



Report of Environmental Assessment and Reasons for Decision

EA1819-01

Diavik Diamond Mines Inc.

***Depositing processed kimberlite into
pit(s) and underground***

January 2020

*Let's listen well to each other. Let's listen... that's
our land that we love that we're talking about.
Let's share good stories and make good decisions.*

-Tłjchq Elder Dora Migwi (PR#156 p56)

Review Board decision

To make its decision in this environmental assessment, the Mackenzie Valley Environmental Impact Review Board (Review Board) has considered all the evidence on the public record and made its decision under section 128 of the *Mackenzie Valley Resource Management Act*.

The Review Board finds that Diavik Diamond Mines Inc's (Diavik) proposal to deposit processed kimberlite in pit(s) and underground (the Project) is likely to cause significant adverse impacts on the environment. The Project, without additional mitigation, is likely to cause a significant adverse impact on the cultural use of Lac de Gras. In addition, Diavik has not done enough to demonstrate that adverse impacts to water quality will not occur.

The Review Board recommends, under subparagraph 128(1)(b)(ii) of the *Mackenzie Valley Resource Management Act*, that the Project be approved subject to the measures described in this report, which are necessary to prevent significant adverse impacts on the environment. Specifically, the Review Board requires measures to:

- ensure that water in the pit lake(s) meets new water quality objectives
- collaboratively develop criteria for judging if water will be good for cultural use
- update water quality modelling
- establish an independent review panel to improve updated modelling
- conduct additional and more effective engagement with potentially affected Indigenous communities
- develop community-specific indicators of well-being and adaptively manage project-specific and cumulative impacts on cultural use of Lac de Gras

The Review Board requires a follow-up program, under subsection 111(1) of the *Mackenzie Valley Resource Management Act*, including annual reporting from Diavik, the GNWT, and regulatory authorities on the implementation of the measures.

With these measures and Diavik's commitments to reduce or avoid impacts, the Review Board has concluded that the Project may proceed to the regulatory phase for approvals. These measures will also help to improve the Project and require meaningful actions to mitigate significant impacts that would otherwise occur.

JoAnne Deneron
Chairperson
Mackenzie Valley Environmental Impact Review Board

Table of contents

Review Board decision	i
Table of contents	ii
Summary	vii
Acknowledgements.....	ix
Guide to this Report.....	1
1 Project and setting.....	3
1.1 Diavik needs more space for processed kimberlite	3
1.2 Diavik examined four options for storing processed kimberlite.....	5
1.3 Diavik is proposing to put processed kimberlite into pit(s) and underground (scope of development)	6
1.4 Environmental setting.....	11
2 The environmental assessment.....	15
2.1 Why the Review Board is assessing this project	15
2.2 What guided the Review Board’s process and determinations.....	16
2.2.1 Determining impact significance	16
2.2.2 Assessing cumulative vs. project-specific impacts	18
2.2.3 Cultural use and well-being are connected	18
2.2.4 Climate change considerations.....	19
2.3 Issues the Review Board examined (scope of assessment).....	19
2.4 Environmental assessment steps.....	21
2.5 Intervenors	23
2.6 Preliminary screening.....	24
3 Evidence about impacts.....	27

3.1	Evidence about potential impacts on water	27
3.1.1	Framing the issues: everything is connected, and water is key	27
3.1.2	Effects on water quality during closure and beyond	29
3.1.3	Concern and uncertainty about impacts on water quality	32
3.1.4	Less water required for closure	35
3.2	Evidence about impacts on fish from changes to water quality and habitat	35
3.2.1	Impacts on fish from changes in water quality.....	35
3.2.2	Changes in water quantity and fish habitat.....	38
3.3	Evidence about potential impacts on wildlife.....	38
3.3.1	Bathurst caribou are in serious decline	38
3.3.2	Water quality as a pathway of impacts on wildlife	40
3.3.3	Other potential effects on caribou and other wildlife.....	42
3.4	Evidence about impacts on cultural use	43
3.4.1	Cultural importance of Lac de Gras	43
3.4.2	Effects on cultural use of Lac de Gras from changes to water, fish, and wildlife...	45
3.4.3	Other impacts on cultural use	47
3.4.4	Indigenous intervenors said Diavik’s engagement was poor	49
4	Evidence about mitigations	52
4.1	Appropriate benchmarks or objectives for water.....	52
4.2	Updated water quality modelling	54
4.3	Independent review of updated modelling	55
4.4	Keeping fish safe	56
4.5	Keeping wildlife safe	57
4.6	Comprehensive monitoring	58
4.7	Engagement to mitigate cultural impacts.....	60

4.8	Expanding the use of Traditional Knowledge	62
5	Review Board findings	64
5.1	The Review Board finds significant adverse impacts on cultural use of Lac de Gras	65
5.1.1	The acceptability of changes in the Lac de Gras area is low	65
5.1.2	The Project is likely to reduce cultural use of the Lac de Gras area	68
5.1.3	Impacts from the Project on cultural use of Lac de Gras are significant.....	71
5.1.4	The Project will add to pre-existing cumulative cultural impacts	72
5.2	The Review Board is unconvinced by Diavik’s assessment of water quality impacts ...	73
5.2.1	Diavik’s preliminary modelling leaves too much uncertainty	73
5.3	A suite of measures is required to mitigate the project impacts	74
5.4	The Bathurst caribou herd is under threat, but the Project is not likely to make this problem worse	75
5.5	The Project may lead to environmental benefits for closure of the processed kimberlite containment facility	76
6	Mitigation and follow-up.....	79
7	Conclusion	96
	Appendix A – Public Registry Index.....	97
	Appendix B – Diavik’s Commitments.....	106
	Appendix C – Adaptive Management	115

List of figures

Figure 1: Location of the Diavik Mine	4
Figure 2: The PKC Facility on the shores of Lac de Gras	5
Figure 3: The Diavik Diamond Mine.....	7
Figure 4: Mine workings including the pit and underground	8
Figure 5: Illustration of pit layers for A418 Scenario 2a, which estimated putting 5 000 000 m ³ of PK into the pit	10
Figure 6: Diavik’s closure plan is to fill the pits with water to create pit lakes	12
Figure 7: Review Board members Sunny Munroe, JoAnne Deneron, and David Krutko during the site tour at Diavik.....	20
Figure 8: Review Board members and Board Chair at the public hearing in Dettah	21
Figure 9: The public hearing in Behchokò.....	22
Figure 10: Tłjchq Elder and former Grand Chief Joe Rabesca speaking at the public hearing in Behchokò	28
Figure 11: Blake Rasmussen speaking at the public hearing in Behchokò.....	29
Figure 12: Diavik staff at the public hearing in Dettah	31
Figure 13: Lena Black speaking at the public hearing in Dettah.....	33
Figure 14: The Environmental Monitoring Advisory Board speaking at the technical hearing in Yellowknife.....	34
Figure 15: Pit A418, Diavik’s preferred disposal location for PK, Diavik Diamond Mine	36
Figure 16: Patrick Simon and Richard Simon of Deninu Kue First Nation at the technical hearing in Yellowknife.....	44
Figure 17: Tłjchq Elder and former Chief of Wekweètì Joseph Judas speaking at the public hearing in Behchokò	47
Figure 18: Łutsel K’e member Doris Enzoë speaking at the public hearing in Dettah	50
Figure 19: Pits A154 and A418 at Diavik Diamond Mine	53
Figure 20: Review Board members at the public hearing in Behchokò	64
Figure 21: The holistic suite of measures to protect water, fish, wildlife and cultural use, and build confidence to reduce cultural impacts	80
Figure 22: Illustration of an effective adaptive management framework	115

List of abbreviations

AEMP	Aquatic Effects Monitoring Program
CCME	Canadian Council of Ministers of the Environment
CEAA	Canadian Environmental Assessment Agency
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
DDMI	Diavik Diamond Mines Inc.
DKFN	Deninu Kue First Nations
DFO	Department of Fisheries and Oceans Canada
EA	Environmental Assessment
ECCC	Environment and Climate Change Canada
EMAB	Environmental Monitoring Advisory Board
ENR	Department of Environment and Natural Resources, GNWT
GNWT	Government of the Northwest Territories
GoC	Government of Canada
FRMC	Fort Resolution Métis Council
IR	Information Request
IMA	Interim Measures Agreement
LKDFN	Łutsel K'e Dene First Nation
The Act	Mackenzie Valley Resource Management Act
MVEIRB	Mackenzie Valley Environmental Impact Review Board
NSMA	North Slave Métis Nation
NWTMN	Northwest Territories Métis Nation
ORS	Online Review System
PR#	Public registry number
PK	Processed Kimberlite
TG	Tłjchq Government
TK	Traditional Knowledge
WLWB	Wek'èezhii Land and Water Board
YKDFN	Yellowknives Dene First Nation

Summary

Diavik wants to put processed kimberlite in the pit(s) and underground

The Diavik Diamond Mine (the mine) is located on East Island in Lac de Gras, about 300 km northeast of Yellowknife, Northwest Territories. Diavik Diamond Mines Inc. (Diavik) is mining three open pits at the mine and currently puts all the processed kimberlite (a mine waste) it produces into its processed kimberlite containment facility. **Diavik has proposed to put some of the processed kimberlite into the pit(s) and underground at the mine** instead. This proposal is referred to here as “the Project”.

Diavik wants to put 5 000 000 m³ of processed kimberlite into the A418 and/or A154 pit(s) and underground beneath those pits. Once the processed kimberlite is in the pit(s) and underground, Diavik intends to follow its existing closure plan, including:

1. **filling the pits with freshwater** from Lac de Gras,
2. **monitoring** to make sure water in the pit(s) meets guidelines and benchmarks, and then
3. **breaching the dike walls** to allow water and fish to travel between the pit lake(s) and Lac de Gras.

This environmental assessment examines the potential impacts of the Project on the environment, including water, fish, wildlife, and cultural use of the area.

The Project is likely to result in significant adverse impacts

The Review Board carefully considered all the evidence and information on the public record.

The acceptability of impacts from developments depends on how people value the area where the impacts occur and on the parts of the environment that are affected. The Review Board has determined that the amount of acceptable change to the Lac de Gras area is low because:

- it is highly valued for cultural reasons,
- clean water is essential for a healthy environment, and
- Indigenous people have a low tolerance for uncertainty about changes to Lac de Gras.

Indigenous people indicate they lack certainty about the impacts of the Project. This makes them question the future quality and safety of the area and means that they are less likely to use it. They lack this certainty because Diavik has not properly assessed or mitigated the potential for impacts on cultural use. It is also because Diavik did not develop appropriate

standards to judge if the water quality in Lac de Gras will be suitable for cultural uses. As a result, the Review Board finds that the Project is likely to reduce cultural use of Lac de Gras.

Because of the low acceptability of change in Lac de Gras and the likely reduction in cultural use of the Lac de Gras area, combined with the irreversible nature of the Project, the **Review Board concludes that this Project, without additional mitigation, is likely to cause a significant adverse impact on cultural use of Lac de Gras.**

In addition, Diavik's modelling, which at this time is only preliminary, does not provide the Review Board with the level of confidence it requires to conclude that significant impacts to water quality are not likely.

A suite of measures is required to reduce these impacts

The Review Board determined that a suite of measures is required to prevent significant adverse impacts on cultural use. These measures require Diavik to:

- ensure acceptable water quality
- work with Indigenous groups, including Traditional Knowledge holders, to develop criteria to judge if water quality is culturally acceptable
- update water modelling to improve predictions about if water will be acceptable
- establish an independent review panel to improve water quality modelling
- additional and more effective engagement with potentially affected Indigenous communities

Another measure requires the Government of the Northwest Territories to develop indicators of cultural well-being, and to monitor and adaptively manage impacts from the Project and other sources.

The Review Board is confident that the proposed measures will prevent significant impacts from this Project.

Acknowledgements

The Review Board would like to acknowledge and thank all of the people who participated in this environmental assessment. This gratitude extends to community members, intervenors, consultants, logistics personnel, government officials and all of those who helped this process run fairly and efficiently and provided the evidence required for a good decision.

The Review Board would also like to acknowledge the invaluable contributions from special advisors Joe Handley and Bertha Norwegian. Their insights, wisdom, and perspectives have helped to guide the Review Board in its decision for this environmental assessment.

Lastly, the Review Board would like to acknowledge the hard work of Board member Jim Edmondson, who has been a part of this environmental assessment, considered the full record of evidence and participated in Review Board deliberations for this file. However, due to personal reasons, Mr. Edmondson was not able to take part in the Review Board's final decision. The Review Board looks forward to Mr. Edmondson's contribution in future Review Board work. This change does not affect the Review Board's quorum.

Guide to this Report

Diavik Diamond Mines Inc. (Diavik) operates a diamond mine on Lac de Gras in the Northwest Territories. This document is the Mackenzie Valley Environmental Impact Review Board's (Review Board) *Report of Environmental Assessment and Reasons for Decision* on Diavik's proposal to put processed kimberlite (PK), a mine waste, into the pit(s) and underground of the existing Diavik mine. Diavik refers to this as its Processed Kimberlite to Mine Workings Proposal (referred to throughout this document as "the Project"). This document describes:

- the Project and setting (Chapter 1)
- the environmental assessment (Chapter 2)
- the evidence from Diavik and intervenors about impacts (Chapter 3)
- the evidence from Diavik and intervenors about mitigations (Chapter 4)
- the Review Board's findings and reasons for decision (Chapter 5)
- the mitigation measures that the Review Board finds necessary (Chapter 6)

Chapter 1: Project and setting

1 Project and setting

This chapter describes the need for the Project, what activities the Project involves, and the environmental setting in which the Project is proposed.

1.1 Diavik needs more space for processed kimberlite

Diavik Diamond Mine (the mine) is on East Island in Lac de Gras, about 300 km northeast of Yellowknife, Northwest Territories (see Figure 1). The environmental effects of the mine were assessed under the *Canadian Environmental Assessment Act*¹ in 1999. The *Comprehensive Study Report* produced for this assessment concluded that, “with the implementation of mitigation measures and follow-up requirements described in this comprehensive study report, the Diavik Diamonds Project will not result in significant adverse environmental effects” (PR#29 pxii).²

Today, Diavik is mining at the site and has three open pits. Two of the pits (A418 and A154) have underground mine workings extending down from the bottom of the pits.³ All infrastructure and activities for operating the mine have already been authorized through the *Canadian Environmental Assessment Act* comprehensive study and the licenses and permits that followed.

Diavik’s mine plan requires all processed kimberlite (PK) to be stored in the existing PK containment facility, which has been expanded six times since operations began. However, even with these expansions, Diavik will run out of space for PK in 2021 – four years before mining is expected to end. Diavik has permission to build another dam raise of eight meters but has also considered other options for disposing of the PK it will generate before mining ends (PR#5 PDF p26).

¹ S.C. 1992, c.37 (repealed).

² This report references documents on the public registry as ‘PR’ followed by the registry number of the document, and specific page numbers where appropriate. A complete listing of all documents on the public registry for this environmental assessment can be found in Appendix A.

³ Diavik is currently applying for permission to mine underground beneath pit A21. Diavik has indicated that this work will not extend the life of the mine.

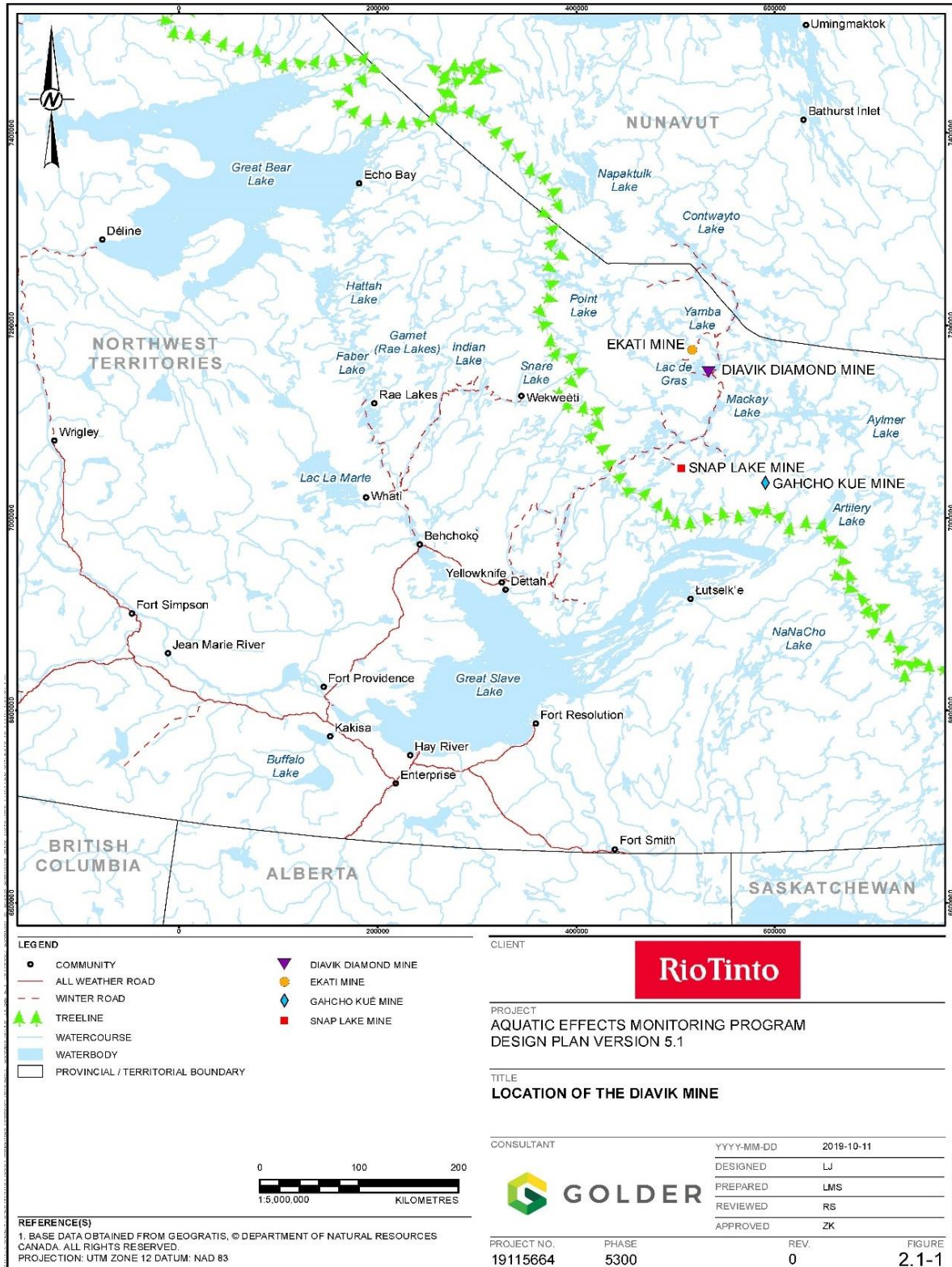


Figure 1: Location of the Diavik Mine

Figure courtesy of Diavik

1.2 Diavik examined four options for storing processed kimberlite

Diavik examined different options for storing the fine PK that it will generate before the end of mining. Diavik proposes to deposit only fine processed kimberlite in the pit(s) and underground.⁴ Coarse PK will still be deposited in the PK containment facility. Diavik expects that approximately 5 000 000 m³ of fine PK will be produced between 2021 and the end of mine life in 2025 (PR#53 p51). Options included (PR#5 PDF p28; PR#53 pp26-27):

1. raising the dam eight meters to store the remaining PK in the PK containment facility,
2. depositing all remaining PK into the pit(s) and underground (no dam raise),
3. finding a different place on the mine site to deposit remaining PK (no dam raise),
4. raising the dam four meters and depositing some PK into the PK containment facility, and some PK into the pit(s) and underground.

Diavik determined that option 2 is not possible because it cannot complete mining in any of the pits before it runs out of space in the existing PK containment facility (PR#53 PDF p27) (see Figure 2). Diavik determined that option 3 is not possible because all the other areas on site that it looked at are needed for other purposes, so there are no other suitable locations on site to store PK (PR#5 PDF p30).



Figure 2: The PKC Facility on the shores of Lac de Gras
Photo from PR#13

⁴ Diavik is investigating moving extra-fine PK off the surface of the PK containment facility into the pit(s) and underground but has not yet proposed this activity.

Diavik's preference is option 4, which includes (PR#5 PDF p28; PR#53 pp26-27):

- building part of the seventh dam raise (four meters of the eight meter raise) so it can store some of the PK in the containment facility while it finishes mining one of the pits, and
- putting PK into the open pit(s) and underground once those are available.

Putting PK into the pit(s) and underground was identified as an option requiring further investigation in the original comprehensive study, but it was not assessed at the time because Diavik did not think any of the pits would be empty early enough to be used for storing PK. The mine plan has changed over time and Diavik now has the option to put PK into A418 while production in the other two pits continues.⁵

Diavik argues that putting PK into the pit(s) and underground is the best option because it (PR#53 p6; PR#160 PDF p1):

- reduces health, safety, and environmental risk⁶ since the last PK containment facility dam raise that is not needed
- allows closure of the PK containment facility to start earlier and gives Diavik more flexibility in how to close the PK containment facility
- uses less water from Lac de Gras during in-filling at closure
- costs less than other options identified

1.3 Diavik is proposing to put processed kimberlite into pit(s) and underground (scope of development)

This section summarizes the development activities and infrastructure requirements for the Project. Full details about the Project can be found in Diavik's *Summary Impact Statement* (PR#53). The Project is located entirely at the existing Diavik mine site (see Figure 3). Diavik is already authorized to:

- construct dikes around the outside of the pits,
- take water out of the areas inside the dikes to conduct mining activities,
- process kimberlite (the rock that contains diamonds),

⁵ The *Comprehensive Study Report* indicated that the PK containment facility closure plan would evolve over the life of the mine and could consider the possibility of backfilling PK into the pit (PR#29 p31).

⁶ The Project reduces the need for the last dam raise around the PK containment facility. This reduces risks because the on-land PK containment facility will be smaller, water quality in Lac de Gras will be better, and there would be less chance of caribou coming into direct contact with PK.

- store PK behind a dam in a containment facility, and
- re-fill the mined-out pits with freshwater from Lac de Gras at closure.

The Project will use existing infrastructure and personnel from the mine but will also require some new infrastructure and activities.



Figure 3: The Diavik Diamond Mine
Photo courtesy of Diavik

Scope of Development

The Review Board sets the scope of development for all projects that it assesses.⁷ For this environmental assessment, the scope of development includes:

- transporting, depositing, and storing PK into pit(s) and underground, and

⁷ Please see the Review Board's *Scope of Environmental Assessment and Reasons for Decision* and *Reasons for Decision on Clarification of Scope of Assessment* (PR#40; PR#54).

- closing and reclaiming mine infrastructure related to the transport, deposition, and storage of PK in pit(s) and underground.

Construction of the Project would involve building new pipelines to take PK slurry from the processing plant to A418 or A154 pits (or a combination of these pits) (see Figure 4). The pipelines would run alongside existing pipelines that remove water from the pit(s) and underground. They would run parallel to the existing roads and then go down the ramps into the pit(s). The length of the pipelines would depend on which pit they go to and how far down into the pit(s) they go. Diavik expects pipeline construction to take approximately four months.

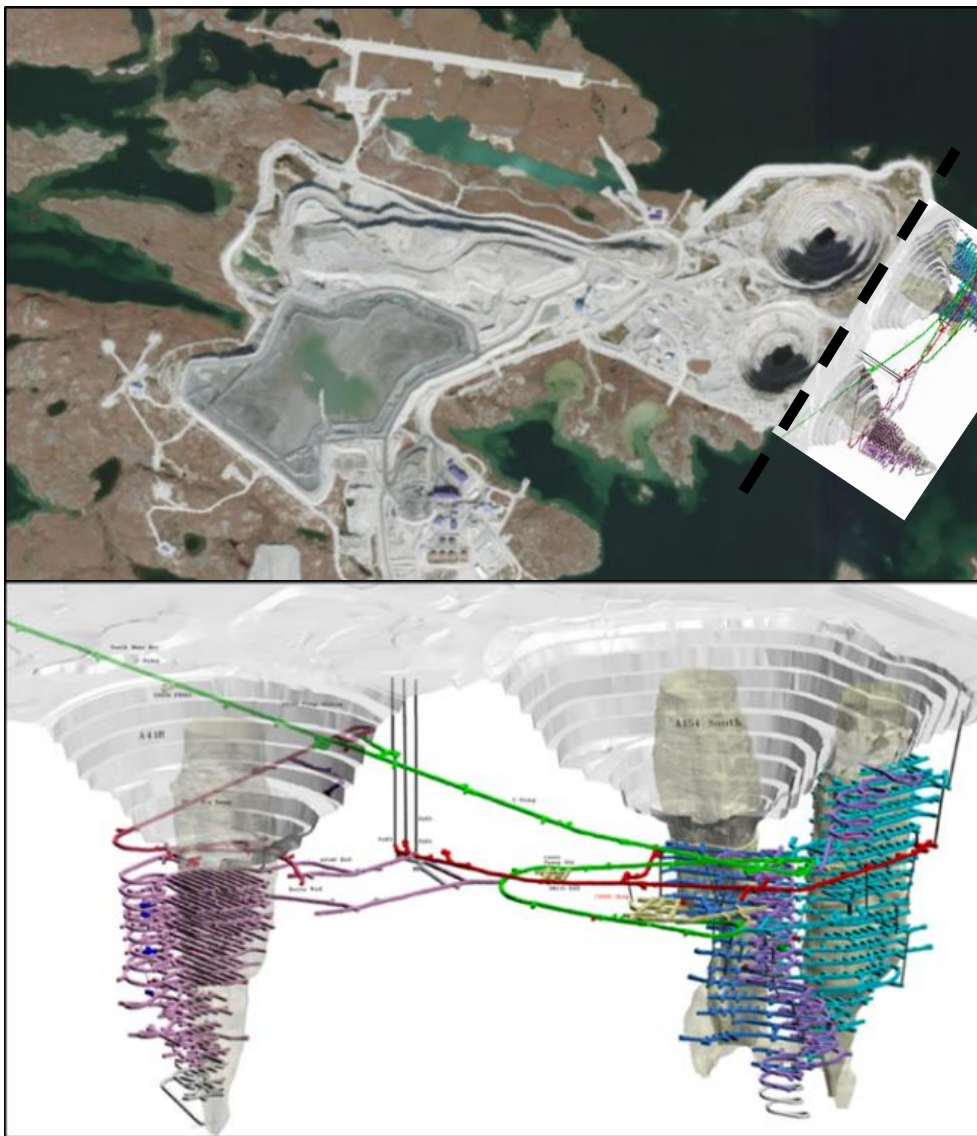


Figure 4: Mine workings including the pit and underground
Adapted from an image courtesy of Diavik

Operation of the Project involves moving the PK in the form of a slurry from the processing plant, through the pipelines, and into the A418 and/or A154 pits. A418 is Diavik’s preferred pit for depositing PK. The slurry would be deposited into the bottom of the pit and flow into the underground part of the mine. If Diavik begins to deposit PK in A418 while mining is still occurring at the adjacent A154 pit, at least two bulkheads will be constructed to prevent PK from flowing through the underground decline that connects the two mine workings.

Diavik expects water to be squeezed out of the PK as it consolidates in the bottom of the pit(s) and underground. This water, called porewater, will mix with groundwater, surface runoff, and precipitation to form a layer of salty, low quality water on top of the PK. Diavik plans to send some of this water to the treatment plant or for re-use in the Process Plant.

When mining is finished and no more PK is deposited into the pit(s) and underground, Diavik will add freshwater from Lac de Gras on top of the low-quality salty water on the bottom of the pit(s). This will be done using a pipeline system over a period of six months to two years. Diavik has proposed to put at least 50 meters of freshwater on top of the PK (this is the freshwater cap). A cross section of pit A418 with the layers of PK and water (for one of the preferred scenarios Diavik studied) after filling at closure is illustrated in Figure 5.

What’s the difference?

“Top 40 meters of the pit” refers to the depth that Diavik has modelled and has said water quality will meet benchmarks.

“50 meter freshwater cap” refers to the minimum layer of freshwater from Lac de Gras.

Diavik expects a process called meromixis to keep the dense salty water squeezed out of the PK contained at the bottom of the pit(s) (PR#53 p53). Meromixis happens when temperature or chemical differences (in this case, differences in salt content) create stable layers in water. The denser water at the bottom of the pit lake will not readily mix with less dense water above it. Diavik’s modelling indicates that meromixis will be stable for at least 100 years (PR#53 p56), and potentially thousands of years (PR#165 p141).

Prior to reconnecting the pit lake(s) to Lac de Gras Diavik will test the water inside the pits to make sure that the top 40 meters of water meets Aquatic Effects Monitoring Program benchmarks. This water quality testing is already a requirement of Diavik’s Closure and Reclamation Plan.

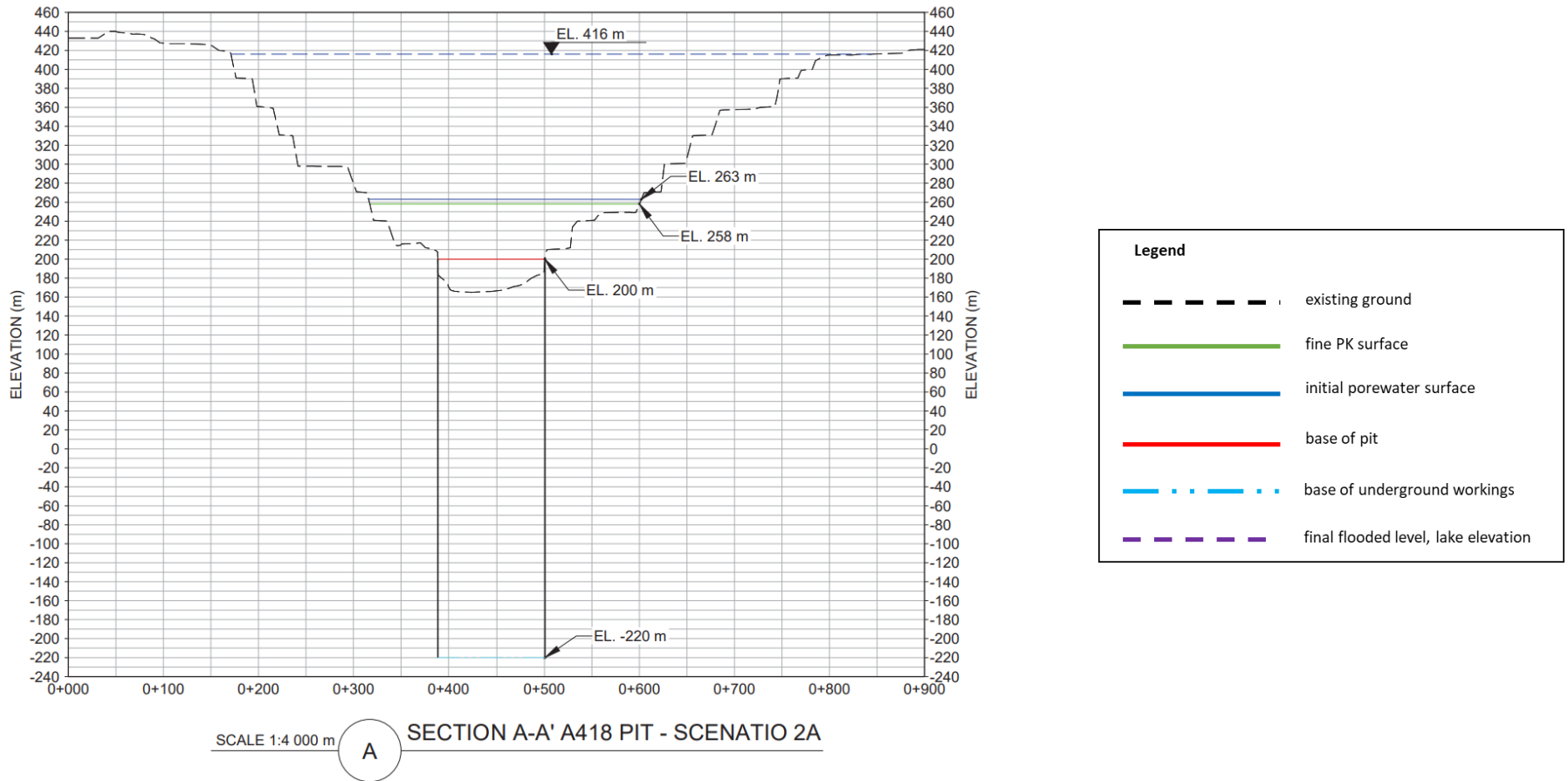


Figure 5: Illustration of pit layers for A418 Scenario 2a, which estimated putting 5 000 000 m³ of PK into the pit⁸
 Adapted from PR#53 p20

⁸ Diavik scenario 3a estimated putting an extra 5 000 000 m³ of extra-fine PK from the PK containment facility into the pits. Similar figures are available for each pit under three different deposition scenarios in PR#53.

Once this freshwater cap is established and tested to make sure it is safe, the pit lake(s) will be fully reconnected to Lac de Gras by breaching the dikes (see Figure 6). This would let water and fish move back and forth between the pit lake(s) and Lac de Gras. This is called the post-closure phase. This phase will include monitoring of water quality and fish. Diavik believes that it will be able to close the pits in the same way if it puts PK into the pit(s) and underground.

The Review Board asked Diavik and parties to comment on how different closure scenarios⁹ would affect the use of Lac de Gras by Indigenous groups (PR#43). One of the scenarios the Review Board asked about was putting PK into the pit lake(s) and then keeping them isolated from Lac de Gras. Diavik told the Review Board that connecting the water between the pit lake(s) and Lac de Gras is necessary for closure (PR#100 p3). Without water flowing between the pit lake(s) and the rest of Lac de Gras, Diavik says water levels in the pit lake(s) would continue to increase and would eventually overflow into Lac de Gras. Diavik predicts that full isolation would also lead to worse water quality outcomes in the pit lake(s) and in Lac de Gras and would need an on-going presence at the site (PR#100 p3; PR#127 p4). Diavik is not proposing any Project alternative that isolates the pit lake(s) from the rest of Lac de Gras.

What does reconnection mean?

The terms “reconnection” and “isolation” have caused some confusion during this environmental assessment. For clarity, the Review board will use the terms in the following ways:

Isolation – prevent water and fish movement between the pit lake(s) and Lac de Gras.

Partial reconnection – allow movement of water, but not fish. This could be accomplished in different ways, for example backfilling the dike breaches or fracturing the dike wall instead of excavating it.

Full reconnection – allow movement of water and fish. This is Diavik’s current plan and would be accomplished by excavating breaches in the dike.

1.4 Environmental setting

The Diavik mine is located on an island in Lac de Gras, a large lake on the arctic tundra. It covers approximately 560 km² and drains an area of around 4 100 km² that forms the headwaters of the Coppermine River.

⁹ Under subparagraph 117(3)b of the Act, the Review Board can consider alternative means of carrying out the project that are technically and economically feasible.

Lac de Gras is in the traditional territories of the Tłı̄chǫ, Yellowknives Dene First Nation, Łutsel K'e First Nation, Deninu Kue First Nation, Fort Resolution Métis Council, North Slave Métis Alliance, Northwest Territories Métis Nation, and Kitikmeot Inuit Association. The Lac de Gras region is a place of “high cultural, ecological, and social significance” (PR#109 PDF p2), where Indigenous groups hunt, trap, fish, gather medicinal plants, and participate in other cultural activities, as they have for many generations (PR#106; PR#114; PR#112).

At least seven different fish species are found in Lac de Gras, including lake trout, lake cisco, round whitefish, longnose sucker, Arctic grayling, burbot, and slimy sculpin (PR#53 p99). Most fish grow slowly and mature late, as is typical of arctic lakes with low nutrient concentrations like Lac de Gras (PR#53 p100). The low nutrient concentration of the lake limits phytoplankton growth. This limits the amount of zooplankton, benthic invertebrates, and fish that can be supported in Lac de Gras (PR#53 p95).



Figure 6: Diavik’s closure plan is to fill the pits with water to create pit lakes

Photo courtesy of Diavik

Fish habitat in Lac de Gras is found in the near-shore areas (the waterline to about six meters depth) and is mostly coarse gravel, cobble, and boulders. Shoals are common and are good habitat for spawning lake trout and cisco.

Bathurst caribou move through the region on their way to northern calving grounds during spring migration and south during fall migration to overwintering grounds (PR#29 p93). The area in and around the mine is part of the Bathurst caribou’s key migration zone and within the herd’s centre of habitation (PR#167 pp36, 38). Of high importance is the area of the inflow from

Lac du Sauvage to Lac de Gras, known as the Narrows. The Narrows is a key migration spot, and an area for traditional harvesting of fish (PR#53 pp158, 160).

The Bathurst caribou herd has declined by approximately 96% in the last 30 years (PR#115 p11). Both Traditional Knowledge and science identify predation and habitat change due to climate change, industrial development, and wildfire as contributing factors to impacts on barren-ground caribou (PR#167 p17). The *Bathurst Caribou Range Plan* states that traditional harvesters are reporting fewer caribou than seen in living memory, caribou in poor health, and a damaged relationship between Indigenous people and caribou (PR#167 p16). This decline is of great concern as caribou are an ecological and cultural keystone species for Indigenous communities (PR#167 p12).

Chapter 2: The environmental assessment

2 The environmental assessment

This chapter discusses why an environmental assessment for this Project was required, the issues that the Review Board examined, and the steps that the Review Board took during the assessment process. It describes how the Review Board approached significance determinations and cumulative effects assessment. This chapter also discusses how the Review Board's environmental assessment process interacted with the Wek'èzhii Land and Water Board's preliminary screening of the Project.

2.1 Why the Review Board is assessing this project

To put processed kimberlite (PK) into the pit(s) and underground, Diavik needs to amend its existing water licence. Diavik submitted the application to amend its licence on June 1, 2018 (PR#5). Shortly afterwards, the Wek'èzhii Land and Water Board began its public review process and a preliminary screening. On February 19, 2019, the Review Board ordered the Project to environmental assessment.

A brief summary of some of the reasons why the Review Board ordered this project to environmental assessment is presented below. Readers are encouraged to refer to the original document for details (PR#2).¹⁰

- The original comprehensive study of the Diavik Mine did not assess putting PK into the mine workings, including:
 - whether doing this is acceptable,
 - what the related effects may be,
 - what the acceptable level of risk to Lac de Gras and other valued components is, and
 - how to mitigate potential impacts.
- Putting PK in the mine workings is outside the scope of Diavik's *Interim Closure and Reclamation Plan* and the existing *Fisheries Act Authorization*.
- Putting PK in the mine workings would be permanent and irreversible.
- Restoring the pits to productive fish habitat within Lac de Gras through full reconnection was an important part of the original assessment decision.

¹⁰ The Review Board's *Reasons for Decision on Referral to Environmental Assessment* can be found online at http://reviewboard.ca/upload/project_document/EA1819-01%20-%20Reasons%20for%20Decision%20on%20referral%20to%20EA%20-%20Diavik%20PK%20to%20Pits%20and%20Underground-%20Feb%202019.pdf

- Potential impacts on traditional use of Lac de Gras and Indigenous cultural values need careful consideration.
- The Project involves use of a relatively new technology (meromixis for PK containment) in an untested setting (a large, deep, culturally important, and cold climate lake such as Lac de Gras).

2.2 What guided the Review Board’s process and determinations

The Review Board is responsible for environmental assessment under Part 5 of the *Mackenzie Valley Resource Management Act* (the Act).¹¹ The Review Board is required to run timely environmental assessments that consider the protection of the environment, the protection of the well-being of residents and communities, and the importance of conservation to the well-being and way of life of Indigenous peoples. Section 128 of the Act requires the Review Board to decide, based on the evidence on the public record, whether in its opinion the proposed development is likely to have a significant adverse impact on the environment or be a cause of significant public concern.

In addition to the guidance from the Act, the Review Board has internal policies that guide its activities and process. This environmental assessment followed the *Rules of Procedure for Environmental Assessment and Environmental Impact Review Proceedings*, the *Environmental Impact Assessment Guidelines*, and *Guidelines for Incorporating Traditional Knowledge into Environmental Impact Assessment*.

2.2.1 Determining impact significance

The Review Board did not accept the criteria that Diavik used in its evaluation to predict if impacts of the Project would be significant.¹² In the Review Board’s view, these criteria do not adequately reflect the requirements of sections 114 and 115 of the Act, do not appropriately address the issues raised during this environmental assessment, and do not integrate the concerns of Indigenous people as required by the Tłı̄ch̄q land claim and the Act.¹³ Significance under the now repealed *Canadian Environmental Assessment Act* and significance under the *Mackenzie Valley Resource Management Act* are defined differently. For example, the *Canadian Environmental Assessment Act* took a different approach to social and cultural impacts,

¹¹ The *Mackenzie Valley Resource Management Act* is available here: <https://laws-lois.justice.gc.ca/eng/acts/m-0.2/>.

¹² Diavik’s *Summary Impact Statement* outlines its approach to characterizing impacts and defining significance (PR#53 p33).

¹³ Specifically, subsection 114(c) requires environmental assessment to ensure that the concerns of Aboriginal people and the general public are taken into account and paragraph 115(1)b requires the Review Board to have regard to the protection of the social, cultural and economic well-being of residents and communities in the Mackenzie Valley.

considering them only if they resulted from a biophysical environmental change caused by the project. The *Mackenzie Valley Resource Management Act* considers direct social and cultural impacts.

The 1999 *Comprehensive Study Report* for the Diavik Mine conducted under the *Canadian Environmental Assessment Act* considered an impact to be significant only if it met all the following criteria (PR#29 p23):

- high probability of a permanent or long-term effect
- high magnitude
- regional in area
- not technically or economically mitigable

Diavik chose to use the same approach when assessing impacts in this environmental assessment (PR#53 PDF p49). This approach is now two decades old and is not consistent with the considerations and principles set out in the Act. The current environmental assessment must satisfy requirements of the Act. Several intervenors voiced their concerns over Diavik's use of the 1999 *Comprehensive Study Report* criteria (e.g. PR#106 p9; PR#107 pp5-8; PR#168 pp240-241). Impacts that would not be considered or would not be significant under a *Canadian Environmental Assessment Act* comprehensive study could still be significant to the Review Board based on the requirements of the Act.

In this environmental assessment, as in others, the Review Board used its own judgement informed by the evidence to decide whether predicted impacts are likely to be significant. The Review Board formed its opinion about significance based on the values of co-management and potentially affected Indigenous groups.¹⁴

The Act defines “environment” as the components of the Earth including land, water, and air, all organic and inorganic matter and living organisms, and the interacting natural systems that include those components. Indigenous intervenors expressed similar worldviews. For example, Tłı̨ch̓ Elders described how water quality and values surrounding water are viewed differently by Tłı̨ch̓ standards than by government and industry standards. Tłı̨ch̓ Elders believe it is therefore necessary to consider “how knowledge holders evaluate impacts, water quality, the interconnected ecosystems, as well as the dependency of those people living along the waterways and off of the surrounding resources” (PR#185 p5).

¹⁴ For more information, please see *The Significance Spectrum and EIA Significance Determination*, available on the Review Board's website: <http://reviewboard.ca/file/937/download?token=w4SMFAte>

In line with this, the Review Board views the environment as both a set of components and an interconnected system. Consideration of both Indigenous and non-Indigenous worldviews is the core of meaningful co-management under the Act. Project impacts are considered both in terms of how they interact with those individual ecosystem components and the environment as a whole.

2.2.2 Assessing cumulative vs. project-specific impacts

The Project is a change to the existing Diavik Diamond Mine. The Review Board assessed any new impacts that may result from the Project and considered these as project-specific impacts. Section 117 of the Act also requires the Review Board to consider cumulative effects.

When assessing cumulative impacts, the Review Board considered the impacts of the Project in combination with impacts from other developments, including past, present, and reasonably foreseeable future projects. When assessing impacts, the Review Board considers the baseline condition to be the environmental setting that existed prior to the development of the Diavik and Ekati Diamond Mines, while background condition is the current environmental setting, prior to the Project.

Sections 5.1.4 and 5.4 below describe the Review Board’s consideration of cumulative impacts of the Project on culture and caribou.

2.2.3 Cultural use and well-being are connected

Subsection 115(1) sets out three guiding principles for the environmental assessment process under the Act:¹⁵

- protection of the environment, which includes the social and cultural environment,
- protection of the social, cultural and economic well-being of residents and communities, and
- the importance of conservation to the well-being and way of life of Indigenous peoples.

Culture is central to each of these principles, through the “cultural environment”, cultural “well-being”, and Indigenous “well-being and way of life”. The Review Board understands that there is a strong connection between a viable cultural environment, cultural use, and the well-being and way of life of Indigenous peoples and communities.

¹⁵ See the Act for the full text of subsection 115(1).

A healthy cultural environment depends on cultural use, which is the ability of Indigenous people to meaningfully practice their culture. The continued practice of culture, time spent on the land, and passing knowledge on to future generations are also key aspects of Indigenous well-being. The Review Board incorporated this understanding into its evaluation of Project impacts, recognizing the interconnectedness of all parts of the human environment, biophysical environment, and well-being.¹⁶

2.2.4 Climate change considerations

The Review Board considers climate change in its environmental assessments in keeping with best practice. Diavik does not expect the Project to involve significant carbon new emissions relative to other industrial activities in the area (PR#5 PDF p6). Intervenors did not assert otherwise.

Climate change was mentioned by intervenors at different stages of the environmental assessment.¹⁷ The Review Board notes that intervenors asked questions about Project resilience to climate change, and that Diavik has considered this in its modelling and Project design.¹⁸ The Review Board has conducted no further analysis other than where climate change was discussed in sections 3 and 5 of this report.

2.3 Issues the Review Board examined (scope of assessment)

An important part of the Review Board's analysis included the consideration of the following three key questions (PR#40 p8):

1. Is storing PK in pit(s) and underground likely to be safe for the environment and acceptable to parties, including traditional users of the Lac de Gras area?
2. If PK is stored in pit(s) and underground, under what conditions, if any, should the pits be reconnected with Lac de Gras?
3. How would changes to water quality resulting from reconnection to Lac de Gras affect the cultural use of the Lac de Gras area, fish and fish habitat or wildlife after closure?

Accordingly, this environmental assessment considered the potential impacts of Diavik's proposed activities on:

¹⁶ See the introduction in chapter 3, section 3.1, and section 5.1.1 for further discussion.

¹⁷ For example, section 5.1.1 notes that Indigenous groups described effects of climate change on their ability to practice their way of life.

¹⁸ See PR#53 p53; PR#83 p106; PR#165 p131 for details.

- water quality and quantity,
- cultural use of the area,
- fish and fish habitat, and
- other wildlife (specifically caribou, aquatic and migratory birds, and species at risk).

The Review Board noted in its *Scope of the Environmental Assessment and Reasons for Decision* for this Project that water quality is the key driver of potential impacts on the other valued components (cultural use of the area, fish and fish habitat, and wildlife), and that focusing the assessment on these pathways of effects is important to ensure that significant adverse impacts as a result of the project do not occur (PR#40 p8). The Review Board identified that it was particularly concerned about impacts on water quality that may result in impacts on cultural use of the Lac de Gras area.¹⁹



Figure 7: Review Board members Sunny Munroe, JoAnne Deneron, and David Krutko during the site tour at Diavik
Review Board photo (July 24, 2019)

¹⁹ For more information on the scope of assessment, please see the Review Board's *Scope of Environmental Assessment and Reasons for Decision* (PR#40) and *Reasons for Decision on Clarification of Scope of Assessment* (PR#54).

2.4 Environmental assessment steps

This environmental assessment involved several phases. In the **scoping phase**, the Review Board identified and prioritized the matters that needed to be examined, which resulted in the scope of assessment described in section 2.3.

After scoping, the environmental assessment entered the **analytical phase**. In this phase, the public record from the Wek'èezhii Land and Water Board was added to the Review Board's public record for use in the assessment. Diavik submitted a *Summary Impact Statement* (PR#53) to supplement the public record for this project from the Wek'èezhii Land and Water Board process, and to re-focus and reorganize the material for environmental assessment. Parties used the information in the *Summary Impact Statement* and the information provided through the Wek'èezhii Land and Water Board process to develop information requests.

The Review Board also organized a site visit to Diavik mine for Board members and intervenors (PR#81) (see Figure 7).



Figure 8: Review Board members and Board Chair at the public hearing in Dettah
Review Board photo (September 4, 2019)

The analytical phase was followed by the **hearing phase**. The Review Board held community hearings in Behchokò and Dettah to hear directly from people that might be affected by the Project (see Figure 8 and Figure 9). The community hearings were followed by two days of technical hearings in Yellowknife.

After the hearings, intervenors and Diavik submitted written closing arguments. The Review Board then began its **deliberations**. In deliberating, the Review Board considered all the material on the public record for the Project and made its decision about the significance of predicted impacts and the necessary mitigation measures. The results of that deliberation form the basis for this Report of Environmental Assessment and Reasons for Decision.

The final step of the environmental assessment process is for the Review Board to provide its **recommendation**, in the form of this report, to the Government of the Northwest Territories Minister of Lands.²⁰ The Minister of Lands and any Responsible Ministers will then make a decision for this Project under section 130 of the Act.



Figure 9: The public hearing in Behchokò
Review Board photo (September 3, 2019)

²⁰ The Review Board's options for recommendations are described in section 128 of the Act.

2.5 Intervenor

Once the Review Board ordered an environmental assessment of the Project, all interested groups and individuals were welcome to participate as parties. At the beginning of the hearing phase, parties who wanted to participate as intervenors submitted intervenor application forms.²¹ Intervenor have special roles and responsibilities in the hearing phase, including submitting interventions, presenting these interventions at the hearings, participating in questioning, and submitting written closing arguments.

Following the original approval of the Diavik Diamond Mine in 1999, Diavik entered into an environmental agreement with the Government of Canada, the Government of the Northwest Territories, Ndek'òowo (now, the Tłı̄chǫ Government), Łutsel K'e Dene First Nation, Yellowknives Dene First Nation, North Slave Métis Alliance, and the Kitikmeot Inuit Association (PR#5 PDF p22). Diavik's engagement for its water licence amendment application for this Project focused only on signatories to the *Environmental Agreement*²² for the Diavik mine and members of the Traditional Knowledge Panel (PR#5 PDF p50). All but one of the signatories to the *Environmental Agreement* participated in this environmental assessment; the Kitikmeot Inuit Association decided to not participate as an intervenor in this environmental assessment.

The Review Board considered other individuals, communities, and organizations to be interested parties if they were potentially affected by the Project, regardless of whether they were signatories to the *Environmental Agreement*. The Review Board understands the value of meaningful engagement and consultation to the environmental assessment process, and also recognizes the Crown's reliance on the environmental assessment process to support its Crown Consultation requirements (PR#28; PR#35). Therefore, the Review Board was open to the participation of all Indigenous groups who felt they might be affected by the Project. The Deninu Kue First Nation, the Fort Resolution Métis Council, and the Northwest Territories Métis Nation all participated in this environmental assessment but are not signatories to the *Environmental Agreement*.

²¹ The Northwest Territories Treaty 8 Tribal Corporation – Akaitcho Interim Measures Agreement Office participated in the early stages of the environmental assessment and applied for intervenor status, but later withdrew its intervenor status (PR#119).

²² The *Environmental Agreement* is available at:
https://www.emab.ca/sites/default/files/signed_environmental_agreement_1.pdf

The intervenors for this environmental assessment are:

- Tłı̄chǫ Government
- Łutsel K'e Dene First Nation
- Yellowknives Dene First Nation
- North Slave Métis Alliance
- Environmental Monitoring Advisory Board
- Deninu Kue First Nation
- Fort Resolution Métis Council
- Northwest Territories Métis Nation
- Government of the Northwest Territories
- Fisheries and Oceans Canada
- Environment and Climate Change Canada

Participant funding for this environmental assessment was provided by Crown-Indigenous Relations and Northern Affairs Canada. Interested parties applied for funding directly to Crown-Indigenous Relations and Northern Affairs Canada during the scoping phase. All parties who applied for funding received funding. The Review Board was not involved in any funding decisions. The Review Board continues to support the implementation of the Northern Participant Funding Program for future environmental assessments.

2.6 Preliminary screening

As was noted in the Review Board's *Reasons for Decision to order an Environmental Assessment* for this Project,²³ it is the Review Board's view that the necessary preliminary screening should have been completed much earlier in the water licensing amendment process. A preliminary screening is intended to be "preliminary" in nature. Part 5 of the Act (including preliminary screenings) has a separate purpose and involves considerations that are distinct from those required for water licensing and land use permitting.

The Review Board acknowledges that significant time was taken by the Wek'èezhii Land and Water Board to secure the information that was on the record by the time of the Review Board's decision. This was in part due to the lack of detail in the original amendment

²³ Please see the Review Board's *Reason for Decision to order an Environmental Assessment* (PR#2):
http://reviewboard.ca/upload/project_document/EA1819-01%20-%20Reasons%20for%20Decision%20on%20referral%20to%20EA%20-%20Diavik%20PK%20to%20Pits%20and%20Underground-%20Feb%2025_2019.pdf

application submitted by Diavik, and the challenges of completing a robust preliminary screening in the absence of such foundational information.

In a preliminary screening, the “might test” is prescribed to determine if a development proposal “...might have a significant adverse impact on the environment or might be a cause of public concern” (under subsection 125(1) of the Act). If either of these tests are met, a development must be referred to the Review Board for an environmental assessment.

In its *Reasons for Decision to order an Environmental Assessment*, the Review Board noted a number of factors that contributed to its decision to order an environmental assessment, such as the large scale of the proposed development, the sensitive ecological and cultural setting of Lac de Gras, and the potential for adverse effects to the water quality in Lac de Gras after closure (amongst other noted considerations) that could have met the “might test” earlier in the preliminary screening.

The Review Board does not believe that a preliminary screening is intended to be a process which attempts to eliminate the likelihood or reduce the magnitude of significant adverse impacts from a development. Nor is it intended to manage public concern. The onus is on the developer to provide adequate information with their application, sufficient to allow for an effective preliminary screening to be conducted. The preliminary screener should ensure that it understands the nature and scope of the proposed development using a reasonable approach to addressing outstanding information requirements. The “preliminary” nature of this process and the low threshold for a referral indicate that developments which will require detailed analysis and review of environmental impacts should be referred to environmental assessment.

The Act also provides for a Board to coordinate its activities, including hearings, with the activities of other Boards.²⁴ The Review Board had initially intended to try to coordinate its Diavik environmental assessment process with the regulatory work of the Wek’èezhì Land and Water Board, to find efficiencies within the two Boards’ processes. Unfortunately, due to the extended water licensing process, which had already included technical sessions and several rounds of information requests, the Review Board was unable to usefully coordinate the environmental assessment process with the water licensing process.

The Review Board will continue to work with the Land and Water Boards and other preliminary screeners to ensure that future preliminary screening processes are undertaken in an effective and timely manner.

²⁴ paragraph 24.1(a) of the Act

Chapter 3: Evidence about impacts

3 Evidence about impacts

The Review Board has considered all the evidence on the public record. This chapter summarizes the evidence Diavik and intervenors provided about predicted impacts, as presented in Diavik's *Summary Impact Statement*, the interventions, public hearings, and written closing arguments. This Report of Environmental Assessment only addresses the issues that, in the Review Board's view, warranted further discussion. This chapter is therefore not an exhaustive description of all evidence, but focuses on themes, main points, and evidence about water, fish, wildlife, and culture that was given weight in the Review Board's decision. Evidence about proposed and recommended mitigation for the Project is described in Chapter 4.

Holistic worldview

Indigenous intervenors and community members explained to the Review Board that based on their worldview, all things are connected, and impacts should be both understood and evaluated through this lens (PR#185 p5; PR#156 p73). They highlighted the importance of clean water to the integrity of the entire ecosystem as it relates to fish and animal health, and the continued cultural use of the area. Elder Joe Rabesca described this in saying “[w]hen one thing changes, it’s like a domino effect. It affects everything” (PR#165 p177) (see Figure 10). As Patrick Simon of Deninu Kue First Nation said:

[e]verything has a relationship. Science calls it cause and effect. We call it relationships. The fish, the water, the air, the climate, the rain, the wind, the animals all relates...it’s all together, all in relationship. (PR#159 pp53-54)

In its intervention, the Tłjchq Government emphasized the need for the Review Board to consider impacts holistically, and to weigh cultural impacts equally with biophysical impacts (PR#114 p5). The Review Board has looked at impacts both as individual parts of a system (in this chapter) and holistically (see Chapter 5).

3.1 Evidence about potential impacts on water

3.1.1 Framing the issues: everything is connected, and water is key

Throughout the environmental assessment, Diavik, intervenors, and members of the public provided evidence about the importance of water, and the need to ensure that the Project does not harm water. Considering the views of intervenors and Diavik during a scoping meeting, the Review Board determined that changes to water quality are the most direct and obvious pathway for potential effects on other valued components (PR#40 p9). Diavik

prioritized its assessment of impacts on water in its *Summary Impact Statement* (PR#53) accordingly. It identified that water quality is the “fundamental effects pathway to other valued components of fish, wildlife and cultural use” (PR#165 p41).



Figure 10: Tłı̄ch̄o Elder and former Grand Chief Joe Rabesca speaking at the public hearing in Behchokò
Review Board photo (September 3, 2019)

Indigenous intervenors emphasized that water is the key part of an interconnected system which includes the biophysical environment and the Indigenous people who traditionally use it. The Yellowknives Dene First Nation stated that water quality is the most significant valued component in this environmental assessment, as it has major influence on all the other valued components (PR#112 p9). Tłı̄ch̄o Elders specified that if water is affected, ecosystems, wildlife, and traditional lifestyles and harvesting practices will be affected (PR#185 p5). In the hearing in Dettah, the Yellowknives Dene First Nation further stated that “cultural use of the land is connected to a clean environment. That is, wildlife, fish and water – particularly water” (PR#159 p47).

Violet Camsell-Blondin, speaking on behalf of the Tłı̄ch̄o Government, summarized by saying “[w]e have told you what we require: clean water, land that can be used, and no impact to wildlife and fish, and the cultural use of the area” (PR#168 p17). As Yellowknives Dene First Nations harvester Blake Rasmussen (see Figure 11) put it,

Water is powerful enough to give us life, it does give us life, but powerful enough to take it away as well. We got to keep the water safe, whatever the cost. (PR#159 p115)



Figure 11: Blake Rasmussen speaking at the public hearing in Behchokò
Review Board photo (September 3, 2019)

The Fort Resolution Métis Council illustrated how water is connected to other valued ecosystem components by describing concerns that low quality water might affect caribou by either direct ingestion or contamination of forage grounds (PR#115 p19).

3.1.2 Effects on water quality during closure and beyond

Diavik conducted water quality modeling for three processed kimberlite (PK) deposition scenarios in each pit to understand the range of impacts of the Project on water quality.²⁵ Diavik's modelling identified a range of water quality impacts that depend on three main factors: the total amount of fine PK put in the pit(s), the amount of extra-fine PK put in the pit(s), and the depth of porewater retained above the PK layer (see Figure 5; PR#53 p11). Diavik also said that water quality impacts were related to the depth of the freshwater cap (PR#53 p53; PR#193 PDF p2).

²⁵ Each scenario included depositing 5 Mm³ of PK that will be produced by the end of mine life. Scenario 2a assumed a 5 meter porewater layer. Scenario 3a included the 5 meter porewater cap and an extra 5 Mm³ of extra-fine PK from the PK containment facility. Scenario 4a included no PK from the containment facility, but a 15 meter porewater layer. For more information see PR#53 p10.

Diavik provided evidence that the Project could not interact with water in Lac de Gras before the dikes are breached (PR#53 p50). This means that there is no potential for the Project to cause impacts on Lac de Gras during operations (PR#53 p50). Diavik identified that spills or pipeline ruptures could occur, but infrastructure design and containment plans make the risk of PK entering Lac de Gras from a spill very small (PR#53 p69).

Diavik plans to breach the dikes surrounding the pit lake(s) when water quality in the top 40 meters of the pit lake(s) meet the Aquatic Effects Monitoring Program benchmarks (PR#53 p25).²⁶ Diavik observed that the Aquatic Effects Monitoring Program benchmarks are conservative and protective of aquatic life.²⁷ Diavik asserts that water that enters Lac de Gras from the pit lake(s) will therefore be safe for people, animals, and aquatic life (PR#165 p41).

In contrast to Diavik's position, many intervenors, including the North Slave Métis Alliance, the Environmental Monitoring Advisory Board, and the Tłı̨chǫ Government, indicated that using the Aquatic Effects Monitoring Program benchmarks as a basis for predicting impacts is not sufficient. During the public hearings and in written interventions, these intervenors suggested that change from baseline may be a better way to measure effects and determine significance of impacts (PR#121 p4; PR#165 p306; PR#168 p35).

During and after closure, Diavik predicts that denser water with higher concentrations of salts and other water quality parameters will remain at the bottom of the pit lake and cause the pit lake(s) to stratify. This layered state is called meromixis. Diavik predicts that meromixis will form and be stable for a long time, potentially thousands of years (PR#165 p141). This will help to isolate poor-quality water and PK from the upper layers of the pit lake and Lac de Gras (PR#53 p53).

During the hearing, Environment and Climate Change Canada questioned Diavik on the potential for slow, gradual movement (diffusion) of water quality constituents into upper layers of the pit lake(s) which could disrupt meromixis over time (PR#165 p141). Diavik responded that this process will occur slowly over the very long term, and that when meromixis eventually breaks down due to the gradual diffusion of contaminants, the concentration of constituents in the water (in the top 40 meters and at depth) will be low and will not lead to adverse impacts on water quality (PR#165 p142).

²⁶ Diavik's discussion on the need to breach the dikes can be found in section 1.3.

²⁷ Diavik has stated that its Aquatic Effects Monitoring Program benchmarks represent water quality concentrations that are intended to protect human health and/or aquatic life. They are based on *Canadian Water Quality Guidelines for the Protection of Aquatic Life*, the *Guideline for Canadian Drinking Water Quality* and other sources (PR#53 p38).

The Łutsel K'e Dene First Nation questioned Diavik's reliance on both meromixis and gradual dilution of porewater into Lac de Gras as a means of preventing and minimizing impacts of the Project. It also worried that the viability of meromixis to contain PK in the very long term and in arctic environments has not yet been demonstrated (PR#168 p73). In the hearings, the Yellowknives Dene First Nation and Environment and Climate Change Canada both identified a concern about the potential for groundwater inflow to disrupt the stability of meromixis (PR#165 pp140, 181). Diavik responded that it expects that there would be no pressure difference that would result in groundwater movement into the pit(s) once they are full (PR#165 p181).



Figure 12: Diavik staff at the public hearing in Dettah
Review Board photo (September 4, 2019)

Diavik's modelling results indicate water quality in the pit lake(s) will remain below Aquatic Effects Monitoring Program benchmarks in the top 40 meters of the pit lake(s) for at least 100-year period following closure. This led Diavik to its conclusion that there will be no impacts on water quality in this top 40 meters of the pit lake(s) and to Lac de Gras in general (PR#53 p60). Diavik's position is that since there are no predicted impacts on water quality as a result of the Project, there is no potential for cumulative effects on water quality (PR#53 p73).

Some intervenors disagree with this conclusion. For example, the Environmental Monitoring Advisory Board contended that Diavik's assessment of cumulative effects on water quality was inadequate, as it did not provide enough information to understand the potential for cumulative effects (PR#107 p30). The Government of the Northwest Territories criticized Diavik's cumulative effects assessment for being based on assumptions about worst case scenarios rather than actual modelling (PR#113 p7).

The Review Board questioned Diavik about the potential for cumulative effects after closure during the hearing (PR#165 p266). Diavik responded that while there may be a measurable contribution of total dissolved solids to Lac de Gras from the pit lake(s), it would be very small compared to the contribution from local runoff from the mine. Diavik also stated that improved understanding of the Project's contribution to cumulative effects would be part of its upcoming modelling updates and closure planning processes (PR#165 p268).

3.1.3 Concern and uncertainty about impacts on water quality

General uncertainty about Project impacts on water

Although Diavik has a high degree of confidence that predicted changes to water in the pit lake(s) will not result in a significant adverse effect (PR#53 p77) it was also committed to updating its water quality modelling to confirm predictions and reduce uncertainty. However, many intervenors and community members expressed doubt and concern about the potential impacts of the Project on water quality. In some cases, this was expressed as a general statement:

Many of the [E]lders indicated that there was a high level of uncertainty. They have many unanswered questions and feel that the process of assessing impacts and acquiring information has been problematic so far. (PR#114 p6)

Lena Black expressed concern in Diavik's ability to prevent contamination of the lake (Figure 13):

For me, it just feels like—how do you know that the land—the rock that you're going to be putting back into the water is free of 100 percent contamination? (PR#159 p130)

Some Indigenous groups, including the Yellowknives Dene First Nation and community members, expressed that Indigenous people have a "heightened sensitivity to water quality issues around mines and their potential for environmental harm" due to legacies of water contamination from other projects such as Giant Mine and Rayrock (PR#112 p9, PR#159 p137). Uncertainty about impacts on water quality fits into a bigger picture of uncertainty that is discussed in section 5.1.1.



Figure 13: Lena Black speaking at the public hearing in Dettah
Review Board photo (September 4, 2019)

Other intervenors and members of the public expressed concern that specific aspects of the project could lead to adverse impacts on water quality. For example, the North Slave Métis Alliance expressed concern that climate change has the potential to interact with the Project in ways that could lead to other effects such as nutrient upwelling or methane release (PR#121 p7). The Tłı̄chǫ Government and the Deninu Kue First Nation identified the potential that the extra-fine particulates of the PK might not consolidate and may be re-mobilized in the water column leading to the potential for adverse impacts in Lac de Gras including increased turbidity (PR#168 p53; PR#184 p2).

Uncertainty due to the preliminary nature of the modelling

During the hearings, intervenors consistently described their concern that the water quality modelling conducted to date is preliminary and uses simplified assumptions (e.g. PR#187 p10; PR#184 p2; PR#185 p3). The Yellowknives Dene First Nation argued that the modelling results do not constitute a reliable basis for decision making (PR#188 p2). The Environmental Monitoring Advisory Board believes that uncertainties within the model lead to the potential for the model to under-predict effects of the Project (PR#107 p12). In its intervention, the Tłı̄chǫ Government contended that

there is significant uncertainty at this time about DDMI's predictive work and, as a result, significantly increased risk from the proposal that the ultimate pit lake water quality will not meet acceptable guidelines within a reasonable timeframe... (PR#114 p11)

Some intervenors, including the Tłı̨chǫ Government and the Deninu Kue First Nation, were concerned that the modelling work to date treats fine PK in the same way as extra-fine PK. In the view of these intervenors, this is problematic since it has not been demonstrated that these two types of PK will consolidate in the same way (PR#106 p5; PR#114 p13).

The Government of the Northwest Territories highlighted several things that have not yet been adequately characterized by Diavik’s modelling, including groundwater flow and variation in groundwater total dissolved solids concentration, and processes associated with fractures in the pit wall (PR#165 p55). In response, Diavik confirmed that updates to the modelling will address these and other issues (PR#165 p55).



Figure 14: The Environmental Monitoring Advisory Board speaking at the technical hearing in Yellowknife Review Board photo (September 5, 2019)

Not all intervenors had the same level of concern over the uncertainty of Diavik’s modelling. Environment and Climate Change Canada indicated that current modelling is preliminary but noted Diavik’s commitment to updating the modelling and monitoring programs. Environment and Climate Change Canada concluded that “effects to water quality should be very limited and [will] be managed and predicted prior to any fatal flaws occurring...” (PR#168 p92).

Diavik agrees that its modelling is preliminary but argues that it is based on conservative assumptions and was intended to scope out the issues and identify if the project is viable (PR#165 p75). Diavik has a high level of confidence in the modelling it has conducted to date, which is supported by the experts who did the work, the conservative nature of the model, the

worst-case scenario assessment, and the sensitivity analysis that was conducted (PR#83 p71). In response to questioning from the Environmental Monitoring Advisory Board, Diavik indicated that model updates would help to address uncertainties and would yield more realistic and better water quality predictions (PR#165 p77).

3.1.4 Less water required for closure

During the scoping phase, the Review Board determined that it would examine potential impacts of the Project on water quantity in Lac de Gras and connected waterbodies (PR#40 p9). Diavik is already required to fill the pits with water at closure. It has closure objectives to maintain minimum water elevations in Lac de Gras during this filling period (PR#8-4 PDF p28).²⁸

Diavik said that putting PK in the pit(s) would fill some of the void space in the pit(s) that would otherwise need to be filled with freshwater from Lac de Gras. Diavik’s position is that putting PK in the pit(s) means that any potential effects on the volume and outflow of Lac de Gras will be “lesser magnitude and shorter duration than those associated with the current [Interim Closure and Reclamation Plan]” (PR#53 p84).

3.2 Evidence about impacts on fish from changes to water quality and habitat

In the *Summary Impact Statement*, Diavik determined that “fish are valued by people for their intrinsic value as a component of healthy aquatic ecosystems and for subsistence, recreational and traditional uses” (PR#53 p86). At the public hearing, the Łutsel K’e Dene First Nation posed key questions with respect to fish: Will fish be able to live in pit lake(s) containing PK, and will those fish be healthy and safe to eat (PR#168 p73)?

This section summarizes key evidence relevant to impacts on fish due to changes in water quality and quantity as a result of the Project. Potential impacts of the Project on fishing and human consumption of fish are discussed in section 3.4.2.

3.2.1 Impacts on fish from changes in water quality

Diavik predicts that there is no potential for the Project to interact with fish during operations and therefore no potential for effects on fish during this phase (PR#53 p121). As described in section 3.1.2, Diavik will only breach the dikes once water in the top 40 meters of the pit lake(s) meets Aquatic Effects Monitoring Program benchmarks. As discussed in section 1.3, Diavik

²⁸ Diavik’s infilling activities cannot lower the surface level of Lac de Gras below 415 meters above sea level (PR#8-4 PDF p28).

believes that even if the dikes are not breached, it will need to ensure that water can flow between the pit lake(s) and Lac de Gras. Diavik's position is that this is necessary to avoid a situation where there is a higher water level inside the dam (PR#100 p3). If there is no water exchange, this would lead to worse water quality outcomes (PR#127 p4) (see Section 1.3).

Diavik told the Review Board that since Aquatic Effects Monitoring Program benchmarks are based on *Canadian Water Quality Guidelines for Protection of Aquatic Life* and *Guidelines for Canadian Drinking Water Quality*, water that meets the benchmarks is not expected to cause adverse effects on aquatic life or human health (PR#100 p5). Since fish could only enter pit lake(s) containing PK once water in the top 40 meters meets Aquatic Effects Monitoring Program benchmarks, Diavik predicts that fish will not be adversely affected by the Project (PR#53 p113).

Diavik predicts that the top 40 meters of the pit lake(s) will meet Aquatic Effects Monitoring Program benchmarks and both Diavik and Fisheries and Oceans Canada believe that fish are not likely to go below 40 meters very often or for very long (PR#168 p123; PR#156 p31). This prediction is based partly on Traditional Knowledge from Traditional Knowledge Panel members, which indicates that fish usually go where there's food and oxygen, so they are not likely to go very deep into the pit lake(s) (PR#165 p36). Fisheries experts from Fisheries and Oceans Canada agreed with Diavik's prediction at the public hearing, stating that ensuring good quality water in the top 40 meters was precautionary because, while some species can go lower than 40 meters, they will be limited by dissolved oxygen and light (PR#168 p123).



Figure 15: Pit A418, Diavik's preferred disposal location for PK, Diavik Diamond Mine
Review Board photo (2019)

Other intervenors questioned Diavik's assumption that fish are unlikely to go below 40 meters and questioned Diavik's reliance on this assumption for keeping fish safe (PR#168 p203). For example, the North Slave Métis Alliance stated "[t]he idea that fish would only occupy the top 40 meters of the pit lake(s), members are not convinced that this would be the only place that fish would occupy, and we would like more information in this regard" (PR#168 p217). The Deninu Kue First Nation described that the 40 meters threshold has not been validated for some large bodied fish, and that some fish are known to occupy depths greater than 40 meters (PR#168 p236).

Diavik and intervenors disagree about the potential for fish occupying deeper areas of the pit lake(s). However, Diavik argued that even if fish did go very deep into the pit lake(s) and come close to porewater or PK, they would not be harmed because porewater and PK are not acutely toxic to aquatic life (PR#165 p85). Fisheries and Oceans Canada pointed out that toxicity tests are based on surrogate species that are not present in Lac de Gras (PR#168 p116). Because of this, the Fort Resolution Métis Council expressed some doubt as to the relevance of these toxicity tests (PR#168 p116).

Intervenors have different conclusions about the potential for the Project to harm fish. For example, Deninu Kue First Nation concluded that fish might be harmed because of the potential for contaminants to migrate upwards in the water column if the stratification of pit lake(s) is disturbed (PR#184 p3). Diavik's accidents and malfunctions analysis (PR#53 p116) showed that, even with complete failure of meromixis, that changes in water quality were small, localized and would not result in significant effects on fish. The Environmental Monitoring Advisory Board believes there is potential for the Project to interact with fish and other aquatic life and cause adverse impacts, and that Diavik has not provided enough evidence to support its position otherwise (PR#107 p17). In contrast, Fisheries and Oceans Canada concluded that "the proposed project amendment is not anticipated to result in any additional negative impacts to fish and fish habitat not already covered under the existing *Fisheries Act Authorization*" (PR#168 p111).

Diavik's existing *Fisheries Act Authorization* allows for the destruction of some fish habitat on six small east island lakes and streams (PR#168 p108).²⁹ If the pit lake(s) cannot be re-connected to Lac de Gras at closure due to poor water quality, this would represent an additional loss of 244 ha of fish habitat (or, less than 1% of the pre-mine area of Lac de Gras) as the pit lakes are part of the Habitat Compensation Plan for the existing, approved project

²⁹ The existing *Fisheries Act Authorization* allows for the destruction of 2,432 habitat units.

(PR#53 p111. If the pit lake(s) are not re-connected to Lac de Gras, Diavik would have to provide an updated offsetting plan to Fisheries and Oceans Canada to “ensure that harmful alterations, disruptions, and destruction of fish habitat accrued from the construction and operation of the dikes is effectively offset, as required by their Fisheries Act authorization” (PR#110 p8).

3.2.2 Changes in water quantity and fish habitat

Diavik described that changes in water quantity as a result of the Project could affect fish in two ways:

- change in fish mortality due to ice scour or dewatering, and
- change in fish habitat in Lac de Gras or the Coppermine River due to infilling the mine workings (PR#53 p110).

Potential effects on fish and fish eggs from increased ice scour or dewatering could only occur during the closure phase when the pits are being filled with water from Lac de Gras (PR#53 p105). Diavik states that filling rates will be established so that fish habitat in Lac de Gras and the Coppermine River will not be greatly affected (PR#53 p120). Fisheries and Oceans Canada predicts that the Project is not expected to add to the habitat that needs to be offset. However, if the pit lake areas could not be fully reconnected, Diavik will have to compensate for that habitat through additional offsetting (PR#168 p109). Further discussion about the potential for the Project to affect water quantity can be found in section 3.1.4.

3.3 Evidence about potential impacts on wildlife

3.3.1 Bathurst caribou are in serious decline

A consistent theme in the evidence that the Review Board heard was concern for the Bathurst caribou herd. Caribou are integral to the culture and well-being of Indigenous communities in the Northwest Territories. In the *Bathurst Caribou Range Plan*, Herman Catholique of Łutsel K'e is quoted saying “We are caribou people you know. That is what they call us.” (PR#167 p13).

The 2019 *Bathurst Caribou Range Plan* summarizes:

[Caribou] are part of the social-natural landscape and recognized as sentient, intelligent and communicative animals. It is through the practice of respect (following traditional laws and practices around behaviour, harvesting, knowledge accumulation and knowledge transfer) that caribou herds remain abundant and healthy and the relationship between caribou and Indigenous people is maintained. (PR#167 p12)

During the public hearings in Dettah, Fred Sangris pointed out that “... without caribou [the caribou people] probably wouldn’t be here” (PR#159 p93).

The Bathurst caribou herd was once several hundred thousand strong but has declined steadily over the past 30 years. Members of the Diavik’s Traditional Knowledge Panel note the decline and displacement of caribou herds and emphasized that “[t]hese changes are alarming to...Elders because caribou are an important source of past and current survival, sustenance, and cultural identity for all Indigenous groups” (PR#53 p131).

Based on Government of the Northwest Territories surveys, the herd was at a high of 470 000 caribou in 1986, declining just over 25% to 350 000 in 1996 (PR#168 p172). The herd continued to decline in the 2000s, particularly rapidly between 2006 and 2009 (PR#168 p172). In 2018, the Government of the Northwest Territories surveys estimated that the herd is down to 8 200 caribou (PR#168 p172).

Traditional Knowledge and oral stories in the Northwest Territories include other times when caribou populations were low, or the caribou did not arrive as expected (PR#167 p12). But the extreme degree of the current population decrease has many Indigenous people very worried. As Elder Charlie Jim Nitsiza put it when describing concerns about this Project, “...we’re really, really concerned about water and the caribou” (PR#156 p68). During the *Traditional Knowledge Panel Session #11* held May 10-14, 2018, Elders expressed concern about the caribou interacting with PK (PR#53 p126).³⁰

Any effect on Bathurst caribou matters

Evidence from Indigenous groups and the developer differed regarding the nature and importance of effects on caribou and underlying values.

In its assessment, Diavik used the significance definitions from the *Comprehensive Study Report*, which defined a significant effect on caribou as a residual effect that has a high probability of a permanent or long-term, high magnitude effect in a regional area (PR#53 p130).³¹ However, evidence from Government of the Northwest Territories describes a dramatically different baseline for caribou today than in the 1990s (PR#168 p172) when the *Comprehensive Study Report* was prepared, which has implications for defining significance.

³⁰ See section 5.5 for the Review Board’s analysis of impacts on caribou.

³¹ See section 2.2.1 for further discussion.

In contrast to Diavik’s definition of significance and prediction of no project effects that could contribute to cumulative effects, the Review Board heard great concern from Indigenous groups. The Deninu Kue First Nation pointed out that considering the state of the herd, a change of less than 10% magnitude (used in Diavik’s definition) could have significant impacts on caribou (PR#106 p10). The Łutsel K’e Dene First Nation and the North Slave Métis Alliance agreed, stating:

Given the state of the Bathurst caribou herd, even a low magnitude (1%) of change is significant and unacceptable. (Łutsel K’e Dene First Nation PR#109 p7)

...[T]he population can not even sustain impacts that affect as little as 0.01% of the population (North Slave Métis Alliance, PR#121 p5)

The Fort Resolution Métis Council believes there is an existing significant adverse impact on caribou already, that any impact should be evaluated in that context, and that any measurable effect could affect the herd’s survival (PR#115 p11-12).

Diavik emphasized that it does not predict any project effects that are likely to interact with cumulative effects from other projects (PR#53 p142). The Review Board notes that the Government of the Northwest Territories agreed that the potential for cumulative effects on caribou were minor, in part because the effects from Diavik mine are expected to decrease as the mine closes and there are fewer activities that could disturb caribou (PR#168 p192).

3.3.2 Water quality as a pathway of impacts on wildlife

Impacts during closure and post-closure

Diavik assessed impacts on caribou, aquatic and migratory birds, and species at risk in its *Summary Impact Statement* (PR#53), focusing on how changes in water quality or contamination of food sources could impact caribou and birds that might be in the area.

The Government of the Northwest Territories agrees with Diavik that the only pathway to effects on caribou is through “potentially contaminated surface water” (PR#113 p11). Similarly, the Yellowknives Dene First Nation agrees that water quality is the most important part of the environment because it is the major influence or source of impacts on the rest of the environment (PR#112 p9).

Diavik limited its assessment to a qualitative assessment of impacts on wildlife during closure and post-closure and identified the only pathway to potential effects as a change to wildlife health through changes in water quality in the pits (PR#53 p126). Diavik justified its focus on wildlife during closure and post-closure partly because all the activities for the Project are

within the existing mine footprint, and there will be no new loss of habitat, mortality risk, or change in movement of wildlife (PR#53 p126). In the *Summary Impact Statement*, Diavik concluded that there are no potential interactions with wildlife during construction and operations (PR#53 p134).

In the assessment of impacts during the closure phase, Diavik identified the natural stabilization of water in the pit lake(s) and breaching of the dikes as project activities that may result in a change wildlife health (PR#53 p134). In looking at changes in health for caribou, aquatic and migratory birds, and peregrine falcon during closure and post-closure, Diavik focused on how changes in water quality in the pit lake(s) could lead to changes in health through either ingestion or exposure to contaminants through prey species or sediment (PR#53 p137). Diavik's modelling results indicate that concentrations of contaminants in the surface water of the pit lake(s) will remain low and safe for wildlife throughout the closure and post-closure phases (PR#53 p139).

Diavik ultimately concluded that “[a]s such, activities associated with the [Project] are not predicted to pose a direct or indirect health risk to barren-ground caribou, aquatic and migratory birds (e.g., waterfowl) or peregrine falcon” (PR#53 p139). The Government of the Northwest Territories agreed in its intervention and closing argument that significant adverse impacts on wildlife and wildlife habitat are unlikely after implementation of mitigation (PR#113 p11; PR#187 p9).

During the hearing, the Government of the Northwest Territories pointed out that caribou will only be in contact with surface water and concluded that if surface water is acceptable for aquatic wildlife and people, then it should be safe for caribou (PR#168 p195). The Government of the Northwest Territories acknowledged all the concerns from intervenors and members of the public with respect to caribou, but concluded that:

Provided that water quality concerns are addressed, it is unlikely that adverse impacts on this herd or neighbouring herds will occur due to this Project. The possible causes of caribou avoidance of the diamond mines (noise, dust, blasting, traffic on roads) should diminish when the mine is closed. In the unlikely event of deceased caribou being found near the flooded pits, testing for contaminants (heavy metals and organic compounds) by [The Department of Environment and Natural Resources, Government of the Northwest Territories] may be possible, depending on the physical condition of the caribou... (PR#187 p10)

Some intervenors said there are potential impacts on wildlife during operations

Over the course of the environmental assessment, the Review Board also heard concerns from some intervenors about potential effects during Project construction and operations. Although Diavik did not identify any potential interactions during these phases, the Environmental Monitoring Advisory Board raised concerns over the potential for caribou or other wildlife to interact with the Project while the pits are being filled with PK or before the pits are reconnected to Lac de Gras (PR#107 p21). Specifically, the Environmental Monitoring Advisory Board is concerned that open water in pits could attract wildlife, particularly in spring when it is likely that the pit will be open before the rest of the lake, which would attract waterfowl (PR#165 p292). In its intervention, the Environmental Monitoring Advisory Board said that if the ice on the pit lake(s) melts earlier than the ice on Lac de Gras, wildlife and waterfowl may be drawn to the pits to drink and swim in the water (PR#107 p21).

Diavik acknowledged the potential for wildlife to get close to the pits during construction and operations but said it will minimize potential for animals to interact with PK during operations by monitoring for wildlife and deterring them from the area using existing wildlife monitoring and management procedures (PR#83 p97).

3.3.3 Other potential effects on caribou and other wildlife

Despite Diavik's position that the only pathway of effects on caribou (and other wildlife) is through ingestion of contaminated water or exposure to contaminated food or soil during closure and post-closure (see 3.3.2), intervenors raised concerns about other ways that caribou could be affected by the project.

Tłjchq Elders pointed out that caribou are smart, sensitive animals with good memories, a strong sense of smell, and a susceptibility to pollutants (PR#156 p125; PR#114 p7). They may be able to smell a change in water quality, they could be affected by contaminants in the mud they use to coat themselves, or they may be bothered by cloudy water or changes to the vegetation that caribou eat (PR#156 p88). The Fort Resolution Métis Council and Tłjchq Elders pointed out that if the caribou detect changes to the taste or smell of lichens, they may change their migration routes and stop coming to the area (PR#115 p18; PR#114 p7). The Northwest Territories Métis Nation pointed out that its members believe the caribou have already shifted their migration routes to avoid the eastern arm of Great Slave Lake to avoid the diamond mines (PR#192 p3). Similarly, Fort Resolution Métis Nation stated:

All water is all connected and connected to Great Slave Lake too. Impacting wildlife, fish, and caribou. All [the caribou have] moved away. If we eat something that is spoiled we leave it alone, just like the caribou moving on to new feeding groundings. (PR#115 p18)

The North Slave Métis Alliance members remain concerned that caribou or waterfowl could land or fall into the pits and be adversely affected (PR#165 p210). In response to the mitigation that Diavik has proposed to keep wildlife away from the pits, the Łutsel K'e Dene First Nation raised concerns that the deterrent methods themselves might cause stress and energy loss in caribou (PR#109 p7). The Łutsel K'e Dene First Nation believes this could affect caribou health and survival (PR#109 p7).

Tłıchq Elders also noted that limiting the height of the PK containment facility might also help to reduce visual disturbances to caribou (PR#185 p5). Similarly, the North Slave Métis Alliance noted that the Project would reduce the surface footprint of the site post-closure, which would bring the site back closer to pre-development conditions and is therefore positive (PR#76 p2).

Despite Diavik's assertions that caribou will be safe, many Indigenous groups concluded that Diavik has not done enough to show that caribou will be safe if there is PK in the pits (PR#186 p5; PR#184 p4). Indigenous people are concerned that there will be adverse impacts from ingestion of drinking water or increased exposure to contaminants (PR#192 p4; PR#186 p5). If this adds to cumulative impacts on caribou, it will affect Indigenous people's ability to harvest caribou (PR#192 p3).

The Deninu Kue First Nation asserted that when you consider the importance of the Bathurst caribou herd as well as the existing pressures on it, looking only at water quality to assess the effects of the Project is not good enough (PR#184 p4). The Deninu Kue First Nation emphasized that Diavik should have done more to show that putting PK in the pits is safer for caribou than the alternative (raising the PK containment facility) (PR#184 p4).

3.4 Evidence about impacts on cultural use

3.4.1 Cultural importance of Lac de Gras

The continued importance of Lac de Gras as an integrated cultural landscape for Indigenous groups was evident during the environmental assessment. The Yellowknives Dene First Nation pointed out that Ek'ati means "Fat Lake" in Willideh (PR#130 PDF p6) and the Tłıchq Government said "...there's a freezer and a bank over there for us" (PR#71 p8). The North Slave Métis Alliance told the Review Board that they want the area returned to as close to original conditions, and the Northwest Territories Métis Nation added that this should happen as soon as possible (PR#192 p5; PR#76 PDF p1).

Indigenous groups want to be able to use their land now and into the future. As Arthur Beck of the Fort Resolution Métis Council told the Review Board at the hearing “[w]e eat the caribou; we eat the fish; we drink the water... We have to take care of that for the future of our children.” (PR#168 p268). At the hearing, Chief Sangris of the Yellowknives Dene First Nation pointed out that everyone needs to work together to make sure that future generations can continue to enjoy the land the way their ancestors did (PR#159 p12). The Łutsel K’e Dene First Nation emphasized that when considering cultural uses, the timeframe for understanding impacts should be much, much longer—200-500 years (PR#109 p2). The North Slave Métis Alliance said that its members want the area to be safe for “as long as the land lasts” (PR#168 p219). Elder Joseph Judas with the Tłı̄chǫ Government stated that the Tłı̄chǫ want to continue to train younger generations on using the land (PR#168 p19).

In addition, Indigenous participants at the hearings spoke of a responsibility towards the land:

We have to monitor our land and water.... [W]e want to continue to keep on with our culture and continue on with our way of life...[A]t the same time as we mine our lands, we still continue to monitor to make sure that you’re keeping up with a sustainable development. (Elder Charlie Jim Nitsiza, PR#156 p69)

...[W]e take this serious...our duties to that lake. Our duties are to that land and that area. And our duties are to the fish, to the wildlife, to the birds and to every living and non-living thing in that area. (Patrick Simon, see Figure 16, PR#168 p245)



Figure 16: Patrick Simon and Richard Simon of Deninu Kue First Nation at the technical hearing in Yellowknife Review Board photo (September 5, 2019)

The Government of the Northwest Territories linked cultural use to well-being when it said “[t]raditional and continued use of Lac de Gras and the area surrounding it is important to cultural continuity and preservation, and this is related to well-being” (PR#168 p143).

All of these comments speak to the importance of the land, and Lac de Gras, being clean and available for cultural use into the future.

3.4.2 Effects on cultural use of Lac de Gras from changes to water, fish, and wildlife

Diavik and intervenors agree that if water, fish, or wildlife is adversely affected by the Project, there could be impacts on cultural use. Although Diavik concludes that this is unlikely, intervenors are concerned. As the Government of the Northwest Territories summarized:

[a]fter PK deposition into the pits and the filling of the pits with water, if either (1) water quality in the pits is determined to be poorer than the existing modeling shows, (2) traditional users are unwilling to use the pit lake area, and/or (3) traditional users are unable to use the pit lake area, this would represent a likely significant adverse impact.
(PR#187 p10)

What Diavik said

To examine impacts on cultural use, Diavik focused on the ways that water chemistry and wildlife use of the area might change, and how that in turn might affect traditional resources (PR#165 p236). Diavik focused its effects assessment on cultural impacts on the five Indigenous signatories of the *Environmental Agreement* (PR#53 p155).³² Diavik determined that there were three ways the Project could alter cultural use (PR#53 p148). Each of these pathways are outlined below.

The first pathway to impacts on cultural use that Diavik examined was **changes in availability of traditional resources for cultural use**. Diavik considered its effects assessment on wildlife and wildlife habitat, fish and fish habitat, and water quality, which all predicted negligible impacts and no significant impacts (PR#53 p166). Diavik concluded that any impacts on availability of traditional resources will be very small and not significant (PR#53 p168).

The second pathway Diavik examined was **changes in access to resources or areas for cultural use**. Diavik considered whether water quantity could impact access and determined that the

³² The Indigenous signatories of the *Environmental Agreement* are the Tłıchǫ Government, Lutsel K’e Dene First Nation, Yellowknives Dene First Nation, Kitikmeot Inuit Association, and North Slave Métis Alliance.

effects will be less than under the current closure plan, because less water will be required to fill the pits with PK in them. Diavik also considered its impact prediction on fish habitat, where it determined there will be very small impacts. Diavik concluded that the impacts on access to resources or areas for cultural use will be very small and not significant (PR#53 p170).

The third pathway that Diavik considered was **changes in sites or areas for cultural use**. Diavik pointed out that the Project is entirely on the existing mine site and will cause no additional surface disturbance. As a result, Diavik determined that no further assessment of this pathway was necessary (PR#53 p171).

Because Diavik predicts negligible residual impacts on availability of traditional resources and access to resources or areas for cultural use, it concludes that the Project does not interact cumulatively with other projects and there are no residual effects that could contribute to cumulative effects (PR#53 p174).

What intervenors said

Indigenous groups were concerned that impacts from the Project may result in Indigenous people avoiding the area for traditional activities, like hunting and fishing (PR#71 p9; PR#109 p4). As the Łutsel K'e Dene First Nation stated, “[i]f Lac de Gras were contaminated by the [PK] in the pit lake(s), this would render the area unusable for traditional uses” (PR#72 p6). The North Slave Métis Alliance emphasized the need to make sure the area is as clean and safe as possible for people and wildlife (PR#76 p1). The Northwest Territories Métis Nation repeatedly told the Review Board that it wants the areas to be safe as soon as possible (PR#192 p5).

Some groups expressed concerns about what the Project will mean for their physical health. For example, the Łutsel K'e Dene First Nation said its members were worried that if the Project has an adverse effect on the health of caribou and other wildlife, then the health of people who eat those animals would be affected (PR#109 p7). Similarly, Tłıchq Elder Joseph Judas (see Figure 17) told the Review Board that “...knowing that the animal drink from the lake and then... we consume it... if the caribou... get sick... we might get affected too” (PR#156 p51).

The Tłıchq Government expressed concern about what this Project might mean to an “already changed food system” (PR#114 p5) and also stated:

Elders mentioned the likelihood that the project will add pressure to their already changing food system and will discourage wildlife from returning to the area. They highlighted the interconnectedness of the wildlife and the ecosystems. They are concerned about what will happen if one element of the ecosystem and food chains is disrupted and how this will lead to wider changes in the area. (PR#71 p7)



Figure 17: Tłjchq Elder and former Chief of Wekweètì Joseph Judas speaking at the public hearing in Behchokò Review Board photo (September 3, 2019)

The Environmental Monitoring Advisory Board pointed out that “[a]s LDG [Lac de Gras] is a traditional and cultural area, it is important that the affected peoples have confidence that the area is safe to use for subsistence activities” (PR#107 p17).

3.4.3 Other impacts on cultural use

Indigenous intervenors said perception can affect cultural use of the area

The Review Board asked Indigenous groups about their cultural use of the area and how this Project could affect that use (PR#43). Many Indigenous groups said that they were concerned that the Project could change the way their members view and use the area. Intervenors were concerned that Indigenous people may view traditional foods to be tainted, water to be contaminated, and fish to be unsafe for consumption—leading to Indigenous people avoiding the area.

For example, the Łutsel K’e Dene First Nation said that its traditional users would “not feel safe consuming meat, fish, plants, or water in Lac de Gras...” and “...would exercise caution by not fishing, hunting, gathering, or camping in the area” (PR#109 pp3-4; PR#186 p5). It concludes that this alienation of members from the Lac de Gras area would be a significant adverse impact (PR#109 p3). The Łutsel K’e Dene First Nation also pointed out that “...real or perceived socio-ecological impacts...effectively alienates our members from continuing to practice our

way of life in that area” (PR#72 p3). The Tłı̨chǫ Government described how this Project will “alter the cultural and traditional use of, and relationship with, Lac de Gras and the surrounding area” for Tłı̨chǫ people (PR#114 p5).

The Yellowknives Dene First Nation expressed concern early in the Environmental Assessment that PK in the pits might lead to Indigenous people limiting their use of the area or avoiding it altogether (PR#69 p11). When discussing the impacts in the pit, the Yellowknives Dene First Nation said that if water quality in the pit lake(s) is so bad that fish are excluded from it, its members will perceive the entire lake as being affected (PR#112 p13).

The Fort Resolution Métis Council said that perceptions of contamination could lead to impacts on culture through changes to country food harvesting and consumption, reduced traditional activity on the land, and a reduction in transmission of Indigenous Traditional Knowledge (PR#115 p28; PR#168 p261).

Diavik’s assessment of perception and impacts on cultural use

In its *Summary Impact Statement*, Diavik acknowledged the potential for Indigenous people to not use the area around the mine for “...personal, practical, aesthetic, and spiritual reasons” (PR#53 p168). However, Diavik did not assess these impacts, and focused only on biophysical impacts on cultural use (PR#165 p236).

Indigenous groups concluded that Diavik did not do enough to understand how the Project could affect perception of the area. The Fort Resolution Métis Council emphasized that “[b]iophysical components are not appropriate proxies for culture, especially where the potential for alienation of Indigenous Groups due to ‘perceived effects’ is likely” (PR#115 p27). In particular, the Fort Resolution Métis Council was concerned that the burden of assessing impacts from perception has fallen on Indigenous groups (PR#191 p19).

The Yellowknives Dene First Nation emphasized that Diavik did not do enough to consider the perception of its members, other than those on the Traditional Knowledge Panel (PR#188 p3). At the hearing, the Yellowknives Dene First Nation emphasized that it is “...of the opinion that the proponent did not do enough to smooth over these concerns or try to make core perceptions—adverse perceptions diminish about the [area]” (PR#168 p203).

The Łutsel K’e Dene First Nation pointed out that Diavik did not follow the guidance in the Review Board’s *Final Scope and Reasons for Decision* (PR#186 p5), which said:

Activities that may affect how traditional land users perceive the safety, quality, and health of Lac de Gras need to be carefully considered, because perceptions can change how an area is used. Actual or perceived effects to Lac de Gras that affect how people use

the area must be identified and assessed so that, if necessary, impacts may be mitigated appropriately. (PR#40 p9)

The Łutsel K'e Dene First Nation said at the hearing that Diavik "...failed to adequately identify and assess how the proposed project may affect Łutsel K'e land users, mainly their perception of the safety, quality, and health of Lac de Gras..." (PR#168 p71).

The Government of the Northwest Territories in its final argument stated that Diavik did not do enough to analyze, discuss, and develop mitigations to address Indigenous communities' perceptions of adverse impacts on the safety, quality, and health of the Lac de Gras area (PR#187 p15). It concluded that the Project could contribute to cumulative effects on well-being without proper mitigation (PR#168 p144), but also said that it could not determine the significance of this impact due to a lack of information from Diavik on social well-being (PR#187 p2). The Government of the Northwest Territories observed that if traditional users are unwilling to use the area, that would likely be a significant adverse impact (PR#187 p10).

3.4.4 Indigenous intervenors said Diavik's engagement was poor

Indigenous groups were not satisfied with the engagement from Diavik during the environmental assessment process. A common theme to concerns about engagement was Diavik's use of the Traditional Knowledge Panel. Intervenors pointed out that engaging the Traditional Knowledge Panel does not replace engaging communities directly.

The Yellowknives Dene First Nation and the Łutsel K'e Dene First Nation emphasized that the Traditional Knowledge Panel is advisory (PR#168 p71; PR#188 p2). The Yellowknives Dene First Nation points out that the views and concerns of Traditional Knowledge panel members do not necessarily represent the views and concerns of the community and the Panel should not be relied on exclusively when the things being examined have far-reaching cultural and environmental impacts (PR#168 p207; PR#188 p2). Łutsel K'e Dene First Nation member Doris Enzoe said (see Figure 18):

I never knew that they were going to take my [T]raditional [K]nowledge and use the information that was okay to put that [PK] into the tailings pond. And we're only allowed two people from my community for making decision...when it should have been consulted with...the rest of... my people in my community. (PR#165 p108)

The Fort Resolution Métis Council expressed concern that because it is not a member of the Traditional Knowledge Panel, and Diavik did not try to gather Traditional Knowledge from it in other ways, it has not had the same level of input in the Project to date (PR#115 p25; PR#191 p16).



Figure 18: Łutsel K'e member Doris Enzoe speaking at the public hearing in Dettah
Review Board photo (September 4, 2019)

There were several other ways that Indigenous groups considered the engagement to date, or future plans for engagement, to be deficient.

- The Łutsel K'e Dene First Nation pointed out that Diavik only went to Łutsel K'e once during the environmental assessment, which it concluded is not enough engagement (PR#186 p4).
- The Deninu Kue First Nation emphasized that engagement needs to be collaboratively developed (PR#184 p4).
- The Northwest Territories Métis Nation believes that meaningful engagement requires more than Diavik's commitments for expanded engagement and review of Traditional Knowledge criteria; it requires resources for Northwest Territories Métis Nation to participate (PR#192 p6).

Chapter 4: Evidence about mitigations

4 Evidence about mitigations

This chapter summarizes the mitigations that Diavik and intervenors provided, as presented in the *Summary Impact Statement*, interventions, public hearings, and written closing arguments. It is not an exhaustive description of all mitigations that were discussed in this environmental assessment, but rather focuses on themes, main points, and mitigations that were most important for the Review Board's decision.

A complete list of Diavik's commitments can be found in Appendix B. The Review Board also notes that Diavik recommended measures as conditions of approval (PR#193 pp6-8).

4.1 Appropriate benchmarks or objectives for water

The Government of the Northwest Territories recommended that if water in the pit lake(s) does not, at minimum, meet the Aquatic Effects Monitoring Program benchmarks, processed kimberlite (PK) should not be put in the pits (PR#187 p13. This recommendation was echoed in various forms by many intervenors, including the Environmental Monitoring Advisory Board, Tłıchq Government, Łutsel K'e Dene First Nation, Yellowknives Dene First Nation, and by Diavik (PR#181 p5; PR#185 p3; PR#186 p8; PR#188 p3; PR#193 p7).

Diavik made specific commitments to design a freshwater cap such that water quality in the top 40 meters of the pit lake(s) would meet Aquatic Effects Monitoring Program benchmarks (Commitment 19). Diavik noted that a minimum freshwater cap of 50 meters is necessary to ensure meromixis forms and recommended this as a measure in its closing arguments (PR#53 p53; PR#193 PDF p2). Łutsel K'e Dene First Nation expressed the need for a 100-meter cap (PR#186 p9). Based on its estimates for the volume of PK, Diavik modelled scenarios in pits A418 and A154 that would have freshwater caps of between 100 and 204 meters (PR#53 p24). Diavik committed to only breach the dikes once monitoring demonstrates that water in the pit lake(s) is below Aquatic Effects Monitoring Program benchmarks (Commitment 2).

Many intervenors, however, went further and stressed the importance of setting clear measures to "protect water quality and ensure the Project does not impact the ability or willingness for traditional users to access Lac de Gras and the connected waterways" (PR#185 p4). Łutsel K'e Dene First Nation recommended Traditional Knowledge-based parameters in the Aquatic Effects Monitoring Program as well as improved communication and engagement "...so that members have the knowledge they need to determine whether or not it is safe to drink water and eat fish from the pit lakes" (PR#72 p4).



Figure 19: Pits A154 and A418 at Diavik Diamond Mine
Photo courtesy of Diavik (PR#25)

The Yellowknives Dene First Nation expressed the need to define “culturally acceptable criteria for water quality and reconnection of the pit lake” to Lac de Gras, developed through engagement with Indigenous groups and the use of Traditional Knowledge (PR#188 p3). In the hearing, the Government of the Northwest Territories said that when thinking about setting these objectives, “[i]t’s about beliefs. They’re...numerical values that speak to toxicity, but there’s also sociologic numbers that speak to valuation” (PR#168 p160). The Environmental Monitoring Advisory Board stated that Diavik should both have objectives and demonstrate to an Inspector’s satisfaction that water in the pit lake(s) will meet approved closure objectives and criteria before depositing PK. These objectives and criteria should be set by the Wek’èezhìi Land and Water Board and should include water quality, sediment quality, pit wall stability, and Traditional Knowledge (PR#181 pp5-6).

The Tłıchǫ Government and the Government of the Northwest Territories suggested consistent and prescriptive water quality objectives for the Review Board to consider (PR#187 p13; PR#185 p4). Specifically:

- water should meet established water quality benchmarks;
- changes to water in the pits and Lac de Gras should be of low magnitude; and
- traditional users should not be adversely affected by changes associated with the Project.

Łutsel K'e Dene First Nation asserted that water in Lac de Gras must be "as close to pre-mine conditions as humanly possible" and "able to support all life forms that live in and access the Lake" (PR#186 p9). The Northwest Territories Métis Nation echoed this position, stating that water in Lac de Gras should, in the future, "once again be safe for aquatic life, fish and fish habitat" (PR#192 p5).

Diavik also recognized the need for culturally relevant water quality standards. It made a commitment to engage with Indigenous groups through the Traditional Knowledge Panel to develop "Traditional Knowledge-based closure criteria" for defining culturally acceptable pit-lake conditions for reconnection (Commitment 25). Diavik suggested that the Environmental Monitoring Advisory Board could help to facilitate the development of these criteria and would seek input from Indigenous groups not represented on the Traditional Knowledge Panel before submitting the criteria to the Wek'èezhìi Land and Water Board for approval.

In response, the Environmental Monitoring Advisory Board noted that it is an independent organization that does not represent the Indigenous intervenors to this environmental assessment. The Environmental Monitoring Agency Board believes that developing these criteria should be Diavik's responsibility (PR#165 p289). The Yellowknives Dene First Nation indicated that relying on the Traditional Knowledge Panel for this type of work was inappropriate, given that the panel is advisory and "should only be used for onsite undertakings without far reaching cultural and environmental impacts" (PR#188 p2). In its closing argument, Łutsel K'e Dene First Nation said that updated Aquatic Effects Monitoring Program benchmarks based on Traditional Knowledge should be co-developed by "Diavik....with all interested parties in order to assist Indigenous water users in assessing the safety, quality and health of water in Lac de Gras...based on Indigenous knowledge systems" (PR#186 p9).

4.2 Updated water quality modelling

In closing arguments, Diavik and most intervenors agreed that the water modelling needs to be updated. Diavik has committed to updating the modelling before putting PK in the pits, before

filling the pits with freshwater, and before breaching the dikes (PR#193 p2). The Tłjchq Government, Łutsel K'e Dene First Nation, and the Government of the Northwest Territories emphasized that this updated modelling is needed to know *if* the Project can proceed (PR#187 p2; PR#185 p3; PR#186 p8). They assert that updated modelling must be compared against appropriate criteria for determining water quality, as discussed in section 4.1. The Yellowknives Dene First Nation stated that these updates should be required before the water licence approval (PR#188 p2).

Diavik anticipates that the modelling updates will include more information about PK consolidation and geochemistry among other things (PR#165 pp75, 84). The modelling will also undergo independent review (PR#136 p3). The Environmental Monitoring Advisory Board argued that these updates should be a “whole new model”, as mentioned by Diavik at the hearing, and that it must address the deficiencies in the model that intervenors have identified (PR#181 p5). See section 3.1.3 for a detailed description of the issues intervenors raised about Diavik’s water quality modelling.

4.3 Independent review of updated modelling

Most intervenors indicated that updated water quality modelling should be paired with independent review. The Government of the Northwest Territories stated that independent review, and the establishment of a process that allows interested parties to be involved in the design, composition, and oversight function of the panel, would help to “ensure stakeholder comfort with the modeling” (PR#187 p12). Diavik recommended a measure for independent review, following the framework of the Diavik Geotechnical Review Board (PR#193 p6).³³ However, most intervenors thought that an independent panel should take on more than just a review role. The Tłjchq Government, the Łutsel K'e Dene First Nation, and the Government of the Northwest Territories indicated that the independent review panel should work collaboratively with all interested parties to (PR#185 p4; PR#187 p12; PR#186 p8):

- determine how the panel will select the water quality model and inputs,
- document the process for reporting, and
- develop a process for incorporating panel recommendations into modelling and monitoring.

³³ According to Diavik’s existing water licence, the Geotechnical Review Board is the Expert Review Board established by Diavik to review dike designs. The water licence can be found here: <http://registry.mvlwb.ca/Documents/W2015L2-0001/Diavik - Water Licence - Schedule 1, Schedule 6 and SNP Updates - Jun 13 18.pdf>.

4.4 Keeping fish safe

Most of Diavik's proposed mitigations for keeping fish safe are linked with ensuring that water quality remains below Aquatic Effects Monitoring Program benchmarks in the pit lake(s) (Commitments 5-7). If water does not meet Aquatic Effects Monitoring Program benchmarks, Diavik will keep fish out of the pit lake(s) (Commitment 8) either by:

- filling the breaches with crushed rock, or
- fracturing the dike walls instead of excavating them (PR#100 p3).

Both methods would allow water through but not fish (PR#100 p3). Diavik contends that water quality outcomes in both the pit lake(s) and Lac de Gras would be comparable whether dikes are breached or fractured because water flow would be similar either way (PR#83 PDF p84, PR#127 p8).

Diavik also committed to “work with [Fisheries and Oceans Canada] and Indigenous groups to finalize water withdrawal rates that will not significantly affect fish habitat in Lac de Gras or the Coppermine River” during pit re-filling (Commitment 9).³⁴ Diavik proposes to limit the potential for the Project to adversely affect fish by updating its fish habitat offsetting plan if required (that is, if the pits cannot be returned to fish habitat) (PR#193 p35). Łutsel K'e Dene First Nation recommended that Diavik should not put PK in A154 to minimize fish habitat loss, and to not reconnect any pit with PK in it with Lac de Gras (PR#186 p10). Diavik has indicated that its preferred deposition location is A418, with A154 as an alternate location (PR#193 p3). Diavik does not want to remove A154 from consideration, as it would limit its operational flexibility (PR#193 PDF p63). Łutsel K'e's recommendation would require Diavik, Fisheries and Oceans Canada, and affected Indigenous governments to identify fish habitat improvements elsewhere to offset this loss of fish habitat (PR#186 p11).

Some intervenors identified additional mitigations that, in their view, are necessary to prevent harm to fish. For example, the Northwest Territories Métis Nation recommended that water quality and fish and fish habitat should be monitored for at least 100 years following closure (PR#192 p5). The Łutsel K'e Dene First Nation recommended that monitoring should include fish palatability and texture (PR#186 p11).

The Environmental Monitoring Advisory Board recommended Diavik ensure that guidelines for the protection of aquatic life are met in the top 40 meters of the pit lake(s), or deeper if fish are

³⁴ The Review Board notes that these rates would be regulated by the Wek'èezhì Land and Water Board.

using areas below 40 meters (PR#181 p6). The Environmental Monitoring Advisory Board also recommended that there be a comprehensive monitoring program in place to (PR#181 p7):

- verify water quality model predictions,
- monitor the use of the pit lake by fish and other aquatic life, and
- monitor the health of fish and aquatic life using the pit lake.

Fisheries and Oceans Canada submitted a similar recommendation for Diavik to update relevant fish and fish habitat monitoring plans (PR#189 pdf p15).

Diavik's responses to these and other comments on monitoring is discussed in section 4.6.

4.5 Keeping wildlife safe

Intervenors stressed that keeping caribou safe is of paramount importance, given the current precarious state of the herd and existing significant cumulative adverse impacts on caribou.³⁵ Diavik identified several mitigations that it believes will prevent impacts on wildlife and specifically caribou in its *Summary Impact Statement*. These include monitoring to ensure that water quality remains safe for wildlife, monitoring, and deterring wildlife that approach the pit area, and project design elements like excavating ramps into pit walls that will become shoreline (PR#53 p138). Other specific mitigations that Diavik described include monitoring and tracking wildlife, training all site personnel to record and report wildlife observations, and deterrence techniques including truck horns, bear bangers, decoy animals, noise makers, and herding techniques if required (PR#83 p97).

The Yellowknives Dene First Nation, the Northwest Territories Métis Nation, and the Łutsel K'e Dene First Nation recommended preventing caribou access to the pits that contain PK by using either physical barriers or other ways identified by Traditional Knowledge and science (PR#188 p4; PR#192 p4; PR#186 p5). The Fort Resolution Métis Council and the North Slave Métis Alliance recommended community-based monitoring programs related to wildlife (PR#191 p12; PR#190 p3). The Łutsel K'e Dene First Nation and the Northwest Territories Métis Nation recommended monitoring, testing, and informing Indigenous groups about any caribou mortality in the mine area (PR# 186 p6, PR#192 p4).

The Fort Resolution Métis Council also recommended (PR#191 p5):

³⁵ See section 3.3.1 for evidence on the current state of the Bathurst herd, and section 5.5 for the Review Board's related analysis and conclusions about impacts on caribou.

- a Fort Resolution Métis Council Indigenous Traditional Knowledge study, funded by Diavik,
- a caribou forage sampling program based on Traditional Knowledge, and
- a community caribou organ meat sampling program.

The Łutsel K'e Dene First Nation also recommended that Diavik conduct a CircumArctic Rangifer Monitoring and Assessment program for caribou, and partially fund the Łutsel K'e Dene First Nation to complete a complementary sampling program (PR#186 p5).

4.6 Comprehensive monitoring

Diavik has committed to updating its monitoring programs for the Project (Commitments 1, 5,6, 10, 12, 13, 17 and 18). For water quality, Diavik specifically committed to:

- sampling PK porewater to confirm constituent concentrations used in modelling,
- monitoring the development of meromixis in the pit lake(s) that includes visual monitoring of the pit lake(s) by the Traditional Knowledge Panel,
- monitoring water quality in the pit lake(s) and Lac de Gras after breaching the dikes, and
- continuing the Aquatic Effects Monitoring Program in Lac de Gras, including sampling water quality, sediment, fish, and invertebrates in the water and sediment.

Diavik has also committed to monitor the pit lake(s) during operations, after filling with water, and before reconnection. Diavik proposed a measure that would require monitoring towards demonstrating that water in the top 40 meters of the pit lake(s) meets Aquatic Effects Monitoring Program benchmarks prior to re-connecting the pits to Lac de Gras (PR#193 PDF p11, 65).

Throughout the environmental assessment process, the Environmental Monitoring Advisory Board raised concerns over Diavik's proposed updates to the Aquatic Effects Monitoring Program. In its closing argument, the Environmental Monitoring Advisory Board argued that Diavik's proposed monitoring is deficient in terms of duration and spatial extent of sampling, lack of sediment quality sampling, and fish use and health indicators (PR#181 p6). Diavik believes there is "sufficient alignment" in the proposed monitoring, but also recommended a measure that would require the Wek'èezhì Land and Water Board to set the terms and conditions necessary for this monitoring as water licence conditions (PR#193 PDF p11, 65).

The Government of the Northwest Territories identified the need for Diavik to engage with all potentially affected groups to:

- “ensure that potentially affected Indigenous communities are being provided opportunities to jointly determine appropriate monitoring for the Project,
- ensure open and consistent communication between communities and Diavik, and
- to promote cultural continuity in relation to community well-being.” (PR#187 piii)

Several intervenors commented on the need to monitor impacts throughout the closure period, and to ensure that communities and community members were involved in the monitoring. The Yellowknives Dene First Nation said that to maintain “...‘good’ perception of the [area] it is important the proponent works collaboratively [to] monitor the water quality as without direct involvement [a] knowledge gap will occur with the likely potential to darken our perception and thus severing us from the land” (PR#69 p10). As the Yellowknives Dene First Nation stated in the public hearing:

...monitoring...is not just about benchmarks and the thresholds. It’s very much about perceptions, and we are of the opinion that the proponent did not do enough to smooth over these concerns or try to make core perceptions – adverse perceptions diminish about the [area]. (PR#168 p198)

The Government of the Northwest Territories stated that “strong monitoring programs can contribute to well-being and mitigate likely significant adverse impacts” (PR#187 p17).

Intervenors made several recommendations and specific monitoring program requirements for the closure period. For example, the Northwest Territories Métis Nation requested funding to conduct on-site environmental monitoring, desktop technical reviews, and Traditional Knowledge monitoring (PR#192 p3). It further recommended that water quality and fish and fish habitat should be monitored for at least 100 years post-closure (PR#192 p5). The Fort Resolution Métis Council recommended several measures about monitoring impacts on caribou, including the need for a community-based caribou monitoring program specific to closure (PR#191 p12). The North Slave Métis Alliance also suggested the need for community-based, post-closure monitoring to fully utilize its members’ expertise in environmental monitoring and remediation procedures (PR#190 p3). The North Slave Métis Alliance maintained that ongoing, extended community-based monitoring would increase public confidence (PR#121 p12).

In response to concerns over the length of time monitoring would continue, Diavik indicated that at minimum, monitoring would occur for at least two years before it reconnects the pit lake(s) to Lac de Gras (PR#193 p31). Diavik explained it expects the length of monitoring after

reconnection to be guided by the results of the monitoring program (PR#193 p31). Diavik also said that it is working with the Traditional Knowledge Panel to “develop approaches to [Traditional Knowledge]-based closure monitoring”, but that specific monitoring plan components should be set by the Wek’èzhìi Land and Water Board (PR#193 p31).

4.7 Engagement to mitigate cultural impacts

Initially, the mitigation Diavik identified for impacts on cultural use was limited to the mitigation it has planned for wildlife, fish, and closure (PR#53 p165, 169). In its closing arguments, Diavik reiterated that Indigenous people may choose not to use the area “for a variety of reasons” whether this particular project goes ahead or not, and emphasized that it would continue engaging with affected Indigenous groups:

...to better understand Indigenous perceptions about the safety, quality, and health of Lac de Gras and identify practical strategies to address these concerns and improve perceptions to match actual input. (PR#193 p40)

Diavik made several commitments to improve its engagement going forward. These include:

- continued engagement with stakeholders to inform project design and execution (Commitment 15),
- continued engagement to understand Indigenous perceptions about the safety, quality, and health of Lac de Gras, and to identify practical strategies to address concerns (Commitment 16),
- expanded engagement with non-signatory groups (Fort Resolution Métis Council, Deninu Kue First Nation, Northwest Territories Métis Nation) (Commitment 24),
- developing engagement plans in collaboration with the Deninu Kue First Nation and the Fort Resolution Métis Council (Commitment 30), and
- continued engagement with the Łutsel K’e Dene First Nation to identify alternative approaches to closure and post-closure activities, to understand and identify approaches for assessing and mitigating impacts on cultural use, and to identify approaches to limit wildlife interactions with the project (Commitments 31, 32, and 34).

The Government of the Northwest Territories emphasized that “...in order to mitigate potential impacts on the social well-being of Indigenous peoples and [Indigenous Government Organizations], [Diavik] should commit now to improved engagement on this Project” (PR#187 p17). The Government of the Northwest Territories believes this should be done by:

- working closely with Indigenous groups,
- timely plain-language communication,

- participation in monitoring of the project,
- involvement in final closure plans, and
- iterative identification of mitigations to address perception impacts.

The Government of the Northwest Territories recommended that Diavik provide an updated, collaboratively developed framework for community engagement and participation in closure planning and the closure phase to address interactions between the Project and cultural use (PR#187 p3).

The Fort Resolution Métis Council recommended that Diavik be required to engage with all groups meaningfully (PR#191 p16). The Yellowknives Dene First Nation recommended that Diavik should not be allowed to proceed with the Project until it has done enough engagement to consider Indigenous concerns (PR#188 p3).

In addition to the mitigation proposed by Diavik and intervenors for engagement, intervenors also made the following specific comments about the mitigation for impacts on cultural use:

- The Fort Resolution Métis Council expressed strong concerns that Diavik relied on mitigations for impacts on biophysical components to reduce effects on cultural components (PR#115 p30).
- The Environmental Monitoring Advisory Board recommended that Diavik should have to find “...practical strategies to address concerns that would prevent traditional use of the area” (PR#181 p5).
- The Northwest Territories Métis Nation recommend that Diavik undertake studies and monitoring to make sure that Indigenous people feel safe hunting, trapping, fishing, and gathering in the area (PR#192 p5).
- The Government of the Northwest Territories recommended that Diavik include potentially affected Indigenous groups and government organizations in visual monitoring and increase communication and engagement to mitigate impacts on social well-being (PR#187 p18).
- The Fort Resolution Métis Council recommended that Diavik be required to design a follow-up program to verify the accuracy of impacts on culture and should be required to provide proof that it is working with Indigenous groups “...to identify mitigation appropriate for preventing, reducing or compensating/offsetting harms to cultural use” (PR#191, 20, 21).

4.8 Expanding the use of Traditional Knowledge

As described in section 3.4.4, intervenors were dissatisfied with Diavik’s nearly exclusive reliance on the Traditional Knowledge Panel for obtaining, understanding, and interpreting Traditional Knowledge. Several groups indicated that existing monitoring programs and engagement plans needed to be updated for the Project. Specifically, these updates should include the involvement of potentially affected groups and Traditional Knowledge (PR#112 p10, PR#107 p20; PR#109 p5; PR#168 p74). The Yellowknives Dene First Nation described the importance of this engagement and inclusion of Traditional Knowledge:

Dene have great respect for water. Dene have their own ways to test water quality before they will trust water for drinking. When the people can see that edible plants along the shore have changed, the people stop using them because they know that changes in water quality have damaged the plants. When the people can see meat in fish that used to be healthy is mushy and the fish have sores, they do not eat the fish. (PR#69 p11)

Indigenous intervenors who are not signatories to the *Environmental Agreement* are not included on the Traditional Knowledge Panel. These groups pointed out that Traditional Knowledge from their communities and members has not been included in the Project, or in the design and management of the Diavik Mine more generally (see section 3.4.4). To address this, the Fort Resolution Métis Council recommended that Diavik engage with *all* affected Indigenous groups to further Indigenous Traditional Knowledge data gathering, including (PR#191 p18):

- supporting the collection of knowledge related to traditional land use, and
- thoroughly considering Traditional Knowledge in project closure design, mitigations, monitoring, and adaptive management.

Chapter 5: Review Board findings

5 Review Board findings

Summary of the Review Board's decision

This chapter describes how, after carefully considering all evidence on the public record, the Review Board has decided the following:

- Impacts from the Project on cultural use of Lac de Gras are significant (section 5.1) because:
 - the acceptability of changes in the Lac de Gras area is low, and
 - the Project is likely to reduce cultural use of the Lac de Gras area.
- The Review Board is unconvinced by Diavik's assessment of water quality impacts because Diavik's preliminary modelling leaves too much uncertainty (section 5.2).
- A suite of measures is required to mitigate the project impacts (section 5.3).

These conclusions and reasons are described in detail below. This chapter also includes the Review Board's analysis of the project's relationship to caribou (section 5.4) and the potential benefits that may arise from the Project (section 5.5).



Figure 20: Review Board members at the public hearing in Behchok̓
Review Board photo (September 3, 2019)

Engagement, understanding, and public concern are related

An overarching element of the Review Board’s analysis below is the recognition of the connection between engagement, intervenors’ understanding of the Project, public concern, confidence, and trust. As the Yellowknives Dene First Nation pointed out, “[t]ensions, fear, and angst can arise when development is not in alignment with cultural values and perspectives” (PR#159 p47).

The Review Board is of the view that early, ongoing, and effective engagement between developers and communities potentially affected by a development is an essential part of project design and operations. People who use the Lac de Gras area traditionally need to understand the project design in order to understand potential project impacts. This understanding can come about through ongoing and effective engagement and helps reduce or prevent public concern. The ways in which engagement, public understanding, and public concern are relevant to this environmental assessment are discussed in more detail in the following sections.

5.1 The Review Board finds significant adverse impacts on cultural use of Lac de Gras

5.1.1 The acceptability of changes in the Lac de Gras area is low

The acceptability of impacts from developments is related to the value that people place on the area where the impacts occur and on the parts of the environment that are affected. Based on the arguments of all Indigenous intervenors, the Review Board has determined that the acceptability of changes in the Lac de Gras area is low, because:

- Lac de Gras is culturally important to Indigenous people and must remain clean for future generations,
- clean water is essential for a healthy environment, and
- past and present experiences have reduced Indigenous peoples’ tolerance for uncertainty.

The sections below discuss these reasons in more detail.

Lac de Gras is culturally important to Indigenous people and must remain clean for future generations

The Review Board heard plainly from Indigenous intervenors that Lac de Gras is an important area for cultural use (PR#115 p10; PR#130 PDF p6; PR#114 p5)). In its intervention, the Tłı̄chq Government highlighted the importance of Lac de Gras in the words of one of their Elders:

'[O]ur forefathers have been using the lands for winter trapping, harvesting, every year they were travelling through there, getting arctic fox, fish.' He went on to explain that they want to make sure they can use the area again since there is a cultural connection to the area that must be considered in project closure plans. As the Elder explained, 'there's a freezer and a bank over there for us'. (PR#114 p5)

The Traditional Knowledge Panel indicated that water in Lac de Gras is “still good and healthy” and “still tastes great” (PR#53 p63). Indigenous intervenors emphasized repeatedly that it needs to remain this way, so that future generations can use the land (PR#168 p19; PR#159 p12).

The Review Board agrees and is of the opinion that the value of Lac de Gras is about more than just the way Indigenous people use it now. It is also about the inherent quality of the water and land overall. It is about the importance of knowing that an area that has been used traditionally for countless generations will continue to be safe for future generations, long after industrial activities have ended, the mine has closed, and Diavik has left. The Review Board heard that if part of the lake is not suitable for cultural use, this would affect how some Indigenous people value the surrounding area as a place to practice cultural activities (PR#112 p14). For example, Łutsel K'e Dene First Nation stated “...if Lac de Gras were contaminated by the processed kimberlite in the pit lakes, this would render the area unusable for traditional uses” (PR#72 p6). It is clear to the Review Board that if the area became “unusable for traditional uses”, this would be a change to the way Indigenous people use the area for cultural purposes and would be an adverse impact on the environment under the Act.³⁶

Clean water is essential for a healthy environment

Indigenous intervenors emphasized the importance of water from their unique perspective. They described water as a central and fundamental driver of the environment, an interconnected system that must be considered holistically.³⁷ For example, the Tłı̄chq Elders

³⁶ as defined in section 111 of the Act

³⁷ See section 3.1.1 for this discussion.

said “...you cannot separate water quality from the quality of the land, the wildlife and... use of the area” (PR#185 p5). The Review Board accepts that, from this perspective, it is necessary to consider impacts on the environment holistically: healthy water is a foundation of a healthy ecosystem, and healthy ecosystems are essential for the preservation of the way of life of Indigenous people.³⁸

Intervenors and Diavik agreed that if water were to be adversely affected, there could be adverse impacts on other parts of the environment, including fish, caribou, and cultural use of the area (PR#156 p37; PR#159 p47; PR#185 p1). The Yellowknives Dene First Nation stated during the public hearing, “[c]ultural use of the land is connected to a clean environment. That is wildlife, fish, and water, particularly water” (PR#159 p47). Patrick Simon from Deninu Kue First Nation told the Review Board that:

You can't put things in the water, in the berries, in the plants, in the lichen, and not affect the caribou. You can't because the caribou are all part of that relationship that's so sensitive that they probably could smell the difference in that pit. They probably could feel it as they walk by. (PR#159 p56)

Intervenors told the Review Board that this relationship between caribou and water takes on particular importance given the precarious and diminished state of the Bathurst caribou herd.³⁹

The Review Board agrees that cultural use of Lac de Gras would be affected if water, fish, or caribou are adversely affected, or if these resources are seen by Indigenous groups as affected. The Review Board observes that if Indigenous groups are going to use Lac de Gras in the future, they must have confidence that the water will be suitably clean for cultural uses. Because of this, there is a low acceptability of change to water quality for Lac de Gras.

Past and present experiences have reduced Indigenous peoples' tolerance for uncertainty

It is clear to the Review Board that Indigenous groups' lack of trust in and sense of uncertainty about the Project is influenced by their experiences. In this environmental assessment, the Review Board heard intervenors discuss:

- legacies of contamination at other sites. For example, Giant, Pine Point, and Rayrock mines (PR#159 pp48, 68, 74, 137; PR#168 p266; PR#193 p12).

³⁸ The Act defines the environment to include the interacting natural systems that include components of land, water, and air and all organic and inorganic matter and living organisms.

³⁹ See section 5.4 for the Review Board's analysis of project impacts on caribou.

- serious concerns about how climate change has and will continue to harm the ability of Indigenous people to practice their way of life (PR#159 pp55, 71, 114; PR#156 p51).
- a history of poor engagement and misunderstandings with different developers, leading to questions about why Diavik is asking to change what it does with PK now, after it originally said that it would keep PK out of Lac de Gras (PR#159 pp58, 125).

The Review Board understands that past experiences frame the way people decide how much uncertainty is acceptable. The other sources of uncertainty that Indigenous people already live with create a low tolerance for additional uncertainty from project-specific impacts.

5.1.2 The Project is likely to reduce cultural use of the Lac de Gras area

Indigenous people are unlikely to use the Lac de Gras area if they are not certain about the impacts of the Project and the future quality and safety of the area. Diavik’s assessment of cultural impacts has not given Indigenous people the confidence they need about the suitability of the area for future cultural use. The Review Board finds that the Project is likely to reduce cultural use of the Lac de Gras area, because:

- Diavik has not properly assessed the potential for impacts on cultural use, and
- Diavik did not develop culturally relevant water quality standards for Lac de Gras.

The sections below discuss these reasons in more detail.

Diavik has not properly assessed the potential impacts on cultural use

The original Diavik Mine was assessed in 1999 under the *Canadian Environmental Assessment Act*. Since that time, the *Mackenzie Valley Resource Management Act* (the Act) has come into force and the Tłıchǰ *Land Claims and Self-government Agreement* was signed.⁴⁰ Co-management and the specific requirements in the Act have increased the importance of Indigenous worldviews in understanding, assessing, and mitigating impacts.

The Act changed how project impacts are evaluated and how significance is determined within the Mackenzie Valley.⁴¹ The *Canadian Environmental Assessment Act* defined “environmental effect” in a way that only considered cultural effects resulting from the biophysical impacts of a

⁴⁰ Tłıchǰ rights can be exercised throughout Wek’èezhì, which includes the Lac de Gras area.

⁴¹ As described in section 2.2.1 the significance thresholds that were used for the 1999 comprehensive study assessment are out of date and no longer appropriate for project assessment in the Mackenzie Valley.

project. Under the Act, however, “impact on the environment”⁴² includes direct cultural impacts as well as those caused by biophysical changes.

Diavik argued that if there were no adverse impacts on the availability of harvested resources or no reduced access to culturally used areas, then there would be no impacts on cultural use (PR#53 p148). However, Diavik also acknowledged that there are other “personal, practical, aesthetic, and spiritual reasons” that Indigenous people may not use an area for cultural use (PR#53 p68). Putting PK, a mine waste, into pit(s) and underground that will be part of (or reconnected to) Lac de Gras creates the potential for impacts that were not assessed as part of the mine’s original environmental assessment. The Project would effectively create an additional waste disposal area. The Review Board finds that this opens new pathways for impacts on cultural use of the Lac de Gras area that Diavik has failed to assess.

Cultural use of the area also depends on Indigenous people’s cultural and personal motivations to use the area and requires confidence and trust that it is safe. Evidence from Indigenous intervenors supports this conclusion. For example, Łutsel K’e Dene First Nation stated that “...real or perceived socio-ecological impacts ...effectively alienate our members from continuing to practice our way of life in that area” (PR#72 p3). Fort Resolution Métis Council expressed this when it said “[b]iophysical components are not appropriate proxies for culture, especially where the potential for alienation of Indigenous Groups due to ‘perceived effects’ is likely” (PR#115 p27).

Evidence from all Indigenous intervenors is that the Project has the potential to affect their cultural use of Lac de Gras. For example, “Tłı̨ch̨o members feel that connecting Lac de Gras to the pits will alter the cultural and traditional use of, and relationship with, Lac de Gras and the surrounding area” (PR#114 p5). Łutsel K’e Dene First Nation indicated “...they would not feel safe consuming water and fish from Lac de Gras if processed kimberlite is deposited into the mined out pits” (PR#186 p5).

On the same subject, the Yellowknives Dene First Nation stated the following:

As an [I]ndigenous community, we are mindful of the perception of our members, even in the light of the proponent offering the most trusting suggestions of minimal adverse effects. If the processed kimberlite was to be placed into the mine workings, [o]ur perception of the area would change, and this would lead to us (if not avoiding the area altogether) limiting our contact to it (the area)...If the water is not clean, or even not

⁴² See section 111 of the Act

perceived to be clean, our members will refrain from using the site, a site which we have used to exercise our Aboriginal rights since time immemorial. (PR#69 p11)

Despite hearing these and other concerns, there is no evidence that Diavik made an effort during this assessment to work with Indigenous groups to understand and mitigate these potential cultural impacts. In the Review Board's opinion, ongoing use of the project area will not just depend on wildlife resources and access to the site after closure. The Review Board finds that Diavik's narrow focus on biophysical components of the environment did not adequately consider the potential for the Project to affect Indigenous groups, because it did not appropriately consider the way Indigenous people make decisions about land use.

Diavik did not develop culturally relevant water quality standards for Lac de Gras

Guidance from the Mackenzie Valley Land and Water Board *Water and Effluent Quality Management Policy* requires proponents to consider traditional and potential uses and the cultural significance of water bodies in determining site-specific water quality standards.⁴³ However, Diavik examined impacts on cultural use by focusing only on how the Project could affect water, fish, and wildlife. Diavik assumed that meeting Aquatic Effects Monitoring Program benchmarks (which are based on the protection of aquatic life) will mean that there will be no impacts on cultural use. Diavik did not develop site-specific water quality standards for Lac de Gras that explicitly consider traditional Indigenous values or past, present, and future cultural use.

In the absence of water quality standards which integrate cultural use, Diavik has no direct, meaningful way to judge if water in Lac de Gras will continue to be good for cultural use after reconnecting the pit lake(s). Aquatic Effects Monitoring Program benchmarks are intended to be protective of aquatic life and drinking water quality but are science-based and do not include Traditional Knowledge. Using only these benchmarks as determinants for water quality outcomes for the Project may not be the most appropriate approach to evaluating the suitability of the area for cultural use.

As discussed in section 4.1, intervenors described the need to develop water quality standards which can be used to judge the suitability of water for cultural uses. The Review Board agrees

⁴³ See section 8.1 of the Mackenzie Valley Land and Water Board *Water and Effluent Quality Management Policy*, available online at: https://mvlwb.com/sites/default/files/documents/MVLWB-Water-and-Effluent-Quality-Management-Policy-Mar-31_11-JCWG.pdf.

with intervenors who indicated that these standards should be rooted in Traditional Knowledge and must be meaningful to communities and individuals.

To its credit, by the end of the environmental assessment, Diavik stated that a measure was necessary to ensure engagement with potentially affected Indigenous communities in order to develop Traditional Knowledge-based acceptance criteria for reconnecting the pit lake(s) to Lac de Gras. The Review Board was encouraged by Diavik's commitment to "developing a [Traditional Knowledge] based approach to assessing pit lake conditions with respect to impacts on cultural use" (PR#193 p42). Importantly, Diavik discussed these criteria as a means of mitigating potential impacts on social well-being and cultural use (PR#193 p42).

5.1.3 Impacts from the Project on cultural use of Lac de Gras are significant

Lac de Gras is highly valued for cultural reasons, and Indigenous people want to ensure that it stays safe and clean for future generations. Making sure that water quality is good is necessary because water is a pathway for effects on other parts of the environment. Clean water is necessary to justify and maintain Indigenous groups' trust that water, fish, and caribou will support cultural use now and in the future. Past experiences have also led to a low tolerance of project-specific uncertainty among Indigenous communities affected by the Project. In combination, these reasons lead the Review Board to the conclusion that **the acceptability of changes in the Lac de Gras area is low.**

Based on the evidence, the Review Board determines that Diavik has not met its burden of proof about impacts on cultural use of Lac de Gras. Diavik did not adequately assess impacts on cultural use because it focussed on biophysical impacts only and did not engage sufficiently with potentially affected Indigenous communities to fully understand the likelihood of direct or indirect cultural impacts from the Project. In addition, Diavik did not propose any culturally relevant water quality standards and based its impact assessment on preliminary modelling that only considered Aquatic Effects Monitoring Program benchmarks. Taken together, these shortcomings in Diavik's impact assessment have led Indigenous intervenors to doubt that the area will continue to be good for cultural use after closure if the Project proceeds. If there is an adverse impact on water quality or if the Lac de Gras area is seen by Indigenous groups to not be suitable for cultural use, **the Review Board finds that there will likely be reduced cultural use of the Lac de Gras area.**

Putting PK in the pit(s) and underground, and connecting them to Lac de Gras, is permanent. The Review Board shares concerns that the Łutsel K'e Dene First Nation expressed early in the environmental assessment process about "...the irreversibility and permanency of placing processed kimberlite in pit lakes and re-connecting those pits to the greater ecosystem..."

(PR#72 p6). Since this Project is irreversible, the Review Board believes that a high standard of confidence in impact prediction is needed.

As described above, the Review Board has determined that the acceptability of change in the Lac de Gras area is low and that the Project is likely to reduce cultural use of Lac de Gras. The low acceptability of change in this area and the irreversibility of putting PK in the pit(s) and underground affect the Review Board's opinion about the threshold for significance of impacts on cultural use. **The Review Board therefore concludes that this Project, without additional mitigation, is likely to cause a significant adverse impact on cultural use of Lac de Gras.**

The Review Board agrees with the Government of the Northwest Territories' position that "...health and well-being of Indigenous peoples and communities is linked to the health of the biophysical environment" (PR#187 p15). Protecting cultural use of a highly valued area is a means to ensure the well-being and way of life of Aboriginal people, which the Review Board is bound to consider under paragraph 115(1)(c) of the Act.

5.1.4 The Project will add to pre-existing cumulative cultural impacts

The Review Board expects residual project-specific impacts to combine with pre-existing impacts on the well-being and way of life of Indigenous groups. The Review Board recently concluded an environmental assessment of the nearby Ekati Jay Project.⁴⁴ It determined that the Jay Project "...will add to the disturbance of a culturally important landscape... [that has] already been significantly affected by the Ekati Mine and other diamond mining operations".⁴⁵ The Review Board concluded that Indigenous peoples' reduced connection to the land in an area recognized for its high cultural importance resulted in a "cumulative adverse impact that has significantly affected Aboriginal peoples' way of life in the Jay Project area". Fort Resolution Métis Council referenced this conclusion and observed that, in its view, pre-existing cumulative effects on Indigenous culture are significant (PR#168 p262).

Indigenous participants in Diavik's Aquatic Effect Monitoring Program Traditional Knowledge Study noted that components of the Diavik mine have already affected cultural use of the area. For example, they said that the North Inlet area of the Diavik mine used to be an important harvesting site where caribou shelter (PR#53 p160). The evidence shows the Diavik mine area

⁴⁴ Report of Environmental Assessment and Reasons for Decision, Dominion Diamond Ekati Corp. Jay Project (EA1314-01), February 1, 2016 (pp147-149). http://reviewboard.ca/upload/project_document/EA1314-01_Report_of_Environmental_Assesment_and_Reasons_for_Decision.PDF

⁴⁵ Misery pit of the Ekati Diamond Mine is approximately five kilometers away from the Diavik mine.

has already been significantly changed and these changes have displaced cultural uses. Project related effects will be additional to these pre-existing impacts.

As the Review Board determined in section 5.1.3, based on the evidence on the record, this project is likely to cause significant adverse impacts on cultural use of Lac de Gras. These significant project-specific impacts will add to the pre-existing significant cumulative impacts on cultural use of this important area. The Review Board therefore finds that the Project will add cumulatively to the significant adverse cultural impacts affecting the area. This is a significant cumulative cultural impact.

5.2 The Review Board is unconvinced by Diavik’s assessment of water quality impacts

Diavik’s water quality modelling, which is only preliminary, does not provide the level of confidence the Review Board requires to conclude that significant impacts to water quality are not likely.

5.2.1 Diavik’s preliminary modelling leaves too much uncertainty

The Review Board notes and understands the perspective offered by Indigenous intervenors that water is a central and fundamental driver of the environment, an interconnected system that must be considered holistically (see section 5.1.1). The Review Board heard from Diavik that it predicts only small changes, if any, to the water chemistry of Lac de Gras. Since Aquatic Effects Monitoring Program benchmarks are designed to be protective of aquatic life, Diavik believes that changes below these benchmarks are unlikely to result in significant adverse impacts on fish, wildlife, or aquatic organisms in Lac de Gras.

Diavik’s preliminary water quality modelling shows that Aquatic Effects Monitoring Program benchmarks are likely to be met in the top 40 meters of the pit lake(s) and that planned updates to the modelling will help to improve the accuracy of these predictions (PR#193 p2). Diavik’s consideration of the worst-case scenario showed only a small, localized, and short-lived potential for exceeding Aquatic Effects Monitoring Program benchmarks (PR#53 p71). Diavik acknowledges that its preliminary modelling is not sufficient to confirm that Aquatic Effects Monitoring Program benchmarks will be met. Diavik agrees that updated modelling is required to confirm this prediction.

Throughout the environmental assessment, intervenors have strongly and consistently stated that they lack confidence in Diavik’s preliminary water quality modelling and Diavik’s reliance on this modelling for impact predictions. Considering the irreversible nature of the Project, **the**

Review Board agrees that more certainty from further modelling is necessary. Specifically, the Review Board believes that additional work is required to address uncertainties raised by intervenors (such as the consolidation behaviour of extra-fine PK, groundwater inputs, and a lack of input data to adequately characterize the physical and chemical characteristics of different PK sources).⁴⁶

For these reasons, the **Review Board concludes that Diavik has not done enough to demonstrate that adverse impacts to water quality will not occur.** Updates to the modelling are necessary for Diavik to meet its burden of proof, verify its predictions, and ensure that water quality is not adversely affected. Since water is a fundamental driver of the ecosystem, preventing adverse impacts to water quality is necessary to ensure that impacts to fish, wildlife, and cultural use of Lac de Gras do not occur.

5.3 A suite of measures is required to mitigate the project impacts

The Review Board has considered Project impacts holistically⁴⁷ and decided that an interconnected suite of measures is required to prevent significant adverse impacts on cultural use. These measures will protect both the biophysical and cultural aspects of the environment. In designing this suite of measures, the Review Board considered all the mitigations that intervenors and Diavik proposed. The Review Board notes that all but one intervenor indicated that the Project should be approved, subject to measures.⁴⁸

The Review Board concludes that many of the potential impacts of the Project are related to the way Indigenous people view and experience change on the landscape. Continued cultural use of an area depends on water, fish, and wildlife being safe and healthy, and on Indigenous people having the knowledge and trust that this is so.

The Review Board has set out a suite of measures, described in the following chapter, that will:

- reduce risk of (and uncertainty about) adverse impacts on water, fish, and wildlife.
- build Indigenous groups' confidence and trust the Project will not lead to adverse impacts on the environment (to reduce impacts on cultural use).

⁴⁶ See section 3.1.3 for specific details

⁴⁷ See the beginning of chapter 3 for details.

⁴⁸ For the Deninu Kue First Nation, risks and uncertainties associated with this Project were great enough that it concluded that the Project should not be approved (PR#184).

Taken together, and working toward these objectives, the Review Board is confident that the proposed measures will prevent significant impacts from this project. The Review Board is of the opinion that concerns related to significant impacts raised by intervenors will be addressed by the suite of measures prescribed by the Review Board. In the Review Board's view, other specific concerns raised by intervenors, including Deninu Kue First Nation's reasons for not supporting the Project, can be adequately addressed through the regulatory process.⁴⁹

5.4 The Bathurst caribou herd is under threat, but the Project is not likely to make this problem worse

Pre-existing cumulative impacts have already affected the Bathurst caribou herd significantly. Indigenous intervenors and the Government of the Northwest Territories agree that the Bathurst caribou herd has declined in what the Government of the Northwest Territories described as a "...very spectacular fall..." from approximately 470 000 in 1986, to 350 000 individuals when Diavik started the mine, to only 8 200 last year (PR#168 p172). The herd population has declined by approximately 96% (PR#115 p11).⁵⁰ Intervenors told the Review Board how this has affected Indigenous people who rely on caribou, and said that even small changes are unacceptable (PR#109 p7; PR#121 p5; PR#168 p255).⁵¹

The Review Board accepts Diavik's evidence that the Project is entirely on the footprint of the existing mine. Diavik asserts that this project will not lead to an extension of mine life and will not affect any additional caribou habitat. Diavik stated that its predicted changes to water quality are too small to pose a risk to caribou (PR#53 p139). The Government of the Northwest Territories agreed that if water quality concerns were addressed satisfactorily, it is unlikely that there will be adverse impacts on caribou from the Project (PR#187 p10). The Environmental Monitoring Advisory Board identified possible physical risks to caribou before or during pit filling, or in spring if water in pits melts earlier than the rest of Lac de Gras (PR#107 p21). Diavik identified ways it keeps caribou out of harm's way during operations, including monitoring and deterrence (see section 4.5 for more detail).

⁴⁹ This includes specific concerns about updated conceptual site models and Aquatic Effects Monitoring Program benchmarks for total dissolved solids, and more evidence to support that fish will only use the top 40 meters.

⁵⁰ See section 3.3.1.

⁵¹ The Review Board notes that the spatial extent of the pre-existing cultural cumulative impacts, described in section 5.1.4, includes the communities and traditional territories of the groups that experience them. The pre-existing cumulative impacts on caribou, described in section 5.4, are also part of these cultural impacts, due to the cultural importance of caribou and harvesting activities. The reduced range of the Bathurst herd expands the spatial extent of the cultural impact to include places where Indigenous people can no longer harvest caribou traditionally. This includes Indigenous residents of communities further from Lac de Gras than the originally identified "diamond mining communities".

The Review Board agrees that great caution is appropriate given current caribou numbers. The Project is a very small portion of the activities at the Diavik mine site, entirely within existing disturbance. As described in section 5.5, it is also possible that the Project may lead to a better closure option for the PK containment facility, which could pose on-going risks to caribou after closure.

The Review Board has recommended mitigations that reduce the likelihood and significance of impacts on water quality. These mitigations further reduce the possibility of the Project affecting caribou distribution (from avoidance due to sensory disturbance) or causing health impacts (from caribou drinking harmful water). With these mitigations in place, the Review Board concludes that this project, which is primarily about water and entirely within an industrialized footprint, is unlikely to cause adverse impacts on caribou. It is therefore also unlikely to contribute to cumulative significant adverse impacts on caribou.

The Review Board encourages the federal and territorial governments to take careful notice of the degree of concern expressed by Indigenous intervenors about the current cumulative effects of human activities and climate change on Bathurst caribou numbers. Indigenous peoples who traditionally rely on caribou, and whose cultural identity is partly based on the relationship with caribou, expressed alarm to the Review Board about the population trend and state of the herd. The well-being of Indigenous peoples and their ability to exercise their traditional right to harvest caribou are at risk. Herd recovery is very important to intervenors, as are appropriate management actions.

5.5 The Project may lead to environmental benefits for closure of the processed kimberlite containment facility

The Review Board notes that the Project offers the potential for some environmental benefits. For example, Tłı̄ch̄q Elders noted that keeping the height of the PK containment facility lower might also help to reduce visual disturbances to caribou (PR#185 p5).⁵² Currently, extra-fine PK on the surface of the PK containment facility poses challenges for closure of the PK containment facility. Diavik argues that the Project creates the potential for safe, environmentally sound long-term storage of this extra-fine PK, which may reduce risks to caribou after closure. If this project does prove that storing PK in pit(s) and underground is a better long-term option than storing PK on the surface, it may help meet mine closure

⁵² Some of the other benefits that Diavik described include less long-term porewater release to Lac de Gras via surface runoff, and early closure of the PK containment facility (PR#163).. See section 1.2 for more detail.

objectives at Diavik.⁵³ The Project may also provide a viable option for Diavik to remove and safely store extra-fine PK currently stored in the PK containment facility.⁵⁴ The Review Board encourages Diavik to investigate the feasibility of moving extra-fine PK off the containment facility.

⁵³ if so, it may offer a useful option for PK containment at other mines in the future.

⁵⁴ The extra-fine PK on the surface of the PK containment facility is also referred to as “slimes” by Diavik in its Summary Impact Statement (PR#53 PDF pp51, 181, 216-218).

Chapter 6: Mitigation and follow-up

6 Mitigation and follow-up

Based on all the evidence on the public record for this environmental assessment, and the analysis presented in chapter 5, the Review Board concludes that this Project is likely to result in a significant adverse impact on the cultural use of Lac de Gras. The Review Board has determined that a suite of measures is required to prevent or reduce the likelihood of these impacts. Most of the measures proposed by the Review Board build on recommendations from Diavik and intervenors. The Review Board commends Diavik for recommending measures that the Review Board was able to build on.

These measures are not intended to act in isolation to minimize or prevent individual impacts. They are intended for systematic implementation, to help minimize the likelihood of and mitigate impacts on water, fish, wildlife, and cultural use. Acting in combination, these measures will achieve two important goals that are necessary to prevent or minimize significant Project impacts. They will:

1. **prevent or reduce the risk of impacts on water**, which will both maintain water quality in Lac de Gras and help to prevent adverse impacts on other parts of the environment including fish, wildlife, and cultural use.
2. **build confidence in the Project**, to increase understanding and trust, and reduce the likelihood of adverse impacts on cultural use of Lac de Gras.

Figure 21 is a visual representation of the suite of measures that the Review Board recommends.

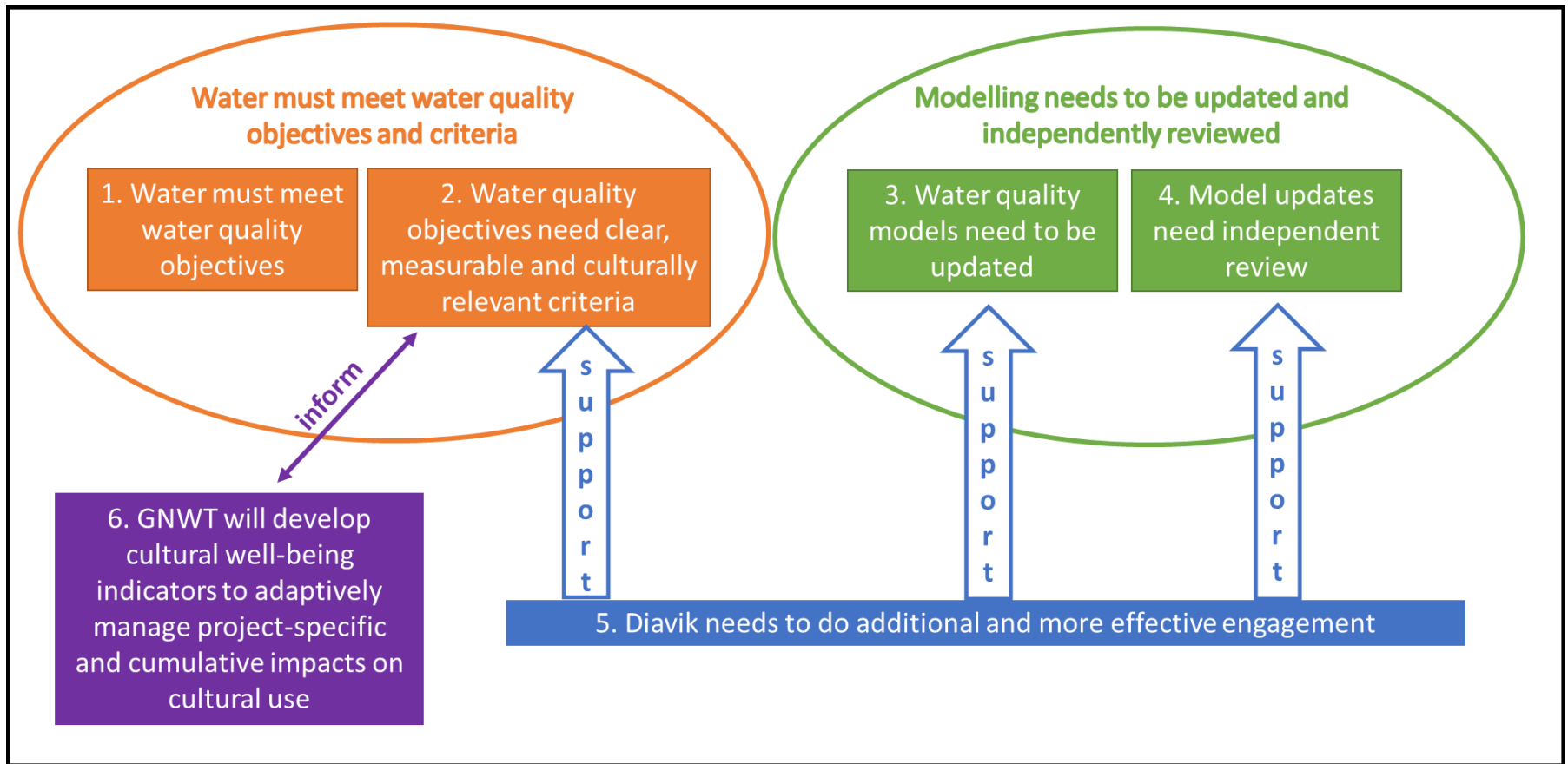


Figure 21: The holistic suite of measures to protect water, fish, wildlife and cultural use, and build confidence to reduce cultural impacts

Water must meet water quality objectives which include measurable criteria

Indigenous intervenors need to know that Traditional Knowledge and traditional ways of knowing have been included in the determination that the Project area is safe, rather than relying only on scientifically derived numerical standards for water quality.

The Review Board determines that, to prevent unacceptable changes to Lac de Gras, water in the pit lake(s) must meet clearly defined water quality objectives, so that the water remains safe and good. Defining levels of change that are acceptable and meaningful to communities will allow Diavik and regulators to demonstrate to communities that the water remains safe for aquatic life, people, and wildlife, and suitable for cultural use. This will reduce the likelihood of significant adverse impacts on the cultural use of Lac de Gras. Water quality objectives must be tied to key Project decision points; if the objectives cannot be met, then the Project cannot proceed. The Review Board is also concerned that Diavik has not yet presented options for adaptively managing impacts once processed kimberlite (PK) is put into the pit(s) and underground. Therefore, developing options for adaptive management is required before PK goes into the pit(s) and underground (see Appendix C).

Defining clear, measurable criteria for water quality objectives is necessary so that Indigenous people know that Lac de Gras will be safe for cultural use. This will reduce avoidance of Lac de Gras in the future as a place for cultural pursuits. The collaborative development, use, and monitoring of these criteria will allow change to be measured in ways that are meaningful and understandable for communities and cultural users.

The Review Board developed the objectives in Measure 1 based on evidence from intervenors. The Review Board developed Measure 2 by building on Diavik's recommendation for Traditional Knowledge reconnection criteria (see section 4.1).

Measure 1: Diavik will meet water quality objectives at closure

To prevent significant adverse impacts on the cultural use of Lac de Gras, Diavik will design and operate the Project so that water in at least the top 40 meters of the pit lake(s) at closure and post-closure meets the following objectives:

Water quality objective 1: safe for people⁵⁵, aquatic life, and wildlife

Water quality objective 2: suitable for cultural use (see Measure 2)

Diavik will not put processed kimberlite into the pits until it demonstrates through updated modelling (see Measure 3a) that water in the pit lake(s) will meet these objectives.

Diavik will neither partially nor fully reconnect⁵⁶ the pit lake(s) to Lac de Gras until it demonstrates through updated modelling (see Measure 3c) and monitoring that water in the pit lake(s) will meet these objectives.

Diavik will update all relevant monitoring plans and management programs⁵⁷ to ensure these objectives are met, including updating the Aquatic Effects Monitoring Program Response Framework to include action levels, triggers for response and potential mitigation options. The Wek'èezhì Land and Water Board will review and approve any updates to plans required under the water licence and land use permit before processed kimberlite is put into the pit(s) and underground.

⁵⁵ water quality meets the *Canadian Drinking Water Quality Guidelines*

⁵⁶ The Review Board defined partial and full reconnection in section 1.3.

⁵⁷ under the water licence, land use permit, and the *Environmental Agreement*

Measure 2: Diavik will work collaboratively with Indigenous groups to develop criteria for determining water in the pit lake(s) is acceptable for cultural use

Diavik will develop clear, measurable, and meaningful criteria to determine if water is suitable for cultural use (see Measure 1, water quality objective 2). Diavik will work directly, in a culturally appropriate manner, with Traditional Knowledge holders and other experts identified by Indigenous intervenors⁵⁸ in developing these criteria. The Wek'èezhìi Land and Water Board will review and approve these criteria before Diavik puts processed kimberlite into the pit(s) and underground.

Diavik will support involvement of communities represented by the Indigenous intervenors to develop and implement long-term monitoring, informed by Traditional Knowledge, of the pit lake(s) using the criteria developed above. These programs will be in place before reconnection occurs.

⁵⁸ "intervenors" refers intervenors to this environmental assessment process.

Modelling needs to be updated and independently reviewed

The Review Board has determined that the preliminary nature of Diavik’s water quality modelling contributes to uncertainty about impacts, and feeds into the lack of confidence that Indigenous people feel about future cultural use of the area. Intervenors recommended updated modelling and said that model updates must be subject to independent review.

The Review Board finds that updated modelling subject to independent review is required to reduce the likelihood of significant adverse impacts on cultural use of Lac de Gras by:

- improving water modelling predictions,
- adding certainty that changes to water quality will be small,
- increasing confidence and trust in the process and the results, and
- giving Diavik and intervenors better information at key decision points.

An important aspect of the updated modelling is the timing of the updates. The Review Board agrees with Diavik that the modelling needs to be updated at key stages, and that model results should be used to inform the next steps. The most important update is prior to depositing any PK in the pit(s) and underground, because at that point if the modelling results are not good, impacts can still be prevented by not proceeding with the Project.

While Diavik recommended independent review of updated modelling results, intervenors proposed more prescriptive versions of independent review, including having a panel of experts and having that panel involved through all stages of modelling. The Review Board agrees that relevant areas of expertise, in a panel, are required. The Review Board also agrees that the panel should be involved in all stages of updating the modelling, both to reduce uncertainty and to increase Indigenous people’s confidence in the predictions, thus reducing concern. The panel will provide the Wek’èezhìi Land and Water Board with information to assist in making decisions on putting PK in the pits and reconnection.

The following measures build on commitments and recommendations from Diavik (commitment 28 and recommended measures 2 and 3 from PR#193) and intervenors.

Measure 3: Diavik will update modelling periodically to show whether water in the pits and Lac de Gras will meet the water quality objectives

To mitigate significant adverse impacts on the cultural use of Lac de Gras, Diavik will update its modelling to show whether water will meet water quality objectives defined in Measure 1 at the following stages of the Project:

- a) **Before depositing** processed kimberlite into the pit(s) and underground
- b) **Before filling the pit(s)** with water from Lac de Gras: This update will include the detailed conditions of the processed kimberlite in the pit(s) and the planned pore water layer depth.
- c) **Before reconnecting (partially or fully)** the pit lake(s) containing processed kimberlite to Lac de Gras: This update to the model will include real data from monitoring of the pit lake(s) to calibrate the model predictions.

These updates will address deficiencies identified by model review and include all available and relevant input data, to better understand (at minimum):

- i. consolidation and behaviour of fine processed kimberlite and extra-fine processed kimberlite in the pit lake(s)
- ii. water quality in the pit lake(s)
- iii. long-term stability of meromixis in the pit lake(s)
- iv. spatial extent of effects on water quality in Lac de Gras

Diavik will update all relevant monitoring plans and management programs under the supervision and authority of the Wek'èezhì Land and Water Board to ensure they are collecting all necessary input information for updated modelling.

The Wek'èezhì Land and Water Board will review and approve all plans for updated modelling.

Measure 4: Diavik will establish an independent review panel for water quality modelling

To prevent significant adverse impacts on cultural use of Lac de Gras, Diavik will establish and fund an independent review panel for the updated modelling described in Measure 3.

Diavik will develop the terms of reference for this panel for approval by the Wek'èezhì Land and Water Board. The Wek'èezhì Land and Water Board will engage Diavik and intervenors to identify and select panel members with appropriate expertise in:

- hydrodynamic water quality modelling, and
- extra-fine processed kimberlite or clay hydrodynamics.

The terms of reference and panel member selection will be approved in a timeframe that leaves adequate time for it to carry out the tasks below.

For each modelling update defined in Measure 3, the panel will review and make recommendations on:

- a) model selection and design,
- b) model input data, assumptions, and processes,
- c) monitoring requirements for informing the modelling process, and
- d) model results.

The panel will provide reports to the Wek'èezhì Land and Water Board for inclusion on its public registry. Diavik will report to the Wek'èezhì Land and Water Board and communities about how it responded to panel recommendations. If Diavik does not accept, or modifies, panel recommendations, it will explain why and provide reasons. The Wek'èezhì Land and Water Board will consider panel reports and Diavik's responses when reviewing and approving any plans for updated modelling.

Diavik needs to conduct additional and more effective engagement

The Review Board has determined that Diavik’s engagement has been insufficient to communicate the potential impacts of the Project on the environment and to understand how the Project might affect Indigenous people’s cultural use of Lac de Gras.

Engagement for this Project must be project-specific and must include all potentially affected Indigenous communities. Engagement should also be used to improve monitoring and adaptive management of impacts on water, fish, and wildlife (see Appendix C). Local communities and Traditional Knowledge holders have valuable expertise in environmental management, wildlife behaviour, and the environment of the Lac de Gras area. This is necessary so that Indigenous people can be confident that their long-term cultural use of the area and Lac de Gras will not be adversely affected by the Project.

Additional and more effective engagement with potentially affected Indigenous communities is necessary to build public confidence in the Project and reduce the likelihood of cultural impacts. The Review Board is of the opinion this is engagement is integral to carrying out measures 2 to 4.

Measure 5: Diavik will conduct additional and more effective engagement with potentially affected Indigenous communities

Diavik will conduct additional and more effective engagement with potentially affected Indigenous communities⁵⁹ to accomplish Measures 2, 3, and 4 and prevent significant adverse impacts on cultural use of Lac de Gras from this Project. Diavik’s engagement for this Project will:

- a) include all potentially affected Indigenous communities,
- b) ensure potentially affected Indigenous communities’ access to meaningful and plain language results from monitoring programs,
- c) include Traditional Knowledge in monitoring plans and management programs,
- d) enhance opportunities for potentially affected Indigenous communities to provide feedback directly to Diavik about the Project, its potential impacts, and mitigation options, and,
- e) include reporting back to potentially affected Indigenous communities on how Diavik acted (or reasons for not acting) in response to feedback from communities.

As part of its engagement for this Project, Diavik will collaborate with each potentially affected Indigenous community individually to develop meaningful engagement protocols that are culturally appropriate to each group. At a minimum, each of these engagement protocols will describe:

- i. how often Diavik will engage to discuss the Project,
- ii. an updated contact list for each potentially affected Indigenous community, relevant to specific purposes for engagement (listing contacts such as community government staff, technical consultants, Traditional Knowledge advisors, community leadership), and,
- iii. preferred engagement methods, frequency, and triggers.

Diavik will submit an updated engagement plan incorporating this measure for review and approval by the Wek’èezhìi Land and Water Board with sufficient time for the engagement to inform Measures 2-4.

⁵⁹ In this measure, the Review Board uses the term “potentially affected Indigenous communities” to mean communities represented by Indigenous intervenors in this environmental assessment and the Kitikmeot Inuit Association.

Government of the Northwest Territories needs to manage project-specific and cumulative impacts on cultural well-being

In this environmental assessment the Review Board has heard about direct and indirect project impacts on cultural and overall well-being (see section 5.1.4), adding to existing cumulative impacts on the cultural environment. The Review Board has set out the following measure to help mitigate the Project’s contributions to cumulative impacts on cultural well-being. The measure recommends an improved engagement and adaptive management process by the Government of the Northwest Territories to measure and respond to adverse cultural well-being impacts from the Project (see Appendix C).

The Government of the Northwest Territories has the mandate and responsibility to monitor and manage cumulative effects, including the Cumulative Impact Monitoring Program under Part 6 of the Act. Part 6 uses the same definition of “impact on the environment” as the environmental impact assessment process in Part 5, which includes “wildlife harvesting” and “any effect on the social and cultural environment”. Should the Government of the Northwest Territories accept this report of environmental assessment under subsection 130(5) of the Act, it must help to carry out the decision to the extent of its authorities.

The measure below requires the Government of the Northwest Territories to support the Indigenous intervenors to **develop cultural well-being indicators** that can be used to monitor both project-related and cumulative impacts and support adaptive management. It is the Review Board’s view that communities or Indigenous intervenors should take the lead in defining their cultural well-being, factors which affect them, and the indicators that will be applied to contribute to more effective monitoring and adaptive management. The measure below is consistent with the 2015 Northwest Territories Environmental Audit⁶⁰ recommendation (#4) that:

[The Government of the Northwest Territories] should work with [the Review Board] and communities to identify indicators of community wellness and to develop monitoring programs for these indicators that can support the regulatory decision-making process.

⁶⁰ Publicly available at <https://www.enr.gov.nt.ca/en/services/nwt-environmental-audit/Past-Environmental-Audit-Reports>.

Measure 6: Adaptive management of cultural impacts

To mitigate significant cumulative adverse cultural impacts of the Project, the Government of the Northwest Territories will engage and work with Indigenous intervenors, and the communities they represent, to **monitor and adaptively manage** adverse impacts on cultural well-being from the Project, in combination with the Diavik Mine and other diamond mining projects.

The Government of the Northwest Territories will support the Indigenous intervenors to **develop community-specific cultural well-being indicators** to monitor and evaluate cultural well-being impacts associated with the Project, in combination with other diamond mining projects.

The Government of the Northwest Territories will meet with potentially affected Indigenous communities⁶¹ within one year of Ministerial approval of this Report of Environmental Assessment, and annually afterwards (or as agreed to by the Indigenous Intervenors), to:

- a) prioritize cultural well-being impacts related to the Project and other diamond mines, as identified by communities and by the Government of the Northwest Territories,
- b) evaluate the effectiveness of Government of the Northwest Territories programs or other programs to address these identified impacts, and
- c) discuss improvements to existing Government of the Northwest Territories programs to mitigate identified impacts, new Government of Northwest Territories programs, or support for new community-based programs.

The Government of the Northwest Territories will **submit an annual progress report** on the three items above to the Indigenous intervenors,⁶² describing its engagement on and adaptive management of cultural impacts, and the Government of the Northwest Territories' plans to help address identified impacts.

Wherever feasible, the Government of the Northwest Territories should coordinate and collaborate with Diavik and the other diamond mining operators in the Northwest Territories when carrying out this measure.

Outcomes of this measure should be used, where relevant and available, to inform work on other measures.

Suggestion 1: The Government of the Northwest Territories should coordinate cultural well-being and socio-economic well-being requirements of the Project and the Ekati Jay Project

Implementation of Measure 6 should be coordinated with the Government of the Northwest Territories' work required by Measure 8-1 (and the accompanying suggestion), from the Ekati Jay Project environmental assessment which addressed cumulative socio-economic impacts, health, and well-being in relation to diamond mining. The Government of the Northwest Territories should use a similar adaptive management framework to that set out in Measure 8-1 from the Ekati Jay Project environmental assessment.

Suggestion 2: The Government of the Northwest Territories should support improved community-based monitoring of cumulative impacts on cultural well-being

As cultural well-being indicators are developed, the Government of the Northwest Territories should support long-term community-based monitoring of the cultural well-being indicators developed under Measure 6 to inform future environmental assessment processes and adaptive management. This could be accomplished in part by expanded programming by the Cumulative Impacts Monitoring Program.

⁶¹ In this measure, the Review Board uses the term “potentially affected Indigenous communities” to mean communities represented by Indigenous intervenors in this environmental assessment and the Kitikmeot Inuit Association.

⁶² “intervenors” refers intervenors to this environmental assessment process

Diavik should examine the feasibility of moving extra-fine processed kimberlite off the containment facility

The Review Board understands that Diavik has not proposed to remove extra-fine PK off the PK containment facility. Diavik has indicated it intends to do a feasibility study of moving the extra-fine PK from the surface of the containment facility into the pit(s) and underground. However, this was neither a commitment nor a recommended measure from Diavik.

Diavik identified potential benefits of removing extra-fine PK from the PK containment facility (see section 5.5). One of these benefits is improved long-term surface conditions of the PK containment facility, reducing the risk of caribou and other wildlife getting stuck in the extra-fine PK. The Review Board is of the opinion that, given the state of the caribou herd and the intimate relationship between caribou and culture, any and all actions that could help caribou should be examined.

Suggestion 3: Diavik should conduct a feasibility study of moving extra-fine processed kimberlite off the containment facility

As soon as possible, Diavik should conduct a feasibility study of moving extra-fine processed kimberlite off the surface of the processed kimberlite containment facility. The results of this study should be incorporated into decision making about closure options for the processed kimberlite containment facility.

Diavik, government, and regulators will report on implementation of environmental assessment measures

The Review Board has prescribed measures in this Report of Environmental Assessment to mitigate significant adverse impacts. Diavik, governments, and regulatory authorities are responsible under the Act for implementing or ensuring the implementation of approved measures.

To support effective implementation of the measures, the Review Board has the authority to recommend additional measures or a follow-up program. A **follow-up program under subsection 111(1) of the Act**⁶³ is a program for evaluating:

- a) the soundness of an environmental assessment or environmental impact review of a proposal for a development; and
- b) the effectiveness of the mitigative or remedial measures imposed as conditions of approval of the proposal.

Most of the ingredients of a robust follow-up program for the broader Diavik Mine are already in place through mechanisms such as the Aquatic Effects Monitoring Program and Response Framework (for adaptive management) under the water licence.⁶⁴

Additional follow-up is required to **confirm the implementation and effectiveness of measures from this environmental assessment**. Diavik, government, and regulatory authorities must communicate their actions (including any adaptive management) to implement the environmental assessment measures. This applies throughout all phases of the Project, including post-closure (where applicable). Reporting should be concise and use plain language.

The Review Board acknowledges that specific approaches to reporting may differ from year to year or between government, Diavik, the Wek'èezhìi Land and Water Board, and other regulators. In particular, the Wek'èezhìi Land and Water Board explains in its Reasons for Decision documents how it incorporates environmental assessment measures into licence conditions, or otherwise takes action to implement the measures. The follow-up requirements

⁶³ The requirements from recent environmental assessments for similar follow-up reporting and monitoring were included in measures. In this environmental assessment, the Review Board is instead formalizing the follow-up program under subsection 111(1) of the Act.

⁶⁴ Follow-up programs were required under the *Canadian Environmental Assessment Act* when the Diavik Diamonds Project was originally approved and were detailed in the *Comprehensive Study Report* (PR#29 pp227-238). Implementation and oversight of the follow-up programs from the *Comprehensive Study Report* is either through regulatory instruments (such as a water licence or *Fisheries Act authorization*) or the *Environmental Agreement* or *Socio-Economic Monitoring Agreement* (for subjects that had no regulatory process).

below allow the Wek'èezhìi Land and Water Board to continue to use its Reasons for Decision documents as the basis to communicate the implementation of measures within its jurisdiction.

The Review Board will publish the information from Diavik, government, and regulators on the Review Board's registry so it is accessible to the parties and the public and may use the information to evaluate the effectiveness of the environmental assessment measures.

Follow-up Program: Reporting on implementation of environmental assessment measures

To demonstrate how measures are being implemented and to help evaluate their effectiveness, Diavik, government, and any regulatory authority that is wholly or partly responsible for implementation of any measure in this Report of Environmental Assessment will communicate to the Review Board on the implementation of measures.

Part A: Diavik and governments will provide annual reports to the Review Board beginning one year after the date of the final approval of this *Report of Environmental Assessment*, and annually afterwards. These reports will:

- i. describe the actions, including actions carried out through adaptive management, being undertaken (by the organization submitting the report) to implement the measures; and
- ii. based on available information, comment on how effective these actions have been in reducing or avoiding impacts on the environment (for example, considering the results of monitoring programs or adaptive management frameworks) from the Project.

Part B: Regulatory authorities will report as described in Part A, above, **or** will clearly and explicitly include details about implementation of environmental assessment measures in Reasons for Decision documents whenever a regulatory decision (including future changes to a licence, permit, or management plan) relates to a Project environmental assessment measure. If relying on Reasons for Decision, regulatory authorities will provide a summary of how they are implementing each measure directly to the Review Board in a reasonable time after the Reasons for Decision are published.

Chapter 7: Conclusion

7 Conclusion

Based on the evidence on the public record, the Review Board finds that the Project is likely to result in a significant adverse impact on cultural use of the Lac de Gras area. The Review Board has recommended a suite of measures to prevent or mitigate these impacts so they are no longer significant. Specifically, these measures will:

- ensure that water in the pit lake(s) meets new water quality objectives
- collaboratively develop criteria for judging if water will be good for cultural use
- update its water quality modelling
- establish an independent review panel to improve updated modelling
- conduct additional and more effective engagement with potentially affected Indigenous communities
- develop community-specific indicators of well-being and adaptively manage project-specific and cumulative impacts on cultural use of Lac de Gras

The Review Board requires a follow-up program, under subsection 111(1) of the *Mackenzie Valley Resource Management Act*, including annual reporting from Diavik, the GNWT, and regulatory authorities on the implementation of the measures.

The Review Board expects that carrying out these measures will keep water clean, let Indigenous groups bring a cultural perspective into judging water quality, and ensure that independent expertise leads to more reliable water quality models. Implementing these measures will also engage and involve Indigenous groups more meaningfully in the Project and improve the Government of the Northwest Territories' support of cultural well-being of Indigenous groups affected by diamond mines.

The measures, in combination with Diavik's commitments, will reduce the risk of (and uncertainty about) adverse impacts on water, fish, and wildlife. They also will build Indigenous groups' confidence and trust that the Project will not lead to adverse impacts on the environment. In combination they will prevent impacts on cultural use of the Lac de Gras area. The Review Board expects that the required measures will also help to reduce the concerns of Indigenous groups that have used Lac de Gras for many generations, so they can continue to use the area for many generations to come.

Appendix A – Public Registry Index⁶⁵

PR #	Title	Stage Name	Originator	Received
1	Notice of Referral to EA	Assessment/review start-up	Review Board	2019-02-26
2	Reasons for Decision for Referral to EA	Assessment/review start-up	Review Board	2019-02-26
3	Notice of intention to coordinate EA and Licensing processes	Assessment/review start-up	Review Board	2019-02-26
4	Draft EA Scoping Document and Workplan	Assessment/review start-up	Review Board	2019-02-26
5	Diavik's Water License W2015L2-0001 Amendment Request	Preliminary screening	Developer	2019-02-26
6	Letter from Review Board to Distribution List re EA Notification	Assessment/review start-up	Review Board	2019-02-26
7	Diavik's Sensitivity Analysis Results	Preliminary screening	Developer	2019-02-26
8	Interim Closure and Reclamation Plan version 3.2 Part 1	Preliminary screening	Developer	2019-03-29
8	Interim Closure and Reclamation Plan v3.2 Part 2	Preliminary Screening	Developer	2019-03-29
9	Information Request for Diavik Water License (W2015L2-0001) Amendment Application for Processed Kimberlite to Mine Workings	Preliminary screening	Other	2019-02-26
10	Diavik's Response to WLWB Information Request for Diavik Water License (W2015L2-0001) Amendment Application for Processed Kimberlite to Mine Workings	Preliminary screening	Developer	2019-02-26
11	Diavik's Response to WLWB Information Request re Water License W2015L2-0001 Amendment Request for the Deposition of Processed Kimberlite in Mine Workings	Preliminary screening	Developer	2019-02-26
12	Diavik's Sensitivity Analysis Results - Report from Technical Session	Preliminary screening	Developer	2019-02-26
13	Diavik's presentation from the WLWB's Technical Session on the water license amendment to deposit process kimberlite into mine workings	Preliminary screening	Developer	2019-02-26

⁶⁵ All public registry documents can be found online: <http://reviewboard.ca/registry/ea1819-01>

14	Information Requests resulting from the WLWB Technical Session on Diavik's Water License (W2015L2-0001) Amendment Application for Processed Kimberlite to Mine Workings	Preliminary screening	Other	2019-02-26
15	Environment and Climate Change Canada's Response to the IR's for Diavik's amendment application from the WLWB Technical Sessions	Preliminary screening	Parties/Public	2019-02-26
16	Diavik's response to WLWB's information requests regarding the W2015L2-0001 amendment request	Preliminary screening	Developer	2019-02-26
17	DFO response to information requests from WLWB technical session on Diavik's amendment application for W2015L2-0001	Preliminary screening	Parties/Public	2019-02-26
18	EMAB's response to information requests from technical session on Diavik's water license amendment application (WL2015L2-0001)	Preliminary screening	Parties/Public	2019-02-26
19	Response from GNWT-ENR to information requests results from Diavik's technical session for water license amendment W2015L2-0001	Preliminary screening	Parties/Public	2019-02-26
20	Diavik's response to DFO regarding information requests from technical session	Preliminary screening	Developer	2019-02-26
26	Review slides for scoping meeting	Scoping	Review Board	2019-03-15
21	Notice of Proceeding - scoping meeting in Yellowknife	Scoping	Review Board	2019-03-05
22	ORS summary table of party information requests and developer responses re: amendment application	Preliminary screening	Review Board	2019-03-12
23	ORS summary table of party information requests and developer responses re: WLWB's Aug. 31 follow-up information requests	Preliminary screening	Review Board	2019-03-12
24	Scoping Meeting Agenda - Diavik EA1819-01	Scoping	Review Board	2019-03-14
25	Developer's Presentation - Scoping Session	Scoping	Developer	2019-03-14
27	Developers Presentation - REVISED - Scoping Session	Scoping	Developer	2019-03-18
28	GNWT and GoC Notice of Initiation of Aboriginal Consultation on EA1819-01	Assessment/review start-up	Federal or responsible ministers	2019-03-19

29	CEAA's Comprehensive Study Report on the Diavik Diamonds Project	Preliminary screening	Other	2019-02-26
30	Letter to Environment Canada from the Review Board re SARA species	Assessment/review start-up	Review Board	2019-03-19
31	Participant Funding Guide	Assessment/review start-up	Other	2019-03-20
32	Participant Funding Application Form	Assessment/review start-up	Other	2019-03-20
33	Updated Notice to Parties re Participant Funding	Assessment/review start-up	Review Board	2019-04-05
34	Scoping Meeting Summary	Scoping	Review Board	2019-03-21
35	GNWT Notice of Initiation of Aboriginal Consultation - letter to Akaitcho Pre-screening Board	Assessment/review start-up	Parties/Public	2019-03-22
36	Tlicho Government letter to the Review Board - Re: the MVEIRB and WLWB review process	Scoping	Parties/Public	2019-03-22
8	Interim Closure and Reclamation Plan v3.2 Part 3	Preliminary Screening	Developer	2019-03-29
8	Interim Closure and Reclamation Plan v3.2 Part 4	Preliminary Screening	Developer	2019-03-29
8	Interim Closure and Reclamation Plan v3.2 Part 5	Preliminary Screening	Developer	2019-03-29
8	Interim Closure and Reclamation Plan v3.2 Part 6	Preliminary Screening	Developer	2019-03-29
8	Interim Closure and Reclamation Plan v3.2 Part 7	Preliminary Screening	Developer	2019-03-29
37	Scoping - Online Review System summary	Scoping	Review Board	2019-04-02
38	Participant funding extension request from Fort Resolution Metis Council	Assessment/review start-up	Parties/Public	2019-04-05
39	Note to file- Review Board staff meeting with Diavik Staff	Scoping	Review Board	2019-04-09
40	Scope of Environmental Assessment and Reasons for Decision	Scoping	Review Board	2019-04-18
41	Notice of Proceeding - information requests	Information Requests	Review Board	2019-04-18
42	Updated Workplan	Terms of Reference and Workplan	Review Board	2019-04-18
43	Review Board Information Requests to Parties	Information Requests	Review Board	2019-04-26
50	Participant Funding Announcement from CIRNAC	Assessment/review start-up	Parties/Public	2019-05-10
45	Note to file- Review Board staff meeting with Diavik staff	Information Requests	Review Board	2019-05-02
46	Letter from Diavik to the Review Board re: scope and summary impact statement	Scoping	Developer	2019-05-02

47	Notice of Proceeding - clarification to scope and workplan update	Scoping	Review Board	2019-05-03
48	ECCC letter to Review Board Re: Species at Risk	Assessment/review start-up	Review Board	2019-05-09
49	Note to file - removal of LKDFN initial response to IRs	Information Requests	Review Board	2019-05-10
51	Updated Participant Funding Letter from CIRNAC	Assessment/review start-up	Parties/Public	2019-05-13
52	Notice of Proceeding - clarification on scope of assessment	Scoping	Review Board	2019-05-15
53	Summary Impact Statement	Information requests	Developer	2019-05-17
54	Reasons for Decision on clarification on scope of assessment	Scoping	Review Board	2019-05-21
55	IR Extension Request from LKDFN	Information requests	Parties/Public	2019-05-21
56	GNWT letter to MVEIRB Re: participation and status of GNWT departments in EA	Assessment/review start-up	Parties/Public	2019-05-24
57	MVEIRB letter to GNWT Re: participation in EA	Assessment/review start-up	Review Board	2019-05-24
58	MVEIRB letter to ECCC Re: participation in EA	Assessment/review start-up	Review Board	2019-05-24
59	MVEIRB letter to DFO Re: participation in EA	Assessment/review start-up	Review Board	2019-05-24
60	Notice of Proceeding - information request deadline extension	Information requests	Review Board	2019-05-28
61	GNWT response to MVEIRB letter Re: participation in EA	Assessment/review start-up	Parties/Public	2019-05-30
62	YKDFN Extension Request	Information Requests	Parties/Public	2019-06-06
63	Letter from the Review Board to YKDFN in response to extension request	Information Requests	Review Board	2019-06-18
64	Letter from Diavik Re: request for an update on the MVEIRB-WLWB Coordinated Review	Assessment/review start-up	Developer	2019-06-19
65	Scoping Clarification - Online Review System summary	Scoping	Review Board	2019-05-14
66	Note to file- Meeting report reminder	Information Requests	Review Board	2019-06-28
67	Workplan - June 28, 2019	Terms of Reference and workplans	Review Board	2019-06-28
68	Notice of Proceeding - Hearing Phase	Public Hearings	Review Board	2019-06-28
69	YKDFN response to Review Board IRs	Information requests	Parties/Public	2019-07-03
70	EMAB response to Review Board IR	Information requests	Parties/Public	2019-07-04
71	TG response to Review Board IRs	Information requests	Parties/Public	2019-07-04

72	LKDFN response to Review Board IRs	Information requests	Parties/Public	2019-07-04
74	NWT Metis Nation response to Review Board IRs	Information requests	Parties/Public	2019-07-04
73	GNWT response to Review Board IR	Information requests	Parties/Public	2019-07-04
75	DKFN response to Review Board IRs	Information requests	Parties/Public	2019-07-04
76	NSMA response to Review Board IRs	Information requests	Parties/Public	2019-07-04
77	FRMC response to Review Board IRs	Information requests	Parties/Public	2019-07-04
79	Notice of Proceeding - tips for preparing interventions	Technical reports	Review Board	2019-07-05
80	Pre-hearing Conference Agenda	Technical reports	Review Board	2019-07-05
81	Notice of Proceeding - site visit opportunity	Public Hearings	Review Board	2019-07-05
78	Federal Government response to Review Board IRs	Information requests	Parties/Public	2019-07-04
82	Akaiitcho IMA Office response to Review Board IRs	Information requests	Parties/Public	2019-07-08
83	Information Requests - ORS Summary	Information requests	Review Board	2019-07-04
87	MVEIRB Pre-hearing conference presentation	Public hearings	Review Board	2019-07-09
88	Revised call-in info for Pre-hearing conference	Public hearings	Review Board	2019-07-09
84	Attachments to the ORS table for Information Requests - 1 of 3	Information requests	Review Board	2019-07-04
85	Attachments to the ORS table for Information Requests - 2 of 3	Information requests	Review Board	2019-07-04
86	Attachments to the ORS table for Information Requests - 3 of 3	Information requests	Review Board	2019-07-04
89	Workplan - July 10, 2019	Terms of Reference and workplans	Review Board	2019-07-10
90	Joint MVEIRB-WLWB letter in response to Diavik's letter	Assessment/review start-up	Review Board	2019-07-11
91	Pre-hearing Conference Meeting Notes	Public hearings	Review Board	2019-07-16
94	Diavik-ECCC Meeting Report	Technical reports	Developer	2019-07-19
95	Letter to Participants on Diavik Site Tour	Public Hearings	Review Board	2019-07-22
93	Review Board Letter to the Minister Re: Joe Handley participation in the public hearings	Public hearings	Review Board	2019-07-18
92	Letter from FRMC to the Review Board re: hearing locations	Public hearings	Parties/Public	2019-07-18
96	Note to file: Review Board staff meeting with Diavik	Public Hearings	Review Board	2019-07-26

97	List of interveners	Public Hearings	Review Board	2019-07-26
98	Letter from the Review Board to Diavik Re: Supplemental Information Requests	Information requests	Review Board	2019-07-26
99	FRMC Request for extension on interventions	Public Hearings	Parties/Public	2019-07-29
100	Diavik responses to supplementary information requests	Information Requests	Developer	2019-07-29
101	Notice of Proceeding- public participation in the hearing phase	Public Hearings	Review Board	2019-07-30
104	Letter from the Review Board to FRMC Re: intervention extension request	Technical reports	Review Board	2019-07-30
102	Review Board response to FRMC hearing request	Public Hearings	Review Board	2019-07-30
103	Notice of Proceeding- Supplemental information requests	Information Requests	Review Board	2019-07-30
105	Diavik-DFO Meeting Report	Technical reports	Developer	2019-07-30
106	Intervention from DKFN	Technical reports	Parties/Public	2019-08-01
107	Intervention from EMAB	Technical reports	Parties/Public	2019-08-01
109	Intervention from LKDFN	Technical reports	Parties/Public	2019-08-01
110	Intervention from DFO	Technical reports	Parties/Public	2019-08-01
112	Intervention from YKDFN	Technical reports	Parties/Public	2019-08-01
111	Intervention from ECCC	Technical reports	Parties/Public	2019-08-01
108	Attachments for Intervention from EMAB	Technical reports	Parties/Public	2019-08-01
113	Intervention from GNWT	Technical reports	Parties/Public	2019-08-01
114	Intervention from TG	Technical reports	Parties/Public	2019-08-01
115	Intervention from FRMC	Technical reports	Parties/Public	2019-08-01
116	Intervention from NWT Metis Nation	Technical reports	Parties/Public	2019-08-01
117	Pre-hearing conference follow-up meeting agenda	Public Hearings	Review Board	2019-08-02
118	Correspondence regarding late intervention submissions	Technical reports	Review Board	2019-08-02
119	NWT Treaty 8 Tribal Corporation - Akaitcho IMA Office Intervener status withdrawal	Public Hearings	Parties/Public	2019-08-06
120	Notice of Proceeding - qualifications of expert technical witnesses	Public Hearings	Review Board	2019-08-08
121	Intervention from NSMA	Technical reports	Parties/Public	2019-08-07

122	Draft Public hearing agenda	Public Hearings	Review Board	2019-08-08
123	Corrections to interventions from ECCC and YKDFN	Technical reports	Review Board	2019-08-08
124	Presentation slides for second pre-hearing conference	Public Hearings	Review Board	2019-08-08
125	Follow-up letter to interveners from second pre-hearing conference	Public Hearings	Review Board	2019-08-09
126	Meeting notes from second pre-hearing conference	Public Hearings	Review Board	2019-08-09
127	DDMI response to supplemental information request #5	Technical reports	Developer	2019-08-09
128	Tony Pearce CV submitted by Tlicho Government	Technical reports	Parties/Public	2019-08-09
129	CVs from EMAB technical experts	Technical reports	Parties/Public	2019-08-01
130	YKDFN TK Reports referenced in Intervention	Technical reports	Parties/Public	2019-08-11
131	Public Hearing agenda	Public Hearings	Review Board	2019-08-16
132	CVs for Diavik consultants	Public Hearings	Developer	2019-08-16
133	Revised public hearing agenda	Public Hearings	Review Board	2019-08-20
134	Diavik and GNWT meeting report	Public Hearings	Developer	2019-08-21
135	Notice of Proceeding - temporary closure of public record	Public Hearings	Review Board	2019-08-22
136	DDMI response to interventions	Technical reports	Developer	2019-08-22
137	Note to file- online access to PK consolidation video	Technical reports	Developer	2019-08-22
138	CV for internal consultant for the Review Board	Public Hearings	Review Board	2019-08-27
139	NSMA hearing presentation	Public Hearings	Parties/Public	2019-08-26
140	DKFN hearing presentation	Public Hearings	Parties/Public	2019-08-27
141	EMAB hearing presentation	Public Hearings	Parties/Public	2019-08-27
142	TG hearing presentation	Public hearings	Parties/Public	2019-08-27
143	TG community hearing presentation	Public hearings	Parties/Public	2019-08-27
144	DFO hearing presentation	Public hearings	Parties/Public	2019-08-27
145	ECCC hearing presentation	Public hearings	Parties/Public	2019-08-27
146	GNWT hearing presentation	Public Hearings	Parties/Public	2019-08-27
147	YKDFN hearing presentation	Public Hearings	Parties/Public	2019-08-27
148	LKDFN hearing presentation	Public Hearings	Parties/Public	2019-08-27

149	FRMC Hearing Presentation	Public Hearings	Parties/Public	2019-08-27
150	NWTMN Hearing Presentation	Public hearings	Parties/Public	2019-08-29
151	Teleconference information for Yellowknife hearings	Public Hearings	Review Board	2019-08-30
152	Diavik community hearing presentation	Public hearings	Developer	2019-08-30
153	Diavik technical hearing presentation	Public hearings	Developer	2019-08-30
154	Retention of Joe Handley as special advisor	Public Hearings	Review Board	2019-09-03
155	Diavik's updated hearing presentation for Dettah	Public Hearings	Developer	2019-09-04
156	Public hearing transcript - September 3, 2019	Public hearings	Review Board	2019-09-03
157	CV for YKDFN consultants	Public hearings	Parties/Public	2019-09-05
158	Note to file - video presentation for technical hearing	Public Hearings	Review Board	2019-09-05
159	Public hearing transcript - September 4, 2019	Public hearings	Review Board	2019-09-04
160	Advantages and disadvantages of the project (undertaking 1)	Public hearings	Developer	2019-09-05
161	GNWT Response - Healing, Wellness and Land	Public Hearings	Parties/Public	2019-09-05
162	Note to file - web presentation for day 2 of technical hearings	Public Hearings	Review Board	2019-09-06
163	Advantages and disadvantages of using only the containment facility for PK storage (undertaking 3)	Public hearings	Developer	2019-09-06
164	Updated hearing presentation for ECCC	Public Hearings	Parties/Public	2019-08-28
165	Public hearing transcript - September 5, 2019	Public hearings	Review Board	2019-09-05
166	PKC facility dam raise schedule and filling curves (undertaking 4)	Public hearings	Developer	2019-09-06
167	Bathurst Caribou Range Plan 2019	Public hearings	Review Board	2019-09-06
168	Public Hearing transcript - September 6 2019	Public Hearings	Review Board	2019-08-08
169	Note to file - undertakings and commitments	Hearing follow-up	Review Board	2019-09-10
170	Notice of Proceeding - Post hearing	Hearing follow-up	Review Board	2019-09-11
171	Letter from GNWT Re: supplementary information requests	Hearing follow-up	Parties/Public	2019-09-19
172	Updated list of Diavik commitments	Hearing follow-up	Developer	2019-09-20
173	Diavik's response to LKDFN's recommendations at the hearings	Hearing follow-up	Developer	2019-09-20
174	Letter from LKDFN Re: supplementary information requests	Hearing follow-up	Parties/Public	2019-09-20

175	Letter from NSMA Re: Undertaking 5	Hearing follow-up	Parties/Public	2019-09-20
176	Diavik response to NSMA's comments	Hearing follow-up	Developer	2019-09-20
177	Diavik response to Undertaking 2	Hearing follow-up	Developer	2019-09-20
178	Letter from DKFN Re: Commitment 2 from the public hearings	Hearing follow-up	Parties/Public	2019-09-23
179	Note to file - Bertha Norwegian acting as special advisor	Hearing follow-up	Review Board	2019-09-23
180	Diavik response to LKDFN questions	Hearing follow-up	Developer	2019-09-27
181	Closing argument from EMAB	Hearing follow-up	Parties/Public	2019-09-27
182	Note to file - post-hearing follow up with ECCC	Hearing follow-up	Review Board	2019-09-30
183	Letter from ECCC to the Review Board re: post-hearing follow up	Hearing follow-up	Parties/Public	2019-09-27
184	Closing argument from DKFN	Hearing follow-up	Parties/Public	2019-10-02
185	Closing argument from the TG	Hearing follow-up	Parties/Public	2019-10-04
186	Closing argument from LKDFN	Hearing follow-up	Parties/Public	2019-10-04
187	Closing argument from the GNWT	Hearing follow-up	Parties/Public	2019-10-04
188	Closing argument from YKDFN	Hearing follow-up	Parties/Public	2019-10-04
189	Closing argument from federal agencies	Hearing follow-up	Parties/Public	2019-10-04
190	Closing argument from NSMA	Hearing follow-up	Parties/Public	2019-10-04
191	Closing argument from FRMC	Hearing follow-up	Parties/Public	2019-10-04
192	Closing argument from the NWTMN	Hearing follow-up	Parties/Public	2019-10-09
193	Closing argument from Diavik	Hearing follow-up	Developer	2019-10-18
194	Notice of Proceeding - Closure of the Public Record	Hearing follow-up	Review Board	2019-10-18

Appendix B – Diavik’s Commitments⁶⁶

No.	Subject	Source	Commitment	Phase
1	Follow-up and monitoring	Summary Impact Statement	<p>Follow-up to verify the environmental effects predictions and effectiveness of mitigation is an important component of this Project and is summarized below:</p> <ul style="list-style-type: none"> • Sample PK porewater to confirm constituent concentrations used in model • Monitor the chemocline development and stability prior to breaching dike (Surveillance Network Program). Include visual monitoring by Traditional Knowledge Panel. • Monitor water quality in the flooded mine workings following dike breaching. • Monitor water quality in Lac de Gras following re-connection of pit lake(s) to Lac de Gras. • Adequately size breaches to optimize water circulation within the closure water cap to meet water quality objectives; and • Continue the AEMP in Lac de Gras (water quality, sediment, fish and invertebrates within the water and sediment). 	All Phases
2	Timing of breaching of dikes	Summary Impact Statement	Breach dikes following receipt of monitoring results that show acceptable water quality (i.e., below AEMP benchmarks) within the pit lake(s).	Closure
3	Decision-making process to isolate pit lakes from Lac de Gras	Summary Impact Statement	Close the breaches or isolate the pit lake from Lac de Gras if water quality is later determined to pose a risk to water quality, fish and fish habitat, caribou, humans or cultural land uses.	Closure and Post-closure

⁶⁶ See Appendix A of PR#193

No.	Subject	Source	Commitment	Phase
4	Community engagement	Summary Impact Statement	Report findings back to Indigenous communities.	All Phases
5	Follow-up and monitoring	Summary Impact Statement	In addition to continuation of the ongoing Aquatic Effects Monitoring Program (AEMP), DDMI will: <ul style="list-style-type: none"> • Monitor water quality in the pit lakes after the mine workings are filled to determine when and if water quality parameters meet aquatic effects benchmarks. • Monitor water quality, particularly TSS and TDS, in Lac de Gras at near-field, mid-field, and far-field areas during the breaching of the mine workings dikes. 	All Phases
6	Follow-up and monitoring	Summary Impact Statement	DDMI would also work with DFO and Indigenous Groups to identify any follow-up monitoring that may be necessary to adaptively manage water levels in Lac de Gras and flows in the Coppermine River during the pit infilling periods.	All Phases
7	Deposition method	Summary Impact Statement	Select a deposition scenario that predicts water quality in the pit lake(s) meets AEMP benchmarks in the top 40m.	Operations
8	Fish interaction with pit lake(s)	Summary Impact Statement	Exclude fish from the pit lake(s) until the monitoring program shows that water quality in the top 40 m of the pit lake(s) meets AEMP benchmarks.	Closure
9	Freshwater withdrawal for pit infilling	Summary Impact Statement	Work with DFO and Indigenous Groups to finalize water withdrawal rates that will not significantly affect fish habitat in Lac de Gras or the Coppermine River.	Closure

No.	Subject	Source	Commitment	Phase
10	Follow-up and monitoring	Summary Impact Statement	In addition to continuation of the on-going Wildlife Monitoring Program, DDMI will monitor: <ul style="list-style-type: none"> Water quality in the pit lakes after the mine workings are filled to determine when and if water quality parameters meet aquatic effects benchmarks. Water quality, particularly TSS and TDS, in Lac de Gras at near-field, mid-field, and far-field areas during the breaching of the mine workings dikes. 	Operations and Closure
11	Wildlife interactions with pits/mine workings	Summary Impact Statement	Any wildlife observed in the mine workings will be removed prior to pit lake infilling in accordance with applicable regulations. In the case of peregrine falcon nests on the pit walls, recommended minimum buffer distances in applicable guidelines will be followed until the birds have fledged and left the nests.	Operations
12	Water quality monitoring	Summary Impact Statement	Water quality monitoring will be used to assess potential changes in water concentrations of chemical constituents.	All phases
13	Wildlife monitoring	Summary Impact Statement	Wildlife monitoring to assess potential interactions of wildlife with potential contaminants.	All phases
14	Wildlife deterrence	Summary Impact Statement	Wildlife deterrent techniques will be implemented as required to reduce interactions with contaminants, if necessary.	Construction, Operations, and Closure
15	Engagement with Indigenous groups	Summary Impact Statement	DDMI will continue its engagement with stakeholders, including with the Participation Agreement groups and communities and other Indigenous groups to inform project design and execution.	All phases

No.	Subject	Source	Commitment	Phase
16	Engagement with Indigenous groups	Summary Impact Statement	DDMI will continue to engage with potentially affected Indigenous groups through the TK Panel Sessions and other engagement activities to better understand Indigenous perceptions about the safety, quality, and health of Lac de Gras and identify practical strategies to address these concerns.	All phases
17	Water quality monitoring	Summary Impact Statement	Water quality will be monitored to assess potential changes in concentrations of chemical constituents in comparison to acceptable criteria	All phases
18	Wildlife monitoring	Summary Impact Statement	Wildlife monitoring will assess potential interactions of wildlife with potential contaminants.	All phases
19	Water quality management	Summary Impact Statement	Cover the PK and porewater in each mine working with a freshwater cap such that water quality in the top 40 m meets AEMP benchmarks	Operations and Closure
20	Water quality management	Summary Impact Statement	Breach dikes to connect the pit lakes to Lac de Gras once monitoring shows that water constituents in pit lakes are below Canadian Water Quality guidelines for the Protection of Aquatic Life (CCME 2019) and/or the Aquatic Environmental Monitoring Program (AEMP) Effects Benchmarks	Closure
21	Wildlife management	Summary Impact Statement	Remove any observed wildlife from pit/dike areas before infilling in accordance with applicable guidelines / regulations	Operations and Closure
22	Wildlife monitoring	Summary Impact Statement	Monitor area for approaching wildlife during infilling	Operations and Closure
23	Wildlife management	Summary Impact Statement	Employ deterrents as required to reduce risks to wildlife.	Construction, Operations, and Closure

No.	Subject	Source	Commitment	Phase
24	Stakeholder Engagement	Responses to Interventions	<p>Expanded engagement with non-signatory Indigenous groups</p> <ul style="list-style-type: none"> • DDMI undertakes extensive community engagement with signatory Indigenous Groups; however, DDMI accepts that more could be done to engage with Fort Resolution Metis Council (FRMC) – Northwest Territory Metis Nation (NWTMN) and Deninu Kue First Nation (DKFN). • DDMI commits to meeting with each group annually to: <ol style="list-style-type: none"> i. Provide updates on the PK to Mine Working Project specifically but also on closure planning generally; ii. Review recommendations made by the Traditional Knowledge (TK) Panel and DDMI’s responses; and iii. Consider any recommendations from FRMC/NWTMN and DKFN and provide written responses. 	All phases
25	Traditional Knowledge-based Closure Criteria	Responses to Interventions	<p>Reconnection criteria to define culturally acceptable pit-lake conditions</p> <ul style="list-style-type: none"> • DDMI recognizes the importance of the views of Indigenous Groups to the decision on whether to breach the pit lakes and re-join with Lac de Gras. • DDMI commits to working toward the development of acceptance criteria for re-connection that are TK-based. • DDMI will: <ol style="list-style-type: none"> i. Seek the TK Panel’s permission to change the scope of the September 12-16, 2019 TK Panel session to instead develop recommended TK-based re-connection criteria; ii. Ask that the Environmental Monitoring Advisory Board (EMAB) facilitate the revision/support of the recommended TK-based criteria with the five (5) Indigenous Parties represented on EMAB; iii. Provide opportunity for Indigenous Groups that are not represented on EMAB to review and comment on TK-based criteria; iv. Submit the TK-based re-connection criteria to the Wek’èzhù Land and Water Board (WLWB) for public review and approval as a closure criteria. 	Regulatory/Permitting Stage

No.	Subject	Source	Commitment	Phase
26	Fish and Fish Habitat	Responses to Interventions	<p>Fish habitat off-setting plan</p> <ul style="list-style-type: none"> • With the implementation of proposed mitigation measures, residual environmental effects are not expected to significantly impact pit lake fish habitat, however DDMI acknowledges that some Indigenous Groups have still expressed concern about reconnecting the pit lakes to Lac de Gras. • DDMI appreciates Fisheries and Oceans Canada’s willingness to work with DDMI to consider alternative fish habitat off-setting plans should pit lake reconnection no longer be considered acceptable. • DDMI commits to considering alternative off-setting plans that are reasonable, practical and provide fisheries benefits to Indigenous Communities. • DDMI will advance alternative off-setting plans by February 1, 2020 if: <ol style="list-style-type: none"> i. There is a high likelihood that predicted pit-lake water quality conditions will not meet TK-based pit-lake criteria for reconnection; or ii. It is determined that TK-based acceptance of pit-lake reconnection can only be determined by visually inspecting the pit-lake making it not possible to confirm acceptability based on predicted water quality; or iii. The MVEIRB determines that DDMI should not breach the dike and allow access to the pit-lake. 	All phases
27	A21 Open Pit	Responses to Interventions	<p>Removal of A21 Open-Pit from review</p> <ul style="list-style-type: none"> • DDMI continues to advise that A418 is the preferred location at this time for PK deposition to mine workings. • DDMI accepts Interveners’ recommendation to remove the A21 Open-Pit from consideration for processed kimberlite (PK) deposition in the current Review. • DDMI believes it is prudent to continue to consider A154 to provide the maximum practical flexibility. Limiting the deposition location option to only the preferred A418 could result in an inability to adapt to changes in mine plans because of the long lead times inherent in permitting processes. 	Environmental Review Stage

No.	Subject	Source	Commitment	Phase
28	Water License conditions and Project Follow-up	Responses to Interventions	<p>Conditions to be included in an amended water licence or as Follow-up measures</p> <ul style="list-style-type: none"> • DDMI has reviewed Interveners’ recommended conditions, if the Project is to be approved by the MVEIRB. It is DDMI’s view that most of these can be addressed as conditions to be included in an amended Water License. These include: <ol style="list-style-type: none"> a. Additional modelling of pit water quality. <ul style="list-style-type: none"> • DDMI commits to providing updated modelling estimates: <ol style="list-style-type: none"> i. for WLWB approval prior to commencing deposition as part of the Processed Kimberlite Containment in Mine Working Design Report; ii. prior to pit filling with Lac de Gras water (incorporating as-built conditions); and iii. after pit filling but before dike breaching (to allow calibration of model inputs and assumptions). b. Independent Review of final model predictions. <ul style="list-style-type: none"> • DDMI recognizes the importance of water quality modelling in the decision to deposit PK in mine workings. DDMI would also like to ensure confidence in the model predictions. DDMI commits, as a condition of an amended Water License, to submit a review prepared by an Independent expert. The review would be of the updated modelling that would be submitted as part of the Processed Kimberlite Containment in Mine Working Design Report for the WLWB approval prior to commencement of PK deposition. Similar conditions exist in DDMI’s Water License for independent geotechnical reviews of critical engineering designs. c. Pit Lake monitoring – operations, after filling, after re-connection. <ul style="list-style-type: none"> • DDMI has provided proposed monitoring programs for PK to Mine Workings. Interveners have provided monitoring recommendations that DDMI has reviewed and responded. DDMI believes there is sufficient alignment on the general scope of the proposed monitoring that they could be consolidated into monitoring conditions for an amended Water License. 	Regulatory/Permitting State and Pre-construction and Construction

No.	Subject	Source	Commitment	Phase
			<p>d. Wildlife management.</p> <ul style="list-style-type: none"> DDMI has Standard Operating Procedures for deterring wildlife. DDMI commits to revising these to include wildlife deterrents during pit filling. DDMI will submit these to the Government of Northwest Territories and EMAB for review and will address any recommendations that might come from this review as governed by the Environmental Agreement. <p>e. Monitoring plans.</p> <ul style="list-style-type: none"> In DDMI's view, the specific terms and conditions that will define the monitoring plans related to the PK to Mine Workings Project should be established by the WLWB through the Water Licence Amendment Process. The terms and conditions may include updates to existing environmental management and monitoring programs plans for the Diavik Diamond Mine. 	
29	Pre-deposition Water Quality Modelling	Hearing	If pre-deposition modelling shows that Diavik cannot meet AEMP benchmarks in the top 40 m of the pit lakes, Diavik will not put processed kimberlite in the pit.	Pre-construction
30	Engagement Plan with Deninu Kue First Nation and the Fort Resolution Métis Council	Hearing	Diavik commits to developing an engagement plan with Deninu Kue First Nation and the Fort Resolution Métis Council, building on the commitment to meet annually	All phases
31	Indigenous Engagement – LKDFN	Post-hearing commitments	DDMI commits to continuing to engage with the LKDFN to identify alternative or complementary approaches to closure and postclosure activities associated with the PKMW Project. As part of this commitment, DDMI intends to work with the TK Panel, Participation Agreement organizations and communities, and other Indigenous Groups toward the development of TK-based acceptance criteria for re-connection of the pit lake(s) to Lac de Gras at closure/postclosure. These intended additional	All phases

No.	Subject	Source	Commitment	Phase
			engagement activities will be reflected in the Engagement Plan for the Diavik Operations.	
32	Indigenous Engagement – LKDFN	Post-hearing commitments	DDMI commits to continuing to engage with the LKDFN, including elders and other Traditional Knowledge holders, to understand and identify approaches to assess and mitigate potential impacts on cultural use. DDMI has committed to proceed with the development of a TK-based approach to assessing pit lake conditions with respect to impacts on cultural use and will be seeking direct involvement from the TK Panel and EMAB. LKDFN is actively involved in both.	
33	Wildlife Monitoring Program	Post-hearing commitments	DDMI commits to updating the wildlife monitoring program for Diavik to include the PKMW Project to validate/confirm predictions about potential for wildlife-project interaction. The updated monitoring program will support site monitoring during operations to determine whether wildlife, including caribou and migratory birds, interact with pit(s)/mine workings during infilling and prior to stabilization of water quality.	Pre-construction, Construction, Operations, and Closure Phases
34	Engagement on Potential for PKMW-Wildlife Interaction	Post-hearing commitments	DDMI commits to continuing to engage with the LKDFN to identify alternative or complementary approaches to limiting wildlife, including caribou, interaction with the PKMW Project during the operations phase.	Operations Phase

Appendix C – Adaptive Management

In several places in this *Report of Environmental Assessment*, the Review Board has noted where adaptive management should be part of the overall mitigation strategy (for example, in the preambles to Measure 1 and 5 and text of Measure 6). The Review Board is not prescribing the specific details for this adaptive management (such as triggers, action levels, management actions) for this adaptive management. Rather, where adaptive management is mentioned in a preamble Diavik should update all relevant existing plans and frameworks, considering the information in this Appendix and existing guidance from the Mackenzie Valley Land and Water Board.^{67,68} The Government of the Northwest Territories should also consider this guidance when carrying out Measure 6.

Figure 22 shows what the Review Board considers is an effective adaptive management system.

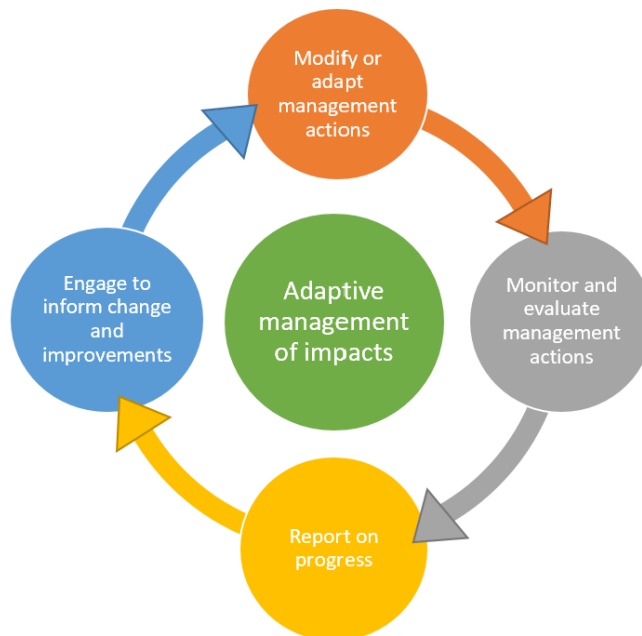


Figure 22: Illustration of an effective adaptive management framework

⁶⁷ The Mackenzie Valley Land and Water Board has draft guidance for adaptive management in Aquatic Effects Monitoring Plans: <https://mvlwb.com/sites/default/files/documents/Final-Draft-Response-Framework-for-Aquatic-Effects-Monitoring-Oct-17-2010.pdf>.

⁶⁸ Regulators should consider the information in this appendix and existing guidance when reviewing and approving monitoring and management plans involving adaptive management.