GENERAL INSTRUCTIONS FOR EXCEL TEMPLATE:

1. Do not leave blank rows above or between comments.
2. Do not modify or delete the instructions or the column headings (*i.e.* the grey areas).
3. Each comment must have an associated topic and recommendation.
4. All formatting (*i.e.* bullets) will be lost when this file is uploaded to the Online Comment Table.
5. If necessary, adjust the cell width and height in order to view all text.
6. Cutting and pasting comments from WORD documents cannot include hard returns (spaces between paragraphs).
7. If you would like to create paragraphs within a single cell, please use a proper carriage return (ALT & ENTER).

TOPIC *Be as specific as you think is appropriate; for example a section or page of the document, a recommendation #, general comment, etc.*	COMMENT *Comments should contain all the information needed for the proponent and the Board to understand the rationale for the accompanying recommendation.*	RECOMMENDATION *Recommendations can be for the proponent or for the Board. Recommendations should be as specific as possible, relating the issues raised in the "comment" column to an action that you believe is necessary.*
FCRP Schedule	The FCRP provides some conflicting information about the plans for development of a detailed schedule for closure implementation. Section 8 states "A refined schedule will be possible once final designs and decommissioning plans have been completed." This indicates that the schedule can't be defined until designs are complete. With respect to engineering design, the same section states "Design drawings and construction specifications for closure activities would be provided 45 days prior to implementation of the construction activity." Contrary to the previous statement, this appear to indicate that the completion of designs will be driven by the schedule. The two statements appear contradictory with respect to defining the schedule and completion of designs. One indicates that the schedule will be driven by completion of design, while the second indicates that the designs will be driven by the schedule. It is also notable that the cover letter states that 29 designs have been issued "for construction." If the designs are needed to support scheduling, these 29 designs should allow scheduling for most of the FCRP activities.	Provide additional clarity about the approach for scheduling of the activities in the FCRP. Where design information is available, update the FCRP schedule to provide additional detail about the sequence and timing of proposed closure activities.

Progressive Reclamation	Section 6.3 lists many potential progressive reclamation activities but does not provide a schedule or plan for conducting these activities.	Provide a plan and schedule for conducting progressive reclamation activities, and require reporting on achievement of the schedule, including rationales for failing to complete progressive reclamation activities on schedule.
Appendix V - Demonstrating Achievement of Closure Criteria	In Appendix V, Section 4 DDMI proposes 5 years as generally being a "reasonable amount of time to demonstrate closure success." Achievement of closure success and the achievement of closure criteria will depend on the type of activity, the expected outcome and the level of acceptable post-closure risk. Also, while it may be administratively possible to confirm achievement of closure criteria at a point in time, success in completing a CRP (i.e., closure success) is not something that can be measured and confirmed at a single point in time. Initial achievement of closure criteria should be considered the start of demonstrating that the CRP has been successful, a condition that will require continued confirmation throughout post-closure, and correction/mitigation where necessary. The reliance on 5 years to demonstrate achievement of closure criteria and as a duration for monitoring is repeated in Appendix VI, the Closure and Post-Closure Monitoring Plan, for example: Section 3.1.1.3 – "After 5 years of confirmed stability, the closure criteria will be met, and monitoring of the mine areas, and collection ponds will be ceased." Physical performance of collection pond breaches is primarily related to size of flow events. Monitoring needs to continue in the long-term, especially after extreme events; Section 3.1.4.3 – Seepage and Runoff: "Five years after decommissioning, and with adherence to closure criteria, monitoring may cease." ...continued in next cell	1. DDMI should revise the time frames identified for achievement of closure criteria to more accurately reflect the time to observe and confirm acceptable outcomes, and reduce uncertainty about ongoing, long-term performance of each closure facility and element. Monitoring durations for confirming achievement of closure criteria should be specific and relevant to the closure elements. 2. The FCRP should be revised to acknowledge that achievement of closure criteria as only one step – albeit an important one for administrative purposes – in the process of demonstrating and confirming closure success. 3. The post-closure monitoring and maintenance plan should be updated to provide a realistic description of the duration of expected post-closure monitoring for all facilities and closure elements. 4. DDMI should describe how it intends to address its responsibilities for long-term monitoring and maintenance of closure success, even after achievement of closure criteria, including how it will address costs and implementation.

Appendix V - Demonstrating Achievement of Closure Criteria (continued)	Section 3.6.2.3 – Collection Ponds: “Five years after decommissioning, and with continued adherence to closure criteria, monitoring may cease.” Water quality monitoring downstream of any waste storage facilities must continue in the long-term – development of ARD/metal leaching and migration of contaminants can be very slow processes. Discontinuation of monitoring after 5 years is unlikely to capture any potential effects; Section 3.4.3.3 – Seepage and Runoff from PKCF: “Five years after decommissioning, and with adherence to closure criteria, monitoring may cease.” The water balance and thermal conditions in the PKCF will take a long time to stabilize after closure – EFPK for example, will take a very long time to drain if the water balance is negative. Evolution of water balance and thermal conditions will affect seepage quantities and possibly qualities. Global climate warming will influence thermal conditions in the PK and the dams over the long-term, also potentially affecting seepage conditions. Monitoring needs to continue throughout this period of transition as the conditions in the PKCF stabilize ,which could take decades. In all cases, monitoring to evaluate initial closure success (i.e., achievement of closure criteria) needs to continue until closure elements demonstrate stable, predictable, acceptable performance over a period that is sufficient to substantially reduce uncertainty about continued long-term performance. ...continued in next cell	

Appendix V - Demonstrating Achievement of Closure Criteria (continued)	In most cases, the level of uncertainty about long term performance will be reduced by having monitoring over extended periods that demonstrates ongoing acceptable performance. Once the initial achievement of closure criteria has been confirmed, monitoring for closure success still needs to continue for closure facilities and elements where conditions and performance may change over time, or where the facilities/elements provide critical, permanent post-closure functions (e.g., containment dams, water conveyance structures). Section 1 of Appendix VI, the Closure and Post-Closure Monitoring Plan addresses monitoring after initial achievement of closure criteria and shows limited monitoring continuing for 20 years, for planning and costing purposes. There are many cases where monitoring will be required well beyond 20 years, and where periodic maintenance will also be needed, for example: The PKCF will be permanently contained by dams with spillways to manage surface water flows including floods. The dams and conveyance structures will require permanent monitoring and periodic maintenance to ensure their permanent performance; Successful closure of the NCRP relies on eliminating contaminant loading from the Type III waste rock by ensuring that water does not move through the Type III material. Maintaining the material in a frozen state and building a cover that is thicker than the active layer are important features of the closure design. ...continued in next cell	

Appendix V - Demonstrating Achievement of Closure Criteria (continued)	The uncertainty associated with global climate warming creates uncertainty about the long-term performance of the NCRP closure. Understanding performance will require long-term monitoring of the cover and thermal conditions in the waste rock; Potential migration of contaminants from mine components into water is a primary driver for the closure plan. The release of contaminants can be a slow process due to the time for oxidation reactions to happen, consumption of neutralizing materials, and contaminant transport. Water quality conditions could take many years to stabilize, and they could also change after many years of stable conditions as geochemical thresholds are reached. Water quality monitoring for all mine waste storage facilities will be required for at least several decades until conditions are stable and there is a good understanding of expected long-term water quality outcomes.	
Appendix V, closure criteria	DDMI should be asked to explicitly identify contingency measures associated with each closure criterion, with these measures to be deployed if monitoring indicates that the closure criterion has not been met. This has not been done, as far as EMAB can find, and its absence is a substantial shortcoming for an objectives-and-criteria framework.	Diavik should identify contingency measures for each closure criterion that will be deployed if monitoring shows the criterion is not being met.
Appendix V Section 4: Proposed Criteria	DDMI has proposed the addition of a temporal component to some criteria which indicate the amount of time that needs to be demonstrated before the closure performance can be deemed successful. For the most part this has been proposed to be five (5) years. DDMI acknowledges that they will need to submit a Closure Performance Report for WLWB approval. There is a lot of uncertainty pertaining to the climate change modeling and the potential impacts that climate change could have on the performance of the closure measures, especially for the North Country Rock Pile (NCRP). DDMI should provide consideration for the impacts of climate change to performance in the proposed temporal criteria.	Add a discussion on climate change and the potential impacts on the temporal criteria added to the FCRP.

Appendix V Table 1 - SW1 and SW2 W3-2, W4-1	The performance assessment period has been proposed to be 5 years. Five years will not be long enough to determine the potential impacts of climate change on the NCRP design and potential seepage. This impacts W3-2 and W4-1 closure criteria as well.	DDMI should update their climate change projections and account for the updated predictions in the proposed performance assessment period.
Appendix V Section 1: Introduction SW2 & I3	It is not clear why chemical closure criteria for soil and sediment have been reduced to petroleum hydrocarbons and no other parameter. Additional justification is required.	DDMI should provide rationale why metals are not included for closure criteria for soil and sediment.
Appendix V Table 1 - SW2	SW2 does not consider the potential loading of sediment or suspended solids to the Lac de Gras and the potential accumulation of metals in sediment in the catchment areas. As this could impact water quality and aquatic life, sediment monitoring and numerical sediment quality criteria should be added to the SW2 closure criteria.	DDMI should consider adding sediment quality criteria to SW2 and to the SWALF.
Appendix V of the FCRP Table 2 Surface runoff and seepage water quality criteria - SW1	Diavik removed Drinking Water Guidelines from closure criteria SW1 in the FCRP. While it is understood that the risk assessment (X-22) did not predict an exceedance of the criteria protective of potable water at ARC-1, this evaluation is based on modeled and not measured concentrations. Comparison with Drinking Water Guidelines should be added to the SWALF and closure criteria for SW1-1 .	Drinking Water Guidelines should be added back to the closure criteria for SW1-1, and monitoring of potable water quality at stream discharges should be added.
Closure Objective SW2 - AEMP Benchmarks	Meeting AEMP benchmarks at the mixing zone was part of the previous version of the CRP V4.1. It is not clear why DDMI has removed this as a closure criterion. DDMI has predicted water quality to meet the AEMP benchmark at Arc 1 (at least the 95th percentile to meet).	DDMI should add meeting the AEMP benchmarks to criteria SW2 and the SWALF as a criteria to be met at the mixing zone boundary.

Appendix V - Closure Objective SW2	Closure objective SW2 requires that water quality from the mine site will not cause adverse effects on aquatic life or water uses in Lac de Gras or the Coppermine River. The proposed closure criteria only address sublethal toxicity (SW2-1) and acute toxicity (SW2-2). Sublethal toxicity is to be evaluated using a single species of invertebrate (Ceriodaphnia dubia) using 12.5% strength of effluent – i.e., 8:1 dilution. DDMI's rationale for selecting 8:1 dilution is that it provides an indication of potential toxicity at a lower dilution ratio than the 10:1 dilution that DDMI expects to have at the mixing zone boundary. The selection of this dilution ratio for evaluation of achievement of the closure objective means that sublethal toxicity may occur in effluent streams and large parts of mixing zones, while still meeting the closure criteria and achieving the closure objective. Also, the decision to rely on a single species to evaluate sublethal toxicity means that potential sublethal effects on other species are not considered in the evaluating performance.	Closure criterion SW2-1 should be revised to consider a broader range of species. Typically testing would be completed on relevant sensitive fish, invertebrate and algae/aquatic plant species.
Appendix V - Closure Objective SW2	Previous versions of the closure criteria included thresholds for specific parameters of concern. These have now been removed and thresholds for specific parameters are contained in the SWALF. The proposed removal of thresholds for specific parameters from the Closure Criteria would allow DDMI to argue that it has achieved closure objectives and criteria even if AEMP benchmarks are being exceeded in Lac de Gras. This should not be considered a suitable closure outcome unless there is further discussion about the long-term implications. To avoid this situation, the closure criteria for SW2 should be revised to retain thresholds for specific parameters of concern. This could be achieved by including specific thresholds, or by requirements to achieve thresholds set out in the SWALF.	Revise the closure criteria for SW2 to include thresholds for specific parameters of concern in addition to the toxicity criteria. These could be specific thresholds for relevant parameters, or appropriate references to achieving thresholds set out in the SWALF.

Appendix V - Closure Objective SW2	At the Technical Session DDMI explained that for some parameters, the predicted background (i.e., non-mine related) water quality loading can lead to concentrations that are very close to the AEMP benchmarks in post-closure conditions. In the Response to Information Request #1 following the technical session, DDMI states that this arises from an "artifact of conservative modelling assumptions." This may be a reasonable conclusion given the approach for modelling and the assumptions about background water quality. However, the issue does raise some questions about the methods for evaluating achievement of the proposed closure criteria, specifically toxicity testing methods. The proposed testing may not provide an accurate characterization of the actual conditions, depending on the source of dilution water used for toxicity testing. Lab toxicity testing typically relies on dilution water that is low in contaminant concentrations. In this case, the lab dilution water may not be representative of the actual dilution water that will be present in Lac de Gras. Therefore, the toxicity testing at 8:1 dilution using lab water may have contaminant concentrations lower than what will be present at the actual mixing zone boundaries and therefore underpredict the toxicity conditions that are present in Lac de Gras.	DDMI should consider whether toxicity testing protocols for evaluating achievement of closure criterion SW2-1 should be revised to require use of Lac de Gras water as dilution water for lab testing.
Appendix VI - Monitoring, North Inlet SW1 & SW2	Appendix VI, Section 3.1.4.4 proposes that Five years of data will be used to determine achievement of SW1 and SW2 (i.e., water quality criteria) for the North Inlet and that these criteria "will be assessed based on a weight of evidence approach." It is not clear what evidence will be used to undertake a "weight of evidence approach" for these objectives. The criteria for these objectives are numerical and definitive in nature, so there does not appear to be need for additional information to interpret the outcomes.	The approach for evaluating achievement of SW1 and SW2 and the associated criteria for the North Inlet should be clarified. If the numerical and definitive closure criteria will not be used, additional or alternative criteria should be defined. If the criteria will be interpreted using a weight of evidence approach, DDMI should provide details about what information it intends to consider and how it will make decisions about achievement of criteria.
Appendix VI-1 Section 3.3.3.1 Overview of Closure Objectives, Criteria and Monitoring Activities (Waste Rock Storage and Till Areas) SW1 & SW2	Closure criteria should be based on meeting the closure objectives, which are no adverse effects to aquatic life and water quality that is safe for humans and wildlife and other water uses in Lac de Gras or the Coppermine River.	Modify the TPH criteria to be risk-based and designed to measure the closure objectives.

Appendix V - Closure Objective SW2	Closure criterion SW2-2 sets a threshold of "no acute toxicity observed." Acute toxicity is to be evaluated by toxicity testing of full-strength effluent using 96-hour tests for Rainbow Trout and 48-hour tests for Daphnia magna. In its response to comments on the recent water licence application, DDMI confirms that it intends to use the same testing threshold as the MDMER for defining acute toxicity – that no more than 50 percent of test organisms die during the test procedure. While this is a common threshold for defining acceptable acute toxicity for regulatory purposes, it does not mean that the effluent will not result in toxic effects even if it passes the toxicity criterion. Because the streams on East Island may often have flows that are almost entirely made up of site runoff, the proposed criterion means that some acute toxicity effects may occur throughout streams while meeting the proposed closure criteria. Ongoing acute toxicity even at levels that are lower than 50 percent lethality during the test procedure may have adverse effects on the aquatic environment.	The use of the MDMER acute toxicity threshold as a closure criterion should be reconsidered for any streams that may provide aquatic habitat. More restrictive acute toxicity thresholds should be identified so that the conditions are protective of aquatic values.
	Criterion SW3-1 continues to use a "pollute-to-guidelines" approach (i.e., setting the criterion at the Government of Northwest Territories residential/parkland threshold), which is not precautionarily protective during the post-closure phase. For post-closure, it would be more appropriate to use a criterion based on reference dustfall levels (e.g., dustfall in post-closure should show no significant difference between the 12 mine-site locations and the 2 background	Criteria for dustfall levels should be reference conditions for the area. Revise objective to "dust levels safe for people, vegetation, aquatic life, and wildlife, and do not contribute to a degraded air-quality environment in the post-closure phase"

Objective SW3/criterion SW3-1	["C1" and "C2"] locations). It seems that the proposed criterion, which EMAB is interpreting as 1.75 $\mu g \cdot dm^{-2} \cdot day^{-1}$, is ~4 times higher than the upper 95^{th} confidence interval of the geometric mean of dust deposition at reference sites from 2003 to 2021 (Appendix VI, Section 3.1.5). What is the justification for having a criterion that is substantially higher than ambient dust levels in the post-closure phase? Slater Environmental Consulting (SEC) commented on this same issue in its September 2017 review of CRP V4.0. In Appendix V1 Section 3.1.2, DDMI states, "Post-closure emissions of fugitive wind-blown dust from the NCRP waste rock storage area and from the PKC facility area are likely low to negligible due to the size/composition of the proposed cover materials (i.e., granitic gravels). The cover material is considered stable and will likely become dust-limited over time. (Watson et al. 2014). Any vegetation growth over time would likely further reduce the potential for wind erosion of the permanent landforms." However, DDMI has also chosen not to actively revegetate these facilities. ...continued in next cell	Diavik should revegetate the waste rock storage areas and PKC to lower dust emissions and achieve habitat objectives.
Objective SW3/criterion SW3-1 (continued)	There is a conflict between the criterion SW3-1 and these revegetation decisions, and EMAB suggests that DDMI adopt a reference-condition approach to the post-closure dust criterion (as discussed directly above), and reconsider revegetating the rock storage areas and PKC facility to actively lower fugitive dust emissions.	

Closure Criteria for SW3 - Dust levels safe for people, vegetation, aquatic life, and wildlife	In ICRP 3.2, Diavik proposed monitoring of Total Suspended Particulate (TSP) from the WRSA, PKC, Pits, Dikes, North Inlet and Infrastructure. In ICRP 4.0 Appendix VI-2 section 1.4 Diavik stated it would use the existing TSP monitoring system and procedures combined with visual observations to monitor dust from the mine. In its response to EMAB Comment 60 on ICRP 4.0, Diavik said it would consider adding PM2.5 to its monitoring. Diavik removed TSP monitoring from SW3 criteria in ICRP 4.1. EMAB does not agree that TSP monitoring be removed from ICRP 4.1.	As part of meeting site-wide Objective SW3, Diavik should develop a robust TSP monitoring program during closure.

Appendix VI-1 Section 3.1.4 Table 3-6 SW4	Closure Objective SW4 - dust levels do not affect palatability of vegetation to wildlife. The criteria for this is monitor evidence of post closure wildlife use of the area. It is not clear how this monitoring will effectively evaluate the closure objective. As stated the criterion implies that any evidence of post-closure use by wildlife would be sufficient to demonstrate successful achievement of the objective. Evidence that wildlife could use the post-closure landscape would be supported by comparing similarity of vegetation abundance/richness between near mine and reference sites. If wildlife foraging and habitat use information is collected systematically, then data could be compared between mine and reference sites to confirm similarity in "wildlife use of area". However, if this information is only incidentally documented, it will not provide quantitative data to support the objective.	DDMI should provide additional criteria for how the closure objective will be evaluated. Clearly define "evidence" to be used in the wildlife criteria and the methods to be used for surveying and analysis. Develop an objective that ensures that revegetation is successful in terms of wildlife use of revegetated sites. Measurements of post-closure deposition of fugitive dust collected under objective SW3 would allow setting of objective SW4 thresholds for the criterion, based on reference conditions (pre-mine levels or measurements from outside the fugitive-dust footprint). The expectation would be a return to levels equivalent to pre mining within a certain period from closure, with regular monitoring and reporting on observed trends. Add a vegetation closure criterion and link it to the vegetation monitoring program. Define a target using vegetation and vascular plant abundance and richness (i.e., abundance/richness is similar between reference and near mine sites). ...continued in next cell
Appendix VI-1 Section 3.1.4 Table 3-6 SW4 (continued)		Systematically document wildlife foraging and habitat use and compare between near mine and reference sites).
	The criterion "monitoring evidence of post-closure wildlife use of area" does not "describe the conditions when the objective has been achieved" (DDMI's definition of a criterion), given the associated objective "dust levels do not affect palatability of vegetation to	Include a criterion for SW4-1 to "continued confirmation that a ZOI is non-detectable for caribou".

Objective SW4/criterion SW4-1	objective "dust levels do not affect palatability of vegetation to wildlife." As written, the criterion is not a testable statement, and must be written as such. This issue was raised in EMAB's 2017 review of CRP V4.0. It would be preferable to include a Zone-of-Influence (ZOI) analysis as a criterion for this objective. Section 3.4.4.1 of the CRP states that the most recent ZOI analysis for caribou (2019) indicates that it "did not detect a ZOI." Continued confirmation of this finding of absence of a ZOI would be a much stronger criterion.	
Objective SW4/criterion SW4-1	Another indicator for this criterion could be concentrations of elements of interest in lichen tissues within the mine's zone of influence. Golder report: 1) an observation by Elders from the Tłı̨chǫ and Łutsel K'e communities that lichens adjacent to the mine (near-field sampling locations) are of poorer forage quality for caribou than those in far-field sampling locations, which they attribute to dust deposition; 2) an observation by Elders that caribou use of the near-field sites is absent or reduced compared to pre-development conditions; and 3) significantly higher element concentrations in near-field lichen samples as compared to far-field samples (for aluminum, antimony, bismuth, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, strontium, thallium, uranium, and vanadium). Sampling at three-year intervals should be continued, and the criterion should be a return to concentrations in the majority of the above listed elements for near-field samples that are not significantly higher than those in far-field samples, using the current sampling design.	Add criterion: concentrations of aluminum, antimony, bismuth, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, strontium, thallium, uranium, and vanadium in lichens in near-field sites are not significantly higher than in far-field sites, assessed on a three-year interval.
Closure Objective SW4 - Vegetation monitoring schedule during closure and post-closure	During operations DDMI has conducted vegetation and lichen monitoring every 2 to 3 years. During closure DDM proposes monitoring every 5 years unless a dustfall trigger has been exceeded, in which case monitoring will occur every 3 years. In 2021 the dust-level trigger was exceeded in nearfield monitoring. The next round of monitoring will take place in 2024, instead of the regularly scheduled, 2026. It is unclear how the dustfall exceedance in 2021 impacts the frequency and timing of monitoring during closure and post-closure.	Does monitoring in 2024 vs 2026 impact any of the dust and vegetation monitoring schedules during closure and post-closure?

Closure Objective SW5 - Re-vegetation targetted to priority areas.	In its RFD for ICRP 4.1, the WLWB directed Diavik to clarify the purpose/goal of revegetation activities and propose criteria that evaluate the success of revegetation post-closure, and applicable monitoring (WLWB Revision #21). The MVLWB closure planning guidance cited in FCRP Section 2.2 provides valuable input about establishment of objectives related to re-vegetation, stating that selection of reclamation objectives should consider characteristics of the surrounding landscape, ecological productivity, expected end land use, and community values, among other things. In FCRP section 5.2.9.3.5 Diavik states its primary goals for re-vegetation are to increase vegetation growth as compared with natural recovery processes, maximize vegetation cover in re-vegetated areas, and promote soil development and sustainable vegetation growth. Diavik's goals, and Closure Objective SW5, do not address the MVLWB guidance. The objective does not describe a desired closure outcome. Instead, it is solely process related – that re-vegetation effort should take place in areas that someone sets as priorities.	DDMI should revise objective SW5 to define an expected revegetation/land reclamation outcome. This would form the basis for appropriate refined criteria, closure measures, and contingencies. Based on this guidance, a revised closure objective and criteria for revegetation should require and assess establishment of vegetation cover and communities that are consistent with surrounding lands and which, in the long-term, will have ecological productivity similar to surrounding lands. This type of objective assumes that end land use for East Island would be similar to the land use that existing pre-mining, focused on the area providing an ongoing contribution to the local ecology, supporting traditional and subsistence land uses, and restoring/maintaining local users' trust about the safety of the land.
Closure Objective SW5 - Re-vegetation targetted to priority areas.	This process-based objective leads to similarly process-related criteria, for example “native seed applied at a minimum rate of 25 kg/ha.” Applying seed does not demonstrate a closure outcome – only the achievement of the seeding process. The proposed criteria for objective SW5 do not effectively assess the requirements for revegetation: - active revegetation that aims to cover a similar area as was destroyed during construction and operation of the mine - active revegetation that establishes cover and communities similar to those that were present before the mine was developed.	Diavik should revise the criteria for SW5 to establish vegetation that is similar in cover and communities to what was present before the mine was developed, and that meets industry standards for revegetation.

Closure Objective SW5 - Re-vegetation targetted to priority areas.	The implications of the stated objective also extend to DDMI's approach to closure contingencies. Section 5.2.9.9 of the FCRP identifies methods to address unsuccessful re-vegetation, but DDMI states that it "would prefer to not have to repeat the revegetation effort as a contingency if initial efforts prove unsuccessful." It would not be acceptable for Diavik to cease revegetation if its initial efforts are not successful.	Diavik should make best efforts to ensure the success of revegetation. Vegetation should be as close as possible to pre-development conditions, and percent vegetation cover should be the same as prior to the development of the mine ie. 70%, including the NWRSA, SWRSA and PKC. Revision of Objective SW5 and performance-based criteria for Objective SW9 will be critical factors in determining the success of revegetation. Provide a trigger that would indicate if or when additional action must be taken to ensure that revegetation efforts are meeting expectations for area covered, plant species richness and abundance.
Objective SW5/criterion SW5-1	The rationale for restricting active revegetation to infrastructure areas remains unclear and inconsistent with industry standards (see IEG Technical Memo included with EMAB comments).	Actively revegetate the mine footprint to the level of the pre-development landscape, with a minimum target of 70% of the total footprint actively revegetated. Diavik should use the surplus of 1.0 Mm^3 of till reported in the reclamation materials balance to support revegetated covers on the rock piles and PKC facility, or demonstrate why this is not possible or desireable. Diavik should also use the treated sewage as a soil amendment, including sewage that has been disposed in the landfill, or demonstrate why this is not possible or desireable. This is in keeping with TK Panel Recommendation 8.33, which Diavik said was In Progress.
	There appears to be no justification for what seems like an arbitrary criterion of establishing a minimum of 10 stems/m^2 in areas of active revegetation. Further, the monitoring supporting the evaluation of	Diavik should monitor revegetation success using a minimum sampling area of 100 square metres per 2 ha of revegetated area.

Objective SW5/criterion SW5-3	this criterion is inadequate. Appendix VI, Section 3.1.5.2 states that "revegetation monitoring plots of 1 m by 1 m will be established at a density of 1 plot per 10 ha in mine infrastructure areas that have been contoured and seeded." This planned monitoring intensity results in sampling 0.001% of the actively revegetated area. Standard reclamation monitoring practices involve substantially higher sampling intensities, e.g., sampling of 0.5 to 10% of the treated area. Appendix X-9 indicates that the area of active revegetation (scarification and seeding) is 311 ha (including the airstrip). This would result in the establishment of approximately 31 revegetation monitoring plots, representing 31 m^2 of monitored area. The associated criterion then indicates that identification of at least 310 total stems of germinating vegetation across this sampled area will be taken as demonstrating achievement of the revegetation objective. This represents an observation of not many plants over not much sampled area, and is thin evidence on which to base an assertion of successful revegetation.	Diavik should use a reference-condition approach for revegetation performance criteria using characteristics from adjacent, ecologically comparable undisturbed areas, as measured through ground-based sampling and/or remote-sensing approaches.
Closure Objective SW5 - Insufficient Criteria	The currently proposed monitoring criteria for this objective during closure include metrics of amount of seed applied per hectare, and the number of stems per m2. However, no sampling of plant community structure is scheduled during closure. Monitoring Community structure is only scheduled to occur once during post-closure.	We recommend monitoring criteria during closure also include measurements of community diversity to understand if reclaimed areas are on a trajectory towards resembling pre-mining plant communities prior to post-closure monitoring.
Closure Criterion SW6-1	The criterion does not provide any information about the intent of the design so it is not clear what a final inspection is supposed to evaluate.	The criterion should be refined to provide clarity about what should be measured by an inspection.
Closure Criterion SW6-2	Major channel-altering flow events are infrequent. As such, monitoring for a period of five years will not be sufficient to evaluate channel performance for events larger than those which occur within that five-year period. The criterion should define the expectation for channel performance in extreme events.	The criterion should define the expectation for channel performance in extreme events and monitoring should be revised to include monitoring after extreme events regardless of whether they occur in the first five years post closure.

Closure Objective SW8	SW8 site-wide closure objective and associated closure criteria as described currently do not have effective indicators that are measurable, do not have identified thresholds, and do not appear to support a timely response. DDMI has not clearly defined "regular or systemic" in the wildlife criterion, making it unclear what would represent mitigation failure for residual features at the mine site.	Define "regular or systemic predation" quantitatively. A measurable indicator and an associated measure of 'success' are needed. (i.e., 3 predation events/year/feature? 8 predation events/year/feature? Will the number of prey and predator observed be incorporated into the measure?).
Closure Objective SW8 - Reliance on incidental surveys to record caribou predation events	During closure, DDMI proposes to record caribou predation events, their location, and whether these events are associated with a residual site wide feature that could prevent escape from predation. However, they propose to do this using incidental observation, no systematic surveys of reclaimed areas are currently proposed. Furthermore, monitoring staff will be on site irregularly. The number of observations collected is dependent on the concurrent presence of observers, caribou and wolves at the mine site. That is, a lack of predation may be due to a lack of caribou, a lack of wolves, or a lack of overlap in caribou, wolves, and monitors, at residual features, rather than the feature itself having no impact. Would periodic visits to permanent transects placed in reclaimed habitats, rather than incidental observation, reveal more predation events that could inform the closure objective? The ability to collect appropriate data to support this objective may influence the frequency and duration of the monitoring if predation events are not captured during monitoring efforts.	How confident is DDMI that incidental observation will provide sufficient data to confirm mitigation effectiveness, or lack of predation? Given the potential for irregular occurrences of staff on site, we recommend utilizing systematic approaches to examine reclaimed sites for evidence of predation when possible.
Closure Objective SW8 - Triggers to discontinue monitoring	The WMMP (Appendix V1-3, pg. 6-22) indicates that monitoring will be discontinued once closure objective SW8 has been achieved. We presume this means there is no evidence of regular or systemic predation. It is unclear how many years of zero predation would be required to confirm predation rates are not higher in reclaimed areas?	Please specify, with quantitative metrics, how it will be determined if/when closure objective SW8 has been achieved.
Closure Objective SW8 - use of TK	In addition to monitoring, review of design, and as-built conditions, required by TK holders and biologists for predation opportunities, compared to pre-development conditions.	TK Holders and biologists to review design and as-built conditions related to potential for caribou predation.

Closure Objectives and Criteria SW9 also W2	Closure objective SW9 is stated as “Landscape features (topography and vegetation) that match aesthetics and natural conditions of the surrounding natural area.” The list of closure activities intended to achieve the objective are provided in Table 5-6 but do not include any activities related to topography. As a result, it appears that the FCRP has not taken any measures to achieve outcomes related to topography. TK Panel Recommendation 3.1 says "Simulate an esker when considering the final shape of the rock pile." Diavik says this is complete (Appendix IX-2, p 9, 3rd row) but does not explain how. The Panel's context for Recommendation 3.2 refers to considering the esker 8 km north of Diavik as an example for shaping the pile. Recommendation 10.3 - "If the SCRP is large, designated pathways become more important and must follow caribou routes known through TK."" Diavik shows this recommendation as Complete (Appendix IX-2, p 74, 2nd row). Recommendation 10.8 - Diavik must plan for the same values, principles and goals held by the TK Panel for the NCRP, to the SCRP (e.g. maintain low height, 3:1 slope for caribou)." Diavik shows this recommendation as In Progress (Appendix IX-2, p 75, 5th row). Diavik says it is not planning to re-slope because there is no need for a cover on the SCRP. ...continued in next cell	The FCRP needs to provide descriptions of the measures that have been or will be taken to achieve topography that matches the aesthetics and natural conditions of the surrounding natural area, taking into account the TK Panel recommendations.
Closure Objectives and Criteria SW9 also W2 (continued)	EMAB does not accept that the lack of a need for a cover on the SCRP prevents re-sloping the SCRP. Whether or not there is a cover, closure criteria SW9 still applies.	
Closure Objectives and Criteria SW9	Diavik's approach to criteria for this objective seems to be that if the design is approved then conformance with design meets these criteria. EMAB's stated view is that there are no measurable criteria associated with this objective. WLWB Revision #21 from the RFD for ICRP 4.1 states: With its proposed design for site re-vegetation, clarify the purpose/goal of re-vegetation closure activities and propose a closure criterion which evaluates the success of re-vegetation post-closure (e.g., additional SW9 criterion) and applicable monitoring. Diavik has not changed the criteria from ICRP 4.1.	Diavik should fulfill the requirements of WLWB Revision #21 from ICRP 41. RFD.

Objective SW9	The relatively small area Diavik is proposing for revegetation is inconsistent with Objective SW9: Landscape features (topography and vegetation) that match aesthetics and natural conditions of the surrounding natural area. Large blocks that are barren of vegetation (e.g., NCRP, SCRP, PKCF) are not consistent with vegetation characteristics in the surrounding area, or with the vegetation cover in the minesite footprint prior to development of the mine. SW9s associated criteria indicate the need for inspections by engineers, and the need to meet the vegetation criterion described above, i.e., establishment of at least 310 plants on the mine site. As discussed above, the revegetation criterion is inadequate, and would not be indicative of closure actions that have achieved the objective of matching the conditions of the surrounding natural area. We note CRP V4.0 contained a criterion for evaluation of change in biodiversity across the Regional Study Area. EMAB's review noted that the criterion as stated was mathematically problematic, and asked for either a justification of or amendment to the proposed value. Diavik has deleted this criterion. This is not a positive advancement of the FCRP closure criteria. EMAB recommends the biodiversity criterion be maintained with an amended appropriate threshold.	See recommendation for SW5-1. Diavik should develop a meaningful, quantitative biodiversity-related criterion to evaluate achievement of SW9.

Closure Objective SW10 - Monitoring data	The proposed criterion is “SW10-1 – No residual feature of the Mine confirmed as being a hazard based on more than one incident of identified harm year over year”. The number of observations collected will be dependent on the presence of caribou and other wildlife at the mine site. If no, or few observations are collected per residual feature, the frequency and duration of the monitoring may need to increase to confirm the safety of the landscape for wildlife passage is meeting the objective criteria. Monitoring for SW10 is basically proposed to be the same as described for SW8, although incidental observations of injury events will likely be exceedingly rare, or at least rarer than observing active or historic predation events. It is unlikely that analysis of data from incidental surveys will be able to differentiate between increased predation rates or injury rates in reclaimed areas.	Please define 'identified harm'?
Closure Objective SW10 - Safe passage and use for caribou and other wildlife.	The objective identifies caribou and other wildlife, but the description of the monitoring approaches and the timing of the surveys are primarily geared toward caribou observations. The number of observations collected is dependent on the presence of caribou and other wildlife at the mine site. If no or few observations are collected per residual feature, the frequency and duration of the monitoring may need to increase to confirm the safety of the landscape.	DDMI’s proposed criterion should be linked to an explicit identification of potential hazards to passage and use for caribou and other wildlife, and a detailed plan for assessment and monitoring of these hazards. 2. The criteria and their attendant indicators should be explicitly linked to adaptive-management responses. The proposed criteria do not indicate what mitigation will be applied in the event of such an assessment. The design of a monitoring program associated with this objective will require a well conceived experimental/ monitoring methodology and statistical rigor. Indicate what “other wildlife” will be monitored. If “other wildlife” includes carnivores, are the survey methods proposed appropriate in terms of observer safety? Is the survey timing appropriate for these “other wildlife” species as the timing is set to correspond with caribou presence? Consider how many observations of wildlife encounters with residual features with no injury are required to determine that they do not pose a hazard.

Objective SW10 also P1	SW10 requires safe passage and use for wildlife. Criteria proposed for this objective focus on wildlife movement, but do not address consumption of vegetation. In EMAB's view safety of vegetation for consumption by wildlife is required, likely as part of Closure Objective SW10 (or possibly SW4). The HHERA has addressed risk of vegetation contamination based on predicted concentrations, but there is no certainty that the predictive models are accurate. In addition there is some concern about the approach to contribution of risks above background (see comments on HHERA). In our review of ICRP 4.1 EMAB noted the recommendations from our 2017 Closure Workshop Report with respect to safety of revegetation for wildlife - Vision of vegetation that provides healthy food and habitat (p. 12) The TK Panel also made recommendations on this topic: Recommendation 7.4 - Test natural vegetation and plants from re-vegetation plots for toxicity to wildlife. Need to be sure vegetation on mine site is safe to eat. Diavik says this recommendation is In Progress (Appendix IX-2, p. 13, row 4). Note that EMAB did not discuss whether revegetation should occur where fuel was stored during our engagement with Diavik on March 26-27, 2019.	Vegetation should provide healthy food and habitat. Referencing the closure workshop results and TK Panel Recommendation 7.4, supported by community input, Diavik must assure vegetation, including revegetation, is safe for wildlife to eat everywhere on the site. Diavik should provide updates on the testing it is doing to address TK Panel Recommendation 7.4. Diavik should establish criteria to address the risk of vegetation contamination for wildlife consumption. DIavik should derive risk based closure criteria for wildlife consumption of vegetation growing in impacted areas. Vegetation, including revegetation must be monitored by vegetation sampling to ensure criteria are being met. A response framework is also required to address results that do not meet criteria. See also section on wildlife safety and vegetation contamination
Closure Objective SW10 - use of TK	In addition to monitoring, review of design, and as-built conditions, required by TK holders and biologists for predation opportunities, compared to pre-development conditions.	TK Holders and biologists to review design and as-built conditions related to potential for caribou predation.

Appendix VI-1, FCRP v 1.0 Section 3.2.3.1 Overview of Closure Objectives, Criteria, and Monitoring Activities, Table 3-11, p. 34 and Section 3.2.3.4 Comparison to Closure Criteria, p. 37 M1	The closure criteria for Closure Objective M1 (Water quality in the flooded pit and dike area that is similar to Lac de Gras or at a minimum protective of aquatic life) M1-1 - states that the AEMP Benchmark is to be met within the top 40 m of water column of pit lakes (p. 34). It is later stated that "Some fish habitat enhancements have been constructed within the shallow areas of the flooded pits. It is expected fish use will occur and will be restricted to the upper layer of the pit above the chemocline, which is referred to as the mixolimnion. Fish are not expected to use the deeper water within and beneath the chemocline. Therefore, only water quality results for the mixolimnion will be required to meet closure criteria; however, data from all sample depths will be reviewed to monitor and assess water quality throughout the water column and provide additional information if needed to address any issues during post-closure." p. 37 The chemocline for the A418 Pit Lake is predicted to be much deeper than 40 m (modeling indicates a permanent chemocline will exist at a depth of 235 m). The other pit lakes are expected to fully mix on an annual basis. It is unclear why M1-1 is applied only to the upper 40 m of the pit lakes when biota may use depths greater than 40 m. ...continued in next cell	Clarify if and how it will be determined if Diavik's expectation that fish use of the pit lakes will be restricted to the upper 40 m of the water column. If no actions are taken pre-emptively to confirm this expectation, recommend that a study be conducted to assess presence and use of water depth greater than 40 m by fish if monitoring demonstrates that AEMP benchmarks are not met below the 40 m depth.
Appendix VI-1, FCRP v 1.0 , Section 3.2.3.1 Overview of Closure Objectives, Criteria, and Monitoring Activities, Table 3-11, p. 34 and Section 3.2.3.4 Comparison to Closure Criteria, p. 37 M1 (continued)	It is noted that the Water Licence indicates: "17. The Licensee shall ensure that water in at least the top 40 meters of any Pit Lakes containing Processed Kimberlite meets the following objectives at closure: a) the AEMP Effects Benchmarks..." Diavik acknowledges that fish use is "expected" to be restricted to the upper layer of the pit above the chemocline. This statement inherently acknowledges that fish use below 40 m is therefore possible yet no commitment to evaluating fish use at these depths is provided.	

Appendix VI-1 Section 3.2.3.1 Overview of Closure Objectives, Criteria and Monitoring Activities (open pit, underground and dike areas) SW2 & M1	It is not clear why the criteria for SW2 is different than the criteria for M1. At the end of the mixing zone, the AEMP should apply.	DDMI should add meeting the AEMP benchmarks to the SWALF as a criteria to be met at the mixing zone boundary.
Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.2.3, Water Quality, Section 3.2.3.4 Comparison to Closure Criteria, p. 36 M1 & M2	Appendix VI-1 indicates a risk assessment may be completed and results may be used to revise AEMP benchmarks in relation to Closure Objectives M1 and M2: "In cases where constituent concentrations exceed AEMP Effects Benchmarks, a detailed risk assessment may be completed and results may be used to revise AEMP benchmarks.". There is inadequate detail provided regarding actions that would be taken in the event AEMP benchmarks are exceeded.	Provide a detailed description of actions that would be taken in the event AEMP benchmarks are exceeded in pit lakes.
Closure Objectives and Criteria W3-2	There are two criteria for W3-2 but they are separated by "OR" so that only one needs to be met to achieve the objective. EMAB's view is that both should be met	Change "OR" to "AND" in criteria W3-2 to both the thermal monitoring and surface water criteria.
Appendix V Table 1 Objective W3-3	The W3-3 criteria is no hydrocarbon impacts in surface water downstream of the contaminated materials facility (Pond 1). The criteria is set to TPH <3.0 mg/L. 3.0 mg/L of TPH in surface water would result in a sheen on the surface and is indicative of free product. The closure criteria should be based on the protection of aquatic life.	Modify the TPH closure criteria for W3-3.
Closure Objectives and Criteria W4-1	There are two criteria for W4-1 but they are separated by "OR" so that only one needs to be met to achieve the objective. EMAB's view is that both should be met	Change "OR" to "AND" in criteria W4-1 to both the thermal monitoring and surface water criteria.

Closure Objectives and Criteria P3-1	DDMI's cover letter for the FCRP describes a proposed change to closure criterion P3-1 for the PKCF. Closure Objective P3 states: "*Prevent processed kimberlite from entering the surrounding terrestrial and aquatic environments"* with a criterion that required there be "*no visible fine processed kimberlite either inside or outside the PKC facility* ." In the FCRP, DDMI proposes that "*The overarching and approved Objective is to prevent processed kimberlite from entering the surrounding terrestrial and aquatic environments and success is more appropriately measured by confirming PK is not leaving the PKCF* ." Based on this assertion, DDMI proposes that the existing criterion be revised to remove reference to exposed PK inside the PKCF, instead referring only to exposure outside the PKCF. This proposal clearly does not achieve the intended outcome for the closure plan, that there should be no PK exposed at surface where animals, plants or people may be in direct contact or where the material could be moved by wind or water. A successful closure plan will result in conditions where no PK is exposed at surface whether in the PKCF or outside it. The need to avoid exposure of PK inside the PKCF in an important consideration for design and long-term performance of the cover for the PKCF.	DDMI's proposed change to closure criterion P3-1 should not be accepted. Instead, a closure criterion that requires no exposure of PK either inside or outside of the PKCF should be retained.
Appendix V Table 1 - Sediment: NI2 & NI3	The North Inlet Area Closure Objectives indicate Closure Objectives related to sediment quality (NI2) and fish habitat (NI3). It is not clear how the proposed closure criteria of the AEMP benchmarks for aquatic life and a sediment F3 number of 1,500 mg/kg measures whether these objectives are met? It is unclear why sediment benchmarks are not proposed in this version and how surface water quality and PHC F3 concentrations in sediment influence fish habitat.	DDMI should consider the use of sediment quality guidelines to evaluate NI2 and will need to revisit the closure criteria for measuring NI3.
Appendix V - Closure Objective NI2, North Inlet Sediment NI2	DDMI has proposed that the closure criteria for sediment quality in the North Inlet be revised to remove all numerical criteria except one for F3 hydrocarbons. Previous versions have included numerical criteria for metals and a variety of hydrocarbons.	Retain numerical closure criteria for metals and other hydrocarbons in North Inlet sediments for closure objective NI2, or provide rationale for why other contaminants do not need to be included.

Appendix VI-1, FCRP v 1.0, Section 3.5.2.1 Overview of Closure Objectives, Criteria and Monitoring Activities, Table 3-24, p. 62 NI4-1	Closure criterion N14-1 for closure objective N14 (water quality in the North Inlet that is as similar to Lac de Gras as possible) refers to water quality trending toward reference conditions. There are no details provided regarding how trending will be assessed.	Provide a description of how trending towards reference conditions in the North Inlet will be assessed.
Closure Criteria	DDMI argues that Design Criteria, as DDMI defines them, have no role as closure criteria because they cannot be meaningfully measured following construction. Nonetheless, DDMI continues to include conformance with designs as closure criteria in some cases.	Conformance with designs can only be effective as a closure criterion if it is accompanied by clear characterization of what the design is intended to achieve, and mechanisms to measure achievement. DDMI has refined many of the conformance-with-design types of criteria to include more clarity about the expected performance of the design, but others may require further work.
Appendix VI-1 Section 3.5.2.4 Comparison to Closure Criteria (North Inlet)	the second paragraph refers to the AEMP Effects Benchmarks (FCRP Appendix V) as compliance criteria. The AEMP Effects Benchmarks do not seem to be present in Appendix V of the FCRP. References to the AEMP in Appendix V are present in other areas of the document (i.e., Section 3.6.2.4).	DDMI should correct the references to the AEMP Criteria throughout Appendix V.
Appendix VI-2 Section 2.2.3.2 Predicted in-lake Concentrations over the Post-Closure Period, pg 17, second bullet	A number of parameters are indicated to increase for about 6 - 10 years into post-closure. These parameters include but are not limited to aluminum, cadmium, lead, selenium and uranium. The text indicates that although the mine does contribute the two main sources are natural tributaries and Lac du Sauvage. The potential for cumulative effects of impacts from other sources, such as Ekati mine, needs to be considered in the protection of water quality in Lac de Gras. It is not clear that cumulative effects have been adequately considered in the setting of the closure criteria.	DDMI should indicate how the closure criteria have considered cumulative effects and contributions from other sources in the area.
Vegetation/Site Restoration	The primary objective for a closure plan is to return the land to conditions similar to that which was present before mining. The Diavik mine site has disturbed extensive areas of productive land and replaced this with hundreds of hectares of sterile broken rock surfaces. A small component of this area will be vegetated at a total costs of less than $1 million or about 0.4% of the closure costs. No effort has been included to restore the extensive areas of exposed waste rock on surface.	The board should require Diavik to include plans to restore all rock covered areas unless requested not to do so by the land owners. Diavik has shown the costs for vegetation are minor. Vegetation of another 1000 ha of land would not be a financial burden and would only add about 1% to the closure cost.

Revegetation - General	Key Issues with respect to revegetation: i) Revegetation plan as presented does not meet Objective SW9 (see comments on Objective SW9 and criteria). ii) Objective SW5 does not describe revegetation performance and should be revised (see comments on Objective SW5) iii) Extent of revegetation, including revegetation on NWRSA, SWRSA and PKC iv) Safety of vegetation for wildlife, including any revegetation v) Approach to revegetation – need to demonstrate success; use of U. of Alberta study results and recommendations EMAB's comments on revegetation rely on EMAB review and decisions, expert review, TK Panel recommendations and recommendations from EMAB's 2017 Closure Workshop (report submitted to the WLWB with ICRP 4.1 review). EMAB's view is that Diavik should target revegetating East Island to the same proportions as prior to development of the mine i.e. 65-70% of the island was vegetated. EMAB ratified this recommendation at its March 26-27, 2019 meeting.	See recommendation for closure criterion SW5-1
Revegetation Extent - EMAB Closure Workshop	Recommendations from the EMAB Closure Workshop Report, with respect to revegetation extent: - Vision: vegetation as close as possible to pre-development conditions (p. 12). - 3b) Active re-vegetation efforts using seeds from wild local plants should take place, including on the North Country Rock Pile. - 3c)The PKC facility should be at least partially revegetated, perhaps around the edges, so that it would become closer to pre-development conditions. EMAB has submitted the Closure Workshop Report to WLWB as part of a previous review. The workshop included participants from all Affected Communities, and the recommendations were ratified by all participants.	

Revegetation Extent -- TK Panel Recommendations	In Revision #14 of its RFD for ICRP 4.1, the WLWB directed Diavik to describe how each TK Panel Recommendation was incorporated into the submission, and provide justification for any recommendation not adopted. The WLWB also required Revision #22: With its proposed design for site re-vegetation, DDMI is to describe how the TK Panel Recommendations informed the design, and how/whether follow-up to Recommendation 7.15 has occurred. EMAB has reviewed the TK Panel Reports and Recommendations related to revegetation and Diavik's responses in Appendix IX-2 and concludes that Diavik has not fulfilled the WLWB direction in Revision #14 (see comments on Appendix IX above) or Revision #22 describing how the TK Panel Recommendations informed the revegetation design. We note the following specific recommendations: TK Panel Recommendation 7.15 Diavik has again presented a map developed by the TK Panel in August 2014 as the main basis for identifying areas to revegetate (Figure 5-5), with Figure 5-27 showing the area they propose to revegetate. The proposed area includes about one-fifth of the footprint. Diavik does not want to do any revegetation on the NWRSA, SWRSA or PKC. It will be impossible to achieve 70% vegetation cover using only Diavik's proposed revegetation areas. …continued in next cell.	Diavik has not fulfilled WLWB Revision #14 or Revision #22 from ICRP 4.1, and should be required to do so. It may be helpful for the WLWB to give Diavik more specific direction on this.

Revegetation Extent -- TK Panel Recommendations (continued)	TK Panel Recommendation 7.15 states "The re-vegetation maps developed in this session are not yet complete and more time needs to be spent discussing and finalizing these." These are the maps that Figure 5-27 is based on. In Appendix IX-2, p 9, top row Diavik lists this recommendation as Complete. EMAB confirmed with Diavik at the March 2023 FCRP workshop that Diavik has never held a follow-up session with the TK Panel on these maps. In EMAB's view, Diavik has not addressed this recommendation. The TK Panel has made a number of other recommendations related to revegetation that Diavik has not adequately addressed: 2.6 - "Some revegetation should be planned for the rock pile. Consider use of good, black soil from the tundra or other eskers in the area. Plant native shrubs such as dwarf birch and willow in the soil near the bottom and allow the remainder to revegetate naturally." Diavik says this recommendation was not accepted (Appendix IX-2, p 18, 5th row) because the current closure plan does not account for revegetation on the rock pile. EMAB notes that the Context column for this recommendation says Caribou will go on top of the piles in summer; consider having vegetation there for them to eat. continued in next cell...	

Revegetation Extent -- TK Panel Recommendations (continued)	3.2 - "Safe wildlife access needs to be considered for all seasons when designing the final shape of the rock pile. There needs to be soft material in areas where caribou will be; consider the use of PK material for animal paths." This recommendation is about caribou accessing the NWRSA and includes a context comment that "Caribou will go on top of the piles in summer; consider having vegetation there for them to eat." Diavik says this recommendation is complete (Appendix IX-2, p 9, 5th row). 5.2 - "Cap the rock pile with the best materials for biodiversity based on TK and science, using nearby hills as a reference." Diavik says this recommendation is complete (Appendix IX-2, p 22, 2nd row). It says it plans to use mine rock and till for capping the pile. EMAB disagrees that this recommendation has been addressed in a meaningful way eg. the UofA revegetation study, discussed further below, makes a number of recommendations on creating the best conditions for revegetation, including addition of organic soil amendments. 6.1 - "Cover PKC area with a combination of natural sand and soil to ensure that the PKC is not over-heating the area (and melting permafrost) and to support natural re-vegetation." Diavik says this is completed (Appendix IX-2, p 10, top row) and that WLWB approved the rock cover, limiting opportunities for revegetation. Since Diavik has not addressed revegetation on the PKC cover, EMAB disagrees this is complete. continued in next cell...	

Revegetation Extent -- TK Panel Recommendations (continued)	6.4 - "Create wildlife habitat and stabilize ground with transplanted willow" (in the PKC). Diavik says this recommendation was not accepted (Appendix IX-2, p 18, 6th row) because they don't plan to revegetate the PKC. EMAB notes that the Context column for this recommendation says the Panel came to realize that caribou and other wildlife will attempt to access the area after closure, and shifted to recreating habitat similar to what was present before the mine was constructed. 6.5 - "Create marshy areas with moss, lichen and berries" (in the PKC). Diavik says this recommendation was not accepted (Appendix IX-2, p 18, 7th row) but the justification appears to refer to the wet cover option. EMAB notes that the Context column for this recommendation says this vegetation would provide a food source and safe travelways for animals, and resemble what the area looked like before the mine. 7.4 - "Test natural vegetation and plants from re-vegetation plots for toxicity to wildlife. Need to be sure vegetation on mine site is safe to eat." Diavik shows this recommendation as In Progress (Appendix IX-2, p. 13, 4th row; p 23, 4th row). Results of this testing were an important consideration for TK Panel members with respect to revegetation. continued in next cell...	

Revegetation Extent -- TK Panel Recommendations (continued)	7.12 - "When using fertilizers, use natural local fertilizers like droppings from local animals. The question of treated human sewage needs to be revisited." Diavik shows recommendation 7.12 as Not Accepted (Appendix IX-2, p. 25, top row), although it also states it is interested in using it. 8.33 - "Re-seed land and use dirt and safe sewage to facilitate re-growth." Diavik shows recommendation 8.33 as In Progress (Appendix IX-2, p 47, 7th row). EMAB notes Diavik's status assessment of 7.12 and 8.33 are inconsistent. We also note that Diavik is putting sewage in the landfill in spite of saying that it plans to use it as a soil amendment (see attached Jan 11'23 email and Inspector's Report from Nov 28'22). 7.13 - "Complete the TK literature review report so that it can be used as a guide in the vegetation program and closure plan, and be available to communities." Diavik shows this recommendation is Complete (Appendix IX-2, p. 8, last row; and p 21, 3rd row) and as Not Applicable (Appendix IX-2, page 49, row 7). Diavik does not identify how the information was incorporated in the revegetation design, or provide justification for not incorporating it. continued in next cell...	

Revegetation Extent -- TK Panel Recommendations (continued)	In EMAB's view Diavik's responses to the TK Panel recommendations related to Revegetation are inconsistent, incomplete and selective. They appear to try to justify Diavik's proposed intent of avoiding active revegetation on the rock piles and PKC and expending relatively little effort on active revegetation. As Diavik states in FCRP section 5.2.9.3.5 "The preferred re-vegetation approach is to scarify and seed with native grasses. As documented in Appendix X-9, the site-based research on re-vegetation supports this approach. Addition efforts and the cost to supplement the substrate and/or plant shrubs were not viewed as providing sufficient additional closure benefits." After reviewing the TK Panel recommendations, EMAB's interpretation is that, taken as a whole, they express the desire to return the site as much as possible to its pre-development condition, and to support active revegetation of the site, including the NWRSA, SWRSA and PKC, with the qualifier that the vegetation must be safe for caribou and other animals to eat. This view is consistent with the outcomes of EMAB's 2017 Closure Workshop.	
Revegetation Extent - neutral landscape	In section 5.2.9.3.5 of the FCRP Diavik has argued that revegetating the NCRP, SCRP and PKC would likely be an unnecessary attractant to wildlife. It proposes to rely on natural revegetation for the PKC and WRSA's. Its rationale is that Diavik Closure Goal #5 is a final landscape that is neutral to wildlife, neither a significant attractant nor significant deterrent relative to pre-development conditions. EMAB's view is that a neutral landscape would have a similar amount and type of vegetation cover to pre-development conditions. Significantly less cover, as Diavik is currently proposing, would be a deterrent to wildlife, not neutral. Taking all the recommendations from experts, TK Panel and the EMAB Closure workshop together, the mine footprint should be actively revegetated with the target of amount and type of vegetation being similar to pre-development conditions.	See recommendation for closure criterion SW5 Diavik should remove statement that revegetation of NWRSA, SWRSA and PKC is likely an unnecessary attractant to wildlife or provide a defensible rationale.

Revegetation - use of Local Species	In our review of ICRP 4.1 EMAB noted the recommendations from our 2017 Closure Workshop Report, with respect to species used for revegetation: 3b) - Active re-vegetation efforts using seeds from wild local plants should take place, including on the North Country Rock Pile. In Appendix B: Additional Revisions of its RFD for ICRP 4.1 the WLWB noted Diavik's commitment to provide information on use of native species for revegetation in its Annual Closure and Reclamation Plan Progress report in March/April 2021. EMAB reviewed the Annual CRP Progress Report and the FCRP. We were able to find the list of species Diavik proposes to consider in its seed mix but were unable to find information on whether these species are commonly found in the local area.	Diavik should demonstrate that the species being considered for its revegetation seed mixture are commonly found in the local area. Diavik should demonstrate that the proposed seed mixture will lead to vegetation cover that is similar to pre-development conditions and the surrounding natural area.
Revegetation - UofA Revegetation Study	As discussed in detail in EMAB's comments and recommendations on ICRP 4.1 Diavik did not appear to apply the results of the University of Alberta revegetation research report (Appendix X-16 of ICRP 4.1) in its revegetation planning. In summary, the report made several useful and relevant conclusions that Diavik did not address including: - need for active revegetation to achieve recovery in a reasonable time period - good results from use of crushed rock with organic amendments, especially salvaged soil and treated sewage, and recommended ways to improve success - planting islands of vegetation to make best use of amendments In Appendix B: Additional Revisions, of its RFD for ICRP 4.1 the WLWB noted Diavik's commitment to provide additional information regarding how the UofA results were included in the revegetation plan in its Annual Closure and Reclamation Plan Progress report in March/April 2021. EMAB reviewed the Annual CRP Progress Report and the FCRP. We were unable to find information on how the UofA results were included in the revegetation plan. We also note that Diavik did not include the UofA report as part of its FCRP. Two paragraphs in section 5.2.4.5.4 briefly review the UofA report, and it is not referenced in Appendix X-9, the revegetation design. continued in next cell...	EMAB reiterates our recommendation on ICRP 4.1 that Diavik should follow the recommendations from the University of Alberta revegetation consultants to add organic soil amendments and include a range of local plant types in its revegetation, as well as planting "islands" of vegetation to make best use of available amendments.

Revegetation - UofA Revegetation Study (continued)	The only reference to the UofA study that EMAB could find was in FCRP section 5.2.9.3.5 where Diavik references site-based research:"The preferred re-vegetation approach is to scarify and seed with native grasses. As documented in Appendix X-9, the site-based research on re-vegetation supports this approach. Addition efforts and the cost to supplement the substrate and/or plant shrubs were not viewed as providing sufficient additional closure benefits." As we noted in our comments on ICRP 4.1, the University of Alberta research indicates that re-vegetation success and performance on crushed rock improves with amendments that add nutrients and organic matter. The conclusions of the University of Alberta report do not support DDMI's approach and rationale. Instead, the results indicate that amendments provide substantial benefits in re-vegetation success. Given the limited local availability and high costs of imported amendments, the report provides recommendations for how to make the most efficient use of amendment materials (e.g., re-vegetation islands). The DDMI proposal does not provide any details about who concluded that amendments "were not viewed as providing sufficient … benefits" or the rationale for the conclusion. It also does not provide any explanation about the rationale for rejecting the University of Alberta recommendations about the efficient use of amendment materials. ... continued in next cell.	
Revegetation - UofA Revegetation Study (continued)	The NCRP and PKC Facility will have rock covers, with rock that will likely include some fine materials due to handling and grading activities. According to the University of Alberta report, fine materials will help to hold moisture and support soil development. The surface of the SCRP will be material delivered as-mined from the A21 mine and likely quite coarse. Water retention characteristics of this material may not support effective natural re-vegetation and soil development. Appendix X-16 notes that **mining disturbances "could take hundreds to thousands of years to recover naturally due to harsh environmental conditions."** This statement likely applies to areas with no reclamation activities, but also to areas with rock covers. ... continued in next cell	

Revegetation - UofA Revegetation Study (continued)	As noted in our submission, Diavik has been disposing treated sewage in the landfill. In April 2020 Diavik proposed to place some sewage solids on the till cover for the NWRSA. These have been identified by the UofA researchers as valuable amendments for revegetation so should be stockpiled, not disposed in the landfill or used in the till cover (operational notification to WLWB, April 21/20). Similarly, if Diavik treats contaminated soil to a CCME Agricultural Standard, it should be considered for use to support revegetation efforts. In this case Diavik seems to be taking actions that will decrease its ability to implement UofA revegetation recommendations by reducing the availability of organic soil amendments to support revegetation.	As EMAB noted in our recommendations on ICRP 4.1, soil and other organic amendments are a critical component of successful revegetation as concluded by the University of Alberta. Diavik should stockpile these valuable amendments for revegetation not dispose of them.

Wildlife Safety - criteria for vegetation contamination	EMAB continues to be concerned that there are no criteria for contamination of vegetation - Diavik seems to have addressed limited monitoring under Objective SW4, with respect to dust. Vegetation contamination might be better addressed under Objective SW10 - Safe Passage for Caribou and Other Wildlife, as well as under specific components including P1 or I2. Regardless, criteria for vegetation contamination are required. No discussion or data is provided on the impact to animals consuming vegetation growing in impacted areas. We note Diavik response to WLWB Revision #23 - RFD for ICRP 4.1, while also observing that Diavik has removed the requirement for no exposed PK in the PKC for criteria P3). The ICRP 4.1 refers to a screening level ecological risk assessment (ERA) and data collected by the University of Alberta which was completed to look at dust deposition on lichen that are consumed by caribou. The screening level ERA concluded that "results to date do not indicate that post-closure metal levels in plants are likely to pose a risk to wildlife." It is unclear when this study was completed as no reference is provided and no data is available for review. In addition, since lichen are not plants and have very different characteristics it is not appropriate to use lichen as surrogates for higher plants and to draw these conclusions. It is also not indicated which impacted areas were sampled and why leaves, berries and other plant parts of higher plants were not included in the study. ...continued in next cell.	Diavik should provide comprehensive criteria for vegetation contamination. These could fall under Objective SW10 - safe passage and use for caribou and other wildlife. Derive risk based closure criteria for wildlife consumption of vegetation growing in impacted areas.

Wildlife Safety - criteria for vegetation contamination (continued)	In ICRP 4.0 EMAB commented under Objective SW4 vegetation metals monitoring: Significantly higher element concentrations in near-field lichen samples as compared to far-field samples (for aluminum, antimony, bismuth, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, strontium, thallium, uranium, and vanadium). Sampling at three-year intervals should be continued, and the criterion should be a return to concentrations in the majority of the above listed elements for near-field samples that are not significantly higher than those in far-field samples, using the current sampling design. EMAB also commented under Criteria P1 & I2 - 'In their report on plant uptake of metals from PK (Appendix VIII-1A), researchers from the University of Alberta state: "The limited association between substrate and plant tissue metal concentrations for the 33 metals analyzed suggest that substrate concentrations are not an effective method for predicting trace metal accumulation in plants."This finding indicates that a soil-concentration-based criteria alone are not sufficient for evaluating adverse effects to wildlife consuming vegetation growing in mine-waste materials. In particular, the University of Alberta research found that although Mo concentrations are not higher in processed kimberlite than in reference substrates, plant-tissue Mo concentrations in plants grown in PK were 10 times higher than plant tissues grown in lakebed sediments. ...continued in next cell.	

Wildlife Safety - criteria for vegetation contamination (continued)	The University of Alberta research does not provide data on what these concentrations were, but Mo is an element known to contribute to secondary copper deficiencies in ungulates when found in elevated concentrations. This reinforces the importance of developing criteria based on plant element concentrations as well as soil element concentrations. Monitoring under SW4 included monitoring of Permanent Vegetation Plots (PVPs), for metals contamination (App VII, p. 29/149) but not hydrocarbons or other chemicals. It is not clear if this monitoring includes revegetated areas or whether monitoring duration is adequate.	Vegetation monitoring for contaminants should sample for metals, hydrocarbons and other contaminants in soil where revegetation takes place. Both active and passive revegetated areas should be sampled. Sampling duration should be long enough to assure that contaminant uptake by plants does not present a risk to animals that feed on them. (see also comments on closure criteria SW10)
Dry Cover Closure Plan-PKC- Plan remains conceptual and unproven and not adequate for final closure plan	There is considerable uncertainty as to whether the proposed conceptual plan for closure of the PKC is feasible. Even the designer of the plan Golder states Golder states on page 31 of Appendix C Design Basis states "In summary, the thermal and consolidation evaluation conducted for the Rockfill Option suggests that the option **may be feasible and warrants further evaluation**."	Although the dry cover proposal may be the preferred option, Diavik needs to submit a defensible engineering design. The current plan is conceptual and unproven.

Dry Cover Closure Plan-PKC- Thermal Modelling and Cover Stability provide considerable uncertainty	Thermal modelling and stability of the cover remains uncertain and does not account for several factors that could affect the results. Selected examples include: oThe very high in situ void ratio estimated for the upper 10 to 15 m of EFPK based on field investigation programs suggests that uncertain site conditions are delaying or limiting the consolidation process. This aspect is not captured in the models and could result in a much longer term for settlement to occur and thus future ponding beyond 2050 could occur. This could result in thawing of the EFPK and failure of the concept. oThe mode for the dissipation of excess pore pressures is unknown. Where does this water go, how is the heat in this drainage water handled in the thermal balance and how does it affect future freezing? The modeler indicated that it is uncertain where this water will flow or even if it will be trapped by frozen PK. o Golder has stated "Given the uncertainties associated with the EFPK characteristics into closure, there is potential for the EFPK to consolidate more than the predicted 4 m. If this occurs, the closure inlet channel gradient may reverse such that water cannot drain and a pond may form." Ponding will result in thawing.	Thermal modelling and stability of the cover remain uncertain and must be improved for the concept to be considered as viable

Dry Cover Closure Plan-PKC- Thermal Modelling issues	Preliminary modelling suggests it may not be possible to maintain the EFPK frozen. For example: o If settlement in future allows a pond to form, the EFPK will thaw. o If the climate change exceeds 5.6o C, the EFPK will thaw. Given that the Arctic is undergoing more substantive changes than are occurring elsewhere, a greater than 5.6o C change may need to be considered. o The rock depth on surface will vary from .5 to 2 m. Modelling has shown that reducing the rock depth from 1.5 to 1 m increases thawing and increase surface temperatures by about 0.7o C. Less cover would result in much higher surface temperature increases. Why is 0.5 m an appropriate depth of cover? This need to be confirmed. o excess pore-water pressure beneath the frozen zone is possible, but this aspect is not evaluated in this modelling exercise. o Piping of EFPK to the surface. There is no geogrid, filter fabric or engineered filters shown in the design presented in Appendix X-15 for the surface of the EFPK. The placement of 1.5 m will occur directly on the frozen EFPK. At many sites where waste rock was placed on fine tailings, elevated pore pressures has resulted in piping of tailings to surface.	Diavik need to demonstrate that the PKC will remain frozen under all climate change scenarios. This may require additional surface cover which is available in the South Country Rock Pile.
Dry Cover Closure Plan-PKC- Stability of the Cover	The stability of sloped rock cover over a deep zone of potentially liquifiable EFPK has not been adequately addressed. Stability analysis has shown the dams will be stable however, the effect of an earthquake on the closed PKC was not discussed. Can it be demonstrated that: 1) the EFPK will not liquefy? If not, what happens when the EFPK liquifies? Can the surface flatten and result in EFPK discharge? These aspects need to be addressed. Furthermore, the Zone 1 cover over the shoreline is shown at 20:1 slope and is founded over a layer of EFPK. It is understood that the stability analysis suggests that the undrained strength of 0.15 is required to assure the beach is stable while EFPK undrained strength range from 0.05 to 0.15. It is unclear why the assessment was completed with the maximum shear strength for EFPK.	Diavik should be requested to address the long term stability of the facility for all credible events.

PKCF Seepage	In Section 5.2.6.5 DDMI predicts that seepage from the PKCF will be eliminated at closure: "At closure, the PKC pond will be pumped down and the beaches and surrounding seepage flow pathways allowed to freeze back once the hydraulic head driving the active seepage flow is eliminated." Appendix X-15, Section 4.7 makes a similar prediction: "During operations, the PKC Facility has experienced seepage rates on the order of 38 L/s to 55 L/s. These rates are mostly related to the presence of the supernatant pond that forms as part of FPK deposition. Once deposition ceases at the PKC Facility in November 2022, it is expected that seepage from the facility will reduce to limited flow as the supernatant pond is dewatered and the FPK and EFPK deposit drains." While seepage will decrease if the FPK and EFPK drain, this may occur over a very long period of time and therefore seepage may continue at a diminishing rate for a long period of time. Also, if the water balance in the PKCF catchment is a positive water balance, then the phreatic surface in the PKCF will continue to be close to or at the spillway invert – i.e., the FPK and EFPK will not drain. In this case, the driver for seepage (head) would not change and seepage would continue, although it is possible that freezing may limit flows in some areas. The presence and amount of seepage from the PKCF is not related to whether there is a pond at the surface, but rather about the level of the phreatic surface in the PK materials. Section 5.2.7.6 identifies uncertainty about the extent to which seepage may be limited by freezing conditions: identified uncertainties include "post-closure thermal conditions, particularly as they relate to long-term seepage control."	Provide additional water balance information for the PKCF to confirm that seepage will not occur during closure/post-closure, and conduct sensitivity analyses to evaluate how seepage at different rates may affect water quality.

Appendix VI - Monitoring, PKCF Cover	Appendix VI, Section 3.4.1.3 proposes that monitoring of the PKCF cover will cease after five years: “After five years of meeting the closure criteria P2-3 and P3-1, monitoring of the PK cover will cease.” Closure criteria P2-3 and P3-1 are related to physical condition of the cover and exposure of PK materials. Consolidation of the EFPK will take a very long time and will affect cover performance. Monitoring of the PK cover must continue until consolidation is essentially complete. At the Technical Workshop, DDMI argued that the cover has been designed to require no long-term maintenance and therefore failure mechanisms like solifluction are not realistic. While robust designs are necessary for long-term closure projects, they do not guarantee performance. Long-term monitoring needs to include specific approaches for measuring consolidation. Also, the monitoring plan does not include an annual inspection of the cover by the Engineer of Record for the PKCF facility.	Revise the monitoring plan for the PKCF to including annual inspections by the Engineer of Record for the PKCF facility, and to include long-term monitoring of thermal and consolidation conditions.
Appendix X-15 - PKCF Rockfill Option Closure Design, Closure Criteria	Table 5 in Appendix X-15 lists closure objectives and criteria related to the PKCF closure design. The criteria are not consistent with those listed in Appendix V.	The PKCF design should be revised to reference the updated closure criteria, and the design should be revised as necessary to achieve the updated criteria.

Appendix X-15 - PKCF Rockfill Option Closure Design, Cover Thickness	Appendix X-15, Section 4.4.2 describes the cover design for the PKCF and states that "There is no minimum cover thickness as long as there is sufficient cover material to meet the closure objectives of providing a barrier between the environment and the PK." Similarly, FCRP Section 5.2.7.3 states: "The Zone 2 cover thickness may vary between 0.5 and 2 m, depending on the particle size of the rockfill material. Additional cover thickness may also be provided in areas that are more susceptible to differential settlement or rockfill loss into FPK/EFPK under thawed conditions." These sections leave uncertainty about the design and thickness of the cover, with little supporting rationale. The FCRP, Section 5.2.7.4 further states: "The CPK, FPK, and EFPK will be covered by enough Type I (non-PAG) waste rock or rock fill material to be sufficient for erosion protection of the underlying PK. The rock cover will parallel the final PK surface. DDMI expects a 1.5 m thick cover to be adequate and constructible. A thinner cover would also be acceptable but would require a crushed rock product." The statements leave uncertainty about what cover will actually be built and what the rationale will be for its thickness and design. SEC provided comments about the cover thickness for PKCF covers in a memo to EMAB dated September 12, 2022 about the Zone 1 cover design. These comments, as copied below, remain relevant for both the Zone 1 and Zone 2 covers. ...continued in next cell	Provide additional design details and rationale to support cover thickness for the PKCF, and for not including any filter component between tailings and rock fill. Characterize the relationship between cover thickness and predicted contaminant loading from PK materials.

Appendix X-15 - PKCF Rockfill Option Closure Design, Cover Thickness (continued)	DDMI proposes that the approval of Interim Closure and Reclamation Plan (CRP) Version 4.1 included approval of the proposed cover, now proposed as a nominal 1.5 m thick cover of Type 1 rock over beach areas of the PKCF. Interim CRP Version 4.1 included as Appendix X-5 the "Diavik Diamond Mine PKC Facility, Revised Closure Concept" (AMEC, 2013). That concept included a 2 m rock cover over the beach areas of the PKCF and also incorporated geotextile over much of the area (e.g., transition area from beach FPK to semi-fluid FPK) to address concerns about "piping of PK into the waste rock open voids." During discussions about Interim CRP Version 4.1, "DDMI committed to providing the cover design details, including rational for the selected thickness, within the PKC Facility Closure Design" (WLWB. 2021. Reasons for Decisions Interim CRP Version 4.1). The WLWB required that the Closure Design "Include the analysis to support the selection of the rock cover configuration (e.g., how the rock cover thickness influences the post-closure water quality and quantity)." The Cover Placement Methodology does not provide any detailed analysis to support the proposed cover thickness or configuration – whether related to water quality or any other matters. Instead, it states that cover thickness was selected "based on the expected maximum particle size of the ROM rockfill." ...continued in next cell	

Appendix X-15 - PKCF Rockfill Option Closure Design, Cover Thickness (continued)	The Cover Placement Methodology proposes that the engineer may adjust the thickness during construction but does not provide any constraints on the range of thickness or any parameters that would be used to decide about the need for adjustment. Appendix X-15, the Rockfill Option Closure Design does not provide additional analysis or rationale to support the proposed cover thickness. The only rationale provided to-date is related to the practicality of material placement due to the size of the largest boulders in the cover material. This rationale does not address the question of how cover thickness influences water quality and quantity. It also does not address whether the proposed cover design will avoid piping of PK into the waste rock open voids or potentially to surface. The water quality modelling and thermal modelling indicate that the decision about cover thickness will have a substantial influence on water quality because the active layer is expected (even under existing climate conditions) to penetrate into the PK materials. Contaminant loading from the PK material is expected to be substantially higher than from cover materials.	
Appendix X-15 - PKCF Rockfill Option Closure Design, Migration of PK Through Cover	The proposed cover design does not include any elements aimed at preventing migration of PK through the rockfill cover. This migration is commonly observed with placement of rockfill covers on liquefiable tailings materials and is usually addressed by including appropriate granular or synthetic filters to maintain appropriate separation between rockfill and tailings. Appendix X-15 does not include any analysis or discussion of potential PK upwelling. If PK migrates up though the cover, it will result in exposure to the terrestrial environment, and potential wind/water erosion.	DDMI should revise the Rockfill Option Closure Design to include consideration of migration of PK material into and through rockfill cover materials.

Appendix X-15 - PKCF Rockfill Option Closure Design, Mitigation for Settlement	Appendix X-15 Section 4.4.2 proposes mitigation for areas where PK settles after placement of cover materials: “Increased cover thickness in select areas provides a tool to minimize long-term maintenance requirements. The areas that could benefit from increased cover thickness will be identified during rockfill placement, informed by historical and future site investigations, analysis of monitoring data collected from cover trials and rockfill installation. If maintenance is required, it would likely involve localized reshaping of the cover in areas affected by differential settlement and possibly the addition of rockfill.” The proposed approach for mitigation of settlement will likely not be very effective because it will be difficult to predict settlement amounts accurately across the PK surface and place the appropriate amounts of additional rock in all areas. Also, placing rock fill in areas with excess settlement will not address the important issue of ponding on the surface of PK. Instead, the ponding will just occur within the rock fill, but the implications on infiltration into PK are the same as if the pond were visible on surface – there is no change in the head whether the water is on surface or in rockfill. As a result, the proposed mitigation is unlikely to be effective for addressing the concerns related to ponding.	Describe methods that will be used to accurately predict settlement across the PK surface and place different thicknesses of rock fill in areas according to expected settlement. Also, describe how the proposed mitigation will address ponding on the surface of these materials, whether that ponding occurs on surface or within the rockfill cover.

Appendix X-15 - PKCF Rockfill Option Closure Design, Spillway Inlet Channel	Appendix X-15, Section 4.5 describes construction of the spillway inlet channel that is intended to provide conveyance of water from the centre of the PK materials to the PKCF spillway: "Considering the weakness of the EFPK, the channel will be excavated out of the EFPK and FPK once the material is frozen to sufficient depth (conceptually 5 m freeze depth, to be refined in feasibility design study). This will support the excavation during construction and create stable conditions for the side slopes throughout closure." The design proposes a spillway with side slopes of 20H:1V in order to address the stability of PK under thawed conditions. For a spillway with the 4 m proposed depth, this will result in a spillway width of at least 160m. The design proposes a rockfill lining, but does not include filters. In this case, the underlying thawed EFPK and FPK is likely to be subject to erosion and migration through the rock fill. Appendix X-15, Section 5.4.2 describes results of stability analysis for slopes in FPK overlying EFPK. Slopes within EFPK were not analyzed but some portions of the proposed channel will be within EFPK. EFPK can be expected to be weaker than the FPK that was analyzed. As a result, the stability analysis may be overly optimistic about expected performance. To address larger than expected settlement of EFPK materials and associated ponding, the design proposes addition of rockfill, similar to that proposed for other areas where settlement may occur (see Section 11.4 of SEC report). ...continued in next cell	Reconsider the proposed spillway inlet channel design including the need for filters under rockfill, the use of more conservative parameters in analysis of stability, and how to address settlement of the channel invert due to consolidation of PK material.
Appendix X-15 - PKCF Rockfill Option Closure Design, Spillway Inlet Channel (continued)	The same concerns about ponding within rockfill are relevant for the proposed addition of rockfill over the EFPK materials. In this case, it is not clear how the proposed channel would continue to convey flow if settling occurs in the centre portion of the PKCF (where more settling is expected). Even if rock fill is placed in this area, the coarse fill will not convey water on its surface, so the proposed mitigation does not change the invert of the channel at locations where rock fill is proposed.	

Appendix X-15 - PKCF Rockfill Option Closure Design, Thermal Analysis	With respect to physical stability for the inlet channel, Section 3 of the Stability Assessment in Appendix C of Appendix X-15 notes that "The peak undrained shear strength of the EFPK in the centre of the facility, measured during the 2019 site investigation, was between approximately 0.3 and 0.6 kPa (Golder 2020a), and the undrained shear strength ratio is estimated to range from approximately 0.05 to 0.1. These values are lower than the modelling indicates is required to achieve the required FoS." This indicates that the modelling for stability of the inlet channel is likely not conservative and the factors of safety may be overestimated.	Conduct updated analysis of thermal conditions after addressing CGS comments.
Appendix X-15 - PKCF Rockfill Option Closure Design, Cover Design Basis Memo	Table 2 in Appendix C of Appendix X-15 lists design criteria for the PKCF cover, including "No visible CPK or FPK exposed at end of cover construction." Exposure of CPK or FPK at any point in time should also be considered unacceptable – whether inside or outside the PKCF.	Revise design basis to clarify that there should be no exposure of CPK or FPK at any time after construction of the PKCF cover. If necessary, revise the design to address this change in design basis.

Appendix X-15 - PKCF Rockfill Option Closure Design, Thermal and Consolidation Modelling	Appendix D of Appendix X-15, Section 4.2.5 describes thermal modelling and asserts that frozen EFPK will create a nearly impermeable zone. However, this condition creates some challenges for the choice to use a 1-D model for consolidation: "Under saturated conditions, freezing of EFPK would create a nearly impermeable zone. However, due to the 1-D nature of the model, a nominal hydraulic conductivity value was required to be assigned to the frozen EFPK zone or water would not leave the model geometry because only upward flow is considered." The report goes on to suggest that the use of nominal hydraulic conductivity in this apparent impermeable zone addresses the contradiction between the selected model and the frozen conditions at the upper surface: "This situation would theoretically represent 3-D conditions where pore-water during consolidation of thawed EFPK would drain not through the frozen zone but laterally toward portions of the PKC Facility that may not be fully frozen in the long term." 1-D modelling as conducted does not appear to be appropriate for estimating consolidation of the EFPK. The 1-D model is founded on an understanding that water extracted due to consolidation can only move upwards through the PK, but the setup assumes that water cannot move upward through frozen materials. Instead, the model applies a permeability to the upper frozen zone, intended to represent the movement of water in a lateral direction. ...continued in next cell	A revised modeling approach should be undertaken to evaluate consolidation of EFPK materials. The model should more accurately reflect the understanding of expected physical conditions for consolidation.
Appendix X-15 - PKCF Rockfill Option Closure Design, Thermal and Consolidation Modelling (continued)	However, there is no explanation of why or how the selected permeability is related to the lateral movement of water or why the model is representative of expected conditions. At the Technical Workshop DDMI acknowledged that the 1-D model does not represent expected physical conditions, but argued that the model is "useful." It further acknowledged that a more complex 2-D model was not contemplated.	

Appendix X-15 - PKCF Rockfill Option Closure Design, Consolidation Assumptions for Design	Section 4.2.6 of the report describes model limitations: "The very high in situ void ratio profile estimated for the upper 10 to 15 m of EFPK based on field investigation programs suggests, however, that uncertain site conditions are delaying or limiting the consolidation process." The model is primarily based on testing in the lab, but existing field conditions indicate that lab tests may be overestimating consolidation rates. As a result, consolidation may take longer than predicted.	Revise the design basis for the PKCF cover design to include a more conservative consideration of consolidation.
Appendix X-15 - PKCF Rockfill Option Closure Design, Dam Stability Assessments	Appendix E of Appendix X-15, Sections 3.1/3.2 describe ice rich frozen materials in both dam foundations and dam fill. These materials may cause performance issues if/when they thaw.	Monitoring programs for the PKCF and PKCF Dams should include long-term monitoring of ground temperatures, and response plans (e.g., monitoring of porewater pressure) to address conditions if these materials approach thawing conditions.
Appendix X-15 - PKCF Rockfill Option Closure Design, Stability Assessment	Appendix E of Appendix X-15, Section 4.1 describes an assumption, for stability analysis and consolidation purposes, that freezing and thawing will occur at the rates currently observed. No rationale is provided for the assumption that thaw rates would be the same as those currently experienced. Greater thaw rates could arise due to climate change, or due to changes in phreatic surfaces.	Provide additional rationale for the selected freeze/thaw rates assumed for stability analysis re: frozen materials for the PKCF Dams.
Appendix X-15 - PKCF Rockfill Option Closure Design, Monitoring of Creep	Section 4.4.2 recommends instrumentation and monitoring to provide more consistent monitoring of potential dam foundation movement due to creep.	Clarify whether DDMI has made or intends to make adjustments to monitoring equipment and plans to incorporate recommendations for monitoring of creep in PKCF foundations.

Appendix X-20 - Water Quality Model, PKCF Seepage	Appendix X-20, Section 3 states the model assumption that there will be no seepage from the PKCF: "The model results presented in this report are representative of an unsaturated PK scenario, for which only the water quality of runoff from the PKC Facility has been considered. The model assumes there is no seepage from the PKC Facility, and all water sourced from the PKC Facility will report as runoff to Lac de Gras via Pond 3 in catchment C3." If the PKCF water balance is positive, then water must be accounted for somewhere, as runoff, seepage or evaporation. If the standard runoff coefficients are used here, but the model assumes no seepage, then the remainder of the water would have to evaporate. Appendix X-19 (Table 2) states that runoff coefficients account for evapotranspiration, infiltration, and storage losses over land. When combined with an assumption that the PKCF will have no seepage, the long-term water balance can only include evapotranspiration and runoff because infiltration would lead to seepage and storage in the long-term must reach an equilibrium to support the no seepage assumption. Based on the numbers presented in Appendix X-19 (Site-Wide Water Balance), runoff makes up approximately 43% of precipitation inputs for catchment C-3 (which includes the PKCF). In order to balance the water inflows/outflows, this would require evaporation of 57% of incident precipitation. This is unlikely on a rock cover. ...continued in next cell	1. Provide additional rationale to support the PKCF water balance to corroborate assumptions about seepage. Describe how assumptions about frozen PK preventing seepage are accounted for by use of site-wide runoff coefficients. 2. If runoff from the PKCF may be greater than that associated with site-wide runoff coefficients, update water quality predictions to account for greater runoff.
Appendix X-20 - Water Quality Model, PKCF Seepage (continued)	If the water balance behaves as predicted (i.e., no infiltration and seepage), then runoff quantities may be higher than predicted, leading to greater loading and concentrations of contaminants.	
Appendix X-20 - Water Quality Model, Source Term for PK	Also, if the PK behaves as DDMI predicts and becomes unsaturated over time, then seepage must occur (likely at diminishing rate for lengthy period of time) to lower phreatic surface.	The thermal analysis and related seepage and water quality predictions for the PKCF should be updated based on conservative, current projections of climate change.

Appendix X-20 - Water Quality Model, Source Term for PK	The thermal analyses for the PKCF rely on estimates of material properties in order to predict temperature profiles over time – for example the thermal conductivity of materials, and their capacity to hold heat both influence the temperature profiles over time. Table 3 in the 2013 Golder memo lists properties of materials, including Type I rock fill that will be part of the cover. The source of these properties is referenced to earlier work completed by Golder in 2007 – design reports for the PKCF. Appendix XI for the NCRP Final Closure and Reclamation Plan v1.1 (2017) is a thermal analysis conducted by TetraTech to support the cover design for the NCRP. Table 7 of that report provides thermal properties for Type I rock fill that is part of the cover. The properties were "determined indirectly from well-established correlations with soil index properties" and were verified by comparison to measurements made in test piles at Diavik and other locations reported in literature. Table 1 provided in the attached Slater Environmental report provides comparisons of material thermal properties for Type I rock fill used in the two analyses. There are some substantial differences between the thermal properties used for Type I rock fill in the two analyses. It is not clear whether the differences reflect a better understanding of the properties for the later study, or if there is significant uncertainty about the actual properties. ...continued in next cell	Use existing conditions to validate whether the PKCF thermal model provides an accurate prediction of current thermal conditions in the Facility, and consider whether the model and its assumptions and inputs (e.g., material properties) should be refined.
Appendix X-20 - Water Quality Model, Source Term for PK (continued)	Nonetheless, the difference in material properties could have a significant influence on the predictions of temperature profiles and freeze/thaw characteristics. Therefore, it would be useful to understand whether the 2013 thermal model accurately portrays the conditions that have developed in the facility to verify the modelling and its assumptions.	

North Inlet	With respect to the North Inlet, the FCRP proposes consideration for reconnection to Lac de Gras over a longer period of time than in recent versions of the Interim Closure and Reclamation Plan. This will allow a longer period for natural degradation of petroleum hydrocarbons (PHCs) in sediments before DDMI proposes to make a final decision about reconnection. This is a positive change, but may still not go far enough. DDMI still identifies the possibility of a hydraulic connection without access for fish as described in Section 5.2.1.8: "Should the NI sediment not bioremediate within the timeframe of closure construction then the contingency option of a hydraulic connection is proposed to be executed." The time frame of closure construction may be too short to allow adequate remediation. If this is the case, and if sediment quality is on a trajectory towards suitable conditions then there would still be	Revise the FCRP to provide a contingency for continued monitoring of North Inlet sediments after completion of closure construction and later completion of the reconnection, if sediment quality is on a trajectory towards suitable quality at the end of closure construction.
North Inlet	Section 5.2.4.4.5 describes alternatives analysis for previously considered closure alternatives for sediment in the North Inlet. Prior to consideration of natural remediation, options for covering and dredging sediments were evaluated. Not surprisingly, alternatives that involved dredging were ruled out due to concerns about practicality. Covering, on the other hand, was removed primarily due to concerns about cost. As a result, DDMI abandoned any alternatives that involved active measures to address the contamination, and concluded that nothing beyond natural remediation of PHCs would be done. In reaching this conclusion, DDMI asserts that if natural remediation is unsuccessful, then it should be acceptable to leave the contamination in place. This does not appear to be consistent with the closure goal "Land and water that is physically and chemically stable and safe for people, wildlife	The FCRP should be revised to include a contingency for covering or other remedial measures for North Inlet sediments if monitoring demonstrates that natural remediation is unlikely to be effective in achieving suitable sediment quality conditions.

South Country Rock Pile	Section 5.2.6.3 describes the closure plan for the SCRP as follows: "Re-sloping of the SCRP is not expected for closure. However, localized re-sloping to construct an access/egress wildlife ramp is currently planned. The ramp will be constructed at the north end of the SCRP-WRSA and will be at a slope of 3H:1V to allow caribou access and egress. The remainder of the SCRP slopes will be left at the waste rock angle of repose (1.3H:1V)." DDMI's proposed closure plan will leave the SCRP as a permanent landscape feature – a pile of rock with angle of repose slopes. While DDMI expects the slopes to meet physical stability design criteria, the final condition does not appear to be consistent with closure objectives related to landscape and aesthetics (e.g., SW9 – "Landscape features (topography and vegetation) that match aesthetics and natural conditions of the surrounding natural area"), or closure goals including: Final landscape guided by pre-development conditions, and Final landscape that is neutral to wildlife – being neither a significant attractant nor significant deterrent relative to pre development conditions. ...continued in next cell	Revise the FCRP to include reclamation measures for the SCRP that are consistent with mine reclamation best-practice, consistent with closure goals, and expected to achieve closure objectives.
South Country Rock Pile (continued)	The surface of the SCRP will not receive any measures to support re-vegetation, leaving a barren rock surface that will likely remain for many decades to centuries, possibly permanently. For the most part, the SCRP will have a permanent landscape appearance that is similar to that during mining. Leaving an un-reclaimed waste rock dump as a permanent landscape feature does not meet current best practice for mine reclamation.	
South Country Rock Pile - TK	The TK Panel made three recommendations specific to the SCRP Recommendation 10.1 - "Avoid disturbing new areas (e.g. tundra) with A21 material at the SCRP as much as possible. The proposed SCRP area is part of a major caribou migration and feeding corridor and should not be disturbed." Diavik shows this recommendation as Complete (Appendix IX-2, p 74, top row). In its response to this recommendations Diavik stated it is not planning to re-slope the SCRP because there is no need for a cover on it. Diavik did not address the Panel's concern that the SCRP is part of a major migration and feeding corridor.	Revise the FCRP to include reclamation measures for the SCRP that are consistent with the TK Panel recommendation ie. re-slope the entire pile to allow easy, safe passage and provide food by revegetating (see also comments on closure criteria SW9 and on TK Panel Recommendation 2.6).

Appendix X-17 - SCRP Design, Thermal Analysis	Appendix X-17, Section 2.1.1 describes the thermal analysis considered for stability of the SCRP: "The impact of climate change was modelled by assuming a uniform increase in ground surface temperatures over the long term. A predicted mean temperature warming rate of 5.6°C per 100 years was adopted for the thermal model scenarios starting at the beginning of placement in the pile (Golder 2017)." The thermal analysis for performance of SCRP foundations has not been updated with most up-to-date recent climate predictions.	Update thermal analysis for the SCRP to consider more up to date climate change predictions.
Appendix VI - Monitoring, Waste Rock Thermal Conditions	Appendix VI, Section 3.3.1.3 proposes discontinuation of physical monitoring of waste rock storage areas after five years: "After five years meeting the closure criteria, monitoring of the waste rock storage and till areas will be ceased." This appears to include both thermal monitoring and surveying. Understanding of thermal conditions in the North WRSA is critical to understanding whether the mitigation and design are working as proposed. Without frozen conditions, the potential for adverse seepage quality is increased – a condition that likely would not be observed in seepage quality for years to decades. Monitoring of thermal conditions provides a more proactive measure for understanding whether the facility is performing as expected. Given climate change, thermal performance remains as a substantial uncertainty. Also, the climate change predictions indicate that the active layer could reach the full thickness of the cover within the next century. Monitoring is needed to confirm that this does not happen more quickly. From a broader physical stability perspective, the movement of frozen slopes, especially those with fine grained materials, can be slow rather than catastrophic. This could include creep of frozen materials, or deformation caused by solifluction. These types of changes may not be observed within the proposed time frame of five years. ...continued in next cell	Thermal and physical monitoring of the NCRP should continue until there is no longer a water quality risk associated with the facility and permafrost conditions in the facility have stabilized.
Appendix VI - Monitoring, Waste Rock Thermal Conditions (continued)	This issue was discussed at the Technical Workshop and DDMI asserted that the cover has been designed so that no long-term maintenance would be required, including as a result of solifluction. This, of course, is the intent of the design. Nonetheless designs have uncertainty and monitoring is the correct tool for evaluating that uncertainty over time.	

Appendix X-14 - Landfill Cover Design	Appendix X-14, Section 3.1 lists closure criteria and objectives relevant for the Landfill Cover Design. SW1 and SW2 are not identified, but water quality is relevant for the landfill facility.	Ensure that the landfill cover design considers the need to meet water quality related closure objectives and criteria (i.e., SW1 and SW2 and associated criteria).
Appendix X-14 - Landfill Cover Design	Appendix X-14, Section 4.1 describes consideration of climate change in design of the proposed landfill cover, including use of the 50th percentile long-term climate projections to evaluate the potential for the active layer to thaw to depths greater than the cover thickness. Table 3 indicates that even under these median climate change projections, the active layer will almost penetrate the whole thickness of the cover after a period of 100 years. As per comments on climate changed projections (See Core Geoscience memo appended to the attached Slater Environmental report), the use of the 50th percentile results likely does not provide a conservative analysis of thermal conditions. Also, the cover must perform well beyond 100 years.	Take into consideration more adverse climate projections when analyzing thermal performance of the landfill cover. Revise the cover design if necessary to address more adverse climate projections.
Appendix X-14 - Landfill Cover Design	Appendix X-14, Section 5.1.1, describes the design expectations for operation of the landfill when disposing of demolition waste during closure: “In general, waste material should be chipped, crushed, and/or ground prior to placement and compacted using a dedicated landfill compactor.” DDMI should confirm that it will have equipment (e.g., chipper or grinder for large building waste and concrete) on site to achieve these requirements during closure, and that the landfill will be operated according to this and other requirements specified in the design. If these operational requirements cannot be met, then long-term settling of landfill materials is more likely and could be more severe. This type of settling would affect the long-term performance of the cover, and the effectiveness of landfill containment.	Confirm that the landfill can be operated as proposed in the design, given constraints on equipment and conditions at the site.

Appendix X-11 - Remedial Strategy Report, Contaminated Soils	Appendix X-11, Section 4.0 identifies strategies for management of contaminated soils: “The following four potential remedial/risk management options have been identified for both PHC or non-PHC impacted surficial material.” The four strategies include rockfill caps; excavation, landfarm and re-use/landfill disposal; excavation and landfill disposal; and, off-site disposal. The Report indicates that these general strategies may be applied for management of materials contaminated with non-PHC contaminants. However, the Remedial Strategy Report does not provide any information about what monitoring will be done to identify other relevant contaminants. Section 4.0 does note that glycol contaminated soils would be disposed of in the inert landfill. As discussed in Section 2.16 of Slater Environmental report, for PHC contaminated soils, these materials may not be appropriate for disposal in an inert landfill. Proposed post-closure monitoring does not include contaminants other than PHC. Other contaminants would be relevant if disposed of in the landfill.	1. Revise the Remedial Strategy Report to address monitoring of contaminated soils for relevant contaminants in addition to PHC – both for identification of contamination, and for post-closure conditions. 2. Provide design information to demonstrate that the inert landfill is appropriate for containment of glycol contaminated materials.
Appendix X-11 - Remedial Strategy Report, Contaminated Soils (continued)	Appendix X-11, Section 4.0 Tables 5 and 6 describe remedial strategies for a range of levels of PHCs and non-PHC contaminants in soil. EMAB does not agree with the proposed remedial strategies where contaminant values are greater than the CCME Agricultural standard. EMAB's position is that any soil that does not meet the Agricultural standard after treatment should be shipped offsite. As discussed in detail in our comments on ICRP 4.1, the Ekati mine has demonstrated successful remediation of hydrocarbon contaminated soil (The "Ekati Diamond Mine, Environmental Agreement and Water Licence Annual Report 2019" (Dominion Diamond Mines, 2020)) so there is good evidence that Diavik would have similar success.	Diavik should make use of the report The "Ekati Diamond Mine, Environmental Agreement and Water Licence Annual Report 2019" (Dominion Diamond Mines, 2020) when planning its approach to landfarming hydrocarbon contaminated soil.

Hydrocarbon Contaminated Soils	In Section 5.2.9.3.3 DDMI proposes that for petroleum hydrocarbon (PHC) contaminated soils identified during operations, it will make "best efforts to reduce hydrocarbon levels in collected surficial material through active landfarming." Following these best efforts it proposes to bury the contaminated material on site whether it meets Canada-Wide Standards or not. DDMI also proposes that "During decommissioning, any surficial material in areas where hydrocarbons were stored or spilled will be sampled. Materials that are found to exceed the Canada-Wide Standards for PHCs will be either excavated for specific disposal in the landfill or encapsulated in situ by placement of an approximately 1 m thick A21 waste rock cover." DDMI appears to only commit to landfarming PHC contaminated soils identified during operations. Soils identified during closure are to be buried, regardless of contamination levels. Also, "best efforts" is not defined – it appears that this means active landfarming while closure construction is underway but not for longer. There should be commitment to continue landfarming until it is proven to be no longer effective, or until standards have been met. This should be for all PHC contaminated material that is identified during both operations and closure.	DDMI should be required to landfarm all PHC contaminated material regardless of the mine phase when it is identified. Landfarming should continue, including whatever active measures are appropriate (e.g., aeration, addition of reagents) to meet Canada wide standards for PHCs.
Hydrocarbon Contaminated Soils- incorrect statement of EMAB position	In Section 5.2.9.3.3 states "The EMAB appeared to be willing to accept on-site burial of hydrocarbons provided DDMI could first demonstrate that it had made best efforts to reduce hydrocarbon levels in collected surficial material through active landfarming." As EMAB noted in our comments on ICRP 4.1, at our March 26-27'19 meeting EMAB formally agreed that any contaminated soil should be treated to the strictest criteria (CCME Agricultural), and if it didn't meet the CCME Agricultural standard after treatment, it should be shipped off site. These meeting minutes were submitted to the WLWB as part of our submission on ICRP 4.1. EMAB's position on contaminated soils has not changed. As noted in our comments on ICRP 4.1 communities have stated that they do not want any contaminated material to be buried as the minesite.	Through our community consultations and our Closure workshop we understand that communities object strongly to contaminated material being buried on site. EMAB is also aware that Diavik's consultation with communities on this topic resulted in at least three of the Aboriginal Parties stating contaminated materials should not be buried at the minesite. EMAB recommends that Diavik treat any contaminated soil be treated to the CCME Agricultural soil standard. If landfarming is unable to bring the soil to this standard, the contaminated soil should be shipped offsite.

Hydrocarbon Contaminated Soils	The FCRP and Appendix X-11 the Remedial Strategy propose that contaminated material that does not meet the Canada-Wide Standards could be disposed of in the on-site landfill. For example, Appendix X-11 states: "The affected surficial material is excavated and transferred to the onsite landfarm facility for bioremediation. No surficial material has been removed from the landfarm to date. Should surficial material remain contaminated at the completion of the landfarming process, these materials will either be disposed of within the onsite inert waste landfill; or transported off-site with other contaminated materials." The FCRP indicates that the inert landfill in the North Country Rock Pile (NCRP) is and will be used for disposal of inert material consistent with that approved by the WLWB (i.e., inert material from buildings, machinery and equipment). Appendix X-13, the Landfill Cover Design confirms that the design only considers containment for inert materials: "The landfill is currently used for disposal of inert waste and will be used for disposal of site infrastructure during closure." "Waste types will include wood, metal, plastic, concrete, and other debris." This indicates that the landfill design only considered inert materials, not PHC contaminated soils. DDMI confirmed at the Technical Workshop that the landfill design did not consider containment of materials other than inert materials. In the response to IR#1 following the Technical Workshop, DDMI refers to a 2012 options analysis for management of contaminated soils which concluded that exposure to PHC contamination could be mitigated through	Consider the long-term risks associated with permanent storage of contaminated materials in the on-site landfill.
Executive Summary - pg 1-2, 2nd paragraph	The text indicates that inert material with no resale/reuse/recycle value will be disposed of on-site.	DDMI should provide justification why disposal off-site is not being considered.

Buildings and Mobile Equipment	Section 5.2.9.3.1 describes plans for handling of building materials and equipment: "Materials and equipment with no sale or net salvage value will be decontaminated, if required, broken down, and disposed of in the designated waste rock landfill or underground tunnels." DDMI indicates that sale/reuse of buildings and equipment is preferrable, followed by recycling. However, it notes that if there is no net salvage value, then material will be left on site and buried. Despite there being no net value to DDMI, some of the materials and equipment may be valuable resources that should be saved or recycled. Recycling rarely results in net salvage value to the owner. There is a cost to completing reclamation, including potentially costs for recycling of materials and equipment.	Decision-making about recycling of materials and equipment should consider a broader range of factors than just having a positive net salvage value.
Appendix X-25 FCRP V1.0 Human Health and Ecological Risk Assessment Section 3.4.3 and Table 8	Section 3.4.3 indicates humans can be exposed to sediment while swimming/bathing, yet Table 8 indicates exposure to sediment through incidental ingestion and dermal contact (hands and feet).	Please clarify.
Appendix X-25, Section 4.1.1, P.37	The mixing zones proposed by DDMI remain too large. ARC 1 should be the mixing zone boundary at which chronic effects to aquatic life are not expected.	It appears that DDMI's approach to the protection of aquatic life would not result in meeting their closure objective of no adverse impacts to aquatic life. Mixing zones need to be as small as possible and the end of the mixing zone (ARC1) should not result in chronic effects to aquatic life. Mixing zones need to be reduced and the action levels defined in the SWALF need adjustment as previously suggested.
Appendix X-25, Section 4.3.1.1	The reliance on literature models needs to be validated with site-specific toxicity testing to confirm the lack of acute lethality. Acute toxicity testing is being conducted as part of the AEMP monitoring.	Confirm model prediction of no acute lethality with toxicity test results collected as part of monitoring programs.

Appendix X-25, Section 4.3.1.1	Given that stakeholders have described considerable issues with dust and having to brush dust from the mine off of their clothing when they were situated at a distance from the mine, it is questionable whether these locations represent unimpacted areas from mine activity. It is suggested that the data relied upon as reference locations be compared with data collected pre-mining activity to confirm that they are indeed unimpacted by mining activity.	EMAB suggests that the data relied upon as reference locations be compared with data collected pre-mining activity to confirm that they are indeed unimpacted by mining activity.
Appendix X-25, Section 4.4	It is not supported to provide an interpretation of magnitude of risk based on a predicted HQ above 1. HQs cannot be linearly scaled to risk because the intercept, slope and shape of the dose-response relationship is not reflected in the point estimate HQ. Reliable comparisons can only be made through detailed understanding of the underlying concentration-response relationships, safety (application) factors, and uncertainties, none of which are conveyed by an HQ.	It is suggested that DDMI remove reference to low risk from an HQ of 5 in Table 19.
Appendix X-25, Section 4.4	It is acknowledged by DDMI that uncertainty remains with the BLM and Windward models in that predicted concentrations e.g., of copper are lower than concentration in natural conditions of Lac de Gras which seems unrealistic. This seems to underestimate the input and end concentrations in Lac de Gras which potentially underestimates risk.	DDMI should verify modelling results and once monitoring commences confirm with measured data whether the predictions are accurate.
Appendix X-25, Section 5, Appendix F, Section 2.4.1 and FCRP Section 9.1.2	DDMI included exposure from bedrock/boulders and waste rock for wildlife. What transfer factors were considered and how is the particle size present at Diavik relate to the percentage of bedrock/boulder/waste rock ingested?	Ensure that sufficient information is presented to understand methodology used in the RA.
Appendix X-25, Section 5.3.3	It is unclear how exposure to reference locations could result in higher HQs than post-closure modelled exposure. It also doesn't follow that if HQs from reference locations are equal or lower than exposure locations that there is no contribution from mining activities. The choice of reference locations remains an uncertainty and it is unclear if reference locations represent background concentrations or if other factors are contributing.	DDMI should demonstrate that reference locations are appropriate and provide an explanation on how the models may predict lower concentrations post closure.

Appendix X-25, Sections 5.3.3 and 5.3.5	It is unclear why DDMI considers an HQ of 2.7 for red-backed vole an indication of negligible risk. Any HQ above 1 can potentially indicate unacceptable risk since exposure responses are not linear and differ for each contaminant.	Clarification should be provided.
Appendix X-25, Section 5.4, Table 27	It is stated that COPCs were retained in the RA based on identification by stakeholders even if concentrations were below guideline and that this would result in an overestimation of risk. It is not clear how this would be the case since any COPC below guidelines would result in HQs below 1, therefore indicating no risk.	DDMI should provide further explanation how COPCs with concentrations below guidelines would result in an overestimation of risk.
Appendix X-25, Section 5.4, Table 27	The soil ingestion rate is stated to be overestimated for terrestrial wildlife because of less soil development compared to other locations. However, wildlife that consume plants, e.g., willow ptarmigan would still consume the same amount as the plants it consumes have the same soil requirements for growth whether they grow in shallow or deep soil and therefore, the soil ingestion rate would likely be the same.	An explanation should be provided.

Appendix X-25 FCRP V1.0 Human Health and Ecological Risk Assessment Section 6.3.1 Table 30 and 31	For human health, exposures and risks were calculated for post-closure conditions as well as for reference conditions to determine the contribution of the post closure conditions to risk. This is an acceptable approach. However the interpretation of this exposure and risk is a bit misleading and requires further information. 1) This approach assumes that equal time (frequency and duration) will be spent in the reference condition area and the mine site. Support for this assumption should be provided. Consideration of size of the mine site relative to the surrounding areas as well as conditions could be discussed. 2) The RA discusses only those situations where the dose/risk from the mine site - minus the reference dose/risk is greater than the risk threshold of 0.2 or 1X 10-5. It does not consider the situations where the post-closure conditions result in an unacceptable risk that is larger than what is attributed to reference conditions. These situations must be identified and discussed to inform whether additional management of impacts is required. 3) There is some uncertainty whether the reference locations used in this assessment are free from impacts from the mine. Reference locations used to determine regional background should be free from anthropogenic inputs and should be reflective of regional conditions.	DDMI should identify all parameters where the mine is contributing to an incremental risk above reference conditions. DDMI should also discuss the appropriateness of the reference data used and address any uncertainty with respect to the use of this data.

Appendix X-25 FCRP V1.0 Human Health and Ecological Risk Assessment Section 6.3.1 Table 30 and 31	The reviewer agrees with providing an interpretation of risk based on contribution from the mine to background conditions, however, an unacceptable risk should not be identified only if the difference in the risk from the mine is greater than the acceptable risk threshold. As per Alberta Health guidance (referenced in DDMI's response) "The primary outcome of a quantitative HHRA is to estimate the risk of potential adverse health effects on an individual, community or population that could arise from changes in environmental quality due to the proposed project alone and combined with the cumulative impact from other existing and planned projects, as well as inclusion of ambient or baseline conditions in the region. By comparing the predicted risks with the relevant protection goals, the overall effect of a project on human health, and the significance of the effect, can be assessed". Alberta's guidance is to assess the risk from the project alone, and to assess the risk from the project in addition to reference and other local contributions. ...continued in next cell	DDMI should revise the approach to identify and discuss all risks above background.
Appendix X-25 FCRP V1.0 Human Health and Ecological Risk Assessment Section 6.3.1 Table 30 and 31 (continued)	BC's guidance indicates that any parameter that has a measurable increase from baseline conditions (measurable increase is defined as a predicted increase equal or greater than he lowest laboratory RDL) due to project activities is to be kept as a COPC and retained for assessment. As such DDMI should consider re-evaluating the potential risks to be any of those that are predicted to be greater than the acceptable risk thresholds where mining activity has resulted in a potential increase in exposure.	
Section 9	General Comment- no references are provided for statements made, e.g., dermal exposure for birds and mammals being negligible.	References as support for statements should be added to the text.
Section 9.1.1	The NI (in addition to the NI point location) is also considered an acute exposure location.	DDMI should justify why NI is considered an acute exposure location.

Section 9.1.1	Near-field exposure receiving environment is based on 100 to 200 m mixing zones.	Greater than 200m is unacceptable for a mixing zone. Chronic benchmarks should be met at around 100 m from the discharge point. DDMI should revise their approach.
Section 9.2.2, Table 9.2	Typographical error- scientific name for red fox is *Vulpes vulpes* .	Please correct.
Section 9.3	The last paragraph of this section (Background COPC concentrations in soil…) is not clear.	Please consider re-wording the paragraph so that the approach taken is clearly explained.
Section 9.4.1	The surface water ingestion exposure pathway for aquatic life was identified as inoperable. This is in contradiction to Appendix X-25, Section 3.4.1.	Please clarify and ensure consistency.
Section 9.4.3	Ingestion of surface water run-off and direct contact with and ingestion of surface water in the pit lakes were not considered operable pathways for human receptors. This is in contradiction to Appendix X-25, Section 3.4.3 where direct contact and ingestion of surface water from the pit lake is considered operable. Ingestion of surface water run-off was considered inoperable based on the volumes being insufficient. However, since surface water run-off volumes vary seasonally exposure from ingestion should be considered. Similarly, the assessment of direct contact and ingestion of pit lake water should be included in the HHERA.	These exposure pathways should be assessed for human receptors as they can be considered complete.
Section 9.4.3.1	Birch was used as surrogate for Labrador Tea. It was not stated which part of birch were substituted for Labrador Tea and whether it was for the same type of traditional use.	Please clarify.
Figure 9-2 Eco CSM	Uptake and ingestion of bedrock and boulders is shown as a complete exposure pathway for terrestrial invertebrates, plants, birds and mammals. It is unclear how this would be media considered in an HHERA since bedrock and boulders cannot be taken up or ingested and there are no guidelines for these non-soil components.	It is unclear how these pathways would be completed and how contaminants were measured in bedrock and boulders and what guidelines were used to determine COPCs in bedrock and boulders. Please provide sufficient information to allow transparency.
Figure 9-2 Eco CSM	The exposure route for terrestrial invertebrates to surface water and ingestion by aquatic birds and mammals is shown as complete. It is unclear how this exposure pathway would occur.	An explanation should be provided.
Figure 9-3 Eco CSM	Minor comment- The full blue arrow is missing in the legend of the figure. It is also not shown what PK stands for.	The legend should be revised.
Figure 9-4 HH CSM	Sediment to wild game to human receptor ingestion is shown as complete exposure pathway. It is unclear how wild game is exposed to sediment. Also, this exposure pathway is not shown in Section 9.4.3.	Please clarify.

Section 9.6.2	It is stated that exposed bedrock/boulders and waste rock contributed to less than 2% of the HQs for these receptors and COPC combinations. It is unclear how bedrock and boulders can contribute to a hazard quotient (or how exposure would be predicted from rock.	An explanation should be provided.
Section 9.6.3	The assumption that people will not access the shoreline with bare feet and will wear shoes is considered a risk management measure. It is not appropriate to minimize unacceptable risk using assumptions that may or may not be true, if people are assumed to be swimming and bathing in the lake, they may have bare feet as they pursue those activities.	DDMI should revise the HHRA accordingly.
Section 9.7	The conclusions of the HHERA were that risks to aquatic, wildlife and human health posed by the project were negligible and as a result no additional closure activities, remediation or monitoring is required beyond that already envisaged. However, a number of HQs in the ERA and HHRA were above 1. It is unclear how this would no pose a potentially unacceptable risk to ecological and human receptors.	Please clarify.
Appendix X-25 FCRP V1.0 Human Health and Ecological Risk Assessment Table 30 and 31	DDMI should discuss all parameters where the HQ or ILCR are above the acceptable risk threshold and mining activity has contributed to exposure.	Additional discussion should be added for all parameters where potential unacceptable risks are identified and the mine contributed to exposure.
Appendix X-25 FCRP V1.0 Human Health and Ecological Risk Assessment Appendix E Soil	It is unclear why soil has not been sampled for PHC and PAHs given the use of heavy equipment on the Site, and the presence of an underground fuel bay and a tank farm.	DDMI should provide a rationale for why PHCs and PAHs in soil were not considered.
Appendix X-25 FCRP V1.0 Human Health and Ecological Risk Assessment Appendix I Table I-2	Please confirm the servings/week of a woman of childbearing age for berries. It appears to be low relative to other receptors and other food stuff.	Please verify the assumption.
Appendix X-25 FCRP V1.0 Human Health and Ecological Risk Assessment Appendix I	An ingestion rate was not calculated for a child for caribou kidney and liver. How will DDMI assess this exposure to children?	Provide rationale to support the evaluation of the exposure route to children of the consumption of caribou organs.
Appendix X-25 FCRP V1.0 Human Health and Ecological Risk Assessment Appendix I Section 2.1, p5	"…whereas Recreational receptors were considered to only eat Caribou (meat, fish and berries). This sentence requires modification as it is misleading.	Consider changing to "…whereas Recreational receptors were considered to only eat Caribou (meat), fish and berries.
Appendix X-25 FCRP V1.0 Human Health and Ecological Risk Assessment Appendix I Section 2.2, p8	DDMI assumed that a Recreational receptor could visit the site for hunting and wildlife observation, but assumed that they would not take food items home for consumption at other times of the year. If the Recreational hunter is hunting larger game, then this assumption would not be valid.	DDMI should provide rationale to support the assumption and at a minimum address the uncertainty surrounding the assumption in the uncertainty section of the HHRA.

Appendix X-25 FCRP V1.0 Human Health and Ecological Risk Assessment Appendix I Section 2.3	How is DDMI addressing the uncertainty as the arsenic concentrations predicted are below the range for which the in vitro/in vivo validation are available and below the range used to develop the regression equation.	DDMI should provide a discussion of the uncertainties associated with relying on a model for which the predicted concentrations are outside the validation range.
Appendix X-25 FCRP V1.0 Human Health and Ecological Risk Assessment Appendix I Section 6.1 Exposure Concentrations	DDMI assumed that human receptors can access any area of the Site and surrounding areas and therefore did not consider exposures from the site separate from the surroundings area. This assumption makes it difficult to determine the contribution of the exposure to people from the mine as it is assumed they spend equal time at the mine Site and surrounding areas. Given the exposure duration assumed on site, and given the approach that DDMI has taken to look at incremental exposures from the mine Site, this assumption requires support.	DDMI should provide a rationale for the approach taken.
APPENDIX C - Exposure Concentrations, Section 3.10 Fish Tissue, p.54	The HHERA indicates that the only COPC with measurements for Lake Trout is mercury. There are data available for other metals in Lake Trout. For example, Lake Trout muscle was analysed for a suite of metals in 2015 (Golder 2017) and 2018 (Golder 2019) as part of the Traditional Knowledge Study.	Verify that the conclusions of the HHERA would not change with the use of actual Lake Trout metals data.

APPENDIX C - Exposure Concentrations, Section 3.10 Fish Tissue, Table C-38, p.55	Appendix C indicates that summary statistics for metals in Slimy Sculpin were calculated using near-field and mid-field data collected from 2007 to 2019. DDMI recently noted that the 2007 Slimy Sculpin metals dataset is anomalous as the laboratory analysis method differed from other years. This observation would warrant exclusion of the 2007 dataset, though it is noted that the 2007 data are believed to be "biased high" and therefore their inclusion may err on the side of being conservative in the HHERA. The 2016 data are also considered to be problematic due to inadvertent exclusion of sculpin livers in the analysis of metals in sculpin carcasses; in this case the dataset is expected to be biased on the low side. Table C-39 presents the Reference Condition concentrations for Slimy Sculpin metals. These values may also be affected by inclusion of these two datasets. Additionally, derivation of Bioaccumulation Factors (BAF) presented in the HHERA may be affected as they reportedly include metals measured in Slimy Sculpin over the period of 2007-2019. While exclusion of the 2007 and 2016 datasets from the HHERA may have little to no effect on the risk assessment conclusions, it would be prudent to assess whether any conclusions of the RA would change with exclusion of these data.	Verify conclusions of the HHERA would not be affected by removal of the 2007 and 2016 slimy sculpin metals datasets.

APPENDIX C - Exposure Concentrations, Section 3.10 Fish Tissue, Table C-38, p.56	It is unclear what data were used for mercury in Lake Trout in the HHERA. Table C-38: Summary Statistics for Small-Bodied and Large-Bodied Fish Tissue Concentrations Used in the ARA, WRA and HHRA for Post-Closure Conditions indicates that the Lake Trout mercury summary statistics were derived from a sample size of 250, however the text (p. 54) indicates that monitoring data from 2008-2018 were used. Based on Lake Trout mercury data provided to EMAB by DDMI previously, this sample size appears to be in error and appears to include data prior to 2008 and possibly multiple measurements made on the same fish in 2008 and/or duplicate samples. Could the specific dataset used for this task be clarified? For the 2008 data for which there are three sets of measurements, which dataset was used?	Verify and clarify what specific mercury in Lake Trout datasets were used to define summary statistics to support the HHERA. Data sets should exclude replicate samples and analyses (e.g., 2008 dataset). Verify that the conclusions of the HHERA would not change with use of a corrected dataset (if applicable).
APPENDIX C - Exposure Concentrations, Section Appendix E, Table E-15 (no page number indicated)	Table E-15 indicates the reference condition for mercury in Slimy Sculpin is based on the higher of the two 75th percentiles of measurements (upper end of the normal range) collected in 2007 and 2010. The value indicated (0.000085 mg/kg w.w.) is considerably lower than the 75th percentiles presented in the Reference Conditions Report (Golder 2022; 2007 = 0.085 and 2010 = 0.018 mg/kg w.w.) and lower than analytical detection limits employed over the monitoring period. Golder. 2022. AEMP Reference Conditions Report Version 2.1. Submitted to Diavik Diamond Mines (2012) Inc. Yellowknife, NT, December 2022.	Verify the Reference Condition value identified for mercury in Slimy Sculpin is correct. If incorrect, describe any changes to the assessment and conclusions.

Human Health Risk Assessment - Drinking Water	Section 9.2.3 describes Indigenous Receptors considered in the Human Health Risk Assessment (HHRA). The receptor description assumes that Indigenous users will rely on Lac de Gras as a drinking water source. However, DDMI proposes water quality criteria for mixing zones that are based on recreational water quality – allowing water quality in these areas to be considered acceptable if it reaches levels as high as 20 times the drinking water guidelines – based on the assumption that people do not drink the water but only have incidental intake associated with recreational activities. The revised SWALF options propose an Action Level 3 trigger that would be reached only when water quality at the mixing zone boundary exceeds drinking water criteria.. This means that water quality within the mixing zone – but still in Lac de Gras – could exceed drinking water standards before corrective action is taken.	Describe how the use of 20X drinking water standards as water quality criteria for mixing zones was considered in the HHRA, and what implications there may be for Indigenous users who may use drinking water from within the mixing zone areas. Given that water quality within the mixing zones is expected to exceed drinking water criteria, DDMI should identify how it plans to manage long-term constraints on use of water within the mixing zone areas for drinking water purposes.
Addressing Traditional Knowledge Panel Recommendations: WLWB Decision #7 and Revision #14 - ICRP 4.1	WLWB Decision #7 (ICRP 4.1): In CRP submissions moving forward, address all recommendations received based on Traditional Knowledge, describe how the recommendations were incorporated into the submission, and provide justification for any recommendation not adopted. WLWB Revision #14 (ICRP 4.1): In the final CRP, describe how each TK Panel Recommendation was incorporated into the submission, and provide justification for any recommendation not adopted. EMAB's review of Appendix IX, and particularly IX-2 finds that Diavik has not addressed Decision #7 in a meaningful way. Tables 3.1 through 3.11 present paraphrased versions of many of the TK Panel recommendations, a general description of how the closure plan addresses the paraphrased recommendation and a statement of whether the recommendation is accepted but not started, in progress, completed, not applicable or not accepted. continued in next cell...	Diavik has not fulfilled WLWB Decision #7 / Revision #14 from ICRP 4.1, and should be required to do so. It may be helpful for the WLWB to give Diavik more specific direction on this.

Addressing Traditional Knowledge Panel Recommendations: WLWB Decision #7 and Revision #14 - ICRP 4.1 (cont.)	The paraphrased recommendations do not state which TK Panel recommendation they are addressing and the tables do not specifically refer to a section of the FCRP where a recommendation has been incorporated. The justifications for not adopting a recommendation are generally insufficient. In a few cases where EMAB followed up one of the referenced recommendations we found that recommendations listed as complete had not been addressed eg. TK Panel Recommendation 7.15 is shown in Appendix IX-2 Table 3.1 (p 9, top row) as complete but Diavik did not follow up with the TK Panel as recommended.	
Addressing Traditional Knowledge Panel Recommendations: WLWB Revision #7 - ICRP 4.1	WLWB Revision #7 (ICRP 4.1):Revision #7: In the final CRP, clarify how “Traditional Knowledge verification” will be evaluated and what associated monitoring is required. Section 1 of Appendix VI-1 on Closure and Post-Closure Monitoring includes a description of "The Communities-Traditional Knowledge “Closure Watching” Program" including Seasonal On-Site Observers, Area Closure Watching and Verification Sampling. It includes a general description of verification in comparison to science results. Section 5.1 of Appendix VI-2 on Aquatic Monitoring includes the same description of the Closure Watching program and the same description of verification. Section 4 of Appendix VI-3 on Wildlife Monitoring describes engagement and incorporation of TK, with Section 4.3 including the same description of the Closure Watching program and the same description of verification. There are no details provided on how the verification will be evaluated, or the associated monitoring.	Diavik has not fulfilled WLWB Revision #7, and should be required to do so. It may be helpful for the WLWB to give Diavik more specific direction on this.

TK Monitoring Plan: WLWB Revision #8 - ICRP 4.1	WLWB Revision #8 (ICRP 4.1): In the final CRP, propose the Traditional Knowledge Monitoring Plan. Include an engagement log which identifies how recommendations made through engagement were considered and incorporated, or provide rationale for those not incorporated. The level of detail provided in this Plan should provide the Board confidence that Traditional Knowledge has been integrated into the post-closure monitoring program and evaluation of successful closure. Diavik has not submitted the Traditional Knowledge Monitoring Plan (TKMP) required by the WLWB. It is Diavik's responsibility to submit a TKMP that is based on engagement with all Affected Communities, and addresses all recommendations made through that process, as directed by the WLWB. Diavik has provided a 1 page description of "The Communities-Traditional Knowledge “Closure Watching” Program" including Seasonal On-Site Observers, Area Closure Watching and Verification Sampling in Appendix VI-1, VI-2 and VI-3. The relationship between the Closure Watching program and the TKMP is not clear. Diavik has not provided an engagement log on the Closure Watching program or any information on community recommendations regarding the proposed program. continued in next cell...	Diavik should explain the relationship between the "Communities-Traditional Knowledge “Closure Watching” Program" and the TKMP, if any. Diavik should identify all community recommendations regarding the proposed Closure Watching program as per WLWB Revision #8. Diavik should submit a detailed workplan for development of the TK Monitoring Plan through the TK Working Group of the Parties, including resources required and a timeline for completion. This should be submitted as soon as possible for WLWB approval. It may be helpful for WLWB to define some basic principles for the TKMP including: - meet the requirements of WLWB Revision #8 - involve all Affected Communities in the development of the TKMP - involve all Affected Communities in implementation of the TKMP

TK Monitoring Plan: WLWB Revision #8 - ICRP 4.1 (cont.)	Diavik has had many years to develop the TKMP with little progress. It has changed its approach a number of times, each time starting again at square one. The result is continued delays in development of the plan. - Diavik worked with the TK Panel for several years seeking input on TK with respect to closure planning, including monitoring. - In April 2022 Diavik provided an update on the TKMP to EMAB that included a draft description of an approach to TK Monitoring that involved engaging with the Indigenous Government Organizations (letter of April 6'22, attached). It proposed to submit a final TKMP based on those discussions as part of the FCRP. - In August 2022 Diavik informed EMAB that it had decided not to follow its proposed approach to TK Monitoring and instead planned to issue a request for Expressions of Interest (EOI) to a range of Indigenous governments and organizations to bid on development of a TKMP. It hoped to have a program design prepared by mid-2023. This is the approach presented in Appendix IX-5 of the FCRP - Following objections from EMAB (see attached letter of December 15, 2022) and some other community organizations to the structure of the EOI process, Diavik decided not to proceed with it, and convened a meeting of the Parties to the Environmental Agreement to discuss a path forward for the TKMP. The meeting took place January 20, 2023. continued in next cell...	
TK Monitoring Plan: WLWB Revision #8 - ICRP 4.1 (cont.)	A TK Working Group was established at the January 20, 2023 meeting of the Parties, and tasked with development of the TKMP (minutes attached). Diavik has not provided a timeline for development of the TKMP through the TK Working Group. EMAB is concerned that the TKMP is not in place and there is no clear workplan or timeline to develop and implement the plan.	

TK Monitoring of Discharges and Cultural Use Criteria	The TK Monitoring Program is an important component of Diavik's closure monitoring and it is disappointing that Diavik has not yet submitted it, leaving the monitoring of discharges and SWALF without Traditional Knowledge (TK) components. Diavik is responsible for developing the TKMP and should have included it in its FCRP submission. In follow-up to Information Request #4 at the March 6-10'23 Technical Sessions Diavik proposed considering inclusion of cultural use criteria as an Action Level 3 trigger. However monitoring of cultural criteria was not described. In Diavik's most recent proposed version of the SWALF (response to interventions on the Natural Drainages Water Licence Amendment Application) Diavik has removed references to cultural use criteria. Diavik has stated that it expects that if water quality meets AEMP objectives, it also expects it would meet cultural use criteria (Transcript of WLA Technical Session, Day 1, page 236 & 237). EMAB disagrees with this view; Diavik should explain and provide evidence to support its statement that cultural use criteria will be met by achieving AEMP benchmarks, showing a direct linkage between each of the cultural criteria and the AEMP benchmarks. ...continued in next cell	A condition should be included in any approval for Diavik to breach collection ponds that Diavik propose Traditional Knowledge monitoring of the collection ponds, discharge and effects on the receiving waters, and incorporate early warning triggers into the SWALF. EMAB's opinion is that community observers need to assess whether cultural use criteria have been met. If Diavik proposes that meeting AEMP Benchmarks also meets the cultural use criteria, then it must demonstrate a direct linkage between each of the cultural criteria and the AEMP benchmarks, as directed by the WLWB in its decision on PK Management Plan Version 7.0 and Cultural Use Criteria. EMAB seeks clarification from WLWB on how a determination will be made about whether cultural use criteria have been met, and if they are not met, how this will be addressed.
TK Monitoring of Discharges and Cultural Use Criteria (cont'd).	In its decision on PK Management Plan Version 7.0 and Cultural Use Criteria, the WLWB decided that Diavik must provide "A demonstration of how results of water quality monitoring for AEMP Effects Benchmarks compare to cultural use criteria to confirm the inference that meeting AEMP Effects Benchmarks will lead to meeting cultural use criteria." with each PKMW Modeling update (Decision #5, part ii).	
Climate Projections (Appendix X-24)	Because bias-corrected, and downscaled climate projections were not yet available from the IPCC AR6 (2021) for the site at the time of writing the climate change assessment, future climate projections from publicly available statistically downscaled daily future climate projections used were based on the Fifth Assessment Report. Because AR6 climate projections have not been downscaled for the Project site yet, it is unknown how this will translate locally, but there is potential for predicted climate parameters to be different (potentially hotter temperatures) than under AR5.	It is recommended to run sensitivity analyses to understand the potential implications of a greater temperature increase on the Project Closure Plan. Sensitivity analyses were run for the Processed Kimberlite Containment Facility (PKCF) thermal cover design, but not site-wide. The plan should also include contingency mitigations associated with a greater temperature or precipitation increase.

Climate Projections (Appendix X-24)	Diavik's climate change assessment presents climate projections obtained using 24 different Global Climate Models (GCMs) focused on three AR5 Representative Concentrations Pathways (RCPs; RCP 2.6, RCP 4.5, and RCP 8.5). Projections across the multi-model ensemble are summarized in terms of percentiles where the 50th percentile represents the median value and the 95th percentile represents extreme projections for the site. Since the RCP 6.0 pathway is not included (downscaled projections are not available for this pathway), we are concerned that the 50th percentile and to a lesser extent the 95th percentile have a low bias. "Downscaled outputs are based on GCM projections from the Coupled Model Intercomparison Project Phase 5 (Taylor et al. 2012) and historical daily gridded data across the globe (Sheffield al. 2006) and are available for 21 GCMs. Two scenarios (RCP 2.6 and RCP 4.5) are available for each of the 21 GCMs which results in 42 individual climate scenarios." (Section 2.1.2, p.10). It is unclear if the use of the two lower representative concentrations pathways only (RCP 2.6 and RCP 4.5) is also introducing bias in the range of predictions.	Describe any possible bias in climate projections and discuss implications.
Climate Projections (Appendix X-24)	Climate projections are available up to 2100, and Diavik's climate change assessment includes a semi-qualitative approach allowing for monthly timeseries of precipitation and temperature variables to be generated up to 2126, along with estimates of the climate projection statistics for the 2120s future period (2106-2135). Certain aspects of the Project closure design are however expected to be maintained in perpetuity (e.g. North Country Rock Pile frozen cover).	A discussion of the different emissions pathways and of their implications for the Project design in the long-term (beyond 2120s) should be included to better understand if the closure design can be expected to be sustainable over that time horizon.
Climate Parameters (Appendix X-10)	The current climate parameters were sourced from the baseline climate analysis update (Golder, 2021) in the Current and Projected Climate Parameters compilation document (Appendix X-10). This is different than the current climate parameters used in the climate change assessment which used a longer infilled time series (Appendix X-24). For certain parameters, future climate is presented as % change from current climate, but the "current climate" reference is different in the two documents. This inconsistency could introduce discrepancies and/or inaccuracies and missing data (e.g. some values not available from Golder 2021).	A reference baseline dataset should be established and used consistently for all models, analyses and projections.

Water Balance (Appendix X-19)	The water balance model approach evaluates conditions under three closure scenarios (around 2025, without considerations for climate change, around 2125 with consideration for climate change using the 50th percentile projections and around 2125 with consideration for climate change using the 95th percentile projections), but only for an average precipitation year.	It is recommended that the three closure scenarios also be modeled for a dry (1:100) and for a wet (1:100) year.
Water Quality Model (Appendix X-20)	The water quality model was run for a 1:100 dry year under current climate and for an average precipitation year under climate change projections (50th and 95th percentile).	Similar to the water balance, it is recommended that the three scenarios (current climate and two climate change scenarios) be modelled for a dry year (1:100), average year, and wet year (1:100). While a dry year would result in higher contaminant concentrations for a given mass loading, a wet year could result in storm surges and increased flushing of contaminants.
Water Quality Model (Appendix X-20)	*"The climate change scenarios resulted in lower predicted concentrations, overall. This is due to the cumulative annual mass loading being released over a longer period of time each year (early May through October or November), which results in a smaller amount of mass being released on a daily basis relative to the base case scenario. It is also a function in the increase in the runoff volume. Predicted concentrations decrease with increasing percentile climate change projections." (Appendix X-20, p. 18)*	It would therefore be prudent to also model the lower percentile end of climate change projections (e.g. 5th percentile which predicts a decrease in precipitation).
North Country Rock Pile Closure Design (Appendix X-16)	Thermal analysis conducted on the closure design of the North Country Rock Pile relies on data from 2010 and 2011. It is unknown whether current ground temperatures at varying depths, and seasonally, are the same as the temperature measurements taken more than 10 years ago, and whether the site still overlies continuous permafrost. It is also unknown whether the active layer zone depths, seasonally, are the same, and if the permafrost layer is present and is the same thickness. Recent measurements were taken in the till layer (Appendix X-16 Attachment E and Appendix H), but the depth of the measurements is not known.	Further measurements are needed to provide a complete understanding of seasonal temperature changes within and below the NCRP over time. Measurements (ground temperature at varying depths, and seasons; active layer and permafrost layer thicknesses; continuous permafrost zone confirmation) should be re-taken for the NCRP.

North Country Rock Pile Closure Design (Appendix X-16)	The climate scenarios case studies for the cover designs climate change prediction ranged from 1970 to 2060, which is 37 years from now. The predictions do not go far enough in the future to consider closure and post-closure 100 years from now. In addition, this prediction was completed in 2008. Fifteen year later, there is more information known, and updated, more accurate climate change scenario predictions available.	The updated climate change assessment, Diavik Diamond Mines Climate Change Assessment (Golder, 2021), should be applied to thermal modelling cover design analyses. Warmest temperature scenarios (95th percentile) should be applied to thermal cover climate change numerical analyses.
North Country Rock Pile Closure Design (Appendix X-16)	The case study numerical simulations of the thermal cover design only considered predicted temperature changes over time, and not precipitation projections. There was no discussion or analyses completed on the effect of increased precipitation over time due to climate change, and how that could affect the saturation level of the till layer, including the possibility of over-saturation. Additionally, there was no discussion on how increased predicted precipitation, including extreme events such as storm surges and flooding, could affect water management and increased ponding along the sides of the North Country Rock Pile.	Updated thermal modelling of the NCRP cover should incorporate predicted precipitation changes from the Diavik Diamond Mines Climate Change Assessment (Golder, 2021). These predictions should be applied to the till design layer of the thermal cover, and water management designs of the NCRP.
North Country Rock Pile Closure Design (Appendix X-16)	Design specifications of the cover, test piles and climate change scenarios were all completed in 2013 as part of a PhD thesis by Hoang Pham entitled "*Heat transfer in waste-rock piles constructed in a continuous permafrost region*" . Pham provided follow-up recommendations, as there were still gaps in his study of the NCRP thermal cover design.	These recommendations should be implemented: Test piles were much smaller than the NCRP, and so measurements should be taken from the NCRP, to measure the thermal regime of the bedrock beneath the pile and within (Additional thermistors beneath and within the pile and Additional heat flux plates should be installed.) Additional numerical simulations are needed to examine the influence of water transport on the thermal behaviour of the cover.
Diavik Processed Kimberlite Containment Facility: Rockfill Option Closure Design (Appendix X-15)	The report does not provide geochemical characterization of the material within the facility, and there is no consideration for how this material will be managed and the facility designed based on geochemical characterization.	Discussion of the ARD/ML characterization of the materials in the facility should be discussed, along with how this informs the material placement and design of the facility. Monitoring (including groundwater monitoring) planning at closure, including cover performance should be discussed.
Diavik Processed Kimberlite Containment Facility: Rockfill Option Closure Design (Appendix X-15)	There is no discussion of the active layer and permafrost depths underlying the facility. Ground temperature measurements, and measurements within the Extra Fine Processed Kimberlite (EFPK) were not taken.	Ground temperature measurements below the facility and within should be measured seasonally, to characterize the extent of permafrost and active layer, as well as temperatures within the facility year-round.
Diavik Processed Kimberlite Containment Facility: Rockfill Option Closure Design (Appendix X-15)	Cover trials were short-term and only conducted in the spring and summer months. There were no year-round trials conducted.	Cover trials should be conducted year-round to understand the cover performance year-round.

Diavik Processed Kimberlite Containment Facility: Rockfill Option Closure Design (Appendix X-15)	Precipitation changes (increases) due to climate change is not considered in the climate change scenarios within the thermal cover modelling.	Thermal cover modelling climate change scenarios should include precipitation changes. This modelling should include moisture transport within the facility. Water management should address potential increases in precipitation due to climate change.
Diavik Processed Kimberlite Containment Facility: Rockfill Option Closure Design (Appendix X-15)	Climate change scenarios use a temperature increase of 5.6°C over 100 years. This value is likely taken from the 2008 study from Environmental Modelling and Prediction P/L Australia.	Climate change scenarios for thermal cover modelling should be re-run with up-to-date climate change prediction values. Long-term site-specific data should be incorporated into climate change predictions.
Diavik Processed Kimberlite Containment Facility: Rockfill Option Closure Design (Appendix X-15)	Thermal modelling was conducted in 1D. Stevens et. al. 2018 recommend 2D modelling to allow for analyses of slopes, geometric effects, boundary conditions modified to meet surface conditions.	Thermal modelling should be conducted in 2D.
Appendix VI-1 Section 3.1.2.3 and 3.1.2.4, p.12	It is not clear how many monitoring events of dust for the closure and post closure phase need to be below the NWT residential/parkland guideline before monitoring can cease.	DDMI should consider stating a minimum number of sampling events where the monitoring results must be below the air quality criteria for dust fall, before monitoring can cease.
Appendix VI-1 Section 3.1.4.4 Comparison to Closure Criteria	The text indicates that 5 years of data will be used to determine achievement of SW1 and SW2 and that a weight of evidence approach will be applied. The FCRP would benefit from additional details regarding what will be considered in the weight of evidence approach as well as factors that will be considered to reduce or alter the monitoring requirements.	Diavik should provide details of what will be included in the performance assessment reports (PAR) for the FCRP. The information contained in the performance assessment reports should also be indicated to be subject to board approval.
Appendix VI-1 Section 3.1.4.4 Comparison to Closure Criteria	As discussed at the FCRP workshop, once closure criteria and closure designs are complete, Diavik plans to provide outlines for the PARs for the various components.	Diavik should be required to provide detailed outlines for each PAR well in advance of submission.

Security - long term maintenance and monitoring	The FCRP asserts that "The site closure has been designed with the view to no long-term maintenance requirements" (e.g., Sections 5.2.5.7, 5.2.6.6). For a site of this scale and with permanent structures for conveyance of water and containment of PK (i.e., tailings dams), there should be no expectation that long-term maintenance will not be required. Monitoring will certainly be required to observe the conditions of dams, spillways, conveyance channels and covers (e.g., waste rock, PK). Severe events, for example extreme floods or earthquakes, greater than expected climate change or changes caused by permafrost, may lead to adverse effects on facilities that are critical to maintaining physically and chemically stable post-closure conditions. Because this site has permanent structures for containment of tailings and water, and conveyance of water, there will be permanent requirements for ongoing monitoring and likely occasional maintenance. The FCRP should describe expectations for these activities and identify how they will be financed and managed in the long-term.	The FCRP should be revised to recognize and describe requirements for longterm monitoring and estimates of maintenance requirements. Mechanisms for financing and managing these long-term requirements should be identified. The post-closure monitoring and maintenance plan should be updated to provide a realistic description of the duration of expected post-closure monitoring for all facilities and closure elements. DDMI should describe how it intends to address its responsibilities for long-term monitoring and maintenance of closure success, even after achievement of closure criteria, including how it will address costs and implementation. The RECLAIM estimate should be updated to take these long-term costs into account.

Security - access for long term maintenance and monitoring	EMAB has commented previously about the need for long-term maintenance or repair costs that might include building a winter road and setting up a camp, or the worst-case scenario where climate change no longer allows construction of a winter road. Diavik has said it believes GNWT must advance the policy context first. Diavik now proposes that its design philosophy for closure is sufficiently robust that it will not require any long-term maintenance and so there will be no need to mobilize equipment on a winter road (Appendix VI-4, section 4). While EMAB applauds Diavik's philosophy and efforts to develop robust engineering designs, we note the uncertainties associated with the NWRSA design, and the lack of a final PKC design as well as ongoing climate change, and the inherent uncertainties in predicting future conditions over periods of decades and centuries. We are not prepared to accept that there will never be the possibility of a need to mobilize equipment to the mine post-closure.	The WLWB identified Winter Access to the mine as Security Issue #9 in its RFD for ICRP 4.1. EMAB requests WLWB provide an update on its follow-up with GNWT to inform future proceedings on this topic. In EMAB's view these estimates should include the scenarios where either the entire ice road must be built, or where climate change no longer allows the construction of an ice road. Sufficient mobilization security will need to be held back to bring equipment and operators to site, along with any support requirements (staff, camp facilities etc.) and demob them after the proposed work is completed. This security will need to be held back until a time when regulators are satisfied that the issues associated with the uncertainties will not occur.

Security - post-closure holdbacks	Diavik's proposed Post-Closure Holdbacks need to be expanded and better justified. The MVLWB Guidelines for Closure and Reclamation Cost Estimates for Mines guidance on holdback ranges shown in Table 1 (selected) are: - tailings ponds 20% to 50%; Diavik proposes 20% - rock piles 20% to 50%; Diavik proposes 10% - water treatment 50% to 100%; not included - revegetation 10% to 100%; not included Diavik's PKC design is in preparation with a number of uncertainties. Diavik is proposing a holdback at the lowest end of the guideline range. This is likely inadequate at this stage of the design. There are uncertainties with the NWRSA performance over the long-term. EMAB also has concerns about the design of the SWRSA. Diavik is proposing a holdback less than the lowest end of the guideline range. This is inadequate. There is still potential for water treatment to be required. Diavik has not included a water treatment holdback. The revegetation design is inadequate and will need to be revised; there are many uncertainties. Diavik has not included a revegetation holdback.	In EMAB's estimation Diavik's proposed holdbacks are likely too low. Diavik must address all the potential holdback items and provide a more fulsome discussion and justification of its propose holdback amounts.
Closure Cost and Liability: Post-Closure Monitoring	There does not appear to be a contingency to cover potential increases in duration or frequency of post closure monitoring.	Diavik should add a contingency for increasing duration and/or frequency of post-closure monitoring.
Security - need to update RECLAIM estimate after revisions to FCRP 1.0	EMAB expects Diavik will need to make significant revisions to its FCRP, notably in relation to PKC closure design and revegetation design as well as a number of other components.	EMAB looks forward to reviewing a revised RECLAIM estimate that will accompany a revised FCRP.

Financial Assurance and Financing for Long-Term Care	The plan does not appear to include funding for long term care and maintenance of the facility beyond 2050. The PKC is an engineered facility and long term monitoring and possibly maintenance may be required. Potential requirements beyond 2050 could include: • Rebuilding the PKC spillway as a result of damage or need to lower the invert because of settlement in the PKC. • Additional rock to either the NCRP or PKC to assure long-term freezing or to address greater than expected settlement. • Monitoring costs beyond 2050. • Cleanup of spilled PKC in the event of catastrophic failure EMAB also notes that GNWT was directed to provide an indication on timing of the expectations and process for relinquishment of mine sites in the Mackenzie Valley. EMAB's understanding was that this question referred to the development of a regulatory and policy framework for relinquishment, and responsibility for long-term liability at any mine site. In our view GNWT did not answer this question.	The WLWB should assure funding is in place for long term care and maintenance of the site beyond 2050. There is a moral responsibility for all proponents to assure there is adequate funding for long term care and maintenance such that the burden does not revert to the land owners. WLWB should direct GNWT to provide timelines for the development of the regulatory and policy framework for relinquishment of mine sites in the Mackenzie Valley, including responsibility for long-term liability.
Engagement on FCRP	Diavik held four information sessions on different sections of the FCRP from March to September 2022, including a site visit in June. These were useful opportunities for Diavik to present its FCRP at a general level and for participants to ask questions. Participants included regulators, EMAB and people from Affected Communities. Diavik has included the presentations from each session and notes from the discussion.	EMAB appreciates the information sessions Diavik organized. We note that our expectation was that Diavik would contact EMAB regarding engagement prior to presenting their approach at the FCRP information sessions, and that the sessions should not be considered to have fulfilled WLWB directives on engagement in the RFD for ICRP 4.1. EMAB recommends that in future WLWB provide specific direction as to its expectations for engagement to ensure acceptable engagement occurs.

Reporting on Engagement as per WLWB Requirements for Engagement in RFD for ICRP 4.1	Engagement Requirement #2: Prior to submission of the final CRP, engage with parties on the closure on the method for proposing and implementing reductions (including cessation) to post-closure monitoring. In Appendix XII-4 Diavik described how this requirement was addressed at its FCRP information sessions. As noted, the FCRP Information Sessions did not include engagement. Diavik presented its approach to implementing reductions to post-closure monitoring and answered questions, then suggested that participants submit any comments through the FCRP review process. There was no further discussion on how Diavik's approach might be changed, as directed by the WLWB. Engagement Requirement #3: Engage with parties on additional modelling required to support the final CRP submission, including what additional supporting information is required in the submission. Diavik explains in Appendix XII-4 that the required engagement took place through the Progressive Reclamation Water Licence Amendment proceeding. It then refers to documents submitted with the FCRP, which were not submitted with the Amendment Application. A review of EMAB's comments on the modelling provided in the FCRP shows that Diavik did not engage on its modelling prior to submission.	While it is too late for Diavik to undertake meaningful engagement on Requirements 2 and 3, it should make greater efforts to comply with WLWB directives related to engagement in future.

Reporting on Engagement as per WLWB Requirements for Engagement in RFD for ICRP 4.1 (continued)	Engagement Requirement #4: Engage with EMAB to understand how the EEM and Performance Monitoring work together. Engagement Requirement #4 relates to Revision #28 and refers to Diavik's Wildlife Monitoring Program as a form of environmental effects monitoring, as opposed to performance monitoring, and directs Diavik to engage with EMAB on our comments and how they relate to closure objectives and criteria SW8 and SW10, and monitoring. Diavik appears to have misunderstood the directive and in its response in Appendix XII-4 it refers to EEM in relation to the AEMP. In Diavik's description of conformance on Revision #28 it states that it has engaged with EMAB through the FCRP information sessions. As noted above these sessions do not replace direct engagement.	EMAB continues to raise concerns about closure criteria for objective SW8 and SW10 in our comments on the FCRP. While it is too late for the required engagement to take place, it would be useful if it were to take place before the next version of the FCRP is prepared.
Reporting on Engagement as per LWB Guidelines	Diavik has provided notes of discussion from the FCRP information sessions in 2022, which are useful. Diavik has also provided reports of TK Panel meetings, which are also useful. Beyond the direct reporting provided on those specific meetings, Diavik's reporting and assessment of engagement with Aboriginal communities to meet WLWB requirements continues to be a concern. Appendix IX-3 lists participants and location for engagement. There is no reporting on the substance of any engagement discussions. The requirements for an Engagement Record are clearly set out in the LWB Engagement and Consultation Policy, and the Engagement Guidelines and are to be comprehensive, and to explicitly include a summary of key concerns, resulting changes to the project and unresolved issues. The reporting of engagement results in the closure plan consists of brief, general statements of one or two sentences such as: Revegetation - "..there were many and varied views on this subject.." and "Views on the benefits of re-vegetating the WRSAs were diverse, and no consensus was reached." (section 5.2.9.3.5)	

Reporting on Engagement as per LWB Guidelines (continued)	Hydrocarbon-contaminated Soil – “As with disposal of inert material in the approved on-site landfill, there is a general view from communities that no materials should be buried on site and that everything that was brought up the winter road should be taken back down.” (section 5.2.9.3.3) No evidence (meeting notes, minutes etc) to support any of the statements regarding engagement is provided. There is no means for communities to verify the accuracy of their engagement with Diavik. It is unclear whether Diavik has made any effort to incorporate the results of the engagement in the closure plan.	Diavik should provide complete engagement records as described in the LWB engagement policies and guidelines. In addition to the summary of key issues and resolutions in the engagement records, it is helpful for Diavik to provide notes from each of its engagement meetings showing the outcome of the discussion, and explain how it arrived at its conclusions about the engagement.
EMAB discussions are not community engagement	On page 2-5 of the FCRP Diavik states that "DDMI regularly engaged with communities through the Environmental Monitoring Advisory Board (EMAB) and the Diavik Technical Committee of the Mackenzie Valley Land and Water Board (MVLWB). EMAB notes that EMAB does not speak for communities and discussion with EMAB should not be considered community engagement.	Revise references to community engagement occurring through EMAB.

Collection Pond Breaches	Section 5.2.1.8 proposes breaching of ponds based on water quality of surface runoff reporting to ponds: “Breaching of the collection ponds will only be conducted if the surface water runoff reporting to these ponds has been confirmed to be acceptable for direct discharge to Lac de Gras.” Decision-making about breaching of ponds is not, however, tied to whether there may be future activities including land disturbance or earth-moving activities in the catchment. These types of activities could adversely affect water quality in collection ponds. Table 3 in DDMI’s February 24, 2023 response to Information Requests confirms that many ponds are to be breached before reclamation activities in catchments are complete. For example, grading and re-vegetation activities will continue within most pond catchments after the proposed dates for breaching. Until grading is complete and vegetation established, there is ongoing potential for sediment release from disturbed areas. Breaching of ponds for which operation and closure-related earthworks are incomplete should be reconsidered. DDMI argues that ponds can be re-established if needed. However, re establishment will be difficult, especially at times when water quality conditions are most likely to deteriorate, due to high flow events. Temporarily keeping pond functionality in place (i.e., not breaching) while allowing controlled discharge of water that meets licence limits for discharge from Collection Ponds provides another alternative. ...continued in next cell	Limit breaching of Surface Water Ponds until after completion of operation and closure-related earthworks and erosion control closure measures (e.g., re-vegetation) in the specific catchments while providing for controlled discharge of surface runoff that meets licence limits (for discharge from Collection Ponds), numerical closure criteria and thresholds in the SWALF.

Collection Pond Breaches (continued)	While the retaining structures remain in place, discharge of water in accordance with licence requirements could be undertaken using pumps, siphons or spillways. However, in Section 5.2.8.3.2 DDMI argues that approaches that maintain the integrity of collection pond containment are not practical: “DDMI has determined that it is not practical to create a controlled discharge that will accurately represent passive, diffuse and discontinuous post-closure discharge conditions.” As DDMI suggests, using pumps, siphons or spillways will create discharge rates and timing that are different than discharge in a stream with no control pond. Nonetheless, discharge while retaining the pond dams in place would still entail discharge of water via stream channels, a condition that is much more similar to post-closure conditions. It provides an opportunity to reduce the costs of pumping/treatment and consider the effects of direct discharge, while maintaining the ability to rapidly respond if water quality conditions deteriorate.	

Collection Pond Breaches - only Pond 2 and 7	EMAB observes that if Diavik had proposed its research program in March/April 2021 as originally proposed, and had submitted its amendment application with credible supporting documentation later in 2021, it is reasonable to expect that it could have been collecting monitoring data on the results of a controlled release in summer 2023, and possibly even in late summer of 2022. These monitoring results would have given stakeholders a much better understanding of the effects of discharging collection pond runoff into Lac de Gras, and on the accuracy of Diavik's modelling of the discharges. EMAB also notes that Diavik's current water licence expires on December 31, 2025. The schedule that Diavik included as part of its application has Ponds 2 & 7 breached in 2023, Ponds 1 & 13 breached in 2025 and the remaining 7 ponds breached in 2026 or 2027. Monitoring of the collection ponds decommissioned in 2023 will inform the future decommissioning of collection ponds, which can be approved through Diavik's post-2025 water licence. EMAB is proposing that any approval to allow breaching of collection ponds in the current amendment be limited to Ponds 2 & 7, with a focus on collection of a broad range of monitoring information including delineating the mixing zone, and the effects of the discharges on water quality, fish, plankton and benthic invertebrates within the mixing zone.	Limit any approval to Pond 2 and Pond 7, scheduled to be breached in 2023 so that monitoring data can inform the approach to breaching collection ponds during the closure water licence renewal.

Collection Pond Discharge - waste	EMAB has reviewed Diavik's arguments that the runoff from breached collection ponds is not a waste as defined under the Waters Act and regulations. We have also reviewed the GNWT response to Information Request #2 from the Technical Session explaining why GNWT considers the runoff a waste. And EMAB has reviewed Diavik's submissions with its application. EMAB does not agree that the uncontrolled discharges from the breached collection ponds are not a waste. In our view Diavik has misinterpreted the definition of waste. The basis for Diavik's view that the discharge from the breached collection ponds is not a waste is not clear to EMAB: i)If Diavik's argument is that the discharge does not affect all of Lac de Gras, so is not a waste we would disagree with that interpretation of the definition. In our view, if the discharge could detrimentally affect the receiving waters where it enters them, then it is a waste (see definitions of Receiving Waters and Receiving Environment in Mackenzie Valley Land and Water Board Waste and Wastewater Management Policy). The GNWT response to IR#2 dated March 21, 2023 addresses this question in greater detail, and EMAB accepts GNWT's arguments. ...continued in next cell	The discharge from the breached collection ponds should be considered a waste as defined by the Waters Act and Diavik should sample water from the streams as it enters Lac de Gras.

Collection Pond Discharge - waste (continued)	ii)If Diavik's argument is that the discharge is not potentially harmful to aquatic life, humans or wildlife we note that Diavik's evidence for this application shows that water at all the breaches will be above some AEMP benchmarks and above levels that are safe for drinking water (see Table 1). Comparison of predicted concentrations of mine-impacted runoff to various benchmarks, in DDMI's response to February 24, 2023 IR). Diavik's proposed SWALF allows water quality to be at levels 10 times above AEMP benchmarks as it enters the channel that flows into Lac de Gras. In our view this means the discharge is a waste. Again the GNWT response to IR#2 dated March 21, 2023 addresses this question in greater detail, and EMAB accepts GNWT's information and interpretation. Diavik acknowledges that the discharged water is affected by the mine's operations through the placement of materials from the mine on the surface of the catchments and by runoff and seepage from mine facilities such as the waste rock piles and the Processed Kimberlite Containment area. We observe that Diavik does not propose to sample water from the streams as it enters Lac de Gras, so as proposed there will not be data on the quality of the water entering the receiving waters, or any response actions linked to the quality of the water.	

Collection Pond Decommissioning - information requirements	EMAB does not agree that approval of the FCRP should provide a blanket approval of decommissioning of all collection ponds without the need for Decommissioning Plans. In our assessment, Diavik has not provided all the information described in Schedule 8, Section 3 of the draft licence submitted with its application as required to approve breaching of collection ponds, including: •Pond-specific closure criteria •Identifying new or updated Closure Objectives and/or Closure Criteria being proposed, with rationale, including: oSW1 and SW2 criteria for the decommissioned catchment that include a list of contaminants of potential concern with rationale; oConsideration of new closure criteria and/or objective(s) to assess effects in the Receiving Environment, including sediment quality, with rationale; and oConsideration, with rationale, of a SW2 criterion to address extent of sublethal effects." • Whether a controlled discharge may be an appropriate research activity prior to breaching a pond •Description of the nature and extent of the mixing zone and predictions at 100 meters and the edge of the mixing zone oNote: EMAB understands that Diavik's modeling approach restricts its ability to make predictions of water quality at 100 meters from the point of discharge into Lac de Gras. ...continued in next cell	EMAB recommends that Diavik's argument that it has provided sufficient evidence in its proposed Final Closure and Reclamation Plan to meet the requirements set out in the Decommissioning Plan description be rejected. References to approval of decommissioning of collection ponds through an approved Closure and Reclamation Plan in Part G(27)(e), G(28(g), G28(h), G(33), Part J(9) and J(10) of the draft licence should be removed. Diavik should address all requirements set out in the Decommissioning Plan described in the Schedule 8, section 3 of the draft licence included with its amendment application, or provide a detailed justification for any requirements it is unable to provide.
Collection Pond Decommissioning - information requirements (continued)	•Investigations to determine the potential impacts to aquatic life within the mixing zone •Investigations, such as a plume delineation study, to understand the anticipated mixing •Consideration of effects on cultural uses within the proposed mixing zones and monitoring to assess the potential effects of water quality on cultural uses •A sampling plan to evaluate effects of reconnection on the Receiving Environment including: oMonitoring to confirm the size of the mixing zone and extent of sub-lethal effects oA sediment sampling plan oBenthics and fish sampling plan •How it will learn from the ponds that are decommissioned earlier to adaptively manage decommissioning of ponds that come after.	

Collection Pond Decommissioning - TSS limits	For discharge from Collection Ponds, clear licence limits should be established now for parameters that are likely to be consistently relevant for all of the runoff locations and where effects are also consistently relevant. The proposed water quality limits in the licence only include pH and acute toxicity, and SW2 criteria are established only for toxicity to aquatic organisms. Total Suspended Solids (TSS) is a significant contaminant of concern for all mine site runoff, especially as reclamation activities proceed. It is often one of the first indicators of problems with reclamation measure performance. Without modifications to standard toxicity testing, TSS is not likely to have much influence on results of lab toxicity tests and therefore is not addressed by the proposed licence limits. Nonetheless, it can have adverse effects on aquatic life and aquatic habitat (Slater Environmental Review of Diavik Water Licence Amendment Progressive Reclamation – Re-establishing Natural Drainages, 2023, p. 2). In the Response to Comments and at the Technical Session regarding the proposed water quality limits in the licence, DDMI acknowledged an oversight with respect to TSS and acknowledged the need to address the oversight. ...continued in next cell	In addition to effluent quality limits for pH and acute toxicity, the Water Licence should include limits for TSS. These should either be consistent with the MDMER, or if/when MDMER do not apply to the runoff, then CCME Guidelines should be used.
Effluent Quality Criteria for Discharge (continued)	However, the Response to Information Request appears to propose that TSS would only be addressed through the Surface Water Action Level Framework (SWALF), not by inclusion of an effluent standard as proposed for pH and acute toxicity (Part G, Clauses 36 and 37 of the Draft Water Licence). Like pH and acute toxicity, TSS should be directly regulated in the licence at least until such time as the consistent, ongoing erosion resistance of the closure landscape has been confirmed (Slater Environmental Review of Diavik Water Licence Amendment Progressive Reclamation – Re-establishing Natural Drainages, 2023, p. 3).	
Discharge - contaminants of concern	see Section 3.2, sub-section on Contaminants of Potential Concern in EMAB Intervention on Diavik's Water Licence Amendment Application for Natural Drainages.	Provide clear regulatory requirements to establish and meet numerical thresholds for relevant contaminants of concern in all of the affected watersheds.

Pit Lake Stratification	The FCRP provides some contradictory information about predicted stratification of pit lakes. Section 5.2.5.3.3 appears to indicate that all three pit lakes will be permanently stratified: "This lake configuration should result in stable permanently stagnant lower monolimnion underlying an upper mixolimnion that circulates regularly." On the other hand, Section 5.2.1.10.4 appears to indicate that the A154 and A21 pits will fully mix annually, while the A418 pit will be stratified: "The A154 Pit Lake is predicted to mix annually to have full or near full vertical mixing. The A21 Pit Lake is predicted to fully mix annually. A permanent chemocline establishes in the A418 Pit Lake at a depth of approximately 235 m."	Clarify the expected conditions in the pits with respect to stratification, and provide explanation and analysis to demonstration why the pits are expected to behave differently from each other.
A21 Causeway	Section 5.2.5.3.4 describes the proposed removal of the A21 Causeway. It appears that this would make the A21 pit and associated laydown area inaccessible during the post-closure period and therefore monitoring would be very difficult.	Describe the implications (e.g., cost, practicality, frequency) on post-closure monitoring and maintenance for the A21 area and the SCRP if the A21 Causeway is removed.
Control Pond Sediment	FCRP Section 5.2.18 proposes that "Sediment remaining in the ponds will be tested for contamination and covered, if required." In the response to comments on its recent water licence application, DDMI confirms that one sediment sample was collected from each of 10 Collection Ponds and the E21 sump with results provided in FCRP Appendix X-27. These samples were analyzed for moisture, hydrocarbons, and metals. In the response to comments DDMI stated that it would use a Total Petroleum Hydrocarbon (TPH) threshold of 1,500 mg/kg as a trigger to require mitigation of sediments – in this case placement of a cover over the sediments. At the Technical Session, DDMI clarified that the 1,500 mg/kg threshold was intended to apply to F3 hydrocarbons, not TPH. It also confirmed that this is the same threshold that is has proposed for sediments in the North Inlet. DDMI has not provided any specific rationale for selection of this threshold, or for why only one parameter (F3 hydrocarbons) is considered in decision-making about sediment quality. Based on the proposed threshold, DDMI identifies Ponds 5 and 10 as exceeding the threshold and proposes a rock cover on these sediments. ...continued in next cell	DDMI should revise the thresholds and remediation plans for sediment in control pond areas to consider the material as contaminated soil rather than sediment that will remain submerged.

Control Pond Sediment (continued)	The data in Appendix X-27 demonstrate that control pond sediments in several ponds exceed the closure criteria for hydrocarbon contaminated soils specified in Table 3 of Appendix V, which includes criteria for F1, F2, F3 and F4 hydrocarbons (respectively 210, 150, 300 and 2,800 mg/kg). For example, Ponds 1, 5, 10, and 11 and Sump E21 all have concentrations of F3 (C16-34) hydrocarbons exceeding the closure criteria of 300 mg/kg that applies for contaminated soils. Once the ponds are drained, the control pond sediments will no longer typically be submerged. In the post-closure environment these materials will be in conditions more similar to contaminated soils than submerged sediments (e.g., North Inlet). Where these materials exceed the closure criteria for contaminated soils, they should be managed as contaminated soils in accordance with the FCRP – excavated and landfarmed to reduce hydrocarbon contamination.	
Control Pond Sediment - additional contaminants	There was discussion at the Technical Session about the need for additional criteria to address other contaminants of concern for sediments in control ponds. DDMI argued that work done for the North Inlet confirmed that hydrocarbons were the only relevant contaminant of concern. However, the mechanism for sediment contamination and the source of contamination in the North Inlet (i.e., pumping of water from active mining areas) are likely not the same as those for contamination in the control pond sediments (runoff from mine waste storage and mine disturbed areas). As a result, the evaluation of the need for sediment remediation should consider a broader range of contaminants. For example, if there are sources of metal contamination in pond catchments, sediment should be evaluated for relevant metal contaminants.	DDMI should conduct an analysis of contaminants of concern for Collection Pond sediments to consider the range of contaminants consistent with the potential sources and mechanisms of contamination for the materials present in each catchment.

Appendix X-3 - A418 Pit Crest Ramp Design	Appendix X-3 describes the design of a ramp to mitigate potential hazards for caribou associated with the steep pit slope terminating in the pit lake. The design entails a ramp with a slope no steeper than 3H:1V. However, the design proposes that side slopes of the ramp in overburden materials can have slopes as steep as 1.5H:1V. Appendix X-3, Section 4.0 indicates that the top of the ramp is at approximately 425 masl, while overburden/bedrock interface is at an elevation of approximately 420 masl. With limited movement of additional overburden materials, the side slopes of the overburden section could also be flattened to 3H:1V, providing better access to the ramp for caribou and less potential for erosion of overburden materials.	Flatten side slopes of overburden section of ramp to 3H:1V to provide better access to and from the ramp.
Appendix X-3 - A418 Pit Crest Ramp Design	Section 5.1.2 proposes that rock excavated during ramp construction will likely be Type I rock (i.e., non-acid-generating), and that any Type III rock encountered would be disposed of in accordance with the procedures in the Waste Rock Management Plan – disposal in the NCRP. Submerging any Type III rock in the pit rather than moving it to the NCRP would likely be a suitable alternative since submergence of acid-generating rock is an effective method for mitigating concerns about acid-generation and metal leaching. While this approach is not practical for Type III waste rock produced during operations, it may be appropriate for any Type III rock produced during closure.	Consider the practicality and effects of disposing Type III rock from the pit ramp into the pit for permanent storage under water.

Appendix X-4 - Pit Fill Piping Design	Appendix X-4 describes the design of piping for siphoning of water from Lac de Gras into pits, for the purpose of filling pits. Neither the design nor the FCRP provide any information about planning and design to avoid erosion of pit wall materials. Appendix X-4 specifically notes that erosion control and mitigation is outside the scope of the design. Also, the design and FCRP do not discuss any measures in A418 Pit to avoid or minimize mixing of fresh lake water with the supernatant water from tailings disposal that may already be contained in the pit, or suspension of tailings into the water column. The proposed design envisions siphons operating with a hydraulic gradient of approximately 5 m, meaning that siphon pipes would terminate at elevations only a few metres below the surface level of Lac de Gras – potentially hundreds of metres up the pit wall and above water and tailings already present in the pits. At this elevation, the pipes will be discharging in areas that are located within overburden or constructed dike materials, creating risks of erosion of these materials and potential stability concerns for the dikes. Appendix X-4, Table 1 estimates that flow velocities at the pipe exits will be more than 4 m/s, conditions that could be highly erosive. ...continued in next cell	DDMI should provide additional information about how it plans to address erosion of pit walls during pit back-flooding, and mixing of inflows with tailings and supernatant. It should also describe the process for updating piping designs if discharge locations are changed.
Appendix X-4 - Pit Fill Piping Design (continued)	The design asserts that "It is the responsibility of DDMI to confirm the suitability of the proposed discharge locations, to confirm local effects of erosion as well as confirm any civil constraints such as structural, geotechnical, or environmental design concerning the pit back-filling operation." It further states that "If the discharge location, as identified in this final report, is deemed unsuitable by DDMI due to erosion concerns or any other factors such as dike integrity, additional design evaluation will be required considering the changes in line lengths, elevations, and final siphon placement." Decisions about discharge locations need to be made in order to finalize designs for the pipes and siphons. The design also proposes that spillways be constructed at siphon exit points. The FCRP does not provide any additional information about discharge locations, or how these concerns will be addressed. It also does not identify the need for further designs if discharge locations are changed.	

Appendix X-6 - Openings to Surface Closure Design	As noted in Appendix X-6, the closure designs for openings to surface are intended to address Objective SW11 – mine areas are physically stable and safe for use by people and wildlife. The mine areas are not just the pits and the openings to surface, but the overall underground workings as well. The design addresses issues related to stability and safety for openings to surface, but does not address the overall stability of underground workings. Failures of underground workings, whether at openings or in other areas, can affect safety for people and wildlife if those failures propagate to surface. The scope of the design should include information about any risks related to stability of underground areas, whether at openings or in other areas. If necessary, closure measures should be identified to address long-term effects arising from underground workings.	Expand the scope of the Openings to Surface Closure Design so that it addresses potential stability issues in all areas of underground, not just opening to surface.
Appendix X-6 - Openings to Surface Closure Design	Appendix X-6, Section 6.1.4 notes that design for closure of the A154/A418 Bulk Sample Drift has not been completed: "The A154/A418 Bulk Sample Drift, located on the A154/A418 side of the mine, is currently filled with water and a site inspection has not been able to be completed. As such, closure designs have not been developed for this portal and the design drawing (Drawing D-DV-3621-B-DRG-00006 in Appendix A) is Issued for Use."	The water licence should require submission of designs for the A154/A418 Bulk Sample Drift once water levels allow collection of necessary information to support design.

Appendix X-12 - Surface Water Management	Appendix X-12, provides designs for the breaches of most Collection Ponds – all except Pond 3 which is to be addressed through design for the PKCF. The design basis assumes a design life of 100 years from the start of closure. The design criterion for floods is conveyance of peak flows from a 1:200-year 24-hour storm event. The closure landscape at Diavik must perform adequately in perpetuity, not just for 100 years. As a result, facilities designed to convey 1:200-year events will, over the life of the project, certainly sustain some damage from events larger than the design events. In some cases, this may be tolerable, provided that the damage expected: (1) is consistent with the level of channel evolution that may happen in natural channels during similar return-period events, and (2) does not create risks for mine waste storage facilities. If failure of any breach could lead to progressive erosion that may affect a mine waste storage facility, then more robust designs should be required. In response to comments on its recent water licence application, DDMI argues that failures at breach locations are unlikely to affect adjacent infrastructure: ...continued in next cell	DDMI should provide evidence for each proposed breach about the potential erosion that may result from failure during events larger than the design event. As part of this, it should consider whether that erosion is consistent with erosion rates in similar natural channels during similar events and whether progressive erosion at any of these locations could adversely affect mine waste storage facilities. Where erosion could affect mine waste storage facilities, more robust closure designs would be required. Where erosion greater than that expected in natural channels may occur, post-closure maintenance should be expected and required.
Appendix X-12 - Surface Water Management (continued)	"Collection pond breaches are located downstream of mine waste facilities. Upslope progression of erosion to mine waste facilities is unlikely given the distance between collection pond breaches and these facilities. Thus, the performance of the post-closure design of the breaches is not expected to impact mine waste facilities." In the response, DDMI refers to FCRP Appendix X-12 Sub-Appendix A, Table 1, Item 4. The referenced item addresses incremental consequences of failure and provides a design basis relating to erosion. However, it does not confirm that upslope progression of erosion near other structures was considered. Sub-Appendix D of Appendix X-12 provides a geomorphological assessment for the pond breaches and Task 2 characterizes terrain downstream of the breaches, but does not consider potential upstream progression. Figures in the Sub-Appendix confirm that some breaches are located within close proximity to the toes of other mine structures (e.g., Pond 4). DDMI has not provided evidence that upstream progression of erosion from pond breaches has been specifically addressed at relevant breach locations.	

Final CRP 5.2.1.10.1 Site-Specific Climate Change Assessment	Given the uncertainty in climate change projections, it is not clear why only the 50th percentile for the 2120 projections were used in the engineering designs.	DDMI should also consider the 95th percentile to evaluate the upper end of the predicted modeling. It is important to measure the effectiveness of the designs if the impacts of climate change end up being on the upper end of the predictive modeling.
Final CRP 5.2.1.10.4 Pit Lake and Lac de Gras Water Quality Modelling - Mixing Zones	It is not clear why the mixing zone cell must have water for the entire year for the predictive modeling. This requirement requires the extension of mixing zones beyond the 100 -200 m for C1, C5 and C13.	DDMI should provide a rationale for why the mixing zone cell must have water for the entire year in order to conduct predictive modeling.
Final CRP 5.2.1.10.4 Pit Lake and Lac de Gras Water Quality Modelling - Mixing Zones	Meeting AEMP benchmarks at the mixing zone was part of the previous version of the CRP V4.1. It is not clear why DDMI has removed this as a closure criterion. DDMI has predicted water quality to meet the AEMP benchmark at Arc 1 (at least the 95th percentile to meet).	DDMI should add meeting the AEMP benchmarks to criteria SW2 and the SWALF as a criteria to be met at the mixing zone boundary.

Appendix X-20 Site Water Quality Model, Section 4.1 Water Quality Source Term Inputs, p. 5, Table 1	The baseline (i.e., pre-Project) water quality data for streams used in the modeling is not presented in the submission (only median values are presented) and the reader is referred to Diavik (1998) for details. The Environmental Assessment Report (Diavik 1998) presents one table with minimum, maximum, and median statistics for water quality measured in eight streams. The number of samples, frequency and timing of sampling, and locations of the sampling are not provided. There is also no discussion of the occurrence of "natural" exceedances of AEMP benchmarks for these streams in this reference. The information as provided is inadequate to: (1) understand the quantity and quality of baseline water quality data for these systems (which formed the basis of model inputs); (2) determine what if any water quality parameters exceeded AEMP benchmarks before the Project and if exceedances occurred, how frequently and by what magnitude; (3) understand the appropriateness of the use of a median for defining background water quality conditions for water quality modeling; and (4) interpret modeling results and – in particular – discriminate Project-related effects on water quality. Ultimately the information presented is insufficient to determine if modeling was appropriate and adequate and what the Project-specific effects are projected to be. ...continued in next cell	Provide a table(s) of source term loads used in runoff modeling to assist with identifying what source terms are the most significant in each drainage. Conduct runoff modeling using a more conservative background water quality source term (e.g., maximum or 95th percentile) and compare to predictions based on the median baseline water quality values.

Appendix X-20 Site Water Quality Model, Section 4.1 Water Quality Source Term Inputs, p. 5, Table 1 (continued)	In response to a question on the baseline data used from modeling, Diavik indicated the raw data and details regarding the stream baseline water quality sampling are presented in Golder Associates. 1996. Technical Memo #9-3. Stream/watershed water quality report. Review of the data presented in this report indicate that none of the streams sampled in 1996 (the baseline dataset used for water quality modeling) were located on East Island. Further, the vast majority of the data were obtained in spring; only three streams were sampled in summer and fall. Lastly, total phosphorus was only measured in summer and fall at these three streams (total n = 6). Detection limits are only provided for the summer and fall programs (not spring) and there is only one blank sample reported for the whole program (submitted with the spring program). The single field blank sample indicates potential sample contamination – including for total copper. For the site water quality modeling, background water quality conditions for unimpacted drainages (i.e., "natural" runoff) were assigned the median concentrations from baseline studies conducted in 1996 and these values were held constant (i.e., background water quality does not vary with differing climate/flow conditions) in the modeling conducted. ...continued	

Appendix X-20 Site Water Quality Model, Section 4.1 Water Quality Source Term Inputs, p. 5, Table 1 (continued)	In addition, the modeling assumed that source loading is constant over time; this assumption is unlikely to be accurate and likely not conservative. This approach may not be adequately sensitive or appropriate. It appears that the only model input that was varied under the different climate change scenarios is flow; therefore, the model only predicts increases or decreases in runoff constituents as a direct function of flow/volume (i.e., dilution). It is unclear what if any exceedances of water quality benchmarks and/or acute toxicity benchmarks beyond those predicted based on the median background water quality values would be predicted if a higher background water quality statistic were selected. Specifically, for those parameters that were predicted to be higher in runoff than background median concentrations but lower than AEMP benchmarks, would use of a different statistic for background water quality conditions result in runoff concentration exceeding AEMP benchmarks? Inclusion of loading data used for all source inputs would assist with determining what drainages may be more affected by the background water quality source term (e.g., a table identifying loads from each source, including background water quality).	
Attachment 1 - source terms p. 1	Natural runoff was assigned one half the detection limit (DL) where constituent concentrations were below the DL. This approach is commonly applied for addressing censured values. However, it would be more conservative to apply a value equal to the DL in this instance. It would also be useful to note which values/terms were affected (i.e., below the DL) in Attachment 1.	Apply a value equal to the analytical detection limit for values reported as below the DL. Note which values/terms were below the DL in Attachment 1.
Attachment 1 - source terms p. 1	Natural runoff chemical constituent source terms were assigned a value of zero where data were not available. This was applied for nitrite and antimony. As previously noted, some variables (i.e., mercury) were not included in the modeling exercise. All parameters of relevance should be included in modeling (i.e., mercury and if feasible pH and dissolved oxygen) and those lacking data (i.e., nitrite and antimony) values should be assigned a value other than zero (e.g., apply a value of the lowest detection limit available).	Apply a non-zero value for all source terms for runoff water quality.

APPENDIX X-21 - Hydrodynamic and Water Quality Modelling of Pit Lakes and Lac de Gras, Section 3.5 Water Quality, Modelled Constituents, p. 30-31	It is noted that mercury was not included in the modeling for three reasons: (1) baseline studies used a very high detection limit; (2) data to estimate geochemical source terms are "insufficient"; and (3) mercury was frequently below detection in water management ponds and influent to the NIWTP measured over the period of 2011-2021. Lack of sufficient data should not preclude inclusion of mercury in the modeling exercise. Rather, estimates for background conditions and geochemical source terms should be generated with associated caveats provided if appropriate/warranted. A common approach to addressing instances of high uncertainty for modeling is to conduct sensitivity analysis and/or examination of ranges of model inputs to provide a description of anticipated effects. For example, a reasonable "worst-case-scenario" could be simulated and results compared to AEMP benchmarks. If model predictions are well below AEMP benchmarks there would be reasonable certainty that conditions would not cause direct unacceptable toxicological impairment to aquatic biota. Additionally, uncertainty associated with #1 could be addressed through sampling of "unaffected runoff" on East Island. Lastly, the detection limits applicable to the 2011-2021 monitoring data that are referenced are not provided which makes it difficult to determine if this rationale is appropriate (i.e., were detection limits adequately sensitive over this period).	Recommend defining a reasonable "base-case" scenario using available information to define model inputs/source terms for mercury and conduct additional simulations with "worst-case-scenario" estimates to reduce uncertainty respecting potential anticipated conditions. Provide details on analytical detection limits for measurements of mercury in water management ponds and influent to the NIWTP for the period of 2011-2021.

Water Quality Modelling	Section 5.2.8.3.2 describes results of water quality modelling in Lac de Gras, including that "Hydrodynamic model results for Arc 1, located approximately 100 m to 200 m from modelling discharge points, indicate that for all mass conservative constituents the 95th percentile of the daily depth averaged concentrations at Arc 1 are below AEMP benchmarks at all times." Exceedance of AEMP benchmarks in up to 5% of predicted conditions would usually be considered unlikely to cause chronic effects if these events occur randomly and do not have long durations. However, the use of daily time step, probabilistic modelling may not accurately portray the actual conditions, especially the duration of exceedance events. Water quality conditions in Lac de Gras will change slowly and AEMP exceedance events that make up less than 5% of predictions may occur on many recurrent days – potentially lasting months or years. These long duration changes in water quality may not be reflected in the model results. In these conditions, chronic effects are more likely to occur as a result of the exceedances event though the modelling predicts that the conditions occur with low frequency.	DDMI should consider the potential implications of lengthy exceedances of AEMP benchmarks at the mixing zone boundary, assuming that water quality in Lac de Gras will change slowly and that AEMP exceedances will occur repeatedly over longer periods of time.

Appendix X-19 - Closure Site-Wide Water Balance Model, Average Conditions	Appendix X-19 Table 2 and Section 3.1 describe scenarios for the water balance model. The model scenarios all rely on average conditions – with scenarios to consider average conditions after incorporation of climate change predictions. No wet or dry conditions are considered in the scenarios. The implications of relying on average conditions are illustrated by validation results in Appendix X-21, Section 5.1 pdf 100 and Figure 16: "During the validation period, the observed water level data suggests that lake water levels were higher in 2020 and 2021 compared to the previous 10 years (Figure 16), which is more representative of wet climate conditions. The maximum observed water elevation during the validation period is 416.35 masl, which is approximately 0.61 m higher than the maximum water elevation observed during the calibration period. Modelled water elevations do not follow the same pattern as the observed water elevations during these two years, because model inputs (i.e., all inflows to the lake) are based on average climate conditions." As confirmed by the validation results, conditions can be more adverse during wet or dry scenarios. Also see comments related to climate change projections in the Core Geoscience memo appended to the attached Slater Environmental Report.	Include wet and dry scenarios in closure site-wide water balance modelling.
Appendix X-19 - Closure Site-Wide Water Balance Model, Runoff Coefficients	As described in Table 2 of Appendix X-19, the water balance uses a single (varied by season) runoff coefficient used for all land types. Runoff from all land types is not likely to be consistent – e.g., waste facilities with bare rock covers are likely to have different runoff characteristics than vegetated areas. This may be important because chemical loading from rock covers may also be higher than from natural or vegetated areas.	Provide explanation of why runoff characteristics are expected to be similar for all land types. Also describe potential implications on modelling of the decision to use a single runoff coefficient. Consider sensitivity analyses to evaluate water quality impacts if runoff from rock cover areas is higher than expected. Confirm whether previous research on test piles supports the decision to use a single runoff coefficient for modelling.

Appendix X-20 - Water Quality Model, Source Term for ARD Materials	Appendix X-20, Section 4.2 states a general assumption that current water quality conditions for mine wastes are representative of future conditions: "The inherent assumption in the model is that geochemistry data obtained through field testing, and surface water quality data obtained as part of the baseline programs adequately and conservatively represent the input sources and will continue to do so in the future." This assumption is reasonable for materials that are not acid-generating or subject to oxidation processes. For ARD materials it is unlikely that current water quality data is representative of water quality after oxidation occurs. Unless remediation measures will stop oxidation (e.g., submergence of ARD material in water) then the assumption is likely not conservative.	Reconsider water quality model assumptions for material that is considered potentially acid-generating. If potentially acid-generating material can contribute loading, long-term source terms should account for acid-generating characteristics of the material.
Appendix X-21 - Hydrodynamic Model, Model Domains	Figures in the hydrodynamic model report (Appendix X-21) illustrate runoff from locations and catchments on East Island to Lac de Gras. Unfortunately, the numbering system for the model is different from that used for Collection Ponds. As a result, it is very difficult to correlate the model and the physical locations of ponds.	Provide clear information to describe the relationship between collection pond locations and the model domains used in the hydrodynamic model.
Appendix X-21 - Hydrodynamic Model, Range of Climate Conditions	Appendix X-21, Section 3.2 describes inputs for hydrodynamic modelling: "For future simulations (i.e., 2022 onward), the hourly time series of meteorological parameters from January 2009 to December 2021, except for precipitation, were repeated to cover the simulation period for the Lac de Gras 3D Model. The monthly precipitation data were obtained from the Site Water Balance Model for an average climate year to provide consistency between the water balance and hydrodynamic components." Given the short record used for climate parameters (13 years) and use of average precipitation, the model likely does not consider extreme wet or dry conditions. Water quality outcomes could be different in these conditions – which are likely to extend over long periods of time (i.e., not daily events, see Section 2.11 of this Report) and could lead to chronic effects.	Conduct sensitivity model runs to assess expected conditions in Lac de Gras in wet/dry years.

Appendix X-21 - Hydrodynamic Model, PK Porewater Quality	Appendix X-21, Section 3.5.2 provides information about source terms used for porewater from PK, referencing DDMI 2020c – Pit Lake Chemical Source Definition – FPK Porewater Component_R0. Technical Memorandum Prepared by Lianna Smith for Gord Macdonald 29 February 2020. SEC provided comments about this source term in a November 2020 memo to EMAB. The following comments are still relevant. "The model documentation provided in the application lacks detail about the basis for the water quality source term for porewater. Section 2.4.2 of 'Hydrodynamic and Water Quality Modelling of Pit Lake and Lac de Gras' (Golder, October 2020), states that the water quality in porewater is represented by the 'median measured constituent concentration' and refers to DDMI, 2020a, a memo prepared by Lianna Smith titled 'Pit Lake Chemical Source Definition – FPK Porewater Component' dated February 2020. The notes in Table 5 in the same document, perhaps in error, refer to a 'geomean value' from DDMI, 2020c, a draft memo prepared by Lianna Smith titled 'Pit Lake Chemical Source Definition – Dike and Pit Components' dated March 2020." "DDMI provided an addendum to its modelling submission, including a November 2019 memo from Lianna Smith, including graphs of porewater chemistry measurements from four different sources of information: the PKC Pond, PK tank drains, expelled porewater from fine PK consolidation tests, and expelled porewater from slimes consolidation tests. ...continued in next cell	1. Conduct additional sensitivity analysis of conditions in Lac de Gras, considering more adverse concentrations of contaminants in porewater. This analysis should incorporate data from other relevant test methods, including data from porewater extracted from in-situ samples. 2. Undertake additional characterization programs to understand expected porewater conditions, including testing of fresh PK as proposed by the IRP and also additional testing of porewater from PK that has aged in saturated conditions within the PKCF.

Appendix X-21 - Hydrodynamic Model, PK Porewater Quality (continued)	In an email dated November 4, 2020, DDMI stated that the fine PK porewater source term was a calculation from water chemistry (e.g., median and mean) from the raw data in the November 2019 memo. However, DDMI did not clarify what data were used to make this calculation – was it all four sources of information, or one of the sources, or some other combination? The IRP report indicates that the source term for porewater was developed based on a single sample." "After several requests, DDMI provided the referenced February 2020 memo on November 13, 2020. The memo confirms that the estimates of porewater quality used in the modelling are based on results from porewater extracted from a single sample of fine PK obtained directly from the process plant." "Model documentation provided as part of the Summary Impact Statement in May 2019 provided data of five different types that could be considered in the development of source terms for PK porewater. The July 28, 2019 Slater Environmental Consulting review memo concluded the following with respect to DDMI's selection of source terms at that time: 'Table B-2 in the Summary Impact Statement provides data for five different characterizations of porewater. Of these five, DDMI has optimistically selected the two characterizations that have the lowest concentrations to support its predictions of porewater quality for PK deposited from the processing facility, and EFPK deposited from the PKC facility.	

Appendix X-21 - Hydrodynamic Model, PK Porewater Quality (continued)	Given the available data, and the interpretation provided in Moncur and Smith (2014), it appears likely that the predictions may underestimate the contributions of porewater to contaminant loading.' (Slater Environmental Consulting memo to EMAB, July 28, 2019) "DDMI acknowledged at the time that its reliance on data from fresh PK slurry may underestimate the concentrations of parameters in porewater. Data from porewater extracted from samples of in-situ PK (i.e., PK that had aged in the PKCF) had substantially higher concentrations of many parameters, with average values often exceeding the assumptions used even in the sensitivity analysis for the updated modelling (75th percentile of the data from samples extracted from the single fine PK sample)." "The February 2020 memo provides data from the PKC pond for comparison with the porewater data used in the modelling. DDMI provides rationale for why the PKC pond water may not be representative of porewater concentrations. However, there is no rationale provided with respect to other data, especially data from porewater extracted from in-situ samples." In Appendix X-21, Golder states that the porewater quality for PK was represented by the “geometric mean of measured constituent concentration, based on data provided by DDMI” referring to the February 2020 Smith memo. ...continued in next cell	

Appendix X-21 - Hydrodynamic Model, PK Porewater Quality (continued)	As noted in the earlier comments repeated above, the results are all from a single FPK sample, where there were 11 water quality samples analyzed from a consolidation test. Because the testing was completed on a fresh PK sample, the results are not likely to be indicative of conditions in the PK over time. Results from other testing appear to confirm this. Also, there is no rationale provided for the decision to rely on the geometric mean, other than it is "consistent with previous modelling exercises" . The geometric mean is always lower than the arithmetic mean (average), and therefore its application in this case means that constituent concentrations used in modelling are lower and may not be conservative estimates of the future average conditions. Geometric mean can be appropriate in certain circumstances including where data sets include large outliers. Unfortunately, the Smith memo does not provide all of the data or the maximum and minimum values. However, the results for the 25th, 50th and 75th percentiles seem to indicate quite consistent data for most parameters. The decisions about the source of data and the application of geometric mean to estimate source term concentrations compound to create an estimate of porewater quality that is likely not conservative for future predictions, even for the "average" conditions that are modelled. As a result, loading from porewater could be higher than predicted.	
Appendix X-21 - Hydrodynamic Model, Predictions in Lac de Gras	Appendix X-21, Section 5.3, describes calibration of modelling of water quality conditions based on comparison of predictions to measured conditions in Lac de Gras. For location MF3-1 the report describes that the model is underpredicting concentrations at the bottom of the lake: "Figure 19 and Appendix D show that at MF3-1, modelled bottom TDS concentrations are generally lower than the observed concentrations (calculated based on measured specific conductivity) during most April and May surveys." The model calibration indicates that concentrations of contaminants in Lac de Gras in under ice conditions could be worse than the model is predicting at some locations (e.g., MF3-1).	Appendix X-21 should discuss the potential effects of water quality conditions worse than predicted where calibration results indicate that the model is underpredicting concentrations.

Appendix X-22 - Rationale for Assessed Mixing Zones	Appendix X-22, Section 3.6, Table 7 lists predicted loading of lead and uranium from specific Collection Pond catchments as compared to existing loading from the North Inlet Water Treatment Plant (NIWTP). The table only presents predicted future loads from individual catchments but not the cumulative load. The sum of the predicted future loadings is substantially higher than the existing load, but this is not presented or discussed in the report. This differs notably from Table 8 which presents results for other parameters (Nitrogen, Phosphorus, Total Dissolved Solids) where the cumulative future loading is predicted to be lower than existing loads and the cumulative results are provided in the table and noted in the text.	Discuss and address implications of much higher total predicted post-closure loadings for lead/uranium as compared with loading from the NIWTP.
Appendix X-23 - Effects of Pumping during Pit Filling	Appendix X-23 describes potential effects of pumping for pit filling on water levels in Lac de Gras. The analysis conducted in is not consistent with the pumping rates and pumping design proposed in Appendix X-4. Pumping rates now proposed are much higher. Appendix X-4, the 2022 Pit Fill Piping Design, recommends the 6-month filling period with pumping rates of 5,006 to 14,066 m3/hr depending on which pit. Appendix X-23, the 2021 analysis of effects of pit filling on the other hand, considers effects of pumping rates ranging from 2,742 to 9,400 m3/hr. The higher pump rates would have greater effects on water levels than estimated in 2021	Redo analysis of effects of pumping for pit filling to consider new proposed pumping rates and durations.
Appendix VI-2 Section 3.3 Stressors of Potential Concern; Release of Source Water and Exchange of Pit Lake and NI Water with Water in Lac de Gras, pg 21, last paragraph.	It is indicated that predicted concentrations will remain well below AEMP Effects Benchmarks at assessment locations outside of mixing zones. Given the size of the mixing zones (that have not been fully delineated to our knowledge), it is not clear how large of an area this is. As indicated in previous CRP submissions, mixing zones should be as small as possible and shouldn't be larger than 100 m. Given that concentrations at ARC 1 are not intended to be similar to water quality in Lac de Gras, then the mixing zone is assumed to be larger than ARC1.	DDMI should present where the edge of the mixing zone is predicted to be and where in the mixing zone AEMP benchmarks are predicted to be met.
Appendix VI-2 Section 2.2 Closure and Post-Closure Site Drainage Conditions, pg 14 paragraph 4 of Section 2.2	DDMI indicates that one or two ponds are planned to be decommissioned in 2023. Based on information presented at the workshop, Ponds 2 and 7 are suggested to be the first to be reconnected. Both ponds show predicted concentrations above benchm+43:44arks and/or measured concentrations above acute and/or chronic benchmarks as well as chronic toxicity. Additional data should be collected prior to breaching these ponds to understand variability and conditions.	Additional investigation and studies should be provided before breaching of ponds should be approved. Once a pond is breached, concentrations at the discharge point to Lac de Gras should be measured and concentrations within the mixing zone of Lac de Gras should also be studied.

Appendix E FCRP Main Body, Section 5.2.8 Permanent Closure Requirements – North Inlet and Surface Water Management, Section 5.2.8.3.2 Collection Ponds, p. 5-68	The FCRP indicates that "In addition to water quality monitoring and toxicity testing as outlined in Appendix VI-1, sampling and analysis of collection pond sediment will be conducted prior to breaching to confirm that accumulated sediment is not contaminated and will not contribute contamination to Lac de Gras. Any identified sediment contamination within the pond will be either removed or isolated in place with a layer of rock or till from the pond breach excavation." There are no details provided regarding sampling and analysis of collection pond sediments provided or what criteria will be applied to determine if sediments are "contaminated" and require removal or isolation. DDMI response: "Sediment samples have been collected from 10 Collection Ponds and the E21 sump and the results are provided in FCRP Appendix X-27. One sample was collected from each of the ponds using a glass soil sampling jar attached to an extendable pole to collect a sample approximately 1-2m from the shore of the pond. Parameters analysed are listed in FCRP Appendix X-27 and include moisture, hydrocarbons, and metals. DDMI is using a THP threshold of 1,500 mg/kg as a trigger to require a cover. ...continued in next cell	Provide a description of the collection pond sediment sampling and analysis (number of sites, depth of sediment collected and analysed) that will be undertaken to make a determination regarding contamination and associated actions. Provide a description of the chemistry of the depth of sediment that may be mobilized after pond breaching.
Appendix E FCRP Main Body, Section 5.2.8 Permanent Closure Requirements – North Inlet and Surface Water Management, Section 5.2.8.3.2 Collection Ponds, p. 5-68 (continued)	On that basis and in consideration of the management strategies identified in Appendix 11: Remedial Strategy Report, the initial monitoring results indicate that rock cover would be appropriate at Pond 5 and 10." It was clarified at the Technical Sessions that the trigger is actually F3 500 mg/kg. How many samples will be collected in each pond and what depth of sediment will be sampled? What information is there respecting what depth of pond sediment may be mobilized into the stream once breached?	
Appendix VI-1 Section 3.1.4.3 Post-closure Monitoring for SW1 and SW2 (Pond Breach)	It is indicated that after the completion of closure activities on site, monitoring for chemical and toxicity analysis will be reduced to twice annually. The FCRP should indicate that any proposed reduction in sampling frequency will be subject to board approval.	The FCRP should indicate that any proposed reduction in sampling frequency will be subject to board approval.

Appendix VI-1 Section 3.1.4.3 Post-closure Monitoring for SW1 and SW2 (Mixing Zones)	Mixing zones are proposed to be sampled once annually for two years following decommissioning. Given the uncertainty in the predictive modelling together with the uncertainty in the climate change models, two years of monitoring following decommissioning is likely insufficient.	Triggers for stopping monitoring should be defined (i.e., no significant change for X years, for example) and the FCRP should include wording to indicate that any change to the monitoring frequency and duration is subject to board approval.
Appendix VI-1 Section 3.1.4.3 Figure 3-2	Many of the SNP monitoring sites are a fair distance from the breach point/SNP location to the discharge point to Lac de Gras. It is not clear why DDMI is not also monitoring near the entry point of Lac de Gras, as water quality could change given the distances. Distances seem to range from 30 m from pond 10 breach to around 600 m from Pond 7 breach.	Provide a rationale for not sampling near the discharge point to Lac de Gras or include addition sampling locations.
Appendix VI-2 Section 4.4.2.1 Selection of New NFC Station Locations, p40, last paragraph	It is not clear why the NFC station locations need to be located where water is at a depth of 18 to 22m. The purpose of these sampling locations is to monitor the effects of discharge to Lac de Gras and should be located as close to the discharge points as possible and within 100 m of the discharge point.	Monitoring locations to measure the potential impacts of discharge to Lac de Gras should be located as close to the discharge point as possible and within 100 m of the discharge point to measure whether discharge to Lac de Gras is impacting aquatic life or the use of Lac de Gras by humans and wildlife.
Appendix VI-2, Table 4.5-2, pg 46	Collection pond breach locations indicate sampling will occur weekly for the first year and then quarterly for about 5 years. The sampling frequency for years 2+ is not suitable to determine if impacts are occurring.	Increase frequency to weekly for at least 2-3 years.
Appendix L Water Quality Screening Criteria Section 2.2 Human Health	The Aquatic Effects Monitoring program is to be replaced with the SWALF after mine closure. The predicted concentrations were below the drinking water guidelines, however, until such time that the model is validated and is accurately predicting concentrations at the end of the mixing zone, the comparison to drinking water guidelines should be completed as part of the closure monitoring.	DDMI should add Drinking Water Guidelines to the SWALF and monitor for them.

Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.1.3, Hydrology	EMAB previously submitted a technical comment in a review of the Diavik Licence Amendment Application - Progressive Reclamation – Re-Establishing Natural Drainages (NSC 2023) seeking clarification of what monitoring is proposed with respect to site runoff discharge. Specifically, it was noted that Appendix VI-1 does not clearly indicate whether runoff discharge will be monitored at all sites post-breaching of the ponds or what methods would be employed - specifically measurement frequency. DDMI response: "Post-decommissioning surface runoff flow (discharge) will be monitored through presence/absence observations at the time of planned sampling." Clarification was provided by Diavik at the Technical Sessions that model validation would consist of verification of the predicted dilution factors at the mixing zone boundary (MZB). Diavik noted this would involve comparing the concentrations from the runoff and MZB "plus background". It is our understanding that there is no "background" water quality sampling planned in the lake to be used for this purpose.	It is recommended that discharge of surface runoff be monitored regularly (e.g., daily discharge) if/as feasible to: (A) provide a means to monitor the overall flow conditions encountered each year (i.e., hydrograph, periods of flow, volume of runoff); (B) document the range of discharge conditions to assist with interpretation of monitoring results (e.g., was toxicity testing sampling or mixing zone sampling conducted during a relatively high or low discharge); and (C) to facilitate verification of modeling results, including verification of dilution, and allow for calculation of loadings from site runoff. Model validation of dilution factors should compare water quality in the runoff directly to the water quality at the MZB (i.e., background conditions should not be added to the MZB measurements).
Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.1.4, Seepage and Runoff, Section 3.1.4.1 Overview of Closure Objectives, Criteria, and Monitoring Activities, p. 16 and Figure 3-2, p. 19	It is proposed that runoff will be sampled for chemistry and toxicity at the breach locations. Monitoring of the streams should also be conducted near the mouths to determine if and how water quality changes along the length of the stream and prior to discharging to the lake.	Recommend sampling runoff for water quality analysis at an additional site near the stream mouths to assess changes in water quality conditions for a minimum of one year.

Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.1.4, Seepage and Runoff, Section 3.1.4.1 Overview of Closure Objectives, Criteria, and Monitoring Activities, p. 17	Appendix VI-1 indicates that a proposal will be submitted to make an SNP station inactive in the event surface and runoff monitoring of a current SNP station establishes that flow is "unable to be successfully sampled for two consecutive monitoring years." There may be considerable variability in inter-annual flow/discharge and two years may be insufficient to capture a range of high and low flow conditions. For example, the first two years may be atypically dry which would lead to inactivation of the SNP site based on the proposed approach. It would be more appropriate to consider the specific hydrological conditions encountered during the initial monitoring years (i.e., dry or wet years) relative to the estimated range of flow conditions for each stream when determining if a station could be deactivated. Recommendation: Consideration of deactivation of an SNP station should consider the hydrological conditions/climatological conditions encountered during initial monitoring relative to the range of flow conditions for each stream. If the period of monitoring did not capture relatively high flow conditions, the station should remain active. ...continued in next cell	A decision to deactivate an SNP station should consider the hydrological conditions/climatological conditions encountered during initial monitoring relative to the range of flow conditions for each stream. If the period of monitoring did not capture relatively high flow conditions, the station should remain active
Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.1.4, Seepage and Runoff, Section 3.1.4.1 Overview of Closure Objectives, Criteria, and Monitoring Activities, p. 17 (continued)	DDMI Response: "It is DDMI's understanding that WLWB approval will be required to deactivate an SNP station and any request will likely be distributed for public comment including EMAB. DDMI will likely include with any request the historical pond water quality data collected over a full range of hydrologic conditions."	

Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.1.4, Seepage and Runoff, p. 19	Figure 2-2 presents the proposed SNP monitoring stations associated with seepage and runoff. One site is proposed at the mixing zone boundary in 10 drainages/areas. Are the proposed locations to be "fixed" points in space or is the intention for the site to move in accordance with the actual mixing zone boundary location at the time of sampling? Do the results of the mixing zone modeling indicate the mixing zone boundary will be highly variable in space and if so, how were the specific monitoring site locations identified given the variable nature of the boundary location? Recommendation: Describe if the mixing zone monitoring sites are "fixed" or will move in relation to changes in the size and characteristics of the mixing zones. DDMI Response: "The mixing zone monitoring location will be at 100m from the discharge location unless the water depth in the area is less than 5m. In this case the monitoring location would be moved further away until a 5m depth of water is located." Comment: Sampling at the Mixing Zone Boundary (MZB) is proposed to be at fixed locations – either 100 m from shore or farther offshore to the 5 m depth contour. ...continued in next cell	Remove the 5 m depth constraint for establishing MZB stations and modify sampling methods as required to sample shallower depths if/as needed. Collect depth-integrated samples at the MZB stations rather than only a portion of the water column in the event that a site is not fully mixed. Conduct a plume survey in each mixing zone to establish the size, dimensions, and location of full mixing. Review the proposed MZB sampling site locations based on the results of the plume survey and move stations as required and appropriate

Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.1.4, Seepage and Runoff, p. 19 (continued)	Diavik clarified at the Technical Sessions that the proposed sampling at the 5 m depth contour is due to logistical constraints (i.e., assumed 2 m ice thickness, sampling 2 m off the bottom and using a 1 m Kemmerer). Diavik also clarified at the Technical Sessions that the MZB sites are expected to be fully mixed but that in situ depth profile measurements will be collected. It is our understanding that the MZB SNP stations would not be sampled under ice either because runoff will not be flowing, and therefore sampling is not required, or because conditions on the lake would be unsafe for sampling when runoff is flowing but ice remains on the lake. Assuming this is correct, then the presence of ice (and therefore the need to account for 2 m of ice depth) is not applicable to the selection of the precise location (i.e., minimum 5 m depth). Other sampling methods (i.e., other than a 1 m vertical Kemmerer water sampler) could also be used for sampling these sites including but not limited to grab sampling (directly filling sample bottles) or use of a horizontal sampler or a peristaltic pump. These methods would allow for sampling of shallower depths. In addition, if sites are not fully mixed it would be more appropriate to collect a depth-integrated sample for chemistry and toxicity testing, rather than sampling the upper 1 m of the water column as proposed. ...continued in next cell	Develop an alternate sampling plan for scenarios in which the MZB stations cannot be sampled for safety reasons. Recommend sampling the mouth of the runoff stream (if regular sampling of these sites is not required) and/or the nearshore area of the lake as feasible. Estimate concentrations using predicted dilution factors at the SNP MZB stations in the event the sites cannot be sampled for safety reasons.

Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.1.4, Seepage and Runoff, p. 19 (continued)	It would be most appropriate to locate all MZB SNP stations at the 100 m distance from shore as proposed, or closer to shore if the full mixing is achieved closer than 100 m from shore, rather than applying a minimum water depth. A plume survey would assist with delineating the dimensions of the plume and identifying the location of full mixing. It is expected that due to safety considerations, sampling of the MZB SNP stations will not be feasible early in the spring when runoff begins to flow but the lake is still ice-covered. In the absence of the ability to monitor the mixing zone in these instances, an alternate sampling plan should be developed that can feasibly and safely be implemented. Sampling the runoff stream at the mouth (point of entry to the lake) as recommended in Section 2.1.5 (or an alternate site as/if needed) and/or in the nearshore area of the lake if safe/feasible is recommended. It has been noted that due to the nature of the drainages and flow conditions, that runoff flow may be inadequate to facilitate collection of water samples for chemistry and/or toxicity testing during some periods. Though this constraint may apply to the entirety of some/all of the drainages, sampling should be attempted at alternate locations farther downstream in the event sampling cannot be completed at the proposed runoff SNP stations. If sampling cannot be completed at any site in the stream(s), sampling should be conducted in the nearshore of the lake near the point of entry of the runoff.	Identify alternate sampling sites in runoff streams downstream of the breach locations to be sampled in the event of practical constraints on sampling at the proposed runoff SNP stations. Identify alternate sampling sites in the nearshore of the lake in the event that runoff cannot be sampled at any location in the runoff streams.

Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.1.4, Seepage and Runoff, Section 3.1.4.3 Post-closure Monitoring, p. 17 and Figure 3-3, p. 20	The appendices indicate a reduction of monitoring frequency for runoff from weekly for 1 year to monthly (quarterly for toxicity) and ultimately twice per year thereafter. This reduced sampling frequency may not be adequate to effectively characterize discharge and water quality in the drainages given that inter-annual variability may be considerable. In addition, site runoff is likely to be highly variable within the open-water season and quarterly sampling may be inadequate to fully characterize these source waters; sampling needs to capture periods of intermittent flow, which may be highly variable in time and for brief periods (i.e., days). More frequent sampling (weekly or biweekly sampling) may be required to capture a range of flow and water quality conditions for more than a 1-year period. Recommendation: Recommend a minimum of two years of weekly monitoring of SNP runoff sites; reductions in sampling frequency thereafter should be based on the results of the monitoring, including consideration of hydrological conditions encountered during the initial monitoring (i.e., wet or dry years/ range of flow conditions encountered during initial monitoring years) and variability of water quality conditions. Identify the approach that will be taken to trigger sampling of the streams subject to infrequent/intermittent flows, including the time required to mobilize and complete toxicity/water quality sampling once flow is detected.	Recommend a minimum of two years of weekly monitoring of SNP runoff sites; reductions in sampling frequency thereafter should be based on the results of the monitoring, including consideration of hydrological conditions encountered during the initial monitoring (i.e., wet or dry years/ range of flow conditions encountered during initial monitoring years) and variability of water quality conditions. Identify the approach that will be taken to trigger sampling of the streams subject to infrequent/intermittent flows, including the time required to mobilize and complete toxicity/water quality sampling once flow is detected.
Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.1.4, Seepage and Runoff, Section 3.1.4.3 Post-closure Monitoring, p. 17 and Figure 3-3, p. 20 (continued)	DDMI Response: "The WLWB will be required to approve a change in monitoring frequency and any request will likely be distributed for public comment including EMAB. DDMI will likely include with any request the many years of pond water quality data collected over the range of historical hydrological conditions as supporting evidence. (See FCRP Appendix X-27)."	

Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.2.3, Water Quality, Section 3.2.3.3, Post-Closure Monitoring, p. 36	Appendix VI1 indicates that at post-closure, the frequency of monitoring of Pit Lakes will be reduced to twice per year and will align with AEMP sample collection. Sampling will include collection of depth profiles and grab samples for chemical analysis. "The duration of post-closure monitoring will depend on the results documented in the Performance Assessment Reports (Section 3.7.3); however, monitoring of the rejoined areas is expected to continue for five years." A greater frequency of sampling may be warranted for the initial years of post-closure until there is sufficient data to demonstrate conditions are stable and as predicted. Sampling twice per year would leave long durations without any information to confirm water quality is stable and aligned with predictions.	Recommend more frequent sampling (quarterly or monthly in the open-water season) - at a minimum for pit lake A418 during the initial years of post-closure until there are sufficient data to conclude water quality is stable and as predicted.
Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.5.2, Water Quality, Section 3.5.2.1 Overview of Closure Objectives, Criteria and Monitoring Activities, Table 3-25, p. 62-63	Table 3-25 indicates that closure criteria for the North Inlet (NI) water quality will be assessed against a single station (SNP 1645-13) post-closure. Assessment of closure and post-closure conditions in the NI should incorporate more than one sampling station to provide robust data. It is also indicated that monitoring of the NI during post-closure will be conducted twice per year (once in each of the ice-cover and open-water seasons). It would be prudent to monitor at a higher frequency (e.g., quarterly) prior to breaching and during the initial post-closure period to provide a robust dataset.	Include several water quality monitoring sites in the NI during closure (pre-breaching of the dike) and post-closure until adequate data are obtained to be confident that water quality is stable and suitable for aquatic life. Sample quarterly prior to breaching and during the initial post-closure phase to establish water quality conditions are stable and as predicted.
Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Attachment 2, Table 4	Attachment 2 indicates that water quality monitoring of pit lakes A21 and A154 post-closure will begin one year following breaching of the dikes. Monitoring should occur during/immediately following breaching of the dikes to verify that water quality conditions are stable and meet Closure Criteria.	Monitor water quality in the A21 and A154 pit lakes during and immediately following breaching of the dikes rather than beginning a year following breaching.
Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Attachment 2, Table 27, p. 25	The water quality parameters that will be monitored at the mixing zone boundary stations do not include chlorophyll a. This parameter should be included to monitor for effects related to potential nutrient enrichment. This is particularly relevant as water quality modeling indicated TP is one of the parameters that is predicted to increase post-closure. It is also noted in Appendix VI-2 (p. 17) that biological uptake will reduce concentrations in the lake, particularly during the open-water season; a measure of algal abundance is needed to account for the effect of nutrients released in runoff.	Add chlorophyll a to the list of water quality parameters to be monitored at the SNP Mixing Zone stations.

APPENDIX X-21 - Hydrodynamic and Water Quality Modelling of Pit Lakes and Lac de Gras, Section 2.2 Project Modelling Times, p. 3	The modeling report indicates that the A21 Pit Lake would be breached July 5, 2025. The schedule presented in the FCRP (Figure 5-8) also indicates breaching of this pit in 2025. The AEMP (Appendix VI-2) indicates that sampling of the proposed new AEMP sampling sites/areas would first be undertaken in 2025. This schedule does not allow for completion of "baseline" (i.e., pre-breaching) sampling to be completed if the sampling under the Closure/Post-Closure AEMP is not initiated until 2025. The Closure/Post-Closure AEMP incorporates a number of changes to the current AEMP including the addition of new sampling sites/areas that have not previously been sampled.	Please clarify when pre-breaching monitoring in Lac de Gras would be undertaken at the new sampling sites proposed under the SNP and AEMP for each monitoring component. Sampling should be conducted a minimum of once (for components monitored seasonally (i.e., for water quality and plankton, this should include a minimum of one open-water and ice-cover season round of monitoring) and ideally 2 or more years to provide adequate "baseline" to support post-closure monitoring.
Misclassified Waste Rock	Section 4.4.3.3 of the FCRP discusses misclassified waste rock from the A-Portal. This Type III rock has potential for acid-generation and metal leaching, but was used for construction activities in some areas of the site. Based on subsequent investigations and sampling, DDMI concluded that “the bulk geochemical characteristics of the areas that incorporated A-Portal waste rock into construction (and specifically the worst-case surface construction scenarios) are still constructed with Type I or non-PAG rock” and that “acid rock drainage and metal leaching is expected to remain within the normal range for Type I Rock.” As shown on FCRP Figure 4.4, the misclassified rock is concentrated in a few drainages. Even though the bulk characteristics of the material used for construction may be non-acid generating/non-metal leaching, the Type III materials could cause increased concentrations of contaminants at a local scale and could affect runoff quality in some catchments. For example, materials are not necessarily well mixed with other neutralizing materials, and flow paths of runoff/seepage may not contact neutralizing materials or may contain contaminants that are not removed by contact with the available natural neutralizing material (i.e., they remain in solution at pHs higher than neutralizing material will develop).	DDMI should revise monitoring durations for catchments in which misclassified Type III rock was used for construction. Monitoring durations should be sufficient to detect any contamination that arises from potential ARD and metal leaching, based on predictions of the time for the specific materials to react and consume neutralizing materials, and for contaminants to be measurable at seepage sampling locations.

Misclassified Waste Rock (continued)	Elevated contaminant concentrations caused by oxidation of reactive materials may not be apparent in current sampling and may take many years to develop because the effects will not be apparent until reactions consume the effective neutralization potential in the materials. For catchments that contain misclassified rock, it will be important to continue monitoring for at least as long as it would take for the reactive materials to produce ARD and metal leaching, and for any contamination to be measurable in the drainage path if it were to occur. In its response to comments on this matter in its recent water licence application DDMI asserts that "Impact on water chemistry would be expected sooner rather than later and particularly by now" but it doesn't provide any evidence to support this statement. At the technical session for the water licence application DDMI referenced kinetic test work for Type III waste rock indicating that it generates acid quickly. However, it did not provide or refer to test work and/or analyses to confirm that the rock would have currently released sufficient acidity to consume its inherent neutralizing potential and that contaminants would have travelled to monitoring locations. In the absence of this type of information, there is remaining uncertainty about performance.	
Appendix VI - Monitoring, Hydrology	Appendix VI, Section 3.1.3.1 proposes that monitoring of hydrology can be discontinued once collection ponds are breached. Hydrology information continues to be relevant after breaches, including to understand the timing and scale of high flow events, including as they may be changing as a result of climate change. Also, hydrology information is critical for understanding loading in relation to water quality effects.	Retain hydrology monitoring as part of the post-closure monitoring program to support understanding of effects of high flow events, and to support adjustment of designs if necessary.

Appendix VI - Monitoring, Seepage and Runoff	Appendix VI, Section 3.1.4.3 proposes that monitoring of site runoff and in mixing zones would be discontinued unless sampling shows exceedance of closure criteria or AEMP benchmarks: "If SNP source water samples collected from the pond breach location did not meet closure criteria, or if concentrations at the edge of the mixing zone exceeded AEMP effects benchmarks then sampling would continue." For many parameters, the triggers proposed for continued sampling represent substantially higher concentrations than have been experienced in the past or modelling predicts will occur. As described in Section 2.13 of this report, statistically significant variance from predicted conditions should be considered as an early indicator of changes in water quality conditions and should lead to continued monitoring of water quality conditions.	Sampling of water quality in Collection Pond locations and Mixing Zones should be continued in post-closure if concentrations exceed predictions, are at the upper end of predicted values, or if increasing trends are observed. Also, the proposal to only collect two samples (once a year for two years) in mixing zones will not allow for evaluation of trends (at least three years of sampling would be needed to see a trend), so higher sampling frequencies or longer sampling periods will be required.
Appendix VI - Monitoring, Pit Reconnection to Lac de Gras	Appendix VI, Section 3.2.3.4 describes the sampling that will be used to make decisions about reconnection of pit lakes to Lac de Gras (i.e., breaching of dikes): "Water quality will be required to meet closure criteria during the intensive sampling event that will occur immediately prior to breaching the dikes." Sampling in an intensive one-time sampling effort is necessary and important because it will help to characterize spatial variability of water quality at that time. However, reconnection should also consider temporal variability – especially over the course of the year, but also inter-annually. Once breaches are excavated it will be difficult to reverse the reconnection so it is important to understand variability across both space and time before reconnections are established.	Decisions about re-connection of pit lakes to Lac de Gras should be based on an understanding of water quality conditions including temporal and spatial variability. Sampling should be designed to develop this understanding, and the decision-framework should include consideration of results from a more comprehensive sampling program that addresses both spatial and temporal variability.
DDMI Response to Technical Session Information Requests IR # 4 and Attachment B: IR#4 Revised SWALF	DDMI has provided options for a revised SWALF. DDMI indicates that the SWALF approach may be more appropriate for regulation of a non waste discharge. Based on the definition of waste provided by the Wek'èezhéìi Land and Water Board (WLWB) on March 6, 2023 of the technical sessions and based on the Government of Northwest Territories Response to Information Request, surface water and seepage drainage would be considered a waste. Therefore, is DDMI implying that the SWALF is not appropriate for measuring SW1 and SW2 closure objectives?	DDMI should provide clarification of the intended use of the SWALF and the measurement of SW1 and SW2 if it is not intended for a waste discharge.

DDMI Response to Technical Session Information Requests IR # 4 and Attachment B: IR#4 Revised SWALF	DDMI is proposing to have the SWALF for humans, wildlife and aquatic life separated. This approach is supported and will add clarity to the process Both the assessment of SW1 and SW2 would benefit from an early warning trigger. Exceedance of this early warning trigger would then result in a completion of the risk assessment and examining causation and potential mitigation measures. Diavik has proposed an early warning trigger for SW1. For the SW2, stopping the discharge of surface water run-off or seepage water should occur before adverse effects are expected. An IC50 as a trigger level would not confer sufficient protection to aquatic life.	a) Present SWALF separately for human health and wildlife and aquatic life as proposed in the Responses to Information Requests. B) Implement a trigger level before the 10X AEMP or the SW1-1 and SW1-2 exceedance. c) AL3A trigger should be changed to toxicological impairment defined as an IC20 (not an IC50).
DDMI Response to Technical Session Information Requests IR # 4 and Attachment B: IR#4 Revised SWALF Wildlife	It is not clear why measuring chemistry only at the mixing zone boundary makes sense for the protection of wildlife. Wildlife would be consuming water near the shore. As such, sampling in Lac De Gras near the discharge point should also be completed to determine if adverse effects are possible in the near shore waters where terrestrial wildlife could be expected to consume water.	Identify monitoring locations in the bay where discharge is occurring at near shore locations and determine water quality.
DDMI Response to Technical Session Information Requests IR # 4 and Attachment B: IR#4 Revised SWALF Human Health	Sampling at the mixing zone and at near shore areas should occur as Action Level 3 and compared with SW1-1 and drinking water guidelines (or AEMP).	For Action Level 3 Triggers, water quality criteria should not exceed AEMP benchmarks or drinking water quality guidelines at the mixing zone boundary or near shore areas.
DDMI Response to Technical Session Information Requests IR # 4 and Attachment B: IR#4 Revised SWALF Human Health	Given that the detailed risk assessment could take multiple months to complete, the frequency of monitoring should be increased to confirm the SW1-2 is not exceeded during the completion of the risk assessment.	Monitoring water quality at the breach location as well as along the path to Lac de Gras should occur weekly at a minimum until such time that the risk assessment is completed, water quality returns for at least three sampling events to below the early warning trigger concentrations or the investigation of cause has identified an issue that has been mitigated and water quality has returned to conditions lower than the trigger.

DDMI Response to Technical Session Information Requests IR # 4 and Attachment B: IR#4 Revised SWALF Aquatic Life	Action Response 1 indicates consideration of adjustment of the triggered parameters. It is not clear exactly what is meant by this but it appears that DDMI is suggesting that if there are exceedances of the 10X AEMP benchmark but no toxicity then the AEMP benchmark should be adjusted. This would require a very thorough investigation including looking at dose responses to numerous aquatic species. If DDMI does not think that the AEMP benchmarks are appropriate criteria, then the derivation of Site-Specific criteria should have been completed prior to this point, but should definitely be completed and approved prior to closure.	If AEMP benchmarks are determined not to be applicable, then they should be adjusted to site-specific criteria prior to closure. Adjusting closure criteria during closure and post-closure should be avoided. .
DDMI Response to Technical Session Information Requests IR # 4 and Attachment B: IR#4 Revised SWALF Aquatic Life	The purpose of "confirming biological sampling locations" and "examining ecological significance" is unclear. These should all be defined in the study design and in the proposed monitoring programs.	Remove reference to evaluating sampling locations and examining ecological significance.
DDMI Response to Technical Session Information Requests IR # 4 and Attachment B: IR#4 Revised SWALF Aquatic Life	Based on the figures provided in the response for information requests it appears that there is very little current/movement of water within each of the discharge areas for breeching ponds. With very little current speed in these shallow areas, one would expect sedimentation to occur. It is not clear why closure criteria for sediment have not been included in the FCRP or the SWALF.	Add sediment quality monitoring and comparison to EQG for sediment to the SWALF in the mixing zones for each discharge point.

AEMP triggers and action levels, DDMI Response to IR #4	Diavik has proposed some options for modifications to the SWALF in their response to Information Requests (DDMI 2023; Attachment B). For aquatic life, proposed changes include the addition of two chemistry parameters to Action Level 2 (total suspended solids [TSS] and pH) and addition of triggers from the AEMP to the SWALF. We support the inclusion of triggers and actions for the AEMP and integration within the SWALF. However, we offer the following comments/questions: 1. Action Level 2 - Fish: It is unclear what is meant practically by the "Nearfield mean" (NF). Only two sampling areas for fish are proposed for the nearfield area adjacent to drainages where collection pond breaches will occur; the third is proposed in the area adjacent to the North Inlet. An "effect" may be observed in one of the NF areas but not the others and applying a mean for all areas may mask this effect. How will Farfield (FF; i.e., matched "reference areas") data collected concurrently with the NF data be utilized in the proposed framework? What is the rationale for the proposed critical effect size (CES) of 1.5x the reference condition? Metal and Diamond Mining Effluent Regulations (MDMER) specify CESs for fish metrics of 10% (condition) to 25% (all other metrics). 2. Action Level 2 - Invertebrates and Plankton: As above, it is unclear what is meant practically by the "Nearfield mean". ...continued in next cell	Clarify what is meant by the nearfield mean for the fish component (Action Level 2 trigger). Recommend assessing this trigger for each individual NF area against the reference condition. Include a description of how FF data will be incorporated in the assessment. Clarify what is meant by the nearfield mean for the plankton and benthic invertebrate components (Action Level 2 trigger). Recommend assessing this trigger for each individual NF area adjacent to the pond breaches against the reference condition. Include a description of how FF data will be incorporated in the assessment. **Provide a rationale for the proposed CES of 1.5x the reference condition for fish and 50% of the reference condition for plankton and benthic invertebrates.** Define "effects threshold" for water quality. If the effects thresholds have not been defined for water quality, describe how the Action Levels 2 and 3 triggers will be assessed. Assuming effects thresholds have not been defined, identify what trigger would be applied to cause an effects threshold to be defined. Clarify if the water quality trigger proposed for the Midfield area would apply to individual stations or to all stations combined.

AEMP triggers and action levels, DDMI Response to IR #4 (continued)	Would the mean be calculated from all NF sites collectively or would this apply to specific areas adjacent to collection pond breaches independently? As above, what is the rationale for the proposed CES of 50% lower than the reference condition for invertebrates and plankton? MDMER specify CESs for benthic invertebrates of 2 x standard deviation (SD). 3. Action Level 2 - Water Quality: An Action Level 2 trigger for water quality is defined as "a Nearfield station greater than the normal range plus 50% of the effects threshold." It is unclear what is meant by the "effects threshold". If the effects thresholds have not been defined for water quality, how will this trigger be assessed? Assuming they have not been defined, what trigger would be applied to cause an effects threshold to be defined? 4. Action Level 3 - All: It is unclear if the water quality trigger proposed for the Midfield area would apply to individual stations or to all stations combined; Since water quality will be monitored annually and benthic invertebrates and fish on a three-year rotation, it is unclear if the proposed water quality trigger would apply to any year or only the year(s) in which the biological sampling was conducted; The term reference conditions (RC) and NR (assuming this is normal range) are used in the revised SWALF. Can Diavik clarify if these are referring to the same data?	
DDMI Response to Technical Session IR # 4 and Attachment B: IR#4 Revised SWALF Prior to reconnection - Collection Pond and updated Attachment D: Updated FCRP v1.0 Appendix X-27 Toxicity Sample Summary of the SNP Data)	TSS - >15 mg/L average or 30 mg/L grab. The basis for this criterion is not presented. CCME indicates that there should be no more than an average increase of 5 mg/L from background levels for inputs that last between 24h and 30 d, or a maximum increase of 25 mg/L from background levels for an input that lasts less than 24 h. Given it is assumed the discharge will be longer than 24h and the median TSS for open water and ice cover is <1, can DDMI please justify a TSS<30 mg/L.	DDMI should consider having a TSS criterion of 5-6 mg/L.

Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.1.4, Seepage and Runoff, Section 3.1.4.3 Post-closure Monitoring, p. 18 and Figure 3-3, p. 20	The text indicates that "If SNP source water samples collected from the pond breach location did not meet closure criteria, or if concentrations at the edge of the mixing zone exceeded AEMP effects benchmarks then sampling would continue, and the surface water action level framework would be applied (see Section 3.1.4.4 and Figure 3-3)." The surface water action level framework appears to apply criteria (AL 0/1) of 10 x AEMP benchmarks and these appear to apply specifically to the runoff and not the mixing zone. It is unclear how these two actions interconnect as the framework does not apply the criterion of conditions being below AEMP benchmarks at the MZB. Further, the framework does not include direct assessment of water quality conditions and comparisons to AEMP benchmarks in the mixing zone. Therefore, the framework lacks a mechanism to invoke an action in the event that water quality conditions are above benchmarks. Since the proposed AEMP lacks a response framework, including triggers and actions levels and responses, collectively the proposed monitoring programs do not include a framework for actions related to changes in water quality conditions, but rather rely entirely on results of toxicity testing of the mixing zone – which would only be tested in the event that site runoff exhibits toxicity. ...continued in next cell	Describe how water quality monitoring results in the mixing zone will be incorporated into the SWALF and clarify what the actions would be in the event that AEMP benchmarks are not met at the MZB.

Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.1.4, Seepage and Runoff, Section 3.1.4.3 Post-closure Monitoring, Figure 3-3, p. 20 (continued)	Recommendation: Clarify when and how the surface water action level framework will be applied to runoff and the mixing zone and what criteria will be applied with respect to AEMP benchmarks. Describe how water quality conditions in the mixing zone will be incorporated into the SWALF. DDMI Response: "Action Level 0/1 of the Surface Water Action Level Framework (SWALF) will be applied to runoff from any breached collection pond. Water chemistry will be compared with the 10XAEMP trigger and toxicity compared with the IC25-12.5% trigger. At action level 2 sampling includes the mixing zone boundary (MZB) for sublethal toxicity and water chemistry. At this point sublethal toxicity test results will be compared against the IC50-100% threshold and water chemistry will be used to review dilution factors and AEMP benchmarks." Comment: The response does not appear to align with the statement "If...concentrations at the edge of the mixing zone exceeded AEMP effects benchmarks then sampling would continue, and the surface water action level framework would be applied." EMAB previously commented: "The surface water action level framework identifies several assessment steps with an associated action. For aquatic life, these are: ...continued in next cell	Describe what the response and actions will be in the event that action AL1A (runoff toxicity) or AL2A is triggered (i.e., MZB sampling) but the runoff is no longer flowing, the quality and/or quantity of runoff changes notably, and/or if actions can no longer be implemented due to lack of flow or safety considerations.

Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.1.4, Seepage and Runoff, Section 3.1.4.3 Post-closure Monitoring, Figure 3-3, p. 20 (continued)	- Action Level AL1A - trigger - runoff > 10X AEMP benchmarks for aquatic life; Action - sub-lethal toxicity testing of runoff at 12.5% dilution; - Action Level AL2A: trigger - sublethal toxicity observed in runoff at 12.5% dilution; Action - sublethal toxicity testing of undiluted surface water from the mixing zone boundary (MZB); - Action Level AL3A: trigger - sublethal toxicity observed at MZB; Action - re-establish temporary water collection; conduct a special effects study on the extent of effects in Lac de Gras; toxicity identification evaluation; and, identification of mitigations. The process is conceptually logical; however, in practice may be problematic to implement in some cases due to time lags associated with sampling, laboratory analysis, and subsequent implementation of actions (estimated to be on the order or 3-5 weeks depending on the trigger). Time lags between initial runoff sampling and subsequent implementation of Action Level AL2A sampling (MZB sampling) could result in issues associated with changes in runoff quantity and/or quality between the sampling events. Time lags on the order of several or more weeks may also result in a scenario in which runoff to Lac de Gras ceases prior to implementation of MZB sampling and/or where sampling conditions become unsafe. ...continued in next cell	Revise the surface water action level framework to include appropriate triggers for TP and chlorophyll a. Add a trigger/response/action level for chlorophyll a in the mixing zone.

Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.1.4, Seepage and Runoff, Section 3.1.4.3 Post-closure Monitoring, Figure 3-3, p. 20 (continued)	DDMI Response: "The sampling frequency /schedule is summarized in the SWALF (Figure 3-3). Analytical turn around times and timing of action levels would be the same as currently exists for SNP 1645-18/18b and the Water License EQC. This is typically 3 weeks from the date of sampling but can fluctuate depending on flight availability and the workload of the commercial laboratories and if they required any re-work. "The surface water action level framework Action Level AL1A - Runoff monitoring triggers for the aquatic environment (SW2) are: (1) runoff > 10X AEMP benchmarks for aquatic life; or (2) runoff exhibits sublethal toxicity. The only trigger in the framework with respect to SW2 for the mixing zone monitoring is sublethal toxicity; there are no triggers for the MZB based on water quality for SW2. The proposed framework is not appropriate for application to nutrients and the eutrophication pathway. Two key issues are: - the trigger of 10X the AEMP benchmark for TP would be 7.5 ug/L x 10 = 75 ug/L and for chlorophyll a would be 4.5 ug/L x 10 = 45 ug/L. These triggers are far too high/insensitive and represent eutrophic/hypereutrophic conditions. Triggers for TP and chlorophyll a need to be identified that are adequately sensitive; and ...continued in next cell	

Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.1.4, Seepage and Runoff, Section 3.1.4.3 Post-closure Monitoring, Figure 3-3, p. 20 (continued)	- the framework needs to explicitly consider chemistry at the MZB for the nutrient enrichment pathway - specifically, the program should monitor for effects on chlorophyll a in the lake proper and the framework should include a trigger for chlorophyll a at the MZB. It is also noted that the AEMP does not include action levels or responses; as currently proposed, effects of nutrient enrichment in the lake are not incorporated into any action level response framework. It is acknowledged that the loading of phosphorus to Lac de Gras is expected to decrease post-closure. However, nutrient inputs from pond drainages would occur over a shorter period (open-water season) than those from operation (i.e., from the North Inlet Water Treatment Plant [NIWTP]). Moreover, the receiving environments differ in terms of mixing and habitat conditions such as water depth. Therefore, effects of site runoff on nutrients in the mixing zones may be expected to differ from those observed near the NIWTP.	
Appendix VI-1 Section 3.1.4.4 Comparison to Closure Criteria - Surface Water Action Level Framework	The basis for the Action Level 1 (AL1) trigger of 10 X AEMP benchmarks for aquatic life has not been provided in this section. DDMI should provide the basis and assumptions used in the setting of the action level. If DDMI is assuming that more than a 10X fold dilution will occur before ARC1 and therefore the 10X AEMP is a conservative trigger, then it is not clear why they are not setting the closure criteria to meeting the AEMP benchmarks at ARC1. Meeting an IC/EC50 at ARC1 does not confer suitable protection for aquatic life and would not enable DDMI to meet their closure objective of no adverse effect to aquatic life.	Once the dilution factor at each point of discharge is verified with data to be reliable, then DDMI should set a suitable protective early trigger level at each discharge point based on the assumption that the AEMP benchmarks will be met at the end of the mixing zone (ARC1). If AEMP benchmarks are not met, then chronic toxicity testing using multiple species should be the next action level with anything above an IC20 triggering another action level (i.e., stop releasing discharge to Lac de Gras).

Appendix VI-1 Section 3.1.4.4 Comparison to Closure Criteria - Surface Water Action Level Framework	DDMI added three triggers from AEMP monitoring, namely AEMP fish, AEMP plankton & benthic invertebrates and AEMP WQ. •The critical effects or effects thresholds proposed by DDMI (i.e. 1.5 X or 50% lower or greater than an effects threshold) are much higher than what would be acceptable under the Environment Canada Metal Mining Technical Guidance for Environmental Effects Monitoring (EC 2012) (between 10% (condition) and 25% (all other metrics) difference), and for benthic invertebrates of 2 x standard deviation (SD). A 50% difference from reference concentrations does not result in no effect to aquatic life and therefore does not appear to be a suitable criteria. Diavik did not provide a rationale. •It is also not clear what CES is being proposed. For example, for AEMP fish, Action 2 Trigger is stated to be Near Field (NF) mean is significantly different than reference conditions (RC) mean and magnitude >1.5X Critical Effects size (CES). It is not clear if this includes all the fish health components as specified in Appendix VI of the FCRP including reproduction, survival and condition, or what it is referencing. •the criteria proposed to trigger an action level should be measurable, enforceable, with little or no interpretation needed and timely. ...continued in next cell	References to the AEMP fish and AEMP plankton & benthic should be removed and the effect level for AEMP WQ needs to be revised.

Appendix VI-1 Section 3.1.4.4 Comparison to Closure Criteria - Surface Water Action Level Framework (continued)	The inclusion of the AEMP criteria for fish, plankton and benthic and WQ introduces ambiguity and interpretation that will make enforcement and compliance difficult. For example, the interpretation of the AEMP data relies on identifying outliers and removing data as "not representative". The timeline for an exceedance to be observed and a risk assessment to be completed is too long for discharge at concentrations of concern to continue. As such the trigger levels and action items for human health and wildlife are not acceptable as presented. DDMI has proposed an early action level trigger, whereby the risk assessment would be started when the water quality is 80% of the criteria. This is a positive proposed change to the SWALF. The investigation of causation should also commence at this earlier trigger action level.	DDMI should consider replacing the Action Level 0/1 with an early warning trigger. A fundamental issue with the SWALF is that the first criteria is a level where impacts are expected and the timeframe to confirm and mitigate those effects for human, wildlife and aquatic life is either too long or uncertain. No mitigation measures are in place if that first level is exceeded until such time that additional testing can be safely completed or until a risk assessment can be completed. DDMI should add another "warning level" trigger that would commence action prior to concentrations being that were adverse effects could be expected. This applies to human health, wildlife and aquatic life. DDMI has proposed optional amendments to the SWALF in the response to Information Request (IR#4) which includes an early trigger. This concept should be captured in the final SWALF if it is to proceed.
Appendix VI-1 Section 3.1.4.4 Comparison to Closure Criteria - Surface Water Action Level Framework	An exceedance of the current SW1 and SW2 Action Level 0/1 suggests the potential for adverse effects to be occurring, as such mitigation measures need to be implemented immediately to eliminate the potential risk. The time frame required to complete a risk assessment and identify source/mitigation controls is too long when a potential adverse effect is occurring. As such, it is recommended that an early warning trigger sign be used (such as a percentage of the SW1/SW2 criteria) to instigate the risk assessment and source investigation. DDMI has proposed an early warning trigger as a potential option in the response to Information Request (IR#4). This early warning trigger together with an investigation of causation would help to alleviate the concern of the timeline. DDMI should commit to a timeline to have these completed in the WLA and FCRP.	As such, it is recommended that an early warning trigger sign be used (such as a percentage of the SW1/SW2 criteria) to instigate the risk assessment and source investigation. DDMI has proposed an early warning trigger for SW1 that will help to alleviate concerns with timeframes. DDMI should also incorporate an early warning trigger for SW2 into the SWALF for aquatic life.

Appendix VI-1 Section 3.1.4.4 Comparison to Closure Criteria - Surface Water Action Level Framework	DDMI indicated that meeting an IC25 at an 8 fold dilution would be predictive of meeting an IC50 at 100% at the end of the mixing zone. This may be true, but it would be dependent on the steepness of the dose response curve, and the dose response curve could change depending on the composition of the discharge. In addition, an IC50 at the end of the mixing zone is unacceptable. To meet their closure criteria there needs to be no adverse impact to aquatic life. An IC20 is typically used as a benchmark to indicate that although some impacts will be seen, it is unlikely to cause adverse effects to aquatic life. As such, the threshold criteria at the end of the mixing zone needs to be a criteria to which unacceptable impacts to aquatic life are not anticipated.	It is suggested the DDMI 1) confirm the dilution required at the discharge point to the end of the mixing zone at each discharge point using information representing the worst case scenario. The trigger level to the required dilution factor to meet the AEMP at the mixing zone boundary could then be applied (i.e.., DF * AEMP), along with no acute toxicity and no chronic toxicity at the IC20 for that dilution factor. If there is an exceedance or toxicity is present, then if weather permits, sampling at the end of the mixing zone should be completed within 7 days. Water quality at the end of the mixing zone should meet the AEMP and there should be no chronic effects to at least an invertebrate (C. dubia) and a fish species (rainbow trout) at an IC20 level. If there is chronic toxicity then mitigation measures need to be implemented and discharge to Lac de Gras stopped. If weather does not permit sampling at the end of the mixing zone, then sampling should occur as close to the mixing zone as possible or mitigation measures stopping discharge should be implemented, until such time a repeat of the testing at the discharge location can be completed with confirmatory sampling at the end of the mixing zone occurring within 7 days.
Appendix VI-1 Section 3.1.4.4 Comparison to Closure Criteria - Surface Water Action Level Framework Figure 3-3	DDMI response to EMAB's Comment # 40 on the WL Amendment - Natural Drainage is not clear, what is meant by the phrase "at the threshold of AEMP Benchmarks.." AEMP benchmarks are based on chronic toxicity being at or below IC25. If AEMP benchmarks are met, there should be no toxicity above an IC20 for any test species tested. If DDMI expects AEMP benchmarks to not be suitable criteria, then they should propose site-specific criteria prior to site closure. Criteria shouldn't be changed during closure to meet the actual closure conditions.	The SWALF should be clarified to illustrate the situations where criteria may be revised and should also indicate that criteria will not be changed without Board approval. If DDMI does not think that AEMP benchmarks are appropriate, then site-specific criteria should be developed and proposed prior to closure.

Appendix VI-1 Section 3.1.4.4 Comparison to Closure Criteria - Surface Water Action Level Framework	The SWALF should clearly identify what toxicity tests are being completed. Currently the level of protection to aquatic life at the mixing zone boundary is not suitable to protect aquatic life in Lac De Gras.	The threshold of toxicity should be an IC20 and not an IC50. An IC50 would mean adverse impacts to 50% of the test organisms and is not an appropriate threshold to protect aquatic life. In addition, more than one species should be tested for chronic effects at the AL2A. Chronic testing of an invertebrate (C.dubia) and a fish (rainbow trout) should be completed at a minimum. Chemistry data should also be collected as part of the AL2A and compared with AEMP benchmarks to help identify the potential constituents causing the toxicity.
Appendix VI-1 Section 3.1.4.4 Comparison to Closure Criteria - Surface Water Action Level Framework Figure 3-3	The closure objective for SW2 is "Surface runoff and seepage water quality that will not cause adverse effects on aquatic life or water uses in Lac de Gras or the Coppermine River. " A mixing zone is based on the understanding that somewhat elevated concentrations can occur in a small area of a receiving water body without significantly affecting the integrity of the water body as a whole. However, at the end of the mixing zone, water quality should meet water quality guidelines protective of aquatic species and the most sensitive use of the water. Water quality guidelines are derived to be "protective of all forms of aquatic life and all aspects of aquatic life cycles" with the goal to protect "all life stages during an indefinite exposure to water" (CCME, 2007). Guidelines are preferentially derived using the lowest observed effect level from a chronic study using a non-lethal endpoint for the most sensitive life stage of the most sensitive species. If a chronic lowest effect level isn't reported, then an Acute to chronic ratio (ACR) can be used (CCME. 2003) As such, federal guidance does not consider an IC50/EC50 to be appropriate as an indicator of no adverse effect to aquatic life. CCME, 2007. A Protocol for the Derivation of Water Quality Guidelines for the Protection of Aquatic Life 2007. CCME, 2003. Guidance on the Site-Specific Application of Water Quality Guidelines in Canada: Procedures for Deriving Numerical Water Quality Objectives.	DDMI should change the Action Outcome of Toxicity impairment IC50 at the mixing zone boundary to Toxicity Impairment IC20 at the mixing zone boundary so as to meet their closure objectives.

Appendix VI-1 Section 3.1.4.4 Comparison to Closure Criteria - Surface Water Action Level Framework Figure 3-3	The action level and response box for AL2A suggests to review the dilution factor at the mixing zone boundary. DDMI has indicated that this review may be necessary if their predictions/expectations are incorrect. The dilution within the mixing zone should be studied and known prior to breaching the ponds.	The SWALF should indicate that no changes to the criteria will be made without approval from the Board. DDMI should also present the information for each discharge point where they determined the required dilution factor. This information should look not only at the average conditions, but also at the "worst case".
Appendix VI-1 Section 3.1.4.4 Comparison to Closure Criteria - Surface Water Action Level Framework	If there is toxicity at the AL2A trigger, then this will trigger a AL3A response which will include re-establishing water collection, conducting additional studies to determine effects, toxicity evaluation and identifying mitigation measures. If no "practical" mitigation measures are identified, then DDMI proposes the completion of an environmental trade-off study. DDMI should at least at a conceptual level indicate what would be considered in a trade-off study and that water treatment will be implemented.	DDMI should provide at a conceptual level what would be involved in a trade off study, who would be consulted, the timeframe and the decision process.
Appendix VI-1, FCRP v 1.0 Closure and Post-Closure Monitoring, Section 3.5.2, Water Quality, Section 3.5.2.4 Comparison to Closure Criteria, p. 63-64	Appendix VI-1 indicates that the Surface Water Action Level Framework (SWALF) would be implemented in the event that Closure Criteria for the North Inlet Closure Objectives NI2, 3, and 5 were not met post-closure (i.e., AEMP benchmarks are exceeded). It is unclear how the SWALF will be applied to these Closure Criteria. The SWALF shown in Figure 5.4-2 in the FCRP is structured to be applied to surface water runoff and not the NI. Further, action levels 0/1 for surface water quality with respect to aquatic life refer to runoff toxicity texting results and runoff water quality exceeding 10X AEMP benchmarks. What specifically are the triggers and actions associated with aquatic life for Closure Criteria NI2, 3, and 5 in the SWALF?	Provide a description of the criteria, triggers, and action levels that will be applied to NI water quality monitoring within the SWALF with respect to aquatic life. Modify the SWALF figure or create a second figure to be specific to the NI monitoring and Closure Criteria N2, 3, and 5. If the SWALF will not be applied to NI monitoring, identify triggers and actions for NI monitoring.
Appendix VI-2 Section 2.2 Closure and Post-Closure Site Drainage Conditions, pg 14 paragraph 3 of Section 2.2	The text refers to a Runoff Water Quality Response Framework. Is this the same as the Surface Water Action Level Framework? If not please describe this Runoff Water Quality Response Framework.	Please clarify.

Surface Water Action Level Framework (SWALF)	DDMI proposes that management of surface runoff from the site will rely on the proposed SWALF. The Technical Session included substantial discussion about the SWALF and IR#4 required DDMI to provide a revised SWALF or options that DDMI is prepared to consider. DDMI's Response to IR#4 provided options for further consideration. With respect to both Wildlife and Human Health, the revised SWALF proposes that the response to Action Level 1 triggers (exceeding 80% of a criterion) would entail a "detailed risk assessment to confirm or adjust" the criterion/criteria. Investigation of cause and implementation of control mitigation are identified as responses to Level 2 triggers – i.e., when water quality exceeds any adjusted/confirmed criteria. At a fundamental level, the proposed framework begins with the assumption that it is the criteria that are the problem, not the measured conditions. In the context of a mine closure project an adaptive response plan should initially be focused on whether the closure plan is performing as expected, not on whether the measurement criteria need to be relaxed. To achieve this, the response to Action Level 1 triggers should include investigation of cause. This would form the basis for subsequent decisions about responses. For example, if the cause is not mine-related and is expected to continue, then reconsideration of criteria may be warranted – but that may or may not be to rely on a risk assessment methodology depending on conditions. ...continued in next cell	Revise the SWALF to provide for investigation of causes of SW1-1 or SW1-2 exceedance, and consideration and implementation of maintenance/mitigation before considering revision of closure criteria. Revision of closure criteria could be considered as a potential response to a revised Action Level 2, but should not be a response for Action Level 1.
Surface Water Action Level Framework (SWALF) (continued)	On the other hand, if the cause is mine-related appropriate, practical mitigation (e.g., runoff management, source control) should be developed and implemented. Only after practical measures have been implemented but exceedance of criteria continues, should there be consideration of risk assessment to adjust criteria. The consideration of adjusting criteria could be addressed as a response to a revised Action Level 2 trigger.	

Surface Water Action Level Framework (SWALF)	Initial triggers under the SWALF are related to AEMP benchmarks and closure criteria. However, these triggers are not proactive triggers for water quality conditions. For many parameters and locations, these triggers represent changes in water quality and conditions that are substantially different than what is predicted through modelling. The first indication that water quality is different than expected arises when measured conditions exceed the predictions. If this occurs, the framework should trigger, at the least, some investigation of causes. Then, if trends continue then there should be action to curtail the changes, rather than waiting until triggers associated with AEMP benchmarks before taking actions.	Conditions that are statistically different from predictions should be an action level trigger in the SWALF, rather than waiting for triggers specifically defined by the AEMP benchmarks and closure criteria.
Appendix VI-2 Section 1.3 Integration of the AEMP with Closure and Reclamation Planning - pg 3, paragraph 3	It is stated that the AEMP and other environmental effects monitoring programs will not be used to evaluate compliance with closure criteria. If the AEMP or other monitoring results indicate that closure criteria are not being met, then they should be considered in the evaluation of whether closure has been successful.	All data collected should be used in the evaluation of the whether the closure objectives are being met. The AEMP monitoring is the only monitoring proposed at this time that compares water quality to benchmarks protective of aquatic life and consumption of water as a potable source.
Appendix V1-2: FCRP v. 1.0 Closure and Post-closure AEMP Design Plan, Section 2.2.2 Closure and Post-closure Site Drainage Conditions, p. 14 & Appendix VI-1, Section 3.1.4 Seepage and Runoff, Figure 3-3, p. 20	The AEMP design plan indicates that "a Runoff Water Quality Response Framework" was developed to provide "an adaptive management framework to address unexpected issues related to runoff water quality or the stability of water quality in the reconnected pits and NI throughout post-closure" (p. 14). The SWALF presented in Appendix VI-1 (see Figure 3-3, p. 20) only refers to site drainage and mixing zones downstream of these discharges.	Clarify how the Runoff Water Quality Response Framework will be applied to the NI and reconnected pits in the SNP.
Appendix V1-2: FCRP v. 1.0 Closure and Post-closure AEMP Design Plan, Section 5.0 Description of AEMP Components, Section 5.3.4.4.1 Source Water Quality and Quantity, p. 64	The AEMP indicates that results of water quality modeling in flooded pits and the NI area will not be incorporated into the AEMP. This information is an important component of the overall monitoring of Lac de Gras and should be incorporated into the AEMP.	Include results for SNP monitoring at the NI and the flooded pits.

Appendix V1-2: FCRP v. 1.0 Closure and Post-closure AEMP Design Plan, Section 2.2.2 Closure and Post-closure Site Drainage Conditions, Figure 2.2-1, p. 15	Figure 2.2-1 indicates there are two drainages on East Island that are "unimpacted" (D and E). It would be beneficial to monitor water quality and flow for these drainages as part of the monitoring program (SNP) to serve as reference areas. This may provide useful information for gauging Project-related effects. EMAB had recommended including water quality and flow monitoring for drainages D and/or E (i.e., tributaries/inflows to Lac de Gras) to serve as reference areas. DDMI's response was: "There is already sufficient data to date to provide indications of reference conditions. New reference area sampling would not improve the SWALF or AEMP interpretation." Inclusion of monitoring unaffected streams would provide valuable contextual data that would assist with confirming predicted effects of the Project and help to discriminate Project-related effects on water quality. It is also noted that there is no pre-Project or contemporary water quality data for East Island streams; baseline data identified by Diavik is restricted to 8 streams sampled in 1996 - none of which were on East Island.	Recommend including water quality and flow monitoring for drainages D and/or E (i.e., tributaries/inflows to Lac de Gras) to provide "reference area" information and to provide water quality information for East Island streams in general.

Appendix V1-2: FCRP v. 1.0 Closure and Post-closure AEMP Design Plan, Section 2.0 Project Description, Section 2.2.3 Post-closure Source Water and Surface Water Quality Modeling, p. 16	The Closure and Post-Closure AEMP Design Plan proposed to add two new sampling areas for Slimy Sculpin monitoring: (1) one area in the vicinity of the outflow from Pond 4 (referred to as NFC-3); and (2) one area in the vicinity of the outflows from Ponds 1, 5, 10, and 13 (referred to as NFC-6). Additionally, it is proposed to drop one NF area in the vicinity of the A21 pit (MF3 area). The summary of water quality modeling results indicates that the highest predicted concentrations of constituents in runoff during post closure are associated with the PKC Facility and the E21 and A418 Pit drainages and that the PKC Facility drainage will flow to drainage C3. None of the three NF fish sampling areas are in the areas of runoff discharge from these drainages/sources and no other sampling (i.e., water quality, plankton, benthic invertebrates, and sediment quality) is proposed in the bay that will received C3 runoff. EMAB had previously requested clarification for the rationale used to select fish sampling areas and DDMI responded that sites were selected based on habitat constraints (water depth of 18-22 m) and that this bay does not meet these criteria. ...continued in next cell	Sample all components in the C3 bay and collect a minimum of one year of pre-closure monitoring data to facilitate pre- vs. post-closure comparisons of conditions.

Appendix V1-2: FCRP v. 1.0 Closure and Post-closure AEMP Design Plan, Section 2.0 Project Description, Section 2.2.3 Post-closure Source Water and Surface Water Quality Modeling, p. 16 (continued)	DDMI Response: "DDMI's perspective is that the currently proposed NFC-3 sampling station (Figures 4.4-2 and 4.4-3 of Appendix V1-2) provides an appropriate near-field sampling point for the C3 drainage. The locations of new NFC stations, including the proposed NFC-3 station, were estimated in consideration of the results of post-closure water quality modelling and bathymetric information for Lac de Gras. Water depth, specifically the location of the 18-22 depth contour, was a key factor that limited where new AEMP stations could be located around the East Island. Water depth was particularly limiting around the north end of the East Island, where the lake is generally shallower. As indicated in Section 4.4.2 of Appendix V1-2, water depth is an important consideration for the AEMP sediment and benthic invertebrate components, which are influenced by physical characteristics of bottom sediments. Since the primary physical variable that influences sediment composition and benthic invertebrate communities in lakes is water depth, AEMP stations should be located within the existing AEMP station depth range of 18 to 22 m. Situating a station outside of the AEMP target depth range would complicate the data analysis for sediments and benthic invertebrates in particular, and could introduce data comparability issues for other AEMP components. ...continued in next cell	

Appendix V1-2: FCRP v. 1.0 Closure and Post-closure AEMP Design Plan, Section 2.0 Project Description, Section 2.2.3 Post-closure Source Water and Surface Water Quality Modeling, p. 16 (continued)	As all other AEMP stations (i.e., both the current operational and proposed closure and post-closure stations) are situated along the 18 to 22 m depth contour in Lac de Gras, locating a single station, particularly an NFC station associated with one of the potentially more affected areas of Lac de Gras, outside of this target depth range is problematic as it would introduce data comparability issues, thereby potentially influencing the sensitivity of the AEMP to detect effects from the Mine. The currently proposed NFC-3 sampling station is situated at the closest deep hole that intersects the 18-22 depth contour, without encroaching on the post-closure mixing zone located in the C2-C3 bay (Figure 3-2 of Appendix V1-1). Although a small area within the appropriate depth range exists within the C2-C3 bay, situating a station inside or immediately adjacent to a mixing zone is not appropriate as the exposure level would be much higher than at other NFC area stations and would not be representative of the overall receiving environment in the near-field area around the East Island. ...continued in next cell	

Appendix V1-2: FCRP v. 1.0 Closure and Post-closure AEMP Design Plan, Section 2.0 Project Description, Section 2.2.3 Post-closure Source Water and Surface Water Quality Modeling, p. 16 (continued)	There are some additional deeper locations within the 18-22 depth contour in the prominent West Island bay that extends in a northwesterly direction away from the East Island (Figure 3-2 of Appendix V1-1); however, locating a station in this bay is not recommended, as this area is relatively isolated and may have naturally different physical habitat characteristics compared to other NFC area stations which are situated in open-water areas of the lake. As outlined above this could introduce data comparability issues with other AEMP stations. Station NFC-3 is located as close as feasible to the East Island and the C3 drainage, while remaining within the appropriate water depth contour for the AEMP. Based on projected water quality conditions, the station is expected to provide an appropriate level of sensitivity to detect effects associated with Mine water drainage inputs." Comment: The Closure and Post-Closure AEMP Design Plan proposed to add two new sampling areas for Slimy Sculpin monitoring: (1) one area in the vicinity of the outflow from Pond 4 (referred to as NFC-3); and (2) one area in the vicinity of the outflows from Ponds 1, 5, 10, and 13 (referred to as NFC-6). Additionally, it is proposed to drop one NF area in the vicinity of the A21 pit (MF3 area). ...continued in next cell	

Appendix V1-2: FCRP v. 1.0 Closure and Post-closure AEMP Design Plan, Section 2.0 Project Description, Section 2.2.3 Post-closure Source Water and Surface Water Quality Modeling, p. 16 (continued)	The summary of water quality modeling results indicates that the highest predicted concentrations of constituents in runoff during post closure are associated with the PKC Facility and the E21 and A418 Pit drainages and that the PKC Facility drainage will flow to drainage C3. None of the three NF fish sampling areas are in the areas of runoff discharge from these drainages/sources and no other sampling (i.e., water quality, plankton, benthic invertebrates, and sediment quality) is proposed in the bay that will receive C3 runoff (hereafter referred to as the "C3 bay"). EMAB had previously requested clarification for the rationale used to select fish sampling areas and DDMI responded that sites were selected based on habitat constraints (water depth of 18-22 m) and that this bay does not meet these criteria. While the desire to maintain consistency in habitat attributes when selecting sites is understood (and is critical), this constraint should not preclude sampling in areas where monitoring is particularly important. Water quality sampling is generally not constrained by habitat attributes and should be completed in this area. Fish sampling is conducted in nearshore areas and is decoupled from sampling of other components – therefore fish site selection is not dependent upon water depth and substrate offshore. Sediment quality and benthic invertebrates could be affected by sampling at shallower depth and/or in areas with different. ...continued in next cell	
Appendix V1-2: FCRP v. 1.0 Closure and Post-closure AEMP Design Plan, Section 2.0 Project Description, Section 2.2.3 Post-closure Source Water and Surface Water Quality Modeling, p. 16 (continued)	However, sampling could be undertaken in the C3 bay in shallower habitat and data could be analysed through a pre-closure vs. closure/post-closure approach (i.e., before-after approach) or potentially through alternative study designs (e.g., gradient design). Given that the C3 bay is predicted to experience the largest impacts related to the Project post-closure, the AEMP should not only include some sampling in this area, this area should be a high priority for monitoring. It is further suggested that collection of data in the C3 bay will increase confidence/reduce uncertainty with respect to predicted effects of the Project post-closure and would provide valuable data to inform the understanding of closure impacts.	

Appendix V1-2: FCRP v. 1.0 , Section 4.4.2 Sampling Locations, p. 39 and Section 4.5 Sampling Schedule, p. 43 FCRP - MAIN BODY; Section 5.2.8.3.2 Collection Ponds (p. 138-140)	The AEMP Design Plan for the Closure and Post-Closure Phases indicates sampling would start in 2025 (anticipated start of closure) and that the comprehensive monitoring (including fish, invertebrates, and FF sites) would be done in 2025 and 2028 with sampling frequency to be determined thereafter. The Closure and Post-Closure AEMP Design Plan proposed to add two new sampling areas for Slimy Sculpin monitoring: (1) one area in the vicinity of the outflow from Pond 4 (referred to as NFC3); and (2) one area in the vicinity of the outflows from Ponds 1, 5, 10, and 13 (referred to as NFC-6). Additional new NF sites for other components have also been proposed. The FCRP indicates that "subject to schedule changes based on completion of closure work within catchments, the envisioned schedule for breaching is": -Ponds 2 and 7: 2023 -Ponds 1 and 13: 2025 -Ponds 4 and 5, Sump E21: 2026 -Ponds 3, 10, 11, and 12: 2027. DDMI clarified that fish sampling is not planned to be undertaken prior to breaching closure drainages, the North Inlet, or the pit lakes and that the first planned sampling is in 2025. ...continued in next cell	Two years of pre-closure sampling at the new areas/sites is recommended to provide robust data for comparison. At a minimum, one round of monitoring at the new NFC should be completed for all components (water quality, plankton, sediment quality, invertebrates, fish, and metals in fish) prior to breaching of ponds. For water quality and plankton, the pre-closure sampling should include at least one summer and one winter sampling event.
Appendix V1-2: FCRP v. 1.0 Section 4.4.2 Sampling Locations, p. 39 and Appendix V1-2: FCRP v. 1.0 Section 4.5 Sampling Schedule, p. 43 FCRP - MAIN BODY; Section 5.2.8.3.2 Collection Ponds (p. 138-140) (continued)	Diavik indicated that sampling will be undertaken “where schedule permits” for water quality, plankton, sediment quality, and benthic invertebrates in 2023 or 2024 but only ice-cover season sampling for water quality would be completed before breaching of Ponds 2 and 7. All new sampling sites for all components should be sampled prior to pond breaching to provide a “baseline” data set for comparison to closure/post-closure monitoring. This is critical information as these areas have not been sampled previously. For Slimy Sculpin, past monitoring conducted under the AEMP has noted considerable variability in the data sets and confounding factors with respect to similarities in habitat between the FF (reference) areas and the NF/MF areas which has affected data interpretation. This consideration renders the need for pre-closure data collection particularly important.	

Appendix V1-2: FCRP v. 1.0 Closure and Post-closure AEMP Design Plan, Section 4.0 Study Design, Section 4.4.2.1 Selection of New NFC Station Locations, p. 40-42	Proposed new NFC sites for water quality, sediment quality, plankton, and benthic invertebrate were selected based on water depth (18-22 m) and predicted (modeled) mine water tracer concentrations of approximately 0.5-2.0%. It is noted that the depth range was selected to maintain consistency with depth range in the current AEMP. However, there is no discussion provided regarding the rationale for adopting this tracer concentration as a site selection criteria. Consideration should be granted to actual model predictions (i.e., predicted concentrations of constituents) in the receiving environment in addition to the size and dimensions of the plumes/mixing zones. The AEMP notes that the highest predicted constituent concentrations in runoff occur in Drainages 3, A21, and A418. The FCRP (Table 5-7) indicates for example that runoff site C3 has by far the highest TDS concentration and the second highest flow/discharge (surpassed slightly by the NI). Do the proposed locations capture areas that are predicted to experience the largest effects on water quality related to site runoff? Figures 4.4-2 and 4.4-3 do not present runoff discharge or mixing zone monitoring locations which renders it difficult to assess the entirety of the proposed monitoring programs (SNP and AEMP).	Clarify if the proposed NFC sites capture the area(s) predicted to be most affected by pond breaching.

Appendix V1-2: FCRP v. 1.0 Closure and Post-closure AEMP Design Plan, Section 4.0 Study Design, Section 4.4.2.1 Selection of New NFC Station Locations, p. 40-42 (continued)	Recommendation: Clarify why a Mine water tracer concentration of approximately 0.5-2.0% was used as a criterion for AEMP NFC site selection. Include sites that capture areas with the greatest anticipated effects on water quality. Include SNP (runoff and mixing zone) monitoring stations on AEMP maps 4.4-2 and 4.4-3 and others as appropriate. DDMI Response: "The following factors were considered when estimating locations for new NFC sampling stations: •Site drainage conditions on the East Island at post-closure, specifically the locations of discharge points and mixing zones •Bathymetric information, specifically, the location of the 18 to 22 m depth contours in Lac de Gras. •Results of water quality modelling for post-closure •Consideration to integrate a subset of existing NF and MF area stations into the post closure NFC area to allow for consistency with operational monitoring. DDMI notes that water depth (i.e., location of 18 to 22 m depth contour) was the main factor that limited where new AEMP stations could be located around the East Island. New stations were generally located as close to the East Island as possible based on the 18 to 22 m depth contours (Figure 4.4-3 of Appendix V1-2), while avoiding encroaching on the proposed post-closure mixing zones (Figure 3-2 of Appendix V1-1). ...continued in next cell	

Appendix V1-2: FCRP v. 1.0 Closure and Post-closure AEMP Design Plan, Section 4.0 Study Design, Section 4.4.2.1 Selection of New NFC Station Locations, p. 40-42 (continued)	The modelled mine water tracer results were used to confirm that NFC area stations were situated in waters exposed to mine effluent, and that stations were not located too far from the East Island such that dilution would limit the potential to detect effects. The mine water tracer concentration was used as an additional information source to support decision making, and not as a definitive criterion for locating new stations (i.e., a specific threshold concentration was not defined). Runoff water chemistry reporting from the East Island, and consequently, exposure conditions in the NFC area, are predicted to be spatially variable (Golder 2022a). Given the importance of prioritizing that near-field (NF) sampling points were included in the general vicinity of all closure discharge points, a specific threshold concentration for the mine water tracer was not defined. However, as the concentration range for the mine water tracer ranged from approximately 0.5 to 2% in the NFC area, stations are expected to be exposed to effluent concentrations up to four-fold greater than those in the rest of the lake. Use of a mine water tracer variable to support station selection is consistent with the commonly used approach of basing station locations on the results of an initial plume delineation study. The results of a plume delineation study were used when selecting the original NF stations to be sampled in the vicinity of the NIWTP discharge for the operational AEMP. ...continued in next cell	

Appendix V1-2: FCRP v. 1.0 Closure and Post-closure AEMP Design Plan, Section 4.0 Study Design, Section 4.4.2.1 Selection of New NFC Station Locations, p. 40-42 (continued)	For the operational AEMP, NF stations were located within the estimated 1% effluent zone (DDMI 2007). The modelled post-closure mine water tracer concentrations in the NFC area are generally similar or higher than those defined for the operational AEMP NF area. The utility of using modelled constituent concentrations (i.e., rather than predicted mine water tracer concentrations) for selecting station locations for the AEMP is limited due to differences in runoff chemistry among the post-closure discharge points, as well as variation over time (Golder 2022a; Golder 2022b). For example, the pits generally have higher concentrations of certain nutrients compared to other discharge points, whereas the C3 drainage is associated with relatively higher concentrations of uranium. Additionally, while TDS has been used effectively as a tracer of mine effluent for the NIWTP during operation (AEMP Design Plan V6.1), it is not a useful tracer for post-closure conditions. As indicated by Golder (2022a), there are minimal differences in predicted TDS concentrations throughout the lake at post-closure, as well as among the 13 post-closure mixing zones. Therefore, TDS was not considered a reliable predictor of exposure to mine effluent for post-closure conditions. The use of a generic mine water tracer was considered to be a more broadly applicable tool for estimating exposure conditions in Lac de Gras. ...continued in next cell	
Appendix V1-2: FCRP v. 1.0 Closure and Post-closure AEMP Design Plan, Section 4.0 Study Design, Section 4.4.2.1 Selection of New NFC Station Locations, p. 40-42 (continued)	DDMI's perspective is that the locations of NFC area stations capture areas that are predicted to experience the largest effects on water quality related to site runoff, while still taking into consideration important habitat features (e.g., water depth) and comparability to historical AEMP data.	
Appendix E FCRP Main Body, Section 2.5.2.1 Comprehensive Study Report Conclusions, p. 2-10	SNP runoff monitoring locations are summarized in the closure and post closure AEMP in Figure 5.3-1 of Appendix V1-2. Mixing zone monitoring locations are summarized in Figure 3-2 of Appendix V1-1. To facilitate review of the proposed new NFC stations, DDMI will add the SNP source water stations and mixing zone arcs to the next version of the closure and post-closure AEMP. "	Provide clarification if any monitoring of fish from East Island will be undertaken.

Fish Habitat Enhancement	In Section 5.2.1.5 DDMI states that it no longer intends to construct the previously planned fish habitat within the dike areas of the pits: "Fish habitat construction within the dike areas has been reconsidered with DFO and Indigenous communities and the decision has been made to avoid encouraging fish into the pit lakes and not construct the designed fish habitat enhancement." The rationale for this proposed change is found in Section 5.2.5.3: "Concerns have been raised by communities and the TK Panel regarding construction of fish habitat enhancements in a Mine-affected area that may not be used by people in the future rather than alternative offsetting approaches that could be more beneficial to affected Indigenous communities." Instead of constructing fish habitat at East Island in Lac de Gras, DDMI now proposes habitat enhancement at Frame Lake in Yellowknife. Frame Lake currently does not support any fish populations, a condition thought to be due to low oxygen levels especially under ice. Frame Lake is far from the site, Lac de Gras and the Coppermine River watershed. ...continued in next cell	Further description should be provided about the benefits expected from the Frame Lake fish habitat enhancement and the relationship to the Diavik project.

Fish Habitat Enhancement (continued)	It also has arsenic concentrations which have led GNWT to designate it as a lake that would not be suitable for consumption of harvested fish. (Arsenic in Lake Water Around Yellowknife. Government of Northwest Territories. Accessed on February 27, 2023 at https://www.hss.gov.nt.ca/en/newsroom/arsenic-lake-water-around-yellowknife). Frame Lake is identified as having arsenic concentrations in the range of 100-499.99 parts per billion, falling in the "red" category with the following description: "Lakes with orange, red or purple points: Arsenic levels are elevated (52 parts per billion and above). Water should not be consumed from these lakes. It is also recommended to avoid fishing, swimming, and harvesting berries, mushrooms and other edible plants within this zone. However, walking through this area does not pose a health hazard." Specifically for Frame Lake, GNWT states: "People should continue to avoid swimming, fishing and harvesting berries, mushrooms and other edible plants around David Lake, Fox Lake, Frame Lake, Gar Lake, Handle Lake, Jackfish Lake, Kam Lake, Niven Lake, Peg Lake, Meg Lake, and Rat Lake." As a result, any fishing conducted in Frame Lake could only be catch-and-release. It is not clear whether the proposed habitat enhancement achieves the desired outcome of being "more beneficial to affected Indigenous communities." This should be confirmed before approving the proposed change in approach for fish habitat enhancement.	
Slater Environmental Technical Review	n/a	n/a
North-South Technical Review	n/a	n/a
Arcadis Canada Technical Review	n/a	n/a
MSES Technical Review	n/a	n/a
Randy Knapp Technical Review	n/a	n/a
April 6'22 letter from Diavik - attachment	n/a	n/a
Dec 15'22 letter from EMAB - attachment	n/a	n/a
Jan 11'23 email - attachment	n/a	n/a
Jan 20'23 minutes - attachment	n/a	n/a