



August 31, 2019

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RE: Submission of 2019 Geotechnical Inspection Report No. 1 (July 2019)

Under Part D, Item 18 of Baffinland Iron Mines Corporation's (Baffinland) Type "A" Water Licence 2AM-MRY1325 Amendment No. 1 (Water Licence), Baffinland is required to conduct biannual geotechnical inspections of specified Mary River Project (the 'Project') infrastructure. Part D, Item 18, of the Water Licence states that:

"The Licensee shall conduct inspections of the earthworks and geological and hydrological regimes of the Project biannually during the summer or as otherwise approved by the Board in writing. The inspection shall be conducted by a Geotechnical Engineer and the inspection report shall be submitted to the Board within sixty (60) days of the inspection, including a cover letter from the Licensee outlining an implementation plan to respond to the Engineer's recommendations."

The first biannual geotechnical field inspection for 2019 was conducted by Laszlo Bodi, M.Sc., P.Eng., Principal Civil/Geotechnical Engineer with Wood Environment and Infrastructure Solutions. The focus of the inspection was on the Water Licence related infrastructure located at the Mary River Mine Site and Milne Port, as well as select water crossings along the Milne Inlet Tote Road. The attached report covers the first inspection that was conducted between June 27th and July 2nd, 2019.

During the July 2019 inspection, the following site facilities were inspected:

Mary River Mine Site

- Polishing/Waste Stabilization Ponds (3)
- Hazardous waste disposal areas - (HWB-1 to HWB-7)
- MS-06 and MS-08 surface water collection ponds and ditches
- Generator Fuel Berm (referred to as 'Genset Pond' in report)
- Fuel Farms (3) – Aerodrome fuel storage, Existing diesel fuel farm, and the New fuel farm
- Solid-waste disposal site (non-hazardous landfill)
- CLSP silt sedimentation control ponds and berms
- Water discharge area

Milne Inlet Port Site

- Hazardous waste disposal areas - (HWB-1 through to HWB-4)
- MP-01A pond
- MP-03 fuel tank farm
- MP-04 and 04A ponds

- Surface water collection ponds and ditches adjacent to the ore stockpile (MP-05 and MP-06)
- Freight dock check dam
- Surface water collection ditches (P-SWD-3, P-SWD-5, P-SWD-6, P-SWD-7, W3/W14, 380M pad)
- Tote road ditches and culverts (conveying surface water from the quarry area)

Milne Inlet Tote Road

- Bridges (4)
- Culverts (12)

The attached report (refer to Attachment 1) presents the findings of the July 2019 inspection and recommendations for the aforementioned structures. The following subsections of this letter summarize Baffinland's plan for implementing recommendations.

Recommendations for the Mary River Mine Site Infrastructure

Polishing/Waste Stabilization Ponds (3 PWS ponds)

Some minor damage was visible on the liner on the crest of the berms (above the maximum water/freeboard line) at a few locations. Another relatively common issue in water lagoons is the appearance of whales within the ponds, which was identified. Furthermore, large timbers and miscellaneous other elements (e.g., used tires etc.) are utilized as weight to secure the liner in-place at the berm's crest.

Baffinland Action: Baffinland commits to having the minor damage to the liner repaired as part of the regular maintenance program. Baffinland will continue to monitor the PWSPs for the presence of whales in the liner, and as needed will develop a plan to address these when the affected pond is drained. Cleanup of this area will occur to remove excess materials.

Mine Site Hazardous Waste Disposal Areas

HWB-1

It may be advisable to rebuild the perimeter berm around the cell, followed by the installation of a new geomembrane liner with sand cover.

Baffinland Action: The cell is currently not being used and has been left empty. Baffinland shall not use this facility for the storage of hazardous waste or substances until it has been repaired. Alternatively, this facility may be decommissioned.

HWB-6

The berms have been extensively disturbed by truck and foot traffic, particularly at the northern section of the berm. Cracking and tearing of the liner are also visible at several locations on the upstream face and crest of the berm.

Baffinland Action: Baffinland is aware HWB-6 will require repairs to continue receiving waste materials in the future. A repair of both the berm structure and the liner is scheduled to be completed.

HWB-7

Minor damages to the geotextile (covering the liner) were noted at a few locations on the crest and downstream slope of the berm.

Baffinland Action: Baffinland commits to reinstating geotextile and soil cover in the specified areas in order to prevent potential damage to the liner in the future.

MS-06 – Surface Water Collection Pond Adjacent to the Crusher Pad

The corrugated steel pipe culvert beneath the tote road entrance is almost fully clogged with silt.

Baffinland Action: Baffinland commits to cleaning the culvert identified during the inspection. The collected excess silt will be deposited at an appropriate disposal location onsite.

Generator Fuel Berm (Genset Pond)

The Generator Fuel Berm is a historic secondary containment structure from the operation of fuel bladders and the associated generator at the Mine Site Weatherhaven Complex, and is referred to in the Wood report as 'Genset Pond'. Some sloughing of the upstream slope of the berm is visible at the south-east corner of the pond. It shall be pointed out that the berm at this pond is generally stable and the liner appears to be intact.

Baffinland Action: Baffinland commits to bringing granular fill to this location to re-fill the slope and regrade the area. In addition to the repair work on the slope, the southern, lower section of the berm will be reconstructed to its original geometry.

CLSP Silt-sedimentation Check Dams and Berms

To prevent the siltation around the water intake structure control berms and check dams need to be regularly maintained.

Baffinland Action: Baffinland commits to removing and disposing the collected silt at the check dams on an as-needed basis. Baffinland also commits to re-stabilizing the gully through installation of an erosion resistant layer (coarse gravel / rip-rap).

Water (Effluent) Discharge Area

Minor surface erosion was noted adjacent to the rock fill slope, within the native material.

Baffinland Action: Baffinland commits to recovering the eroded slope with rock fill to prevent any regressive erosion in the future.

Recommendations for Milne Port Infrastructure

Milne Port Hazardous Waste Disposal Areas

HWB-1

Ripped geotextile and exposed liner were noted at a few locations at higher elevations along the berm.

Baffinland Action: Baffinland commits as part of the onsite maintenance program, that the disturbed areas of the berm on the slopes and crest be regraded. In areas where the liner is exposed, Baffinland commits to covering the area with a protective layer of soil (clean sand and gravel).

HWB-2

As a result of some recent earthwork immediately adjacent to the cell, sections of the perimeter berm have been impacted, and the slopes and liner were somewhat damaged in the process. There is a small area in one of the corners with ponding water, where the liner is exposed.

Baffinland Action: The Site Services Department supervisors are aware HWB-2 will require repairs. A repair of both the perimeter berm shall be reconstructed and the liner where exposed, carefully repaired.

HWB-3 and HWB-4

The liner within the ponds are intact; however, they are exposed at a few locations on the crest and downstream slopes of the berms.

Baffinland Action: Baffinland commits to regrading and covering areas where liner is exposed with a protective granular fill (clean sand and gravel).

MP-04 and 04A Landfarm and Contaminated Snow Disposal Cells

Exposed liner was visible on the downstream slope of sections of the berm for MP-04, particularly along the north berm.

Baffinland Action: Baffinland commits to regrading and covering areas where liner is exposed with a protective granular fill (clean sand and gravel).

Tote Road Ditches and Culverts Near the Rock Quarry

The flow of water may soften the original native subgrade beneath the road embankment and eventually could create some instability of the embankment.

Baffinland Action: To increase the stability of the embankment in the affected areas, Baffinland commits to re-grading the upstream area leading to the culverts by placing additional rock fill at the culvert's outlet (toe-berm reinforcement for increased embankment stability).

Tote Road between Mary River and Milne Inlet - Bridges and Culverts

Bridge 17

There are two historic abutments, located immediately adjacent to the “new” ones. The metal front and wing walls of both “old” abutments have suffered damages in the past, particularly the south abutment.

Baffinland Action: To maintain the stability of the currently used bridge abutments, Baffinland will keep the two old abutments in place since they provide support to the adjacent new structures. Baffinland will schedule repairs to the damaged sections of the abutments identified during the inspection. Additional rip-rap on the regraded granular fill slopes will also be placed to prevent erosion.

Bridge 63

There are two historic abutments, located immediately adjacent to the “new” ones and damage to the metal front and wing walls of both abutments are visible. In order to maintain the stability of the currently used bridge abutments, the two old abutments should be kept in place since they provide support to the adjacent new structures.

Baffinland Action: To maintain the stability of the currently used bridge abutments, Baffinland will keep the two old abutments in place since they provide support to the adjacent new structures.

Bridge 80

There are two historic abutments, located immediately adjacent to the “new” ones, providing support to the new abutments and road embankment. Therefore, removal of these structures is not recommended.

Baffinland Action: To maintain the stability of the currently used bridge abutments, Baffinland will keep the two old abutments in place since they provide support to the adjacent new structures.

Bridge 97

At this location the old abutments are located somewhat away from the new ones and they appear to be structurally stable. Since no access is provided to them from the road they shall be left in place.

Baffinland Action: Baffinland will not be removing the old abutments identified at Bridge 97 during the inspection.

Culvert – 083

The outlet of this culvert appears to be short. It should be extended by about 1.5 m and the adjacent road embankment shall be upgraded to a more stable slope with the placement of crushed stone.

Baffinland Action: Baffinland commits to placing crushed rock fill adjacent to the culvert at its inlet. This will further prevent erosion of the road embankment by the flowing water in the creek.

Culvert – 107

Both ends of this culvert are short, particularly at the inlet side.

Baffinland Action: Baffinland commits to further inspecting this culvert and will determine if replacement with a longer, larger pipe is required.


Culvert – 114

Both ends of this double-barrel culvert are damaged and too short, particularly at the outlet end.

Baffinland Action: Baffinland commits to further inspecting this culvert to determine if replacement with a longer, larger pipe is required. If replaced, both pipes will be repaired and extended. Once the pipes are repaired and extended, the road embankment may be widened.

We trust that this submittal meets the requirements for geotechnical inspections as outlined in the Water Licence. Should you have any questions, please do not hesitate to contact the undersigned or William Bowden.

Regards,



Connor Devereaux
Environmental Superintendent

Attachments:

Attachment 1: 2019 Geotechnical Inspection Report No. 1 (August 31, 2019)

Cc: Karén Kharatyan (NWB)
Chris Spencer, Jared Ottenhof (QIA)
Bridget Campbell, Godwin Okonkwo, Jonathan Mesher, Justin Hack (CIRNAC)
Tim Sewell, Shawn Stevens, Megan Lorde-Hoyle, Lou Kamermans, Christopher Murray, Sylvain Proulx, Francois Gaudreau, Amanda McKenzie (Baffinland)

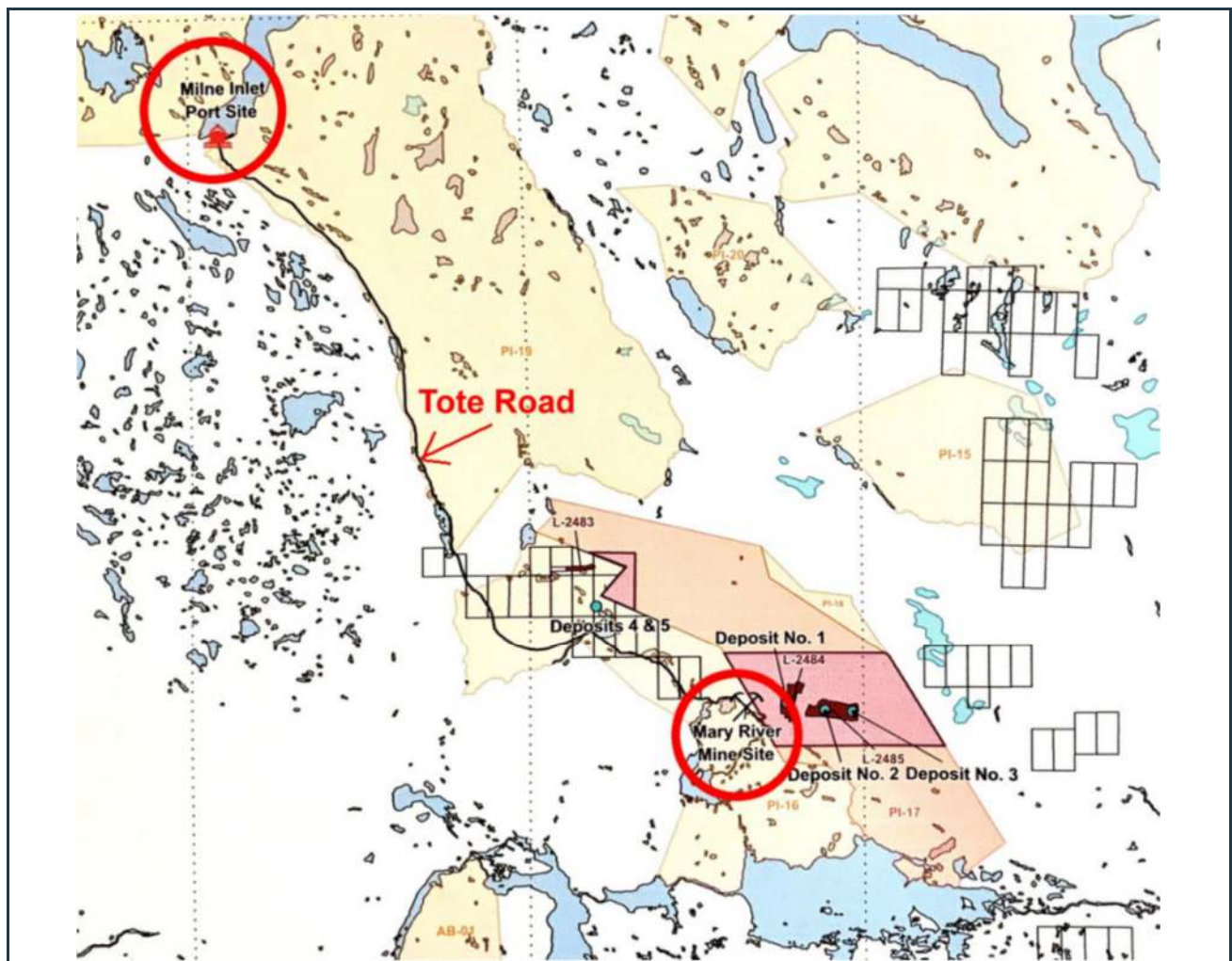
Attachment 1

2019 Geotechnical Inspection Report No. 1

Baffinland Iron Mines Corporation

Project #: TC190307

Annual Geotechnical Inspections – 2019 Report 1. Mary River Iron Mine Complex – Nunavut



August 31, 2019
TC190307

Mr. William Bowden - Environmental Superintendent, Mary River Iron Mine, and
Mr. Connor Devereaux - Environmental Superintendent, Mary River Iron Mine
Baffinland Iron Mines Corporation
2275 Upper Middle Road East, Suite 300
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L6H 0C3

Re: Annual Site Inspections and Reporting - Mary River Iron Mine Complex, Nunavut

Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood), has been retained by Baffinland Iron Mines Corporation to carry out Annual Geotechnical Engineering Services at the Mary River Iron Mine Complex in Nunavut. Based on information and guidance provided in connection with the site's infrastructure, the undersigned has completed the first of the planned two inspections and summarized the findings in the following report. In addition to field observations, the following historic reports had also been reviewed:

- Annual Geotechnical Site Inspections (2016) – SNC Lavalin
- Annual Geotechnical Site Inspections (2017) – ARCADIS Design and Consultancy
- Annual Geotechnical Site Inspections (2018) – SNC Lavalin
- Annual Geotechnical Site Inspections (2018 August and October) – B.H. Martin Consultancy
- Tote road bridges – Abutment Review (2018 December) – B.H. Martin Consultancy

We trust that the content of this report meets your expectations. Should you have any questions regarding the details presented in the following document, please do not hesitate to contact our office.

Sincerely,

Wood Environment & Infrastructure Solutions
a Division of Wood Canada Limited



Laszlo Bodi, M.Sc.; P.Eng. – Principal Civil/Geotechnical Engineer
Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited

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1.0 Introduction

Wood Environment & Infrastructure Solutions (Wood), has completed the first geotechnical field inspection of 2019 at the Mary River Project (The Project), which is a condition of the Type A Water License No: 2AM-MRY1325 – Amendment No.1 (Water License)".

According to the Water License, the field inspections shall include the review of various engineering facilities that contain waste materials (hazardous and non-hazardous), and store or retain / convey water (ponds and ditches) at the Mary River mine and Milne Inlet Port sites. The field review assessed the stability of the berms and slopes, and report on potential seepage problems from the ponds, if any.

In addition to the condition survey of the above noted infrastructure components, critical watercourse crossings (bridges and selected culverts) were also reviewed along the Tote Road, connecting the Mary River and Milne Inlet Port sites. As specified by the Nunavut Water Board, the conditions of the above listed infrastructure components need to be visually inspected and documented by photographs.

The inspected structures included the followings:

A. Mary River Mine Site

- a) Polishing/Waste Stabilization Ponds (3)
- b) Hazardous waste disposal areas - (HWB-1 to HWB-7)
- c) MS-06 and MS-08 surface water collection ponds and ditches
- d) Genset pond (i.e., located adjacent to the generators)
- e) Fuel Farms (3) – Aerodrome fuel storage, Existing diesel fuel farm, and the New fuel farm
- f) Solid-waste disposal site (non-hazardous landfill)
- g) CLSP silt sedimentation control ponds and berms
- h) Water discharge area

B. Milne Inlet Port Site

- a) Hazardous waste disposal areas - (HWB-1 through to HWB-4)
- b) MP-01A pond
- c) MP-03 fuel tank farm
- d) MP-04 and 04A ponds
- e) Surface water collection ponds and ditches adjacent to the ore stockpile (MP-05 and MP-06)
- f) Freight dock check dam
- g) Surface water collection ditches (P-SWD-3, P-SWD-5, P-SWD-6, P-SWD-7, W3/W14, 380M pad)
- h) Tote road ditches and culverts (conveying surface water from the quarry area)

C. Tote Road from the Mary River mine site to the Milne Inlet Port

- a) Bridges (4)
- b) Culverts (12)

The above listed infrastructure components were visually inspected between June 27 and July 2, 2019, by the author of this report, Laszlo Bodi P.Eng. of Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited. During the inspection program their current conditions were documented, and the findings are summarized in the following report.

The locations of most of the inspected structures, ponds and ditches are shown in the following Figures:

- a) Mary River Mine site - Northern, Central and Southern Zones: Figures 1, 2 and 3
- b) Milne Port site - Central zone: Figure 4
- c) Representative section of the tote/haul road: Figure 5

Photographs of the inspected structures are shown in the following documents (attached to the report):

- a) Appendix A: Mary River Mine site – Figures 6 to 41
- b) Appendix B : Milne Port site - Figures 42 to 71
- c) Appendix C : Bridges and culverts along the tote road: Figures 71 to 105



Figure 1: Site layout – Mary River Mine Site - Northern Zone



Figure 2: Site layout – Mary River Mine Site - Central Zone



Figure 3: Site layout – Mary River Mine Site - Southern Zone



Figure 4: Site layout – Milne Inlet Port Site – Central Zone



Figure 5: Section of the tote/haul road between the Mary River Mine site and Milne Inlet Port

Details of condition survey of the individual structures are summarized in the following sections of the report, while the photographs are shown in Appendix A, B and C, as integral parts of the document.

2.0 Mary River Mine Site

2.1 Polishing/Waste Stabilization Ponds (3 PWS ponds)

There are three polishing/waste stabilization ponds, located adjacent to the central part of the runway, as shown in Figure 1. Pond #1 is a single structure, while Ponds #2 and #3 had been constructed as a twin-cell structure, as shown in Figure 6. According to previous inspection reports, these ponds were associated with the exploration phase of the mine, and currently serve as emergency holding ponds in case problems would arise, which would prevent the discharge of treated effluent directly to the receiving environment.

The berms around the ponds generally comprise granular soils (sand and gravel), supporting High Density Polyethylene (HDPE) geomembrane liners. The liners are secured in anchor trenches on the crest of the berms, and no damage is visible on the membranes on the upstream face of the slopes. However, there are some minor damages visible on the liners on the crest of the berms (above the maximum water/freeboard line) at a few locations, as shown in Figure 7 (see red circles). These minor damages should be repaired as part of the regular maintenance program.

As shown in Figure 6, the berms around the three ponds appear to be stable, having shallow downstream slopes. They were built by using non-frost-susceptible well compacted granular materials (dense state of compactness based on visual inspection and manual probing). Based on surficial site observations, it appears that the subgrade around the berms comprise thaw-stable granular soils with trace to some fines. With this observation, the berms are assumed to have stable foundations, which is further supported by the fact that there are no indications of differential settlements, sinkholes, sloughing, etc. at the perimeter berms. However, at a few locations truck-tire related damages (e.g., depression on the crest's surface and related densification) were observed (see yellow circles in Figures 7 and 8) at the top of the berms. These are assumed to be caused by discharging activities. It is advisable to backfill these depressions with compacted sand and gravel until these areas match the crest elevations elsewhere. Prior to fill placement all visible minor damages to the liners shall be repaired.

A relatively common issue in water lagoons is the appearance of "whales" within the ponds. Whales are sections of the liners which have risen above the surface of the water, particularly in shallow ponds where the weight of water above the liner is minimal. Such a "whale" was visible during the inspection at PWS pond #3, as shown in Figure 9. The presence of whales ("liner bubbles") is usually attributed to suspected potential gas generation beneath the liners due to decomposition of organics in topsoil layer that may have been left in place beneath the liner away from berm foundation during construction, resulting in the formation of whales. Such whales had been recorded in the past in some of the ponds at the subject mine site. However, no damage to the liners or seepage from the ponds has been reported, including the current survey/inspection. Should the affected pond be drained in the near future, it is recommended that the gas from beneath the liner be released by poking holes and repairing the liner in the next step.

As pointed out above, the berms appear to be structurally stable, and no visible wet downstream slopes and toe seepage was noted. However, as shown in Figure 10, the surface appearance was not found to be orderly at the front of the water discharge pipes at the middle of the south-western perimeter berm at its juncture with the central berm between Ponds #2 and #3. Namely, heavily wrinkled surficial liner was observed to cover the crest at this location and at the junction. It is suspected that this may have been water discharge point for further conveyance of the discharged water into the two adjacent ponds.

Large timbers and miscellaneous other elements (e.g., used tires etc.) are utilized as weight to secure the surficial liner in-place at the berm's crest at this location. The downside of this measure is potential ice development in areas of trapped water within the wrinkles, and this could have a potential to displace the above elements across the liner and consequently, result in liner damage (e.g., cracking). Under this scenario, there is a potential of berm fill saturation. As a cautionary measure, it is recommended to clean-up this area and remove all hard materials other than used tires from above the liner. Existing tires, and perhaps addition of more used tires to at least counterweight the removed weight, will protect from / reduce risk of wind uplift effects. Furthermore, timbers should also be removed from inside the ponds. Alternatively, it would be advantageous to remove the wrinkled surface liner and replace it with spigots, to convey water into the ponds directly from the discharge pipe.

2.2 Hazardous Waste Disposal Areas

There are seven hazardous waste disposal areas at the Mary River mine site (HWB-1 to HWB-7). HWB-6 is located at the north side of the runway near the incinerator, as shown in Figure 1. The other six areas are located opposite of HWB-6, at the south side of the runway. All HWB areas are lined and comprise shallow perimeter berms. There is no visible instability at the berms (sloughing, excessive settlement or tension cracks), other than some soil displacement by foot and truck traffic on the surface of the slopes and crests at some locations, as shown in the relevant images in Appendix A. It is recommended that foot and truck traffic on the slopes and crest of the berms should be limited, with controlled/ramped access point (preferably one) provided for trucks and skid-steers to dispose/remove materials in the cells.

a) HWB-1

This cell is currently empty, as shown in Figure 11. Based on personal communication with William Bowden at the time of the site visit, concerns have been raised recently to suspected liner damage within this cell, and consequently no material is stored in the cell. The fact that no ponding water was visible within the cell during the inspection, may confirm this assumption. It may be advisable to rebuild the perimeter berm around the cell, followed by the installation of a new geomembrane liner with sand cover. Once the cell would be reconstructed, all materials from HWB-6 could be transferred into an upgraded HWB-1 cell, and the HWB-6 cell could be decommissioned. The reason for this suggestion will be explained within the section of HWB-6, in page 10.

b) HWB-2

As shown in Figure 12, the perimeter berm appears to be stable. The presence of water visible within the pond demonstrates that the liner is intact. No visible seepage from the pond was noted around the berm, and the pond operates as intended.

c) HWB-3 and HWB-4

These cells are located side-by-side and were called in previous reports as "Fuel Containment" cells. As shown in Figures 13 and 14, there are predominantly contaminated waste (HWB-3) and fuel barrels (HWB-4) stored in these two cells.

The photographs of the cells attest stable berm condition, and good liner performance (e.g., ponded water in Figure 14). However, it is also shown on the images that foot traffic had caused disturbance on the slopes of the berms and that should be avoided. Furthermore, access points into the cells should be limited and foot traffic on the berms, particularly on their slopes, should be minimized. Furthermore, damaged wood pallets (shown in Figure 14) with nails sticking out of them, should be stored in a designated area, in order to minimize the possibility of liner damage by the nails.

d) HWB-5

As shown in Figure 15, there are a few totes of lubricants currently stored in this cell. The berms around the cell appear to be stable and there is no visible liner damage. As recommended above, foot and truck traffic on the slopes and the crest of the berm should be prohibited with controlled / ramped access points (preferably one) provided for the skid-steers to dispose designated materials in the cell.

e) HWB-6

As mentioned earlier, the HWB-6 cell is in poor condition, as shown in Figures 16 and 17. The berms had been extensively disturbed by truck and foot traffic, particularly at the northern section of the berm. Cracking and tearing of the liner are also visible at several locations on the upstream face and crest of the berm. As shown in Figure 17 disturbance by truck traffic is evident. As suggested earlier, it would be advantageous to upgrade HWB-1 so that stored material from HWB-6 could be accommodated there. An added benefit in this alternative is that all HWB cells would be in each other's proximity on the west side of the runway. However, should there be a need for HWB-6 to continue receiving waste materials in the future, a repair of both the berm structure and the liner will be required.

f) HWB-7

Based on information from historic reports, the HWB-7 cell was a bulk fuel storage facility in the past. Currently it is used to store fuel barrels, lubricant totes and a large fuel tank, as shown in Figures 18 and 19. The perimeter berm around three sides of the cell appears to be stable and the visible water within the cell supports adequate liner performance. There is a ramp along the fourth side of the cell (with appropriately high elevation at its highest end) to provide truck access into the cell.

Minor damages to the geotextile (covering the liner) were noted at a few locations on the crest and downstream slope of the berm. It is recommended that the geotextile and soil cover be reinstated at those locations, in order to prevent potential damage to the liner in the future. As part of such maintenance program, regrading of slopes affected by foot traffic disturbance is recommended.

2.3 MS-06 and MS-08 Surface Water Collection Ponds and Ditches

a) MS-06 – Surface Water Collection Pond Adjacent to the Crusher Pad

The MS-06 pond collects surface water from the area of the crusher site. The water is collected in perimeter ditches around the crushed and stockpiled ore and conveyed in those open ditches to the pond. There are two intake locations to the pond at the northeast and southeast corners, and there is an emergency spillway located opposite to the intakes, as shown in Figure 20. The liner within the pond and on the upstream slopes of the berm is intact and no wet downstream slopes or toe seepage were visible.

The side slopes of the water collection ditches were observed to be stable (Figures 21, 22 and 23). As with any other run-off collection ditches, the silt sized soil particles are accumulated at the base of the ditches (siltation), wherever the effluent flow velocity decreases. This is evident in Figures 21, 22 and 23. The siltation tends to reduce the design wet section of the ditches (flow capacity). The observed silt accumulation does not warrant maintenance measures at this time. However, this should be regularly monitored by mine personnel and any significant reductions in the flow capacity of the ditch should trigger maintenance measures by means of silt removal.

As shown in Figure 22, the corrugated steel pipe culvert beneath the tote road is almost fully clogged with silt. It is recommended that the culvert be cleaned, and the collected excess silt be deposited at appropriate location on site. Excessive amount of collected silt within the ditches should also be removed periodically and the material disposed at appropriate location on site. As shown in Figure 23, ponding surface water is visible above the silt within one of the ditches, located between the tote road and the MS-06 pond.

Minor potential pad seepage water was observed at the toe of the berm at one location adjacent to the pond where the pad meets the tundra, as shown in Figure 24. This clear water seepage; however, is not to be mistaken as seepage from the subject pond and ditches.

b) MS-08

The MS-08 sedimentation pond is surrounded by a crescent shaped semicircular berm to the east, north and west and by the waste rock dump to the south, as shown in Figures 25 and 27 in Appendix A. Contact water from the waste dump area flows directly into the pond (see Figure 27) from the south, and conveyed to the pond via open ditches from the other sides of the dump. As shown in Figure 26, the construction of drainage ditches to allow for more flow capacity / minimize erosion is in progress.

The berm was constructed using granular soils from borrow sources similar in composition as the ones underlying the base of the pond / mine complex. The pond is lined with exposed HDPE liner that is secured in place in anchor trenches on the crest of the berm. In addition to the ditch inlets there is an emergency spillway. Based on information provided at the site, the retained water is not suitable for direct discharge to the environment as it does not meet discharge criteria. Therefore, the collected water is pumped to the adjacent plant for treatment, while maintaining the freeboard within the pond.

The entire berm structure around the MS-08 pond appears to be stable (no evidence of tension cracks or crest subsidence). The exposed geomembrane on the slopes above the ponded water level at the time of inspection was noted to be wrinkled, which is common condition for such thick liners in irregularly shaped ponds. No water seepage from the pond was noted at the time of the inspection. Based on personal communication with William Bowden, some water seepage was historically observed at the downstream (north) toe of the berm.

As pointed out above, the water from the pond is pumped to the nearby designated facility for treatment. There is a lined treatment area located immediately next to the plant with stable perimeter berms, as shown in Figure 28. No issue with this treatment area was ever recorded and the entire facility is in excellent condition.

2.4 Genset Pond

The "genset pond" contains melt snow and rainwater that previously contained fuel bladder for the gensets. The pond is located immediately adjacent to the power generators, south-west of the hazardous waste cells (Figure 1). As shown in Figure 29, the perimeter berm around the pond generally comprises granular materials and the pond is lined. Disturbance by foot-traffic is visible along most of the berm's crest and some sloughing of the upstream slope of the berm is also visible at the south-east corner of the pond (see Figures 30 and 31).

Granular fill should be brought to this location and the slope should be filled and regraded manually and compacted using a plate temper or like equipment. Special attention should be given not to damage the liner within the pond and on the slope of the berm during the repair. A few random cobbles that are visible on the crest in the area should be removed and placed on the downstream slope of the berm only.

In addition to the repair work on the slope, the southern, somewhat lower section of the berm should also be reconstructed to its original geometry. Again, truck traffic on the berm must be avoided.

It shall be pointed out that the berm at this pond is generally stable and the liner appears to be intact. No seepage from the pond was noted at the time of the inspection.

2.5 Fuel Farms

There are three fuel farms at the Mary River mine site, two operating and one under construction. The berms around them are in good conditions as shown in the relevant images in Appendix A.

a) Jet Fuel Tank Farm

The jet fuel tank farm is located at the aerodrome and it is surrounded by a stable perimeter berm. In addition, a second berm provides additional protection at two sides of the facility, constructed by using crushed rock fill, as shown in Figure 32. The facility is lined, and the liner within the cell appears to be in good condition. The geotextile fabric that covers the liner is exposed at a few locations along the berm's crest, as shown in Figure 33. During maintenance, these areas should be regraded, and the exposed geotextile and liner should be covered by soil (clean sand and gravel).

b) MS-03 Diesel Fuel Tank Farm

The berms around the diesel fuel tank farm are in excellent condition (see Figure 34) and they are well maintained. The collected precipitation within the cell is clean and its presence indicates that the liner system is fully functional (i.e., no seepage from the cell is visible and the liner is well protected by granular fill throughout the facility).

c) New Fuel Tank Farm (under construction)

A new fuel tank farm is currently under construction, as shown in Figures 35 and 36. Based on our field review the tank farm is constructed as specified in the design drawings (subgrade, berms, bedding layer, liner and protective cover).

2.6 Solid Waste Disposal Area

The solid waste disposal area is located in the southern zone of the Mary River mine site, as shown in Figure 3. Only non-hazardous solid waste is placed into this facility that has no liner, nor a leachate collection system. As shown in Figure 37, the solid waste placed into the facility is covered as required with a layer of locally available clean soils.

No stability issue is present at the solid waste disposal site.

2.7 CLSP Silt-sedimentation Check Dams and Berms

The CLSP silt sedimentation control berms and check dams are located along the access road to the mine's water intake jetty. The primary purpose of these structures is to collect fine soil particles that are eroded from the adjacent road and slopes, and to prevent the siltation around the water intake structure. As shown in Figure 38, the berms are stable, and the check dams are fully functional. The following two recommendations are offered for consideration for this area:

- a) The collected silt at the check dams should be frequently removed and disposed at an appropriate location on the site.
- b) Figure 39 shows an unprotected drainage line near the lake-shore, in the vicinity of the lowest CLSP check dam. As shown in the image, fine soil particles are eroded from the adjacent slope and transported toward the lake. Although a silt curtain is present at the front of the gully, it is recommended that the gully be stabilized and should receive an erosion resistant layer (coarse gravel / rip-rap).

2.8 Water (Effluent) Discharge Area

The effluent discharge point is located south of the Mary River mine complex, as shown in Figure 3. There are several discharge pipes at that location, conveying the discharged water down the slope toward the adjacent river. Trucks also bring water for discharge to this location and let the water flow down on the adjacent embankment, comprising crushed rock fill, as shown in Figure 40. The rock fill slope appears to be stable and no evidence of surface erosion or instability was observed during the inspection within the immediate discharge area.

However, minor surface erosion was noted adjacent to the rock fill slope, within the native material, as shown in Figure 41. At this stage this erosion does not seem to affect overall slope stability as this relates to the water discharge area; however, it would be beneficial to cover the eroded slope with crushed rock fill to prevent any regressive erosion in the future.

3.0 Milne Inlet Port Site

3.1 Hazardous Waste Disposal Areas - (HWB-1 to HWB-4)

There are four hazardous waste disposal cells at the Milne Inlet Port site. HWB-1 and HWB-2 cells are single detached structures, located north-east and south-east of the large fuel storage area, respectively. HWB-3 and HWB-4 had been constructed as twin-cells, located south/south-west of the fuel storage farm.

a) HWB-1

The HWB-1 cell covers a relatively large area, surrounded by a stable perimeter berm, constructed of granular fill material, as shown in Figure 42, in Appendix B. The cell predominantly contains fuel barrels, cubes of lubricants and other materials. Ponding water was visible across the deeper area of the cell, indicating that the liner within the pond is intact. No seepage from the pond was visible around the toes of the berm. However, ripped geotextile and exposed liner were noted at a few locations at higher elevations along the berm, as shown in Figure 43. It is recommended that as part of the maintenance program the disturbed areas of the berm (generally by foot traffic) on the slopes and crest should be re-graded manually and all exposed liner areas should be covered with a protective layer of soil (clean sand and gravel).

b) HWB-2

The HWB-2 is a small cell that is currently empty. As a result of some recent earthwork immediately adjacent to the cell, sections of the perimeter berm have been impacted, and the slopes and liner were somewhat damaged in the process. There is a small area in one of the corners with ponding water, where the liner is exposed, as shown in Figure 44. It is suggested that the soil cover from above the damaged liner and the liner itself be removed and disposed into the HWB-1 cell. As an alternative option to the full decommissioning the perimeter berm shall be reconstructed and the liner carefully repaired.

c) HWB-3 and HWB-4

The HWB-3 and HWB-4 cells are located immediately next to each other (twin-cells) and contain shipping containers only, as shown in Figures 45 to 48. The berms appear to be in good condition with no indication of slope movements or settlement. The liner within the ponds are intact; however, they are exposed at a few locations on the crest and downstream slopes of the berms. It is suggested that all exposed liner areas be regraded and covered with protective granular fill (clean sand and gravel), to prevent potential damage to the liner in the future.

3.2 MP-01A Pond

The new (2014) MP-01A polishing waste stabilization pond is located immediately south of the MP-03 fuel tank farm. As shown in Figure 49 the berm around the pond is in excellent condition and the liner appear to be intact. No sign of slope instability, settlement or seepage from the pond was noted during the field inspection.

3.3 MP-03 Fuel Tank Farm

The MP-03 fuel tank farm occupies a large area in the center of the Milne Inlet port complex. As shown in Figures 50 and 51 the berms around the facility are well maintained and are in excellent condition. The visible ponding water within the internal cells is an indication of proper liner functionality. The facility is fenced in and no indication of berm instability or seepage was noted on and around the berms comprising compacted granular materials.

3.4 MP-04 and 04A Landfarm and Contaminated Snow Disposal Cells

The MP-04 and MP-04A cells are located south of the port complex at higher elevation, adjacent to the rock quarry. MP-04 is a large landfarm cell that stores contaminated soils, as shown in Figure 53. The berm structure around the cell appears to be in stable condition. The ponding water within the cell indicates proper liner functionality and no wet downstream slopes and toe seepage were noted. Exposed liner was visible on the downstream slope of sections of the berm, particularly along the north berm. It is recommended that the liner be covered (weighed down by a gravel layer) along the toe of the slope to prevent wind uplift related impacts (e.g., wrinkling, etc.) in areas marked by yellow circles in Figure 53.

MP-04A is a smaller cell used generally for the disposal of contaminated snow. This pond was constructed immediately adjacent to the MP-04 landfarm cell, shown in Figure 54. There are no geotechnical problems visible at this cell and the liner appears to be working as intended. No seepage from the cell was noted anywhere around the pond.

3.5 Surface Water Collection Ponds and Ditches (MP-05 and MP-06)

The high-grade iron ore that is mined, crushed, and screened at the Mary River site is transported to the Milne Inlet port, and stockpiled across a large flat area that can accommodate up to 3.5 million metric tonnes of ore. Contact water is collected along the west and north sides of the ore stockpile in side ditches and conveyed into two water collection ponds.

The MP-05 pond is located adjacent to the north-east corner of the stockpile, while MP-06 has been constructed at the north-west corner. Both ponds are in excellent condition with stable, well maintained berms and intact geomembrane liners, as shown in Figures 55, 56, 58 and 59.

No instability, erosion or settlement was noted at the berms and no toe seepage from the ponds is visible anywhere around the ponds' perimeter. The surface water from around the stockpile is collected in the two well maintained drainage ditches, shown in Figures 57 and 60, reporting to the two ponds via the intakes.

Pond MP-06 is divided into two ponds by a liner-covered internal berm and the northern cell within the pond is called the overflow cell, as shown in Figure 59. Both water collection ponds have emergency spillways. The water level in both ponds was well below the spillways' inverts at the time of the inspection.

3.6 Freight Dock Check Dam

The freight dock check dam is a newly constructed structure comprising a crushed rock fill berm with geotextile cover on its upstream slope, as shown in Figure 61. This structure collects fine-grained soil particles (silt and clay) that may erode down from the port site and from the adjacent slope located along the bay's shore, approximately at the front of the HWB-1 pond. The berm/dam appears to be stable for intended purpose. It is suggested, however, that its condition be monitored during ice formation in the bay and check its resistance against the impact of ice forces.

3.7 Surface Water Collection Ditches (P-SWD-3, P-SWD-5, P-SWD-6, P-SWD-7, W13/W14, 380M pad)

There are several water collection drainage ditches (listed above), most of them still under construction or improvement, as shown in Figures 62 to 67. These open ditches are excavated somewhat into the native soils and then their sides and inverts receive erosion protection layers composed of fine crushed rock. It was noted during the inspection that geotextile have been used wherever the native subgrade composed of fine-grained material to prevent migration of fines into the rockfill. The condition of these ditches should be monitored, particularly prior to the spring freshet, and any potential slope deterioration should be rectified prior to the anticipated increased flow during the thaw period of the year.

3.8 Tote Road Ditches and Culverts Near the Rock Quarry

Surface water from higher elevations around the rock quarry is collected in drainage ditches and conveyed down the slope through corrugated galvanized steel culverts, installed under an internal haul road and then under the tote road. The water in the ditches is conveyed to small natural ponds, located along the west side of the tote road, as shown in Figures 68 to 71. Figure 68 shows the outlet of two culverts, located under the internal haul road at higher elevation, well above the tote road. The blue arrows in the image show the alignment of the drainage ditch and the theoretical flow path for the collected water. Figure 68 shows the two culverts located under the tote road that should convey the collected surface water to the other side of the tote road. However, since all fill in the area (road embankment and slope cover) comprise crushed rock fill, a portion of the water bypasses the two culverts beneath the tote road embankment (through-flow) and finds its way to nearby ponds (see Figures 70 and 71).

The flow of water may soften the original native subgrade beneath the road embankment and eventually could create some instability of the embankment. To increase the stability of the embankment in the

affected areas it is recommended to regrade the upstream area leading to the culverts and place additional rock fill at the culvert's outlet (toe-berm reinforcement for increased embankment stability).

4.0 Tote Road between Mary River and Milne Inlet - Bridges and Culverts

Four bridges and several culverts were inspected during the recent site visit. The general conditions of those structures are summarized below, and the images are attached in Appendix C.

4.1 Bridges (4)

a) **Bridge 17** (located approximately 17 km from Milne Inlet port)

As shown in Figures 72 to 75, the abutments of this bridge are stable and no scour in the river-bed was noted during the site visit. The abutments show no differential settlement or any structural discrepancy, like cracking on the foundation concrete. There are two historic abutments, located immediately adjacent to the "new" ones. The metal front and wing walls of both "old" abutments have suffered damages in the past, particularly the south abutment, as shown in Figure 75. That image also shows that a pump is operated on the top of the abutment, supplying water to the water trucks from the river (used for dust control on the road).

To maintain the stability of the currently used bridge abutments, the two old abutments should be kept in place since they provide support to the adjacent new structures. However, the damaged sections should be repaired, particularly if the abutments would continuously be used for taking water from the river. Alternatively, the damaged metal parts of the structures (above the water level) can be removed and the granular fill within them regraded to stable slopes. Additional rip-rap on the regraded granular fill slopes must be placed to prevent river erosion.

b) **Bridge 63** (located approximately 63 km from Milne Inlet port)

As shown in Figures 76 to 78, the abutments of this bridge are stable and no scour in the river-bed was noted during the site visit. The abutments show no differential settlement or any structural discrepancy like cracking on the foundation concrete. The wing-wall at the north-west abutment appears to be short and minor erosion of the road fill was noticed (Figure 78). At that location a metal section should be added to the wing-wall or alternatively some rock-fill be placed there to prevent soil erosion from the road into the river.

Similarly to the previous bridge, there are two historic abutments, located immediately adjacent to the "new" ones and damage to the metal front and wing walls of both abutments are visible. In order to

maintain the stability of the currently used bridge abutments, the two old abutments should be kept in place since they provide support to the adjacent new structures. Similarly, to the previous bridge the damaged part of the structures (above the water level) can be removed and the granular fill within them regraded. Additional rip-rap on the regraded granular fill must be placed to prevent erosion.

c) **Bridge 80** (located approximately 80 km from Milne Inlet port)

As shown in Figure 79, the abutments of this bridge are stable and no scour in the river-bed was noted during the site visit. The abutments show no differential settlement or any structural discrepancy like cracking on the foundation concrete.

Similarly, to the previous bridges, there are two historic abutments, located immediately adjacent to the "new" ones, providing support to the new abutments and road embankment. Therefore, removal of these structures is not recommended. Any damage on the metal parts shall be repaired or the structures should be covered with additional crushed rock fill.

d) **Bridge 97** (located approximately 97 km from Milne Inlet port)

As shown in Figure 80 and 81, the abutments of this bridge are stable and no scour in the river-bed was noted during the site visit. The abutments show no differential settlement or any structural discrepancy like cracking on the foundation concrete.

Similarly, to the previous bridges, there are two historic abutments located adjacent to the "new" ones. At this location the old abutments are located somewhat away from the new ones and they appear to be structurally stable. Since no access is provided to them from the road they shall be left in place. Should removal of them be selected, only the above ground parts can be removed, and the stability of the adjacent bridge must always be maintained.

4.2 Culverts (12)

Twelve culverts (CV-076, CV-078, CV-083, CV-094, CV-102, CV-107, CV-110A, CV-111, CV-112D, CV-114D, CV-202, and CV-225) were inspected during the recent site visit, installed beneath the tote road between the Mary River and Milne Inlet sites. These culverts were selected for inspection based on construction work on these crossings, completed in 2018 and 2019. Most of the culverts are in good condition and they provide uninterrupted flow of water from their upstream to their downstream sides. Photographs of the inlet and outlet ends of all inspected culverts are shown in Figures 82 to 105, in Appendix C.

Culverts that require some rehabilitation work are listed below:

CV-083 (Figures 86 and 87): The outlet of this culvert appears to be short. It should be extended by about 1.5 m and the adjacent road embankment shall be upgraded to a more stable slope with the placement of crushed stone. Crushed rock fill should also be placed adjacent to the culvert at its inlet, to prevent erosion of the road embankment by the flowing water in the creek. Improvement of the creek's alignment at the front of the inlet is also recommended (minimize water flow parallel with the embankment at its toe, to prevent toe erosion and subsequent potential slope instability).

CV-107 (Figures 92 and 93): Both ends of this culvert are short, particularly at the inlet side. Consideration shall be given to replace this culvert with a longer and somewhat larger pipe. It is visible in Figure 93 that the inlet's invert is currently located above the water level, resulting in ponding water at the front of the inlet. A larger and longer pipe would facilitate uninterrupted flow of water from upstream to the other side of the road.

CV-114D (Figures 100 and 101): Both ends of this double-barrel culvert are damaged and too short, particularly at the outlet end. Both pipes should be repaired and extended. Once the pipes are repaired and extended, the road embankment should be widened at the downstream end of the pipes and stable slopes must be provided.

5.0 Conclusions

Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood), has completed the first of the two required geotechnical field inspections of 2019 at the Mary River iron mine complex in Nunavut. Based on field observations, the condition of the inspected infrastructure components can be summarized as follow:

- All ponds and waste disposal areas are enclosed by relatively shallow, stable berms. The berms show no signs of instability, there are no tension cracks or excessive settlements and no slope erosion is visible at the berms. These structures were constructed by using thaw-stable granular materials, placed over thaw-stable subgrades (based on observations of adjacent areas away from their footprints). Minor disturbance on the surface of the slopes and crests were noted at some of the berms, however, these discrepancies can be rectified by a more frequent maintenance (regrading) program. Foot and truck traffic on the berms must be limited and only one ramped access point should be provided to each cell.
- The water and waste storage ponds comprise HDPE liners, generally in good conditions. No seepage from the currently operating cells was noted around those cells. Minor damages to the liner were noted at a few locations above the water lines. As specified within this report, these damages to the liners should be repaired as soon as practically possible.

- Open ditches across the Mary River and Milne Inlet sites are generally in good conditions with minor erosion and siltation visible at a few locations. As part of a more frequent maintenance program, the eroded sides of the ditches should be regraded and the excess silt from the ditches should be removed and deposited at appropriate locations onsite.
- The new abutments at the four inspected bridges are in good condition and no scour in the riverbed were noted at the time of the site visit.
- The “old” abutments are located immediately next to the new abutments. As pointed out earlier, these old abutments are providing additional support to the new abutments and to the adjacent road embankments. Therefore, their removal is strongly discouraged. The visible damages on the metal frame of the old abutments shall be rectified either by repair work or by their removal above the water line.
- Water crossings by culverts at the inspected locations are generally in good conditions. At a few locations, culverts were noted as being either too short or damaged. As specified within the report, those culverts should be repaired as soon as practically possible.

6.0 Closing Remarks

We trust that the above technical report provides you with satisfactory information in connection with the reviewed infrastructure components at the selected sites of the Mary River Operation.

Should you have any questions regarding this report, please do not hesitate to contact our office.

Sincerely,

Wood Environment & Infrastructure Solutions
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Baffinland Iron Mines Corporation

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APPENDIX "A" - Mary River Mine Site - Photographs

Figure 6 to Figure 41



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1.0 Mary River Mine Site

1.1 Polishing/Waste Stabilization Ponds (3 PWS ponds)

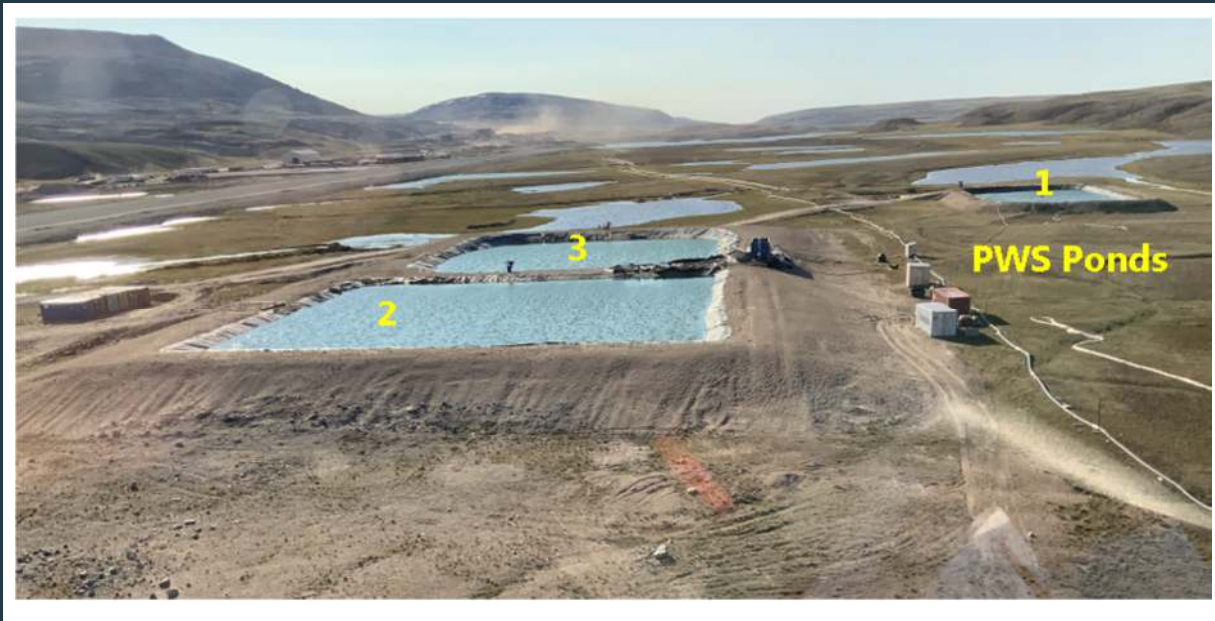


Figure 6: Aerial view of the three PWS ponds



Figure 7: PWS pond #1 – Lower crest elevation (yellow circle) and damages to the liner (red circles)



Figure 8: PWS pond #2 – Lower crest elevation caused by truck traffic at the water discharge point (yellow circle)



Figure 9: PWS pond #3 – A “whale” is visible in pond #3.



Figure 10: PWSP #2 and #3 – Untidy conditions at the water discharge point between ponds #2 and #3

1.2 Hazardous Waste Disposal Areas

a) HWB-1



Figure 11: View of HWB-1 – Currently this cell is empty

b) HWB-2



Figure 12: View of HWB-2

c) HWB-3 and HWB-4



Figure 13: View of HWB-3



Figure 14: View of HWB-4

d) HWB-5



Figure 15: View of HWB-5

e) HWB-6



Figure 16: View of HWB-6. Note the damaged liner at the yellow circle.



Figure 17: View of HWB-6. Note the shallow berm near the pickup truck.



Figure 18: View of HWB-7

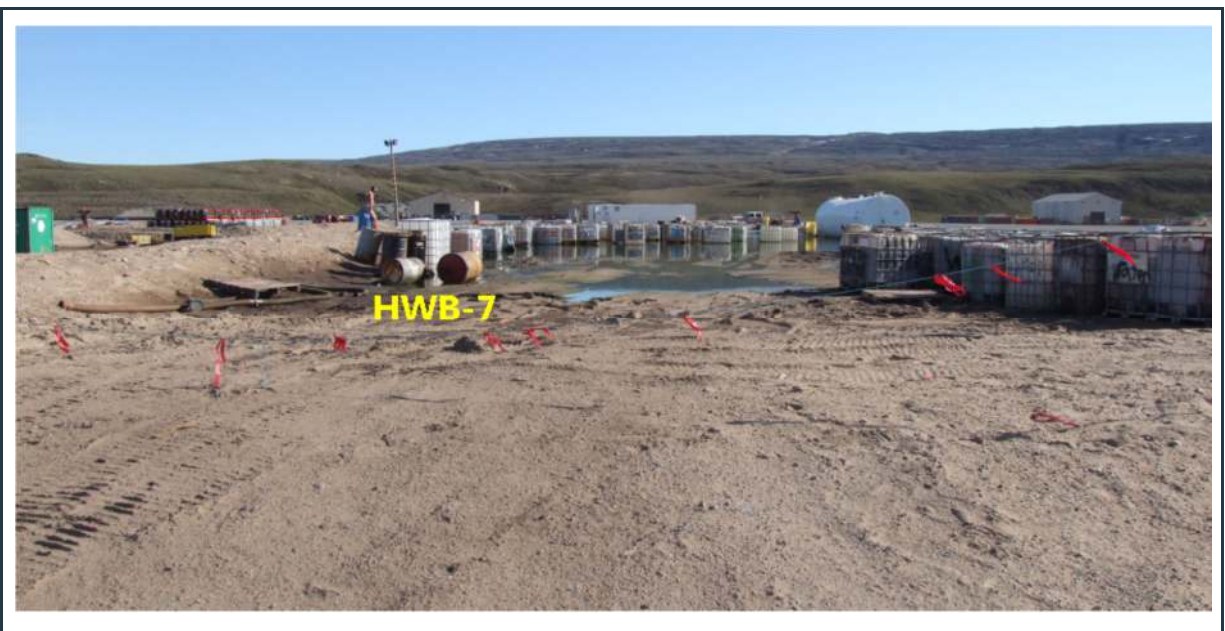


Figure 19: View of HWB-7

1.3 MS-06 and MS-08 Surface Water Collection Ponds and Ditches

a) MS-06 – Surface Water Collection Pond Adjacent to the Crusher Pad



Figure 20: MS-06 surface water collection pond



Figure 21: Surface water collection ditch around the crusher plant



Figure 22: Surface water collection ditch with clogged culvert



Figure 23: MS-06 surface water collection pond and side-ditch



Figure 24: Water seepage at the toe of the tote road embankment near the crusher pad

b) MS-08 Pond next to the waste rock dump

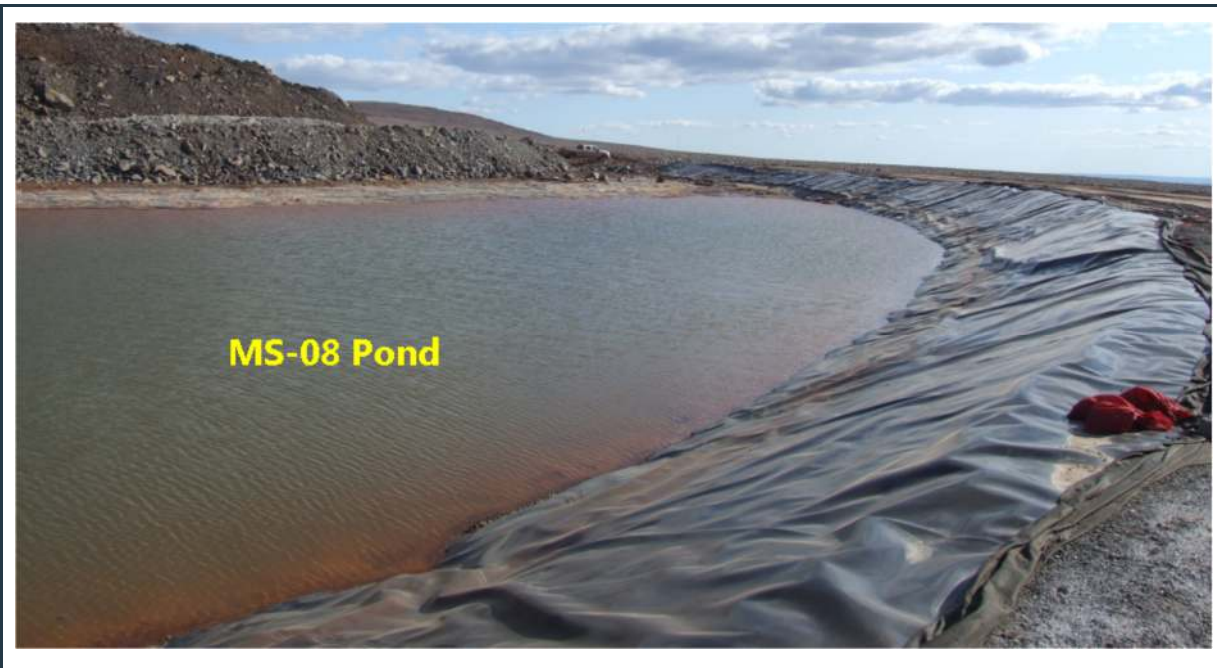


Figure 25: View of the MS-08 pond downstream of the waste rock dump



Figure 26: Side-ditch under construction around the waste rock dump

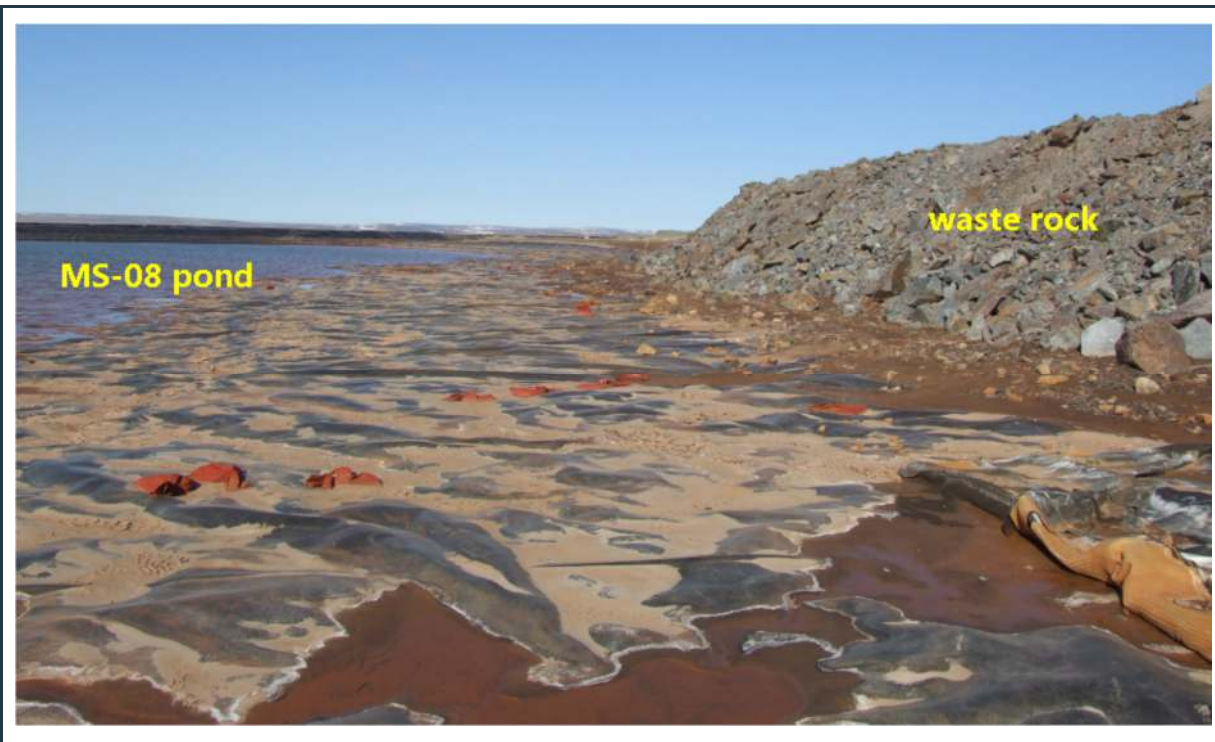


Figure 27: MS-08 pond at the toe of the waste rock dump



Figure 28: Water treatment pond adjacent to the waste rock dump and MS-08

1.4 Genset Pond



Figure 29: View of the berm at the Genset pond



Figure 30: View of minor slope problem at the south-east corner of the berm at the Genset pond



Figure 31: View of the south section of the berm that needs to be repaired (raised and regraded)

1.5 Fuel Farms

a) Jetfuel Tank Farm



Figure 32: View of the jetfuel farm's double berm system (note the additional crushed rock berm)



Figure 33: Exposed and ripped geotextile fabric on the berm of the jetfuel farm

b) MS-03 Diesel Fuel Tank Farm



Figure 34: View of the MS-03 diesel fuel farm

c) New Fuel Tank Farm (under construction)



Figure 35: View of the new fuel tank farm (under construction)



Figure 36: View of the new fuel tank farm at the Mary River site (under construction)

1.6 Solid Waste Disposal Area



Figure 37: Solid waste landfill facility

1.7 CLSP Silt-sedimentation Check Dams and Berms



Figure 38: CLSP silt sedimentation check dams forming small ponds



Figure 39: Slope erosion in the vicinity of the CLSP check dams

1.8 Water Discharge Area



Figure 40: Water discharge area. Stable slope, comprising a mix of crushed rock and soils.



Figure 41: Minor slope erosion adjacent to the water discharge area.





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APPENDIX "B" – Milne Inlet Port Site - Photographs

Figure 42 to Figure 71



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1.7 Surface Water Collection Ditches (P-SWD-3, P-SWD-5, P-SWD-6, P-SWD-7, W13/W14, 380M pad)	13
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1.0 Milne Inlet Port Site

1.1 Hazardous Waste Disposal Areas - (HWB-1 to HWB-4)

a) HWB-1



Figure 42: View of the HWB-1 pond with stable berm and ponding water within the cell



Figure 43: Ripped geotextile and exposed liner at the HWB-1 cell

b) HWB-2



Figure 44: Small area of ponding water within the HWB-2 cell with locally exposed liner

c) HWB-3



Figure 45: View of the HWB-3 cell, containing shipping containers

d) HWB-4



Figure 46: Stable berm at the HWB-4 pond



Figure 47: Exposed liner between the HWB 3 and HWB-4 ponds



Figure 48: Exposed geotextile and liner at the HWB-4 pond, with location of potential damage to liner

1.2 MP-01A Pond

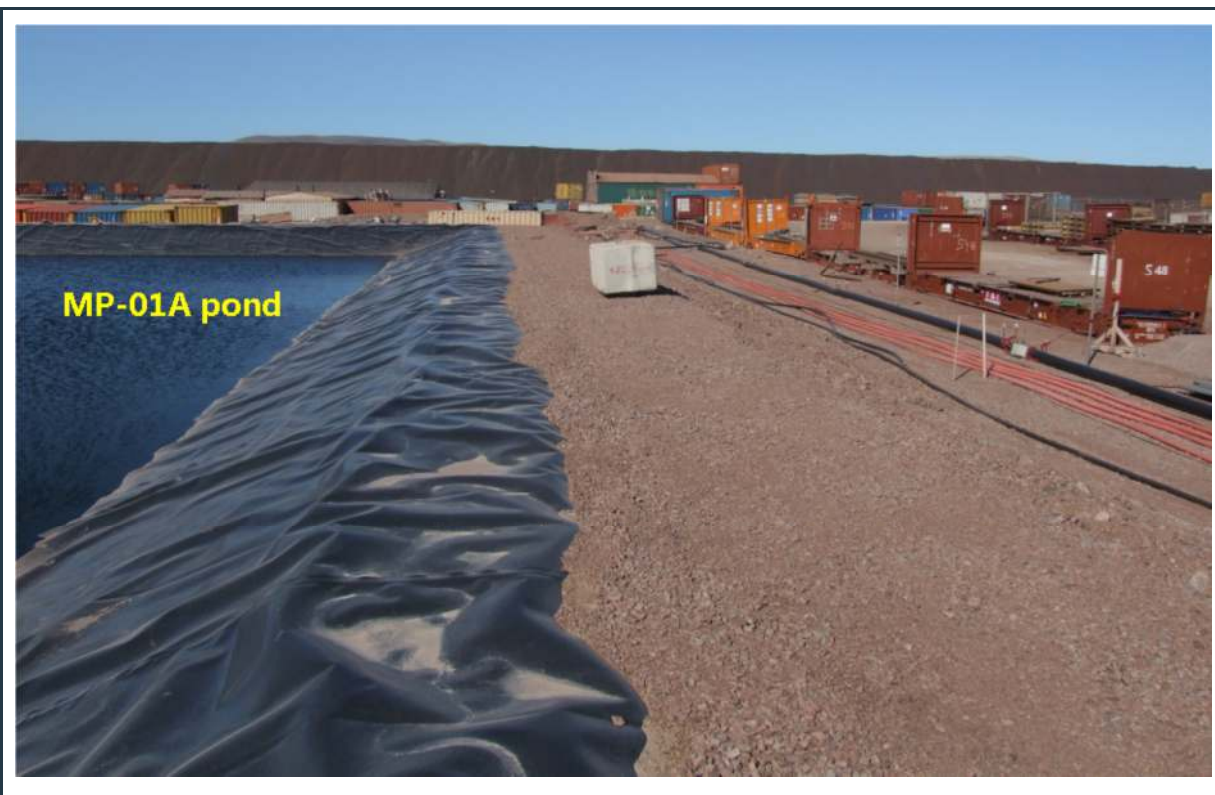


Figure 49: Berm in excellent condition with stable slopes around the MP-01A pond

1.3 MP-03 Fuel Tank Farm



Figure 50: View of stable, well maintained berms around the MP-03 fuel tank farm



Figure 51: View of stable, well maintained berms around the MP-03 fuel tank farm

1.4 MP-04 and 04A Landfarm and Contaminated Snow Disposal Cells



Figure 52: View of the waste and the stable berm at the MP-04 landfarm



Figure 53: Stable berm at the MP-04 landfarm with exposed liner on the downstream face of the berm



Figure 54: Condition of the ramp at the MP-04A contaminated snow dump

1.5 Surface Water Collection Ponds and Ditches (MP-05 and MP-06)

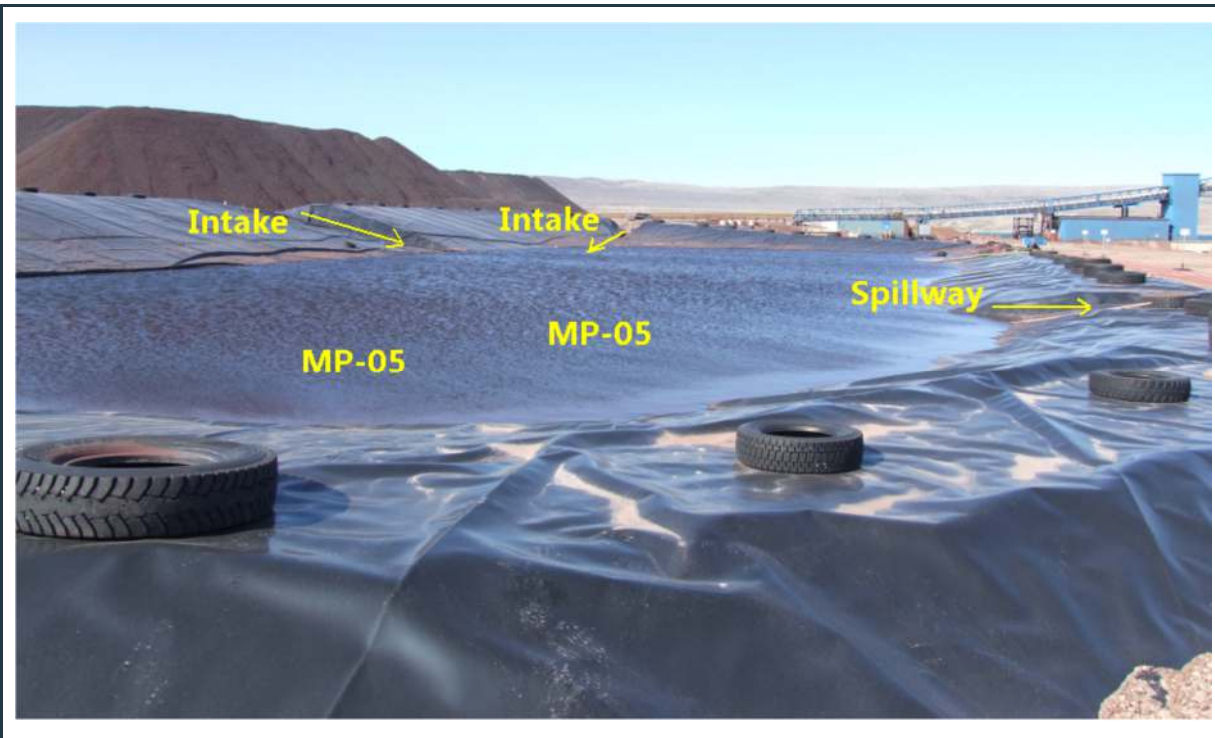


Figure 55: View of the MP-05 pond at the north-east corner of the ore stockpile

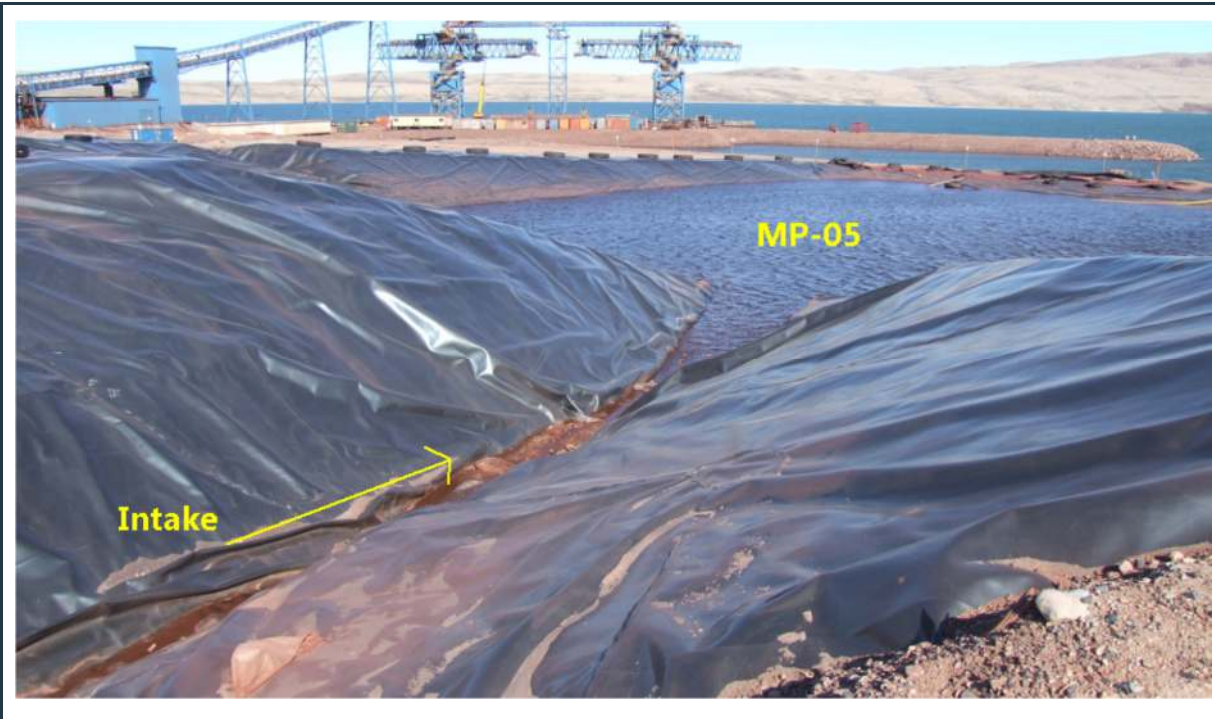


Figure 56: View of the MP-05 pond



Figure 57: Surface water collection ditch adjacent to stored, crushed ore (leading to the MP-05 pond)



Figure 58: View of the MP-06 pond at the front of the north-west corner of the ore stockpile



Figure 59: View of the MP-06 overflow pond with stable berm in excellent condition



Figure 60: Surface water collection ditch, adjacent to stored, crushed ore leading to the MP-06 pond

1.6 Freight Dock Check Dam



Figure 61: View of the freight dock check dam/berm with geotextile filter on the upstream face of the crushed rock berm, to retain silt

1.7 Surface Water Collection Ditches (P-SWD-3, P-SWD-5, P-SWD-6, P-SWD-7, W13/W14, 380M pad)



Figure 62: Future "P-SWD-3 LP2" surface water collection ditch – under construction



Figure 63: P-SWD-5 Q1 North surface water collection ditch



Figure 64: P-SWD-6 Q1 South surface water collection ditch



Figure 65: P-SWD-7 surface water collection ditch adjacent to the new freight dock (under construction)



Figure 66: W13-W14 surface water collection ditch (under construction)



Figure 67: 380 M surface water collection ditch (under construction)

1.8 Tote Road Ditches and Culverts



Figure 68: Culverts and drainage ditch, conveying surface water from higher elevation toward the road



Figure 69: Surface water bypassing the two culverts installed under the tote road



Figure 70: Water seepage through the road embankment adjacent to the tote road culverts



Figure 71: Water seepage through the road embankment adjacent to the tote road culverts



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APPENDIX "C" – Tote/Haul Road - Photographs

Figure 72 to 105



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1.0 Tote Road - Bridges and Culverts

1.1 Bridges (4)

a) Bridge 17 (located approximately 17 km from Milne Inlet port)



Figure 72: View of bridge 17 (17 km from the port), looking north-east



Figure 73: Foundation and rip-rap conditions at one of the abutments at bridge 17



Figure 74: The "old" south-east abutment at bridge 17



Figure 75: The "old" north-east abutment at bridge 17

b) Bridge 63 (located approximately 63 km from Milne Inlet port)



Figure 76: View of bridge 63, looking north

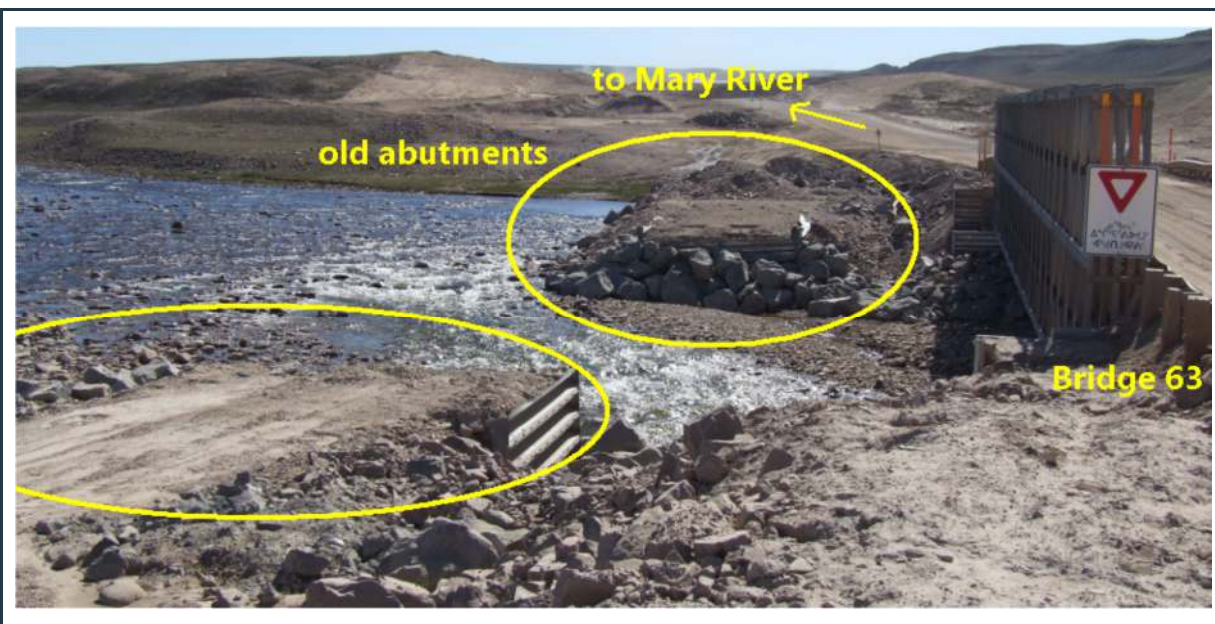


Figure 77: View of the "old" abutments at bridge 63



Figure 78: Minor erosion at the north-west wingwall at bridge 63

c) Bridge 80 (located approximately 80 km from Milne Inlet port)



Figure 79: View of bridge 80 with one of the old abutments, looking north

d) Bridge 97 (located approximately 97 km from Milne Inlet port)



Figure 80: View of bridge 97, looking south



Figure 81: One of the “old” abutments at bridge 97. The section above the red-line may be removed, but the removal is not necessary.

1.2 Culverts (12)

a) CV-076



Figure 82: View of culvert 076 (outlet)



Figure 83: View of culvert 076 (inlet)

b) CV-078



Figure 84: View of culvert(s) 078 (outlet)



Figure 85: View of culvert(s) 078 (inlet)

c) CV-083



Figure 86: View of culvert 083 (outlet) with some slope erosion



Figure 87: View of culvert 083 (inlet)

d) CV-094



Figure 88: View of culvert(s) 094 (outlet) in excellent conditions



Figure 89: View of culvert(s) 094 (inlet) in excellent conditions

e) CV-102



Figure 90: View of culvert(s) 102 (outlet) in excellent conditions



Figure 91: View of culvert(s) 102 (inlet) in excellent conditions

f) CV-107



Figure 92: View of culvert 107 (outlet)



Figure 93: View of culvert 107 (inlet). Extension of the culvert is required.

g) CV-110A



Figure 94: View of culvert 110A (outlet) in good condition



Figure 95: View of culvert 110A (inlet) in good condition

h) CV-111



Figure 96: View of culvert 111 (outlet)



Figure 97: View of culvert 111 (inlet)

i) CV-112D



Figure 98: View of culvert(s) 112D (outlet)



Figure 99: View of culvert(s) 112D (inlet)

j) CV-114D



Figure 100: View of culvert(s) 114D (somewhat damaged outlet). Repair and extension is required.



Figure 101: View of culvert(s) 114D (somewhat damaged inlet). Repair is required.

k) CV-202



Figure 102: View of culvert 202 (outlet)



Figure 103: View of culvert 202 (inlet)

I) CV-225



Figure 104: View of culvert 225 (outlet)



Figure 105: View of culvert 225 (inlet)

