stability of the section of the road abutting the watercourse. **Recommendation:** (R-11) CIRNAC recommends that if the bridge is removed, the stream crossing restoration as provided in Figure 5.2 of the report is expected. CIRNAC recommends clarity on the safety and responsibility of leaving bridge abutments in place without the crossings in the ICRP.	Table 9.2 lists the remaining water crossing abutments that will be assessed as part of the geotechnical closure and monitoring requirements. Section 9.4.1 outlines how the assessment will be completed at closure and what will be considered. It is expected that the stream crossing restoration designs will be developed as part of the ongoing discussion regarding land use with the QIA post closure, and will be a subject of discussion for the Mine Closure Technical Advisory Group (MCTAG) to provide feedback to Baffinland.	Section 9.4.1 and Table 9.2

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12	Interim Closure and Reclamation Plan Version 6	Appendix D	WRF Permafrost Evaluation	In Appendix D of the ICRP, BIMC states that they have developed a 1-D thermal model to assess long term climate change implications on permafrost within the WRF. This model will be used to provide the basis to develop a more complex 2-D model, ready for 2026. BIMC also states that future updates to the thermal model will establish an appropriate final cover thickness based on the latest climate change predictions. The objective of the WSP study was to develop a conceptual thermal model to predict the impact of climate change on the depth of ground subject to seasonal freezing and thawing (active zone). To meet this objective, multiple climate change projection scenarios must be considered. It is CIRNAC's opinion that this objective was not achieved. The WSP study only considers SSP1-2.6 (low warming) which is the least conservative climate change projection scenario. For most mining projects evaluating ML/ARD prevention via freeze-up a range of scenarios should be considered including, SSP5-8.5 (worse case/highest warming), SSP2-4.5 (moderate warming) and SSP1-2.6 (low warming), to provide a balanced risk assessment of warming impacts. The WSP 2024 use the Mean Annual Temperature (˚C) for the Climate Air Temperature Change Projections. This is not optimal. It is recommended using, the Median Daily and Median Monthly Temperature instead, as is common for climate change assessments. This will incorporate extreme events for the analysis. Air temperature can change rapidly throughout the day, while soil temperature changes more slowly. The soil absorbs and releases heat more gradually. Therefore, is important to consider the Median ground temperature, instead of the average as suggested in the Technical Memorandum. CIRNAC recommends BIMC consider additional variables in the analysis. For instance, Freeze-Thaw Cycles provide a simple count of the days when the air temperature fluctuates between freezing and non-freezing temperatures on the same day. Freeze-thaw cycles can have major impacts on infrastructure, increasing the ML/ARD risk. Additionally, the new model does not address the inconsistencies in the thermal profiles reported previously. The reason for the inconsistencies has not been determined, questioning the assumptions the model is based on. Thus, these inconsistencies need to be addressed to develop a model that can represent the geochemical and thermophysical conditions in the waste rock. **Recommendation:** (R-12) CIRNAC recommends BIMC complete a new climate risk assessment based on multiple climate change scenarios to evaluate ML/ARD prevention via freeze-up. The range of scenarios should consider SSP5-8.5 (worse-case/highest warming), SSP2-4.5 (moderate warming) and SSP1-2.6 (low warming), to provide a balanced risk assessment of warming impacts. The update should use of the median ground temperature and freezethaw cycles when assessing the impacts of climate change on the depth of the active zone and implications of ML/ARD prevention. The update should also address the inconsistencies in the thermal profiles to develop a model that can represent the geochemical and thermophysical conditions in the waste rock.	BIM committed to using multiple scenarios during the Water Licence renewal process, details are available in Appendix D4 of the ICRP. Specifically the model will consider three climate change scenarios as defined by the IPCC Sixth Assessment Report on climate change (IPCC, 2021). These scenarios are as follows: 1.SSP1-2.6 (Global CO_2 emissions cut to net zero ~2075) 2.SSP2-4.5 (Global CO_2 emissions around current levels until ~2050, then falling but not reaching net zero until 2100) 3.SSP5-8.5 (Global CO emissions continue to rise throughout the 21st century, with no net zero achieved by 2100) In addition to the multiple climate scenarios to be included in the 2D model, other model inputs and boundary conditions to be considered during the model formulation will include parameters such as ground temperature, freeze thaw cycle, thermal profiles and geochemical and thermophysical conditions.	Appendix D4
13	Interim Closure and Reclamation Plan Version 6	Table 4.1, Table 5.1 and Table 9.2	Mine Site Geotechnical	In the geotechnical overview of mine site (Section 4.3.3.3), the report identified that the upper horizontal portion of the bedrock is highly fractured, often containing ice lenses and infilling in the joints, which might impact the risk of failure. Physical stability is one of the closure objectives shown in Table 5.1. However, the more detailed plans and remediation methods are not provided in Table 4.1 nor Table 5.1. This might result in missing the risks. **Recommendation:** (R-13) CIRNAC recommends that BIMC include the monitoring plan on bedrock conditions in Tables 4.1, 5.1, and 9.2 (Geotechnical Engineering Monitoring Requirements).	Baffinland has included post-closure mine site bedrock stability monitoring into Table 5.1 and Table 9.2. Table 4.1 is a list of Major Project Components which does not include information on monitoring plans.	Tables 4.1, Table 5.1, Table 9.2
14	Interim Closure and Reclamation Plan Version 6	Table 5.1	Post Closure Water Quality	Review of Table 5.1 Closure Objectives, Criteria and Actions by Major Project Components of the ICRP suggests the Site Wide closure objective of surface water runoff and seepage from the WRF being safe for the environment will not be met. Whereas the same table mentions the effluent quality from the WRF is consistent or improved from FEIS predictions. **Recommendation:** (R-14) CIRNAC recommends that BIMC provide clarification, backed up with data, on whether the WRF will be chemically stable and meet the closure objective.	Baffinland does not state that the Site-Wide closure objective related to surface water runoff and seepage from the Waste Rock Facility (WRF) will not be met. Current closure criteria indicate that predicted water quality will meet the applicable regulatory standards, including Type A Water Licence effluent quality criteria, territorial and federal guidelines, the Metal and Diamond Mining Effluent Regulations (MDMER), and/or site-specific, risk-based criteria, as appropriate for individual mine components. The reference in Table 5.1 to effluent quality being consistent with or improved from FEIS predictions is accurate. While historical monitoring has identified potential concerns, water quality trends, particularly for the WRF, have improved due to the implementation of ongoing mitigation and management measures. These outcomes are supported by the site's active water quality monitoring program. As noted in Table 5.1, closure criteria will be refined over time based on monitoring results and outcomes of ongoing research. To date, the modelling and assessments presented in Appendix D3 do not indicate that the closure objective will be exceeded for the WRF. Furthermore, a site-wide water quality model to evaluate conditions under near-term or unplanned closure is scheduled for completion in 2027 and will provide additional confirmation of long-term chemical stability of the WRF, which will address CIRNAC's recommendation. Baffinland is committed to providing further data and updated predictions, as they become available, to support ongoing closure planning and to ensure alignment with the closure objectives.	Appendix D3

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15			Mine Working Water Quality and Runoff	Within Appendix H (FEIS Freshwater Quality Predictions), Table H9 – 14 list water quality predictions for Based on studies completed by AMEC in 2012, the water quality within the open pit is expected to be elevated in select metals and have a pH of around 4.2. We understand that the research plan described will improve predictions for water quality within the open pit and long-term effluent flow. Since 2012, the occurrence of ML/ARD in the waste rock has been observed. Runoff at and from the mine working is not currently being assessed. Task # 1.2 in Table D1.1 states that monitoring of the water quality related to the open pit will only be started once open pit dewatering will be started as no pit water is currently available. Runoff similar to what will drain into the open pit once it is established, however, is already available to be analyzed and support the model verification. Baffinland argues that such measurements will not be accurate as the rock type proportions will change throughout the LOM. Controlled sampling of certain formations and knowledge of the resource geometry will allow to properly assess the importance of each runoff sample for the final pit water quality. Review of Table D1.1 suggest that water quality data in the open pit should be compared against the assumptions made in the initial water quality predictions. Use this data and geochemical results from the WRF to better predict water quality in the proposed open pit before it is created. **Recommendation:** (R-15) CIRNAC recommends that BIMC develop a comprehensive geochemical model of the Mine Site which includes the mine workings. This model should include water flow monitoring and quality sampling locations with annual reporting within the mine workings (including runoff) and discharging toward the Mary River or in the KM105 sedimentation pond.	Baffinland's annual reporting, specifically the 2024 QIA-NWB Annual Report for Operations, provides comprehensive data on effluent flow, as detailed in Table 5.1, 5.2, 5.3 and 5.4. Existing management plans, monitoring programs and reporting also provide thorough and detailed information on site water management and effluent discharges. The Blockflow diagrams referenced by CIRNAC in Appendix L4 accurately represent the site, with the exception of routine additions to the overall water management system, such as the KM106 stockpile pond, KM105 dam and Milne Surface Water Management Pond 3.These updates will be incorporated in the next revision of the Fresh Water, Supply, Sewage and Wastewater Management Plan, scheduled for submission in 2025. Additionally, precipitation runoff is accounted for in these Blockflow diagrams through the mean annual unit runoff, shown in the top of the diagrams. This approach is aligned with Part E, item 10 of the Water Licence: "The Licensee shall update or revise annually following the commencement of the Operations Phase and/or the Early Revenue Phase, the Project Block-flow Diagram Water Supply Balance information for the various Project sites provided with the Application, and submit the revisions, for review by the Board, with the Annual Report under Part B, Item 4." Given the extensive and detailed nature of current documentation, including the annual review of the water balance as outlined in the existing Water Licence, Baffinland believes that an additional geochemical water balance model is unnecessary.	N/A
16			Missing Water Quality	Predicted and monitored sulfate and nickel concentrations for the WRF pond are presented. The latest monitored data are from Summer 2022, while the report was prepared in 2024. The 2023 data is missing. **Recommendation:** (R-16) CIRNAC recommends that BIMC update the presented graphs to include the most recent data and provide explanation for any missing data.	The water quality data presented in Appendix D3 is from a water quality model completed in 2023 by WSP and published in 2024. The ICRP contains site monitoring information that is a snapshot of data that was developed when the plan was drafted. Additional monitoring and modelling data will be integrated into the ICRP as relevant when available.	Appendix D3
17	Waste Rock Facility Thermal Model		Hydrocarbon Soil and Water Contamination	Section D2.5.5, Task 6.5 – Landfarm Treatment Research states that starting in 2025 there will be a research program to assess the effectiveness of treatment for petroleum hydrocarbon in soil. CIRNAC notes this issue/commitment and continually mentioned but not actioned year after year. Furthermore, CIRNAC notes BIMC reports on annual contamination volumes, but it is not clear what the total volume of contaminated soil and water are. **Recommendation:** (R-17) CIRNAC recommends that the total volume of contaminated soil and water are reported annually and posted security be updated to include shipping of petroleum hydrocarbon impacted soil to an offsite location, until research shows a viable onsite remediation method. The ICRP should be updated to reflect these changes.	Baffinland reports the volume of contaminated soil deposited in landfarm facilities quarterly, as per the conditions of the QIA Commercial lease, and annually in accordance with the Type 'A' water licence. As outlined in Appendix D6, Baffinland is planning to undertake a Landfarm Treatment Research Program in 2026. Baffinland has engaged soil remediation companies regarding technologies for increasing the performance of landfarming, and will continue to investigate options to enhance the performance of landfarming to treat hydrocarbon impacted soils. These results will be used as part of the ongoing progressive reclamation process. Currently, based upon similar programs in Northern Canada, it is assumed that soil contaminated with hydrocarbons will be treated as part of the closure process on site, soil contaminated with other materials as identified in the ESA process or otherwise will be removed from site and treated as appropriate. This is standard practice in northern Canada. Baffinland disagrees with CIRNAC's assertion that independent research is required to verify the assumption that landfarms are a viable method for soil treatment within Nunavut. Landfarming is widely accepted, as included in Baffinland's Type A Water Licence, and is also implemented at many Federally managed contaminated sites, such as the DEW Line Remediation Project.	Appendix D6
18	Interim Closure and Reclamation Plan Version 6		Missing Detail in Appendices	The appendices provided with the ICRP tend to be relatively short documents only providing limited data. Research studies and data reports are cited, but they are not provided. In at least one occasion (D4 the 2024 WSP report) the cited document is not yet available, hindering the review of the ICRP. **Recommendation:** (R-18) CIRNAC recommends that BIMC provide all required information to review the document in a single package.	Baffinland acknowledges this request, however the ICRP is a technical document that is subject to ongoing updates and revisions based on evolving site conditions, operational experience, and new research. In accordance with the water licence and other regulatory requirements, technical reports and supporting documentation are submitted through the annual reporting process and may not always be fully integrated into the ICRP. However, Baffinland is committed to transparency and would be pleased to provide any of the referenced reports upon request, should the reviewer be unable to locate them within existing regulatory registries.	N/A
19	Interim Closure and Reclamation Plan Version 6		Groundwater Quality	There was groundwater contaminants identified for both the Hazardous Waste Berm Facility and Landfill, neither of which have been fully delineated or deemed to be stable. There is also no discussion on how groundwater impacts will be dealt with during closure. **Recommendation:** (R-19) CIRNAC recommends that BIMC includes a plan for properly assessing groundwater impacts to identify if there is a risk based on current and predicted conditions. If unacceptable risks are anticipated there should be a plan to deal with groundwater impacts during closure.	Appendix D6 within the ICRP has been drafted in response to historical comments from CIRNAC and other stakeholders. This research plan outlines the schedule and timeline for conducting Environmental Site Assessments (ESA) prior to closure to provide information for the Final Closure and Reclamation Plan. This plan includes provisions for a literature review, prioritizing assessments (for areas such as the identified Hazardous Waste Berm Facility), ESAs and the subsequent remediation and treatment of materials if required. Environmental Site Assessments will include assessment of seasonal flows in the active layer, and remedial actions will be identified and actioned as needed.	Appendix D6

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20	Interim Closure and Reclamation Plan Version 6		Groundwater Flow and Quality at Milne Port	It is inferred that active groundwater monitoring is not occurring at Milne Port downgradient of the ore stockpile or other areas of potential groundwater contamination sources. While it is understood widespread permafrost limits the presence of groundwater at the Site, it is also noted that the presence of permafrost at/near the Milne Port area may be approximately 3m or more below disturbed/ active areas. Due to the proximity to the receiving environment (i.e., Milne Inlet), it is inferred there is potential for shallow groundwater flowing from these contaminant sources to the receiving environment. **Recommendation:** (R-20) CIRNAC recommends BIMC develop a plan to confirm the presence/absence of groundwater and characterization of the shallow groundwater quality downgradient of contaminant source areas at Milne Port be investigated and reported to CIRNAC. It is also recommended that this plan be implemented during operation to establish current groundwater quality and support the eventual reclamation/remediation activities to meet the ICRP closure objectives, specifically to “ensure chemical stability of the mine open pit, WRF, quarries, and other Project disturbed areas”.	Appendix D6 within the ICRP has been drafted in response to historical comments from CIRNAC and other stakeholders. This research plan outlines the schedule and timeline for conducting Environmental Site Assessments (ESA) prior to closure to provide information for the Final Closure and Reclamation Plan. This plan includes provisions for a literature review, prioritizing assessments, ESAs and the subsequent remediation and treatment of materials if required. The ore stockpiles, pits and other areas of potential contamination are included as part of the assessment process.	Appendix D6, Section 9.6
21	Interim Closure and Reclamation Plan Version 6		Waste Rock Facility Water Discharge Quality	Mitigation strategy for prevention of acid generation and metal leaching from the WRF is permafrost aggregation. The water quality model was updated in 2023 and assumes that flow from the WRF only occurs via direct runoff or as shallow interflow within the waste rock active layer. Groundwater is not considered. The purpose of the model was to forecast future WRF pond chemistry from 2023 through 2026 based on recent data and mine plans. The model does not consider closure conditions, downstream water discharge toxicity, or environmental assimilative capacity within the receiving water environments. The report mentions treatment is not predicted to be required when strictly considering the Metal and Diamond Mining Effluent Regulations (MDMER) defined parameters arsenic, copper, nickel, lead and zinc. However, the report states results are not representative of discharge to the receiving environment, or the final discharge point regulated under MDMER. One of BIMCs Closure Principle and Abandonment Goal as stated in the ICRP v6 section 2.5.2. is to achieve the “Recognized Closed Mine” under MDMER and ensure no requirements for long-term active care, which includes water quality discharge meeting the Schedule 4 maximum authorized concentrations and acute lethality testing. Table 5.1 of the ICRP states that at present, water quality predictions for the WRF discharges and receiving waterbodies indicate that risk-based criteria and/or risk management strategies may be required. Suggesting some post closure exceedances of the regulatory guidelines. It is inferred water quality modeling and aquatic risk assessment will be required for BIMC to meet regulatory requirements and closure goals and objectives as outlined in the ICRP. Furthermore, these progressive measures may support the refinement of the ICRP during future revisions and improve future reclamation efficiency. **Recommendation:** (R21) CIRNAC recommends that BIMC update the operations geochemical model to include the conservative loading estimates under various closure scenarios. In addition, CIRNAC recommends that BIMC review of the assimilative capacity of the receiving water environment and confirmation that no acute toxicity would present with the completion of an interim aquatic risk assessments to support the statements made on the aquatic effects monitoring program.	Appendix D3 outlines the proposed research plan for waste rock stockpile seepage water quality. Modelling for the WRF was last updated in 2023, and will be monitored through several regulatory mechanisms throughout the life of the project. As CIRNAC notes, Baffinland acknowledges in Appendix D3 that additional modelling (which includes source term development) is required to ensure closure criteria are met. Specifically, there will be an initial model update in 2027 for near term closure (as stakeholders have requested this) and a second model update in 2028 for the life of mine scenario, with an update schedule every 10 years thereafter. To prepare for this model update, Baffinland is currently assessing monitoring data and source terms for the WRF, as accurate and representative inputs are a requirement for accurate modelling. These additional data sources will be described and defined in the 2025 QIA/NWB Annual Report for Operations, which can be reviewed by CIRNAC and other regulators and stakeholders.	Appendix D3
22			KM105 Pond Change of Designation and Function	KM105 Pond was designed to provide a robust engineered system to manage Total Suspended Solids (TSS), however recurring non-compliances for TSS are observed in this catchment area. KM105 Pond has not been functioning as designed and does not provide enough residence time for flow to facilitate settling. An alternative system has been placed, which comprises an in line chemical dosage further upstream of the pond, followed by a check dam, and finally the current pond has been designated as polishing pond. It has been reported that the alternative system works. CIRNAC notes there are no design criteria details, inflow and outflow water chemistry data or description as to whether the system is temporary or permanent. **Recommendation:** (R-22) CIRNAC recommends BIMC update the ICRP to provided additional closure details on permanent engineered surface runoff water management sedimentation systems across the mine including KM105. CIRNAC recommends that additional details on the design criteria for this check dam, inflow and outflow water chemistry data and description as to whether the system is temporary or permanent be provided in 90 days.	The design of the water control structures at KM105 is not complete. These details will be added the next revision of the ICRP after they are developed. A summary from the 2024 QIA-NWB Annual Report for Ops - Appendix E.13 (2023 Responses) and January 22, 2025 'Follow-up Spill report' is provided below for information: "Baffinland submitted a comprehensive KM 105 Pond Seepage report on January 22, 2025 which detailed the full summary of activities related to the KM 105 Pond, including mitigation measures planned for 2025 to address seepage from the pond facility. Water management measures within the KM 105 facility footprint below and above the dam is planned in 2025 which involves improving sediment control measures for the runoff flowing from the valley infrastructure through two processes for sediment removal: filtration and settling, both enhanced with chemical addition at the inflow. The surface water runoff flowing into the KM 105 Pond will be treated using a chemical dosing system. This system, which has been in operation since 2024, has demonstrated significant improvements in water quality. The flocs generated by this chemical treatment will be retained by a rock filter berm constructed within the KM 105 Pond containment, allowing for enhanced settling within the pond and filtration through the berm. The planned approach aligns with the International Erosion Control Association (IECA) guidelines for instream control following designs defined within the Mine Site Water Management Plan within Modification 13. The treated water will then flow into the existing downstream pond of the KM 105 dam. This pond will function as a polishing pond, enhanced with silt curtains to facilitate the settling of any remaining fine sediment. Finally, the effluent from the polishing pond will flow through an engineered structure as the final control point, where flows and water quality will be recorded. Due to winter construction constraints, some of these features will need to be installed following 2025 freshet. The discharge location is planned to be relocated once engineering for a new FDP is complete. A Construction Summary Report (CSR) will be submitted to the NWB within ninety (90) days following completion of the FDP, in accordance with Part D, Item 17 of the Type 'A' Water Licence, and in accordance with the Commercial Lease. Finalized details will be incorporated in the next revision of he ICRP."	N/A

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23	Interim Closure and Reclamation Plan Version 6		KM105 Pond Seepage Quantity Monitoring	Since July 2022, the seepage has been observed every year from the KM 105 pond but there have been no monitoring reports on quantity of the seepage. Continuous monitoring for quality control is missing. In addition, it is inferred multiple sources of seepage exist and more detailed monitoring plans based on the periodical (seasonal or monthly) quantities are considered required, in addition to water quality. **Recommendation:** (R-23) CIRNAC recommends the development of additional investigation plan(s) and periodical monitoring plans to further characterize seepage quantity and seepage sources to inform operations and refinement of the ICRP.	The design of the water control structures at KM105 is not complete. These details will be added the next revision of the ICRP after they are developed. MS-11 is not an active monitoring location currently due to the seepage experienced from the dam, however, due diligence water quality sampling was conducted at proxy sample locations to fully characterize the water quality of the seepage. Note however that collection of samples representative of actual effluent water quality of the seepage was found to be difficult due to the inconsistent nature of seepage flow, and sediment resident of the tundra combined with low magnitude flows associated with overland (sheet) flow. Results were reported on a monthly basis as per required frequencies and included within QIA-NWB Type 'A' annual reports. Discharge quantity was estimated through daily flow measurements and pressure transducers installed at the downstream hydrology station following the onset of consistent warmer conditions and ice free conditions. As part of the due diligence monitoring program, samples were also collected at downstream monitoring locations to assess receiving environment conditions. In conjunction with due diligence water quality monitoring, supplemental internal sampling was also completed throughout the process to inform operational decisions, including water treatment dosage requirements; thus also supporting refinement of the ICRP. Plans for 2025, as described above, include designing of the discharge location once engineering for a new FDP is complete.	N/A
24	Interim Closure and Reclamation Plan Version 6		KM105 Pond Water Management Systems	Water management systems at the Project consist of infrastructure to support supply of freshwater, management of sewage and wastewater treatment systems and surface water management ponds. One of the surface water management ponds proposed for closure is KM105. According to Section 5.3.8 of the ICRP, the overall closure objectives for the KM105 Sedimentation Pond are to re-establish the natural drainage of the KM105 Pond area, and to ensure long-term physical stability by limiting future erosion within the drainage path. The report noted that KM105 Sedimentation Pond will be decommissioned once runoff from the catchment area consistently meets applicable discharge. **Recommendation:** (R-24) CIRNAC recommends that BIMC revisit the decommissioning of the KM105 pond as per the Canadian Dam Association guideline as the pond/berm is likely a designated dam requiring special decommissioning procedure.	Baffinland acknowledges that a site-specific decommissioning plan for the KM105 dam is required. A closure concept memorandum for the KM 105 dam was provided in Appendix A of the 2024 Work Plan on December 1, 2023 and is attached here as Appendix A for reference. Section 5.3.8.5 of the ICRP has been updated with specific activities required at closure for the KM105 Pond.	Section 5.3.8.5
H	Interim Closure and Reclamation Plan Version 6		Progressive Landfill Cell Reclamation	The ICRP document states that during operation and closure activities “project landfills will be progressively covered with overburden, as cells are completed.” **Recommendation:** (R-25) CIRNAC recommends BIMC include documentation of this being completed to-date (if available) to confirm feasibility and procedure. If this has not been completed to date, it is recommended a more detailed plan be included to outlining confirmation that these are non hazardous landfills and the methods for decommissioning and reclamation.	The volume of cover material placed on each lift is an assumption and is incorporated into the updated surfaces that are reported on within our Commercial Lease reporting to QIA. The Landfill Maintenance and Operation Manual (BIM-5200-MAN-0002), Section 5.3.2 Placement of Final Cell Cover, documents how soil for intermediate and final cover should be placed (Rev 0; 2015). Section 5.3 of the Manual is provided below: *5.3 COVER SOIL* *5.3.1 EXCAVATION* *Excavation of soil for cover material shall only be made from designated “borrow” areas. Working cover stockpiles are to be placed within the perimeter of the approved landfill pad where they will be accessible to the working face. However, they are not to be located where they may block truck travel or filling operations.* *5.3.2 PLACEMENT OF FINAL CELL COVER* *Use of soil for intermediate and final cover should be placed in the following manner:* *a. When using a dozer, push cover soil up the slope and feather it out as evenly as possible. Do not permit the tracks of the equipment to spin as you traverse the compacted slope. This action will tear up the waste and it may be necessary to compact the waste again in order to reapply the cover material.* *b. When a cell or portion of a cell has reached the final planned grade and width, a final cover of compacted soil should be placed. A minimum of 0.3 m of cover shall be placed over the deck and 0.1 m over the slope of the cell. Use no more fill than necessary.*	N/A
26	Interim Closure and Reclamation Plan Version 6	Table 8.1, Section 9 and Table 9.1	Post Closure Environmental Monitoring and Reporting Frequency	Table 8.1, Section 9 and associated Table 9.1 in the ICRP version 6 highlight “high-level” schedules for closure activities. Monitoring activities to assure environmental compliance and to oversee the impact on the closure activities and waste and water management strategies are only inferred per the “Closure and Post-Closure Monitoring and Reporting Activities” line item in Table 8.1. These are then elaborated on in Section 9 which highlights key monitoring program and the proposed site locations to be targeted post closure. Section 9, states “Post-closure monitoring would be completed for a period of five (5) years, with a final monitoring assessment completed ten (10) years following”. The monitoring frequency listed indicates annual monitoring from Years 1 to 8 which includes approximately 3 years of Final Closure activities followed by 5 years of post closure activities. This is then followed by a 10-year gap with one final monitoring year in Year 18. **Recommendation:** (R-26) CIRNAC recommends the ICRP post closure monitoring plan be updated to include more frequent monitoring events and for a longer duration. 15 years post closure longterm monitoring and maintenance is considered a reduced timeframe compared to longterm monitoring plans for other active and abandoned mine sites in Canada. CIRNAC suggests plans be between 20 and 50 years for monitoring.	Baffinland notes CIRNAC's request, and notes that the current monitoring program was included as part of the approved FEIS, and is in alignment with closure guidance for Nunavut.	N/A

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27	Interim Closure and Reclamation Plan Version 6	Table 9.1, Section 9.6	Environmental Site Assessment Plan, Frequency, and Approach	The ICRP (Table 9.1) includes high-level planning for future Environmental Site Assessments to occur approximately 1 year prior to the initiation of closure activities (i.e., Year 0), and during the final year of closure activities (i.e., Year 3). Furthermore, in Table 9.1, the "Aquatic Monitoring and Reporting Program" is only scheduled as "Site-Wide" for three years during closure activities followed by a reduction in the monitoring areas. During the proposed post-closure monitoring period, the aquatic monitoring and reporting program is only planned for the Mine Site (i.e., Years 4, 5, 6, 7, 8, and 18). This suggests no post closure aquatic environment monitoring will be completed at other Site areas requiring remediation/reclamation. Previous comments have pointed out that the current modeling suggest there may be water quality issued post closure so a reduction in monitoring events seems premature at this point in the closure planning process. Further information on the methodology for Environmental Site Assessments is listed in Section 9.6, stating "A Phase 1 and 2 Environmental Site Assessment (ESA) will be conducted at the onset of closure for areas where there is the potential for contamination with petroleum hydrocarbons or other parameters. The objective of the Phase 1 and 2 ESAs will be to determine areas of focus for final closure activities and to demonstrate conformance with CCME contaminated sites guidelines or site-specific risk-based criteria at the Mine Site, Milne Port, Tote Road and Steensby Port." These comments suggest that limited to no pre-closure characterization or identification of contamination is planned during operation. Furthermore, suggesting limited to no background or pre disturbance characterization of onsite media (e.g., soil, groundwater, surface water, etc.). Completing baseline soil and groundwater characterization at potential contaminant sources during operation can focus and refine closure plans. This may include interim Phase 1/2 ESAs to identify and target areas of potential environmental concern prior to the initiation of closure activities. BIMC has shown commitment to progressive reclamation; completing contaminant source and background soil and groundwater characterization for key Site area (ex. Milne Port and Steensby Port) prior to closure activities may improve the ICRP plan and show a commitment to reclamation planning. Furthermore, soil and groundwater characterization during operation may support the development of risk-based criteria prior to closure and improve efficiency of reclamation activities and future revisions to the ICRP. **Recommendation:** (R-27) CIRNAC recommends additional frequency and/or rationale be provided in the ICRP to justify the frequency of the Environmental Site Assessment(s) and reduction of the Aquatic Monitoring Program from "Site-Wide" to only occurring at the "Mine Site" post closure (i.e., Years 4 to 18). In addition, it is recommended that BIMC complete baseline soil and groundwater characterization at potential contaminant sources during operation and target areas of potential environmental concern prior to the initiation of closure activities through progressive reclamation.	Baffinland does not agree that aquatic monitoring plans such as the AEMP should extend beyond the mine site. That is the current extent of the AEMP. The railway will be monitored with a similar SNP level program and Steensby Port with a marine monitoring component. The current AEMP is designed to characterize potential changes associated with the Project at the Mine Site where there are multiple stressors that have potential for impacts to the freshwater receiving environment. The 2019 MVLWB/GNWT Guidelines for Aquatic Effects Monitoring Program (March 2019) provides guidance for how monitoring is incorporated into a water license. There are three broad options identified: management plans, surveillance network programs (SNP), and aquatic effects monitoring programs. As the guideline outlines, these methods of monitoring (ascending in complexity) correspond to the project impacts. Specifically, when there are multiple stressors, more conservative methods of monitoring are required (such as an AEMP). Currently, there is an AEMP in place at the Mine site, with surveillance network program level monitoring along the Tote Road, with Milne Port also having Marine Environmental Effects Monitoring as a result of port activities. In line with these guidelines, Baffinland believes that surveillance network program monitoring along the rail is appropriate (a transportation corridor similar to the Tote Road), and at Steensby Port, surveillance network program monitoring combined with the Marine Environmental Effects Monitoring program will be appropriate (in compliance with Project Certificate conditions and Fisheries Act authorization requirements). Baseline data has already been collected and assessed as part of the FEIS. The available supplemental baseline data will be integrated in relevant management plans.	Section 9.1
28	Interim Closure and Reclamation Plan Version 6	9	Risk Assessment Plan and Schedule	Section 9.0 includes an incomplete sentence/statement within paragraph two: "Additional activities, such as human health and ecological risk assessment." No other mention of human health or ecological risk assessment is included in the closure planning schedules presented in Sections 8 and 9. Based on the ICRP Site-wide closure objectives, it is noted that water quality predictions suggest some contaminants may exceed the Type A Water License effluent criteria. This suggests risk assessment and a risk management plan for post closure may be required. **Recommendation:** (R-28) CIRNAC recommends that a risk assessment plan and schedule be incorporated into the ICRP to address potential risk management scenarios during closure.	Baffinland has updated this sentence in paragraph two of Section 9.0 to indicate that "human health and ecological risk assessments may be completed, if required." Baffinland will also perform progressive Environmental Site Assessments at selected high priority locations as mine operations continue. Details of this program including priority areas and schedule of research and assessment activities are located in Appendix D6. Baffinland will report on any new ESA and/or Human Health and Ecological Risk Assessment (HHERA) results on an annual basis to the NIRB (as per Project Certificate No. 005), the NWB (as per Type A Water Licence 2AM-MRY2540) and the Landowner (as per Commercial Lease Q13C301).	Section 9.0
29	Waste Rock Facility Thermal Model		ARD Reactions at Low Temperatures	The only ML/ARD prevention planned for the WRF is the freezing of the waste rock to prevent the sulfides to react with oxygen. To verify the continuous freezing of the waste rock the temperature within the waste rock was modelled also taking climate projections into account. The temperature limit used under which the waste rock is safe (i.e., no ML/ARD occurring) is set in these models to 0ºC. The publications cited above, suggest that tailings may consume oxygen at substantially lower temperatures. The studies from Elberling were performed on Baffin Island; oxygen consumption was considered most likely linked to ARD. ARD occurring in permafrost zone of the WRF has the potential for the production of acidic and metal burdened waters (which will also have a lower freezing point due to the higher osmolarity). Furthermore, ARD in the permafrost zone of the WRF may impact the thermal regime in the WRF potentially leading to larger depth of the WRF to be unfrozen in the summer months. **Recommendation:** (R-29) CIRNAC recommends a discussion on the lower temperature limit on ARD activity be incorporated into the thermal modelling revision(s) and incorporated into the ICRP.	The industry standard methodology is to use 0ºC, which is why it has been selected for the Mary River Project and other locations throughout the North. Baffinland acknowledges some academic research has been conducted that shows in certain circumstances ML/ARD production can occur below freezing, however this research is limited and has not been updated in 20 years, providing a limited comparable dataset for review. Baffinland commits to research the applicability of the cited paper and considering the potential implications of the temperature as part of the model development. The proposed thermal research program is described in Appendix D4, and discussion regarding assessment of this issue has been added.	Appendix D4

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11-Jul-25

Comment #	Reference	Section #	Topic	CIRNAC Comments and Recommendations (March 7th, 2025)	BIM Responses / Comments (July 11, 2025)	ICRP Reference
30	Interim Closure and Reclamation Plan Version 6	Table 5.1	Qualified Professional Requirements	Table 5.1 within the ICRP defines a “Qualified Professional” as “assumes a minimum of 3 years experience in a relevant field”. **Recommendation:** (R-30) It is recommended the definition of a qualified professional be updated within the ICRP to better match industry standards. A Qualified Professional typically refers to a registered professional or accredited practitioner. It is recommended this include licensed/ accredited individuals with a professional designation in good standing (e.g., CSAP, P.Eng, P.Geo., P.Ag., P.Chem., P.Bio, etc.).	Baffinland agrees to update these requirements. The definition of Qualified Professional has been updated in the footnote to Table 5.1 as per the recommendation. The definition has also been added to the Glossary of Terms.	Table 5.1, Section 11.1
31	Interim Closure and Reclamation Plan Version 6		Decommissioning Plan for Buildings and Equipment Containing Hazardous Materials	Reclamation plans do not include hazardous building materials surveys. It is note that hazardous materials may be taken off-Site or placed in on-Site landfills during closure activities. However, a plan for characterizing hazardous materials is not included. **Recommendation:** (R-31) CIRNAC recommends a plan for hazardous building material survey(s) by a qualified person be incorporated into the ICRP to support decommissioning/ reclamation planning.	As part of design specifications for the Mary River Project hazardous materials (e.g. asbestos) are excluded for use as part of design criteria. In addition, the sitewide ESA will assess the potential for an assessment of hazardous materials to be required. However, given the age of the mine, and the design criteria used for the buildings, Baffinland believes at this time carrying a separate line item for this task is unwarranted.	N/A

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Comment #	Reference	Section #	Topic	QIA Comments and Recommendations (March 25th, 2025)	Baffinland Responses / Comments (July 11, 2025)	ICRP Reference
1	Interim Closure and Reclamation Plan Version 6	Appendix D5	Revegetation	QIA remains concerned that without a clear commitment from BIMC to research the use of active revegetation methods (e.g., seeding, planting) beyond soil salvage within a similar context as the Mary River Project, there will be little meaningful progress in engaging active revegetation methods at the Project site. As the data collected by BIMC thus far indicate that a reversal of vegetation loss will take longer than 40 years, BIMC should explore opportunities to accelerate vegetation growth and colonization of disturbed areas. In section D5.4.2, BIMC notes that the outcomes of their Project Reclamation Feasibility Analysis "...will be communicated as part of the Inuit Engagement Strategy" (p. 10). As currently worded, the QIA is concerned that BIMC is not committed to incorporate IQ and feedback from Inuit in the revised Project Reclamation Feasibility Analysis outcomes. **RECOMMENDATION** - QIA requests that BIMC commits to: • Engaging with QIA in the development of the design and Terms of Reference for the proposed Project Reclamation Feasibility Analysis, as well as in its subsequent review and feedback process once the analysis is completed. • Including a formal research assessment of active revegetation measures, including seeding, planting, transplants, and soil salvage, within their Project Reclamation Feasibility Analysis; • Revising the Project Reclamation Feasibility Analysis based on feedback provided by Inuit and IQ holders during the Inuit Engagement Strategy and QIA during their review; and • If requested by Inuit, IQ holders, or QIA based on the engagement and review of the Project Reclamation Feasibility Analysis, undertake an Active Revegetation Research Program that includes a pilot of active revegetation methods (within comparable settings to the Mary River Project), is guided by Inuit and IQ, and takes into account potential socioeconomic benefits.	In reponse to recommendation one, Baffinland commits to engaging with QIA in the development of the design and Terms of Reference for the PRFA and for subsequent review and consideration of the feedback process once the analysis is complete. The following text has been added to Appendix D5 section D5.4.2 (Proposed Research): "Baffinland commits to engaging with QIA in the development of the design and Terms of Reference for the analysis as well as for subsequent review and consideration of the feedback process once the analysis is complete." In response to recommendation two, Baffinland confirms the PRFA will include assessment of active revegetation measures and has added the following task to be completed as part of the PRFA: "Review and evaluation of additional literature and case studies of northern mine revegetation programs and reclamation methods for applicability to the Mary River Project. This will include review and evaluation of active revegetation measures, including seeding, planting, transplants, and soil salvage methods." In response to recommendation three, Baffinland has added the following text to section D5.4.2: "In addition, Baffinland commits to considering feedback from Inuit and IQ holders provided to Baffinland through the Inuit Engagement Strategy and from QIA during their review and revising the PRFA where appropriate." Regarding recommendation four, the Project Reclamation Feasibility Analysis (PRFA) is designed to assess the feasibility of a variety of revegetation options applicable to the Mary River site. Baffinland are unable to commit to QIA's request as it is dependent on the outcomes of the PRFA.	Appendix D5
2	Interim Closure and Reclamation Plan Version 6	Section 9, Appendix D5, and Appendix D7	Terrestrial Environment Monitoring Program timeline	QIA appreciates BIMC's November 1, 2025 response provided to QIA indicating they are now proposing to conduct annual monitoring for years 0 to 7, in addition to year 15 (9 years of data). However, this is not reflected in Table 9.1 (p. 210), which only shows Terrestrial Environment Monitoring and Reporting during years 0, 1, 2, 3, 5, and 7. **RECOMMENDATION** - Please adjust Table 9.1 to reflect BIMC's commitment made to QIA. In addition, BIMC has provided no rationale to justify how their revised Terrestrial Environment Monitoring Program timeline (annual monitoring between years 0-7, and during year 15 post-closure) is sufficient to ensure FEIS predictions are met. It will take more than 40 years to reverse vegetation loss, and it remains unclear how only collecting monitoring data during years 0-7 and year 15 will be sufficient to establish a statistically robust trend that shows residual effects on wildlife lessening over time and resulting in negligible adverse effects post-closure. BIMC should provide reasonable justification for completing monitoring only during years 0-7 and 15 and explain how they will confirm they have met FEIS predictions. Based on available information, BIMC's proposal of evaluating whether additional monitoring years are required at year 15 is insufficient to address QIA's concerns. **RECOMMENDATION** - QIA reiterates their request that BIMC commits to undertaking terrestrial environmental monitoring (wildlife and vegetation) over a period that aligns with the expected trajectory of vegetation recovery in the Project Area, accounts for the natural variation in the use of the Project Area by wildlife, and yields a statistically robust trend that shows residual effects on wildlife lessening over time. At a minimum, QIA requests that this includes regular monitoring between years 0 and 25 post-closure.	Table 9.1 and text in section 9.7 has been adjusted to reflect Baffinland's committment to complete annual monitoring for years 0 to 7 and year 15 post-closure. As further justification for the proposed approach, Baffinland reiterates that as the Project is in the initial years of operations, closure planning is expected to be refined over time using findings from the ongoing and planned engagement efforts described in section 2.7 of this document (e.g., MCTAG, ISP Inuit Committees), site-specific operational knowledge, environmental monitoring programs, progressive reclamation, and reclamation research studies. In particular, closure objectives, criteria, thresholds and responses are required to be confirmed with Inuit through the Inuit Engagement Strategy (section 2.7.2), while duration of monitoring programs will also be a topic discussed. In addition, outcomes of the Reclamation Research Program (Appendix D5) are expected to inform and build on current understanding of final land capability and the trajectory and timeline of recovery required to achieve agreed closure objectives. In line with the Adaptive Management Plan (see ICRP section 2.7.3), as the project advances and more information becomes available to provide a more comprehensive rationale on duration and frequency of post-closure terrestrial environmental monitoring, Baffinland anticipates development of a more detailed study design for assessing residual environmental impacts and achieving objectives following completion of reclamation activities. As outlined in the ICRP section 8.2 and Table 9.1 post-closure activities are expected to last fifteen (15) years, they will be extended if closure criteria (to be determined) are not met in that timeframe.	Table 9.1, Section 8.2, 9.7
3	Interim Closure and Reclamation Plan Version 6	Section 9, Appendix D5, and Appendix D7	Post-closure Terrestrial Wildlife Monitoring	While BIMC noted that their multi-pronged strategy to assess indicators of wildlife usage will include track surveys, monitoring of pellets, and staging of wildlife trap-cameras, it has not provided a clear rationale for the spatial and temporal extent of the above proposed multipronged strategy for monitoring to confirm evidence of habitat use or occupation by indicator terrestrial wildlife during the different seasons and confirm FEIS effect predictions postclosure. Post-closure monitoring is critically important, and BIMC should develop robust, well planned methods and schedules to ensure that BIMC can accurately assess whether they have met FEIS effect predictions so that further monitoring and an adaptive response can be implemented, where necessary. QIA continues to have serious concerns with the current lack of information on the multi-pronged strategy for monitoring and limited monitoring time frame. **RECOMMENDATION** - QIA reiterates their request that BIMC commit to: • Providing clear rationale for 1) the spatial extent of their monitoring, 2) the temporal extent of their monitoring, and 3) the monitoring methodologies to confirm evidence of habitat use / occupation by indicator terrestrial wildlife during the different seasons and confirm FEIS effects predictions post-closure. • Increasing the temporal extent of their post-closure terrestrial wildlife monitoring during each monitoring year (i.e. more than two weeks) should the QIA, Inuit, or IQ holders deem the above rationale inadequate.	Baffinland commits to evaluating the current proposed wildlife monitoring program and providing a clear rationale in the next iteration of the ICRP for 1) the spatial extent of the proposed post-closure monitoring 2) the temporal extent of monitoring and 3) monitoring methodologies to confirm evidence of habitat use / occupation by indicator terrestrial wildlife during the different seasons to confirm FEIS effects predictions post-closure. Duration of monitoring programs will be a topic discussed as part of the Inuit Engagement Strategy described in Section 2.7. Baffinland commits to development of a post-closure monitoring schedule no later than five years prior to closure. Results of research programs will be provided as part of annual reports and included in the next ICRP update.	N/A

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11-Jul-25

Comment #	Reference	Section #	Topic	QIA Comments and Recommendations (March 25th, 2025)	Baffinland Responses / Comments (July 11, 2025)	ICRP Reference
4	Waste Rock Facility Thermal Model	D4.4.5.2	Model Limitations	QIA and its subject matter experts have reviewed BIMC's thermal modeling memorandum titled "Assessment of Active Zone Depth Considering SSP1-2.6 Climate Change Projection at Mary River Mine." Upon review, QIA has concluded that the current model lacks sufficient conservatism, does not adhere to best practices, fails to account for site-specific realities, and does not capture any range of possibilities surrounding climate change scenarios. This exposes QIA and the environment to heightened risks and uncertainties. **RECOMMENDATION**: QIA recommends incorporating multiple climate change scenarios into the thermal modeling process. This approach would provide a more robust assessment of environmental risks associated with the Waste Rock Facility (WRF), particularly concerning the potential increase in active zone thickness and the corresponding need for mitigation measures. Key Observations by QIA's Subject Matter Experts from Okane: • While SSP1-2.6 aligns with the Paris Agreement, there is significant uncertainty about Canada's and the global community's ability to achieve the targets associated with this or other scenarios. • SSP1-2.6 represents the least conservative climate change scenario regarding its thermal impact on the WRF cover system. This choice does not adequately capture potential risks. • The thermal model is insufficiently conservative given the high degree of uncertainty. As a result, the risks posed by climate change to the WRF are not adequately addressed. • The model incorporates several simplifications because of a lack of site-specific data. Although these simplifications are reasonable as a preliminary step, their eventual refinement is likely to reveal an increased active zone thickness and a corresponding need for a thicker thermal cover or other mitigation measures. • In Okane's experience, SSP1-2.6 is rarely, if ever, used as the sole climate change scenario in thermal modeling for waste rock facilities. Mines in Nunavut typically evaluate two or more climate change scenarios. This practice helps assess the sensitivity of thermal cover systems to rising temperatures and understand the environmental implications of selecting specific scenarios. Evaluating multiple scenarios is critical to comprehensively understanding the risks posed to the WRF and other infrastructure at the Mary River Project.	Baffinland agreed to use multiple scenarios during the Water Licence renewal process, details are available in Appendix D4 of the ICRP. The model will consider three climate change scenarios as part of the analysis, specifically three scenarios as defined by the IPCC Sixth Assessment Report on climate change (IPCC, 2021). These scenarios are as follows: 1.SSP1-2.6 (Global CO_2 emissions cut to net zero ~2075) 2.SSP2-4.5 (Global CO_2 emissions around current levels until ~2050, then falling but not reaching net zero until 2100) 3.SSP5-8.5 (Global CO emissions continue to rise throughout the 21st century, with no net zero achieved by 2100)	Appendix D4

Appendix A

Baffinland

Date: December 1, 2023

Re: KM 105 Dam and Sedimentation Pond - Closure Concept and Reclamation Security

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Introduction

To better understand closure requirements and reclamation security for the KM 105 Dam and Sedimentation Pond, Baffinland Iron Mines (Baffinland) retained Knight Piésold (KP) Consulting to develop a closure concept and provide the estimated materials and quantities that would be involved in the closure of the KM 105 Dam and Sedimentation Pond. This closure concept is included as Attachment 1.

Closure Costs Included in 2023 Work Plan

Using the KP closure concept and estimated material quantities, closure costs for the Dam and Pond were included in the 2023 Marginal Closure and Reclamation Financial Security Estimate, Revision 0 (submitted December 15, 2022). Section 2.3 'KM 105 Sedimentation Pond' in this document stated:

Baffinland reviewed the quantity in the EBS for removal of the structures and determined that additional security was required above the grading and recontouring allocated for this area.

The 2023 Work Plan Security Estimate allocates an additional $254,564 in direct costs to account for the closure activities associated with the KM105 Sedimentation Pond. This includes construction of a diversion ditch to divert the upper portion of the Mine Haul Road to the open pit, breaching of the northwest embankment of the KM105 Sedimentation Pond to restore natural drainage, and placement of an erosion protection layer. Table 0-1 provides the estimated materials and quantities for the closure of the KM105 Sedimentation Pond.

Table 0-1: KM105 Sedimentation Pond Estimated Materials and Quantities for Closure

Earthworks	Unit	Quantity
Excavate and Stockpile Granular Material		
Excavate and Stockpile - Rockfill Material	m^3	*44,000*
Excavate and Stockpile - Transition Zone 1 Material	m^3	*6,400*
Excavate and Stockpile - Liner Bedding Material	m^3	*8,100*
Haul (away from km 105 Pond Area)	m^3	*53,000*
Construction		
Place (Previously Stockpiled) - Rockfill Material for Erosion Protection	m^3	*5,200*
Excavate/Drill and Blast - Diversion Berm and Ditch	m^2	*60*
Load, Haul and Place - Diversion Berm and Ditch Transition Zone 2	m^3	*300*

This marginal increase is based on breaching the northwest embankment by removing the material, stockpiling it on a nearby laydown area and then placing the material for erosion protection, as well as creating a diversion berm at the upper Mine Haul Road. The unit rate accounts for costs to Drill & Blast, Excavate, Load and Haul 1km. All quantities associated with Excavate, Stockpile, Load, Haul and Place (i.e., 58,500 m3) were grouped into one-line item in the EBS using a unit rate of Excavate, Load & Haul, assuming a 1 km hauling distance (i.e., $4.32/m3). The material quantity associated with the Diversion Berm and Ditch is assumed to have a drilling depth of 1 m (i.e., 60m3 of material to be drilled and blasted) and was included in the EBS using a Drilling and Blasting unit rate (i.e., $13.54/m3)

A summary of the marginal increase to the estimate for the KM 105 Sedimentation Pond is shown in Table 0-2.

Table 0-2: Marginal Increase for KM 105 Sedimentation Pond

Description	Unit Rate ($/m^3)	Quantity (m^3)	Cost ($)
Excavate, Load and Haul (1km)	*4. 32*	*58,800*	*253,751*
Km 105 Drainage Channel	*13.54*	*60*	*812*
	TOTAL	***58,860***	***254,564***

Additional Reclamation Security Calculated in 2023

Following the submission of the 2023 Work Plan, it was recognized that additional security was required for reclamation of the gabion baskets and liner material that form part of the dam structure, as well as water treatment during the closure phase.

Gabion Baskets

Gabion baskets were utilized to construct the KM 105 Dam per the following schedule:

Table 1: KM 105 Dam Gabion Basket Schedule

Dimensions	Number of Baskets	Volume per Basket (m3)	Total Volume (m3)
2 m x 1 m x 1 m	2	2	4
3 m x 1 m x 0.5 m	804	1.5	1206
4 m x 1 m x 0.5 m	158	2	316
4 m x 1 m x 1 m	6	4	24
TOTAL:	**970**		**1550**

To remove the gabion baskets, they must be ripped open using an excavator, rockfill inside the basket removed, and the gabion baskets crushed and disposed of in the on-site landfill at the Mine Site. Some labour would also be required to pick basket wire out of the rockfill.

It has been assumed that given the small volume of each basket, 12 baskets can be removed per hour using an excavator and a labourer. Using the blended labour rate of $88.14/hr, and blended equipment rate of $137.87 per hour, this yields a total unit rate of $226.01/hr, and a removal cost of $18.83/basket.

As no specific unit rate exists for disposal of gabion baskets in the on-site landfill, the unit rate for liner removal and disposal has been utilized, using the largest side of each basket as the area in m^2.

The direct costs required for removal of the gabion baskets are shown in Table 2 below:

Table 2: KM 105 Dam Closure Costs – Gabion Baskets

Description	*Unit Rate ($/unit)*	*Quantity*	*Cost ($)*
Rockfill in Gabion Baskets - Excavate, Load and Haul (1km)	4.32	1550 m^3	6,696
Removal of Gabion Baskets	18.83	970	18,269
Disposal of Gabion Baskets in Landfill	3.10	3,072 m^2	9,523
		TOTAL	**34,488**

Liner Removal and Disposal

The KM 105 Dam was constructed using Non-Woven Geotextile and Geomembrane Liners. The direct costs required for liner removal are shown in Table 3 below:

Table 3: KM 105 Dam Closure Costs – Liner Removal

Description	Unit Rate ($/$m^2$)	Quantity (m^2)	Cost ($)
60 mil Enviroliner Linear Low Density Geomembrane (Embankment and Abutments)	3.10	7,000	21,700
LP7 Non-Woven Geotextile (Embankment and Abutments)	3.10	14,000	43,400
LP16 Non-Woven Geotextile (Riprap and Gabion Basket Areas)	3.10	2,200	6,820
		TOTAL	**71,920**

Water Treatment

Active treatment of water for total suspended solids (TSS) in the KM 105 Sedimentation Pond will be required for two years after operations cease. As operations on the Mine Haul Road will no longer be taking place, it is expected that sediment quantities entering the KM 105 pond will decrease and no longer require treatment after two years. Treatment will only be required during freshet (i.e. June and the first half of July), as the small inflow volumes from August to October will allow natural settlement to occur.

Discharge volumes from the KM 105 Sedimentation Pond are shown in Table 4 below:

Table 4: KM 105 Pond 2022 Discharge Volumes

Month	Volume (m^3)
June 2022	339,138
July 2022	137,234
August 2022	50,725
September 2022	33,203
October 2022	838

The total discharge for June and the first half of July requiring treatment is 407,755 m^3. Utilizing the unit rate for water treatment of $1/m3, the direct costs for water treatment are shown in Table 5 below:

Table 5: KM 105 Pond Closure Costs – Water Treatment

Description	*Unit Rate ($/m²)*	*Quantity (m²)*	*Cost ($)*
Water Treatment for TSS (Year 1)	1	407,755	407,755
Water Treatment for TSS (Year 2)	1	407,755	407,755
		TOTAL	**815,510**

It is also noted that a water treatment system was installed at the KM 105 Sedimentation Pond in 2023. The reclamation security required for this system is $69,950.

Conclusion

The total direct costs for reclamation of the KM 105 dam and sedimentation pond that have been included in the 2023 Reconciliation are shown in Table 6 below:

Table 6: KM 105 Dam and Sedimentation Pond – Reclamation Direct Costs

Item	Cost ($)
2023 Work Plan Security (Bulk Rockfill Excavation, Stockpile and Placement, and Diversion Berm/Ditch)	254,564
KM 105 Dam - Gabion Basket Removal	34,488
KM 105 Dam – Liner Removal	71,920
KM 105 Sedimentation Pond – Water Treatment for 2 Years	815,510
KM 105 Sedimentation Pond – Water Treatment Plant Installed in 2023	**69,950**
TOTAL	**1,246,433**

Attachment 1: KM105 Sedimentation Pond Closure Concept Memorandum (Knight Piésold, 2022)

Baffinland

ATTACHMENT 1

KM105 Sedimentation Pond Closure Concept Memorandum (Knight Piésold, 2022)

Knight Piésold CONSULTING

Management System Certified by: bsi ISO 9001 ISO 14001 ISO 45001 CERTIFIED

MEMORANDUM

Date:	December 14, 2022	**File No.:**	NB102-00181/76-A.01
		Cont. No.:	NB22-01250
To:	Mr. Steve Borcsok		
Copy To:	Connor Devereaux		
From:	Greg Johnstone		
Re:	**KM105 Sedimentation Pond Closure Concept, Mary River Project**		

1.0 INTRODUCTION

Knight Piésold Ltd. (KP) was retained by Baffinland Iron Mines Corporation (Baffinland) to develop the closure concept and provide the estimated materials and quantities that would be involved in closure of the KM105 Pond at its Mary River Project (the Project), in support of its Annual Security Review (ASR) process.

Closure of the KM105 Pond will be completed consistent with the closure principles described in the *Interim Closure and Reclamation Plan (ICRP)* for the Project (Baffinland, 2018), as follows:

- Ensure the safety of the abandoned sites for wildlife and human users.
- Ensure physical stability of abandoned Project sites and remaining physical features (open pit, waste rock stockpile, quarries, road and railway embankments, stream crossings).
- Ensure chemical stability of the mine open pit, waste rock stockpile, quarries and other Project disturbed areas.
- Incorporate considerations for future land use of Project sites in final closure planning (to be informed over time by the Mine Closure Working Group).
- Achieve the “Recognized Closed Mine” status in as minimal duration as reasonably practical, as defined by Part (4) of the Metal and Diamond Mining Effluent Regulations (MDMER, formerly the Metal Mining Effluent Regulations) SOR/2002-222 dated 1 June 2018 and ensure no requirements for long-term active care.
- Implementation reclamation in a progressive, ongoing manner during the life of the Project and restore sites as soon as an area is no longer required for operations to limit the need for long term maintenance and monitoring.
- Reclaim disturbed Project areas such that no long-term active care is required.

The objectives and criteria proposed for the implementing Final Closure and achieving the stated goal and principles are discussed in the ICRP.

2.0 KM105 SEDIMENTATION POND OVERVIEW

The KM105 Pond is designed to provide temporary containment for runoff reporting from catchment areas upstream of the Mine Haul Road (MHR) and KM105 Pond, as well as from the MHR itself, to settle out Total Suspended Solids (TSS) (Figure 1). Once the pond water quality is acceptable for discharge, effluent from the pond is discharged (pumped) to the drainage course directly downstream of the KM105 Pond Northwest Embankment, which drains to Sheardown Lake Tributary 1 (SDLT-1). The KM105 Pond will function

through the operation phase of the Project and for several years into active closure, until acceptable water quality is observed.

KP produced Issued for Construction (IFC) drawings of the KM105 Pond in 2021 (KP, 2021). The design of the KM105 Pond (Figure 2) consists of two embankments constructed along the south and northwest extents of the pond. The embankments were designed to be constructed using compacted 500 mm minus Rockfill with layers of compacted Transition Zones 2 (6 inch minus material) and Transition Zone 1 (32 mm minus material), and compacted liner bedding placed towards the upstream slope of the embankment. The geometry of the embankments and specifications of the KM105 Pond are summarized in Table 1.

Table 1 KM105 Pond Specifications

Parameter	Value
Embankment Upstream Slopes	3H:1V (Rockfill), 2.5H:1V (Other Materials)
Embankment Downstream Slopes	2H:1V (South Embankment), 3H:1V (Northwest Embankment)
Embankment Crest Width (m)	12
Embankment Crest Elevation (masl) (1)	222
Pond Base Elevation (masl)	209
Sediment Storage (Dead Storage) (m)	0.5 - 1.0
Volume (m^3) (2)	160,457
Dry Freeboard (m)	0.5
Spillway Inlet Elevation (masl)	220.5

Note(s):

1. masl - metres above sea level.
2. Pond volume is based on a 2022 survey provided by Baffinland.

Baffinland constructed the KM105 Pond embankments in late 2021 through early 2022. The 2022 open water season was its first year of operation.

3.0 KM105 SEDIMENTATION POND CLOSURE CONCEPT

The overall closure objectives for the KM105 Sedimentation Pond are to re-establish the natural drainage of the KM105 Pond area, and to ensure long-term physical stability by limiting future erosion within the drainage path.

Closure of the KM105 Sedimentation Pond will occur as part of mine closure, and once runoff from the catchment area consistently meets applicable discharge limits (Water Licence (NWB, 2015) and Schedule 4 of the Metal and Diamond Mines Effluent Regulations (MDMER, 2018)). The determination of “consistently meets” is recommended to be 4 weekly sampling events occurring during the month of July or August when runoff is representing worst case water quality conditions.

Runoff from the MHR that reports to KM105 Pond is highly turbid due to the fine-grained ore dust that covers the road surface. Water treatment is currently required before pond effluent can be discharged to the downstream drainage. Ore dust will no longer be generated upon the cessation of mining, and thus the

quality of the runoff reporting to the KM105 Pond should improve with time. A minimum of two years of water treatment should be assumed

The closure measures for the KM105 Pond are shown on Figure 2, and includes the following closure works (in chorological order):

- **Divert the Upper MHR Ditch into the Open Pit -** To reduce the amount of water reporting to the KM105 Pond basin and ultimately to SDLT-1 at closure, the upper portion of the MHR ditch will be diverted into the open pit where the edge of the pit approaches the MHR. The advantages of this action include both a faster pit flooding rate, and a reduction to the amount of runoff and sedimentation loadings to the KM105 Sedimentation Pond. Water quality is also likely to be improved, as the diverted catchment area represents an area, close to the mining activity (MHR and open pit), where fugitive dust has been the greatest. This measure may be implemented immediately upon mine closure.
- **Pond Operation Including Water Treatment for Two Years -** As noted above, water treatment will continue until effluent in the pond is suitable for discharge without treatment. We recommend planning for a minimum of two years of pond operation before further pond closure measures can be undertaken.
- **Drawdown the KM105 Pond -** Once water quality meets discharge criteria, the water level within the Pond will be drawn down to the greatest extent possible to allow for subsequent work to be completed in a dry environment.
- **Breach the Northwest Embankment -** Once the working conditions are dry, the Northwest Embankment will be breached, through excavation to an elevation of approximately 208 masl. The breach will involve the excavation of the embankment Rockfill, liner bedding, non-woven geotextile and geomembrane that were previously installed within the embankment. The excavated geosynthetics are to be disposed of at the Mine Site Landfill Facility and the remaining materials will be disposed of as per the ICRP (Baffinland, 2018). The excavation will maintain the existing slopes, stop at the Transition Zone 1 material (32 mm minus), and allow drainage towards the natural stream channel. A detail of the excavation limits is presented on Figure 2.
- **Install an Erosion Protection Liner -** Following excavation of the Northwest Embankment, the previously excavated rockfill, consisting of 500 mm minus material, will be placed in an approximate 1.2 m thick layer to use the entire volume of excavated rockfill from the Northwest Embankment and compacted over disturbed areas on the Transition Zone 1 material and native soils across the entire KM105 pond to provide erosion protection and cover the sediments. The rockfill will need to be place so that positive drainage is directed towards SDLT-1.

The final closure measures (pond drawdown, breaching of the Northwest Embankment, and installation of the erosion protection liner) should be completed in the fall, when runoff is minimal, and the ground has not yet frozen.

The South Embankment will not retain water once the NW Embankment has been breached, and thus it can remain in-place.

The excavation cut and fill volumes for the closure works are provided in Table 2.

4.0 CLOSING

We trust this meets Baffinland's current requirements. Please contact the undersigned with any questions.

Yours truly,
Knight Piésold Ltd.

Prepared:	Reviewed:
Greg Johnstone, EIT	Steven R. Aiken, P.Eng.
Geological Engineering	Manager, Environmental Services

Approval that this document adheres to the Knight Piésold Quality System: ☐

Attachments:

Table 2 Rev 0	Estimated Materials and Quantities
Figure 1 Rev 0	KM105 Sedimentation Pond - Closure Overview
Figure 2 Rev 0	KM105 Sedimentation Pond - Closure Plan

References:

Baffinland Iron Mines Corporation (Baffinland), 2018. *Interim Closure and Reclamation Plan*. October 30. Ref. No. BAF-PH1-830-P16-0012. Revised Draft, Rev 5.

Knight Piésold Ltd. (KP), 2021. Letter to: Allan Knowlton, Baffinland Iron Mines Corporation. Re: *KM105 Sedimentation Pond Design Brief and Issued for Construction Drawings*. June 28. North Bay, Ontario. Ref. No. NB21-00655 (NB102-181/71).

Metal and Diamond Mining Effluent Regulations (MDMER), 2018. *SOR/2002-22*.

Nunavut Water Board (NWB), 2015. *Type A Water Licence 2AM-MRY1325 - Amendment 1*. July 30.

/gj

Knight Piésold CONSULTING

TABLE 2

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

KM105 SEDIMENTATION POND CLOSURE CONCEPT
ESTIMATED MATERIALS AND QUANTITIES

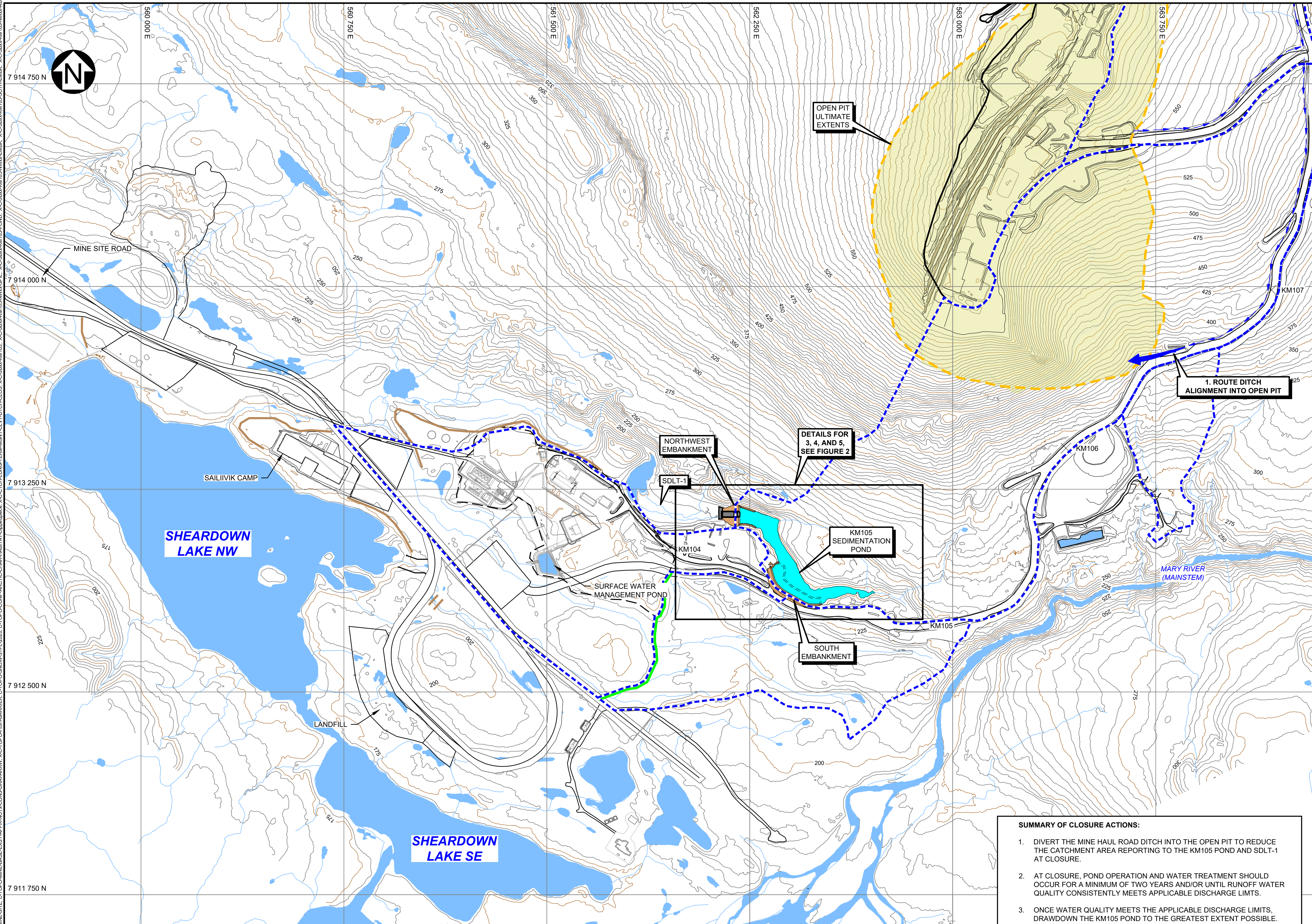
Print Dec-14-22 15:46:34

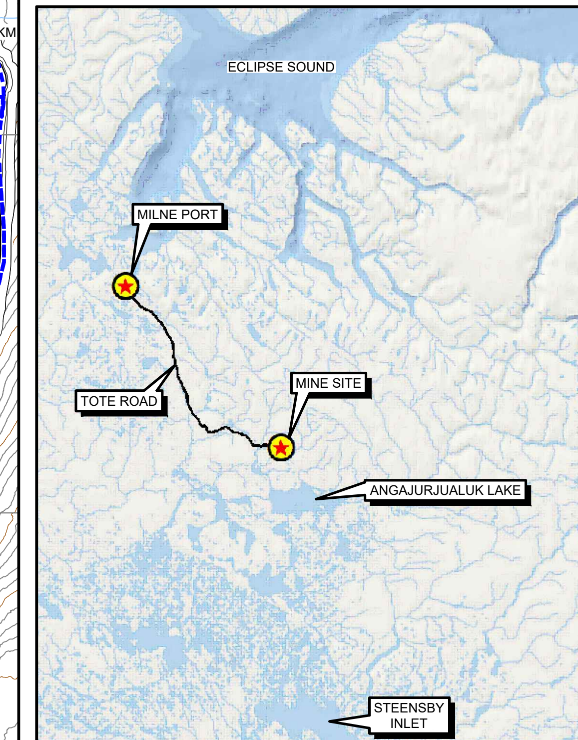
Item No.	Description	Unit	Estimated Quantity
1	**Mobilization and Demobilization**		
1.1	**General**		
1.1.1	Supply, Install, Maintain and Remove - Sediment Control - Best Management Practices (BMPs)	L.S	1
2	**Mine Haul Road (MHR) Work**		
2.1	**Construct Diversion Berm and Ditch**		
2.1.1	Excavate/Drill and Blast - MHR Diversion Berm and Ditch	m^2	60
2.1.2	Load, Haul and Place - MHR Diversion Berm and Ditch Transition Zone 2	m^3	300
3	**KM105 Sedimentation Pond Work**		
3.1	**Water Quality Testing**		
3.1.1	KM105 Pond Water Quality Testing - Annually	L.S	2
3.2	**Water Removal**		
3.2.1	Dewater KM105 Pond (Assume Pond is at the Maximum Water Elevation of 220.5 masl)	m^3	160,500
3.3	**Excavate, Haul and Place Granular Material**		
3.3.1	Excavate, Haul, Place and Compact - Rockfill Material from Northwest Embankment Across Bottom of Pond Surface (approximately 1.2 m depth)	m^3	44,000
3.3.2	Excavate, Haul and Place - Transition Zone 1 Material	m^3	6,400
3.3.3	Excavate, Haul and Place - Liner Bedding Material	m^3	8,100
3.3.4	Remove, Haul and Place - Gabion Basket Material including Baskets	ea.	970

I:\1\02\00181\76\A\Correspondence\NB22-01250 - Memo - KM105 Closure Plan\[KM105 Closure Plan M+Q.2022-12-14.xlsm]KM105 Closure

NOTES:
1. MATERIALS AND QUANTITIES ARE BASED ON NEAT LINE ESTIMATES, AS WELL AS THE TYPICAL SECTIONS AND DETAILS DEVELOPED FOR THE DESIGN. A 15% CONTINGENCY WAS APPLIED TO THE ROCKFILL VOLUME. NO OTHER CONTINGENCIES OR BULKING/COMPACTION FACTORS HAVE BEEN APPLIED.
2. THE ROCKFILL VOLUME WAS CALCULATED ASSUMING THE DAM WAS CONSTRUCTED ACCORDING TO THE DESIGN PROVIDED BY KP (KP, 2021)

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	14DEC'22	ISSUED WITH MEMO NB22-01250	GMJ	SBF





LEGEND:

- OPEN PIT ULTIMATE EXTENTS
- WATER
- SEDIMENTATION POND EMBANKMENT
- MAXIMUM POND (EXTREME PRECIPITATION CONDITIONS)
- WATER MANAGEMENT PLAN CATCHMENT (APPROXIMATE)
- ULTIMATE DEPOSIT NO. 1 PIT LIMITS
- ROCK BERM
- COLLECTION/DIVERSION BERM
- DIVERSION DITCH

NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. DETAILED WATER FROM EAGLE MAPPING (2005). CONTOUR PROVIDED BY BAFFINLAND (2019) INTERVAL IS 5 m.
3. CURRENT MINE AREA FROM THE WASTE DUMP TO THE CRUSHER PAD, AND DITCHES ALONG THE HAUL ROAD PROVIDED BY BIM (MARCH 12, 2018).
4. MINE HAUL ROAD AS-BUILT PROVIDED BY BAFFINLAND IRON MINES CORPORATION (MAY 2021).
5. ALL OTHER SITE INFRASTRUCTURE PROVIDED BY HATCH (AUGUST 2, 2016) AND SIMPLIFIED BY KP STAFF (JAN, 2018).

SUMMARY OF CLOSURE ACTIONS:

1. DIVERT THE MINE HAUL ROAD DITCH INTO THE OPEN PIT TO REDUCE THE CATCHMENT AREA REPORTING TO THE KM105 POND AND SDLT-1 AT CLOSURE.
2. AT CLOSURE, POND OPERATION AND WATER TREATMENT SHOULD OCCUR FOR A MINIMUM OF TWO YEARS AND/OR UNTIL RUNOFF WATER QUALITY CONSISTENTLY MEETS APPLICABLE DISCHARGE LIMITS.
3. ONCE WATER QUALITY MEETS THE APPLICABLE DISCHARGE LIMITS, DRAWDOWN THE KM105 POND TO THE GREATEST EXTENT POSSIBLE.
4. BREACH THE NORTHWEST EMBANKMENT DOWN TO THE TOP OF THE LOWER TRANSITION ZONE 1 MATERIAL SUCH THAT THE BOTTOM ELEVATION IS APPROXIMATELY 208 masl OR TO THE BOTTOM OF THE EMBANKMENT ROCKFILL. THE EXCAVATED GEOSYNTHETICS ARE TO BE DISPOSED OF AT THE LANDFILL FACILITY. THE EXCAVATION WILL MAINTAIN EXISTING SLOPES AND ALLOW DRAINAGE TOWARDS THE NATURAL STREAM CHANNEL.
5. PLACE PREVIOUSLY EXCAVATED ROCKFILL CONSISTING OF 500 mm MINUS MATERIAL IN AN APPROXIMATELY 1.2 m THICK LAYER AND COMPACTED OVER DISTURBED AREAS TO ACT AS EROSION PROTECTION.
6. GABION BASKETS TO BE EMPTIED AND DISPOSED IN THE LANDFILL FACILITY. ROCKFILL TO BE DISPOSED IN THE WASTE ROCK FACILITY.

NOT FOR CONSTRUCTION

SCALE A 150 75 0 250 500 750 m

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

KM105 SEDIMENTATION POND CLOSURE OVERVIEW

Knight Piésold CONSULTING

P/A NO.	REF NO.
NB102-181/76	NB22-01250

FIGURE 1 REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
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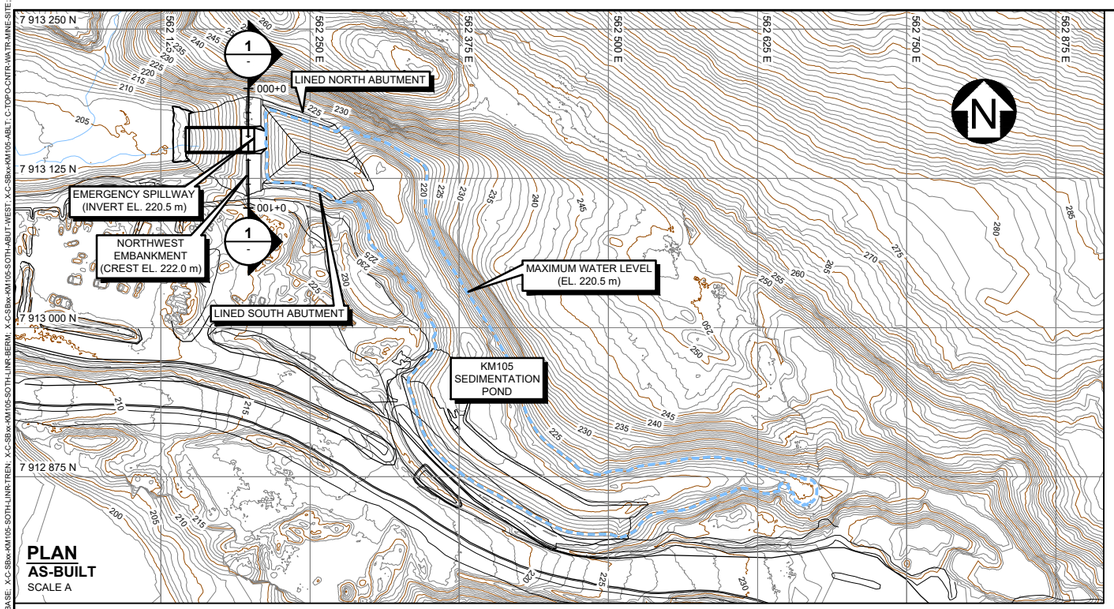
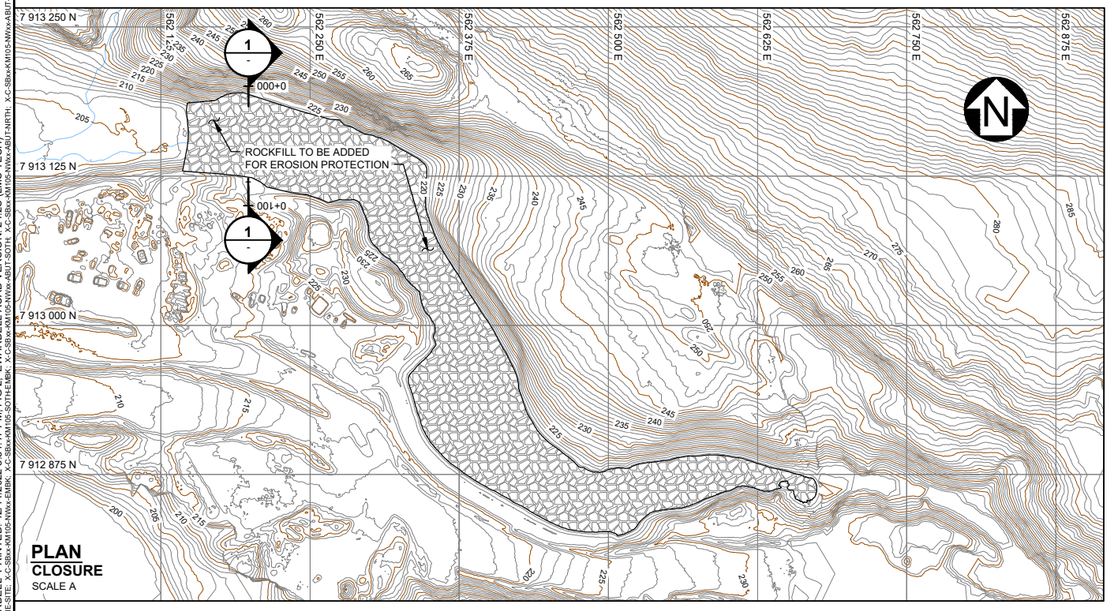
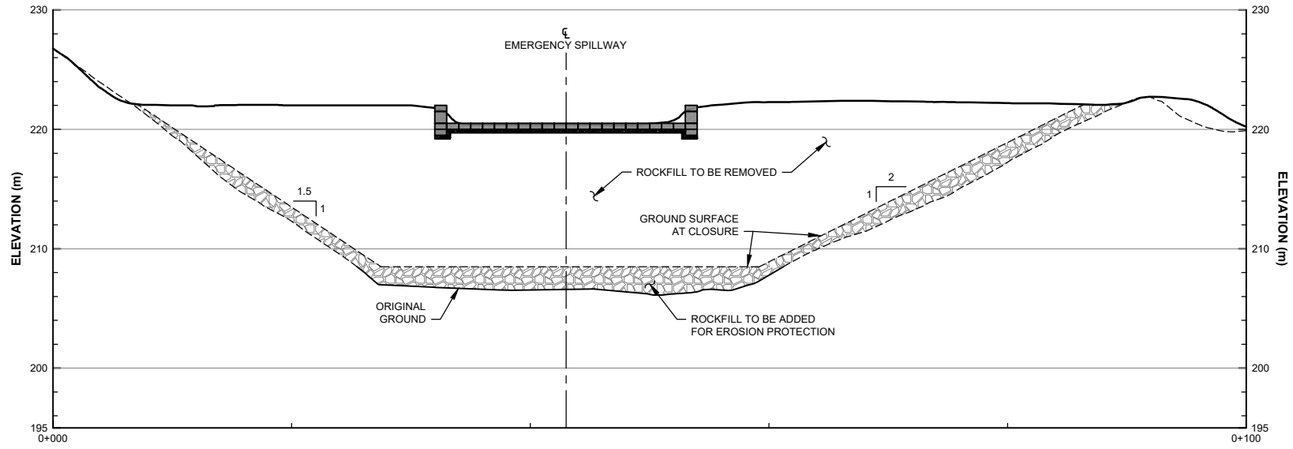


PLAN
AS-BUILT
SCALE A



PLAN
CLOSURE
SCALE A



1 - **SECTION**
NORTHWEST EMBANKMENT
SCALE B

SUMMARY OF CLOSURE ACTIONS:

1. DIVERT THE MINE HAUL ROAD DITCH INTO THE OPEN PIT TO REDUCE THE CATCHMENT AREA REPORTING TO THE KM105 POND AND SDLT-1 AT CLOSURE.
2. AT CLOSURE, POND OPERATION AND WATER TREATMENT SHOULD OCCUR FOR A MINIMUM OF TWO YEARS AND/OR UNTIL RUNOFF WATER QUALITY CONSISTENTLY MEETS APPLICABLE DISCHARGE LIMTS.
3. ONCE WATER QUALITY MEETS THE APPLICABLE DISCHARGE LIMITS, DRAWDOWN THE KM105 POND TO THE GREATEST EXTENT POSSIBLE.
4. BREACH THE NORTHWEST EMBANKMENT DOWN TO THE TOP OF THE LOWER TRANSITION ZONE 1 MATERIAL SUCH THAT THE BOTTOM ELEVATION IS APPROXIMATELY 208 masl OR TO THE BOTTOM OF THE EMBANKMENT ROCKFILL. THE EXCAVATED GEOSYNTHETICS ARE TO BE DISPOSED OF AT THE LANDFILL FACILITY. THE EXCAVATION WILL MAINTAIN EXISTING SLOPES AND ALLOW DRAINAGE TOWARDS THE NATURAL STREAM CHANNEL.
5. PLACE PREVIOUSLY EXCAVATED ROCKFILL CONSISTING OF 500 mm MINUS MATERIAL IN AN APPROXIMATE 1.2 m THICK LAYER AND COMPACTED OVER DISTURBED AREAS TO ACT AS EROSION PROTECTION.
6. GABION BASKETS TO BE EMPTIED AND DISPOSED IN THE LANDFILL FACILITY. ROCKFILL TO BE DISPOSED IN THE WASTE ROCK FACILITY.

LEGEND:

- ROCKFILL
- MATERIALS TO BE REMOVED
- ROCKFILLED GABION BASKET
- ESTIMATED POND EXTENTS
- MAJOR CONTOUR LINE (5 m INTERVAL)
- MINOR CONTOUR LINE (1 m INTERVAL)
- PREPARED SURFACE
- EXISTING GROUND SURFACE

NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 1 m.
3. DETAILED WATER FROM EAGLE MAPPING (2005). CONTOURS PROVIDED BY BAFFINLAND (2019-2022).
4. KM105 POND EMBANKMENT OUTLINES SHOWN REPRESENT THE DESIGN. CONTOURS ARE AS-BUILT SURVEY, PROVIDED BY BAFFINLAND IRON MINES CORPORATION (JUNE 2022).
5. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS OTHERWISE NOTED.

NOT FOR CONSTRUCTION

SCALE A: 50 25 0 50 100 150 200 250 m
SCALE B: 5 2.5 0 5 10 15 20 25 m

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	14DEC'22	ISSUED WITH MEMO	GMJ	AS	SBF

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

KM105 SEDIMENTATION POND
CLOSURE PLAN

Knight Piésold CONSULTING

P/A NO. NB102-181/76
REF NO. NB22-01250
FIGURE 2
REV 0