Joseph Monteith
Water Resources Officer, CIRNAC
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0

RE: Water Licence 2AM-MRY1325 Baffinland Response to September 2021 Inspection

The following submission from Baffinland Iron Mines Corporation (Baffinland) is a follow up in response to the Water Licence Inspection conducted on September 16-17, 2021, at Baffinland's Mary River Project (the Project) by the Crown-Indigenous Relations Norther Affairs Canada (CIRNAC) Water Resource Officer, and subsequent communications between Baffinland and the CIRNAC Water Resource Officer.

Attachments 1 and 2 provide Baffinland's initial responses to the inspection findings submitted in November, and the requested clarified timeline provided in December 2021. This submission provides an updated timeline and details for the water management infrastructure in question, summarized in Table 1.

Should you have any additional concerns or questions regarding the attached responses, please do not hesitate to contact the undersigned at your convenience.

Regards,

Connor Devereaux
Environmental Manager

Cc: Jonathan Mesher, Omer Pasalic (CIRNAC)
Assol Kubeisinova (NWB)
Megan Lord-Hoyle, Lou Kamermans, Tim Sewell, Kendra Button, Francois Gaudreau, Martin Beausejour (Baffinland)

Attachments

Attachment 1 – Baffinland's November 2021 Response to September 2021 CIRNAC Inspection

Attachment 2 – Baffinland's December 2021 Response to September 2021 CIRNAC Inspection

Attachment 3 – Table 1: Baffinland's April 2022 Response to September 2021 CIRNAC Inspection

Attachment 4 – Knight Piesold's Memorandum - Mary River Project - Remediation of Seepage from the KM106 Stockpile

Attachment 1

Baffinland's November 2021 Response to September 2021 CIRNAC Inspection

Jonathan Mesher
Water Resources Officer, CIRNAC
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0

RE: Water Licence 2AM-MRY1325 September 2021 Inspection – Follow Up

The following submission from Baffinland Iron Mines Corporation (Baffinland) is a follow up in response to the Water Licence Inspection[1] conducted on September 16-17, 2021, at Baffinland's Mary River Project (the Project) by Crown-Indigenous Relations Norther Affairs Canada (CIRNAC) Water Resource Officer. The attached Table 1 provides a summary of the Inspector's key observations and concerns. Baffinland has detailed responses to these items in Table 1.

Should you have any additional concerns or questions regarding the attached responses, please to not hesitate to contact the undersigned at your convenience.

Regards,

Kendra Button
Environmental Superintendent

Cc: Francois Gaudreau, Martin Beausejour, Megan Lord-Hoyle, Lou Kamermans, Tim Sewell, Connor Devereaux (Baffinland)

Attachments

Attachment 1 - 2021-QIK-JKM012 2AM-MRY1325 Inspection Report

Attachment 2 - Table 1: Baffinland Responses to CIRNAC 2021 September Inspection Report

Attachment 3 - Photos

[1] CIRNAC (2021) Re: 2021-QIK-JKM012 2AM-MRY1325 Inspection Report - CIRNAC Baffinland Iron Mines Water Licence Inspection Form. Inspection form dated October 18, 2021.

Attachment 1

2021-QIK-JKM012 2AM-MRY1325 Inspection Report

Crown-Indigenous Relations and Northern Affairs Canada | Relations Couronne-Autochtones et Affaires du Nord Canada

WATER LICENCE INSPECTION FORM

☒ Original
☐ Follow-Up Report

Licensee	Licensee Representative
Baffinland Iron Mines	Connor Devereaux
Licence No. / Expiry	**Representative's Title**
2AM-MRY	Environmental superintendent
Land / Other Authorizations	**Land / Other Authorizations**
	--
Date of Inspection	**Inspector**
September 16-17, 2021	Jonathan MESHER

Activities Inspected

☐ Camp ☐ Drilling ☒ Mining ☐ Construction ☐ Reclamation ☐ Fuel Storage
☒ Roads/Hauling ☐ Other: ☐ Other:

Conditions: **A - Acceptable** **C - Concern** **U - Unacceptable** **NA – Not Applicable** **NI – Not Inspected**

Water Use	Condition	Comment	Site Conditions	Condition	Comment	Haz/Mat Management	Condition	Comment
Intake/Screen	NA		Water Management Structures	NA		Storage	NA	
Flow Measure. Device	NA		Culverts / Bridges	NA		Spills	NA	
Source:	NA		Drainage	NA		Spill Plan	NI	
Water Use:	NA		Erosion / Sediment	NA				
Recirculation (y /n)	NA		Mitigation Measures	A		**Administrative**		
			Reclamation Activities	NA		Records	NI	
			Materials Storage	NA		Reports	NI	
Waste Disposal			Signage			Plans	NI	
Waste Water	NA					Notifications	A	
Solid Waste	NA		**Monitoring**			**Other**		
Hazardous Waste	NA		Sample Collection / Analysis	A		Follow-up from previous inspection	NI	

**The number in the comments field will correspond with specific comments provided below.*

Samples taken by Inspector:	**Location(s):**
☐ Yes ☒ No	

SECTION 1 ☒ **Comments** ☐ **Non-Compliance with Act or Licence** ☐ **Action Required**

Background

On September 16-17, 2021 I Jonathan Mesher Resource Management Officer of CIRNAC conducted a Water licence inspection at the Mary River Project, Tote Road and Milne port site.

Inspection

A) Tote Road;

I-60 Crown Land- multiple spills of unknown substance(potentially motor oil) on the ground near the parking area. See oto 3 for the spills.

-154A/ Spill 21247- there was visible erosion on the road near the culvert, upstream of the culvert and down stream of culvert. See photos 4 &5 for erosion.

-115/ spill 21247- no concerns near the culvert.

-112/spill 21247- potentially non-engineered ditches upstream of the culvert could be causing increased TSS. See Photo # or the mentioned ditches.

-093/spill 21247- potentially non-engineered ditches upstream of the culvert could be causing increased TSS. See photo potentially non-engineered ditches. See photo 7 for the potentially, non-engineered ditches.

-24/spill 21247- significant erosion on both sides of culvert. See photos 8-9 for the erosion.

-001/spill 21247- damaged culvert and erosion on down stream side of culvert. See photo 10 for the photos of the

Canada

maged culvert.

B) Milne Inlet

1)MP-05- The inspector noted rips on the liner at the inflow after the culvert, the pond appeared to be appropriately pumped down. See photo 11 for pictures of the rips.

2)MP-06- There was erosion noted on the East inflow of the pond, the pond appeared appropriately pumped down. See photo 12 for the erosion noted.

3)Pond 3- Pond 3 is unable to passively drain into MP-06 and the ditch connecting the two ponds is leaking. The surface water on the South West side of the ore pad is unable to drain into Pond 3. See photo 13 for a picture of the hoses used to pump the water from pond 3 into mp-06 and the area leaking.

4)Snow dumps- The snow dumps appear to be contaminated with litter scooped up during the winter season. see photos 14 and 15 for waste in the snow dumps.

5) HWB 03 and 04- the is no defined berm where waste is being stored it appears if a spill did occur the waste would flow outside of this facility. See photo 16 for a picture of this facility.

6)western globe fuel module- there is no visible berm, this pumping station does not appear to be properly contained, if a spill was or occur or if rain was to pool and become contaminated it appears to be able to flow outside of containment. See photo 17 for the lack of defined berms.

C) Mine site

1) The inspector noted erosion North of the camp lake intake, is appears surface water from the runway and surrounding area has no water management structure to manage it. This surface water has previously caused erosion near the camp lake tributary and now is eroding the sandy hills north of the water intake. See photo 18 and 19 for pictures of this erosion.

2) Aircraft Fuel berm- The inspector noted erosion on the outside of this berm. See photo 20 for the erosion noted.

3) Landfill- While inspecting the landfill the following items were noted; food waste, fuel filters two generators, break fluid and a automotive fuel tank. See photo 21 for a photo of some of the items mentioned.

4) Mine site snow dump- the mine site snow dump also has significant waste. See photo 22 for the waste in the snow dump

5) Waste Rock Stockpile pond- this waste rock stockpile and the surrounding area was snow covered at the time of the inspection making it difficult to identify any concerns, no concerns were noted.

6) MS-07/spill 21268- This facility is currently dealing with a seepage issue potentially due to gradient of the ditch and the type of fill used. See Photo 23 for the ditch with the unresolved seepage.

7) Crusher Pad and pond- The Crusher pad is currently dealing with a unresolved seepage as well, the ditch that is designed to divert surface water to the containment pond is not operational due to a leak. The licensee currently has a sump installed and is pumping water from the sump into the containment pond. See photo 24 for a photo of the sump and berms installed to keep the surface water out o the ditches.

8) Km 104 laydown- during the inspection the inspector noted the following concerns at the 104 laydown;
- Lubricants and hazardous material outside of containment, in damaged containment and staining which smelled strongly of fuel. See photo 25 for the area with staining and hazardous material outside of containment.
- Open containers with dirty absorbent rags nearing capacity, see photo 26 and 27 for the containers.
- Heavy equipment actively leaking on the ground with no drip tray, see photos 28 and 29 for photos of fluid under heavy equipment at laydown 104.

Section 2	☐ Comments	☐ Non-Compliance with Act or Licence	☒ Action Required

The licensee is to provide a plan to with the following concerns by November 25, 2021.

1) The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2. The following items in Part C of the license 2AM-MRY1325 require the licensee to prevent erosion and maintain erosion control measures;

7 . The Licensee shall not cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion.

8. The Licensee shall implement sediment and erosion control measures prior to and maintain such measures during the undertaking to prevent entry of sediment into Water.

2) The licensee is to ensure the following waste/water management structures are operating as intended and consistent with the design in the plans approved by the Nunavut Water Board ; Ore stockpile ditches and gradient, Crusher pad ditches, MP-07 ditches, Western Globe Fuel Module, HWB 03, HWB 04.

3) The licensee is to remove all waste from the snow dumps and provide a monitoring schedule to ensure the snow dumps are not contaminating the surrounding water bodies.

4) The licensee is to remediate all spills noted in this report.

Inspector's Name	
Jonathan MESHER	
Signature	
	
Date	
October 18, 2020	

Water Resource Officer, Nunavut Region
Crown Indigenous Relations and Northern Affairs Canada – CIRNAC
Jonathan.mesher@canada.ca
Office #: 867-975-4296
Fax: 867 979-6445

Date	Camera	Inspector	Authorization
	Sony Cyber-shot	J.Mesher	2AM-MRY

Photo Log

Photo 1

Description: damaged drip tray at km 97

Date	Camera	Inspector	Authorization
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 2

Description: damaged drip tray at km 97

Date	Camera	Inspector	Authorization
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 3

Description: km 60 spill.

Date	Camera	Inspector	Authorization
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 4

Description: Cv-154 erosion upstream

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 5

Description: Cv-154 erosion down stream.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 6

Description: Cv-112, potential cause of TSS.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 7

Description: Cv-093, potential cause of TSS.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 8

Description: BG-24, erosion on down stream side of culvert/ damaged culvert.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 9

Description: BG-24, erosion on down stream side of culvert/ damaged culvert.

Canada

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

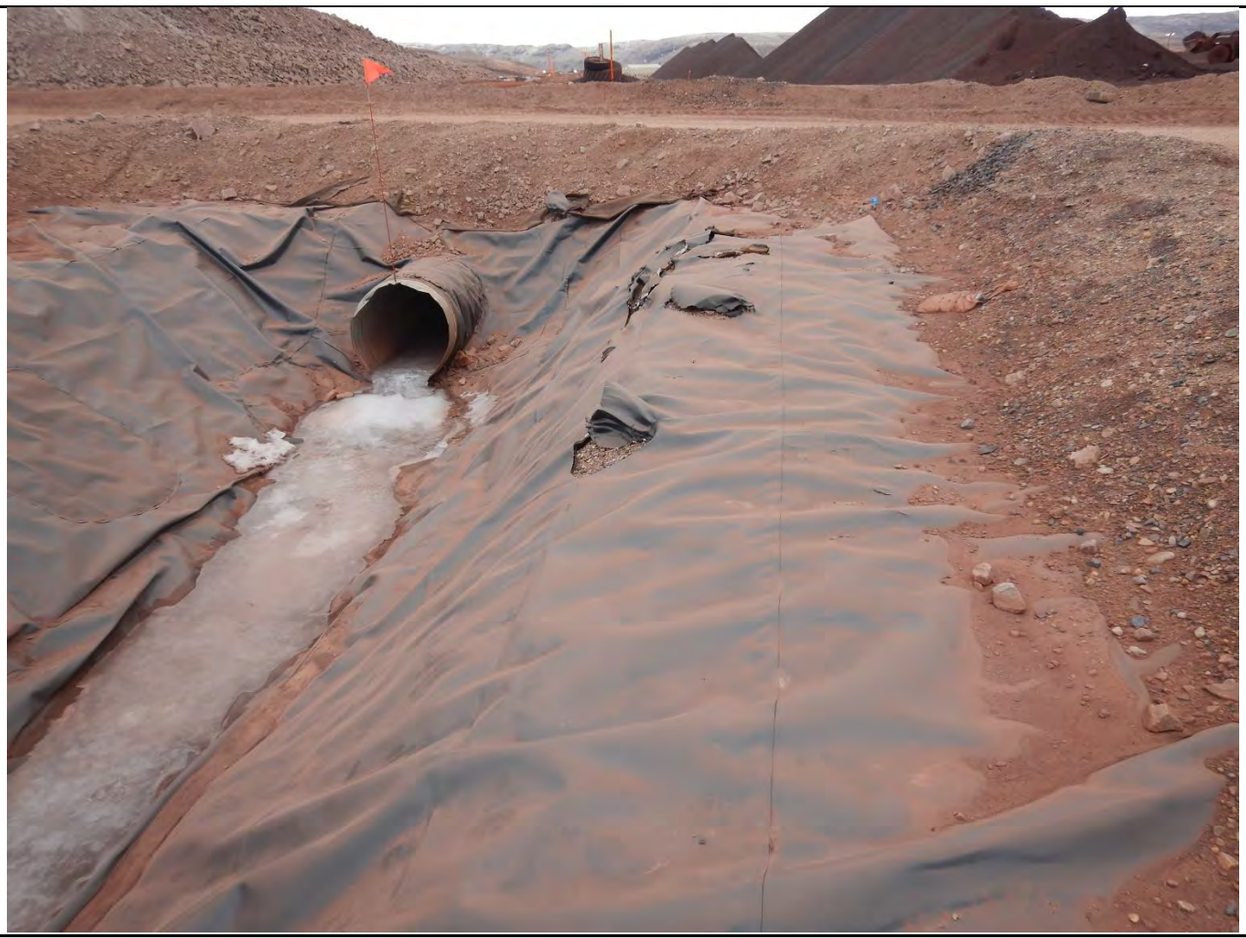
Photo 10

Description: Cv-001 damaged culvert.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 11



Description: damaged liner at MP-05

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 12

Description: erosion on the East inflow of MP-06

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 13

Description: hoses required for pumping and leaking area of the ditch.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 14

Description: current snow dump containing waste.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 15

Description: previous snow dump still containing plastic, metal and wood waste

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 16

Description: standing outside the HWB's looking in, you can clearly see there is no defined berm.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 17

Description: lack of defined berms at fuel module.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 18

Description: Erosion near water intake, standing on runway perimeter road looking towards camp lake.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 19

Description: Erosion near water intake, standing near intake looing at the hillside.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 20

Description: Erosion on outside of aircraft fuel berm.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 21

Description: Erosion near water intake, standing on runway perimeter road looking towards camp lake.

Canada

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 22

Description: Mine site snow dump.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 23

Description: MS-07 ditch with ongoing seepage issue.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 24

Description: Berm and sump installed.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 25

Description: hazardous material outside of containment, in damaged containment and staining in the area.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 26

Description: dirty spill rags and unknown waste in open container outside of containment

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 27

Description: dirty spill rags and unknown waste in open container outside of containment

Canada

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 28

Description: fluid leaking from heavy equipment.

Date	Camera	Inspector	Authorization
September,16-17 2021			
	Sony Cyber-shot	J.Mesher	**2AM-MRY**

Photo Log

Photo 29

Description: fluid leaking from heavy equipment.

Attachment 2

Baffinland Response to CIRNAC 2021 September Inspection Report

Table 1 – Baffinland Responses to CIRNAC 2021 September Inspection Report

Number	Project Location	Description of Concern or Finding	Response
A) Tote Road			
1)	KM-60 Crown Land	Multiple spills of unknown substance (potentially motor oil) on the ground near the parking area. See photo 3 for the spills. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2. The licensee is to remediate all spills noted in this report.	The KM60 Laydown is regularly inspected for surficial staining, and follow-up inspections since the September Water License inspection have confirmed no further staining has been present and no vehicles or stationary equipment were found to be leaking. Surficial staining that is observed on the laydown is cleaned up and placed in appropriate secondary containment. Photo 1 in Attachment 2 show the current status of the KM60 Laydown.
2)	CV-154A	Spill 21247 - There was visible erosion on the road near the culvert, upstream of the culvert and down stream of the culvert. See photos 4 &5 for erosion. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2. The licensee is to remediate all spills noted in this report.	Following the elevated TSS conditions at CV-154A on June 1, 2021, an assessment was completed to identify potential erosion and sediment control measures around the culvert crossing. During July 2021, check dams were constructed within the ditch and armouring of the ditch upstream of the culvert inlet was completed. Photo 2 in Attachment 2 shows the completed check dams. Additional work will be completed at this culvert crossing prior to freshet 2022, including removing excess sediment from the culvert inlet and outlet banks, reshaping and re-armouring of the embankment slopes, and routine maintenance of the check dams.

3)	CV-115	Spill 21247- No concerns near the culvert. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2. The licensee is to remediate all spills noted in this report.	Following the elevated TSS conditions at CV-115 on June 1, 2021, temporary ESC measures were installed and an assessment was completed to identify erosion and sediment control measures around the culvert crossing. During the summer 2021, rip rap was placed at the inlet and outlet of the culvert crossing embankments in accordance with the Surface Water Aquatic Effects Management Plan (SWAEMP). Photo 3 in Attachment 2 shows the rip rap placed at the outlet of the culvert crossing. Additional work will be completed at this culvert crossing prior to freshet 2022, including removing excess sediment from the culvert inlet and outlet banks, extending the culvert inlet/outlet, reshaping and re-armouring of the roadway embankment slope, and sediment clean out and armouring of the ditch draining to the culvert inlet.
4)	CV-112	Spill 21247- Potentially non-engineered ditches upstream of the culvert could be causing increased TSS. See Photo # 6 for the mentioned ditches. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2. The licensee is to remediate all spills noted in this report.	Following the elevated TSS conditions at CV-112 on June 1, 2021, temporary ESC measures were installed and an assessment was completed to identify erosion and sediment control measures around the culvert crossing. Prior to freshet 2022, excess sediment will be removed from the culvert inlet and outlet banks, embankments will be reshaped and re-armoured, and the ditch on the inlet side will be cleaned out of sediment and armoured as per the approved Civil Design Criteria for the Project.
5)	CV-093	Spill 21247- Potentially non-engineered ditches upstream of the culvert could be causing increased TSS. See photo of potentially non-engineered ditches. See photo 7 for the potentially, non-engineered ditches. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2. The licensee is to remediate all spills noted in this report.	Following the elevated TSS conditions at CV-093 on June 9, 2021, temporary ESC measures were installed and an assessment was completed to identify erosion and sediment control measures around the culvert crossing. During the summer 2021, rip rap was placed at the inlet and outlet of the culvert crossing embankments in accordance with the SWAEMP. Photo 4 in Attachment 2 shows the rip rap placed at the inlet of the culvert crossing. Additional work will be completed at this culvert crossing prior to freshet 2022, including the excavation of sediment build up from the ditch draining to the culvert inlet, and reshaping and armouring of the ditch as per the approved Civil Design Criteria for the Project.

6)	BG-24	Spill 21247- Significant erosion on both sides of culvert. See photos 8-9 for the erosion. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2. The licensee is to remediate all spills noted in this report.	Following the elevated TSS conditions at BG-24 on June 8, 2021, an assessment was completed to identify erosion and sediment control measures around the culvert crossing. Prior to freshet 2022, excess sediment will be removed from the culvert inlet and outlet banks, culvert extensions will be installed and road embankments will be re-armoured.
7)	CV-001	Spill 21247- Damaged culvert and erosion on down stream side of culvert. See photo 10 for the photos of the damaged culvert. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2. The licensee is to remediate all spills noted in this report.	Following the elevated TSS conditions at CV-112 on June 1, 2021, an assessment was completed to identify erosion and sediment control measures around the culvert crossing. Prior to freshet 2022, excess sediment will be removed from the culvert inlet and outlet banks, culvert extensions installed to repair the damaged end, and road embankments will be re-armoured.
	KM97	Damaged drip trays were identified in CIRNAC inspection report supporting Photo 1 and Photo 2 beneath fuel drums at KM97.	The fuel drums at KM97 were removed from the area and placed in appropriate secondary containment. Photo 5 in Attachment 2 shows the area at KM97 with the fuel drums and damaged spill trays removed.
B) Milne Port			
1)	MP-05	The inspector noted rips on the liner at the inflow after the culvert, the pond appeared to be appropriately pumped down. See photo 11 for pictures of the rips.	Surface Water Management Pond MP-05 and associated ditches are routinely inspected as per Baffinland's Type A Water License. A geotechnical inspection of MP-05 was completed in September 2021, and the 2021 Geotechnical Report No. 2 noted that the pond was in excellent condition with stable, well-maintained berms and intact liner. The minor liner damage observed by CIRNAC near the crest of the southern inlet channel to the pond was also identified during the September geotechnical inspection. Baffinland is assessing suitable controls to prevent this liner damage, and will repair the minor rips identified above the water line during Q2 2022.

2)	MP-06	There was erosion noted on the East inflow of the pond, the pond appeared appropriately pumped down. See photo 12 for the erosion noted.	Surface Water Management Pond MP-06 and associated ditches are routinely inspected as per Baffinland's Type A Water License. A geotechnical inspection of MP-06 was completed in September 2021, and the 2021 Geotechnical Report No. 2 noted that the pond was in excellent condition with stable, well-maintained berms and intact liner. To prevent the erosion observed during the September Water Licence inspection, a berm will be constructed to ensure runoff from the Ore pad enters the appropriate ditches for conveyance to MP-06. Baffinland will conduct routine monitoring and maintenance activities prior to Freshet 2022, which includes the regrading and stabilization of berm slopes and crests, and ensuring runoff from the ore pad enters the appropriate ditches.
3)	Pond 3	Pond 3 is unable to passively drain into MP-06 and the ditch connecting the two ponds is leaking. The surface water on the South West side of the ore pad is unable to drain into Pond 3. See photo 13 for a picture of the hoses used to pump the water from pond 3 into mp-06 and the area leaking. The licensee is to ensure the following waste/water management structures are operating as intended and consistent with the design in the plans approved by the Nunavut Water Board; Ore stockpile ditches and gradient, Crusher pad ditches, MP-07 ditches, Western Globe Fuel Module, HWB 03, HWB 04.	The west ore pad ditch normally collected a low volume of runoff water from the ore pad intermittently, however, a temporary diversion berm was constructed to prevent this runoff from reporting to the ditch until the ditch is repaired. In the interim, ore pad runoff water is being redirected to the surface water management ponds. The temporary diversion berm is inspected on a regular basis and is functioning as intended and diverting water away from the affected ditch and to the surface water management ponds. Pond 3 water is pumped directly into MP-06 whenever necessary. Corrective actions to address the seepage are under investigation and runoff water from the ore pad will continue to be diverted to the surface water management ponds via the interim measures until permanent corrective actions are identified and implemented.

4)	Snow Dumps	The snow dumps appear to be contaminated with litter scooped up during the winter season. See photos 14 and 15 for waste in the snow dumps. The licensee is to remove all waste from the snow dumps and provide a monitoring schedule to ensure the snow dumps are not contaminating the surrounding water bodies.	As per Baffinland's Snow Management Plan (SMP), clean up and removal of debris is an ongoing task as snow melts throughout the year and debris surfaces (see Photo 6 in Attachment 2). This remains a priority for Baffinland on an annual basis. Water quality monitoring of snowmelt and surface water runoff is monitored via the Surveillance Network Program (SNP), the Tote Road Monitoring Program (TRMP), and additional monitoring locations to support the SNP and TRMP for areas down gradient of snow stockpile locations. Monitoring results of the SNP, TRMP and temporary freshet monitoring stations are reported annually in the QIA & NWB Annual Report for Operations. Results of the SNP are also reported monthly as required by the Project's Type 'A' Water Licence. Regular inspections of the snow stockpiles are completed as per Baffinland's Snow Management Plan (SMP) and include stockpile assessment for the presence of debris.
5)	HWB 03 and 04	There is no defined berm where waste is being stored it appears as if a spill did occur the waste would flow outside of this facility. See photo 16 for a picture of this facility. The licensee is to ensure the following waste/water management structures are operating as intended and consistent with the design in the plans approved by the Nunavut Water Board; Ore stockpile ditches and gradient, Crusher pad ditches, MP-07 ditches, Western Globe Fuel Module, HWB 03, HWB 04.	Baffinland will regrade the area at the entrance of twin-cell HWB-3/HWB-4 prior to freshet 2022 to re-establish the gradient normally present within the cells. Routine inspections of HWB-3/ HWB-4 are completed regularly as part of the inspections of structures designed to contain, withhold, divert or retain waters or wastes during periods of flow; conducted in accordance with Part E Item 11 of the Water Licence.

6)	Western Globe Fuel Module	There is no visible berm, this pumping station does not appear to be properly contained, if a spill was or occur or if rain was to pool and become contaminated it appears to be able to flow outside of containment. See photo 17 for the lack of defined berms. The licensee is to ensure the following waste/water management structures are operating as intended and consistent with the design in the plans approved by the Nunavut Water Board; Ore stockpile ditches and gradient, Crusher pad ditches, MP-07 ditches, Western Globe Fuel Module, HWB 03, HWB 04.	The Western Global Fuel Module is a lined facility equipped with spill response supplies. There should be a small gravel berm around the fuel module to contain any possible spills, and Baffinland will re-construct this berm by December 31, 2021. Baffinland's Environmental Protection Plan (EPP) outlines additional protection measures for fuel dispensing activities to prevent fuel releases during refueling. These measures include supervision of fuel transfer points at all times during refueling and daily inspections of permanent fuel dispensing facilities. Photo 8 and Photo 9 in Attachment 2 show the condition of the OHT refuelling facility and spill kit.
C) Mine Site			
1)	North of Camp Lake Intake	The inspector noted erosion North of the camp lake intake, it appears surface water from the runway and surrounding area has no water management structure to manage it. This surface water has previously caused erosion near the camp lake tributary and now is eroding the sandy hills north of the water intake. See photo 18 and 19 for pictures of this erosion. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2.	Baffinland will implement additional erosion and sediment control measures in accordance with the SWAEMP to address the erosion north of the Camp Lake Intake prior to Freshet 2022, which was identified during the September Water Licence inspection. Water management measures for runoff in this area is being addressed as part of the ongoing implementation of Baffinland's Long Term Water Management Plan (LTWMP).

2)	Aircraft Fuel Berm	The inspector noted erosion on the outside of this berm. See photo 20 for the erosion noted. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2.	The Jet A Fuel Tank Berm, located at the aerodrome, is routinely inspected as per Baffinland's Type A Water License. A geotechnical inspection of the facility was completed in September 2021, and the 2021 Geotechnical Report No. 2 noted that the facility is surrounded by a stable perimeter berm and that a second berm, constructed from crushed rock fill, provides additional protection at two (2) sides (Tote Road and airport parking sides) of the facility. Baffinland will conduct routine maintenance activities prior to Freshet 2022 to address the minor berm erosion, including regrading of berm slopes and crests and runoff diversion away from the berm slopes to prevent future erosion.
3)	Landfill	While inspecting the landfill the following items were noted; food waste, fuel filters, two generators, break fluid and an automotive fuel tank. See photo 21 for a photo of some of the items mentioned.	The debris observed during the September Water Licence inspection was removed from the Landfill Facility as shown in Photo 7 and Photo 8 in Attachment 2. Baffinland continues to improve upon housekeeping and debris management, as demonstrated by Photo 9 and Photo 10 in Attachment 2, and is committed to adhering to the current Waste Management Plan. In addition to ongoing employee education, routine inspections of the Landfill Facility are completed with a focus on waste volume, composition and overall conformance to the Project's Waste Sorting Guidelines**.**
4)	Mine Site Snow Dump	The mine site snow dump also has significant waste. See photo 22 for the waste in the snow dump. The licensee is to remove all waste from the snow dumps and provide a monitoring schedule to ensure the snow dumps are not contaminating the surrounding water bodies.	As per Baffinland's Snow Management Plan (SMP), clean up and removal of debris is an ongoing task as snow melts throughout the year and debris surfaces (see Photo 6 in Attachment 2). Water quality monitoring of snowmelt and surface water runoff is monitored via the Surveillance Network Program (SNP), the Tote Road Monitoring Program (TRMP), and additional monitoring locations to support the SNP and TRMP for areas down gradient of snow stockpile locations. Monitoring results of the SNP, TRMP and temporary freshet monitoring stations are reported annually in the QIA & NWB Annual Report for Operations. Results of the SNP are also reported monthly as required by the Project's Type 'A' Water Licence. Regular inspections of the snow stockpiles are completed as per Baffinland's SMP and include stockpile assessment for the presence of debris.

5)	MS-07	Spill 21268- This facility is currently dealing with a seepage issue potentially due to gradient of the ditch and the type of fill used. See Photo 23 for the ditch with the unresolved seepage. The licensee is to remediate all spills noted in this report.	Interim ground work measures including temporary diversion swales and a sump, constructed in accordance with Baffinland's MDMER Emergency Response Plan, continue to be inspected on a regular basis and are functioning as intended to convey all seepage water into the KM106 Ore Stockpile Facility Pond (MS-07). Baffinland has retained a third party consulting firm to investigate the KM106 diversion berm to determine appropriate corrective actions to ensure the berm functions as per design criteria. All contact water will continue to be captured and conveyed to the surface water management pond via the interim measures until permanent corrective actions are identified and implemented.
6)	Crusher Pad and Pond	The Crusher pad is currently dealing with an unresolved seepage as well, the ditch that is designed to divert surface water to the containment pond is not operational due to a leak. The licensee currently has a sump installed and is pumping water from the sump into the containment pond. See photo 24 for a photo of the sump and berms installed to keep the surface water out of the ditches. The licensee is to ensure the following waste/water management structures are operating as intended and consistent with the design in the plans approved by the Nunavut Water Board; Ore stockpile ditches and gradient, Crusher pad ditches, MP-07 ditches, Western Globe Fuel Module, HWB 03, HWB 04.	Interim contingency measures to manage water at the Crusher Facility which includes a diversion berm and sumps, constructed in accordance with Baffinland's MDMER Emergency Response Plan, continue to be inspected on a regular basis and are functioning as intended to convey all seepage water into Crusher Facility surface water management pond MS-06. MS-06 is routinely inspected as per Baffinland's Type A Water License. A geotechnical inspection of MS-06 was completed in September 2021, and the 2021 Geotechnical Report No. 2 indicated that the liner within the pond and on the upstream slopes of the berm appears to be intact. There was no evidence of seepage from the pond at the time of the inspection. Baffinland continues to implement the Ore Crusher pad Regrading Strategy to prevent the pooling of water on and around the Crusher Facility pad. All contact water will continue to be captured and conveyed to the surface water management pond via the interim measures until permanent corrective actions are identified and implemented. Water management measures for the Crusher Facility are being addressed as part of the ongoing implementation of Baffinland’s LTWMP.

7)	KM 104 Laydown	During the inspection the inspector noted the following concerns at the 104 laydown: • Lubricants and hazardous material outside of containment, in damaged containment and staining which smelled strongly of fuel. See photo 25 for the area with staining and hazardous material outside of containment. • Open containers with dirty absorbent rags nearing capacity, see photo 26 and 27 for the containers. • Heavy equipment actively leaking on the ground with no drip tray, see photos 28 and 29 for photos of fluid under heavy equipment at laydown 104.	Containers that were observed to be located outside of secondary containment are in progress of being removed from the area and placed within appropriate secondary containment. Surficial staining observed beneath heavy equipment at the KM104 Laydown was cleaned up and placed in appropriate secondary containment. Spill trays were subsequently placed underneath dripping equipment and equipment in mid-term and long-term storage, in accordance with the EPP, to provide secondary containment to prevent spills due to product leaks. Photo 11 and Photo 12 in Attachment 2 show examples of these corrective actions. Baffinland is committed to ensuring that spill trays are placed beneath dripping equipment and equipment that is not being used for more than five (5) days, and beneath all stationary equipment that is regularly refueled. Operational areas are inspected for proper use of secondary containment during routine compliance inspections and any issues are addressed as they are identified.

Attachment 3

Photos

Photo 1 – Current Status of the KM60 Laydown – November 2021

Photo 2 – Check Dams Constructed in Ditch Upstream of Culvert CV-154A – August 2021

Photo 3 – Rip Rap Placed at CV-115 Outlet to Stabilize Embankment – August 2021

Photo 4 – Rip Rap Placed at CV-093 Inlet to Stabilize Embankment – August 2021

Photo 5 – KM97 Following Removal of Fuel Drums –November 2021

Photo 6 – Snow Stockpile Clean Up Activities to Remove Debris – July 2021

Photo 7 – Mine Site Landfill Facility Following Debris Removal – October 2021

Photo 8 – Mine Site Landfill Facility Following Debris Removal – October 2021

Photo 9 – Site Waste Clean Up Activities – July 2021

Photo 10 – Site Waste Clean Up Activities – July 2021

Photo 11 – Spill Trays beneath Heavy Equipment at the KM104 Laydown – September 2021

Photo 12 – Spill Trays beneath Heavy Equipment at the KM104 Laydown – September 2021

Attachment 2

Baffinland's December 2021 Response to September 2021 CIRNAC Inspection

From: Kendra Button
To: "Mesher, Jonathan"
Cc: Hack, Justin; Assol Kubeisinova; Connor Devereaux
Subject: RE: [EXTERNAL]RE: Water Licence 2AM-MRY1325 Baffinland Response to September 2021 Inspection
Date: December 10, 2021 6:28:00 PM
Attachments: image001.png
Baffinland Response to September 2021 Inspection - Commitment Timeline.pdf
Baffinland Response to September 2021 Inspection - Commitment Timeline.xlsx

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Hi Jon,

As discussed, please find attached commitment tracker summary from Baffinland's response to the September 2021 inspection report. Baffinland's position is that no plans subject to Part B, Item 12 were part of the inspection response and only commitments with associated timelines to address the various items identified by the inspector were included.

If you require further information or have any questions or concerns please do not hesitate to contact the undersigned.

Regards,

Kendra

Kendra Button | Environmental Superintendent
Mary River Mine Site
T: +1 647 253 0598 x6255
C: +1 416 418 7332

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From: Mesher, Jonathan <jonathan.mesher@rcaanc-cirnac.gc.ca>
Sent: November 29, 2021 11:00 AM
To: Kendra Button <Kendra.Button@baffinland.com>; Connor Devereaux <Connor.Devereaux@baffinland.com>
Cc: Hack, Justin <justin.hack@rcaanc-cirnac.gc.ca>; Assol Kubeisinova <assol.kubeisinova@nwb-oen.ca>
Subject: [EXTERNAL]RE: Water Licence 2AM-MRY1325 Baffinland Response to September 2021 Inspection

Hello,
Thank you for the submission please ensure the plan has timetable for implementation, the requirement for plans to have a timetable for implementation is described in Part B, Item 12 of the licence 2AM-MRY1325 which states that; "The Licensee shall, for all Plans submitted

under this Licence, include a proposed timetable for implementation. Plans required to be submitted for Board approval, cannot be undertaken without subsequent written Board approval and direction. The Board may alter or modify a Plan if necessary to achieve the objectives of the Licence or other regulatory instruments. For plans submitted for Board approval, the Board will notify the Licensee in writing of the Board's approval, rejection or alteration of the Plan. Plans or drawings submitted to the Board for review and/or comment do not require Board approval prior to implementation, but the Board may request revisions to those Plans."

Please submit the plan with a timetable before December 10, 2021.

Regards,

Jonathan Mesher

Resource Managment Officer, Nunavut Region
Crown Indigenous Relations and Northern Affairs Canada – CIRNAC
Jonathan.mesher@canada.ca
Office #: 867-975-4296
Fax: 867 979-6445
Cell #: 867-222-0118

From: Kendra Button <Kendra.Button@baffinland.com>
Sent: Thursday, November 25, 2021 4:24 PM
To: Mesher, Jonathan <jonathan.mesher@rcaanc-cirnac.gc.ca>; Assol Kubeisinova <assol.kubeisinova@nwb-oen.ca>
Cc: Karén Kharatyan <karen.kharatyan@nwb-oen.ca>; licensing@nwb-oen.ca; Hack, Justin <justin.hack@rcaanc-cirnac.gc.ca>; Chris Spencer <CSpencer@QIA.ca>; Hugh J. Karpik <HKarpik@QIA.ca>; Timothy Ray Sewell <Timothy.Sewell@baffinland.com>; Francois Gaudreau <Francois.gaudreau@baffinland.com>; Martin Beausejour <Martin.Beausejour@baffinland.com>; Megan Lord-Hoyle <megan.lord-hoyle@baffinland.com>; Connor Devereaux <Connor.Devereaux@baffinland.com>; Lou Kamermans <lou.kamermans@baffinland.com>
Subject: Water Licence 2AM-MRY1325 Baffinland Response to September 2021 Inspection

Hello,

Please find the attached letter in response to the September 2021 Water License Inspection by CIRNAC.

If you have any questions or concerns please do not hesitate to contact the undersigned.

Kind Regards,
Kendra

Kendra Button | Environmental Superintendent
Mary River Mine Site

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CIRNAC Item #	Project Location	CIRNAC Description of Concern or Finding	BIM Commitment Summary	BIM Commitment Timeline
A) Tote Road				
2	CV-154A	Spill 21247 - There was visible erosion on the road near the culvert, upstream of the culvert and down stream of the culvert. See photos 4 &5 for erosion. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2. The licensee is to remediate all spills noted in this report.	Excess sediment from culvert inlet and outlet banks, reshaping and re-armouring of the embankment slopes, and routine maintenance of the check dams.	Complete prior to freshet 2022.
3	CV-115	Spill 21247- No concerns near the culvert. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2. The licensee is to remediate all spills noted in this report.	Excess sediment from culvert inlet and outlet banks, extending the culvert inlet/outlet, reshaping and re-armouring of the embankment slope, and sediment clean out and armouring of the ditch draining to the culvert inlet.	Complete prior to freshet 2022.
4	CV-112	Spill 21247- Potentially non-engineered ditches upstream of the culvert could be causing increased TSS. See Photo # 6 for the mentioned ditches. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2. The licensee is to remediate all spills noted in this report.	Excess sediment will be removed from the culvert inlet and outlet banks, embankments will be reshaped and re armoured, and the ditch on the inlet side will be cleaned out of sediment and armoured as per the approved Civil Design Criteria for the Project.	Complete prior to freshet 2022.
5	CV-093	Spill 21247- Potentially non-engineered ditches upstream of the culvert could be causing increased TSS. See photo of potentially non-engineered ditches. See photo 7 for the potentially, non-engineered ditches. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2. The licensee is to remediate all spills noted in this report.	Including the excavation of sediment build up from the ditch draining to the culvert inlet, and reshaping and armouring of the ditch as per the approved Civil Design Criteria for the Project.	Complete prior to freshet 2022.
6	BG-24	Spill 21247- Significant erosion on both sides of culvert. See photos 8-9 for the erosion. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2. The licensee is to remediate all spills noted in this report.	Excess sediment will be removed from the culvert inlet and outlet banks, culvert extensions will be installed and road embankments will be re-armoured.	Complete prior to freshet 2022.
7	CV-001	Spill 21247- Damaged culvert and erosion on down stream side of culvert. See photo 10 for the photos of the damaged culvert. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2. The licensee is to remediate all spills noted in this report.	Excess sediment will be removed from the culvert inlet and outlet banks, culvert extensions installed to repair the damaged end, and road embankments will be re-armoured. KM97	Complete prior to freshet 2022.
B) Milne Port				
1	MP-05	The inspector noted rips on the liner at the inflow after the culvert, the pond appeared to be appropriately pumped down. See photo 11 for pictures of the rips.	Repair minor rips.	During Q2 2022.
2	MP-06	There was erosion noted on the East inflow of the pond, the pond appeared appropriately pumped down. See photo 12 for the erosion noted.	Regrading and stabilization of the berm slopes and crests, and ensuring runoff from ore pad enters appropriate ditches.	Complete prior to freshet 2022.
3	Pond 3	Pond 3 is unable to passively drain into MP-06 and the ditch connecting the two ponds is leaking. The surface water on the South West side of the ore pad is unable to drain into Pond 3. See photo 13 for a picture of the hoses used to pump the water from pond 3 into mp-06 and the area leaking. The licensee is to ensure the following waste/water management structures are operating as intended and consistent with the design in the plans approved by the Nunavut Water Board; Ore stockpile ditches and gradient, Crusher pad ditches, MP-07 ditches, Western Globe Fuel Module, HWB 03, HWB 04.	The west ore pad ditch normally collected a low volume of runoff water from the ore pad intermittently, however, a temporary diversion berm was constructed to prevent this runoff from reporting to the ditch until the ditch is repaired.	Ongoing - Corrective actions to address the seepage are under investigation and runoff water from the ore pad will continue to be diverted to the surface water management ponds via the interim measures until permanent corrective actions are identified and implemented.
5	HWB 03 and 04	There is no defined berm where waste is being stored it appears as if a spill did occur the waste would flow outside of this facility. See photo 16 for a picture of this facility. The licensee is to ensure the following waste/water management structures are operating as intended and consistent with the design in the plans approved by the Nunavut Water Board; Ore stockpile ditches and gradient, Crusher pad ditches, MP-07 ditches, Western Globe Fuel Module, HWB 03, HWB 04.	Regrade the area at the entrance of twin-cell HWB-3/ HWB-4.	Complete prior to freshet 2022.
6	Western Globe Fuel Module	There is no visible berm, this pumping station does not appear to be properly contained, if a spill was or occur or if rain was to pool and become contaminated it appears to be able to flow outside of containment. See photo 17 for the lack of defined berms. The licensee is to ensure the following waste/water management structures are operating as intended and consistent with the design in the plans approved by the Nunavut Water Board; Ore stockpile ditches and gradient, Crusher pad ditches, MP-07 ditches, Western Globe Fuel Module, HWB 03, HWB 04.	Re-construction of gravel berm around the fuel module to contain any possible spills.	Complete by December 31, 2021.
C) Mine Site				
1	North of Camp Lake Intake	The inspector noted erosion North of the camp lake intake, it appears surface water from the runway and surrounding area has no water management structure to manage it. This surface water has previously caused erosion near the camp lake tributary and now is eroding the sandy hills north of the water intake. See photo 18 and 19 for pictures of this erosion. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2.	Implement addition erosion and sediment control measures in accordance with SWAEMP to address the erosion north of the Camp Lake Intake.	Complete prior to freshet 2022.
2	Aircraft Fuel Berm	The inspector noted erosion on the outside of this berm. See photo 20 for the erosion noted. The licensee is to install the appropriate erosion control measures to prevent continued erosion identified in comments A1-A7, C1 and C2.	Regrading of berm slopes and crests and runoff diversion away from berm slopes to prevent future erosion.	Complete prior to freshet 2022.

5	MS-07	Spill 21268- This facility is currently dealing with a seepage issue potentially due to gradient of the ditch and the type of fill used. See Photo 23 for the ditch with the unresolved seepage. The licensee is to remediate all spills noted in this report.	Interim measures to convey contact water to pond.	Ongoing - Third party consultant hired to investigate. All contact water will continue to be captured and conveyed to the surface water management pond via the interim measures until permanent corrective actions are identified and implemented.
6	Crusher Pad and Pond	The Crusher pad is currently dealing with an unresolved seepage as well, the ditch that is designed to divert surface water to the containment pond is not operational due to a leak. The licensee currently has a sump installed and is pumping water from the sump into the containment pond. See photo 24 for a photo of the sump and berms installed to keep the surface water out of the ditches. The licensee is to ensure the following waste/water management structures are operating as intended and consistent with the design in the plans approved by the Nunavut Water Board; Ore stockpile ditches and gradient, Crusher pad ditches, MS-07 ditches, Western Globe Fuel Module, HWB 03, HWB 04.	Interim measures to convey contact water to pond.	Ongoing - All contact water will continue to be captured and conveyed to the surface water management pond via the interim measures until construction of pond MS-10 identified in Modification No.13 submittal.

Attachment 3

Table 1: Baffinland's April 2022 Response to September 2021 CIRNAC Inspection

Table 1 – Baffinland's April 2022 Response to September 2021 CIRNAC Inspection

#	Project Location	Description of CRINAC's Concern or Finding	BIM Commitment Summary	Commitment Timelines and Details
3	Milne Port – Pond 3	Pond 3 is unable to passively drain into MP-06 and the ditch connecting the two ponds is leaking. The surface water on the South West side of the ore pad is unable to drain into Pond 3. See photo 13 for a picture of the hoses used to pump the water from pond 3 into mp-06 and the area leaking. The licensee is to ensure the following waste/water management structures are operating as intended and consistent with the design in the plans approved by the Nunavut Water Board; Ore stockpile ditches and gradient.	The Ore Pad Water Management Plan will be updated prior to Freshet 2022 to ensure use of the ditch is as per design.	Baffinland has reviewed this concern with the design engineers (Hatch Ltd) to confirm the section of ditch where seepage was observed in 2021 was built to design. The ditch is designed to redirect rain or snowmelt sheet flow runoff from the ore pad to MP-06, however is not designed to contain an instantaneous flow of water from pumping operations that redirects water to MP-06 from a discharge line from Pond 3. Moving forward in 2022, the ditch will only be used as per the design; which is passively redirecting runoff from the ore pad to MP-06 and no water will be pumped into the ditch. With this operational management directive, there are no anticipated seepage issues moving forward. The Ore Pad Water Management Plan has been updated to include this directive, and Pond 3 water will continue to be directed to MP-06 via the corrective actions implemented in 2021.
5	Mary River - MS-07	Spill 21268- This facility is currently dealing with a seepage issue potentially due to gradient of the ditch and the type of fill used. See Photo 23 for the ditch with the unresolved seepage. The licensee is to remediate all spills noted in this report.	Additional grading to regain positive drainage. Interim measures to convey contact water to pond until it is confirmed the grading was adequate, or further upgrades to the collection/ diversion berm designed and constructed.	A third party consultant (Knight Piésold) was hired to investigate and determine corrective actions; details are provided in Attachment 4. It was determined settlement likely occurred in the diversion ditch in question, therefore positive drainage is no longer present there. Baffinland will review and implement Knight Piésold's recommendations in a phased approach, starting with additional grading, and then monitoring to determine if the collection/ diversion berm needs to be upgraded. All contact water will continue to be captured and conveyed to the surface water management pond via the interim measures implemented in 2021 until the grading has been deemed sufficient corrective action, or further construction of collection/ diversion berm upgrades.

#	Project Location	Description of CRINAC's Concern or Finding	BIM Commitment Summary	Commitment Timelines and Details
6	Crusher Pad and Pond	The Crusher pad is currently dealing with an unresolved seepage as well, the ditch that is designed to divert surface water to the containment pond is not operational due to a leak. The licensee currently has a sump installed and is pumping water from the sump into the containment pond. See photo 24 for a photo of the sump and berms installed to keep the surface water out of the ditches. The licensee is to ensure the following waste/water management structures are operating as intended and consistent with the design in the plans approved by the Nunavut Water Board; Crusher pad ditches.	Interim measures to convey contact water to pond until construction of permanent corrective actions.	All contact water will continue to be captured and conveyed to the surface water management pond via the interim measures to prevent potential seepage to the tundra until construction of permanent corrective actions. Water management measures for the Crusher Facility (CF) are being addressed as part of the ongoing implementation of Baffinland's Long Term Water Management Plan (LTWMP) outlined in Modification No. 13 approved by the Nunavut Water Board on August 16, 2021. As part of the LTWMP, Baffinland plans to construct a new surface water management pond (MS-10) downstream of the Crusher Facility to collect runoff from a large portion of the mine infrastructure area including the existing Crusher Facility. The pond will be formed by constructing perimeter berms along the northwest (Tote Road) and southwest (proposed northern railway embankment) sides. As outlined in Modification No. 13, the MS-10 pond considered in the water management plan will cover 134 metres of low quality fish habitat upstream of the existing culvert crossing CV-186 and requires additional permitting. Baffinland is currently working with DFO to obtain the required permits. The engineering design work is also currently on hold while the NIRB review of the Phase 2 Proposal concludes, as the facility would interface with key Phase 2 infrastructure (railway) that must be considered. In accordance with the Type 'A' Water Licence, Part D, Baffinland will submit Issued for Construction drawings for any new structures designed to contain or divert water from the CF pad that were included in Modification No. 13.

Attachment 4

Knight Piesold's Memorandum - Remediation of Seepage from the KM106 Stockpile

Knight Piésold CONSULTING

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

MEMORANDUM

Date:	March 9, 2022	**File No.:**	NB102-00181/78-A.01
		Cont. No.:	NB22-00239
To:	Mr. Connor Devereaux		
Copy To:	Kendra Button, Allan Knowlton, Emmanuel Ocran		
From:	Amy Adams		
Re:	**Mary River Project - Remediation of Seepage from the KM106 Stockpile**		

1.0 INTRODUCTION

Knight Piésold Ltd. (KP) was requested by Baffinland Iron Mines Corporation (Baffinland) to provide recommendations to address seepage from the KM106 Stockpile at its Mary River Mine.

The KM106 Stockpile was designed to temporarily store run-of-mine (ROM) ore. A collection/diversion berm wraps around the east and south sides of the stockpile to convey runoff to a lined pond and prevent non-contact water from entering the collection system. The stockpile access road, sedimentation pond, and runoff measures were developed by KP (2019) based on a proposed stockpile layout provided by Baffinland (2019). The stockpile and pond were constructed in June to September 2020 (Baffinland, 2020a). The layout is shown on Figure 1.

On June 28, 2021, Baffinland environmental staff observed seepage at two locations at the toe of the collection/diversion berm during regular inspections as per the Operation, Maintenance and Surveillance (OMS) Manual for the KM106 Stockpile (Baffinland, 2020b). These locations are identified as MS-106OS-01 and MS-106OS-02 on Figure 1. The seepages were reported as an unauthorized release to the Nunavut Spill Line, and a letter was provided to the Resource Management Officer at Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC Inspector), the Regulatory Manager at the Qikiqtani Inuit Association (QIA), and the Enforcement Officer under the Metal and Diamond Mining Effluent Regulations (MDMER, 2018) at Environment and Climate Change Canada (ECCC) on the same day (Baffinland, 2021). Baffinland's initial response measures are described in that same letter report from Baffinland to the agencies.

This memorandum describes the observed seepage and provides initial recommendations to mitigate the potential for future seepage.

2.0 SEEPAGE OBSERVATIONS

2.1 GENERAL

Photos taken by Baffinland on June 28, 2021 and presented in its above-mentioned report to the agencies (Baffinland, 2021) are included in Appendix A. KP has reviewed the photos, Baffinland's as-built survey as presented in its Construction Summary Report (CSR; Baffinland, 2020a), and a subsequent drone survey from August 21, 2021. It appears the seepages are due to settlement that occurred between September 2020 and August 2021 that has resulted in insufficient grades that do not direct water towards the pond, as well as the presence of coarse, permeable fill and/or overburden materials that allow for some seepage to occur.

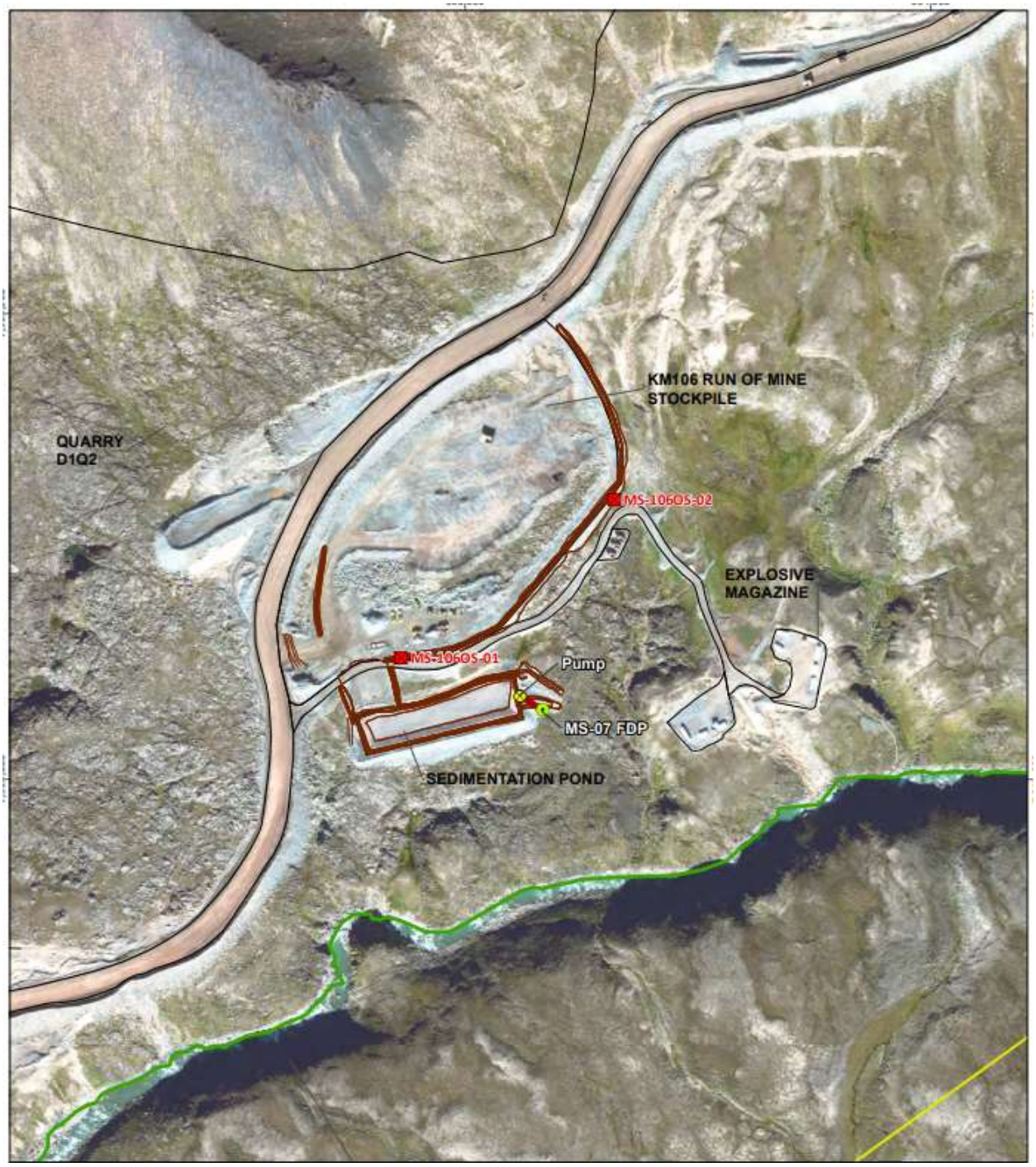

Figure 1 KM106 Stockpile and Pond Showing Seepage Locations (Baffinland, 2021)

Note(s):

1. Red lines indicate the approximate location of the Diversion Berms.

At completion of construction in late September 2020, a grade check survey of the diversion berm was completed by the contractor that showed the channel to have positive drainage (Appendix B). This grade check was also presented in the CSR (Baffinland, 2020a).

2.2 OBSERVED CONDITIONS AT MS-106OS-01

KP's review of the August 2021 drone survey indicates that the diversion ditch adjacent the seepage location MS-106OS-01 is flat, with multiple 277.0 m elevation measurements along the ditch alignment (Figure 2).

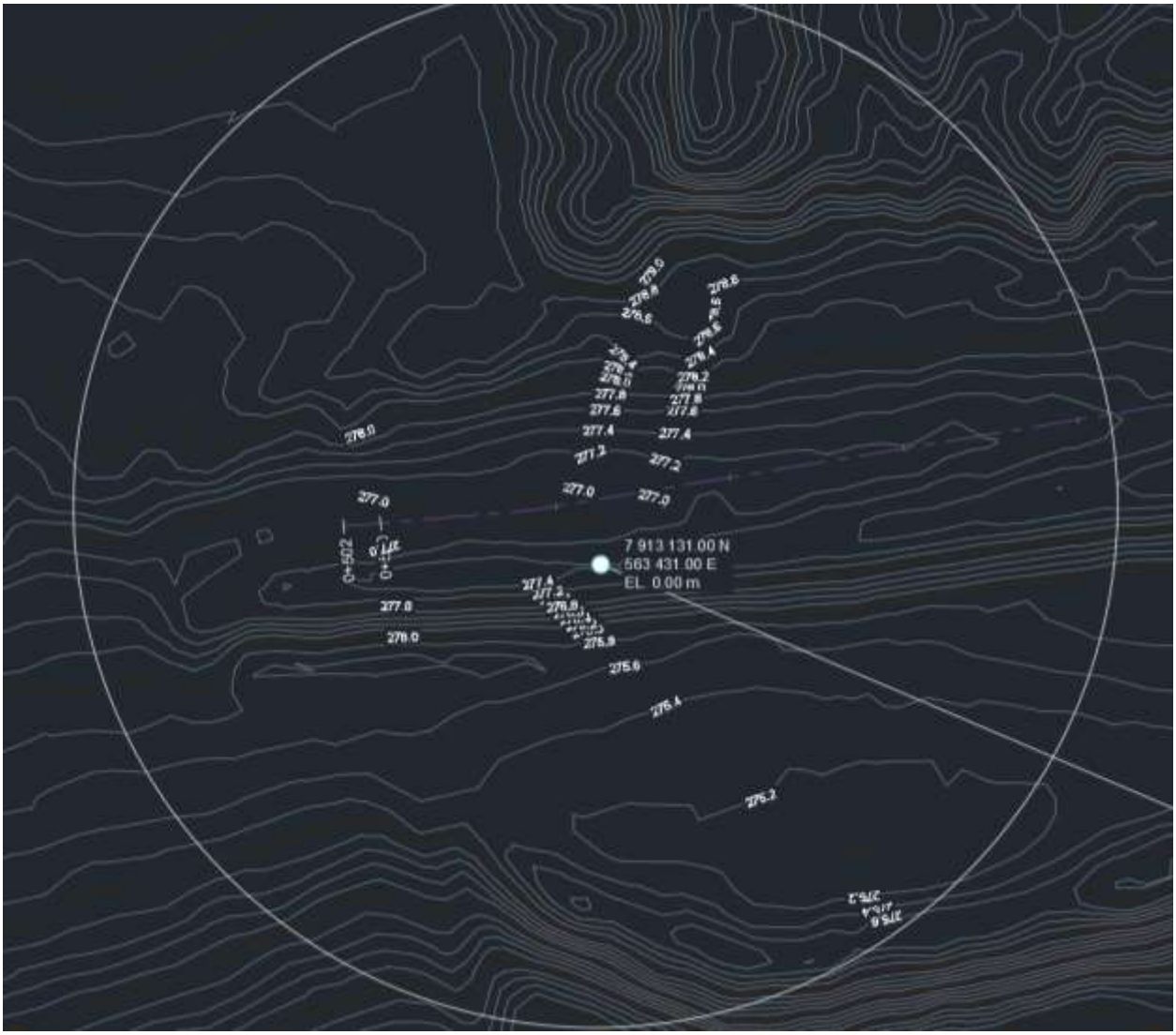

Figure 2 As-built Survey at MS-106OS-01 Showing Flat Topography

The drone survey suggests that settlement has occurred such that positive drainage is no longer present in this area.

2.3 OBSERVED CONDITIONS AT MS-106OS-02

KP's review of the August 2021 drone survey indicates that a local low spot has formed within the diversion ditch at the location of the seepage at MS106OS-02 (Figure 3). This is also evident with the accumulation of fines at this location, as shown on Photo 5 in Appendix A.

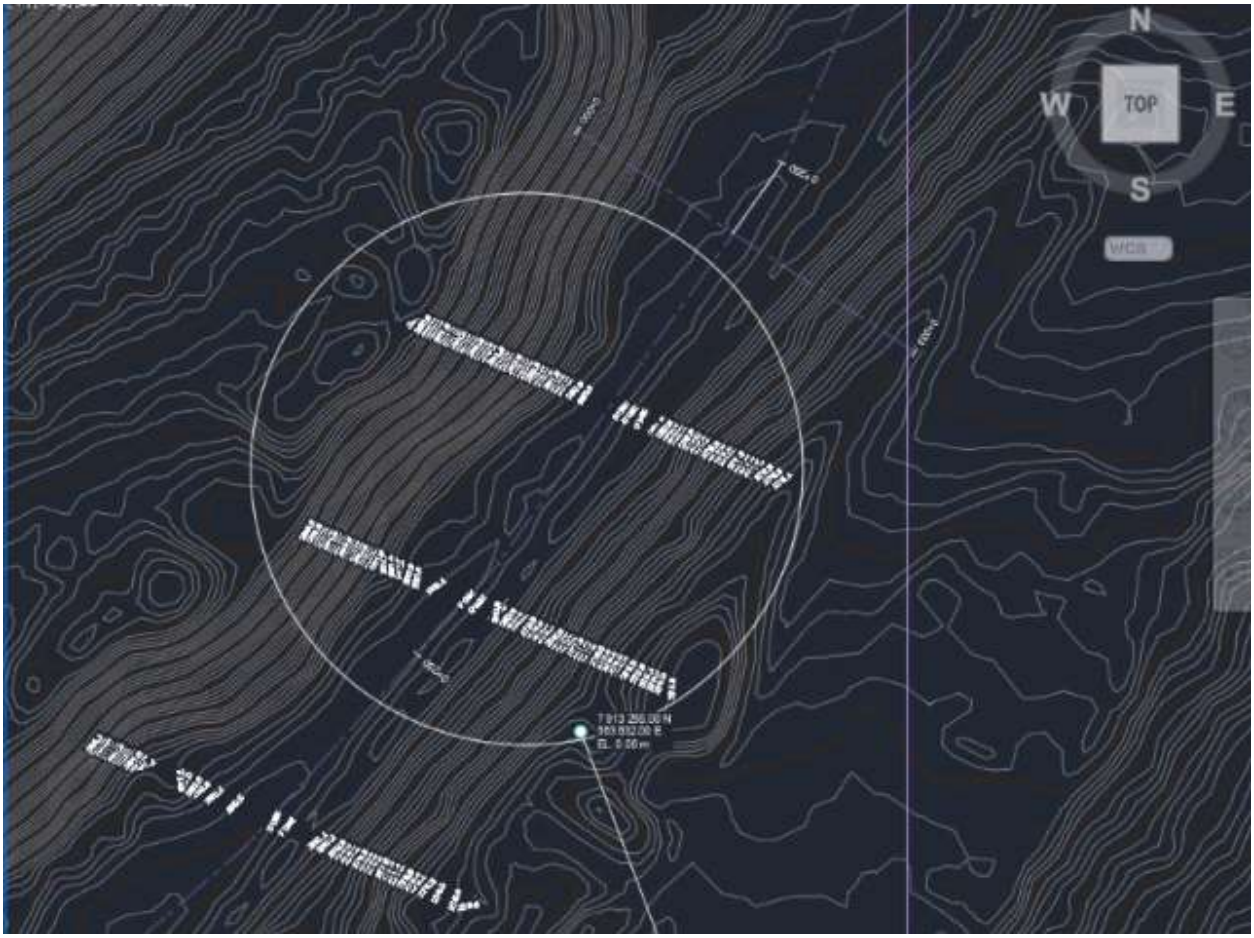

Figure 3 As-built Survey at MS-106OS-02 Showing a Low Spot

3.0 RECOMMENDED REMEDIAL MEASURES

Seepages through the diversion berm have occurred where there is not positive drainage toward the Sedimentation Pond. This is not unexpected as runoff management facilities require ongoing maintenance. Occasionally, seepage bypasses water management facilities (even lined facilities), requiring the short-term interception and recovery of seepage.

KP recommends that additional grading be completed as a first course of action once the ground has sufficiently thawed. Ongoing surveillance and grading will be required to maintain positive surface drainage towards the sedimentation pond in the area upstream of the collection/diversion berm.

Regular inspections should continue to be completed following Baffinland's KM106 Stockpile OMS Manual (Baffinland, 2020b). At minimum, inspections should be completed after every storm event and seasonally to identify grade deviations resulting from erosion, frost action and permafrost degradation.

Correcting the grade within the collection/diversion berm may not be sufficient to reduce seepage given the potential for water to infiltrate upstream of the ditch or through the ditch invert into the overburden (active layer) and/or through the collection/diversion berm itself. Should the collection/diversion berm need to be upgraded to reduce or eliminate seepage overland and through the upper active layer, an engineered solution should be identified to accomplish this. Options may include:

- **Line the collection/diversion ditch and berm -** This could include the installation of low permeability soil layers or a geomembrane liner along the base of the ditch and the upstream slope of the collection/diversion berm. The low permeability soil layer or geomembrane liner would need to be keyed into the overburden to anchor it and serve as a cut off for any runoff flowing through the connected pore space of the active layer at shallow depths. Protection layers (fill) will be required to protect the low permeability soil layers or liner from rock falls (geomembrane) and potential erosion (soil). This may require excavation and reconstruction of the existing diversion berm downslope to maintain flow capacity for the design storm event. If this approach is selected, the work would be best completed in late summer when the active layer is at its maximum thickness.
- **Construct a downstream berm -** This would involve the placement of fill over and downstream of the existing collection/diversion berm to construct a new berm. The new berm would need to be of sufficient height that it would promote the underlying permafrost and active layer to aggregate into the upgraded berm and act as a barrier to seepage through the berm and current active layer. This berm could also be partially constructed with low permeability till to help minimize seepage in the event of thaw. If this approach is selected, the downstream berm would be best constructed under freezing conditions either later in the year or before spring thaw as this approach involves the aggregation of permafrost into the diversion berm.

The following factors will need to be considered during the option evaluation:

- Expected performance
- Material availability
- Available space
- Cost
- Schedule considerations
- Maintenance requirements

Depending on the remedial measures selected (or combination of measures) a significant reduction or possible elimination of the seepage may result. However, unless the active layer downstream of the berm can be aggraded to adequate elevations with respect to the ditch invert, it is likely that some minor seepage will continue to occur through the active layer.

4.0 SUMMARY AND RECOMMENDED ACTIONS

KP recommends Baffinland undertake the following immediate actions to address the seepage issue:

- Regrade the existing collection/diversion berm to re-establish positive drainage towards the Sedimentation Pond
- Continue to monitor and if required, recover seepage through the snow-free period in 2022 using the infrastructure currently in place until seepage is substantially reduced or an engineered solution is implemented

Should the above actions be unsuccessful in reducing or eliminating the seepage to a satisfactory level, the following actions should be taken:

- Develop an engineered solution to reduce or eliminate seepage through the collection/diversion ditch and berm
- Fulfill any regulatory consultation and permitting requirements
- Implement the engineered solution
- Update the OMS Manual to incorporate the inspection and maintenance requirements of the upgrades

5.0 CLOSING

We trust this meets with your present requirements. Please do not hesitate to contact the undersigned with any questions or to discuss the contents of this memorandum.

Yours truly,
Knight Piésold Ltd.

Prepared: Amy L. Adams, Ph.D., P.Eng., P.E.
Senior Engineer

Reviewed: Kevin Hawton, P.Eng.
Specialist Engineer | Associate

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

Attachments:

Appendix A Baffinland Site Photos (June 29, 2021)
Appendix B Channel Grade Survey (September 6, 2020)

References:

Baffinland Iron Mines Corporation (Baffinland), 2019. Email from: Allan Knowlton. Email to: Amy Adams, Knight Piésold Ltd. Re: *Proposed revised location for 107km Stockpile to 106 km*. May 1. (NB102-181/57).

Baffinland Iron Mines Corporation (Baffinland), 2020a. *Baffinland Iron Mines Corporation - Mary River Project - Construction Summary Report - KM106 Run of Mine Stockpile & Sedimentation Pond*. December 12.

Baffinland Iron Mines Corporation (Baffinland), 2020b. *KM106 Stockpile Runoff Measures Operation, Maintenance and Surveillance (OMS) Manual*. December 12. Ref. No. BAF-TS-106KM-OMS-1, Rev 1.

Baffinland Iron Mines Corporation (Baffinland), 2021. Letter to: CIRNAC, QIA and ECCC. Re: *Follow-up to Spill #2021-268 - Mary River Project - Water Licence No. 2AM-MRY1325*. December 12.

Knight Piésold Ltd. (KP), 2019. Letter to: Allan Knowlton, Baffinland Iron Mines Corporation. Re: *Design Summary for the KM106 Stockpile and Runoff Management Measures*. June 20. North Bay, ON. Ref. No. NB19-00443 (NB102-181/57)

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

/rac

APPENDIX A

Baffinland Site Photos (June 29, 2021)

(Pages A-1 to A-5)

Attachment 1

Photos

2275 Upper Middle Road East, Suite 300 | Oakville, ON, Canada L6H 0C3
Main: 416.364.8820 | Fax: 416.364.0193 | www.baffinland.com

MS-106OS-01

Photo 1. Upstream of MS-106OS-01 spill location on June 29, 2021

Photo 2. Spill location MS-106OS-01 on June 29, 2021

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Photo 3. Downstream of MS-106OS-01 spill location on June 29, 2021

Photo 4. Temporary Diversion Swale at MS-106OS-01 spill location on July 2, 2021

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MS-106OS-02

Photo 5. Upstream of MS-106OS-02 spill location on June 29, 2021

Photo 6. Spill location MS-106OS-02 on June 29, 2021

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Main: 416.364.8820 | Fax: 416.364.0193 | www.baffinland.com

Photo 7. Downstream of MS-106OS-02 spill location on June 29, 2021

Photo 8. Enhanced sump at MS-106OS-02 spill location on July 27, 2021

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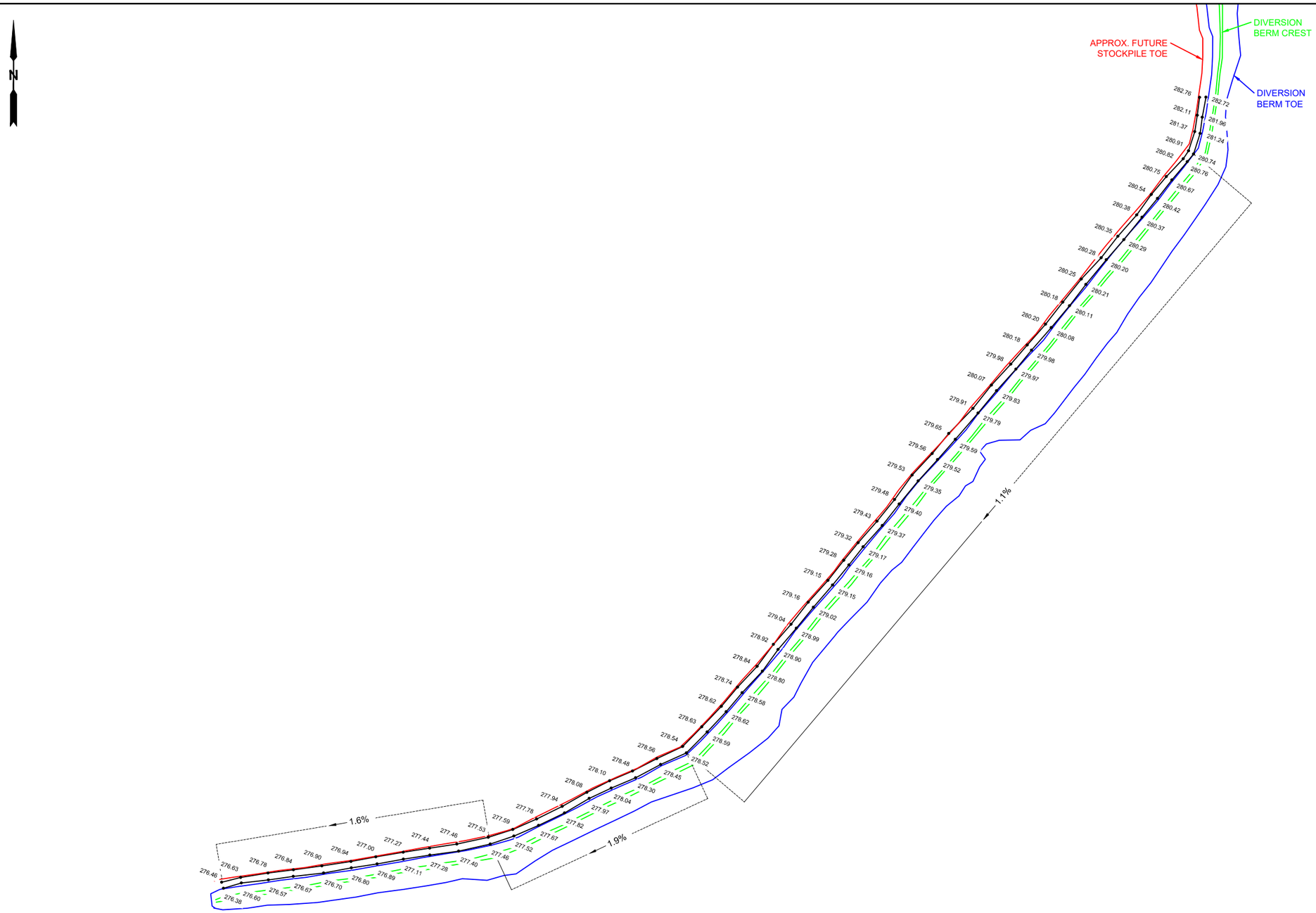
APPENDIX B

Channel Grade Survey (September 6, 2020)

(Page B-1)



	OWNER: BAFFINLAND IRON MINES LP	PREPARED BY: NUNA EAST LTD. PO Box 370 Pond Inlet, NU X0A 0X0		KM 106 STOCKPILE
	PROJECT: MARY RIVER EXPANSION PROJECT			DRAWING TITLE: CHANNEL GRADE *SURVEYED SEPTEMBER 6, 2020*
		DRAWN BY: M. GOREHAM	SCALE: N.T.S.	DATE: Sept. 6, 2020	DRAWING NAME (YYMMDD): 200906 KM 106 CHANNEL GRADE.dwg