Baffinland Iron Mines Corporation

KM104 BORROW SOURCE MANAGEMENT PLAN

BAF-PH1-830-P16-0035

Rev 0

Prepared By: Stephen Ranger
Department: Operations – Materials Handling
Title: Materials Handling Manager
Date: March 20, 2014
Signature:

Approved By: Michael Anderson
Department: Operations
Title: VP Operations
Date: March 20, 2014
Signature:

DOCUMENT REVISION RECORD

Issue Date MM/DD/YY	Revision	Prepared By	Approved By	Issue Purpose
03/20/2014	0	SR	MA	Use

TABLE OF CONTENTS

List of Table

List of Figure

List of Appendix

1 INTRODUCTION

The following document is a borrow source management plan for km104. For further detail regarding borrow source best management practices for the Mary River Project, see Appendix D (Borrow Source Approach) of the Borrow Pit and Quarry Management Plan.

During execution of the 2014 Work Plan borrow material will be required from sources along the Tote Road, sources at the Mary River Mine Site and at the Milne Port site. Borrow material is an essential element for numerous construction activities including: grading, laydown areas, backfill, foundations for the aerodrome, fuel storage, camp expansion, local roads and administration and maintenance facilities, and heavy equipment storage. The purpose of this management plan is to outline the plan for operating the borrow source at km104.

2 BORROW SOURCE LOCATION AND QUANTITY

Operation will continue as necessary at existing borrow source areas adjacent to the Tote Road at Km 104 at the transition from where the Tote Road becomes the Haul Road to Pit 1. Please refer to Drawing H349000-4138-10-015-0008, attached in Appendix A for the exact location of the borrow sites at km104. Table 2-1 summarises the quantities expected to be extracted from this borrow site.

TABLE 2-1: BORROW PIT KM104 SPECIFICATIONS

Requirement	Description
NTS Map Sheet (1:50,000)	• 37 G5 Edition 1 ASE Series A 713
Quarry Vertices Coordinates (UTM)	West Deposit • 7,913,039 N 562,135 E (Centre point) • 7,913,139 N 561,851 E (NW Corner) • 7,913,090 N 562,282 E (N Corner) • 7,912,902 N 562,363 E (NE Corner) East Deposit • 7,912,808 N 562,719 E (Centre Point) • 7,912,814 N 562,511 E (W Extent) • 7,912,828 N 562,782 E (N Extent) • 7,912,739 N 562,873 E (E Extent)
Total Area of Borrow Site	• 4.81 ha for the west and 0.84 ha for east = 5.65 ha as shown in Appendix A
Volume with Contingency	• 50,000 m³
Area of Existing Clearing	• 3.57 ha little clearing is required for larger area as site is primarily exposed gravels
Area of Proposed Quarrying	• Appendix A shows the borrow pit extents
Topsoil/Overburden Storage Area	• None is required as site is primarily exposed gravels. If

	overburden topsoil is removed, it will be stockpiled on site and used for future reclamation
Access Roads/Trails	• The borrow pit will be accessed directly from the Tote Road
Camp Locations	• No camp will be built specifically for the borrow pit operation. Personnel will be housed at the existing Mary River camp

2.1 BORROW SOURCE KM104

Borrow source KM104 is located at approximately kilometre 104 along the Tote Road at the transition to the Tote Road becoming the Haul road up to Pit 1. The borrow source consists of glacial outwash gravels and sands that formed as a result of glacial action and water deposition. The sands and gravels originate from the erosion, transport, and deposition of materials that originate from the varied bedrock underlying the adjacent area and region. This has resulted in a relatively high content of Paleozoic carbonates consisting of dolestone and limestone. A large volume of this borrow type material has been successfully used over the past five years to support Tote Road and Haul Road construction and maintenance. There has been no evidence of the development of ARD or metal leaching processes at or downstream of the existing road embankment. In summary, it is unlikely that the materials from this borrow source will generate ARD and leach metals for the following reasons:

- The origin of the materials are unconsolidated waterborne sediments and hence the unlikely presence of high concentrations of metals.
- There is an absence of sulphide minerals based on visual observations of the material.
- There is a lack of ARD or metal leaching evidence along the Tote Road embankment which contains a large volume of this material.
- There is a high relative abundance of carbonate rock materials which offer significant acid buffering capacity for the material as a whole.

FIGURE 3-1: BORROW SITE KM104 WEST ALONG HAUL ROAD SHOWING GRAVELS

FIGURE 3-2: BORROW SITE KM104 EAST ALONG HAUL ROAD SHOWING GRAVELS

Development of the KM104 Borrow Site is expected to progress as detailed in the following steps:

2.1.1 BORROW SOURCE DEVELOPMENT

The borrow source has been previously accessed for use in building the Haul Road as well as the Tote Road. Little site development is required however storm water needs to be managed to ensure that rainfall does not collect at the borrow source and lead to any potential permafrost degradation. As required, storm water drainage will be managed with perimeter ditching and/or berms to divert rainfall or snow melt to natural drainage channels. Rip-Rap rock check dams will be placed at strategic locations along the drainage channel to minimize erosion by reducing flow velocities and to promote settlement of sediments prior to discharge.

2.1.2 ACCESS ROAD

This borrow site is adjacent to the existing Mine Pit Road; therefore access to the area where material is extracted will be via a simple graded surface at existing ground elevation. This access road is used to transport the borrow materials from the material source to the crusher pad for processing and loading the finished product. A dedicated embankment is not necessary since the existing soils will support the expected truck and equipment loads. There is a non fish bearing stream north of the borrow site. The future Haul Road alignment transects the footprint of the borrow site so the drainage plan reflects the final footprint once the Haul Road is built.

2.1.3 SUMMER EXTRACTION OPERATIONS AT BORROW SITE

Summer extraction of borrow can be achieved by simple excavation of thawed gravels at the surface, dozing the thawed materials into a stockpile, loading, and hauling to the crusher or to the construction site for placement. The material is then hauled to where it is needed or taken to the central crushing and screening operations near Quarry QMR2 to grade the material.

2.1.4 WINTER EXTRACTION OPERATIONS AT BORROW SITE

Winter extraction of borrow material will be similar to that of summer extraction using an excavator, unless the material is too frozen. In this case, with the use of a track drill, a bench is drilled and blasted at some designated elevation to begin bench development. Bench development can proceed from a higher elevation to a lower elevation or vice versa, depending on the topography of the site. Blasted borrow material is ready for loading into haul trucks and hauled to the crusher pad as crusher feed material to produce finished products or hauled to construction sites if crushing is not required.

2.1.5 BENCH DRILLING

As each drill round is blasted out, the drill either stays at this elevation to expand the bench in a longitudinal direction along the face, or the drill climbs to a higher or lower elevation to drill and blast subsequent benches. These benches are expanded in length as required for subsequent blasting of borrow at that elevation. Benches are created for safety and for efficient drill/blast operations.

2.1.6 SUBSEQUENT BENCH DEVELOPMENT

Each bench proceeds toward the main body of borrow rock at that elevation. Lower benches follow behind upper benches and drilled and blasted to move toward the main body of rock. Ramps may be constructed to the upper benches for truck loading near the blasted rock. Whenever practical benching will be minimized during borrow operations, instead utilizing the pushback of hills. When benches are deemed necessary to operate the borrow source safely and effectively, the will be properly regarded upon closure of the borrow source to ensure natural drainage and avoid the pooling of water.

2.1.7 DRILLING FROZEN GRAVELS

Drilling frozen gravels is completed with the use of one or two drill rigs using small diameter boreholes less than 125 mm. The boreholes are laid out by a surveyor to the engineered spacing and burden for each particular rock type and geologic conditions. The drill is removed from the area for loading explosives and blasting. The drill can proceed along the bench to continue drilling or proceed to a new bench.

2.1.8 BLASTING OPERATIONS

Blasting frozen gravels is completed by installing high explosive detonating boosters at the bottom of each hole with initiation wires extending to the surface for connection to the blasting circuit, followed by dropping in pre-packaged sticks of explosives and pouring from pre-packaged emulsion bags. Detonation and initiation is carried out with the use of delays to time the detonators in a fast millisecond sequence of smaller blasts for efficient loosening of the frozen gravels. Blasting lags behind the drill as more drilling is completed. As each new drill round is completed, the drill moves on and the drilled round is loaded with explosives or emulsion and blasted.

2.1.9 HAULING BORROW GRAVELS

The blasted material is loaded onto trucks for delivery to the crusher, temporary stockpiles or to construction sites.

2.1.10 CRUSHING OPERATIONS

Borrow material is fed to the crusher and/or screening equipment to size and produce the desired rock product, stored in stockpiles and loaded into trucks for delivery to construction sites.

3 BORROW SOURCE CLOSURE

The abandonment of the Project works and site reclamation for the borrow sources will be undertaken at or before the close of the Project. Separate closure plans for each borrow source will be required prior to closing each facility, for more information on site closure please refer to the Project Interim Abandonment and Reclamation Plan, BAF-PH1-830-P16-0012. Closure of the Project will involve removing construction materials, equipment and infrastructure and reclaiming the site to self-sustaining productive ecosystem near its original condition.

The general abandonment and reclamation plans include the following:

- Dismantle and transport all fuel/chemical storage and handling infrastructure to an approved facility or for reuse where applicable.
- Dismantle and remove all buildings and related infrastructure.
- Remove all hazardous waste and explosives.
- Re-grade as necessary to establish safe slopes and restore the natural drainage to the area.
- If overburden topsoil has been removed and stockpiled, it will be used to re-grade the land.
- Test soils and granular materials for hydrocarbon content; contaminated soils will be remediated.
- Ensuring that the borrow source area drains such that it does not have standing water within the area. As appropriate, swales will divert water towards rip-rap areas and then discharged into the environment.

Appendix A-
Borrow Source Drawing

(H349000-4138-10-015-0008)

DWG. NO. H349000-4138-10-015-0008

E 561 181 E 562 000 E 562 200 E 562 400 E 562 600 E 562 800

N 7 913 400

N 7 913 200

N 7 913 000

N 7 912 800

MQ-C-H
N 7 913 173
E 561 870

N 7 913 139
E 561 851

CENTRE OF QUARRY
N 7 913 039
E 562 135

N 7 913 090
E 562 282

REALIGNED HAUL ROAD

MP-C-H
N 7 912 979
E 561 847

N 7 912 902
E 562 363

MQ-C-J
N 7 912 858
E 562 524

CENTRE OF QUARRY
N 7 912 808
E 562 719

N 7 912 828
E 562 782

MQ-C-K
N 7 912 825
E 562 504

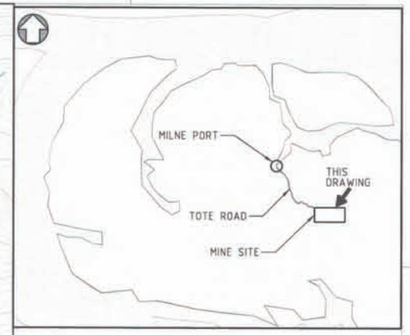
N 7 912 814
E 562 511

EXISTING HAUL ROAD

NEW HAUL ROAD

N 7 912 739
E 562 873

242 204 216 218 234 222 244



KEY PLAN

LEGEND

- EXISTING WATERBODY
- PROPOSED FOOTPRINT OF BORROW SOURCE AREA
- 242 EXISTING CONTOUR
- EXISTING STREAM
- OVERLAND FLOW PATH
- EXISTING DRAINAGE TO BE DIVERTED/ABANDONED
- SURFACE DRAINAGE DIVERSION
- INTERNAL SURFACE DRAINAGE
- RIDGE LINE (HIGH POINT)
- PROPOSED CULVERT
- WATER QUALITY MONITORING LOCATION
- HAUL ROAD NORTH SIDE DITCH

NOTES:

1. TOPOGRAPHY PROVIDED BY TERRAPOINT CANADA INC.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 2.0 METRES.

FOR PERMITTING

0 20 40 60 80 100
SCALE IN METRES

DRAWING NO.	DRAWING TITLE
H349000-4221-10-012-0002	MINE HAUL ROAD-STA. 0+600 TO 1+200-PLAN & PROFILE
H349000-4221-10-012-0001	MINE HAUL ROAD-STA. 0+000 TO 0+600-PLAN & PROFILE

REFERENCE DRAWINGS

PERMIT TO PRACTICE
HATCH LTD.
Signature
Date 19 MAR 14
PERMIT NUMBER: P 512
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE

REVISIONS

REGISTERED PROFESSIONAL ENGINEER M. M. S. HASSAN LICENSED NTI/NU

REV.	ISSUE FOR	AUTH. BY	DATE
0	PERMITTING	SH	2014-03-19

ISSUE AUTHORIZATION

HATCH

DESIGNED BY: D. SINGH DATE 2014-03-19	DRAWN BY: D. SINGH DATE 2014-03-19	
CHECKED BY: A. MOKHTARKHANI DATE 2014-03-19	DISCIP. ENGR: S. HASSAN DATE 2014-03-19	
PROJ. COORD. DATE 2014-03-19	PROJ. MNGR. DATE 2014-03-19	
PROJ. MGR. S. PERRY DATE 2014-03-19		

Baffinland

MARY RIVER PROJECT

MINE SITE
KILOMETER 104 BORROW DEVELOPMENT AREA
DRAINAGE PLAN

SCALE	DWG. NO.	REV.
1:2000 OR AS NOTED	H349000-4138-10-015-0008	0

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

singk64437
19/03/2014 2:33:21 PM
c:\prj\projectwise\singk64437\dms74794\H349000-4138-10-015-0008.sqn