October 10, 2018

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RE: Submission of 2018 Geotechnical Inspection Report No. 2 (Oct. 2018)

Under Part D, Item 18 of Baffinland Iron Mines Corporation's (Baffinland) Type "A" Water Licence 2AM-MRY1325 Amendment No. 1 (Water Licence), there is a requirement 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 2018 was conducted by Barry Martin of Barry H. Martin Consulting Engineer and Architect (BMCE) of Timmins, Ontario. The focus of the inspection was on the Water Licence related infrastructure located at the main camp sites, known as the Mary River Mine Site and Milne Port. Mr. Barry Martin has been conducting annual geotechnical inspections for the Project since 2008. The attached report covers the second inspection that was conducted between October 3rd and 10th, 2018.

During the October 2018 inspection, the following site facilities were inspected:

Mary River Mine Site

- Bulk Fuel Storage Containment
- Generator Fuel Storage Facility Containment
- Polishing/Waste Stabilization Pond # 1
- Polishing/Waste Stabilization Ponds # 2 and #3 (constructed as a two-cell structure)
- Helicopter Fuel Cell Containment
- Barrel Fuel Containment (constructed as a two-cell structure) (MS-HWB-3 and MS-HWB-4)
- Hazardous Waste Storage (MS-HWB-2)
- Enviro-Tank Storage (constructed contiguous with hazardous waste storage and stove oil storage) (MS-HWB-1)
- Stove Oil Storage (MS-HWB-5)
- Jet Fuel Tank and Pump Containment
- Solid Waste Disposal Site
- Mine Site Steel Fuel Tank Farm Containment

- Quarry (QMR2)
- Crusher Pad Drainage Containment
- Waste Pile Drainage Containment
- Jet 'A' Fuel Containment
- Hazardous Waste Containment (MS-HWB-6)

Milne Port

- Hazardous Waste Storage (MP-HWB-3, and MP-HWB-4)
- Port Site Fuel Tank Farm Containment
- Polishing/Waste Stabilization Pond (PWSP)
- Land Farm
- Contaminated Snow Containment
- Sedimentation Ponds East and West
- Quarry (Q1)
- Loading Area Contaminated Storage (MP-HWB-1)
- Fuelling Facility Containment

Milne Inlet Tote Road Bridge Crossings

- Km 17 Bridge
- Km 62 Bridge
- Km 80 Bridge
- Km 97 Bridge

Site plans for the Mary River and Milne Port showing most structures reviewed are included in the inspection report (refer to Attachment 1).

The attached report (refer to Attachment 1) presents the findings of the October 2018 inspection and recommendations for the aforementioned structures. The following subsections of this letter summarize Baffinland's plan for implementing recommendations. Where there is no mention of particular infrastructure, there were no concerns identified by BMCE during the inspection.

Recommendations for the Mary River Mine Site Infrastructure

Bulk Fuel Storage Facility (Exploration Phase Bladder Farm)

We have no recommendations with respect to this containment structure other than to confirm repair of the puncture in the liner on the west berm of the structure.

Baffinland Action: The liner of this storage facility was repaired in August 2018. This repair will be monitored in further inspections to confirm integrity.

Polishing/Waste Stabilization Pond #1

The damage to the liner at the top of the dyke at the area where trucks dump into the cell should be repaired.

Baffinland Action: The small tears on the top of the berm walls where vacuum truck offload will be repaired by Jul 2019.

Hazardous Waste Storage (Now MS-HWB-2)

There is an area at the front of the cell where traffic has exposed the liner. This liner is to be covered.

Baffinland Action: Aggregate will be used to cover the exposed area as soon as conditions and snow cover allow.

Enviro Tank Storage (Now MS-HWB-5)

We recommend that the geotextile over the liner be checked and the granular cover be reapplied prior to continuing use of this cell.

Baffinland Action: The cell is currently not being used and has been left empty. The Site Services Department are aware that this area shall not be used for the storage of Hazardous waste or substances until it has been repaired. Alternatively, this facility may be decommissioned.

Crusher Pad Drainage Containment

We recommend that the ore on the pad be placed to suit the design with a 3m buffer between the ditch and the ore. This shall require the relocation of stockpiles. Ditches were snow filled and could not be reviewed fully.

Baffinland Action: As in 2018, Baffinland will continue to perform ongoing design maintenance of drainage ditches in 2019. Baffinland recognizes the original 2013 Hatch design stating a 3m setback of material from the ditching perimeter and material accessible by heavy equipment has been setback 3m, however, the stockpile design results in certain areas being difficult to access. Baffinland is developing a progressive strategy to address this issue and will work towards addressing this setback in the 2019 season. As an interim supplementary measure to ensure fines do not slough into the ditching structures, strategically spaced out oversize rock barriers have been placed.

Waste Rock Stockpile Drainage Containment

Recommendations:

1. There is a small erosion area on the west side of the containment dyke that is now under snow cover. This area is small but must be mitigated first thing in the spring.
2. Ensure that deposited Waste Rock material is comprehensively contained by the Stockpile ditching system and that the ditches are flowing down-gradient to the Waste Rock Stockpile Pond upon freshet 2019.
3. Continue evaluations of Waste Rock Pond Liner in 2019 to determine compromised location.

Baffinland Action:

1. The erosional area on the west side of the containment dyke will be reinfored with aggregate to mitigate potential erosion prior to Freshet.
2. A new IFC for the Waste Rock Stockpile was issued by Golder as part of the waste rock pond expansion project (Modification No. 8) and it is Baffinland's plan to readjust the existing ditches to fit this new design during the 2019 summer season. Freshet stockpile drainage ditching maintenance and snow clearing will be performed as required prior. The intention of the ditch redesign will be to address berm height, ditch depth and grading concerns and irregularities noted.
3. Approximately 2/3 of the Waste Rock Pond Liner was evaluated by external professional engineers in 2018 and was confirmed competent. In 2019 the remainder of the Pond liner will be evaluated to determine the source of the leak and the pond will be repaired and expanded as conditions allow.

Jet "A" Fuel Containment

There is one small area of exposed liner on the west dyke of this containment. This exposed liner should be covered with material.

Baffinland Action: The liner will be covered with material as soon as snow conditions allow.

Hazardous Waste Containment (MS-HWB-6)

We recommend making repairs to the damaged liner in three damaged locations. The side dykes should be also built up to keep traffic off them and material stored outside of the dykes should be relocated to within the dykes.

Baffinland Action: Baffinland repaired one of the small liner tears in August 2018 and will repair the remaining by July 2019.The tears are located on the berms and are above freeboard levels at this facility.

Recommendations for Milne Port Infrastructure

Hazardous Waste Storage (MP-HWB-3 and MP-HWB-4)

We recommend to repair the liner in MP-HWB-3 directly in front of the container stored within the cell.

Baffinland Action: Baffinland will make repairs the minor tear by July 2019 which is above freeboard levels.

Fuel Tank Farm

We have no recommendations with respect to the containment at this time other than to level/trim the top of the east dyke.

Baffinland Action: Baffinland will perform berm maintenance to level the east dyke by July 2019.

Landfarm Containment

We recommend that as a minimum, the exterior side of the dyke be covered with gravel/soil to at least half way up from the bottom of the dyke at the area around the sump.

Baffinland Action: Baffinland will cover the exposed section of the Landfarm sump by July 2019.

Loading Area Contaminated Storage (MP-HWB-1)

We have no recommendations with respect to this structure other than to repair the tear on the North Side of the structure.

Baffinland Action: Baffinland will repair the torn liner by July 2019. In the meantime, stormwater and snowmelt in the berm will not be allowed to reach the height of the tear.

Fueling Facility Containment

We recommend that 4" to 6" of "mud" be removed without disturbing the gravel layer over the liner at the base and sides of the fuel tank.

Baffinland Action: Baffinland will either remove the built up material from the fueling module pad or propose a mitigative strategy including a flat floor grade and end berms to reduce potential pooling and impacted water.

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, Connor Devereaux or Timothy Ray Sewell.

Regards,

William Bowden
Environmental Superintendent

Attachments:
Attachment 1: 2018 Geotechnical Inspection Report No. 2 and Tote Road Bridges Abutment Review (October 2018)

Cc: Karén Kharatyan (NWB)
Fai Ndofor, Sean Joseph (QIA)
Sarah Forte, Bridget Campbell, Ian Parsons, Justin Hack, Jonathon Mesher (CIRNAC)
Tim Sewell, Grant Goddard, Megan Lorde-Hoyle, Christopher Murray, Sylvain Proulx, Gordon Mudryk (Baffinland)

BHM Project No. 18-068

BAFFINLAND IRON MINES CORPORATION

ANNUAL GEOTECHNICAL INSPECTIONS
MARY RIVER PROJECT
SECOND INSPECTION OF TWO
October 2018

Prepared for:

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December 10, 2018

Baffinland Iron Mines Corporation
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Attention: Connor Devereaux
connor.devereaux@baffinland.com

William Bowden
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RE: ANNUAL GEOTECHNICAL INSPECTIONS
BAFFINLAND IRON MINES CORPORATION
OUR REFERENCE NO. 18-068

1.0 INTRODUCTION

Barry H. Martin, P. Eng., Consulting Engineer, completed the tenth annual water licence geotechnical inspection of the following on-site engineered facilities as required by Licence No. 2AM-MRY 1325 of the Nunavut Water Board:

Pit Walls
Quarries
Landfills
Land Farms
Bulk Fuel Storage Facilities
Sediment Ponds
Collection Ponds
Polishing and Waste Stabilization Ponds

The inspection that took place Oct 3rd to October 10th is the second phase of a biannual inspection to be carried out within the open water shipping season at Mary River, the mine site, and Milne port. As we arrived in Mary River, the last 4 ships had not yet arrived in Milne Inlet.

The inspections were carried out in accordance with the guidelines set out in "Dam Safety Guidelines 2007" as published by the Canadian Dam Association.

The inspections were completed by Mr. Barry H. Martin, P. Eng., the design Engineer for the initial containment facilities both at Mary River and Milne Inlet, the runway extension, initial bridges on the Tote Road, the solid waste disposal site as well as continuing construction of select mine infrastructure.

The nine previous annual water licences geotechnical inspections were completed by Mr. Martin. You shall note that Hazardous Waste Containment Structures have been assigned new designations in the report as compared to past years and are now identified by both the new designation and the past descriptive designation.

The facilities inspected are as per the following:

Mary River Site

Bulk Fuel Storage Containment
Generator Fuel Storage Facility Containment
Polishing/Waste Stabilization Pond # 1
Polishing/Waste Stabilization Ponds # 2 and # 3 (constructed as a two-cell structure)
Helicopter Fuel Cell Containment
Barrel Fuel Containment (constructed as a two-cell structure) (MS-HWB-3 and MS-HWB-4)
Hazardous Waste Storage (MS-HWB-2)
Enviro-Tank Storage (constructed contiguous with hazardous waste storage and stove oil storage) (MS-HWB-1)
Stove Oil Storage (MS-HWB-5)
Jet Fuel Tank and Pump Containment
Solid Waste Disposal Site
Mine Site Steel Fuel Tank Farm Containment
Quarry (QMR2)
Crusher Pad Drainage Containment
Waste Pile Drainage Containment
Jet 'A' Fuel Containment
Hazardous Waste Containment (MS-HWB-6)

A site plan for the Mary River site showing most structures reviewed is attached.

Milne Inlet Site

Hazardous Waste Storage (constructed as a two-cell structure) (MP-HWB-3 and MP-HWB-4)
Port Site Fuel Tank Farm Containment
Polishing/Waste Stabilization Pond (PWSP)
Land Farm
Contaminated Snow Containment
Sediment Ponds East and West (MP-05 and MP-06)
Quarry (Q1)
Loading Area Contaminated Storage (MP-HWB-1)
Fuelling Facility Containment

A site plan for the Milne Inlet site showing most structures reviewed is attached.

2.0 METHODOLOGY FOR INSPECTION

The geotechnical inspector was Barry H. Martin, P. Eng., who also reviewed both sites in the past 9 years during the open water season

The inspections primarily focused on the following aspects:

1. The structures were inspected for conformance with the design basis as presented in “as constructed” and “as-built” drawings (provided in the first and subsequent reports).

2. The structures were specifically inspected for settlement, cracking, and seepage through the berms.

3. The areas around the structures were examined for evidence of seepage.

4. Quarry walls were reviewed for relative stability. I note that the quarries are active removal areas and long term stability was not yet established.

5. New structures under construction were reviewed for conformity with design drawings.

6. Photographs were taken to document observations made during the inspection and are attached.

7. The berms of containment structures were examined with respect to possible tears in liner membranes.

3.0 MARY RIVER CAMP

3.01 General

There had been snowfall in the two weeks prior to our inspection at Mary River. There was very little snow on the ground at Milne Inlet. Hence the integrity of the containment structures could be verified by the recent ice that had formed in the bottom of the containment structures.

A monitoring program is in place to test storm water that accumulates within the containment structures. As reviewed, the water that does not meet the water licence effluent requirements is treated on site prior to release. For small amounts, the water is pumped out and transported to where treatment takes place. This is done earlier in the season.

At the Bulk Fuel Storage Facility Containment, the water that collects within the dyke and is treated at the end of the containment structure. At the time of this inspection, the treatment was not actively taking place due to the cold weather.

The unloading area is currently utilized as an entrance to the containment with some storage.

3.02 Bulk Fuel Storage Facility (Exploration Phase Bladder Farm)

General Conditions

The Bulk Fuel Storage Facility still exists but it is no longer utilized as a bulk fuel storage facility. There are a number of full fuel barrels and lubricant cubes now stored within the berms, as well as a large fuel tank.

The granular cover over the geotextile and liner is still in place within the containment structure with a fair amount of water and ice at one end awaiting treatment.

There is now a ramp over the north end of the containment to permit access over the dyke for placing barrels and cubes in storage. There is also some cube/barrel storage in this area.

At the south end this access is through the former fuel unloading area.

Stability

At the time of the initial springtime inspection water had not been removed from within the containment. This water was ponding above the level of the gravel in the bottom south end of the containment facility. At the time of our current inspection this water is frozen.

At the load-out end of the facility there was water and ice ponding within the dykes. At the former fuel unloading area at the north end there was minor water ponding within the dykes.

The soil structure is considered stable in the present condition and is in conformance with the design basis for the facility.

The presence of water and ice within the structure and at the load-out area is an indication of the liner's integrity.

The dykes have been built up two years ago to reinforce the concept of no loader travel over the dykes.

There is one area along the interior of the west dyke where the liner integrity had been compromised by a loader operator that has punctured the membrane. The puncture appears to have been repaired and covered.

Recommendations

We have no recommendations with respect to this containment structure other than to confirm the puncture was repaired and then covered.

3.03 Generator Fuel Storage Containment (Exploration Phase)

This particular containment structure is currently being decommissioned.

The granular fill over the geotextile and liner shall eventually require landfarming with the material from the bulk fuel storage facility.

There is no indication that the liner is compromised and decommissioning should proceed when the granular cover is either moved to a land farm or other containment. There is water and ice ponding within the structure confirming the integrity of the liner.

3.04 Polishing/Waste Stabilization Pond #1

General Conditions

PWSP # 1 continues to be utilized as a holding facility for sewage plant effluent that does not meet water effluent quality criteria.

Currently the pond is being used primarily as a repository for off spec sewage and sewage sludge forming in lift stations.

The supernatant from PWSP #1 is periodically decanted to PWSPs # 2 and #3 where it is tested and treated as required to meet Water Licence effluent requirements.

At the time of our visit there was approximately fifty percent of capacity to accommodate further sewage and the structure readily conforms to its design intent.

Stability

Our review of this area around the pond at the base of the slopes showed no sign of seepage; hence, we conclude that the liner has been effective in containing sewage. There are no tears or ruptures in the membrane, excepting some minor tears from past activity at the top of the dyke well above the allowable effluent level in the structure in the horizontal portion of the membrane. Travel with small machinery in the past has caused many punctures and small tears in the top of the dyke.

A review of the top of the dyke showed no indication of cracking or settlement which would indicate stresses within the structure.

Many of the tears that had occurred in the liner on the top of the dyke have been patched during the period between reviews in 2008 and 2009 and are holding well. As well, there are no signs of weather related deterioration of the liner where it is exposed.

There appears to be no sign of erosion of the dykes, even with the precipitation that has occurred over the lifetime of the facility.

The minor settlements have had little effect on the integrity of the structure.

Recommendations

The damage to the liner at the top of the dyke at the area where trucks dump into the cell should be repaired.

3.05 Polishing Ponds/Waste Stabilization Ponds #2 and #3

General Conditions

The structure was designed and constructed as a two-cell structure.

The supernatant from PWSP #1 is currently discharged to PWSPs #2 and #3. The treated effluent is tested for Water Licence effluent requirements, treated if necessary, and discharged to the environment.

At the time of our visit there was considerable freeboard to accommodate further sewage and the structure readily conforms to its design intent. Both cells were operating at approximately 50% of capacity.

Stability

Our review of the area around the pond at the base of the slopes showed no sign of seepage and hence we conclude that the liner has been effective in containing the sewage and there are no tears or ruptures in the membrane.

Monitoring points have been set up on the top of the dyke and have been monitored since 2009. Settlements have occurred since that time. These settlements have not led to any stress cracks in the structure. Monitoring was discontinued three years ago. There is no sign that these very minor settlements are affecting the function of this containment structure.

There appears to be no sign of erosion of the dykes and plants are continuing to seed themselves on the dykes. This growth is still minimal, however.

Recommendations

We have no recommendations with respect to this containment facility.

3.06 Helicopter Fuel Tank Containment

General Conditions

The structure was designed and constructed as a single cell structure that contains a 1000 gal fuel storage tank.

The structure currently conforms to its design intent.

In the past, a liner clad wood curb had been added to the top of the berm to prevent the erosion of gravel off the berm, caused by pulling the fuel hose from within the dyke out to the helicopters to provide them with fuel.

The temporary fuel containment cell that was set up last year has been removed since our last inspection in 2017.

Stability

Our review of the area around the pond at the base of the slopes showed no sign of seepage.

A review of the exterior and the top of the berms showed no sign of cracking or settlement which would indicate stress within the structure.

The structure is considered to be stable in its present condition and contains water and ice that attests to its integrity.

Recommendations

We have no recommendations with respect to this structure.

3.07 Barrel Fuel Containment (Now MS-HWB-3 and MS-HWB-4)

General Conditions

This particular structure which we called “Barrel Fuel Containment” in our previous inspection reports is a two-cell structure currently used to accommodate contaminated waste in the east cell and barrels of fuel in the west cell.

Stability

Our review of the area around this containment structure showed no sign of seepage. There is some ice and water ponding in this structure attesting to its integrity

A review of the exterior and top of the dyke showed no sign of cracking or settlement which would indicate stresses within the structure.

The structure is considered to be stable in its present condition.

Recommendations

We have no recommendations at this time.

3.08 Hazardous Waste Storage (Now MS-HWB-2)

General Conditions

This particular cell was constructed contiguous with an existing cell, which is referred to on site as the “Enviro Tank Storage”, from drawings by our office in 2010 and conforms to our drawings. It is also contiguous with the Stove Oil Storage cell.

This structure contains hazardous waste.

Stability

Our review of the area around this cell at the base of the slopes, showed no sign of seepage. There is ice and water ponding in this structure.

The structure appears to be stable in its present condition. The ice and water in the cell confirms the integrity of the liner.

Recommendations

There is an area at the front of the cell where traffic in has exposed the liner. This liner is to be covered.

3.09 Enviro Tank Storage (Now MS-HWB-1)

General Conditions

This particular structure is constructed contiguous with the Hazardous Waste Storage constructed in 2010 and the Stove Oil Storage cell. It is currently not being utilized and access is blocked.

Stability

Two years ago there was concern for the integrity of this cell as the cell was dry and the geotextile was exposed from heavy traffic during our initial inspection. During our second inspection, the cell was holding a small amount of water confirming limited integrity of the liner.

The cell was dry last year during the second inspection raising concerns anew on the integrity of the liner. This inspection showed no ice and water present.

Recommendations

We recommend that the geotextile over the liner be checked and the granular cover be made good prior to continuing use of this cell. Alternatively, as the cell has not been utilized for over a year, it could be removed.

3.10 Stove Oil Storage (Now MS-HWB-5)

General Conditions

This particular structure had been used to store barrels of stove fuel in 2011.

The structure again contains barrels of stove oil and some cubes of lubricant.

This structure was constructed in accordance with a standardized drawing provided by this office utilizing a one-piece liner.

Stability

Our review of the exterior at the base of the dyke showed no sign of seepage. This shows that there is reasonably little chance of tearing or rupture of the membrane having taken place.

A review of the exterior and the top of the dyke showed no sign of cracking or settlement which would indicate stresses with the structure.

There is ice and water contained within the cell confirming the integrity of the liner.

The structure is considered to be stable in its present condition.

3.11 Jet Fuel Tank and Pump Containment

General Conditions

This particular structure was reconstructed based on our recommendation of the 2012 Geotechnical Inspection.

The construction was completed in accordance with our recommendations for such structures and the liner was constructed as a one-piece liner with geotextile protection on both sides and gravel over the geotextile as protection.

The construction appears proper and the structure is in good condition.

Minor ice and water ponding confirms the integrity of the liner.

At this time as in our earlier inspection report two years ago, the jet fuel tank and pump have been removed and the cell is empty.

Stability

Our review of the area around the cell at the base of the slopes showed no sign of seepage and ice and water is ponding within the cell.

The structure is stable in its present condition.

Recommendations

There are no recommendations at this time.

3.12 Solid Waste Disposal Site

The solid waste disposal site is currently in the second phase of its construction. The second lift of solid waste has been placed and covered fully.

A small amount of waste has been placed on the north side and awaits cover.

A new galvanized steel fence has been constructed along the west side to control wind blown debris.

3.13 Mine Site Fuel Tank Farm Containment

General Conditions

There is ice and water ponding in the bottom of the containment confirming the integrity of the liner. This ponding of water is now well above the cover on the bottom of the containment. (6” to 8”) as it was during our earlier inspection this year.

Stability

All work appears to have been completed in accordance with drawings and we have no concerns with the stability of this containment structure.

3.14 Quarry (QMR2)

General Conditions

The quarry has well defined benches. The quarry faces at the benches are clean on the lower lift. Where blasting occurred in the late fall, the edges and back slopes are well protected with large rocks (2' x 3')

Considerable removals have occurred since our last visit as a systematic approach to quarrying is in place.

Recommendations

We have no recommendations with respect to the manner in which quarrying is being carried out.

3.15 Crusher Pad Drainage Containment

General Conditions

The crusher pad drainage containment has now been constructed and appears satisfactory. The crusher pad has now been expanded as designed

Stability

The edge of the crusher pad is now being revised to ensure the drainage, off the pad, to the ditch beside it.

Recommendations

We recommend that the ore on the pad be placed to suit the design with an 3m buffer between the ditch and the ore. This shall require the relocation some ore. Ditches were snow filled and could not be reviewed fully.

3.16 Waste Rock Stockpile Drainage Containment

Stability

The dyke appears stable at this time.

The waste rock stockpile drainage containment had been drained to locate what appears to be a leak in one of the seams in the liner. Dye testing within the containment has confirmed that there is a leak in the liner but further work in the spring is required.

In the meantime, an emergency dyke and ditch have been constructed to operate until construction is complete on the upgraded waste rock stockpile drainage containment.

The operation of adjusting pH and removing suspended solids from the effluent has been suspended for the winter season. The geo tube containment at the treatment facility appears secure.

The drainage ditching systems conveying runoff and flow to the Waste Rock Stockpile Pond were snow filled and could not be reviewed fully.

Recommendations

1. There is a small erosion area on the west side of the containment dyke that is now under snow cover. This area is small but must be made good first thing in the spring.
2. Ensure that deposited Waste Rock Material is comprehensively contained by the Stockpile ditching system and that the ditches are flowing down-gradient to the Waste Rock Stockpile Pond upon flow initiation in Spring 2019.
3. Continue evaluations of Waste Rock Pond Liner in 2019 to determine compromised location.

3.17 Jet "A" Fuel Containment

General Conditions

This cell was constructed to replace the containment structure near the Weatherhaven Camp.
This cell now contains two double walled tanks and is located north of the air terminal buildings.

Stability

The cell was constructed using a one piece enviroliner with geotextile and was constructed in accordance with standardized drawings prepared in the past for such construction by our office.

There is water ponding in the bottom of the cell confirming the integrity of the liner.

There were no signs of cracking of the dykes.

Recommendations

There is one small area of exposed liner on the west dyke of this containment. This exposed liner should be covered with gravel.

3.18 Hazardous Waste Containment (MS-HWB-6)

General Conditions

Although it was constructed in 2012, we have not reported on it until 2015.

It is located near the incinerator and is utilized to store barrels of ash from the incinerator.

Stability

The cell was constructed utilizing a one piece enviroliner with geotextile and was constructed in accordance with standardized drawings prepared in the past for such construction by our office.

There is ice and water ponding in the bottom of the cell confirming the integrity of the liner. There are tears in the enviroliner noted with three in the west side and one in the south east corner. All waste is in barrels or totes and is contained. The tear in the liner in the south east corner has been repaired but not covered. Other tears have not been repaired and are slightly above the bottom of the containment.

There were no signs of cracking of the dykes or seepage around the exterior of the dykes and one in the back corner.

Recommendations

We have no recommendations with respect to this structure other than making repairs to the damaged enviroliner in three locations. The side dykes should be also built up to keep traffic off them and material stored outside of the dykes should be relocated to within the dykes.

3.19 Overview

This report is the annual Geotechnical Inspection at Mary River and Milne Inlet completed by this author on behalf of Baffinland Iron Mines Corporation and will cover the second of two inspections occurring in the 2018 shipping season. This will be the tenth year of annual geotechnical inspections.

As set out in our past reports, there has been little or no erosion taken place from wind or rain and the dykes constructed of the sand/gravel soil have remained stable at slopes of 3:1 and 4:1.

As noted last year, there are signs of settlement appearing at PSWP's 1, 2 and 3. The settlements are not differential settlements of the dykes but are minor overall settlements of the total structures with respect to the surrounding area.

These settlements appear to be within the one metre ± active layer above the permafrost and are of little concern as the PWSP's are temporary structures. These settlements have had no effect on the dyke stability. These settlements may also be settlements within a thicker active layer due to the dark fluid in the ponds.

It is expected that many of the structures that form the basis for the inspections set out in the biannual Geotechnical inspections shall be decommissioned as the mine facilities are finalized.

A number of these structures at Mary River are awaiting the construction of a land farm to facilitate the disposal of contaminated granular fill from the bottom of containment cells.

We particularly reviewed the liner membrane where it was exposed in this inspection. We found no degradation of the liner from exposure.

MARY RIVER PHOTOS

A. Bulk Fuel Storage Facility

B. Generator Fuel Storage Containment

C. PWSP #1 – Repair Liner at Unloading Area

D. PWSP #3

E. PWSP #2

F. Helicopter Fuel Cell Containment

G. MS-HWB-3 – Barrel Fuel Containment

H. MS-HWB-2 – Hazardous Waste Storage – Exposed Liner

I. MS-HWB-5 – Envirotank Storage

J. MS-HWB-1 – Stove Oil Storage

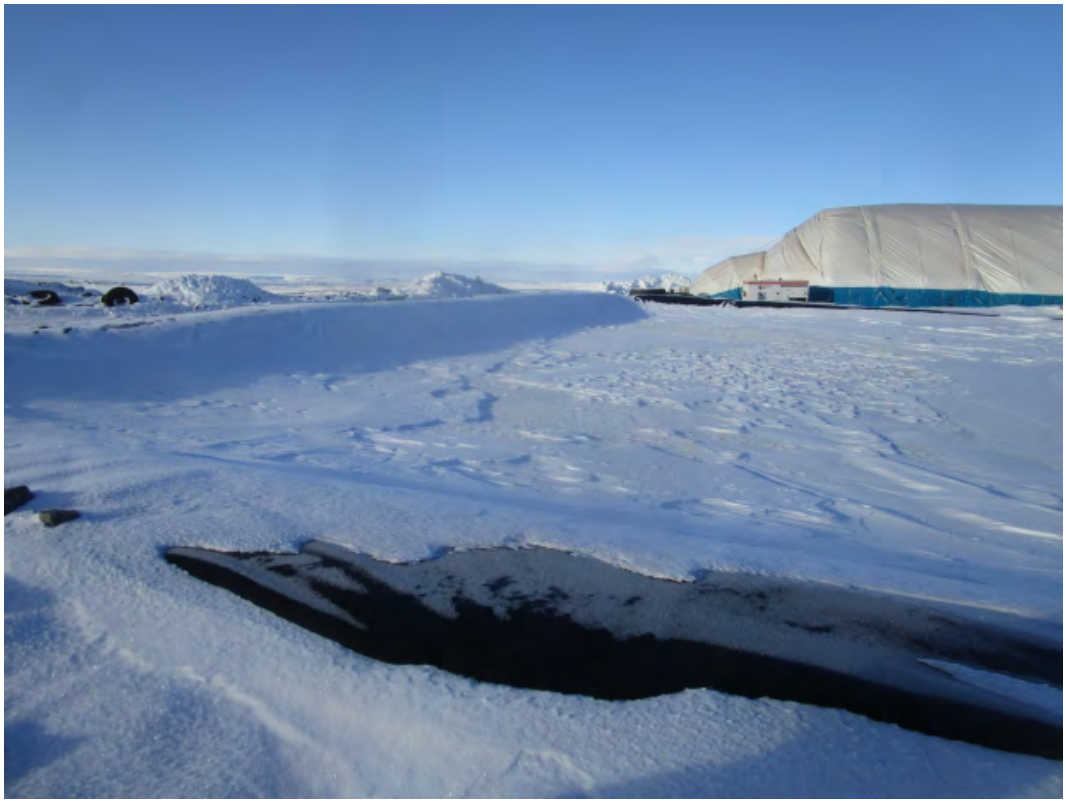
K. Jet Fuel Tank and Pump Containment

L. Solid Waste Disposal Site

M. Mine Site Fuel Tank Farm Containment

N. Mary River Quarry (QMR2)

O. Crusher Pad Drainage Containment (MS-06)



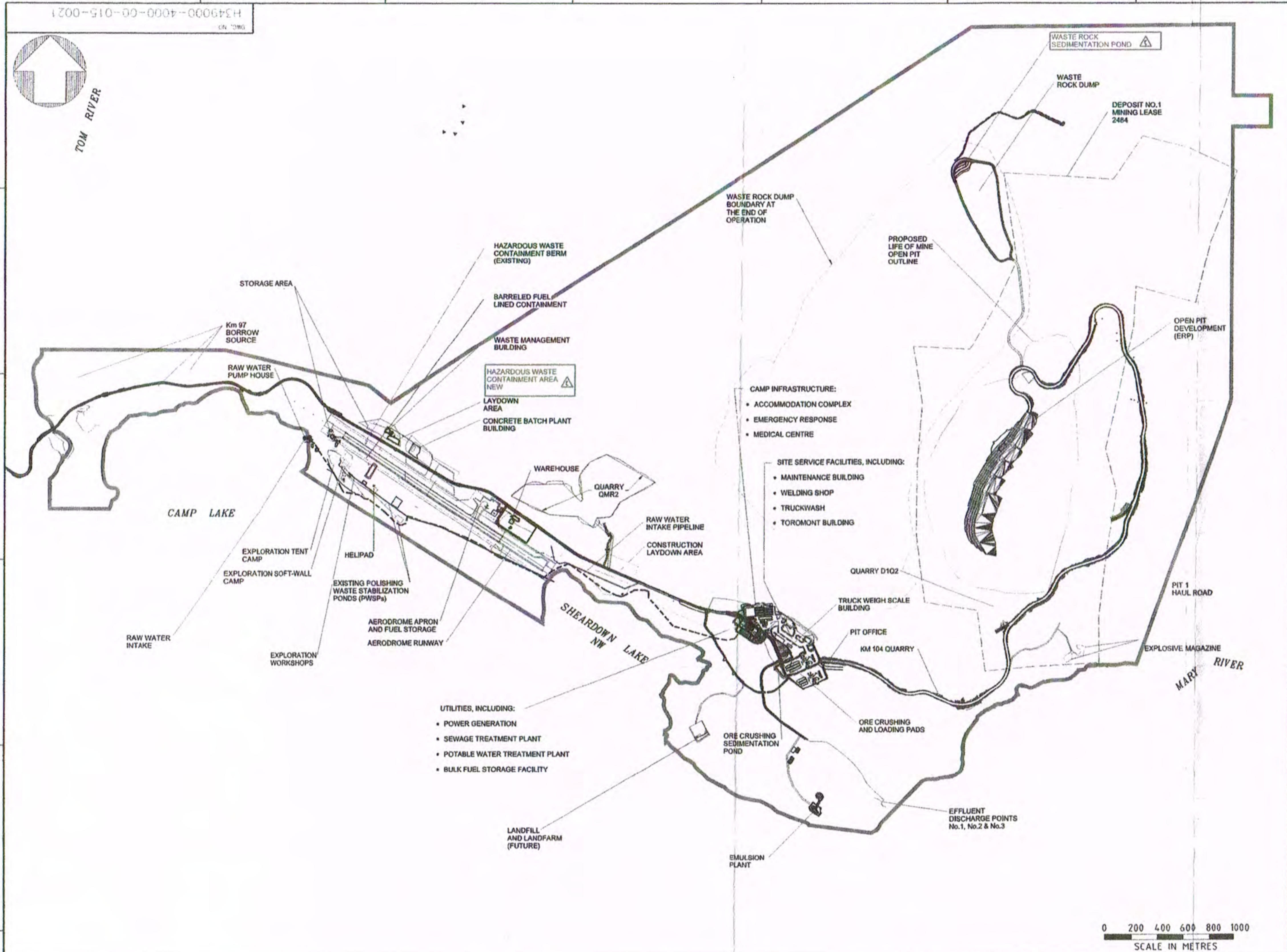
P. Waste Rock Water Treatment System Geotube field

Q. Waste Rock Pond down gradient

R. Jet ‘A’ Fuel Containment

S. MS-HWB-6 – Hazardous Waste Containment

MARY RIVER DRAWINGS


TOM RIVER
Km 97 BORROW SOURCE
STORAGE AREA
RAW WATER PUMP HOUSE
HAZARDOUS WASTE CONTAINMENT BERM (EXISTING)
BARRELED FUEL LINED CONTAINMENT
WASTE MANAGEMENT BUILDING
HAZARDOUS WASTE CONTAINMENT AREA NEW
LAYDOWN AREA
CONCRETE BATCH PLANT BUILDING
WAREHOUSE
QUARRY QMR2
RAW WATER INTAKE PIPELINE
CONSTRUCTION LAYDOWN AREA
CAMP LAKE
EXPLORATION TENT CAMP
EXPLORATION SOFT-WALL CAMP
HELIPAD
EXISTING POLISHING WASTE STABILIZATION PONDS (PWSPs)
AERODROME APRON AND FUEL STORAGE
AERODROME RUNWAY
RAW WATER INTAKE
EXPLORATION WORKSHOPS
SHEARDOWN NW LAKE
UTILITIES, INCLUDING:
• POWER GENERATION
• SEWAGE TREATMENT PLANT
• POTABLE WATER TREATMENT PLANT
• BULK FUEL STORAGE FACILITY
LANDFILL AND LANDFARM (FUTURE)
EMULSION PLANT
ORE CRUSHING SEDIMENTATION POND
WASTE ROCK DUMP BOUNDARY AT THE END OF OPERATION
CAMP INFRASTRUCTURE:
• ACCOMMODATION COMPLEX
• EMERGENCY RESPONSE
• MEDICAL CENTRE
SITE SERVICE FACILITIES, INCLUDING:
• MAINTENANCE BUILDING
• WELDING SHOP
• TRUCKWASH
• TOROMONT BUILDING
QUARRY D1Q2
TRUCK WEIGH SCALE BUILDING
PIT OFFICE
KM 104 QUARRY
ORE CRUSHING AND LOADING PADS
EFFLUENT DISCHARGE POINTS No.1, No.2 & No.3
PROPOSED LIFE OF MINE OPEN PIT OUTLINE
WASTE ROCK SEDIMENTATION POND
WASTE ROCK DUMP
DEPOSIT NO.1 MINING LEASE 2484
OPEN PIT DEVELOPMENT (ERP)
PIT 1 HAUL ROAD
EXPLOSIVE MAGAZINE
MARY RIVER
0 200 400 600 800 1000
SCALE IN METRES

MILNE PORT

MINE SITE

KEYPLAN

FOR INFORMATION

NOTES:

1. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
2. 2016 WORK SHOWN IN RED TEXT.

LEGEND:

WATER	BORROW AREA	RIVER/STREAM/DRAINAGE	COMMERCIAL LEASE
QUARRY	ROAD	RAW WATER INTAKE PIPELINE	PROJECT DEVELOPMENT AREA

REV.	ISSUE FOR	AUTH BY	DATE
C	ISSUED FOR USE	M.B. J.B.	2015-10-15
B	ISSUE FOR USE	S.M. T.M.	2014-12-10
A	ISSUE FOR USE	C.L. A.G.	2014-10-31

ISSUE AUTHORIZATION

HATCH

DESIGNED BY C. LEISTNER DATE 2014-10-21
DRAWN BY J. BAJAGIC DATE 2014-10-21
CHECKED BY S. POTTER DATE 2014-10-21
DISCIP. ENGR. A. GRZEGORCZYK DATE 2014-10-21
PROJ. DES. COORD. T. THERTELL DATE 2014-10-21
PROJ. ENGR. J. CLELAND DATE 2014-10-21
PROJ. MGR. J. CLELAND DATE 2014-10-21

Baffinland

MARY RIVER PROJECT

MINE SITE
INFRASTRUCTURE FOOTPRINT
WORK PLAN 2016

SCALE 1:15000 OR AS NOTED

DWG. NO. H349000-4000-00-015-0021

REV. C

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

DWG. NO. H349000-4000-00-015-0021

4.0 MILNE INLET

4.01 General

There are still changes taking place at Milne Inlet, even since our previous inspection in July/August of this year.

4.02 Hazardous Waste Storage (MP-HWB-3 and MP-HWB-4)

General Conditions

This particular structure has been constructed as a two-cell structure and is still only utilized to store sea cans that contain scraps of enviroliner and geotextile removed from the decommissioning of the exploration phase bulk fuel bladder farm.

Stability

There is water ponding in both cells of the original structure, confirming the integrity of the enviroliner at this time. However, there is a tear in the liner in MP-HWB-3.

Our review of the area around the dykes, at the base of the slopes, showed no sign of seepage. The structure is considered stable.

Recommendations

We have no recommendations with respect to the use of these two cells at this time except for repair to the liner in MP-HWB-3 directly in front of the container stored within the cell.

4.03 Fuel Tank Farm

General Conditions

Since both 2012 and 2013 the fuel tank farm has been expanded considerably with the addition of a number of new tanks. One additional tank has been constructed since the last inspection and a second tank is currently under construction.

Two sumps have been installed in the north end (low end) of the containment. Water is currently ponding in the low end of the containment, confirming the integrity of the enviroliner.

This water is currently 6” to 10” in depth.

Stability

All containment dykes are in excellent condition and there is no sign of weakness except for the top of the dyke midway on the east side where a dozer has turned around on top of the dyke.

Recommendations

We have no recommendations with respect to the containment at this time other than to trim the top of the east dyke.

4.04 New Effluent Pond (PWSP)

General Conditions

This pond was put into operation in 2014.

The containment pond was empty at the time of our inspection.

Stability

We noted no sign of weakness in any of the construction.

Recommendations

We have no recommendations with respect to the use of this structure.

4.05 Landfarm Containment

General Conditions

The landfarm containment is complete except for soil cover on the dykes in the area of the sump.

The landfarm was constructed to accommodate approximately 9000 m^3 of oil contaminated soil and seasonal water accumulations.

At the time of our inspection, the landfarm was in operation and sorting of contaminated materials had taken place since our last inspection. There is still minor sorting to take place including the removal of waste and contaminated waste.

There is still some contaminated waste in the landfarm in addition to contaminated soil. Land farming is just starting with the levelling of much of the contaminated soil.

It appears the structure has been constructed in accordance with good construction practice for structures of this type.

Stability

The structure appears stable as constructed. There has been some minor settlement at the north top side of the dyke.

Recommendations

We recommend that as a minimum, the exterior side of the dyke be covered with gravel/soil to at least half way up from the bottom of the dyke at the area around the sump.

4.06 Contaminated Snow Containment

General Conditions

The construction of the contaminated snow containment structure is contiguous with the east end of the landfarm.

It appears as though the structure has been constructed in accordance with good construction practice for structures of this type.

The snow containment facility has a containment volume of 929 m^3 based on estimates of volume provided by the owner and there is considerable liquid in the cell. It is at approximately 50% of capacity.

The structure has been constructed with good quality control.

Stability

The structure appears stable as constructed.

Recommendations

We have no recommendations with respect to this construction at this time. The structure appears as it did in our July/August review earlier this this year.

4.07 Sediment Pond East

General Conditions

The construction of this sedimentation pond for drainage from the east side of the ore pad is complete.

The basin is shaped and the liner has been installed throughout the basin from inlet to the berms on the north side of the basin.

There has been no cover placed over the liner to this point but, tires have been placed over the liner on the berms as a ballast.

The two inlets to the pond have recently been upgraded and the enviroliner has been repaired at these locations. It is performing well, particularly at the culvert entrance.

Stability

We have no concerns with stability at this time.

Recommendations

I do note that there is no deterioration of the exposed liner.

4.08 Sediment Pond West

General Conditions

The construction of this sedimentation pond for drainage from the west side of the ore pad is now complete with repairs recommended in our past reports having been completed.

The inlet where the water was being conducted under the liner with gravel has been rectified via reconstruction of the inlet.

Stability

We note that the tires placed as ballast on the liner as with the east pond appears to be working well as a ballast.

Recommendations

We have no recommendation with respect to the sediment pond west.

4.09 Quarry (MPQ1)

General Conditions

The quarry was not in operation during our review and has been greatly expanded since our last inspection.

Stability

Rock faces appear stable.

Recommendations

We have no recommendations to be made with respect to the quarry.

4.10 Loading Area Contaminated Storage (Now MP-HWB-1)

General Conditions

This area has been constructed near the loading dock to facilitate assembly of hazardous materials for shipment out.

Most hazardous waste has now been removed from the containment and shipped out.

Construction appears to have taken place in accordance with standardized drawings prepared in the past.

It appears a container of used oil has spilled within the containment and the spill has been controlled by the berm.

Stability

Construction appears stable. However, there is one exposed tear in the liner at the dyke that requires repair. This was noted last year and awaits repair. This tear is where travel took place over the berm on the north side of the structure.

Recommendations

We have no recommendations with respect to this structure other than the liner repair.

4.11 Fuelling Facility Containment

General Condition

A new fuelling facility for the fuelling of B trains has been constructed utilizing design drawings prepared by our office for a double fueling facility.

Work conforms to the design drawing. However, I note that "mud" and the like apparently has been falling from the underside of trucks and trailers to an extent where it is now filling the void set aside to contain a fuel spill. This has been further compounded by the addition of clean gravel over the "mud".

Recommendations

We recommend that 4" to 6" this "mud" and gravel be removed without disturbing the gravel layer over the liner at the base of the structure or the liner in both sides of the fuel tank. It is understood that some work is currently in progress.

4.12 Overview

Further work on containment structures except for maintenance appears complete. Weather will permit very little further work.

Barry H. Martin, P. Eng., MRAIC

REGISTERED PROFESSIONAL ENGINEER
B.H. MARTIN
LICENSEE
4/12/18
NWT/NU

MILNE INLET PHOTOS

1. Hazardous Waste Storage (MP-HWB-3 and MP-HWB-4)

2. Port Site Fuel Tank Farm

3. Polishing/Waste Stabilization Pond (PWSP)

4. Land Farm Containment

5. Contaminated Snow Containment

6. Sediment Pond West (MP-06)

7. Sediment Pond East (MP-05)

8. Quarry (Q1)

9. Loading Area Contaminated Storage (MP-HWB-1)

10. Fueling Facility Containment

MILNE INLET DRAWINGS

H349000-2000-00-015-0021

MILNE INLET

AANDC NUNAVUT LEASE 47H/16-1-2

SHIPLOADER

ORE DOCK

ORE STOCKPILE SETTLING PONDS

FUTURE AIRSTRIP

ORE STOCKPILE PAD

ADDITIONAL LAYDOWN AREA ⚠

POTABLE WATER SUPPLY

CONVERT EXISTING CONCRETE BATCH PLANT BUILDING TO MAINTENANCE BUILDING ⚠

PHILLIPS CREEK

FUTURE POLISHING WASTE STABILIZATION POND

TOTE ROAD

SEALIFT BARGE LANDING AREA

RAMP TO BEACH

FUEL TANK FARM

EFFLUENT DISCHARGE LOCATION
N 7976341
E 503639

HAZARDOUS WASTE BERMS

LAYDOWN AREA

SERVICES AREA PAD
SITE FACILITIES, INCLUDING:

- MAINTENANCE BUILDING
- WELDING SHOP BUILDING
- WORKSHOP OFFICE BUILDING
- TOROMONT MAINTENANCE BUILDING

POWER GENERATORS

INCINERATOR HAZARDOUS WASTE BERM

POLISHING WASTE STABILIZATION POND

EXISTING HAZARDOUS WASTE BERM

MATRIX CAMP

CAMP INFRASTRUCTURE PAD
SITE FACILITIES, INCLUDING:

- ACCOMMODATION COMPLEX
- EMERGENCY RESPONSE OFFICE
- EMERGENCY RESPONSE GARAGE
- SEWAGE TREATMENT PLANT
- POTABLE WATER TREATMENT PLANT
- WASTE MANAGEMENT FACILITY

LAND FARM

ROCK QUARRY N0.1 BOUNDARY

EXTENT OF QUARRY Q1

PERMITTED OPEN BURN PIT AREA

KM2 BORROW AREAS

MILNE PORT

MINE SITE

KLYP_AN

EXISTING HTO CABIN

FOR INFORMATION

NOTES:

1. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
2. 2016 WORK SHOWN IN RED TEXT.

0 50 100 150 200 250
SCALE IN METRES

LEGEND:

- WATER
- QUARRY
- COMMERCIAL LEASE
- AANDC LEASE 47H/16-1-2
- RIVER/STREAM/DRAINAGE
- ROAD
- PROJECT DEVELOPMENT AREA
- BORROW AREAS

REV	ISSUE FOR	AUTH. BY	DATE
D	ISSUED FOR USE	M.B.	J.B. 2015-10-15
C	ISSUE FOR USE	S.M.	T.M. 2014-12-10
B	ISSUE FOR USE	C.L.	T.M. 2014-10-31
A	ISSUE FOR USE	C.L.	A.G. 2014-06-19

ISSUE AUTHORIZATION

HATCH

DESIGNED BY C. LEISTNER DATE 2014-10-20	DRAWN BY J. BAJAGIC DATE 2014-10-20
CHECKED BY S. POTTER DATE 2014-10-20	DISCIP. ENGR. A. GRZEGORCZYK DATE 2014-10-20
PROJ. DES. COORD. T. THERIEN DATE 2014-10-20	PROJ. ENGR. J. CLELAND DATE 2014-06-19
PROJ. MGR. J. CLELAND DATE 2014-06-19	

Baffinland

MARY RIVER PROJECT

MILNE PORT
INFRASTRUCTURE FOOTPRINT
WORK PLAN 2016

SCALE 1:5000 OR AS NOTED

DWG. NO. H349000-2000-00-015-0021

REV. D

BARRY H. MARTIN

Consulting Engineer and Architect
1499 Kraft Creek Road
Timmins, Ontario, P4N 7C3

December 10, 2018

Mr. Connor Devereaux
Environmental Superintendent
Baffinland Iron Mines Corporation
2275 Upper Middle Road East, Suite 300
Oakville, Ontario L6H 0C3

RE: MARY RIVER PROJECT - TOTE ROAD BRIDGES - BRIDGE ABUTMENT REVIEW

On October 7, 2018, the abutments of the four (4) Tote Road bridges were inspected by Barry H. Martin.

The scope of the inspection focused on assessing the general condition of the abutments of each Tote Road bridge.

A summary of the observations noted during the October 7, 2018 inspection by Barry H. Martin is provided below.

1. **Km 17 – Tote Road Bridge**

    a. **South Abutment**

    - On the southwest corner, there is approximately ¼" of clearance between the steel and the ballast blocks. On the southeast corner, there is less than ¼" of clearance between the steel and the ballast blocks.
    - The ballast blocks are no longer exactly aligned. The top block appears to have been "pushed back" by the wood deck at the wood deck level.

    b. **North Abutment**

    - Clearance between the steel and the ballast blocks averages 3 ¼".
    - The ballast blocks are slightly out of alignment but the variance is negligible.

    c. **Abutments for Former Shipping Container Bridge at Km 17**

    - The abutments are geotechnically stable.
    - Fill on the north side of the former south abutment is spilling out slightly.

d. Photographs

i. North Abutment – NW Corner
ii. North Abutment - NE Corner
iii. South Abutment - SE Corner
iv. South Abutment - SW Corner
v. North Abutment (Former Shipping Container Bridge)
vi. South Abutment (Former Shipping Container Bridge)

2. <u>Km 62 - Tote Road Bridge</u>

a. South Abutment

- Clearance between the steel and ballast blocks is 3 ¼" and 2 ¼" on the SE and SW corners, respectively.

b. North Abutment

- Clearance between the steel and ballast blocks is approximately 1 ¼" and 2" on the NE and NW corners, respectively.

c. Abutments for Former Shipping Container Bridge at Km 62

- Heavy rip rap and armouring around the abutments maintain these structures as "secure" and geotechnically stable.

d. Photographs:

i. North Abutment - NE Corner
ii. North Abutment - NW Corner
iii. North Abutment (Former Shipping Container Bridge)
iv. South Abutment (Former Shipping Container Bridge)

No photographs of the South Abutment are available.

3. <u>Km 80 – Tote Road Bridge</u>

a. South Abutment

- Clearance between the steel and ballast blocks is approximately 1 ½" and ¾" on the SE and SW corners, respectively.
- The ballast blocks are slightly out of alignment with the top blocks protruding past the lower blocks.

b. North Abutment

- Clearance between the steel and ballast blocks is approximately 1 ½" and 2" on the NW and NE corners, respectively.
- The ballast blocks are slightly out of alignment with the top blocks protruding past the lower blocks.

c. Abutments for Former Shipping Container Bridge at Km 80

- The abutments are geotechnically stable.

d. Photographs:

i. North Abutment - NE Corner
ii. North Abutment - NW Corner
iii. South Abutment - SE Corner
iv. South Abutment - SW Corner
v. North Abutment (Former Shipping Container Bridge)
vi. South Abutment (Former Shipping Container Bridge)

4. <u>Km 97 – Tote Road Bridge</u>

a. South Abutment

- Clearance between the steel and ballast blocks is ½" and 1 ¼" on the SW and SE corners, respectively.
- The ballast blocks are slightly out of alignment with the top blocks protruding past the lower blocks.

b. North Abutment

- Clearance between the steel and ballast blocks is 3 ½" and 3 ¼" on the NW and NE corners, respectively.

c. Abutments for Former Shipping Container Bridge at Km 97

- The abutments are geotechnically stable.

d. Photographs:

i. North Abutment - NE Corner
ii. North Abutment - NW Corner
iii. South Abutment - SE Corner
iv. South Abutment - SW Corner
v. North Abutment (Former Shipping Container Bridge)
vi. South Abutment (Former Shipping Container Bridge)

Respectfully submitted,

Barry H. Martin, P. Eng., MRAIC

REGISTERED PROFESSIONAL ENGINEER
B.H. MARTIN
LICENSEE
10/12/18
NWT/NU

Photographs

Km 17 Bridge

Photo 1 - North Abutment - NW Corner

Photo 2 - North Abutment - NE Corner

Km 17 Bridge cont'd

Photo 3 - South Abutment - SE Corner

Photo 4 - South Abutment - SW Corner

Km 17 Bridge cont'd

Photo 5 - North Abutment (Former Shipping Container Bridge)

Photo 6 – South Abutment (Former Shipping Container Bridge)

Km 62 Bridge

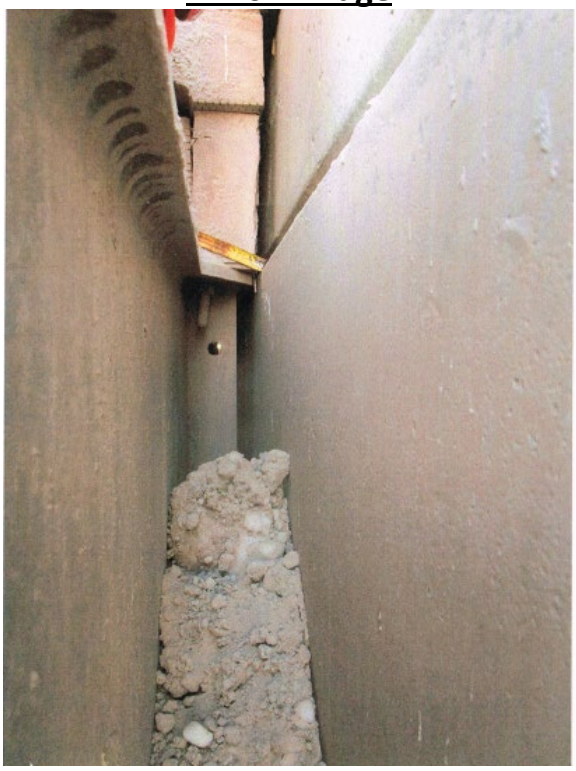


Photo 1 - North Abutment - NE Corner

Photo 2 - North Abutment - NW Corner

Km 62 Bridge cont'd

Photo 3 - North Abutment (Former Shipping Container Bridge)

Photo 4 - South Abutment (Former Shipping Container Bridge)

Km 80 Bridge

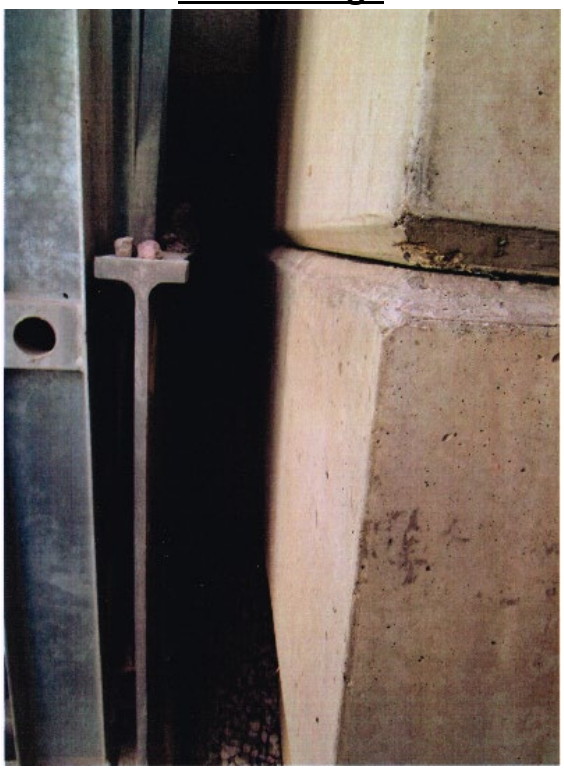


Photo 1 - North Abutment - NE Corner

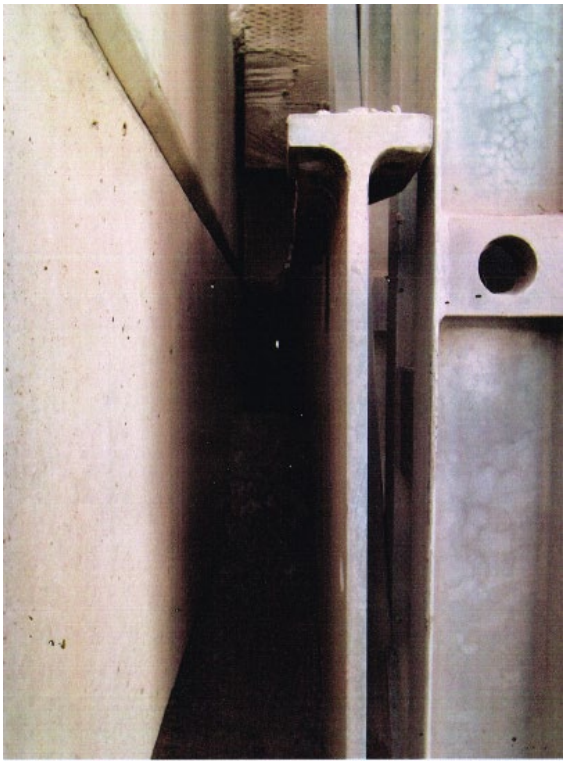


Photo 2 - North Abutment - NW Corner

Km 80 Bridge cont'd

Photo 3 - South Abutment – SE Corner

Photo 4 - South Abutment – SW Corner

Km 80 Bridge cont'd

Photo 5 – North Abutment (Former Shipping Container Bridge)

Photo 6 – South Abutment (Former Shipping Container Bridge)

Km 97 Bridge

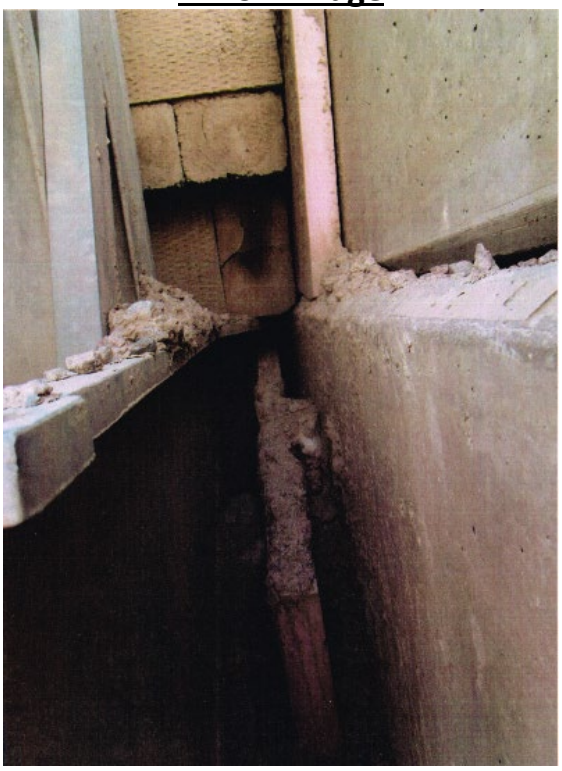


Photo 1 - North Abutment - NE Corner

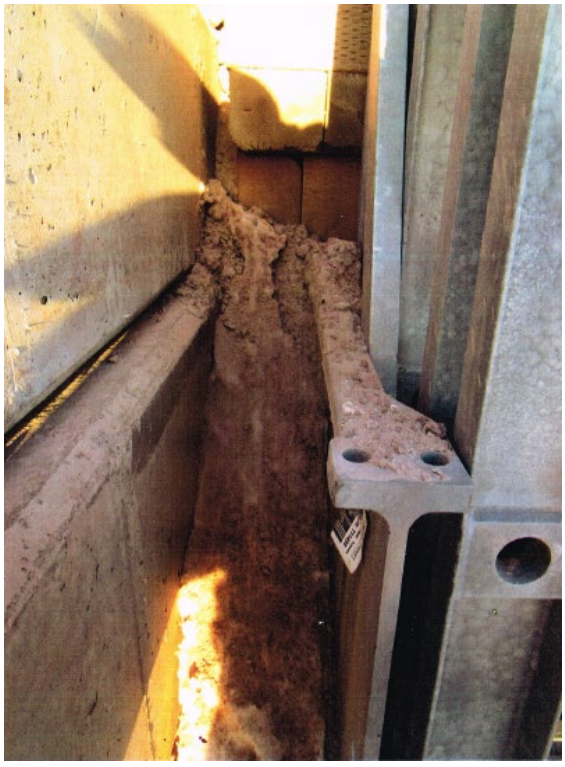


Photo 2 - North Abutment - NW Corner

Km 97 Bridge cont'd

Photo 3 - South Abutment – SE Corner

Photo 4 - South Abutment – SW Corner

Km 97 Bridge cont'd

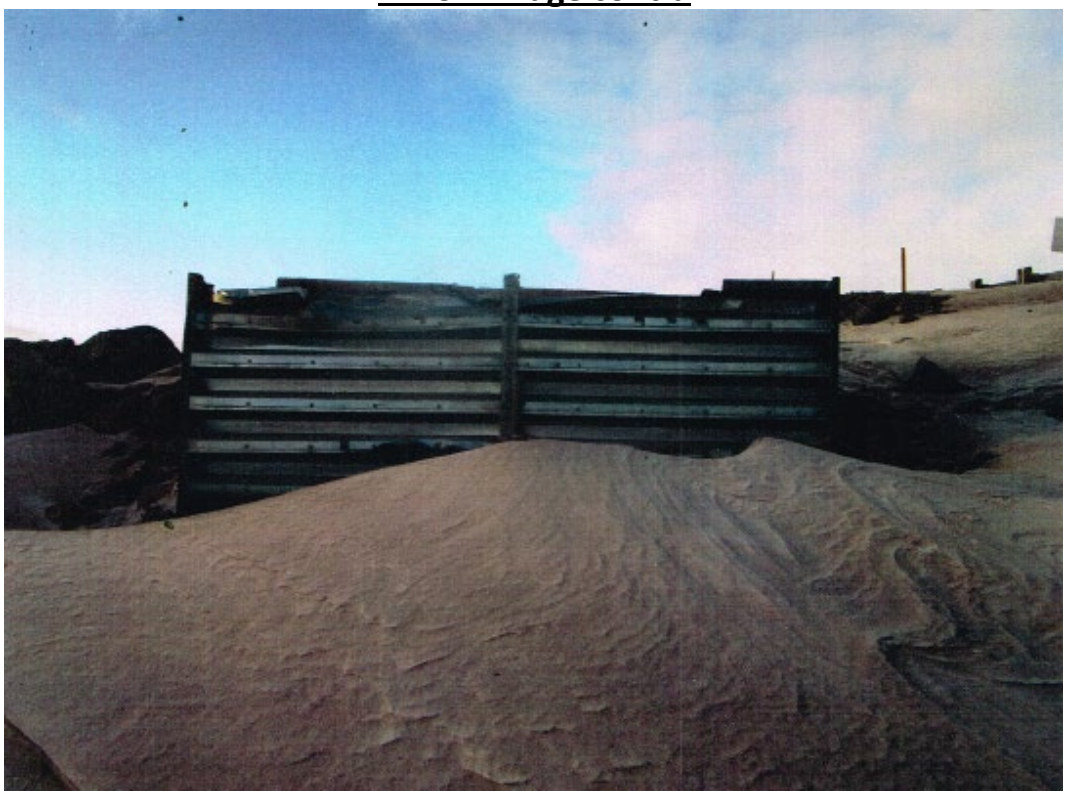


Photo 5 – North Abutment (Former Shipping Container Bridge)

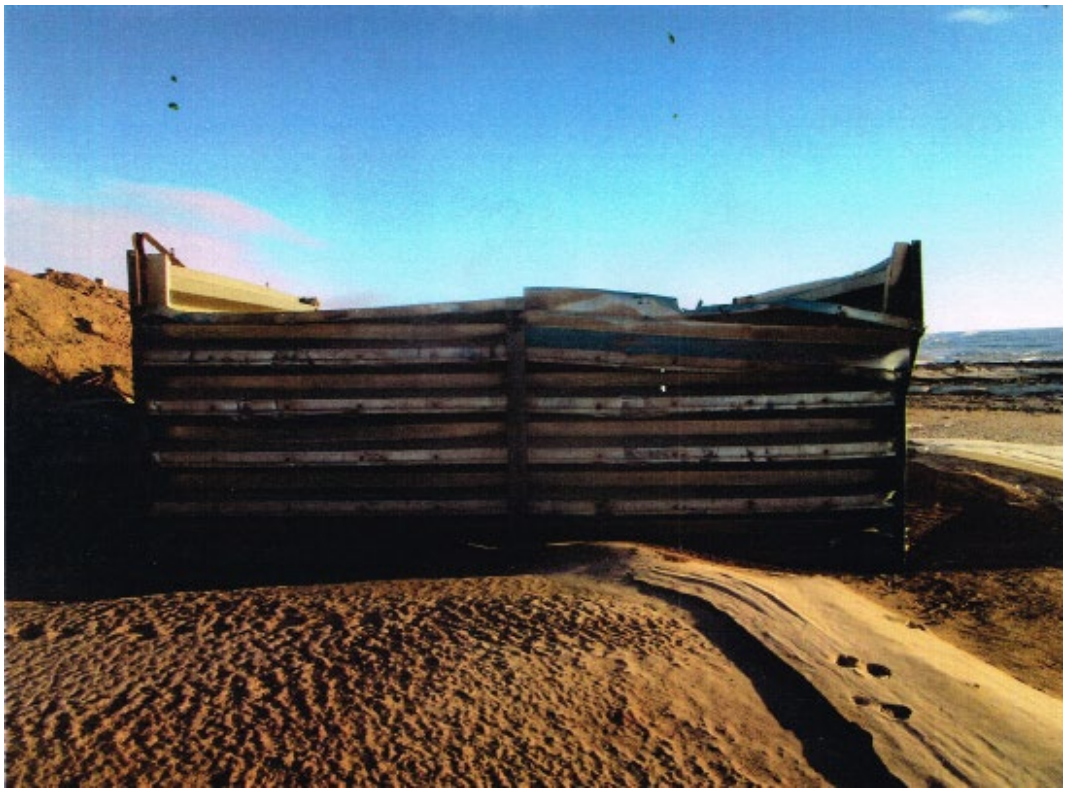


Photo 6 – South Abutment (Former Shipping Container Bridge)